

A GUIDE TO ORGANIZING A COMMUNITY DRINKING WATER TESTING AND
EDUCATIONAL PROGRAM

October, 1988

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A GUIDE TO ORGANIZING A COMMUNITY DRINKING WATER TESTING AND EDUCATIONAL PROGRAM

INTRODUCTION

The luxury of quality drinking water is something that many of us commonly take for granted. Municipal and other public water supplies are subject strict guidelines and water quality testing to ensure that the water meets current drinking water standards and is safe to drink. However, there are over 800,000 private wells which serve as the primary water supply for a large number of people throughout the state. As a result, many Wisconsin residents are concerned about the quality of the groundwater which provides their family's drinking water supply.

Drinking water education programs are a constructive response to their concerns and provide an opportunity to provide a valuable service and educate at the same time. Program participants will learn about the quality of their individual drinking water supplies, possible solutions to drinking water concerns, as well as natural and human influences on groundwater quality in their community. Key benefits of the program include:

- Water testing for private wells in a targeted geographic location on a specific date.
- Educating individuals about groundwater and what they can do to keep their drinking water safe.
- Development of a useful database.

In the past 24 years, University of Wisconsin-Extension (UWEX) groundwater education programs have been held in all but 5 of Wisconsin's 72 counties. Several variations of drinking water education programs have been developed. This manual will describe how to organize a drinking water educational program for a county or other organization through the Water and Environmental Analysis Lab (WEAL) and the Wisconsin Groundwater Center (WGC) at the University of Wisconsin-Stevens Point (UWSP).

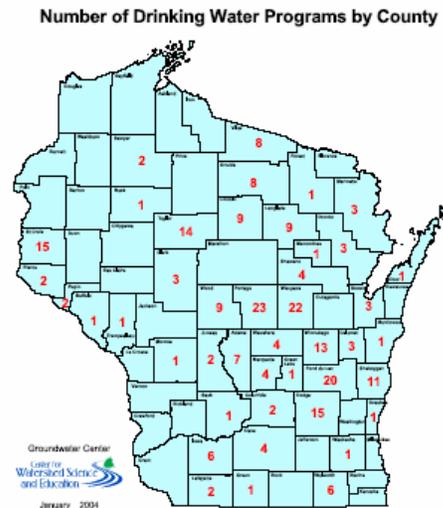


Figure 1. Number of Drinking water programs performed by WGC since 1978.

GROUNDWATER BASICS

Groundwater is water contained in the empty spaces between soil particles and rock materials below the surface of the earth. If you dig a hole and find the point at which all of the empty spaces between the soil and rock are filled with water, you have hit the water table. The saturated areas below the water table are referred to as aquifers.

Groundwater that supplies Wisconsin's wells does not flow in underground rivers. Rather, the aquifers that transmit the water are more appropriately thought of as underground "sponges". Major aquifers in Wisconsin include sand and gravel; limestone, dolomite and sandstone bedrock; and fractured igneous bedrock such as granite.

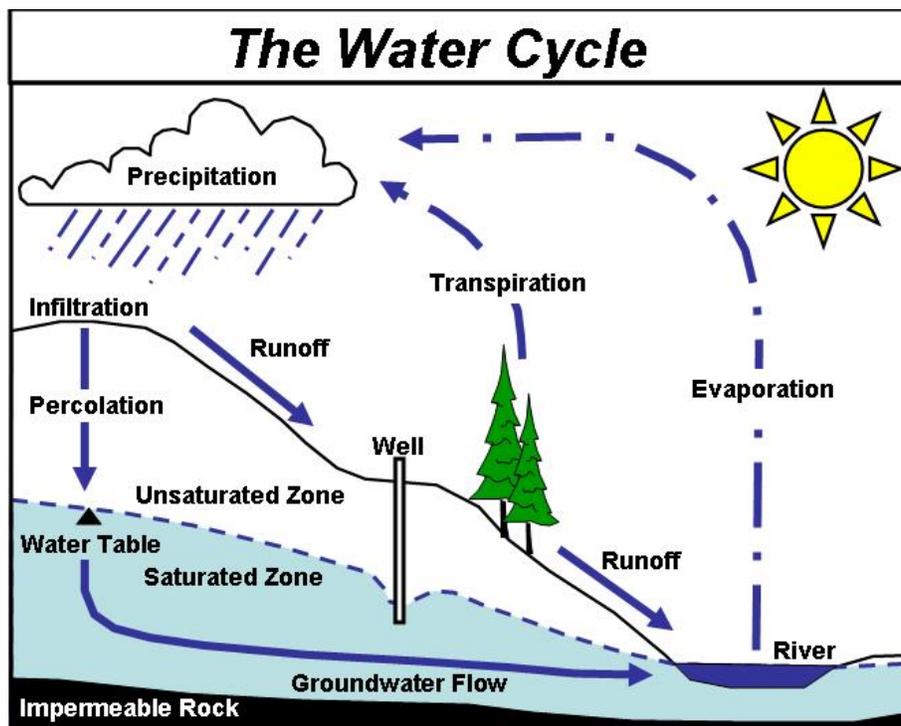


Figure 2. The water cycle.

Groundwater is not the mysterious subject that some people believe it to be. Wisconsin's groundwater is related to all other water on earth through a process called the hydrologic cycle, or the water cycle. In the water cycle, water is transported from the earth by the processes of evaporation and transpiration to form clouds and eventually falls back to the earth as precipitation. Some precipitation runs off into surface water. Some soaks into the ground to be used by plants. Water that soaks past the plant root zone to the saturation zone becomes groundwater. Some of this water is pumped out by a pumping well and is used by humans in our everyday activities. Eventually, the remaining groundwater discharges into lakes, streams, or wetlands, to become surface water again.

In Wisconsin's shallow aquifers, groundwater flows only short distances, a few thousand feet to a few miles, from recharge areas to discharge areas. Such water has been in the groundwater system only a few years or tens of years. In deeper aquifers, water may travel farther and be in the groundwater system a longer time. But Wisconsin's groundwater doesn't come from Canada, and only a very few deep wells tap water that has been underground since glacial times.

Because the groundwater used by most of Wisconsin's residents is locally recharged, it is greatly affected by local geological conditions and local land use. Groundwater quality problems do exist in Wisconsin. While some of the problems occur naturally, others are induced by human activity. The water testing component of the drinking water education program can detect the two most common health-related contaminants found in Wisconsin's groundwater—coliform bacteria and nitrate. Specialists looking at the data can also assess the likelihood of more uncommon types of contamination.

Each individual in Wisconsin lives above the groundwater resource and has the opportunity to affect it daily. Drinking water education programs promote the understanding of this resource and how it may be affected by natural conditions and human activities.

The "Guide to Interpreting Water Quality Data for Drinking Water" in Appendix 1 will explain the importance of the analyses done in the drinking water education program.

NEEDS ASSESSMENT: WHY DO DRINKING WATER EDUCATION PROGRAMS?

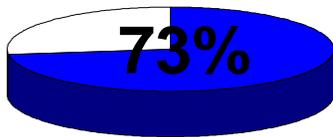
Reasons that county extension faculty members may want to involve themselves in conducting drinking water education programs are as many and varied as the communities they serve. They may include:

1. Education on individual water quality and well construction.

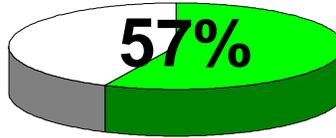
Seventy percent of Wisconsin's citizens, and virtually all of the rural population, depend on groundwater as a drinking water source. Yet relatively few have their water tested annually, as recommended, or know anything about the depth and construction of their wells.

For example, out of 2800 participants in the water testing program conducted at UWSP in 2001, 73% of participants had not had their well tested in the last 5 years, 57% did not know the depth of their own wells, and 66% did not know the depth to water within their well.

Survey of 2001 Drinking Water Program Participants



Participants who had not had their well tested in the past 5 years.



Participants who did not know the depth of their own well.



Participants who did not know the depth to water in their well.

In the educational program, proper well construction methods and separation distances from contamination sources are described. The need for maintaining records of well depth and water quality over time is emphasized.

Another major element of the program is the effect water quality problems may have on the individual. Participants learn about aesthetic problems that may be caused by hard water and about health problems that may result from excessive nitrate, bacteria or corrosivity. Additional testing may be advised in some cases. The availability and effectiveness of water treatment devices for specific problems are also covered.

The program concludes by emphasizing that groundwater protection is the responsibility of each individual. Proper septic system maintenance, proper use of lawn and garden chemicals, and disposal of solid waste and hazardous materials are encouraged.

2. Education on the relationship of geology and land use to water quality.

Wisconsin's geology and glacial history have a large influence on the quality of groundwater obtained from its wells. The pH, hardness, and corrosivity of the water are mainly influenced by natural factors. High iron levels are a problem in groundwater in many parts of Wisconsin as well. Participants in the program are taught that natural variations in water quality occur with depth and in differing geologic settings. The susceptibility of groundwater to human-influenced contamination is also related to natural factors.

