Minnesota Department of Agriculture

June 30, 1999 (651) 297-7178

Mr. John Velin, Director
Legislative Commission on Minnesota Resources
100 Constitution Avenue Room 65
State Office Building
St. Paul, Minnesota
55155-1201

RE: Final Report for the Nitrate Education and Testing (B5) 1997-99 Project

Dear Mr. Velin,

Enclosed are five copies of the final workprogram and abstract for the Nitrate Education and Testing (B5) project. It has been a privilege to team up with LCMR and the Environmental Trust Fund in this highly visible service for rural Minnesota.

Sincerely,

Bruce Montgomery
Unit Supervisor, Special Projects Unit
Minnesota Department of Agriculture

Jennifer Gallus
Nitrate Water Testing Coordinator
MN Department of Agriculture

CC:
Mr. Geir Friisoe, Section Manager-Agronomy Services and Plant Protection

1997 Project Abstract
For the Period Ending June 30, 1999
This project was support by [Environment and Natural Resources Trust Fund (MS 116P.02, Subd 6 (b)]

TITLE: Nitrate Education and Testing (B5)

PROJECT MANAGER: Bruce R. Montgomery
ORGANIZATION: Minnesota Department of Agriculture
ADDRESS: Agronomy and Plant Protection Division
90 West Plato Blvd., St. Paul, MN 55107-2094
WEB SITE ADDRESS: bruce.montgomery@state.mn.us
LEGAL CITATION: ML 1997, Chap. 216, Sec. 15, Subd. 6 (b)
APPROPRIATION AMOUNT:
$LCMR: 150,000 $MATCH (Required): 50,000

Statement of Objectives

In 1993, the Minnesota Department of Agriculture developed a 'walk-in' style of water testing clinic with the goal of increasing public awareness of nitrates in rural drinking and livestock water supplies. The clinic concept went statewide with the funding support of the Environment and Natural Resource Trust Fund. Results from the testing has provided some broad information on the occurrence of nitrate 'hotspots' across the state along with educating the public. The clinic concept revolves around a number of simple principles: local participation is critical; testing is free to the public with immediate results; the overall program needs to be inexpensive; a non-regulatory atmosphere is important and wellowners may remain anonymous; and the staff's most important goal is to provide the required technical assistance across a diverse audience of wellowners.

Project Results

Over 14,000 drinking water samples have been tested for nitrate-nitrogen over the life of the LCMR project. A total of 254 clinics were conducted in 66 of Minnesota's 87 counties. Based on the number of samples collected, 10% exceeded the drinking water standard of 10 mg/L nitrate-nitrogen. The method of analysis was an ultraviolet scan using a HACH DR/4000U Spectrophotometer. A Quality Assurance/Quality Control program was maintained which yielded an R-Square value of 0.9819.

Perhaps one of the most overwhelming observations resulting from this program has been the public's willingness to share information and questions about their water supply. A voluntary survey tool was used to gather information about the characteristics of the wells (age, depth, construction), distances from point and non-point sources, water treatment, and past water testing history. Over 8,000 surveys were completed by wellowners from 1997-99. Based on 1997-98 survey data (5,500 surveys), the following observations are worth noting:

- Fifteen percent of the sand point well (representing 24% of all wells tested) and 35% of all hand dug wells (3% of the total) exceeded the standard. Drilled wells represented 71% of the well construction and 8% exceeded the health standard.
- Age of the wells were also highly correlated with nitrate levels. The number of wells exceeding the health standard in the age categories of 0-10, 11-20, 21-50, and older than 50 years were 6, 8, 12, and 26%, respectively.

Project Results Use and Dissemination

The concept has proven adaptable for county fairs, field day events, public school programs, and 'stand alone' events. Promotion of the clinics has generally been the responsibility of the local sponsor. Past sponsors have been the Soil and Water Conservation Districts, Minnesota Extension Service Educators, county health or environmental services, and farm organizations. Lake associations and public school systems have also played major roles at several locations. Minnesota Department of Health Well Program staff often participate in the clinics by answering wellowner questions. Radio, newspaper, and news letters have been effective advertising tools. Promotional brochures are routinely available for distribution at a number of office locations across the county several weeks prior to the event. Wellowners are instructed on how to collect and properly store the water samples.

The MDH Section of Drinking Water Protection has adopted a similar technique as the program and has purchased the same equipment for use on a statewide nitrate study. The program has been presented at many conferences and meetings such as *MN Water '98*. The program will be presented at the upcoming *44th Annual Midwest Ground Water Conference* (October 13-15, 1999). Water quality programs from several agencies have enlisted the help and advice of the Nitrate Water Testing and Education Program such as Dakota County Environmental Management Department. The website for the program is located at www.mda.state.mn.us.

Date of Report: July 1, 1999

LCMR Final Work Program Update Report

I. PROJECT TITLE: *Nitrate Education and Testing (B5)*

Project Manager: Bruce R. Montgomery
Affiliation: Minnesota Department of Agriculture
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Total Biennial Project Budget (as of 6/30/99):

$LCMR:	$150,000	$Match (Required) (MDA Fertilizer Inspection Account)	$50,000
$LCMR Amount Spent	$150,000	$Match Amount Spent	$50,000
$LCMR Balance	$ 0.00	$ Match Balance:	$ 0.00

A. Legal Citation: ML 1997, Chap. 216, Sec. 15, Subd. 6 (b).

Appropriation Language: This appropriation is from the trust fund to the department of agriculture to accelerate knowledge of nitrate levels in private drinking water supplies through development of water testing clinics for rural wellowners and education programs. This appropriation must be matched by at least $50,000 from the agriculture fertilizer inspection account.

B. Status of Match Requirement:

Match by the MDA will be made prior to the January 1, 1998 deadline.

II. PROJECT SUMMARY AND RESULTS:

❑ Organize and conduct approximately 80 individual nitrate water testing clinics events covering 60+ counties over the life of the project.

❑ Provide free nitrate analysis for private wells to an estimated 6,000 to 10,000 Minnesota families each year.

- ❑ Technical assistance will be provided to private wellowners related to nitrate occurrence in drinking water supplies and causative factors such as well construction, septic tanks and fertilizer management.

- ❑ Educational programs, with the goal to inform students about the relationship between agriculture and other land uses to the quality of their drinking water and surrounding environment, will be conducted in public school systems in 15 to 20 groundwater sensitive counties.

- ❑ Develop a summary report of information volunteered by participants related to well construction, nitrate levels, depth, age, approximate location and other pertinent factors. Results will be valuable in determining severity of impacted wells and designing appropriate response strategies in targeted areas.

III. PROGRESS SUMMARY:

Funding administered by the Legislative Committee on Minnesota's Resources for the 1997 - 1999 biennium provided the Nitrate Water Testing and Education Program the support it needed to evolve into a highly visible and beneficial statewide effort. Water testing clinics were held in 66 of Minnesota's 87 counties. A total of 254 clinics were held from July 1, 1997 through June 30, 1999 resulting in over 14,000 water samples tested by the program. All proposed priorities and goals for the life of the program have been met.

Equipment used to test water was experimental in the beginning of the program. One Hach DR/4000U Spectrophotometer was purchased and run on a trial basis. This equipment proved extremely portable, easy to use, and dependable. The machine was loaded and unloaded on a daily basis in a vehicle traveling around the state. The spectrophotometer needs only a setup time of less than five minutes. Samples are tested within about 30 seconds. Accuracy of nitrate levels achieved with the spectrophotometer in the field was checked against a laboratory cadmium-reduction method throughout the life of the project and the correlation coefficients were excellent. Quality Assurance/Quality Control was maintained as demonstrated by Appendix 1 which illustrates an R-Square value for 1997 and 1998 of 0.9819. All of these confidence factors prompted the program to purchase three more of the exact same units as the program grew.

Clinic schedules were organized with county sponsors annually between January through March. Many sponsors needed ample time to meet with county boards and cooperators before committing to a date. Minnesota Department of Health (MDH) Well Inspectors and Hydrologists were notified of the schedule upon completion. The 1999 schedule was

highly accessible to MDH staff and the general public due to the development of the Minnesota Department of Agriculture (MDA) web site (www.mda.state.mn.us).

Since 1996, participants have the opportunity to place color coded stickers on their county map according to their nitrate levels. Besides being an excellent educational tool, county cooperators frequently would use the map to target areas in the county that need special attention and more intensive testing in the future. Most counties planned following years' clinics according to where clusters of elevated nitrate results were observed. Areas of the county that showed a lack in samples were also noted and taken into account in planning efforts.

Several counties such as Crow Wing, Stearns, and Washington conducted township resolution testing as stated within the LCMR workplan. Several more counties put forth an effort very close to township resolution. This type of testing provided key information for local water planning as well as served a very large county populous. Counties with historically large numbers of participants held clinics in at least four strategic locations to increase the likelihood of high turnouts.

The original goal of the LCMR workplan was to conduct 30 to 40 clinics per year. There were 60 clinics in 30 counties in 1997, 156 clinics in 63 counties in 1998, and in 1999 there are 111 clinics scheduled in 53 counties. Several counties now conduct clinics every other year which accounts for the slight decrease in county participation from 1998 to 1999. Appendix 2 provides a listing of all clinics to be conducted in 1999 along with a summary of data collected from January, 1999 through June 16, 1999. A basic data summary for all clinics conducted since conception of the program in 1993 to June 16, 1999 are in Appendix 3. Note the obvious increase in county participation upon the LCMR appropriation in 1997.

Half of 1999's clinics will be conducted after termination of LCMR funding. This is due to a Federal 319 grant awarded to the program. The grant allows the program to purchase enough Hach DR/4000U Spectrophotometers to place them regionally throughout the state. As part of the 319 match requirements, MDA will fund the Nitrate Testing Coordinator position for at least one year.

Four different types of clinics have been developed to provide services to a variety of customer needs. Clinics were classified as 'regular', 'independent', 'tile', and 'school'. 'Regular' clinics represents the majority of clinics conducted throughout the state. They entail:

- One to two MDA staff to assist with the clinic;
- MDA provides all equipment, forms, and QA/QC sampling;
- Cooperator and MDA share promotion responsibilities;
- Cooperator provides one to three staff and;
- MDA designates date, cooperator designates location.

An 'independent' clinic consists of the same aspects as a 'regular' clinic except the following:

- Minimal MDA staff are present;
- Cooperator does majority of promotion;
- Cooperator has more freedom of designating date;
- MDA provides all equipment and forms;
- Cooperator collects QA/QC sampling to submit to MDA and;
- Cooperator provides majority or all of staff.

These 'independent' clinics are allowed in only those counties that have demonstrated qualities essential for limited MDA oversight. Independent clinics, in turn, free MDA staff to hold simultaneous clinics around the state with a second set of equipment. Counties and Minnesotan's are served more efficiently by this scheduling freedom in mid summer when the majority of counties request clinic dates.

Farmers are the main participants at 'tile drainage' testing clinics. This type of clinic tests both drinking and subsurface tile drainage water. The University of Minnesota Southern Experiment Station initiated this type of clinic. Three clinics were conducted in 1998 and three are scheduled in 1999. Nitrate levels derived from tile drainage are interpreted to participants differently than drinking water since the health standard does not apply to tile water. Farmers receive an explanation of what the nitrate level in their tile water may indicate and what value in dollars, due to nitrate loading loss, may be lost per acre. Tile water interpretation was the result of a joint effort panel represented by the University of Minnesota Southern and Southwest Agriculture Experiment Stations, Extension Service, Board of Water and Soil Resources, and Soil and Water Conservation Districts. A copy of the tile water result handout is located in Appendix 3B.

'School' clinics have taken many forms. The most popular format consisted of MDA staff conducting a clinic in class as part of water quality curriculum. Parents were notified of the testing in advance and could choose whether or not to send a water sample with their child to school. In the classroom, new group of students would participate each class period. Each period would first receive a ten minute presentation about nitrate, groundwater, and wells. Students would then test their own water with guidance from MDA staff. A total of seven counties had schools participate in this type of clinic.

Two Otter Tail County schools (Perham Middle School and New York Mills High School) made an annual event of inviting MDA to station one set of equipment in the lobby of the school for the public and one set in a classroom for students for a day. MDA and MDH provide ample staff for both stations. These two school clinics historically draw the program's largest crowds which may be due in part to the consistent scheduling of the two clinics at the same locations around the same time each year and growing water quality concern in that part of the state.

School children also had the opportunity to test their water at events such as the Envirothon, Children's Water Festival, Geography Night, and Environmental Activity Day. These are events coordinated by different schools that invite environmental programs to act as 'stations' for the students to get hands-on environmental experience. It was at one of these events that a cable television show called the Environmental Journal filmed and narrated the Nitrate Water Testing Program at work. Media Rare produced the show and captured the essence of the program quite well. The ten minute production will continue to serve as a great educational tool through the video tape provided to MDA.

Central Lakes College in Brainerd has made excellent use of the LCMR water testing equipment two or three times a year to use as a lab activity in a chemistry class. The class tests 30 to 50 water samples on the MDA provided spectrophotometer. They test the same samples also on an Ion Probe and a Field Kit, then compare and discuss the similarities and/or discrepancies. Packets of information about nitrate and well water quality are sent home with students after any type of school clinic.

Participants are encouraged to complete a voluntary survey prior to nitrate testing. Over 8,000 surveys have been completed between 1997-99. Data entry and management of well owner information including well depth, construction type, distances from potential contaminants, existing water treatment systems and frequency of past water testing was achieved by collecting and analyzing this voluntary survey. The survey was introduced to the program in 1995. Results and trends produced from the survey for the years 1995 through 1998 are shown in Appendix 4. Survey summaries intrigued many multiagency groups when presented at events such as conferences and meetings. MDH staff were also sent a copy of the survey summary each year.

From 1995 to 1997 the survey summary was annually reported as a statewide summary. In 1998, the statewide summary was generated along with a regional summary. Each of the seven regions of the state displayed somewhat different nitrate and well information behaviors. Due to the interesting nature of the regional analysis, the years 1995 through 1998 were recently combined and analyzed on a regional basis. Three of the most interesting well characteristics and how they differ by region are graphed in Appendix 5. A better grasp of well construction trends across the state is seen regionally. Cooperators appreciate the localized summary statistics.

The second type of wellowner survey in which one to five percent of past wellowner participants are randomly chosen for a phone survey to determine program effectiveness and any behavioral changes is not complete at this time. This will be valuable information and plans are being made to complete this survey by December, 1999. LCMR staff will receive a copy of the report upon completion.

In January of 1999, each county cooperator was sent a survey soliciting their perceptions of the program. A total of 40 surveys were returned out of the 60 surveys sent. This survey provided honest opinions of the cooperators due to the anonymous design of the

survey. Results are summarized in Appendix 6 and indicate great satisfaction with the program. Information gathered in the survey will aide in the on-going evolution of the program, particularly with the gradual shift in clinics becoming county administered rather than MDA administered.

Media coverage has varied throughout each testing season. MDA and county staff consistently generated a news release for every clinic. New releases were sent to all media in the county sponsoring the clinic(s) and surrounding counties in addition to being posted on the MDA website. Occasionally, newspaper reporters and/or television news cameras attended clinics to obtain reports. Several news articles have filtered back to the MDA and are included in the appendix. Clinics were often part of an environmental program or seminar and examples of advertisement fliers for these special events are included in the appendix. As mentioned earlier, a ten minute video presentation about the program was filmed by the Environmental Journal and is available through Media Rare.

Overall efficacy of the program met or exceeded original goals. The program remained a consistent service for Minnesota while continually upgrading procedures and practices for maximum participant benefit. The program will continue to grow due to a Federal 319 Grant. Smooth transition from LCMR dollars to Federal dollars will allow normal clinic operation over the fiscal timeperiod change.

Future related program recommendations based on clinic participants comments include:
1. Design program that provides a quick bacteria in drinking water test.
2. Implement statewide county seminars about well water and ground water quality.
3. Develop a statewide county listing of which agencies in the county (if any) has well record information and starting at what date.

IV. OUTLINE OF PROJECT RESULTS:

Result 1: Staff training, equipment evaluation and acquisition.

LCMR Budget:	$ 15,000	Estimated Balance:	$ 0.00
Match:	$ 15,000	Estimated Match Balance:	$ 0.00
In-Kind Match	$ 16,800		

Completion Date: (See below table)

Comment (5/98): Result #1 completed as originally planned on the below time table.

Activities	Jul'97	Oct'97	Jan'98	Apr'98	Jul'98	Oct'98	Jan'99	Apr'99
Equipment Evaluation	Complete							
Equipment Purchases	Complete			Complete				Complete
Staff Hiring & Training	Complete			Complete			Complete	

Description of project, priorities, goals and factors:

- ❑ Project coordinator and summer staff (2 student para-professionals or interns) will be hired in July'97.

- ❑ **Please note the following since an equipment purchase (greater than $3,500) will be made: Evaluate various portable laboratory nitrate testing equipment for simplicity and reliability so local units of government can continue to borrow this equipment after this LCMR project expires; purchase most appropriate equipment (ultra-violet technology). MDA will serve as the distribution center for the life of the equipment.**

- ❑ Training of coordinator and summer staff.

Result 2: Conduct locally based "walk in" nitrate water testing clinics.

LCMR Budget:	$ 100,000	Estimated Balance:	$ 0.00
Match:	$ 25,000	Est. Match Balance:	$ 0.00
In-Kind Match	$ 72,000		

Completion Date: Due to the nature of this aspect of the educational program, most of the clinics will be conducted between April and August.

Activities	Jul'97	Oct'97	Jan'98	Apr'98	Jul'98	Oct'98	Jan'99	Apr'99
Organize & Coordinate Clinic Schedules	Complete		Complete			Complete	Complete	Complete
Conduct clinics through county fairs, "stand alone" or special events.	5 counties	25 counties	3 counties	20 counties	30 counties	10 counties	2 counties	14 counties
	Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete

Description of project, priorities, goals and factors:

- ❑ Organize annual clinic schedules 4 to 6 months in advance including local participants, location of testing clinics, and advertising strategies.

- ❑ Conduct clinics in 30 to 40 counties per year.

- ❑ In several selected counties with a history of elevated nitrate levels (i.e. Otter Tail, Wabasha, Stearns), conduct intense nitrate testing on township resolution.

- ❑ Design and implement an effective Quality Assurance/Quality Control (QA/QC) program to aid in providing accurate nitrate analysis.

- ❑ Consult with local agencies and organizations on identified areas impacted by nitrate contamination.

Result 3: Conduct nitrate water testing and associated educational programs within public school systems.

LCMR Budget:	$ 15,000	Estimated Balance:	$ 0.00
Match:	$ 5,000	Est. Match Balance:	$ 0.00
In-Kind Match:	$ 17,600		
Completion Date:	This aspect of the program will be conducted while schools are in session (See below table).		

Activities	Jul'97	Oct'97	Jan'98	Apr'98	Jul'98	Oct'98	Jan'99	Apr'99
Develop educational programs and materials		⇒ Not Complete	⇒ Not Complete				Complete	
Implement environmental educational programs within school systems			⇒ Not Complete	⇒		⇒	Complete	

Description of project, priorities, goals and factors:

- ❑ Development of curriculum adaptable for a variety of grade levels related to water quality with emphasis on nitrate related issues.

- ❑ Select interested school districts in 10 to 15 of the most impacted counties of the state; program delivery.

- ❑ Conduct concurrent public testing clinics within the schools.

- ❑ Through consultation with participating science teachers, determine efficacy of program.

Result 4: Development of a statewide summary report of existing nitrate levels in private drinking supplies.

LCMR Budget:	$ 20,000	Est. Balance:	$0.00
Match:	$ 5,000	Est. Match Balance:	$0.00
In-Kind Match:	$ 5,000		

Completion Date: June 30, 1999.

