



LOWER PLATTE NORTH

NATURAL RESOURCES DISTRICT

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Some animals, fish, and birds that previously existed in large numbers in the District are now infrequently present or completely gone. The use of pesticides and loss of habitat has had an extremely negative impact for a variety of species. Some of the endangered or threatened species known to be or may have been in the District include: bald eagle, least tern, piping plover, peregrine falcon, swift fox, black footed ferret, river otter, pallid sturgeon, and blacknose shiner (Nebraska Game and Parks Commission). Much of this wildlife depends heavily upon habitat, food, and water supported by groundwater supplies in the District.

The grasslands, woodlands, and waters of the District support many animals, birds, insects, and aquatic life that are too extensive to mention in this short section. One endangered plant species which has been identified as possibly inhabiting the NRD is the Western Prairie fringed orchid. While this plant species has been observed to be present in Southern Dodge County, it may also be present in other areas of the NRD. The southern Dodge County site is located on an upland in a perched water table setting, which would not be considered part of the manageable groundwater reservoir (Personal Communication - Mike Fritz- Nebraska Game and Parks Commission, April 1994). In this area, land use changes would be more of a threat to the orchid than changes in water quantity in the principal aquifer. As development encroaches upon remaining natural grasslands, the potential for extinction of this species increases greatly. The NRD has embarked upon a program to protect and preserve some of the valuable wetland and grassland resources within its boundaries, because it is aware of the need for such preservation for future generations. The general protection of groundwater quality and quantity is important to preservation of habitats of indigenous and threatened and endangered plant and animal species. Any NRD actions to manage the groundwater resources within District boundaries will be evaluated as it may impact these valuable resources. If adverse effects on sensitive resources are identified from changing groundwater quantity or quality, the NRD will evaluate the need for modification of its Groundwater Management plan as allowed under the

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Nebraska Groundwater Management and Protection Act, to reduce adverse affects. The NRD will continue to support hydrologic and hydrogeologic studies which will contribute to the foundation of knowledge needed to locate and identify orchid habitat and other water related sensitive habitats.

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collected, a better picture of the long-term trend in water levels in the District aquifers will develop. The "index" year can be adjusted over time to more closely approximate a "normal" year.

The levels shown in Exhibit 25 can be placed into perspective by consideration of their relationship to the saturated thickness of the aquifer. Exhibit 20 is a map of saturated thickness of the various coarse grained aquifers of the District from the 1985 Plan and Table 5 summarizes the net water level changes as a percentage of saturated thickness.

Table 5
Net Water Level Change as a Percentage of Saturated Thickness, Selected Wells: Lower Platte North NRD Groundwater Level Data; Spring 1987 - Spring 1993

Well #	County	Aquifer	Long-Term Net Change (feet)	Estimated Saturated Thickness (ft)	Approximate % of Saturated Thickness
6	Platte	Shell Creek	-5.0	50 - 100	5 - 10
8	Platte	Shell Creek	-5.2	75 - 100	5 - 7
12	Platte	Shell Creek	-4.4	100 - 150	3 - 4
17	Platte	Shell Creek	+2.2	75 - 100	2 - 3
21	Colfax	Shell Creek	-2.5	75 - 100	2 - 3
24	Butler	Platte Valley	-6.1	75 - 100	6 - 8
25	Butler	Platte Valley	-6.7	75 - 100	6 - 9
66	Dodge	Platte Valley	-6.5	25 - 50	13 - 26
27	Butler	Uplands	-3.3	150	2
30	Butler	Uplands	-10.9	100 - 150	7 - 11
31	Butler	Uplands	-7.2	150 - 200	3 - 5
34	Saunders	Uplands	-0.4	100 - 150	<1
43	Saunders	Uplands	-2.4	75 - 100	2 - 3
48	Saunders	Uplands	-7.3	75 - 100	7 - 10
49	Butler	Uplands	-4.0	150 - 200	2 - 3
53	Butler	Uplands	-9.4	0 - 25	>38
57	Saunders	Todd Valley	-6.3	100 - 150	4 - 6

As shown in Table 5, a water level decrease in Well No. 31 (saturated aquifer thickness of 150 to 200 feet) does not carry the same implications as a 10 feet decrease in Well No. 53 (saturated aquifer thickness of 0 to 25 feet). The water level decline in the former well is less than 5 percent of aquifer saturated thickness, while in the latter just 6 miles to the north, it is over 35 percent.

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Platte River

Results of monitoring in this reservoir show slight declines (<5 feet) from predevelopment (U.S.G.S. data) and slightly greater declines (still less than 5 feet on average) against the index year.

Todd Valley

Results of monitoring in the Todd Valley show slight declines (<5 feet) from both predevelopment and the index year. One well in upper Clear Creek shows a water level decline approaching 10% of saturated thickness.

General

- 1) The current monitoring network includes 79 wells. Expansion of the network in areas where few wells are presently monitored (e.g., Shell Creek) and in areas where problems may be present or will be in the near future is planned. In 1993, the NRD plans to expand the network to include 120 wells.
- 2) Determination of well elevations are necessary for all wells so that water table elevation maps can be constructed and regional and local changes in groundwater flow direction can be assessed.
- 3) Refinement of the LPN NRD groundwater computer model is needed to predict vulnerable areas to groundwater decline.
- 4) More information is needed on aquifer recharge rates and discharge (including water use).
- 5) A consistent scheme for evaluation of water level changes is needed to quantify their significance. The NRD has established an "Index" year of 1987 to reference changes. As time progresses and more data is acquired, appropriate "index" levels may be adjusted to more closely approximate "predevelopment" water levels.

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THE PLAN FOR GROUNDWATER MANAGEMENT IN THE LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

Section A Framework for Groundwater Management

The Lower Platte North NRD prepared a Master Plan for resources management in the late 1980's, which serves as a parent document to the 1994 updated Groundwater Management Plan. The Master Plan is the foundation from which individual resource planning occurs, and guides the allocation of financial and manpower resources. The Water Quality, Supply, and Pollution Abatement goal and subsequent objectives to support the goal which are present in the Master Plan follows:

GOAL

ASSURE ADEQUATE QUANTITY AND QUALITY OF STREAM FLOW, GROUNDWATER, AND SURFACE RESERVOIRS WITHIN THE DISTRICT FOR BENEFICIAL USES AS PRESCRIBED BY LAW.

OBJECTIVE 1

Insure that all chemigation users are properly trained and comply with state rules and regulations so as to reduce the occurrence of groundwater contamination through the application of pesticides and fertilizers.

OBJECTIVE 2

Actively pursue the proper use of chemigation criteria and assure that all who chemigate have permits to do so.

OBJECTIVE 3

Develop and maintain rural landowner and community reporting stations for well monitoring, water usage, and rainfall statistics.

OBJECTIVE 4

Insure proper local management of ground and surface water resources through cooperation with local community governments, agencies and private firms, which may involve development of Special Protection Areas and groundwater management and control areas.

OBJECTIVE 5

Comply with the District's Groundwater Management Plan as well as state standards and regulations in order to meet proper conservation requirements.