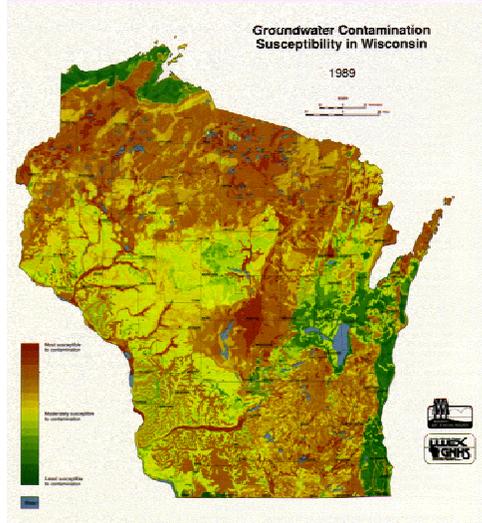


Figure 3. Susceptibility of Wisconsin groundwater resources to contamination. Areas of red represent most susceptibility while green represents least susceptibility. (Map produced by Wisconsin Department of Natural Resources and Wisconsin Geological and Natural History Survey).

Land-use is often a major determinant of water quality for an individual well. If a number of samples show elevated levels of human-induced contaminants in one area, the land use problem might be widespread, such as one caused by a landfill or agriculture. If only one high value appears among low values, the land use problem may be quite local and best remedied by changes in the well itself or the homeowner's individual land-use practices.

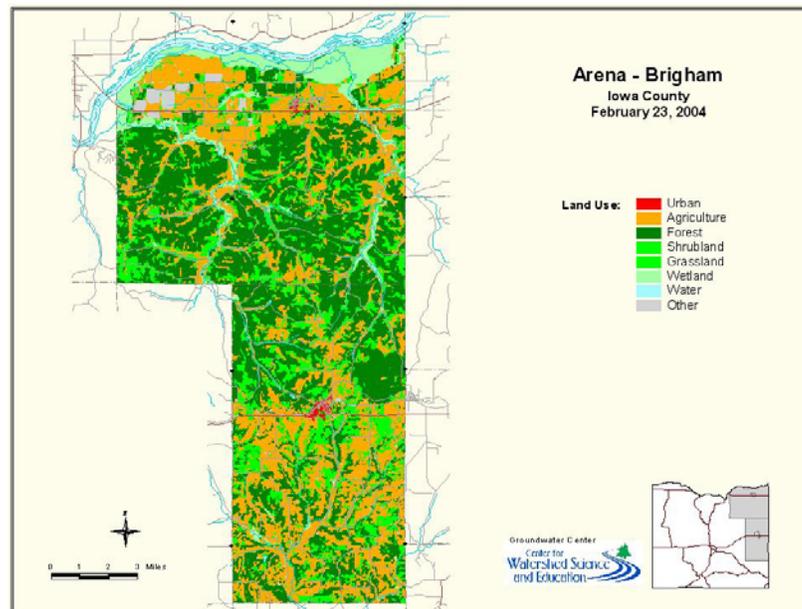


Figure 4. Land-use map for Arena – Brigham Township in Iowa County.

In the program, each well location is located on a map so that trends in both natural and human-influenced water quality can be analyzed for a given area.

Such maps are useful to local government officials, since they not only help locate problems but also give clues as to their sources, if an adequate number of samples are obtained.

3. *Assessment of groundwater quality in vulnerable areas or areas of degraded water quality.*

People living in areas particularly vulnerable to groundwater contamination may have a special need for education on groundwater contaminants and the health effects related to a particular contaminant as well as options for correcting problems.

State agencies, particularly the Department of Natural Resources, may have resources to run expensive, non-routine tests for contaminants such as pesticides and volatile organic chemicals (VOC), but they need to concentrate those resources on areas most likely to have problems. Data collected in a drinking water education program may be an initial step toward alerting a state agency to the need for additional monitoring.

In addition, local officials make many decisions affecting water quality in their county, such as zoning and landfill siting. They should be made aware of particularly vulnerable areas and the existing water quality, so that they can act where possible to preserve good water quality. In areas where water quality is already degraded, emphasis could be placed on cleanup activities, zoning to prevent increases in contamination, or zoning to minimize the number of people who will attempt to use the degraded groundwater in the future.

4. *Background water quality assessment in areas of changing land use.*

People living in areas where potentially polluting land uses are being developed, such as landfills, feedlots, waste treatment facilities, or large unsewered subdivisions, may also have special needs for drinking water education programs. They may have concerns about precautions being taken to minimize pollution. They need to be especially aware of the need for proper well construction and maintenance. They also need to have some measurement of background water quality in their well in case problems develop in the future.

Many types of groundwater contamination, such as nitrate, can be widespread and is very difficult to trace back to a specific source. Individuals will have little recourse when problems develop unless it is reasonably certain that contamination was not a problem before the installation of the facility. The need for periodic testing after the program should also be emphasized.

5. *Responding to local interest.*

Citizen groups may develop an interest in water quality and demand some action at the local level. This interest may come from media reporting of a serious contamination problem, from a few local residents discovering that they have water quality problems or from the perception that the way of life and land use in their community is changing. Drinking water education programs provide county faculty with a mechanism to respond to these concerns. Sometimes the participants discover that their concerns are misdirected. In the process, they become more aware of their personal responsibility for groundwater protection.

6. *Data collection and management.*

Precise location of sampling points is an important aspect of the drinking water education programs done at UWSP. Maps are generated from the data which allow visual observation of any trends that may occur. Over time, collection of this data in a database will allow better groundwater management decisions to be made in the county.

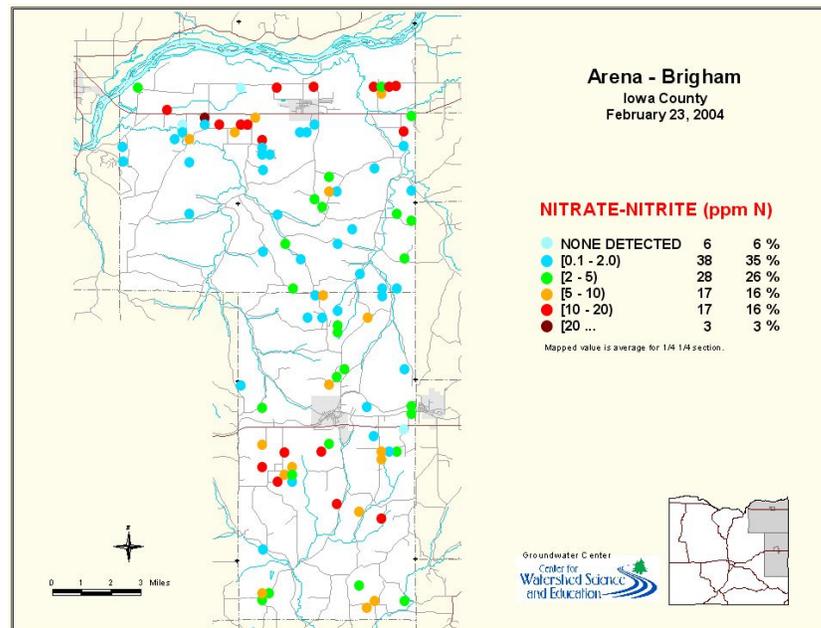


Figure 5. Map generated from water testing program showing the distribution of nitrate-nitrite in water quality in Arena – Brigham Townships in Iowa Co.

Some uses of the database will benefit individual county residents. For example, records are not presently kept at the county level to indicate the depth of new wells. Yet, in some areas, finding adequate water quantity and safe water quality is a matter of choosing the correct well depth. Citizens installing new wells could benefit from the experience of their neighbors if records that correlated water quality to well depth were maintained.

A large aspect of data collection is that effective groundwater management planning at the county level cannot occur without some type of assessment of the current status of groundwater. In several counties, drinking water education programs have been conducted in every township at least once. The programs have assisted groundwater planning efforts, by providing data that help to characterize the extent of the problem and by increasing citizen awareness of local problems. Drinking water programs have helped to create a receptive climate for action. In addition, groundwater data that is collected through these programs annual water testing at WEAL is a useful part of any geographic information system that may be established.

Since groundwater flows slowly and can be affected by surface activities, groundwater quality has the potential to change over time. A database can be quite valuable in determining whether water quality is improving or deteriorating and the impacts that changes in land use have had.

The results of multiple sampling in St. Croix county are a good illustration of how water quality can change over time (Fig. 3). If concentrations stayed the same between 2000 and 2004 the samples should fall exactly on the red line, or more likely we would see an even distribution of samples above and below the red line. The large number of samples that fall above the red line suggests that the data is not random and there has been a small rise in concentration over the last four years.

