LOWER PLATTE SOUTH
natural resources district
3125 Portia Street | P.O. Box 83581 • Lincoln, Nebraska 68501-3581
P: 402.476.2729 • F: 402.476.6454 | www.lpsnrd.org

Memorandum

Date: November 10, 2022

To: Board of Directors

From: Mike Murren Projects Coordinator MM

Subject: Water Resources Subcommittee meeting minutes

The Water Resources Subcommittee met on Monday November 7, 2022, at 5:30 pm. Members present included Susan Seacrest, Bob Andersen, Larry Ruth, Christine Lamberty and Ken Vogel. Others present were Dick Ehrman, Paul Zillig, and Mike Murren, all with the LPSNRD. Also present was legal Counsel Corey Wasserburger Steve Seglin Chair Deborah Egan. There was one item the Subcommittee took action on and two reports. The meeting was called to order by Director Seacrest at 5:30 p.m.

- Revisions of the LPSNRD Groundwater Rules & Regulations (attachment)

Staff reviewed with the subcommittee the proposed changes that were presented during and after the October 17th WRS meeting. The latest version dated 11/2022 was presented. There was some additional discussion about some minor changes and editing that legal counsel would provide. Ehrman explained the first step in the approval process of the changes is to direct staff to hold a public hearing. After the hearing the WRS will make any possible changes and make a recommendation to the board for a motion to adopt. The edits by legal counsel are attached for your review.

It was moved by Vogel, seconded by Ruth and unanimously approved that the WRS recommend that the Board of Directors direct staff to conduct a public hearing on the proposed revisions to the Groundwater Rules and Regulations.

-Discussion on the Omaha World Herald article on Nitrates and Child cancer rates in Nebraska(attachment)

Zillig briefing went over the newspaper article that was published last Saturday regarding childhood cancer. The article mentioned that NRD's are taking measures to curb the amount of nitrates in our groundwater. He pointed out to the subcommittee to look at section 3 of the 2021 LPSNRD

Groundwater Plan Annual Review that talks about the groundwater quality monitoring network with in the LPSNRD. There are three more articles in this series that will be released in the future.

-Peining Dam Report

Murren informed the committed about the Piening dam project located on the Seward/Lancaster County line just north of Hwy 34. This is a project where the dam plans were approved in 2006. However due to not being able to obtain a 404 permit at that time it was put on the shelf. We have budgeted money to hopefully complete the project. One item that needs to be verified is does the current design meet todays classification standard. We hired to Schemmer to do a breach analysis to determine the appropriate hazard classification and dam design standards. Murren will provide updates on the study at the next WRS meeting.

With no further business the meeting adjourned at 6:35

Enc.

Cc: Steve Seglin

Corey Wasserburger

PROPOSED CHANGES TO GROUNDWATER RULES & REGULATIONS (10/17/22)

Pg 2 add definition for "dewatering well"

Pg 2 "District" defines who is required to take action.

Pg 3 add definition for Final Permit and Application

Pg 3 Re-define "Hydrogeologic Analysis"

Pg 5-6 add definition for Preliminary Permit Application
Pg 6 add definition for test hole

Pg 7 3 "Districts" changed to "Board of Directors"
Pg 8 1 "Districts" changed to "Board of Directors"

Pg 12 clarifies preliminary permit process

Pg 12 Change from 30 to 120 days if Hydrogeologic analysis is required

Pg 12 District may verify information and/or do it's own analysis

Pg 12 Add section (xii) on District actions for not complying with the application's terms.

Pg 12-14 clarifies pumping/yield limits for well Classes 1-4

Pg 14-15 adds a Class 5 well permit
Pg. 17 adds reasons a Class 5 well permit cannot be granted

Pg. 17 Add conditions to cancel an approved permit
Pg 18 Add conditions to cancel an approved permit.

Pg 23 add "irrigated acres must be certified by owner of land"

Pg 23 1 "Districts" to "Board of Directors"
Pg 24 5 "Districts" to "Board of Directors"
Pg 25 1 "Districts" to "Board of Directors"
Pg 27 2 "Districts" to "Board of Directors"
Pg 28 5 "Districts" to "Board of Directors"
Pg 29 1 "Districts" to "Board of Directors"
Pg 31 3 "Districts" to "Board of Directors"
Pg 32 5 "Districts" to "Board of Directors"
Pg 36 2 "Districts" to "Board of Directors"

Pg 37 Section P, Rule 4, Add "c" -ties in "good cause shown"
Pg 37 Section P, Rule 4, add "d" -adds when the District may "waive" some parts of the application process.

Pg 39 3 "Districts" to "Board of Directors"
Pg 40 2 "Districts" to "Board of Directors"

LOWER PLATTE SOUTH
natural resources district

GROUNDWATER RULES & REGULATIONS

Revised Effective Date:

XXXX, 2023

This page intentionally left blank.

DRAFT 1011/2022

Table of Contents

Lower Platte South Natural Resources District

Rules and Regulations for the Nebraska Ground Wwater Management and Protection Act

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

DRAFT ~~10~~11/2022

LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT RULES AND REGULATIONS FOR THE NEBRASKA GROUND WATER MANAGEMENT AND PROTECTION ACT

REVISED EFFECTIVE DATE: January 15, 2020

Authority – The following rules and regulations are adopted pursuant to the Nebraska Ground W~~w~~ater Management and Protection Act (the "Act") *Neb. Rev. Stat.* §§46-701 to 46-754.

Purpose – The purpose of the rules and regulations is to implement the Lower Platte South Natural Resources District's Groundwater Management Plan, to develop procedures for the implementation of management practices, to conserve and protect groundwater supplies, to prevent the contamination or inefficient or improper use of groundwater, and to prevent and resolve conflicts between users of groundwater and appropriators of surface water which are hydrologically connected. The District acknowledges the Nebraska preference statute, *Neb. Rev. Stat.* §46-613, which grants preference in the use of groundwater, first for domestic purposes, second for agricultural purposes, and last for manufacturing or industrial purposes.

Section A Definitions

Rule 1 Definitions

For purposes of implementation of these regulations under the Nebraska Ground W~~w~~ater Management and Protection Act, unless the context otherwise requires:

Acre-Inch shall mean the volume of water that would cover an area of one (1) acre to a depth of one (1) inch; one-twelfth of an acre-foot; equivalent to 3,630 cubic feet or 27,154 gallons.

Alleged Violator shall mean any person who is charged with failure to comply with any of these rules and regulations.

Allocation as it relates to water use for irrigation purposes shall mean the allotment of a specified total number of acre-inches of irrigation water per irrigated acre per year or an average number of acre-inches of irrigation water per irrigated acre over a reasonable period of time.

Annual Allocation is the amount of allocation for one (1) calendar year.

Application, when used in the context of a water well permit application, shall mean either a Preliminary Permit Application or Final Permit Application.

Aquifer Test shall mean the design, implementation, and analysis of a test by a licensed professional geologist or engineer according to standard procedures to

determine the hydraulic conductivity, storativity, and other appropriate properties of an aquifer.

Best Management Practices (BMPs) shall mean schedules of activities, maintenance procedures, and other management practices utilized to prevent or reduce present and future contamination and/or depletion of groundwater which may include soil testing, water testing, irrigation scheduling, proper timing of fertilizer and pesticide application, chemigation techniques, crop rotation, residue management, contaminant source inventories, land treatment, irrigation surge valves, pivot conversions, water return lines, reuse systems, water use efficiency techniques, and other management programs and practices as the Board of Directors may adopt from time to time.

Board or Board of Directors shall mean the Board of Directors of the Lower Platte South Natural Resources District.

Certified Irrigated Acres shall mean the number of acres or portion of an acre that the District has approved for irrigation from groundwater in accordance with law and with rules adopted by the District.

Complainant shall mean any person who files a complaint alleging a violation of these rules and regulations.

Community Water System Protection Area shall mean the area of land designated by the Nebraska Department of Environmental Quality that delineates the 20 year time of travel for groundwater to be intercepted by a political subdivision that has 15 or more connections to its water system's well or wells and serves 25 or more year round residents.

Contaminant, Contamination or Contamination of Groundwater shall mean nitrate nitrogen or other material which enters the groundwater due to any action of any person and causes degradation of the quality of groundwater sufficient to make such groundwater unsuitable for present or reasonably foreseeable beneficial uses.

De Minimis shall mean surface runoff of groundwater used for irrigation which causes either no damage or nominal damage to another person's land, crops, buildings, or personal property.

Dewatering Well shall mean a water well constructed for the purpose of lowering the groundwater surface elevation, either temporarily or permanently.

District shall mean the Lower Platte South Natural Resources District. For the purposes of these Rules and Regulations, the General Manager shall be authorized to act on behalf ~~any references to actions taken by~~ of the District ~~shall mean the~~

~~General Manager acting under authorization by the Board of Directors~~, unless ~~any~~ a rule or regulation specifically ~~such actions are specified to~~ requires action by the Board of Directors.

District Compliance Officer shall mean an employee of the District authorized to perform the functions assigned by these rules and regulations.

Domestic Well shall mean a water well pumping groundwater for human needs as it relates to health, fire control, sanitation, and water for domestic livestock and plants.

Final Permit Application shall mean a water well permit application submitted after all information is supplied and appropriate fees paid, after all required analyses are completed, and after all required reports are presented. Such a permit application may require approval by the Board of Directors.

Good Cause Shown shall mean a reasonable justification for granting a variance for a consumptive use of water that would otherwise be prohibited by rule or regulation and which the granting agency, District, or organization reasonably and in good faith believes will provide an economic, environmental, social, or public health and safety benefit that is equal to or greater than the benefit resulting from the rule or regulation from which a variance is sought.

Gravity Irrigation shall mean a method of applying water to plants by letting water flow by gravity from a higher elevation and distributed to the plants at a lower elevation by flooding or furrows.

Groundwater shall mean that water which occurs in or moves, seeps, filters, or percolates through ground under the surface of the land, and shall include groundwater which becomes commingled with waters from surface sources.

Groundwater Reservoir shall mean a designated area of land under which a major aquifer is known to exist and which has been delineated by the District, based on readily identifiable physical boundaries. including boundaries on the land surface and beneath the land surface, to generally coincide with the boundaries of the aquifer and to be the basis for specific rules and regulations pertaining to groundwater as stated in these rules and regulations.

Hydrogeologic Analysis shall mean an analysis of the conditions near the proposed water well site and the impact of the proposed water well. A hydrogeologic analysis shall include, at a minimum, consideration of aquifer boundaries, existing water uses that may be impacted by the proposed water well, and other factors appropriate to the hydrogeologic setting of the proposed water well site. ~~the investigation required to apply for a water well permit in the~~ District. ~~Analysis must include consideration of aquifer boundaries, existing water uses,~~

~~and other factors appropriate to the hydrogeologic setting of the site.~~ The District shall develop guidelines for preparing hydrogeologic analysis reports.

Illegal Water Well shall mean:

(a) any water well operated or constructed without or in violation of a permit required by the Nebraska Ground Wwater Management and Protection Act;

(b) any water well not in compliance with rules and regulations adopted and promulgated pursuant to the Act;

(c) any water well not properly registered in accordance with *Neb. Rev. Stat.* §§46-602 to 46-604; or

(d) any water well not in compliance with any other applicable laws of the State of Nebraska or with rules and regulations adopted and promulgated pursuant to such laws.

Inefficient or Improper Irrigation Runoff shall mean water derived from groundwater used for irrigation that moves off of the land that is being irrigated onto another person's land, lake, stream, or river either as surface flow or as spray that accumulates to create surface flow, unless it is *De Minimis* or agreed to pursuant to these rules and regulations.

Investigator shall mean an employee or agent of the District authorized to perform functions assigned thereto by these rules and regulations.

Irrigation Well shall mean a water well pumping groundwater to apply to plants on two (2) or more acres of land.

Irrigation Runoff Water shall mean groundwater used for irrigation purposes which escapes from land owned, leased, or otherwise under the direct supervision and control of a person.

Large Capacity Well shall mean a well designed and constructed to pump more than 50 gallons per minute in a groundwater reservoir and more than 20 gallons per minute in the remaining area, except for domestic only wells of between 20 and 50 gallons per minute.

Landowner shall mean any person who owns or has a contract to purchase land.

Non-point Source Pollution shall mean contamination from diffuse sources where no one point of release can be identified and/or sources not identified as point source pollution.

Operator shall mean that person who has the most direct control over the day-to-day operations of the land in question.

Person shall mean a natural person, a partnership, a limited liability company an association, a corporation, a municipality, an irrigation District, an agency or a political subdivision of the State of Nebraska or a department, an agency, or a bureau of the United States.

Pollution shall mean the process of contaminating air, water, or land with impurities to a level that is undesirable.

Point Source Pollution shall mean any discernible, confined, and discrete conveyance, including but not limited to, any pipe, channel, tunnel, conduit, well, discrete fissure, container, rolling stone, vessel, other floating craft, or other conveyance, over which the Department of Environmental Quality has regulatory authority and from which a substance which can cause or contribute to contamination of groundwater is or may be discharged.

Preliminary Permit Application shall mean a water well permit application submitted prior to conducting required analyses and before reports are presented. Such a permit application shall require the approval of the District General Manager prior to proceeding with well construction.

Pump Test shall mean the pumping of a well for a specified period of time at a specified pumping rate for the purpose of collecting water quality samples.

Remaining Area shall mean all lands outside of the boundaries of a Groundwater Reservoir

Rolling Allocation shall mean the amount of allocation for a three (3) year period, consisting of the previous two (2) calendar years and the current calendar year.

Salt Water shall mean groundwater pumped from a well containing total dissolved solids in concentrations more than 2500 parts per million.

Salt Water Intrusion shall mean the physical movement of groundwater into a well which either 1) the concentration of total dissolved solids equals or exceeds 2500 parts per million into areas of an aquifer in which the total dissolved solids previously was less than 1000 parts per million due to the pumping of groundwater; or 2) the concentration of total dissolved solids equals or exceeds 5000 parts per million into areas of an aquifer in which the total dissolved solids previously was less than 2500 parts per million due to the pumping of groundwater; or 3) the concentration of total dissolved solids equals or exceeds 10,000 parts per million into areas of an aquifer in which the total dissolved solids previously was less than 5000 parts per million due to the pumping of groundwater.

Salt Water Well shall mean a water well drilled and constructed such that it produces salt water.

Sprinkler Irrigation shall mean a method of applying water to plants by pipelines which carry water under pressure and distributed to the plants from overhead.

Test Hole shall mean a hole or excavation designed to obtain information on hydrogeologic conditions.

Variance shall mean (a) an approval to deviate from a restriction imposed under subsection (1), (2), (8), or (9) of *Neb. Rev. Stat.* §46-714 or (b) the approval to act in a manner contrary to existing rules or regulations from a governing body whose rule or regulation is otherwise applicable.

Water Well shall mean any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed for the purpose of exploring for groundwater, monitoring groundwater, utilizing the geothermal properties of the ground, obtaining hydrogeologic information, or extracting water from or injecting water into the underground reservoir. Water well shall not include any excavation made for obtaining or prospecting for oil or natural gas or for inserting media to repressure oil or natural gas bearing formations regulated by the Nebraska Oil and Gas Conservation Commission.

Section B Groundwater Management Area

Rule 1 Management Options and Means Authorized

(a) The ~~District~~Board of Directors hereby establishes a Groundwater Management Area which includes the entire geographic area within the boundaries of the District. The ~~District~~Board of Directors may, by order and following a hearing held in accordance with *Neb. Rev. Stat.* §46-712, manage the use of water in the management area for water quantity or water quality purposes or both by any of the following means, as provided in *Neb. Rev. Stat.* §46-739:

(i) Allocate the amount of groundwater that may be withdrawn by groundwater users;

(ii) Adopt a system of rotation for use of groundwater;

(iii) Adopt well-spacing requirements more restrictive than those found in *Neb. Rev. Stat.* §§46- 609 and 46-651;

(iv) Require the installation of devices for measuring groundwater withdrawals from wells;

(v) Adopt a system which requires a reduction of irrigated acres pursuant to subsection (2) of *Neb. Rev. Stat.* §46-740;

(vi) Limit or prevent the expansion of irrigated acres or otherwise limit or prevent increases in the consumptive use of groundwater withdrawals from water wells used for irrigation or other beneficial purposes;

(vii) ~~It may r~~Require the use of best management practices;

(viii) ~~It may r~~Require the analysis of water or deep soils for fertilizer and chemical content;

(ix) ~~It may i~~Impose mandatory educational requirements designed to protect water quality or stabilize or reduce the incidence of groundwater depletion, conflicts between groundwater users and surface water appropriators, disputes over interstate compacts or decrees, or difficulties fulfilling the provisions of other formal state contracts or agreements;

(x) ~~It may r~~Require water quality monitoring and reporting of results to the District for all water wells within all or part of the management area;

(xi) ~~It may r~~Require ~~District~~Board of Directors approval of:

(A) Transfers of groundwater off the land where the water is withdrawn; or

(B) Transfers of rights to use groundwater that result from District allocations imposed pursuant to subdivision 1(a) of this section or from other restrictions on use that are imposed by the District in accordance with this section. Such approval may be required whether the transfer is within the management area, from inside to outside the management area, or from outside to inside the management area, except that transfers for which permits

have been obtained from the Department of Natural Resources prior to July 16, 2004, or pursuant to the Municipal and Rural Domestic Ground Wwater Transfers Permit Act shall not be subject to District approval pursuant to this subdivision. The ~~District~~Board of Directors may adopt rules and regulations pursuant to this subdivision that shall require that the District deny or condition the approval of any such transfer when and to the extent such action is necessary to:

(A) Ensure the consistency of the transfer with the purpose or purposes for which the management area was designated;

(B) Prevent adverse effects on other groundwater users or on surface water appropriators;

(C) Prevent adverse effects on the state's ability to comply with an interstate compact or decree or to fulfill the provisions of any other formal state contract or agreement; and

(D) Otherwise protect the public interest and prevent detriment to the public welfare.

(xii) ~~It may r~~Require, when conditions so permit, that new or replacement water wells to be used for domestic or other purposes shall be constructed to such a depth that they are less likely to be affected by seasonal water level declines caused by other water wells in the same area;

(xiii) ~~It may c~~Close all or a portion of the management area to the issuance of additional permits or may condition the issuance of additional permits on compliance with other rules and regulations adopted and promulgated by the District to achieve the purpose or purposes for which the management area was designated; and

(xiv) ~~It may a~~Adopt and promulgate such other reasonable rules and regulations as are necessary to carry out the purpose for which a management area was designated.

(b) In adopting, amending, or repealing any control authorized by subsection (1) of *Neb. Rev. Stat.* §46-739, §46-740 or §46-741, the District's considerations shall include, but not be limited to, whether it reasonably appears that such action will mitigate or eliminate the condition which led to designation of the management area or will improve the administration of the area.

(c) Upon request by the District or when any of the controls being proposed are for the purpose of integrated management of hydrologically connected groundwater and surface water, the Director of Natural Resources shall review and comment on the adoption, amendment, or repeal of any authorized control in a management area. The director may hold a public hearing to consider testimony regarding the control prior to commenting

on the adoption, amendment, or repeal of the control. The director shall consult with the District and fix a time, place, and date for such hearing. In reviewing and commenting on an authorized control in a management area, the director's considerations shall include, but not be limited to, those enumerated in subsection (b) of this section.

(d) If because of varying groundwater uses, varying surface water uses, different irrigation distribution systems, or varying climatic, hydrologic, geologic, or soil conditions existing within a management area, the uniform application throughout such area of one or more controls would fail to carry out the intent of the Nebraska Ground Wwater Management and Protection Act in a reasonably effective and equitable manner, the controls adopted by the District pursuant to *Neb. Rev. Stat.* §46-739 may contain different provisions for different categories of groundwater use or portions of the management area which differ from each other because of varying climatic, hydrologic, geologic, or soil conditions. Any differences in such provisions shall recognize and be directed toward such varying groundwater uses or varying conditions. Except as otherwise provided in this section, if the District adopts different controls for different categories of groundwater use, those controls shall be consistent with *Neb. Rev. Stat.* §46-613 and shall, for each such category, be uniform for all portions of the area which have substantially similar climate, hydrologic, geologic, and soil conditions.