OBJECTIVE 6

Assist federal and state agencies in the protection of ground and surface waters from non-point and point sources of pollutants.

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Maintain groundwater quality and quantity monitoring programs.

OBJECTIVE 8

Encourage and develop programs to assist users in reducing irrigation water needs through best management practices.

OBJECTIVE 9

Develop instream flow requirements that will assist in providing a stable development climate within the District.

OBJECTIVE 10

Develop best management alternatives for chemical use in areas where susceptibility to groundwater pollution is high.

OBJECTIVE 11

Cooperate with state and federal agencies to provide adequate methods of testing groundwater for pollutants.

OBJECTIVE 12

Assist in the development of rural water districts with other applicable entities as required.

OBJECTIVE 13

Develop criteria and data for wellhead protection standards to allow District urban areas to participate in this program.

The goals, objectives, policies, and programs set forth in this Groundwater Management Plan Update were developed in support of the LPN NRD Master Plan, and provide further detail regarding ways to accomplish the intent of the Master Plan. It is the intent of the Lower Platte North NRD to wisely and proactively manage the groundwater resources within the District, while maintaining local control over management and use.

Since the NRD's first Groundwater Management Plan was adopted in 1985, many significant changes have occurred regarding regulatory requirements, responsibilities, and options for groundwater management. The Nebraska Legislature, through the Nebraska Groundwater Management Act and its amendments has offered NRDs the opportunity to manage groundwater at the local level if they choose to accept such responsibility. The Act however, also provides options for intervention at the State level should the NRDs require assistance. To recognize a problem or potential problem and do nothing to prevent or alleviate it is no longer a viable option. An NRD must have a plan of action ready to retain total local control and resource protection.

A summary of "Identified Present Known Problem Areas With Consideration of Potential Problem Areas and Information Deficiencies" has been presented in this plan. It is evident from information presented in the plan that there are several areas of concern which warrant extensive action to meet the goals of both the Master Plan and the Groundwater Management Plan's adopted goals and objectives for resource management.

In the area of groundwater quality, the most significant area of concern is the increase of nitrate concentrations. In the uplands of Saunders and Butler Counties, the data base may not allow for a broad interpretation of the areal distribution. In the Shell Creek reservoir, elevated nitrate levels may not be present but a more comprehensive and definitive monitoring network is

needed. Areas along the Platte River do exhibit elevated levels of nitrate contamination. This finding is consistent with the DRASTIC vulnerability index, which suggests this reservoir is highly vulnerable to pollution. The Todd Valley reservoir is also showing areas where nitrates are becoming higher. A report by Roy Spalding and Mary Exner indicated areas along the Platte River in Butler, Platte, Colfax, and Dodge Counties, the Todd Valley and Shell Creek exhibit an overall nitrate increase about 1 part per million per year from 1978/79 to 1988/89. Along with the higher nitrate concentrations is the potential problem of pesticide contamination. Surface runoff from the agricultural areas in the District are known to carry extremely high levels of pesticides, particularly during spring rainfall events.

As the State moves to recognize the interrelationship of surface and groundwater laws, an area needing extensive analysis is that of the physical surface/groundwater relationship. Some areas of the District demonstrate a potential for significant deterioration of a groundwater aquifer caused by surface water problems. Deep soil samples in the District also point out very high levels of nitrates in the soil profile just below the root zone moving into the groundwater aquifer.

The rate of development of irrigation wells in the District illustrates densely developed aquifers in many areas, which could result in overdraft. This trend is evident in a report from the Nebraska Department of Water Resources showing a steady increase in the number of new well registrations per year. Recharge rates and abilities to recover from overdraft of the aquifer and declines due to climatic changes must be understood for the entire District. Management of the physical system must reflect the ability of the system to respond to natural changes. Water level monitoring must be increased to provide a more comprehensive assessment of the systems responses to stress situations.

The Lower Platte North NRD recognizes the need for comprehensive, practical, and effective systems of groundwater management, combining both non-regulatory and regulatory approaches. Non-regulatory options such as data collection, public education, encouragement of voluntary use of best management practices, demonstration programs, and others have been used by the NRD as primary management tools prior to development of this plan. The District intends to expand its management scheme to include regulatory options available to the NRD under the Groundwater Management Act. Regulatory tools authorized under this Act include:

- 1) Allocating the total permissible withdrawal of groundwater;
- 2) Rotation of use of groundwater;
- 3) Well-spacing requirements pursuant to Section 46-673.12;
- 4) Requiring the use of flow meters on wells;
- 5) Best management practices;
- 6) Requiring the analysis of water or deep soils for fertilizer and chemical content;
- 7) Educational programs designed to protect water quality; or
- 8) Moratorium on new well drilling (Control Area only).

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(Source: Laws 1982, LB375, 11; Laws 1986, LB894, 30; Laws 1991, LB 51,4.)

In order for the NRD to legally utilize the tools outlined above, a Groundwater Management Area must be established with definable boundaries. The LPN NRD intends to establish the entire NRD as a Groundwater Management Area, allowing for utilization of the regulatory tools (listed above) as appropriate for overall management and for problem (subarea) management. Details are provided in Sections B and C of this Plan.

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**PLAN FOR GROUNDWATER MANAGEMENT
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**Section B
Goals, Objectives, and Policies**

In 1985, the Lower Platte North Natural Resources District developed, in accordance with the Groundwater Management and Protection Act of 1975, a Groundwater Management Plan. At that writing, little water quality or water quantity data existed in the NRD. The Plan, as a result of the lack of information, set forth a vigorous course of action which included sixty-four (64) actions designed to provide the District a dataset upon which proper management decisions could be based. Since 1985, the District has placed into action or has completed, 85% of those action items. The remaining 12 are actions which relied upon the database in order to be implemented, and are incorporated into this Groundwater Management Plan.

Goals established in 1985 also reflected the lack of a sufficient database and were adopted in order to assist in the building of such a dataset. With passage of LB 51, the District was in a position to analyze the considerable water information gathered since 1985. The analysis revealed a distinct set of needs for program realignment. The following goals, objectives, and policies or program components will serve to guide the District over the next several years.

GOAL #1 : Groundwater Reservoir Life

**TO PROVIDE A SUSTAINED GROUNDWATER SUPPLY OF QUALITY WATER
ADEQUATE TO SUPPORT REASONABLE AND BENEFICIAL USES, AND
MAINTAIN LONG-TERM QUALITY YIELDS.**

OBJECTIVE

**Designate the entire Lower Platte North Natural Resources District as a
Groundwater Management Area, consistent with Nebraska State Statutes 46-673.01 - 46-
673.06.**

Policy - Within two years of the date of approval of the Groundwater Management Plan by the Director of Water Resources, the Lower Platte North Natural Resources District shall establish a District-wide Groundwater Management Area.

Policy - A phased approach to water quality management based upon a Maximum Contaminant Levels (MCL) and Lifetime Health Advisory Levels (LHAL) trigger scheme, and water-level management with triggers based on water level declines with appropriate management actions, will be implemented (triggers and controls are set forth in Section C of this Plan).

Policy - Prior to establishing the Groundwater Management Area, the NRD will perform the necessary analysis to delineate subarea management boundaries for specific problem area management.