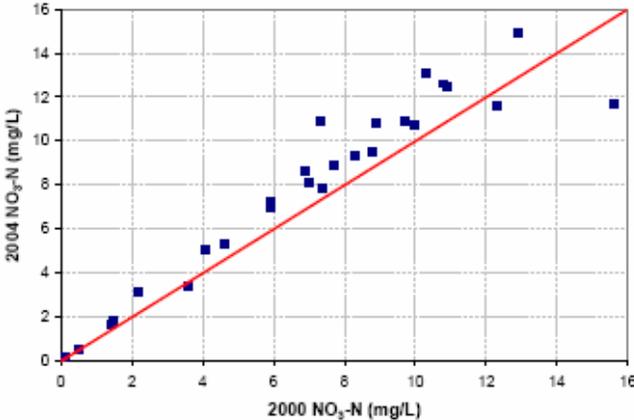


Figure 6. Nitrate-nitrogen results for homeowners who had their water sampled in 2000 and again in 2004.

ORGANIZING AND CONDUCTING A DRINKING WATER EDUCATION PROGRAM

The following is a detailed description of how to organize and conduct a drinking water education program, based on how programs have been organized in Portage County. Each agent wishing to conduct a program is encouraged to modify and improve any aspect of the program as appropriate to the local situation.

1. Contact the Laboratory.

The agent should contact the laboratory upon deciding to do a drinking water program. At this time the agent and lab will work to find a date that works well for both participants and further instructions will be given to the agent. While some counties may have a county health department that coordinates drinking water programs, most do not. These counties are encouraged to have their testing for the program performed at the UWSP Water and Environmental Analysis Laboratory. If the agent is comfortable with the material and decides to do other drinking water programs in the future, they may choose to go through a different lab if it is more convenient. *Please note that providing maps and sample summaries are only services provided at the UWSP WEAL lab, private and county labs are most likely not equipped to provide these services for community drinking water programs.*

The following are choices for laboratories that perform tests for drinking water:

- The UWSP Water and Environmental Analysis Laboratory. They can handle programs of 50 to 150 samples every two weeks. (715)346-4276 or (715)346-4898.
- Laboratories operated by county health departments may also be able to offer needed water testing.
- Testing can also be arranged through numerous private water laboratories throughout the state.

Laboratories in Wisconsin may obtain state certification for analyses they offer. ***It is advisable to select a lab that has obtained certification to analyze for bacteria and the desired inorganic tests.***

Schedule sampling with the chosen laboratory at least six weeks before the proposed sampling date.

2. Identify Test Areas

The first step is to estimate potential participation from a given target area. Note that only municipalities using private water supplies should be tested. Public water systems are regularly monitored by Wisconsin DNR and results of water quality tests are available for viewing.

Once the prospective municipalities have been identified use the WISStat database (2000 Census) to determine the number of households in the designated area. Update the number by multiplying the percent increase in total population from 2000-Present. Assuming one well per household, guess the percentage of those households that will participate.

In Portage County, the assumption was always 20% participation for a general public program. Actual participation ranged from 7% to over 40%. In general, 20% may be optimistic. However, with effective promotion, that level may be achieved. Response from organized groups may be even higher.

If projected participation exceeds the capacity of the testing laboratory, the water testing may be done in stages over consecutive weeks.

Several alternatives for targeting test areas exist. One procedure is to systematically test each municipality in the county over several years. Another method would be to target a specific geographic area. If there is a fairly good estimate of a municipality's well recharge area, testing within that area may show how land use affects the community's water supply. A third alternative would be to compare varying geologic regimes in different areas of the county.

3. Informing Local Officials

It is sometimes prudent to contact local elected officials from the intended testing area to inform them of plans to conduct the program. Some municipal officials are very concerned about what news or information is made known about their community. They might believe that news of poor water quality could damage the community's reputation.

To avoid misunderstandings, it can be helpful to discuss program intentions prior to program promotion. There are numerous good reasons to justify the program as were mentioned in the introduction.

4. Recruiting Local Help

One of the attractions of drinking water programs is the local focus of information provided. It can be advantageous to make sample bottles available from locally known distribution points. If the sample bottle distribution is done outside the Extension office, volunteers will have to be trained to deal with the public.

Water sample bottles can be distributed in any number of ways. One agent prefers conducting the program on election days and recruits election workers to distribute sample bottles. In other cases, sample bottles have been

distributed through the local hospital, from village or town halls staffed by homemaker groups or from private homes. Local 4-H clubs, FFA groups, or other service organizations may also serve as volunteers.

In Portage County, the preference was distribution through local businesses. Local businesses have the advantage of a well-known local location, a limited number of staff already at the site, and the staffs are comfortable handling money and making change. Of all types of businesses used, hardware stores seem to work best, although grocery stores, convenience stores and gas stations have also been used. Since it is typical to collect the program fee at the time the sample bottle is picked up, nonbusiness sample bottle distributors must be given an amount of money for making change.

5. *In Office Preparation*

To help the program run smoothly, various instruction and record keeping materials should be prepared at the office.

Instruction Sheets: A variety of instruction sheets to assist program participants and those who help by distributing water sample bottles also need to be prepared.

- a. Instructions for program participants accompany the data sheet and water sample bottle. These instructions give the participant information on how to fill out the data sheet, how to take a water sample, and where to attend the education program.
- b. Instructions for sample bottle distributors are prepared for the helpers who distribute sample bottles and collect money. This serves as a reminder of the procedures for dealing with program participants.
- c. Sample data sheets are provided to the helpers to remind them of the information that must be obtained from the programs participant when they pick up their sample bottle.
- c. Record sheets assist the helpers in keeping track of sample bottles distributed and money collected. This will be helpful to the agent in tracking individuals who may not return sample bottles or who may owe money.

Appendix 2 contains samples of all information sheets used in Portage County Programs.

6. *Program Promotion*

Just as with any program, the key to good participation is good promotion. The more effort taken to promote a program in more innovative ways, the better the response will be.

The following is a list of ideas to promote drinking water education programs:

- Direct mail to residents in a municipality.
- Newspaper releases.
- Schedule sign-up to coincide with election days
- Email lists.
- Radio – agent reports, features and public service announcements.
- Posters – distributed to local businesses, churches, and other public places.
- Notices – distributed through the schools and taken home with children.
- Notices – sent to civic and service groups and major employers in the test area.
- Newsletters – brief announcements placed in school district or church newsletters and in 4-H and homemaker newsletters.
- Announcements – request the local church pastor announce after services.
- Presentations made to local groups.

Several samples of promotional materials are enclosed in Appendix 3.

One note of caution regarding program promotion—the fee for water testing at WEAL or other publicly funded laboratory are, in fact, quite competitive with what is available through private labs. Do not, however, use this as a selling point in your promotions. Many people are quite concerned with the “public sector using tax revenue to compete with the private sector”. Emphasize the educational benefits and the many other good reasons for participating in program promotional material.

Because the Groundwater Center processes all of the data from the water samples for the educational programs and it would be virtually impossible to obtain this information if all the samples were analyzed at different labs, for this reason all of the samples need to be run at the UWSP lab. Individuals who sample their wells in the future can have their samples run at any state certified lab that is convenient for them if they are concerned about sending their samples to a partially publicly funded lab.

7. *Distributing Sample Bottles*

About a week prior to the scheduled sample bottle distribution, prepare the various instruction sheets for volunteers and participants. For the volunteers distributing sample bottles, prepare 3-4 copies each of the instructions for sample bottle distribution and record sheets. A sample data sheet is also prepared to remind distributors of the information that must be obtained from participants.

In Portage County, the typical water test day is a Monday, and the sample bottles are made available beginning the prior Friday and continuing through the test date. This allows 3-4 days for sample bottle distribution. The Friday and weekend hours should be sufficient for nearly everyone who wishes to participate.

Another reason for distributing sample bottles over several days is to spread the impact of having participants come to the business site. Each participant requires about five minutes time to be given instructions and to answer questions. By spreading the sample bottle distribution over several days, disruption of normal business activities is kept to a minimum.

Assume the agent will spend time training the volunteers and may be called during the course of the sample bottle distribution to answer questions.

In Iowa County, the agent prefers that the bottles all be handed out on one day at the town recycling center. The day is usually a block of time on a Saturday that coincides with the time that the recycling center is open.

On the day prior to the advertised sample bottle distribution, materials are delivered to volunteers. A complete list of the materials include:

- sample bottles
- instructions for taking water samples for each participant
- a well data sheet for each participant
- several copies of instructions for sample bottle distributors
- plat books for well location identification
- record sheets.

Time should be invested training volunteers to insure their understanding of the program and to assure they get needed information from program participants. Following are instructions given to Portage County volunteers.

Record the sample bottle number on the well data sheet. This is the only means for matching the water test results to the participant. The need to have volunteers assure that the number is recorded on the data sheet can not be stressed enough. Volunteers should also stress the need to complete all items on the data sheet to the best of the participant's ability.

Volunteers are asked to assist the participant in identifying the location of their well on the grid map and to record the grid coordinate on the data sheet. This step will take the greatest period of time while the participant is at the business. It may be difficult for the participant to become oriented to the map and to see the detail associated with a plat map.

