

**LOWER PLATTE SOUTH
NATURAL RESOURCES DISTRICT**



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March 17, 2010

Jim Schneider
Deputy Director
Nebraska Department of Natural Resources
P.O. Box 94676
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Dear Jim:

Enclosed is a copy of the District's annual review for the ground water management area. The format was reorganized this year and I hope you find it informative about the District's ground water related activities and programs.

Please contact me if you have any questions or would like additional copies.

Sincerely,

A handwritten signature in black ink that reads "Dan Schulz".

Dan Schulz
Resources Coordinator

Encl.

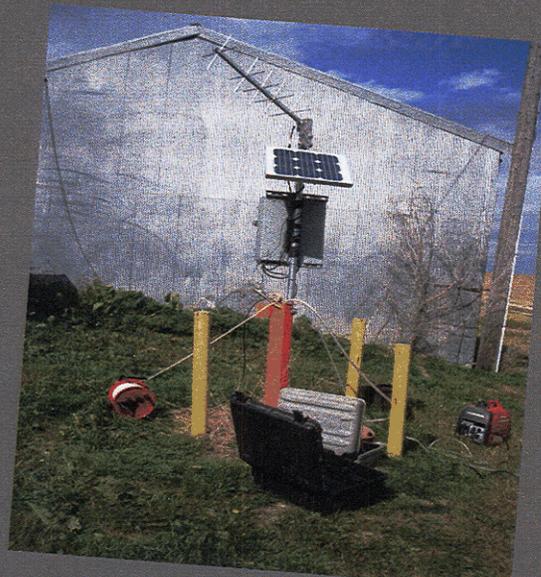
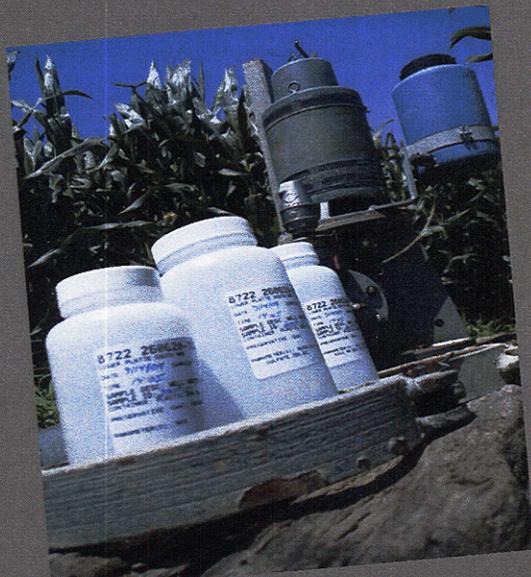
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Lower Platte South Natural Resources District Ground Water Management Area *2009 Annual Review*



Lower Platte South
Natural Resources District



LOWER PLATTE SOUTH NATURAL RESOURCES DISTRICT
GROUND WATER MANAGEMENT PLAN
2009 ANNUAL REVIEW

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Foreword

The following report fulfills the Lower Platte South Natural Resources District's responsibility to conduct a review each calendar year assessing the District's actions, activities, and effectiveness under the Rules and Regulations towards the implementation of the Ground Water Management Plan approved by the Nebraska Department of Water Resources on June 26, 1995. This report features a new format which will hopefully make it easier for the reader to gain information about ground water quality and quantity within the District. The 2009 Annual Review was presented to the Board of Directors Water Resources Subcommittee on February 9, 2010.

Table of Contents

Please Note: This report is organized by major ground water program areas. The applicable rules and regulations governing those program areas are cited in the text for each area where appropriate. The entire text of LPSNRD's Ground Water Rules and Regulations (Revised Effective Date: February 1, 2010) and Regulations for Implementation of LB483 are provided in Appendices A and B for reference.

1. INTRODUCTION	1
1.1 Background	1
1.2 Authority for Ground Water Programs	2
1.3 Ground Water Reservoirs.....	2
1.4 Community Water System Protection Areas (CWSPAs)	3
2. GROUND WATER MONITORING NETWORK.....	4
2.1 Ground Water Quality Monitoring Program	5
2.1.1 Nitrate-Nitrogen Results	5
2.1.2 Pesticide Results.....	7
2.1.3 Other Parameters Results	8
2.1.3.1 Major Ions.....	8
2.1.3.2 Arsenic.....	9
2.1.3.3 Radon.....	10
2.1.3.4 BTEX Compounds	10
2.1.4 Quality Assurance/Quality Control (QA/QC).....	10
2.2 Ground Water Quantity Monitoring Program	12
2.3 Data Management	14
3. Designated Areas of Management.....	15
3.1 Ground Water Quality.....	15
3.1.1 Ground Water Reservoirs.....	15
3.1.1.1 Crete-Princeton-Adams	15
3.1.1.2 Dwight-Valparaiso.....	15
3.1.1.3 Lower Salt Creek	16
3.1.1.4 Missouri River Valley	16
3.1.1.5 Platte River Valley.....	17
3.1.1.6 Remaining Area.....	17
3.1.2 Community Water System Protection Areas (CWSPAs)	17
3.1.2.1 Alvo	19

3.1.2.2	Ashland.....	20
3.1.2.3	Brainard	21
3.1.2.4	Cass County RWD #1/SID #1 (Lake Waconda)	22
3.1.2.5	Cass County RWD #2.....	23
3.1.2.6	Cass County SID #1	23
3.1.2.7	Cass County SID #5/Buccaneer Bay	24
3.1.2.8	Ceresco	25
3.1.2.9	Davey.....	26
3.1.2.10	Denton	27
3.1.2.11	Eagle.....	28
3.1.2.12	Elmwood.....	29
3.1.2.13	Garland	30
3.1.2.14	Greenwood.....	31
3.1.2.15	Hallam	32
3.1.2.16	Hickman.....	33
3.1.2.17	Lancaster County SID #6/Emerald.....	34
3.1.2.18	Louisville.....	34
3.1.2.19	Malcolm.....	35
3.1.2.20	Metropolitan Utilities District (MUD)	36
3.1.2.21	Otoe County RWD #3/Weeping Water	37
3.1.2.22	Panama.....	39
3.1.2.23	Plattsmouth.....	40
3.1.2.24	Pleasant Dale	41
3.1.2.25	Raymond.....	42
3.1.2.26	Roca	43
3.1.2.27	Sprague	44
3.1.2.28	Union	45
3.1.2.29	Valparaiso.....	46
3.1.2.30	Waverly	48
3.1.2.31	Weeping Water	48
3.2	Ground Water Quantity.....	48
3.2.1	Irrigated Acre Certification	49
3.2.1.1	Hydrologically Connected Area.....	49
3.2.1.2	Remainder of District	50

4. Water Well Permits	50
5. Water Well Decommissioning.....	51
6. Chemigation.....	52
7. Water Meters	53
8. Fertilizer Meters	55
9. Irrigation Management	55
10. Salt Water Intrusion.....	56
11. Improper Irrigation Runoff.....	56
12. Transfer of Ground Water	56
13. Variances	56
14. Complaints/Enforcement/Investigations	56
15. Information/Education.....	57
15.1 Programs for Students and Teachers.....	57
15.2 Public Information.....	57
15.3 Activities and Games	58
16. Eastern Nebraska Water Resources Assessment (ENWRA).....	58
17. Research.....	60
18. Interagency Coordination/Cooperation	60
18.1 Lincoln-Lancaster County Health Department (LLCHD)	60
18.2 Nebraska Department of Environmental Quality (NDEQ)	60
18.3 Nebraska Ground Water Monitoring Advisory Committee (NGWMAC).....	61
19. References	61

Appendix A – Lower Platte South NRD Ground Water Rules and Regulations

Appendix B - LPSNRD Rules and Regulations Pursuant to LB483

List of Tables

Table 1 – Phase Determinations for Nitrate-Nitrogen	7
Table 2 – Results of Quality Assurance/Quality Control Sampling.....	11
Table 3 – Phase Determinations for Quantity.....	13
Table 4 – Chemigation Permits and Acreage by Ground Water Reservoir or Area.....	53

List of Figures

Figure 1 – General Location Map.....	1
Figure 2 – Ground Water Reservoirs	3
Figure 3 – Community Water System Protection Areas.....	4

Figure 4 – Nitrate Results – Ground Water Monitoring Network	6
Figure 5 – Nitrate Results – Additional Wells Sampled.....	6
Figure 6 – Pesticide Detections.....	8
Figure 7 – Arsenic Detections.....	9
Figure 8 – Ground Water Level Measurement Locations	13
Figure 9 – Representative Ground Water Level Graphs from Each Ground Water Reservoir	14
Figure 10 – Alvo	19
Figure 11 – Ashland.....	20
Figure 12 – Brainard	21
Figure 13 – Cass County RWD #1/SID #1 (Lake Waconda).....	22
Figure 14 – Cass County RWD #2	23
Figure 15 – Cass County SID #5/Buccaneer Bay.....	24
Figure 16 – Ceresco	25
Figure 17 – Davey.....	26
Figure 18 – Denton	27
Figure 19 – Eagle.....	28
Figure 20 – Elmwood.....	29
Figure 21 – Garland	30
Figure 22 – Greenwood	31
Figure 23 – Hallam	32
Figure 24 – Hickman	33
Figure 25 – Louisville.....	34
Figure 26 – Malcolm.....	35
Figure 27 – Metropolitan Utilities District (MUD)	36
Figure 28 – Otoe County RWD #3/Weeping Water.....	38
Figure 29 – Panama	39
Figure 30 – Plattsmouth.....	40
Figure 31 – Pleasant Dale	41
Figure 32 – Raymond.....	42
Figure 33 – Roca.....	43
Figure 34 – Sprague.....	44
Figure 35 – Union	45
Figure 36 – Valparaiso.....	47
Figure 37 – Waverly	48
Figure 38 – Hydrologically Connected Area.....	49
Figure 39 – Approved Permits to Construct a Water Well.....	51
Figure 40 – Well Decommissioning Application Sites.....	52
Figure 41 – Approved Chemigation Permit Locations.....	53
Figure 42 – Water Meter Cost–Share Locations.....	54
Figure 43 – Fertilizer Meter Cost–Share Locations.....	55
Figure 44 – HEM Flight Area in CPA GWR.....	59

List of Acronyms

BMP	Best management practice
CPA	Crete-Princeton-Adams
CWSPA	Community Water System Protection Area; equivalent to Wellhead Protection Area (WHPA)
DCW	David City-Weston
DV	Dwight-Valparaiso
ENWRA	Eastern Nebraska Water Resources Assessment
gpm	Gallons per minute
GWMA	Ground Water Management Area
GWR	Ground Water Reservoir
HEM	Helicopter Electromagnetic Survey
IWMPP	Interrelated Water Management Plan Program
LSC	Lower Salt Creek
MCL	Maximum Contaminant Level
mg/l	Milligrams per liter; equivalent to parts per million (ppm)
MR	Missouri River
NDEQ	Nebraska Department of Environmental Quality
NHHS	Nebraska Health and Human Services
ppb	Parts per billion; equivalent to micrograms per liter (ug/l)
ppm	Parts per million; equivalent to milligrams per liter (mg/l)
PR	Platte River
QA/QC	Quality Assurance/Quality Control
RA	Remaining Area
RPD	Relative percent difference
RWD	Rural Water District
SID	Sanitary Improvement District
SNAP	Spring Nitrogen Application Program
TDS	Total dissolved solids
ug/l	Micrograms per liter; equivalent to parts per billion (ppb)
USEPA	United States Environmental Protection Area
WHPA	Wellhead Protection Area; equivalent to Community Water System Protection Area (CWSPA)

Phase Determination Criteria

Ground Water Quality Triggers

Phase II: contaminants in $\geq 50\%$ of network wells are $\geq 50\%$ of the MCL (5 ppm for nitrate-nitrogen)

Phase III: contaminants in $\geq 80\%$ of network wells are $\geq 80\%$ of the MCL (8 ppm for nitrate-nitrogen)

(Note: the MCL for nitrate-nitrogen is 10 ppm)

Ground Water Quantity Triggers for CPA GWR, DCW GWR, DV GWR, MR GWR, PR GWR, and RA

Phase II: saturated thickness in $\geq 30\%$ of network wells is $\geq 8\%$ below average

Phase III: saturated thickness in $\geq 50\%$ of network wells is $\geq 15\%$ below average

Ground Water Quantity Triggers for LSC GWR

Phase II: saturated thickness in $\geq 30\%$ of network wells is $\geq 15\%$ below average

Phase III: saturated thickness in $\geq 50\%$ of network wells is $\geq 30\%$ below average

Equations

Relative Percent Difference (RPD):

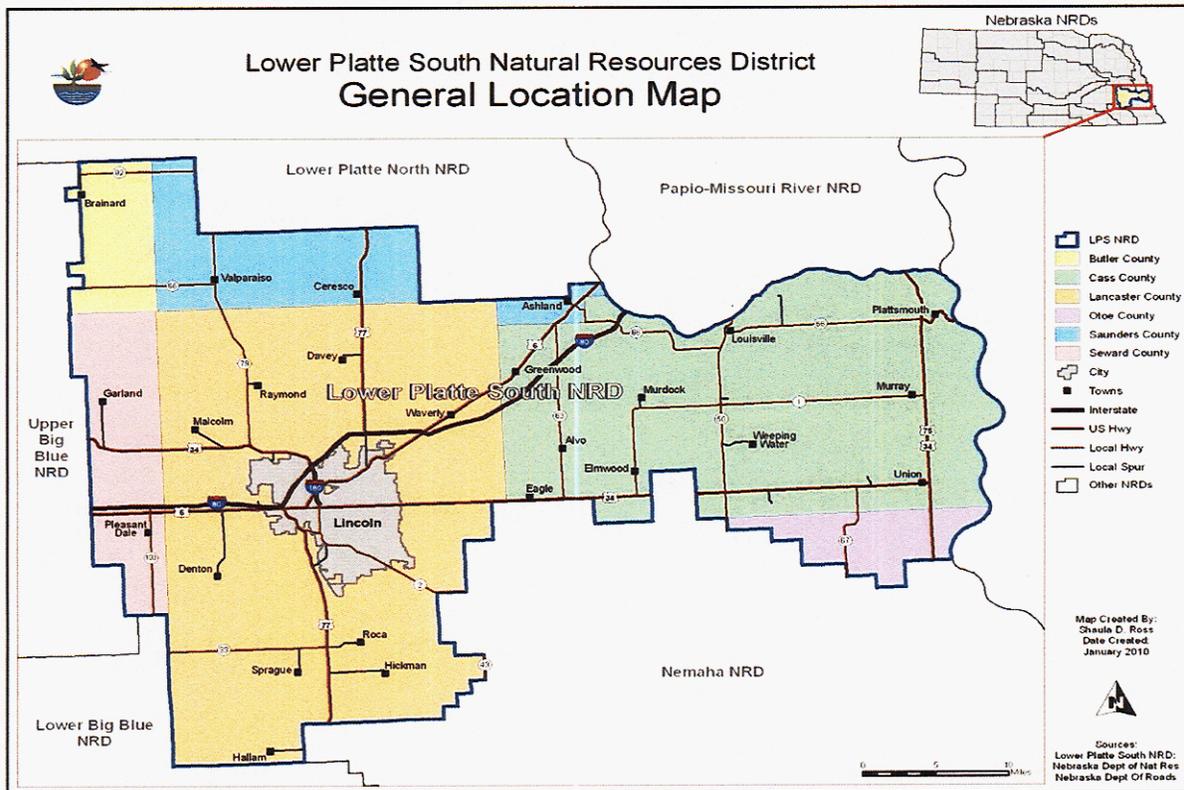
$$RPD = \left[\frac{(Sample1 - Sample2)}{(Sample1 + Sample2)/2} \right] \times 100 \quad (\text{used to calculate \% difference between two samples})$$

1. INTRODUCTION

1.1 Background

The Lower Platte South Natural Resources District (LPSNRD or District) is one of 23 Natural Resources Districts in Nebraska. When created in the early 1970s, Nebraska's Natural Resources Districts (NRDs) were delineated according to major surface water drainage boundaries, and were given broad responsibilities in conservation and management of natural resources. The LPSNRD is located in the southern portion of the Lower Platte River Basin, and encompasses approximately 977,000 acres or more than 1,500 square miles in parts of Butler, Saunders, Seward, Lancaster, Cass, and Otoe Counties in southeast Nebraska (Fig. 1).

Figure 1 – General Location Map



One of the primary areas of responsibility delegated to NRDs is the management and conservation of ground water, both in terms of its quality and quantity (see below). In Nebraska, some 85% of the state's population relies on ground water as the primary source of drinking water. Many of the state's rivers, streams, and wetlands are fed by ground water discharge, and the aquatic and terrestrial plants and animals associated with them depend on ground water of adequate quality and quantity. Ground water for irrigation is also fundamental to the state's agricultural economy, and a wide variety of industries depend on its availability and quality. Clearly, ground water is one of

Nebraska's most precious resources, and the Lower Platte South NRD is committed to implementing programs which protect it.

1.2 Authority for Ground Water Programs

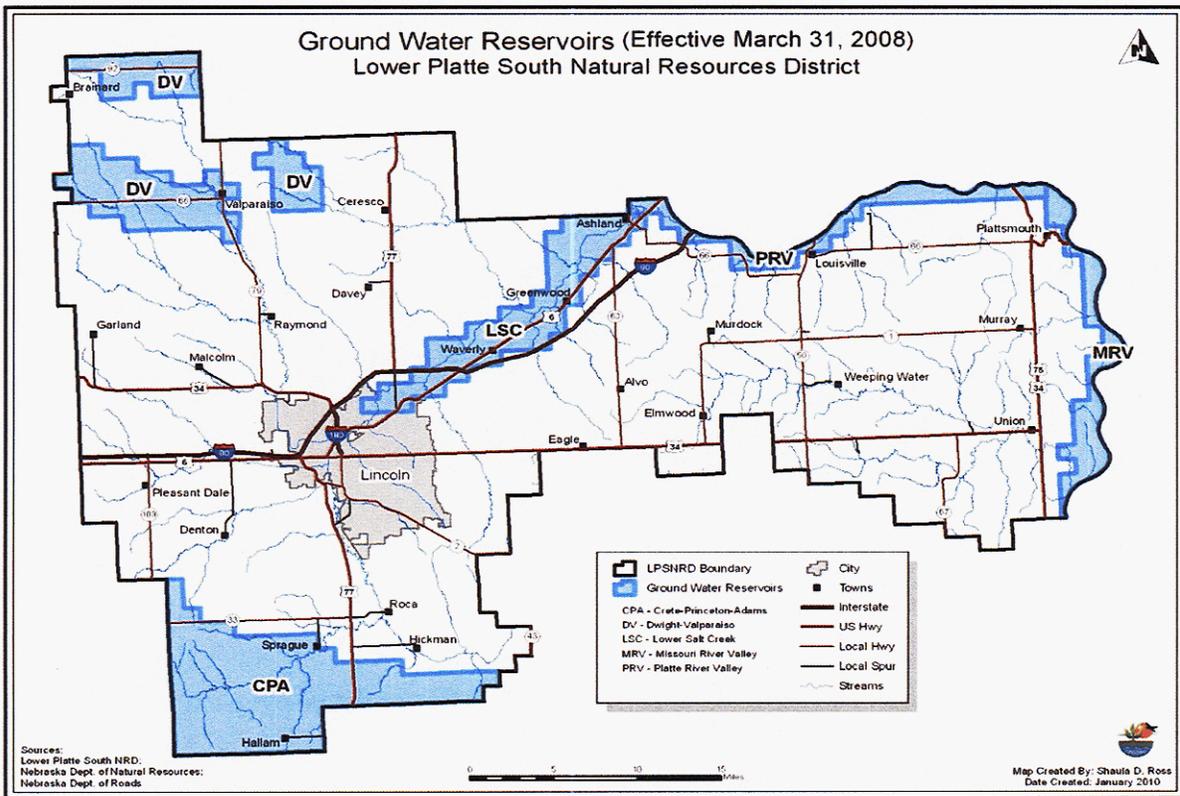
Natural Resources Districts are given a wide variety of responsibilities for the management of ground water quantity and quality by Nebraska statutes. Those authorities can be found mostly in Chapter 46 of the Nebraska Revised Statutes. As required by law, in 1995 LPSNRD developed and adopted a Ground Water Management Plan (GWMP) to govern its ground water management programs (LPSNRD, 1995). In addition, LPSNRD has adopted Ground Water Rules and Regulations (Revised Effective Date: February 1, 2010) as per the authority granted in statutes. Those regulations are included as Appendix A.

1.3 Ground Water Reservoirs

Applicable Regulations: Section A, Rules 2 and 3

As is common in most of eastern Nebraska, the geologic setting of the LPSNRD means that ground water resources in the District are quite variable from place to place. The District has therefore delineated five major ground water reservoirs (GWRs) in its jurisdiction. The GWRs represent areas which useable amounts of good quality ground water are generally available. Typically, the GWRs consist of sand and/or gravel deposits in buried paleovalleys or present-day river valleys. The location of the GWRs can be seen in Figure 2. The remainder of the District has been designated as the Remaining Area (RA), which includes the Dakota Formation aquifer and other small aquifers not designated as part of any GWR. Ground water in the RA is discontinuous spatially, and variable in both quality and quantity. Figure 2 also shows the location of the RA in LPSNRD.

Figure 2 – Ground Water Reservoirs

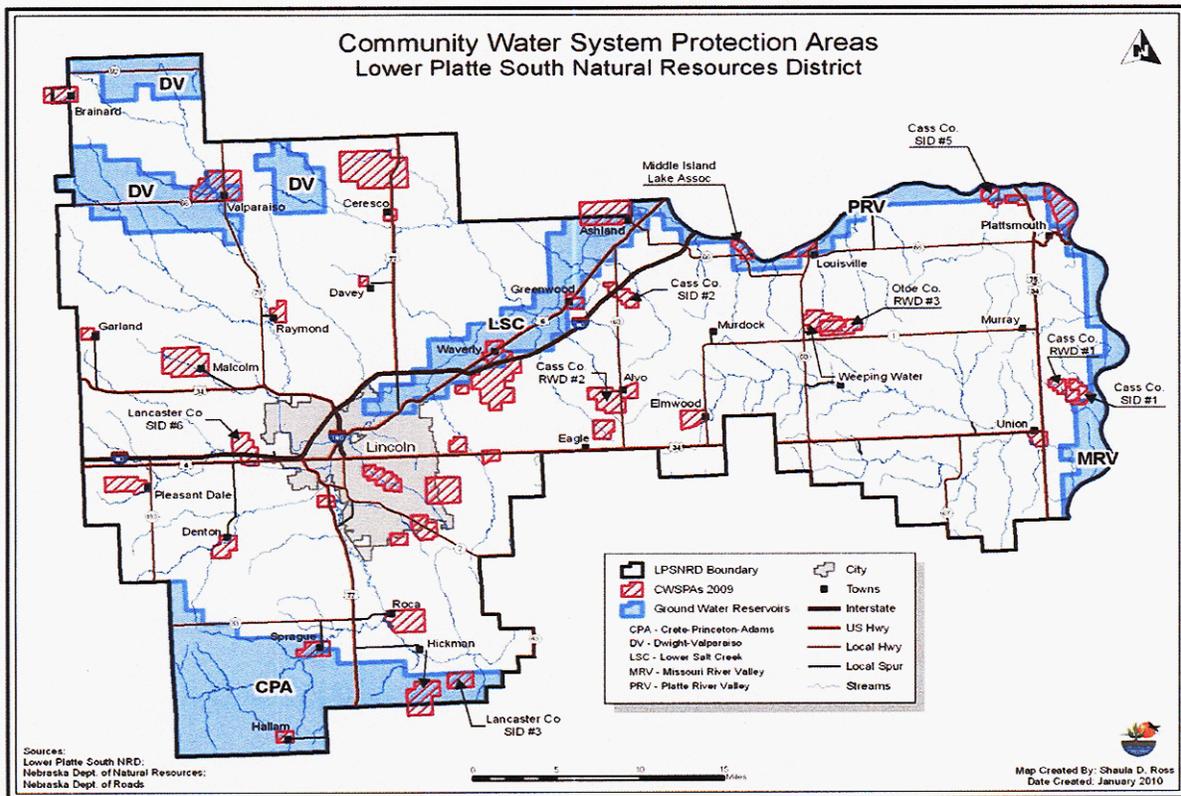


1.4 Community Water System Protection Areas (CWSPAs)

Applicable Regulations: Section A, Rule 2

Drinking water supplies in LPSNRD come primarily from ground water sources, just like most of the rest of Nebraska. The Nebraska Department of Environmental Quality (NDEQ) delineates Wellhead Protection Areas (WHPAs) for all public water supply systems in the state. These WHPAs generally correspond to the predicted 20-year time-of-travel zone for the supply wells in those systems. In other words, the WHPAs represent the area from which ground water could be expected to be extracted during 20 years of normal water use for those public water supplies. LPSNRD has adopted the boundaries of the delineated WHPAs as additional areas for ground water management under the current GWMP. In the LPSNRD, these areas are referred to as Community Water System Protection Areas (CWSPAs); the locations of CWSPAs in the District are shown in Figure 3.

Figure 3 – Community Water System Protection Areas



2. GROUND WATER MONITORING NETWORK

Applicable Regulations: Sections E, F

The District’s ground water monitoring networks are designed to provide a grid-like network of monitoring sites for each of the Ground Water Reservoirs and the Remaining Area, and to provide additional information about each CWSPA. In 2007, staff evaluated the most up-to-date information regarding the distribution of aquifers in the District and found that the boundaries of the GWRs were in need of updating. Accordingly, the monitoring networks were adjusted to coincide with the new boundaries, and subsequent reports reflect these changes.

LPSNRD’s GWMP allows for the designation of various phases to deal with increasing ground water contamination. As currently configured, the entire NRD is currently in a Phase I Ground Water 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). If levels of a contaminant exceed 50% of the federal maximum contaminant level (MCL) for that contaminant in 50% of the District’s ground water monitoring network wells, the NRD can designate a Phase II GWMA, and adopt rules and regulations for management of that contaminant. Finally, if contaminant levels exceed 80% of the MCL in 80% of the NRD’s network wells, 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 (Section 3.1.1.3) and the Valparaiso CWSPA are in Phase II management.

2.1 Ground Water Quality Monitoring Program

Staff collected 363 samples and 58 quality assurance/quality control (QA/QC) samples from 246 different wells in 2009. Samples were collected from monitoring network wells, CWSPA 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, dissolved metals, pH, specific conductance, hardness, alkalinity, and total dissolved solids. Starting in 2005, pesticide analyses are rotated annually between different GWRs. Community water supply wells were tested for radon and arsenic in addition to the basic parameters. CWSPA monitoring network wells were tested for radon, arsenic, and volatile gasoline constituents (benzene, toluene, ethyl-benzene, and total xylenes) in addition to the basic sample parameters.

2.1.1 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 ground water 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 ground water. 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 2009 were analyzed for at least nitrate-nitrogen. Nitrate concentrations were variable across the District (Figures 4 & 5). Phase II and Phase III Determinations for the GWRs are shown in Table 1. The LSC GWR average stayed below the Phase II trigger in 2009, just as it was in 2008. Seven of seventeen samples (41%) from network wells in the LSC GWR exceeded 50% of the MCL for nitrate-nitrogen in 2009. Although this GWR is currently a Phase II Management Area, nitrate levels in NRD network wells have now been below the Phase II trigger for both 2008 and 2009. LPSNRD will continue to monitor the nitrate levels in the LSC GWR to see if this downward trend continues. No other GWRs exceeded a Phase trigger in 2009. More specific information for each GWR can be found in Section 3.

