SOURCE WATER ASSESSMENT PROGRAM

Source Water Assessment Program
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List of Acronyms	
CCR	Consumer Confidence Report
CERCLA	Comprehensive Emergency Response Cleanup and Liability Act
CSI	Contaminant Source Inventory
CWA	Clean Water Act
DWSRF	Drinking Water State Revolving Loan Fund
EPA	Environmental Protection Agency
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
GWMA	Ground Water Management Area
GWUDI	Ground Water Under the Direct Influence of Surface Water
IIS	Integrated Information System
LB	Legislative Bill
LPRCA	Lower Platte River Corridor Alliance
LUST	Leaking Underground Storage Tanks
MCL	Maximum Contaminant Level
NDA	Nebraska Department of Agriculture
NDEQ	Nebraska Department of Environmental Quality
NDWR	Nebraska Department of Water Resources
NeRWA	Nebraska Rural Water Association
NHHS	Nebraska Health and Human Services
NNRC	Nebraska Natural Resource Commission
NOGCC	Nebraska Oil and Gas Conservation Commission
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	Natural Resource Conservation Service
NRDs	Natural Resources Districts
NSFM	Nebraska State Fire Marshal
PWSS	Public Drinking Water Supply System
RC&D	Resource Conservation & Development
RCRA	Resource Conservation Recovery Act
ROA	Result Oriented Activity
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SFM	State Fire Marshal
SWAP	Source Water Assessment Program
TOT	Time of Travel
UIC	Underground Injection Control
UNL	University of Nebraska - Lincoln
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

WDA	Watershed Delineation Area
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program

Source Water Assessment Program
Introduction

The 1996 Amendments to the Federal Safe Drinking Water Act initiated the Source Water Assessment Program (see section 1453 of the Safe Drinking Water Act in Appendix I). The 1996 Amendments required the Environmental Protection Agency (EPA) to publish a guidance document to benefit States in developing a Source Water Assessment Program (SWAP). The guidance outlines the main requirements and offers flexibility to State's to individualize their SWAPs (USEPA, August 1997).

The State of Nebraska Legislature passed LB517 in 1997, giving the responsibility for developing and implementing a SWAP to the Nebraska Department of Environmental Quality (NDEQ). The Ground Water Section at NDEQ already administers the Wellhead Protection (WHP) Program, and the SWAP will be coordinated out of that section as well.

This is the official submittal of the Source Water Assessment Program for the State of Nebraska. Although this is the official submittal, it is very important to NDEQ that it remain readable to the general public. A very strong effort has been made to gain public involvement in the development of the Source Water Assessment Program. This submittal has been written with the public in mind, and could be used to inform and educate individuals and Public Water Supply Systems (PWSSs) about the SWAP.

NDEQ has completed the SWAP description and will deliver it to USEPA in Kansas City by early February of 1999. Approval of Nebraska's SWAP from USEPA should occur by November, 1999. Upon approval of the program NDEQ will begin writing rules and regulations. NDEQ will involve stakeholders in the development of those rules and regulations.

The program description reflects the input from people from across Nebraska. It was written to be a "public" document, in a readable, straight-forward format. It is being presented in three parts:

- Main SWAP description,
- Appendices, important to the SWAP description, and
- Attachments, important to EPA in evaluating the public input NDEQ used when developing the program (this part is available to the public upon request).

1.1 Basic Requirements for the SWAP

This submittal explains how the requirements for the SWAP will be completed in Nebraska. The main requirements for each State's Source Water Assessment Program are as follows:

- delineation of sources of public drinking water - either Wellhead Protection Areas (for ground water systems) or Watershed Delineation Areas (for systems that use surface water),
- inventory of potential contaminant sources,
- a susceptibility analysis of the system to contamination,
- and, making the Source Water Assessment available to the public.
- Additionally, the program must be developed with "stakeholder" involvement from across the state.

Delineation and Inventory are two steps in the Wellhead Protection Program that are also in the SWAP. Any wellhead protection areas (WHPA) that are delineated or inventories that have been done will be used in Nebraska's SWAP. This will be a very important component in completing the assessments in a timely manner. Nebraska has a small number of PWSSs with surface water as the source of drinking water. The majority of the systems will need WHPAs drawn.

A checklist was developed by EPA to determine if all vital aspects of a State's Source Water Assessment Program have been addressed. NDEQ feels all of these points have been addressed. The completed checklist with references to pertinent sections of the SWAP description is included in Appendix J.

1.2 Goal For Nebraska's SWAP

The goal of the Nebraska Source Water Assessment Program is,

"To develop information which enables public water supply owners, consumers, and others to initiate and/or promote actions to protect their drinking water sources."

As part of the assessment, NDEQ will provide the following information to each of the state's approximately 1400 Public Water Supply Systems:

- A map of the Wellhead Protection Area (WHPA) or Watershed Delineation Area (WDA).
- A list of potential contaminant sources found in the database search and their locations. Guidance and training is available to help PWSSs conduct a more detailed "on-the-ground" contaminant source inventory.
- A vulnerability/susceptibility analysis
- A list of options for making the material available to the public.

1.3 Time Table for Implementing and Completing SWAP

The following priority will be made for PWSSs:

System Type	Priority	Approximate Number of Systems in Nebraska *
Community	1st	~ 620
Non- Transient, Non-Community	2nd	~ 184
Transient, Non-Community	3rd	~ 549

* most recent numbers from NHHS web site, www.hhs.state.ne.us/pws (12/8/99)

The following is a very rough estimate of the number of Assessments that may be completed each year for the SWAP. Much of this depends on progress in the WHP program, progress in the Integrated Information System being developed and implemented by the Data Processing Section at NDEQ, the availability of other databases from other agencies, the ability to contract out some aspects of the SWAP, and other unforeseen events. NDEQ will report progress to EPA through biannual reporting.

End of Calendar Year	Approximate Number of Assessments Anticipated to be Done	Running Total
1999	100	100
2000	300	400
2001	300	700
2002	500	1200
May, 2003	200	1400

The Drinking Water State Revolving Loan Fund (DWSRF) Intended Use plan for Nebraska specifies that 10% (approximately 1.2 million dollars) may be set aside from the Capitalization grant for the SWAP. This set aside will be used over a five year period, for personnel, computers, training, travel, contracts, equipment, and incidentals (see Appendix A for NDEQ - EPA workplan for using this money).

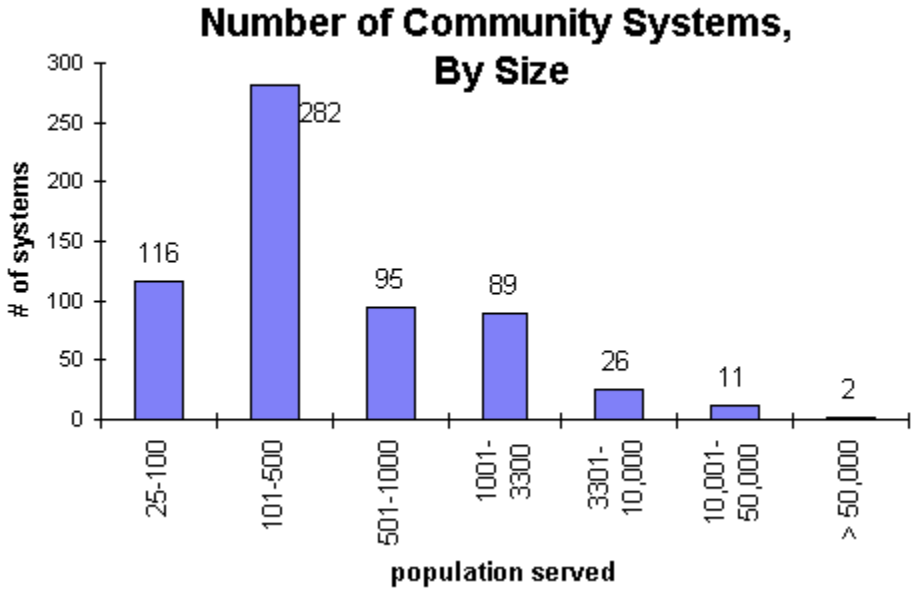
1.4 Public Water Supply Systems in Nebraska

All Public Water Supply Systems (PWSSs) are covered under the Nebraska Safe Drinking Water Act administered by the Nebraska Health and Human Services (NHHS). The following chart indicates the different types of PWSSs in the State of Nebraska. The information was provided by the Nebraska Health and Human Services (NHHS).

system type	definition	examples
Community	25 people or more, 15 or more service connections, year round	City of Lincoln, mobile home parks
Non-Transient, Non-Community	25 people or more, 15 or more service connections, 6 months	rural schools
Transient, Non-Community	25 people or more, 15 or more service connections, 60 days	rest areas, State Parks, rural cafe

These definitions are from Title 179, NAC 2, Regulations Governing Public Water Supply Systems, Section 001 (NHHS, 1998).

As mentioned above, there approximately 1400 PWSSs in Nebraska. The total population of Nebraska is about 1.6 million people, of which about 1.2 million rely on publically supplied drinking water. The following chart shows how the population is split up between the different sizes of Community PWSSs.



As can be seen, 398 (64%) of Nebraska's Community PWSSs serve 500 people or less and only 13 systems serve more than 10,000 people. The "average" Nebraska system serves 991 people. Nebraska's two largest systems are Lincoln and Omaha. Lincoln serves over 210,000 people and Omaha (Metropolitan Utilities District) serves over 500,000 people, which includes several small nearby communities.

The vast majority of Nebraska's PWSSs are ground water based. All Non-Community systems (~719) are ground

water based. NDEQ estimates, with information from NHHS, that there are less than fourteen Community PWSSs that use surface water partially, entirely, or buy water from surface water systems. Some of theses systems have inflitration wells or wells that have been deemed “Ground Water Under the Direct Influence” of surface water.

Source Water Assessment Program
Wellhead Protection and Related Programs

2.1 The Wellhead Protection Program

Amendments to the Safe Drinking Water Act (SDWA) in 1986 authorized states to develop Wellhead Protection (WHP) Programs. Nebraska Governor Orr chose the Department of Environmental Quality (then the Department of Environmental Control) to be the lead agency in WHP program development and implementation in December 1987. Citizens and Technical Advisory Committees were formed and met beginning in September of 1988. Nebraska’s Wellhead Protection Program was approved by the Environmental Protection Agency (EPA) June of 1991.

