Response to Comments on the draft Nitrogen Fertilizer Management Plan

June 4, 2014

Minnesota Department of Agriculture

Pesticide and Fertilizer Management Division

A portion of the funding for the Nitrogen Fertilizer Management Plan revision process was provided by the Clean Water Fund (from the Clean Water Land and Legacy Amendment).

ACKNOWLEDGEMENTS

The Minnesota Department of Agriculture would like to thank everyone that attended listening sessions and contributed thoughtful written and verbal comments. Thank you for taking time to contribute to the revision process.

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Executive Summary

The Minnesota Department of Agriculture (MDA) is in the process of revising the Nitrogen Fertilizer Management Plan (NFMP). The NFMP is the state's blueprint for prevention or minimization of the impacts of nitrogen fertilizer on groundwater. As part of that process, the MDA assembled a multi-stakeholder advisory committee to guide the revision of the plan. The MDA then conducted six listening sessions across Minnesota and asked for public review and comment on the draft NFMP (August-November 2013). The MDA received thirty-two formal comments from a variety of stakeholders. This document organizes those comments into fifteen major subject areas and indicates how the MDA will consider that information when finalizing the NFMP.

The final NFMP, that reflects information presented in this document, will be released in early fall of 2014.

After carefully reviewing the public comments, the MDA has decided to continue with the general approach for addressing nitrate in groundwater from fertilizer as outlined in the draft NFMP. The approach promotes voluntary Best Management Practices (BMPs) to prevent contamination in vulnerable areas and, if necessary, can require specific practices through regulation. The NFMP emphasizes involvement of the local agricultural community in developing and implementing solutions.

While maintaining the overall approach, the MDA will make several significant changes and numerous corrections and edits to the NFMP based on the public comments.

The MDA will begin the process for developing rules for new regulations following completion of the final NFMP. The rule development process will include additional opportunities for public comment. These rules will include two parts.

Part One --Rules will restrict the fall application and application to frozen ground of nitrogen fertilizer in areas that are vulnerable to groundwater contamination.

- These restrictions will apply in areas with vulnerable groundwater when it is listed under "Not Recommended" in the University of Minnesota Best Management Practices for nitrogen fertilizer.
- Restriction will vary for different regions and soil types.
- If there are exceptions where fall application or application to frozen ground is appropriate, the MDA will include those exceptions in the rule.
- Vulnerable groundwater will be defined in consultation with other state agencies and be based on the type of soil and depth to bedrock.

Part Two--The process for moving to regulation, as outlined in the draft NFMP, will be placed into rule.

- Based on regional and site specific conditions and considering input from the local advisory team, the rules will be applied to an area with elevated nitrate through the use of a Commissioner's Order as outlined in the Groundwater Protection Act.

One additional change, based on comments, addresses elevated nitrate in public water supplies.

- New criteria will be used to address nitrate in public drinking water supply wells.
- These new criteria for wellhead protection areas will help to ensure nitrate levels do not reach a point where municipalities will be forced to treat their drinking water, replace wells, or blend multiple wells in order to meet the health standard.

These changes, and others outlined in this document, work in conjunction with prevention efforts. Nitrate contamination prevention measures are a critical piece of the NFMP that will be further outlined in the final NFMP, released in early fall 2014. A more detailed discussion about proposed changes is included in this document.

Nitrogen Fertilizer Management Plan Revision Process

The Minnesota Department of Agriculture (MDA) is undergoing a process to revise the Nitrogen Fertilizer Management Plan (NFMP). First developed in 1990, the NFMP is the state's blueprint for prevention or minimization of the impacts of nitrogen fertilizer on groundwater. This revision process will update the plan to reflect current water protection activities and integrate new scientific information about groundwater protection. Also the revision process will better align the plan with current water resource programs.

The MDA began the revision process in 2010. The MDA convened a multi-stakeholder Advisory Committee (18 members), hosted monthly meetings and conducted a detailed analysis of issues related to nitrate in groundwater. Revisions were based primarily on input from the Committee with consideration for past NFMP implementation experience, input from related programs, increased knowledge about occurrences of elevated nitrate in groundwater, and advances in agricultural technology and management practices.

A draft revision of the NFMP was released for public review and comment on August 2, 2013 and written comments were accepted through November 1, 2013. During that time, the MDA hosted six public listening sessions to provide an overview of the draft NFMP and to obtain feedback. The sessions were held in Crookston, Marshall, Rochester, Roseville, Saint Cloud and Wadena. A total of 159 people attended: 22% farmers, 24% agricultural organizations, 28% agricultural industry, 10% agricultural landowners, 7% environmental organizations, 6% educators, and 28% government (some attendees selected multiple answers when asked for their affiliation). The MDA presented information on the NFMP background, structure and approach. Citizens asked questions and provided comments on the NFMP both verbally and on a Public Comment Form.

