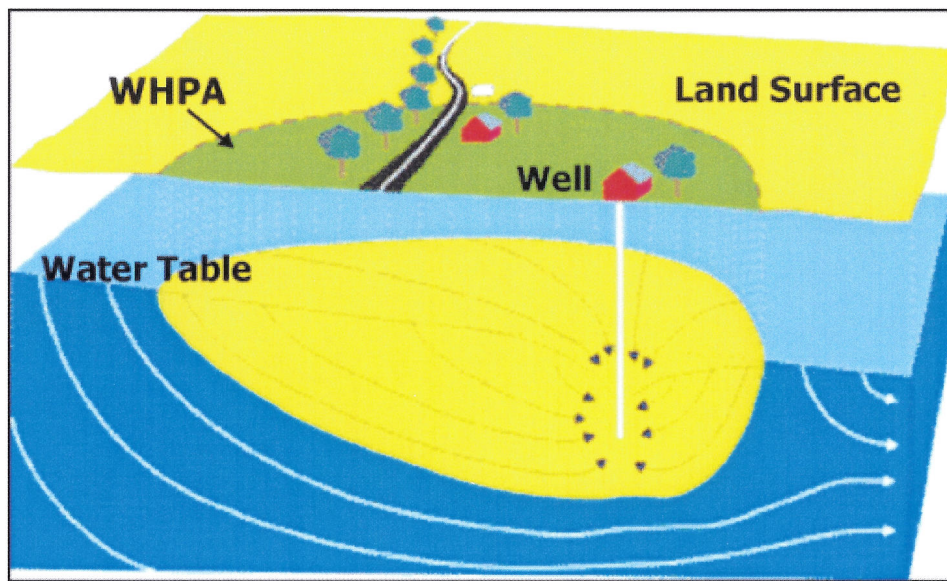


**Source Water Assessment  
for the Deer Lodge Mobile Home Park  
Water System  
Washington County, Maryland**



**Prepared By  
Maryland Department of the Environment  
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## SUMMARY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for the Deer Lodge Mobile Home Park water system. The required components of this report as described in Maryland's Source Water Assessment Program (SWAP) are 1) delineation of an area that contributes water to the source, 2) identification of potential sources of contamination, and 3) determination of the susceptibility of the water supply to contamination. Recommendations for protecting the drinking water supply conclude this report.

The source of the Deer Lodge Mobile Home Park's water supply is a well in an unconfined fractured-rock aquifer. The source water assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for this source type.

Point sources of contamination were investigated within the assessment area from field inspections, contaminant inventory databases, and previous studies. The Maryland Office of Planning's 2000 digital land use map for Washington County was used to identify non-point sources of contamination. Well information and water quality data were also reviewed. An aerial photograph and maps showing land use within the source water assessment area are included in the report.

The susceptibility analysis is based on a review of the existing water quality data for the Deer Lodge Mobile Home Park water system, the presence of potential sources of contamination in the source water assessment area, well integrity, and the inherent vulnerability of the aquifer. It was determined that the Deer Lodge Mobile Home Park water supply is not susceptible to contamination from inorganic compounds, radionuclides, volatile organic compounds, synthetic organic compounds, or microbiological contaminants.

## INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for the Deer Lodge Mobile Home Park water system in Washington County. The Deer Lodge Mobile Home Park is located approximately 6 miles west of Hagerstown in central Washington County. The water system serves a population of 96 and has 56 service connections. The water system is privately owned and operated.

## WELL INFORMATION

Well information was obtained from the Water Supply Program's database, site visits, well completion reports, sanitary survey inspection reports, and published reports. The Deer Lodge MHP system presently obtains its water supply from one well (Fig. 1). An additional well was drilled in response to drought conditions and declining water levels in September 2002. However, since hydrologic conditions have improved, this well has not been added to the water system and therefore is not included in this assessment. A review of the well completion report for Deer Lodge MHP's well indicates that the well was drilled after 1973, when well construction standards went into effect, and should meet current construction standards. Well information is summarized in Table 1.

The Deer Lodge MHP water system has an appropriation permit to draw water from the Martinsburg Shale formation for an average use of 8,000 gallons per day (gpd) and a maximum of 12,000 gpd in the month of maximum use.

