

# **DESIGNATION OF GROUND WATER QUALITY MANAGEMENT AREAS**

- **Phase I Groundwater Quality Management Area - 0% to 50% of the MCL  
(0 – 5.0 ppm nitrate-nitrogen)**

Following a public hearing and evidence presented at the hearing, the entire Upper Elkhorn Natural Resources District (UENRD) was designated a Phase I Groundwater Quality Management Area (GWQMA) June 30th, 1997. A Phase I GWQMA primarily promotes the implementation of Best Management Practices (BMPs) through educational programs. Specific criteria are outlined in the “Groundwater Quality Management Area Controls” section of this document.

- **Phase II Groundwater Quality Management Area - >50% to 90% of the MCL.  
(> 5.0 - 9.0 ppm nitrate-nitrogen)**

As data or other evidence indicated, the first Phase II GWQMAs was designated on January 1, 2003, following a public hearing. Additional Phase II areas were labeled October 1, 2012. This timeline has been established only to show the District’s commitment to addressing the nitrate problem.

Phase II GWQMAs will be designated by townships within the Upper Elkhorn Natural Resources District (UENRD) unless data collected from the District’s monitoring program or other hydrogeologic evidence indicates a definite boundary whereby only a portion of a township or sub-area should be designated a Phase II GWQMA. This designation will be done by the UENRD staff and Board of Directors. The District will monitor an adequate number of registered active irrigation wells and dedicated monitoring wells to accurately describe the average contaminate concentrations in proposed and established Phase II GWQMAs. Specific criteria and controls are outlined in the “Groundwater Quality Management Area Controls” section of this document.

Before a Phase II GWQMA can be designated, the average nitrate concentration in the monitored irrigation wells and monitoring wells must be greater than 50% of the Maximum Contaminant Level (MCL), which is currently 10 ppm (parts per million or mg L<sup>-1</sup>) for a minimum of three consecutive years. However, the District reserves the right to designate a Phase II GWQMA at any time in lieu of these criteria, if deemed necessary.

In areas with less than ten registered irrigation wells and nitrate concentrations exceeding 50% of the MCL, the District will work with the individual operator(s) to implement BMPs. However, if the area is adjacent to a predesignated Phase II or Phase III GWQMA, the operator(s) will be required to abide by the rules and regulations of that predesignated phase area. Applicability of this requirement is at the Board’s discretion.

After initial Phase II designation, it will be determined to redesignate a Phase II GWQMA area as a Phase I GWQMA if data from monitored irrigation and dedicated monitoring wells show a decrease in nitrate concentrations and the average nitrate concentration falls below 50% of the MCL in the wells monitored by the District for a minimum of (3) consecutive years. Areas will remain as Phase II GWQMAs if the average nitrate concentrations from the monitored wells exceed 50% of the MCL, but are equivalent to or less than 90% of the MCL in the wells monitored by the District. An area will be designated a Phase III GWQMA if it meets the criteria outlined below.

- **Phase III Groundwater Quality Management Areas - >90% of the MCL.  
(> 9.0 ppm nitrate-nitrogen)**

As data or other evidence indicates, the first Phase III GWQMAs will be following a public hearing. This timeline has been established only to show the District's commitment to addressing the nitrate problem since several areas in the District currently meet the criteria for designation as a Phase III GWQMA. Phase III GWQMAs can be established prior to and following the cutoff date of January 1, 2018 as data and other evidence indicate.

Phase III GWQMAs will be designated by townships within the Upper Elkhorn Natural Resources District (UENRD) unless data collected from the District's monitoring program or other hydrogeologic evidence indicates a definite boundary whereby only a portion of a township should be designated a Phase III GWQMA. This designation will be done by the UENRD staff and Board of Directors. The District will monitor an adequate number of registered active irrigation wells and dedicated monitoring wells to accurately describe the contaminate concentrations in proposed and established Phase III GWQMAs. Specific criteria and controls are outlined in the "Groundwater Quality Management Area Controls" section of this document.

Before a Phase III GWQMA can be designated, an area must have been designated a Phase II GWQMA for a minimum of three consecutive years, and the irrigation wells and monitoring wells monitored by the District must have an average nitrate concentration greater than 90% of the Maximum Contaminant Level (MCL), which is currently 10 ppm (parts per million or  $\text{mg L}^{-1}$ ). However, the District reserves the right to designate a Phase III GWQMA at anytime in lieu of these criteria, if deemed necessary.

In areas with less than ten registered irrigation wells and nitrate concentrations exceeding 90% of the MCL, the District will work with the individual operator(s) to implement BMPs. However, if the area is adjacent to a predesignated Phase III GWQMA, the operator(s) will be required to abide by the rules and regulations of that predesignated Phase III GWQMA. Applicability of this requirement is at the Board's discretion.