The vast majority of Nebraska’s PWSSs rely on ground water for their source of drinking water. For this reason, Wellhead Protection is a very important part of Nebraska’s SWAP. Nebraska’s voluntary program has the goal of protecting the ground surface and ground water surrounding PWSSs from contamination. There are six steps to Nebraska’s WHP program:

- Delineation of a Wellhead Protection Area (WHPA)
- Contaminant Source Inventory (CSI or Inventory)
- Contaminant Source Management
- Contingency Planning
- Siting New Wells
- Public Education and Participation Throughout the Process

Delineation of a WHPA is calculated using geologic information and annual pumpage of the well. WHPA boundaries are drawn to be inclusive of a 20 year Time of Travel (TOT). NDEQ routinely calculates the following TOTs for a WHPA:

- 60 day
- 6 month
- 1 year
- 2 year
- 10 year
- 20 year

As part of the approved WHP program, NDEQ has committed to drawing all the WHPAs. Currently, NDEQ has drawn or adopted a total of 257 WHPAs, the majority of which are Community systems. NDEQ recommends that the WHPA be computer modeled before an “on-the-ground” inventory is done. Whenever possible, the Nebraska Department of Environmental Quality (NDEQ) adopts WHPAs from other sources, such as the Nebraska Rural Water Association (NeRWA), Natural Resources Districts (NRDs), and others. During an inventory, activities or potential sources of contamination within a WHPA are identified. NDEQ has developed a Contaminant Source Inventory Guidebook (Inman, 1997) to help communities complete an inventory. A series of WHP Newsletters have also been developed to help communities and individuals understand the WHP program. At this time, there are seven WHP Newsletters completed; the titles are:

- What, Why, Where, When, and Who...
- Delineation of Wellhead Protection Areas (WHPAs)
- Contaminant Source Inventory
- Determination of Water Quality Testing Recommendations
- Ground Water Regulations and Wellhead Protection

- WHP Opportunities
- Nonpoint Source Contamination and Wellhead Protection

Newsletters are available on the internet at NDEQs website: http://www.deq.state.ne.us. When Newsletters are initially released, Nebraska Health and Human Services (NHHS) distributes them to Public Water Supply operators in their publication, The Water Spout. The Contaminant Source Inventory Guidebook and WHP Newsletters will be used in educational activities and to get SWAP information out to the public and PWSSs. All are available free upon request. New WHP-SWAP Newsletters and other educational materials will be developed when the SWAP is approved and implementation begins.

2.2 Voluntary Protective Actions and Existing Protective State Regulations

Through the implementation of the SWAP described in this document, NDEQ is providing information to local PWSSs that will help them protect their source of drinking water. The SWAP goal is

> **"To Develop Information Which Enables Public Water Supply Owners, Consumers, and Others to Initiate and/or Promote Actions to Protect Their Drinking Water Sources."**

NDEQ feels that the most effective protection a public drinking water source can have will be decided and acted upon locally. All local protection activities will be encouraged by NDEQ through technical assistance activities (when requested), financial assistance (as available), and educational information. NDEQ is not requiring or implementing any new protection measures or requirements with the implementation of this program.

Local regulations to manage potential contaminant sources will be left up to the PWSS or entity with zoning jurisdiction. NDEQ will provide any example ordinances or assistance possible, but the decision to do management activities will be done on a local level. Currently, NDEQ is contracting with UNL through a small Clean Water Act (CWA) 319 grant to list some options communities have for the management of contaminant sources in WHPAs.

2.2.1 *Title 179 - NAC2 Regulations Governing Public Water Supply Systems*

Title 179 NAC2 Regulations Governing Public Water Supply Systems, (NHHS, 1998), requires PWSSs to control activities and to take action as necessary to protect the system from encroachments which may be hazards to the safety of the drinking water quality. PWSSs may adopt ordinances, regulations, make contracts, etc. to insure adequate protection from potential contamination. These regulations can be reviewed on the internet at **www.hhs.state.ne.us/reg/t179.htm**.

The maximum set-back distance listed in Title 179, NAC2 (NHHS, 1998) is 1000 feet. The 1000 feet encloses the 2 year Time of Travel in WHPAs for ten PWSSs examined. While this 1000 feet or less distance cannot be considered protective of the entire 20 year TOT of a WHPA, it does help protect the immediate zone around the wells. These ten representative PWSSs serve populations ranging from 790 to 1000 (the "average" system in Nebraska serves 919 people), with 27 wells total. The WHPA2 modeled 2 year TOT for these same systems ranged from 970 feet to nearly 1900 feet from the well. Non-Community wells do not typically yield this much water, so 1000 feet will enclose much more than a 2 year Time of Travel.

2.2.2 *Title 118 - Ground Water Standards*

Many of NDEQ Regulations, which are explained in this section, can be found on the internet at NDEQs website: http://www.deq.state.ne.us. Title 118, Ground Water Quality Standards and Use Classification, (NDEQ, 1996) allows for ground water within wellhead protection areas designated through local ordinance to be classified as GA. Class GA ground water is usually given a higher priority in the remediation efforts following spills, leaks, and contamination events. This regulation also specifies how spills and contamination from point sources of contamination will be investigated and remediated, and specifies maximum levels of certain contaminants in ground water. These clean up levels are the same or more restrictive than federal drinking water standards.

2.2.3 *Title 196 - Nonpoint Source Ground Water Management*

Title 196, Rules and Regulations Pertaining to Special Protection Areas (NDEQ, 1988), establishes a process to study, delineate, and manage nonpoint sources of ground water contamination. Nonpoint source (NPS) contamination is usually associated with the agricultural application of fertilizer and pesticides, especially under irrigated conditions. Nonpoint source ground water contamination in Nebraska is most likely in areas of shallow ground water and sandy subsurface materials. However, such contamination has also been documented in regions with deeper ground water and more clay rich soils and sediments.

Under Title 196, NDEQ performs studies to determine if NPS pollution of ground water is occurring or likely to occur. If such is the case, NDEQ can designate a Ground Water Management Area (GWMA), formerly known as Special Protection Area (Natural Resources Districts (NRDs) have separate authority to implement their own Ground Water Management Areas through the Ground Water Management and Protection Act--see Section 2.2.4). When this occurs, the affected NRD is required to develop an action plan to address the problem. If the NRD fails to develop an acceptable action plan, NDEQ will implement an action plan for the GWMA. Typical requirements in a Ground Water Management Area are education/certification for farm operators, permitting of new wells, implementation of Best Management Practices such as irrigation and nutrient management, reporting on Best Management Practices, and timing limitations for application of fertilizer. Requirements are tailored for the type of agriculture, specific geologic conditions, and extent of nonpoint source contamination for the area.

From 1988 through 1998, 14 different areas of the state have been studied under Title 196. These studies have led to NDEQ declaring three Ground Water Management Areas and NRDs declaring four new GWMAs and adding onto existing Management Areas. Two studies have either not been completed or a final determination on the recommendations has not been made. Over 2400 wells, mainly irrigation wells, have been sampled for these studies since 1988 (NDEQ, 1998).

2.2.4 *Ground Water Management and Protection Act*

The Nebraska Ground Water Management and Protection Act (Nebraska Revised Statutes §46-656.01-46-657.67) originated in 1975 when the Nebraska Legislature codified the value and importance of the state's ground water resources to the general welfare of its citizens. The primary function of the Act is to establish a framework for establishment of Ground Water Management Plans by the state's 23 Natural Resources Districts. The Act requires that all NRDs develop a Plan aimed at the management of ground water, both in terms of quality and quantity, within their jurisdiction. In addition to specifying the process by which NDEQ can designate a GWMA (see Section 2.2.3), the Act lays out a process by which NRDs can delineate their own GWMAs, and what actions can be required within the GWMA. In the end, GWMAs designated by NDEQ or an NRD tend to be very similar, with required actions being much alike from GWMA to GWMA. In addition, the Act allows NRDs to designate GWMAs for the purpose of managing ground water supply (quantity). The procedure for establishment is similar to what has already been outlined, and an NRD which establishes a Management Area for ground water quantity can require such actions as well metering, crop rotation, allocation, and well spacing restrictions. Finally, in cooperation with the Nebraska Department of Water Resources, NRDs can establish GWMAs for managing interconnected ground and surface water, the use of which is often referred to as conjunctive use. In addition to such controls as are listed above, GWMAs dealing with conjunctive use can also manage the use of surface water through increased monitoring of diversions, appropriation limitations, and requiring Best Management Practices which conserve surface water.

2.2.5. *Title 117 - Surface Water Standards*

Although the vast majority of public and private drinking water in Nebraska comes from ground water sources, several public supplies depend partially or completely upon surface water. Under Title 117, Nebraska Surface Water Quality Standards, (NDEQ, 1996) drinking water supply is protected as a beneficial use. Title 117 sets standards for surface water used as drinking water (which are generally the same as those for ground water). In addition, it prohibits certain actions which would impair the quality of surface water used for human consumption, and provides a link with NDEQ's other programs and regulations (e.g. NPDES permitting, waste water treatment, etc.).

2.2.6. *Nonpoint Source Management Program*

An increasingly important part of NDEQ's efforts to protect ground and surface water is through the agency's Nonpoint Source Management Program, which is required under Section 319 of the federal Clean Water Act.

Section 319 funds from USEPA are used to fund personnel and activities within the agency as well as projects outside NDEQ. Projects are funded according to NDEQ priorities, one of which is water supply protection. For example, designated Wellhead Protection Areas within the state are considered to be areas of high priority for 319 funding. A number of 319 projects have components which deal with source water protection. Some deal with the larger issues of NPS contamination in general; however, since NPS pollution is the primary threat to drinking water quality, especially in rural Nebraska, these projects often provide a basis for protection and improvement of sources of drinking water. Whenever projects are initiated in areas where drinking water is a concern, NDEQ encourages the project sponsors to consider wellhead or source water protection as a component of the overall approach. In addition, over the past few years, several projects have been aimed specifically at wellhead protection activities such as Wellhead Protection Area delineation, contaminant source inventory, and public education.

2.3 WHP Option for Nitrate Administrative Order

The Nebraska Health and Human Services has provided an option of implementing a WHP program to PWSSs that receive an Administrative Order for exceeding the Maximum Contaminant Level (MCL) for nitrate (greater than 10 parts per million - ppm). This option gives PWSSs some flexibility, and allows them to save time and money by not being required to drill new wells or install treatment plants. This option requires the PWSS to implement a complete local WHP plan, and is intended to be a long term solution. Drinking water must remain below 15 ppm nitrate to use this option, and bottled water must be provided to infants and pregnant women. If nitrate levels rise above 15 ppm, the WHP option becomes invalid. Other options commonly used to solve a nitrate Administrative Order include new wells in an area with lower nitrate concentrations or treatment.

2.4 Changes to the Approved Wellhead Protection Program

With this submittal, NDEQ is formally requesting to make changes in the EPA approved Wellhead Protection Program. The major change is the method of delineation of WHPAs. NDEQ's WHP program description (page 30, NDEQ, 1991) states that the cylindrical displacement method will be used for all delineations. Better and more accessible data is now available that was not available when the WHP program was developed. *EPA computer model WHPA2 or WhAEM will be used for delineations for community PWSSs. This model makes use of ground water flow directions and gradient, which allows the WHPA to reflect the ground water flow direction. Other wells and rivers may be considered in the model and accounted for by special subroutines. Other proven computer ground water models may be used, as well. When adequate ground water data are not available, the cylindrical displacement method will still be used.* More details about WHPA2 and WhAEM data requirements are presented in the Delineation Section (Section 3).

Additionally, WHPAs drawn by others (Nebraska Rural Water Association, Natural Resources Districts, University of Nebraska Conservation and Survey Division, United States Geological Survey, consultants or engineers under contract with the PWS, etc.) will be reviewed. NDEQ will evaluate data used to model WHPAs and adopt these efforts if methods and data assumptions are found to be acceptable.

Another change to the Wellhead Protection Program is using a fixed radius for Non-Community PWSSs. Transient, Non-Community PWSSs will have a WHPA that is 100 feet in radius and Non-Transient, Non-Community PWSSs will have a WHPA that is 1000 feet in radius from the well. More details on Non-Community PWSS delineations are given in the Delineation Section (Section 3).

The existing WHP program addresses surface water bodies that intersect or are included in a WHPA. A clarification and change is proposed to this particular section. The section is proposed to be changed as follows: "Areas of surface water falling within a WHPA will be regarded as part of the WHPA. *It is recommended that PWSSs perform an "on-the-ground" inventory 15 "airline" miles upstream from the WHPA. "Airline" miles means straight line miles, not river reach miles.* ~~In addition, perennial stream reaches extending from within WHPAs to 15 airline miles upstream from a public water supply will be added to WHPAs for certain contaminant source management activities~~" (NDEQ, June 1991). Italics indicate the new language and words with strikeout indicate deleted language.