Activities	Jul'97	Oct'97	Jan'98	Apr'98	Jul'98	Oct'98	Jan'99	Apr'99
Enter associated data from homeowner survey		Complete	Complete	Complete		⇒	Complete	
Conduct two evaluation surveys:								
Cooperator Survey							Complete	
Participating Wellowner Survey			Complete				To be complete by Dec. 1999	
Analyze and summarize well data and survey information.				Complete			Complete	Complete
Write summary report.								Complete

Description of project, priorities, goals and factors:

- ❑ Data entry and management of wellowner information including well depth, construction type, distances from potential contaminates, existing water treatment systems and frequency of past water testing.

- ❑ Report data in consultation with the Nitrate Data Task Force administered through Land Management Information Center (LMIC).

- ❑ Conduct several surveys near the completion of the project. One will be developed for the cooperators to determine if the existing program met their needs and the likelihood of local cooperators continuing the program after the LCMR funding cycle is completed. A secondary survey will randomly pick 1-5% of past wellowner participants to determine program effectiveness and any behavioral changes.

- ❑ Prepare a summary of nitrate results on a statewide and county resolution (or localized if appropriate) and statistical findings related to wellowner information.

❑ Determine efficacy of overall program and make recommendations for future related programs.

V. DISSEMINATION:

Nitrate testing clinics and associated information will be advertised through media alerts, local newspaper ads and stories, public service announcements, and brochures. In past prototype clinics, TV staff frequently visit the clinic during the event. Local cooperators will be highly encouraged to write a summary article for either a newsletter or local newspaper. Cooperating science teachers will get results directly after each clinic to use in subsequent classroom discussions.

Results will be available in report form in the final summary. If this type of data is acceptable by standards of the Nitrate Data Task Force, information will be available through LMIC.

Clinic schedules will be accessible through the Minnesota Department of Agriculture's Web Site (http://www.mda.state.mn.us/DOCS/PRESSREL/).

VI. CONTEXT:

A. Significance:

There are growing concerns about the levels of nitrate (NO_3^-) in rural Minnesota's private water supplies. Although the rationale for these concerns is diverse, a number of changes in agriculture during the last several decades deserve noting. Nitrogen fertilizer sales have increased tenfold since the early 1960's; this was due, in part, to a better understanding of basic plant nutrition, superior corn hybrids and increased corn acreage. Like other Midwestern states, there have been large shifts toward increased livestock numbers and larger containment systems with the eventual fate of the livestock waste in question. There has also been considerable public outcry in response to the rapid expansion of the potato industry. Although the public response on water quality issues is frequently first triggered by other associated events (i.e. feedlot odors, increased irrigated acres or occurrence of aerial pesticide applications), there is ample justification for rural residents to be concerned about the fate of their drinking water supplies.

The Minnesota Department of Agriculture (MDA) was delegated some unique responsibilities in dealing with agriculturally induced nitrate contamination through the 1989 Groundwater Act. While given the authority to impose regulations on nitrogen fertilizer use, MDA has placed major emphasis on environmental education through the development and implementation of voluntary Best Management Practices. Physically targeting areas for accelerated programs should be located, in part, on areas either experiencing elevated nitrate levels or aquifers that are seriously threatened. However human behavioral aspects of nutrient management (fertilizer and manure inputs,

application timings, irrigation scheduling, etc.) can frequently dwarf the physical aspects. Rarely is there access to detailed information that interrelate these two critical components.

In 1993, the MDA developed a "walk-in" style of water testing clinic with the goal of increasing the general awareness of nitrates in rural drinking and livestock water supplies. Results from the testing may also provided some broad information on the occurrence of nitrate "hotspots" across the state; this could eventually aid in justifying nitrate monitoring networks and accelerated educational programs. The clinic concept revolves around a number of simple principles: local participation is critical; testing is free to the public with immediate results; the overall program needs to be inexpensive; a non-regulatory atmosphere is important and wellowners may remain anonymous; and the staff's most important goal is to provide the required technical assistance across a diverse audience of wellowners.

The Nitrate Testing Clinic program quickly expanded. In 1995, approximately 4,000 wells were analyzed at 41 clinics covering 27 counties. Number of counties and samples were similar in 1996. The concept has proven adaptable for county fairs, field day events, public school programs, and "stand alone" events. Promotion of the events has generally been the responsibility of the local sponsor. Past sponsors have been the Soil and Water Conservation Districts, Minnesota Extension Service Educators, county health or environmental services and farm organizations. Lake associations and the public schools systems have also played major roles at several locations. Radio, newspaper, and news letters have been effective advertising tools. Bags, along with a promotional brochure, are routinely available for distribution at a number of office locations across the county several weeks prior to the event. Wellowners are instructed on how to collect and properly store the water samples.

The key component in this program is having the staff and information to address the related questions from the wellowner. Numerous brochures from the Department of Health, Minnesota Extension Service, the MN Water Information Line, and fertilizer information from the Department of Agriculture are available at no charge. In earlier clinics, questions were addressed by MDA and local cooperators. In 1996, staff from the Well Management Unit-Department of Health have cooperated with many of the clinics and have been extremely valuable in answering questions related to human health, well construction and other related topics.

This program uses portable, battery operated meters coupled to solid state nitrate electrodes which provide direct concentration data output. Analysis is simple and rapid; analysis time is generally less than 1 minute. To insure that equipment is working properly, at least 10 percent of the total number of samples at a given clinic are brought back to the MDA Laboratory as Quality

Assurance/Quality Control samples (QA/QC). The QA/QC samples are analyzed using the cadmium reduction method. The coefficient of determination (r^2) was 0.96 for all of the QA/QC water samples (314) collected in 1995. The r^2 was 0.94 for the 360 QA/QC water samples collected in 1996.

Perhaps one of the most overwhelming observations resulting from this program has been the public's willingness to share information and questions about their water supply. A survey tool was introduced in 1995 to gather information about the characteristics of the wells (age, depth, construction), distances from point and non-point sources, water treatment, and past water testing history. Approximately 1,700 surveys were completed in both 1995 and 1996. Although the complete analysis of the data is not yet available, there are some interesting points worth highlighting:

- Over 25% of the participants have *never* had their drinking water tested;
- 43% of the participants have never tested or it has more than 10 years ago;
- Public is highly confused about which types of water treatment systems remove NO_3;
- Public generally knew such things as well depth, age, and construction;
- Approximately 10 % of the wells with some type of water treatment system were capable of removing NO_3;
- Few people test their drinking water on their own initiative. County and state organized testing and private sales staff account for most of the past testing.

B. Time: Project will be completed within two years. If the evaluation phase determines that local level cooperators are unable to provide independent testing and educational support through the framework developed by this project, additional support from LCMR or other funding mechanisms will be solicited.

C. Budget Context:

	July 1995- June 1997 Prior expenditures on this project	July 1997- June 1999 Proposed expenditures on this project	July 1999- June 2001 Anticipated future expenditures on this project
1) LCMR	$ -0-	$ 150,000	$ 100,000
2) Other State $	$ 40,000	$ 50,000	$ 50,000
In-Kind Match	$ 50,000	$ 100,000	$ 100,000
3) Non State Cash	$	$	$
Total	$ 90,000	$ 300,000	$ 250,000

Budget Breakdown on 1997-99 LCMR:

Personnel **$126,517**

1 Unclassified Full-time Coordinator Salary and Benefits $83,317
2 Unclassified Student Para-Professionals $43,200

Equipment **$ 22,283**
Nitrate Testing Equipment (Hach UV 4000 or equivalent) $6,000
Computer System $3,000
Educational Needs and Generic Supplies $16,600

Acquisition	**$ -0-**
Development	**$ -0-**
Other[1]	**$ 51,200**
Total	**$200,000**

VII. COOPERATION:

Minnesota Department of Health

Dan Wilson, Well Management Unit, will provide no more than 2% of his time (In-Kind) on the project. His role will be coordination of the Well Management Staff who will be responsible for providing technical assistance to well owners at the clinics. Dan will also provide assistance to the overall project coordination. MDH will receive $13,000 for hiring a student para-professional.

MN Association of Soil and Water Districts

D'Wayne De Ziel, Executive Director, will provide no more than 1 % of his time on the project (In-Kind). D'Wayne will provide overall project coordination and

[1] Travel: $26,200; Printing & Ad: $13,000; Lab Services: $10,000; Communications.: $2,000.

serve as liason between project team and the 88 Soil and Water Conservation Districts.

Minnesota Water Line

Keith Anderson, Coordinator, will provide no more than 1% of his time on the project (In-Kind). Keith will provide overall project coordination and help with the project promotion through the Water Line.

MN Science Teachers Association

Don Pascoe, President, will provide no more than 1 % of his time on the project (In-Kind). Don will provide overall project coordination and serve as liason between the project and the Minnesota Science Teachers.

MN Extension Service

Barbara Liukkonen, Water Quality Coordinator, will provide no more than 1% of her time on the project (In-Kind). Barbara will provide overall project coordination and serve as liason between the project and the Minnesota Extension Service and their County Educators.

MN Agriculture in the Classroom

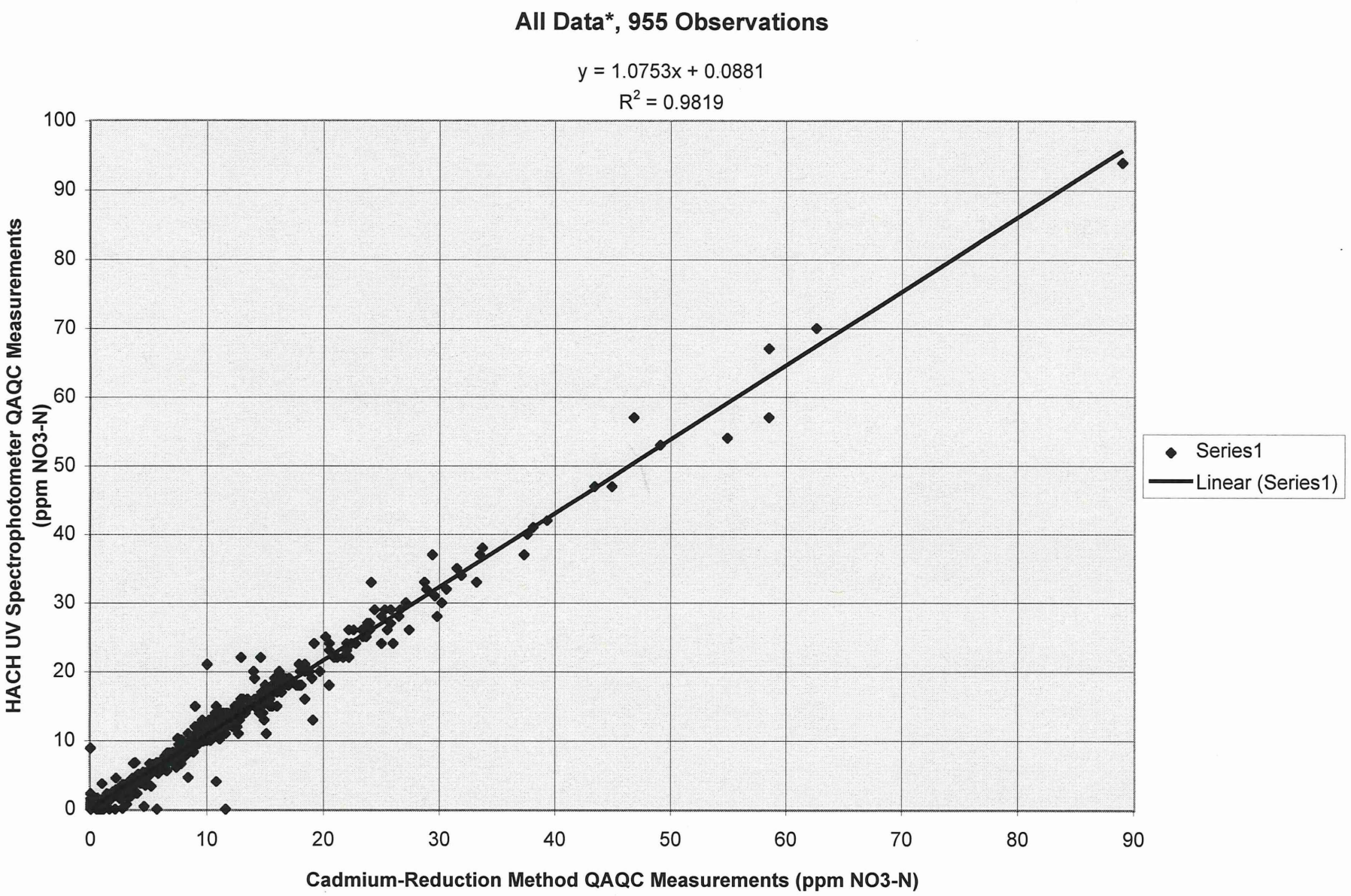
Al Withers, Program Director, will provide no more than 1% of his time on the project (In-Kind). Al will provide overall project coordination and serve as liason between the project and the Ag in the Classroom program

VIII. LOCATION: The nitrate testing clinics are a statewide program available on a "first come, first serve basis". Educational programs will be targeted in the most groundwater sensitive counties which would include the Central Outwash Sands and the Karst regions of southeast Minnesota.

IX. REPORTING REQUIREMENTS: Periodic work program progress reports (2) will be submitted not later than November 1, 1997 and November 1, 1998. A final work program report and associated products will be submitted by June 30, 1999 or by the completion date as set in the appropriation.

1997 and 1998 Nitrate Water Testing Program R-Square Chart for Quality Assurance/Quality Control

Appendix 1



* Out[illegible] data points statistically removed using the Grubb's Outlier Test (31 ob[illegible]tions removed).

Summary Statistics of the 1999 Nitrate Water Testing Clinics
(Sorted by Date)

Appendix 2

	County	Town	Date	*Total # of Samples	Minimum ppm NO3-N	Maximum ppm NO3-N	Median ppm NO3-N	Percent of Samples Over 10 ppm
1	Wadena	Staples	1/25/99	24	0.0	32.0	2.1	21
2	Goodhue	Goodhue	1/27/99	5	0.0	20.0	2.4	40
3	Goodhue	Goodhue	1/28/99	45	0.0	48.0	4.4	27
4	Pine	Pine City	2/23/99	77	0.0	30.0	0.0	4
5	Pine	Willow River	2/23/99	97	0.0	15.0	0.1	2
6	Stearns	St. Cloud	02/23 - 25/99	48	0.0	29.0	0.0	15
7	Nobles	Worthington	3/5/99	150	0.0	140.0	6.8	35
8	Blue Earth	Mankato	3/16/99	Children's Water Festival - no data available				
9	Morrison	Little Falls	3/20/99	54	0.0	27.0	1.9	15
10	Morrison	Little Falls	3/21/99	59	0.0	45.0	2.7	15
11	Chisago	Lindstrom	3/23/99	65	0.0	10.0	0.0	3
12	Red Lake	Red Lake Falls	3/27/99	19	0.0	0.0	0.0	0
13	Stearns	Holdingford	4/15/99	98	0.0	26.0	0.2	6
14	Clearwater	Alida	4/19/99	11	0.0	13.0	0.0	9
15	Clearwater	Bagley	4/20/99	44	0.0	33.0	0.0	5
16	Clearwater	Gonvick	4/20/99	21	0.0	9.8	0.0	0
17	Pennington	Thief River Falls	4/21/99	71	0.0	6.3	0.0	0
18	Pennington	Goodridge	4/21/99	8	0.0	0.0	0.0	0
19	Roseau	Greenbush	4/22/99	39	0.0	25.0	0.0	3
20	Benton	Foley	4/23/99	93	0.0	49.0	0.8	9
21	Wabasha	Wabasha	4/28/99	31	0.0	65.0	3.9	10
22	Mille Lacs	Milaca	4/29/99	School Clinic - no data available				
23	Washington	Denmark	5/17/99	54	0.0	21.0	1.8	13
24	Washington	Afton	5/19/99	156	0.0	26.0	0.6	7
25	Washington	Grant	5/20/99	83	0.0	12.0	1.0	2
26	Kandiyohi	Willmar	6/2/99	62	0.0	76.0	0.0	7
27	Stearns	Paynesville	6/4/99	58	0.0	51.0	0.3	10
28	Stearns	Albany	6/4/99	103	0.0	34.0	0.0	11
29	Clay	Felton	6/7/99	8	0.0	1.2	0.2	0
30	Clay	Glyndon	6/7/99	6	0.0	0.0	0.0	0
31	Clay	Comstock	6/8/99	6	0.0	0.0	0.0	0
32	Clay	Barnesville	6/8/99	6	0.0	0.3	0.0	0
33	Sherburne	Haven Township	6/9/99	84	0.0	47.0	2.4	25
34	Sherburne	Big Lake	6/9/99	95	0.0	28.0	0.2	15
35	Sibley	Gaylord	6/10/99	40	0.0	34.0	0.0	8
36	Wadena	Menahga	6/14/99	35	0.0	21.0	1.8	9
37	Wadena	Sebeka	6/14/99	19	0.0	26.0	0.1	11
38	Crow Wing	Jenkins	6/15/99	19	0.0	4.2	0.2	0
39	Crow Wing	Emily	6/15/99	56	0.0	4.6	0.0	0
40	Crow Wing	Garrison	6/16/99	25	0.0	12.0	0.0	8
41	Crow Wing	Breezy Point	6/16/99	48	0.0	11.0	0.2	2
42	Aitkin	Aitkin	6/19/99					
43	Waseca	Waseca	6/22/99					
44	Washington	Cottage Grove	6/23/99					
45	Redwood	Lamberton	6/23/99					
46	Scott	New Market	6/24/99					

Summary Statistics of the 1999 Nitrate Water Testing Clinics
(Sorted by Date)

Appendix 2

	County	Town	Date	*Total # of Samples	Minimum ppm NO3-N	Maximum ppm NO3-N	Median ppm NO3-N	Percent of Samples Over 10 ppm
47	Scott	Prior Lake	6/24/99					
48	Mahnomen	Mahnomen	6/29/99					
49	Hubbard	Hubbard	7/6/99					
50	Cass	Lake Shore	7/7/99					
51	Cass	Walker	7/8/99					
52	St. Louis	Virginia	7/8/99					
53	Crow Wing	Brainerd	7/9/99					
54	Pope	Glenwood	7/12/99					
55	Washington	Scandia	7/13/99					
56	Mille Lacs	Milaca	7/15/99					
57	Mille Lacs	Wahkon	7/15/99					
58	Otter Tail	Ottertail	7/16/99					
59	Grant	Elbow Lake	7/20/99					
60	Douglas	Alexandria	7/21/99					
61	Otter Tail	Fergus Falls	7/22/99					
62	Otter Tail	Clitherall	7/22/99					
63	Stearns	Waite Park	7/23/99					
64	Stearns	Cold Spring	7/23/99					
65	Rock	Luverne	7/23/99					
66	Todd	Grey Eagle	7/24/99					
67	Dakota	Marshan Twnshp.	7/24/99					
68	Pipestone	Pipestone	7/27/99					
69	Blue Earth	Lake Crystal	7/28/99					
70	Blue Earth	Amboy	7/28/99					
71	Jackson	Jackson	7/29/99					
72	Faribault	Blue Earth	7/30/99					
73	Redwood	Redwood Falls	08/3 - 5/99					
74	Polk	Mentor/Erskine	8/3/99					
75	Houston	Caledonia	8/3/99					
76	Hubbard	Park Rapids	8/4/99					
77	Olmsted	Rochester	8/4/99					
78	Wadena	Wadena	8/5/99					
79	Lake of the Woods	Roosevelt	8/6/99					
80	Lake of the Woods	Baudette	8/6/99					
81	Winona	Lewiston	8/11/99					
82	Goodhue	Zumbrota	8/12/99					
83	Morrison	Little Falls	8/12/99					
84	Goodhue	Zumbrota	8/13/99					
85	Morrison	Little Falls	8/13/99					
86	Becker	Detroit Lakes	8/14/99					
87	Dakota	Farmington	8/14/99					
88	Pope	Westport	8/19/99					
89	McLeod	Hutchinson	8/23/99					
90	Carlton	Esko	8/31/99					
	Carlton	Barnum	8/31/99					
	Beltrami	Blackduck	9/1/99					

Summary Statistics of the 1999 Nitrate Water Testing Clinics
(Sorted by Date)

Appendix 2

	County	Town	Date	*Total # of Samples	Minimum ppm NO3-N	Maximum ppm NO3-N	Median ppm NO3-N	Percent of Samples Over 10 ppm
93	Beltrami	Kelliher	9/1/99					
94	Beltrami	Solway	9/2/99					
95	Beltrami	Debs	9/2/99					
96	Marshall	Fourtown	9/3/99					
97	Redwood	Lamberton	9/8/99					
98	Wilkin	Wahpeton, ND	9/9/99					
99	Meeker	Litchfield	9/10/99					
100	Martin	Trimont	9/13/99					
101	Martin	Ceylon	9/13/99					
102	Martin	Truman	9/14/99					
103	Martin	Fairmont	9/14/99					
104	Washington	Willernie	9/22/99					
105	Fillmore	Chatfield	9/23/99					
106	Fillmore	Rushford	9/23/99					
107	Todd	Long Prairie	9/28/99					
108	Otter Tail	Perham	9/29/99					
109	Otter Tail	New York Mills	9/30/99					
110	Wadena	Thomastown	10/6/99					
111	Wadena	Nimrod	10/6/99					

*Total number of samples may include water samples that did not come from the county that held the clinic.
Also, total number of samples may include all well samples submitted (i.e. multiple samples from one well, before and after treatment, etc.).