(e) The District may establish different water allocations for different irrigation distribution systems.

(f) The District may establish different provisions for different hydrologic relationships between groundwater and surface water:

(i) For management areas for which a purpose is the integrated management of hydrologically connected groundwater and surface water, the District may establish different provisions for water wells either permitted or constructed before the designation of a management area for integrated management of hydrologically connected groundwater and surface water and for water wells either permitted or constructed on or after the designation date or any other later date or dates established by the District. Permits for construction of new wells not completed by the date of the determination of fully appropriated shall be subject to any conditions imposed by the District; and

(ii) For a management area in a basin or part of a basin that is or was the subject of litigation over an interstate water compact or decree in which the State of Nebraska is a named defendant, the District may establish different provisions for restriction of water wells constructed after January 1, 2001, if such litigation was commenced before or on May 22, 2001. If such litigation is commenced after May 22, 2001, the District may establish different provisions for restriction of water wells constructed after the date on which such litigation is commenced in federal court.

An appeal from a decision of the District under this subdivision shall be in accordance with the hearing procedures established in the Nebraska ~~Groundwater~~ Ground Water Management and Protection Act.

(g) Except as otherwise authorized by law, the District shall make a replacement water well as defined in *Neb. Rev. Stat.* §46-602, or as further defined in District rules and regulations, subject to the same provisions as the water well it replaces.

(h) If the District has included controls delineated in subdivision (1)(m) of *Neb. Rev. Stat.* §46-739 in its management plan, but has not implemented such controls within two years after the initial public hearing on the controls, the District shall hold a public hearing, as provided in *Neb. Rev. Stat.* §46-712, regarding the controls before implementing them.

(i) In addition to the controls listed in subsection (1) of *Neb. Rev. Stat.* §46-739, the District may also adopt and implement one or more of the following measures if it determines that any such measures would help the District and water users achieve the goals and objectives of the management area. It may sponsor non-mandatory educational programs and it may establish and implement financial or other incentive programs. As a condition for participation in an incentive program, the District may require water users or landowners to enter into and perform such agreements or covenants concerning the use of land or water as are necessary to produce the benefits for which the incentive program is established.

Rule 2 Designated Areas of Management

(a) The District hereby establishes the following as designated areas of management (see maps in Appendix A):

(i) Crete-Princeton-Adams Groundwater Reservoir;
(ii) Dwight-Valparaiso Groundwater Reservoir;
(iii) Lower Salt Creek Groundwater Reservoir;
(iv) Missouri River Groundwater Reservoir;
(v) Platte River Groundwater Reservoir;
(vi) Remaining Area; and
(vii) Community Water System Protection Areas.

Rule 3 Remaining Area

(a) Due to the hydrogeology of the Remaining Area, the District hereby recognizes the need to manage groundwater declines, conflicts between users and salt water intrusion and may require well permits on all new and replacement wells in the remaining area designed and constructed to pump greater than 20 gallons per minute, except for domestic wells that pump 50 gallons per minute or less.

Section C Water Well Permits

Rule 1 Water Well Permits

(a) Any person who intends to construct any new or replacement water well on land which he or she owns or controls that falls within the following categories shall, before commencing construction, apply to the District for a permit on forms provided by the District, and receive approval from the District:

(i) Any well designed and constructed or modified to pump more than 50 gallons per minute;

(ii) Any well in the Remaining Area designed and constructed or modified to pump more than 20 gallons per minute except for domestic wells and wells used to water range livestock that pump 50 gallons per minute or less;

(iii) Any well in (i) and (ii) above that is designed and constructed to pump salt water for a beneficial use;

(iv) Any wells commingled, combined, clustered, or joined with any other water well or wells and such wells shall be considered one water well and the combined capacity shall be used as the rated capacity;

(v) Except that no permit shall be required for test holes or dewatering wells with an intended use of ninety (90) days or less;

(vi) Permit application forms are available at the office of the District, 3125 Portia Street, at Lincoln, Lancaster County, Nebraska, or shall be available at such office or at such other office or offices as from time to time the Board of Directors shall designate;

(vii) The application shall contain:

(A) The name and post office address of the applicant or applicants;

(B) The nature of the proposed use;

(C) The intended location of the proposed water well or other means of obtaining groundwater;

(D) The intended size, type and description of the proposed water well and the estimated depth, if known;

(E) The estimated capacity in gallons per minute;

(F) The estimated annual water usage in acre feet per year;

(G) The acreage and location by legal description of the land involved if the water is to be used for irrigation purposes;

(H) A description of the proposed use if other than for irrigation purposes;

(I) The registration number of the water well being replaced if applicable; and

(J) Such additional information as the District deems necessary or desirable.

(viii) Prior to submitting a final permit application, the applicant shall submit ~~an application for~~ a preliminary permit application, so as to allow the applicant to conduct the tests and analyses required for such wells.

(ix) For any permit that requires a hydrogeologic analysis report, such report shall be submitted to the District at least one hundred twenty (120) days prior to the submittal of a final permit application.

(~~viii~~x) The District shall review ~~such~~any application and issue or deny the permit within thirty (30) days after a complete and properly prepared application is filed; and

(~~i~~xi) If the District finds that ~~the~~an application is incomplete or improperly prepared, it shall return the application for correction. If the correction is not made within sixty (60) days, or an extension is not granted, the application shall be cancelled. All permits shall be issued with or without conditions attached or denied not later than thirty (30) days after receipt by the District of a complete and properly prepared application. A permit issued shall specify all regulations and controls adopted by the District relevant to the construction or utilization of the proposed water well. No refund of any application fees shall be made regardless of whether the permit is issued, canceled, or denied. The District shall transmit one copy of each permit issued to the Director of the Department of Natural Resources.

(xii) If the District finds that a person has misrepresented any information on a permit application or is operating a water well in a manner inconsistent with the representations made on a previously approved permit application, then the District may place additional requirements on the person, including but not limited to requiring that a new application be made. The District may suspend the operation of a water well until the person complies with such additional requirements. A failure to comply with additional requirements imposed by the District may result in the cancellation of an application or a previously approved permit.

Rule 2 Classes of Well Permits and Required Hydrogeologic and Water Quality Information

(a) Any person who proposes to construct a well requiring a permit shall be required to provide certain hydrogeologic and water quality ~~information~~reports before a final water well permit may be approved, as is provided below. The District may verify the information contained within such reports by whichever methods it deems necessary, including but not limited to reviewing the reports, consulting with a third--party to review the reports, and commissioning its own independent hydrogeologic and water quality analyses. The District shall provide guidelines for required

reports which shall be submitted to the District with each permit application.

(b) Class 1 Permit:

(i) Applies to any proposed well to be located in a Groundwater Reservoir, that is designed to pump more than 50 gallons per minute~~, and~~but less than 1000 gallons per minute, and pump less than 250 acre-feet of water per year;

(A) The requirements for a Class 1 permit shall be as follows and shall be included with the application:

(1) Water quality samples to be collected at the end of a 24-hour pump test. Any well must be pumped at 100% of its designed rate. The samples shall be submitted to a qualified laboratory for an analysis of sodium, chloride and total dissolved solids.

(c) Class 2 Permit:

(i) Applies to any proposed well to be located in a Groundwater Reservoir, which does not qualify for a Class 5 Permit, and which is designed and constructed to pump 1000 gallons per minute or more, or pump 250 acre-feet to 500 acre-feet ~~or more~~ of water per year;

(A) The requirements for a Class 2 permit shall be as follows and shall be included with the application:

(1) A copy of the well log to determine geologic formations present;

(2) An accurate static water level measurement to estimate saturated thickness of the aquifer;

(3) An aquifer test including all necessary pumping, drawdown, and recovery~~pumping~~ data as required by the District. The aquifer test shall be performed over a minimum 24-hour period, and must be designed and supervised by a licensed professional geologist or engineer with experience in such analysis;

(4) Water quality samples to be collected at the end of a 24-hour pump test. Any well must be pumped at 100% of its designed rate for the duration of the pump test. The samples shall be submitted to a qualified laboratory for analysis of sodium, chloride and total dissolved solids; and

(5) A hydrogeologic analysis report considering the impact of the proposed withdrawal on current groundwater users and a minimum twenty (20) year impact on the aquifer for potential future users shall be submitted by the Applicant. The report must be prepared by a licensed professional geologist or engineer with experience in such analysis.

(d) Class 3 Permit:

(i) Applies to any proposed well located in the Remaining Area designed and constructed to pump more than 20 gallons per minute, ~~and~~but less than 250 gallons per minute, and ~~use~~pump less than 25 acre-feet of water per year, except a domestic well that pumps 50 gallons per minute or less is not required to obtain a permit;

(A) The requirements for a Class 3 permit shall be as follows:

(1) Water quality samples to be collected at the end of a 24-hour pump test. Any well must be pumped at 100% of its designed rate for the duration of the pump test. The samples shall be submitted to a qualified laboratory for analysis of sodium, chloride and total dissolved solids.

(e) Class 4 Permit:

(i) Applies to any proposed well in the Remaining Area, which does not qualify for a Class 5 Permit, and which is- designed to pump 250 gallons per minute or more, or pump 25 acre-feet to 500 acre-feet ~~or more~~ of water per year;

(A) The requirements for a Class 4 permit shall be as follows:

(1) A copy of the well log to determine geologic formations present;

(2) An accurate static water level measurement to estimate saturated thickness of the aquifer;

(3) An aquifer test including all necessary pumping, drawdown, and recovery ~~pumping~~ data as required by the District. The aquifer test shall be performed over a minimum 24-hour period, and must be designed and supervised by a licensed professional geologist or engineer with experience in such analysis;

(4) Water quality samples to be collected at the end of a 24-hour pump test. Any well must be pumped at 100% of its designed rate for the duration of the pump test. The samples shall be submitted to a qualified laboratory for analysis of sodium, chloride and total dissolved solids; and

(5) A hydrogeologic analysis report considering the impact of the proposed withdrawal on current groundwater users and a minimum twenty (20) year impact on the aquifer for potential future users shall be submitted by the Applicant. The report must be prepared by a licensed professional geologist or engineer with experience in such analysis.

(f) Class 5 Permit:

(i) Applies to any proposed well located anywhere in the District designed and constructed to pump more than 500 acre-feet of water per year.

(A) The requirements for a Class 5 permit shall be as follows and shall be included with the application:

(1) A copy of the well log to determine geologic formations present;

(2) An accurate static water level measurement to estimate saturated thickness of the aquifer;

(3) An aquifer test including all necessary pumping, drawdown, and recovery data as required by the District. The aquifer test shall be performed over a minimum 72-hour period, and must be designed and supervised by a licensed professional geologist or engineer with experience in such analysis;

(4) Water quality samples to be collected at the end of a 24-hour pump test. Any well must be pumped at 100% of its designed rate for the duration of the pump test.

(5) A hydrogeologic analysis report considering the impact of the proposed withdrawal on current groundwater users and a minimum twenty (20) year impact on the aquifer for potential future users shall be submitted by the Applicant. The report must be prepared by a licensed professional geologist or engineer with experience in such analysis.

(6) The applicant shall contact owners of all adjoining land informing them of the permit application, and shall submit evidence of this contact.

(7) All applications for a Class 5 water well permit shall be presented to the Board of Directors for approval or denial.

(f) Salt ~~w~~Water ~~w~~Well ~~p~~Permit:

(i) A salt water well permit shall be required if an Applicant desires to pump salt water from any proposed well for a beneficial use. The Applicant is required to demonstrate that groundwater withdrawals from the proposed well will not cause salt water intrusion. The requirements for a Class 1, 2, 3, ~~or~~ 4, or 5 well permit, stated above, shall apply to any salt water well permit.

(ii) The requirements for salt water well permits appli~~es~~y to all ~~permit~~ permit-sized wells described above, including ~~in~~ Class 1, 2, 3, ~~and,~~ 4, ~~or~~and 5 well permits ~~above~~, in which either:

(A) The total dissolved solids of the water quality sample taken at the end of a 24-hour pump test are 2500 parts per million or more and the intended use of the water is for a beneficial use; or

(B) The intended use of the well is to pump salt water from an aquifer that is expected to contain salt water under ambient conditions. In this case, the Applicant may choose to fulfill the requirements below during the 24-hour pump test as required for the appropriate Class 1, 2, 3, or 4 permit.

(iii) The requirements for a salt water well permit shall be as follows:

(A) The applicant must collect water quality samples at various times during a 24-hour pumping test at 100% of proposed pumping rate. The samples shall be submitted to a qualified laboratory for analysis of sodium, chloride and total dissolved solids. One sample each shall be collected:

(1) within 15 minutes after the start of pumping;

(2) within 15 minutes of the half-way point between the beginning and end of the pump test. Typically this will be 12 hours after the start of pumping; and

(3) within 15 minutes prior to the end of pumping.

Rule 3 Granting, Denying or Cancelling a Water Well Permit in a Groundwater Reservoir

(a) An application for a permit or late permit for any water well in a Groundwater Reservoir shall be granted unless the District finds any of the following conditions:

(i) The location or operation of the proposed water well or other work would conflict with any regulations or controls adopted by the District or of other applicable laws of the State of Nebraska;

(ii) The proposed use would not be a beneficial use of water for domestic, agricultural, manufacturing, or industrial purposes;

(iii) The applicant refuses to cooperate with the District in groundwater monitoring activities;

(iv) An applicant refuses to equip the well with a water well flow meter;

(v) In the case of a late permit only, that the applicant did not act in good faith by failing to obtain a timely permit;

(vi) For a Class 1 Permit:

(A) The total dissolved solids from a water quality sample taken at the end of a 24-hour pump test are 2500 parts per million or more, and an applicant does not choose to apply for a salt water well permit.

(B) An applicant shall have the option to apply for a salt water well permit prior to denial of the permit.

(vii) For a Class 2 Permit:

(A) ~~(A) The~~A hydrogeologic analysis indicates potential short-term or long-term detrimental effect(s) to the aquifer;

(B) ~~and/or if t~~The drawdown, as determined by an aquifer test, would adversely affect a nearby well with a higher preference of use; ~~and/~~or

(~~B~~C) The total dissolved solids from a water quality sample taken at the end of a 24-hour pump test are 2500 parts per million or more, and the applicant does not choose to apply for a salt water well permit.

~~(C)~~ An applicant shall have the option to apply for a salt water well permit prior to denial of the permit.

(viii) For a Class 5 Permit:

(A) A hydrogeologic analysis indicates potential short-term or long-term detrimental ~~effe~~effect(s) to the aquifer system;

(B) The drawdown, as determined by an aquifer test, would adversely affect a nearby well with a higher preference of use; or

(C) The total dissolved solids from a water quality sample taken at the end of a 24-hour pump test are 2500 parts per million or more, and the applicant does not choose to apply for a salt water permit. An applicant shall have the option to apply for a salt water well permit prior to denial of the permit application.

(~~viii~~ix) For a Salt Water Well Permit:

(A) ~~(A)~~ The water quality samples indicate the potential for salt water intrusion.

(b) An approved permit in a Groundwater Reservoir may be cancelled for any of the following reasons:

(i) Construction of the water well is not completed within one year of the approval of the permit; or

(ii) The water well is not operated under the terms of the permit.

Rule 4 Granting, Denying or Cancelling a Water Well Permit in the Remaining Area

(a) An application for a permit or late permit for a water well in the Remaining Area shall be granted unless the District finds any of the following conditions:

(i) The location or operation of the proposed water well or other work would conflict with any regulations or controls adopted by the District or of other applicable laws of the State of Nebraska;

(ii) The proposed use would not be a beneficial use of water for domestic, agricultural, manufacturing, or industrial purposes;

(iii) An applicant refuses to cooperate with the District in groundwater monitoring activities;

(iv) An applicant refuses to equip the well with a water well flow meter;

(v) In the case of a late permit only, that the applicant did not act in good faith by failing to obtain a timely permit;

(vi) For a Class 3 Permit:

(A) The total dissolved solids from a water quality sample taken at the end of a 24-hour pump test are 2500 parts per million or more, and the applicant does not choose to apply for a salt water well permit.

(B) An applicant shall have the option to apply for a salt water well permit prior to denial of the permit.

(vii) For a Class 4 Permit:

(A) The total dissolved solids from a water quality sample taken at the end of a 24-hour pump test are 2500 parts per million or more, and the applicant does not choose to apply for a salt water well permit.

(B) An applicant shall have the option to apply for a salt water well permit prior to denial of the permit.

(C) ~~The~~A hydrogeologic analysis indicates potential short-term or long-term detrimental effects to the aquifer and/or if the drawdown as determined by an aquifer test would adversely affect a nearby well with higher preference of use.

(viii) For a Salt Water Well Permit:

(A) ~~(A)~~ The water quality samples indicate the potential for salt water intrusion.

(b) An approved permit in the Remaining Area may be cancelled for any of the following reasons:

(i) Construction of the water well is not completed within one year of the approval of the permit; or

(ii) The water well is not operated under the terms of the permit.

Rule 5 Water Well Permit Fees and Required Information

(a) The application shall be accompanied by a fifty dollar ($50.00) filing fee payable to the District.

(b) Any person who has failed or in the future fails to obtain a permit required by Rule 1 shall make application for a late permit on forms provided by the District and the application shall be accompanied by a two hundred fifty dollar ($250.00) fee payable to the District, and shall contain the same information required in Rules 1 and 2.

Rule 6 No Right to Violate

(a) The issuance by the District of a permit pursuant to *Neb. Rev. Stat.* §46-736 or registration of a water well by the Director of the Department of Natural Resources pursuant to *Neb. Rev. Stat.* §46-602 shall not vest in any person the right to violate any District rule, regulation, or control in effect on the date of issuance of the permit or the registration of the water well or violate any rule, regulation, or control properly adopted after such date.

Rule 7 Groundwater Monitoring

(a) All applicants for a water well permit shall, as a condition of the permit, agree to cooperate with the District, at its request, in groundwater monitoring activities to include water level measurements and water quality sampling.

Rule 8 Water Well Commence Construction and One-Year Completion

(a) When any permit is approved pursuant to *Neb. Rev. Stat.* §46-736 the applicant shall commence construction as soon as possible after the date of approval and shall complete the construction and equip the water well prior to the date specified in the conditions of approval, which date shall not be more than one year after the date of approval, unless it is clearly demonstrated in the application that one year is an insufficient period of time for such construction. If the applicant fails to complete the project under the terms of the permit, the District may cancel the permit. If the permit is cancelled, the applicant may apply for a new permit in accordance with these rules and regulations.

Rule 9 Replacement Water Well Permits

(a) The permit for a replacement water well of any Class may be granted by the District without the hydrogeologic analysis and/or water quality sampling results if the replacement water well:

(i) is located within 150 feet of the well to be replaced, as long as such location does not violate existing well spacing requirements;

(ii) is drilled to a depth similar to and is screened over an interval similar to the well being replaced;

(iii) is constructed and equipped such that the yield of the replacement well does not exceed the ~~most current records of the yield~~ of the yield of the well to be replaced, as reflected in the most current records of the well to be replaced; and

(iv) meets all other statutory and regulatory requirements for such a well.

(b) For a replacement irrigation well, the District may require the hydrogeologic analysis and/or water quality sampling results for the permit if additional irrigated acres are requested.

Rule 10 Water Well Spacing

(a) No new water well requiring a permit from the District shall be located within 600 feet of an existing registered water well with the same or higher preference of use, except for a water well owned by the applicant, or a properly permitted replacement well.

(b) All additional spacing requirements as set forth in Nebraska statute and/or State regulations shall apply.

Section D Required Water Well Flow Meters

Rule 1 Water Well Flow Meters

(a) The District shall require all new and replacement water wells requiring a water well permit to be equipped with a flow meter as a condition of the water well permit.

(b) After the effective date of these regulations, any water well capable of pumping more than 50 gallons per minute shall be equipped with a water well flow meter prior to use. No water well capable of pumping more than 50 gallons per minute shall be pumped without first installing a water well flow meter.

(c) The District may, in its sole discretion, require water flow meters on existing wells in the Remaining Area that pump 20 to 50 gallons per minute, on a case by case basis to manage groundwater quality and/or quantity .