2.5 The Wellhead Protection Area Act

The Nebraska Unicameral passed LB1161 on April 15, 1998. Sections 2 through 10 of this bill established the

Wellhead Protection Area Act (see Appendix B). The act leaves the WHP program a voluntary program for PWSSs to participate in, but does set up a legal public process for adopting a local WHP program, including WHPA boundaries, an inventory of potential contaminant sources, and "controls" (contaminant source management). When a PWSS wants to enact "controls" over the Wellhead Protection Area, a complete local WHP program must be sent into NDEQ for approval and then adopted by local ordinance or resolution. A flowchart summarizing the Act is also included in Appendix B.

Legislation for this act also requires NDEQ and the Environmental Quality Council (people appointed by the Governor to enact and modify the NDEQ's rules and regulations) to adopt rules and regulations for the Wellhead Protection Act. Because 1997 legislation (LB517) enabling the Source Water Assessment Program also requires NDEQ and the Environmental Quality Council to adopt rules and regulations, it is hoped that the two sets of regulations can be done at the same time or together.

Source Water Assessment Program Delineation Methods

3.1 Wellhead Protection Areas for Ground Water Systems

3.1.1 *Community Public Water Supply Systems*

Delineations for WHPAs for Community Public Water Supply wells have been drawn using the cylindrical displacement method and the EPA computer model, WHPA2. Wellhead Protection Area boundaries from both methods completely enclose the 20 year Time of Travel (TOT) areas. The 20 year TOT was decided upon by the Technical Advisory Committee during the development of the Wellhead Protection Program.

Most existing WHPAs in Nebraska have been delineated by the cylindrical displacement method. As communities request or prepare to do an "on-the-ground" inventory, cylindrical displacement WHPAs will be re-drawn using WHPA2 by NDEQ. Any WHPA delineations done under contract with NDEQ will be computer modeled. With this SWAP submittal, NDEQ is officially making WHPA2 delineations the preferred WHPA delineation method for Community Public Water Supply Systems if necessary hydrologic information is available. Community PWSSs will be the highest priority for completing delineations.

3.1.2 *Computer Modeled Delineation*

The same basic information needed to delineate WHPAs using the cylindrical displacement method is needed when using the computer model WHPA2 or WHAEM (or other computer modeling methods, see section 2.4). The "Data Sheet for Delineation of a Wellhead Protection Area" is shown in Appendix B. Basic information needed from the PWS includes:

- system name, well name
- well location and characteristics
- geologic information from well log
- average annual pumpage

Additional information needed to use the computer model to delineate the WHPA includes:

- ground water flow direction
- ground water gradient (related to ground water velocity)
- aquifer characteristics (hydraulic conductivity)
- river or aquifer boundaries

For more information on the WHPA2 (EPA, March 1991) or WhAEM (Haitjema, et al, 1994) computer models the reader is encouraged to review the model documentation. To see the difference between the cylindrical displacement method and the WHPA2 computer model, see the example below.

Display Graphic Example

3.1.3 *Fixed Radius on all Non-Community PWSSs*

The fixed radius WHPA method was chosen for Non-Community PWSSs (Transient and Non-Transient) for the following reasons:

- A lack of information about the well. Some PWSSs may not have a well log or even know when the well was drilled, making it difficult to use more scientific methods, such as computer modeling.
- NDEQ budget and time frame constraints may not allow computer modeled delineations done by the Federal deadline. There are over 750 Non-Community PWSSs in Nebraska.
- Title 179 NAC 2 - Regulations Governing Public Water Supply Systems (NHHS,1998). Public Water Supply Systems are required to control the area immediately around their well. These regulations will provide information on specific set back distances for potential contaminant sources.
- Title 124 - Rules and Regulations for the Design, Operation and Maintenance of Septic Tanks (NDEQ,1994). This regulation sets out the distances required between septic tanks and Public Water Supply Wells. This will provide information related to septic tanks as potential contaminant sources.
- An article from the Minnesota Department of Health titled “Pumping Effects of Transient Non-Community Wells on a Fixed Radius Approach to Delineating Wellhead Protection Areas” (MDOH, 1995). This paper summarizes a project that determined a fixed radius will protect drinking water users at a hotel and resort, from acute health effects. A copy of this article can be obtained from NDEQ upon request.
- A statewide emergency response program dealing with contaminant releases. NDEQ has an individual on call 24 hours a day to respond to emergency situations regarding chemical spills and releases. This program addresses the concern related to pesticides and other contaminants that are not tested for by Non-Community PWSSs.
- The maximum set-back distance listed in Title 179, NAC2 (NHHS, 1998) is 1000 feet. This 1000 feet encloses the 2 year Time of Travel for ten PWSSs examined. These representative PWSSs serve populations ranging from 790 to 1000 (the “average” system in Nebraska serves 919 people), with 27 wells. The WHPA2 modeled 2 year TOT ranged from 970 feet to nearly 1900 feet from the well. Non-Community wells do not typically yield this much water, so 1000 feet will enclose much more than a 2 year Time of Travel.

For the assessment that is made available to the public, Non-Community PWSSs may be located on County, NRD, or some regional basis for efficiency in delineation and the first level inventory.

3.1.4 *Non-Transient, Non-Community Public Water Supply Systems*

Delineations will be done using a fixed radius for all Non-Transient, Non-Community PWSSs. These systems serve 25 people or more, over 6 months out of the year, examples include rural schools and factories. The radius will be 1000 feet, based on Title 179 NAC2 sec.007 (NHHS, 1998). WHPAs may be redone using a computer model later, if necessary information is available, as time allows, or special needs for these systems arise. Non-Transient, Non-Community PWSS will be a higher priority than Transient, Non-Community PWSSs, but remain a lower priority than Community PWSSs for completing delineations.

3.1.5 *Transient, Non-Community Public Water Supply Systems*

Delineations will be done using a fixed radius for all Transient, Non-Community PWSSs. These systems serve 25 people or more, over 60 days out of the year. Examples of this type of system include state or local parks, highway or interstate rest areas, or rural cafes. The radius will be 100 feet, based on Title178, Chapter 12, Section 003 (NHHS, 1997). WHPAs may be redone using a computer model later, if necessary information is available, as time allows, or special needs for these systems arise.

The following table summarizes the distance of the fixed radius for delineation of Non-Community PWSSs:

Type of Non-Community PWSSs	fixed radius in feet
Transient	100 feet
Non-Transient	1000 feet

3.1.6 *Delineations of Non-Adjacent Recharge Areas*

There are no areas non-adjacent to WHPAs in the State of Nebraska that recharge those WHPAs. Nebraska has no mountainous areas of remote recharge separated from a WHPA by exposed bedrock. These situations generally typify non-adjacent recharge areas. Additionally, Nebraska's WHPAs enclose the 20 year Time of Travel contribution area, which is a very protective distance.

3.2 Surface Water Systems and Ground Water Under the Direct Influence

All Public Water Supply Systems using surface water (streams, rivers, and lakes) and wells considered ground water under the direct influence of surface water (GWUDI) will follow the same plan for the SWAP. GWUDI means "any water beneath the surface of the ground with significant occurrences of insects or other macroorganisms, algae, or large-diameter pathogens such as Giardia lamblia, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlates to climatological or surface water conditions" (NHHS, 1998). Currently, there are less than 10 PWSSs whose source of water has been determined "surface water" or "GWUDI". There are PWSSs in Nebraska that purchase drinking water from these systems, but assessments will not be done for those purchasing drinking water because they do not have a well or intake.

For systems determined to be GWUDI, NDEQ will delineate WHPAs using provided well information. These systems are required in Title 179, NAC2, 013.02B5 to exclude potential sources of microbiological contamination from the 1 year TOT. Title 179, NAC2, 013.02B5 specifies the one year TOT be determined using the following formula:

T= 3.14nbL2 divided by Q

where

T = Time-of-Travel (days)
L = Distance from the well (feet)
n = Effective porosity (assumed to be 0.2 unless supporting evidence indicates otherwise).
b = Aquifer thickness (feet)
Q = Pumping rate (cubic feet per day)

Translated into a distance formula would read as follows:

$$L = \sqrt{\frac{116.2Q}{nb}}$$

Delineations will be completed for the entire watershed to the state boundaries for each surface water system, starting at the intake. This will be called the Watershed Delineation Area (WDA). When the watershed extends into another state, the Source Water Assessment will list the neighboring state contacts. After SWAP description completion, a multi-state effort will be coordinated, with the help of EPA Region 7, to address multi-state watershed issues and emergency response concerns.

NDEQ will determine the 24 hour Time of Travel (TOT) zone for each WDA individually. This 24 hour TOT zone

will be called the “Assessment Area.” The Assessment Area will be determined using high stream flow data (see figure below for example). NDEQ will also determine the 12 hour TOT, 6 hour TOT, and 3 hour TOT zones within the Assessment Area. The PWSS will determine and justify for which zone(s) it completes an “on-the-ground” inventory, when it does one.

The following formula and information explains how the Assessment Area (24 hour TOT zone) is determined:

$$Dist(miles) = \left\{ \frac{V_k}{\sqrt{Flow_k / Flow_{90}}} \right\} \times \frac{86400\,sec/day}{5280\,ft/mile}$$

Dist (miles) = 24 hour Time of Travel distance in miles
Vk (feet/second) = velocity of stream; measured in the field by various agencies (USGS, NDEQ, Nebraska Department of Water Resources, Nebraska Game and Parks Commission, etc.)
Flowk (cubic feet/second) = known flow of stream; calculated from stream velocity and stream length and depth (area), which was measured in the stream by various agencies (see agencies above)
Flow90 (cubic feet/second) = calculated flow of stream at 90% of measured high flow, determined using many data measurements by various agencies (see agencies above)

Display Diagram

3.2.1 *Conjunctive Delineations of Surface Waters with Significant Hydrologic Connections*

The existing WHP program addresses surface water bodies that intersect or are included in a WHPA (Italics in Section 2.4 show the change to the WHP program as explained).

The diagram below illustrates the concept of airline miles.

Display Diagram

3.3 *Responsibility*

The Nebraska Department of Environmental Quality will assume the responsibility for completing delineations. Delineations completed by sources other than NDEQ will be used for the SWAP whenever possible. Some examples of other sources include NeRWA, NRDs, PWSSs, and County Health Departments. It is possible that some of the delineations may be contracted with agencies, organizations, or private companies outside of NDEQ.

Source Water Assessment Program
Inventory of Potential Contaminant Sources

4.1 Contaminants of Concern

The list of contaminants of concern must include raw water contaminants regulated under the Safe Drinking Water Act that have a maximum contaminant level (MCL), and cryptosporidium. MCL means the maximum permissible level of a contaminant in water which is delivered to any user of a public water supply system (NHHS, 1998). States may also include contaminants that are not federally regulated under the SDWA, but which the state has determined may present a threat to public health. In accordance with the Contamination Potential Rating (CPR) point system for ground water (Table 5.2), sources inside 1000 feet will be considered significant potential sources.
Below is the list of contaminants that PWSSs in Nebraska test for water quality. MCLs are listed strictly for

informational purposes. New contaminants of concern may be added when new federal or state regulations are promulgated.