Policy - Establish and implement a Groundwater Management Area education program, to include proper fertilizer and pesticide application, irrigation scheduling and water use efficiency, urban fertilizer and pesticide use, water quality and chemical health risks, agricultural reporting needs, crop water efficiency, pump plant efficiency, adopted groundwater management triggers, and other groundwater issues as applicable.

Policy - Implement an education program to inform the public regarding the need for developing the LPN NRD as a Groundwater Management Area, with special emphasis on the adopted Management Schemes (outlined in Section C of this document).

Policy - Expand the NRD newsletter to include more information on groundwater activities.

Policy - Develop a network of demonstration farms, by aquifer, to exhibit water use efficiency benefits and solicit cooperation for voluntary metering and reporting to the NRD.

Policy - Increase the awareness of effective long-term conservation and utilization of the groundwater aquifer.

Policy - Coordinate education and information program with NDEQ, NNRC, NDOH, NDWR, and applicable local and federal agencies, to include the above items and other items such as proper well locations, number of wells per area, and new well construction.

GOAL #2: Management Systems Development

PROVIDE A SYSTEM OF GROUNDWATER MANAGEMENT TO SUPPORT THE GROUNDWATER RESERVOIR LIFE GOAL, BASED UPON AN ADEQUATE TECHNICAL FOUNDATION AND PUBLIC AWARENESS OF GROUNDWATER ISSUES.

OBJECTIVE

Provide technically accurate and updated water quantity data upon which to base management decisions.

Policy - Update the saturated thickness map by recording and mapping thickness from all new registered well logs, to assist in further delineation of groundwater aquifers.

Policy - Update water level contour maps that coincide with groundwater data received from monitoring. Contour maps will be used to monitor changes in direction of groundwater flow and saturated thickness.

Policy - Enhance data collection in confined aquifers by monitoring at least 5% of the total registered wells in each confined aquifer. Use the data to evaluate predevelopment pressure head levels and changes from predevelopment to the present.

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Policy - Develop a methodology to statistically analyze water level fluctuations, evaluate the significance of the changes, and relate to the management scheme developed for the GMA.

Policy - Increase the number of observation/monitoring wells in District groundwater reservoirs to provide greater coverage for early problem area detection. The actual number of wells and locations will be based upon the intensity of development of the aquifer and the dependence on the aquifer water supply for various uses. Ultimately the NRD's system will include at least 120 wells.

Policy - Support and perform studies to aid in groundwater model development to predict the amount of water which may be withdrawn from each groundwater aquifer to support the Groundwater Reservoir Life Goal.

Policy - Continue coordination of data collection, storage and analysis with other local, state and federal agencies and groups.

OBJECTIVE

Provide the most technically accurate and updated water quality data upon which to base management decisions.

Policy - Adjust the density of the groundwater quality monitoring network for each aquifer, providing data adequate to evaluate long-term trends and identify present and potential problem areas. The number of wells to be monitored is dependent on the percent of irrigated acres and the number of wells needed to irrigate those acres in each groundwater reservoir to establish and reaffirm baseline conditions.

Policy - Perform trend and random monitoring every 2 years in the most vulnerable areas and problem areas, and every 4 years in less vulnerable areas and areas not presently exhibiting water quality problems.

Policy - Continue coordination of data collection, storage and analysis with other local, state and federal agencies and groups relating to pollution spills (Nebraska Department of Environmental Quality - NDEQ), public water supplies and regulatory notices (NDOH), and results of special investigations (Conservation and Survey Division - C&SD, Department of Water Resources - DWR, NDEQ, Nebraska Department of Health - NDOH, U.S. Geological Survey - USGS, Environmental Protection Agency - EPA, Corps of Engineers - COE, etc.).

Policy - Continue to perform and/or support isolated water quality investigations in NRD aquifers as conditions dictate and the need arises.

Policy - Support nitrogen isotope studies where necessary to determine the source of a nitrate problem and its areal extent for problem boundary definition.

Policy - Support deep soil sampling in areas where suspected over-application of commercial fertilizer and/or animal manure has occurred.

Policy - Perform triazine screen testing of selected wells within the most vulnerable areas of each groundwater reservoir.

Policy - Perform studies to assess needs, benefits, costs, etc. when requested, for possible development of regional or rural drinking water supply systems.

Policy - Develop a program to assist in monitoring rural drinking water wells in cooperation with other agencies.

Policy - Coordinate the NRD's groundwater programs with the Nebraska Department of Agriculture in support of the State of Nebraska's Federal Insecticide, Fungicide, Rodenticide Act and farm management plans.

OBJECTIVE

Further develop and enhance the NRD's computer database management system to provide continual support for program advancements.

Policy - Increase the hardware capabilities of the NRD for data storage, retrieval and analysis, and interfacing with other program needs. Adapt the systems components to be compatible with local, state and federal systems.

Policy - Identify software needs to support: trend analysis; predict impacts of management decisions; and provide mapping capabilities. Acquire software to complement the NRD's hardware.

Policy - Refine the LPN NRD groundwater computer model to provide adequate prediction of vulnerable areas of decline.

Policy - Establish a QA/QC program for data entry to eliminate database errors.

Policy - Utilize the hardware and software capabilities to produce required periodic reports in a standard and meaningful format.

OBJECTIVE

To develop a coordinated NRD program to assist in implementation of the State of Nebraska's wellhead protection program. The NRD program will be targeted toward assisting the District's communities and supportive of the District's efforts in managing ground and surface water.

Policy - Further develop the information needs and assist in the continuance and upgrading of the present LPN NRD well decommissioning program.

Policy - The District will assist any community in the NRD with proper development of a Wellhead Protection Program.

Policy - The District will be the central repository for District water supply contamination information as received from the NDOH and NDEQ.

Policy - Make NRD database information on pollution and water quality readily available to all District communities for use in planning for Wellhead Protection.

Policy - If a Wellhead Protection Area is established due to non-point source pollution, the District may set boundary areas that are less than 9 square miles in size.

Policy - The District will develop a process to locate, identify, and catalogue past, present, and potential point and non-point sources of contamination (to include present and abandoned feedlots, landfills, dumps, industrial sources, etc.), which will be utilized in all ground and surface water program analysis and management.

OBJECTIVE

To support and conduct special studies, research, and data gathering activities that will assist the District in its understanding and management of groundwater.

Policy - Perform sandpit studies when appropriate, to address the locations of such pits, their fluctuations, evaporation/transpiration, and estimated effect on the groundwater table.

Policy - Continue to evaluate the adequacy of the Districts precipitation network and expand where appropriate.

Policy - Support studies/research and refinement of the DRASTIC program to further identify and understand recharge characteristics and areas vulnerable to pollution in the District.

Policy - Support and perform percolation studies to understand the recharge potential of groundwater reservoirs, particularly those areas where known or suspected contamination occurs.

Policy - Develop a water balance model for the NRD considering the effect of phreatophytic growth on the groundwater table and wetlands.

Policy - Participate in and perform instream flow studies which identify the streams dependence upon groundwater for base flow.