SOURCE ID	WELL NAME	PERMIT	TOTAL DEPTH	CASING DEPTH	YEAR DRILLED
03	DEERLODGE WELL	WA-94-1094	600	105	1998

*Table 1. Deer Lodge MHP well information.*

## HYDROGEOLOGY

The Deer Lodge Mobile Home Park lies within the Hagerstown Valley physiographic province, which is underlain by a sequence of metasedimentary limestones and shales that have eroded away to form the valley bound by South Mountain and the Bear Pond Mountains west of Clear Spring. The Deer Lodge MHP wells obtain water from the Martinsburg Shale formation, a sequence of metamorphosed, dark brown and gray fissile shales (Edwards, 1978). The primary porosity and permeability of this aquifer are small due to the dense nature of the metamorphosed rock. Ground water moves principally through secondary porosity (fractures, bedding planes, and joint openings) and is recharged by precipitation percolating through soil and saprolite. Large

production wells are not common in this formation unless significant, water-bearing fractures are encountered, due to the low primary porosity.

## SOURCE WATER ASSESSMENT AREA DELINEATION

For ground water systems, a Wellhead Protection Area (WHPA) is considered the source water assessment area for the system. The source water assessment area for public water systems with an average appropriation amount of less than 10,000 gpd and drawing from fractured-rock aquifers is a circle with a 1,000-foot radius (MD SWAP, 1999). The area should be modified to account for geological boundaries and ground water divides if appropriate. The WHPA is 72 acres and is illustrated in Figure 2.

## POTENTIAL SOURCES OF CONTAMINATION

Potential sources of contamination are classified as either point or non-point sources. Examples of point sources of contamination are leaking underground storage tanks, landfills, discharge permits, large-scale feeding operations, and CERCLA sites. These sites are generally associated with commercial or industrial facilities that use chemical substances that may, if inappropriately handled, contaminate ground water via a discrete point location. Non-point sources of contamination are associated with certain types of land use practices such as use of pesticides, application of fertilizers or animal wastes, or septic systems that may lead to ground water contamination over a larger area.

### *Point Sources*

A review of MDE contaminant databases revealed no potential point sources of contamination within the WHPA.

### *Non-Point Sources*

The Maryland Office of Planning's 2000 digital land use coverage of Washington County was used to determine the predominant types of land use in the WHPA (Fig. 3). The land use summary is given in Table 2. The WHPA is predominantly residential with some commercial and agricultural land.

Land Use Type	Acres	Percent of WHPA
Low Density Residential	40.3	56.3
Medium Density Residential	6.5	9.1
High Density Residential	14.4	20.0
Commercial	9.5	13.2
Pasture	1.0	1.4
Total	72	100

*Table 2. Land Use Summary*

Residential areas without sewer service may be a source of nitrate from septic systems, or microbiological contaminants if they fail. Additionally, residential areas may be a source of nitrate and SOCs if fertilizers, pesticides, and herbicides are not

used carefully in lawns and gardens. Agricultural land is commonly associated with nitrate loading of ground water and can also be a source of microbiological pathogens from animal wastes.

The Maryland Office of Planning's 1996 digital sewer map of Washington County shows that entire WHPA is in an area of the county that is not planned for service.

## WATER QUALITY DATA

Water Quality data was reviewed from the Water Supply Program's database for Safe Drinking Water Act (SDWA) contaminants. The State's SWAP defines a threshold for reporting water quality data as 50% of the Maximum Contaminant Level (MCL). If a monitoring result is greater than 50% of an MCL, this assessment will describe the sources of such a contaminant and if possible, locate the specific sources that are the cause of the elevated contaminant level. All data reported is from the finished (treated) water unless otherwise noted. The Deer Lodge MHP water system currently uses ultraviolet radiation for disinfection and ion exchange for softening and iron removal.

A review of the monitoring data for Deer Lodge MHP's water system indicates that the water supply meets drinking water standards. Contaminants have not been detected above 50% of an MCL, with the exception Di(2-Ethylhexyl)Phthalate. The water quality sampling results are summarized in Table 3.