4.1.1 *List of Contaminants of Concern*

CONTAMINANTS TESTED FOR and REGULATED

These are drinking water contaminants that have a maximum contaminant level (MCL) and are regulated under the Nebraska Safe Drinking Water Act (NHHS,179, NAC2,1998).

CONTAMINANT	
Coliform Bacteria	The MCL is based on the presence or absence of total coliforms in a sample (NHHS, 179, NAC2,002.02C1, 1998).
Inorganic Chemicals:	**MCL**
Antimony	0.006 ppm
Arsenic	0.05 ppm
Asbestos	7M fibers/l
Barium	2.0 ppm
Beryllium	0.004 ppm
Cadmium	0.005 ppm
Chromium	0.1 ppm
Copper	1.3 ppm (Advisory Level)
Cyanide	0.2 ppm
Fluoride	4.0 ppm
Lead	0.015 ppm (Advisory Level)
Mercury	0.002 ppm
Nickel	0.1 ppm
Nitrate	10. ppm
Nitrite	1. ppm
Total nitrate and nitrite	10.0 ppm
Selenium	0.05 ppm
Sodium	500.0 ppm
Thallium	0.002 ppm
Synthetic Organic Chemicals:	
Pesticides & Other Synthetic Organic Chemicals:	**MCL**
Alachlor	2 ppb
Atrazine	3 ppb
Benzo(a)pyrene	0.2 ppb
Carbofuran	40 ppb

Chlordane	2 ppb
Dalapon	200 ppb
Di(2-ethylhexyl)adipate	400 ppb
Dibromochloropropane	0.2 ppb
Dinoseb	7 ppb
Di(2-ethylhexyl)phthalate	6 ppb
Diquat	20 ppb
2,4-D	70 ppb
Endothall	100 ppb
Endrin	2 ppb
Ethylene dibromide	0.05 ppb
Glyphosate	700 ppb
Heptachlor	0.4 ppb
Heptachlor epoxide	0.2 ppb
Hexachlorobenzene	1 ppb
Hexachlorocyclopentadiene	50 ppb
Lindane	0.2 ppb
Methoxychlor	40 ppb
Oxamyl (Vydate)	200 ppb
Pentachlorophenol	1 ppb
Picloram	500 ppb
Polychlorinated biphenyls	0.5 ppb
Simazine	4 ppb
Toxaphene	3 ppb
2,3,7,8-TCDD (Dioxin)	0.00003 ppb
2,4,5-TP (Silvex)	50 ppb
Volatile Organic Chemicals:	**MCL**
Benzene	5 ppb
Carbon Tetrachloride	50 ppb
o-Dichlorobenzene	600 ppb
Para-Dichlorobenzene	75 ppb
1,2-Dichloroethane	5 ppb
1,1-Dichloroethylene	7 ppb
Cis-1,2-Dichloroethylene	70 ppb
Trans-1,2-Dichloroethylene	100 ppb
Dichloromethane	5 ppb
1,2-Dichloropropane	5 ppb
Ethylbenzene	700 ppb
Monochlorobenzene	100 ppb
1,2,4-Trichlorobenzene	70 ppb

1,1,1-Trichloroethane	200 ppb
1,1,2-Trichloroethane	5 ppb
Trichloroethylene	5 ppb
Vinyl Chloride	2 ppb
Styrene	100 ppb
Tetrachloroethylene	5 ppb
Toluene	1,000 ppb
Xylenes (total)	10,000 ppb
Disinfection By-Products:	
Total Trihalomethanes	100 ppb
Radionuclides:	
Gross Alpha (minus	15 pCi/l
Uranium & Radium 226)	
Radium 226 plus Radium 228	5 pCi/l

Abbreviations	full name of abbreviation
MCL	Maximum Contaminant Level
M fibers/l	Million fibers per liter
ppb	parts per billion, roughly equivalent to micrograms per liter
ppm	parts per million, roughly equivalent to milligrams per liter
pCi/l	picoCuries per liter

CONTAMINANTS TESTED FOR/NOT REGULATED

States may also include contaminants that are not federally regulated under the SDWA, but the state has determined may present a threat to public health (NHHS, 1998). Nebraska Health and Human Services requires testing for the following non-regulated contaminants:

Inorganic Chemicals:

Sulfate

Volatile Organic Chemicals:

Chloroform
Bromodichloromethane
Chlorodibromomethane
Bromoform
Chlorobenzene
m-Dichlorobenzene
1,1-Dichloropropene
1,1-Dichloroethane

1,1,2,2-Tetrachloroethane
1,3-Dichloropropane
Chloromethane
Bromomethane
1,2,3-Trichloropropane
1,1,1,2-Tetrachloroethane
Chloroethane
2,2-Dichloropropane
o-Chlorotoluene
p-Chlorotoluene
Bromobenzene
1,3-Dichloropropene

Pesticides and Other Synthetic Organic Chemicals:

Aldrin
Butachlor
Carbaryl
Dicamba
Dieldrin
3-Hydroxycarbofuran
Methomyl
Metolachlor
Metribuzin
Propachlor

4.2 Ground Water Systems, Two Level Approach

4.2.1 *Level One - Database Search*

NDEQ will do a database search of potential contaminant sources within the WHPA (for all types of PWSSs), including databases from the following State Agencies:

- Nebraska Department of Environmental Quality (NDEQ) (see section 4.2.2),
- Nebraska Department of Health and Human Services (NHHS),
- Nebraska State Fire Marshal (NSFM),
- Nebraska Oil and Gas Conservation Commission (NOGCC),
- Nebraska Department of Agriculture (NDA).

A Draft Source Water Assessment including information from the agencies listed above will be shared with the PWS operator before completion. From the draft assessment, the PWSS will be able to make changes or additions if needed. The PWSS will be given a final Source Water Assessment, then the PWSS can move onto Level Two, when ready.

4.2.2 *NDEQ's Database*

NDEQ has developed an Integrated Information System (IIS) which is a centralized, shared database containing descriptive and locational information for all facilities under the agency's jurisdiction. A unique identification number is provided for each facility, and program staff correlate agency-wide information for a given facility. Additionally, IIS facility data is being developed for use with the Geographic Information System (GIS) by obtaining locational coordinates with address matching and from hand-held Global Positioning System (GPS) units. The following are programs or facility information that make up the IIS facility list:

- Clean Air Act
- Emergency Response
- Grants and Planning (recycling centers)

- Integrated Waste Management (landfills)
- Leaking Storage Tanks (underground and above ground)
- Legal Services
- Livestock Waste Control Facilities
- Low Level Radioactive Waste
- National Pollutant Discharge Elimination System (NPDES) - permits for municipal and industrial waste discharge
- Stormwater Permits
- Combined Sewer Overflows - combined storm water and wastewater sewer system
- Remedial Action Plan Monitoring - voluntary ground water and soil remediation sites
- Resource Conservation Recovery Act (RCRA) - hazardous waste investigations
- Septic Tanks
- Comprehensive Emergency Response Cleanup and Liability Act, CERCLA (Superfund) - hazardous waste investigations
- Superfund Amendments and Reauthorization Act (SARA Title III)
- Emergency planning, emergency chemical release notification, community right-to-know reporting, toxic chemical release reporting
- Title 118 Ground Water Investigations and Cleanups
- Title 200 Reimbursement Fund Leaking Underground Storage Tank cleanup sites (petroleum)
- Underground Injection Control (UIC) - injection of fluids in or below ground water drinking water sources
- Wastewater Facilities (Municipal, Industrial, and others)

4.2.3 *Class V UIC Wells*

The Underground Injection Control (UIC) program could contribute information on Class V injection wells in WHPAs and WDAs. This UIC program information is in the IIS. Proposed changes to federal UIC regulations could provide NDEQ with the regulatory influence to prohibit certain Class V wells.

4.2.4 *Level Two - "On-the-Ground" Inventory for all Ground Water PWSSs*

An "on-the-ground" inventory for ground water PWSSs may be done by the community or others at any time. This applies to Community and Non-Transient, Non-Community systems. Transient, Non-Community systems may also do an "on-the-ground" inventory. However, this type of system is only required to monitor nitrate and microbiological contaminants, therefore, they need only to inventory for those sources. As mentioned in section 4.2.1, the database search will be done for all types of PWSSs. The "on-the-ground" inventory will be completed as described in section 4.3.

4.3 Level Two - "On-the-Ground" Inventories

The next step in the inventory process is done by the community, using the level one database search as a starting point. An "on-the-ground" inventory may be done by the PWSS or community served by it. This action is voluntary and can be done at any time. NDEQ encourages PWSSs to use trained volunteers to do the inventory. This type of inventory applies to all PWSSs, ground water and surface water.

As will be explained in section 4.5, any time a level two "on-the-ground" inventory is completed the results must be sent in to NDEQ. This level two inventory is necessary before a more complete Contamination Potential Rating can be done.

4.3.1 *The Contaminant Source Inventory Guidebook for Nebraska*

To aid in the "on-the-ground" inventory effort, NDEQ has developed a Contaminant Source Inventory Guidebook (Inman, 1997), which can be a useful tool in completing an inventory. The Contaminant Source Inventory Guidebook includes categories of sources of contamination as well as an approach for identifying different types of land use or activities which may be potential sources of contamination. While this Guidebook was written for ground water systems, the same principles can be used for surface water systems as well.

Main topics in the Guidebook include a short description of Nebraska's Wellhead Protection (WHP) program, what a contaminant source inventory is, some of the advantages of doing an inventory, how to recruit and train volunteers to do an inventory, materials and maps needed to do an inventory, how to do an inventory (including completed sample forms), recognizing the volunteers, and how to keep people in the community informed about the inventory process.

Extensive appendices include phone numbers and addresses for state and federal agencies/organizations, phone numbers and addresses for county assessors, local cooperative extension, and USDA offices, and phone numbers for regional agencies or organizations, such as Natural Resources Districts, Nebraska Department of Economic Development, Resource Conservation and Development Offices (RC&Ds), University of Nebraska, Midwest Assistance Program, and Groundwater Foundation.

The appendices also include blank and sample inventory forms, as noted above, and miscellaneous information, such as sample press releases. Tables of potential contaminant sources and materials that could be found at sites are also listed.

A copy of the Contaminant Source Inventory Guidebook is available free of charge to anyone, just by requesting it. Currently, it is also available on-line at: **gwpc.site.net/sourcewater.Nebraska/NEguidebook01.htm**. NDEQ anticipates having all the WHP Newsletters on-line soon. These will be found at:**www.deq.state.ne.us** under Programs, Water Quality Division, Ground Water Section, Wellhead Protection. WHP Newsletter 3 is about the Contaminant Source Inventory Guidebook and inventory process.

4.3.2 *WHP Assistance through a CWA 319 Project*

NDEQ is planning a FY99 Clean Water Act (CWA) Section 319 project to aid communities in WHP activities. NDEQ will contract with three Natural Resources Districts to hire a WHP Coordinator to assist local communities with "on-the-ground" Contaminant Source Inventories and Contaminant Source Management plans. These people will be in place for three years. NDEQ will provide support and training for these people. NDEQ hopes to expand this project to several other areas or regions after the first year. This project will enable one-on-one assistance to be given to PWSSs in the WHP program. Since the vast majority of Nebraska's systems are ground water based, NDEQ is targeting these systems. Surface water source PWSS may participate in this project as well.