(d) Any well owner and/or operator who has a well equipped with a water flow meter shall provide water usage information on the volume of water pumped to the District annually. Any well owner and/or operator is required to maintain each flow meter in working condition on each well pumped.

Section E Phases for Designated Areas of Management

Rule 1 Phases for Designated Areas of Management

(a) Phase I for quality and quantity has been designated District-wide and the District has established educational programs, groundwater monitoring and best management practices. Phase II shall establish cost-share incentives to promote best management practices and require educational certification. Phase III shall establish regulatory requirements to address groundwater quality and/or quantity degradation.

Section F Groundwater Monitoring Networks

Rule 1 Monitoring Network in Groundwater Reservoirs

(a) The District shall establish a groundwater monitoring network for groundwater quality and quantity.

Rule 2 Monitoring Network in Remaining Area

(a) The District shall establish a groundwater monitoring network for groundwater quality and quantity.

Rule 3 Monitoring Network in Community Water System Protection Areas

(a) The District shall establish a monitoring well network for groundwater quality and quantity in Community Water System Protection Areas.

Section G Groundwater Phase Triggers

Rule 1 Phase I Quality and Quantity

(a) The entire geographic area of the District has been designated as a Phase I Quality and Quantity Groundwater Management Area.

Rule 2 Groundwater Quality Phase Triggers in a Groundwater Reservoir

(a) The Phase II trigger shall occur when at least 50% of the monitoring wells in the network are at or above 50% of the Maximum Contaminant Level for a contaminant for more than two (2) consecutive years.

(b) The Phase III trigger shall occur when at least 80% of the monitoring wells in the network are at or above 80% of the Maximum Contaminant Level for a contaminant for more than two (2) consecutive years.

Rule 3 Groundwater Quantity Phase Triggers in a Groundwater Reservoir

(a) The Phase II trigger shall occur when spring static groundwater elevations in 30% of the monitoring network wells have declined from the established upper elevation of the saturated thickness to an elevation that represents greater than or equal to a percent reduction in the saturated thickness and has remained below that elevation for more than two (2) consecutive years.

(b) The Phase III trigger shall occur when spring static water elevations in 50% of the monitoring network wells have declined from the established upper elevation of the saturated thickness to an elevation that represents greater than or equal to a percent reduction in the saturated thickness and has remained below that elevation for more than two (2) consecutive years.

(c) The percent reduction for each groundwater reservoir and Phase is:

	Phase II (30% of the wells)	Phase III (50% of the wells)
Lower Salt Creek Groundwater Reservoir	15%	30%
Missouri River Groundwater Reservoir	8%	15%
Platte River Groundwater Reservoir	8%	15%
Crete-Princeton Groundwater Reservoir	8%	15%
Dwight-Valparaiso Groundwater Reservoir	8%	15%

Rule 4 Groundwater Quality Phase Triggers in the Remaining Area

(a) The Phase II trigger shall occur when at least 50% of the monitoring wells in the network are at or above 50% of the Maximum Contaminant Level for a contaminant for more than two (2) consecutive years.

(b) The Phase III trigger shall be when at least 80% of the monitoring wells in the network are at or above 80% of the Maximum Contaminant Level for a contaminant for more than two (2) consecutive years.

Rule 5 Groundwater Quantity Phase Triggers in the Remaining Area

(a) The Phase II trigger shall occur when spring static groundwater elevations in 30% of the monitoring network wells have declined from the established upper elevation of the saturated thickness to an elevation that represents greater than or equal to a 8% reduction in the saturated thickness and has remained below that elevation for more than two consecutive years.

(b) Phase III trigger shall occur when spring static water elevations in 50% of the monitoring network wells have declined from the established upper elevation of the saturated thickness to an elevation that represents greater than or equal to a 15% reduction in the saturated thickness and has remained below that elevation for more than two consecutive years.

Rule 6 Groundwater Quality Phase Triggers in a Community Water System Protection Area

(a) The Phase II trigger shall occur when at least 50% of the monitoring wells in the network are at or above 50% of the Maximum Contaminant Level for a contaminant for more than two (2) consecutive years.

(b) The Phase III trigger shall occur when at least 80% of the monitoring wells in the network are at or above 80% of the Maximum Contaminant Level for a contaminant for more than two (2) consecutive years.

Rule 7 Groundwater Quantity Phase Triggers in a Community Water System Protection Area

(a) The quantity Phase triggers for a Community Water System Protection Area shall be the same as the triggers of the groundwater reservoir or remaining area in which it is located.

Rule 8 Groundwater Monitoring Results Reporting

(a) Each year the District shall disseminate the results of the groundwater monitoring activities to monitoring well cooperators, the Board of Directors, appropriate state and federal agencies and the general public.

Section H Salt Water Intrusion

Rule 1 Investigation

(a) When any groundwater well in the District shows evidence of salt water intrusion as described herein, the District shall conduct an investigation.

Rule 2 Investigation Procedures

(a) Any investigation conducted as a result of salt water intrusion shall include but not be limited to the sampling of the well(s) to determine the concentration of total dissolved solids; collection of historical groundwater quality data; pumping rates and groundwater usage of wells in the vicinity; groundwater level measurements; evaluation of well(s) stratigraphy, depth and pump installation.

Rule 3 Action Plan

(a) Upon completion of the salt water intrusion investigation and a determination by the District that salt water intrusion is occurring, the District shall develop an action plan for the affected area. The action plan can provide for incentives to implement best management practices to stabilize and reduce the salt water intrusion. The action plan shall also include a trigger and time line based on the concentration of total dissolved solids in the effected wells to develop and implement rules and regulations.

Rule 4 Rules and Regulations

(a) When the action plan trigger has occurred, the District shall develop and implement rules and regulations to require well owners to operate their wells in such a manner as to limit or reduce the salt water intrusion.

Section I Groundwater Verification Studies for Management Phase Determination

Rule 1 Groundwater Quality

(a) When the District's monitoring network in a designated area of management shows that the trigger for either Phase II or Phase III has occurred, the District shall conduct a two (2) year verification study to determine if non-point source contamination has occurred and/or is occurring.

Section J Groundwater Management Phase Actions

Rule 1 Annual Review for All Phases of Management Actions

(a) The District shall prepare for the Board of Directors annually, by March 1st, a report reviewing the Groundwater Management actions, even though a Phase has not been triggered.

Rule 2 Phase I Groundwater Management Actions.

(a) The District shall require all lands irrigated with groundwater to be certified by the owner of the land to be irrigated. After the effective date of these regulations, any lands irrigated with groundwater shall first be

certified by the District prior to those lands being irrigated with groundwater. The number of acres of lands certified as being irrigated with groundwater shall correspond with the number of irrigated acres recorded by county assessors. Lands not certified as irrigated with groundwater shall not be irrigated with groundwater without being first certified by the District.

(i) If a landowner wishes to decertify irrigated acres, he or she shall provide evidence for such decertification by completing a form supplied by the District.

(b) The ~~District~~Board of Directors shall establish incentive programs to implement best management practices for groundwater quality and quantity.

(c) The ~~District~~Board of Directors shall establish programs to educate all District constituents on groundwater conservation, management and utilization.

(d) The ~~District~~Board of Directors shall develop, in conjunction with the Department of Natural Resources, integrated management plans for any lands found by the Department to be hydrologically connected by surface water and groundwater under *Neb. Rev. Stat.* §46-712 if not fully appropriated or under *Neb. Rev. Stat.* §§46-713 and 46-715 if fully appropriated.

Rule 3 Phase II Groundwater Management Actions

(a) Upon the Board of Directors designation of a Phase II area, the ~~District~~Board of Directors shall establish an advisory group of stake holders from within the Phase II area to assist the District in developing Phase II rules and regulations, incentives to adopt best management practices and educational certification requirements.

Rule 4 Phase III Groundwater Management Actions

(a) ~~Advisory Group.~~ Upon the Board of Directors designation of a Phase III area, the ~~District~~Board of Directors shall establish an advisory group of stake holders from within the Phase III area to assist the District in developing Phase III rules and regulations. The rules and regulations shall require the implementation of best management practices, and shall require landowner reports relating to the contaminant and/or groundwater.

Section K Phase II Rules and Regulations

Section K(1) Groundwater Quality Management Area Phase II Lower Salt Creek Groundwater Reservoir, and the Davey, Hickman, Otoe County Rural Water District #3/Weeping Water, Pleasant Dale, Union and Valparaiso Community Water System Protection Areas

Rule 1 Determination and Designation of Phase II.

(a) Pursuant to these rules and regulations, the ~~District~~Board of Directors has determined that the criteria have been met to designate the following areas of management as Phase II Groundwater Quality Management Areas for nitrate-nitrogen, and therefore designates Phase II Groundwater Quality Management Areas on the following land, to wit (see maps for each area in Appendix A):

Lower Salt Creek Groundwater Reservoir
Lancaster County, Nebraska:
Township 10 North, Range 7 East,
Sections 4, 5, and 6
Township 11 North, Range 7 East,
Sections 13, 14, 23, 24, 25, 26, 27, 32, 33, 34, and 35;
Township 11 North, Range 8 East,
Sections 1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, and 30;
Township 12 North, Range 8 East,
Section 36;

Cass County, Nebraska:
Township 11 North, Range 9 East,
Sections 6 and 7;
Township 12 North, Range 9 East,
Sections 15, 16, 17, 18, 19, 20, 21, 29, 30, 31, and 32;

Saunders County, Nebraska:
Township 12 North, Range 9 East,
Sections 1, 2, 3, 4, 5, 7, 8, 9, 10, and 11.

Davey Community Water System Protection Area
Lancaster County, Nebraska
Township 12 North, Range 6 East:
Section 24: East ½ of the Southwest ¼; West ½ of the Southeast ¼; and the Southeast ¼ of the Southeast ¼
Section 25: North ½ of the Northeast ¼
Township 12 North, Range 7 East
Section 19: South ½ of the Southwest ¼
Section 30: North ½ of the Northwest ¼

Hickman Community Water System Protection Area
Lancaster County, Nebraska
Township 7 North, Range 7 East:
Section 9: Southeast ¼;
Section 10: South ½;
Section 15: North ½ and Southwest ¼; and
Section 16.

Otoe County Rural Water District #3/Weeping Water Community Water System Protection Area
Cass County, Nebraska:
Township 11 North, Range 11 East:
Section 1: South ½ of the Southwest ¼;
Section 2: South ½ of the Southeast ¼;
Section 11: Northeast ¼ and South ½;
Section 12: Northwest ¼ and South ½;
Section 13: North ½ and North ½ of the South ½;
Section 14: North ½ and North ½ of the South ½;
Section 15: Northeast ¼; North ½ of the Southeast ¼; and
The portion of the South ½ of the Southeast ¼ within the Village of Manley as of January 1, 2011;

Township 11 North, Range 12 East:
Section 7: South ½ of the Southwest ¼; and
Section 18: Northwest ¼ and North ½ of the Southwest ¼.

Pleasant Dale Community Water System Protection Area
Seward County, Nebraska:
Township 9 North, Range 4 East:
Section 2: The portion of the North ½ north of the Burlington-Northern Santa Fe railroad tracks;
Section 3: Northeast ¼ and the portion of the Southeast ¼ north of the Burlington-Northern Santa Fe railroad tracks;

Township 10 North, Range 4 East:
Section 34; and
Section 35: South ½; Northwest ¼; South ½ of the Northeast ¼; and West ½ of the North ½ of the Northeast ¼.

Union Community Water System Protection Area
Cass County, Nebraska:
Township 10 North, Range 13 East:
Section 22: Southeast ¼; and the portion of the South ½ of the Northeast ¼ south of Nehawka Road;
Section 23: Southwest ¼; and that portion of the Southwest ¼ of the Southeast ¼ within the Village of Union as of November 1, 2013;
Section 25: Southwest ¼ of the Northwest ¼; and the Northwest ¼ of the Southwest ¼;
Section 26: North ½; Southeast ¼; and the portion of the Southwest ¼ north of Weeping Water Creek; and
Section 27: Northeast ¼.

Valparaiso Community Water System Protection Area
Saunders County, Nebraska:

Township 13 North, Range 5 East:
Sections 14, 15, 21, 22, 23, and the southeast quarter of Section 16.

Rule 2 Continue Phase I Rules.

(a) The District shall continue to enforce all rules set forth in Groundwater Management Area Phase I, with respect to the land designated in these rules and regulations.

Rule 3 Establishment of Cost-Share Programs.

(a) The ~~District~~Board of Directors will establish cost-share programs to implement Best Management Practices (BMP's) on the land designated in Rule 1 above, which may include, but is not limited to, irrigation scheduling, proper timing and application of nitrogen fertilizers, proper chemigation techniques, crop rotation, residue management, irrigation surge and pivot conversions, water efficiency techniques, groundwater nitrate analysis kits and contaminant source inventories. All guidelines for BMP cost-share programs offered in the areas specified in these rules and regulations shall be made available by the District.

(b) The ~~District~~Board of Directors may also approve cost-share assistance for land in neighboring NRDs as long as the land is in a LPSNRD designated CWSPA, the landowner is certified as per these rules and regulations, and there is a jointly approved Interlocal Agreement allowing cost-share to be paid.

Rule 4 Required Certification Programs.

(a) The District requires educational certification for persons engaged in the use, application and storage of nitrogen fertilizers. Persons required to complete the nitrogen management certification are those that make the nitrogen management decisions on the land to be fertilized to include but not limited to: operators of agricultural lands who fertilize 20 acres or more; farm managers; commercial applicators; operators of lawn service companies; operators of golf courses; operators of sod farms; and anyone engaged in the application of manure/bio-solids/bio-liquids on five acres or more. The District will notify landowners when person(s) have completed nitrogen management certification. Nitrogen management certification can be obtained in one of four ways:

1) Attend a nitrogen management certification class in person,
2) Complete a Nebraska Association of Resources Districts nitrogen management certification course online,
3) Complete a nitrogen management certification home study course and open book exam, or
4) Obtain certification in nitrogen management from an adjoining natural resources District. The operator shall provide proof of certification to the District.

Certification classes will be scheduled each year when necessary from January through March. Certification will be required once every four years. The District will contact each certified person one year prior to the certification expiration date to verify if they are required to be re-certified.

Rule 5 Annual Review.

(a) The District will conduct an annual review no later than January 31 of each calendar year to assess Phase II actions and effectiveness on the land designated in Rule 1 above, including but not limited to the nitrogen management certification program and the BMP cost-share programs. After review by the appropriate subcommittees and/or advisory groups, the annual review will then be reported to the Board of Directors no later than March 1 of each calendar year.

Rule 6 Suspension of Phase II.

(a) When the District's groundwater quality monitoring data indicates that levels of a contaminant have dropped below the Phase II trigger for a period of not less than three (3) consecutive years, the ~~District~~Board of Directors may choose to suspend Phase II requirements. In making such a decision, the ~~District~~Board of Directors will consider all available information, including its groundwater quality monitoring data, vadose zone data, land use information, and all other pertinent information.

(b) Upon the District's determination that levels of a contaminant have dropped below the Phase II trigger, the ~~District~~Board of Directors shall:

(i) suspend the requirement for nitrogen certification in that Phase II area until such time as the ~~District~~Board of Directors should determine that Phase II trigger levels have again been exceeded;

(ii) direct District staff to notify all persons within that Phase II area who are required to obtain/maintain nitrogen certification of the ~~District's~~Board of Directors' determination that levels of a contaminant have dropped below the Phase II trigger and that nitrogen certification requirements have been suspended;

(iii) continue to offer cost-sharing on approved Best Management Practices; and

(iv) continue to offer nitrogen certification training, but on a rotating, voluntary basis. Persons who had been required to obtain/maintain nitrogen certification shall be notified of such voluntary training.

Section L Phase III Rules and Regulations

Section L(1) Groundwater Quality Management Area Phase III Elmwood Community Water System Protection Area

Rule 1 Determination and Designation of Phase III

(a) Pursuant to Rule 4, Section I, the ~~District~~Board of Directors has determined that the criteria have been met to designate the Elmwood Community Water System Protection Area a Phase III Groundwater Quality Management Area for nitrate-nitrogen and hereby designates a Phase III Groundwater Management Area on the following land, to wit (see map in Appendix A):

Elmwood Community Water System Protection Area
Cass County, Nebraska:
Township 10 North, Range 10 East:
Section 8: Southeast ¼
Section 9: South ½
Section 16: The portion of the Northeast ¼ north of the MoPac Trail; Northwest ¼; and the portion of the Southwest ¼ north of the MoPac Trail
Section 17: Northeast ¼ and the portion of the Southeast ¼ north of the MoPac Trail.

Rule 2 Continue Phase I and II Rules.

(a) The District will continue to enforce all rules set forth in Section I, Groundwater Management Area Phases I and II.

Rule 3 Required Certification Programs.

(a) The District requires educational certification for persons engaged in the use, application and storage of nitrogen fertilizers. Persons required to complete the nitrogen management certification are those that make the nitrogen management decisions on the land to be fertilized to include but not limited to: operators of agricultural lands who fertilize 20 acres or more; farm managers; commercial applicators; operators of lawn service companies; operators of golf courses; operators of sod farms; and anyone engaged in the application of manure/bio-solids/bio-liquids on five acres or more. The District will notify landowners when person(s) have completed nitrogen management certification. Nitrogen management certification can be obtained in one of four ways:

1) Attend a nitrogen management certification class in person,
2) Complete a Nebraska Association of Resources Districts nitrogen management certification course online,
3) Complete a nitrogen management certification home study course and open book exam, or
4) Obtain certification in nitrogen management from an adjoining natural resources District. The operator shall provide proof of certification to the District.

Certification classes will be scheduled each year when necessary from January through March. Certification will be required once every four

years. The District will contact each certified person one year prior to the certification expiration date to verify if they are required to be re-certified.

Rule 4 Annual Review.

(a) The District shall conduct an annual review no later than January 31 of each calendar year to assess Phase III actions and effectiveness on the land designated in Rule 1 above, including but not limited to the nitrogen management certification program and the BMP cost-share programs. After review by the appropriate subcommittees and/or advisory groups, the annual review will then be reported to the Board of Directors no later than March 1 of each calendar year.

Rule 5 Except as otherwise provided by Rule 6 below, any landowner, operator, farm manager or applicator who intends to apply nitrogen on any crop is required to conduct soil sampling each year prior to planting such crop. One soil sample shall be collected for each field between 10 and 40 acres, or each 40 acre area within a larger field. Soil samples for each 40 acres shall consist of a minimum of the following:

One shallow composite sample consisting of 10-15 individual samples randomly collected from a depth of 0-8" and thoroughly mixed; and
One deep composite sample consisting of 6-8 individual samples randomly collected from a depth of 8-30" and thoroughly mixed. NOTE: The University of Nebraska recommends that deep samples be taken to a depth of 36".

Rule 6 If any landowner, operator, farm manager or applicator applies nitrogen only as a starter, then the soil sampling described by Rule 5 above is not required.

Rule 7 Nitrogen fertilizer shall only be applied after the results of the soil sampling has been duly considered by the landowner, operator, farm manager or applicator and in no event shall such application exceed the crop nitrogen recommendations as determined according to the most current University of Nebraska formula.

Rule 8 Landowners, operators, farm managers or applicators required to conduct soil sampling shall report to the District the results of soil sampling and the amount of nitrogen applied to the field(s) sampled during any calendar year by the end of that calendar year.

Rule 9 Landowners, operators, farm managers or applicators are prohibited from applying nitrogen fertilizer between harvest and March 1 of any crop year.

Rule 10 The District encourages landowners of abandoned feedlots to identify and implement practices that will increase the uptake of existing nitrogen in the soil below the normal crop root zone and will consider developing programs to provide assistance.

Rule 11 The District encourages the establishment of grass or other buffer zones surrounding all public or community water wells and will consider developing programs to provide assistance.

Rule 12 Suspension of Phase III

(a) When the District's groundwater quality monitoring data indicates that levels of a contaminant have dropped below the Phase III trigger for a period of not less than three (3) consecutive years, the ~~District~~Board of Directors may choose to suspend Phase III requirements and revert to Phase II programs. In making such a decision, the ~~District~~Board of Directors will consider all available information, including its groundwater quality monitoring data, vadose zone data, land use information, and all other pertinent information.