Figure 4 – Nitrate Results – Ground Water Monitoring Network

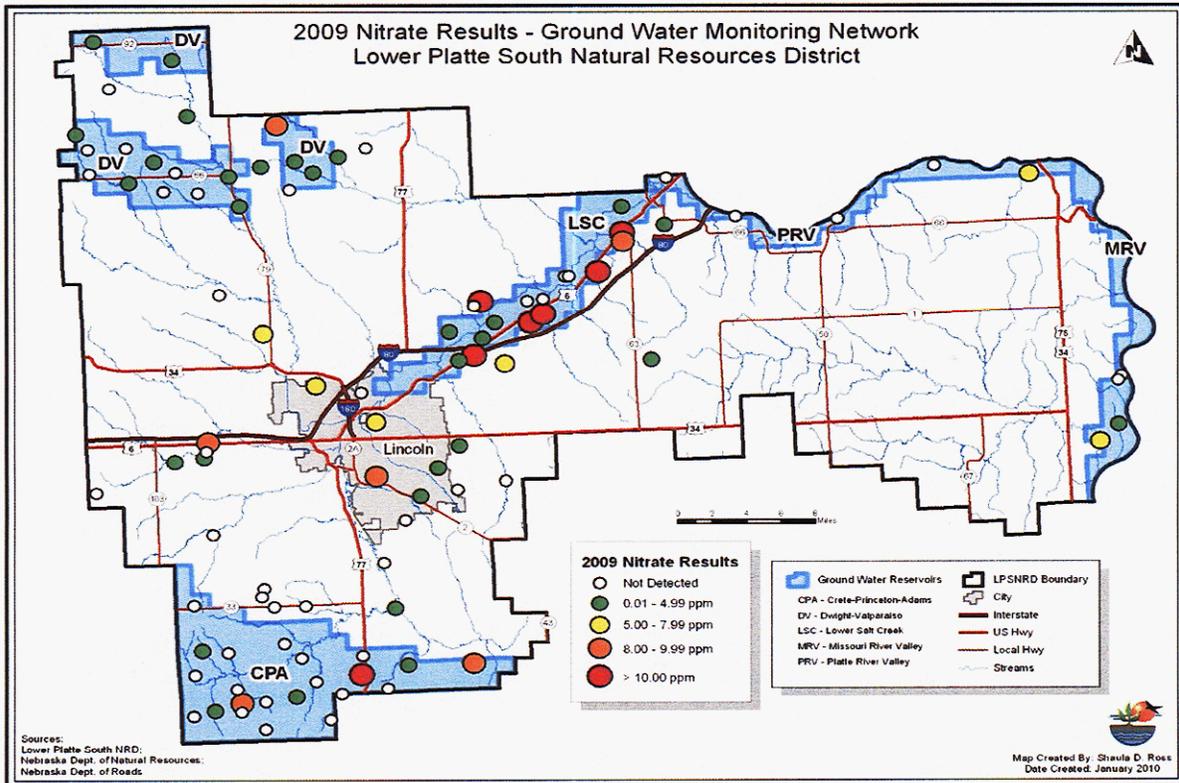
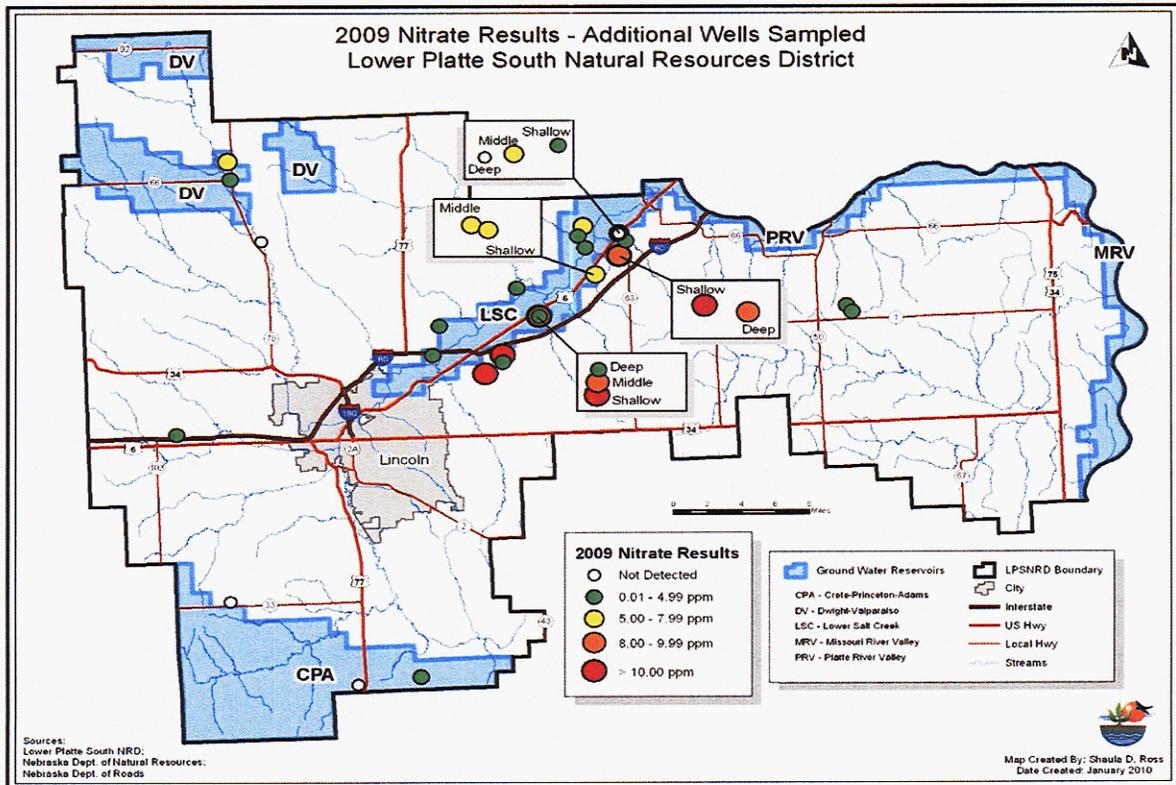


Figure 5 – Nitrate Results – Additional Wells Sampled



Ground Water Reservoir	# Network Wells Sampled	Network Samples ≥ 50% of MCL*	Network Samples ≥ 80% of MCL*
Crete-Princeton-Adams	22	14%	14%
Dwight-Valparaiso	19	5%	5%
Lower Salt Creek	17	41% (Phase II Area)	41%
Missouri River Valley	4	25%	0%
Platte River Valley	5	20%	0%
Remaining Area	30	20%	7%

* MCL = Maximum Contaminant Level; the MCL for nitrate-nitrogen is 10 parts per million

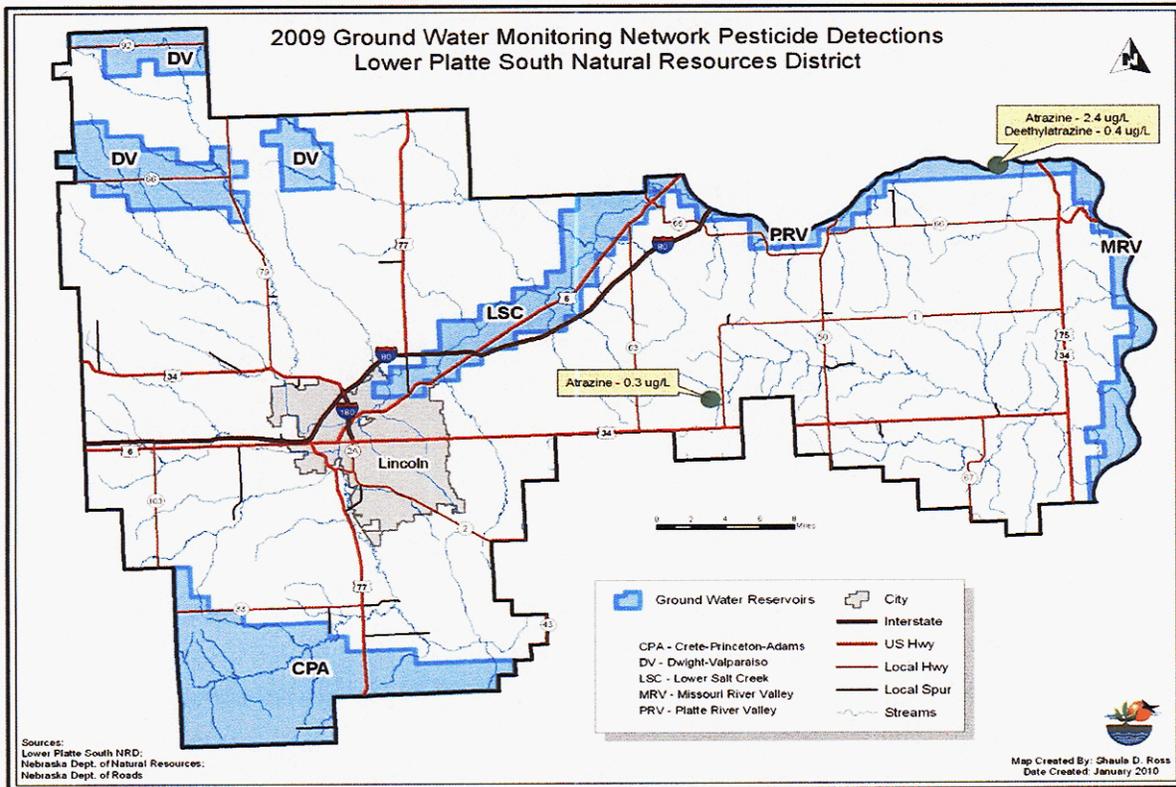
Table 1 – Phase Determinations for Nitrate-Nitrogen

2.1.2 Pesticide Results

Pesticides are compounds that are designed to control pests. Most common of these are herbicides (used to control plants or weeds) and insecticides (use to control 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 ground water. 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 ground water 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 2009, 145 samples were collected from 139 wells and analyzed for these compounds. Pesticides were detected in samples from two different wells (Figure 6). The common herbicide atrazine was detected in both wells, and deethylatrazine (a breakdown product of atrazine) was detected in one. Both detections were below the maximum contaminant level for atrazine of 3 parts per billion (ppb; this is generally equivalent to micrograms per liter or ug/l), and none of the GWRs or CWSPAs exceeded the Phase triggers for pesticides.

Figure 6 – Pesticide Detections



2.1.3 Other Parameters Results

Although nitrate and pesticides are often cited as ground water concerns, LPSNRD also monitors ground water for additional parameters. In 2009, District staff collected additional ground water samples which were analyzed for major ions, arsenic, radon, and BTEX compounds.

2.1.3.1 Major Ions

Analysis of major ionic species in ground water gives a general indication of water chemistry and hydrogeologic conditions. In 2009, LPSNRD had 240 ground water 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).

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

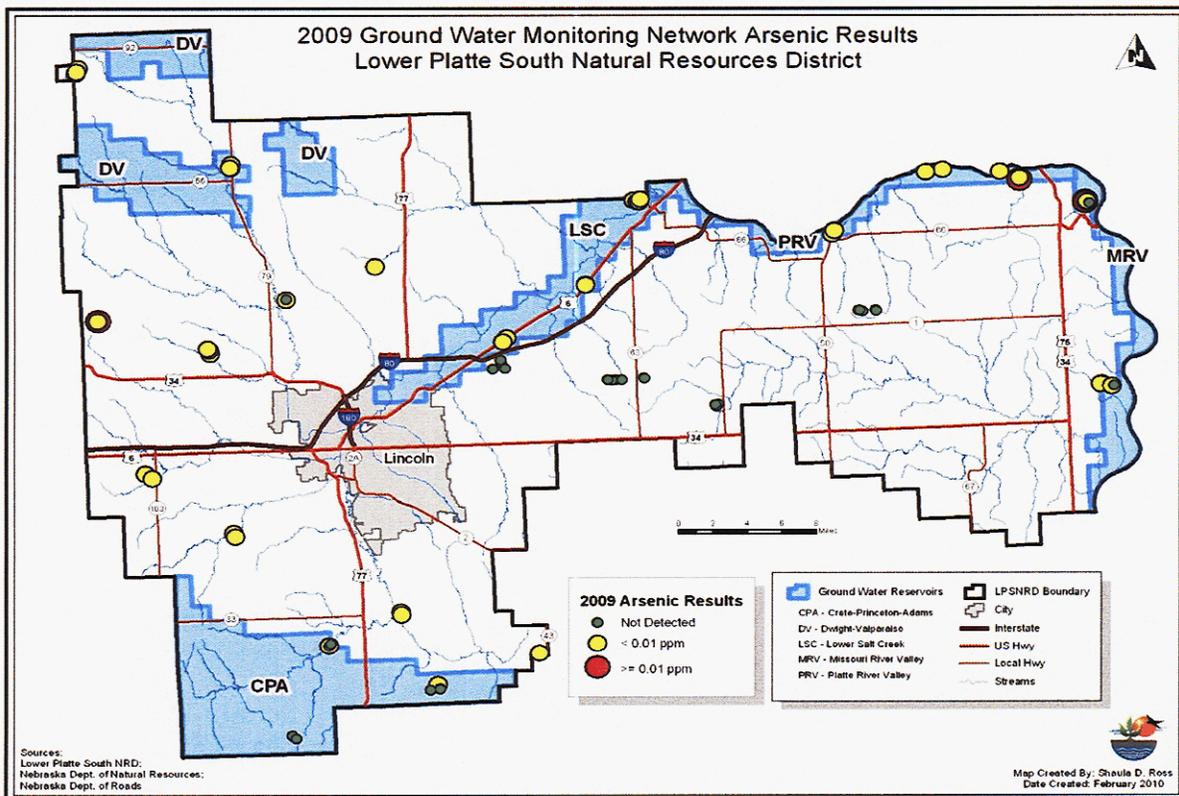
can give important information on situations such as these. None of the monitoring results for major ions from 2009 indicated a concern for these types of issues.

2.1.3.2 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.

In 2009, LPSNRD staff collected 79 samples from 76 different wells in the District. The results of that sampling are shown in Figure 7. The majority of samples had arsenic results either at non-detectable levels or well below the applicable MCL. However, four samples from wells serving the Cass County SID #5, Garland, and Plattsmouth public water supplies were slightly in excess of the MCL. District personnel communicated the results to those suppliers as well as all other cooperators, and will continue to provide information as requested.

Figure 7 – Arsenic Detections



2.1.3.3 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 collected six samples for radon analysis in 2009 as part of existing agreements with the towns of Ceresco and Valparaiso. Wells belonging to these systems will continue to be monitored for radon as per those agreements, and the results will be provided to the water suppliers.

2.1.3.4 BTEX Compounds

Benzene, toluene, ethylbenzene, and xylene are volatile organic compounds that are found in a variety of solvents, but most commonly in gasoline and other petroleum products. Since they are constituents in gasoline and commonly occur together, they are often referred to by the acronym BTEX. Extremely high concentrations of BTEX in drinking water are associated with nervous system and organ damage. USEPA has established the following MCLs for BTEX compounds: benzene, 5 ppb; toluene, 1 ppm; ethylbenzene, 0.7 ppm; and xylene, 10 ppm.

In 2009, District staff collected 19 samples from 15 wells for BTEX analysis. These wells also belong to the towns of Ceresco and Valparaiso, and the BTEX monitoring is part of an existing agreement with these systems. All the samples analyzed in 2009 showed non-detectable levels of BTEX.

2.1.4 Quality Assurance/Quality Control (QA/QC)

The District continued to implement a rigorous QA/QC program in 2009. The QA/QC results are used to monitor the performance of a laboratory's analyses. There were three types of QA/QC checks performed by District staff; inter-lab comparability, precision, and accuracy. The relative percent difference (RPD) is computed for each 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 three 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. The District aims to split 10% of all samples; in 2009, 36 split samples out of 363 total samples were taken, which meets the 10% goal. On average, there was a 2.14% RPD in the results reported by these two

labs; in other words, results from Midwest Labs were, on average, 2.14% higher than those of the NHHS Lab. This is well below the $\pm 5\%$ preferred goal, and represents excellent comparability. It also represents a significant improvement from the 2008 results, when there was a 12.21% difference between the two labs. Following these 2008 results, District staff met with Midwest Labs personnel in mid-2009 to discuss issues regarding sample submittal and processing, and agreed on steps to address the concerns. It appears that actions taken on the part of both District sampling staff and Midwest Labs staff have resulted in increased comparability of data.

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. Thirty-three samples, or slightly less than 10% of the samples collected, were duplicated in 2009. The results of this QA/QC check were well within the acceptable range at an average of -0.25%. This is an excellent indicator of laboratory precision and is well within the District's preferred range of $\pm 5\%$. In 2008, precision was calculated at 1.58%, which was also an excellent result. Again, it appears that procedures in place have resulted in excellent laboratory precision.

To check the accuracy of the results from each lab, the District delivered reference samples containing a known concentration of constituents. These reference samples were prepared by District personnel utilizing instructions provided by the supplier of the samples, and then were mixed in with the regular stream of ground water samples. Twenty-five prepared reference samples were delivered to Midwest Labs in 2009, while 15 were delivered to the NHHS Lab. The labs were unaware of the identity of these samples. Ideally, the labs would report the same concentration as the known reference, resulting in a 0% RPD. The results reported by Midwest results were, on average, 1.77% higher than the known values. NHHS results averaged 6.01% higher than the known values. Overall, Midwest Labs' results were well within the $\pm 5\%$ preferred goal for reference samples established by the District. In addition, this represents a significant improvement over the 9.12% RPD for reference samples achieved by Midwest Labs in 2008. Overall, the NHHS Lab's results were slightly over the $\pm 5\%$ goal, but still well within the $\pm 10\%$ threshold which is considered acceptable for lab results. The results of all three types of QA/QC samples are summarized in Table 2.

The performance of Midwest Labs in 2009 was considerably improved, and the results of the QA/QC sample analysis are considered very acceptable. As mentioned above, there appear to be some minor differences in results between Midwest Labs and the NHHS lab with which samples were split. In addition, the NHHS Lab's results for the reference samples are slightly above the District's preferred range for RPD, but still within the accepted range. LPSNRD will continue to work with both labs in 2009 to maintain this high level of QA/QC and to improve procedures where necessary.

Quality Assurance/Quality Control Check	Relative Percent Difference or Error		Comments
	Midwest Labs (Primary Lab)	Health and Human Services (QA/QC Lab)	
Inter-lab comparability	-2.14%	2.14%	Acceptable; excellent comparability
Precision	-0.25%	N/A	Acceptable; excellent precision
Accuracy	1.77%	6.01%	Acceptable for both labs; Midwest performed better than NHHS

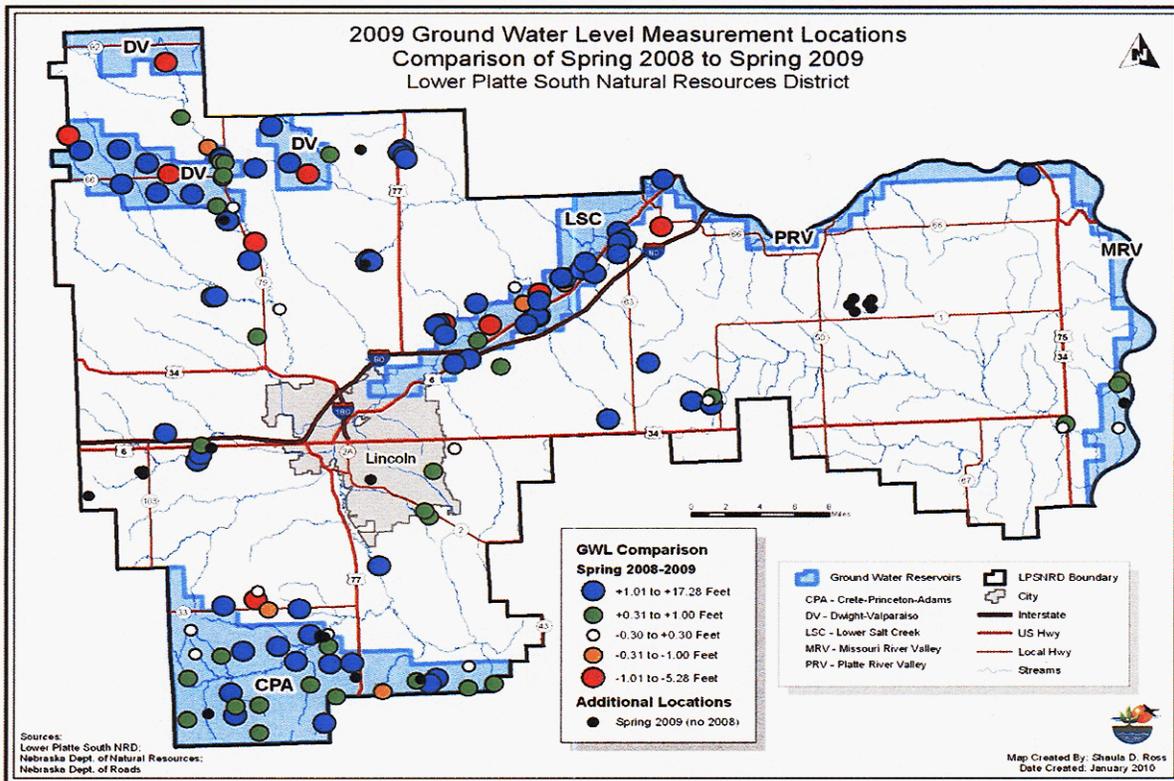
Table 2 - Results of Quality Assurance/Quality Control Sampling

2.2 Ground Water Quantity Monitoring Program

District staff collected a total of 333 water levels from 157 different wells in 2009. 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 March) and fall (usually October and November). For purposes of this report, levels are compared from spring to spring measurements, as the spring measurement is considered to be more indicative of static aquifer conditions. Fall measurements are taken within a few months of the cessation of the irrigation season, and some aquifer units are likely still affected by that activity. Spring measurements represent aquifer conditions after the units have had several months to equilibrate, and are used for the purpose of annual comparison. However, in specific cases, comparison of spring to fall water levels can give an indication of how aquifer units are responding to comparatively intense use over the summer months.

Ground water level fluctuations are variable across the District (Figure 8). In most areas of the District however, spring water levels generally increased from 2008 to 2009. District-wide, no wells indicated a percent reduction in saturated thickness greater than a Phase II or III level (Table 3). In other words, no areas exceeded a Phase trigger for quantity in 2009. Taken as a whole, the average static water level across the District increased by 0.85 feet (10.21 inches) from Spring 2008 to Spring 2009.

Figure 8 – Ground Water Level Measurement Locations



Ground Water Reservoir	Percentage of wells below Phase II %* reduction in average saturated thickness	Percentage of wells below Phase III%* reduction in average saturated thickness
Crete-Princeton-Adams	0%	0%
Dwight-Valparaiso	0%	0%
Lower Salt Creek	0%	0%
Missouri River Valley	0%	0%
Platte River Valley	0%	0%
Remaining Area	0%	0%

*Phase II % reduction for Lower Salt Creek

Ground Water Reservoir is 15%; for all others it is 8%. Phase III % reduction for

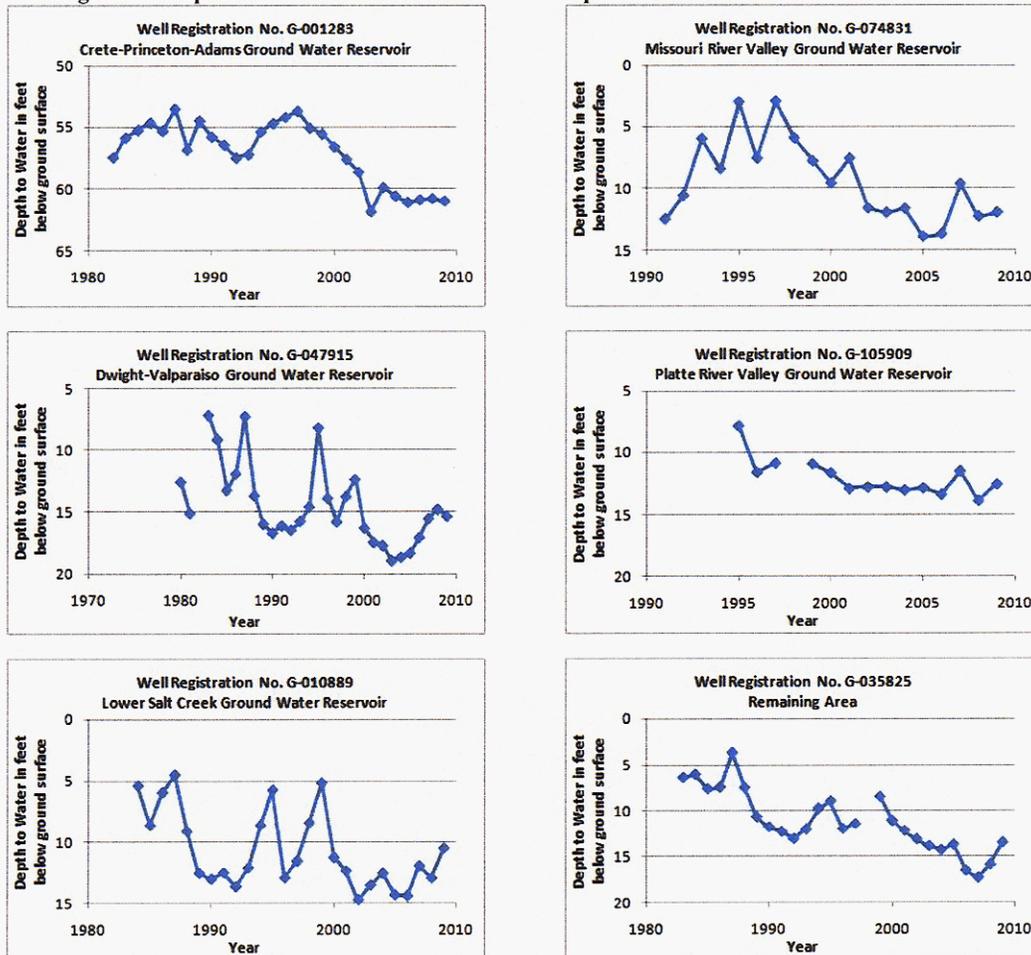
Lower Salt Creek is 30%; for all others it is 15%.

Table 3 – Phase Determinations for Quantity

The District continues to monitor long-term ground water level trends from representative wells from each GWR (Figure 9). Some areas of the District have experienced continued ground water level declines since the early 1980s, even though

trigger levels as reflected in LPSNRD's GWMP have not been exceeded. In response to this disparity, the District is continuing to work with UNL's Conservation and Survey Division on a ground water modeling study to evaluate the possible impacts of these declines on ground water storage and surface water depletions. The model will help the NRD to evaluate whether the current trigger levels are adequate to prevent detrimental depletions to the interconnected ground and surface water resources.

Figure 9 – Representative Ground Water Level Graphs from Each Ground Water Reservoir



Although the total annual precipitation in the District in 2009 was in many cases several inches below normal, much of the rainfall during the spring, summer, and fall months was timely. As a result, the District has continued to see a decline in the number of drought-related inquiries. However, LPSNRD staff did respond to two inquiries about the effect of nearby pumping wells on domestic wells in acreage or rural settings.

2.3 Data Management

LPSNRD's ground water database continued to be developed and maintained in 2009. The District worked with a contractor to enable staff the opportunity to utilize the

database on newly purchased GPS equipment while in the field. This will give the staff the opportunity to more easily update and keep the most accurate information as it relates to well locations, ownership information, and sample results. The District also began working with a contractor to ensure that only necessary information is being stored in the database, thereby cleaning out non-critical or duplicate information. Future plans for the database include expanding or creating a new database to house the information gathered during the certifying acre process, as well as information obtained during the mandatory water metering program.

3. DESIGNATED AREAS OF MANAGEMENT

Applicable Regulations: Sections A, D, E, F, H, I, J

The District's 1995 GWMP specifies three types of areas in which LPSNRD can pursue various management activities to deal with concerns in ground water quality and quantity. These three types of areas are Ground Water Reservoirs (GWRs), the Remaining Area (RA), and Community Water Supply Protection Areas (CWSPAs). The following sections highlight NRD activities in each area in regard to both ground water quality and quantity.

3.1 Ground Water Quality

3.1.1 Ground Water Reservoirs

Note: for more information on LPSNRD's Ground Water Reservoirs, see Druliner and Mason, 2001.

3.1.1.1 Crete-Princeton-Adams

The Crete-Princeton-Adams (CPA) GWR is located in the southwestern portion of LPSNRD (see Figure 2). The aquifer in CPA is generally semi-confined to confined, and consists of a complex sequence of glacial till, loess, sand, and gravel. Saturated thickness of sediments ranges from 50 to 250 feet, and depth to ground water ranges widely from a few feet to about 250 feet below the land surface. Results of ground water monitoring for nitrate, pesticides, and other components in the CPA GWR are summarized in Figures 4-7 and Table 1. In addition to this routine monitoring, several important actions in CPA were undertaken as part of the Eastern Nebraska Water Resources Assessment (ENWRA). These activities are described in Section 17.

3.1.1.2 Dwight-Valparaiso

The Dwight-Valparaiso (DV) GWR occupies the northwestern portion of the District (see Figure 2). The DV aquifer is mostly semi-confined to confined, and is made up of sand and gravel deposits underlying thick glacial till and loess. Saturated thickness of these sands and gravels is about 40-100 feet, and depth to water again ranges from a few feet to about 250 feet below the land surface. Results of ground water monitoring for nitrate,

pesticides, and other components in the DV GWR are summarized in Figures 4-7 and Table 1. In addition to this routine monitoring, the District continues to administer a Phase II management area in the Valparaiso CWSPA (see Figure 3). Activities for the Valparaiso CWSPA in 2009 are described in Section 3.1.3.28.

3.1.1.3 Lower Salt Creek

Applicable Regulations: Section J(1)

The Lower Salt Creek (LSC) GWR is located in the north-central portion of the LPSNRD, roughly between Lincoln and Ashland (see Figure 2). The LSC aquifer is semi-confined to confined, and consists mostly of sand and gravel deposits overlying older bedrock units. Saturated thickness of these sand and gravel deposits is about 40 to 65 feet, and depth to water ranges from a few feet to about 50 feet below the land surface. Results of ground water monitoring for nitrate, pesticides, and other components in the LSC GWR are summarized in Figures 4-7 and Table 1.