The MDA received 32 formal responses: three from academia, three from the agricultural industry, ten from citizens, four from environmental organizations, four from farm organizations, eight from government and two from elected state representatives. Compiled comments are posted on the MDA website; the MDA's responses to individual comments are not covered in this document but are posted on the website (Response to Public Comments on the draft Nitrogen Fertilizer Management Plan).

In order to understand the following response to comments, it is important to understand the strategies and requirements contained in the draft NFMP (released in August 2013). The draft NFMP, public comments and the MDA's response to individual comments are available at:
http://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan.aspx

The MDA Decisions and Proposed Changes

The MDA has reviewed all public input collected from listening sessions, written comments and other meetings. The MDA organized those comments into 15 subject areas and provides the following response to comments by subject area:

Subject 1: Overarching Mitigation Strategy

Comments: Many commenters expressed concern about the proposed mitigation strategy in the plan. Also, many commenters expressed a strong desire to begin immediate regulation of fertilizer use, arguing that a voluntary approach has been unsuccessful and only a regulatory approach can work. There were also several comments supporting the strategy or suggesting relatively small changes but keeping the core concepts intact. Several commenters outlined entirely different approaches to mitigation of nitrogen contaminated groundwater.

Response: The critical challenge for addressing nitrate in groundwater from agricultural fertilizer is that when using even the most responsible management practices, there is always some nitrogen lost through leaching from corn and other high nitrogen demanding crops in areas with vulnerable groundwater. It is not technically possible to achieve non-degradation when growing these crops in these areas, and under unfavorable weather conditions the losses can be quite high. Even without additional fertilizer there are nitrogen losses from the mineralization of organic matter that can be significant. For this reason, nitrate in groundwater is a very complex and difficult issue to address.

The MDA believes the adoption of the nitrogen fertilizer Best Management Practices (BMPs) is very important for reducing nitrate leaching to groundwater, however the greatest potential for reducing leaching is through the appropriate use of low nitrogen input crops such as forage crops (like alfalfa) and other vegetative cover. Numerous sources strongly suggest that the full adoption of the current nitrogen BMPs (rate, timing, source and placement of fertilizer) will reduce nitrate leaching losses by 15-25% (under normal climatic conditions). It is important to note that producers have already integrated many of these practices into their operations over the past twenty years. Under Minnesota soils and field conditions, nitrate concentrations can exceed the 10 mg/L drinking water standard under row crop agricultural fields even when no commercial nitrogen fertilizer is applied. Nitrate losses of 8 to 20 lb/Acre per year are typical under non-fertilized corn/soybean rotations. Nitrate losses under alfalfa or CRP are typically 1 lb/Acre which is a 95% or greater reduction in nitrate leaching (Sawyer and Randall, 2005; Randall and Sawyer, 2005; Mulla et al, 2013; Upper Mississippi River Sub-basin Hypoxia Nutrient Committee, 2005). The MDA does not have the authority, nor do we believe it is appropriate, to require farmers to grow certain crops. But the MDA can encourage and support the adoption of these practices in targeted high risk areas (such as areas with sandy, coarse-textured soil or shallow bedrock).

The MDA believes that a regulatory approach that only requires farmers to immediately adopt specific fertilizer management practices would be much less effective in improving groundwater

quality than an approach that includes both the adoption of BMPs and involving the agricultural community in developing local solutions that may include voluntarily changing land management practices. The strategy outlined in the draft NFMP is intended to do just that. The strategy promotes BMPs to prevent contamination in vulnerable areas and, if necessary, can require specific BMPs through regulation. However, it also involves the local agricultural community in developing and implementing solutions.

When considering options for addressing nitrate in groundwater it is important to recognize that there are significant challenges to enforcing potential fertilizer regulations. Enforcement of some fertilizer management practices could be very difficult and expensive. For practices such as requiring specific fertilizer application rates, a regulator would need to consider proper crediting for residual nitrogen, the specific soil type and crop fertilizer needs for every field. In the case of precision applied fertilizer, regulators would need to consider the capabilities of the equipment and allow for field variability in terms of yield potentials and temporal nutrient reserves. It might be very hard to prove that a violation occurred, and the regulatory process might reduce the good will and participation of the agricultural community in actions that go beyond the minimum requirements outlined in the BMPs.

The MDA believes there is a role for enforcement, but those actions should be carefully targeted to restrict practices which are clearly inappropriate or promote practices that are very effective at protecting groundwater, can be successfully enforced at a reasonable cost and are economically viable. The MDA believes that any regulatory activity should be implemented only after a reasonable period of time for notification, education and voluntary adoption of the desired practices.

The MDA reviewed a number of comments that offered entirely different approaches from the mitigation strategy outlined in the draft NFMP. The MDA did adopt or will conduct further evaluation on some of these recommendations, however in general the MDA continues to support the strategies developed in consultation with the advisory committee as outlined in the draft plan.

Changes to Plan: None except for the restrictions noted below in Subject 4.