Contaminant Group	No. of Samples Collected	No. of Samples over 50% of an MCL
Inorganic Compounds (except Nitrate)	97	0
Nitrate	18	0
Radiological Contaminants	4	0
Volatile Organic Compounds	9	0
Synthetic Organic Compounds	3	1

*Table 3. Summary of Water Quality Samples*

### ***Inorganic Compounds (IOCs)***

A review of the data shows that inorganic compounds have not been detected above 50% of an MCL. Several constituents such as Barium, Sodium, and Sulfate have been detected in the water supply but at very low levels. The system has treatment in place for Iron removal.

### ***Radionuclides***

A review of the data shows that no radionuclides were detected above 50% of an MCL. There is currently no MCL for Radon-222, however EPA has proposed an MCL of 300 pCi/L or an alternate of 4000 pCi/L for community water systems if the

State has a program to address the more significant risk from radon in indoor air. The EPA received many comments in response to their proposed rule, and promulgation may be delayed. Radon-222 results have been reported below the lower proposed MCL.

#### ***Volatile Organic Compounds (VOCs)***

A review of the data shows that VOCs have not been detected above 50% of an MCL.

#### ***Synthetic Organic Compounds (SOCs)***

A review of the data shows that SOCs have not been detected above 50% of an MCL, with the exception of Di(2-Ethylhexyl)Phthalate for which the highest level reported was 11.4 ppb. This contaminant is commonly found in laboratory blank samples and it was confirmed to be present at ten times the level in the blank for this sample.

#### ***Microbiological Contaminants***

Raw water bacteriological data is available for the well from evaluation for ground water under the direct influence of surface water (GWUDI). A review of the data shows that coliform bacteria was not detected in raw water.

### **SUSCEPTIBILITY ANALYSIS**

The well serving the Deer Lodge MHP water supply draws water from an unconfined fractured-rock aquifer. Wells in unconfined aquifers are generally vulnerable to any activity on the land surface that occurs within the wellhead protection area. Therefore, continued monitoring of contaminants is essential in assuring a safe drinking water supply. The *susceptibility* of the source to contamination is determined for each group of contaminants based on the following criteria: 1) the presence of potential contaminant sources within the WHPA, 2) water quality data, 3) well integrity, and 4) the aquifer conditions. Table 4 summarizes the susceptibility of Deer Lodge MHP's water supply to each of the groups of contaminants.

In fractured-rock areas, if a well is constructed properly with the casing extended to competent rock and with sufficient grout, the saprolite serves as a natural filter and protective barrier. Properly constructed wells with no potential sources of contamination in their WHPA should be well protected from contamination.

#### ***Inorganic Compounds***

The water supply is **not** susceptible to inorganic compounds, based on water quality data and the lack of potential contaminant sources within the WHPA.

#### ***Radionuclides***

The water supply is **not** susceptible to radionuclides. The source of radionuclides in ground water is the natural occurrence of uranium in rocks. Based on the low levels

detected in the water supply, the aquifer is not a source of these contaminants in this area.

***Volatile Organic Compounds***

The water supply is **not** susceptible to volatile organic compounds, based on water quality data and the lack of potential contaminant sources within the WHPA.

***Synthetic Organic Compounds***

The wells are **not** susceptible to synthetic organic compounds. SOC's were not detected in the water supply, other than phthalate, which is explained by laboratory error. Potential sources of SOC's in the WHPA may exist in the form of pesticide or herbicide use in the agricultural or residential areas, but represent a minimal risk.

***Microbiological Contaminants***

The water supply is **not** susceptible to microbiological contaminants. Raw water data shows that coliform bacteria, which is used as an indicator for other microbiological contaminants, was not detected in the raw water from the well.