In 2002, the LSC GWR was designated as a Phase II management area in response to nitrate levels which were determined to be above the NRD's trigger levels for that phase. As a result of this designation, a local advisory committee was formed to advise the District on adoption of rules and regulations to deal with the nitrate issue. The regulations subsequently adopted by the District established cost-share programs to implement Best Management Practices (BMPs) aimed at reducing nitrate in ground water. Practices for which cost-share is available (in addition to the District-wide cost-share items) include fertilizer meters and manifolds, and soil sampling and analysis for fertilizer carryover credits. More information on District cost-share in the LSC GWR as well as the remainder of the NRD can be found in Sections 6-10.

As described above, in 2008 and 2009, nitrate monitoring results for the LSC GWR indicated that ground water nitrate levels had dropped below the Phase II trigger. LPSNRD will continue to evaluate the nitrate trend in LSC ground water samples to determine if the Phase II designation should continue or be changed back to Phase I. The NRD will continue to consult with landowners and other interested parties in LSC to get their input on future directions for the GWR.

3.1.1.4 Missouri River Valley

The Missouri River Valley (MRV) GWR is located along the Missouri River at the eastern margin of the District (see Figure 2). The MRV aquifer is mostly unconfined, and consists of fluvial sand, gravel, and silt deposits with some local clay lenses, all overlying older bedrock formations. Aquifer thickness is on the order of 80 feet, and depth to water is generally around 5 to 10 feet below the land surface. Results of ground water monitoring for nitrate, pesticides, and other components in the MRV GWR are summarized in Figures 4-7 and Table 1.

3.1.1.5 Platte River Valley

The Platte River Valley (PRV) GWR is located in the northeastern portion of the District, along the southern edge of the Platte River (see Figure 2). The PRV aquifer is an unconfined alluvial aquifer that consists of fluvial sand, gravel, and silt overlying older bedrock. The aquifer is on the order of 70 feet thick, and depth to water also ranges from about 5 to 10 feet below the surface. Results of ground water monitoring for nitrate, pesticides, and other components in the PRV GWR are summarized in Figures 4-7 and Table 1.

3.1.1.6 Remaining Area

The Remaining Area (RA) includes all the land in the District which is not included in a GWR (see Figure 2). In the RA, the occurrence of ground water bearing units is highly variable; in some portions, practically no ground water is available. As a result of this variability, no specific GWRs are identified within the RA. In those areas where ground water does occur, it usually comes from small, intermittent sand bodies within silt and clay deposits, or from underlying bedrock units such as the Dakota Formation, or even older limestone units. Ground water from these sand units may be of acceptable quality, but the small quantity available limits its use. Conversely, significant amounts of ground water may occur within the Dakota Formation, but salinity and mineral content of this water increases rapidly with depth, and thus the quality is a limiting factor. Ground water from limestone bedrock is usually limited to small quantities, and this water is also highly mineralized, therefore these older bedrock units are not generally considered as significant aquifers. Results of ground water monitoring for nitrate, pesticides, and other components in the PRV GWR are summarized in Figures 4-7.

3.1.2 Community Water System Protection Areas (CWSPAs)

LPSNRD places a high value on ground water which is used for public drinking water supply. This concern has led the District to delineate Community Water Supply Protection Areas (CWSPAs) around the ground water supply wells for the 30 public water supplies (PWSs) within its jurisdiction (see Figure 3). CWSPA boundaries correspond with Wellhead Protection Area (WHPA) boundaries as delineated by the Nebraska Department of Environmental Quality (NDEQ), and are defined as the area which encompasses the 20-year time-of-travel zone around a given wellfield. In other words, the CWSPA is the area around a well or wellfield from which ground water can be expected to travel in a period of 20 years. NDEQ determines these boundaries by entering information on geology, aquifer characteristics, water levels, and well pumping data into a computer model, which then predicts the 20-year time-of-travel zone. LPSNRD staff continues to work with NDEQ staff to ensure that they have the best available geological and ground water data for this modeling effort, so the boundaries of the CWSPAs are as accurate and defensible as possible.

In general, LPSNRD samples each PWS well at least annually, and has these samples analyzed for the following components: nitrate-nitrogen, major ions, arsenic, and

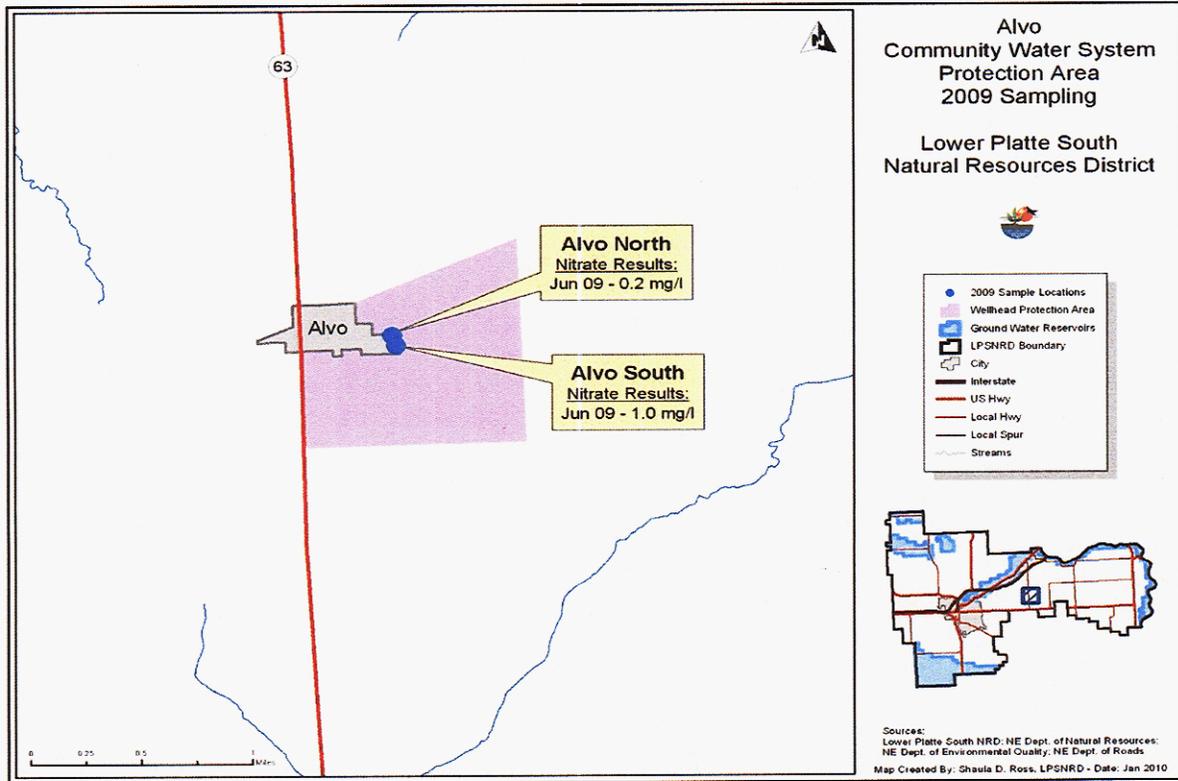
pesticides. Some of the systems have specific agreements with LPSNRD to perform additional analysis.

The following sections provide an overview of the District's activities in each of the CWSPAs in 2009. The maps for each PWS show the wells sampled along with the results for nitrate sampling. Other parameters are described only if they have indicated a cause for concern, otherwise the remaining sample information is communicated to the system for their use.

3.1.2.1 Alvo

The Village of Alvo's CWSPA occupies slightly less than one square mile to the east and north of the village in east-central Cass County. LPSNRD takes annual water samples from two PWS wells for the village, and the results of the 2009 nitrate sampling are shown in Figure 10.

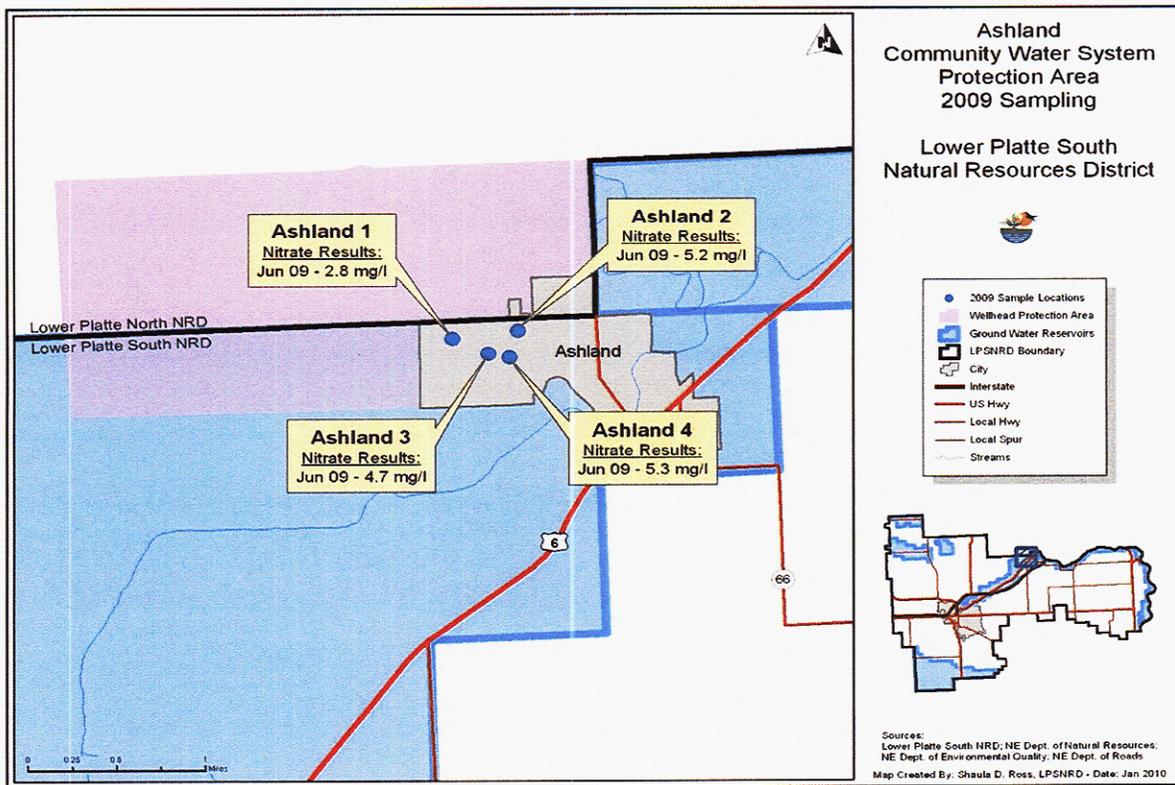
Figure 10 – Alvo



3.1.2.2 Ashland

Ashland's CWSPA encompasses about 4 ½ square miles along the northern edge of the city, located along the Platte River in southeastern Saunders County. This area straddles the boundary between the Lower Platte South and Lower Platte North NRDs; about 1 ½ square miles are located within the LPSNRD. At present, all of Ashland's PWS wells are located in LPSNRD, so the District takes annual water samples from those four PWS wells as part of its regular monitoring. The results of the 2009 sampling for nitrate are shown in Figure 11.

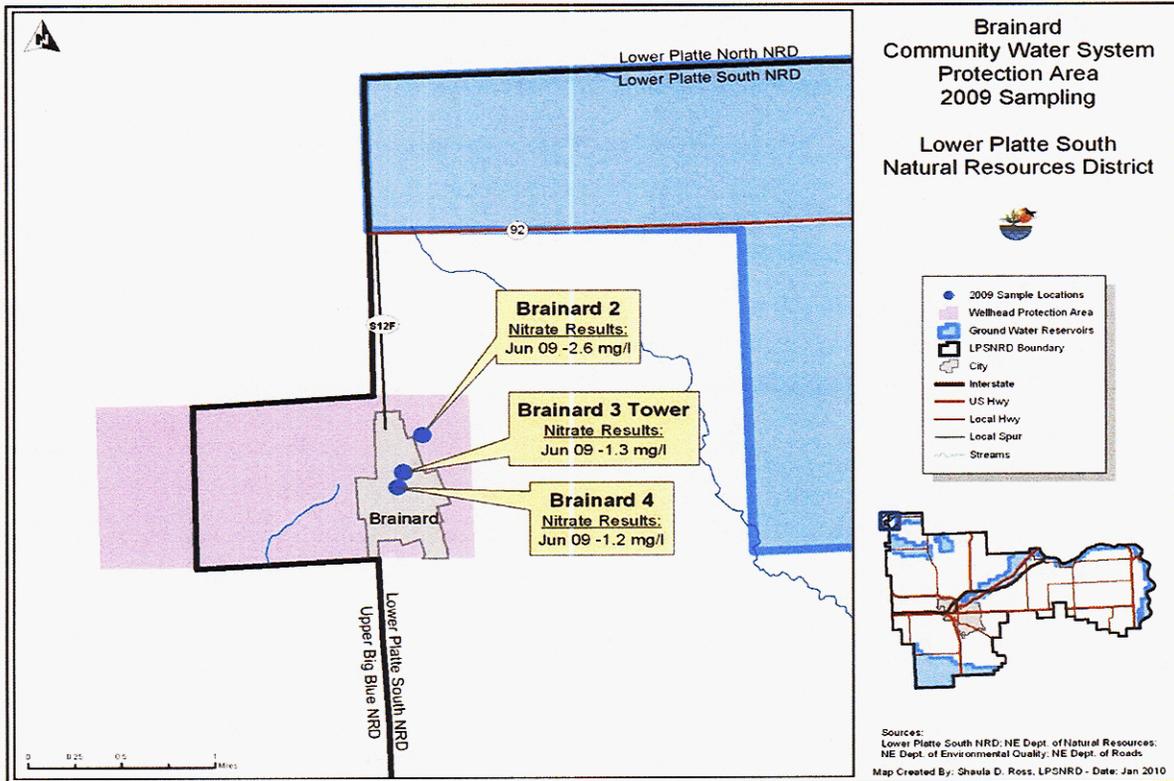
Figure 11 – Ashland



3.1.2.3 Brainard

The CWSPA for the Village of Brainard occupies slightly less than two square miles west of the village in southeastern Butler County. The area straddles the boundary between the Lower Platte South and Upper Big Blue NRDs; about 1 ½ square miles are located in LPSNRD. All three of the village's wells are located in LPSNRD, and the District takes annual water samples from these three wells. The results of the 2009 nitrate sampling are shown in Figure 12.

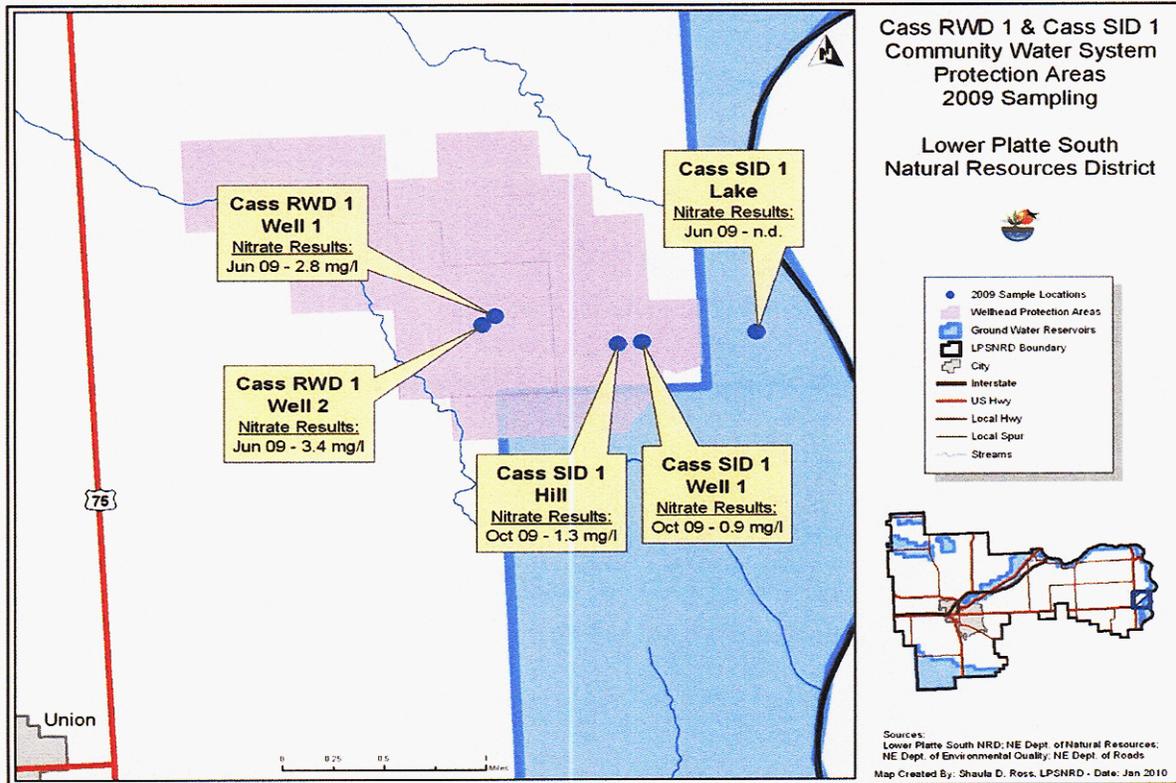
Figure 12 – Brainard



3.1.2.4 Cass County RWD #1/SID #1 (Lake Waconda)

Cass County Rural Water District (RWD) #1 and Sanitary Improvement District (SID) #1 (which serves the Lake Waconda community) are located within about one mile of each other in eastern Cass County, and the CWSPAs overlap each other. The combined area of the two CWSPAs is about 2 ¾ square miles. The NRD takes annual water samples from two PWS wells for the Cass County RWD #1, and three PWS wells for SID #1. The results of the 2009 sampling for nitrate are shown in Figure 13.

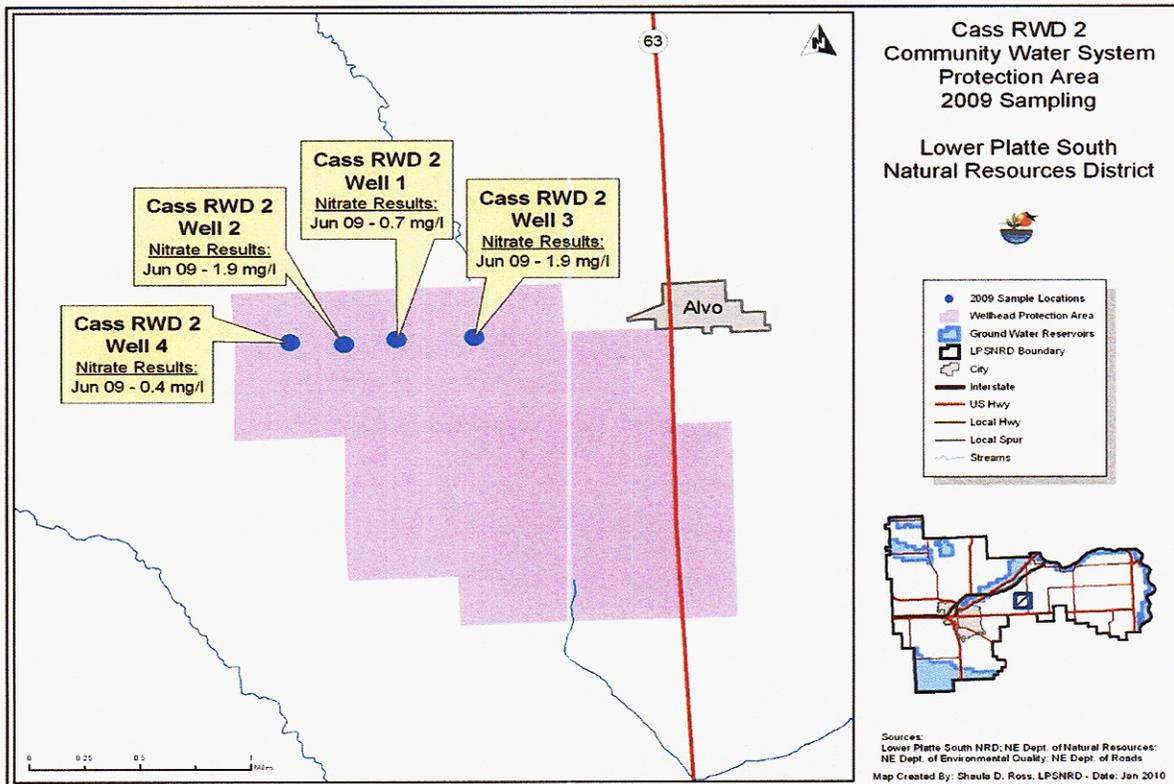
Figure 13 – Cass County RWD #1/SID #1 (Lake Waconda)



3.1.2.5 Cass County RWD #2

The CWSPA for the Cass County Rural Water District #2 takes up about three square miles, just southwest of the Village of Alvo in east-central Cass County. The CWSPAs for the Village of Alvo and the RWD do not overlap each other. LPSNRD takes annual water samples from four PWS wells for the RWD, and the nitrate results of the 2009 sampling are shown in Figure 14.

Figure 14 – Cass County RWD #2



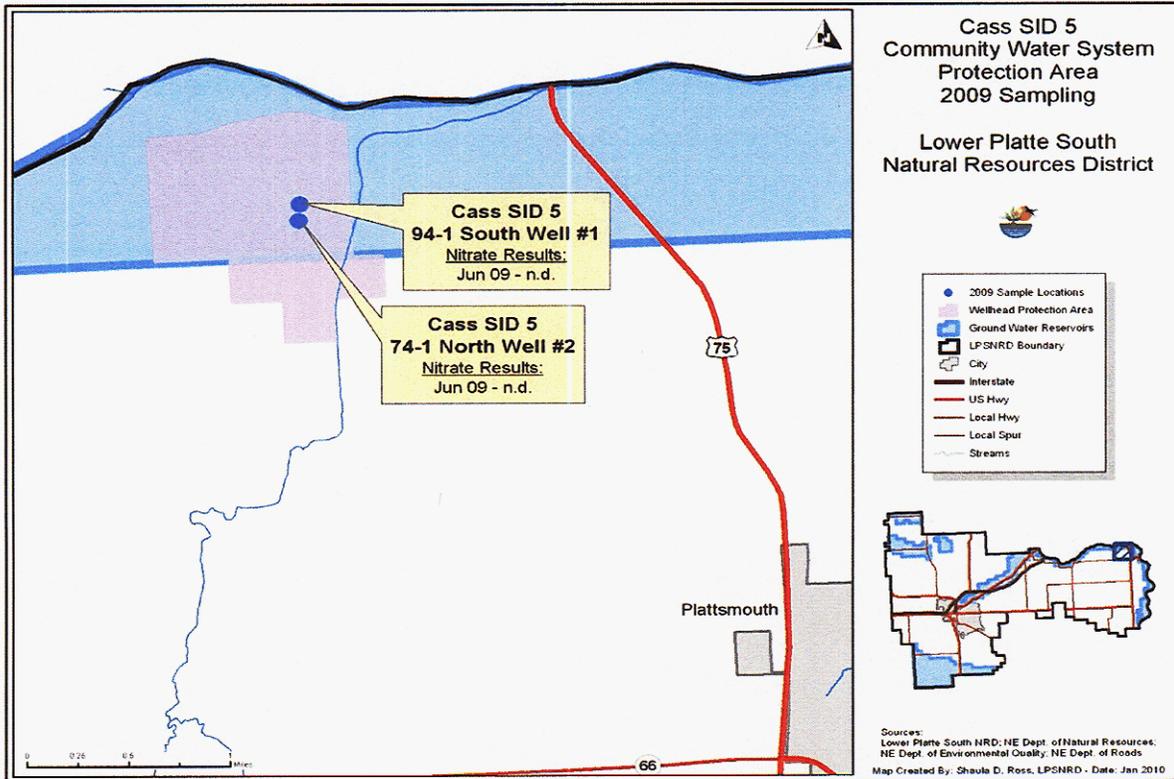
3.1.2.6 Cass County SID #1

See Cass County Rural Water District #1

3.1.2.7 Cass County SID #5/Buccaneer Bay

The Cass County SID #5/Buccaneer Bay development's CWSPA occupies about one square mile northwest of Plattsmouth in northeastern Cass County. The CWSPAs for the SID and Plattsmouth do not overlap. LPSNRD takes annual water samples from two PWS wells for the SID. The results of the nitrate sampling in 2009 are shown in Figure 15. Also, as mentioned in 2.1.3.2, one sample result for arsenic from one of the SID's wells slightly exceeded the MCL, and the SID was notified of this occurrence.

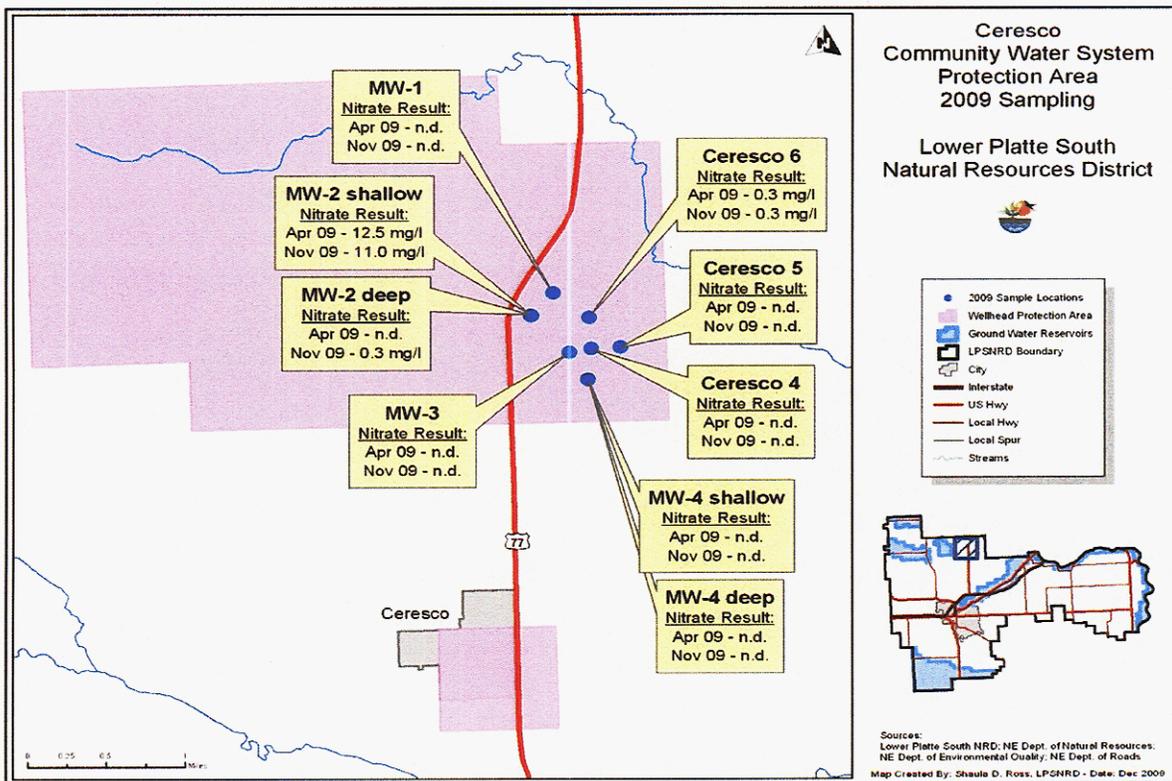
Figure 15 – Cass County SID #5/Buccaneer Bay



3.1.2.8 Ceresco

The Village of Ceresco's CWSPA takes in slightly more than nine square miles north and west of the community in southern Saunders County. In 1997, the District signed an Interlocal Agreement with Ceresco to provide structure for ongoing monitoring and water quality management activities. As a result of this agreement, six dedicated monitoring wells have been installed in the CWSPA, and these wells as well as the three PWS wells are sampled and analyzed biannually for nitrates, and on an annual basis for major ions, radon, pesticides, and BTEX compounds. In addition, Ceresco has completed a contaminant source inventory for the CWSPA detailing the locations of possible sources of contamination. The results of the 2009 nitrate sampling are shown in Figure 16.