(b) Upon the District's determination that levels of a contaminant have dropped below the Phase III trigger, the ~~District~~Board of Directors shall:

(i) suspend all regulatory requirements enacted for Phase III;

(ii) develop and adopt Phase II regulations for that area consistent with other Phase II areas;

(ii) notify all persons within that Phase III area who are required to comply with Phase III regulatory provisions that contaminant levels have dropped below the Phase III trigger, and that the area shall revert to Phase II requirements (i.e. nitrogen certification training only); and

(iii) offer cost-sharing on approved Best Management Practices.

Section M Improper Irrigation Runoff

Rule 1 The District by implementing these rules and regulations intends to conserve groundwater supplies and prevent the inefficient or improper runoff of groundwater used for irrigation. Each person who uses groundwater for irrigation within the boundaries of the District shall take action to prevent or control the inefficient or improper runoff of groundwater used for irrigation. These rules and regulations are not intended to prevent the *De Minimis* surface runoff of water derived from groundwater irrigation, onto the land of another person.

Rule 2 The District has no jurisdiction over the spray of groundwater from an irrigation system directly onto another person's land.

Rule 3 Prevention or Control of Inefficient or Improper Runoff

(a) Each person who uses groundwater for irrigation shall control or prevent the inefficient or improper runoff of such water by implementing structural or non-structural procedures, measures, or combinations thereof

designed to prevent or control inefficient or improper irrigation runoff, including but not limited to:

(i) Limitation of groundwater utilized so that structural measures are not necessary to prevent or control such inefficient and improper irrigation runoff and the utilization of proper operation and management of the irrigation system, including any reuse or other control measures installed;

(ii) Construction of a runoff collection and/or retention system such as a sump or dugout, together with a reuse pump and/or ditch to return the water to the same or other field for beneficial use;

(iii) Blocking of rows or field borders to contain irrigation water within the property where the groundwater is pumped;

(iv) The execution and performance of an agreement between two or more landowners, including tenants if any, and approved by the ~~District~~Board of Directors for utilization of any inefficient and improper irrigation runoff; and

(v) Any other procedure or measure approved by the ~~District~~Board of Directors.

Rule 4 Irrigation Runoff Utilization

(a) Any landowner, including a tenant if any, whose inefficient and improper irrigation runoff is capable of being captured and utilized by another landowner, including a tenant if any, in a manner which will prevent or control the inefficient or improper irrigation runoff may enter into an agreement with such landowner and tenant if any, with the consent and approval of the ~~District~~Board of Directors. The agreement may be terminated at any time by either party or by the ~~District~~Board of Directors whenever it is determined that such agreement no longer prevents or controls the inefficient or improper irrigation runoff. If the ~~District~~Board of Directors terminates the agreement, written notice shall be provided to all parties. If one of the parties to the agreement causes the termination, written notice shall be provided to all other parties and to the District.

Section N Transfer of Groundwater

Rule 1 Transfer of Groundwater

(a) Any person who withdraws groundwater for any purpose pursuant to a groundwater remediation plan as required under the Environmental Protection Act, including the providing of water for domestic purposes, from aquifers located within the State of Nebraska may transfer the use of the groundwater off the overlying land if the groundwater is put to a reasonable and beneficial use within the State of Nebraska and further complies with the requirements of *Neb. Rev. Stat.* §46-691. Groundwater transfers will be allowed for domestic or municipal uses. Groundwater

transfers for environmental, recreational, agricultural and industrial uses from a groundwater reservoir to lands outside of a groundwater reservoir are prohibited.

Section O Enforcement Procedures for the Nebraska Ground W~~w~~ater Management and Protection Act

Rule 1 General

(a) The District shall enforce the provisions of The Nebraska Ground W~~w~~ater Management and Protection Act and all rules and regulations adopted pursuant thereto by the issuance of cease and desist orders in accordance with the procedure hereinafter specified and by bringing appropriate actions in the District court of the county in which any violations occur for enforcement of such orders. Cease and desist orders may be issued for the following reasons:

(i) To enforce any of the provisions of the act or of orders or permits issued pursuant to the Act;

(ii) To initiate suits to enforce the provisions of orders issued pursuant to the Act; and

(iii) To restrain the construction of illegal water wells or the withdrawal or use of water from illegal wells.

Rule 2 Any person who violates any of the provisions of *Neb. Rev. Stat.* §§46-721 to 46-734, and §46-748 for which a penalty is not otherwise provided, other than the Director of Natural Resources, or the Department of Natural Resources, shall be subject to a civil penalty of not more than five hundred dollars. Each day of continued violation shall constitute a separate offense.

Rule 3 Complaints

(a) Any person who owns or leases land within the boundaries of the District, any person who resides within the District, any non-resident person who can show that the actions of any person within the District directly affects him or her, or the Board on its own motion may file a written complaint against a person alleging a violation of these rules and regulations or that such person is constructing, operating or possessing an illegal water well.

(b) Complaints shall be filed at the office of the District, 3125 Portia Street, at Lincoln, Lancaster County, Nebraska, on complaint forms prepared by said District which shall be available at such office or at such other office or offices from time to time the Board of Directors shall designate.

Rule 4 Investigations

(a) The alleged violation shall be investigated by a person authorized by the Board to conduct such investigations within five (5) days following the day of the filing of the complaint exclusive of Saturday, Sundays, and legal holidays. A copy of the complaint shall be delivered to the alleged

violator in person, or at his or her place or residence, or be sent by certified mail prior to the investigation.

(b) Upon completion of the investigation, the investigator shall file a report of his or her findings in the District office and shall deliver a copy of said report to the alleged violator and to the complainant, if other than the Board, in person, or at their place of residence, or shall transmit the same by certified mail.

Rule 5 Submittal of Investigation Report and Subcommittee Consideration Alleging Violation and Alleged Violators Alternatives

(a) A Subcommittee consisting of District Board members shall assist the District staff in administering these rules and regulations and make a determination as to whether a probable violation of these rules and regulations has occurred. Such determination shall be based upon the investigator's report completed pursuant to these rules and regulations and an on-site inspection by the Subcommittee, if warranted. The Subcommittee may also request that both the alleged violator and the complainant appear before them to discuss the complaint. The Subcommittee shall report its findings to the Board, the alleged violator and the complainant with a recommendation of further actions as follows:

(i) If the Subcommittee determines that no violation of these rules and regulations has occurred, it shall recommend and the Board may dismiss the complaint. The complainant shall be given an opportunity to appear before the entire Board before the Board acts on the recommendation;

(ii) If the Subcommittee determines that a probable violation of these rules and regulations has occurred, the alleged violator shall be informed of its findings by letter delivered in person or sent by registered or certified mail. The letter shall specify the options available to the alleged violator, including:

(A) Agree with and accept as true and correct the Subcommittee's findings that the alleged violation has in fact occurred or is occurring, consent to cease and desist from continuing or allowing the reoccurrence of such violation, and submit a plan which shall provide for the discontinuance and/or non-reoccurrence of the violation. If appropriate, such plan shall include the identification and description of all proposed procedures or measure to prevent, control, or abate improper groundwater irrigation runoff. The alleged violator shall agree to implement and abide by the terms of such plan. If such plan involves structural measures, the alleged violator shall simultaneously submit a schedule of compliance on forms provided by the District. The schedule of compliance shall provide for the submittal of a work order within ten days

following approval of the plan in the manner hereinafter provided; or

(B) Reject the findings of the Subcommittee and request that a formal hearing before the Board be scheduled and conducted in accordance with the rules and regulations of the District. The alleged violator shall be granted no less than seven (7) days (excluding Saturdays, Sundays and legal holidays) from the date that said report and notice is provided to him or her to respond and to indicate any actions intended.

Rule 6 Action Subsequent to Person's Consent to Cease and Desist

(a) When an alleged violator has been notified in accordance with Rule 4 of this section and has consented to cease and desist in accordance therewith, a District compliance officer shall review the complaint, the investigator's report, the consent order and any plan for discontinuance and schedule of compliance to determine whether the actions agreed to by the person will, when applied, bring such user into compliance with these rules and regulations, prevent construction, operation or possession of an illegal water well, or prevent improper ground well irrigation runoff. If the compliance officer determines that the proposed actions of the person are adequate and will prevent future non-compliance within a reasonable timer period, he or she shall approve such action or plan and approve the schedule of compliance. If the District compliance officer determines that implementation of the proposed plan and/or schedule of compliance would be inadequate to prevent improper groundwater irrigation runoff, he or she shall indicate the additions or changes he or she deems necessary. There after the person shall have five (5) days to consent to such additions or changes in the event of which the compliance officer shall approve the plan and/or schedule of compliance as amended, or, the person may refuse to agree to such additions or changes and request the scheduling of a formal hearing on the issues, which shall be held no less than ten days from the date of request. The original actions under these rules and regulations and the documents filed in accordance therewith by the person shall not be considered at such hearing unless introduced into record by that person. The complainant shall be notified of any such action by the District compliance officer approving the plan and/or schedule of compliance submitted by the person within three (3) days following such approval. If no objections to the action taken are received from the complainant, other than the Board itself, or from any members of the Board if the Board is the complainant within five (5) days after such notification, the proposed plan and/or schedule of compliance shall be considered as having received final approval, if any such complainant or Board member objects to the approval granted by the compliance officer within five (5) days after notification, a formal hearing before the Board shall be scheduled not less than ten (10) days following notification to all

affected parties and shall be conducted in the same manner as if the person had requested the hearing in accordance with these rules and regulations..

Rule 7 Board Action Subsequent to Person's Request for Hearing

(a) At a meeting of the Board prior to which an alleged violator, complainant, or Board member has, in accordance with these rules and regulations, requested a formal hearing, the Board shall hold such formal hearing. If, following a hearing, the Board determines that such person is violating or has violated these rules and regulations or is constructing or operating an illegal water well, it shall adopt and transmit to such person, in person or by certified mail, an order directing such user to immediately cease and desist from all activities determined by the Board to be violations and specifying any actions deemed necessary and appropriate by the Board.

Rule 8 Board Action if Person Fails to Respond or Appear

(a) At a meeting of the Board prior to which an alleged violator has been notified in accordance with these rules and regulations, and such alleged violator has failed to respond there under, or has failed to appear at any properly scheduled formal hearing, the Board shall review the complaint and the investigator's report as well as any other pertinent information and issue such order or orders in accordance with these rules and regulations as are deemed appropriate.

Rule 9 Person's Actions Following Issuance of Cease and Desist Order

(a) Any person against which a cease and desist order has been issued in accordance with these rules and regulations may within seven (7) days following receipt of such order, submit a schedule of compliance. Any such schedule of compliance requested shall be accompanied by a work order on forms provided by the District and the schedule of compliance and the work order shall be approved by the ~~District~~Board of Directors and the schedule of compliance and the work order shall be approved by the District compliance officer if such request is in accordance with any and all guidance given by the Board of Directors at the time of issuance of the order.

Rule 10 Board Authorization to Initiate Court Action

(a) The Board shall, at the time it takes any action in accordance with these rules and regulations, designate a representative of the Board to initiate appropriate legal actions in the District Court of the County of which the violation has occurred ten days after the notice to the person affected by issuance of any orders of the District which orders have not been complied with nor a schedule of compliance approved. In addition, if any schedule of compliance or work order approved by the Board or the District compliance officer is not initiated as agreed to or is not being properly and timely carried out, unless due to circumstances beyond the control of the

person, the Board shall authorize immediate initiation of appropriate litigation.

Rule 11 Cease and Desist Order

(a) Any violation of a cease and desist order issued by the Lower Platte South Natural Resources District pursuant to *Neb. Rev. Stat.* §46-656.08 shall be a Class IV misdemeanor.

Section P Request for Variance

Rule 1 Information Required

(a) Name, address, phone number, e-mail address;
(b) State the section and rule pertaining to the variance request;
(c) Aerial photo showing location of the variance request;
(d) State why the variance is needed;
(e) Map showing the name and address of all adjoining landowners;
(f) A signed acknowledgement of notice by the adjoining landowners and water well owners;
(g) Any other information the person making the request deems relevant; and
(h) Any other information the District deems necessary.

Rule 2 Fee For Variance Request

(a) Any applicant for a variance shall deliver to the District a non-refundable fee of $500.00 for each variance request.

Rule 3 Appearance Before the Directors of the Lower Platte South NRD

(a) Variance applicant may be required to appear before the Water Resources Subcommittee to explain the variance request.
(b) Variance applicant may be required to appear before the Board of Directors.

Rule 4 Consideration of the Variance Request

(a) All variance requests will be considered on a case by case basis.
(b) All variance requests shall be acted upon by the Board of Directors.
(c) A variance request shall be granted upon a finding of good cause shown when the variance request relates to a consumptive use of water.
(d) A variance request that seeks to waive some part of the permit application process shall be granted upon a finding that a reasonable basis exists for an applicant to request such waiver, and that the requested waiver would not impair the District's permitting process under Section C of these Rules and under the Ground Water Management and Protection Act.

Rule 5 Variance Terms and Conditions

(a) The Board of Directors may place terms and conditions on the variance that the applicant must agree to by signing an affidavit which shall be recorded with the Register of Deeds.

(b) If such terms and conditions are required by the Board, the applicant must provide the District with documentation that the affidavit was recorded within thirty (30) days of the granting of the variance.

Section Q Hydrologically Connected Area

Rule 1 Designation of Hydrologically Connected Areas of Groundwater and Surface Water

(a) The Nebraska Department of Natural Resources has determined that groundwater and surface water in portions of Lancaster, Saunders, and Cass Counties in the Lower Platte South Natural Resources District are hydrologically connected. The District hereby adopts the following as a Hydrologically Connected Area (HCA) for the purpose of managing groundwater and surface water (see map in Appendix A):

Lancaster County: Township 11 North, Range 7 East, Section 24; Township 11 North, Range 8 East, Sections 1, 2, 3, 9, 10, 16, 17, 18, 19, and 20; and Township 12 North, Range 8 East, Sections 25, 35, and 36.

Saunders County: Township 12 North, Range 9 East, Sections 2, 3, 4, 8, 9, and 10; Township 13 North, Range 9 East, Section 36; and Township 13 North, Range 10 East, Sections 31 and 32.

Cass County: Township 12 North, Range 9 East, Sections 15, 16, 17, 19, 20, 21, 22, 29, 30, and 31; Township 12 North, Range 10 East, Sections 4, 5, 9, 10, 11, 12, 13, 14, and 24; Township 12 North, Range 11 East, Sections 1, 11, 12, 14, 15, 16, 18, 19, 20, and 21; Township 12 North, Range 12 East, Section 6; Township 12 North, Range 13 East, Sections 1, 2, 3, 4, and 12; Township 13 North, Range 12 East, Sections 25, 26, 27, 28, 31, 32, 33, 34, 35, and 36; Township 13 North, Range 13 East, Sections 28, 30, 31, 32, 33, 34, 35, and 36; and Township 13 North, Range 14 East, Section 31.

Rule 2 District to Maintain Status

(a) The District intends to maintain the status of not fully appropriated as determined by the Nebraska Department of Natural Resources by adopting and implementing the rules and regulations herein.

Rule 3 Certification of Historically Irrigated Acres

(a) Within the HCA, only acres that are certified by the District as historically irrigated or approved for expansion may be irrigated.

(b) The District has completed certification of acres historically irrigated with groundwater within the Hydrologically Connected Area, and determined that 2,964 acres should be so certified.

Rule 4 Expansion of Irrigated Acres

(a) The District shall allow for the expansion of irrigated acres in accordance with the allowable new depletions in each five-year increment as agreed upon by the Lower Platte River Basin Water Management Plan Coalition.

(b) To expand irrigated acres, landowners shall apply to the District on forms provided by the District.

(c) The ~~District~~Board of Directors shall consider each application and either approve or deny the application based on the following criteria and considerations:

(i) Whether or not the land is suitable for irrigation of the crops grown using criteria established by the U.S. Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS);

(ii) Whether or not the proposed expansion is considered to be "sodbusting" as defined by USDA/NRCS;

(iii) Whether or not the landowner is implementing practices designed to conserve water such as converting from furrow to center pivot irrigation or other practices designed to conserve water;

(iv) Whether or not the irrigation expansion utilizes an existing groundwater source;

(v) Whether or not the groundwater source is proposed to be withdrawn from an illegal water well; and

(vi) Any other criteria and considerations deemed relevant by the District.

(d) Irrigation of land outside the HCA by a new well in the HCA is prohibited.

(e) As of the effective date of these rules and regulations, if an existing well within the HCA is irrigating land outside the HCA, the District will allow that land to continue to be irrigated, but no expansion of irrigated acres will be allowed outside the HCA.

Rule 5 Transfer of Certified Irrigated Acres Designated by the ~~District~~Board of Directors Within the Hydrologically Connected Area

(a) Transfer of certified irrigated acres designated by the ~~District~~Board of Directors within the HCA will be allowed only if:

(i) The transfer is acre-for-acre or less than acre-for-acre;

(ii) The land to which the acres are transferred is suitable for irrigation of the crops grown using criteria established by the USDA/NRCS;

(iii) The transfer is not to a furrow irrigation system; and

(iv) The requirements of LB477, 2009 Legislative Session, are followed.

(b) If the transfer is less than acre-for-acre, the District reserves the right to claim credit for all groundwater not used as a result of the transfer.

Rule 6 District to Claim Credit for Difference

(a) Beginning with the effective date of these rules and regulations, the District reserves the right to claim credit for and set aside for future use the difference between:

(i) Groundwater used on the number of expanded irrigated acres approved by the District; and

(ii) Groundwater that would have been used on 20% of the acres located in the HCA and certified by the District as historical.

Rule 7 New Permits for Water Wells Located Within the Hydrologically Connected Area

(a) The ~~District~~Board of Directors will consider applications for new water well permits in the HCA if the applicants meet all conditions for water well permits set forth in Section C of the District's Groundwater Rules and Regulations as well as the conditions in these rules and regulations.

(b) In addition to the reasons set forth in Section C of the District's Groundwater Rules and Regulations, the ~~District~~Board of Directors shall deny any new water well permits in the HCA for:

(i) Gravity irrigation; or

(ii) Irrigation of land determined by the District to be not suitable for irrigation of the crops grown using criteria established by the USDA/NRCS; or

(iii) Irrigation of lands outside the HCA.

(c) Water well permits are not required for:

(i) Domestic wells pumping 50 gallons per minute or less;

(ii) Wells used to water range livestock and pumping 50 gallons per minute or less;

(iii) Test holes;

(iv) Dewatering wells with an intended use of 90 days or less;

(v) Monitoring or observation wells;

(vi) Wells designed for remediation of groundwater contamination;

(vii) Surface water uses;

(viii) Wells for emergency human consumption or public health and safety; or

(ix) Wells permitted by the Nebraska Department of Natural Resources under the Municipal and Rural Domestic Transfers Permit Act prior to the stay imposed by the Nebraska Department of Natural Resources.

Rule 8 District to Claim Credit for Groundwater Pumped from Outside Hydrologically Connected Area

(a) The District reserves the right to claim credit for future use the discharge from all municipal, community, or industrial water systems if such

systems obtain their water from wells located outside the HCA and such discharge is returned to the Platte River Basin.

Rule 9 Enforcement and Variance

(a) The District will enforce the rules and regulations adopted herein pursuant to and in accordance with the Enforcement Procedures provided in the Groundwater Rules and Regulations of the District, as may from time to time be amended.

(b) Any requests for a variance from these rules and regulations will be governed by the Groundwater Rules and Regulations of the District, as may from time to time be amended.

(c) If a landowner is not satisfied with any determination made pursuant to the rules and regulations adopted herein, he or she may request a formal hearing before the Board as provided in these rules and regulations.

Section R Special Management Area

Rule 1 The District may designate a Special Management Area for the protection of groundwater quantity in a portion or portions of the District where additional controls are necessary for the protection of groundwater quantity in that area. Such additional controls are in the public interest and for the promotion of the health and welfare of the District because they will minimize pumping conflicts and protect groundwater supplies for all beneficial uses.

Rule 2 Dwight-Valparaiso-Brainard (DVB) Special Management Area.