Policy - Participate in studies and research to quantify and qualify the interconnection between ground and surface water.

Policy - Support geologic and hydrogeologic studies which will contribute to the foundation of knowledge needed to locate and identify areas where changes in groundwater quality/quantity may impact environmentally sensitive resources.

OBJECTIVE

To adequately support the Groundwater Management Plan through proper application of District resources.

Policy - Provide sufficient qualified personnel, funding, and equipment to fully support the groundwater management system and the needs of the program.

Policy - Annually re-evaluate and upgrade the Districts Groundwater Management Plan and the resulting Groundwater Management Area designations.

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Policy - Develop background information and a methodology to address potential NRD cost share programs for meter application, assistance with collection of irrigation and drinking water samples for analysis and deep soil sampling. The NRD will only cost-share with landowners that have registered wells with the Department of Water Resources. If wells are unregistered, proper registration forms will be provided by the NRD and a 6-month period will be allowed for registration before the illegal well will be reported to the Department of Water Resources. Chemigation permits will only be issued on registered wells.

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Action Plan**

The Lower Platte North NRD is strongly aware prevention is extremely less costly than correction of a groundwater problem after it has developed. Knowledge of this principle has required the District to develop a groundwater program emphasizing protection based on a proactive approach rather than on a reactive, corrective approach. Data gathered by the District, the USGS, NDEQ and the University of Nebraska since 1985 has indicated areas where groundwater quality nitrate conditions have deteriorated beyond those established as health standards. Other data also indicate problem areas are presently developing which need to be intercepted in order to bring about a clean up of the reservoir and to halt a continuing trend of increased pollution.

The District did not enter into this activity without developing a method to arrive at what is felt to be a consistent planning and implementation strategy aimed at protection of the resource. Within two years of the date of approval of the Groundwater Management Plan by the Director of Water Resources, the District will establish a District-wide Groundwater Management Area. The quality component of the plan is a phased approach based on a Maximum Contaminant Levels (MCL) and health-based standards trigger scheme, addressing Nitrate, pesticides, and other human non-point source contaminant levels in the system. The quantity component of the plan is developed around triggers based on water level declines with appropriate management actions for confined and unconfined aquifers.

Prior to establishing the Groundwater Management Area, the NRD will perform necessary analysis sufficient to delineate subarea management boundaries for specific problem areas associated with levels of concern. A major component of the plan is the implementation of an education program which includes, but is not limited to: proper fertilizer application (both commercial and private), irrigation scheduling and water use efficiency, water quality and chemical health risks, agricultural reporting needs, adopted groundwater management triggers, social/economic aspects, and other issues as applicable. An essential item of the education program is the development of demonstration farms, by aquifer, exhibiting water use efficiency benefits, irrigation scheduling, crop water efficiency, and fertilizer and pesticide application. Another essential item of the education program will be development of educational materials to address proper application of fertilizers, pesticides, and other chemicals on lawns and other non-commercial applications in urban areas.

Groundwater Quality Management Program

The Groundwater Quality Management Program is based on a set of contaminant level triggers designating the Phase of the program in which a particular area must be placed. Phase I nitrate triggers are set at 0 to 8 parts per million in the Groundwater reservoir and includes the entire District. Phase II triggers are from 8.01 to 10 parts per million nitrate concentration in the groundwater while Phase III trigger levels range from 10.01 parts per million or greater. "Other" human-induced non-point source contaminants, such as pesticides have phased trigger levels based upon Maximum Contaminant Levels (MCL) or Lifetime Health Advisory Levels (LHAL). Phase I triggers are set at 0 to 80% of the contaminants MCL/LHAL and includes the entire NRD. Phase II areas will be established when contaminants are present at 80-100% of the

MCL/LHAL. Phase III areas will be established when the MCL/LHAL is exceeded (>100%). Currently, no "other" contaminated areas have been identified that are approaching the upper limit of a Phase I area. As "other" contaminants approach the Phase I area limit, contaminant-specific programs and regulations will be adopted, similar to the nitrate regulations which are based upon increasing levels of management and actions.

For the purpose of implementing the Phases of groundwater management, the LPN NRD has established some guidelines by which a problem area is identified, and phase area boundary setting studies will be initiated. Groundwater management units will be reservoir specific.

- × Within the same reservoir, boundary setting studies will be initiated when: water quality analytical results, within a minimum 9 square mile area are at identified trigger levels, over a minimum of 2 consecutive sampling events. The 9 square mile area must contain a minimum of 10 high yield wells pumping over 100 gpm and contaminant trigger levels must be exceeded in over 50% of the wells. Initial investigation by the NRD will be to determine if the contamination is a result of point-source or non-point source pollution. If non-point source is concluded more intensive investigation for boundary setting will ensue.

If a Wellhead Protection Area should be established due to non-point source pollution, the District may set boundaries that are less than 9 square miles.

Data derived from the monitoring network established by the District, combined with special studies, monitoring studies performed by the USGS, University of Nebraska, NDEQ, County Extension programs, and others as applicable, will be used as the database on which to formulate Phase II and Phase III area boundaries.

Upon confirmation of the GWMP by the Department of Water Resources, the District will move immediately into the process of evaluating Phase boundaries by performing a series of confirmation studies aimed at boundary setting. The District will also begin the development and implementation of the education program. This program will become progressively more intense as an area shifts from one Phase to another higher Phase.

Within two-years of the acceptance of the GWMP, the District will designate the entire NRD in Phase I of the program. The reasoning for this action is in keeping with the Districts goal "to provide a sustained Groundwater supply of quality water adequate to support reasonable and beneficial uses, and maintain long-term quality yields."

PHASE I CONTROLS:

- ◆ All operators in Phase I areas within the District, who use any type of fertilizer, either commercial or organic, are required to be certified by the District every four (4) years. Certification will be consistent with the Districts chemigation program and applicable to the State FIFRA program. The education/certification program will be developed with the assistance of the Cooperative Extension personnel and others, as applicable.