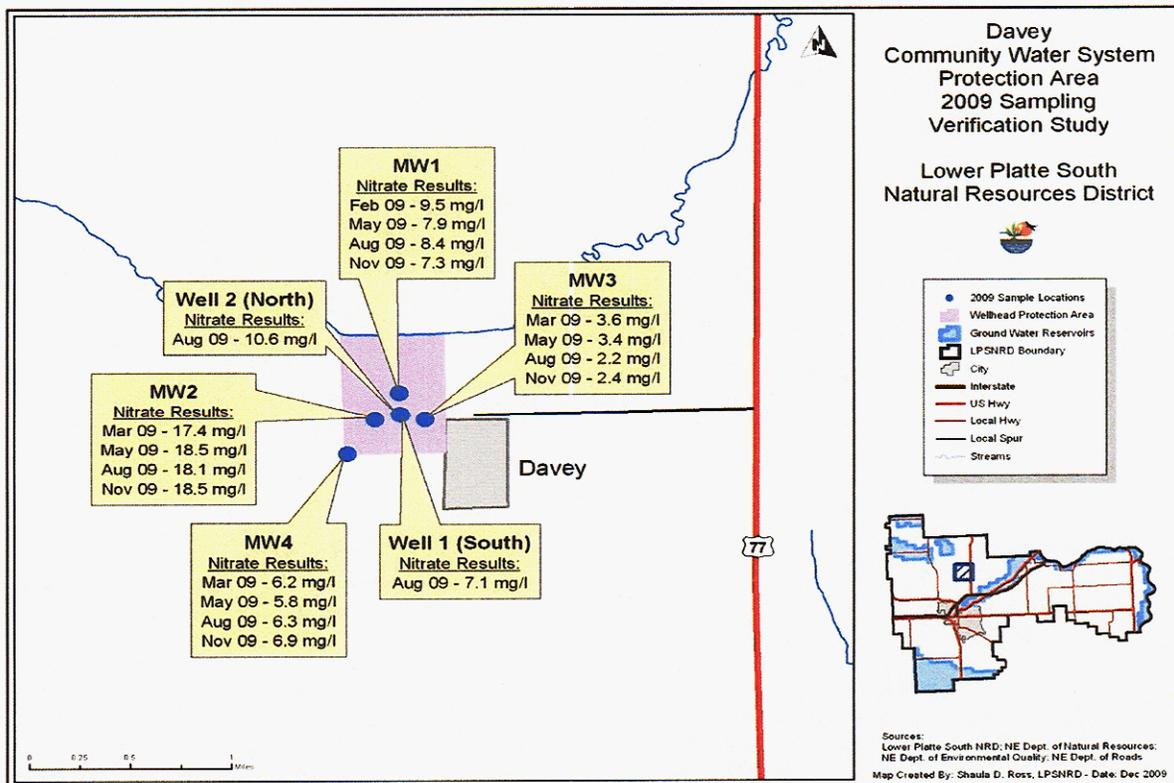
Figure 16 – Ceresco



3.1.2.9 Davey

The CWSPA for the Village of Davey occupies slightly less than ½ square mile west and north of the village in northern Lancaster County. In 2006, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in the CWSPA. As a result, a Phase II Verification Study was initiated and was completed in 2008. This study resulted in the installation of four dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2008a). The nitrate sampling results for the PWS and monitoring wells in 2009 are displayed in Figure 17. As a result of the verification study and subsequent sampling, the LPSNRD designated the Davey CWSPA as a Phase II GWMA in December 2009. The NRD will begin assembling an advisory committee of stakeholders from Davey to advise the District as it develops rules and regulations for the implementation of Phase II. In addition, NRD staff has supplied additional information gained during the verification study to NDEQ to evaluate whether or not the boundaries of the CWSPA need to be modified.

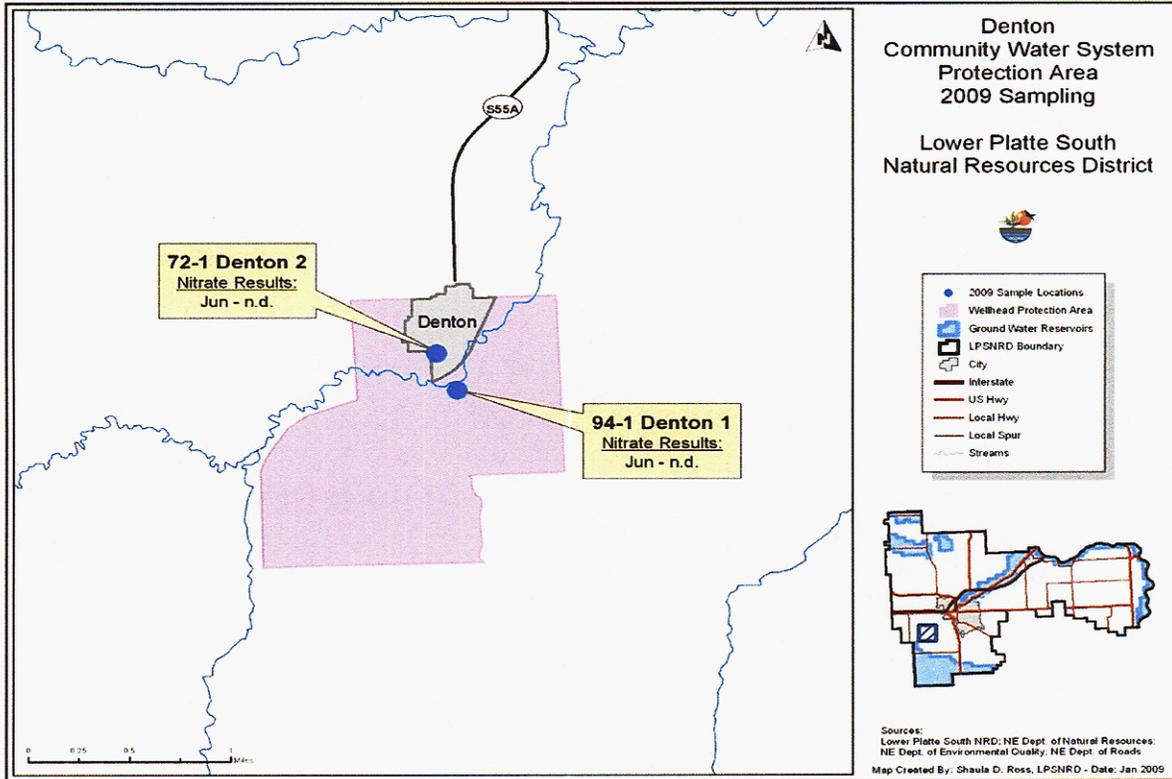
Figure 17 – Davey



3.1.2.10 Denton

The Village of Denton's CWSPA takes up about 1 3/4 square miles around and to the south of the village in west-central Lancaster County. District staff sample two PWS wells for the village, and the 2009 nitrate results are shown in Figure 18.

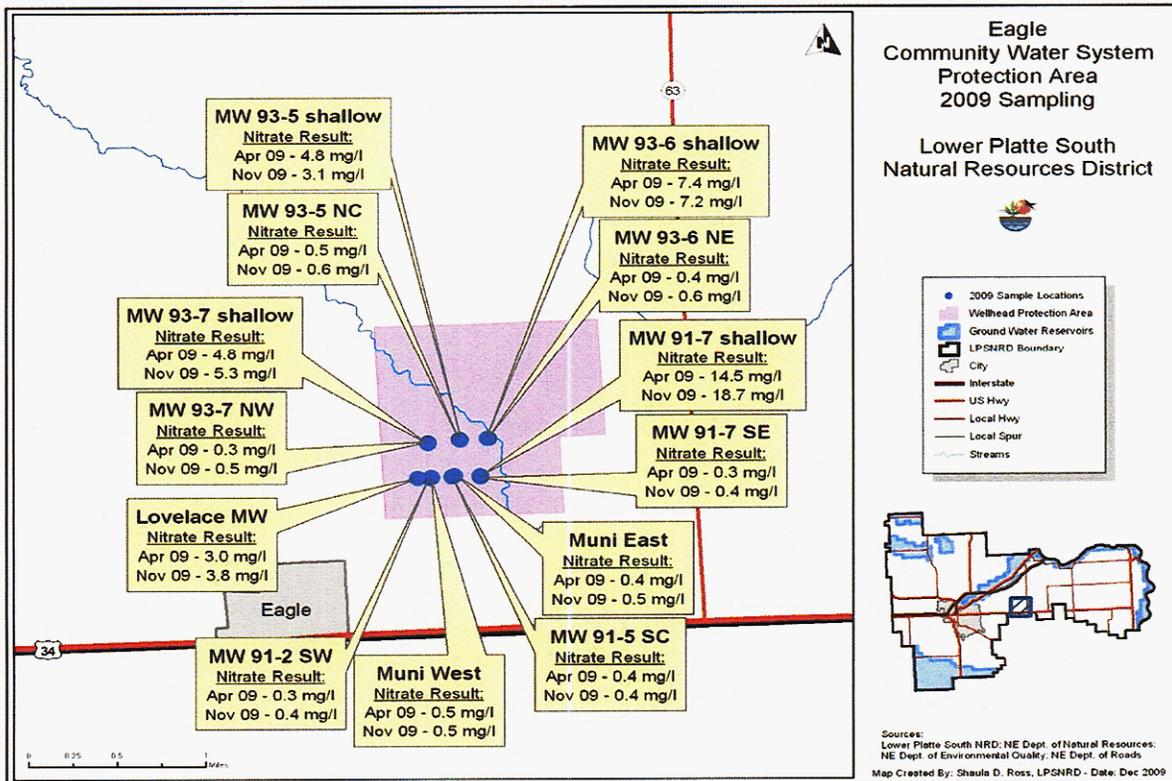
Figure 18 – Denton



3.1.2.11 Eagle

The CWSPA for the Village of Eagle takes in about 1 ½ square miles around and north of the village in southwestern Cass County. In 1998, the District signed an Interlocal Agreement with Eagle to provide structure for ongoing monitoring and water quality management activities, and this agreement was updated in 2009. As a result of this agreement, 11 dedicated monitoring wells have been installed in the CWSPA, and these wells as well as the two PWS wells are sampled and analyzed biannually for nitrates, and on an annual basis for major ions, radon, pesticides, and BTEX compounds. The results of the 2009 nitrate sampling are shown in Figure 19; monitoring for the other compounds of interest showed no exceedences of any applicable MCLs in 2009.

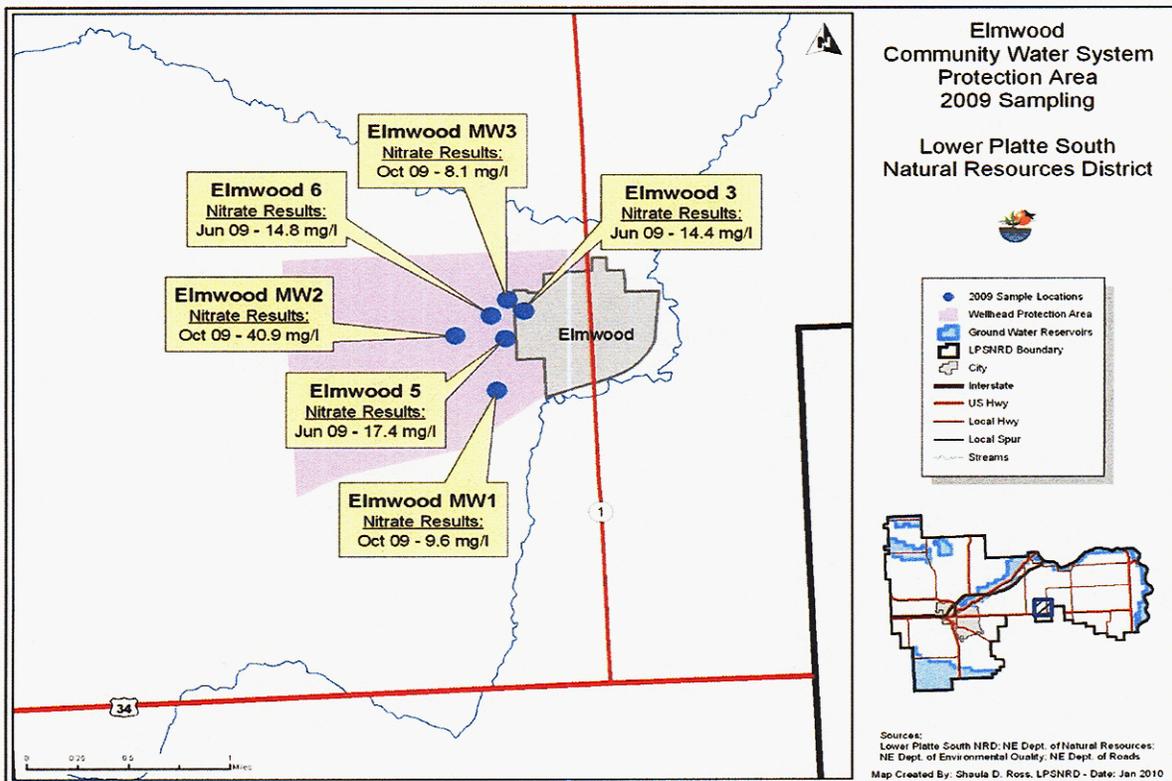
Figure 19 – Eagle



3.1.2.12 Elmwood

The CWSPA for the Village of Elmwood occupies slightly more than 1 ½ square miles west and south of the village in central Cass County. In 2006, District sampling results indicated that the triggers for a Phase III ground water management area had been exceeded in the CWSPA. As a result, a Phase III Verification Study was initiated and was completed in 2008. This study resulted in the installation of three dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2008b). The nitrate sampling results for the monitoring wells and three PWS wells in 2009 are displayed in Figure 20. As a result of the verification study and subsequent sampling, the LPSNRD designated the Elmwood CWSPA as a Phase III GWMA in December 2009. The NRD will begin assembling an advisory committee of stakeholders from Davey to advise the District as it develops rules and regulations for the implementation of Phase III.

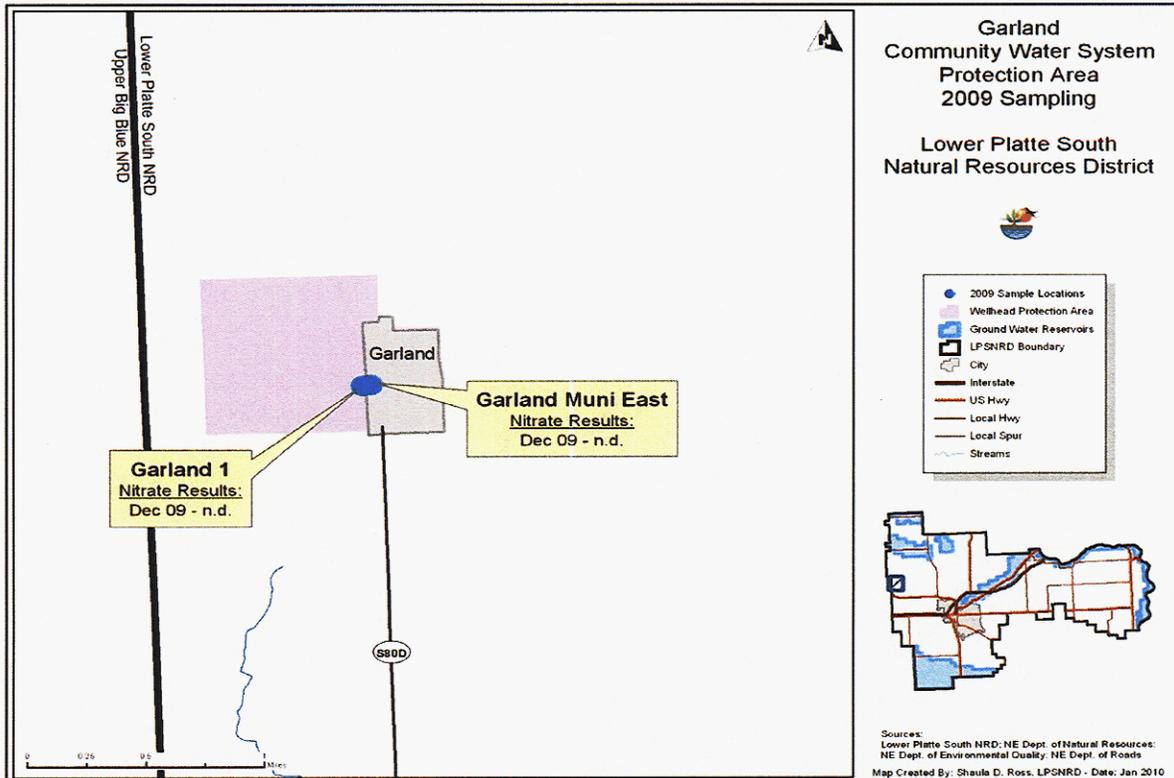
Figure 20 – Elmwood



3.1.2.13 Garland

The Village of Garland's CWSPA takes up slightly less than one square mile around and to the west of the village in northwestern Seward County. District staff sample two PWS wells for the village, and the 2009 nitrate results are shown in Figure 21. Also, as mentioned in 2.1.3.2, one sample result for arsenic from one of Garland's wells slightly exceeded the MCL, and the Village was notified of this occurrence.

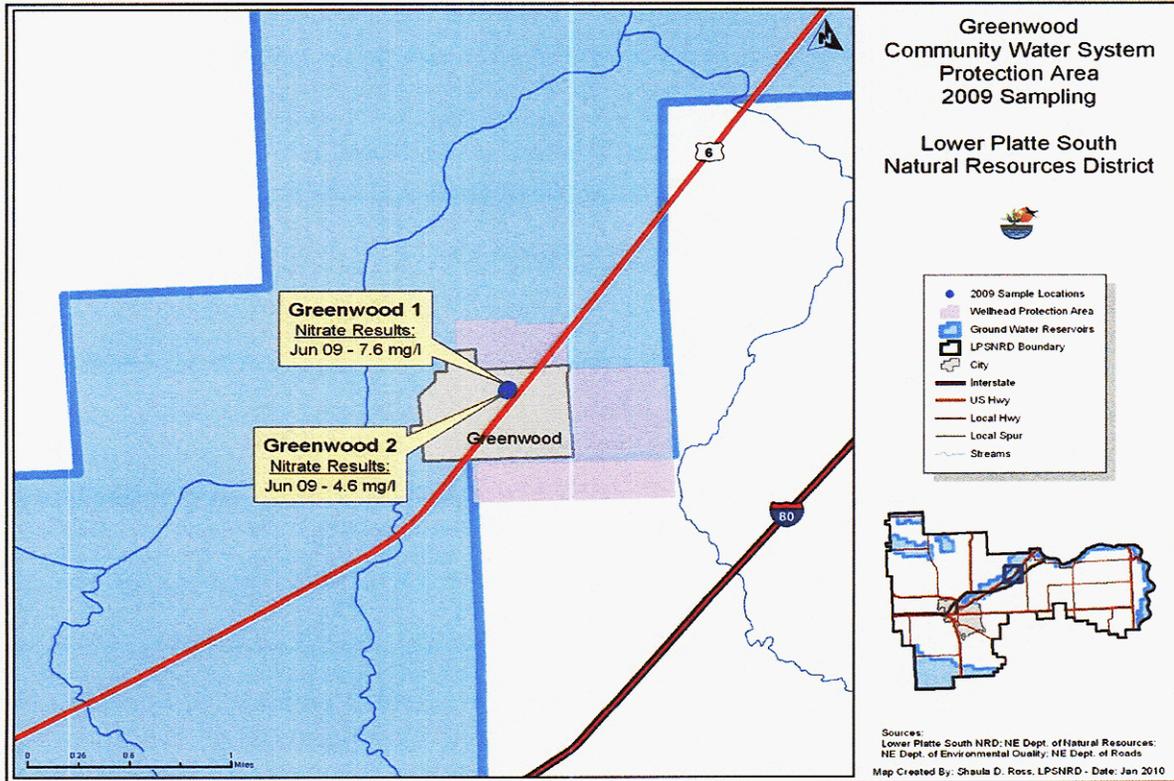
Figure 21 – Garland



3.1.2.14 Greenwood

The CWSPA for Greenwood occupies about one square mile around and to the east and southeast of the village in western Cass County. District staff sample two PWS wells for the village, and the 2009 nitrate results are shown in Figure 22.

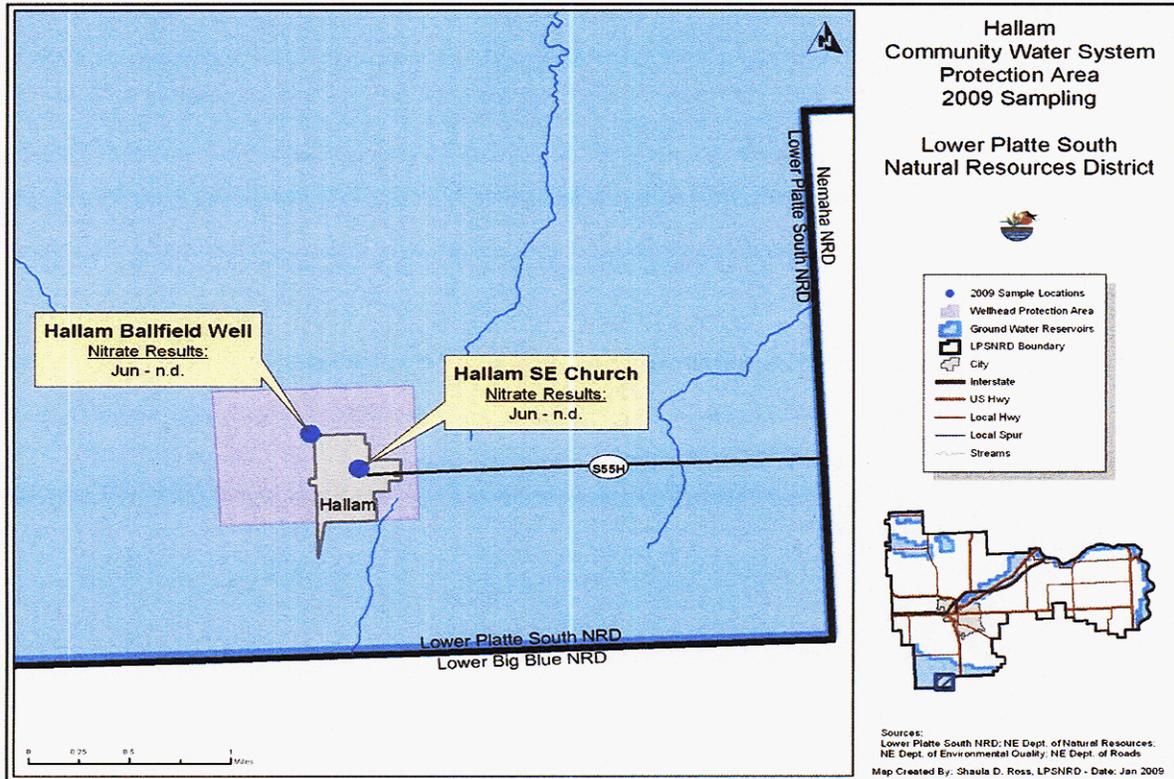
Figure 22 – Greenwood



3.1.2.15 Hallam

The Village of Hallam's CWSPA takes up about 3/4 square mile around and to the north of the village in southern Lancaster County. District staff sample two PWS wells for the village, and the 2009 nitrate results are shown in Figure 23.

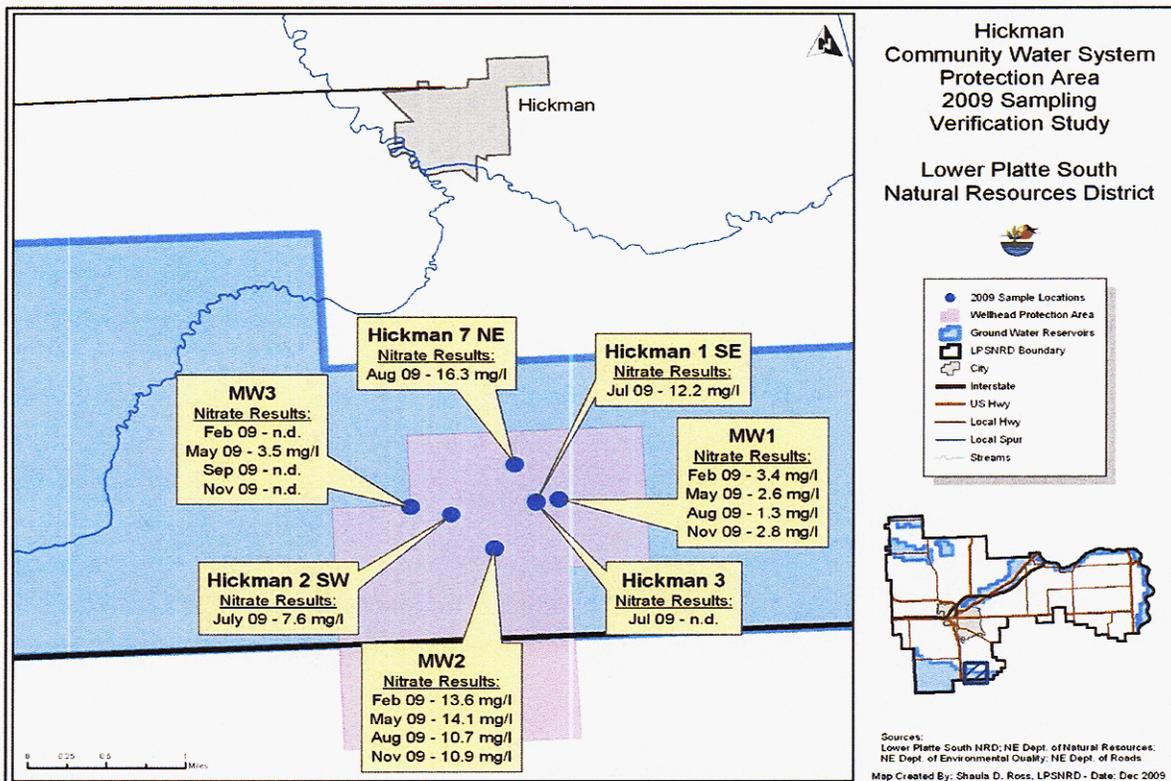
Figure 23 – Hallam



3.1.2.16 Hickman

The City of Hickman's CWSPA takes in slightly more than 3 ½ square miles south of the city in southern Lancaster County. The CWSPA for Hickman straddles the boundary between the Lower Platte South and Nemaha NRDs; about 2 ½ square miles are in LPSNRD, and the remaining one square mile is in NNRD. In 2006, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in the CWSPA. As a result, a Phase II Verification Study was initiated and was completed in 2009. This study resulted in the installation of three dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2009a). The nitrate sampling results for the PWS and monitoring wells in 2009 are displayed in Figure 24. As a result of the verification study and subsequent sampling, the LPSNRD designated the Hickman CWSPA as a Phase II GWMA in December 2009. The NRD will begin assembling an advisory committee of stakeholders from Hickman to advise the District as it develops rules and regulations for the implementation of Phase II. In addition, LPSNRD will consult with the Nemaha NRD to evaluate activities taking place within NNRD's portion of the CWSPA. Finally, as additional information became available about pumping rates and geology, NDEQ completed re-modeling of the Hickman WHPA in 2009, and those boundaries will be adjusted to as administration of the Phase II area continues.

Figure 24 – Hickman



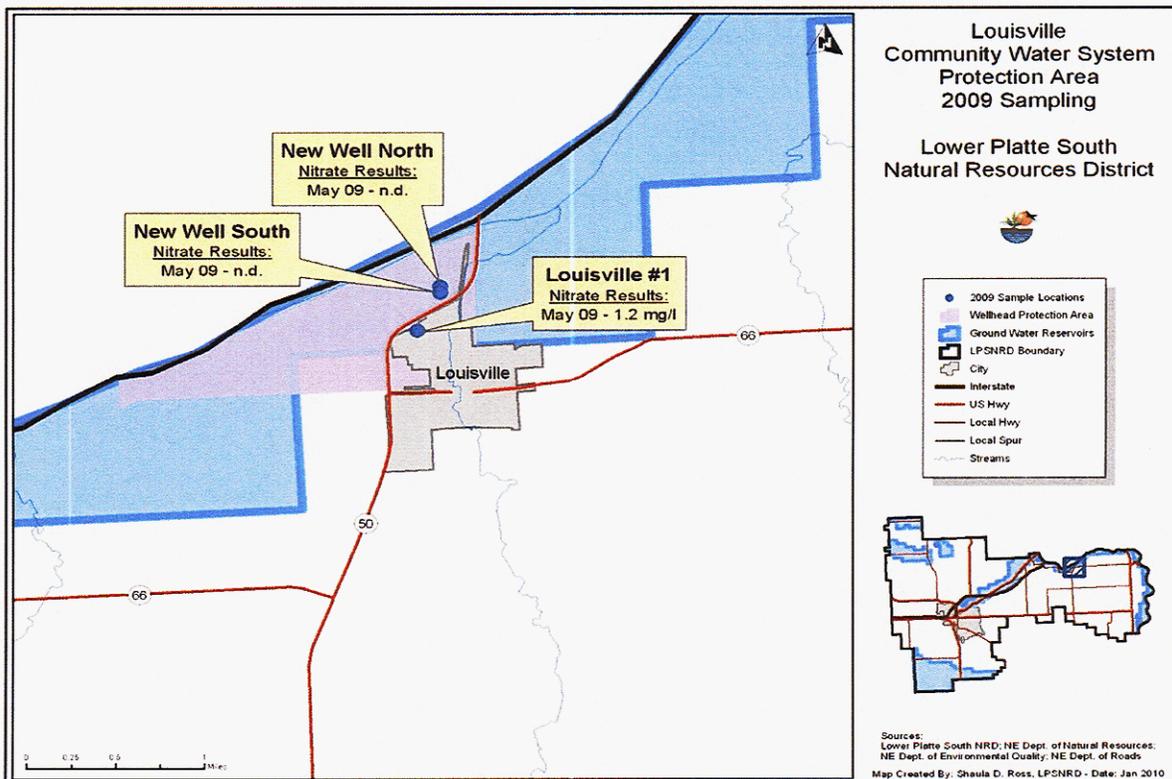
3.1.2.17 Lancaster County SID #6/Emerald

The process of installing a new public water system for the community of Emerald in west-central Lancaster County stretches back for several years. In 2009, land rights for a new system were acquired through condemnation. Two new production wells were constructed, pump tests completed, and the water quality testing results have been returned. The results of the pump tests indicated the two wells will be operated in the 20-30 gallons per minute range. The water quality results indicated there are not any issues with the quality of the water. The water quality results and the pump tests are very similar to the results the District obtained while exploring to find a new wellfield. In addition, the foundation and footings for the structure to house the pressure tank are completed and about 10% of the force main has been laid to take the water into the community. The consultant for the project expects completion of the project in April or May of 2010. As of this report, the CWSPA boundaries for the Emerald system have not been determined, nor has a monitoring arrangement been made, so there is no map or monitoring results for Emerald for this report. Those items will be pursued in 2010.