After initial designation, it will be determined to redesignate a Phase III GWQMA area as a Phase II GWQMA if data from monitored irrigation wells and monitoring wells shows a decreasing trend in nitrate concentrations the average nitrate concentration falls below 90% of the MCL, but exceed 50% of the MCL in the wells monitored by the District for a minimum of (3) consecutive years. A Phase III GWQMA will be redesignated a Phase I GWQMA if data from monitored irrigation wells shows a decreasing trend in nitrate concentrations and the average nitrate concentration falls below 50% of the MCL in the wells monitored by the District. Areas will remain as Phase III GWQMAs if the average nitrate concentrations from monitored irrigation wells and monitoring wells exceed 90% of the MCL in the wells monitored by the District. Specific criteria and controls are outlined in the "Groundwater Quality Management Area Controls" section of this document.

## **RULE 26**

**Testing for Other Contaminants.** At this time, the District has not identified any widespread contamination problems in the groundwater except excessive nitrates. Currently, approximately 15% of wells sampled for nitrate are also sampled for seventeen common pesticides and pesticide metabolites. Other potential contaminants are not monitored on a regular basis, but periodically, specific studies are conducted to assess the quality of groundwater in the District. In addition, the District investigates concerns and complaints from the general public. If a contamination problem is identified, the District will specifically address the contaminant of concern by increasing monitoring and delineating the extent of contamination. For those contaminants with an established Maximum Contaminant Level, MCL, the District will take the following actions at the specified levels:

- **50% of the MCL**

Recommend increased monitoring and further review of the problem

- **75% of the MCL**

In conjunction with the U.S. Environmental Protection Agency (EPA), U.S. Department of Agriculture (USDA), Nebraska Department of Natural Resources (NeDNR), Nebraska Department of Health and Human Services (NDHHS), the Nebraska Department of Environmental Quality (NDEQ), other agencies and organizations, and the general public, amend the UENRD's Groundwater Management Plan to include activities and recommendations which address the contaminant of concern.

## Groundwater Quality Management Area Controls

### ● Phase I Groundwater Quality Management Areas - 0 to 50% of the MCL (0 - 5.0 ppm nitrate-nitrogen)

1. The person or persons responsible for making final decisions on any type of applications of nitrogen fertilizer on a area larger than **one acre** and applying more than 50 pounds per acre of actual nitrogen on any irrigated crop within the UENRD, either commercially or privately, must be certified by the District once every four (4) years. The person or persons will be considered the *certified operator(s)*. The certification requirement will include attending educational classes established by the District with assistance from the County Extension, University of Nebraska Research and Extension personnel, and others. Nitrogen certification from bordering NRDs will be accepted as fulfillment of the UENRD nitrogen certification requirement pending UENRD Board approval. This is possible since most NRDs will be using essentially the same educational program being developed statewide in coordination with the University of Nebraska Cooperative Extension. To address specific issues in the UENRD, additional educational materials may be given to operators certified in other neighboring NRDs.
2. A groundwater analysis for nitrate-nitrogen content in all registered wells used for irrigation of crops must be accomplished by the certified operator once every four (4) years prior to recertification. The results of this analysis must be submitted to the UENRD by the following December 31st report deadline. The sample must be collected and analyzed using UENRD approved methods. A methodology for sample collection and proper analysis procedures will be included as part of the District's educational program. Information from this analysis will give the certified operator knowledge of usable nitrate-nitrogen already present in the groundwater. This information will *not* be used in determining a Phase Area.
3. With the passage of LB 981(1994), all new wells constructed in a control or management area (including a GWQMA) must have a permit from the local NRD prior to construction (see Rule 14). Exceptions include, test holes, dewatering wells with intended use of

ninety days or less, and water wells which are designed and constructed to pump fifty gallons per minute or less. A copy of this permit will be retained at the District office and with the Nebraska Department of Natural Resources. The cost of permitting and penalties applied will be consistent with the laws of the state of Nebraska.

