

**SOURCE WATER PROTECTION PROGRAM  
BENEFITING THE MCHENRY WATER SYSTEM  
(PWSID 001-0018)  
GARRETT COUNTY, MARYLAND**

**ALWI Project No. MD7S075**

**August 14, 2013**

**Prepared for**

**MCHENRY WATER SYSTEM**

**IN PARTIAL FULFILLMENT OF MARYLAND DEPARTMENT OF THE  
ENVIRONMENT IFB SOLICITATION NO. U00R1400308**



**SOURCE WATER PROTECTION PROGRAM  
BENEFITING THE MCHENRY WATER SYSTEM  
(PWSID 111-1096)  
GARRETT COUNTY, MARYLAND**

**ALWI Project No. MD7S075**

**August 14, 2013**

**Prepared for  
MCHENRY WATER SYSTEM**

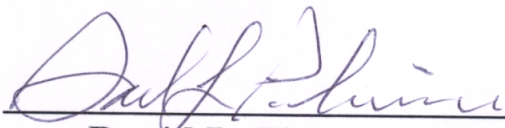
**Reviewed and Approved By:**

**Prepared and Submitted By:**



---

**Mark W. Eisner, P.G.  
President**



---

**David L. Pielmeier  
Operations Manager**

**TABLE OF CONTENTS**  
**ALWI Project No. MD7S075**

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	PURPOSE .....	1
1.2	REGULATORY FRAMEWORK .....	2
1.3	BACKGROUND SYSTEM INFORMATION .....	2
<b>2.0</b>	<b>EXISTING ORDINANCES.....</b>	<b>3</b>
2.1	GARRETT COUNTY SENSITIVE AREAS ORDINANCE .....	3
2.2	GARRETT COUNTY DEEP CREEK WATERSHED ZONING ORDINANCE.....	3
<b>3.0</b>	<b>SWPA DELINEATIONS .....</b>	<b>4</b>
<b>4.0</b>	<b>CONTAMINANT THREATS ASSESSMENT .....</b>	<b>5</b>
4.1	STATE ENVIRONMENTAL DATABASE REVIEW .....	5
4.2	FIELD RECONNAISSANCE WITHIN SWPAs .....	6
4.3	POTENTIAL POINT SOURCE CONTAMINATION HAZARDS .....	6
4.4	NON-POINT SOURCE CONTAMINATION HAZARDS AS SUGGESTED BY LAND USE....	6
<b>5.0</b>	<b>CONTAMINANT SUSCEPTIBILITY.....</b>	<b>8</b>
5.1	PROCEDURES .....	9
5.2	WATER PHYSICAL PROPERTIES.....	10
5.3	INORGANIC COMPOUNDS .....	10
5.4	VOLATILE ORGANIC COMPOUNDS .....	10
5.5	SYNTHETIC ORGANIC COMPOUNDS.....	10
5.6	DISINFECTION BY-PRODUCTS.....	11
<b>6.0</b>	<b>STEERING COMMITTEE INTERACTIONS AND RECOMMENDATIONS .....</b>	<b>11</b>
6.1	INTER-JURISDICTIONAL COORDINATION .....	11
6.2	ORDINANCES.....	11
6.3	DELIBERATIONS AND AGREEMENTS .....	12
6.4	ADDITIONAL RECOMMENDATIONS .....	14

**LIST OF TABLES, FIGURES AND APPENDICES**  
**ALWI Project No. MD7S075**

**TABLES**

**TABLE 1:** LAND USE SUMMARY BY SOURCE WATER PROTECTION AREA

**FIGURES**

**FIGURE 1:** MCHENRY SWPA MAP

**FIGURE 2:** NON-POINT SOURCE HAZARD ASSESSMENT MAP

**FIGURE 3:** PIE CHART OF LAND USE IN VOW ZONE 1 SWPA

**FIGURE 4:** PIE CHART OF LAND USE IN VOW ZONE 2 SWPA

**FIGURE 5:** PIE CHART OF LAND USE IN WILLOWS ZONE 1 SWPA

**FIGURE 6:** PIE CHART OF LAND USE IN WILLOWS ZONE 2 SWPA

**FIGURE 7:** PIE CHART OF LAND USE IN GRAVELLY RUN ZONE 1 SWPA

**FIGURE 8:** PIE CHART OF LAND USE IN GRAVELLY RUN ZONE 2 SWPA

**APPENDICES**

**A:** 2004 SOURCE WATER ASSESSMENT FOR THE MCHENRY WATER SYSTEM

**B:** GARRETT COUNTY, MARYLAND SENSITIVE AREAS ORDINANCE

**C:** GARRETT COUNTY, MARYLAND DEEP CREEK WATERSHED ZONING ORDINANCE

**D:** GARRETT COUNTY NATURAL RESOURCE MAPS

**E:** MAY 15, 2013 PUBLIC WORKSHOP POWERPOINT PRESENTATION

**SOURCE WATER PROTECTION PROGRAM  
BENEFITING THE MCHENRY WATER SYSTEM (PWSID 111-1096)  
GARRETT COUNTY, MARYLAND**

**ALWI PROJECT NO. MD7S075**

## **1.0 INTRODUCTION**

Advanced Land and Water, Inc. (ALWI) was engaged by the Maryland Department of the Environment (MDE) to assist 12 community groundwater systems, including the McHenry Water System (the System), in developing and implementing Source Water Protection Programs (SWPPs). These programs will help protect public health by identifying implementable measures to address existing and potential contaminant threats to groundwater supplies of safe drinking water.