1993 - 1999 Nitrate Water Testing Clinics Basic Summary

Appendix 3

	County	Total # of Clinics	Years Participated	Total # of Samples** (followed by 'x' means all 1999 data not included)
1	Aitkin	2	1998-99	126x
2	Becker	5	1996-99	508x
3	Beltrami	12	1995-99	353x
4	Benton	6	1993, 1996-99	462
5	Big Stone	1	1998	21
6	Blue Earth	5	1998-99	134x
7	Carlton	6	1996-99	245x
8	Carver	2	1998	89
9	Cass	3	1998-99	68x
10	Chisago	3	1996, 1998-99	188
11	Clay	8	1998-99	146
12	Clearwater	5	1998-99	300
13	Crow Wing	19	1995-99	1127x
14	Dakota	4	1997-99	253x
15	Douglas	10	1994-99	994x
16	Faribault	3	1995, 1998-99	119x
17	Fillmore	9	1996-99	352x
18	Goodhue	6	1996-99	555x
19	Grant	5	1998-99	71x
20	Houston	4	1996-99	108x
21	Hubbard	10	1993-99	1008x
22	Itasca	1	1995	101
23	Jackson	5	1994-95, 1997-99	154x
24	Kanabec	1	1998	26
25	Kandiyohi	4	1996-99	389
26	Kittson	2	1998	23
27	Koochiching	2	1995	89
28	Lac Qui Parle	2	1993, 1995	218
29	Lake of the Woods	7	1995-99	228x
30	LeSueur	2	1998	48
31	Lincoln	2	1995	22
32	Mahnomen	2	1998-99	75x
33	Marshall	2	1998-99	24x
34	Martin	12	1997-99	379x
35	McLeod	3	1997-99	158x
36	Meeker	3	1995, 1998-99	196x
37	Mille Lacs	7	1995, 1997-99	332x
38	Morrison	6	1995-99	941x
39	Mower	2	1998	81
40	Nobles	1	1999	150
41	Norman	6	1995, 1997-98	218
42	Olmsted	4	1996-99	189x
43	Otter Tail	22	1993-99	3632x
44	Pennington	4	1998-99	110

1993 - 1999 Nitrate Water Testing Clinics Basic Summary

Appendix 3

	County	Total # of Clinics	Years Participated	Total # of Samples* (followed by 'x' means all 1999 data not included)
45	Pine	2	1999	174
46	Pipestone	5	1995, 1998-99	111x
47	Polk	9	1995, 1998-99	187x
48	Pope	8	1993-99	476x
49	Red Lake	3	1998-99	47x
50	Redwood	7	1993-99	346x
51	Rice	2	1995-96	125
52	Rock	3	1997-99	51x
53	Roseau	3	1998-99	194
54	Scott	4	1998-99	65x
55	Sherburne	7	1996-99	548
56	Sibley	4	1997-99	121
57	St. Louis	2	1998-99	21x
58	Stearns	31	1995-99	3568x
59	Steele	1	1995	59
60	Stevens	3	1993, 1995, 1998	89
61	Swift	2	1997-98	39
62	Todd	6	1996-99	368x
63	Traverse	2	1998	32
64	Wabasha	5	1996-99	227
65	Wadena	21	1993-99	1240x
66	Waseca	3	1997-99	101x
67	Washington	11	1994, 1998-99	875x
68	Watonwan	2	1998	26
69	Wilkin	2	1998-99	45x
70	Winona	6	1995-99	353x
71	Wright	4	1997-98	241
72	Yellow Medicine	1	1995	21
	Total number of samples from 1993 - June 16, 1999			**24,760**

* Two day clinics in same town are counted as one clinic.

** Total number of samples may include water samples that did not come from the county tha the clinic. Also, total number of samples may include all well samples submitted (i.e. multiple samples from one well, before and after treatment, etc.).

Background

Nitrate, a mobile form of nitrogen (N), is an essential nutrient for plant growth that occurs in the soil profile. Sources of nitrate include soil organic matter, fertilizer, manure, legume-fixed N, municipal and agricultural wastes, and precipitation.

Interpreting nitrate-N concentrations in tile water

All subsurface tile drainage water contains some nitrate-N (NO_3-N). The concentration of NO_3-N depends on a number of factors. First, nitrate occurs from the breakdown (mineralization) of soil organic matter. This is a natural source and cannot be controlled. Additional nitrate in tile water is related to the amount on N inputs (fertilizer, manure, etc.) to the land, time of application, and the effects of wet and dry climatic periods. Dry years often lead to high amounts of residual nitrate in the soil profile, which has a high potential for leaching into tile drainage water in wet years.

Conducted by:
Minnesota Department of Agriculture
Jennifer Gallus (612) 215-9037
and
Minnesota Department of Health
Well Management Division
Phil Stephan (612) 215-0852

Sponsored by:
University of Minnesota:
Agricultural Experiment Station
Southern Experiment Station
Gyles Randall (507) 835-3620

Extension Service

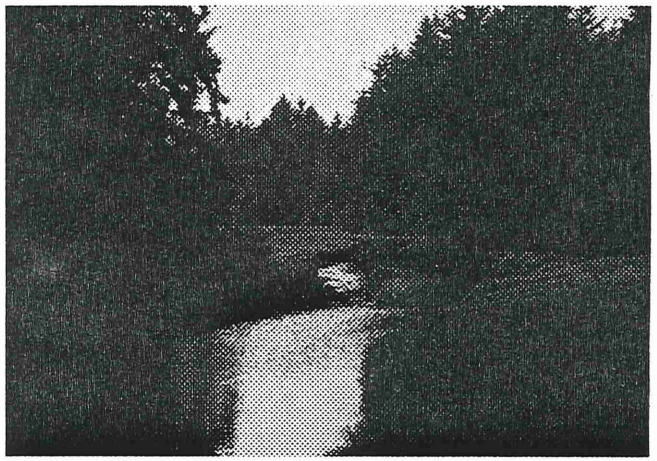
Board of Water and Soil Resources

Soil and Water Conservation Districts

Thank You for Your Participation!

Nitrate Tile Water Testing Clinic

RESULTS Inside...



Your Nitrate-Nitrogen Result ...

Sample ID: _____

Result: _____ ppm

Sample ID: _____

Result: _____ ppm

Sample ID: _____

Result: _____ ppm

Value of N lost in drainage/100 acres

NO_3-N Conc.	Year: Drainage (in.) :	Dry 2	Normal 6	Wet 12
ppm		$ lost/100 acres		
10		90	270	540
20		180	540	1080
30		270	810	1620
40		360	1080	2160
50		450	1350	2700

Explanation

Concentration (mg/L or ppm)	Interpretation*
0 to 5	• fields planted to alfalfa or grass species (CRP). • corn that did not receive N in the previous year.
5 to 20	• continuous corn or corn-soybean rotations that receive optimum recommended amounts of N including credits from legumes and manure. • generally obtained in years following normal or wetter-than-normal growing seasons.
20 to 30	• indicates excessive amounts of N have been added to the cropping system when the previous growing seasons have been normal to wetter-than-normal. • may occur even though proper amounts of N have been used for continuous corn and corn-soybean systems following very dry years. • may occur more frequently with early fall (before Oct. 15) application of N compared to late fall (after Oct. 25) applications.
> 30	• can occur when no crop is grown, i.e. fallowed headlands. • indicates excessive amounts of N have been added in previous years. • can occur after 2 to 3 very dry years, especially with continuous corn.

* For tile drainage water in April - June in south-central Minnesota.

1995-1998 Nitrate Water Testing Program Volunteer Survey Summary for Minnesota

1. Where do you live?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
Town	485	56	12
Lake Home	1689	85	5
Country	4514	565	13

2. If you live in the country, do you have livestock?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
No	4054	407	10
Yes	981	188	19

3. If you live in the country, do you mix or store fertilizer on your property?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
No	4605	545	12
Yes	142	23	16

4. Do you or your spouse farm?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
No	5966	568	10
Yes	1517	277	18
Retired	472	54	11

5. What is the age of your well?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
0 - 10 years	2203	144	7
11 - 20 years	2476	216	9
21 - 50 years	3072	401	13
Over 50 years	744	191	26
Unsure	294	46	16

6. What is the depth of your well?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
0 - 50 feet	2609	472	18
51 - 100 feet	2876	279	10
101 - 300 feet	2309	170	7
Over 300 feet	320	43	13
Unsure	413	38	9

7. How far is your well from an active or inactive feedlot?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
0 - 50 feet	2811	361	13
51 - 100 feet	431	94	22
101 - 300 feet	802	145	18
Over 300 feet	3787	408	11
Unsure	855	64	8

8. How far is your well from a septic system?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
0 - 50 feet	1679	215	13
51 - 100 feet	3051	339	11
101 - 300 feet	3296	372	11
Over 300 feet	1137	198	17
Unsure	278	17	16

9. How far is your well from an agricultural field?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
0 - 50 feet	495	89	18
51 - 100 feet	905	188	21
101 - 300 feet	1656	244	15
Over 300 feet	3883	404	10
Unsure	425	22	5

10. What type of well do you have?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
Drilled	5678	510	9
Sand Point	2213	367	17
Hand Dug	244	88	36
Flowing	327	42	13
Other	59	9	15
Unsure	296	27	9

11. Is the well currently used for human consumption?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
No	474	134	28
Yes	9596	1052	11

12. What type of treatment system do you have for your well water, excluding a softener?

	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
None	4559	522	11.4
Reverse Osmosis	423	79	18.7
Distillation	145	25	17.2
Filter	2379	216	11.0
Other	331	28	8.5

13. When did you last have your water tested?

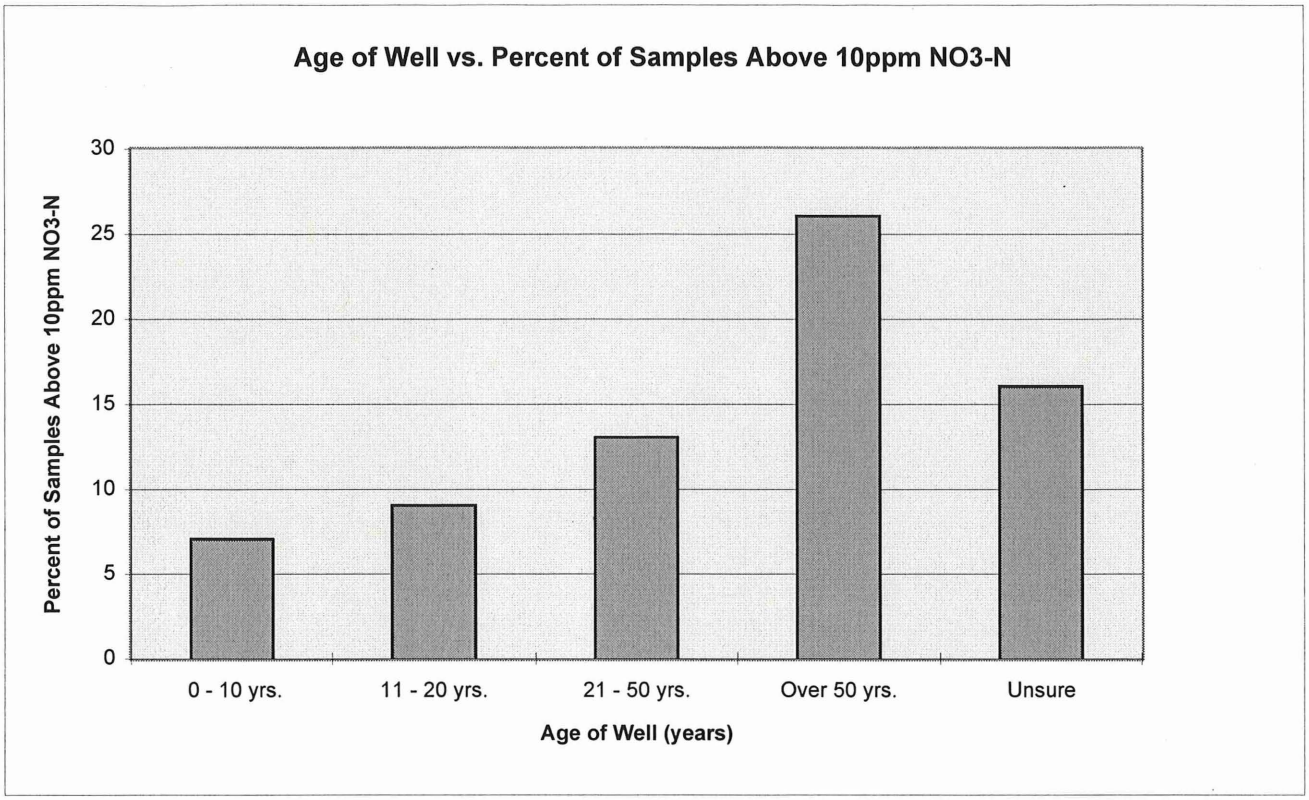
	Number of Participants	# of wells over 10 ppm NO3-N	% of wells over 10 ppm NO3-N
Never	2180	239	11
Less than 1 yr.	1447	264	18
Less than 3 yrs.	2075	259	13
Less than 10 yrs.	1800	193	11
Greater than 10 yrs.	1339	114	9
Don't remember	801	69	9

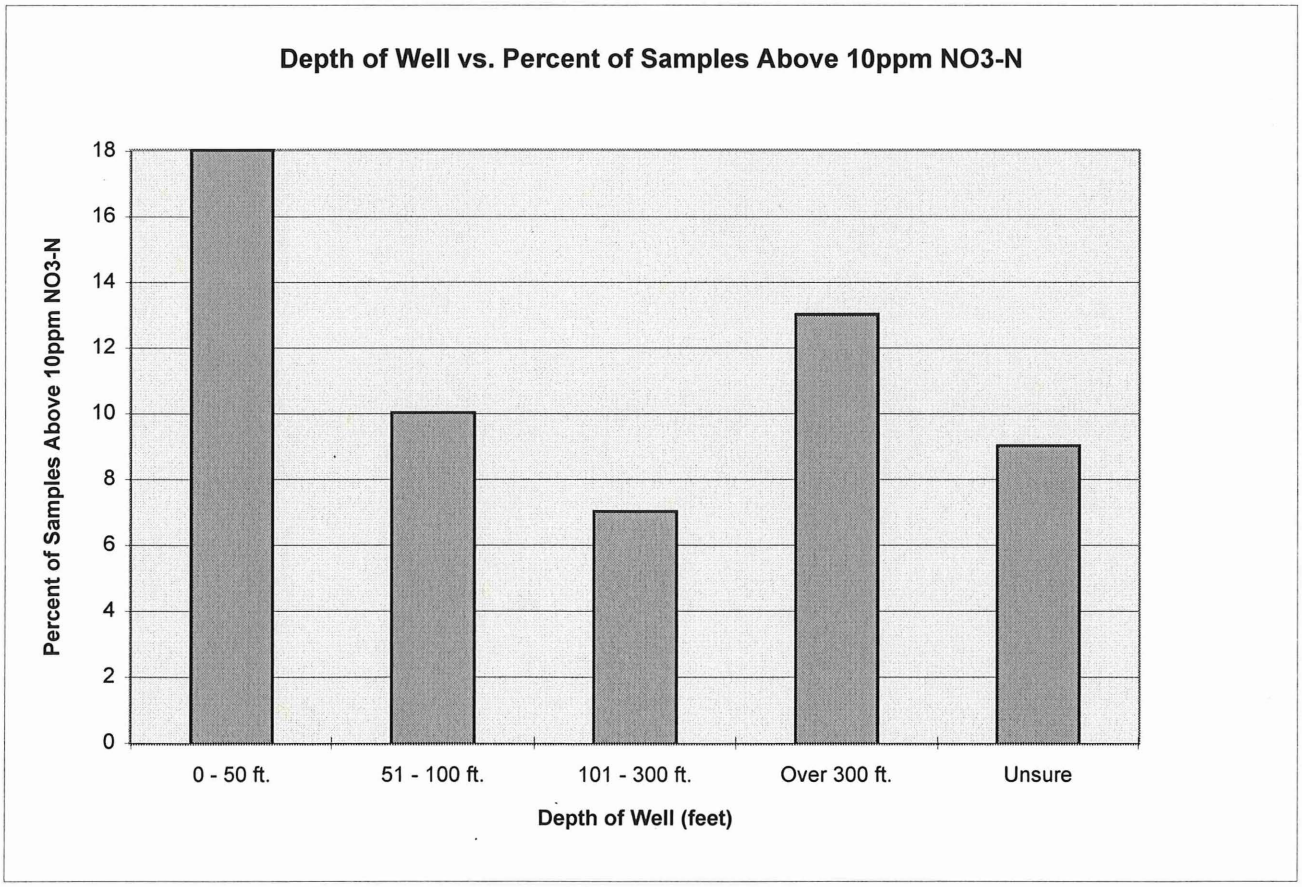
* Total number of participants responding to each question varies due to individual interpretation of participants feeling their situation may or may not be applicable.

Data generated[illegible]n the Minnesota Department of Agriculture: Nitrate Water Testing Pro[illegible]
Contact perso[illegible]nifer Gallus, Nitrate Water Testing Coordinator (651) 215-9037.