Subject 2: Need to Revise the NFMP

Comments: Many commenters questioned the need to revise the NFMP; however it was for two completely different reasons. One group expressed a strong desire to go immediately to regulation and indicated that revising the NFMP would only slow the process for going to regulation. A second group indicated that current farm practices are adequate to address groundwater quality or there is insufficient data to prove that agricultural practices are responsible for significant nitrate contamination of groundwater, and therefore the NFMP did not need to be revised. Most commenters appeared to accept the need to revise the NFMP. One commenter, in addition to supporting the revision of the NFMP, suggested revising the NFMP every 10 years.

Response: The MDA believes there is a need to revise the NFMP. The NFMP was initially developed in response to direction from the legislature, and it has been 24 years since it was last updated. The NFMP is useful for several reasons. The NFMP provides consistency and guidance to the MDA on future actions to address nitrate in groundwater. It serves as a platform for communicating this process to the public. The act of revising the NFMP provides an opportunity to gather input from the public about the process for addressing nitrate from fertilizer in groundwater. The original NFMP was outdated and no longer accurate, and needed up-to-date references and links to new technology and existing information sources. Further, the processes outlined in the original NFMP were slow, resource intensive and difficult to implement.

The MDA believes there is a wealth of data confirming that the use of agricultural fertilizer is a significant source of nitrate contamination of groundwater and there is a need to address these concerns in many areas in the state. The MDA also believes it is important to have a NFMP regardless of whether the NFMP directs an immediate regulatory response. A desire to go to immediate regulation does not negate the need for revising the NFMP. The MDA agrees that it is appropriate to revise the NFMP on a regular basis, at least every 10 years and more frequently if there is a need to address new developments.

Changes to Plan: Text will be changed to indicate the NFMP will be revised every 10 years or more frequently if needed.

Subject 3: Use of Term "Phase" and a Phased Approach

Comments: Some commenters were confused over the concept of a "phased approach" and the use of the term "phase". There was an assumption that all sites would start at Phase 1 and it might take several years to progress to Phase 2.

Response: The draft NFMP indicates that an area (typically a township) would always start in a voluntary mode of the mitigation process, but that could be either Phase 1 or Phase 2 based on the water quality data. The MDA acknowledges that use of the term "phases" would intuitively suggest that an area should start at the beginning, or at Phase 1. In an effort to correct this misconception, the MDA will use the term "level" instead of "phase".

Changes to Plan: The MDA will substitute the use of the word "level" for "phase". The NFMP will provide additional clarity and definition to level classification and progression to Levels 3 and 4.

Subject 4: Immediate Regulatory Actions and Timeliness of the Process

Comments: Many commenters recommended the immediate development of regulations on the use of nitrogen fertilizer. They indicated that the voluntary approach has not worked and therefore regulations are necessary. Several commenters also expressed concern about the potential for a

very long process before reaching a regulatory step and wanted the process accelerated. Another concern was the lack of clarity on timelines in the draft NFMP and more detail was requested on how long it would take to move between phases (now levels) including specific timelines between phases.

Response: As noted above, the MDA believes that a voluntary approach is preferred with the precise application of regulations when appropriate and necessary. MDA also acknowledges that the draft NFMP provides only general guidance on timelines for many activities and that more detail could reasonably be provided.

The process for developing rules (called Water Resource Protection Requirements) in the Groundwater Protection Act (MN Statute Chap 103H) provides for two options, one is applying a rule statewide and the second is developing a rule which would be applied to specific geographic areas by Commissioner's Order.

The MDA has decided to use both options. The MDA will begin the development of new rules which will restrict the fall application of nitrogen fertilizer and the application of nitrogen fertilizer to frozen soil statewide in areas with vulnerable groundwater when it is listed under "not recommended" in the University of Minnesota (U of M) BMPs. The MDA believes that these practices are clearly inappropriate and that the vast majority of Minnesota farmers and their crop advisors do not fall apply or apply fertilizer to frozen ground when it is not recommended by the U of M. The following practices will be restricted:

- **Coarse Textured (Sandy) Soils**: Fall application of nitrogen regardless of source
- **Southwestern and West-Central Minnesota:** Fall application of UAN (28-0-0) or any fertilizer containing nitrate-nitrogen
- **Southeastern**: Fall application of ammonia, urea and UAN with or without a nitrogen inhibitor.
- **South Central**: Fall application of urea and ammonia without N-Serve
- **Northwestern**: Fall application of liquid nitrogen (UAN (28-0-0)) or any fertilizer containing nitrate-nitrogen.

University of Minnesota Extension Nitrogen Management web page:
http://www.extension.umn.edu/agriculture/nutrient-management/nitrogen/

Vulnerable groundwater will be defined in consultation with other state agencies and be based on the type of soil and depth to bedrock.

In addition to restrictions on the application of nitrogen fertilizer in the fall and to frozen ground, the rules will adopt a process for moving to regulation based on the mitigation process outlined in the draft NFMP. This includes implementing regulations at Levels 3 and 4. Site specific regulations would be selected from a menu options that will be in the rule, with specific requirements applied to a local area (such as a township or wellhead protection area) through a Commissioner's Order.