(a) The District hereby designates an area, which includes the Dwight-Valparaiso Groundwater Reservoir and portions of the Remaining Area, as a Special Management Area for additional groundwater quantity controls to address ~~short~~ short-term problems, in response to the situation where the existing groundwater quantity Phase Triggers for this Groundwater Reservoir are not responsive. This area includes the following land, to wit (see map in Appendix A):

Butler County, Nebraska
Township 14 North, Range 4 East
Sections: 1-5, 8-18, 20-29 and 32-36.

Township 13 North, Range 4 East
Sections: 1-5, 8-18, 20-30, and 32-36.

Saunders County, Nebraska
Township 14 North, Range 5 East
Sections: 4-9, 16-21, and 28-33.

Township 13 North, Range 5 East
Sections: 1-36.

Township 13 North, Range 6 East
Sections: 3-11, 14-23, and 26-35.

Seward County, Nebraska
Township 12 North, Range 4 East
Sections: 1-3.

Lancaster County, Nebraska
Township 12 North, Range 5 East
Sections: 1-6, and 10-12.

(b) No New Irrigated Acres.

(i) There shall be no new groundwater irrigated acres from any water well located in the Special Management Area beyond those acres certified by the District on March 1, 2014 as irrigated acres by groundwater.

(c) Allocation.

(i) The use of groundwater from any water well for irrigation of certified acres in the Special Management Area shall be subject to an allocation. The District hereby establishes a three (3) year rolling allocation of twenty-one (21.0) acre-inches per irrigated acre not to exceed a nine (9.0) acre-inch annual maximum. The rolling allocation shall remain in effect until such time as the District modifies or removes it. The District shall also maintain a local advisory committee.

(A) There shall be no required allocation for that portion of the Special Management Area located in Township 13 North, Range 6 East, Saunders County.

(ii) If groundwater use has exceeded the annual maximum allocation during any one (1) calendar year of the three (3) year rolling allocation period, the subsequent allocation shall be reduced by an amount equal to two (2) times the amount in excess of such annual allocation, and carried forward in each of the following calendar years until such penalty is reduced to zero (0).

(iii) In addition to (ii) above, if groundwater use exceeds the maximum three (3) year rolling allocation of 21.0 acre-inches, the subsequent allocation shall be reduced by an amount equal to two (2) times the amount in excess of such three (3) year rolling allocation, and carried forward in each of the following calendar years until such penalty is reduced to zero (0).

(d) Required Certification Programs.

(i) The District shall require educational certification in irrigation management for those persons making the management decisions for using a well to irrigate agricultural land. The irrigation management

certification may be obtained by attending class, as a take home test, or on-line. After June 1, 2015, the name of each person so certified must be on file with the District for each groundwater well irrigating agricultural lands in the Special Management Area. Irrigation certification will be required once every four years. The District will accept certification in irrigation management from other natural resources Districts upon providing proof of certification.

(e) Establishment of Cost-Share Programs.

(i) The District will establish cost-share programs to implement Best Management Practices (BMP's) on the land designated in these rules and regulations, which may include but is not limited to, irrigation management practices.

(f) New or Replacement Wells.

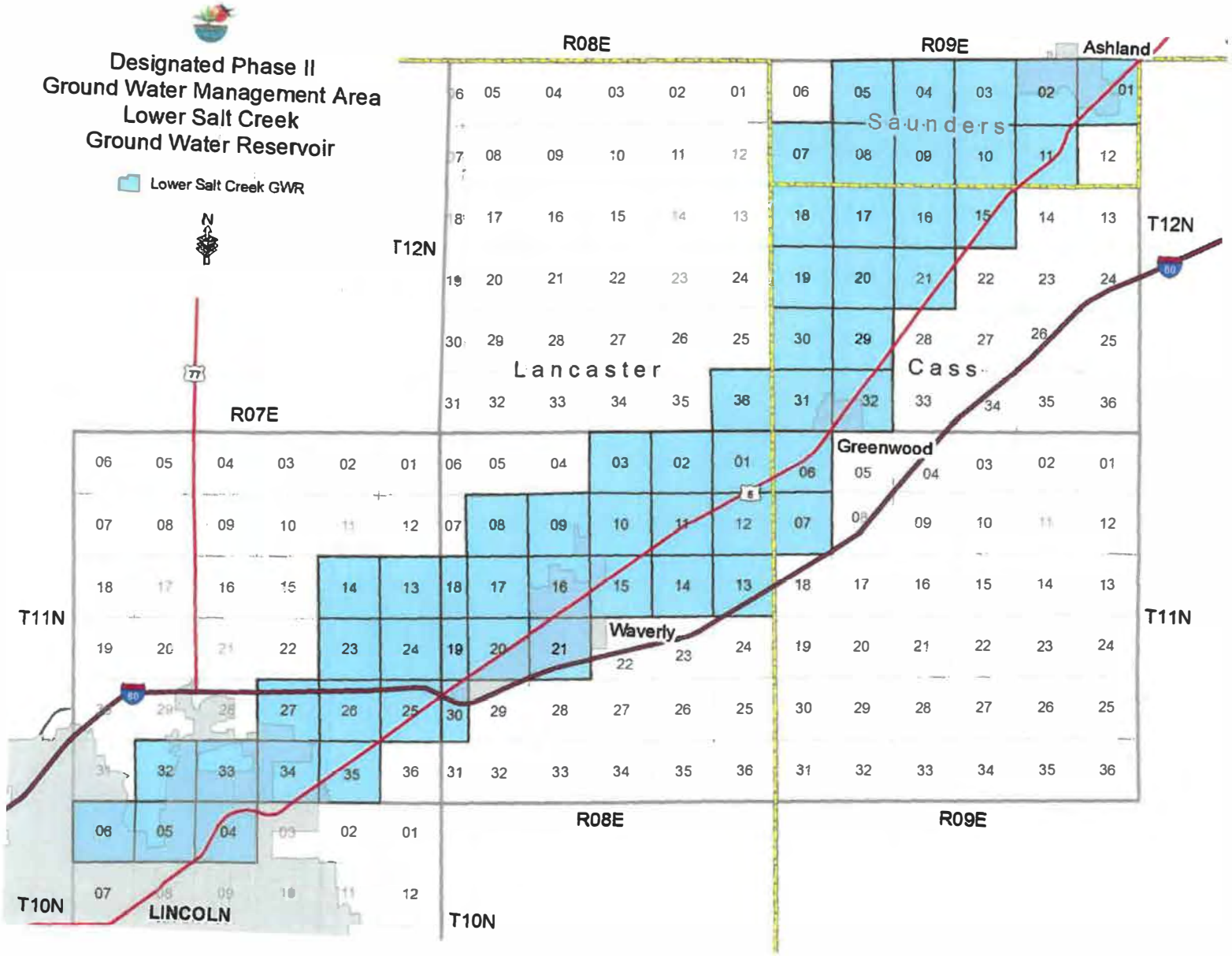
(i) All new or replacement water wells to be used for domestic or other purposes, excluding monitoring and other non-consumptive wells, shall be constructed to such a depth that they are less likely to be affected by seasonal declines caused by other water wells in the same area.

(ii) Except for wells listed as exceptions to stays in *Neb. Rev. Stat.* §46-714(3), all applications for wells in the Special Management Area for which permits are required shall be presented to the Board of Directors for consideration. The District may request an applicant to provide a hydrogeologic assessment from a qualified professional geologist or engineer with experience in such analysis showing the extent of any impact from this new or replacement well on existing wells. The Board may deny an application for a permit if it finds that the operation of a new or replacement well will adversely impact an existing well or wells or if such well is not in the public interest. Public interest shall include consideration of the economic, social, and environmental impacts of the proposed new or replacement well and whether and under what conditions other sources of water are available for use proposed for the new or replacement well.

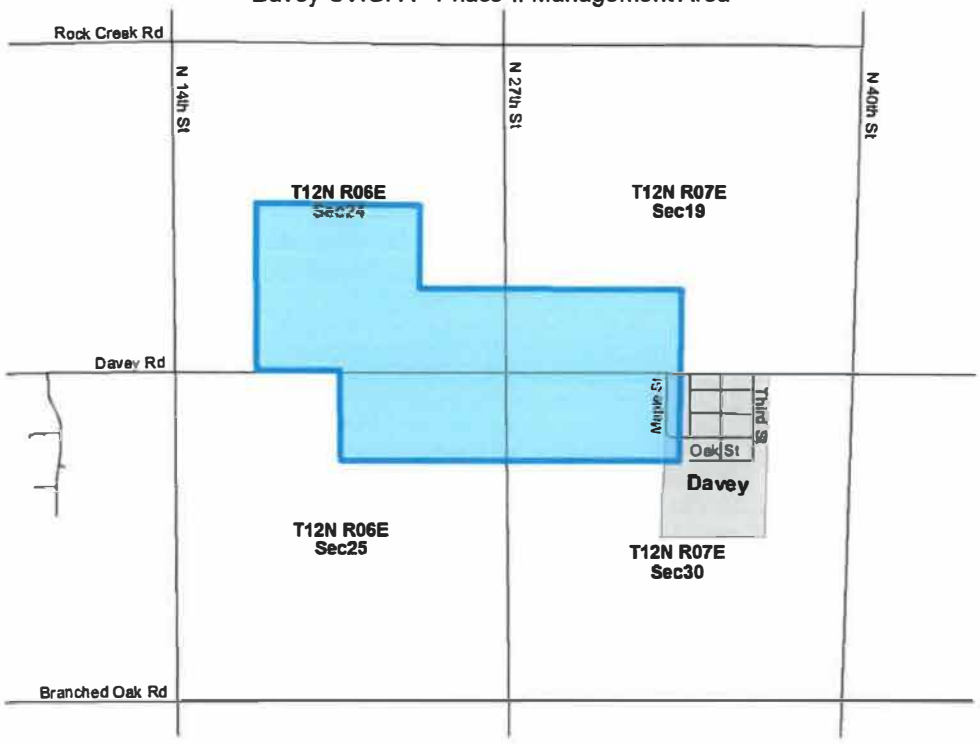
This page intentionally left blank.

Appendix A

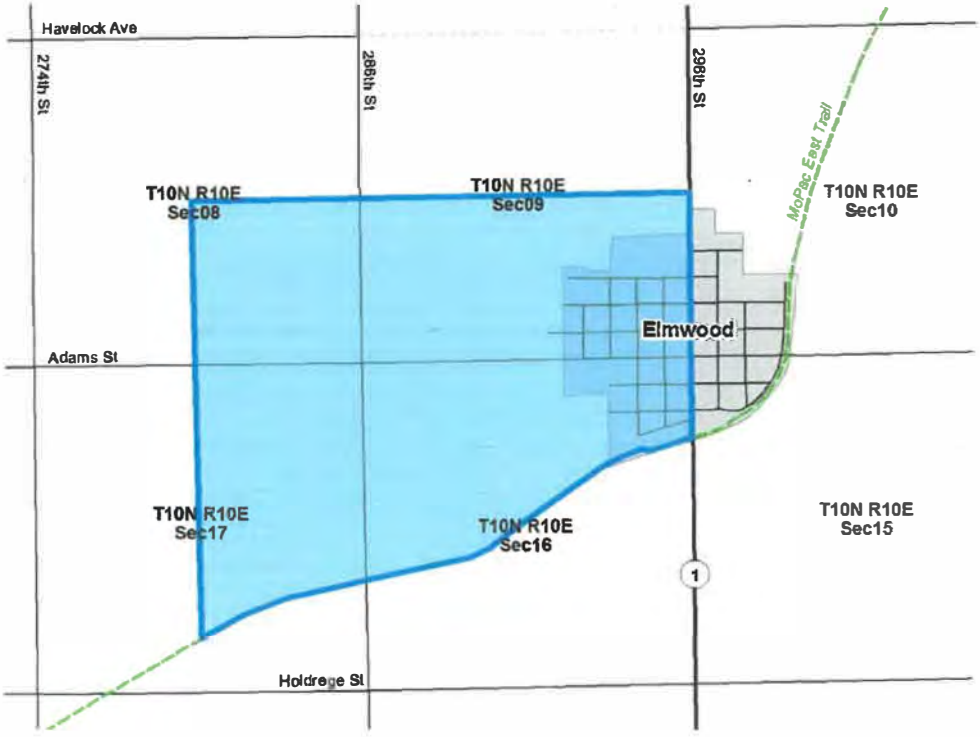
Maps


Designated Phase II
Ground Water Management Area
Lower Salt Creek
Ground Water Reservoir
Lower Salt Creek GWR
N
R08E
R09E
Ashland
Saunders
Lancaster
Cass
T12N
R07E
Greenwood
Waverly
T11N
R08E
R09E
T10N
LINCOLN
T10N

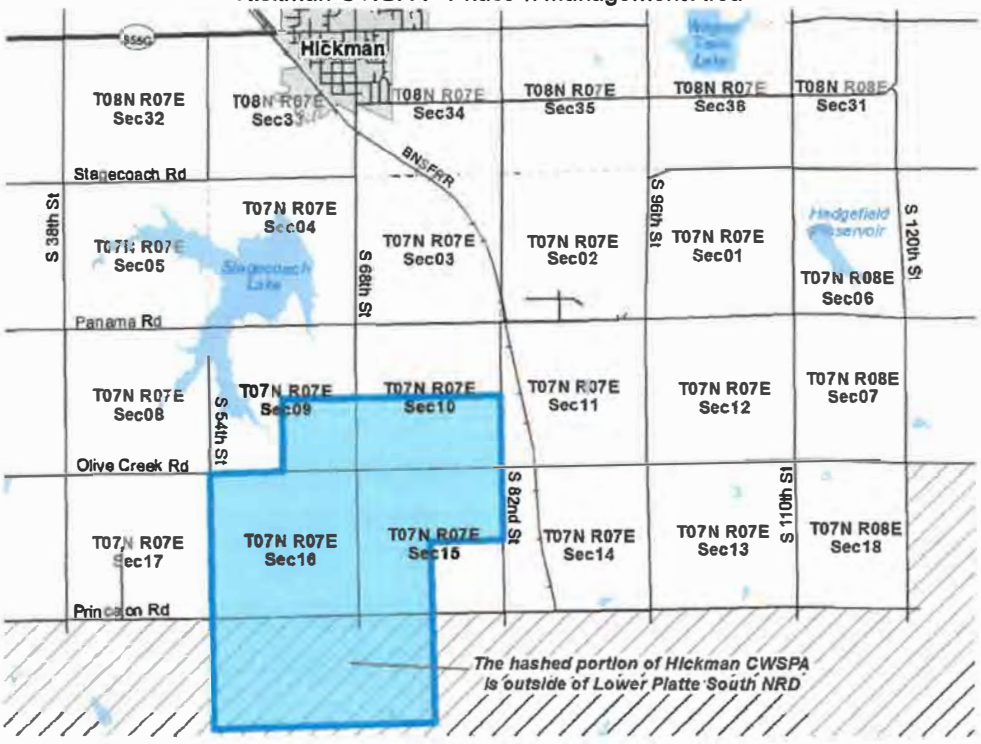
Davey CWSPA - Phase II Management Area



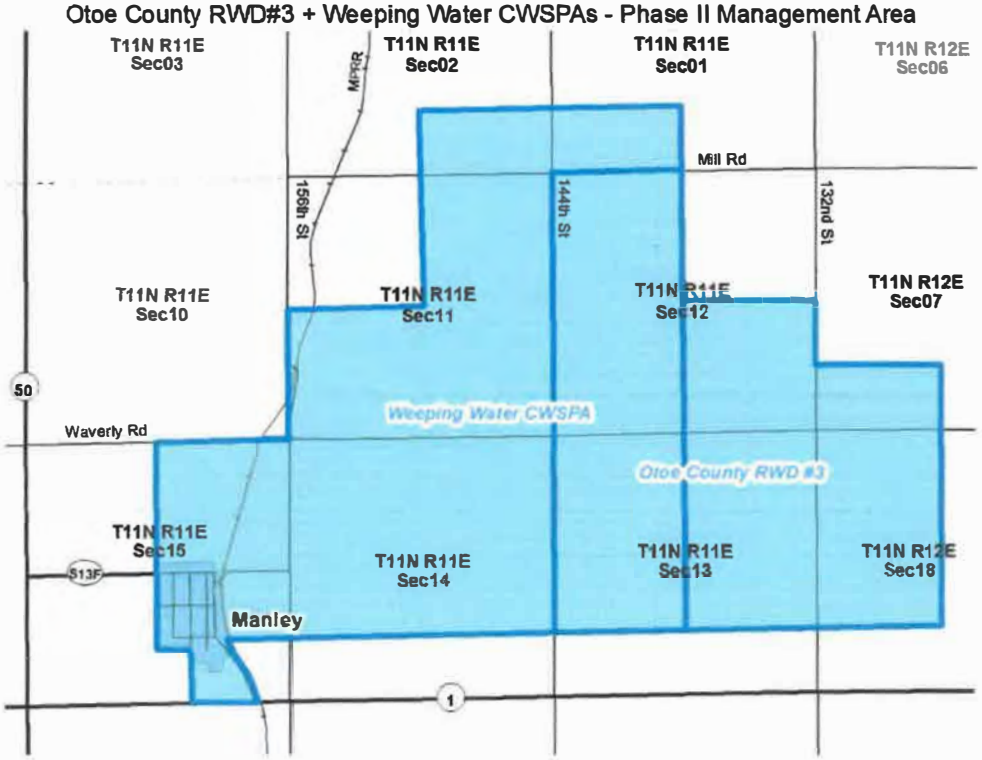
Elmwood CWSPA - Phase III Management Area