In 2002, EA Engineering, Science and Technology (EA Engineering) developed a Source Water Assessment report for the System (Appendix A). This report stated that the System is supplied by seven production wells with an average yield of 93,400 gallons per day (gpd). Only three of these wells (Wells 1, 5 and Test Well 2) were actively supplying water for the system in 2002.

We updated the previous source water assessment for currency, following technical guidance and advice received from the Water Supply Program. Notwithstanding this, source water assessment is an intrinsically dynamic process. The currency of this assessment continuously is affected by new data, changing regulations and the evolving experience and professional judgment of those involved in developing and implementing this assessment and the recommendations herein.

### **1.1 PURPOSE**

Maryland's Source Water Assessment Program was approved by the U.S. Environmental Protection Agency (EPA) in November 1999, and the initial Source Water Assessment for the System was completed in 2002. The 2002 assessment included recommendations for ongoing management and protection, as well as periodic updates to reflect changes to the water system, appropriation permit and/or land uses within Source Water Protection Areas (SWPAs) as they may periodically occur. Note that in the era of the 2002 report, SWPAs sometimes may have been termed "source water assessment areas" and "wellhead protection areas."

While these past efforts recommended certain source protection and management concepts, MDE determined that the System be included in our current work based on a combination of the size of the population served and an agency perception of its ongoing vulnerability to potential groundwater contamination. Accordingly, the overall purpose of this work is to assist the System in developing a SWPP, which includes specific guidance on implementing feasible source protection measures.

## 1.2 REGULATORY FRAMEWORK

ALWI followed MDE's source water assessment and wellhead protection guidelines, which stem from The Safe Drinking Water Act (SDWA) of 1974 and its later amendments. The SDWA established wellhead protection programs for each state under the oversight of the EPA. The 1996 Amendments to the SDWA mandated that the State of Maryland develop a Source Water Assessment Program. MDE contracted EA Engineering to complete such a Source Water Assessment in 2002 (Appendix A). In September of 2011, ALWI was awarded the SWPP contract.

The System's participation in the SWPP was voluntary and not a regulatory requirement under the SDWA.

## 1.3 BACKGROUND SYSTEM INFORMATION

The System (PWSID 111-1096) serves approximately 983 people with 377 connections. The system actively withdraws water from Village of Wisp (VOW) Wells 1 and 5 located on the west side of Marsh Run Cove, as well as the Gravelly Run Well and Willows Well#1, which were installed on the east side of Marsh Run Cove (Figure 1). A second Willows well (Well #2) exists near Well #1, and the System is contemplating its use as a backup source. Deep Creek Village Wells 1 and 2 have been primarily used by the residents of Deep Creek Village, and could be used to serve as backup supply wells for the McHenry System if adequate infrastructure is installed to connect them to the System.

In 2002, EA Engineering presented a comprehensive analysis of the risks to source waters supplying the McHenry System, along with information necessary to implement protection programs. EA Engineering's recommendations for the System included the following:

- Form a team to protect the water supply;
- Provide the public with information for safeguarding the SWPA;
- Continue monitoring groundwater for SDWA contaminants (as required by MDE);
- Form a contingency plan in emergency situations, such as accidental spills or leaks;
- Update potential contaminant source inventories and purchase conservation easements or property; and
- Contact Wisp Resort Hotel golf course management to discuss the potential overuse of fertilizers and/or herbicides that may impact ground-water quality.

One of ALWI's overall SWPP goals was to assist Garrett County in moving forward with many of these and other recommendations.

## **2.0 EXISTING ORDINANCES**

Two existing Garrett County ordinances presently provide land use restrictions for properties located within the McHenry SWPAs. These two ordinances are the (1) Garrett County Sensitive Areas Ordinance (Appendix B) and (2) Garrett County Deep Creek Watershed (DCW) Zoning Ordinance (Appendix C).

### **2.1 GARRETT COUNTY SENSITIVE AREAS ORDINANCE**

The Sensitive Areas Ordinance (Appendix B) originally was adopted on June 24, 1997, and amended May 25, 2010. The Sensitive Areas Ordinance includes a map of its applicable areas outlined in red, including some of the McHenry wells that are subject to this effort (Appendix B).

The Sensitive Areas Ordinance provides for and applies a two-zone approach to incremental groundwater source protection. It provides for “Zone 1” delineations via 500-foot fixed radii around sources, based on a criterion established by Garrett County. Zone 2 areas generally are the surrounding, contributing watersheds, and these delineations generally follow applicable MDE source water delineation guidance. At the outset of this work, the map that is integral to the Sensitive Areas Ordinance included some but not all McHenry delineations because some of the wells postdate the initial 2004 SWAP effort. Chapter 3.0 of this report presents revisions to the existing delineations.