The menu of options would be based primarily on the existing regional nitrogen fertilizer BMPs and would be selected in consultation with a local advisory team.

The MDA will also adopt a three year period as representative of a typical crop rotation for decision making between Levels 2 and 3, and 3 and 4. Other guidance on regulatory steps as outlined in the draft NFMP will stay the same except as noted below.

Changes to Plan: The MDA will begin the process for developing rules following completion of the final NFMP in the early fall of 2014. These rules will include two parts. Part one of the new rules will restrict the fall application of nitrogen fertilizer and the application of nitrogen fertilizer to frozen soils in areas that are vulnerable to groundwater contamination. These restrictions will apply statewide and will vary for different regions and soil types as described under "not recommended" in the University of Minnesota Best Management Practices for nitrogen fertilizer. The rule will define areas that are vulnerable to groundwater contamination for the purpose of the rule. If there are exceptions where fall application or application to frozen ground is appropriate, the MDA will include those exceptions in the rule.

Part two of the rules will place into rule the regulatory process outlined in the draft NFMP. These rules will include a series of options for regulation under Level 3 and Level 4. Based on regional and site specific conditions and considering input from the local advisory team, the rules will be applied to an area with elevated nitrate through the use of a Commissioner's Order as outlined in the Groundwater Protection Act.

In addition, the NFMP will be revised to use a default period of three years as a typical crop rotation, for the voluntary adoption of BMPs before considering regulations. The guidance and criteria in the draft NFMP will be used for determining the content of the rule and when a Commissioner's Order will be required.

The NFMP will also include an initial assessment or survey of practices which will be reviewed by local farmers. This will be a simplified version of the MDA's FANMAP (FArm Nutrient Management Assessment Program) process, which is a method for conducting a field survey of fertilizer management practices. This will help speed up the evaluation process while continuing to ensure accurate assessments of local practices and needs.

Subject 5: Nitrate Criteria for Mitigation Levels

Comments: Several commenters suggested changes to the criteria for determining the four mitigation levels. Many of these recommendations were for lower criteria, in part to move faster to a regulatory action and to minimize or prevent wells from exceeding the nitrate drinking water standard of 10 parts per million (ppm). Some commenters supported the current criteria. One commenter noted that the mitigation process does not clearly describe how a phased approach would work for a wellhead protection area and recommended lower criteria for mitigation levels in

wellhead protection areas to ensure that public water supplies do not exceed the health standard. It was noted that public water systems may have to invest considerable resources for additional wells or a treatment system prior to the source water exceeding the drinking water standard, to ensure that the water does not ever exceed the standard.

Response: After carefully considering the recommendations the MDA determined not to change the nitrate criteria for areas other than in wellhead protection areas. The current criteria were developed in consultation with the Advisory Committee and while no approach is perfect, the MDA believes the current mitigation levels provide a reasonable structure that will help the MDA prioritize efforts based on the relative severity of groundwater contamination. While it is the MDA's goal that no drinking water exceed the standard for nitrate and that contamination be minimized to the extent practicable, Minnesota is a large state with complex hydrogeology, and the MDA will need to focus resources on the most impacted areas in order to be effective in reducing nitrate in those areas.

The MDA agrees with the comment that the current NFMP does not clearly describe how a phased (now called levels) approach would work for a wellhead protection area and there is a clear need to take action prior to the source water exceeding the drinking water standard, which justifies lower mitigation levels for wellhead protection areas. Wellhead protection areas are already a high priority in the NFMP. Upon further review of well data in wellhead protections areas, the MDA notes that the trend in contaminant concentration can vary enormously including downward trends depending upon changes in land use and other factors. Therefore, the MDA will base the Level 2 and 3 criteria on the trend in concentration, as opposed to a single water quality benchmark, with a goal of taking action to prevent the source water from exceeding the nitrate drinking water standard (10 ppm nitrate), with consideration for recent changes in land use and other factors. This will allow the MDA to take action quickly if changes in land use or other factors indicate a rapid increase in nitrate concentration, or move an area to a lower priority if the concentration of nitrate is decreasing.

Finally, the MDA would note that local government is free to take additional actions to reduce nitrate in groundwater. The MDA encourages and will support local government led efforts to address this concern.

Changes to Plan: The MDA will change the text and mitigation criteria for wellhead protection areas. This includes a statement to the goal in wellhead protection areas is to prevent the source water from exceeding the drinking water standard. Level 1 criteria in wellhead protection areas will be 5.4 ppm nitrate which is the value at which additional monitoring is currently required under the Safe Drinking Water Act. The Level 2 and 3 criteria will be based on a projection of the trend for nitrate contamination in the source water. The area will meet Level 2 and 3 criteria if an increase in nitrate contamination in the source water indicates the public well(s) will exceed the drinking water standard of 10 ppm nitrate in 10 years or less. Consideration will also be given to significant changes to land use, the size of the wellhead protection area and local problem, and other factors which might be expected to increase or decrease nitrate levels. Level 4 mitigation criteria in

wellhead protection areas will be 9 ppm nitrate. The criteria will be applied to samples from wells which meet the screening criteria in the NFMP and are the most representative of the source water. This could include raw source water, finished water, or other area wells.