Contaminant Group	Are Contaminant Sources Present in WHPA?	Are Contaminants Detected Above 50% of MCL?	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible?
Nitrate	YES	NO	NO	YES	NO
Inorganic Compounds (except nitrate)	NO	NO	NO	YES	NO
Radiological Compounds	NO	NO	NO	NO	NO
Volatile Organic Compounds	NO	NO	NO	YES	NO
Synthetic Organic Compounds	YES	NO	NO	YES	NO
Microbiological Contaminants	YES	NO	NO	NO	NO

***Table 4. Susceptibility Analysis Summary.***



## **MANAGEMENT OF THE SOURCE WATER ASSESSMENT AREA**

With the information contained in this report the Deer Lodge MHP is in a position to protect the Deer Lodge MHP water supply by staying aware of the area delineated for source water protection and evaluating future development and land planning. Specific management recommendations for consideration are listed below:

### ***Form a Local Planning Team***

- The Deer Lodge Mobile Home Park should contact the County Water and Sewer Department and the County Planning Department to form a local planning team to begin to implement a wellhead protection plan. The team should represent all the interests in the community, such as the water supplier, home association officers, the County Health Department, local business, developers, and property owners, and residents within and near the WHPA. The team should work to reach a consensus on how to protect the water supply.
- A management strategy adopted by the County should be consistent with the level of resources available for implementation. MDE remains available to assist in anyway we can help the process.
- MDE has grant money available for Wellhead Protection projects.

### ***Public Awareness and Outreach***

- The Consumer Confidence Report should list that this report is available to the general public through their county library, by contacting the Owner or MDE.
- Conduct educational outreach to residents on potential contaminant sources. Important topics include (a) appropriate use and application of fertilizers and pesticides, and (b) chemical storage and disposal.

### ***Monitoring***

- Continue to monitor for all Safe Drinking Water Act contaminants as required by MDE.
- Annual raw water bacteriological samples are a good test for well integrity.

### ***Planning/ New Development***

- Review the State's model wellhead protection zoning ordinances for potential adoption. Coordinate with Washington County Department of Planning to adopt a wellhead protection ordinance.

### ***Land Acquisition/Easements***

- Loans are available for the purchase of property or easements for protection of the water supply. Eligible property must lie within the designated WHPA. Loans are currently offered at zero percent interest and zero points. Contact the Water Supply Program for more information.

### ***Contingency Plan***

- Deer Lodge MHP should have a Contingency Plan for its water system. COMAR 26.04.01.22 requires all community water systems to prepare and submit for approval a plan for providing a safe and adequate drinking water supply under emergency conditions.
- Develop a spill response plan in concert with the Fire Department and other emergency response personnel.

### ***Contaminant Source Inventory Updates/ Inspections***

- The Deer Lodge Mobile Home Park should conduct their own field survey of the source water assessment area to ensure that there are no additional potential sources of contamination.
- Periodic inspections and a regular maintenance program for the well will ensure their integrity and protect the aquifer from contamination.

### ***Changes in Use***

- Deer Lodge MHP is required to notify MDE if new wells are to be put into service. Drilling a new well outside the current WHPA would modify the area; therefore the Water Supply Program should be notified if a new well is being proposed.