4.3.3 *RC&D/Groundwater Foundation AmeriCorps Application*

Several Resource Conservation and Development (RC&D) offices, in cooperation with the Groundwater Foundation, have applied for an AmeriCorps grant. This grant would place seven individuals in seven different areas of the state to do WHP and recycling/household hazardous waste activities. One of the main duties of these people would be to help communities do "on-the-ground" Contaminant Source Inventories and Contaminant Source Management plans. NDEQ will provide support and training for these people.

During the summer of 1998, several RC&Ds housed summer interns who helped communities do "on-the-ground" inventories. The lessons learned and successes of this short-term project encouraged the RC&Ds to apply for the AmeriCorps grant.

4.3.4 *Train the Trainer Opportunities*

Both the Midwest Assistance Program and the Nebraska Environmental Training Center (part of Central Community College at Hastings) have expressed interest in conducting "train-the-trainer" sessions. These sessions would train water operators and other community individuals on how to conduct "on-the-ground" inventories and how to recruit and train volunteers for doing inventories.

4.3.5 *Groundwater Guardian*

There are currently 13 Groundwater Guardian communities (a Groundwater Foundation program) in Nebraska. An activity that has been recognized as a good "Result Oriented Activity" (ROA) is an "on-the-ground" inventory. NDEQ supports and encourages Groundwater Guardian communities in WHP activities.

4.3.6 *Nebraska Rural Water Association*

The Nebraska Rural Water Association (NeRWA) works with communities on WHP activities. One of their efforts is to help towns (less than 10,000 population) with Contaminant Source Inventories. Once information from the NeRWA and their continuing efforts in the area of map drawing and inventories are coordinated, it will be a great benefit to the SWAP.

4.3.7 *Sampling Waivers*

NHHS has an existing waiver program that provides statewide waivers to all PWSSs, for contaminants that are not used in Nebraska. Beyond this type of waiver, it is possible for a PWSS to get an additional waiver, specific to a contaminant or water test for a group of contaminants. A Public Water Supply System that completes an "on the ground" contaminant source inventory may be able to use that information to help them apply for a water testing waiver from NHHS. An Inventory may show that the use and storage of a particular chemical has never occurred in the Wellhead Protection Area. NHHS may approve a reduced testing schedule for that particular chemical, thereby saving the community money.

4.4 Surface Water Systems, Two Level Approach

4.4.1 *Level One - Database Search*

The approach for Nebraska's surface water systems is very similar to the ground water system approach described in Section 4.2 and 4.3. NDEQ will do a database search of potential contaminant sources within the established Assessment Area (24 hour Time-of-Travel zone), including the data from the following State Agencies:

- Nebraska Department of Environmental Quality (NDEQ),
- Nebraska Health and Human Services (NHHS),
- Nebraska State Fire Marshal (NSFM),
- Nebraska Department of Agriculture (NDA), and Nebraska Oil and Gas Conservation Commission (NOGCC).

All relevant information from these agencies will be used in a Source Water Assessment and given to the PWSS. Since some of the Assessment areas are relatively large, a priority will be made in the database search for direct discharges to surface water. In accordance with the Contamination Potential Rating point system for surface water (Table 5.5), sources inside the assessment area (24 hour TOT) will be considered significant potential sources. A Draft Source Water Assessment will be shared with the PWS operator before completion. From the draft assessment the PWSS will be able to make changes or additions if needed. The PWSS can then move onto Level Two, when ready. The area upstream of the 24 hour TOT zone will be delineated, but it will be up to the system to decide what is done in this area. NDEQ will not require any protection activities in this area. If known potential contamination sources lie outside the Assessment Area (24 hour TOT zone), they may be included in the first level inventory as well.

4.4.2 *Level Two - "On-the-Ground" Inventories*

Level two is exactly the same for surface water systems as it is for ground water systems. This is described above in section 4.3.

4.5 *Responsibility*

The Nebraska Department of Environmental Quality will assume the responsibility for completing the database search (Level One) for all PWSSs (ground water and surface water systems), and include the results in the Assessment for PWSSs to make any changes or additions.

Level Two, or "on-the-ground" inventories will be the responsibility of the PWSS and will remain voluntary. NDEQ has several projects planned to aid PWSSs with their

"on-the-ground" inventories. Once the "on-the-ground" inventory has been completed, PWSSs are required to send a copy of the results to NDEQ.

Source Water Assessment Program
Vulnerability Analysis

5.1 Vulnerability Definition

For purposes of Nebraska's SWAP, the terms susceptibility and vulnerability are interchangeable. Nebraska has chosen to use the word vulnerability because of its use in Nebraska Health and Human Services' (NHHS) Sanitary Survey Program and statewide familiarity with the term in the public drinking water supply industry. Both the SDWA Amendments and EPA's SWAP Guidance encourage the use of existing information and coordination with other programs. Using the existing Sanitary Survey for the first phase of the vulnerability analysis is a use of effective information and cooperation between programs. The following chart shows examples of the information examined and recorded when a Sanitary Survey is completed by NHHS (see Appendix C for a complete blank vulnerability form).

Sanitary Survey Inspection Categories	Examples
Records	Water-Quality, Quantity, Use, Lab Reports
Wells	Site- Access, Drainage, Encroachment
Pumps	Base- Seal, Motor Mount, Bolts
Well House Mechanical	Piping- Supports, Ties, Sleeves, Corrosion
Auxiliary Equipment	Chemical- Safety, Storage, Controls, Pump
Storage Tanks	Condition- Structural, Corrosion, Leaks
Truck Fill Location	Backflow Prevention- Vacuum Breaker
Distribution System	Material Storage and Spare Parts
Operating Practices	New Construction and Abandonment
Miscellaneous	Wellhead Encroachment Policy, Emergency Plan
Treatment Plant	Sites, Structures, Buildings and Bins, Waste Handling

A Public Water Supply System's vulnerability to contamination is based on several factors:

- the integrity of the well (ground water) or intake (surface water) construction
- the geologic environment, including depth to water, presence of retarding sediments in the subsurface (ground water)
- the nature of the surface water source and watershed - large lake, small stream, large river, etc.
- the locations of potential contaminant sources in the WHPA or WDA

Nebraska is proposing a two phase Vulnerability Assessment, much like the two level Contaminant Source Inventory. The database search that was done as the level one Contaminant Source Inventory will be provided to NHHS field representatives to aid them in completing a Sanitary Survey for a PWSS. The existing Sanitary Survey vulnerability determination will be used for the first phase, and a more detailed vulnerability analysis of the PWSS will be done using the information from the "on-the-ground" inventory of potential contaminant sources (Section 4) and specific site information. This second vulnerability will be called a **Contamination Potential Rating (CPR)**.

The first phase vulnerability analysis will assist PWSSs in focusing their local voluntary protection activities on the wells and locations that are more vulnerable to contamination. As Contamination Potential Ratings are completed, PWSSs will also benefit from this advanced analysis when assessing resources and protection activities for the Assessment Area (24 hour Time of Travel) in the watershed or the Wellhead Protection Area. It is also possible

that results of the second phase vulnerability will be coordinated in the future to the Drinking Water State Revolving Loan Fund (DWSRF) priority list.

5.2 Ground Water Systems

5.2.1 *Phase One - Existing Sanitary Survey Program*

The Nebraska Health and Human Services (NHHS) visits all Public Water Supply Systems to conduct a Sanitary Survey. The phase one vulnerability analysis for the Source Water Assessment will not change from the existing NHHS Sanitary Survey rating. Community PWSSs are visited once every three years and Non-Community PWSS are visited once every five years. Current regulations require PWSSs to take "actions as necessary to protect the system and its components from encroachments which are likely hazards to the safety of the drinking water quality, or which could have a substantial impact on system pressure or economies delivered by the system" (NHHS, Title 179 NAC2.008.02F, 1998). The Sanitary Survey is a vulnerability assessment done within 1000 feet of a well. A well is given a rating of vulnerable or not vulnerable to contamination. Specific components of a PWSS are evaluated in a sanitary survey, including source water, treatment, storage, the distribution system, and maintenance. A copy of the form used by NHHS, listing the specific details that are recorded, is included as Appendix C.

The phase one vulnerability analysis 1000 feet review distance is not inclusive of the entire source of drinking water for the PWSS. However, it has been determined that for a "middle" sized PWSSs well, 1000 feet is inclusive of the 2 year Time of Travel zone within the WHPA. This 1000 foot radius may include as much as the 5 year Time of Travel (this 5 year Time of Travel is not routinely calculated for the WHP program). This zone is the most crucial area to protect and NHHS's regulations reflect this need.

NDEQ intends to use all existing sanitary survey data with cooperation from NHHS to make a "first round" vulnerability analysis. This first phase vulnerability analysis will be accessed in NHHS's files for the initial Source Water Assessment given to the PWSS (Section 6). It should be noted that no changes will be made to this already existing sanitary survey program and vulnerability assessment. PWSSs may challenge the "vulnerable" or "not vulnerable" rating given to them by NHHS (this form is also included in Appendix C). Being rated "vulnerable" usually means the PWSS may not be eligible for additional monitoring waivers.

5.2.2 *Phase Two - More Detailed Vulnerability Analysis*

A more detailed vulnerability analysis will be made by NDEQ after the results of the voluntary "on-the-ground" contaminant source inventory by the PWSS (or individuals, agencies, or organizations helping with inventories) are given to NDEQ. A review of available PWS well information from the WHP file and Safe Drinking Water Information System (SDWIS - EPA's database of PWS information and violations) will be undertaken and a table completed (see Table 5.2). A Vulnerability Score will be the result of filling out the table. The scores will fall into different ranges, high to low, that will compare vulnerability of PWSS across the state (see Table 5.1). It should be noted that vulnerability scores will be ranked differently for Community ground water systems, Non-Community ground water systems, and surface water systems. This means a score of 40 does not mean the same thing for the above noted categories (see Table 5.7). The second phase vulnerability determination is independent of the initial rating by NHHS's sanitary survey. This second phase vulnerability determination will help PWSS prioritize and plan local protection activities.

Table 5.1 Vulnerability Scores Ranking for Ground Water Community PWSSs

High Vulnerability	Medium Vulnerability	Low Vulnerability
> 65	45 - 65	< 45

It is likely that more information about the well(s) and local geology will be needed after an initial review of the WHP file is completed. NDEQ will work with the local PWS operator, the NHHS field representative and any other organizations which may have more site specific information available (Nebraska Rural Water Association,

Natural Resources Districts, University Nebraska Lincoln-Conservation and Survey Division, local County Health Departments, etc.). NDEQ may contract with consultants, agencies, or organizations to complete this task. A PWSS may hire a consultant or engineer to complete this task, as an addition to a local WHP program. Vulnerability Analyses done by consultants and engineers on behalf of the PWS will be reviewed by NDEQ for completeness and adequacy prior to acceptance. By NDEQ performing or reviewing all of the Contamination Potential Ratings, statewide consistency will be maintained.

Table 5.2 - Second Phase Vulnerability Analysis for Ground Water Community PWS wells - ranking by well or by well field, only if wells are in close proximity and share similar characteristics.