Subject 6: Prevention Chapter

Comments: Several commenters wanted more detail on prevention activities including a desire for the NFMP to emphasize land management activities such as forage and cover crops. Some commenters noted strong support for accelerated research, funding and implementation of cover crops and other vegetative cover. Specific recommendations were made on potential prevention actions. One commenter noted the NFMP does not address requirements for the Minnesota Department of Natural Resources (DNR) to define vulnerable areas under the Groundwater Protection Act.

Response: The MDA believes that prevention activities, especially in areas with vulnerable groundwater and in wellhead protection areas are an extremely important part of the NFMP. The MDA agrees that more detail needs to be provided on prevention activities. The lack of detail is in part because the MDA wants much of the detail to be developed through a new Nitrogen Fertilizer Education and Promotion Team (NFEPT) with the participation of the agricultural community and did not want to specify specific actions or outcomes without the participation and input of that team. In addition, prevention activities need to be coordinated to the extent practicable with other water plans still being developed or refined by the state. These include recently developed state groundwater and surface water management strategies and the "One Watershed One Plan" approach for local water management planning and funding. These are major initiatives and it will take time to integrate actions to protect groundwater from nitrate into these other activities.

One action that is especially important is developing economically viable low-nitrogen input cropping systems and other forms of vegetative cover on targeted areas of vulnerable landscapes. This is a central component of the MDA's mitigation strategy and is also important for protection efforts. This effort is supportive of other actions recently being funded to promote vegetative cover. The MDA believes that various types of cover crops are one of the most promising approaches to reducing nitrate contamination in groundwater. However, we also recognize these crops are not currently economically viable or in the case of many cover crops are very difficult to establish and need significant work to implement on a larger scale. Nevertheless we believe that the NFMP and the state of Minnesota should commit to a long-term strategy of developing these crops and markets for them. The MDA is currently funding a number of research projects in this area and will be actively seeking to build economically viable markets to support this need.

The MDA has requested the Department of Natural Resources (DNR) to develop rules on criteria to determine vulnerable groundwater areas and the DNR has agreed to do so. The MDA notes that the DNR and Minnesota Pollution Control Agency (MPCA) in consultation with the Minnesota Geological Survey and others conducted much of this work in the early 1990s and sensitivity maps have been in

use since then, but the work was not formally adopted by rule. Although developing these rules will likely take two to three years, these rules and notification regarding sensitive areas may create an opportunity for local government to emphasize prevention activities in local areas. The MDA will continue to work on these opportunities.

Changes to Plan: The MDA will provide more detail regarding prevention activities in the plan. These changes will include:

1. Emphasis on the Nitrogen Fertilizer Education and Promotion Team (NFEPT) and through the NFEPT seeking to involve the agricultural community in developing additional prevention strategies. Widespread promotion of BMPs especially in vulnerable areas.
2. Development of new BMPs or refinement of existing BMPs to minimize groundwater impacts.
3. Emphasis on promoting forage crops, cover crops and other vegetative cover in targeted vulnerable areas and for developing markets so these crops are economically viable. This is viewed as the greatest long term opportunity for improvement of groundwater quality.
4. The MDA has asked the DNR to develop rules on sensitive areas as required under the Groundwater Protection Act and DNR has agreed to do so. These rules and other requirements for local involvement outlined in the Groundwater Protection Act will be extremely useful in promoting a targeted approach to prevention.

Subject 7: Alternative Management Tools (AMTs)

Comments: Several commenters wanted more detail on Alternative Management Tools (AMTs). Some commenters noted strong support for accelerated research, funding and implementation of cover crops and other potential AMT's and that this should be a high priority.

Response: Most of the actions outlined in the response to comments on the Prevention Section (Subject 6) also apply to AMTs and will not be repeated here. Cover crops and various forms of low nitrogen input vegetative cover will likely be the major type of AMTs. However, AMTs may also include entirely different solutions such purchasing land to take it out of production, swapping use of land between farmers in vulnerable and non-vulnerable settings and any site specific activity that individual farmers or a local advisory team might be able to implement to reduce nitrate contamination to groundwater. These might be especially important in wellhead protection areas where creative options might be developed in cooperation with a city or water supply system. Historically, AMTs have evolved when problem solving is conducted at the local level with very active farmer involvement.

Changes to Plan: More detail will be provided on options for AMTs. Significant emphasis will be placed on vegetative cover, especially for market supported crops and systems, in coordination with other similar initiatives as noted under the prevention section. This is viewed as the greatest long term opportunity for improvement of groundwater quality.