4. Certified operators are encouraged to set a realistic yield goal for crops where more than 50 lbs of actual nitrogen fertilizer per acre is to be applied. A realistic goal is based on the last five years actual yield averaged plus five percent.
5. Residents residing in communities within the UENRD who apply nitrogen fertilizer will be encouraged to attend Nitrogen Awareness Programs established by the District with assistance from the County Extension, University of Nebraska Research and Extension personnel, and others.
6. Fall (*September 23 to December 20*) and Winter (*December 21 to March 1*) applications of commercial nitrogen fertilizer will be discouraged on all soils. Spring (*March 2 to June 20*) applications of commercial nitrogen fertilizer greater than **100 pounds of actual nitrogen fertilizer per acre** will be encouraged through split applications (i.e. preplant, planting, weed and feed, post emergence side-dressing, and, if applicable, through an irrigation distribution system).
7. The District encourages voluntary testing of all domestic and stock wells for nitrate-nitrogen content.
8. The District encourages a deep soil sampling analysis (two or three foot sample if applicable) for nitrate-nitrogen content on each field larger than **40 acres** with more than **50 lbs per acre of actual nitrogen fertilizer** applied. Approved sampling and analysis techniques will be included as part of the educational program. This analysis will give the certified operator knowledge of usable and inaccessible (below the root zone) nitrogen in the soil profile.
9. The District encourages the use of calibration monitors on all applications of fertilizers and pesticides. Proper maintenance of all fertilizer and pesticide equipment is also encouraged.
10. The District encourages producers to use alternative irrigation and fertility management technology as it becomes available to increase efficiency and protect the environment.

● **Phase II Groundwater Quality Management Areas - > 50% to 90% of the MCL (>5.0 - 9.0 ppm nitrate-nitrogen)**

1. A continuation of Phase I activities will remain in effect unless modified or negated by Phase II requirements.

2. The District will require the certified operator to accomplish an annual deep soil sampling analysis (mandatory two foot sample, three foot sample encouraged, if applicable) for nitrate-nitrogen content on each field larger than **40 acres** with more than **50 lbs per acre of actual nitrogen fertilizer** applied. The sample must be collected and analyzed using UENRD approved methods. Approved sampling and analysis techniques will be included as part of the District's educational program. This analysis will give the certified operator knowledge of usable and inaccessible nitrogen (below the root zone) in the soil profile.
3. Certified operators must submit a report to the Upper Elkhorn NRD by **December 31<sup>st</sup>** following each crop year on forms provided by the District for areas larger than **40 acres** where more than **50 lbs per acre of actual nitrogen fertilizer** is applied. The report will consist of three sections and will include, but is not limited to, the following information:

**Section I. Nutrient Management** (based on information from *previous year*)

- a) Field identification and size.
- b) Type of crop(s)
- c) Results of the water nitrate-nitrogen analysis (in parts per million) from each irrigation well must be reported (Phase I, 2).
- d) Results of the soil sampling analysis if required (average pounds of residual nitrate-nitrogen to the depth sampled).
- e) UNL nitrogen fertilizer recommendations.
- f) Nitrogen credits from water, residual soil nitrogen, and other nitrogen sources such as manure applications.
- g) The actual pounds of nitrogen fertilizer applied per acre.
- h) Actual yield.
- i) A realistic yield goal for next year's crop.

**Section II. Pest Management** (based on information from *previous year*)

- a) Field identification and size.
- b) Type of crop(s).
- c) Names and types of pesticides applied.
- d) Types of pests intending to control.
- e) Application rates.

**Section III. Irrigation Management** (based on information from *previous year*)

- a) Field identification and size.
- b) Type of crop(s).
- c) Area irrigated.
- d) Total evapotranspiration.
- e) Amount of irrigation water applied in inches.
- f) Total precipitation.

An informational packet will be provided to each of the certified operators containing any necessary information and a list of possible information sources. Similar reports are used by the Natural Resources Conservation Service and other NRDs. This continuity allows for greater information exchange and dissemination. Many different entities will be available to certified operators should questions arise. The District reserves the right to request additional information needed to assist in the successful implementation of this groundwater management plan.

4. The District will encourage certified operators to incorporate credits from application of animal waste (solid or effluent) and municipality waste into the total nitrogen requirement for the specific crop where this application of waste is made. An analysis of waste slurry will be encouraged to determine nitrogen content. Operators are encouraged to apply animal and municipality waste evenly over as many acres as possible. The following rules and regulations apply to the application of animal and municipal waste, accordingly:
  - a) All required livestock waste facilities must be properly permitted by the State of Nebraska.
  - b) Nitrogen application including livestock waste (solid or effluent) should not exceed agronomic rates for a crop.
  - c) Waste application on land subject to frequent flooding (see County Soil Survey) will be discouraged.
  - d) Waste applications within 200 feet of, and draining into, adjacent water bodies will be discouraged.
  - e) Spreading of animal and municipality waste on frozen or snow covered ground will be discouraged. Animal and municipality waste should be applied to land where slopes are four percent (4%) or less or adequate erosion control practices are used.
  - f) The application of waste disposal on tilled ground with greater than ten percent (10%) slopes is discouraged unless adequate erosion control practices are present.
  - g) A nitrogen analysis of animal waste slurry will be encouraged.
5. Fall (September 23 to December 20) and Winter (December 21- March 1) application of all commercial nitrogen fertilizer will not be allowed before **November 1**. It will be discouraged until after **March 1** on all soils. Exceptions will be allowed for Spring and Fall seeded crops and meadows if the actual nitrogen application rate is **less than 20 pounds per acre**.
6. The use of monitoring equipment (i.e., flow meters, rain gauges, hour meters, etc.) and distribution equipment (i.e. pressure regulators, low pressure nozzles, etc.) for efficient fertilizer and water distribution will be encouraged by the District.