The Sensitive Areas Ordinance establishes requirements and prohibitions to protect community well sources from potential groundwater contamination. Largely, groundwater protections are accomplished through restrictions on incompatible land uses within SWPAs. Specifically, the Sensitive Areas Ordinance offers the following protections:

- ❑ Both above ground and underground storage tanks are prohibited from being placed within 500 feet (Zone 1) of a community water supply system well.
- ❑ Hazardous substance storage tanks located within the SWPA, but more than 500 feet from a community water supply system well, shall be placed above ground and be surrounded by a 100% catchment basin or double-walled containment and a spill protection overfill alarm.
- ❑ Uses which principally involve the manufacture, storage, use, transport, or disposal of hazardous materials or any use which involves hazardous materials in quantities greater than associated with normal household use are prohibited.

A more complete list of use restrictions is included in Appendix B.

### **2.2 GARRETT COUNTY DEEP CREEK WATERSHED ZONING ORDINANCE**

The DCW Ordinance (select sections provided in Appendix C; entire Ordinance available at <http://garrettcountry.org/planning-land-development/zoning-administration/deep-creek-watershed-zoning>) originally was adopted on May 13, 1997, and amended May 25, 2010.

Like the Sensitive Areas Ordinance, the DCW Ordinance establishes requirements and prohibitions to protect community well sources, as well as Deep Creek Lake itself, from potential contamination. Protections are accomplished through restrictions on incompatible land uses. The DCW Ordinance includes a table of use regulations (§157.024) that sets forth the following SWPP-related regulations for natural resources and agricultural uses:

- ❑ Forest conservation practices and the harvesting of forest products, excluding saw milling as permitted by right uses.
- ❑ Mining, quarrying or the removal of coal, clay, sand, gravel, peat, topsoil or any other natural resources, except natural gas, from on or beneath the land surface for commercial purposes, subject to the provisions of §157.064 and provided that a minimum lot size of 10 acres shall be required for such uses (except for the removal of topsoil), which are subject to special exception.
- ❑ Drilling for, or removal of underground storage of natural gas, subject to the regulations of the MDE, the Maryland Public Service Commission and Federal Energy Regulatory Commission are permitted by right uses. The wellhead and all areas used for storage or operation of equipment shall comply with the following minimum setbacks:
  - a. 2,000 feet from the high water elevation line of Deep Creek Lake, measured at 2,462 feet above sea level.
  - b. 1,000 feet from the property line of any lot not owned or leased to the entity responsible for the gas drilling, removal or storage operation.
- ❑ Agriculture, as defined in §157.007, is a “permitted by right” use provided that all buildings or enclosures used commercially for feed lots, hog raising or poultry raising shall be subject to three times the setback requirements specified in §157.062.
- ❑ Commercial stockyards and similar livestock sales establishments only are permitted in areas zoned general commercial, provided that such uses are subject to three times the setback requirements specified in §157.062.

### **3.0 SWPA DELINEATIONS**

ALWI updated the previous source water protection zone delineations to address the installation of two new wells and the change in System appropriation associated with these wells. Changes in either of these parameters, including the additions of the Gravelly Run Well and Willows Well #1, increase the area from which these sources draw water. The updated delineations (Figure 1) accommodate the appropriation permit increase from the addition of Gravelly Run (96,000 gpd) and Willows 1 (50,000 gpd).

The new delineations are concordant with the Sensitive Areas Ordinance, as amended on May 25, 2010 (Appendix B), which embraces a two-zone approach to protection as follows:



- ❑ **Zone 1** - The Sensitive Areas Ordinance uses a fixed radius of 500 feet. The Steering Committee was reluctant to embrace any change in this delineation method.
- ❑ **Zone 2** - The Zone 2 delineations also are concordant with applicable MDE guidance. We modified the original delineations by incorporating the new sources on the east side of Marsh Run Cove, while taking into account surface water bodies, topography and drainage divides, and other significant land features.

The Steering Committee sought conformity with the Sensitive Areas Ordinance and its two-zone approach to source water protection. The Steering Committee was reluctant to embrace any changes to delineation methods that we otherwise might have contemplated because of their ripple effect upon the existing ordinance.

#### **4.0 CONTAMINANT THREATS ASSESSMENT**

ALWI performed regulatory database reviews, a field reconnaissance and limited interviews to update the 2004 inventory of potential sources of contamination within the SWPAs originally delineated by MDE in 1999 and modified by EA Engineering in 2004. Both point and non-point sources of contamination were considered. Additionally, MDE specifically suggested that the compatibility of existing and future natural resources development projects within the SWPAs be considered. Such natural resources projects may include but are not necessarily restricted to coal mines, natural gas wells and timbering operations.