1995 - 1998 Nitrate Water Testing Program Volunteer Survey Summary

Appendix 4

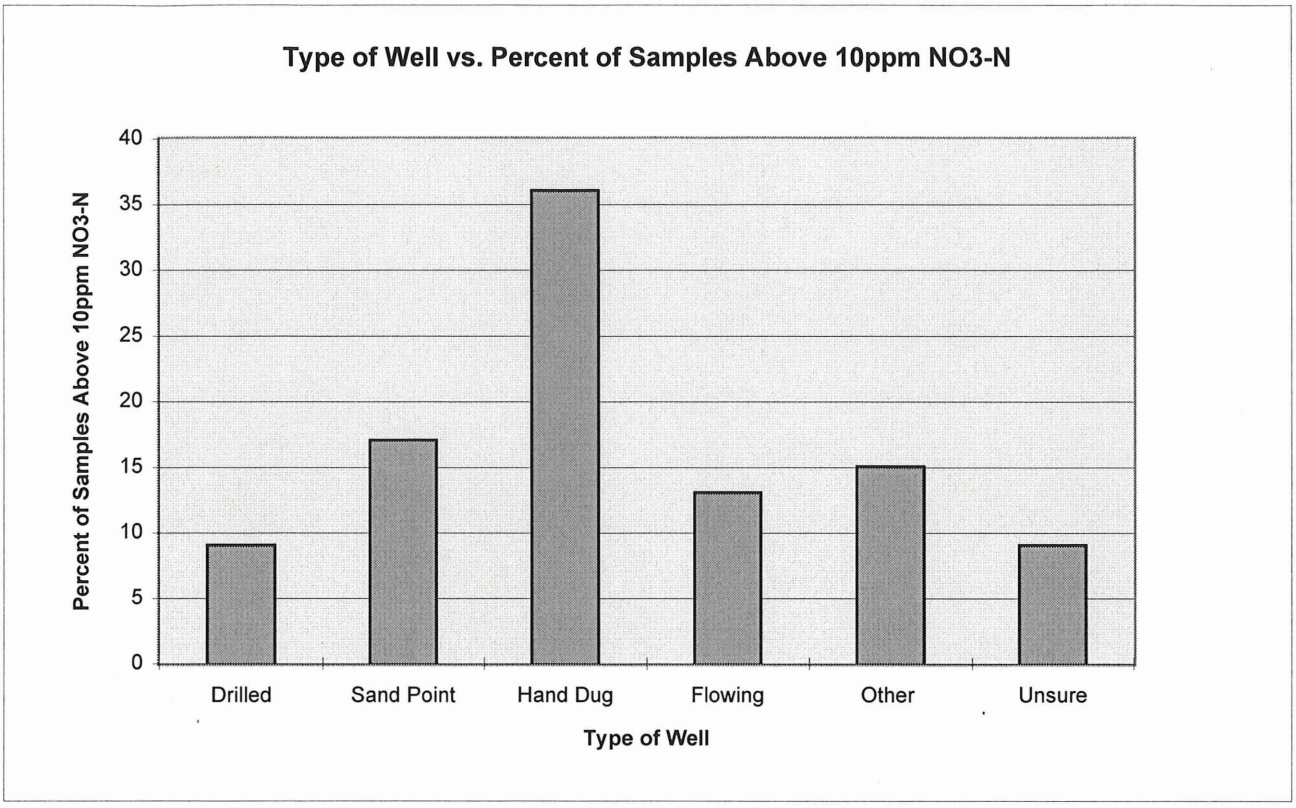


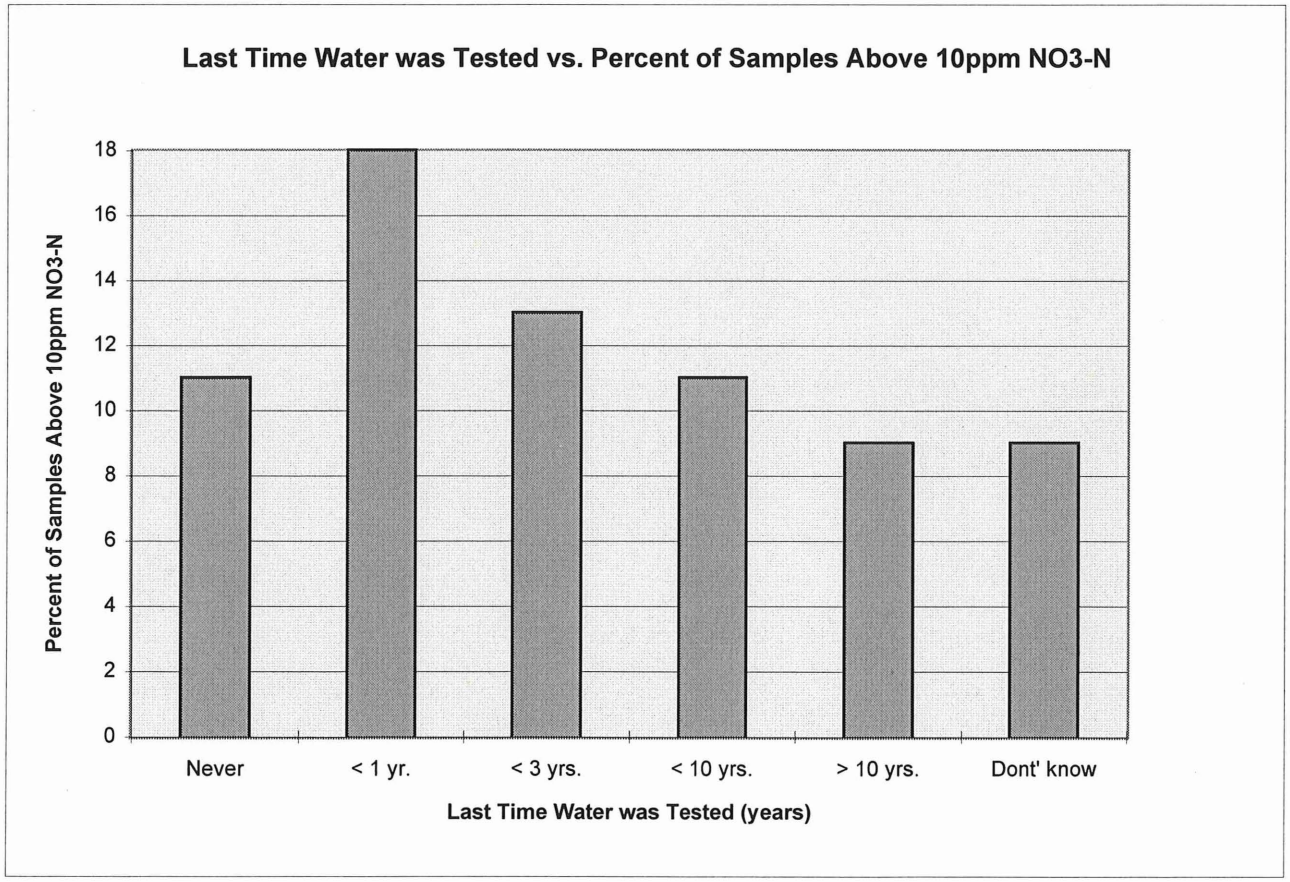


*Percent of Samples Above 10ppm NO3-N is based on number of samples collected.

1995 - 1998 Nitrate Water Testing Program Volunteer Survey Summary

Appendix 4





*Percent of Samples Above 10ppm NO3-N is based on number of samples collected.

VOLUNTARY SURVEY ABOUT YOUR PRIMARY DRINKING WATER WELL

The Minnesota Department of Agriculture appreciates you taking the time to answer a few questions about your well. **These questions may help in the discussion about your nitrate results** and will also provide information as to general well water quality across Minnesota. This information will be kept confidential and only summary data will be released. If you don't know an answer to a question, skip it and go on to the next question. (Version 3 - 1999)

Location of your well...

Q1: County _____ **Q2: Township** _____

Q3: (check one) 1☐ Town 2☐ Lake Home 3☐ Rural area

Q4: If the water sample came from a **farm site**, do you have livestock (more than 10 head of cattle, 30 head of hogs or an equivalent number of other livestock)? 1☐ Yes 0☐ No

Q5: If the well is located on a **farm site,** do you mix or store fertilizer (500 lb. or more)? 1☐ Yes 0☐No

Q6: Do you or your spouse farm? 1☐ Yes 0☐ No 2☐ Retired farmer

If you have a **private well**, please answer the following:

Q7: Approximate **age** of well in **years**. 1☐ 0 -10 2☐ 11-20 3☐ 21-50 4☐ 51+ 5☐Unsure

Q8: Approximate **depth** of well in **feet**. 1☐ 0 -50 2☐ 51-100 3☐ 101-300 4☐ 301+ 5☐Unsure

Q9: Distance to an active or inactive feedlot(**ft**). 1☐ 0 -50 2☐ 51-100 3☐ 101-300 4☐ 301+ 5☐Unsure

(Distance to a septic system in **feet**. 1☐ 0 -50 2☐ 51-100 3☐ 101-300 4☐ 301+ 5☐Unsure

Q11: Distance to an agricultural field in **feet.** 1☐ 0 -50 2☐ 51-100 3☐ 101-300 4☐ 301+ 5☐Unsure

Q12: Type of well construction. 1☐Drilled 2☐Sand point 3☐Hand dug 4☐Flowing 5☐Other 6☐Unsure

Q13: Is this well currently used for human consumption (Drinking or Cooking)? 1☐ Yes 0☐ No

Q14: Please check any water treatment you use.

0 ☐ None 1☐ Reverse Osmosis 2☐ Distillation 3☐ Carbon Filter 4☐Water Softener 5☐ Other_____

Q15: When did you last have your well tested for nitrates, lead, hardness, bacteria, etc.?

1☐ Never tested 2☐ Within the past year 3☐ Within the last 3 years

4☐ Within the last 10 years 5☐ More than 10 years 6☐ Don't know

Q16: May we contact you for additional information?

Name: _____ **Phone Number:** _____ **Thank you!**

Primary Drinking H_2O Sample(s)

^ Single sample -**OR**-

^ Before treatment

____

^ After treatment

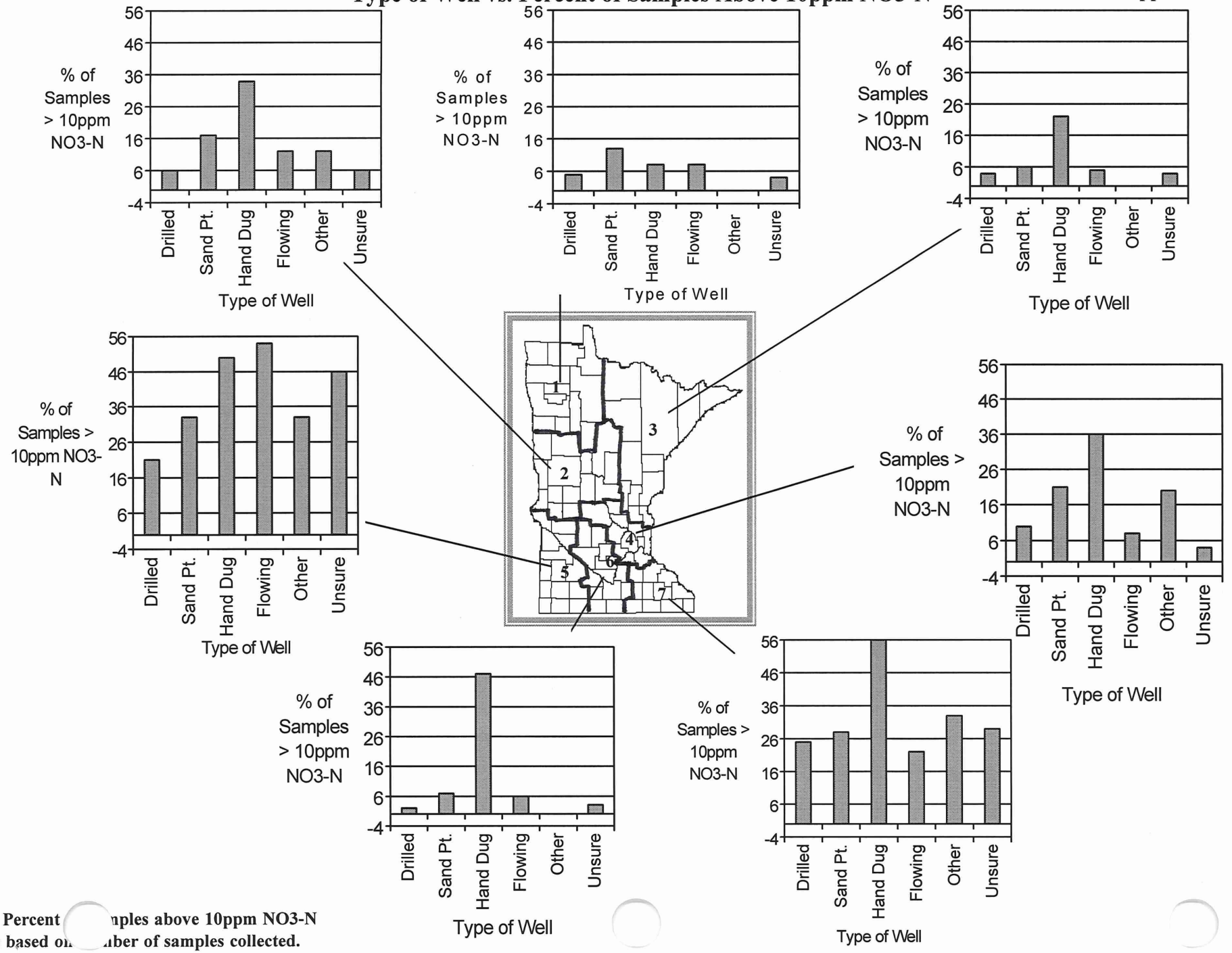
Additional Samples (i.e. neighbors, extra wells, etc.)

Site #

1995 - 1998 Nitrate Water Testing Program Survey Results by Region

Type of Well vs. Percent of Samples Above 10ppm NO3-N

Appendix 5

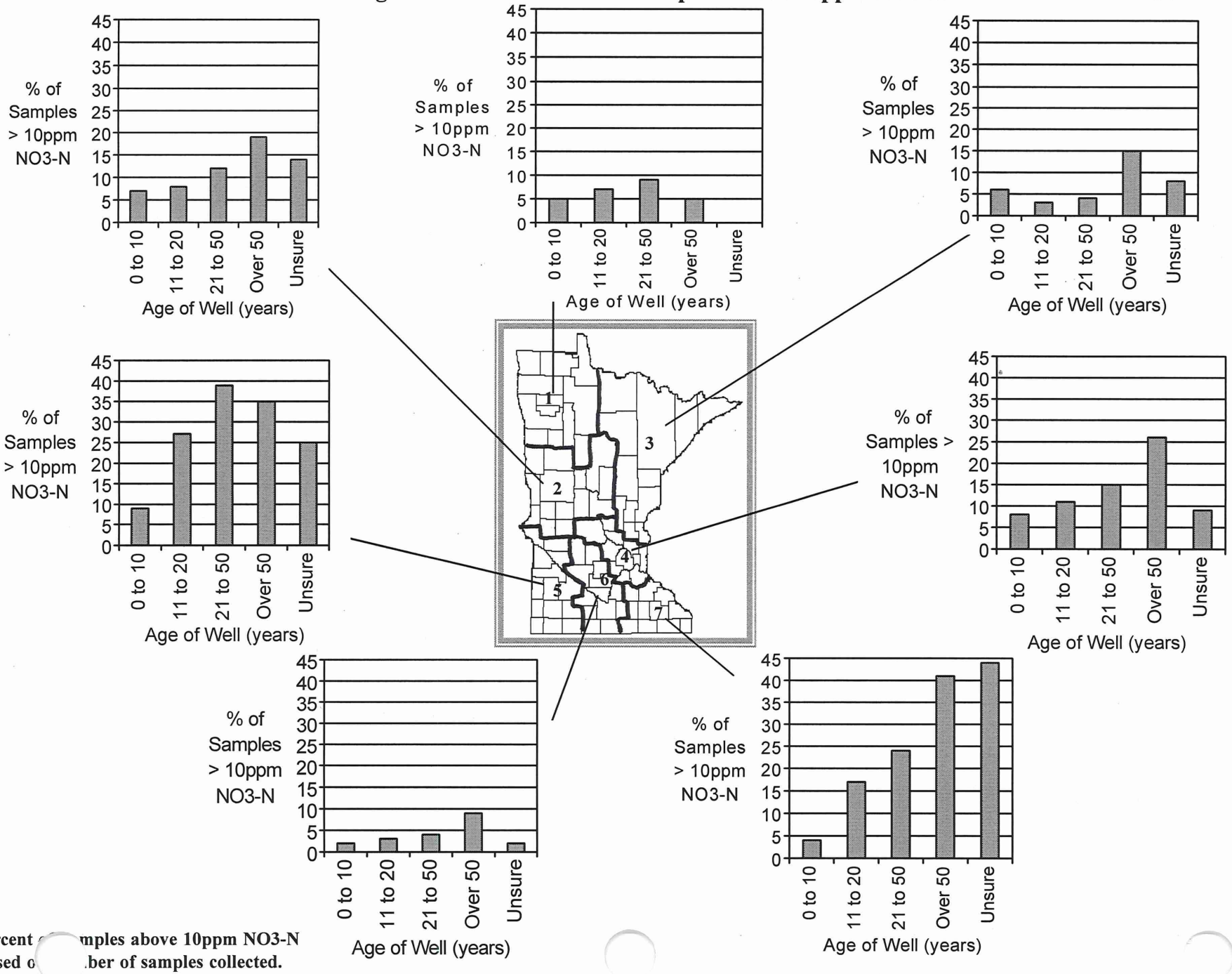


*** Percent ... mples above 10ppm NO3-N is based on ... mber of samples collected.**

1995 - 1998 Nitrate Water Testing Program Survey Results by Region

Age of Well vs. Percent of Samples Above 10ppm NO3-N

Appendix 5

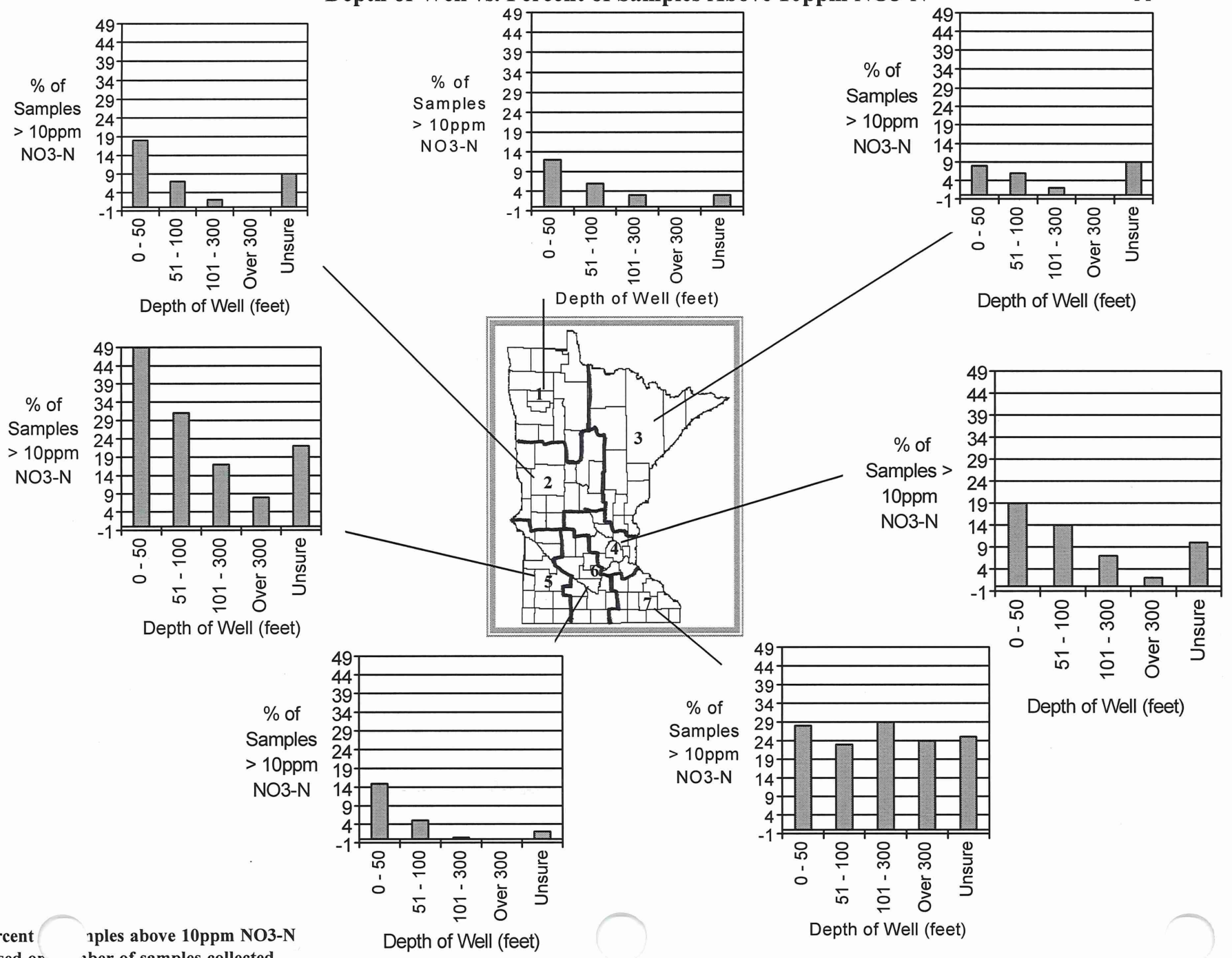


*** Percent of samples above 10ppm NO3-N is based on number of samples collected.**

1995 - 1998 Nitrate Water Testing Program Survey Results by Region

Depth of Well vs. Percent of Samples Above 10ppm NO3-N

Appendix 5



*** Percent of samples above 10ppm NO3-N is based on number of samples collected.**

1999 Survey for County Cooperators Participating in 1997 - 1998 Nitrate Water Testing Program.

Appendix 6

	Question	Response (%)*				
		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
	Scheduling					
1	The number of clinics was appropriate.	41	51	5	0	3
2	The clinics were too short.	0	0	23	36	41
3	The clinics were too long.	3	5	36	33	23
4	The best time of day for clinics is morning.	23	46	20	11	0
5	The best time of day for clinics is afternoon.	13	48	39	0	0
6	The best time of day for clinics is evening..	15	19	26	22	19
7	MDA was flexible with the scheduling of clinics.	71	26	3	0	0
	Advertisement					
8	Overall, the advertisement for clinics was effective.	20	65	8	8	0
9	Advertisement reached diverse groups.	20	55	18	8	0
	Participants					
10	I am happy with the attendance of the clinics.	23	35	15	25	3
11	Participants were given enough time and attention	50	45	5	0	0
	no matter how large of a group was attending.					
12	People wait too long before they receive their results.	0	0	10	43	48
13	The brochures MDA brings to clinics are appropriate/helpful.	41	56	3	0	0
	Service to your county					
14	My county agency is benefited by the Nitrate Testing Program.	53	38	10	0	0
15	The results are helpful to county water planning activities.	35	42	15	8	0
16	The program educates the residents of my county and helps	50	48	3	0	0
	them become more aware of water quality issues.					
			over			