Once the volunteer becomes familiar with using the map, that person can assist the participant, and the process goes fairly quickly. By having the volunteer help locate the well, many errors in recording well location are avoided.

If a person from outside the targeted test area wishes to participate, it has always been the policy in Portage County to never turn any person away. The participant will not have their test results included on the summary maps, but they may still have their water tested.

The volunteer then gives the participant sampling instructions along with the sample bottle and data sheet. At this point, the fee is also collected. It is usually preferable to collect the fee when the sample bottle is given out. This assures the sample bottle will come back.

It can also be helpful for the agent to overview the sampling procedures and other information with the volunteer so that they can be prepared to answer questions. In addition to procedural questions, volunteers will frequently have other questions asked of them. One of the common questions is whether other tests for pesticides, VOC's, gasoline, etc. will also be conducted. Here, it is helpful to talk about how these simple, inexpensive tests serve as indicators for other potential problems, and to emphasize that this issue will be covered in the education program.

If the participant has a strong, well founded suspicion that there is some health threatening contaminant in their water, the volunteer should have them call the agent who in turn refers them to the Groundwater Education Specialist at the Groundwater Center.

Another common question is when the participant will get their results. They should be told to attend the educational program to obtain their results. If the participant walks away thinking they must attend the program—that's OK.

Of course, for those people who do not attend, it is the agent's responsibility to mail the results. However, it is a fact that is not widely advertised because many people will choose not to attend the program, and the agent will spend hours on the phone individually explaining and interpreting results.

A few people will also complain that since their tax dollars support the university, the testing should be done free. Here, the people are reminded of the increasing emphasis for self-supporting university programs.

During the course of the sample bottle distribution, it is a good idea for the agent to periodically visit the volunteers to answer questions and ensure things are running smoothly.

The water test day is always on a Monday, and is the day before the samples are due back at the lab. On Monday, participants are asked to take their water samples and drop them off at the distribution center by the end of the business day. The agent then picks up all materials and delivers the water sample bottles and data sheets to the laboratory the following day.

Some of the minor problems that may arise during testing include some participants not returning sample bottles, data sheets without sample bottle numbers or grid coordinates, or the money collected may not be exactly correct. If the agent looks over the materials first thing, some of these problems can be straightened out quickly.

The samples must arrive at the lab within 30 hours of being taken. Most agents working with WEAL choose to drive them to Stevens Point. Other options might include mailing them, sending them UPS or by bus, but these have not been tried. A single check from the Extension Office or other organization in the amount of \$35 for each water sample submitted is the preferred payment method.

Approximately one month after the samples are submitted, the education program can be held. Results will be distributed to participants at the meeting.

8. *The Educational Program*

The program is normally taught by the agent and one or two state specialists. Sometimes an agent will invite other county resource people to become involved. The program usually lasts 1 – 1 ½ hours.

The agent is often an active participant in the teaching and should take on as much of the teaching responsibility as they feel comfortable. The Groundwater Education Specialist will work with the agent as necessary to prepare for teaching. The following teaching outline is frequently used:

- A. Introduction – Agent
- B. Groundwater Basics – Agent
- C. Hydrogeology of the Test Area – Specialist
- D. Test Results and Interpretation – Specialist
- E. Water Quality Trends – Specialist

- F. County Groundwater Activities (Optional) – Agent or County Resource Person
- G. Groundwater Protection Strategies – Agent

Introduction: The agent welcomes the audience, introduces specialists, and outlines the program agenda.

Groundwater Basics: Participants learn the water cycle and the relationship of groundwater to other waters. Information is presented on the mechanics and rate of groundwater flow. The relationship of land use to water quality is stressed.

Hydrogeology of the Test Area: A specialist takes discussion the next step—relating the general concepts to local conditions. A geologic cross-section is often drawn to illustrate the types of rock and soil materials in the area and their influence on groundwater quality. Varying natural conditions make some areas more susceptible to pollution than others. Demonstration of a sand-tank groundwater flow model reinforces the concepts.

Test Results and Interpretation: Program participants are given their water test results, and a specialist explains each parameter. Participants learn the known health effects of varying levels of contamination and options for problem mitigation. The importance of information on well depth and construction and the need for regular testing is stressed.

Water Quality Trends: Test results are recorded on maps of the test area and used to illustrate water quality pattern. If the sample area is large or diverse, the specialist discusses the geological differences that lead to variations in background water quality and susceptibility to human contamination. The effects of land use practices on groundwater quality are also discussed.

County Groundwater Activities: This is an optional section of the program that gives the agent the opportunity to talk about what is going on in the county relative to groundwater. If the county has a monitoring program or if water test results are being computerized in a database, these may be discussed. If there are any efforts to develop local management strategies, these will also be of interest to the audience. Any other related issues can also be discussed.

This portion of the program represents a good opportunity to work with other county departments. The audience is introduced to other local resource persons who deal with water quality issues. Many agents will work with health department personnel or, perhaps, with planning and zoning officials. The benefit of working with other county staff is to give them good exposure through a quality Extension program and to help them take on some identification of water quality as a local priority.

Groundwater Protection Strategies: Here the agent concludes the program by emphasizing the individual actions available for program participants to become more effective in protecting groundwater. The audience learns action strategies available to prevent groundwater pollution.

Depending on the local situation, different strategies are emphasized, and the agent may wish to develop additional teaching materials. However, to aid the agent, sample materials are available for use in Appendix 4.

9. *After the Program*

A number of people who submitted water samples will not attend the education program. The agent will have to mail test results to these people. It can be helpful to enclose a copy of the “Guide to Interpreting Water Quality Data for Drinking Water”.

The agent can expect a number of individual phone calls or visits following the program. Some of those who did not attend will ask for an interpretation of their results. Others for whom it has been determined that a problem exists will ask questions about what can be done to resolve the problems.

To prepare for these questions, the agent should spend time discussing the tests and problem mitigation strategies with the water quality specialists. It is likely that some questions will go beyond what the agent is prepared to answer. The agent should feel free to refer questions to the groundwater education specialist (715-346-4276).

BEYOND DRINKING WATER EDUCATIONAL PROGRAMS: IMPLEMENTING THE RESULTS IN THE COMMUNITY

After the results of the drinking water program have been distributed and the education program is over, the data collected in the program still have many potential uses. This section will provide examples of follow-up activities that will help to advance groundwater protection at the county level.

1. *Presentation of the Results to Local Officials*

A packet of material, including maps for each parameter tested and a statistical summary of the results is provided to the agent after the program. From these, a summary presentation can be made to county or township officials. Local officials will probably be most interested in the number of residents having unsatisfactory water quality and problems caused by natural factors or land-use. They will then be better able to make appropriate decisions about land development or zoning in those areas.

2. Follow-up Monitoring by or for Individuals

There are disadvantages to advising people on the basis of a single water test. The well has not been inspected for sanitary defects or proximity to pollution sources. The water quality may fluctuate over time, so the sample taken today may be representative of the well at its best, its worst, or somewhere in between. People should be encouraged to see this test as the first in a series that give a more complete picture of water quality over time. In the program, they are advised to sample quarterly for at least one year if they have questionable bacteria or nitrate results, or annually if there are no apparent problems. Also, testing for additional contaminants may be advised.

3. Follow-up Monitoring by Communities

Local units of government may also wish to do follow-up monitoring. The monitoring methods used may be different depending on whether the objective is to further investigate the water quality problems of individuals or of the community as a whole. Groundwater Center or other extension specialists can provide the agent with guidelines for setting up a long-term monitoring program.

In choosing private wells for monitoring groundwater quality in a community, certain criteria should be used: the depth should be known; the well should be constructed according to Wisconsin's well code unless it is likely that most wells in an area have similar code violations; wells chosen should be in the aquifer(s) used by most homes; there should be a good spatial distribution of the sampling points; and the people chosen should agree to cooperate over a long period of time. The same wells should be retained in the program as long as possible to build a history on them. If different wells are used each time, the data from one year to the next cannot be easily compared statistically. It should also be remembered that private wells may be less contaminated than monitoring wells installed specifically to look for contaminants near their source.

4. Formation of Citizen Action Groups

If people become aware that there is a groundwater contamination problem in their area, they will want action taken and quickly. Unfortunately, solutions to groundwater problems are often difficult. Many reference books are available which describe the many federal, state and local regulatory programs that can be undertaken to protect groundwater or correct groundwater problems. However, some rather substantial sources of pollution are still unregulated. Education is important for these potential polluters. In any case, the process of changing people's attitudes and activities is a slow one. After practices change, the natural processes by which groundwater renews and cleans itself of contaminants can be slower still.

Local citizens can be a powerful force in either implementing or resisting change in their communities. Formulation of a citizens' task force may give them the feeling of control and of progress they need.