##### **4.1 STATE ENVIRONMENTAL DATABASE REVIEW**

MDE provided ALWI the following state-maintained environmental databases to incorporate into point-source hazard inventories, with the date of database publication provided parenthetically as follows:

- ❑ Municipal and Industrial Groundwater Discharge Permits (6/14/2012);
- ❑ Pesticide Dealers (1/12/2012);
- ❑ Land Restoration Program Sites (Voluntary Cleanup Program and Comprehensive Environmental Response, Compensation, and Liability Act) (1/16/2012);
- ❑ MDE Oil Control Program (OCP) databases (10/14/2011);
- ❑ Supplemental database listing of solid waste facilities, wood waste disposal sites and other hazardous waste generators (2/2012); and
- ❑ Resource Conservation and Recovery Act sites (6/18/2012).

The databases helped with interpretations of groundwater susceptibility, in that the listed facilities may be generators of hazardous materials, petroleum products and/or other drinking water contaminants. Results of this review are integrated with the points source hazard inventory

(Section 4.3) of this report.

#### **4.2 FIELD RECONNAISSANCE WITHIN SWPAs**

On December 13, 2011, ALWI performed a field reconnaissance guided by system representatives. During this reconnaissance, local land use conditions were observed with an emphasis on the potential use, storage and disposal practices of hazardous materials and petroleum products near the wells and elsewhere in the delineated SWPAs.

Such conditions may have included visual evidence of present or former spills, stained or discolored ground surfaces, stressed vegetation, unusual odors or visible underground storage tank appurtenances. Adjacent and nearby properties were visually scanned to the degree practicable from public rights-of-way.

Though ALWI did not observe specific contamination threats warranting further investigation or corrective action, (1) contaminant hazards may exist and could remain undetected due to limitations in the methods employed (concealed visual evidence, etc.) and/or (2) new contamination hazards may develop in the future. For these reasons, the measures employed herein for identifying contaminant hazards should be repeated periodically for the assessment to remain current.

No point-source hazards, significant land use or waste disposal changes were noted within the SWPAs. However, some residential and forested areas were not accessible without substantial trespassing on private property. The possibility of concealed point-source contamination hazards remains, consequently.

The municipal production wells appeared to possess good physical integrity, though no subsurface or invasive work of a confirmatory nature was performed. No visible changes in well physical integrity were noted.

#### **4.3 POTENTIAL POINT SOURCE CONTAMINATION HAZARDS**

During our December 13, 2011 field reconnaissance, ALWI staff did not directly observe any potential point sources of contamination specifically within the SWPAs.

From the point source hazard databases provided by MDE (Section 4.1), only a single facility was identified within the SWPAs. The OCP database included a record (Facility ID 710) for two permanently out of use (tanks removed from ground) USTs at Recreational Industries (Wisp Ski Area). Because these USTs were removed, and the System does not have a history of volatile organic compound (VOC) contamination (Section 5.4) we do not judge them to constitute point source hazards.

#### **4.4 NON-POINT SOURCE CONTAMINATION HAZARDS AS SUGGESTED BY LAND USE**

In order to evaluate the hazard represented by non-point sources of contamination, MDE guidance suggests consideration and mapping of the public sewer service area and land use data

within the SWPAs. Pertinent land use acreages and percentages by SWPA zone are listed in Table 1. Each of these has implications in terms of non-point contaminant sources (e.g., septic systems). Note that approximately 90% of the SWPAs are within public sewer service areas (Table 1; Figure 2). This estimate was derived from sewer service area maps provided by the Garrett County Department of Public Utilities.

Potential sources of non-point-source contamination may include but are not restricted to:

- ❑ **Septic System Discharges** - These include nitrate- and bacteria-laden discharges concordant with the intended design of septic systems. They also can include the inappropriate discharge of hazardous and other regulated liquids through such systems, arising from ignorance or intent. For this reason, MDE guidance suggests consideration and mapping of the public sewer service area(s), with the inference that those areas not sewered are on septic systems. Sewer system maps available from the Maryland Department of Planning (Figure 2) suggest that only 1.8% of the SWPA lies outside of the sewered area.
- ❑ **Agriculture** - Fertilization of cultivated fields, livestock wastes, and agri-chemical releases constitute the primary sources of groundwater contamination from agricultural sources. Agricultural lands within the SWPAs may be sources of nutrients (including nitrates), herbicides, insecticides and/or animal wastes. Land use coverage maps (Figure 2) indicate that only 12% of the total SWPA is in agricultural use and that farming land uses do not exist closer than 600 feet from any of the wells. The majority of agricultural lands (101 of 104 total acres) exist within the Gravelly Run SWPAs.
- ❑ **Energy and Other Natural Resources Operations** – Notwithstanding the existing DCW Ordinance protections provided over the majority of the VOW and Willows SWPAs (see Section 2.2), natural resources extraction and utilization activities possibly could imperil groundwater quality based on similar occurrences reported elsewhere in the country. Major timbering operations, coal mines, and natural gas exploration and production operations may warrant greater scrutiny and/or protective measures before they come to exist or expand within the SWPAs. ALWI identified via maps obtained from the Garrett County website that a substantial amount of lands are either leased and/or had mineral rights sold to energy companies, though it is our understanding that many of the leases have expired (Appendix D). Assuming for conservatism that the mapped leased lands remain active, we found that 4.6 acres (22%) of the Deep Creek Village Zone 1 SWPA are leased by Texas Eastern. In the Zone 2 SWPA for the VOW/Deep Creek Village wells, 146 acres (33%) are leased by Texas Eastern while 6 acres (1%) are leased by Chevron. Finally, 12.6 acres (11%) of the delineated Zone 2 SWPA for the Willows wells are leased by Texas Eastern. These leased lands are depicted on Figure 2. According to the County maps, mineral rights have not been sold within the SWPAs. Some suggestions relating to such future operations are offered in Chapter 6.0 herein.
- ❑ **Sediment and Stormwater** - Commercial and industrial land uses, particularly those with substantial impervious areas, may contribute to contaminant- and sediment-laden stormwater within the SWPA. Some measure of additional, future development also is possible. Related land use statistics by SWPA are included in Table 1.