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- ◆ A groundwater analysis for nitrogen (nitrate nitrogen) content for all wells pumping greater than 100 gpm and used for irrigation of commercial crop production must be made every four years using NRD approved analysis methods, and results submitted to the NRD by December 31 of the fourth year. This analysis is deemed necessary to both assist the NRD in their monitoring program and to aid the operator in developing a knowledge of their particular groundwater nitrate level. This knowledge can readily be translated into a decrease of nitrogen usage by the operator and thus a financial incentive to properly use that nitrate in the system. A methodology for sample collection and proper analysis procedures will be a part of the education program.
- ◆ A soil analysis (3-4 feet in depth) for nitrogen (nitrate nitrogen) content for each field under control of the operator used for commercial crop production are encouraged every four years. NRD approved analysis methods should be used, and results submitted to the NRD by December 31 of the fourth year. This analysis is likewise considered necessary to aid the operator in developing a knowledge of their pending useable soil profile nitrogen and of that amount already inaccessible to the crops. A methodology for sample collection and proper analysis procedures will be a portion of the education program.
- ◆ All operators are encouraged to submit a Fertilizer Application Report to the NRD once every four years on a form provided by the District, which indicates the pounds per acre of nitrogen (commercial and organic) applied to each field under their control for the past four years. The quantity in pounds per acre of pesticides applied for each field where applied, will also be encouraged. Such reports will incorporate, if applicable, those reports required under the NRD chemigation program and such reporting requirements resulting from the implementation of the State assumption of the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA). These reports will also remain consistent with changes resulting from reauthorization of the Clean Water Act which affects such reports.
- ◆ Passage of LB-981 by the Nebraska Legislature in 1994, requires all new wells to be drilled in any management area which will pump greater than 50 gpm to have a permit prior to construction. The cost of the permit will be consistent with conditions of the law. Penalties applied under this Law will be in accordance with the law.
- ◆ Application of organic fertilizer (liquid manure, dried manure, sludge or composted organic waste) is very diversified and poses management problems relative to the size of the operation. The desire of the District is to allow farming operations to continue, yet not allow the N concentration in the groundwater to increase. Not all organic waste contains the same amount of N per unit of measurement, as such the amount/acre/year allowed to be applied in Phase I areas will be based on method of collection and storage, land application method, types of crops or cover crop, soil types, landscape features, source of manure, and previous manure application rates. Amount/acre/year of manure applied on each field is encouraged to be reported on the Fertilizer Application Report and submitted to the NRD once every four years.
- ◆ No fall applications of N fertilizer (commercial) will be allowed on non-sandy or fine textured soils until after November 1. Such determination of non-sandy soils or fine textured soils will also be determined and identified in the same manner as sandy soils.

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- ◆ Fall and winter applications of N fertilizer (commercial) will be prohibited on sandy soils. Sandy soils will be designated utilizing the USDA Soil Conservation Service Soil Surveys for the counties in the District. Such determination will be set forth prior to designation and identified prior to confirming the GWMA Phase I program. Commercial fertilizer can be applied on sandy soils after March 1 of the crop year.

Present data indicates that some of the areas in the District may be placed in the Phase II category upon designation of the GWMA in the District. Phase II areas will be delineated via the above noted procedure of delineating boundaries. Such delineation will cause extended activities to be brought into play. Those additional requirements are:

PHASE II CONTROLS:

- ◆ A continuation of Phase I activities as they apply.
- ◆ A Groundwater analysis for nitrogen (nitrate) content for all wells pumping greater than 100 gpm irrigating commercial crops must be made annually and reported to the NRD by December 31.
- ◆ Annual soil samples in the root zone (3' to 4' in depth) on each field used for commercial crop production are required for Phase II and Phase III areas. This information will be used in conjunction with use of proper best management practices. The results of the soil samples will accompany the annual report made to the NRD by December 31.
- ◆ All operators will submit a Fertilizer Application Report to the NRD at the end of each crop year or prior to December 31 of each year. Submittal will be on a form(s) developed by the NRD. Reporting of Application of Pesticides will be encouraged on this form.
- ◆ Commercial nitrogen-fertilizer as anhydrous ammonia will be permitted on non-sandy or fine textured soils from November 1 to March 1, provided that an approved inhibitor is used and applied as recommended. After March 1 an inhibitor is not needed.
- ◆ In order to assure use of an approved inhibitor, the operator will be required to furnish certification from a dealer that an approved inhibitor was used and applied as recommended. Methodology for this activity will be developed as part of the education program.
- ◆ The District will begin a voluntary fertilizer calibration program addressing all applications and will strongly encourage operators to participate in the process. The District may, as conditions warrant, choose to develop a cost share program with operators.
- ◆ Monitoring (meters or time totalizers) of water applications will be required to allow operators to better manage fertilizer applications and control excessive nitrate leaching into the aquifer. If time totalizers are used then well output must be certified by the NRD. This activity will be phased in over a period of six (6) years.

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- ◆ In Phase II and Phase III areas, amount per acre per year of organic fertilizer allowed to be applied (liquid manure, dried manure, sludge, or composted organic waste) will be based on method of collection and storage, land application method, types of crops or cover crop, soil types, landscape features, source of manure, and previous manure application rates. The Nebraska Cooperative Extension Service Bulletin EC 89-117 "Fertilizing Crops with Animal Manure" shall be used as guidance unless more current guidelines are available. Amount/acre/year of manure applied on each field is to be reported on the Fertilizer Application Report and submitted to the NRD by December 31 of each year. The amount and timing of application must be adjusted to the N concentration in the soil profile and groundwater content. Application is allowed to frozen soils and is to be determined on a site-by-site basis as this is a prime cause of both groundwater and surface water degradation.
- ◆ The education program will be expanded to assist the Phase II operators and other personnel in the area to realize that continued increases of nitrate and/or other non-point source contamination could cause the area to be elevated to a Phase III area.

Phase III areas are characterized by contaminant levels exceeding the MCL or LHAL in the groundwater. Present data indicates the potential to delineate areas in the District where nitrate levels are consistently in this range. Areas designated as Phase III areas are further constrained in order to more fully protect the citizens of the area and to remediate the aquifer.

PHASE III CONTROLS:

- ◆ Phase I and Phase II controls remain in effect.
- ◆ Monitoring (meters or time totalizers) of water applications to allow operators to better manage fertilizer applications and control leaching of nitrates is to be phased in over 4 years. If time totalizers are used then well output is to be certified by the NRD.
- ◆ The application of commercial nitrogen fertilizer is prohibited in the fall and winter on all soils until after March 1. Spring applications of commercial nitrogen fertilizer will require split applications (pre-plant and sidedress) or the use of an approved inhibitor applied as recommended. If a split application is used and 50 percent or more is applied as a pre-plant, the use of an approved inhibitor applied as recommended is still required.
- ◆ If 50% or more of commercial nitrogen fertilizer is applied to pre-plant then operators are required to furnish certification from the dealer that an inhibitor was used at recommended rates. Methodology for this process will be developed as part of the education program.
- ◆ Require fertilizer calibration monitors on applications >50 lbs./acre. The application of fertilizer (>50 lbs/acre) would be required to be calibrated to the results of soil and water tests and monitored for compliance. The District may choose to develop or increase a cost share program.

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Groundwater Quantity Management Programs

DEPARTMENT OF
WATER RESOURCES

The District is composed of both confined and unconfined aquifers. Confined aquifers being generally defined as those aquifer areas where there is a pressure such that the water tends to rise in the well casing. This rise is termed the potentiometric head. Unconfined aquifers are those which do not exhibit this characteristic. The two differing types, due to their varying characteristics, are treated differently in the designation of Levels in the management of the system.

The LPN NRD has defined subareas within the District that have similar aquifer conditions. When greater than 50% of the LPN NRD monitoring wells in a subarea has reached or exceeded the trigger level, then a control area can be established. As more information becomes available in the future, these subareas can be further defined.

LPN NRD monitoring wells are established by a cooperative agreement with the current landowners on a voluntary basis. Due to hydrologic considerations LPN NRD monitoring wells are not to be located on municipal well field property.