3.1.2.18 Louisville

The City of Louisville's CWSPA takes up about 1 ¼ square miles to the west of the city along the south side of the Platte River in northern Cass County. District staff sample three PWS wells for the village, and the 2009 nitrate results are shown in Figure 25.

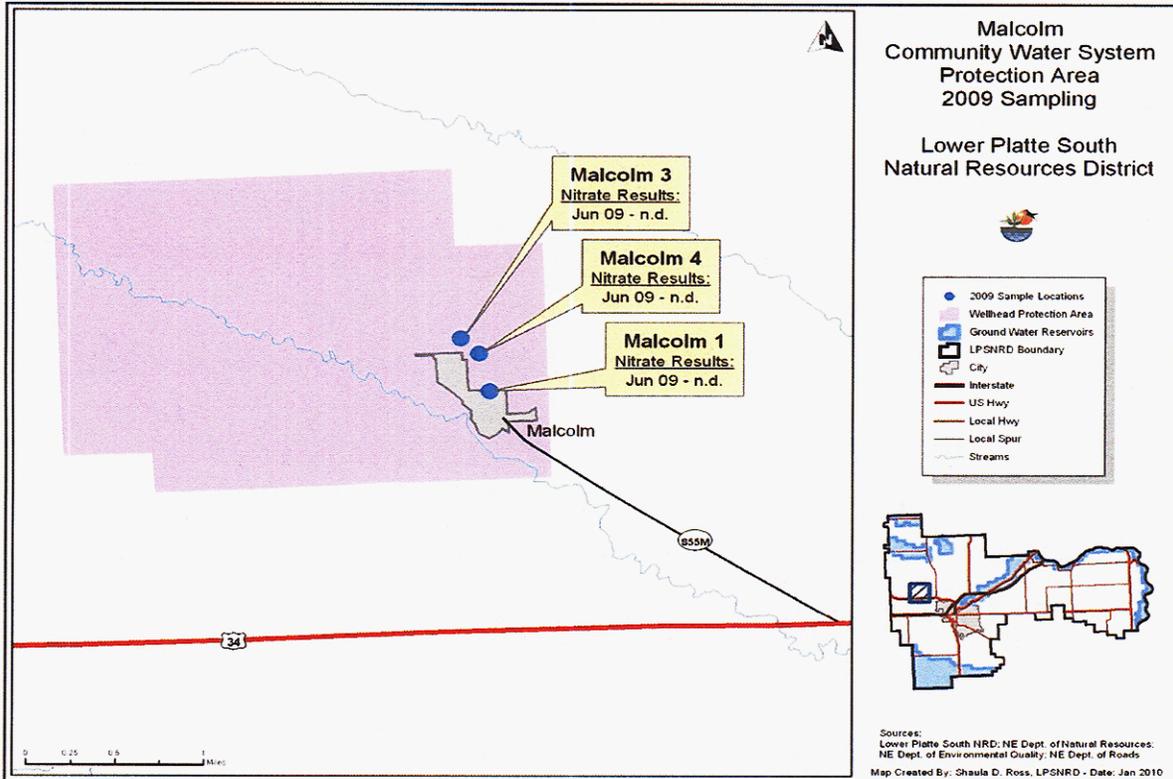
Figure 25 – Louisville



3.1.2.19 Malcolm

The Village of Malcolm's CWSPA covers about 5 square miles north and west of the village in west-central Lancaster County. District staff sample three PWS wells for the village, and the 2009 nitrate results are shown in Figure 26.

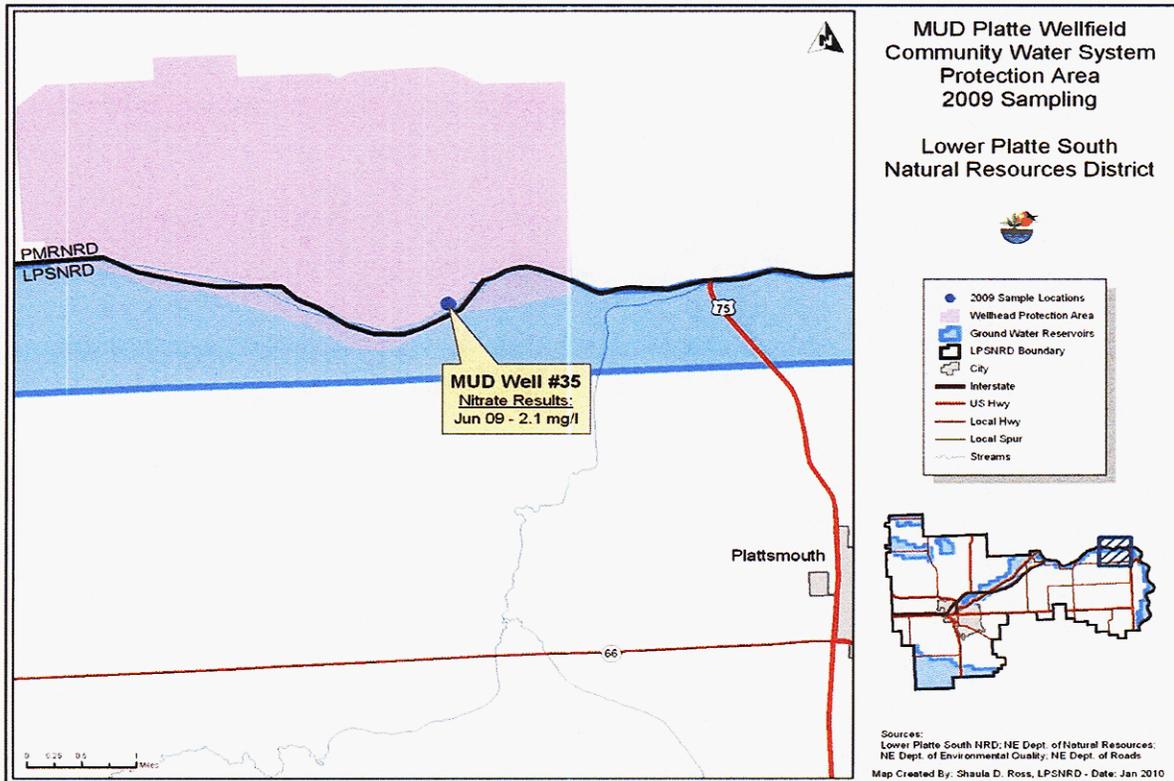
Figure 26 – Malcolm



3.1.2.20 Metropolitan Utilities District (MUD)

The Metropolitan Utilities District (MUD) serves the greater Omaha area. It gets its water supply from the Missouri River and several wellfields, one of which is the Platte wellfield just northwest of Plattsmouth along the lower reaches of the Platte River. The CWSPA for the MUD Platte wellfield occupies about 12 square miles along the Platte River, most of it on the north side of the river in the Papio-Missouri River NRD. LPSNRD staff sample one well in the wellfield, and the 2009 results are shown in Figure 27.

Figure 27 – Metropolitan Utilities District (MUD)



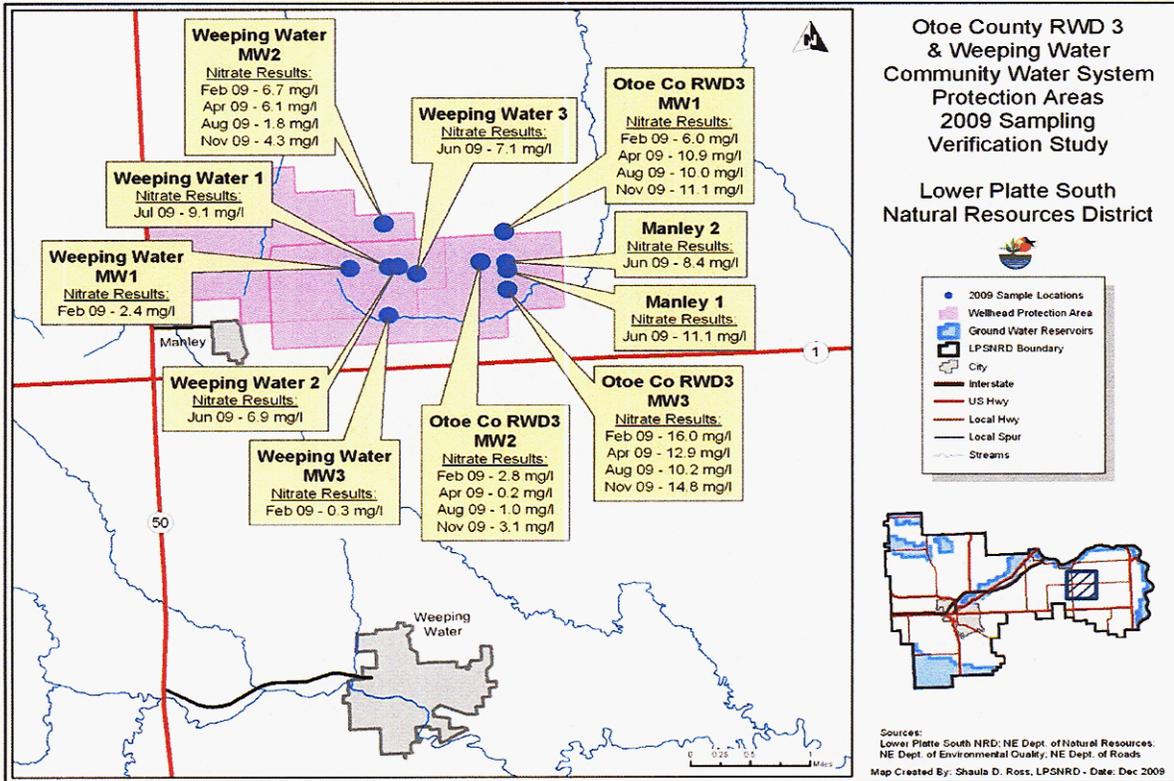
3.1.2.21 Otoe County RWD #3/Weeping Water

The CWSPAs for Otoe County Rural Water District #3 (OCRWD#3) and the City of Weeping Water are located within about one mile of each other just northeast of the village of Manley in central Cass County, and the CWSPAs overlap. The total area of the two CWSPAs is slightly over four square miles, and the overlap area is about one square mile. Water from the OCRWD#3 wells is combined with water from other supply wells throughout the system to supply customers in other parts of Cass and Otoe Counties, including the Village of Manley. Water from the Weeping Water wellfield is used to supply customers in the City of Weeping Water, which is about five miles south of the wellfield.

In 2006, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in these two CWSPAs. As a result, a Phase II Verification Study was initiated and was completed in 2009. This study resulted in the installation of six dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2009b). The nitrate sampling results for the PWS and monitoring wells in 2009 are displayed in Figure 28. Unfortunately, two of the monitoring wells for the Weeping Water investigation (MW-1 and MW-2) were inadvertently installed too close to the county road right-of-way, and had to be decommissioned in mid 2009. Therefore, only one sample from each of these wells was available for 2009.

The results of the District nitrate sampling from 2006-2009 indicated that the trigger for Phase II and possibly Phase III had been exceeded. However, conversations with NDEQ late in 2009 indicated that the boundaries of the two CWSPAs might need modified based on the additional information gained in the verification study. The District supplied the information to NDEQ and will evaluate possible new boundaries of these CWSPAs once that modeling is complete. Based on the model results, the District will also consider whether to administer each CWSPA separately or to combine them into one area for the purposes of phase management. These actions should be accomplished early in 2010.

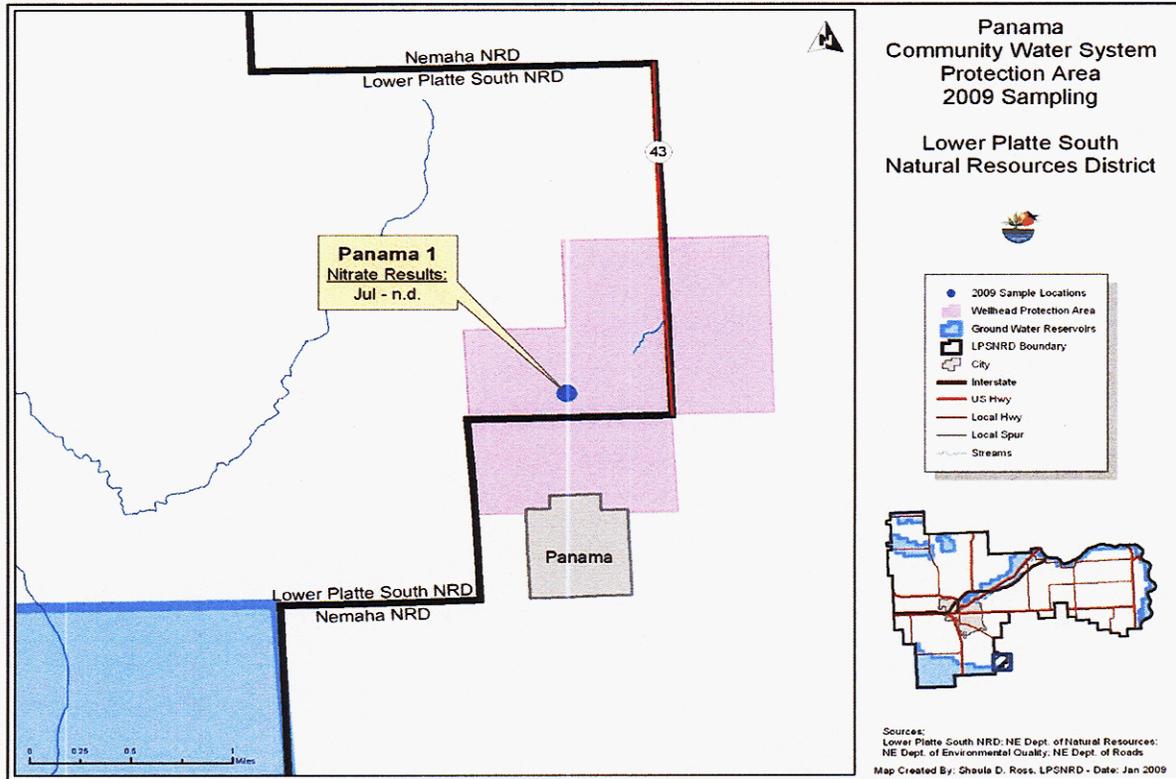
Figure 28 – Otoe County RWD #3/Weeping Water



3.1.2.22 Panama

The Village of Panama's CWSPA occupies about one square mile north and east of the village in southeastern Lancaster County. LPSNRD samples one PWS well for the village, and the 2009 results are shown in Figure 29.

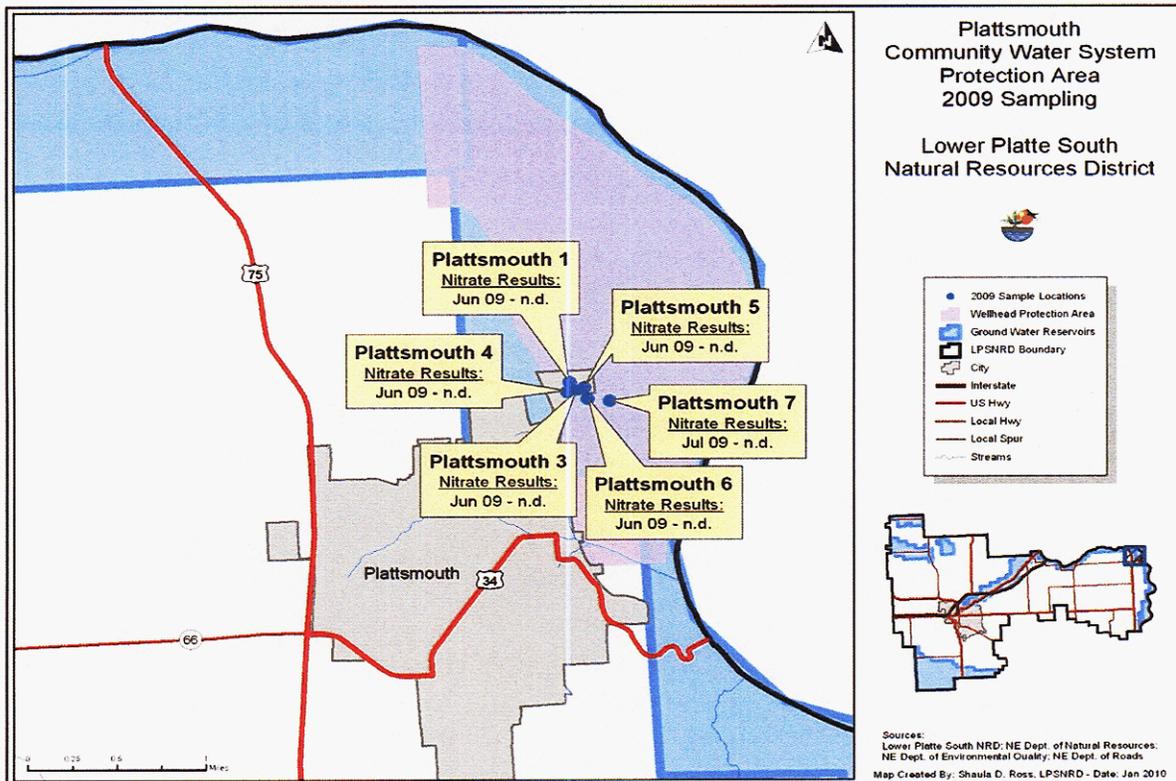
Figure 29 – Panama



3.1.2.23 Plattsmouth

The City of Plattsmouth's CWSPA occupies about 3 ¼ square miles to the northeast of the city along the Platte and Missouri Rivers in northeastern Cass County. District staff sample six PWS wells for the city, and the 2009 nitrate results are shown in Figure 30. Also, as mentioned in 2.1.3.2, two sample results for arsenic from Plattsmouth's wells slightly exceeded the MCL, and the City was notified of this occurrence.

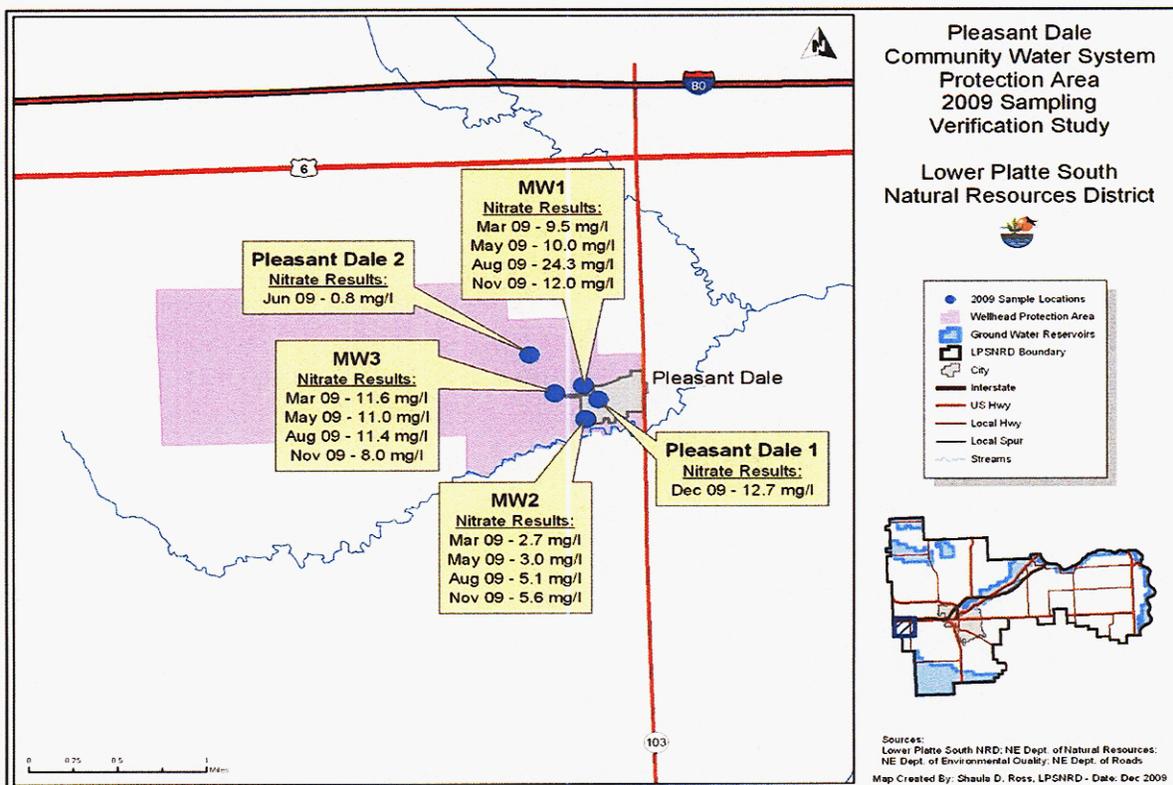
Figure 30 – Plattsmouth



3.1.2.24 Pleasant Dale

The CWSPA for the Village of Pleasant Dale occupies about 2 ½ square miles west and north of the village in eastern Seward County. In 2006, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in the CWSPA. As a result, a Phase II Verification Study was initiated and was completed in 2009. This study resulted in the installation of three dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2009c). The nitrate sampling results for the two PWS and three monitoring wells in 2009 are displayed in Figure 31. As a result of the verification study and subsequent sampling, the LPSNRD designated the Pleasant Dale CWSPA as a Phase II GWMA in December 2009. The NRD will begin assembling an advisory committee of stakeholders from the Pleasant Dale area to advise the District as it develops rules and regulations for the implementation of Phase II. In addition, NRD staff has supplied additional information gained during the verification study to NDEQ to evaluate whether or not the boundaries of the CWSPA need to be modified.

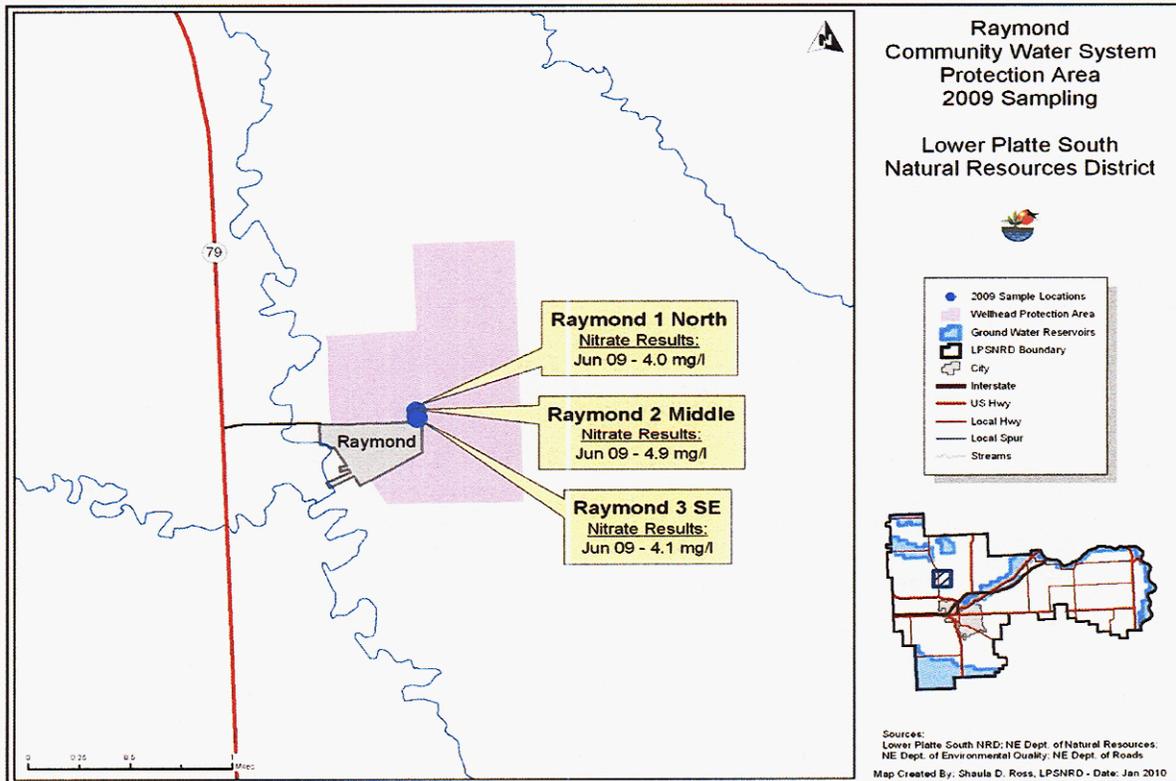
Figure 31 – Pleasant Dale



3.1.2.25 Raymond

The Village of Raymond's CWSPA covers a little more than one square mile north and east of the village in northwestern Lancaster County. District staff sample three PWS wells for the village, and the 2009 nitrate results are shown in Figure 32.

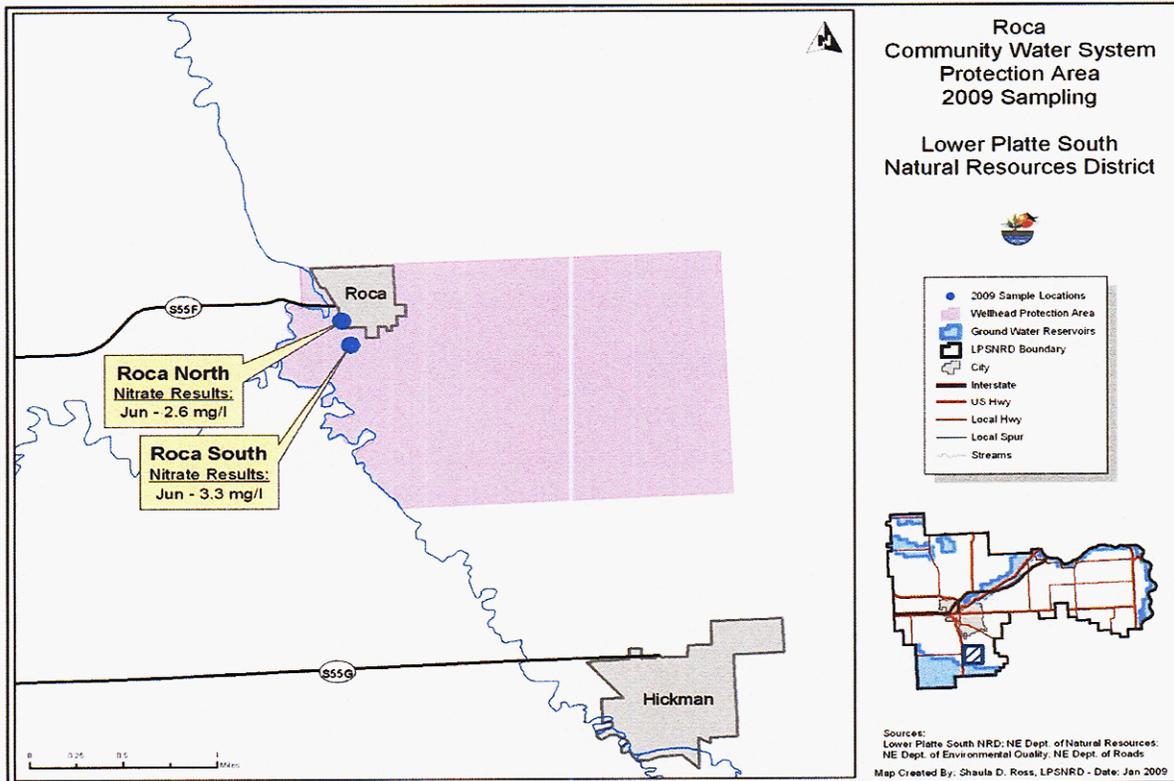
Figure 32 – Raymond



3.1.2.26 Roca

The CWSPA for the Village of Roca occupies about 3 ¼ square miles south and east of the village in south-central Lancaster County. District staff sample two PWS wells for the village, and the 2009 nitrate results are shown in Figure 33.