1999 Survey for County Cooperators Participating in 1997 - 1998 Nitrate Water Testing Program.

Procedures

To make the clinics more efficient, a future goal of the water testing program is to station sets of water testing equipment regionally so that county agencies could check out equipment from one of seven locations in the state, setup, and run clinics independently.

If thorough directions were included with equipment, how comfortable do you feel with the following:

		Very comfortable	Comfortable	Neither Comfortable nor Uncomfortable	Uncomfortable	Very Uncomfortable
17	Holding a clinic without any MDA staff present.	43	23	10	23	3
18	Setup procedures, including getting the spectrophotometer started.	38	28	13	23	0
19	Use of equipment and procedures.	45	20	13	20	3
20	Explaining results to the participants.	48	33	5	13	3

* This survey accounts for 40 county cooperators, 20 cooperators did not reply. Survey was conducted in January 1999.

Survey for Counties Participating in the Nitrate Water Testing Program

Thank you for your help in making this year a success for the MDA water nitrate testing clinics. To better our service to your organization and the community, we would appreciate you taking the time to complete the following s[illegible]y.

Scheduling

How many clinics has your county had total, between 1997 and 1998?_____

How long were your clinics (hrs) ?_____

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The number of clinics was appropriate.	☐	☐	☐	☐	☐
The clinics were too short.	☐	☐	☐	☐	☐
The clinics were too long.	☐	☐	☐	☐	☐
The best time of day for clinics is...					
Morning	☐	☐	☐	☐	☐
Afternoon	☐	☐	☐	☐	☐
E[illegible]ng	☐	☐	☐	☐	☐
MDA was flexible with the scheduling of the water testing clinics.	☐	☐	☐	☐	☐

Comments_____

_____

_____

Advertisement

Overall, the advertisement for clinics was effective.	☐	☐	☐	☐	☐
Advertisement reached diverse groups.	☐	☐	☐	☐	☐

Are there any changes that should be made and/or do you have any ideas of how to reach more people?

_____

_____

_____

D[illegible]our agency do any additional advertisement, if so, what?_____

_____

_____

Participants

On average, approximately how many participants attended each clinic? ☐ 0-15 ☐ 16-30 ☐ 31-50 ☐ 51-100 ☐ 100+

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am happy with the attendance of the clinics.	☐	☐	☐	☐	☐
Participants were given enough time and attention no matter how large of a group was attending.	☐	☐	☐	☐	☐
People wait too long before they receive their results.	☐	☐	☐	☐	☐

Brochures

The brochures the MDA brings to clinics are appropriate/helpful.	☐	☐	☐	☐	☐

Are there any brochures or topics that the MDA should add? _____

_____

Service to your county

My county agency is benefited by the Nitrate Testing Program.	☐	☐	☐	☐	☐
The results are helpful to county water planning activities.	☐	☐	☐	☐	☐
The program educates the residents of my county and helps them become more aware of water quality issues.	☐	☐	☐	☐	☐

Procedures

To make the clinics more efficient, a future goal of the water testing program is to station sets of water testing equipment regionally so that county agencies could check out equipment from one of seven locations in the state, setup, and run clinics independently.

If thorough directions were included with equipment, how comfortable do you feel with the following:	Very Uncomfortable	Uncomfortable	Neither Comfortable nor Uncomfortable	Comfortable	Very Comfortable
Holding a clinic without any MDA staff present.	☐	☐	☐	☐	☐
Setup procedures, including getting the spectrophotometer started.	☐	☐	☐	☐	☐
Use of equipment and testing procedures.	☐	☐	☐	☐	☐
Explaining results to the participants.	☐	☐	☐	☐	☐

Please mail to Jennifer Gallus in envelope provided.

Day 2 - Wednesday, May 6

Poster Session II (cont.)

12. *Flow and transport of inorga*
Ronnie Daanen and **John Ni**
and Agricultural Engineering,

13. *Monitoring of vadose zone w*
Alexander, Department of G

14. *Resource-based vs. complian*
both! **Jan Falteisek**, Minneso
Pfannkuch, Department of G

15. *The sinkholes of Pine County,*
Geophysics, University of Mi
Conservation District

16. *Evidence of karstic features i*
Ordovician Platteville Forma
Geology and Geophysics, Uni

17. *Application of field computer*
Monitoring and Assessment P
Agency

18. *Geostatistical approach to m*
Groundwater Model. **Yuan-M**
Pollution Control Agency

19. *Enabling farmers to protect o*
John Vickery, and **William V**

20. *Economic evaluation of targe*
programs. **John Westra** and
Minnesota

21. *A one-dimensional lake water*
Falls Laboratory, Department of Civil Engineering, University of Minnesota

22. *Overview of the MDA nitrate water testing program*. **Jennifer Gallus**, **Bruce Montgomery**, and **Denton Bruening**, Minnesota Department of Agriculture; **Dan Wilson** and **Phil Stephan**, Minnesota Department of Health

UNIVERSITY OF MINNESOTA

Sixth Biennial Conference

FINAL PROGRAM

May 5-6 1998

Holiday Inn Metrodome
Minneapolis, Minnesota

Sponsored by
Minnesota Water Resources Center

in cooperation with water management and research agencies and organizations throughout Minnesota

Carver Soil and Water Conservation District
219 East Frontage Road
Waconia, MN 55387-1862
Phone: 612-442-5101
FAX: 612-442-5102

MINNESOTA ENVIROTHON

November 18, 1997

Jennifer Gallus
Minnesota Department of Agriculture
Second Floor, Agronomy Department
90 West Plato Blvd.
St. Paul, MN 55117

An Opportunity for
High School Students

Dear Jennifer:

First of all, I would like to thank you for agreeing to help lead a station at the 1998 Area IV Envirothon, I hope you will find it a fun and rewarding experience. You will be responsible for the **Watersheds Station**. You and the other presenters chosen for the Watershed station will be responsible for developing 20 test questions for the students. I have included the test questions from the 1997 Envirothon, which should be helpful. Keep in mind that the students received a copy of these questions and answers last year, so we cannot use the same questions.

The oral presentation's station will be a little different this year. The students will have a "Watershed problem" that they will report on (copy enclosed for your review). The presentations will be 10 minutes long, and will be judged based on how well the presentation is done, not just 10 points if they did a presentation and 0 points if they didn't.

We will go into more detail of all the stations at the Presenter meeting, scheduled for **December 3, 1997,** at the **Hennepin Conservation District** office (Agenda on reverse side). You **do not** need to have your questions completed at this meeting, since this is more of an informative meeting that anything else. If you cannot attend the meeting, please let me know.

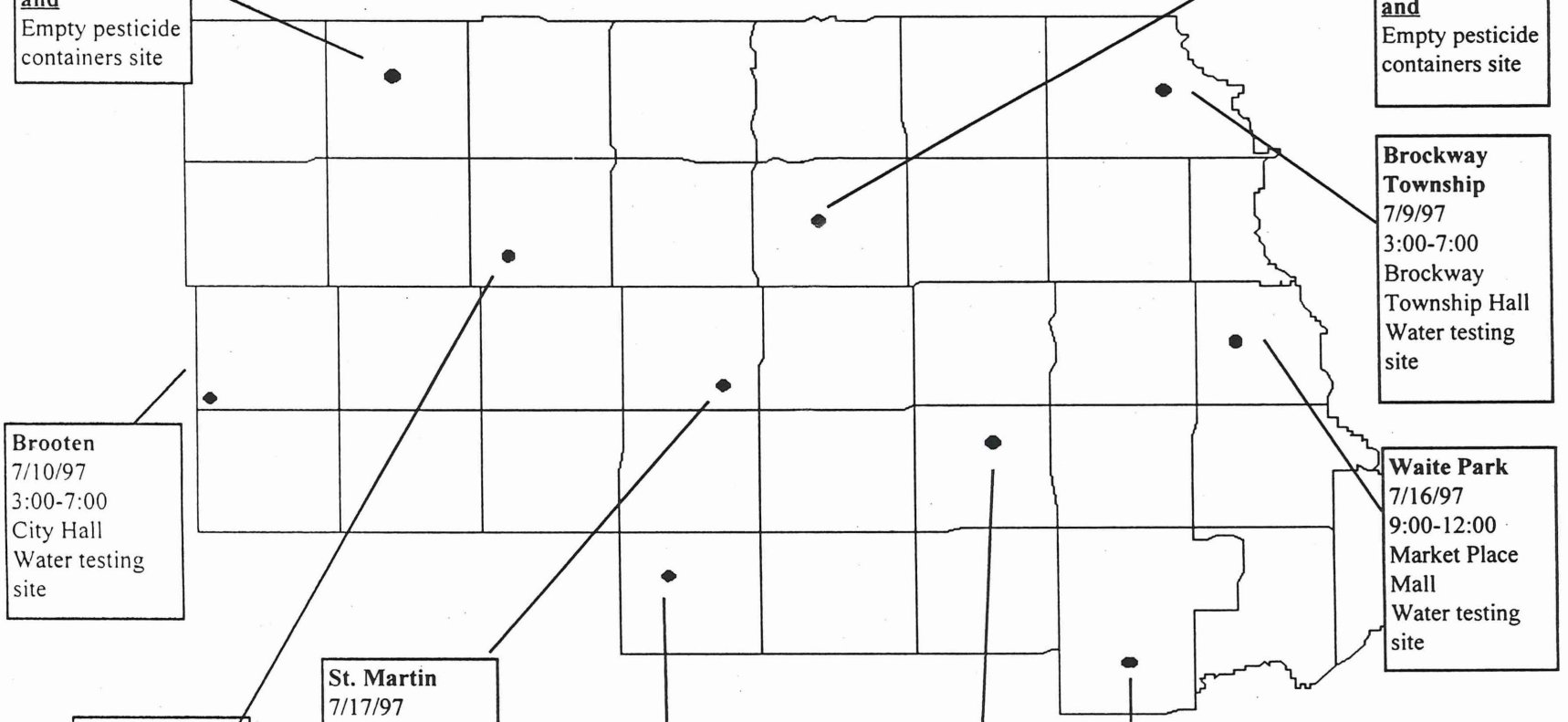
If you have any questions, do not hesitate to call me. If you cannot help with the Envirothon, please call me as soon as possible so I can get a replacement. I look forward to seeing you on December 3!

Sincerely,

Felicia Brockoff

Felicia Brockoff

Water Testing Clinics and Empty Pesticide Container Sites in Stearns County



Sauk Centre
7/23/97
9:00-4:00
Buenings UAP
Water testing
and
Empty pesticide containers site

Albany
9/18/97
9:00-4:00
Albany Coop
Water testing
and
Empty pesticide containers site

Brockway Township
7/9/97
3:00-7:00
Brockway Township Hall
Water testing site

Brooten
7/10/97
3:00-7:00
City Hall
Water testing site

Waite Park
7/16/97
9:00-12:00
Market Place Mall
Water testing site

Greenwald
7/16/97
3:00-7:00
Greenwald Pub
Water testing site

St. Martin
7/17/97
9:00-4:00
St. Martin Coop
Water testing
and
Empty pesticide containers site

Paynesville
7/10/97
9:00-12:00
Senior Center
Water testing site

Cold Spring
7/11/97
9:00-4:00
City Hall
Water testing site

Kimball
7/9/97
9:00-12:00
City Hall
Water testing site

Call Denton Bruening at (612) 297-4400 for water clinic information.

Call Steve Poncin at (612) 296-5136 for information about the empty pesticide container collection program.

WELL WATER: HOW TO KEEP IT SAFE

Tuesday, November 10, 1998
Chisago County Senior Center, 6th and Maple St, North Branch
Program: 7:30 to 9:30 p.m.

7 to 7:30 p.m. ..... Registration & Nitrate Testing, Jennifer Gallus, MDA

7:30 to 7:35 p.m. ..... Welcome, Daryl Johnson, U of M EQIP Program Specialist

7:35 to 7:50 p.m. ..... Private Wells: Protecting Your Water Quality (15 minute video)

7:50 to 8:25 p.m. ..... Interpreting Water Test Results/Short-Term Solutions
Kamal Alsharif, Water Resources Education
with U of M Extension & BWSR

8:25 to 8:40 p.m. ..... Break/Refreshments

8:40 to 9:10 p.m. Identifying Watershed Pollution Sources to Protect Your Water Supply
Mike Howe, MN Department of Health

9:10 to 9:30 p.m. ..... Local Resources Available,
Rodney Elmstrand, U of M Extension Educator
Neal Feeken, SWCD District Administrator
Mary Schmitz, Chisago Coutny Water Plan Coordinator

The program is funded in part by EQIP grant received by the Chisago County Water Plan.
Team members planning a series of eight education programs include:

Daryl Johnson, U of M Extension EQIP Program Specialist
Rodney Elmstrand, U of M Extension Educator
Neal Feeken, Chisago SWCD District Administrator
Mary Schmitz, Chisago County Water Plan Coordinator
Michelle Smith, District Conservationist, NRCS

AITKIN COUNTY

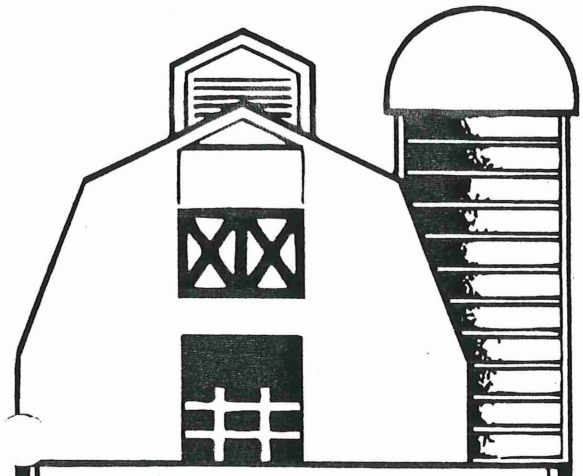
RIVERS AND LAKES FAIR

June 13, 1998
9:00 a.m. – 1:00 p.m.
Rippleside Elementary School
225 2nd St. N.W.
Aitkin, MN 56431

Adult Sessions		
Time	**Room #**	**Speaker/Topic**
9:00 a.m. – 9:50 a.m.	#2 (144)	Harry Hutchins – "Landscaping for Wildlife"
10:00 a.m. – 10:50 a.m.	#1 (154A)	Larry Luukkonen – "Highways of the Frontier"
11:00 a.m. - 11:50 a.m.	#2 (144)	The Minnesota Zoomobile
12:00 noon – 12:50 p.m.	#2 (144)	The Minnesota Zoomobile
Children's Sessions		
9:15 a.m. – 9:45 a.m.	#3 (154B)	Fish Identification
10:00 a.m. – 10:30 a.m.	#3 (154B)	Fish Senses/Printing
10:45 a.m. – 11:15 a.m.	#3 (154B)	Pop Can Casting
11:30 a.m. – 12:00 noon	#3 (154B)	Mussel Mania
12:15 p.m. – 12:45 p.m.	#3 (154B)	Would You Drink This Water?
Ongoing Activities		
DNR – River Walks (two ½ hour sessions)		
Blue Bird House Building (all day) by Tamarack Sportsmans Club		
Bill Brownlee – Rock Display		
→ Water Testing by Minnesota Department of Agriculture		

CROPS AND SOILS FIELD DAY

Tuesday, June 23, 1998



At the University of Minnesota
Southern Experiment Station

Registration begins at
7:30 a.m.
Field day hours:
8:00 a.m. – 2:30 p.m.
Lunch served: 11 AM – 1 PM

Highway 14 W. & Co. Rd. 57
Waseca, Minnesota

Research Tours Depart
8:00-11:15 a.m. & 1-2:00 p.m.

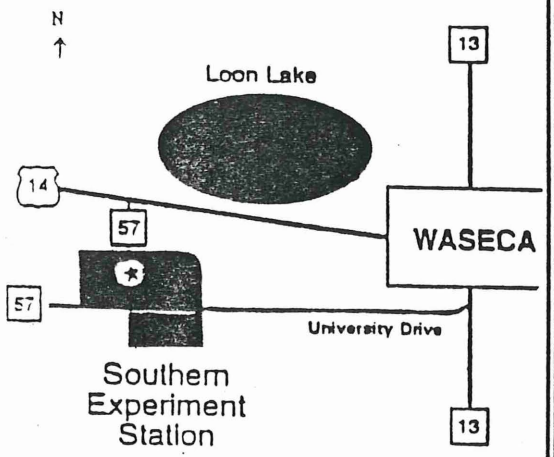
Clinics and Exhibits
8:00 a.m. to 2:30 p.m.

"GEIS & Agriculture" - 12:00
Gene Hugoson, Dept. of Ag Commissioner

Tile Water Testing for Nitrate
8:00 a.m. to 2:30 p.m.

FREE Tile Water Testing for Nitrate

Label a Ziploc™ bag with your name and/or other identification with a permanent marker. Collect sample directly from a tile lateral or main. DO NOT collect drainage ditch samples. Samples must be less than 36 hours old and kept refrigerated. Keep sample cool until delivery.