Unconfined Aquifers

Unconfined aquifer management subareas are to be designated within the District when conditions, taking into consideration climatic variables, indicate a 10% drop in the saturated thickness of the aquifer. Assessment of percentage drop will be calculated utilizing the spring readings of the wells over a three (3) year period assessed against the 1987 well levels or to comparable year well levels. When this condition is noted to be developing, the District will enhance the education program which may assist in correcting the situation. If this type of action does not provide the needed results the following will occur.

LEVEL 1 CONTROLS:

- ◆ The area will be designated a Level 1 Quantity Area and all operators of well systems that pump greater than 100 gpm must attend education classes designed by the District and in agreement with applicable other agency input. Certification of all operators is required every four years.
- ◆ A permit will be required for all new wells to be drilled in the area which will pump greater than 50 gpm.
- ◆ The District will encourage a well metering program (meters or time totalizers) to be established on all wells pumping >100 gpm. This voluntary well metering program will be established with possible incentives available to operators. Incentives may include a variety of options and will be developed prior to designation of a Level 1 area.
- ◆ Encourage an acre-inch allocation system that will be developed per commercial crops planted that are dependent on that particular aquifer.
- ◆ The District will encourage submission of the Water Use Report to the NRD prior to December 31 of the fourth year.

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As conditions become more severe the District will utilize a 15 percent drop in the saturated thickness as the trigger to move into Level 2 quantity programs.

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LEVEL 2 CONTROLS:

- ◆ The same requirements as in Level 1 but enhanced.
- ◆ Well meters or time totalizers will be a requirement on all wells pumping greater than 100 gpm. If time totalizers are used then well output must be certified by the NRD.
- ◆ An acre-inch allocation per crop planted will be put into place and will be based on the aquifer and the use of the aquifer.
- ◆ The District will require annual submission of the Water Use Report to the NRD by December 31.
- ◆ Well spacing requirements will be applied in the Level 2 area pursuant to Section 46-673.12 of the State Statutes. (Well spacing will vary with % of decline in the aquifer.)
- ◆ Best management practices will be required to conserve water and will be developed prior to designation of the area as a Level 2 Area.

Confined Aquifers

The sensitivity of the confined aquifers has led the District to the decision to manage them in a different manner than the unconfined aquifers. The triggers are based on a reduction in the potentiometric-aquifer thickness. The potentiometric surface is defined as an "imaginary" surface representing the total head of groundwater in a confined aquifer that is defined by the level to which water will rise in a well. The potentiometric-aquifer thickness (PAT) is defined as the distance from the potentiometric surface to the base of the principal aquifer. The use of this procedure requires the data derived from the well drilling operation as the total aquifer thickness will need to be determined.

Three Levels have been assigned to the confined aquifer designations. Level 1A is triggered by a 7 percent drop in potentiometric-aquifer thickness. Assessment of percentage drop will be calculated utilizing the spring readings of the wells over a three (3) year period assessed against the 1987 well levels or to comparable year well levels. This program is one of primarily education and the controls applied are:

LEVEL 1A CONTROLS:

- ◆ All operators of well systems that pump greater than 100 gpm are required to attend education classes as designed by the District. These classes will be developed prior to any area being designated. All operators are to be certified every four years.
- ◆ Permits are required for all new wells to be drilled in the area which will pump greater than 50 gpm.
- ◆ The District will encourage a well metering program (meters or time totalizers) to be established on all wells pumping greater than 100 ppm.

- ◆ Encourage adoption of acre-inch allocations on crops planted that are dependent on the aquifer.
- ◆ The District will encourage submission of the Water Use Report to the NRD prior to December 31 of the fourth year.

Level 2A is triggered by a 10 percent drop in the potentiometric-aquifer thickness of the aquifer and the following controls are applied.

LEVEL 2A CONTROLS:

- ◆ The same controls as set forth in Level 1A apply.
- ◆ Well meters or time totalizers are required to be installed and used on all wells pumping greater than 100 gallons per minute. If time totalizers are used then well output must be certified by the NRD.
- ◆ The District will develop and assess acre-inch allocations per crops planted. These allocations will be developed according to data assessments, wells in the area, use of the wells, and other pertinent factors leading to the proper assessment of the available resource.
- ◆ The District will require an annual submission of the Water Use Report to the NRD prior to December 31.

The trigger for the Level 3A Area is a 15 percent drop in the potentiometric-aquifer thickness. This level signals the need for extreme measures as the aquifer is under considerable stress.

LEVEL 3A CONTROLS:

- ◆ Same conditions as applied in Level 1A and Level 2A as applicable.
- ◆ As required, the District will further adjust the acre-inch allocations. Such adjustment will be commensurate with the data developed from implementation of Level 2A area designation.
- ◆ The District will adopt a well spacing requirement pursuant to Section 46-673.12 Nebraska statues and implement such a system. Well spacing will vary with % decline in the aquifer.

AGRICULTURAL RESEARCH FACILITIES

Agricultural Research Facilities within the LPN NRD may apply to the Board of Directors for a modification of the individual requirements within the groundwater management areas, that specifically affects the land they own or operate. Such requests will be reviewed on a case-by-case basis.

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APPEAL PROCESS

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In implementing the LPN NRD Groundwater Management Plan, all those affected are provided with an administrative appeal process whereby they may address the Board of Directors to present their case. The incorporation and functioning of the appeals process is carried out with the same manner as other administrative appeals processes utilized by the District (i.e., sediment and erosion control program appeal process).

SUMMARY

In pursuing the goals of this Groundwater Management Plan, the District will orient its programs in support of accomplishing the goals, objectives and policies of the plan. Provisions will be incorporated in the process to allow for Areas and Levels to change over time in response to changes in either nitrate levels, chemical constituent levels, or water levels.

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DEPARTMENT OF
WATER RESOURCES**PLAN FOR GROUNDWATER MANAGEMENT
IN THE LOWER PLATTE NORTH
NATURAL RESOURCES DISTRICT****Section D
Public Participation**

Public knowledge of the ideas and designs included in the Groundwater Management Plan is crucial to the successful implementation of the plan. Therefore, the Board of Directors felt that a series of public hearings and meetings to present and discuss the changes to the adopted Groundwater Management Plan would be beneficial. Public hearings and meetings were held at the following locations:

<i>July 26, 1993</i>	Public Hearing - Fremont Public Hearing - Schuyler Public Hearing - Wahoo
<i>July 28, 1993</i>	Public Hearing - Platte Center Public Hearing - David City
<i>August 25, 1993</i>	Press Conference - Wahoo
<i>September 8, 1993</i>	Public Meeting - Wahoo
<i>August 29, 1994</i>	Public Hearing - Wahoo
<i>August 31, 1994</i>	Public Hearing - Platte Center

During each public meeting the plan was presented by NRD staff. Public comments, questions, and concerns were recorded for consideration by the Board and possible incorporation into the Plan. Overall the meetings were very beneficial, and provided guidance to the Board of Directors and NRD staff. Appropriate comments were incorporated into the Plan.

In addition to the public meeting process, public awareness was fostered through a series of 17 news articles in local papers, 5 radio spots, and presentations at 7 area meetings during 1993 and 1994. The LPN NRD board and staff is grateful to those who took the time to participate in this process.