- ❑ **Heating Fuel Use and Storage** - Though not restricted by the existing Sensitive Areas Ordinance (see Section 6.3, No. 2), liquid petroleum products commonly are used as a heating fuel. Leaks and spills associated with the use and storage of heating fuels may expose System sources to hydrocarbon contamination. According to the Sensitive Areas Ordinance, hazardous substance storage tanks within 500 feet (i.e., Zone 1) are prohibited. Further, hazardous substance storage tanks within SWPAs outside of 500 feet (i.e., Zone 2) must be above ground and surrounded by a 100% catchment basin, or double-walled containment, and a spill protection overflow alarm. Though the extent of reliance on heating fuels within each SWPA is unknown, determining the degree to which heating oil is used was outside of the scope of this SWPP.
- ❑ **Commercial Lands** - Such lands include the golf course (Wisp Resort Golf Course) in the northwestern portion of the watershed, as well as the Wisp Ski Resort in the western portion of the watershed. Golf courses may be treated with fertilizers and herbicides, which can percolate into the unconfined aquifer from which the System withdraws its water. Oftentimes, ski trails are treated with herbicides to prevent future plant growth. Such herbicides may be transported into the wellfield via overland flow, or may enter the groundwater directly through recharge.
- ❑ **US Route 219** - Highway spills, including accidental automobile discharges along US Route 40, may act as non-point sources of various synthetic or volatile organic compounds in the Willows SWPA.

Sources of the information summarized in this subsection included 2010 land use and recent public sewer service areas Geographic Information System data obtained from the Maryland Department of Planning (Figure 2). We have found that actual sewer service areas differ from those provided by the Maryland Department of Planning. Table 1 reflects dominant land uses by type, within each delineated zone within the SWPA. Figures 3 through 8 reflect this information in pie chart form.

## 5.0 CONTAMINANT SUSCEPTIBILITY

ALWI completed a review of available groundwater quality records, integrated with other findings herein, to support an assessment of groundwater susceptibility for active wells (i.e., the Deep Creek Village emergency supply wells were not included). MDE guidance defines a threshold for regarding a water source being “susceptible” to a given contaminant as being either:

- ❑ When the concentrations exceed or equal 50% of the Maximum Contaminant Level (MCL) for 10% or more of the documented samples for a regulated contaminant and/or
- ❑ When a persistent but lower concentration is either increasing or chemically appears associated with an unknown or unexpected source.

In addition to these water quality data considerations, ALWI also considered the following factors in evaluating overall susceptibility:

1. The spatial position of potential contamination hazards relative to System water sources and SWPAs (note that no such hazards were identified within the SWPAs for the System),
2. Observed conditions of wellhead integrity and treatment supplies management, and
3. The natural chemical properties of the source water within contributing aquifers.

## 5.1 PROCEDURES

ALWI completed the susceptibility assessment in accordance with the following step-wise procedure:

1. **Obtain and Filter Water Quality Databases** - ALWI reviewed available electronic databases of water quality analyses provided by MDE for the period 2002 to 2011. The raw databases were filtered to isolate only prospective groundwater contaminants affecting System groundwater supplies.
2. **Consider Chemical Classes and Sampling Conditions** - The furnished databases were developed by MDE as an incidence of operational compliance record-keeping. They contained analytical records for inorganic compounds including radiological species, VOCs and synthetic organic compounds (SOCs). In most cases, the available water quality records only reflect post-treatment, composite water samples and not raw groundwater sources, unless otherwise noted. As such, mixing, blending and treatment efficacy is reflected but well-by-well raw water quality trends are not. Generally the absence of comprehensive analytical results of raw groundwater samples hampered correlating specific water quality findings to specific wells.
3. **Identify “Exceedance” Instances** - In order to identify water quality sample exceedances, we compared each specific analytical result to published MCLs (in COMAR 26.04.01 as of September 2011). Guided by MDE, we judged that a concentration of greater than or equal to 50% of a given MCL should be considered an “exceedance.” Procedurally, this was accomplished by sorting the database by analyte and concentration.
4. **Assess Frequency and Relative Percentage of Exceedance Instances** - The number of times that a given analyte was detected in a concentration greater than 50% of its respective MCL was discerned in terms of overall frequency, percentage of total number of samples and date range of exceedance. Contaminants with results equaling or exceeding 50% of the MCL more than 10% of the time were considered *prima facie* susceptible. ALWI also identified changes in contaminant trends over time, even for those that did not equal or exceed 50% of the MCL more than 10% of the time.
5. **Integrate Information** - ALWI then considered these identified exceedances in the context of the results of the contamination hazard reconnaissance to correlate water quality results to

specific field observations suggestive of a condition of susceptibility.