● **Phase III Groundwater Quality Management Areas - > 90% of the MCL (> 9.0 ppm nitrate-nitrogen)**

1. All rules and regulations established for Phases I & II will remain in effect unless modified or negated by Phase III requirements.
2. If the groundwater analysis from Phase I, #2 and reported in Phase II, #3( c) shows nitrate-nitrogen levels greater than (90)% of the MCL, then the groundwater analysis for nitrate-nitrogen in Phase I, #2 must be made annually and results submitted in the report discussed in Phase II, #3 (c ). In other words, the groundwater analysis required prior to recertification (once every four years) in a Phase I GWQMA, now must be conducted on an annual basis if the nitrate-nitrogen levels exceed 90% of the MCL or 9.0 ppm in the case of nitrate-nitrogen.
3. The District will require the use of monitoring equipment (i.e., flow meters, rain gauges, hour meters, etc.) and distribution equipment (i.e. pressure regulators, low pressure nozzles, etc.) for efficient fertilizer and water distribution. A flow test through the irrigation distribution system will be required once every eight (8) years. The first flow test must be completed within the first two (2) years following initial designation of a Phase III Area. The Upper Elkhorn NRD may decide to develop a cost-share program to assist operators in the purchase, installation, and testing of such equipment.
4. If a town, village or city lies within a Phase III Area, will be encouraged to complete a Well Head Protection Area Plan. The Upper Elkhorn NRD will provide assistance to the communities for completing this plan.
5. Certified operators are required to submit an annual **Integrated Crop Management Plan (ICMP)** to the UENRD by **April 1** (prior to planting of crops) on forms provided by the District for all areas larger **than 40 acres** where more than **50 lbs per acre of actual nitrogen fertilizer** is applied. This ICMP will emphasize future planning and the establishment of fertility, pest, and irrigation management plans. The required reports from Phase II, #3 will be incorporated into the ICMP to help evaluate past practices and identify areas for improvement. The ICMP will consist of three sections including, but not limited to, the following:

**Section I. Fertility Management Plan**

- a) Fertility Management Report - from *previous* year (from Phase II, #3).
- b) Evaluation of the Fertility Management Plan - from *previous* year.
- c) Planned fertility management activities - for *upcoming* year.

**Section II. Pest Management Plan**

- a) Pest Management Report - from *previous* year (from Phase II, #3).



- b) Evaluation of Pest Management Plan - from *previous* year.
- c) Planned pest management activities - for *upcoming* year.

### **Section III. Irrigation Management Plan**

- a) Irrigation Management Report - from *previous* year (from Phase II, #3).
- b) Evaluation of Irrigation Management Plan - from *previous* year
- c) Planned irrigation management activities - for *upcoming* year.

Each section of the ICMP consists of three subsections. The first subsection is the Management Report (Fertility, Pest, and Irrigation) already required in Phase II, #3. This subsection is a summary of activities and results from the *previous* year. The second subsection is an evaluation of the Management Plan (Fertility, Pest, and Irrigation) from the *previous* year. It compares the activities planned prior to planting with activities and results reported following harvest. For the first ICMP, no evaluation will be required since there will not be any documented planned management activities (Phase III, Section III, c) from the *previous* year. The District will provide guidelines and recommendations during this first year. For following years, the certified operator will need to refer back to the ICMP from the *previous* year for documentation of planned activities. The third and final subsection details planned management activities (fertility, pest, and irrigation) for the upcoming year. Planned activities should be based on the evaluation in subsection c and can change from year-to-year depending upon the ability of activities to produce desired results.

6. The application of commercial nitrogen fertilizer is prohibited on all soils until after **March 1**. Spring (*March 1 to June 20*) application of commercial nitrogen fertilizer at a rate of **over 100 pounds of actual nitrogen per acre** will require split applications (i.e. pre-plant, post emergence side dress, weed and feed, planting time, and through the center pivot, if applicable).
7. If the Board of Directors deems it necessary to maintain, enhance, or protect groundwater quality, or to address concerns regarding conjunctive use and adverse effects on groundwater quality, the UENRD may choose to implement additional controls as listed in Nebraska State Statutes 46-739. Some of the controls in this Statute are groundwater allocation and irrigated acre reduction.