Local elected officials should be informed about and involved in the process. The group could work to identify sources of pollution in there are, relying on experts such as an extension agent or specialist, county sanitarian or DNR employee for technical advice. They could try to build consensus about what changes in land-use or management practices are needed and in what time frame they can reasonable occur. State or federal representatives could be approached to suggest changes in existing regulations. One objective the group might adopt is to educate more people in the community about the problem they have discovered.

Drawbacks of such groups include the frustrations participants may feel at the slow pace of change and the increased amount of work such a group may entail for the agent.

USING THE DATA FOR SITE-SPECIFIC DECISION MAKING

The samples collected in a drinking water program come from individuals who are concerned about their water quality. Locations of these individual wells as well as the limited information provided by most homeowners may not be ideal for gaining a thorough understanding of area wide water quality. However, the data may provide some useful background information. For example, typical private well depth and construction in an area or groundwater quality during a specified time period can be generalized from the data. Insights gained from group testing can be extremely useful for encouraging other residents to test their wells and identifying potential problem areas within a community.

GROUNDWATER MANAGEMENT PLANNING

Data collected in drinking water education programs can be excellent baseline data for the environmental assessment section of a county groundwater management plan. In Portage County's plan, the hardness, conductivity, alkalinity, pH, corrosivity, chlorides and bacteria were derived almost exclusively from drinking water program data.

An excellent reference, "A Guide to Groundwater Quality Planning and Management for Local Governments" (Wisconsin Geological and Natural History Survey Special Report 9), has been developed on groundwater management planning. Some counties may not be ready to do a comprehensive plan, but may wish only to address certain issues, such as a well code or animal waste ordinance. In any case, background data will be useful to justify proposed action.

APPENDIX A

Guide to Interpreting Water Quality Data for Drinking Water

This guide explains some of the more common analyses performed by homeowners who participate in drinking water programs. Each test has a brief description of what each test is, why it is important to test for, reasons that these elements are found in water and what the results tell you about water quality.

INTERPRETING YOUR DRINKING WATER QUALITY TEST RESULTS: IDENTIFYING PROBLEMS AND SOLUTIONS

Byron Shaw, Christine Mechenich and Jim Peterson
University of Wisconsin - Extension
University of Wisconsin - Stevens Point and University of Wisconsin - Madison

This fact sheet will help you interpret the results of commonly recommended analyses for drinking water from private wells in Wisconsin.

NITRATE AND NITRITE NITROGEN

Nitrate nitrogen is a commonly used lawn and agricultural fertilizer. It is also a chemical formed in the decomposition of waste materials, such as manure or sewage. If infants less than six months of age drink water (or formula made with water) that contains more than 10 mg/L nitrate nitrogen, they are susceptible to methemoglobinemia. This disease interferes with the blood's ability to carry oxygen. Recent studies also suggest that high nitrate water may be linked to birth defects and miscarriages, so pregnant women should avoid drinking high nitrate water. High nitrate levels also suggest that other contaminants might be present. The natural level of nitrate in Wisconsin's groundwater is less than 0.2 mg/L.

Nitrite is an unstable form of nitrogen which might be found in small amounts along with nitrate. Often times nitrate and nitrite are reported together.



Acceptable results: 10 mg/L or less nitrate nitrogen ($\text{NO}_3\text{-N}$) or nitrate and nitrite nitrogen ($\text{NO}_2 + \text{NO}_3\text{-N}$). Less than 2 mg/L is preferred. When reported as nitrate (NO_3), the acceptable level is 45 mg/L or less.

Sources: Fertilizer, septic system effluent, and animal waste. In most cases, elevated nitrate levels indicate general contamination of the aquifer (water-bearing formation) at the depth of the well.

CHLORIDE

In most areas of Wisconsin, chloride in groundwater is naturally less than 10 mg/L. Some higher concentrations in limestone and sandstone aquifers in eastern Wisconsin may also be natural. Higher concentrations usually indicate contamination by septic systems, road salt, fertilizer, animal waste or other wastes. Chloride is not toxic, but some people can detect a salty taste at 250 mg/L. Water with high chloride may also have a high sodium content. High chloride may also speed up corrosion in plumbing (just as road salt does to your car).

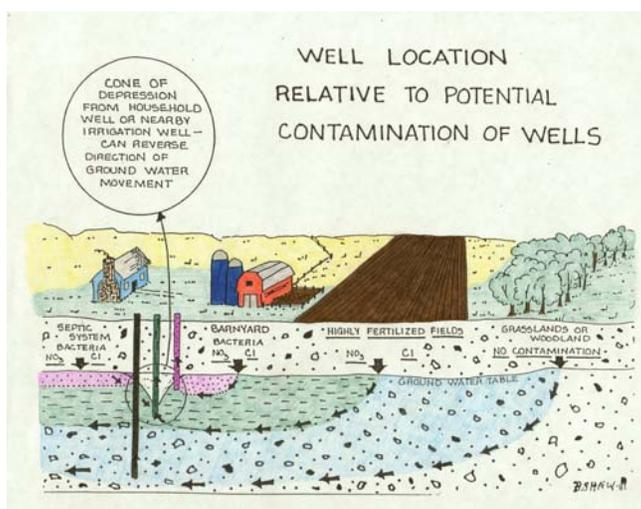


Acceptable results: Chloride has no health standard. Sodium (which may be found with chloride) has a health advisory level of 30 mg/L. Levels less than 10 mg/L are desirable. Levels more than 250 mg/L may cause a salty taste.

Sources: Septic systems, road salt, fertilizer, animal waste, landfills, or other wastes.

Corrective Action for Nitrate Nitrogen and Chloride

- Change the depth of, repair, or replace the well.
- Eliminate contamination source.
- Carry or buy drinking water, or connect to a public supply.
- Use a water treatment device (reverse osmosis; distillation; or for nitrate alone, anion exchange).



ALKALINITY

Alkalinity is a measure of water's ability to neutralize acids, and so is related to pH. It results primarily from dissolving limestone or dolomite* minerals in the aquifer. Alkalinity and total hardness are usually nearly equal in concentration (when they are both reported in mg/L CaCO₃ (calcium carbonate)), because they form from the same minerals. If alkalinity is much higher than total hardness in an unsoftened sample, consider testing for sodium. If alkalinity is much lower than total hardness, test for chloride, nitrate, and sulfate.

The lower the alkalinity, the more likely water is to be corrosive. High alkalinity water (greater than 150 mg/L) may contribute to scale (lime) buildup in plumbing.



Acceptable results: There is no health standard. Values near 150 mg/L are considered ideal if the corrosivity index is satisfactory. When expressed as mg/L CaCO₃, the value should be near that of hardness (from 75% to 100% of the hardness value).

Sources: Primarily dissolved limestone or dolomite* minerals (carbonates and bicarbonates) from soil and rock materials.

TOTAL HARDNESS

Hardness in water is caused mostly by dissolved calcium and magnesium, primarily the result of dissolving limestone or dolomite* from soil and rock materials. Hard water is beneficial to health. However, high hardness can cause lime buildup (scaling) in pipes and water heaters. It also reacts with soap to form a "scum", decreasing the cleaning ability of the soap and increasing bathtub ring and graying of white laundry. Water that is naturally too soft may be corrosive. The water softening industry measures hardness in grains per gallon. 1 grain/gallon = 17.1 mg/L CaCO₃.



Acceptable results: Hard water benefits health. However, values near 150 mg/L are ideal from an aesthetic viewpoint, if the corrosivity index is satisfactory.

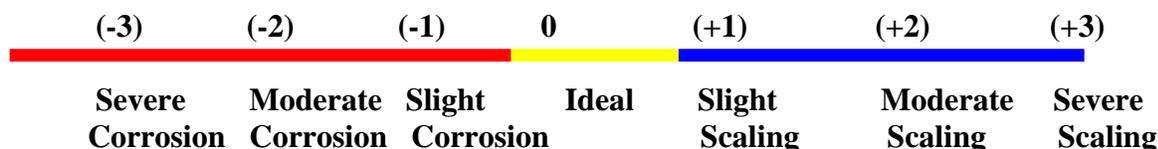
Sources: Primarily dissolved limestone or dolomite* minerals (calcium and magnesium) from soil and rock materials.

*Many rocks in Wisconsin commonly referred to as limestone are actually dolomite. Limestone is composed of calcium and carbonate, while dolomite is made up of calcium, magnesium and carbonate.

CORROSIVITY INDEX (Saturation Index, Stability Index, Langelier Index)

Corrosivity index is a measure for the tendency for lime (calcium carbonate) to precipitate (form a solid and settle out) from water. It is calculated from pH, alkalinity, calcium hardness and conductivity data.

Water is a good solvent, and will attack unprotected metal plumbing. Lead, copper and zinc from pipes and solder joints may then leach (dissolve) into drinking water. Symptoms of corrosive water include pinhole leaks in copper pipes or green stains on plumbing fixtures. Lime precipitate (scale) is a natural protection against corrosion. Too much scale, however, will plug pipes and water heaters, decreasing their efficiency. Water softeners prevent scale buildup, but also decrease any protection from corrosion the natural water may have provided.