## **5.2 WATER PHYSICAL PROPERTIES**

One sample taken on February 24, 2005 had a turbidity value of 22 NTU, over four times the MCL of 5 NTU. This was the only sample taken between 2002 and 2011 in which turbidity was evaluated. ALWI staff noted that this high turbidity record coincides with the timing of the construction of the Gravelly Run Well and likely represents a raw sample taken during well development. System representatives indicated that this sample came from the Gravelly Run Test Well and does not reflect water in the McHenry System. MDE has determined that the wells supplying the McHenry water system are not groundwater under direct influence (GWUDI) and that subsequent GWUDI sampling has not shown any indication of high turbidity.

## **5.3 INORGANIC COMPOUNDS**

Water samples collected between 2002 and 2011 did not contain inorganic compounds in excess of 50% of their respective MCLs. Therefore, the System is not susceptible to contamination from inorganic compounds. Low levels of nitrate were detected over this period, never exceeding a concentration of 2.57 milligrams per liter (mg/L). Potential sources of nitrate include agricultural lands, septic systems and natural deposits.

Additionally, low concentrations of arsenic and selenium were detected in September 2009, with concentrations approximately one-third and one-fourth of their respective MCLs. These compounds may be of natural origin and could be attributed to chemical properties of rock formations. However, both of these inorganic compounds may also be found in bottom ash, a deicing agent possibly used on roads in the watershed. Their occurrence in the water supply system could reflect such use of bottom ash. We noted that these compounds were not detected in four prior samples dating back to 2000, and that their presence did not necessarily time correlate to winter months, though dilution and travel time could account for their low detections in September.

## **5.4 VOLATILE ORGANIC COMPOUNDS**

No VOCs were detected in the water quality samples collected between 2002 and 2011. The System currently is not susceptible to VOC contamination. To help maintain this status of non-susceptibility, we recommend implementation of a spill notification system within the Willows SWPA to help mitigate and prevent potential VOC contamination from US Route 219, as explained in Section 6.4.

## **5.5 SYNTHETIC ORGANIC COMPOUNDS**

No SOCs were detected in the water quality samples collected between 2002 and 2011. The System is not susceptible to SOC contamination. However, the potential exists for non-point sources, including golf courses, ski trails and agricultural land to contribute pesticide and/or herbicide contamination to the aquifer from which the System withdraws its water.

## **5.6 DISINFECTION BY-PRODUCTS**

Disinfection By-Products (DBPs) were not detected in two out of three samples taken between 2002 and 2011. In 2004, Total Trihalomethanes, the sum of four closely related methane compounds, had a concentration of 1.88 micrograms per liter ( $\mu\text{g/L}$ ), well below the MCL of 80  $\mu\text{g/L}$ . DBPs can form in the distribution system as a complication of mixing organic matter, found naturally in water, and chlorine, used for disinfection processes. The System is not susceptible to DBPs in the distribution system.

## **6.0 STEERING COMMITTEE INTERACTIONS AND RECOMMENDATIONS**

Garrett County officials convened a joint McHenry/Mountain Lake Park Source Water Protection Steering Committee comprised of officials representing Garrett County Department of Public Utilities. ALWI met with the Committee twice; first on December 13, 2011 and again on April 30, 2012. Representatives of the Garrett County Department of Planning and Land Development later became involved in the planning and review of SWPP elements.

### **6.1 INTER-JURISDICTIONAL COORDINATION**

Though the McHenry and Mountain Lake Park water systems are owned, operated and maintained by Garrett County, other Systems subject to this MDE SWPP contract also exist within Garrett County jurisdiction. Though not directly maintained and operated by Garrett County, certain SWPAs for the City of Frostburg and the joint Midland-Lonaconing-Barton water system exist within Garrett County jurisdiction and are subject to the protections and enforcements of the Sensitive Areas Ordinance. The benefit of inter-jurisdictional coordination was discussed with and understood by representatives of each respective water system. The desire for inter-jurisdictional coordination was shared by Steering Committee members for each of these Systems.

Though source protection objectives differed slightly in detail from system to system, generally each of the four systems under this contract that are subject to the protections, restrictions and enforcements of the Sensitive Areas Ordinance shared the same general needs. Each of these systems required SWPA delineation updates and shared many of the benefits of the recommended Ordinance revisions.

### **6.2 ORDINANCES**

Though the DCW Ordinance (Appendix C) also applies to areas within the McHenry SWPAs, we elected to focus our recommended ordinance revisions on the Sensitive Areas Ordinance for the following reasons:

1. A section of the Sensitive Areas Ordinance focused specifically on source water protection. Appendix B contains the source protection ordinance (i.e., Garrett County Sensitive Areas Ordinance No. 2010-06) as it existed at the start of this effort.