Characteristic	Point System		
Depth to water	• < 10 feet • 10 - 50 feet • > 50 feet	*choose one*	• 15 • 10 • 0
Vadose (unsaturated) zone (zone above water table)	• all sand and/or gravel • 1 - 15 feet of clay present • > 15 feet of clay present	*choose one*	• 10 • 5 • 0
Age of well	• constructed before May, 1977 • constructed after May, 1977, but before May, 1986 • constructed (or reconstructed) after May, 1986	*choose one*	• 10 • 0 • -10
Potential contaminant source within WHPA1 - includes potential nonpoint2 sources	• inside 2 year Time of Travel • within 2 year to 10 year TOT • outside 10 year TOT • none	*choose highest value*	• 10 • 5 • 2 • 0
Transportation corridors within WHPA	• main line railroad or pipeline • major highway or interstate intersection • state or federal highway or interstate • county roads or city/village streets • none	*choose highest value*	• 5 • 5 • 2 • 2 • 0
Average PWSS nitrate as nitrogen concentration over last 5 years	• below or equal to 5 ppm • between 5 - 7 ppm • between 7 -10 ppm • at 10 ppm or above	*choose one*	• -2 • 0 • 5 • 10
Detection of any contaminant regulated under drinking water quality standards in last 5 years (not including coliform)	• none • any at or below 50% MCL • any above 50% MCL, but < MCL • any at or above MCL or Administrative Order	*choose one*	• -10 • -5 • 5 • 20
Existing land use or zoning ordinances for water quality concerns or protecting PWSS	• none • county	*choose one*	• 5 • 0

	• local WHP program		• -10
Natural Resources District Ground Water Management Area in place	• none • Phase I • Phase II higher	*choose one*	• 5 • 0 • -5

Footnotes:

1. Potential contaminant sources from "on-the-ground" inventory and from NDEQ database search.
2. Nonpoint sources are usually associated with agricultural production where fertilizers and pesticides are applied. Pasture or wooded land are not usually included as potential nonpoint sources of contamination.

5.2.3 *Explanation of Table Characteristics*

Depth to Water
Shallow depth to the ground water table elevation makes a well more vulnerable to contamination than a deeper ground water level.

Vadose (Unsaturated) Zone
The zone between the surface and the saturated sediments that define the ground water table transmit recharge and contaminants downward. The type of sediments that comprise this zone are very important in determining how fast or even if contaminants will move toward the ground water. Sand and gravel transmit contaminants much faster than clay.

Age of well
May, 1977 was the date of the original Nebraska Safe Drinking Water Act, requiring plans and specs to be submitted after this date. Consideration may be given to PWSSs that submitted plans and specifications to NHHS prior to the 1977 date, even though they were not required.

Potential or existing contaminant source within WHPA - including potential nonpoint sources
Potential contaminant sources within a WHPA indicate a possible threat to nearby or existing well(s). NDEQ feels that any potential source of contamination should be treated equally and that proximity to PWS wells is more important than the type of contaminant. Existing active ground water or soil remediation or monitoring will be included here. Nonpoint sources of contamination (see section 2.2.3), such as irrigated and fertilized corn fields, may also increase the risk of nitrate as nitrogen or pesticide contamination to the PWSS. This characteristic also includes potential sources of bacterial contamination, such as septic systems.

Transportation corridors within WHPA
These potential sources were likely identified in the "on-the-ground" second level inventory. However, they offer the unpredictable threat of accidental spills that should be factored into the vulnerability analysis.

Average PWSS nitrate as nitrogen concentration over last 5 years
One of Nebraska's most widespread and serious threats to drinking water quality is nitrate as nitrogen (Maximum Contaminant Level = 10 ppm). In many places, nitrates have increased over the past five to ten years and many domestic and public water supply wells have been impacted. Higher nitrate concentrations in PWSS wells indicates vulnerability to further nitrate increases.

Detection of any other contaminant in last 5 years (not including bacteria detections)
The detection of contaminants other than nitrate and bacteria over the last 5 years indicates the PWSS may be vulnerable to contamination. Bacteria is not included here because sampling for it is from the system (at someone's home or business) and not at the well or Point of Entry. This sampling reflects more on the sampling point and procedures rather than the source of water. Potential sources of bacterial contamination will be addressed during the "on-the-ground" inventory.

Existing land use or zoning ordinances for water quality concerns
This characteristic is given points that will lower the PWSS's vulnerability rating if controls (county or local zoning, ordinances, etc.) are in place to help prevent impacts to the PWSS's water quality. An example of county zoning to protect water quality might relate to the size and number of confined animal feeding operations in a county.

Natural Resources District Ground Water Management Area in place
As in the characteristic explained above, points are given that will lower the vulnerability rating if a Ground Water Management Area (GWMA) is in place. Please refer to Section 2.2 for an explanation of GWMAs and the types of protective activities that may occur in them.

5.2.4 *Non-Community PWSS*

For Non-Community PWSS (both transient and non-transient), the same phased approach to vulnerability assessments will be taken as for Community PWSS, but on a less detailed scale. The first phase will be simply NHHS's "vulnerable" or "not vulnerable" rating, based on the results of the Sanitary Survey (done once every five years for Non-Community PWSSs).

For the second phase, an area-wide approach will be used. All non-community PWSSs in a county will be plotted on a county, NRD, or some regional map. Ground water nitrate concentrations for the county (or NRD) from the University of Nebraska - Water Center Clearinghouse project (soon to be accessible on the Nebraska Natural Resources Commission internet web site) will be plotted or assessed within a one mile radius of the PWS well(s). Regional nitrate concentrations, PWSS monitoring violations, and regional depth to water will be taken into account for this CPRs.

Table 5.3 Second Phase Vulnerability Analysis for Non-Community PWSS

Characteristic	Point System	
Monitoring detections of regulated contaminant not meeting drinking water quality standards in last 5 years (including coliform)	• none • any	• 0 • 15
Regional nitrate concentrations	• average < 7 ppm in 1 mile radius • average > 7 ppm in 1 mile radius	• 0 • 5
Regional depth to water	• < 50 feet • > 50 feet	• 10 • 0

Table 5.4 Vulnerability Scores Ranking for Non-Community PWSS

High Vulnerability	Medium Vulnerability	Low Vulnerability
20	15	0 - 10

As more information about these types of vulnerability assessments become available, NDEQ will consider refining this process. If deemed necessary, NDEQ will submit a SWAP amendment to EPA.

5.2.5 *Vulnerability by Well, Wellfield, or by System*

Currently, NHHS determines vulnerability for individual wells, unless several wells use a common Point of Entry (POE). This same rating by well or Point of Entry will be used for the first phase of vulnerability analysis in the SWAP.

For the second phase of the SWAP vulnerability analysis, NDEQ will look at wells in the same contiguous Wellhead Protection Area for a common vulnerability rating. Often PWSSs will have more than one wellfield,

separated by more than a mile. Each separate Wellhead Protection Area will be rated using the appropriate table from this section. This second phase rating does not change the rating given by NHHS in the Sanitary Survey process, it is intended to be used for planning purposes.

5.3 Surface Water Systems

Surface water systems undergo the same Sanitary Survey with NHHS as the ground water PWSSs. The same two phased approach will be used for these systems, as explained above. The following table (Table 5.5) reflects modifications needed for the surface water systems.

Table 5.5 Second Phase Vulnerability Analysis for Surface Water Systems

Characteristic	Point System		
Integrity of intake, from last NHHS inspection	• poor • adequate • excellent	*choose one*	• 10 • 2 • 0
Size of Watershed Delineation Area (WDA)	• > 35 square miles • < 35 square miles	*choose one*	• 10 • 0
Potential contaminant source within Assessment Area2 -- includes potential nonpoint3 sources and permitted discharges	• present • absent	*choose one*	• 15 • 0
Transportation corridors within Assessment Area (24 hour TOT)	• main line railroad or pipeline • major highway or interstate intersection • state or federal highway or interstate • county roads or city/village streets • none	*choose highest value*	• 5 • 5 • 2 • 2 • 0
Detection of any contaminant regulated under drinking water quality standards in last 5 years (not including coliform)	• none • any at or below 50% MCL • any above 50% MCL, but less than MCL • any at or above MCL or Administrative Order	*choose highest value*	• -10 • -5 • 5 • 20
Existing land use or zoning ordinances for water quality concerns	• none • county • local Watershed Protection program or project4	*choose highest value*	• 5 • 0 • -10

Footnotes:

1. From NDEQ database search, within the Assessment Area (24 hour TOT).
2. Potential contaminant sources from “on-the-ground” inventory

3. Nonpoint sources are usually associated with agricultural production where fertilizers and pesticides are applied. Pasture or wooded land are not usually included as potential nonpoint sources of contamination.
4. Local Watershed Protection program or project could be a CWA 319 project, Nebraska Environmental Trust project, or other local/state program to protect the watershed and/or educate the public.

Table 5.6 Vulnerability Scores Ranking for Surface Water Community PWSS

High Vulnerability	Medium Vulnerability	Low Vulnerability
> 40	20 - 40	< 20

5.3.1 *Explanation of Table Characteristics*

Many of the Vulnerability Analysis characteristics are the same between ground water and surface water systems. Please see section 5.2.3 for these common explanations.

Table 5.7 Summary of Different Types of PWSSs Vulnerability Scores

Type of PWSS	High Vulnerability	Medium Vulnerability	Low Vulnerability
Community, Ground Water	>65	45-65	<45
Non-Community, Ground Water	>20	15	0-10
Surface Water	>40	20-40	<20

Integrity of Intake, from Last NHHS Inspection

Nebraska Health and Human Services routinely inspects surface water intakes as part of their Sanitary Survey program and ongoing work with PWSSs. Integrity of an intake structure for a surface water system should include:

- Withdrawal of water from more than one level if quality varies with depth (most often in a lake, but if the potential exists for a chemical spill it may also apply to a river).
- Should be a valve at each inlet and also a valve in the pipeline in case inlet valves are damaged/malfunction.
- Adequate protection against damage by ice, anchors, etc.

Integrity and safety of the intake to accident are evaluated in this inspection and reflect on the vulnerability of the system to contamination.

Size of Watershed Delineation Area (WDA)

A PWSS in a larger WDA will be more vulnerable to contamination than a smaller one due to a greater number of potential sources.

Existing Land Use or Zoning Ordinances for Water Quality Concerns

Counties may have controls (zoning, ordinances, etc.) that are protective of water quality. Local sponsors (such as NRDs, City of Omaha, etc.) have implemented watershed or lake projects that put Best Management Practices on the land and help educate land owners about surface water quality. Points are given for these types of projects that could lower a PWSS's vulnerability.

5.4 Responsibility

The Nebraska Department of Environmental Quality will assume the responsibility of compiling the data from the Sanitary Survey Program with assistance from the Nebraska Health and Human Services, for the first phase of the vulnerability assessment/analysis. NDEQ will also undertake the CPRs for a PWSS, after the results of the voluntary "on-the-ground" inventory are given to NDEQ. In addition, the state or its contractors/cooperators will do a CRP (including a second round CSI within 3 hour TOT) for all Surface Water systems in Nebraska by May 2003. The goal for the Contamination Potential Ratings is to complete 90% of the PWSSs by the year 2010. A new Source Water Assessment, reflecting the Contamination Potential Rating, will be sent to the PWSS. An explanation of how the new vulnerability score was determined will be provided. The PWSS owner will be required to make this Assessment known and available to the public as explained in Section 6.

Source Water Assessment Program
Making Source Water Assessments Available to the Public

6.1 Information in a Source Water Assessment

When a Source Water Assessment goes to a PWSS it will contain the following:

- a map of the Wellhead Protection Area (WHPA) or the Watershed Delineated Area (WDA),
- a list of potential contaminant sources found from the database search and possibly their locations shown on the WHPA/WDA map mentioned above,
- a level one vulnerability rating, from NHHS Sanitary Survey Program (the PWSS will be responsible for providing a copy of the Sanitary Survey upon request),
- and a list of options for making the information available to the public.