Subject 8: Groundwater Sampling Data

Comments: Many commenters expressed concern about using sampling data from private wells as the primary approach for determining the need for and evaluating the effectiveness of mitigation actions. Some commenters indicated that monitoring should be conducted by aquifer and/or only using monitoring wells. Some commenters indicated that the MDA should use existing private well and other monitoring data especially in southeast Minnesota. Several commenters expressed concern that nitrate contamination in private wells may be present from many sources and there is a need to carefully screen private wells to remove wells with poor well construction or other potential sources nearby.

Response: The MDA generally agrees that all of these comments have merit. However some of them have already been addressed in the NFMP and others would impose significant limitations on sampling and mitigation activities in the near term.

In most of the state there is insufficient nitrate data to evaluate impacts on a local or regional basis by aquifer. This is especially true for any statistically defensible effort to evaluate water quality using monitoring wells by aquifer. The MDA is open to using existing groundwater sampling data provided it is recent and meets the well screening criteria in the plan.

The approach of sampling large numbers of private wells in vulnerable areas (areas having both a vulnerable aquifer and significant row crop agriculture) has several advantages. First, it should be effective in determining those areas that are most at risk and which should be a high priority for mitigation efforts. Second, it will inform homeowners regarding the water quality in their well and provide an opportunity to educate homeowners regarding potential sources and risks to their water supply. Third, it is something that we can do now, without any delay.

The MDA agrees that well construction must be considered. The MDA believes there is a significant risk of wells being contaminated by nitrate from non-fertilizer sources. This is especially true for wells that do not meet the Well Construction Code and for shallow wells in areas with septic systems or nearby manure sources. The MDA believes that the well screening procedure in the NFMP will screen and remove wells potentially vulnerable to non-fertilizer sources of contamination.

The MDA has initiated discussions through the Interagency Groundwater Team about developing a statewide groundwater monitoring network of permanent non-private wells which could be used to evaluate water quality for each vulnerable aquifer across the state. Other state agencies are supportive of this concept. The goal of this network will be to provide statistically defensible water quality concentration and trend data which can be used for evaluating nitrate impacts. However, it will take several years at the earliest before this information would be available.

The MDA believes that the proposed approach for sampling private wells in vulnerable settings is the most useful and practical approach currently available for identifying areas that have high nitrate.

Changes to Plan:

1. The MDA will continue with sampling of private wells in high risk areas as the primary approach to determining the need and priority for mitigation efforts as outlined in the draft NFMP.
2. The MDA agrees with using existing groundwater monitoring data provided that it is recent and it meets the requirements for data collection and well screening as outlined in the plan.
3. The MDA will work with the other state agencies to develop a long-term statewide statistically defensible monitoring network of non-private wells for evaluating water quality within specific aquifers.

Subject 9: Local Advisory Teams

Comments: Many commenters, especially in the public listening sessions, wanted additional detail on the composition and role of the local advisory teams. Strong concerns were expressed that these teams should be composed exclusively of people who live or work in the affected area and that the majority of members should be farmers. Several commenters had questions on the role and authority of the local advisory teams and expressed concern that the teams could be used to avoid the requirements and strategy outlined in the NFMP.

Response: The MDA believes strongly that local farmers and their crop advisors are critical in helping develop and implement appropriate actions to address local concerns for nitrate in groundwater. We believe that local farmers will develop the best solutions when given the opportunity to do so. We also note that farmers control the land and they have the ability to do the minimum required actions or much more than the minimum to help address the concern. The mitigation strategy is constructed specifically to involve the local agricultural community in problem solving with the opportunity to avoid additional regulations if voluntary actions are effective.

At the same time the MDA acknowledges there are other important stakeholders who are affected or can bring important resources to help address the issue, and need to be part of developing solutions.

The MDA expects that the composition of each local advisory team will differ based on the size and nature of the area and availability and suitability of local stakeholders; therefore the MDA does not want to be overly prescriptive regarding the membership on the advisory teams. The MDA would generally seek a small workgroup of approximately 12 to 20 people. Members should be from the local community with a majority being local farmers or their crop advisors, except for University, state, federal or county members who can provide technical support or funding, especially within wellhead protection areas.

The role of the local advisory team is to advise the MDA regarding appropriate actions for the area and to support implementation of these actions. The input of all members on the team is

important. Decisions will not be determined by majority vote but rather the team will seek consensus and common ground. The MDA will be responsible for final determinations of potential regulatory actions and will seek to provide consistency in decision making for generally similar situations.

Changes to Plan: The MDA will revise the NFMP to include more detail on the composition and role of the local advisory teams. This will include the following:

1. The size and composition of the team will vary depending upon the size of the area and nature of the problem.
2. The primary purpose of the team is to help develop and implement locally viable solutions to address the concern and to provide accurate data to the MDA.
3. The team will advise the MDA in an open process. All members' comments and recommendations will be considered.
4. The MDA will be responsible for final determinations of potential regulatory actions and will seek to provide consistency in decision making for generally similar situations.
5. The local advisory team will consist of individuals and groups who are local to the area, representatives of local government and public water supply systems, and government staff and/or researchers who can provide technical or financial support.
6. The majority of members will be local farmers and their crop advisors.