2. We believe that Garrett County would incur less of an administrative burden to revise the Sensitive Areas Ordinance since it covers each of the water systems within Garrett County that are subject to the overall SWPP contract (McHenry, Mountain Lake Park, Midland-Lonaconing-Barton, and Frostburg).

The Steering Committee conceptually embraced an ALWI recommendation to achieve source water protection via ordinance revision, inasmuch as the delineations reflected on the existing Sensitive Areas Ordinance map do not portray all of the groundwater supply wells that were subject to this SWPP.

ALWI led Steering Committee discussions to explain how the Sensitive Areas Ordinance would be improved in both completeness (i.e., covering presently unprotected public supply wells) and clarity (by addressing certain ambiguities and inconsistencies in language) if it were superseded by incorporating the recommendations arising from the work performed under this contract. We explained how certain elements in the Sensitive Areas Ordinance would benefit from revisions to reduce ambiguities, particularly language regarding restrictions on petroleum products.

### **6.3 DELIBERATIONS AND AGREEMENTS**

The Steering Committee enthusiastically supported the SWPP effort. Below is an outline of points that were discussed:

1. **Update to Sensitive Areas Ordinance Map** - We recommended and the Steering Committee agreed that the Sensitive Areas Ordinance map should be updated to reflect the delineations borne of this and other related SWPPs; see Chapter 3.0 for an explanation of delineations revisions. In addition to the changes for McHenry (Figure 1), the map should be revised to reflect delineation updates for other Systems within Garrett County for which ALWI was contracted to develop SWPPs (i.e., the Koontz Reservoir SWPA for the Midland-Lonaconing-Barton water system is not reflected on the County map, nor are the SWPA re-delineations for the Mountain Lake Park and Frostburg's Savage Run Watershed sources).
2. **Resolution of "Petroleum" Ambiguity** - Certain ambiguities existed in the Sensitive Areas Ordinance, with respect to restrictions on the presence and use of petroleum products. Considering that the EPA specifically excludes petroleum from its definition of "hazardous," attendees agreed that the petroleum ambiguity should be addressed. Changing "hazardous substances" to "hazardous substances and petroleum products" was presented as one workable way. A less desirable alternative also was discussed, which would involve defining "hazardous" as specifically including petroleum, which would require an insertion within the definitions section.
3. **Ordinance Revision to Include Parallel Protections for Spring Sources** - Presently, there only is language in the Sensitive Areas Ordinance regarding the protection of wells, specifically in §156.09.C(2) and (3). However, there is not similar language to extend such protections to spring sources. Though not specifically germane to the McHenry water system, other Systems under this MDE SWPP contract within the jurisdiction of Garrett County rely on springs as a primary source of water (i.e., Mountain Lake Park and Frostburg). ALWI



recommends that the Sensitive Areas Ordinance be revised to include equal protection for spring sources.

4. **Sensitive Areas Ordinance Reference to Storage in “Greater than Household Quantities”** - We recommended and the Steering Committee agreed that both clarity and flexibility would be enhanced by restricting this prohibition to the Zone 1 radii only.
5. **Community Involvement and Public Workshop** - The Steering Committee accepted the concept of public involvement in source water protection. Ordinance revisions require the review and voting approval by the County Commissioners. Applicable MDE guidance also recommends public involvement in the consideration and adoption of protective measures (such as the Ordinance revisions). The Steering Committees for each of the four related Systems came to agree to convene a joint public workshop on source water protection with the public input solicitation processes otherwise inherent to Ordinance(s) revision and adoption procedures. A joint workshop was held on May 15, 2013 (Appendix E) as a part of these public involvement processes.
6. **Energy Resources Development (General)** - Energy resources development in SWPAs garnered considerable discussion. While ALWI recommends broad energy resources facility restrictions within SWPAs, and notwithstanding the existing protections provided by the DCW Ordinance (Section 2.2; Figure 2), Steering Committee members were disinclined to embrace restrictions that could be construed as a disincentive for the economic investment that arises from energy resource development projects. County officials further advised that prior to acting on related ordinance initiatives, the County seeks to review the content of the Marcellus Shale Safe-Drilling Initiative Advisory Commission report, which reportedly is planned for completion in the summer of 2014.
7. **Wind Turbines** - We explained that wind turbines probably are not a significant concern because of the small quantities of lubricants and other petroleum products used. Our opinion is that wind turbines should be disallowed in Zone 1, but could be permissible in Zone 2 as long as the quantity of petroleum stored was not greater than household quantities.
8. **Coal Mines and Gas Well Exploration Projects** - We suggested that neither coal mines nor gas well exploration projects be allowed in source water protection areas. With the Steering Committee we discussed how the majority of threats surrounding gas well projects manifest in the storage and management of frack water, brines, and wastewaters at the land surface (and are not caused by subsurface hydrologic interference). While we discussed the economic importance of natural gas, we also observed that the SWPAs cover but a small portion of the County's overall acreage. Consequently the economic impact on the County, as a whole, should be relatively small if prohibitions are placed on gas and coal exploration within SWPAs. The Steering Committee deferred offering final guidance on this matter, as they await the findings of the Marcellus Shale Safe-Drilling Initiative Advisory Commission report.
9. **Unneeded Wells** - We discussed failed test wells, failed land development projects and other wells in or near SWPAs that no longer are needed (Figure 1). We recommended that

unneded wells be abandoned and sealed, as a method to further protect System sources. This includes Willows Well#2, should the System decide not to use the well as an emergency back-up source. For those wells not already planned for abandonment by the County, we recommended that the County health department be contacted regarding their (or MDE's) capability to order the proper abandonment and sealing of such wells owned or controlled by third parties.