The University of Minnesota
Is an equal opportunity educator and employer.

POPE COUNTY LAKE CONFERENCE VIII

MONDAY, JULY 6, 1998

LOCATION: MINNEWASKA HOUSE, GLENWOOD, MN

PROGRAM

8:30 - 9:00 a.m.	**Registration**
9:00 - 9:05	**Welcome** - Arne Stoen, County Board Chairman
9:05 - 9:35	**The Pope County Land Use Plan** / Mark Scheidel, Consultant
9:35 - 10:05	**The Chippewa River Clean Water Project**/Kylene Olson, Proj.Coord.
10:05 - 10:20	**Coffee Break**
10:20 - 11:00	**The Sustainable Lakes Project** / George Orning, U of M/CURA
11:00 - 11:15	**Pope COLA TSI Monitoring Update** / Bruce Brown, COLA President
11:15 - 11:30	**2nd Annual COLA Shoreline Awards** / Bruce Brown, COLA President
11:30 - 11:45	**Federal Farm Program Changes** / Craig Bower, NRCS
11:45 - 12:00	**Nitrate Water Testing Results** / Jennifer Gallus, MDA
Noon -	**Lunch** for all paid registrants, presentors

FREE WATER TEST FOR NITRATES from 8:00 am until 12:00 pm at Minnewaska House. Bring your well water sample to the Lake Conference. (Use a Whirlpak or Ziploc type plastic bag to collect the sample. Mark the bag with a permanent marker before filling with your name. Allow water to run 5-10 minutes prior to drawing sample. Approximately 4 ounces or ½ cup is sufficient sample size. Sample must be less than 24 hours old. Refrigerate or pack on ice to keep cool when you bring it in. You may bring in more than one sample.) Free water testing clinic provided by Minnesota Department of Agriculture.

Area residents participate in water testing

Truman Farmers Elevator was the site of a Water Testing Clinic held in September. The clinic, which tested for nitrate, was sponsored by Martin County Minnesota tension Service and Soil and ater Conservation Division.

Among those on hand for the clinic were Linda Meschke, Martin County Water Coordinator, Phil Stephan of the Minnesota Department of Health, Trisha Heimerman and Jennifer Gallus of the Department of Agriculture, Billeye Rabbe of Martin Co. Extension Office, and Darren Newville of Martin Co. Soil and Water.

The purpose of the program was to provide useful information concerning nitrate levels in the area water supply. The testing information gave participants an approximate level for nitrate content.

Most samples in the county tested in the 0-10 mg/L range which is considered safe for all animals. At least three sites tested in the 16-20 range which is considered safe for livestock unless feed has high nitrate levels. One sample tested above 20 mg which experts say might cause problems for livestock. If feed contains more than 1000 , total nitrate is likely to exceed levels.

Rates from 40-100 are considered risky for livestock, while levels that exceed 100 should not be used.

Nitrate may occur naturally in groundwater resulting from decayed vegetation, atmospheric nitrogen contained in rainfall, and minerals found in certain soils. In most cases, natural sources contribute very small amounts of nitrate to groundwater.

The Major sources of nitrate are animal and human wastes, nitrogen fertilizers and, to a lesser extent, industrial wastes, wastewaters, and landfills. Nitrate can enter the groundwater from improper management of nitrate wastes, failing septic systems, improper well construction or poor management of nitrogen fertilizer. Nitrate leaching contributed from nitrogen fertilizer can be reduced by carefully matching the application of fertilizer to crop needs.

In addition to nitrate testing, private wells should be tested at least once a year for bacterial safety. It is also wise to test well water for bacteria any time the water changes in taste, odor or appearance.

Additional questions about your household water issues can be directed to Linda Meschke at 238-3221 or the Minnesota Water Line, 1-800-455-4526.

Stearns County to hold water testing clinics for nitrates

The Minnesota Department of Agriculture (MDA) and the Minnesota Department of Health (MDH), Well Management Unit, will be conducting a series of water clinics to test drinking water, livestock watering systems, and irrigation wells for the presence of nitrate in Stearns County and surrounding counties. Nitrate is the most common contaminant in Minnesota's groundwater. The clinics will be held on: July 10, 1997 at the Senior Center in Paynesville from 9:00 a.m. to 12:00 noon, July 17 at the St. Martin Co-op in St. Martin from 9:00 a.m. to 4:00 p.m., July 10 at the City Hall in Brooten from 3:00 to 7:00 p.m., and July 23 at Buenings UAP in Sauk Centre from 9:00 a.m. to 4:00 p.m. Tests are free.

Plans have also been made to collect empty pesticide containers at the St. Martin Co-op in St. Martin from 9:00 a.m. to 4:00 p.m., July 23, 1997; at Buenings UAP in Sauk Centre from 9:00 a.m. to 4:00 p.m.; and the Albany Co-op in Albany from 9:00 a.m. to 4:00 p.m. At these three sites the empty pesticide containers collection days will be held in conjunction with the water testing clinics.

In order to participate in water testing, homeowners must bring to the clinic site at least one-half cup of water in either a Whirl-Pak plastic bag or a Ziploc-type bag. Before obtaining a sample, allow the water to run five to 10 minutes to get a representative sample. Four ounces or one-half cup of water is sufficient to have tested. Homeowners who have water treatment equipment installed should take two water samples, one before and one after the treatment process. Homeowners with just a water softener need only to take one sample, either before or after the water softener. Samples should be less than 24 hours old and must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners are asked to label the bags with their name, phone number and a well identification number if more than one well is sampled. Homeowners also have the option of remaining anonymous. In that case they should simply choose another easily recognized number. The test result is for your benefit. It is not necessary to provide testers with any information about your well.

Samples are analyzed on the spot which usually takes less than five minutes, and the results are given directly to the homeowner. If the nitrate level in a sample is elevated, MDA/MDH staff will refer the homeowner to certified labs that can retest the water. MDA/MDH staff will also distribute printed information to the homeowner describing ways to correct the problem.

Farmers, commercial applicators and commercial dealers are also encouraged to participate in the empty pesticide container collection program. Any size pesticide container up to and including 55 gallons that are made of #2 HDPE plastic are recyclable and will be collected. Remove the caps from the containers and make sure the containers are triple rinsed. No wet or solid residue can be left in the container. Containers will be col-

MDA offers water-testing clinic in Wright County

The Minnesota Department of Agriculture (MDA), along with the Minnesota Department of Health's (MDH) well management unit, and Wright County Water Planning, will conduct a clinic next month to test drinking water, livestock watering systems and irrigation wells for nitrates in Wright County and surrounding counties.

The clinic will be held on Tuesday, April 14 from 8 to 11 a.m. in Annandale at the French Lake Township Hall, and from 1 to 4 p.m. in Montrose at the Community Center. The event is part of a statewide series of water-testing clinics being offered throughout 1998.

Nitrates are the most common contaminants in Minnesota's groundwater, and a significant number of the state's wells have high nitrate levels. With that in mind, MDA Commissioner Gene Hugoson urges people to take advantage of the free clinics.

"We strongly recommend that people take advantage of this service because studies indicate somewhere between 5 percent and 25 percent of the private wells in greater Minnesota have nitrate levels above the federal drinking water standard," Commissioner Hugoson said. "Nitrates can be a major problem when they are consumed by infants because they can cause suffocation due to a condition known as 'blue baby' syndrome."

In 1997, 60 clinics were held in 35 counties across the state. Clinics have been offered at county fairs, University of Minnesota Agricultural Experiment Station field days, and as separate events. In order to participate in the testing, homeowners must bring at least one-half cup of water in either a Whirl-Pak plastic bag or a Ziploc-type bag.

In order to get a representative sample, allow the water to run five to 10 minutes before filling the bag. Homeowners with water treatment equipment should take two water samples — one before and one after the treatment process. Homeowners with just a water softener need only take one sample, either before or after the water passes through the water softener.

Samples should be taken no more than 24 hours before the testing, and they must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners should mark the bags with their name, phone number and a well identification number if more than one well is sampled.

If they wish, homeowners may remain anonymous. In that case they should simply choose another easily recognized number to put on the well samples. It is not necessary to provide information about the wells from which water is taken.

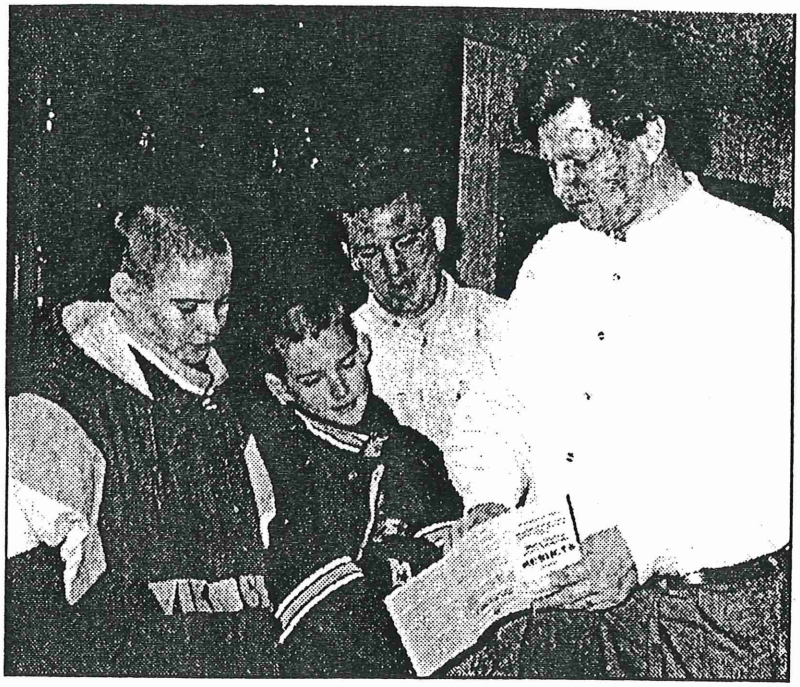
Samples are analyzed on the spot, as the process usually takes less than 5 minutes, and results are given directly to the homeowner. If the nitrate level in a sample is elevated, MDA/MDH staff can refer the homeowner to certified labs that will retest the water.

MDA/MDH staff will also distribute information to the homeowner describing ways to correct nitrate problems. Minnesota Extension Service bulletins about fertilizer best management practices will be available, as well as information on manure management and crediting nitrate in irrigation water.

The MDA/MDH's nitrate testing clinics are presented in cooperation with county extension educators, soil and water conservation districts and local organizations.

"We were very pleased with the attendance and public interest in past clinics," Commissioner Hugoson said. "In some cases, as many as 500 people brought in water samples for testing. Many people asked that the clinics continue so they can feel more confident that the water they are drinking is safe."

For more information on the clinics, contact MDA nitrate water testing coordinator, Jennifer Gallus at 612-215-9037 or MDA soil scientist, Bruce Montgomery at 612-297-7178.



Dozens do water testing

Ross (left) and Reed Van Hulzen, sons of Keith and Amy Van Hulzen of rural Edgerton, learned the results of their water samples at the Farm & Home Show. The boys brought in a sample from the creek running past their farm site as well as from their well. Going over the results is Denton Bruening from the Minnesota Department of Agriculture, while Pipestone County conservation officer John Biren watches.

About fifty percent of the water samples tested that day were over 10 ppm, according to Mavis Menning at the Pipestone County Conservation and Zoning Office, and thus above the state's health standard. Bruening said that most high tests are related to well construction. These are wells that are either hand dug or augured and constructed of red clay tile or concrete curbs, allowing contaminants to get down into the well. The nitrates could be coming from the breakdown of organic matter rather than a point source, he indicated, or they might possibly be coming from any one of three different sources: commercial fertilizer, manure, or septic systems.

MDA will conduct water testing clinics to check for nitrate

The Minnesota Department of Agriculture (MDA) and the Minnesota Department of Health (MDH), Well Management Unit, will be conducting a water clinic to test drinking water, livestock watering systems, and irrigation wells for the presence of nitrate in Olmsted County and surrounding counties. Nitrate is the most common contaminant in Minnesota's groundwater. The clinic will be held May 30 at the American Legion in Byron, MN from 9 a.m. to 5 p.m. Tests are free.

In order to participate, homeowners must bring to the clinic site at least one-half cup of water in either a Whirl-Pak plastic bag or a Ziploc-type bag. Before obtaining a sample, allow the water to run 5-10 minutes to get a representative sample. Four ounces or one-half cup of water is sufficient to have tested. Homeowners who have water treatment equipment installed should take two water samples, one before and one after the treatment process. Homeowners with just a water softener need only to take one sample, either before or after the water softener. Samples should be less than 24 hours old and must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners are asked to label the bags with their name, phone number and a well identification number if more than one well is sampled. Homeowners also have the option of remaining anonymous. In that case they should simply choose another easily recognized number. The test result is for your benefit. It is not necessary to provide any information about your well.

Samples are analyzed on the spot which usually takes less than 5 minutes, and the results are given directly to the homeowner. If the nitrate level in a sample is elevated, MDA/MDH staff will refer the homeowner to certified labs that will retest the water. MDA/MDH staff will also distribute printed information to the homeowner describing ways to correct the problem. Minnesota Extension Service bulletins will also be available on fertilizer Best Management Practices (BMPs), which are guidelines homeowners can use to apply products in both an economically and environmentally sound manner as well as information on manure management and crediting nitrate in irrigation water.

For further information on water testing clinics for nitrate, contact Dennis Bruening, MDA, Soil Scientist at 612-297-4400 or Bruce Montgomery, MDA, Soil Scientist at 612-297-7178.

Water testing clinics planned

Homeowners with private wells can take advantage of two nitrate water testing clinics in our area. The Minnesota Department of Agriculture will be conducting these clinics to evaluate nitrate levels in private water wells, including farm wells.

Cooper Extension

Dates and Locations are: Tuesday from 10 a.m. to 3 p.m. at the New York Mills School; and Wednesday from 10 a.m. to 3 p.m. at the Perham Prairie Wind Middle School.

The tests are free. Bring in a half cup of water in a clean plastic baggie with a lock.

Wells that are less than 50 feet in depth can have nitrates leached into them. Major sources of contaminants are animal wastes, fertilizers and human sewage.

Sheep and Grazing Day

Saturday, Sept. 20, from 9:40 a.m. to 3:45 p.m. is the date for the Sheep and Grazing Day at the West Central Experiment Station in Morris.

Topics include: Grazing Research, Keeping Grazing Animals Healthy, Pasture Systems for Sheep, Beef and Dairy.

Feed Mangers for Dairy

Much research has been done on surfaces of feed mangers. The surface can have a direct influence on feed intake.

Eating surfaces must be smooth, clean and free from left over feed and other debris in order to encourage good feed intake and aid in control of disease. The low pr.

Water testing doubles

BY LAWRENCE SCHUMACHER
Daily Journal

Reflecting increased concern over water quality, this year's annual free water testing clinic saw roughly twice the number of well water samples tested as last year's.

The clinic on Monday saw 307 samples brought in for nitrate screening to the West Otter Tail Soil and Water Conservation District office in Fergus Falls. The clinic was sponsored by the Minnesota Departments of Health and Agriculture.

"The response has been great this year, much higher than in previous years," said Denton Bruening, MDA water testing supervisor.

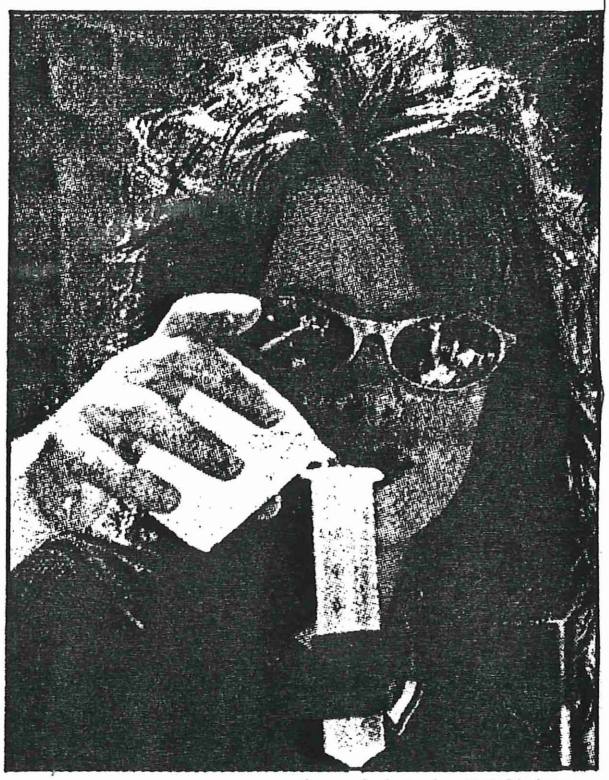
Approximately 5 percent of the tested well samples indicated levels of nitrates higher than the Environmental Protection Agency's Maximum Contaminant Level of 10 parts per million, Bruening said. That is a lower percentage than last year's results indicated, he added.

Nitrate is the most common contaminant in Minnesota's groundwater. It is of particular concern when it is consumed by infants because it can cause suffocation due to a condition called methemoglobinemia, also known as "blue baby syndrome".

Water samples are tested for nitrates using a $6,000 piece of computerized equipment that scans the water using ultraviolet rays. The concentration of nitrates is displayed within a few seconds.

One concerned group, the Battle Lake Association,

See Nitrate — **Page 3**



Journal photo by Pat Christman

Jennifer Gallus of the Minnesota Department of Agriculture tests for nitrate levels Wednesday.

Photo by Lori Ehde

Assistant Rock County Land Management Director Doug Bos tests a local water sample with Aron Anderson of the Minnesota Department of Agriculture. Free testing was offered at the fair Friday from noon to 7 p.m. According to Bos, 42 local samples were tested.

Local water tested for nitrates

Out of 42 drinking water samples, 18 test positive

By Lori Ehde

The water testing booth was popular Friday at the Rock County Fair. According to Assistant Rock County Land Management Director Doug Bos, he and Aron Anderson of the Minnesota Department of Agriculture tested water samples brought in by 42 local residents.

Free testing was offered at the fair Friday from noon to 7 p.m. in the Commercial Building. According to Bos, 18 of the 42 samples tested positive for nitrate levels over the amount recommended by the Public Health Department as safe.

"This was worthwhile for the Department of Agriculture to come down."

- Doug Bos, Assistant director, Rock County Land Management

Ten parts per million is considered the highest amount of nitrates that can be safely consumed by humans. Most of the 18 positive test samples were at 10 to 20 parts per million, but Bos said a couple samples were at 87 and 160 parts per million.

He said he was pleased to have 42 residents participate in the free testing. "This was worthwhile for the Department of Agriculture to come down," Bos said.

The primary sources of nitrate contamination in local wells are fertilizer runoff and feedlots and septic systems that are poorly maintained. Bos said the 18 samples that tested positive for nitrates were taken from locations all over the county. "It's individually based as to what's going on in the area,"

Water testing/See page 2A

Nitrate Water Testing Clinic News Articles and Events

Appendix 7

◆HYDRO TESTING

Journal photo by Pat Christma

Dan Haglund of the Minnesota Department of Agriculture calibrates a nitrate testing machine Monday afternoon during a free wate testing clinic at the Soil and Water Conservation District office in Fergus Falls.

When you bring a sample of water to one of MDA's nitrate clinics, the reponse is fast (results within 10 minutes) and accurate (to one part per million (PPM)). Nitrates are naturally found in soil but when they show up water, they could spell trouble. Nitrates themselves are harmless enough but in very young babies they convert to nitrites. This nitrate is same one that gives packaged meats their bright fresh color by combining with hemoglobin at the expense of oxygen. Baby turns blue and doesn't look fresh at all! While adults can take much higher levels of nitrates in stride, the presense of nitrates in water can be a warning of more serious contaminants in the water supply.