Hickman CWSPA - Phase II Management Area

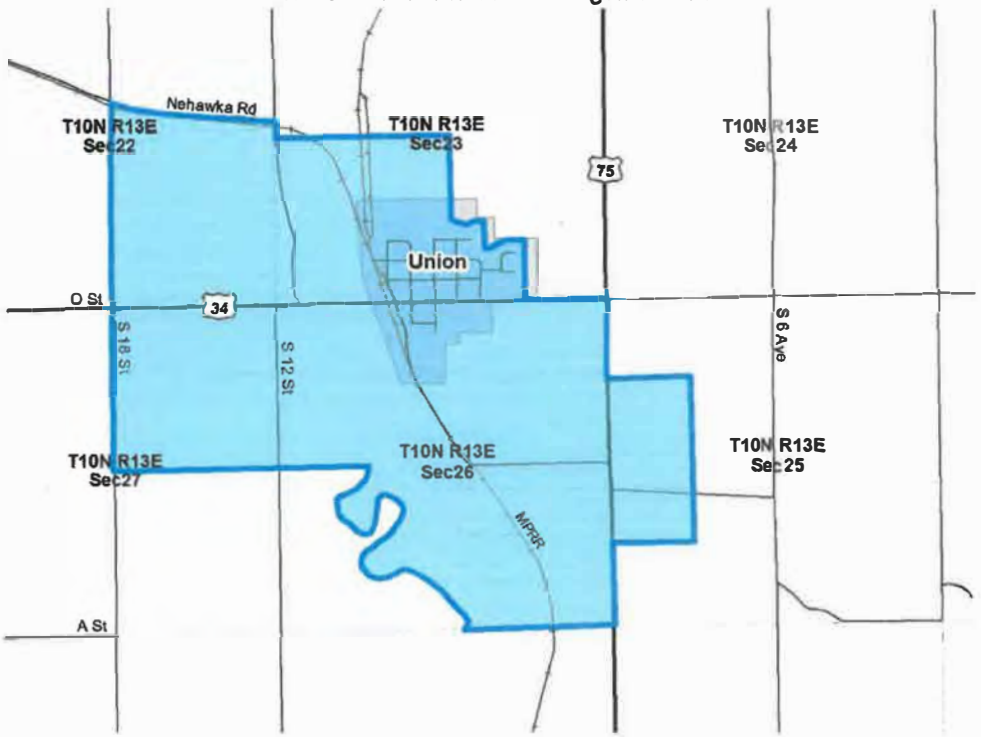


Otoe County RWD#3 + Weeping Water CWSPAs - Phase II Management Area

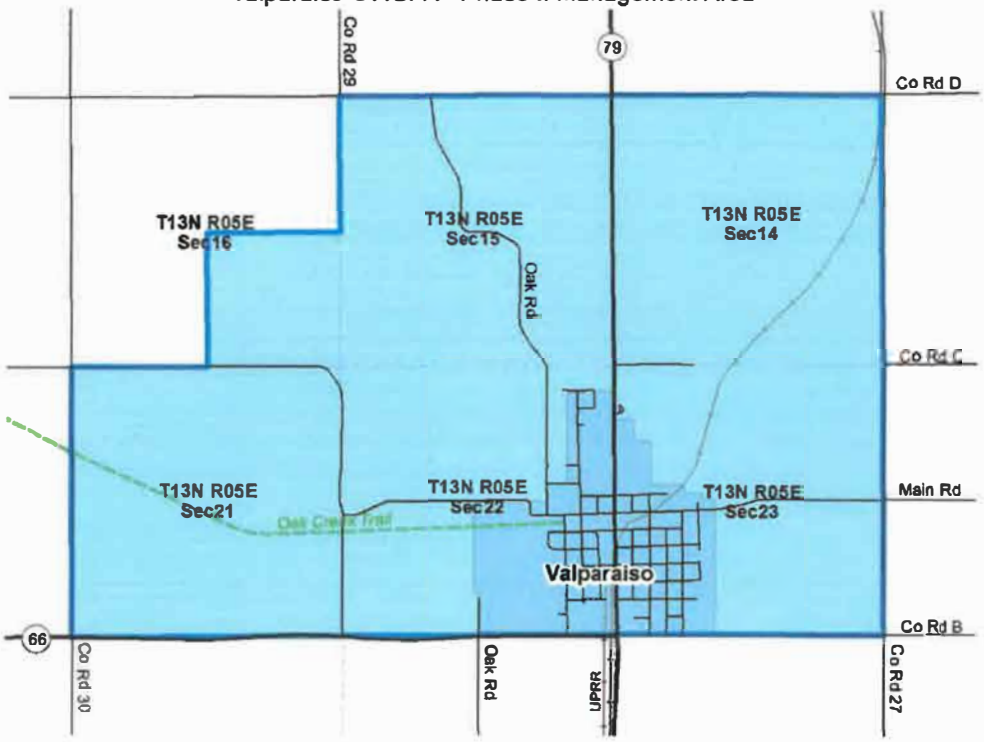


Pleasant Dale CWSPA - Phase II Management Area

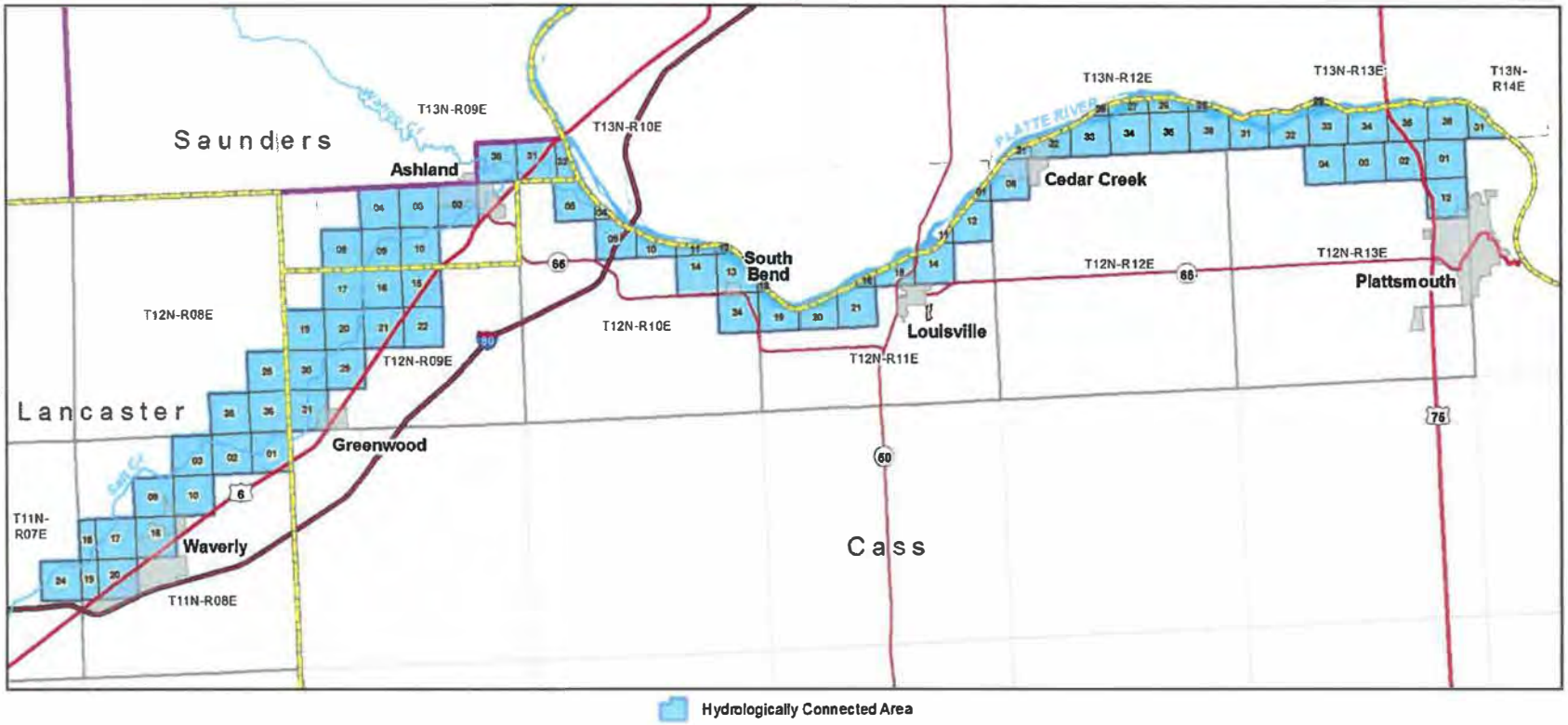
Union CWSPA - Phase II Management Area

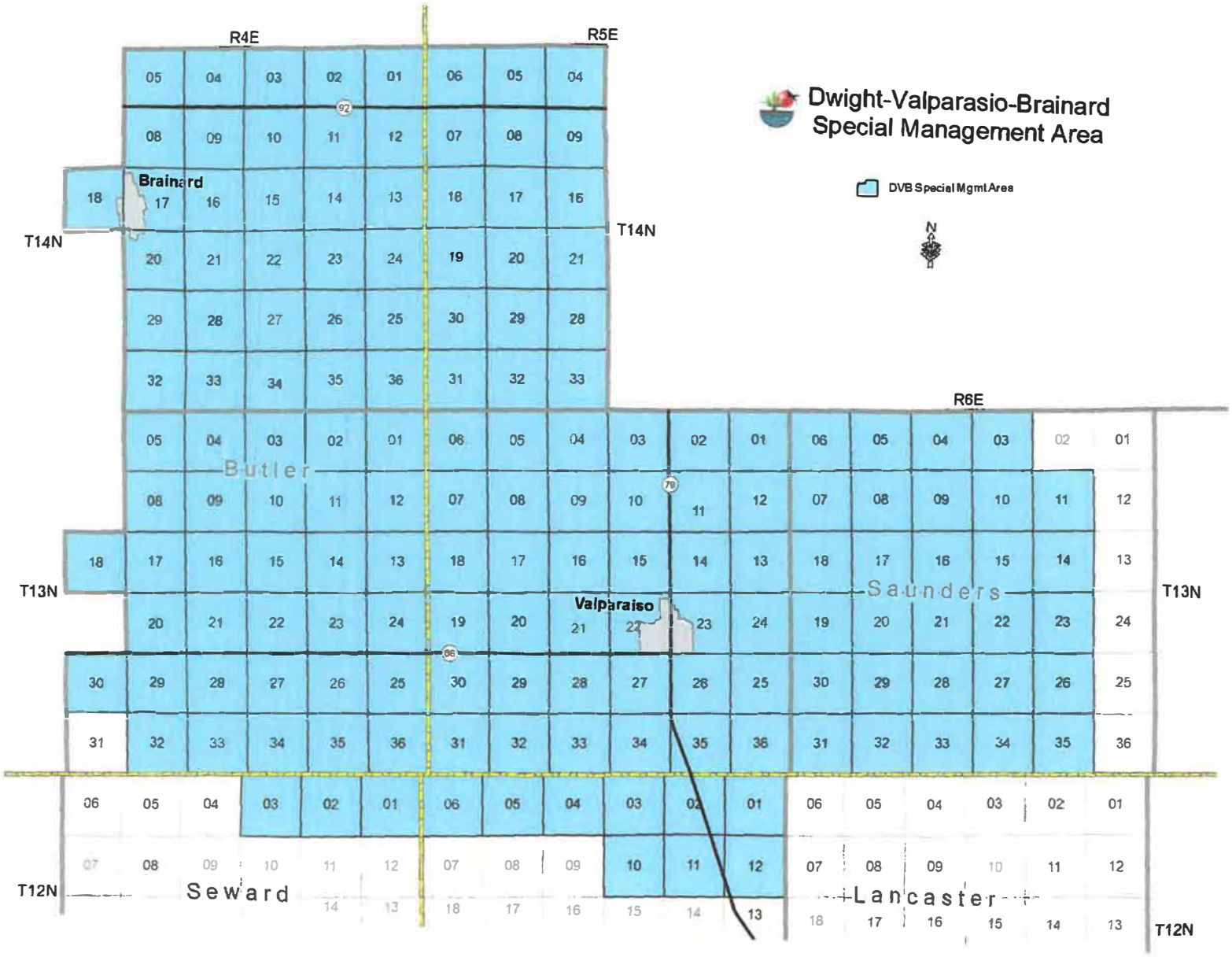


Valparaiso CWSPA - Phase II Management Area

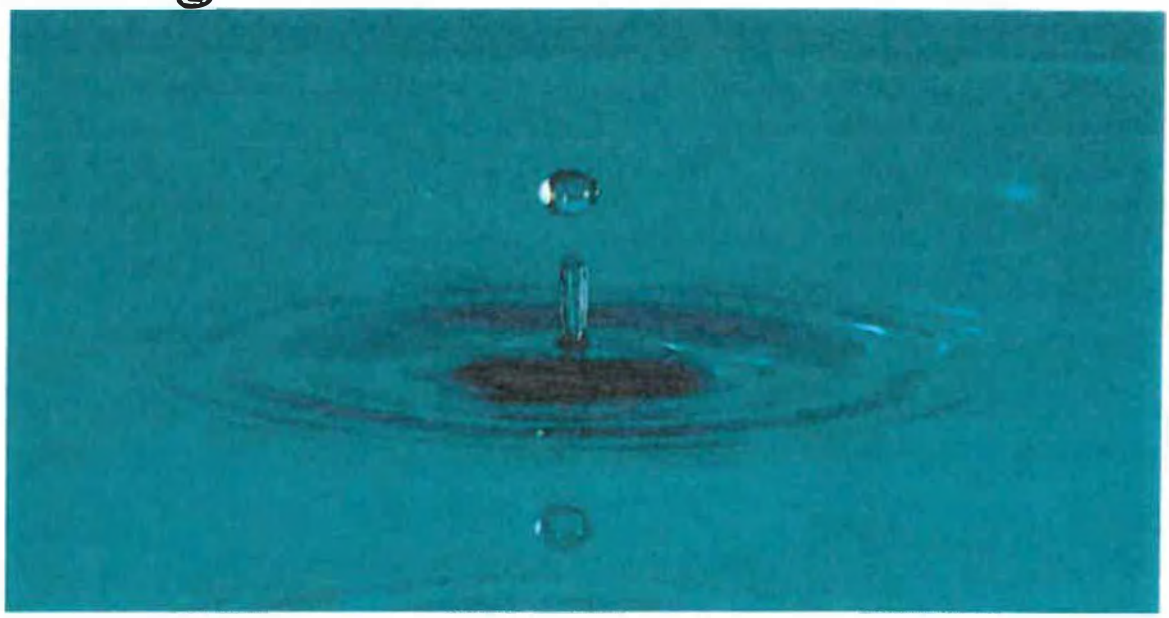


Hydrologically Connected Area - Lower Platte South Natural Resources District



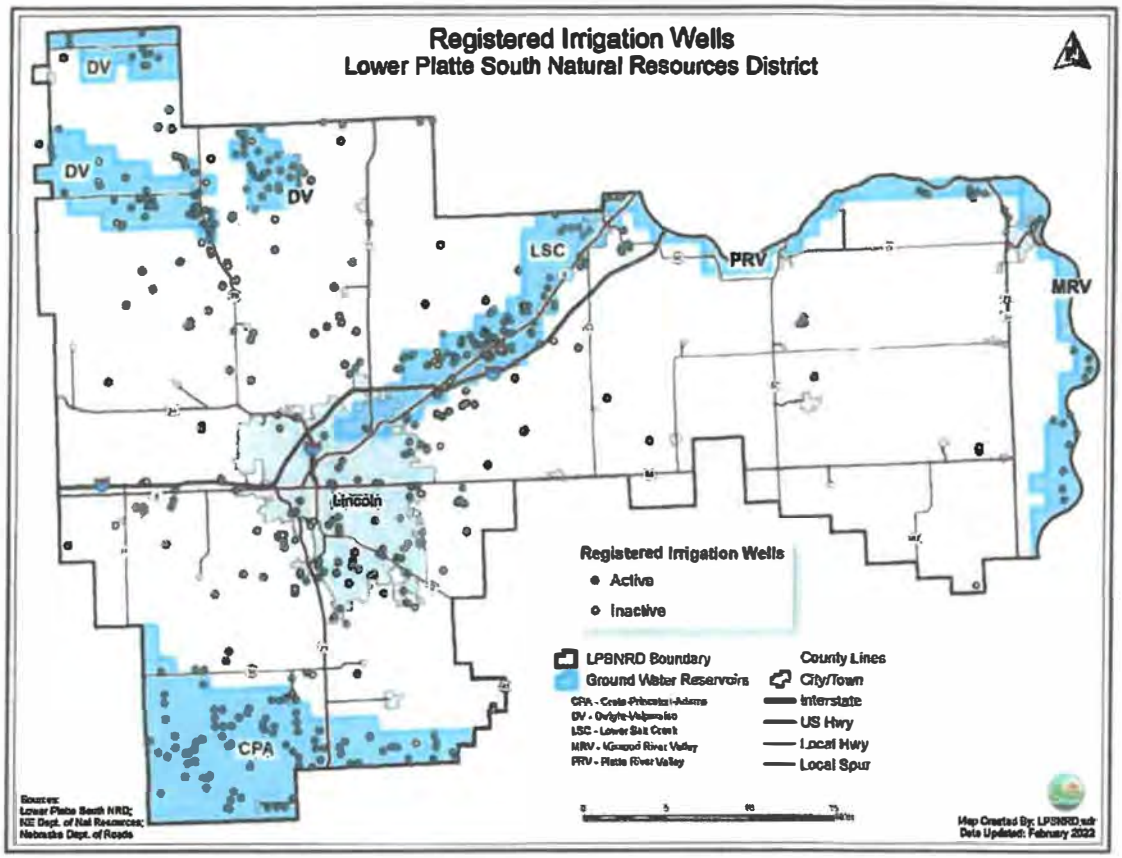

Dwight-Valparasio-Brainard
Special Management Area
DVB Special Mgmt Area
N
R4E
R5E
R6E
T14N
T13N
T12N
Brainard
Butler
Valparaiso
Saunders
Seward
Lancaster

Lower Platte South Natural Resources District 2021 Groundwater Management Plan Review



Section 3
Groundwater Monitoring Network

Figure 5 – Locations of Registered Irrigation Wells



3. GROUNDWATER MONITORING NETWORK

Applicable Regulations: Sections F, G

The District's groundwater monitoring networks are designed to provide a grid-like network of monitoring sites for each of the Groundwater Reservoirs and the Remaining Area, and to provide additional information about each CWSPA. LPSNRD's GWMP allows for the designation of various phases to deal with increasing groundwater contamination and/or decreasing groundwater levels. The entire NRD is currently in at least a Phase I Groundwater Management Area (GWMA), and in this phase the District establishes various information and education programs, and requires permits for all new wells which pump more than 50 gallons per minute (gpm) in a GWR or CWSPA, and 20 gpm for non-domestic wells in the RA. Higher levels of phased management have been implemented in some parts of the District to deal with concerns over groundwater quality and quantity (see below). Progress in developing LPSNRD's monitoring well network is shown in Table 1.

Groundwater Reservoir	# Network Wells Needed	# Quality Network Wells/% Complete	# Quantity Network Wells/% Complete
Crete-Princeton-Adams	33	31/94%	26/79%
Dwight-Valparaiso	23	22/96%	24/104%
Lower Salt Creek	19	16/84%	25/131%
Missouri River Valley	10	5/50%	3/30%
Platte River Valley	12	7/58%	4/33%
Remaining Area	58	42/72%	58/100%

Table 1 – Status of Groundwater Monitoring Networks

For groundwater quality, if levels of a contaminant exceed 50% of the federal maximum contaminant level (MCL) for that contaminant in 50% of the District's groundwater monitoring network wells for two consecutive years, the NRD can designate a Phase II GWMA, and adopt rules and regulations for management of that contaminant. If contaminant levels exceed 80% of the MCL in 80% of the NRD's network wells, again for two consecutive years, the NRD can designate a Phase III GWMA, and adopt additional, more stringent rules and regulations for dealing with the situation. Currently, the Lower Salt Creek GWR and the Valparaiso, Otoe County RWD #3/Weeping Water, Davey, Hickman, Pleasant Dale, and Union CWSPAs are in Phase II management, and the Elmwood CWSPA is in Phase III management for groundwater concerns due to elevated nitrate levels (see Figure 3).

For groundwater quantity, LPSNRD's GWMP lays out a similar procedure for designating phased management areas to deal with groundwater declines. If spring static water level elevations in 30% of the District's groundwater monitoring network wells have declined from the established upper elevation of the saturated thickness by 8% (15% in the Lower Salt Creek GWR), the NRD can designate a Phase II GWMA, and adopt rules and regulations to manage groundwater declines. If spring static water level elevations in 50% of the District's network monitoring wells decline by 15% (30% in the Lower Salt Creek GWR), the NRD can designate a Phase III GWMA, and again can adopt additional and more stringent rules and regulations for management of groundwater declines. Currently, there are no Phase II or III GWMAs for groundwater quantity in the LPSNRD, but due to concerns over seasonal declines, LPSNRD is implementing management actions in a Special Management Area in the Dwight-Valparaiso-Brainard area (see Section 4.2).

3.1 Groundwater Quality Monitoring Program

Staff collected 274 samples and 61 quality assurance/quality control (QA/QC) samples from 242 different wells in 2021. Samples that were collected were obtained from monitoring network wells, CWSPA wells, irrigation wells, and other wells that the District samples on an annual basis. Samples were analyzed for a variety of parameters, including nitrate-nitrogen, major ions, pH, specific conductance, hardness, alkalinity, and total dissolved solids. Since 2005, pesticide analyses have been rotated annually between different GWRs, and in 2010, the District adopted a similar rotation for major ions. Community water supply wells and CWSPA monitoring wells were tested for arsenic in addition to the basic parameters.

3.1.1 Nitrate-Nitrogen Results

Nitrates in drinking water have been a concern for many years in many parts of Nebraska, the United States, and the world. Nitrate (often expressed by the term "nitrate as nitrogen" or "nitrate-nitrogen") is naturally present in groundwater at low levels, usually less than 2 parts per million (ppm; this is essentially equivalent to milligrams per liter or mg/ℓ), and at such levels typically does not present any health concerns. However, nitrogen fertilizers, manure, or other nitrate-containing material applied to farm ground or lawns and gardens can supply additional nitrate which can infiltrate with natural recharge and lead to higher than natural levels of nitrate in groundwater. Nitrate in drinking water at elevated levels of several tens of ppm can cause acute health problems especially in infants by causing a condition in which the oxygen-carrying capacity of the blood is inhibited. High nitrate levels have also been associated with health and gestational problems in livestock, and may have long term chronic effects on humans as well. The United States Environmental Protection Agency (USEPA) has established an MCL of 10 ppm for nitrate-nitrogen in drinking water.