Subject 10: Targeted Education and Messaging to Farmers

Comment: Some commenters recommended that targeted education be provided to farmers who farm in areas which are vulnerable to groundwater contamination. Commenters also felt that the NFMP and current communications by the MDA and the U of M Extension do a poor job informing farmers of the risk that nitrogen fertilizer leaching poses to groundwater and the urgency to address nitrate in groundwater, especially in the southeastern karst and central sands area of Minnesota. Commenters felt the education materials on nitrogen fertilizer BMPs emphasize the economic reasons for adopting the BMPs but do little to emphasize the risk to groundwater if the BMPs are not adopted.

Response: The NFMP Advisory Committee discussed the idea of some form of a required continuing education program as an important option for keeping farmers and their crop advisors informed about developing practices and technology to reduce nitrate in groundwater. The draft NFMP outlines a regulatory option under Level 3 which would require farmers to attend at least one continuing education meeting, field day, clinic or workshop annually. The MDA supports this concept and will include an education option under Level 3. The MDA will also raise the idea to the Nitrogen Fertilizer Education and Promotion Team (NFEPT) to explore other means of providing educational activities to farmers who farm land in vulnerable areas.

The MDA believes that the concern about nitrate from fertilizer contaminating groundwater is an important theme that has been presented to farmers during discussions of nitrogen fertilizer BMPs. We acknowledge that the potential for increased profitability from adopting BMPs has also been emphasized since it has been viewed as an easy and practical way to help convince farmers to adopt the BMPs. However, the MDA in consultation with the U of M and others will revisit the messaging and ensure that this concern is appropriately emphasized in future materials and events. These discussions are well suited for the NFEPT.

Changes to Plan:

1. The NFMP will include a discussion of targeted education.
2. The primary vehicle for addressing targeted education opportunities and activities will be through the Nitrogen Fertilizer Education and Promotion Team (NFEPT). These activities will be voluntary.
3. Some form of targeted education will be considered as a regulatory option for Level 3 and Level 4.
4. The MDA will look for ways to ensure an appropriate message about nitrogen fertilizer BMPs and the risk to groundwater is integrated into education and outreach activities.

Subject 11: Surface Water Protection

Comments: Some commenters felt that the NFMP should direct greater attention to protecting surface waters.

Response: The NFMP is designed specifically to address groundwater. Many of the actions in the NFMP are designed to work with a relatively small group of farmers to develop and implement solutions to address elevated nitrate concentrations in groundwater. The NFMP is especially well suited for this purpose. The NFMP also emphasizes activities to minimize or prevent groundwater contamination from occurring. These prevention activities in particular have the potential to significantly benefit surface water as well as groundwater especially in areas such as southeast Minnesota where they are so closely interrelated. Nitrogen fertilizer BMPs that will reduce the impact of nitrate to groundwater will usually benefit surface water. It is the intent of the MDA that the NFMP will, to the greatest extent possible, be smoothly integrated with and support other water management plans including plans to protect surface water. The MDA does not want to duplicate efforts, but rather to ensure that they are integrated.

The MDA will seek opportunities to ensure that the NFMP supports other state efforts to protect water resources. In fact, these conversations and related planning are already occurring through the Clean Water Fund Interagency Teams including discussions and plans for integrating surface and groundwater strategies. The MDA will continue to support these efforts. Discussions of how best to integrate prevention actions will also be initiated through the Nitrogen Fertilizer Education and Promotion Team (NFEPT).

Changes to Plan: The text will be revised to ensure that opportunities to integrate and support surface and groundwater strategies are addressed.

Subject 12: Development and Purpose of BMPs

Comments: Some commenters noted that BMPs should be developed which are capable of achieving the water quality goals rather than being developed for the purpose of maximizing profitability. Commenters noted that these BMPs could be applied in a Phase 3 or Phase 4 scenario (now referred to as Level 3 or Level 4). Another suggestion was to establish water quality based maximum nitrogen loss levels in prioritized communities which would define the maximum allowable level of nitrate loss under local conditions. Under that approach the NFMP could assign nitrogen fertilization application rates that would result in nitrogen losses that do not exceed this goal.

Response: The MDA is very interested in research that would allow for the accurate quantification of nitrogen leaching losses to groundwater. Unfortunately, the MDA's knowledge and experience in this area, supported by consultation with modeling experts, indicates it is very doubtful that currently available technologies can estimate nitrogen leaching from field practices sufficiently to predict a suite of practices for high nitrogen input crops that can meet groundwater quality goals for any specific location. The state of the science is currently inadequate to do so. The variability in field conditions and especially in weather makes it highly doubtful that potential leaching can be controlled with that level of precision. However the MDA believes that predictive modeling of nitrate leaching to groundwater with field validation (empirical data) has great potential for the future and we will continue to support research opportunities in this area.

The MDA notes the requirements for development of BMPs are defined in the Groundwater Protection Act. BMPs are defined as "practicable voluntary practices that are capable of preventing and minimizing degradation of groundwater, considering economic factors, availability, technical feasibility, implementability, effectiveness, and environmental effects".