Under a two year LCMR project, Special Projects Unit workers have been holding testing clinics throughout the state, 48 so far this year according to intern, *Jennifer Gallus.* She reports between 5 and 40 percent of samples have been high in nitrate - high being anything over 10 PPM and they have been as high as 100 PPM according to Special Projects, soil scientist, *Denton Bruening.* The project's field testing equipment, the Hach 4000 Spectrophotometer has been a reliable work horse but just to be certain, 10 percent of all samples are returned to the MDA lab for verification. The results for better or worse are an important service that can either assure or protect homeowners seeking a reading on their water supply while providing valuable information to MDA on areas in need of improved nitrate management practices.

Students test water

On Friday, Feb. 30, Jennifer Gallus, left, from the Minnesota Department of Agriculture, and her assistant Shelly Strusz, back right, directed a group of fifth graders Andy Thomforde, Brian Buck and Molly O'Connor in testing the level of nitrates in water they brought from home. Gallus had talked to the fourth, fifth and sixth graders about nitrates in drinking water on Thursday. If the water had 10 ppm or below, the water considered safe for infants by health officials.

WSWCD to offer free nitrate tests July 29

The Wabasha Soil and Water Conservation District is hosting a nitrate water testing clinic again this year. It will not be at the Wabasha County Fair this year. The testing will be at the Old Mittle Schule on July 29 from 9-12 a.m.

Mark your name or ID number on a zip lock bag. Run the water 5 to 10 minutes before taking a sample. 4 ounces or a half a cup is a sufficient amount. The sample should be no more than 24 hours old and should be cool when arriving at the clinic. The water samples brought to the clinic are tested on the spot and analysis usually takes less than three minutes.

Contact the Wabasha Soil and Water Conservation District with questions at 612 565 4673 611

OTC water nitrates lower than most

BY LAWRENCE SCHUMACHER
Daily Journal

Otter Tail County residents wanted to know what was in their water this year, and the answer was — not as much as we feared.

More Otter Tail County residents brought in water samples to Minnesota Department of Agriculture nitrate water testing clinics than any other county in Minnesota where testing took place in 1997.

However, the results indicate that nitrate groundwater contamination may not be a countywide problem, but rather limited to certain areas of the county.

"From what the numbers seem to indicate ... it doesn't sound like the nitrate levels in the county are as high as what people had suspected," said Harold Stanislawski, Minnesota Department of Agriculture representative. "There do seem to be a few problem areas, but overall this is a good indicator of the water quality in the county."

A recently released summary of 1997 clinics in 35 counties revealed that 992 water samples from Otter Tail County were analyzed, the most of any county, participating in the clinic.

Of those analyzed, 78 samples or 8 percent revealed nitrate levels in excess of federal Environmental Protection Agency guidelines.

Otter Tail County Extension Educator Bob Stommes said the news was generally positive.

"The results seem to indicate that the nitrate levels are not as high as some feared," he said. "The levels we see here in comparison to other counties are not very bad at all."

Water with more than a 10 parts per million concentration of nitrates is considered unsafe for infants, pregnant women and people with certain rare respiratory diseases to drink.

> "The levels we see here in comparison to other counties are not very bad at all."
> — Bob Stommes

In Otter Tail County, four nitrate clinics were held in 1997, in Fergus Falls, Ottertail, New York Mills and Perham.

Water samples brought in to the Perham clinic showed the highest concentrations of nitrates, with 13 percent of the 346 samples higher than EPA levels. Four percent of samples brought to Perham contained nitrate levels above 20 parts per million.

Samples analyzed in Fergus Falls contained the lowest levels of nitrates. Only 3 percent of the 304 samples analyzed in Fergus Falls were shown to contain high levels of nitrates.

Water clinics at New York Mills and Ottertail fell in the middle, with 9 percent of the 151 Ottertail samples and 6 percent of the 191 New York Mills samples recording high nitrate concentrations.

Two areas of high nitrate concentrations were revealed, in the Perham and Clitherall areas. Stanislawski said the causes of high nitrates in those areas should be investigated more thoroughly.

"Clitherall has a real history of high nitrates," he said. "There, septic systems that have gone bad are probably a major contributor to the problem.

"The Perham area deals with some of the same kinds of problems. There are lots of unapproved septic

See Nitrates — Page 3

Page 4 FILLMORE COUNTY JOURNAL Monday, September 1, 1997

Results from water testing clinics released

By Donna Rasmussen

Results from two water testing clinics have been released by the Minnesota Department of Agriculture. The clinics, held on August 19 in Lanesboro and Mabel, offered an opportunity for county residents to test water samples from private wells for nitrate-nitrogen. The clinics were free, and were sponsored locally by the Fillmore County Water Planning Committee and the SWCD.

In Lanesboro 81 samples were analyzed. The nitrate levels ranged from 0 parts per million (ppm) to 19 ppm. Half the samples were over 2.5 ppm and half were below. Eleven samples had nitrate levels above 10 ppm. There were 69 samples tested in Mabel ranging from 0 ppm to 34 ppm. Half the samples (35) were over 10 pp

umber of samples tested does not reflect the number of wells tested since some people brought in more than one sample per well, for example, before and after in-home water treatment systems. Results may also be skewed slightly if people who suspect problems with their well are more likely to get their well water tested.

Nitrate-nitrogen in drinking water is a health concern at levels above 10 ppm, the safe drinking water standard established by the U.S. Environmental Protection Agency. Levels above 10 ppm are especially a concern for infants under six months of age because of the danger of developing methemoglobinemia, or "blue baby syndrome". This is caused when nitrate is converted to nitrite which interferes with oxygen transport in the blood. Infants and pregnant women should not drink water with nitrate-nitrogen levels over 10 ppm, and infant formula should not be prepared with water high in nitrate. ***Boiling water with high nitrate will not remove the nitrate and will cause the nitrate levels to become even more concentrated.*** There are no immediate health effects for older children or adults. Long-term effects are not known. Health effects may be seen in livestock depending on nitrate content of the feed being used. Nitrate levels above natural background levels of 1 ppm do indicate that the well is being impacted by surface water, and other more harmful substances may be present in the water.

Water testing clinics

The Minnesota Department of Agriculture (MDA) and the Minnesota Department of Health (MDH) Well Management Unit, will be conducting a water clinic to test drinking water, livestock watering systems, and irrigation wells for the presence of nitrate in Todd County and surrounding area. The clinic will be held Sept. 25 at the Long Prairie Armory in Long Prairie from 1-6 p.m. Tests are free.

In order to participate, homeowners must bring to the clinic site at least one-half cup of water in either a Whirl-Pak plastic bag or a Ziploc-type bag. Before obtaining a sample, allow the water to run 5-10 minutes to get a representative sample. Four ounces or one-half cup of water is sufficient to have tested. Homeowners who have water treatment equipment installed should take two water samples, one before and one after the treatment process. Homeowners with just a water softener need only to take one sample, either before of after the water softener. Samples should be less than 24 hours old and must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners are asked to label the bags with their name, phone number and a well identification number if more than one well is sampled. Homeowners also have the option of remaining anonymous. In that case they should simply choose an easily recognized number.

For further information on water testing clinics for nitrate, contact Denton Bruening, MDA, Soil Scientist at (612) 297-4400 or Bruce Montgomery, MDA, Soil Scientist at (612) 297-7178.

JENNIFER GALLUS of the Minnesota Department of Health assists Rea Pesta at the water testing

East Otter Tail County

Extension News & Views

Denzil D. Cooper
County Extension Director

Nitrate Water Clinic --

If you have a private well that is used for humans or animals, it is wise to have it's water tested periodically. Nitrate is a common contaminant found in shallow wells in Minnesota. Wells that are less than 50 feet in depth can have nitrates leached into them. Major sources of contaminants are animal wastes, fertilizers and human sewage.

A free nitrate water testing program is scheduled for the public in our County.

The dates are: Tuesday, September 16, 10:00 a.m. - 3:00 p.m.- New York Mills Public S[illegible] and Wednesday, S[illegible]ber 17, 11:00 a.m. - 3:00 p.m. - Perham Middle School.

The Minnesota Department of Agriculture will be doing the testing. Bring a half cup of water in a clean zip-lock type bag.

Free Nitrate Water Testing Clinic

The MDA is offering free water testing of nitrates at selected locations across Minnesota. The purpose of the testing to raise environmental awareness related to potential groundwater contamination. Elevated levels of nitrates in drinking water can cause Blue-baby Syndrome in infants. Farmers and rural residents wit private wells are encouraged to participate in the testing of drinking, irrigation, and livestock water supplies. Monitoring studies have shown up to 25% of drinking wells contain nitrate-N levels above the health advisory limits of 10 PPM

The next testing clinic in southwest Minnesota is September 9 at the Southwest Experiment Station near Lamberton, MN at their annual fall field day. The testing procedure only requires a 1/2 cup of water. Take the sample before any water treatment devices.

If you can not attend the Sept. 9 field day, contact Russ Derickson at 605-688-4740 and he will collect a sample and submit it for testing.

Water testing clinics for nitrate scheduled in July

The Minnesota Department of Agriculture and the Minnesota Department of Health, (MDA/MDH) well management unit, will be conducting a water clinic to test drinking water, livestock watering systems, and irrigation wells for the presence of nitrate in Stearns County and surrounding counties.

Nitrate is the most common contaminant in Minnesota's ground water.

The clinics will be held:

Tuesday, July 8, 9 a.m. to 4 p.m., Old Log Cabin, Kandiyohi County Fairgrounds, Willmar.

Thursday, July 10, 9 a.m. to 12 noon at the Paynesville Area Senior Center.

Friday, July 11, 9 a.m. to 4 p.m. Cold Spring City Hall.

Thursday, July 17, 9 a.m. to 4 p.m.at the St. Martin Co-op.

In 1996, more than 30 clinics were held in over 25 counties. In order to participate, homeowners must bring to the clinic site at least one-half cup of water in either a Whirl-pak plastic bag or a Ziploc-type bag.

Before obtaining a sample, allow the water to run five to 10 minutes to get a representative sample. Four ounces or

Water testing clinics dates

- Tuesday, July 8, 9 a.m. to 4 p.m., Old Log Cabin, Kandiyohi County Fairgrounds, Willmar.
- Thursday, July 10, 9 a.m. to 12 noon at the Paynesville Area Senior Center;
- Friday, July 11, 9 a.m. to 4 p.m. Cold Spring City Hall.
- Thursday, July 17, 9 a.m. to 4 p.m. at the St. Martin Co-op.

should take two water samples, one before and one after the treatment process. Homeowners with just a water softener need only to take one sample, either before or after the water softener.

Sample should be less than 24 hours old and must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners are asked to label the bags with their name, phone number and a well identification number if more than one well is sampled. Homeowners also have the option of remaining anonymous. In [illegible] should simply choose

benefit. It is not necessary to provide the MDA with any information about the well.

Samples are analyzed on the spot which usually takes less than five minutes, and the results are given directly to the homeowner. If the nitrate level in a sample is elevated, MDA/MDH staff will refer the homeowner to certified labs that can test the water. MDA/MDH staff will also distribute printed information to the homeowner describing ways to correct the problem.

Farmers, commercial applicators and commercial dealers are also encouraged to participate in the empty pesticide container collection program. Any size pesticide container up to and including 55 gallons that are made of #2 HDPE plastic are recyclable and will be collected. Remove the caps from the containers and make sure the containers are triple rinsed. No wet or solid residue can be left in the container. Containers will be collected at the Albany, Sauk Centre and St. Martin sites only.

For further information on water testing clinics for nitrate, contact Denton Bruening, MDA, soil scientist at 612-297-4400 or for information on the empty pesticide container collection program contact Steve Poncin at 612-

129 area wells checked for nitrate

by [illegible] Walker

NORTH BRANCH – "I told them we'd have 100," said Dennis Lockwood, North Branch building inspector. That's how many people he'd thought would come in with water samples if a water testing clinic was held.

Lockwood's estimate was low.

Wednesday, Feb. 26., 129 tests were done by Denton Bruening, of the Minnesota Department of Agriculture and Curtis Wunderlick, of the state's department of health, environmental health division.

The water testing clinic came on the heels of the discovery in mid-February of some isolated cases of high levels of nitrate in wells east of North Branch.

Nitrate, which is a common contaminant in many Minnesota wells, is a naturally occurring chemical made of nitrogen and oxygen. It is found in air, soil, water and plants. Much of the nitrate in the environment comes from decomposition of plants and animal wastes. Fertilizers also add nitrate to the environment.

The Minnesota Department of Health recommends doing yearly nitrate tests. Although state regulations require well contractors to test new wells for bacteria and nitrate, home-ov[illegible]re responsible for subsequent tests.

[illegible] who brought water to be tested last Wednesday were asked to fill out a questionnaire regarding their well's construction, depth and age.

Of the first 100 samples, Bruening said, eight tested out at a level where the homeowners should take corrective measures if they had children in the home, or grandchildren who visited them. Two of those first tests were borderline.

Bruening said the samples testing too high were usually from shallow or older wells, or both.

These high readings, Bruening said, could be caused by a number of things.

"A leaky septic system, manure, fertilizer – it could be any of those," he said. "It can even be caused by an outhouse that's been gone for 20 years."

Homeowners whose wells have a high nitrate reading can address the problem a number of ways. Drilling a deeper well might solve the problem, according to Bruening. Or, he added, they can find another water source or purchase a purification system that removes nitrate.

MARTIN COUNTY

FREE RURAL WATER TESTING

FOR RURAL RESIDENTS WITH A PRIVATE WELL

Monday and Tuesday, September 8 and 9

Sept. 8

9-12 Trimont Community Building

2-5 Auditorium of City Hall in Dunnell

Sept. 9

9-12 TFE Basement Meeting Room in Truman

2-6 Water Plan Office, First Floor of the Courthouse in Fairmont

Bring a fresh water sample in a clean container (does not have to be sterile). Each sample will be tested for nitrates. On the day of testing, residents who have a vulnerable well will have an opportunity to have a coliform bacteria test done. You may go to any of the four sites listed to have your sample tested. Questions should be directed to the Minnesota Extension Service Office at 235-3341 or the Water Plan

Aaron Anderson, Agricultural Specialist with the Minnesota Department of Agriculture from St. Paul, MN.; Tanya Hanson, District Manager of the Red Lake County Soil and Water Conservation District tested the water sample that Donna Linder and her two sons, Benjamin and Levi, brought. The Water-Testing Clinic for Nitrates was held in Oklee on Friday, October 2. This service is provided in every community in the state yearly. There were 16 water samples tested in Oklee and 12 in Red Lake Falls where a clinic was held earlier that

Lewiston drinking water tested for nitrates

By Jeff Dankert
Winona Daily News

LEWISTON, Minn. — Residents concerned about nitrate levels in their drinking water took advantage of free water testing in Lewiston Monday.

The clinic was held at the U.S. Department of Agriculture's Ag Service Center, and about 100 people were expected to have their water tested by day's end, according to Denton Bruening with the Minnesota Department of Agriculture.

Nitrate is a chemical produced from fertilizer and manure runoff and is the most common contaminant in Minnesota groundwater. The major concern from nitrates are its effects on unborn and newborn babies.

"Once it's in the bloodstream the blood loses its ability to take in oxygen," Bruening said. This can cause the baby's skin to turn blue and lead to suffocation, Bruening said, in what is called blue baby syndrome.

The federal drinking water standard for nitrates is a maximum of 10 parts per million, and Bruening said of 90 samples tested by 3 p.m., 28 had exceeded this level. Of the 28, about half were above 20 ppm, Bruening said.

Amy Cordry, who lives on a farm south of Winona, brought a sample of her water in "just as a safety precaution."

She said they first had it tested following the advice from a pediatrician after the birth of their son. Her water tested 0.7 ppm for nitrates Monday, well below the limit.

"That's good," she said. "That's where it's been pretty much since the last time (it was tested)."

Aside from blue baby syndrome, Bruening said nitrate may also lead to spontaneous miscarriage, but this is not certain yet. At very high levels it can cause digestive problems with young hogs and calves.

Last year approximately 40 percent of the wells tested near Lewiston were beyond the unsafe limit. Bruening cautioned that these were only for people who brought samples in and may not reflect the actual pollution in the area.

In addition to providing free testing, Bruening said the clinics allow people to get answers for their well water questions, find alternatives to fertilizer application, discover solutions to farm and feedlot management and find ways to improve their construction.

Bruening said people can install treatment systems that rely on reverse osmosis or distillation. Both remove nitrates and can cost from $400 to $1,000.

However, distillation is more foolproof then reverse osmosis. He said about half of the water samples from reverse osmosis systems fail the standard for nitrate due to a bad membrane, which should be replaced yearly. For example, he said one sample showed nitrates of 14-16 ppm.

He said the best solution is to find a clean source of water, which can require digging a new well. This can cost about $15,000 to $20,000. Most wells are currently 300-600 feet deep, but to get a clean source owners may have to drill down to the next layer of water, or aquifer. There are

Other test sites

Clinics are scheduled today at the community center in Lanesboro from 9 a.m. to 12:30 p.m. and at the fire station in Mabel from 2-6 p.m.

At least one-half cup of water should be collected in a Zip-Loc bag within 24 hours of testing. Store it in the refrigerator before bringing it to be tested. The bag should labeled with identification.

Run water five to 10 minutes before collecting the sample.

Water Testing Clinic Successful

The Minnesota Department of Agriculture (MDA) in cooperation with the McLeod County Planning, Zoning and Environmental Services Office and the McLeod County Public Health Department held a water clinic to test drinking water. This clinic was held on August 28, 1997 in Glencoe.

The purpose of the clinic was to test [illegible]g water from residences in [illegible]nty for nitrates. Nitrate levels above 10 milligrams per liter of nitrate - nitrogen are considered above the safe levels according to standards set by the United States Protection Agency.

Nitrate itself is relatively nontoxic to humans. Health problems associated with nitrates arise primarily after nitrate enters the body and is converted to nitrite, the chemically active form of nitrogen. This form of nitrogen can be especially serious to infants under six months old and in adults with existing stomach disorders. In infants, high nitrites can cause methemoglobinemia a condition in which the oxygen-carrying capacity of blood is reduced. This can cause a bluish or slate grey discoloration of the skin, lips or nailbeds, also known as blue baby syndrome. In extreme cases, the infant suffocates.

Well samples were brought in by residents in the county. A total of 83 samples were brought in and tested. Of these only 6 were above the safe level of 10 milligrams per liter. The highest reading was 46 milligrams per liter. The other samples were below 10 milligrams per liter with 70 of the samples being 0. Those people with high levels were advised to do more in depth testing to verify the results and were cautioned on the effects of high nitrates.

Because of the success of this program, arrangements are in the planning stage to hold this clinic again next year.

Appendix 7

Nitrates / Rock was highest

From Page 1

systems in the Richville area. There are also a lot of feedlots there and that needs to be looked at too. Some people say irrigation farming in both areas needs to be investigated more closely, and it will be."

The county reporting the highest number of high nitrate samples was Rock County, where 44 percent of samples testing above the EPA limit. However, Rock county only analyzed nine samples.

Closer to the area, Wadena County reported 20 percent of the 345 samples tested had high nitrate concentrations. Wadena also reported 7.2 percent of the samples tested showed levels of nitrates in excess of 20 parts per million, or double the EPA guideline levels.

However, just to the south in Todd County, only 3 percent of the 160 samples analyzed were found to have high nitrate content. Only 1.8 percent of the samples contained more than 20 parts per million.

Steps that should be taken how that the database of information about nitrates in Otter Tail County is growing include identifying and sealing abandoned wells and monitoring areas of high concentration on a continuing basis, Stanislawski said.

However, even after taking steps to reduce nitrate contamination in those areas that need it, it will be a while before nitrates are no longer a problem, he added.