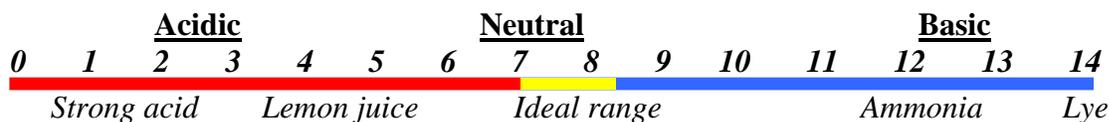


Acceptable results: There is no health standard. Values between 0.5 and 1 units are considered the most desirable for a corrosivity index. However, the relationship between the corrosivity index and leaching of metals is imperfect. You may still need to test your water for lead and copper, or run the water until cold before drinking it, if your plumbing contains these metals.

Sources: Low values may be caused by lack of natural carbonate minerals in the aquifer and/or high nitrate levels. Low values also occur when hardness is removed with a water softener. High values normally relate to high water hardness and alkalinity.

pH

pH is the measure of the hydrogen ion (acid) concentration in water. A pH of 7 is neutral. Values above 7 are alkaline or basic; those below 7 are acidic. A change of 1 pH unit is a 10-fold change in acid level. Acidic water is often corrosive (see Corrosivity Index). Iron may also be a problem in acid water. pH values are often slightly higher in the laboratory than at your well, because carbon dioxide gas (CO₂) leaves water when it is exposed to air.



Acceptable results: There is no health standard. In Wisconsin pH is commonly found between 6.5 and 8.5. The lower the pH, the more corrosive the water will be.

Sources: Low values are most often caused by lack of carbonate minerals from limestone and dolomite* in the aquifer. Some contaminant sources such as landfills may also lower pH.

Corrective Action for Corrosivity, Hardness, Alkalinity or pH

If values are too low, indicating a corrosion problem:

- Deepening the well may be helpful.
- Increase the hardness and/or alkalinity of water with a water treatment device.
- Run water until cold to flush dissolved lead and copper from pipes before drinking.
- Replacement of all plumbing with plastic is a partial solution.

If hardness or corrosivity values are too high, indicating a scaling problem:

- Softening water, except a cold water tap for drinking water. Softened water prevents protective scale formation and also contains sodium.

CONDUCTIVITY

Conductivity (specific conductance) is a measure of the ability of water to conduct an electrical current. It is related to the amount of dissolved substances in water, but it does not give an indication of which minerals are present. Conductivity (measured in $\mu\text{mhos/cm}$ at 25°C) is about twice the hardness (mg/L CaCO_3) in most uncontaminated waters in Wisconsin. If it is much greater than two times the hardness, it may indicate the presence of contaminants such as sodium, chloride, nitrate, or sulfate, which may be human-influenced or natural. Changes in conductivity over time may indicate changing water quality.

Acceptable results: There is no health standard. A normal conductivity value is roughly twice the hardness in unsoftened water.

Sources: Natural and human-made dissolved substances in the water.

COLIFORM BACTERIA

Coliform bacteria are microorganisms found in surface water, soil and in the feces of humans and animals. They do not usually cause disease. However, their presence indicates that fecal wastes may be contaminating the water and means that pathogenic (disease-causing) organisms could be present. If human or animal wastes are contaminating the water, gastrointestinal diseases, hepatitis, or other diseases may result.

Not present = Safe

Any present = Unsafe

Acceptable results: 0 coliform/100 milliliters of water (ml). If you have coliform bacteria present in a water sample, you should resample. If a second test shows coliform, take corrective action.

Many laboratories can also test for a specific fecal coliform bacteria, *E. coli*. The presence of *E. coli* in a water sample is more conclusive evidence of fecal contamination which represents an even greater health risk than the presence of total coliform bacteria.

Sources: Coliform bacteria occur in soils and in the feces of humans and animals. In areas using fractured bedrock or coarse sand and gravel aquifers, coliform bacteria may contaminate groundwater. More often, they are an indication of well construction and maintenance faults (also called sanitary defects).

Corrective Action for Coliform Bacteria

Resample first, using careful technique.

Check well for sanitary defects. Examples include:

- Well cap or seal not on tightly, or cap on tightly but not vented.
- Wiring not in conduit.
- Well in a pit or basement.
- Well casing not at least 12 inches above grade.
- Casing cracked or rusted through.
- Pitless adaptor poorly welded.
- Inadequate grout (seal or fill around well casing).

Some defects are easily viewed; others may require excavating around the well or opening the well. After correcting visible defects, disinfect the well with a dilute chlorine bleach solution and resample after all traces of chlorine have dissipated. Test again one month later to ensure that the contamination source has been eliminated. See the DNR publication "Bacteriological Contamination of Drinking Water" for disinfection instructions and more information.

ARSENIC

Arsenic occurs at low levels in soil and bedrock, but has been found at levels above the drinking water standard in Wisconsin wells. Studies show that levels of arsenic above 10 µg/L can increase the chances of developing cancer of the skin, liver, kidney or bladder. While the chance of finding elevated levels of arsenic appear to be greatest in northeastern Wisconsin, problems have been detected in other areas of the state as well. Because little is known about the extent of the arsenic throughout the state, all residents are encouraged to test for arsenic at least once.

Acceptable results: 10 µg/L (parts per billion) of arsenic or less. Can be partially removed by reverse osmosis, anion exchange, or distillation. Taking special precautions when drilling a new well may also limit occurrence of arsenic.

Sources: Naturally occurring in soil and found along with sulfide minerals in bedrock formations and some glacial deposits. Increased groundwater withdrawal may introduce oxygen into the aquifer and increase the likelihood of chemical reactions that release arsenic into groundwater.

LEAD

Lead is a toxic metal which until 1985 was commonly used in the construction of most household plumbing systems in Wisconsin. Under natural conditions groundwater has little to no measurable lead. However, water that sits in pipes constructed of lead or contain lead solder has the potential to dissolve lead and increase the concentration of lead in a homes water to unsafe levels.

Acceptable results: Less than 0.015 mg/L is the health standard for lead in drinking water. Lead is especially harmful to young children and has been shown to cause brain and nerve damage as well as kidney damage. One way to reduce lead levels in drinking water is to run your faucet for a couple of minutes to flush out water that has sat in pipes for extended periods of time. Reverse osmosis, anion exchange and distillation are treatment methods that can also reduce lead to acceptable levels.

Sources: Not naturally found in Wisconsin groundwater at levels of health concern. Found in water systems that contain lead pipes or lead solder. Corrosive water increases the likelihood of experiencing elevated lead levels.

COPPER

Copper is a reddish metal that occurs naturally in rock, soil, water, and air, however the source of copper in drinking water is most often due to plumbing. Copper pipes are commonly used in household plumbing. Much like lead, when water sits in copper pipes for extended periods of time it has the potential to dissolve copper pipes and increase copper levels in water. Copper in our diet is necessary for good health, however too much copper in our diets can be potentially harmful. Immediate effects from drinking water with elevated levels of copper include vomiting, diarrhea, stomach cramps, and nausea. Long-term exposure of high levels of copper may cause kidney and liver damage in some people.

Acceptable results: Less than 1.3 mg/L of copper in drinking water is considered safe. A simple way to reduce copper levels in drinking water is to run the faucet for a couple of minutes to flush out water that has sat in pipes for extended periods of time. Reverse osmosis, anion exchange and distillation are treatment methods that can also reduce lead to acceptable levels.

Sources: Copper plumbing. Corrosive water increases the likelihood that you will experience elevated copper levels in drinking water.

TRIAZINE SCREEN

Triazines include the pesticide atrazine and several chemicals it breaks down into (degradation products), as well as other pesticides such as simazine, cyanazine, and propazine. A triazine test is an approximate test performed as an inexpensive alternative to more costly, but more accurate tests. Atrazine is the most common herbicide used in Wisconsin and is commonly found in groundwater. Private wells near agricultural areas should be tested for atrazine.

Acceptable results: Less than 3 ppb (parts per billion) for the total of atrazine and its degradation products is considered safe. However, since the triazine screen is an approximate test results may warrant a more accurate but expensive test.

Sources: Agricultural pesticides. There are no natural sources of atrazine.

Revised August 2004.

APPENDIX B

Sample Materials

These materials are meant to aid the person who is setting up the drinking water program. Some of these materials can be used as is while others may need to be slightly modified for the date and location of the program. None of these materials must be used. The organizer is always free to develop materials or change the existing materials to suite their individual style or needs.