All wells sampled by the District in 2021 were analyzed for at least nitrate-nitrogen. Nitrate concentrations were variable across the District (Figures 6 and 7). Based upon this data, Phase II and Phase III determinations for the GWRs are shown in Table 2. Three of 16 samples (19%) from network wells in the LSC GWR exceeded 50% of the MCL for nitrate-nitrogen in 2021. The LSC GWR average was below the Phase II trigger in 2011 through 2020, although in some cases it was only slightly below that trigger. Thus, it appears that overall nitrate levels in groundwater in the LSC GWR are not increasing and may be declining somewhat. As a result of the nitrate levels being consistently below the Phase II trigger for several years, in its implementation plan for Fiscal Year 2020 LPSNRD included an action item to continue to evaluate whether to suspend Phase II in the LSC GWR; this process is ongoing. No other GWRs exceeded a Phase trigger in 2021. More specific information for each GWR can be found in Section 4.

Figure 6 – Nitrate Results – Groundwater Monitoring Network

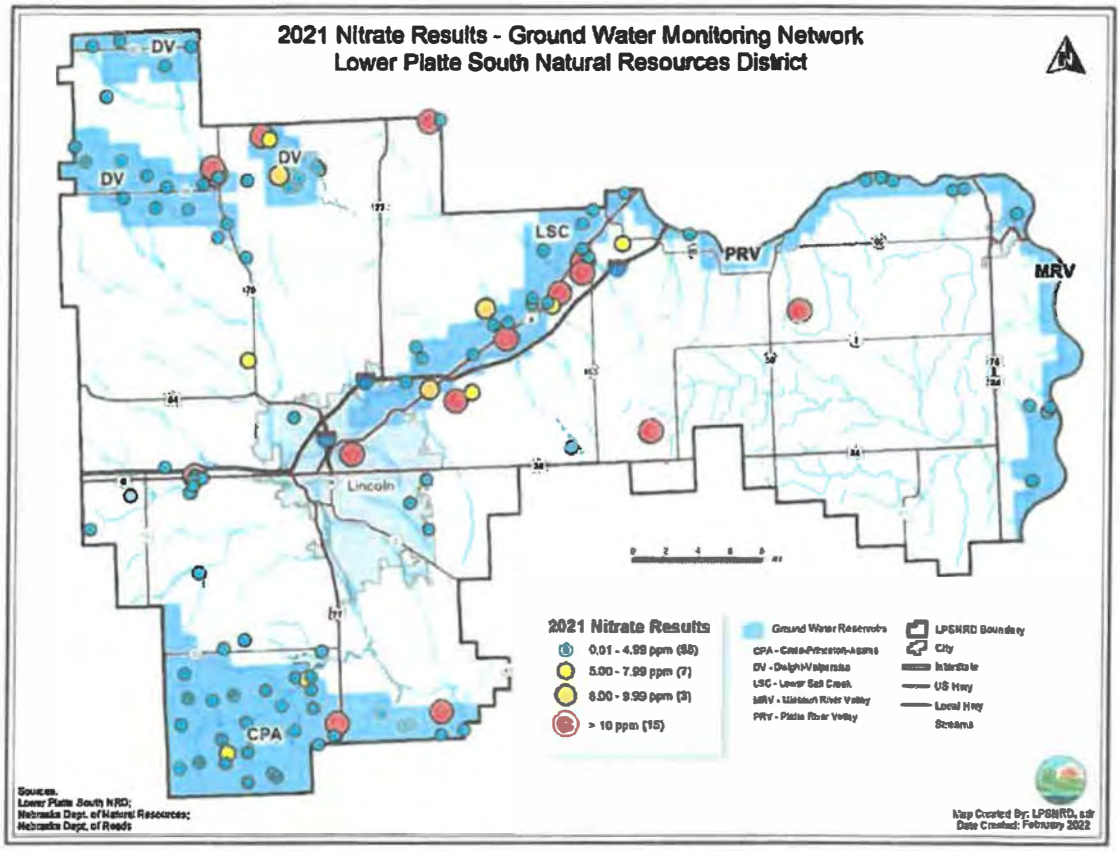
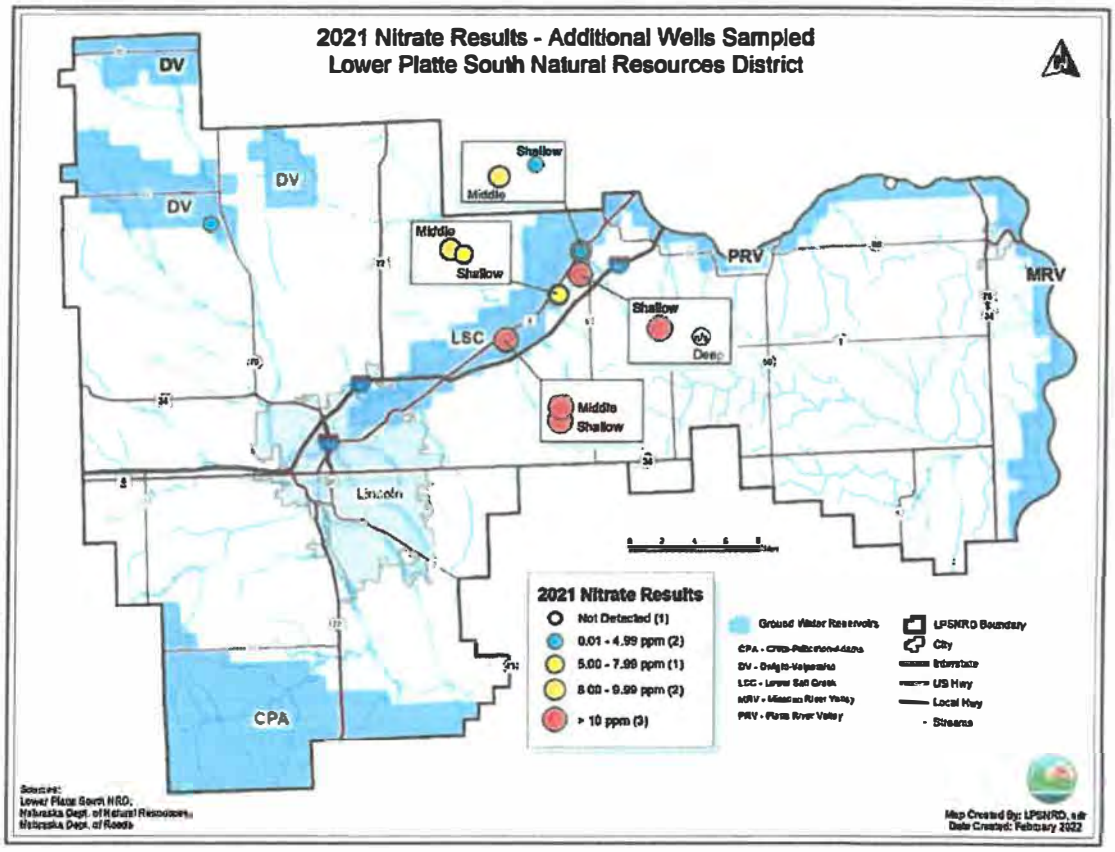


Figure 7 – Nitrate Results – Additional Wells Sampled



Groundwater Reservoir	# Network Wells Sampled	Network Samples ≥ 50% of MCL*	Network Samples ≥ 80% of MCL*
Crete-Princeton-Adams	31	13%	6%
Dwight-Valparaiso	22	18%	14%
Lower Salt Creek	16	19% (Phase II Area)	19%
Missouri River Valley	5	0%	0%
Platte River Valley	7	0%	0%
Remaining Area	42	33%	24%

* MCL = Maximum Contaminant Level; the MCL for nitrate-nitrogen is 10 parts per million
Phase II trigger is 50% of network wells ≥ 50% of MCL
Phase III trigger is 80% of network wells ≥ 80% of MCL

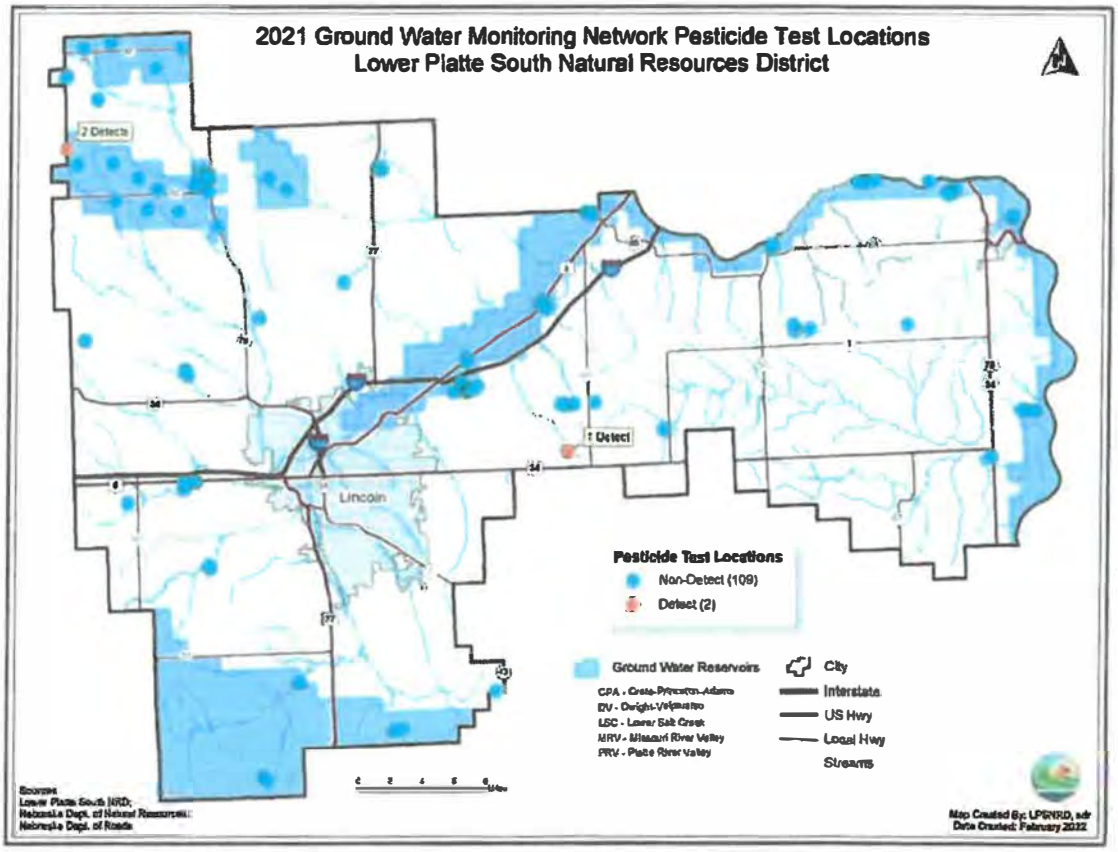
Table 2 – Phase Determinations for Nitrate-Nitrogen

3.1.2 Pesticide Results

Pesticides are compounds that are designed to control pests. Most common of these are herbicides (used to control undesirable plants) and insecticides (use to control undesirable insects). Other commonly used pesticides include fungicides, algicides, rodenticides, and grain fumigants. Residues from pesticides applied to crop ground, buildings, or lawns and gardens, or concentrated amounts from leaks and spills can move into the ground with infiltration and may eventually find their way to groundwater. The possible health effects of pesticides vary widely depending upon the compound and concentration, but as a general rule it is obviously desirable to keep such compounds out of groundwater and drinking water altogether, or at least to keep the levels of pesticides below any applicable health limits.

The District analyzes samples for 31 separate pesticide compounds on a rotating basis; in some cases existing agreements with public water suppliers specify annual pesticide sampling. In 2021, samples were collected from 111 wells and analyzed for these compounds. Of the wells sampled in 2021, only two wells (one public supply well and one irrigation well) had any detections of a pesticide. The public supply well showed a detection of phorate at 0.6 parts per billion (ppb; this is essentially the same as micrograms per liter or ug/ℓ). Phorate is a pesticide commonly used for the suppression of insects and nematodes in a variety of crops. There is currently no federal MCL for phorate but the lifetime health advisory recommendation is 1.1 ppb , so the level of this contaminant are well below that health advisory. The irrigation well showed detections of acetochlor at 0.51 ppb and phorate at 1.1 ppb. Acetochlor is a selective herbicide used to control weeds in corn and other crops. The federal MCL for acetochlor is currently 2 ppb, so this detection was approximately one quarter of that level, while as mentioned above the lifetime health advisory for phorate is 1.1 ppb, which is the level shown in this sample. As in the past, the owners of the wells will be notified of these detections, and further sampling will be performed to evaluate any changes in these detections. Figure 8 shows the locations of the wells that were sampled in 2021 along with the location of the two pesticide detections.

Figure 8 – Pesticide Sample Locations



3.1.3 Other Parameter Results

Although nitrate and pesticides are often cited as groundwater concerns, LPSNRD also monitors groundwater for additional parameters. In 2021, District staff collected additional groundwater samples which were analyzed for major ions and arsenic.

3.1.3.1 Major Ions

Analysis of major ionic species in groundwater gives a general indication of water chemistry and hydrogeologic conditions. In 2021, LPSNRD had 126 groundwater samples analyzed for the following ions: calcium, iron, magnesium, manganese, potassium, silicon, sodium, chloride, fluoride, and sulfate. Alkalinity and hardness expressed as calcium carbonate were also included, as was measurement of total dissolved solids (TDS). Based on previous years' monitoring, LPSNRD began a rotational system for monitoring major ions in 2011; in 2021 samples from the Dwight-Valparaiso GWR as well as several public water supplies (depending upon the NRD's agreement with those municipalities) were analyzed for these compounds. Samples from

the other GWRs and the Remaining Area will be analyzed on this rotational basis in coming years, and those from all PWS wells will continue to be analyzed.

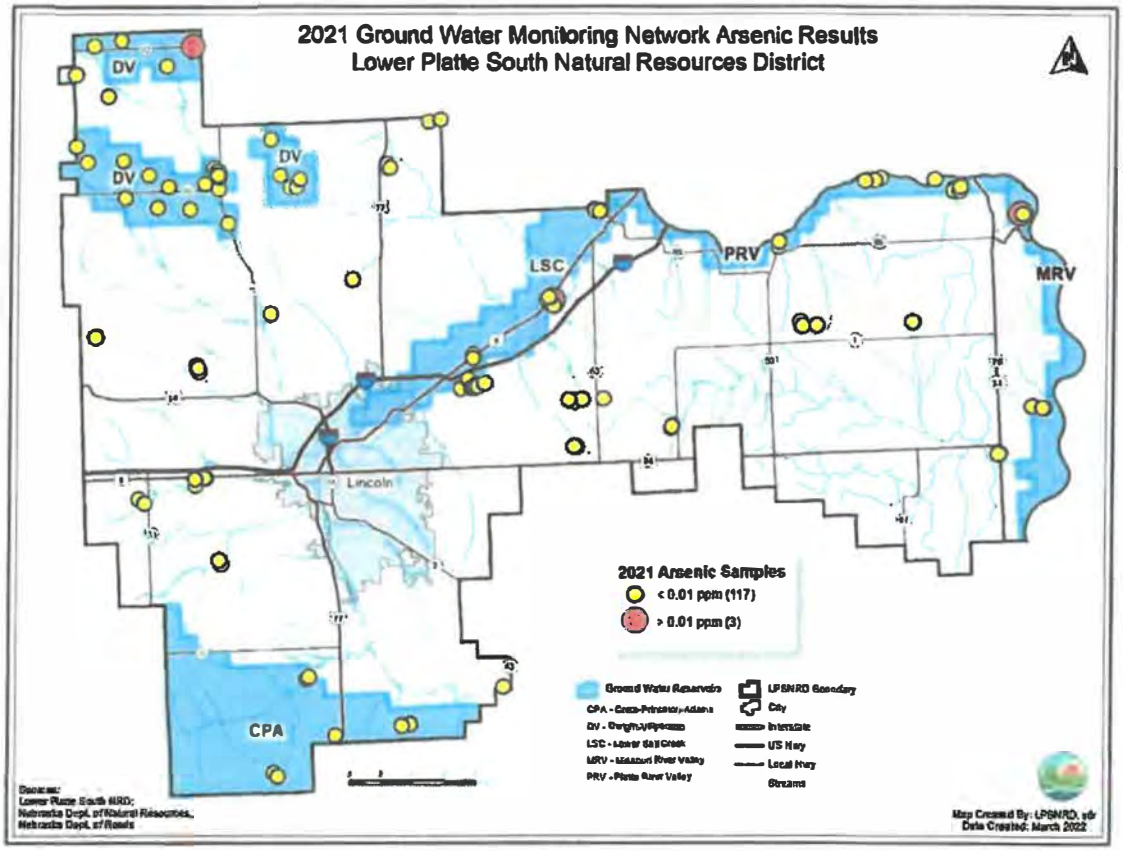
For the most part, analysis of major ions provides information regarding general water quality, and can also be used to evaluate changing groundwater conditions or to help identify concerns. For example, groundwater influenced by animal waste or septic tank effluent may exhibit elevated levels of sodium and/or chloride. In parts of the District, groundwater contained in lower portions of the Dakota Formation may also be elevated in sodium, chloride, and TDS, and pumping of shallow groundwater or various natural conditions may cause saline water to move toward the surface. Monitoring of major ions can give important information on situations such as these.

3.1.3.2 Arsenic

Arsenic is a semi-metallic element that can be found naturally in various kinds of rock and sediment, and can also be produced in agricultural and industrial processes. Acute effects from arsenic can occur at high levels of ingestion, and long-term exposure to arsenic has been linked to various forms of cancer. The USEPA has established an MCL for arsenic in drinking water of 10 parts per billion (ppb), which is equivalent to 0.01 ppm. LPSNRD collects groundwater samples for arsenic analysis as a service to several community water suppliers in the District. Although arsenic is a regulated contaminant for public water supplies, in Nebraska its occurrence is most commonly as a result of naturally-occurring sources, and as such is beyond the NRDs' regulatory authority to manage.

In 2021, LPSNRD staff collected 121 samples from that number of different wells in the District. The results of that sampling are shown in Figure 9. All but three of the samples had arsenic results at either non-detectable levels or levels below the MCL; this number is comparable to past years. The three wells in which arsenic levels exceeded the MCL included one public water supply well (Plattsmouth), one irrigation well, and one CWSPA monitoring well (Greenwood). Such detections of arsenic at slightly elevated levels are thought to be a result of naturally-occurring conditions involving a variety of sediment deposits. District personnel communicated the results to all cooperators, and will continue to provide information as requested.

Figure 9 – Arsenic Detections



3.1.3.3 Radon

Radon is a colorless, tasteless, odorless gas that is produced by the natural breakdown of uranium in rocks and sediments. The main health concern from radon is exposure through inhalation, as high levels of radon in indoor air have been linked with lung cancer. Most radon in indoor air comes from the soil and rock surrounding buildings, but a small amount can be released from water used indoors. In addition, there is some possibility that concentrations of radon in drinking water might increase the likelihood of stomach and other digestive cancers. However, the USEPA has not established an MCL for radon in drinking water. LPSNRD staff did not collect any radon samples in 2021 but will consider such sampling on a case-by-case basis as needed.

3.1.4 Quality Assurance/Quality Control (QA/QC)

The District continued to implement its QA/QC program in 2021. The QA/QC results are used to monitor the performance of a laboratory's analyses. There were four types of QA/QC checks performed by District staff-- inter-lab comparability, precision, accuracy, and cross-contamination. The relative percent difference (RPD) is computed for each of

the first three types of QA/QC sample, and the results are averaged for each type of QA/QC check. Ideally, the RPD should be 0% for each of the QA/QC checks. Generally, an average difference of 10% or less is acceptable, but 5% or less is preferred.