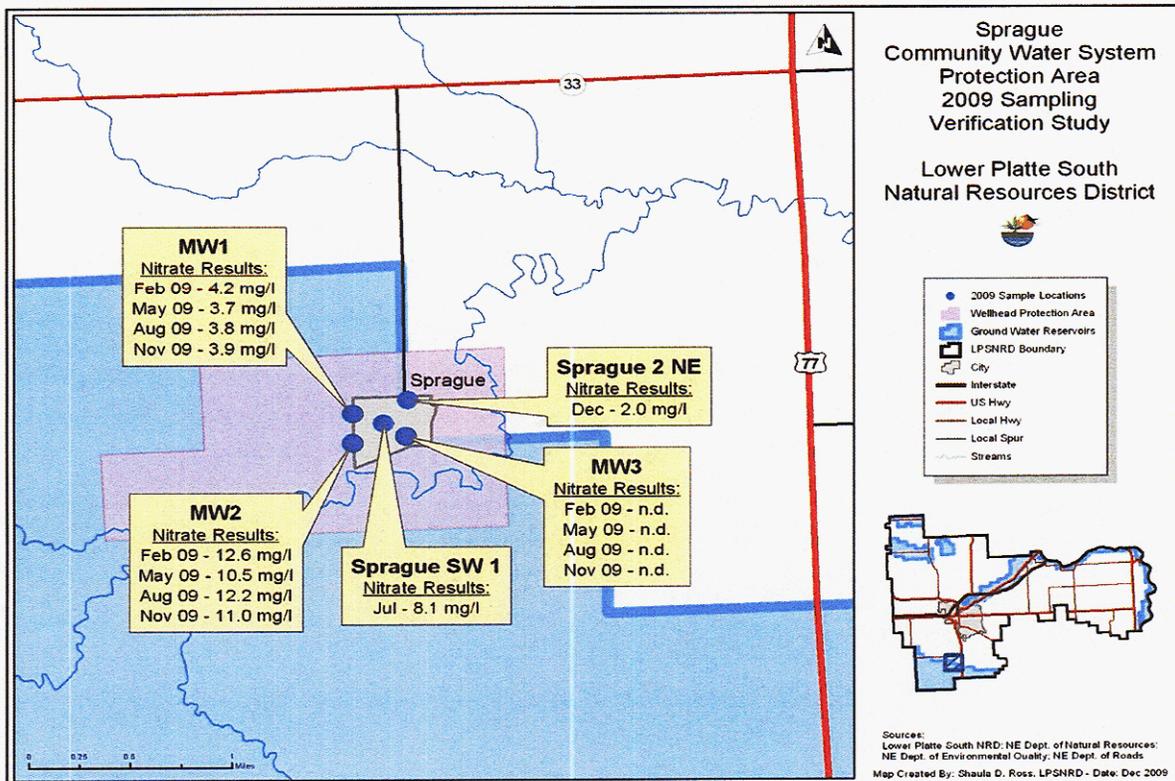
Figure 33 – Roca



3.1.2.27 Sprague

The Village of Sprague's CWSPA occupies about 1 ¾ square miles around the village in southwestern Lancaster County. In 2006, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in the CWSPA. As a result, a Phase II Verification Study was initiated and was completed in 2009. This study resulted in the installation of three dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2009d). The nitrate sampling results for the two PWS and three monitoring wells in 2009 are displayed in Figure 34. These sampling results show that nitrate levels in the Sprague CWSPA are very close to the Phase II trigger. As a result, in December 2009 the LPSNRD Board directed the staff to continue to monitor the PWS and monitoring wells in the CWSPA to determine if those levels are in fact being exceeded.

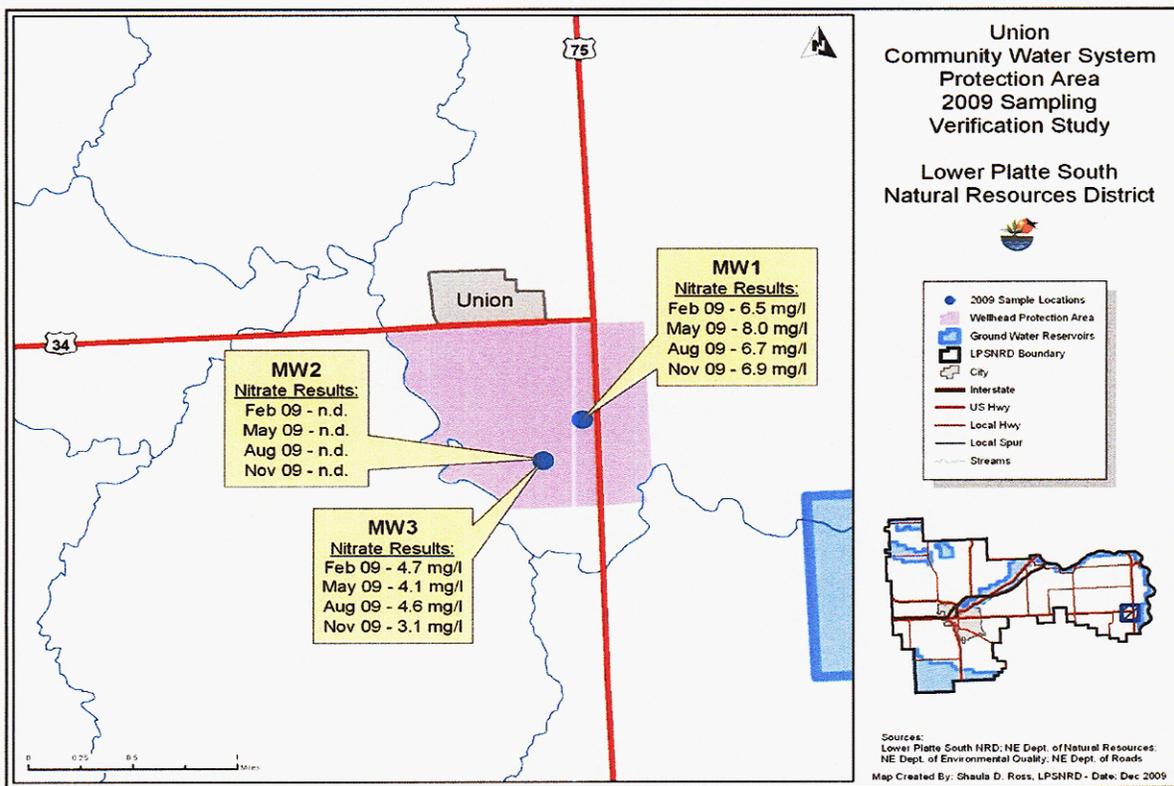
Figure 34 – Sprague



3.1.2.28 Union

The CWSPA for the Village of Union occupies about one square mile south of the village in southeastern Cass County. In 2006, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in the CWSPA. As a result, a Phase II Verification Study was initiated and was completed in 2008. This study resulted in the installation of three dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2008c). At the PWS' request, LPSNRD does not sample the individual public supply wells. The nitrate sampling results for the three monitoring wells in 2009 are displayed in Figure 35. As a result of the verification study and subsequent sampling, the LPSNRD designated the Union CWSPA as a Phase II GWMA in December 2009. The NRD will begin assembling an advisory committee of stakeholders from Union to advise the District as it develops rules and regulations for the implementation of Phase II. In addition, NRD staff has supplied additional information gained during the verification study to NDEQ to evaluate whether or not the boundaries of the CWSPA need to be modified.

Figure 35 – Union

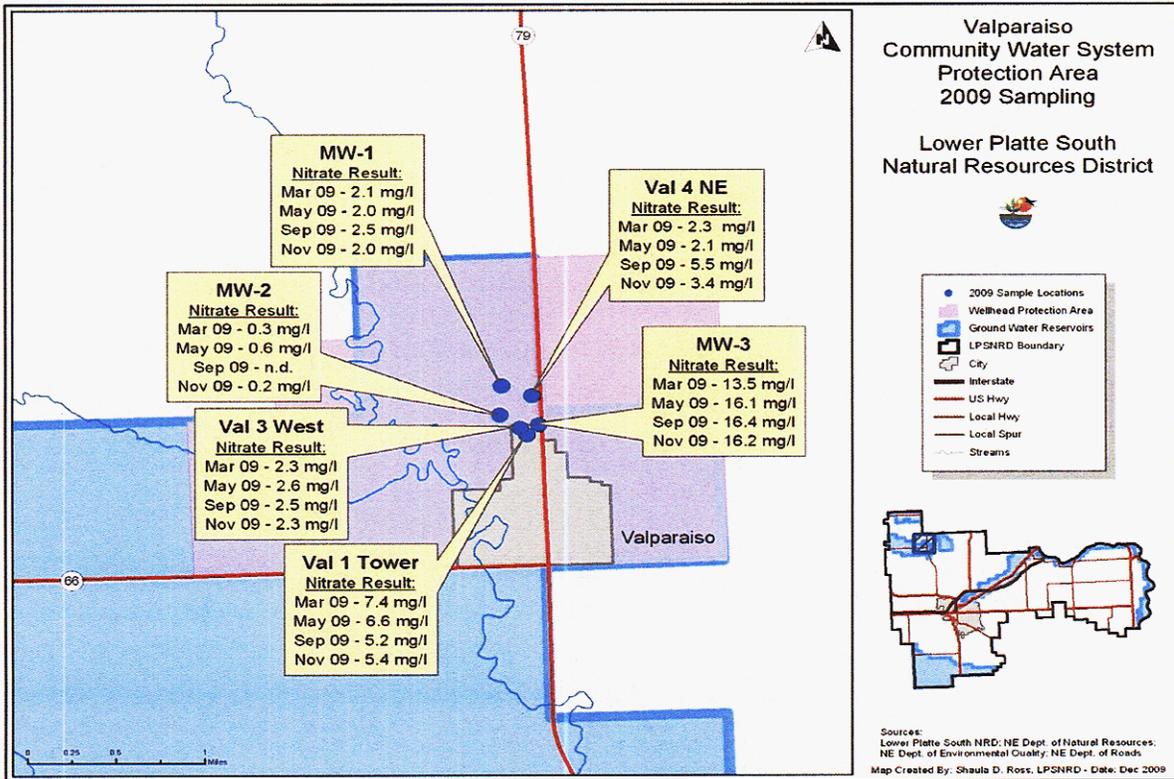


3.1.2.29 Valparaiso

Applicable Regulations: Section J(2)

The CWSPA for the Village of Valparaiso covers about 5 ¼ square miles surrounding the village in southwestern Saunders County. In 2001, District sampling results indicated that the triggers for a Phase II ground water management area had been exceeded in the CWSPA. As a result, a Phase II Verification Study was initiated and was completed in 2003. This study resulted in the installation of three dedicated monitoring wells in the CWSPA, as well as collection of a great deal of geologic, soil, and other data (EA Engineering, Science, & Technology, 2003). As a result of this study, the Valparaiso CWSPA was designated as a Phase II GWMA in 2004. An advisory group of interested parties from the Valparaiso area was formed to assist in the development of rules and regulations, which were adopted in 2004. As per the District's regulations, cost-share programs for the promotion of nitrogen management best management practices were established, and the District cost-shared on two applications for the Valparaiso Phase II Spring Nitrogen Application program (SNAP) in 2009. In addition, the District provided cost-share for purchase of one fertilizer meter to a producer who farms in the vicinity of the Valparaiso CWSPA. Of the other cost-share applications, permits, or inspections processed by the District in 2009 (well permits, well decommissioning, water meters, and chemigation), none were in the Valparaiso CWSPA. In addition, a certification program for landowners and operators who apply nitrogen fertilizer was developed and implemented. The District held its first certification class for the Phase II area in 2007, and no certification classes were held in 2009. In 2007, the District signed an Interlocal Agreement with Valparaiso to provide structure for ongoing monitoring and water quality management activities. The nitrate sampling results for the two PWS and three monitoring wells in 2009 are displayed in Figure 36.

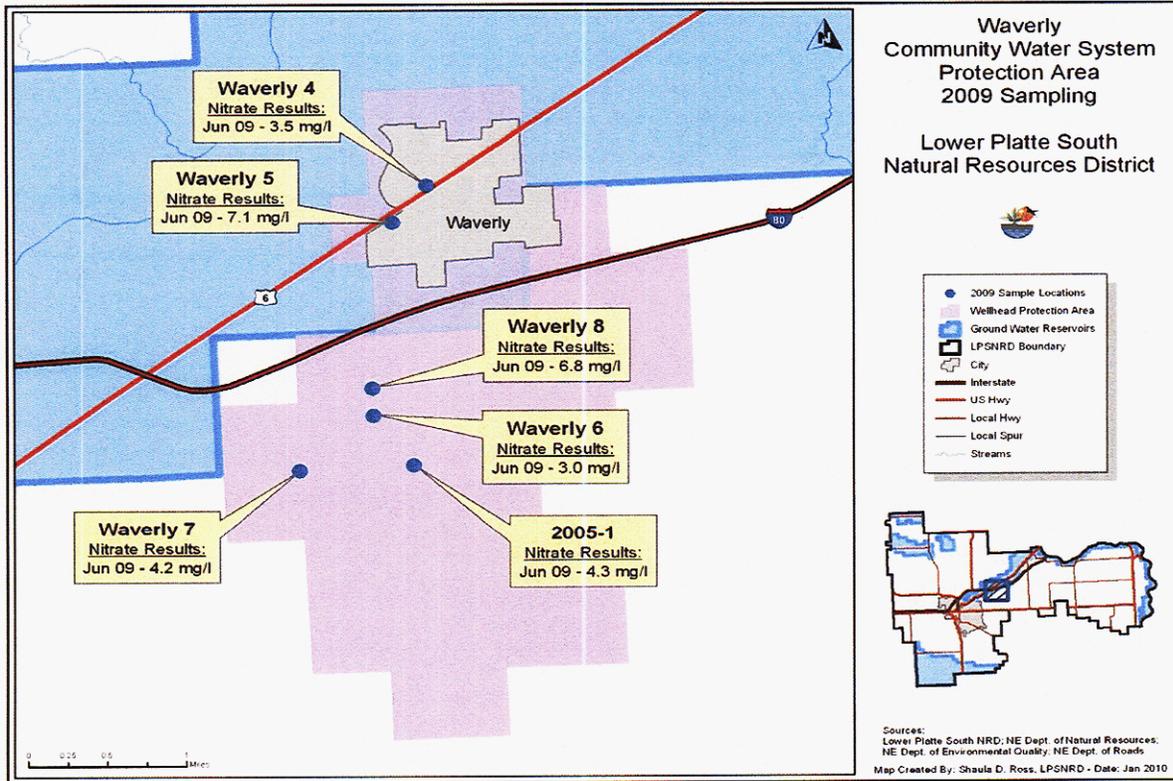
Figure 36 – Valparaiso



3.1.2.30 Waverly

The City of Waverly's CWSPA occupies more than eight square miles around and south of the city in northeastern Lancaster County. District staff sample two PWS wells for the village, and the 2009 nitrate results are shown in Figure 37.

Figure 37 – Waverly



3.1.2.31 Weeping Water

See Otoe County Rural Water District #3

3.2 Ground Water Quantity

Designated areas of management for ground water quantity follow the same boundaries as those for ground water quality—that is, Ground Water Reservoirs, the Remaining Area, and Community Water System Protection Areas. Spring 2008 to spring 2009 water level changes are shown for the entire District in Figure 8, and representative long-term trends are shown in Figure 9. Typically, water levels are measured from irrigation wells and dedicated monitoring wells. Public water supply wells are not usually measured. In 2009, none of the water levels designated area of management exceeded phase triggers for ground water quantity (Table 3).

3.2.1 Irrigated Acre Certification

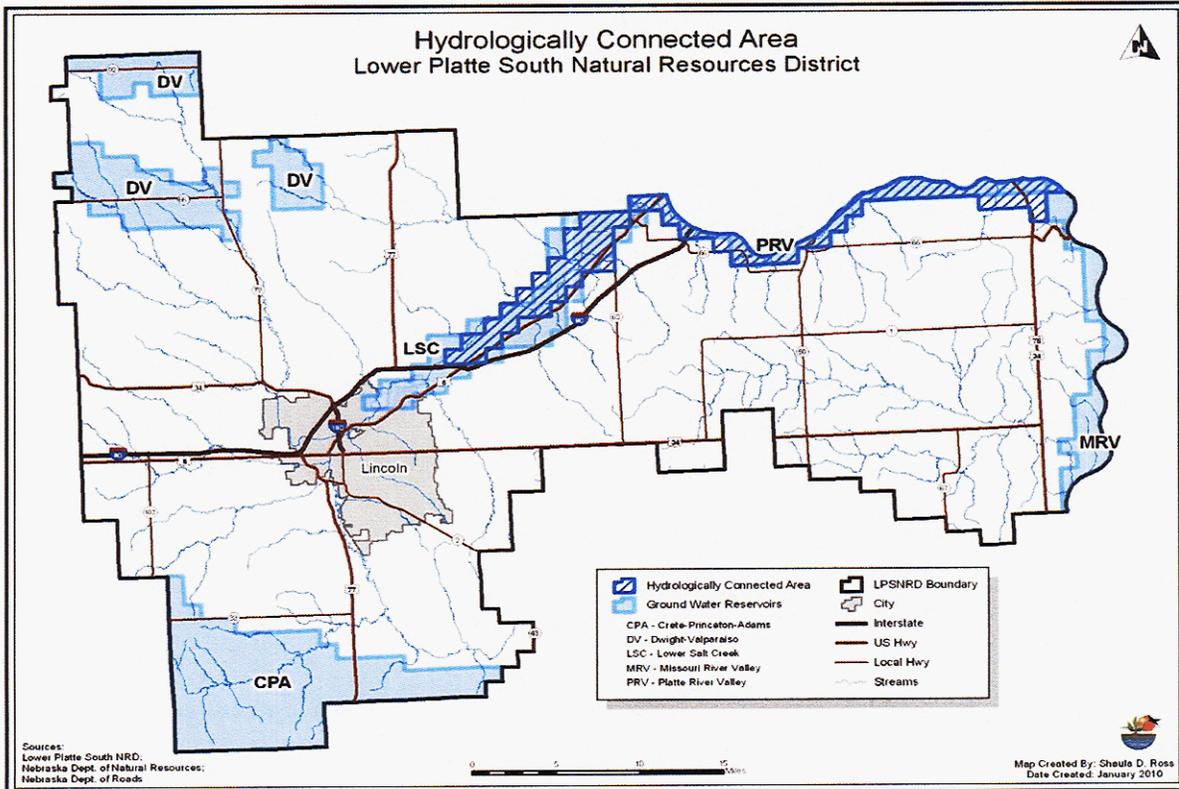
One of the tools used by LPSNRD as well as many other Districts in Nebraska to effectively manage ground water quantity concerns is the certification of irrigated acres. In an agricultural state like Nebraska, irrigation is a primary use of ground water. Therefore, accurate data as to the location and number of irrigated acres as well as the water applied to those acres is critical in making management decisions. In the Lower Platte South NRD, certification of irrigated acres is taking place in two phases, one involving what's known as the Hydrologically Connected Area (HCA), and the other involving the remainder of the District.

3.2.1.1 Hydrologically Connected Area

Applicable Regulations: LB483 Regulations (Appendix B)

The Nebraska Department of Natural Resources has designated areas within Nebraska known as Hydrologically Connected Areas (HCAs). These are defined as areas where ground and surface water resources are directly connected and have relatively immediate and substantial impacts on one another. In LPSNRD, the HCA occupies all or parts of about 70 sections along both sides of Salt Creek between roughly Waverly and Ashland, and then along the south side of the Platte River from Ashland to Plattsmouth. Figure 38 shows the location of the HCA in LPSNRD.

Figure 38 – Hydrologically Connected Area



Legislation passed in 2009 (LB483) required the Lower Platte South NRD and other Districts in the Lower Platte River Basin to develop regulations limiting the expansion of irrigated acres within the designated HCAs. An important consideration in this process was identification of “historically ground water irrigated acres,” those acres which were under irrigation from a ground water source before the requirements of this law took effect. As a result of this requirement, the District developed and passed rules and regulations for the certification of historically ground water irrigated acres and allowing for limited expansion of these acres on an annual basis for a five-year period through 2012. These regulations are attached as Appendix B.

The NRD’s regulations for the Hydrologically Connected Area state that all acres historically irrigated with ground water shall be certified no later than March 31, 2010. As of the end of 2009, the District had contacted 50 landowners or owners of registered wells within the HCA, and had begun assisting several of them through the certification process.

3.2.1.2 Remainder of District

Applicable Regulations: Section I, Rule 2

As part of its ongoing efforts at ground water quantity management, the District is also undertaking certification of irrigated acres in the remainder of the District outside the HCA. When LPSNRD revised its ground water rules and regulations in 2008, the original deadline for certification of these acres was set at January 1, 2010. However, with the passage of LB483 and the associated requirements, it was not possible to accomplish this goal. Therefore, in late 2009, the District revised its rules and regulations to move the deadline for certification of irrigated acres in the remainder of the District to January 30, 2011 (see Appendix A, Section I). This deadline corresponds with that for installation of water meters (see Section 7 below). The NRD has begun initial preparations for this certification and will continue to collect this information throughout 2010.

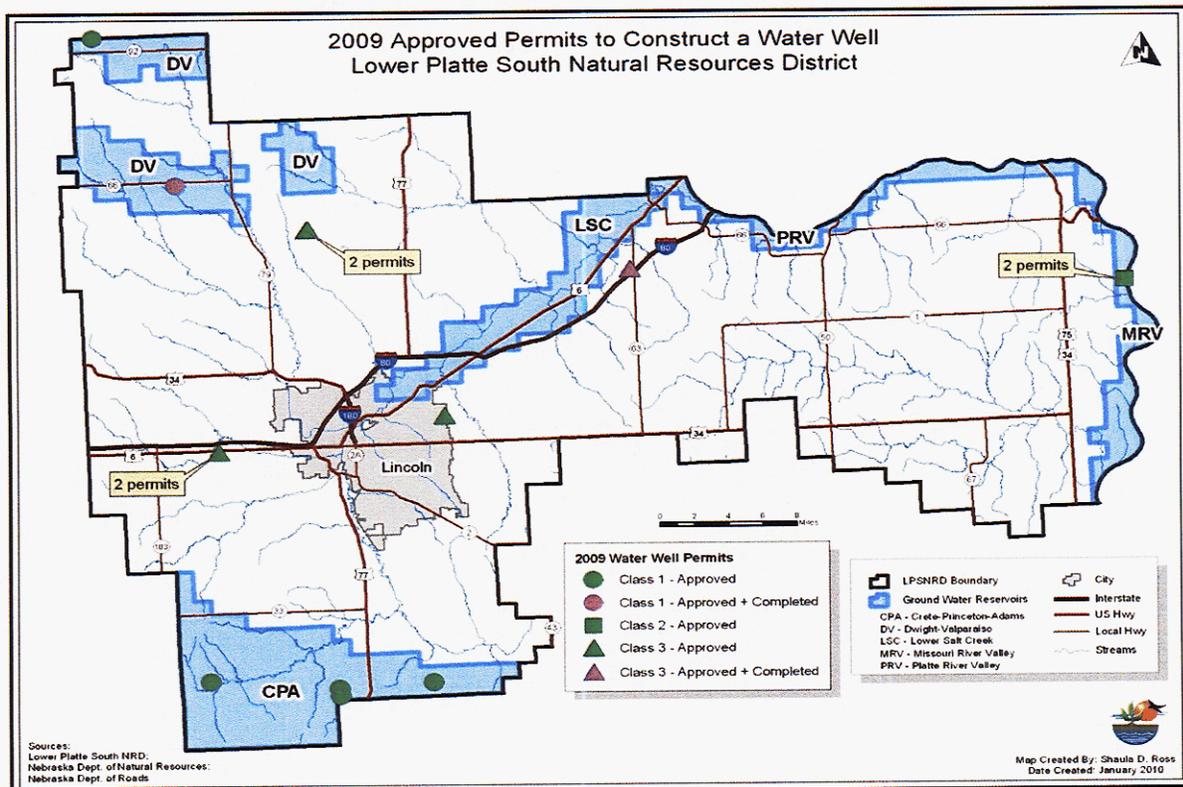
4. WATER WELL PERMITS

Applicable Regulations: Section B

An important responsibility given to NRDs is that of permitting new and replacement water wells within their jurisdiction. In the LPSNRD’s 2008 revisions to the Ground Water Rules and Regulations, the District adopted rigorous requirements for the permitting of wells which pump more than 50 gallons per minute. These requirements vary based on the actual pumping rate and total amount of water pumped, as well as whether the proposed well is located within a Ground Water Reservoir or the Remaining Area. Since GWRs generally have greater supplies than the RA, the thresholds for various permit actions are higher than in the RA. Essentially, the new regulations are aimed at demonstrating that there is ground water of adequate quality and quantity in a given area before a specific well is permitted.

The District issued 14 water well permits during 2009 (Figure 39). Of these, eight were for irrigation wells, including one replacement well, three were for commercial/industrial wells, and three were for public water supply wells. Of the 14 water well permits issued in 2009, three have been completed and received final approval in 2009. The District received six Class 1 permits, and two Class 2 permits; these permits are for wells located within a Ground Water Reservoir. In addition, the NRD received six Class 3 permits, and no Class 4 permits; these permits are for wells located within the Remaining Area. All filing fees and required information were submitted for these applications. Finally, the District did not issue any late permits in 2009.

Figure 39 – Approved Permits to Construct a Water Well



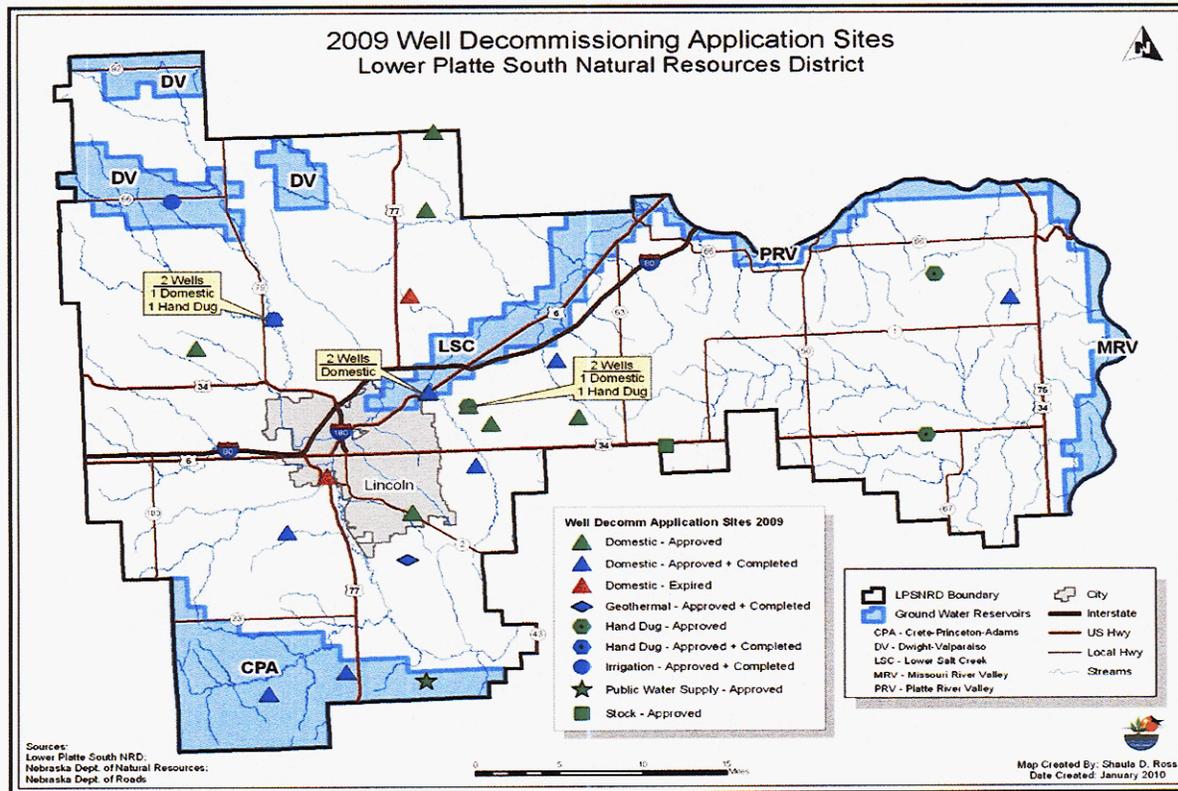
5. WATER WELL DECOMMISSIONING

If not properly sealed at the surface, water wells can be a physical safety hazard to people and animals, as well as conduits for surface runoff and pollution to make its way directly into ground water. Therefore, since the mid 1980s, Nebraska has had requirements not only for proper water well construction, but also the proper decommissioning or abandonment of unused wells to protect human health and ground water quality. The state's NRDs are charged with promotion of proper well decommissioning through cost-share programs, inspections, and information and education programs.