Contents:

- Instructions for sample bottle distribution
- Registration Form
- Instructions for water testing
- Sample mailing
- Sample letter to potential sponsors
- Sample news release

Instructions for Sample Bottle Distribution

1. Write the sample bottle number onto the registration form and indicate what tests they are going to have performed.
2. If they do not know their properties legal description or think they will have trouble locating it at home, assist the homeowner in determining the legal description for the location of their well and write it on the well information sheet where it says LEGAL DESCRIPTION. (If there are any questions about why the legal description is needed assure them that the legal description is only used to produce maps for the educational program.)
3. Instruct the customer to fill out the top half of the well information sheet when they get home with as much information as they can. If they don't know all the information, that's okay.
4. Remind the customer that they must take their sample(s) on Monday _____ only and drop off at the collection site on the same day.
5. Remind the customer that the sample bottle is sterile. They should not open the bottle prior to taking their sample, and they should carefully follow the sampling instructions on the instruction sheet.
6. Give the customer their sample bottle(s), information sheet and instruction sheet.
7. Collect the water testing fee. Total will vary depending on which tests each homeowner signs up for. (Homeowners Package - \$38, Metals Package - \$38, Triazine - \$22). Checks can be made payable to _____.
8. Remind them to come to the educational program on _____ to pick up their results.
9. Thank them for their participation.

NOTES

*Depending on what tests the homeowner wants performed water samples will be analyzed for:

Homeowners Package: Bacteria, nitrate, chloride, pH, alkalinity, hardness, and corrosivity.

Metals Package: Arsenic, lead, copper, iron, zinc, manganese, calcium, magnesium, sodium, potassium, and sulfate.

Triazine Screen: Triazine (weed killing herbicides commonly used in Wisconsin).

*For the best understanding of the results, people should attend the educational program if at all possible.

Questions? Call _____ at _____.

Sampling Protocol for Drinking Water Testing

Your water test results will be most accurate if you collect the samples following the procedure below. **COLLECT YOUR SAMPLES ON THE DESIGNATED DAY ONLY!** Samples more than 36 hours old when they reach the lab cannot be accurately analyzed for bacteria. *Samples should be refrigerated until you take them to the drop-off site.*

IF YOU ARE TAKING MORE THAN ONE TYPE OF SAMPLE YOU MUST SAMPLE IN THE FOLLOWING ORDER!

1. Metals Package
2. Homeowners Package
3. Triazine Sample

1. METALS PACKAGE

The Metals Package bottle is small and rounded, with a blue cap and red tape around the cover. ***This sample should be taken first thing in the morning, before any water is run in your home!!!*** CAUTION: *This bottle contains a strong acid which acts as a preservative. DO NOT rinse the bottle or you will lose the preservative.*

- Choose a faucet in your home which supplies most of your drinking water.
- Run the water for only 2-3 seconds.
- Slow the water flow to a trickle and fill the Metals Package bottle to within ¼ inch from the top. DO NOT ALLOW TO OVERFLOW!! Avoid splashing when you are filling the bottle. *If you splash acid on yourself, rinse affected area for 5 minutes under cold water.*
- Replace cap TIGHTLY, dry the bottle, and reattach red tape around cover.



2. HOMEOWNERS PACKAGE

The Homeowners Package bottle is rectangular and has a white cover.

- Choose a faucet where water is not softened or otherwise treated. Wash your hands thoroughly with soap and water. Remove any faucet screen or other attachments.
- Flame the cold water faucet with a candle or torch. Heat tip of faucet until it is hot to sterilize the faucet. Be sure only metal parts are contacted by flame. *Caution: Some newer faucets are plastic!!*
- Run water for 5 minutes.
- Carefully remove the cover of the Homeowners Package sample bottle. Do not let fingers touch the mouth or inside of the cap. The cap may be placed top down on a clean surface. *Do not rinse bottle.*
- Slow the water stream down until it is about the size of a pencil.
- Fill the bottle within ½ inch from the top. Avoid splashing.
- Replace cap TIGHTLY.



3. TRIAZINE SAMPLE

The Triazine sample bottle is cylindrical and has a blue cap.

- Choose a faucet where water is not softened or otherwise treated.
- Run water for 5 minutes.
- Rinse the triazine plastic sample container 3 times with tap water.
- Fill the bottle to within ½ inch from the top.
- Replace cap TIGHTLY.



SPECIAL DRINKING WATER EDUCATION PROGRAM FOR THE Townships of Clyde and Wyoming

Paul Ohlrogge, Community Resource Development Agent, Iowa County

UW
Extension

February 2004



Dear Residents of the Towns of Clyde and Wyoming:

Greetings from the UW-Extension Office! An exciting opportunity to learn about groundwater is being offered to all residents in your townships. In mid-March water samples will be gathered from your private wells and taken to a laboratory at UW-Stevens Point for testing. This is not a mandatory program nor is it a regulatory program. This is simply an educational opportunity to learn about your water, groundwater and things that you might do to keep your water in a healthy condition.

Three years ago we offered this type of program to the residents of Wyoming along with Arena and Brigham. Over 80 families participated. Feedback from these earlier programs has been very positive and numerous requests have been made to offer this again. **This is the first time that this program has been offered to residents of Clyde.**

There are three tests: The Homeowners Package, Heavy Metals and a Triazine Test (atrazine type chemicals). Information on these three tests can be found on page three of this newsletter. *If you are uncertain which test to do I would encourage the Homeowners Test as this tests 7 different areas of your water and will give you a good indicator how your water is doing.*

Oftentimes a family may have no idea what is happening with their water. This often is because people who live in the country forget or ignore the fact that to have their water tested they must do this themselves.

Groundwater specialists strongly encourage residents who live rurally to test their water every two years if not more. If you are interested in participating please call the names below to pre-register.

Your results will be available on Wednesday, April 14 at 7 p.m. At this time a 90-minute educational seminar is planned. You will have the opportunity to ask any questions that you might have. Your results are kept confidential. If you are unable to make the program on April 14th we will mail your results to you.

Pre-registration is requested. Call soon as only 150 households can participate:

**Linda Kane, Town of Clyde at 583-2156 or
John Hess, Town of Wyoming at 588-7082**

Best Regards,
Paul Ohlrogge, Iowa County Community Resource Development Agent
935-0391

**Join us for the
Towns of Clyde and Wyoming
Drinking Water Testing Program**

BOTTLE PICK-UP

Date: Saturday, March 13, 2004

**Clyde Community Center, 10 a.m.
to 2 p.m.
Wyoming Town Hall, 8 a.m. to 2
p.m.**

**You must pay for the testing fee
when you pick up your bottles.
Make Checks payable to :
UW-Extension**

**FILL WATER BOTTLE ON
MONDAY, NOT BEFORE!
Keep Refrigerated!**

BOTTLE RETURN:

Date: Monday, March 15

**Clyde Community Center, 6-8 a.m.
and 5-7 p.m.
Wyoming Town Hall, 5-7 p.m.**

**Water Test Results Will Be
Available At A 90-Minute
Education Program**

Date: Wednesday, April 14
7 p.m. – Clyde Community Center

WATER TREATMENT

Concerns about groundwater quality and the safety of drinking water make many people wonder if it's time to take precautions such as treating their water. Before investing in a water treatment device, determine if your water is contaminated by having a water test done.

Examine the test results carefully to understand what contaminants, if any, exist in your water, where they come from, and what risks they pose. Testing can help determine if treatment is necessary, and if so, which type of treatment system is most appropriate.

Water treatment can be a satisfactory solution to water problems, although it is not the only option. If you are considering home water treatment, it's best to consider a range of corrective actions. If you know the cause of the problem (such as a faulty septic system), correcting the cause may be the best approach.

WATER CONTAMINANTS

Drinking water can be contaminated from a variety of sources. Most water pollutants cannot be easily detected by taste or smell. Having your water tested is the best way to determine if your drinking water has been contaminated. A certified laboratory can determine if it is free of harmful chemicals or bacteria.

Homeowners on public water supply systems and private wells should test their water for any contaminant they're concerned about, based on their knowledge of the water source, treatment, and possible risks to water quality posed by local conditions.

PUBLIC WATER SUPPLY

If you use a municipal or community water system, you can call your water utility manager or DNR public water supply specialist to find out if the water quality meets standards. Ask for a copy of the most recent water analysis and an explanation of the figures. Remember that these tests often only tell the condition of the water when it left the water treatment plant. It may not tell you the condition of your water at the tap. Water quality problems can develop at home, especially lead or copper problems, even if the water is safe at the source.



A PRIVATE WELL

Most rural residents rely on a private well for their drinking water. If a private well is properly installed, the owner can be reasonably assured of a safe, drinkable water supply. However, a variety of contaminants can pollute private water supplies. If you have a private well, you should test your water regularly, even if you do not observe any smells, stains or changes in the taste of your drinking water. Anyone buying or selling a home with a private well should also have their water tested.