The inter-lab comparability was checked by 'splitting' some samples into two different bottles. The 'split' samples are analyzed by separate laboratories. One sample was sent to Midwest Labs (which is the primary lab for District sample analysis) and the other to the Nebraska Health and Human Services (NHHS) Lab. In 2021, 39 split samples were taken. On average, there was a -14.62% RPD in the results reported by these two labs; in other words, results from Midwest Labs were, on average, 14.62% lower than those of the NHHS Lab. This is outside of the NRD's acceptable range of difference, which is ±10%. However, this number was greatly affected by the results of only one sample, where Midwest Labs documented a concentration of several ppm while NDHHS showed a non-detect. If this anomalous result is removed, the RPD was -9.50%, which is within the acceptable range, although not preferred. Also, it should be noted that the median value for the RPD was -2.58%, which is well within LPSNRD's preferred range. LPSNRD staff is communicating with laboratory staff to establish the reason for the large anomaly in the one sample mentioned above, and will continue to work with both labs to maintain and improve data quality.

The precision, or ability to reproduce similar results, was checked by taking 'duplicate' samples for analysis by Midwest Labs. Duplicates are similar to split samples, but both samples are sent to the same lab – Midwest Labs. Twenty-three samples were duplicated in 2021. The results of this QA/QC check averaged -12.49%. Again, this number is outside of the District's acceptable range of RPDs, but like above, this number was greatly affected by one sample, where the parent sample showed a result of a fraction of a ppm, while the duplicate showed non-detect. These types of results generate high percentage differences, but actually represent only a fraction of a ppm difference in real results. Once this anomalous result was removed, the RPD was -1.38%, which is well within the District's preferred range. Again, the median value for the RPD was 0%, which of course is well within the preferred range. Likewise, NRD staff is working with laboratory personnel to determine the reason for some of these difference, but it appears that procedures in place have resulted in proper laboratory precision, which maintains confidence in the results produced.

In order to demonstrate the accuracy of results from the main contract lab (Midwest Labs), District staff employed analysis of documented reference samples. Reference samples are samples with a predetermined concentration of a certain constituent, prepared beforehand, and sent to the lab concerned to see if that lab can accurately determine that documented concentration. LPSNRD contracted with the University of Nebraska-Lincoln Water Sciences Laboratory (UNL-WSL) to produce nitrate samples of four documented nitrate-nitrogen concentrations, unpreserved: low (1mg/ℓ), medium (5 mg/ℓ), high (10 mg/ℓ), and very high (20 mg/ℓ). UNL-WSL staff prepared these samples using standard laboratory methods, and documented the concentrations of each sample by analyzing them in duplicate via autoanalysis employing the cadmium-reduction method. LPSNRD sent twelve total reference samples (two of each of the concentrations listed

above) to Midwest Labs. On average, Midwest Lab's results showed a -1.14% RPD from the UNL documented concentration. These results are well within the preferred ±5% range, and as a result, LPSNRD considers these results to document excellent accuracy from the primary contract lab.

The final type of QA/QC check utilized by the District is the employment of field blanks. A field blank is a sample of distilled or deionized water which is prepared in the field using the same techniques as all other samples. These blanks are then sent to the primary contract lab. The expected result is that all parameters will come back with non-detectable results. If any parameters are detected in any field blank, this is an indication that some operation in sampling, transport, processing, and/or analysis is introducing some sort of outside contamination into the sample. However, in all blank samples taken in 2021 as in almost all years preceding, there were no detections of any contaminant. This is an indication of proper sampling, transport, processing, and analysis.

The results of the calculations for the QA/QC samples with returned detections are summarized in Table 3. Given that a few anomalous results greatly affected the RPDs of the District's QA/QC, and that the median values for those RPDs are well within LPSNRD's preferred range of values, the District considers the results for 2021 to be acceptable. LPSNRD will continue to work with all labs in coming years to maintain and where necessary improve this high level of QA/QC and to improve procedures if necessary.

	Relative Percent Difference		
Quality Assurance/Quality Control Check	Midwest Labs (Primary Lab)	NDHHS/UNL-WSL (QA/QC Lab)	Comments
Inter-lab comparability	9.50%	-9.50%	Acceptable comparability
Precision	-1.38%	N/A	Acceptable; excellent precision
Accuracy	1.14%	-1.14%	Acceptable; excellent accuracy

Table 3 - Results of Quality Assurance/Quality Control Sampling

3.2 Groundwater Quantity Monitoring Program

District staff measured a total of 289 water levels in 140 different wells in 2021. For purposes of quantity calculations, the NRD was able to use measurements from all 140 of these wells. The results have been reported to the U.S. Geological Survey and the District's cooperators. Water levels are measured in the spring (usually February and

WORLD-HERALD

Omaha, Nebraska

Date: Saturday, October 29, 2022
Frequency: DAILY
Circulation: 71,723
Article Size: 134.55 column inches
Ad Value: $21797.10
Page/Section: A 0001

WATER QUALITY

Risk to kids grows with nitrate levels

Nebraska, a 'hot zone,' has seventh-highest child cancer rate in US

YANQI XU
Flatwater Free Press

Nick Herringer claps along with a metronome. He draws lines on a big screen, repeating patterns drawn by the computer. He identifies icons of cars when they flash before his eyes.

This is the 22-year-old's speech and cognitive therapy, which he has been doing at least twice a week. Every week. For three years.

Nick's thick brown hair hides a massive, ear-to-ear scar from his four brain surgeries for glioblastoma, an aggressive brain cancer he has battled since he was a teenager.

Please see NITRATE, Page A4

RYAN SODERLIN, FLATWATER FREE PRESS

Water resources technicians Josh Schnitzler and Connor Baldwin, who work for the Lower Elkhorn Natural Resources District in Norfolk, prepare to test the water in a monitoring well near the north fork of the Elkhorn River.

Nitrate

From A1

His mom, Tammy Herringer, drives Nick to therapy in Hastings and back home. She takes Nick shopping and to community events. He can't go alone because of damage to his brain.

"I have worn the paths back and forth to town all these years," Tammy said.

Recently driving the gravel road from Hastings to their house northwest of town, she could barely peer beyond the rows of corn on both sides of the road, mile after mile, standing tall in the scorching sun.

Corn is the main crop of the No. 1 industry in Nebraska. It's a plant so important it's in the name of Nick's favorite team: the Cornhuskers. And it's what is sprayed onto corn to help it thrive that experts say may be the culprit behind many pediatric cancers like Nick's.

Nitrogen fertilizer powers the corn's growth. It also converts to nitrate as it seeps into the soil — right into the water.

This problem costs serious taxpayer money. Cities and small towns have spent millions treating their water, struggling and sometimes failing to meet the Environmental Protection Agency's drinking water standard for nitrate of 10 parts per million.

Fifty-nine of Nebraska's 500-odd community public water systems have violated that standard at least once since 2010, the Flatwater Free Press found during a months-long investigation into the safety of Nebraska's water.

Those who live in the country and drink water from private wells, like the Herringers, continue to bear the cost of treating their own nitrate-laced water.

This problem is growing worse: The statewide median nitrate level has doubled since 1978.

Authorities have never fined or stopped anyone who uses too much nitrogen fertilizer, multiple leaders of Nebraska's Natural Resources Districts told the Flatwater Free Press.

The problem may have serious consequences:

Nebraska has the seventh-highest pediatric cancer rate in the country, according to the federal Centers for Disease Control and Prevention. It has the highest pediatric cancer rate of any state west of Pennsylvania.

High nitrate levels are closely linked to colorectal cancer and connected to thyroid disease. They're associated with neural tube defects, a birth defect that often kills young children.

Pregnant people can be harmed by ingesting nitrates, experts say, spurring anemia, premature labor and even miscarriage.

And the risks may be increasing for Nebraskans, roughly 85% of whom use groundwater.

The Herringer family had no idea that their private well had tested at a nitrate level of 30 parts per million in 2010. That's 10 times higher than Eleanor Rogan, a University of Nebraska Medical Center researcher examining the link between high nitrate levels and childhood cancers, says she would allow children to drink.

Nick drank this water for years. He showered in it. He ate food cooked in it all his life.

A few years before the family got Nick's 2015 cancer diagnosis, the Herringers' water was worse than the water in 99% of the wells then tested in and around Hastings.

When Nick and Tammy recently arrived home from one of Nick's appointments, they bumped into well driller Eric Jensen, who had been putting chlorine in their well. He told Tammy that high nitrate is common. A nearby feedlot and those cornfields that surround her house are culprits, he said.

Drilling a new well won't solve the problem. There's only one way to remove nitrate, the well driller told the mother: Install a complex filtration system.

It costs about $1,000. He said it's worth it.

"Nitrate ain't good," he told Tammy.

***

Nick was healthy growing up. Tammy thought it was strange when he asked to stay home from school because of a headache in 2015. Tylenol didn't help.

He started complaining about sunlight. He wore sunglasses everywhere. He vomited inside a Walgreens kiosk as Tammy printed photos. Tammy drove him to the emergency room.

A doctor did a CT scan and found an orange-sized mass on

WORLD-HERALD

Omaha, Nebraska

Date: Saturday, October 29, 2022
Frequency: DAILY
Circulation: 71,723
Article Size: 134.55 column inches
Ad Value: $21797.10
Page/Section: A 0001

Nick's brain. They rushed him to Omaha. The diagnosis: a grade 4 brain tumor, the most aggressive form of primary brain cancer.

Pediatric cancer cases like Nick's are becoming more common in Nebraska, especially childhood brain tumors. A study led by UNMC and the state health department found an increase in both between 1990 and 2013.

Areas of the state that have higher pediatric cancer rates and birth defect rates also have higher nitrate levels, researchers say.

"Over some time, we identified that there is something in Nebraska that's a little bit different," said Dr. Don Coulter, who participated in the statewide cancer study. "It's the Ogallala Aquifer."

Nebraskans' water is often clear, cool and drawn directly from the aquifer. The 174,000-square-mile Ogallala Aquifer is the largest source of groundwater in the United States, a lifeline for cattle, corn and families.

Crops need nitrogen to grow. But the nitrogen fertilizers applied to cornfields can't all be absorbed by plants. Roughly a third of nitrogen applied to corn is lost, according to the Nebraska Water Center. Some seeps into the water supply.

A UNMC research team headed by Rogan is now examining links between high nitrate and the three most common pediatric cancers.

Nebraska counties with slightly elevated nitrate levels showed a seven-fold increase in the leukemia rate above counties with minimal nitrate levels. Lymphoma rates were four times higher. These findings are preliminary, scientists caution.

But the cancer most consistently linked to elevated nitrate levels: childhood brain cancers like Nick's. Brain cancers are eight times as high as in counties with low nitrate.

Nick's family didn't know the risks. Most Nebraskans don't.

The state's well water is rarely tested. Less than 4% of the roughly 180,000 registered wells are tested each year, excluding public water systems. Private wells, found in rural areas not connected to a community's water supply, aren't required by law to be tested at all.

The Herringers didn't know that nitrate levels in Hastings were high. They didn't know their own nitrate levels were much higher.

"You don't think that this is going to happen to you," she said. "I'm not saying that that's what caused Nicholas' diagnosis ... How will we ever know?"

***

State leaders have been concerned about the nitrate seeping into Nebraska's water for half a century.

Nebraska's environmental agencies started testing nitrate in the 1970s.

In 1986, then-Sen. Loran Schmit of Bellwood spearheaded new state laws to address increasing nitrate. But in the decades since, the state has continued to approve bigger feedlots. Nebraska farmers have grown more and more corn.

"The bill was to prevent groundwater contamination, and I do not know we have made progress in that direction," said Schmit, a lifelong farmer, now 94.

A few years after Schmit's bill, the EPA took its first major action to limit nitrate in drinking water in response to something called methemoglobinemia.

Its common name: "Blue baby syndrome."

To respond, the federal government, in 1992, enacted its first-ever rule for how much nitrate would be allowed in drinking water. Ten parts per million, the rule said.

It hasn't budged. But decades of further study suggests that nitrate, even at levels below the EPA standard, is linked to potential health risks.

Some 48% of private wells are over Rogan's suggested limit of 3 parts per million, according to publicly available state water data.

"I think there's just mounting evidence that the EPA standard for nitrate is too high," she said.

Water quality plays a pivotal role in community health, said Paul Black, former chair of the Department of Biochemistry at the University of Nebraska-Lincoln.

"Nitrate is the key problem in Nebraska," Black said. "The kids are sicker, so they don't learn as well in school. So your community's not as healthy because your kids now are having problems."

Imagine looking at a map and zooming out so you can see the whole country, Black said. The chemical follows tributaries all the way into the Mississippi River and then the Gulf of Mexico.

Nebraska stands out on this map, Black said. It's in red, a "hot zone."

"I would say Nebraska is the epicenter in the upper Midwest."

***

This spring, Tylr Naprstek, assistant manager of the Lower Loup Natural Resources District, went to another NRD's meeting. There, he described the reaction when an area north of Columbus was designated a management area in 2019 — after nitrate readings skyrocketed to as high as 48 parts per million.

"Everyone was pointing fingers," he told the members of the Lower Elkhorn NRD board. "This half of the room says, 'Well, it's the manure guys over there that are doing it all,' and ... (feedlot owners were) saying, 'It's the commercial fertilizer guys!'"

It's the classic blame game, described to the Flatwater Free Press by multiple local officials, NRD board members and water quality experts.

Dan Snow, a lab director at the Nebraska Water Center, has a tool that can pinpoint who's to blame. A process called "fingerprinting" allows Snow's lab to identify whether it's coming from commercial fertilizer or organic sources such as manure.

In the case of the 48-parts-per-million test near Columbus, it's essentially "all of the above."

Manure from feedlots played a role, Snow found. So did commercial fertilizer.

That's not the case across Nebraska.

Testing done by Snow's lab consistently shows that the majority of nitrate comes from commercial fertilizers — what we spray on our lawns, golf courses, but most of all corn.

"I'm guessing more than 90% (comes) from commercial fertilizer," Snow said.

Some conditions make it worse: shallow water tables, sandy soil texture and heavy irrigation, Snow said.

Nebraska Farm Bureau President Mark McHargue knows that his hometown, Central City, fits this profile.

"We live in those communities. I have eight grandchildren. I want them to have good drinking water," he said.

He says he and others have changed for the better. His family farm has tested the nitrate in its soil. He factors in what's already there when calculating how much the crop needs.

His family applies hog manure, a method known as "split application." "Quite frankly, it's a hassle," he said. "But we know in our sandy soils we can't hold as much nitrogen."

Snow hopes his "fingerprinting" findings will help Nebraska move beyond years of finger-pointing. Recent tests show an increase of nitrate in soils of large swaths of the state.

His study in the Hastings area, where the Herringers live, found that nitrate there increased by 30% between 2011 and 2016.

Statewide, public water systems are hemorrhaging money to treat the problem.

Creighton, a northeast Nebraska town of about 1,100 people, spent $1.3 million in 1993, building the state's first reverse osmosis treatment system to filter out nitrate.

WORLD-HERALD

Omaha, Nebraska

Date: Saturday, October 29, 2022
Frequency: DAILY
Circulation: 71,723
Article Size: 134.55 column inches
Ad Value: $21797.10
Page/Section: A 0001

Seward, about 25 miles west of Lincoln, spent $5 million.

Hastings spent $15 million.

To Norfolk Mayor Josh Moenning, Creighton's response felt like a "canary in the coal mine" moment.

"If we don't get to some kind of solution here and get a handle on this problem, it's only going to cost us more and more and into the future," he said. "And it's going to cost us in terms of negative health impacts."

***

A few months before Nick Herringer's diagnosis, Adams Central, the high school down the road from the Herringers' home, played a football game at Aurora. It was Childhood Cancer Awareness Night. Gary Peters, an Aurora father who lost his son Jacob to lymphoma in 2011, walked onto the field.

"Stand up if you knew Alyssa Sandmeier."

"Stand up if you knew Tyler Larson."

"Stand up if you knew Jacob Peters."

"Stand up if you knew Sydnee Owens."

By the end, almost everyone was standing.

All were children. All died of childhood cancer. To him, the seven pediatric cancer cases from 2005 to 2013 seemed like a "waterfall" of different cancer diagnoses.

UNMC researchers also have found an association between pediatric cancer and atrazine, a herbicide many farmers say they have already phased out. Rogan's team is further expanding to study uranium and arsenic.

After seeing the UNMC research, Peters wondered if Jacob's death was related to the water he consumed.

"How long is it gonna (take to) change, to get legislation that outlaws these chemicals that could give our kids cancer?" Peters said. "There's just too many dollars involved. And the people making those decisions are only concerned about the bottom line. They're not really concerned about kids getting cancer."

He's frustrated at the status quo. Policymakers have known about nitrate for decades. Little has changed.

NRDs in the state, created 50 years ago for local management of water resources in each watershed, have been taking painstaking steps toward battling nitrate.

"It takes tough decisions," said Mike Sousek, general manager of the Lower Elkhorn NRD in northeast Nebraska. He and his team have been encouraging farmers to adopt practices that help, such as growing cover crops. Farmers can receive government funding for doing so.

"I got millions of dollars. I can't even spend it. I can't get people to sign up just to try to change (their practices)," he said. "Money isn't enough of a carrot."

The stick isn't there either.

Then-Sen. Schmit designed a mechanism to protect groundwater safety — the state environmental protection authority and local NRDs should work together.

They're not. Neither the Nebraska Department of Environment and Energy nor NRDs have issued a cease-and-desist order or fined a single person for using too much nitrogen fertilizer or applying excessive manure in the state, NRD leaders said.

***

After almost a year of stable health, Nick recently learned that his tumor has grown again. His family is exploring his next treatment plan.

He won't have another surgery.

"Nick always says, 'I'm in a win-win situation. If I beat this cancer, then I beat a cancer that's very aggressive. And if I don't, then I will be in heaven with Jesus, and that is a win-win,'" Tammy said.

Nick, sitting nearby, nods his head. "That gives me goose bumps," he said.

For now, Nick continues the fight that many Nebraskan children already have lost.

"Experts are telling us this is affecting our children. There are real life-and-death situations being played out here," Sousek said. "We have to start paying attention. It's our kids."

The Flatwater Free Press is Nebraska's first independent, nonprofit newsroom focused on investigations and feature stories that matter.

This article was produced as a project for the University of Southern California Annenberg Center for Health Journalism's 2022 National Fellowship.

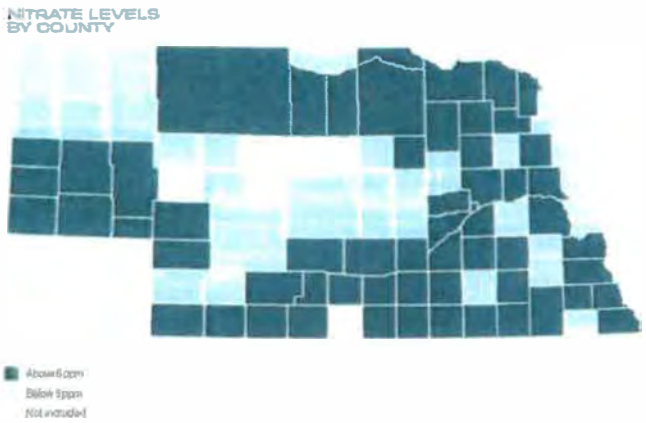
WORLD-HERALD

Omaha, Nebraska

Date:	**Saturday, October 29, 2022**
Frequency:	**DAILY**
Circulation:	**71,723**
Article Size:	**134.55 column inches**
Ad Value:	**$21797.10**
Page/Section:	**A 0001**

FLATWATER FREE PRESS

Nick Herringer and his mother, Tammy Herringer, outside their house northwest of Hastings, Nebraska. Their water, drawn from their privately drilled well, showed a nitrate level of 18 parts per million earlier this year, much higher than the EPA limit of 10 parts per million.



SOURCE: GEOSPATIAL DISTRIBUTION OF AGE-ADJUSTED INCIDENCE OF THE THREE MAJOR TYPES OF PEDIATRIC CANCERS AND WATERBORNE AGRICHEMICALS IN NEBRASKA, OUATTARA ET AL., 2022

RYAN SODERLIN, FLATWATER FREE PRESS

University of Nebraska Medical Center researcher Eleanor Rogan heads a team studying the potential link between high nitrate levels in water and a number of serious health problems, including pediatric cancers, birth defects and Parkinson's disease. Here, she poses for a portrait at the Maurer Center for Public Health in Omaha.