**TABLE 1
QUALITY**

AREA	DATE TO BEGIN	PHASE	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Phase I Area	0-8 ppm NO ₃ -N in groundwater, or <80% of MCL/LHAL of "other" man-induced, non-point source contaminants.	<p>a) All operators using any type of fertilizer must attend the education/certification classes established by the District to become certified, every 4 years.</p> <p>b) A groundwater analysis for nitrogen (NO₃-N) content for all wells pumping greater than 100 gpm and irrigating commercial crops must be made every 4 years and reported to the NRD by December 31 of the fourth year.</p> <p>c) A soil (3-4 ft. depth) analysis for nitrogen (NO₃-N) content on each field growing commercial crops are encouraged every 4 years and results reported to the NRD by December 31 of the fourth year.</p> <p>d) All operators are encouraged to submit a Fertilizer Application Report to the NRD prior to December 31 once every 4 years which indicates the pound per acre of nitrogen (commercial and organic) and quantity per acre of pesticides applied to each field on crop lands under their use for the reporting period. Such reports will incorporate, if applicable, those reports required under the NRD chemigation program and such reports resulting from implementation of the State assumption of the Federal Insecticide Fungicide, Rodenticide Act (FIFRA).</p> <p>e) Require permits for all new wells to be drilled which will pump greater than 50 gpm.</p> <p>f) Amount/acre/year of organic manure allowed (liquid manure, dried manure, sludge or composted organic waste) will be based on method of collection and storage, land application method, types of crops or cover crop, soil types, landscape features, source of manure, and previous manure application rates.</p> <p>g) No Fall application of N fertilizer (commercial) on non-sandy or fine textured soils until after November 1.</p> <p>h) Fall and Winter applications of N fertilizer (commercial) is prohibited on sandy soils. Commercial fertilizer can be applied on sandy soils after March 1.</p>

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**TABLE 2
QUALITY**

AREA	DATE TO BEGIN	PHASE	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Phase II Area	8.01-10 ppm NO ₃ -N in groundwater, or >80% but <100% of MCL/LHAL of "other" man-induced, non-point source contaminants.	<p>a) Same as Phase I</p> <p>b) A groundwater analysis for Nitrogen (NO₃-N) content for all wells pumping greater than 100 gpm and irrigating commercial crops must be made annually, and reported to the NRD by December 31.</p> <p>c) A soil (3-4 ft. depth) analysis for nitrogen (NO₃-N) content on each field growing commercial crops are required annually and results reported to the NRD by December 31.</p> <p>d) The Fertilizer Application Report must be submitted to the Lower Platte North NRD each crop year prior to December 31.</p> <p>e) Commercial Nitrogen Fertilizer will be permitted on non-sandy or fine textured soils from November 1 to March 1 provided that an approved inhibitor is used at recommended rates. After March 1 inhibitor is not needed.</p> <p>f) Require operators applying commercial fertilizer from November 1 to March 1 to furnish certification from dealer that an approved inhibitor was used as recommended.</p> <p>g) Encourage fertilizer calibration monitors on all applications and develop cost-share programs.</p> <p>h) Monitor (meters or time totalizers) water applications to allow operators to better manage fertilizer applications and control leaching of Nitrates. (Phase in over 6 years)</p> <p>i) Amount/acre/year of organic manure allowed (liquid manure, dried manure, sludge or composted organic waste) will be based on method of collection and storage, land application method, types of crops or cover crop, soil types, landscape features, source of manure, and previous manure application rates. (Use of Nebraska Cooperative Extension Service Bulletin EC-89117 is recommended.) Amount and timing of application must be adjusted to the N concentration in the soil profile and groundwater content. Application to frozen soils on a site-by-site basis.</p> <p>j) Expand education programs.</p>

**TABLE 3
QUALITY**

AREA	DATE TO BEGIN	PHASE	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Phase III Area	greater than 10.01 ppm NO ₃ -N in groundwater, or >100% of MCL/LHAL of "other" man-induced, non-point source contaminants.	<p>a) Same as Phase I and Phase II</p> <p>b) Monitor (meters or time totalizers) water applications to allow operators to better manage fertilizer applications and control leaching of Nitrates (Phase in over 4 years).</p> <p>c) Application of commercial nitrogen fertilizer is prohibited in the fall and winter on all soils until after March 1. Spring applications of commercial nitrogen fertilizer will require split applications (pre-plant and sidedress) or the use of an approved inhibitor applied as recommended. (On split application, if 50% or more is applied as a pre-plant the use of an approved inhibitor applied as recommended is still required).</p> <p>d) If 50% or more of commercial nitrogen fertilizer is applied at pre-plant then operators are required to furnish certification from the dealer that an inhibitor was used at recommended rates.</p> <p>e) Require fertilizer calibration monitors on applications of > 50 lbs. per acre.</p>

TABLE 4
UNCONFINED AQUIFERS
QUANTITY

AREA	DATE TO BEGIN	LEVEL	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Level I	10% drop in the saturated thickness.	<p>a) All operators of well systems that pump greater than 100 gpm must attend education classes designed by the District. All operators to be certified every 4 years.</p> <p>b) Permits required for all new wells to be drilled which will pump greater than 50 gpm.</p> <p>c) Encourage well metering program (meters or time totalizers) to be established on all wells pumping greater than 100 gpm.</p> <p>d) Encourage adoption of acre-inch allocations per crops planted that are dependant on the aquifer.</p> <p>e) Encourage submission of the Water Use Report to NRD prior to December 31 of the fourth year.</p>

TABLE 5
UNCONFINED AQUIFERS
QUANTITY

AREA	DATE TO BEGIN	LEVEL	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Level II	15% drop in the saturated thickness.	<p>a) Same as Level I.</p> <p>b) Require well meters or time totalizers to be installed on all wells pumping greater than 100 gpm.</p> <p>c) Require adoption of acre-inch allocations per crops planted that are dependent on the aquifer.</p> <p>d) Require annual submission of the Water Use Report to the NRD prior to December 31.</p> <p>e) Requirement of well-spacing pursuant to Section 46-673.12 - Nebraska Statutes. (Will vary with % of aquifer decline.)</p> <p>f) Require use of best management practices to conserve water.</p>

TABLE 6
CONFINED AQUIFERS
QUANTITY

AREA	DATE TO BEGIN	LEVEL	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Level 1A	7% drop in potentiometric-aquifer thickness.	a) All operators of well systems that pump greater than 100 gpm must attend education classes designed by the District. All operators to be certified every 4 years. b) Permits required for all new wells to be drilled which will pump greater than 50 gpm. c) Encourage well metering program (meters or time totalizers) to be established on all wells pumping greater than 100 gpm. d) Encourage adoption of acre-inch allocations per crops planted that are dependent on the aquifer. e) Encourage submission of the Water Use Report to NRD prior to December 31 of the fourth year.

1) The potentiometric surface is defined as an "imaginary" surface representing the total head of groundwater in a confined aquifer that is defined by the level to which water will rise in a well.

2) The potentiometric-aquifer thickness (PAT) is defined as the distance from the potentiometric surface to the base of the principal aquifer.