TIPS FOR WATER TESTING

- Water testing is important when you first construct or become the owner of a well.
- Test for bacteria yearly, and whenever the water changes in taste, odor, color or appearance. Coliform bacteria are usually not harmful, but indicate the possible presence of disease-causing bacterial from human or animal waste.
- Sample for nitrates once every five years if levels are low. If the first sample shows elevated levels (above 5 parts per million [ppm] as nitrogen) consider testing seasonally to determine if any fluctuations in nitrate levels occur throughout the year. Test for nitrate before infants or pregnant women drink the water; do not give the water or formula made with the water to infants if tests show 10 ppm or more as nitrogen. Nitrate, introduced into groundwater by humans, is a common contaminant, and often indicates the presence of other contaminants.
- Test for atrazine at least once if pesticide is used in the area.
- Test for lead and copper at least once if your water is naturally soft and your home was constructed before 1985, or if you have small children at home. Lead and copper can dissolve into water from pipes and solder joints in home plumbing and can represent a significant health threat.
- Sample for VOCs (volatile organic compounds) if the well is near a gasoline storage area, an old or new landfill, other facilities where chemicals were used, or if you notice a solvent taste or odor.
- Water testing is not enough! A water test only provides a "snapshot" of today's water quality. Groundwater quality can change over time. To ensure good water quality for the future, you must be sure that your well is both properly constructed and is located a safe distance from sources of contamination.

Read a more detailed report on Iowa County Water Quality. Go to the UWEX website at <http://www.uwex.edu/ces/cty/iowa/cnred>

What's in That Glass of Water?

Paul Ohlrogge, Community
Resource Agent
Iowa County UW-Extension



Is the quality of our drinking water getting any better? Evidence from water tests done over past three years in Iowa County does not support that conclusion.

Each year, people who depend on private wells for their drinking water voluntarily pay to have their well water tested through a UW-Extension Drinking Water education program. These programs test for nitrates, bacteria, chloride, hardness, corrosivity, and alkalinity. Other tests for atrazine and heavy metals are also available. The University of Wisconsin-Extension staff has conducted Drinking Water/Well Testing programs in towns throughout Iowa County over the past three years. Thirteen of the fourteen towns have participated. The results from Iowa County are not that different from other counties.

The good news:

- 600+ landowners of private wells demonstrated that they understand the importance of testing their drinking water and took the time to participate in these programs.
- Nearly 38% of the samples tested showed little or no contamination with nitrate (two or less parts per million).
- 76% of the samples were clear of bacteria contamination.

The bad news:

- Only 600 households had their water tested.
- 13% of the samples tested had relatively high levels of nitrate, containing 10 or more parts per million.
- 24% tested positive for coliform bacteria
- 22% had high levels of chloride
- Only 53% of participants knew when their well had last been tested.

Water quality specialists consider nitrate levels of two parts per million or less as the background level, or naturally occurring level. Levels above two parts per million indicate that nitrate from human activity has entered the groundwater. Nitrate levels above 2 parts per million but less than 10 parts per million are not a human health concern in and of themselves. However, the presence of nitrate in the water *may* be an indicator that other, more harmful contaminants may also be present in the water.

Nitrate levels above 10 parts per million are a more serious concern. The Environmental Protection Agency has set the drinking water standard for nitrate at 10 parts per million. Infants under the age of 6 months are susceptible to a disease called blue baby syndrome when nitrate levels exceed 10 parts per million. Water quality specialists also recommend that pregnant women avoid drinking or cooking with water with nitrate levels exceeding 10 parts per million.

Nitrate nitrogen forms when organic materials decompose. It is also a fertilizer. Common sources of nitrate that ends up in wells include agricultural and lawn fertilizers, animal wastes, and septic tank effluent.

There is no safe standard for bacteria. It is recommended that all bacteria be absent from your drinking supply. Residents of Iowa County who live in a municipality automatically have their water tested every week by the municipal government. This is state law. For those of us who live rurally, it is up to us to test our water.

While by no means do these annual tests comprise a definitive, scientific study; the annual tests serve as a rough touchstone of the quality of our ground water. The results of your test serve as one more indicator that we all need to do more to protect the quality of this most valuable natural resource.

LOCAL TOWNSHIP DRINKING WATER TESTING PROGRAM, March 2004

■ **Who can participate?** Residents in the Towns of Clyde and Wyoming are encouraged to participate. We are offering reduced rates on the cost of the water testing.

■ **Why get involved?** If you are a homeowner with a private well, it's important to get your water tested at least once a year. Groundwater is constantly moving, so a water sample taken today may have different results than a sample taken a year ago. **Get involved** and find out what you and your family are drinking.

■ **Pre-register by calling Linda or John**

■ **When and where?** Pick up a sterilized water bottle on **Saturday, March 13th** at the **Clyde Community Center, 10 a.m. to 2 p.m.** or **Wyoming Town Hall, 8 a.m. to 2 p.m.**

Water samples can be dropped off **Monday, March 15** **Clyde Community Center, 6-8 a.m. or 5 to 7 p.m. or Wyoming Town Hall, 5-7 p.m.**

What Tests Are Available?	
	Cost
Homeowners Package includes tests for nitrate, coliform bacteria, pH, alkalinity, hardness, conductivity, corrosivity, and chloride.	\$35
Triazine Screen Test for triazine-type pesticides like atrazine.	\$21
Metals Packages Package test for copper, lead, iron, manganese, zinc, potassium, sodium, calcium, and magnesium.	\$35

IOWA COUNTY UNIVERSITY EXTENSION
222 NORTH IOWA STREET
DODGEVILLE WI 53533
(608) 935-0391

NON-PROFIT
U.S. POSTAGE PAID
Dodgeville WI 53533
Permit No. 65



Please read the detailed instructions that are included with your water bottles.

WATER SAMPLES SHOULD BE TAKEN ON MONDAY BEFORE YOU DROP OFF YOUR BOTTLE AT THE TOWN HALL OR COMMUNITY CENTER

- DO NOT USE SWIVEL FAUCET.
- You will be collecting samples in a different bottle for each test. Samples should be collected in the order outlined in the instructions.
- Wash your hands thoroughly with soap and water. Remove any faucet screen or other attachments.
- Carefully remove the cover of the sample bottle. Do not let fingers touch the mouth or inside of the cap. The cap may be placed top down on a clean surface.
- Fill the bottle. Avoid splashing. Do not rinse the bottle. Leave one-half inch air space at the top. Replace the cap tightly. **Refrigerate your samples** until you take them to the dropoff site.

Iowa County University Extension
222 N Iowa St Dodgeville WI 53533
(608) 935-0391

paul.ohlrogge@ces.uwex.edu

Sample Letter to Local Officials

Dear _____,

Through the County Extension office we have decided to conduct a drinking water education program for residents in the Towns of _____ to take place on _____.

Most residents living in rural areas rely on private wells to supply their drinking water needs. While public and municipal wells are regulated to ensure that water quality meets current drinking water standards, private well owners must assume the responsibility of testing and treating water to ensure that it is safe to drink.

Drinking water education programs provide private well owners with a convenient opportunity to have their drinking water tested for a nominal fee. Following the testing, participants are invited to attend an educational program where water quality specialists from the University of Wisconsin-Stevens Point will explain their results and provide information on additional steps that can be taken to improve their water quality.

We feel that this is an extremely valuable opportunity for area residents to learn more about the quality of their drinking water and groundwater resources in general. Because of the large number of wells that are tested during this time it also offers the community an opportunity to gain a better understanding of their local water quality.

As a way to encourage participation and show support for the program, many other counties and towns provide resources to cover the cost of advertising and some even provide funds to help offset the cost of the water testing for its residents.

Because this program is such a valuable opportunity for the community, please consider contributing resources or other types of support to ensure that this program benefits as many families as possible.

If you have any questions please contact me at _____.

Thank you for your cooperation.

Sincerely,

Sample Press Release

COMMUNITY DRINKING WATER PROGRAM

The _____ County UW-Extension Office has teamed up with the University of Wisconsin-Stevens Point to offer a drinking water testing and an educational program to be offered on _____ for those residents living in the Town of _____ and not serviced by public water.

For a nominal fee private well owners will have eight different water quality tests performed on their water. Bacteria and nitrate-nitrogen, two of the most common health related water concerns will be tested for. In addition, tests such as pH, hardness, alkalinity, conductivity, chloride and corrosivity index will help give a good indication of overall water quality and sometimes indicate other potential water quality concerns. Shortly after the water testing occurs, water specialists will hold an educational program to share information about local water quality issues and help people understand their water test results and possible solutions to any problems.

Most residents living in rural areas rely on private wells to supply their drinking water needs. While public and municipal wells are regulated to ensure that water quality meets current drinking water standards, private well owners must assume the responsibility of testing and treating water to ensure that it is safe to drink.

While most of the wells in Wisconsin produce safe drinking water, about 10% of all water samples test positive for coliform bacteria and another 10% contain levels of nitrate-nitrogen above the safe drinking water standard. While water may look clean and taste good, the only way to know that it is safe to drink is to have it tested.

This is an extremely valuable opportunity for area residents, particularly those who have never had their water tested, to learn more about the quality of their drinking water and groundwater resources in general. Because of the large number of wells that are tested during this time it also offers the community an opportunity to gain a better understanding of their local water quality.

For more information on testing your water through this educational program please contact _____ at _____.