As aforementioned, the Steering Committee focused on the ramifications of existing and/or potential energy resources development activities in SWPAs. Regardless of the outcome of the Marcellus Shale Safe Drilling Initiative report, ALWI recommends that the county prohibit drilling related to energy exploration within the SWPAs. This became a specific issue in connection with the large lease holdings of natural gas companies within certain SWPAs (including McHenry) and the economic value of the petroleum resources and their associated benefit for jobs creation.

Steering Committee members came to feel that decisions on the restriction or prohibition of such activities would best be made only after reviewing the findings of the Marcellus Shale Safe-Drilling Initiative Advisory Commission report and then consulting with County Commissioners and other County officials. For this reason, at this time the prohibition of energy resources development projects within SWPAs remains an unaccepted recommendation.

#### **6.4 ADDITIONAL RECOMMENDATIONS**

ALWI has developed additional recommendations to improve overall source protection in light of the observations, analyses and interpretations presented herein:

1. **Limit Incompatible, Upgradient Land Uses** - ALWI judges that the greatest measure of source water protection would arise from the protection of upgradient watershed areas from incompatible land uses. Based on the setting of the System, we further judge that the most likely form of potentially incompatible land use would be in the form of operations and facilities associated with energy resources exploration and development. Coal and natural gas exploration programs and production facilities may cause the release or migration of groundwater contaminants (and surface water contaminants as well). It would be best if such land uses were prohibited in the delineated source water protection areas. We recommend that the Steering Committee reach a final consensus and recommendation (to the Commissioners) on this issue. If prohibition is infeasible or untenable, ALWI would recommend conservative and comprehensive baseline water quality analyses before any such energy project is approved to begin, as well as monitoring throughout the project's lifetime. Prohibitions requiring the application and uses of the best available protective techniques and technologies should be considered as well.
2. **Consider Land Acquisition** – Based on Maryland Department of Planning property ownership information, 100% of the forested lands (357 acres) within the SWPAs are privately owned. Though the majority of these lands appear to be owned by land development companies and/or the Wisp Resort, as economically feasible the System should consider purchasing available forested lands to better protect their sources from alternative

land uses such as agriculture and natural resource exploration.

3. **Promote Participation in Forest Conservation and Management Program** - The System also should consider encouraging private landowners within the SWPAs to manage their forested lands by way of the Maryland Department of Natural Resources (DNR) Forest Conservation and Management Program. The program allows for a legal agreement between the landowner and the DNR to be recorded in the land records of the County in which the property is located. The landowner agrees to manage their forest land according to a plan that is prepared for the property in return for a reduced and/or frozen property tax assessment (generally reduced and frozen at a low agricultural rate). The minimum acreage to participate in the program is five acres and the minimum term of the agreement is fifteen years. If the agreement is breached through failure to comply with the plan, sale of the property to someone unwilling to assume the responsibility or a landowner who simply wants to be out of the program, back taxes will be levied and will be computed back to the beginning of the agreement. The agreement can be amended to increase or decrease acreage and it can be transferred to a buyer if the buyer is willing to assume the responsibilities of the agreement.
4. **Create a Spill Notification System** - The potential exists for surficial spills to infiltrate the unconfined aquifer. A spill notification system along US Route 219 in the Willows SWPA (particularly for Zone 1) would give water plant managers notice of potential contaminants that could impact drinking water quality. This would allow them ample time to design and incorporate preventative measures to reduce the impact of these spills.
5. **Consider Revising Road Salt Application Procedures** - In October 2012, the Maryland Department of Transportation State Highway Administration (SHA) issued new guidance for reducing the use of road salt, particularly in Sensitive Areas, which include susceptible areas (as defined by MDE) identified by the Wellhead Protection Program. For the McHenry system, this would be especially applicable to the Willows SWPA, as MD Route 291 runs through the SWPA and exists upgradient of the Willows wells. Site specific plans for the SWPAs should be developed. Such plans may include reducing salt usage, or substituting another ice control material in place of road salt (e.g., abrasives such as gravel and sand). SHA also encourages placing signs to alert motorists in areas where deicing service may be reduced due to environmental concerns.
6. **Post “No Dumping” Signs Within SWPA** - Consideration should be given to posting “No Dumping” signs at various locations within the SWPAs to discourage the informal disposal of hazardous wastes and petroleum products. Similarly, the County should recon the SWPA for evidence of dumping, while removing unwanted debris and waste items.
7. **Community Outreach and Public Education** - The County may consider a SWPA-wide community outreach and awareness program, concentrating on residential and commercial landowners. The County should consider a mass mailing with pertinent information on best management practices for landscaping and handling of household chemicals as a measure to educate landowners on contamination issues.