The LPSNRD received 26 applications in 2009 for the Water Well Decommissioning Cost-Share Program. Of the 26 applications approved, 12 wells were actually decommissioned in 2009 (Figure 40). Of those completed, nine were domestic, one was

geothermal, one was an irrigation well, and one was a hand-dug well. Since the LPSNRD's program inception in October 1990, a total of 865 wells within the District have been decommissioned.

Figure 40 – Well Decommissioning Application Sites

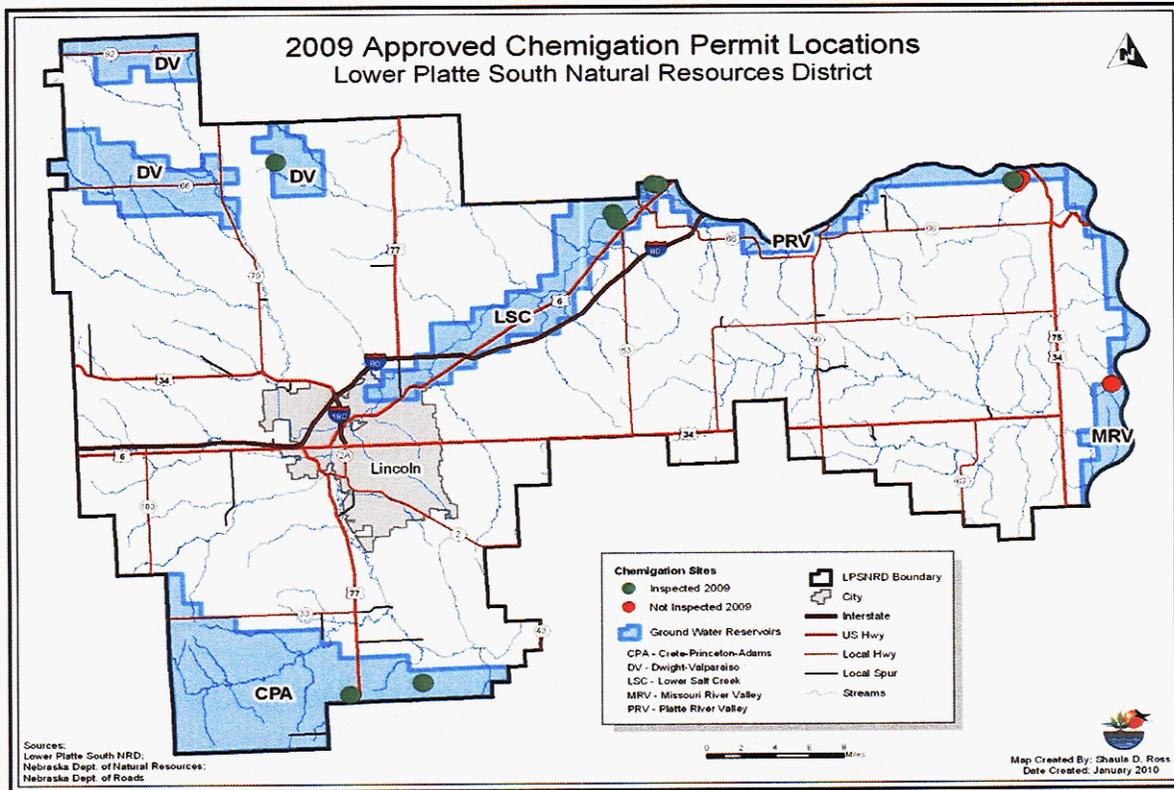


6. CHEMIGATION

Chemigation is generally defined as the application of chemicals such as liquid fertilizers, pesticides, fungicides, etc. through an irrigation distribution system. Properly done, chemigation is a safe, cost-effective, and efficient means of applying such materials. However, in order for this to be true, the irrigation system has to be fitted with appropriate safety equipment. Such equipment has been required by Nebraska law since the late 1980s, and NRDs, together with NDEQ, are charged with overseeing chemigation activities in the state. The Districts issue chemigation permits and inspect systems for proper installation and operation of the required safety equipment.

In 2009, LPSNRD continued its inspection and permitting duties pursuant to the Nebraska Chemigation Act. The District inspects systems on a 3-year rotation or when modifications are made to an already permitted system. In 2009, the Lower Platte South NRD inspected eight systems and issued seven renewal permits as well as 4 new permits (Figure 41); these systems covered an applied area of 1095 acres. No emergency permits were issued in 2009. A breakdown of permits and number of acres covered by ground water reservoir or area is presented in Table 4.

Figure 41 – Approved Chemigation Permit Locations



Ground Water Reservoir	# of Chemigation Permits	# of Acres
Crete-Princeton-Adams	3	245
Dwight-Valparaiso	1	135
Lower Salt Creek	2	250
Missouri River Valley	1	95
Platte River Valley	4	275
Remaining Area	1	95

Table 4 – Chemigation Permits and Acreage by Ground Water Reservoir or Area

District staff also performed permit compliance monitoring on five systems by noting the locations of chemigation sites while in the field. The chemigation locations were recorded while performing such duties as ground water sampling and water level monitoring. The permit status for each location was verified upon returning to the office. No violations were found in 2009.

7. WATER METERS

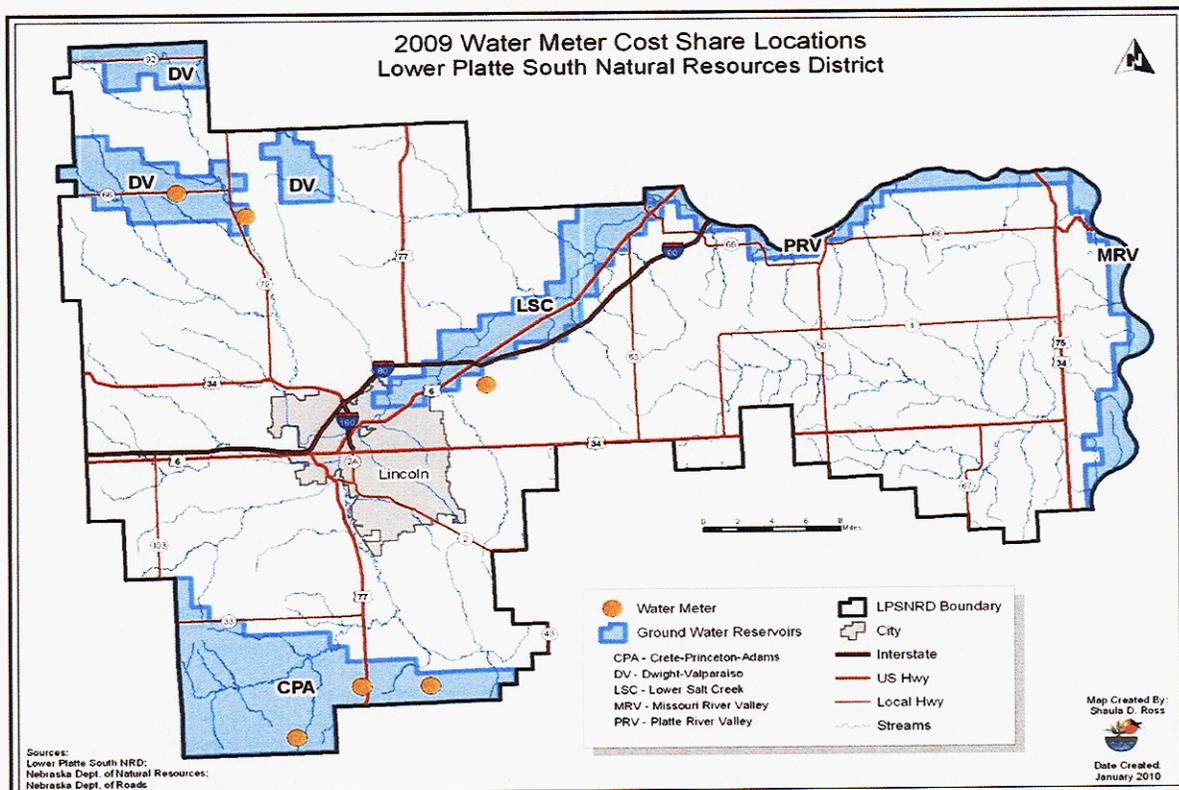
Applicable Regulations: Section C

Water meters for accurately measuring the flow from a well are among the most important tools used to document and manage the use of ground water. In Nebraska, NRDs are given the authority to require the installation of water meters, and several Districts throughout Nebraska have implemented that requirement.

In its 2008 revisions to the Ground Water Rules and Regulations, LPSNRD required that all new wells constructed to pump over 50 gallons per minute be fitted with a water meter that could accurately measure the flow, and that the annual volume of water pumped from those wells be reported to the District. In addition, those regulations required that all wells capable of pumping 50 gpm be fitted with a water meter by January 30, 2011 (which is now the same deadline for certification of irrigated acres—see Section 3.2.1.2 above). There is no specific requirement of a given type of meter; LPSNRD only requires that the meter installed be accurate, and have the capability of showing the total volume of water pumped. In addition, these wells that are retrofitted with water meters must also begin reporting total annual pumpage to LPSNRD.

The District has also implemented a cost-share program to promote adoption of this important management tool. The program provides 75% cost-share for the purchase of a water meter, to a maximum of \$675 (although that maximum is likely to increase due to corresponding increases in meter prices over the past several years). In 2009, payment was made on six applications (Figure 42).

Figure 42 – Water Meter Cost–Share Locations

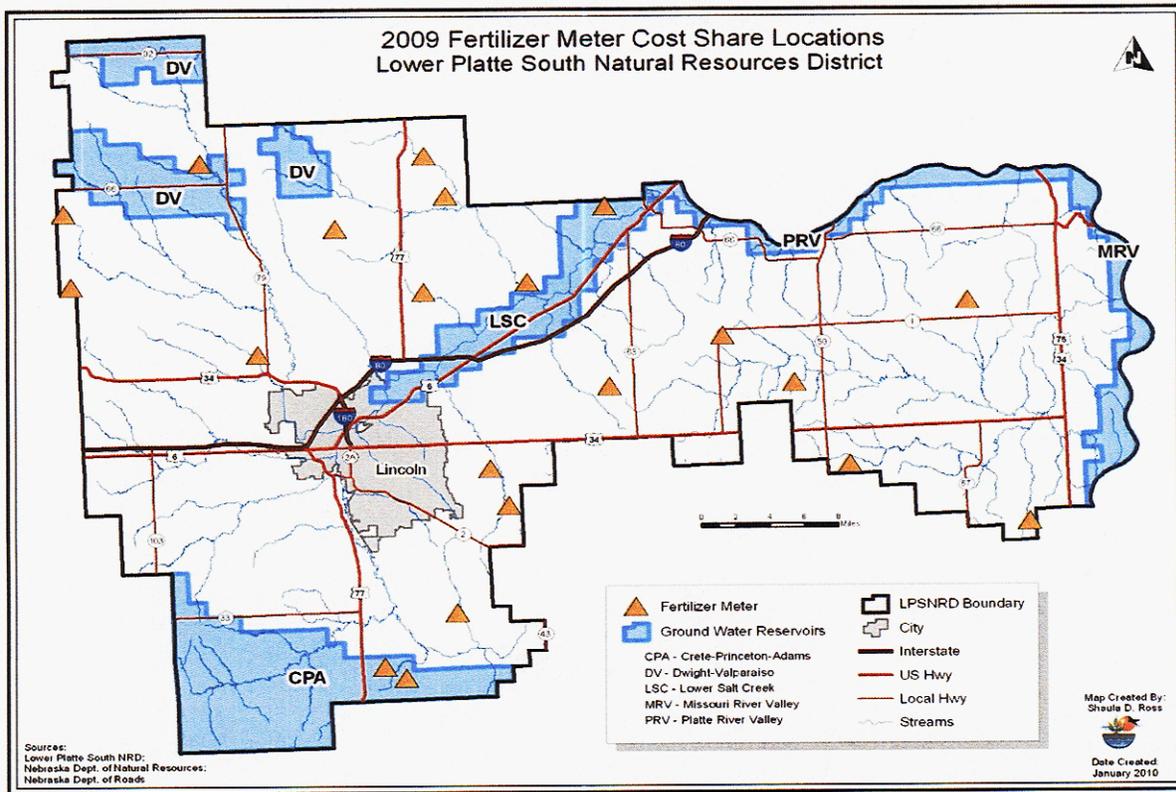


8. FERTILIZER METERS

Accurate application of nitrogen fertilizer to crop ground is an important part of protecting ground water from leaching of nitrates. If producers can accurately control the amount of fertilizer applied, it is less likely that excess nitrates will leach below the crop root zone and infiltrate to ground water. LPSNRD cost-shares on the purchase of these meters as a way of promoting proper nitrogen management.

In 2009, the District received and approved 23 applications for the Fertilizer Flow Meter Cost-Share Program (Figure 43). Cost-share payments were actually made on 21 applications (two payments were made on applications received in 2008).

Figure 43 – Fertilizer Meter Cost-Share Locations



9. IRRIGATION MANAGEMENT

Proper irrigation management goes hand-in-hand with fertilizer management to prevent the leaching of nitrate to ground water. If only the amount of water used by the crop is applied, less deep infiltration is available to carry excess nitrate to ground water. The District cost-shares on a variety of best management practices associated with irrigation water management. In 2009, LPSNRD cost-shared on one center pivot nozzle conversion and one soil-sampling program.

10. SALT WATER INTRUSION

Applicable Regulations: Section G

In some parts of LPSNRD, the intrusion of salt water into fresh ground water is a concern. This is especially so in areas where the Dakota Formation bedrock is fairly close to the surface, as some units within the Dakota contain saline water. Excess pumping of shallow, fresh ground water can induce intrusion of saline water from deeper geologic units, and therefore the District continues to monitor for indicators of salt water intrusion, as well as work with well owners to address such concerns. In 2009, however, the District did not receive any reports or inquiries regarding salt water intrusion.

11. IMPROPER IRRIGATION RUNOFF

Applicable Regulations: Section K

Nebraska's NRDs are granted authority to deal with the improper runoff of ground water applied as irrigation water. Such runoff is a waste of ground water, can contribute to both ground and surface water quality problems, and can cause a variety of erosion problems. In 2009, LPSNRD received one report of improper irrigation runoff in southern Saunders County. The subsequent investigation documented that improper runoff of ground water from irrigation was in fact occurring at this location. As of the date of this report, the District is coordinating with the operator of the irrigation system involved and the U.S. Department of Agriculture to develop a plan to stop the improper runoff.

12. TRANSFER OF GROUND WATER

Applicable Regulations: Section L

The District has the responsibility of reviewing and approving or denying applications to transfer ground water from one area to another. In 2009, no requests were received for such a transfer.

13. VARIANCES

Applicable Regulations: Section N

LPSNRD also has provisions in its regulations for granting variances from those regulations upon petition if a landowner, well owner, or other individual can demonstrate such a need. However, no requests for variances were received in 2009.

14. COMPLAINTS/ENFORCEMENT/INVESTIGATIONS

Applicable Regulations: Section M

From time to time, the District receives a variety of complaints or inquiries regarding various water resources concerns. These issues are investigated on a case-by-case basis, and the District will then determine if any violations of its rules and regulations have

occurred. Other than the improper irrigation runoff complaint described in Section 11, the District did not receive any formal complaints in 2009.

15. INFORMATION/EDUCATION

One of the most important activities that the LPSNRD undertakes is education of its citizens about ground water quality and quantity issues. The District is involved in a wide variety of such activities. Highlights of the District's 2009 activities are described below.

15.1 Programs for Students and Teachers

- Ground water related classroom presentations were given at area schools to 4,000 elementary, junior, and senior high school students. The students utilized hands-on models, kits, and activities such as the District's ground water flow model, Enviroscope, Hach nitrate test kit, Incredible Water Journey, Sum of the Parts, and H2O Olympics.
- The District led 20 field trips with elementary, junior, and senior high school students focusing on different water quality parameters and the influence of land practices on surface and ground water.
- The LPSNRD sponsored the Earth Wellness Festival, which was attended by 3,000 fifth graders from Lancaster County. The District also participated in Spring Conservation Sensation, Waterworks, and other ground water festivals.
- Ground water material and information was made available from the Resource Lending Library and was emphasized in the Resources Corner newsletter to teachers throughout the District.
- The NRD developed a Water Kit available for check out to junior/senior high school students with materials and tools to help students learn about water quality in their watershed.
- Teachers from throughout the District continued to utilize hands-on ground water activities, materials, and information from our Resource Lending Library.
- Two Project WET (Water Education for Teachers) workshops were held for pre-service elementary and junior/senior high school teachers with 45 attending. The District also facilitated a "Healthy Water, Healthy People" workshop focusing on watersheds and water quality.

15.2 Public Information

- The Ground Water section of the District's website, re-designed and re-organized in 2008, was kept updated with the help of ground water staff. Many changes were due to changes in existing programs.

- The District's National Association of Conservation Districts award-winning "Look Out Below" TV commercial, produced in 2000 and emphasizing water quality, was aired on local TV in the early spring of 2009.
- The District produced a second TV commercial with an emphasis on water conservation in 2008, and that commercial also aired in the spring of 2009.
- Display booth space was donated to the NRD at the annual Nebraska Well Drillers' Association conference in February 2009 at the State Fair grounds. This booth was manned by ground water staff.
- The District continued advertising on 12 baseball park placards throughout the District to remind citizens about the importance of ground water protection.
- Articles on various ground water programs and activities appeared in District media (NRD newsletter, website, news releases, etc.), and in commercial media throughout the District.
- The District solicited participation in its well abandonment, water meter, and fertilizer meter cost-share programs in newspaper ads throughout the District.
- Themes and hands-on activities relating to ground water and its importance were prominent in various District activities, including the Earth Wellness Festival, middle school nature nights, Husker Harvest Days, the Water Quality Open, and others.
- Ground water programs and water quality best management practices (BMPs) were featured in brochures produced and printed in-house on an as-needed basis. Brochures are continuously updated.
- The District distributed many water education aids featuring the "Look Out Below" and "Wellhead Willy" logos, including bottled water, computer screen cleaners, magnets, T-shirts, golf balls, temporary tattoos, and informational brochures.

15.3 Activities and Games

The District continued to promote its three online games: "Keep the Aquifer Clean," "Willy's Pollution Puzzler," and "Willy's Water Cycle Memory Match." The games are designed to help players realize the importance of preserving and protecting ground water, as well as to attract visitors to the District's website. The Games web page is consistently among the top five pages on the site for visits by the public.

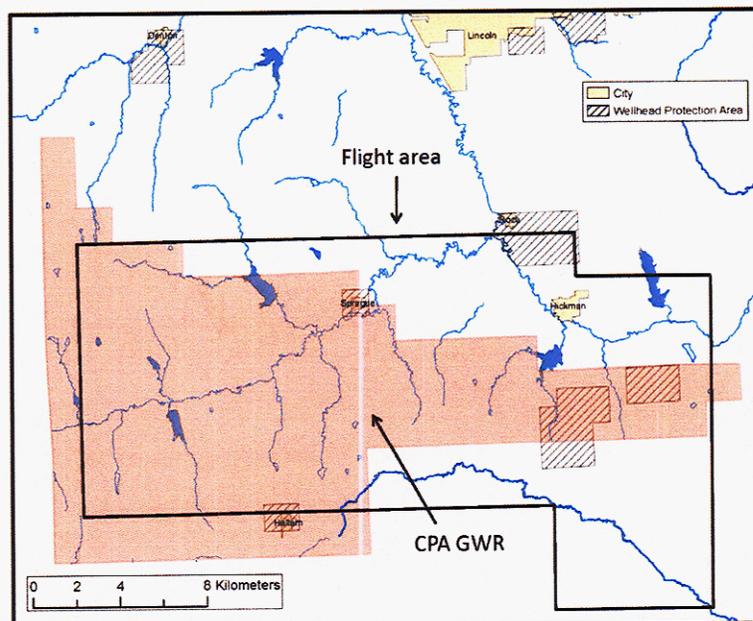
16. EASTERN NEBRASKA WATER RESOURCES ASSESSMENT (ENWRA)

The Eastern Nebraska Water Resources Assessment (ENWRA) was formed in 2006 by a joint agreement between the six NRDs which cover the easternmost portion of Nebraska. The Lewis and Clark, Lower Elkhorn, Lower Platte North, Lower Platte South, Nemaha, and Papio-Missouri River NRDs formed a coalition aimed at developing a three-

dimensional geologic framework and water budget for all of eastern Nebraska (Divine et al., 2009). In the years since its inception, ENWRA has hired a project coordinator, and has completed a variety of projects and investigations aimed at gaining a better understanding of the complex water system in the glaciated portion of eastern Nebraska. An excellent description of these activities is presented in Divine et al., 2006.

In April 2009, an additional 109 square miles of the Crete-Princeton-Adams Ground Water Reservoir was mapped via helicopter electromagnetic (HEM) survey. This additional area is located immediately west of a 36 square mile ENWRA pilot study area (Figure 44). A poster presenting the preliminary findings was coauthored with the U.S. Geological Survey (USGS) and the Conservation and Survey Division (CSD) of the University of Nebraska, and presented at the annual Geological Society of America meeting in October. USGS is currently inverting the new HEM data (inversion is a modeling process that allows the production of cross sections with a vertical depth axis), and this process is expected to be completed in spring 2010. Once the inversion is complete, CSD will drill test holes at locations requiring physical geologic samples to clarify the hydrogeologic interpretation. The HEM data inversion and test hole drilling is funded through a Nebraska Environmental Trust (NET) grant. CSD has signed a cooperative agreement with LPSNRD to analyze the HEM and test hole data and produce a hydrogeologic interpretation by July 1, 2011.

Figure 44 – HEM Flight Area in CPA GWR



Other ENWRA activities in 2009 included an aquifer test using an old City of Hickman production well, collecting ground water samples from ENWRA monitoring wells, creating a database that catalogs ground water documents on file at CSD, analyzing HEM data from the pilot study sites, testing additional geophysical tools at the Oakland pilot study site in the Lower Elkhorn NRD, and drafting a long range plan. The current ENWRA Interlocal Agreement expires on July 1, 2011.

The primary funding for the ENWRA project is provided by an Interrelated Water Management Plan Program (IWMPP) grant. ENWRA's IWMPP grant was reduced by approximately \$89,000 in 2009 due to reductions in the state budget. This reduction will likely exclude the planned purchase of equipment, but will not adversely affect the analysis and publication of data, which is the primary focus of ENWRA at this time.

17. RESEARCH

In addition to the research activities undertaken by the ENWRA project, the District engages in a variety of other research related actions. Currently, the District is cooperating with CSD to perform ground water modeling in the area of the Lower Salt Creek GWR. This modeling effort has involved various field activities including installation of monitoring wells, pump tests, streambed conductivity analysis, and similar actions. In 2009, the project continued to move forward with the purchase of additional modeling software, and initial efforts at refining the existing model. The overall objective of the project is to use the refined model to run future scenarios of water use in the Lower Salt Creek GWR to evaluate the District's current ground water quantity triggers as well as NDNR's current delineation of the Hydrologically Connected Area. The project is being funded by another IWMPP grant.

18. INTERAGENCY COORDINATION/COOPERATION

LPSNRD continues its cooperative efforts with other resource agencies and entities to accomplish its overall water quality and quantity goals. Examples of this cooperation in 2009 are described below.

18.1 Lincoln-Lancaster County Health Department (LLCHD)

The District continues to share data with LLCHD regarding ground water quality within the City of Lincoln and Lancaster County. LLCHD provides data on a variety of domestic and other wells that it samples on an ongoing basis, and the NRD provides LLCHD with information about sampling that may not be included in LLCHD's regular sampling rotation.

18.2 Nebraska Department of Environmental Quality (NDEQ)

As described in Section 3.1.3, in 2009 LPSNRD provided NDEQ with the data from its verification studies in the eight CWSPAs completed in 2009. NDEQ used this data to remodel the boundaries for the Otoe County Rural Water District #3/Weeping Water and the Davey CWSPAs in 2009. NDEQ will continue to evaluate this data in 2010 for other CWSPAs whose boundaries may need modification.

18.3 Nebraska Ground Water Monitoring Advisory Committee (NGWMAC)

In 2002, the Nebraska Ground Water Monitoring Advisory Committee (NGWMAC) was formed to promote statewide exchange of information and ideas regarding ground water monitoring. NGWMAC includes representatives from seven NRDs or local agencies, five state agencies, and one federal agency. The Committee meets twice annually in the spring and fall, and often coordinates its activities with a parallel group interested in surface water monitoring, the Nebraska Surface Water Monitoring Council (NSWMC). In 2009, a District staff member was elected chair of the NGWMAC, and will continue to coordinate Committee activities in 2010 and beyond.

19. REFERENCES

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Appendix A

Lower Platte South NRD Ground Water Rules and Regulations

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

REVISED EFFECTIVE DATE: February 1, 2010

Authority – The following rules and regulations are adopted pursuant to the Nebraska Groundwater 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 Ground Water Management Plan, to develop procedures for the implementation of management practices, to conserve and protect ground water supplies, to prevent the contamination or inefficient or improper use of ground water, and to prevent and resolve conflicts between users of ground water 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 ground water, first for domestic purposes, second for agricultural purposes, and last for manufacturing or industrial purposes.

Section A Ground Water Management Area

Rule 1 Management Options and Means Authorized

- (1) The District hereby establishes a Ground Water Management Area which includes the entire geographic area within the boundaries of the District. The District 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.
 - (a) allocate the amount of ground water that may be withdrawn by ground water users;
 - (b) adopt a system of rotation for use of ground water;
 - (c) adopt well-spacing requirements more restrictive than those found in *Neb. Rev. Stat.* §§ 46- 609 and 46-651;
 - (d) require the installation of devices for measuring ground water withdrawals from wells;
 - (e) adopt a system which requires a reduction of irrigated acres pursuant to subsection (2) of § 46-740;
 - (f) limit or prevent the expansion of irrigated acres or otherwise limit or prevent increases in the consumptive use of ground water withdrawals from water wells used for irrigation or other beneficial purposes;
 - (g) it may require the use of best management practices;
 - (h) it may require the analysis of water or deep soils for fertilizer and chemical content;
 - (i) it may impose mandatory educational requirements designed to protect water quality or stabilize or reduce the incidence of ground water depletion, conflicts between ground water users and surface water appropriators, disputes over interstate compacts or decrees, or difficulties fulfilling the provisions of other formal state contracts or agreements;
 - (j) it may require water quality monitoring and reporting of results to the district for all water wells within all or part of the management area;
 - (k) it may require District approval of (i) transfers of ground water off the land where the water is withdrawn or (ii) transfers of rights to use ground water 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 Water Transfers Permit Act shall not be subject to district approval pursuant to this subdivision. The district 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 ground water 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;
 - (l) it may 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 cause by other water wells in the same area;
 - (m) it may 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;

- (n) it may adopt and promulgate such other reasonable rules and regulations as are necessary to carry out the purpose for which a management area was designated.
- (2) In adopting, amending, or repealing any control authorized by subsection (1) of section 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.
- (3) Upon request by the District or when any of the controls being proposed are for the purpose of integrated management of hydrologically connected ground water 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 (2) of this section.
- (4) If because of varying ground water 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 Water Management and Protection Act in a reasonably effective and equitable manner, the controls adopted by the District pursuant to section 46-739 may contain different provisions for different categories of ground water 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 ground water uses or varying conditions. Except as otherwise provided in this section, if the District adopts different controls for different categories of ground water use, those controls shall be consistent with section 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.
- (5) The District may establish different water allocations for different irrigation distribution systems.
- (6) The District may establish different provisions for different hydrologic relationships between ground water and surface water:
 - (a) for management areas for which a purpose is the integrated management of hydrologically connected ground water 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 ground water 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;
 - (b) 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 Ground Water Management and Protection Act.
- (7) Except as otherwise authorized by law, the District shall make a replacement water well as defined in section 46-602, or as further defined in district rules and regulations, subject to the same provisions as the water well it replaces.
- (8) If the District has included controls delineated in subdivision (1)(m) of section 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 section 46-712, regarding the controls before implementing them.
- (9) In addition to the controls listed in subsection (1) of section 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

- (1) The District hereby establishes the following as designated areas of management:

- (a) Crete-Princeton-Adams Ground Water Reservoir;
- (b) Dwight-Valparaiso Ground Water Reservoir;
- (c) Lower Salt Creek Ground Water Reservoir;
- (d) Missouri River Ground Water Reservoir;
- (e) Platte River Ground Water Reservoir;
- (f) Remaining Area; and
- (g) Community Water System Protection Areas.