A CPR will be included in an Assessment after a second level (on-the-ground) Contaminant Source Inventory has been completed. A new Assessment will be sent to the PWSS when the CPR is complete. This updated Assessment will include the items listed above, and an explanation of how the CPR was determined. Additionally, a list of available materials regarding local protective activities will be sent to the PWSS. The format of assessments will be the same for all PWSSs in Nebraska. An example of materials that may be found in a Source Water Assessment are shown in Appendix D.

6.2 Consumer Confidence Reports

Community PWSSs are already required to distribute a Consumer Confidence Report (CCR) to all water consumers by October of 1999 (USEPA, August 1996). The CCR is to be sent to all customers by mail on an annual basis. NDEQ and NHHS are working together to develop acceptable language and format for CCRs. The report must include:

1. information on a) the source of drinking water and b) the completed Source Water Assessment,
2. brief definitions of terms,
3. the MCL (if regulated contaminants are found), MCLG (maximum contaminant level goal), and the level found,
4. information (if MCL is violated) on health effects, and
5. information on levels of regulated contaminants.

Nebraska's SWAP is requiring Community PWSSs to put a statement in the CCR regarding the availability of their Source Water Assessment. This statement will briefly explain that an assessment on the source of the drinking water for this system has been done. Included in the assessment is an inventory of potential contaminant sources in the WHPA or WDA, and a determination of the vulnerability of the wells or intakes to contamination. The location of the full assessment will be stated, and how the consumer can get a copy. NDEQ will provide required language and work with NHHS and their efforts to aid PWSSs with the CCR. Adding a statement about SWAP and where the assessment can be found should be a good way to reach consumers. It is important that consumers know where it can be found and who to contact if they have questions. Individual CCRs will be on the internet under NHHS.

Nebraska's SWAP also requires All PWSSs to notify the public in one alternate way in addition to the CCR. Non-Community PWSSs are not required to complete CCRs and must notify the public in another way. Community PWSSs must put a statement in the CCR and notify the public in one alternate way. NDEQ feels it is very important for PWSSs to have a large range of options for making the assessments available to the public. PWSSs already reach their consumers in different ways, accordingly a number of options have been developed. NDEQ will provide guidance on how to make the Assessments available to the public, this information will go to the PWSSs with their Assessment. Options include but are not limited to:

- Water Bills
- Television, Community Access Channel on Cable
- Posters and Flyers
- Press Releases
- Internet
- Public Meetings, special meetings or scheduled board meetings
- Newsletters
- Other

6.2.1 *Water Bills*

Many communities send water bills to consumers, adding a statement about SWAP and where the assessment can be found is an option.

6.2.2 *Television, Community Access Channel on Cable*

It was learned through public stakeholder meetings that some communities have the ability to show the assessment on a public access television station. This would be another option provided that they also give a contact person, or indicate where a copy of the assessment can be found.

6.2.3 *Posters and Flyers*

Many Non-Community PWSSs (rest areas, cafes) have consumers that can only be notified by posting the information. These systems may want to post a notice with the actual assessment at the facility, or post a notice stating where it can be found and who to contact if they have questions. Examples of posters and flyers are included in Appendix E. Community PWSSs may want to post flyers in public places for at least 30 days after the assessment is complete. Places such as cafes, public schools, businesses, or the nearest post office could be options.

6.2.4 *Press Releases*

Some PWSSs may feel that the best way to reach their consumers is in the newspaper. A press release or paid public notice with a statement about SWAP is an option. An example of a press release is included in Appendix E.

6.2.5 *Internet*

The internet is another place to put a complete assessment. Many communities, businesses, or schools within a community host an internet homepage. These sites can be used to notify the public of the assessment or show the entire assessment. As of January, 1999 there are 144 communities in Nebraska that have internet web sites. To find links to these sites go to http://assist.neded.org/neweb.html

6.2.6 *Public Meetings*

Holding a public meeting is an option that would allow consumers to ask questions and clear up any confusion right away. This meeting must be advertised so the public has advance notice to attend. Alternately, a community could place the assessment topic on the agenda of their regularly scheduled board or council meeting.

6.2.7 *Newsletters*

Utility Departments or the PWSS may already send out a newsletter to their consumers. A newsletter is a good option that would allow enough room to give an explanation of SWAP, as well as list contacts, availability, and locations of the assessment.

6.2.8 *Examples of Where To Have the Assessments Available*

Anywhere that is easily accessible to the public is a good location to have assessments. NDEQ recommends

assessments be in a location where someone is available to answer questions or help consumers understand what the SWAP is for. Examples of places are:

- the City Utility office,
- local library,
- NRD office,
- USDA-NRCS office,
- County Extension office,
- RC&D office,
- NDEQ offices in Lincoln, Chadron, and North Platte,
- NHHS offices in Lincoln and the field offices throughout the state (North Platte, Omaha, Grand Island, and Norfolk).

NDEQ will have copies of individual Assessments available upon request. A copy of a map indicating the NRD names and boundaries is included in Appendix F, for reference. Appendices in the Contaminant Source Guidebook have addresses and phone numbers of organizations, and State, and Federal Agencies involved in wellhead protection, Cooperative Extension offices, County Assessors, Farms Service Agency offices, Natural Resource Conservation Service offices, Natural Resources Districts offices, Resource Conservation and Development offices, and offices of the Nebraska Department of Economic Development.

6.2.9 *NDEQ's Internet Website*

Information about the WHP program and SWAP is available on NDEQ's website. The website address is **www.deq.state.ne.us**. NDEQ will regularly update a list on it's homepage showing which systems have Source Water Assessments completed. Ideally, all complete Source Water Assessments would be available on the internet, but that capability does not exist at this time.

6.2.10 *SWAP Distribution List*

When an individual SWAP is complete NDEQ will distribute a copy to the following:

- PWSS operator and elected officials (if applicable)
- local NRD
- NHHS
- NeRWA

NDEQ may send a copy to the following:

- County Extension office
- RC&D office
- NRCS office

6.3 *Responsibility*

NDEQ will provide a copy of the Assessment to the PWSS. The Public Water Supply System will be responsible for notifying the public in two ways. PWSSs are required to 1) place a statement in their CCR, and 2) inform the Department of Environmental Quality which of the other options above they chose to complete this requirement. They must also send NDEQ some proof of the public notification, i.e. a copy of the poster, newspaper article, web address, etc. The PWSS will be responsible for providing a copy of the Sanitary Survey and the completed Assessment to consumers, upon request.

Source Water Assessment Program
Public Stakeholder Involvement

7.1 Advisory Committee

NDEQ made a decision to have one advisory committee that combined the technical and citizen advisory committees. A list of individuals and who they represent is shown below (in 7.1.2). This committee met on three different occasions, information from each meeting is included in Attachment A (The Attachment section was prepared for submittal to EPA with the SWAP description. It is available upon request from NDEQ). This committee will be retained for future input on issues involving the SWAP, such as Rules and Regulation development.

7.1.1 *Meeting dates*

January 8, 1998
April 1, 1998
August 4, 1998
November 12, 1998 Video Conference (see section 7.3.8)

The first meeting of the Advisory Committee was on January 8, 1998 and the main topics included:

- overview of the Safe Drinking Water Act Amendments and SWAP,
- explanation of the Drinking Water State Revolving Loan Fund,
- discussion and explanation of Nebraska's Wellhead Protection Program,
- and setting dates and topics for the next Advisory Committee meeting.

The Advisory Committee met again on April 1st and broke out into four smaller groups. Each group answered questions dealing with different issues. The different groups included:

- delineation and contaminant source inventory,
- susceptibility analysis,
- informing the public,
- and surface water systems.

Questions addressed and other information, including meeting notes from each of the four groups is included in Attachment A.

A meeting was held August 4, 1998 for review and comments on the SWAP program description and submittal for Nebraska. The draft program description was sent out prior to the meeting for the Advisory Committee to study. Written comments were taken from Advisory Committee members and NDEQ's response to these comments is summarized in Attachment G.

7.1.2 Invited Advisory Committee Participants

Mr.	Dave	Aiken	UNL - Department of Ag Economics
Ms.	Diana	Allen	Lower Platte River Corridor Alliance
Mr.	Robert	Andersen	Nebraska Cooperative Council
Ms.	Marsha	Babcock	Nebraska Sierra Club
Mr.	Lash	Chaffin	League of Municipalities

Mr.	Joel	Christensen	Drinking Water Advisory Council and City of Omaha
Mr.	Dean	Edson	Nebraska Association of Resources Districts
Mr.	DeLynn	Hay	UNL - Cooperative Extension
Ms.	Rachael	Herpel	Groundwater Foundation
Ms.	Alice	Licht	Nebraska Fertilizer & Ag-Chemical Institute
Mr.	Dan	Ludwig	Nebraska Wildlife Federation
Mr.	Bill	Lukash	Nebraska Rural Water Association
Mr.	Art	May	Midwest Assistance Program
Mr.	Scott	Merrit	Nebraska Corn Growers
Mr.	Jack	Mills	Nebraska Association of County Officials
Mr.	Terry	O'Brien	American Water Works Association
Mr.	Jerry	Obrist	Lincoln Water System
Dr.	Bill	Orr	Nebraska Medical Association
Mr.	Lee	Orton	Well Drillers Association
Mr.	Howard	Ottoson	League of Women Voters
Mr.	Paul	Peters	Nebraska Pork Producers
Mr.	Rich	Robinson	American Consulting Engineers Council
Mr.	David	Sands	Nebraska Audubon Society
Mr.	Herb	Scott	Nebraska Environmental Training Center
Mr.	Troy	Bredenkamp	Nebraska Cattleman's Association
Ms.	Kris	Thorp	Center for Rural Affairs
Dr.	Bob	Volk	UNL - Water Center
Mr.	Bob	West	Nebraska Rural Water Association
Dr.	Perry	Wigley	UNL - Conservation and Survey Division
Mr.	Jeff	Yost	Nebraska Community Foundation Inc.
Dr.	John	Andersen	US Army Corps of Engineers
Mr.	Jason	Clarke	US Environmental Protection Agency
Mr.	Jack	Daniel	Nebraska Health and Human Services - Regulation & Licensure
Mr.	Doug	Druliner	US Geologic Survey
Mr.	Michael	Durst	Nebraska State Fire Marshal Office
Mr.	Brent	Esmoil	US Fish and Wildlife Service
Mr.	Steve	Gaul	Nebraska Natural Resource Commission
Mr.	Jamie	Green	Nebraska Department of Agriculture
Ms.	Mary	Harding	Nebraska Environmental Trust
Mr.	Larry	Hutchinson	Nebraska Game and Parks
Mr.	Harold	Klaege	Natural Resouce Conservation Service
Ms.	Maxine	Moul	Nebraska Department of Economic Development
Mr.	Rod	O'Sullivan	Bureau of Reclamation
Mr.	Larry	Sitzman	Nebraska Department of Agriculture
Mr.	Dale	Vagts	Nebraska Department of Water Resources

7.2 Surface Water Users Committee

7.2.1 *Meeting dates*

January 12, 1998
April 1, 1998
June 25, 1998
August 4, 1998

Due to the fact that there are so few surface water systems in Nebraska, it was determined that a separate committee within the Advisory Committee should be developed to represent these systems and deal specifically with surface water issues. A list of individuals and who they represent is shown below. This committee met separately from the Advisory Committee on two different occasions, and with the Advisory Committee on two occasions. Meeting notes and decisions from each meeting are included in Attachment B.