TABLE 7
CONFINED AQUIFERS
QUANTITY

AREA	DATE TO BEGIN	LEVEL	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Level IIA	10% drop in potentiometric-aquifer thickness.	<p>a) Same as level IA.</p> <p>b) Require well meters or time totalizers to be installed on all wells pumping greater than 100 gpm.</p> <p>c) Require adoption of acre-inch allocations per crops planted that are dependant on the aquifer.</p> <p>d) Require annual submission of the Water Use Report to the NRD prior to December 31.</p>

TABLE 8
CONFINED AQUIFERS
QUANTITY

AREA	DATE TO BEGIN	LEVEL	TRIGGERS	CONTROLS
Lower Platte North Natural Resources District		Level IIIA	15% drop in potentiometric-aquifer thickness.	a) Same as level IA and IIA. b) Further adjust acre-inch allocations. c) Require well-spacing pursuant to section 46-673.12 Nebraska Statutes. (Will vary with % of aquifer decline) d) Require use of best management practices to conserve water.

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TABLE 9
LPNNRD's - GROUNDWATER QUALITY MANAGEMENT PROGRAM

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RULES AND REGULATIONS	Phase I	Phase II	Phase III
1. Phase areas will be established on Nitrate-Nitrogen (NO ₃ -N) concentration found in the groundwater.	0-8 ppm	8.01-10 ppm	10.01 ppm or >
2. Phase areas can be established on other non-point source contaminants found in the groundwater or soil.	0-80% MCL/LHAL	80-100% MCL/LHAL	>100% MCL/LHAL
3. Operators using any type of fertilizer are required to become certified every 4 years.	X	X	X
4. A groundwater analysis for Nitrogen (NO ₃ -N) content for all wells pumping greater than 100 gpm irrigating commercial crop production must be made and reported to the NRD by December 31.	Once every 4 yrs.	Annually	Annually
5. Soil samples in the root zone (3 to 4 ft. deep) are to be taken and reported to the NRD by December 31.	Encouraged	Annually	Annually
6. Fertilizer Application Report (both commercial and organic fertilizers) to NRD prior to December 31.	Encouraged	Annually	Annually
7. Permit for all new wells to be drilled which will pump greater than 50 gpm.	X	X	X
8. Amount/acre/year of organic fertilizer allowed (liquid manure, dried manure, sludge or composted organic waste) will be based on method of collection and storage, land application method, types of crops or cover crop, soil types, landscape features, source of manure, and previous manure application rates.	X		
9. No fall application of N fertilizer (commercial) on non-sandy soils until after November 1 .	X		
10. Fall and winter applications of commercial nitrogen fertilizer is prohibited on sandy soils. Commercial fertilizer can be applied on sandy soils after March 1.	X	X	
11. Commercial nitrogen fertilizer permitted on non-sandy soils from November 1 to March 1 provided an approved inhibitor is used at recommended rates.		X	
12. Require operators applying commercial fertilizer from November 1 to March 1 to furnish certification from dealer that an approved inhibitor was used as recommended.		X	
13. Encourage fertilizer calibration monitors on all applications and develop cost-share programs.		X	
14. Monitor water applications to allow operators to better manage fertilizer application and control leaching of Nitrogen.		phase in over 6 yr.	phase in over 4 yr.
15. Amount/acre/year of organic fertilizer allowed (liquid manure, dried manure, sludge or composted organic waste) will be based on method of collection and storage, land application method, types of crops or cover crop, soil types, landscape features, source of manure, and previous manure application rates. Amount and timing of application must be adjusted to the N concentration in the soil profile and groundwater content. Application to frozen soils on a site-by-site basis.		X	X
16. Expand Education program.		X	X
17. Application of commercial nitrogen fertilizer is prohibited in the fall and winter on all soils until after March 1. Spring applications of commercial nitrogen fertilizer will require split application (pre-plant and sidedress) or the use of an approved inhibitor applied as recommended. (On split applications, if 50% or more is applied as a pre-plant, the use of an approved inhibitor applied as recommended is still required.)			X
18. If 50% or more of commercial nitrogen fertilizer is applied at pre-plant then operators are required to furnish certification from dealer that an inhibitor was used at recommended rates.			X
19. Require fertilizer monitors on all applications greater than 50 lbs/acre.			X

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TABLE 10
LOWER PLATTE NORTH NRD
GROUNDWATER QUANTITY MANAGEMENT PROGRAM

UNCONFINED AQUIFER		
Rules and Regulations	Level I 10% drop in saturated thickness	Level II 15% drop in saturated thickness
1. All operators of well systems that pump greater than 100 gpm must attend education classes and be certified every 4 years.	X	X
2. Permit required for all new wells to be drilled which will pump greater than 50 gpm.	X	X
3. Well metering program established on all wells pumping greater than 100 gpm.	Encouraged	Required
4. Adopt acre-inch allocations per crops planted dependent on aquifer.	Encouraged	Required
5. Water Use Report to NRD prior to December 31.	Encouraged	Annually
6. Require well-spacing pursuant to section 46-673.12 (will vary with % decline)		X
7. Require use of best management practices.		X

CONFINED AQUIFERS			
Rules and Regulations	Level IA 7% drop in potentiometric-aquifer thickness	Level IIA 10% drop in potentiometric-aquifer thickness	Level IIIA 15% drop in potentiometric-aquifer thickness
1. All operators of well systems that pump greater than 100 gpm must attend education classes and be certified every 4 years.	X	X	X
2. Permits required on all new wells to be drilled which will pump greater than 50 gpm.	X	X	X
3. Well metering program established on all wells pumping greater than 100 gpm.	Encouraged	Required	Required
4. Adopt acre-inch allocations per crops planted dependant on aquifer.	Encouraged	Required	Required
5. Water Use Report to NRD prior to December 31.	Encouraged	Annually	Annually
6. Require well spacing pursuant to Section 46-673.12. (Will vary with % decline)			X
7. Require use of best management practices.			X



LOWER PLATTE NORTH NATURAL RESOURCES DISTRICT

Exhibit 49B

DISTRIBUTION OF WASTE DISPOSAL SITES JUNE, 1994

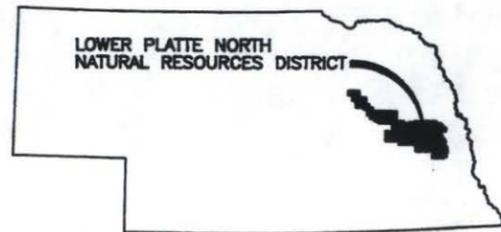
KEY

- ⊙ PERMITTED
- NON-PERMITTED (CLOSED OR INACTIVE)

SOURCE: DEPARTMENT OF ENVIRONMENTAL QUALITY
UNPUBLISHED FILE DATA, JUNE, 1994

GROUNDWATER RESERVOIR AREAS

- | AREA | NAME |
|------|-------------------------|
| I | SHELL CREEK RESERVOIR |
| II | PLATTE VALLEY RESERVOIR |
| III | UPLANDS RESERVOIR |
| IV | TODD VALLEY RESERVOIR |



LOCATION