Rule 3 Remaining Area

- (1) Due to the hydrogeology of the remaining area, the District hereby recognizes the need to manage ground water 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 B Water Well Permits

Rule 1 Water Well Permit

- (1) 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:
 - (a) any well designed and constructed or modified to pump more than 50 gallons per minute;
 - (b) any well in the Remaining Area (Rule 2 (f) above) 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;
 - (c) any well in (a) and (b) above that is designed and constructed to pump salt water for a beneficial use;
 - (d) 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;
 - (e) except that no permit shall be required for test holes or dewatering wells with an intended use of 90 days or less;
 - (f) 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;
 - (g) 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 ground water, (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, and (i) the registration number of the water well being replaced if applicable;
 - (g) the District shall review such application and issue or deny the permit within thirty days after the application is filed;
 - (h) if the District finds that the application is incomplete or defective, it shall return the application for correction. If the correction is not made within sixty days, or an extension is granted, the application shall be cancelled. All permits shall be issued with or without conditions attached or denied not later than thirty 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.

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

- (1) Any well requiring a permit shall be required to provide certain hydrogeologic and water quality information before a water well permit may be approved (Report). The District shall provide guidelines for required Reports which shall be submitted to the District with each permit application.
- (2) Class 1 Permit:
 - (a) applies to any proposed well to be located in a Ground Water Reservoir, that is designed to pump more than 50 gallons per minute and less than 1000 gallons per minute and pump less than 250 acre-feet of water per year;

- (1) The requirements for a class 1 permit shall be as follows and included with the application:
 - (a) water quality samples shall 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.
 - (3) Class 2 Permit:
 - (a) applies to any proposed well to be located in a Ground Water Reservoir designed and constructed to pump 1000 gallons per minute or more, or pump 250 acre-feet or more water per year
 - (1) The requirements for a class 2 permit shall be as follows and included with the application:
 - (a) a copy of well log to determine geologic formation;
 - (b) an accurate static water level measurement to estimate saturated thickness of the aquifer;
 - (c) an aquifer test with at least 1 observation well, and all necessary drawdown and pumping data, as required by the District. Aquifer test must be designed and supervised by a licensed professional geologist or engineer;
 - (d) water quality samples shall 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 analysis of sodium, chloride and total dissolved solids.
 - (e) a hydrogeologic analysis report considering the impact of the proposed withdrawal on current ground water users and a minimum twenty (20) year impact on the aquifer for potential future users shall be prepared and submitted by the Applicant. The report must be prepared by a licensed professional geologist or engineer.
 - (4) Class 3 Permit:
 - (a) applies to any proposed well located in the Remaining Area (Section A, Rule 2 (f) above) designed and constructed to pump more than 20 gallons per minute and less than 250 gallons per minute and use 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;
 - (1) The requirements for a class 3 permit shall be as follows:
 - (a) water quality samples shall 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 analysis of sodium, chloride and total dissolved solids.
 - (b) if the well is located within 600 feet of an existing registered well with a higher preference of use, except for a well owned by the applicant, the District shall require:
 - (i) a copy of well log to determine geologic formation;
 - (ii) an accurate static water level measurement to estimate saturated thickness of the aquifer;
 - (iii) an aquifer test with at least 1 observation well, and all necessary drawdown and pumping data as required by the District. The aquifer test must be designed and supervised by a licensed professional geologist or engineer;
 - (5) Class 4 Permit:
 - (a) applies to any proposed well in the Remaining Area (Rule 2 (f) above) designed to pump 250 gallons per minute or more, or pump 25 acre-feet or more of water per year;
 - (1) The requirements for a class 4 permit shall be as follows:
 - (a) a copy of well log to determine geologic formation;
 - (b) an accurate static water level measurement to estimate saturated thickness of the aquifer;
 - (c) an aquifer test with at least 1 observation well, and all necessary drawdown and pumping data as required by the District and the aquifer test must be designed and supervised by a licensed professional geologist or engineer;
 - (d) water quality samples shall 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 analysis of sodium, chloride and total dissolved solids.
 - (e) a hydrogeologic analysis report considering the impact of the proposed withdrawal on current ground water users and a minimum twenty (20) year impact on the aquifer for potential future users shall be prepare and submit by

the Applicant. The report must be prepared by a licensed professional geologist or engineer.

(6) Salt water well permit

(a) 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 ground water withdrawals from the proposed well will not cause salt water intrusion. The requirements for a Class 1, 2, 3, or 4 well permit, stated above, shall apply to any salt water well permit.

(b) The requirements for salt water well permits applies to all permit sized wells described in Class 1, 2, 3, and 4 well permits above, in which either:

i) 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

ii) 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.

(c) the requirements for a salt water well permit shall be as follows:

(a) Applicant must collect water quality samples from the well at various pumping rates. The samples shall be submitted to a qualified laboratory for analysis of sodium, chloride and total dissolved solids.

One sample each shall be collected at:

a pumping rate of 5 gallons per minute or less. This sample shall be used to determine the ambient water quality of the formation.

a pumping rate equal to 50% of the designed rate.

a pumping rate equal to 100% of the designed rate.

(b) 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:

(i) within 15 minutes after the start of pumping.

(ii) 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;

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

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

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

(a) 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;

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

(c) the applicant refuses to cooperate with the District in ground water monitoring activities;

(d) an applicant refuses to equip the well with a water well flow meter;

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

(f) for a Class 1 Permit;

(1) 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.

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

(g) for a Class 2 Permit;

(1) the hydrogeologic analysis indicates potential short or long-term detrimental effects to the aquifer and/or if the drawdown cone as determined by an aquifer test would intersect a nearby well with a higher preference of use.

(2) 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.

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

(h) for a Salt Water Well Permit:

(1) the water quality samples indicate the potential for salt water intrusion.

Rule 4 Granting, Denying or Cancelling a Water Well Permit in the Remaining Area (Rule 2 (f) above, page 4)

- (1) 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:
 - (a) 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;
 - (b) the proposed use would not be a beneficial use of water for domestic, agricultural, manufacturing, or industrial purposes;
 - (c) an applicant refuses to cooperate with the District in ground water monitoring activities;
 - (d) an applicant refuses to equip the well with a water well flow meter;
 - (e) in the case of a late permit only, that the applicant did not act in good faith by failing to obtain a timely permit;
 - (f) for a Class 3 Permit;
 - (1) 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.
 - (2) an applicant shall have the option to apply for a salt water well permit prior to denial of the permit.
 - (3) if the well is located within 600 feet of an existing registered well with a higher preference of use, except for a well owned by the applicant, and the aquifer test indicates the potential short or long-term detrimental effects to the aquifer and/or if the drawdown cone would intersect a nearby well with higher preference of use.
 - (g) for a Class 4 Permit;
 - (1) 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.
 - (2) an applicant shall have the option to apply for a salt water well permit prior to denial of the permit.
 - (3) the hydrogeologic analysis indicates potential short or long-term detrimental effects to the aquifer and/or if the drawdown cone as determined by an aquifer test would intersect a nearby well with higher preference of use.
 - (h) for a Salt Water Well Permit:
 - (1) The water quality samples indicate the potential for salt water intrusion.

Rule 5 Water Well Permit Fees and Required Information

- (1) The application shall be accompanied by a fifty dollar (\$50.00) filing fee payable to the District.
- (2) 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

- (1) The issuance by the District of a permit pursuant to section 46-736 or registration of a water well by the Director of the Department of Natural Resources pursuant to section 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 Ground Water Monitoring

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

Rule 8 Water Well Commence Construction and One-Year Completion

- (1) When any permit is approved pursuant to section 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 Rule 2 of this section.

Section C Required Water Well Flow Meters

Rule 1 Water Well Flow Meters

- (1) 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.
- (2) All existing registered water wells that pump more than 50 gallons per minute shall be equipped with a water well flow meter not later than January 30, 2011. The Applicant may apply for any water well flow meter cost-share available at the time of the application..
- (3) 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 ground water quality and/or quantity .
- (4) 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.
- (5) The District shall develop a program to cost-share for the inspection and maintenance of water well flow meters.

Section D Phases for Designated Areas of Management

Rule 1 Phases for Designated Areas of Management

- (1) Phase One for quality and quantity has been designated District-wide and the District has established educational programs, ground water monitoring and best management practices. Phase Two shall establish cost-share incentives to promote best management practices and require educational certification. Phase Three shall establish regulatory requirements to address ground water quality and/or quantity degradation.

Section E Ground Water Monitoring Networks

Rule 1 Monitoring Network in Ground Water Reservoirs

- (1) The District shall establish a ground water monitoring network for ground water quality and quantity.

Rule 2 Monitoring Network in Remaining Area

- (1) The District shall establish a ground water monitoring network for ground water quality and quantity.

Rule 3 Monitoring Network in Community Water System Protection Areas

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

Section F Ground Water Phase Triggers

Rule 1 Phase One Quality and Quantity

- (1) The entire geographic area of the District has been designated as a Phase One Quality and Quantity Ground Water Management Area.

Rule 2 Ground Water Quality Phase Triggers in a Ground Water Reservoir

- (1) The Phase Two 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.
- (2) The Phase Three 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.

Rule 3 Ground Water Quantity Phase Triggers in a Ground Water Reservoir

- (1) The Phase Two trigger shall occur when spring static ground water 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 a two consecutive year period.
- (2) Phase Three 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 a two consecutive year period.
- (3) The percent reduction for each ground water reservoir and phase is:

		Phase Two (30% of the wells)	Phase Three (50% of the wells)
Lower Salt Creek Ground Water Reservoir	15%	30%	

Missouri River Ground Water Reservoir	8%	15%
Platte River Ground Water Reservoir	8%	15%
Crete-Princeton Ground Water Reservoir	8%	15%
Dwight-Valparaiso Ground Water Reservoir	8%	15%

- Rule 4 Ground Water Quality Phase Triggers in the Remaining Area
- (1) The Phase Two 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.
 - (2) The Phase Three 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.

- Rule 5 Ground Water Quantity Phase Triggers in the Remaining Area
- (1) The Phase Two trigger shall occur when spring static ground water 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 a two consecutive year period.
 - (2) Phase Three 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 a two consecutive year period.

- Rule 6 Ground Water Quality Phase Triggers in a Community Water System Protection Area
- (1) The Phase Two 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.
 - (2) The Phase Three 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.

- Rule 7 Ground Water Quantity Phase Triggers in a Community Water System Protection Area
- (1) The quantity phase triggers for a Community Water System Protection Area shall occur the same as the triggers of the ground water reservoir or remaining area in which it is located. See rules 3 and 5 of section F.

- Rule 8 Ground Water Monitoring Results Reporting
- (1) Each year the District shall disseminate the results of the ground water monitoring activities to monitoring well cooperators, the Board of Directors, appropriate state and federal agencies and the general public.

Section G Salt Water Intrusion

- Rule 1 Investigation
- (1) When any ground water well in the District shows evidence of salt water intrusion as described herein, the District shall conduct an investigation.

- Rule 2 Investigation Procedures
- (1) 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 ground water quality data; pumping rates and ground water usage of wells in the vicinity; ground water level measurements; evaluation of well(s) stratigraphy, depth and pump installation.

- Rule 3 Action Plan
- (1) 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 effected 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
- (1) 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 H Ground Water Verification Studies for Management Phase Determination

- Rule 1 Ground Water Quality
- (1) When the District's monitoring network in a designated area of management shows that the trigger for either Phase Two or Phase Three has occurred, the District shall conduct a two year verification study to determine if non-point source contamination has or is occurring.

Section I Ground Water Management Phase Actions

- Rule 1 Annual Review For All Phases of Management Actions
- (1) The District shall prepare for the Board of Directors annually, by March 1st, a report reviewing the Ground Water Management actions, even though a Phase has not been triggered.
- Rule 2 Phase One Ground Water Management Actions.
- (1) The District shall require all lands irrigated with ground water to be certified. Land owners shall report ground water irrigated lands by January 30, 2011, which shall correspond with the number of irrigated acres recorded by county assessors.
 - (2) The District shall establish incentive programs to implement best management practices for ground water quality and quantity.
 - (3) The District shall establish programs to educate all District constituents on ground water conservation, management and utilization.
 - (4) The District shall develop in conjunction with the Department of Natural Resources ("Department"), integrated management plans for any lands found by the Department to be hydrologically connected by surface water and ground water under *Neb. Rev. Stat.* 46-712 if not fully appropriated or under 46-713 & 46-715 if fully appropriated.
- Rule 3 Phase Two Ground Water Management Actions
- (1) Upon the Board of Directors designation of a Phase Two area, the District shall establish an advisory group of stake holders from within the Phase Two area to assist the District in developing Phase Two rules & regulations, incentives to adopt best management practices and educational certification requirements.
- Rule 4 Phase Three Ground Water Management Actions
- (1) Advisory Group. Upon the Board of Directors designation of a Phase Three area, the District shall establish an advisory group of stake holders from within the Phase Three area to assist the District in developing Phase Three rules & regulations. The rules and regulations shall require the implementation of best management practices, and shall require landowner reports relating to the contaminant and/or ground water.

Section J Phase Two Rules and Regulations

**Section J (1) Ground Water Quality Management Area Phase Two
Lower Salt Creek Ground Water Reservoir**

- Rule 1 Quality Phase Determination Criteria.
- In accordance with rule 3, section I, the district has determined the criteria has been met to designate the Lower Salt Creek Ground Water Reservoir a phase two ground water quality management area for nitrate nitrogen on the following portions of Lancaster, Cass and Saunders Counties in Nebraska:
- Township 11 North, Range 7 East, Sections 13, 14, 15, 22, 23, 24, 25, 26, and 27, Lancaster County, Nebraska; and Township 11 North, Range 8 East, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 29, and 30, Lancaster County, Nebraska; and Township 12 North, Range 8 East, Sections 34, 35, and 36, Lancaster County, Nebraska; and Township 11 North, Range 9 East, Sections 5, 6, and 7, Cass County, Nebraska; and Township 12 North, Range 9 East, Sections 14, 15, 16, 17, 20, 21, 22, 23, 27, 28, 29, 30, 31, 32, 33, and 34, Cass County, Nebraska; and Township 12 North, Range 9 East, Sections 1, 2, 3, 4, 5, 8, 9, 10, and 11, Saunders County, Nebraska.
- Rule 2 Continue Phase I Rules.

The district shall continue all rules set forth in Section I, Ground Water Management Area phase one.

Rule 3 Establishment of Cost-Share Programs.

The district shall establish cost-share programs to implement Best Management Practices (BMP's) that may include, but are 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, ground water nitrate analysis kits and contaminant source inventories. All guidelines for BMP cost-share programs offered in the Lower Salt Creek Ground Water Reservoir phase two ground water quality management area shall be made available by the district.

Rule 4 Required Certification Programs.

The district shall require 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 concerned, and include but is 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. The nitrogen management certification will be offered by attending class(s) or as a take home test. Certification classes will be held each year during January through March. Certification will be required every four years. Everyone must be certified by March 31, 2004. Those who reside or operate land in the Lancaster County portion of the Lower Salt Creek Ground Water Reservoir shall be certified by March 31, 2003. Those who reside or operate land in the Cass and Saunders County portions of the Lower Salt Creek Ground Water Reservoir shall be certified by March 31, 2004. 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. The district will accept certification in nitrogen management from adjoining natural resources district's if lands are operated in the Lower Salt Creek Ground Water Reservoir and the adjoining district and the operator has been certified. The operator shall provide proof of certification to the district.

Rule 5 Annual Review.

The district shall conduct an annual review no later than January 31 of each calendar year to assess phase two actions and effectiveness 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. Following the report to the Board of Directors, each landowner, operator, farm manager and applicator will receive from the district by mail a report assessing the phase two actions and effectiveness and a request to verify their status in the Lower Salt Creek Ground Water Reservoir.

Section J (2) Ground Water Quality Management Area Phase Two Valparaiso Community Water System Protection Area

Rule 1 Quality Phase Determination Criteria.

In accordance with rule 3, section I, the district has determined the criteria has been met to designate the Valparaiso Community Water System Protection Area a phase two ground water quality management area for nitrate nitrogen on the following portions of Saunders County Nebraska:

Township 13 North, Range 5 East, Sections 14, 15, 21, 22, 23, and the southeast quarter of section 16, Saunders County, Nebraska.

Rule 2 Continue Phase I Rules.

The district shall continue all rules set forth in Section I, Ground Water Management Area phase one.

Rule 3 Establishment of Cost-Share Programs.

The district shall establish cost-share programs to implement Best Management Practices (BMP's) that may include, but are 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, ground water nitrate analysis kits and contaminant source inventories. All guidelines for BMP cost-share programs offered in the Valparaiso Community Water System Protection Area phase two ground water quality management area shall be made available by the district.

Rule 4 Required Certification Programs.

The district shall require 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 concerned, and include but is 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. The nitrogen management certification will be offered by attending class or as a take home test. The certification class will be scheduled each year during January. Certification will be required every four years. Everyone must be certified by June 1, 2007. 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. The district will accept certification in nitrogen management from adjoining natural resources district's if lands are operated in the Valparaiso Community Water System Protection Area and the adjoining district and the operator has been certified. The operator shall provide proof of certification to the district.

Rule 5

Annual Review.

The district shall conduct an annual review no later than January 31 of each calendar year to assess phase two actions and effectiveness 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. Following the report to the Board of Directors, each landowner, operator, farm manager and applicator will receive from the district by mail a report assessing the phase two actions and effectiveness and a request to verify their status in the Valparaiso Community Water System Protection Area.

Section K Improper Irrigation Run-Off

Rule 1 Improper Irrigation Run-Off Prevention or Control Options

- (1) All persons must prevent irrigation run-off by implementing any structural or non-structural procedure, measure, or combination thereof which provides for effective prevention, control or abatement of improper ground water irrigation run-off, including but not limited to:
 - (a) limitation of water utilized so that structural measures are not necessary to prevent irrigation run-off water and proper operation and management of the irrigation system, including any reuse or other control measures installed
 - (b) construction of a run-off 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
 - (c) blocking of rows or field borders to contain irrigation water within the property under the direct supervision or control of such person
 - (d) the execution and performance of an agreement between two or more persons and approved by the District for utilization of any irrigation run-off water in accordance with Rule 3 of this Section, and
 - (e) any other procedure or measure approved by the District

Rule 2 Irrigation Run-Off Utilization

- (1) Persons whose irrigation run-off water is capable of being captured and utilized by another person in a manner which will prevent waste of such water, deterioration of surface water quality, and accumulation of water upon the land of any other person within his or her consent may have such water excluded from the definition of improper irrigation run-off water by submitting to the District an agreement providing for such capture and utilization signed by all affected parties, on forms provided by the District. When such agreement is approved by the District it will show the District's concurrence that the person's irrigation run-off water is under adequate control. The agreement may be terminated at any time by either party or by the District whenever it is determined that such agreement no longer prevents or controls improper irrigation run-off water. If the District 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 L Transfer of Ground Water

Rule 1 Transfer of Ground Water

- (1) Any person who withdraws ground water for any purpose pursuant to a ground water 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 ground water off the overlying land if the ground water 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. Ground water transfers will be allowed for domestic or municipal uses. Ground water transfers for environmental, recreational, agricultural and industrial uses from a ground water reservoir to lands outside of a ground water reservoir are prohibited.

Section M Enforcement Procedures for the Nebraska Ground Water Management & Protection Act

Rule 1 General

- (1) The District shall enforce the provisions of The Nebraska Ground Water 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:
 - (a) to enforce any of the provisions of the act or of orders or permits issued pursuant to the act
 - (b) to initiate suits to enforce the provisions of orders issued pursuant to the act, and
 - (c) to restrain the construction of illegal water wells or the withdrawal or use of water from illegal wells

Rule 2 (a) Any person who violates any of the provisions of sections 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

- (1) 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.
- (2) 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

- (1) 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.
- (2) 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 Submission of Investigation Report and Subcommittee Consideration Alleging Violation and Alleged Violators Alternatives

- (1) 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 Rule 3 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:
 - a. 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
 - b. 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:
 1. 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 ground water irrigation run-off. 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 submission of a work order within ten days following approval of the plan in the manner hereinafter provided

2. 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

- (1) 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 run-off. 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 ground water irrigation run-off, 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 Rule 4, Part a of this section 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 Rule 5 of this section.

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

- (1) At a meeting of the Board prior to which an alleged violator, complainant, or Board member has, in accordance with Rule 4 or Rule 5 of this section, 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

- (1) At a meeting of the Board prior to which an alleged violator has been notified in accordance with Rule 4 or Rule 5 of this section 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

- (1) 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 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 at the time of issuance of the order.

Rule 10 Board Authorization to Initiate Court Action

- (1) The Board shall, at the time it takes any action in accordance with Rules 6 or 7 of this section, 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

- (1) 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 N Request for Variance

Rule 1 Information Required

- (1) Name, address, phone number, e-mail address
- (2) State the section and rule pertaining to the variance request
- (3) Aerial photo showing location of the variance request
- (4) State why the variance is needed
- (5) Map showing the name and address of all adjoining landowners
- (6) A signed acknowledgement of notice by the adjoining landowners and water well owners
- (7) Any other information the person making the request deems relevant
- (8) Any other information the District deems necessary

Rule 2 Fee For Variance Request

- (1) Deliver to the District a non-refundable fee of \$100 for each variance request

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

- (1) Variance applicant may be required to appear before the Water Resources Subcommittee to explain the variance request
- (2) Variance applicant may be required to appear before the Board of Directors

Rule 4 Consideration of the Variance Request

- (1) All variance requests will be considered on a case by case basis
- (2) All variance requests shall be acted upon by the Board of Directors

Rule 5 Variance Terms & Conditions

- (1) 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
- (2) Provide the District with documentation the affidavit was recorded within 30 days of the granting of the variance

Section O Definitions.

Rule 1 Definitions.

For purposes of the Nebraska Ground Water Management and Protection Act, unless the context otherwise requires.

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

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 and storativity 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 ground water 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.

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 ground water 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 Ground Water shall mean nitrate nitrogen or other material which enters the ground water due to any action of any person and causes degradation of the quality of ground water sufficient to make such ground water unsuitable for present or reasonably foreseeable beneficial uses.

District shall mean the Lower Platte South Natural Resources District.

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

Domestic Well Inside a Ground Water Reservoir shall mean uses of ground water for human needs as it relates to health, fire control and sanitation including water for domestic livestock and plants.

Domestic Well in the Remaining Area shall mean uses of ground water for human needs as it relates to health, fire control and sanitation including water for domestic livestock, plants, and irrigation of less than one acre of land.

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

Ground Water 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 on the land surface, to generally coincide with the boundaries of the aquifer and to be the basis for specific rules and regulations pertaining to ground water as stated in Rule 2, page 4.

Hydrogeologic Analysis shall mean 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 Water 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 sections 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.

Improper Irrigation Run-off shall mean ground water which is used for irrigation purposes and is allowed to leave or runoff the land where it is being used and which causes or contributes to the accumulation of water upon or beneath the surface of the lands of any other person(s).

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

Irrigation on Lands in the Remaining Area shall mean ground water pumped to apply to plants on one or more acres of land.

Irrigation Run-off Water shall mean ground water 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 ground water 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 ground water is or may be discharged.

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 Ground Water Reservoir

Salt Water shall mean ground water 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 ground water 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 ground water; 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 ground water; 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 ground water.

Salt Water Well shall mean a ground water well drilled and constructed which produces salt water.

Water Well shall mean any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed for the purpose of exploring for ground water, monitoring ground water, 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.

Appendix B

LPSNRD Rules and Regulations Pursuant to LB483

**Lower Platte South Natural Resources District
Ground Water Rules & Regulations
Adopted July 22, 2009 Pursuant to LB483, 2009 Legislative Session**

Hydrologically Connected Area

- Rule 1 Designation of Hydrologically Connected Areas of Ground Water and Surface Water
- (1) The Nebraska Department of Natural Resources has determined that ground water 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 ground water and surface water:
- 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
- (1) 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
- (1) After March 31, 2010, only acres that are certified by the District as historically irrigated or approved for expansion may be irrigated.
- (2) On or before March 31, 2010, the District will certify the number of acres historically irrigated with ground water within the Hydrologically Connected Area.
- (3) Landowners requesting certification of historically irrigated acres within the HCA will provide the following information:
- a. A legal description of the location of the land;
 - b. Documentation that the land was irrigated prior to December 16, 2008. Examples of documentation include but are not limited to U.S. Department of Agriculture (USDA) crop verification records, County Assessor records, aerial photography, or crop insurance records;
 - c. Documentation that the number of acres to be certified corresponds with the number of acres recorded as irrigated by the applicable County Assessor; and
 - d. Documentation of the appropriate water well registration number(s) for any ground water source(s) of irrigation.
 - e. Land located within the HCA which is irrigated with ground water from a source outside the HCA will not be certified as historically irrigated, but may continue to be irrigated from the same water well.
- Rule 4 Expansion of Irrigated Acres
- (1) Until December 31, 2012, the District shall allow for the annual expansion of irrigated acres not to exceed 20% of the total irrigated acres in the HCA that are certified by the District as historical.
- (2) To expand irrigated acres, landowners shall apply to the District on forms provided by the District by October 1 of each year through 2012.
- (3) The District shall consider each application and either approve or deny the application based on the following criteria and considerations:
- a. 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);
 - b. Whether or not the proposed expansion is considered to be "sodbusting" as defined by USDA/NRCS;
 - c. 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;
 - d. Whether or not the irrigation expansion utilizes an existing ground water source;
 - e. Whether or not the ground water source is proposed to be withdrawn from an illegal water well; and
 - f. Any other criteria and considerations deemed relevant by the District.
- (4) Irrigation of land outside the HCA by a new well in the HCA is prohibited.

- (5) 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 Within the Hydrologically Connected Area
- (1) Transfer of certified irrigated acres designated by the District within the HCA will be allowed only if:
- a. The transfer is acre-for-acre or less than acre-for-acre;
 - b. The land to which the acres are transferred is suitable for irrigation of the crops grown using criteria established by the USDA/NRCS;
 - c. The transfer is not to a furrow irrigation system; and
 - d. The requirements of LB477, 2009 Legislative Session, are followed.
- (2) If the transfer is less than acre-for-acre, the District reserves the right to claim credit for all ground water not used as a result of the transfer.

- Rule 6 District to Claim Credit for Difference
- (1) Beginning with the effective date of these rules and regulations and continuing until December 31, 2012, the District reserves the right to claim credit for and set aside for future use the difference between
- a. Ground water used on the number of expanded irrigated acres approved by the District and
 - b. Ground water 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
- (1) The District 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 B of the District's Ground Water Rules and Regulations as well as the conditions in these rules and regulations.
- (2) In addition to the reasons set forth in Section B of the District's Ground Water Rules and Regulations, the District shall deny any new water well permits in the HCA for:
- a. Furrow irrigation;
 - b. Irrigation of land determined by the District to be not suitable for irrigation of the crops grown using criteria established by the USDA/NRCS;
 - c. Irrigation of lands outside the HCA; or
 - d. Any annual expansion of irrigated acres greater than 20% of the irrigated acres certified by the District as historical in the HCA, until December 31, 2012.
- (3) Water well permits are not required for:
- a. Domestic wells pumping 50 gallons per minute or less;
 - b. Wells used to water range livestock and pumping 50 gallons per minute or less;
 - c. Test holes;
 - d. Dewatering wells with an intended use of 90 days or less;
 - e. Monitoring or observation wells;
 - f. Wells designed for remediation of ground water contamination;
 - g. Surface water uses or wells for emergency human consumption or public health and safety;
 - h. Replacement wells with no increase in consumptive use; or
 - i. 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.

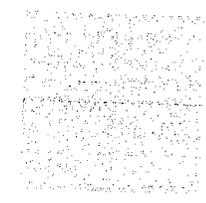
- Rule 8 District to Claim Credit for Ground Water Pumped from Outside Hydrologically Connected Area
- (1) The District reserves the right to claim credit for future use the discharge from all municipal, community, or industrial water systems if such systems obtain their water from wells located outside the HCA and such discharge is returned to the Platte River Basin.

- Rule 9 Enforcement and Variance
- (1) The District will enforce the rules and regulations adopted herein pursuant to and in accordance with the Enforcement Procedures provided in the Ground Water Rules and Regulations of the District, as may from time to time be amended.
- (2) Any requests for a variance from these rules and regulations will be governed by the Ground Water Rules and Regulations of the District, as may from time to time be amended.
- (3) 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 Rule 5(1)b.2 of the Ground Water Rules and Regulations of the District.

**LOWER PLATTE SOUTH
NATURAL RESOURCES DISTRICT**

P.O. Box 83581 · LINCOLN, NE 68501-3581

RETURN SERVICE REQUESTED



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Jim Schneider
Deputy Director
NE Department of Natural Resources
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