7.2.2 **Invited Surface Water Users Committee Participants**

Mr.	Scott	Borman	City of Chadron
Mr.	Joel	Christensen	Omaha Metropolitan Utilities District
Mr.	Earnest	De Gunia	Village of Crawford
Mr.	Michael	Lawson	Community of Beaver Lake
Mr.	Gary	Mader	City of Grand Island Utilities
Mr.	Jerry	Obrist	Lincoln Water System
Mr.	Steve	Oltmans	Papio-Missouri River Natural Resources District
Mr.	David	Sands	Nebraska Audubon Society
Mr.	Jim	Sheldon	Cedar Knox Rural Water Project
Mr.	Phil	Soenksen	US Geologic Survey
Mr.	Kirk	Stocker	City of Kearney
Mr.	Steve	Walker	NDEQ Surface Water Section.
Mr.	Troy	Weatherby	Community of Beaver Lake
Mr.	Michael	Wentink	Nebraska Health and Human Services - Regulation & Licensure
Mr.	Warren	Whitaker	City of Blair
Mr.	Dan	Wiley	Upper Niobrara White Natural Resources District
Mr.	Doug	Woodbeck	Nebraska Health and Human Services - Regulation & Licensure

7.2.3 *Mailings to Advisory Committee*

The Advisory Committee was sent notes from the meetings they were invited to, whether they attended or not. The committee was also sent a questionnaire containing Nebraska's goal for SWAP and some other issues raised by EPA. The questionnaire is included in Attachment C. Also in the mailings, NDEQ informed the Advisory Committee of the draft SWAP availability on the internet. NDEQ felt it was very important to keep the Advisory Committee informed and allow them to give input whenever possible.

7.2.4 *Goal Setting Meeting*

On May 14, 1998 a group of people met to develop a goal for the State of Nebraska's SWAP. Those involved in this meeting were group leaders from the Advisory Committee break out sessions, representatives from Nebraska Health and Human Services, and representatives from NDEQ. The meeting was run by a trained facilitator. The goal that was developed at this meeting was later sent out to the whole Advisory Committee for comments, a copy of the questionnaire is included in Attachment C.

7.3 Other Public Outreach and Coordination

7.3.1 *Public Stakeholder Meetings at NRD offices*

NDEQ has made a substantial effort to gain public stakeholder involvement before writing the SWAP submittal. Public stakeholder meetings for SWAP were held at 20 of the 23 Natural Resources Districts (NRDs) from November 1997 through early May 1998. A map of NRD names and boundaries is included in Appendix F. Appendix F also indicates where and when the meetings were held, invitation lists, attendance lists from each meeting (see Attachment D), and notes regarding what was asked and discussed (see Attachment E). Due to the fact that public stakeholder meetings were held before a SWAP draft was written, the main topics discussed were the basic requirements from the guidance. The main issues that stakeholders commented on were:

- Delineation of a WHPA or WDA, and how delineations should be completed for Non-Community PWSSs
- Contaminant Source Inventories, specifically what can be done to help and educate PWSSs to complete "on-the-ground" inventories.
- Vulnerability Analysis
- What would work for their PWSS for making their Assessment available to their consumers.
- Public stakeholder input and the importance of it.

The average attendance at each meeting was about 10 people, but ranged between 5 to 25 people. Each NRD produced a list of individuals that might be interested in attending a SWAP meeting, and invitations were sent out by NDEQ for each meeting. Follow up phone calls were made by NDEQ and NRDs to individuals that did not respond.

Most meetings were held at night to facilitate attendance. Attendance at the meetings was very good, with a wide range of people with different occupations or representing diverse interests. There were usually two representatives from NDEQ present, one to lead discussion and one to take notes. The majority of the meetings lasted at least two hours. Each meeting was deliberately kept small and informal in order to allow people to feel comfortable and willing to give input.

Introductions were made, then a brief description of SWAP and the requirements from the guidance and Federal legislation were explained. Next, each requirement was discussed in detail by following a handout prepared by NDEQ (all handouts are shown in Appendix I). Individuals were allowed to ask questions at any time, and were asked to give opinions and share ideas about every requirement. Each meeting was unique and something new was discussed at each one. Credit should be given to the NRDs in Nebraska for all their effort and cooperation in making the public stakeholder meetings possible. Some of the NRDs even provided doughnuts or lunch.

7.3.2 *Public Presentations*

Presentations about the Source Water Assessment Program have been done at numerous meetings and conferences throughout the State of Nebraska in 1997 and 1998. A list including the date, location, and NDEQ staff giving the presentation is included in Appendix G.

7.3.3 *Coordination with the Groundwater Guardian Program*

The Groundwater Foundation has a program that develops Groundwater Guardian Teams to do different activities and promote ground water protection in local communities. These teams get recognition for specific actions known as "Result Oriented Activities" (ROAs). Doing a contaminant source inventory has been adopted by the

program as a ROA. Whenever possible, inventories done by the Groundwater Guardian Program will be adopted by NDEQ and used in the SWAP. The Groundwater Guardian Program held two meetings with NDEQ to specifically discuss Contaminant Source Inventories and SWAP. Team members from Ground Water Guardian Communities attended these meetings and gave input on program development. Agendas and other information from those meetings is included in Attachment F.

7.3.4 *Coordination with the Resource Conservation and Development Areas*

The Resource Conservation and Development Areas (RC&Ds) received a grant from USDA to do educational activities and help communities with WHP activities during the summer of 1998. A training session was held on June 16, 1998 to educate RC&D managers, interns, and volunteers on the WHP Program. The RC&Ds worked with communities to help them complete the information needed by NDEQ to draw a WHPA map. They also performed on-the-ground Contaminant Source Inventories with members of the community. Whenever possible, Contaminant Source Inventories done by the RC&Ds will be adopted by NDEQ and used in the SWAP. A list of those who attended the June 16 meeting is included in Attachment F. A follow up meeting was held on August 12, with representatives from all the participating RC&Ds, NRDs, NeRWA, Santee Sioux Tribe, and NDEQ.

7.3.5 *Coordination with the Nebraska Rural Water Association*

The Nebraska Rural Water Association (NeRWA) has a Ground Water Technician on staff as of March 1997. This individual does work regarding WHP for communities. Funding from EPA to the National Rural Water Association became available allowing Rural Water Associations in individual states to do WHP work. This individual does delineations using the WHPA2 computer model, which is also used by NDEQ. A community can also receive assistance in doing an inventory from NeRWA. The Ground Water Technician also provides valuable WHP information to water operators and elected officials. Whenever possible, WHPA maps and Contaminant Source Inventories done by the NeRWA are adopted by NDEQ and used in the SWAP. NeRWA has invited NDEQ to speak at various meetings which have been very beneficial in providing information to PWSSs (see Attachment F for notes).

7.3.6 *Coordination with the Lower Platte River Corridor Alliance*

Two planning meetings have been held between staff with the Lower Platte River Corridor Alliance and NDEQ on November 16, 1997 and April 16, 1998 to discuss water quality investigations to assess and protect drinking water supplies in the Lower Platte River Corridor. NDEQ has contracted with the University of Nebraska Conservation and Survey Division to complete the WHPA delineations for this area. This was made possible through a grant from the U.S. Army Corps of Engineers. The Lower Platte River Corridor Alliance (LPRCA) will coordinate Contaminant Source Inventories among interested communities and suppliers once the WHPA maps are drawn. A handout from LPRCA that explains their plans for water quality investigations is included in Attachment F. Plans are underway to get on-the-ground inventories done in this area (see section 4.2.4). Two follow-up meetings were held on September 9, and November 10, 1998.

7.3.7 *Programs and Groups Working in Cooperation with SWAP*

A list of programs and groups working in cooperation with SWAP, and a list of individuals or groups who have published information about SWAP are shown in Attachment F. Many different organizations and agencies have published different articles and announcements regarding the Source Water Assessment Program.

7.3.8 *Video Conference*

A video conference was held on November 12, 1998 at 8:00 P.M. Central, 7:00 P.M. Mountain, through the University of Nebraska Cooperative Extension satellite downlink sites. The purpose of this conference was to outline the SWAP draft and receive public comment on it. The video conference was broadcast to 20 sites throughout the State of Nebraska, individuals could call in on a toll free number to comment. A map showing the site locations and flyer used to announce the video conference is included in Appendix H. Again, public stakeholder involvement is a priority to NDEQ and we hoped to reach anyone who was interested in participating. All members of the Advisory Committee as well as the stakeholder (small group) invitees were invited to the video conference. Over 2000 copies of the aforementioned flyer were distributed, and a press release was sent out. A

copy of the press release and various newspaper clippings regarding the video conference are included in Appendix H. Copies of the conference are available on video tape.

Source Water Assessment Program
Additional Notes

8.1 Updates

As on-the-ground inventories are completed, updated Source Water Assessments with Contamination Potential Rating will be sent to the PWSSs. If the second round of the Assessment has not been completed in 5 years, an update will be done on available database information. This time frame fits with the Sanitary Survey Program administered by NHHS. Ideally the PWSS will record or be able to identify any changes in their Contaminant Source Inventory over the five year period. NDEQ will check for any well changes and develop new WHPA and a new database search, as necessary. NDEQ will request that the PWSS make any additions or corrections to the existing assessment regarding issues not on record or known by NDEQ.

8.2 New Systems

It is recommended that any new PWSSs (regardless of type) will complete a Source Water Assessment before or at the time it goes on line, and provides drinking water to the public. This may be incorporated with Capacity Development which is a requirement of the Safe Drinking Water Act (SDWA) Amendments.

As other federal and state regulations change, appropriate changes and updates to Nebraska's SWAP will be considered.

8.3 Emergency Response Plan and Other States

After SWAP submittal to EPA, development of an emergency response plan will be done in cooperation with other States, appropriate state and local agencies, and all surface water systems (or GWUDI wells). Major coordination is especially needed for Missouri and Platte River PWSSs. NDEQ recognizes how important this issue is, and with help from EPA to coordinate this effort, a notification and response system will be developed.

NDEQ has been in contact with South Dakota, Iowa, Missouri, Colorado, and Wyoming on interstate coordination issues. NDEQ will continue its cooperation with the above mentioned states, and work with all adjacent states as necessary. All information regarding contaminant source issues affecting adjacent states will be shared between Nebraska and those states.

8.4 Priority for Permits and Compliance NPDES Inspections

Discussions with NDEQ management are continuing to re-examine inspections for NPDES discharges. Discharges to rivers upstream from surface water PWSS intakes may be prioritized for more frequent inspections.

8.5 Ground Water Disinfection Rule

Information that is gained from Source Water Assessments for ground water systems could aid in determining the potential for microbial contaminants as proposed for regulation under the Ground Water Disinfection Rule now known as the Ground Water Rule. Because the Rule is not final yet, it is difficult to predict how the two programs will interact.

8.6 18 Month Extension

NDEQ is requesting an 18 month extension due to budget and time constraints. NDEQ recognizes that the lack of information and geographic locations for Transient PWSSs will make these assessments more difficult and time consuming. Additionally, the existing Sanitary Survey Program for Public Water Supply Systems has an

established five year cycle in which assessments are being completed, therefore the entire time is needed to complete the Assessments.

8.7 Tribes

NDEQ sent a draft SWAP description to representatives of the Tribes in Nebraska. After SWAP approval, NDEQ will discuss the SWAP with Tribes and offer any assistance that may be needed or requested. Additionally, NDEQ will offer to perform the Source Water Assessment for each PWSS on Tribal land, if so requested and arranged by the Tribes.