Changes to Plan: Text will be revised to indicate support for continuing research on accurate quantification and prediction of nitrogen leaching losses to groundwater under field conditions.

Subject 13: Response to Impacted Wells

Comments: Several commenters noted the need to provide alternative drinking water sources, compensate water treatment, or share the cost for new wells for well owners who incur costs to provide a safe potable water source, and recommended the NFMP include a process or program to do so.

Response: The MDA is open to exploring, in cooperation with the agricultural community and others, potential ways to compensate well owners with elevated nitrate in their wells. However a program of this type would not likely change the nitrogen management strategies to prevent or mitigate nitrate contamination in the NFMP and therefore can be developed separately from the revision of the NFMP.

Changes to Plan: None.

Subject 14: Guidance for Local Government Activities

Comments: Some commenters recommended that the NFMP describe the kinds of activities that communities or others can do if BMPs are not working, including recommended land use changes, regulations and other practices. One commenter stated that the adoption rate of BMPs should not bar communities from pursuing regulatory actions to protect their own drinking water resources.

Response: The prevention and mitigation activities outlined in the NFMP could be adopted by any party and therefore the NFMP could serve as a reference for these activities. In addition, activities supported by the Nitrogen Fertilizer Education and Promotion Team (NFEPT) , the MDA and others could be posted or linked through the MDA website to provide more detailed and current guidance to any interested party. The MDA has in the past and will continue to provide fact sheets and other materials intended to help local government with implementing groundwater protective actions.

The MDA would note that there is no state pre-emption of local regulation of the use of nitrogen fertilizer. A local unit of government may choose to regulate the use of nitrogen fertilizer in Minnesota.

Changes to Plan: The MDA will include suitable references for providing guidance to local government on prevention and mitigation activities in the NFMP. These will include factsheets and links to information sources on the MDA website.

Subject 15: Criteria for Removing Regulations

Comments: One commenter expressed concern about the process for removing regulations after they have been established. They recommended that the decision to remove regulations in a specific area should be based on water quality data and not just the rate of adoption of BMPs.

Response: The draft NFMP contains language that an area should not be removed from regulation unless nitrate data is at least 10% below the nitrate criteria to ensure the reduction is permanent (page 85), although it also states this might be modified if multi-year data indicates sustained BMP adoption. The MDA agrees that there should be a clear and convincing indication of long-term change before removing a regulatory requirement. Furthermore, the MDA believes that a statistical based analysis of water quality monitoring data is the most objective and defensible indicator of

long term trends and changes in water quality. Recent evaluation of nitrate monitoring data from private well monitoring networks indicates that the 90th percentile (9 out of 10 wells are lower) is a useful and relatively stable indicator of long-term water quality trends in private wells. Therefore the MDA will use the 90th percentile as an objective measure of water quality for the purpose of removing a site from a regulatory requirement.

Changes to Plan: The NFMP will be changed to indicate that a site may be removed from regulation if the 90th percentile from the monitored wells shows a statistically significant stable or downward trend for three consecutive sampling events over a period of at least three years, and the area wells are 10% below water quality goals as outlined in the plan.

Next Steps

The MDA will finalize the Nitrogen Fertilizer Management Plan by early fall of 2014

The MDA will complete final edits to the NFMP by early fall of 2014. Significant edits will be based on the "Changes to Plan" sections listed in this document. Minor edits will correct text errors, style inconsistences and formatting errors. Upon completion, the final NFMP will be available at: http://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan.aspx.

The MDA will begin the rule writing process following completion of revisions to the NFMP

Following completion of the final NFMP, the MDA will begin the rule writing process as described in this document. The MDA will draft language for the new rules in consultation with interested stakeholders; however there will be no formal advisory committee. The rule writing process allows for public comment. Following the public comment period, language must be submitted to the legislature for approval. Rule writing is a formal process; the MDA anticipates that it will take at least two years to complete.

The MDA will implement the Nitrogen Fertilizer Management Plan

The MDA will continue to implement certain aspects of the NFMP, this includes water quality monitoring and prevention. Mitigation activities will begin after the final plan is completed.

The MDA will continue existing prevention activities as well as additional activities as described in the NFMP. Ongoing prevention activities include education and promotion of Best Management Practices, Wellhead Protection assistance, Alternative Management Tool promotion (emphasis on forage and cover crops), and Local Water Planning assistance. New activities will include the development and coordination of the Nitrogen Fertilizer Education and Promotion Team (NFEPT) and coordination of prevention efforts with other entities.

The MDA will begin implementing mitigation activities following the process outlined in the NFMP. Additionally, the MDA will work with other state agencies to ensure that activities in the NFMP are

integrated with other groundwater and surface water protection and restoration activities throughout the state.

Additional information about the MDA's programs, projects and activities related to groundwater and drinking water protection can be found at: http://www.mda.state.mn.us/protecting/cleanwaterfund/gwdwprotection.aspx.