"Nitrates take a while to dissipate," he said. "They don't disappear overnight."

Nitrates emerge in water sampling from area wells

By CHUCK JOHNSON

Nearly 10% of local drinking water sampled for nitrates recently exceeded the state maximum safe drinking water standard.

The Minnesota Department of Health and Department of Agriculture conducted the free testing clinics in Perham, New York Mills and Ottertail in recent weeks. As expected, there was high participation with 694 people having their water tested for nitrates.

66 of those 694 exceeded the suggested maximum level of nitrates for safe drinking water, or 9.5%. Samplings in Perham had the highest percentage exceeding the standard, at 12%, with 8.5 in Ottertail and 5.6% in Mills. The maximum recommended level of nitrates in drinking water is 10 parts per million.

Jennifer Gallus, who was on hand for testing last week, has been involved in numerous such testings during the summer. She said she wasn't surprised by either the number of participants, or the nitrate levels revealed by sampling.

Awareness of water quality is especially high in the sand plains area of west central Minnesota, so the large showups at local test sites was predictable. And previous testing showed a significant nitrate presence.

"That area (west central Minnesota) has lots of problems, she said, with your sand and things like fertilizing lawns along lakes and potato farming. The results aren't surprising to me."

Those results, plus continued high demand for sampling, mean the program will come back into the area again next year, she adds.

Here's a look at results from the three sampling sites:

PERHAM

-- 347 samples tested (plus 144 samples by students, and 55 by a lake association, neither of which is included in overall results)

-- 42 exceeded drinking water standard of 10 ppm, or 12% of total

-- Sampling done September 17

NEW YORK MILLS

-- 194 samples tested

-- 11 exceeded drinking water standard of 10 ppm, or 5.6% of total

-- Sampling done September 16

OTTERTAIL

-- 153 samples taken

-- 13 exceeded drinking water standard of 10 ppm, or 8.5% of total

-- Sampling done August 23

FREE NITRATE TESTING CLINIC

On August 15 our office, along with the Minnesota Department of Agriculture (MDA), held two free nitrate testing clinics, one located in Menahga and the other one in Wadena. At Menahga 124 samples were tested, and at Wadena 119. The results at the Menahga area showed that only 4 out of 124 samples had nitrates above the recommended drinking level of 10 ppm (parts per million) or less. Results of the Wadena clinic were unavailable at time of printing.

A big thanks to everyone who took part in the free clinics. We did notice, however, that of all the participants who filled out survey forms, only 8 were active farmers.

We anticipate setting up several clinics in the future and hope that more people take advantage of this informative free water testing clinic.

If you are a group that would like to sponsor a water testing clinic or you know of a group that would be interested in helping promote this worthwhile event please call Don at 218-631-3195.

The Wadena Soil and Water Conservation District has been involved with the Minnesota Department of Agriculture (MDA) FREE NITRATE WATER TESTING CLINICS held in the Wadena County area in the past four years. These clinics, that have been held at major cities in our area, have served many people. The MDA will now furnish (loan) the testing equipment to the Wadena SWCD so we can go out to serve smaller groups. We are asking groups or clubs to help with organizing site locations for us to bring the testing equipment to so that people will not have so far to travel with their water sample(s). We will be able to have the testing equipment for about a week at a time. During that time we could do testing in evenings or short periods of time throughout the day. It would be nice to do ten to twenty of these smaller clinics in Wadena County. So please get involved and contact our office. **SPECIAL NOTE: Free water testing clinic scheduled for Menahga and Wadena in July. Watch for dates and times.**

Thursday, January 22, 1998 5a

Water testing

Members of the Staples Motley FFA chapter helped Minnesota Department of Agriculture and Wadena County Soil and Water Conservation District test water samples for nitrates at the Second Annual Farm Family Appreciation Day sponsored by the Staples Motley Area Chamber of Commerce Monday at the Staples M[illegible] High School cafeteria. Glenn Williams, left, of Staples b[illegible] in a water sample to be tested by Jay Winter of the FFA. N[illegible]50 people attended the free pancake and sausage meal and the talk by Sen. Dallas Sams. Other educational booths were available on Family Health by Greater Staples Hospital, Manure Management and Master Gardener by Minnesota Extension, Farm Financial Data by Central Lakes College and International Programs by Minnesota International Center. Co-sponsors were the Todd Wadena Electric Cooperative and Todd County American Dairy Association

A Sincere Thank You

to all who participated in our free nitrate water testing clinic that was held at the Farm & Home Show at Southwest Christian High School in Edgerton on Saturday, February 14. We're very pleased by the response we received and feel it is a reflection of everyone's concern for a clean, safe supply of drinking water. We would also like to thank the Edgerton Chamber of Commerce for giving us the opportunity to offer the water testing clinic at the Farm & Home Show.

Phil Berg, John Biren, Mavis Menning, Denton Breuning

Pipestone County Extension Office
Pipestone Conservation and Zoning Office
Minnesota Department of Agriculture

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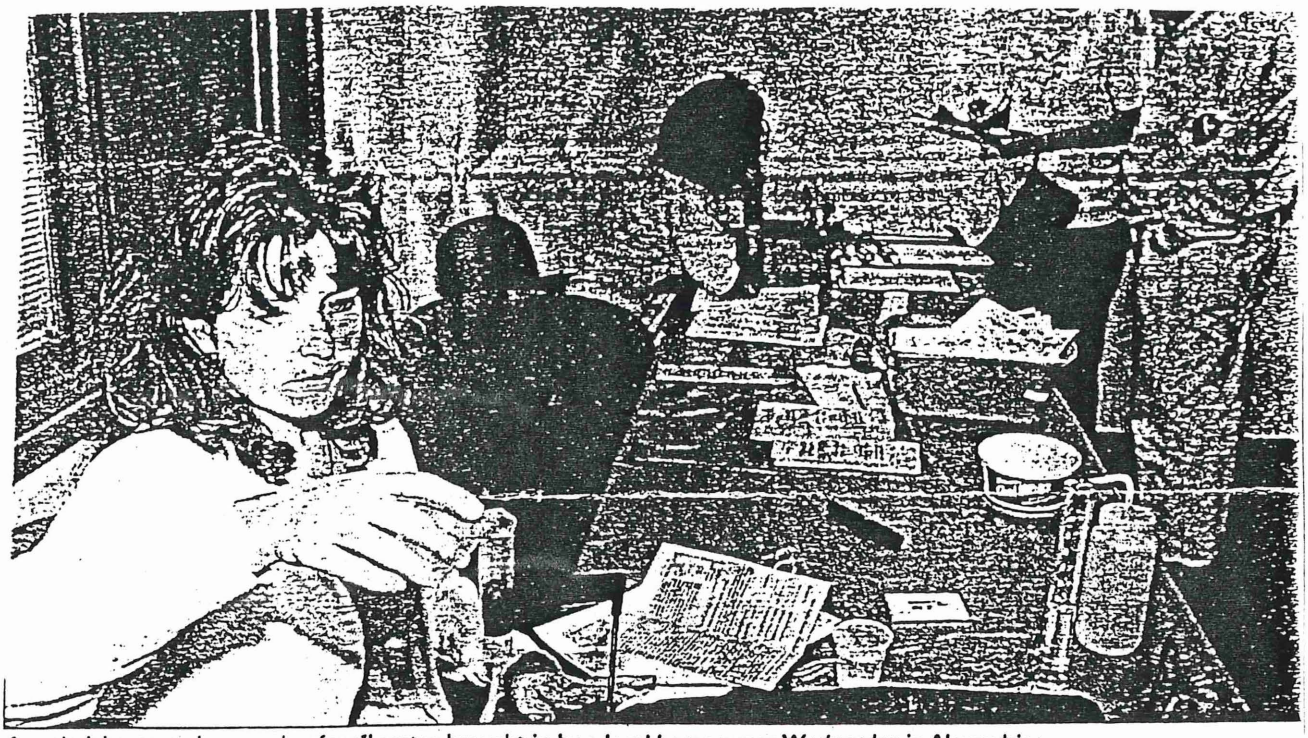


A technician tested a sample of well water brought in by a local homeowner Wednesday in Alexandria.

Tests show most county wells free of nitrate pollutants

BY DENNIS DALMAN
STAFF WRITER

Tests show that most well water in Douglas County is "really good" or at least nitrate-free, according to the Minnesota Department of Agriculture.

This week, after a big ad blitz, 228 residents of Douglas County and surrounding areas brought in samples of their well water for free testing by specialists from the state ag department.

The officials set up shop at the Douglas/Pope County Hazardous Household Waste office in Alexandria.

Denton Bruening, resource specialist with the ag department, talked about the results Thursday morning.

The water samples were tested only for nitrates – the most common pollutant in drinking water.

"Overall, the water samples in the Douglas County area looked really good," Bruening said. "A very low percentage were high in nitrates."

A couple of the samples with high nitrates were from Pope County.

The only other problem spot was a small area near Forada, where a half-dozen samples tested above the standard safety limit of 10 parts per million.

Most of the samples that tested high were the result of poorly constructed wells, said Bruening. He added that at the time those wells were built, they may have been following acceptable building practices, but the wells have deteriorated over time, resulting in rusting and seepage.

"It was an excellent turnout," said Bruening. "We were hopping."

Most samples were from Douglas County, but others came from Pope, Otter Tail and Becker counties.

Between 5 and 10 percent had high nitrate levels, above the standard safety level of 10 parts per million.

Those with nitrate problems were advised to not give the water to children 6 months or younger.

For those small children, high nitrates can result in a condition known as "blue baby syndrome." Nitrates build up in their systems to the point where their blood can no longer take in oxygen and they suffocate.

"High nitrate levels can have serious consequences," warned Bruening. "The problem isn't as simple as diarrhea. It can be deadly to small children."

Those with high nitrate levels in their well water have a few options. The ag department recommends they should try to pinpoint the source of the problem, such as perhaps a pile of manure, which can be removed, or a septic system that is not working properly, which can be replaced.

"In most cases, there is a construction problem and a new well would be a remedy," said Bruening.

If replacing the well is not an option, those with nitrate problems can also try two other solutions – reverse osmosis or distillation.

Until corrective measures are taken, those with nitrate problems should get a different water source, such as bottled water, for their children.

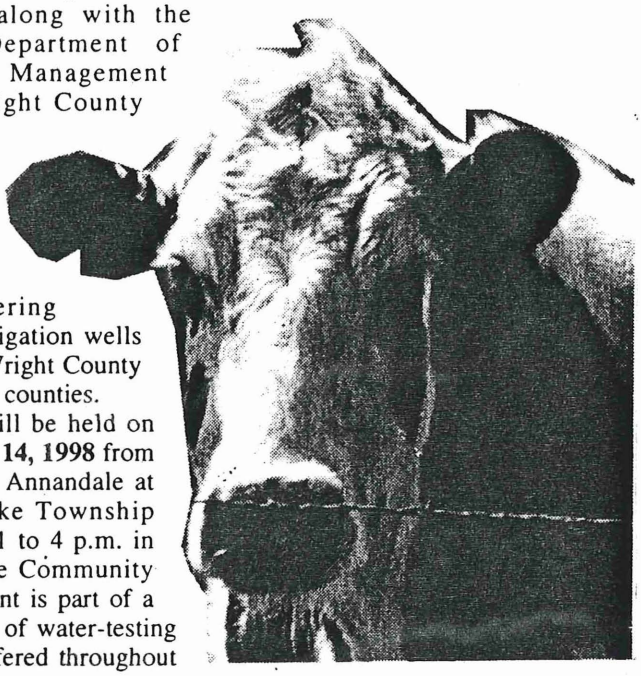
The free nitrate testing is conducted once a year by the Department of Health, the Department of Agriculture and Douglas County Solid Waste Management.

Nitrate *could be removed*

FROM PAGE A1

Livestock watering system test to determine nitrate levels in private wells

The Minnesota Department of Agriculture, along with the Minnesota Department of Health's Well Management Unit, and Wright County Water Planning, will conduct a clinic next month to test drinking water, livestock watering systems and irrigation wells for nitrates in Wright County and surrounding counties.



The clinic will be held on **Tuesday, April 14, 1998** from 8 to 11 a.m. in Annandale at the French Lake Township Hall and from 1 to 4 p.m. in Montrose at the Community Center. The event is part of a statewide series of water-testing clinics being offered throughout 1998.

Nitrates are the most common contaminants in Minnesota's groundwater, and a significant number of the state's wells have high nitrate levels. With that in mind, MDA Commissioner Gene Hugoson urges people to take advantage of the free clinics.

"We strongly recommend that people take advantage of this service because studies indicate somewhere between 5 percent and 25 percent of the private wells in greater Minnesota have nitrate levels above the federal drinking water standard," Commissioner Hugoson said. "Nitrates can be a major problem when they are consumed by infants because they can cause suffocation due to a condition known as 'blue baby' syndrome."

In 1997, 60 clinics were held in 35 countries across the state. Clinics have been offered at county fairs, University of Minnesota Agricultural Experiment Station field days, and as separate events.

In order to participate in the testing, homeowners must bring at least one-half cup of water in either a Whirl-Pak plastic bag or a Ziploc-type bag. In order to get a representative sample, allow the water to run 5 to 10 minutes before filling the bag. Homeowners with water treatment equipment should take two water samples - one before and one after the treatment process. Homeowners with just a water softener need only take one sample, either before or after the water passes through the water softener.

Samples should be taken no more than 24 hours before testing, and they must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners should mark the bags with their name, phone number and a well identification number if m ore than one well is sampled.

If they wish, homeowners may remain anonymous. In that case they should simply choose another easily recognized number to put on the well samples. If is not necessary to provide information about the wells from which water is taken.

Samples are analyzed on the spot - the process usually takes less than 5 minutes - and results are given directly to the homeowner. If the nitrate level in a sample is elevated, MDA/MDH staff can refer the homeowner to certified labs that will retest the water.

MDA/MDH staff will also distribute information to the homeowner describing ways to correct nitrate problems. Minnesota Extension Service bulletins about fertilizer Best Management Practices will be available, as well as information on manure management and crediting nitrate in irrigation water.

The MDA/MDH's nitrate testing clinics are presented in cooperation with county extension educators, soil and water conservation districts and local organizations.

"We are very pleased with the attendance and public interest in past clinics," Commissioner Hugoson said. "In some cases, as many as 500 people brought in water samples for testing. Many people asked that the clinics continue so they can feel more confident that the water they are drinking is safe."

Where do I get more information?

Fore more information on the clinics, contact MDA nitrate water testing coordinator Jennifer Gallus at 612-215-9037 or MDA soil scientist Bruce Montgomery at 612-297-7178.

Nitrate / Perham area has some high nitrate concentratio

From Page 1

brought in 50 water samples to be tested, Bruening said. Only one of the samples indicated a high nitrate concentration, he added.

The causes of high nitrate concentration can vary, he explained.

"In many cases, the age of the wells and the depth plays a large part in determining the nitrate concentration," he said. "Hand-dug wells are notorious for having high nitrate concentrations. If there are many wells tested and only one or two have high nitrate concentrations, we generally suspect the wells. In some cases, geographic concentrations appear, and that's when we want to look more closely at a cause other than the wells."

Three such areas have appeared over the last two years of testing. The most consistently high nitrate concentrations are found around the Perham area. The screenings have also recorded clusters of nitrate concentration to the south and east of Clitherall Lake and north of the City of Ottertail, around Rush Lake and Lake Buchanan.

The cause of these concentrations is hard to determine, because of the age of the water tested, Bruening said.

"Most of the water tested is 20 years older or more," he said. "Of course, it varies with the depth of the well, but what we're testing today is usually the result of actions taken 20 or more years ago, so it's hard to know how what we do today will affect the water supply."

Concerned well owners who dropped off their water samples were asked to fill out a questionnaire listing the age of the well, its depth, distance from feedlots, septic systems or agricultural fields, and its type of construction. All these factors have been shown to influence the amount of nitrates present in well water, Bruening said.

A woman from Fergus Falls, who did not want to be identified, owns a cabin on Jewett Lake and was the last person to bring in her water sample for testing. She said she knew from previous testing approximately five years ago her water has a high concentration of nitrate. She said she just wanted to be sure how high.

"When we go up there, we don't use the water for drinking or cooking," she said. "At least we use it as little as possible. It's down the hill from a farm, where there used to be cattle. There might be something wrong with our well, though."

The results of her test indicated the high nitrate concentration had not disappeared. Her water showed a concentration of 26 parts per million, almost three times the same limit.

From her survey, Bruening determined her well may be the cause of the problem. It is 30 years old, shallow and built using sand-point construction. All of these things, combined with the fact that a neighbor tested his well and recorded negligible results, led Bruening to speculate her well is probably the cause of the high nitrate levels.

We haven't talked about fixing it up," the woman said. "I guess we'll have to, and hope that improves the situation some."

If a well is found to have nitrate concentrations above safety levels, the first thing the MDA advises is to prevent infants from drinking the water, Bruening said. Nearby septic systems should be checked, and any necessary repairs made to it or the well, he added.

If the well is in order and no fault can be found in the septic system, then the MDA advises a closer examination of agricultural activity in the area. Bruening admitted there is no good way to trace non-point pollution to its source.

"In these areas, the MDA concentrates on getting farmers to go along with Best Management Practices," he said. "There really are no quick fixes."

There will be two more free water sample testings in Otter Tail County this summer. Bruening and his team will travel to New York Mills on Sept. 17 for a clinic, and on Sept. 18 they will be in Perham.

Free water testing for nitrates to be conducted

Clinics slated in Jenkins, Emily, Garrison, Breezy Point, Aitkin

Clinics to test drinking water, livestock watering systems and irrigation wells for nitrates in Crow Wing County and surrounding counties will be conducted this month.

The clinics will be held 9 to 11 a.m. Tuesday, June 15, at Jenkins Town Hall and 1 to 4 p.m. that day at Emily City Hall; 9 to 11 a.m. Wednesday, June 16, at Garrison City Hall and 1 to 4 p.m. that day at B[illegible]y Point City Hall; and 9 a.m. to 1 p[illegible]rday, June 19; at Ripplesside Eleme[illegible]chool in Aitkin.

The event is part of a statewide series of water-testing clinics being offered throughout 1999. They are sponsored by the Minnesota Department of Agriculture, the Minnesota Department of Health's Well Management Unit, Crow Wing County Planning and Zoning Department, Aitkin Soil and Water Conservation District, and the Rivers and Lakes Fair Committee.

Nitrates are the most common contaminants in Minnesota's ground water, and a significant number of the state's wells have high nitrate levels.

"We strongly recommend that people take advantage of this service because studies indicate somewhere between 5 percent and 25 percent of the private wells in greater Minnesota have nitrate levels above the federal drinking water standard," said MDA Commissioner Gene Hugoson. "Nitrates can be a major problem when they are consumed by infants because they can cause suffocation due to a condition known as 'blue baby' syndrome."

In 1998, 156 clinics were held in 63 counties across the state. Clinics have been offered at county fairs, University of Minnesota Agricultural Experiment Station field days and as separate events.

To participate in the testing, homeowners must bring at least one-half cup of water in either a Whirl-Pak plastic bag or a Ziploc-type bag. To get a representative sample, allow the water to run five to 10 minutes before filling the bag.

Homeowners with water treatment equipment should take two water samples — one before and one after the treatment process. Homeowners with just a water softener need only take one sample, either before or after the water passes through the water softener.

Samples should be taken no more than 24 hours before the testing, and they must be refrigerated. Samples should be cool when arriving at the clinic. To ensure accuracy, homeowners should mark the bags with their name, phone number and a well identification number if more than one well is sampled.

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For more information on the clin[illegible] contact MDA Nitrate Water Test[illegible] Coordinator Jennifer Gallus at (612) [illegible] 9037.