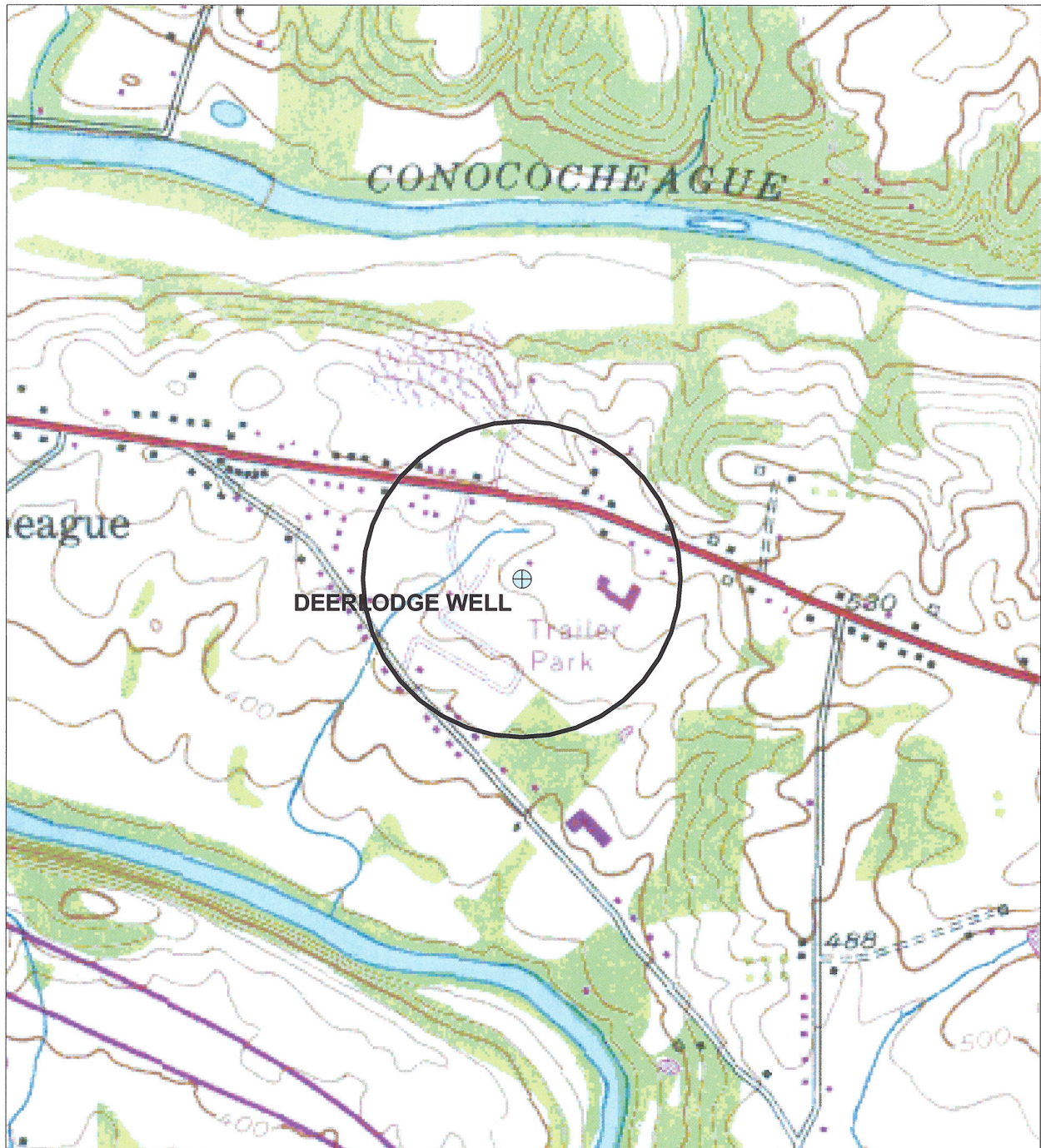
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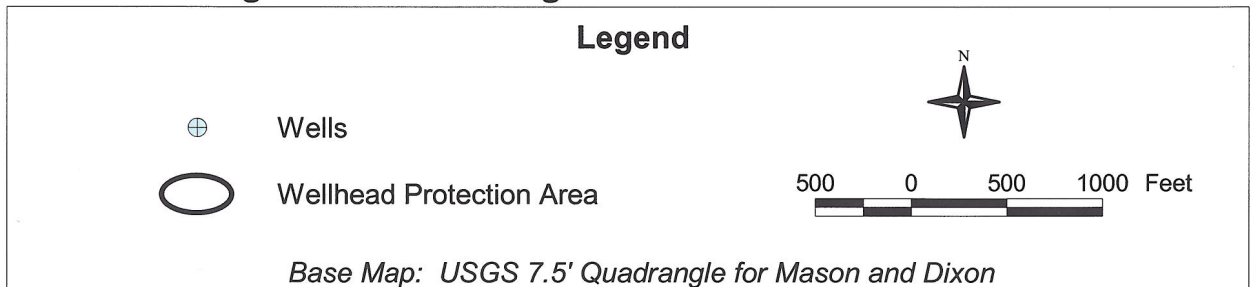
## OTHER SOURCES OF DATA

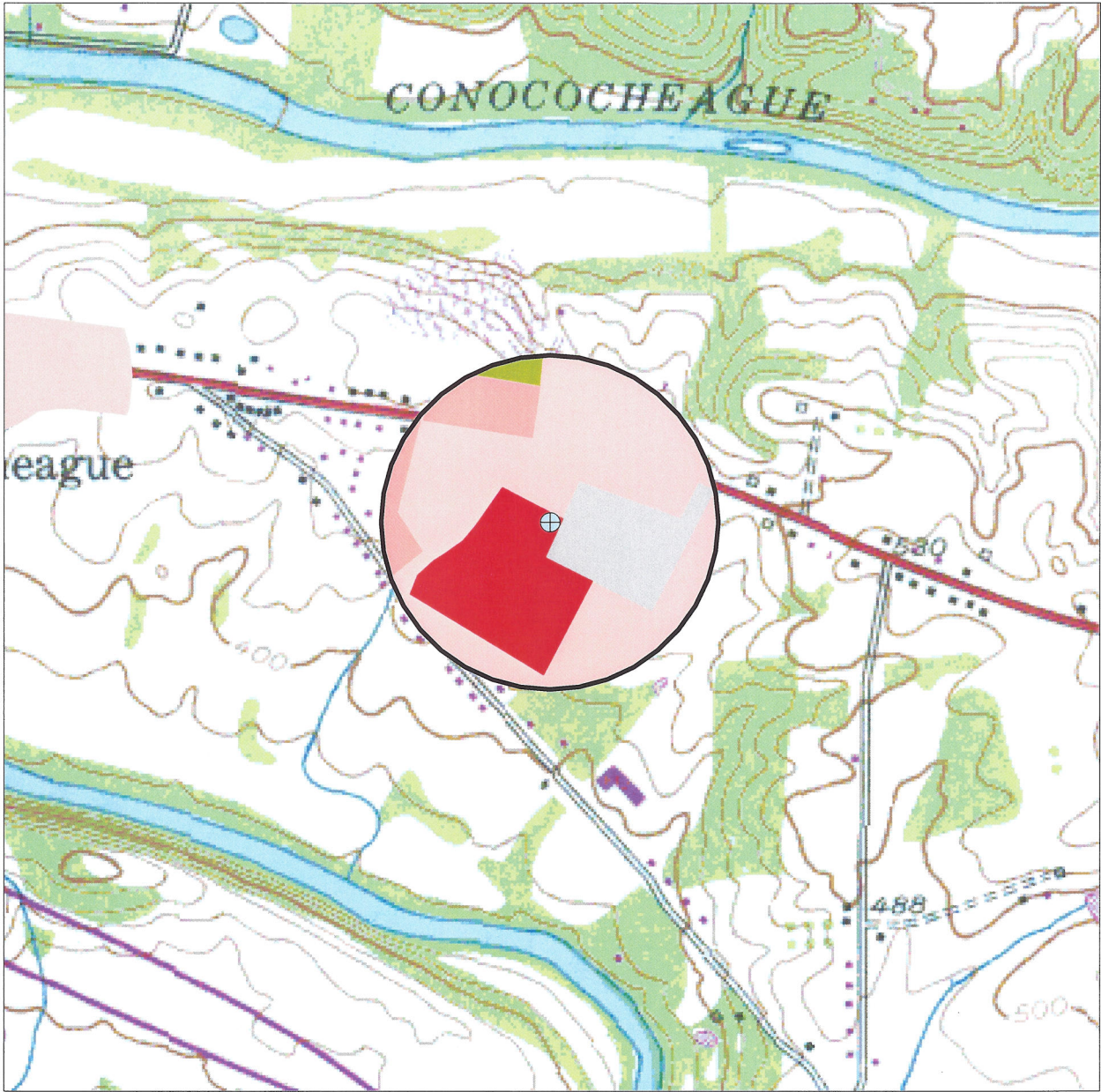
Water Appropriation and Use Permit WA1963G010  
Public Water Supply Sanitary Survey Inspection Reports  
MDE Water Supply Program Oracle® Database  
MDE Waste Management Sites Database  
Department of Natural Resources Digital Orthophoto Quarter Quadrangles for Mason and Dixon  
USGS Topographic 7.5 Minute Quadrangles for Mason and Dixon  
Maryland Office of Planning 2000 Washington County Digital Land Use Map  
Maryland Office of Planning 1996 Washington County Digital Sewer Map

**FIGURES**



**Figure 2. Deer Lodge MHP Wellhead Protection Area**





**Figure 3. Deer Lodge MHP Wellhead Protection Area with Land Use**

