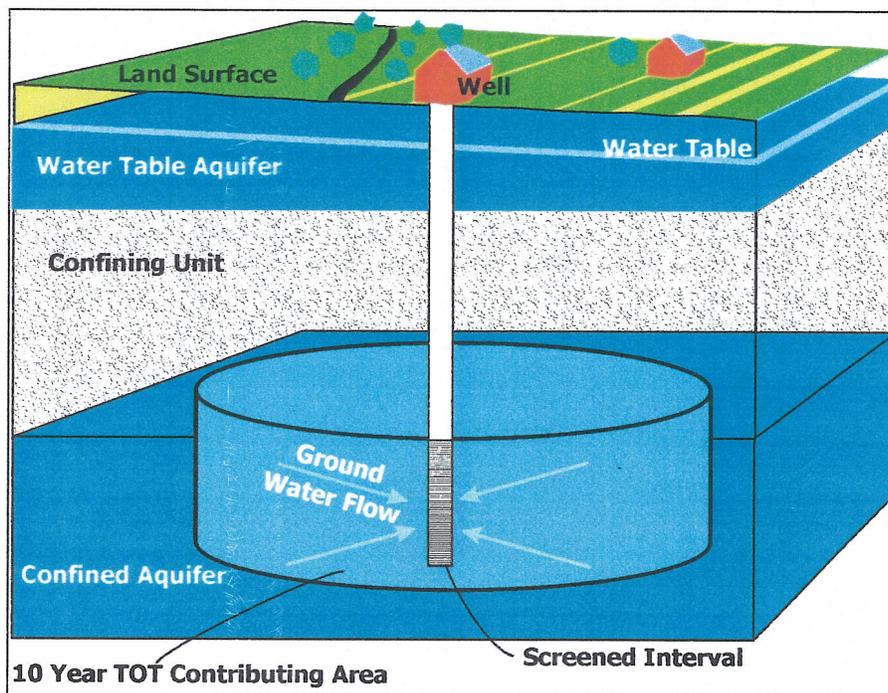


SOURCE WATER ASSESSMENT
FOR COMMUNITY WATER SYSTEMS USING
CONFINED AQUIFERS IN ANNE ARUNDEL COUNTY, MD



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SUMMARY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County. 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The twenty-four community water systems included in this report are currently using fifty-seven wells that pump water from four different aquifers known as the Aquia, Magothy, Patapsco and Patuxent Formations. The Aquia Formation is the shallowest and youngest in age with the Patuxent Formations being the deepest and the oldest. All these aquifers are naturally protected confined aquifers. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for sources in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Maps showing Source Water Assessment areas are included in this report.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the water systems are not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. Some naturally occurring contaminants do pose a risk to the water supply and have been detected in the water samples. It was determined that fourteen systems may be susceptible to naturally occurring iron. Four systems were determined to be susceptible to naturally occurring radiological contaminants. The susceptibility of an additional five systems to radon will depend upon the final MCL that is adopted for this contaminant. In addition, one system was found to be susceptible to cadmium.

INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County. Anne Arundel County is located south of the City of Baltimore and is bounded on the east by the Chesapeake Bay and on the west by the Patuxent River. Its total population, reported in July 2001 is 488,500 (Md. Assoc. of Counties, 2001/2002). These twenty-four community systems serve a population of approximately 70,000 of the county residents. The community systems include three water systems that are owned and operated by the County Department of Public Works (DPW), one State facility, one federal facility and nineteen systems that are individually owned and operated (table1). The community systems included in this report are shown in figure 1. Source water assessments were completed by County DPW for two county operated systems and the City of Annapolis under a MDE grant funded project.

WELL INFORMATION

Well information for each system was obtained from the Water Supply Program's database, site visits, well completion reports, sanitary survey inspection reports and published reports. Amongst the twenty-four community water systems included in this report, a total of fifty-seven wells are currently used as production or backup wells. Fifty of these wells were drilled on or after 1973 and should comply with Maryland's well construction regulations. The remaining seven wells were drilled prior to 1973, when current regulations went into effect, and may not meet the current construction standards. Table 2 contains a summary of well information for each of the systems.

Based on site visits, most wells were in good condition and appeared to be regularly maintained, sealed and protected to insure integrity. Some of the older wells had a one-piece well cap, which may present a possible route of contamination (insects) through unscreened vents and electrical holes. This situation can be easily remedied with the installation of a new two-piece sanitary well cap to prevent contamination. Another common threat to wells observed during field inspections are unused wells in the same aquifer as the production wells. Several water systems have wells that are not in use due to screen problems, or were drilled as test wells during new well construction (table 2). As long as these wells are sealed with a tight cap, and the pumps are exercised regularly they pose little threat to the production wells. However, unused wells, with loose caps, no pumps or with no potential for use in the future should be rectified or permanently abandoned and sealed by a licensed well driller because they represent a pathway for contamination to the deep aquifer. Wells that are properly grouted and without pumps may be useful for long-term monitoring. Access to such wells should be restricted through locked caps and/or other security measures.

HYDROGEOLOGY

Ground water flows through pores between gravel, sand and silt grains in unconsolidated sedimentary rock aquifers such as those used by the community water systems in Anne Arundel County. An aquifer is any formation that is capable of yielding a significant amount of water. The transmissivity is a measure of the amount of water an aquifer is capable of producing and is related to the hydraulic conductivity and the thickness of the aquifer. A confining layer is generally composed of fine material such as clay and silt, which transmits relatively very little water. Confined aquifers are those formations that are overlain by a confining unit. Confined aquifers are recharged from the water stored in the confining unit above and from precipitation that infiltrates into the formation where it is exposed at the surface.

Anne Arundel County lies within the Atlantic Coastal Plain physiographic province. This province, which in Maryland includes roughly the area east of Interstate 95, is underlain by unconsolidated clastic sediments of Lower Cretaceous to recent age, which thicken to the southeast so that they appear wedge-shaped. These sediments crop out in a concentric band that lies parallel to the Fall Line which marks the western boundary of the Coastal Plain. The community water systems pump water from four confined aquifers known as the Aquia, Magothy, Patapsco and Patuxent Formations. The Aquia Formation is the shallowest and youngest in age with the Patuxent Formation being the deepest and the oldest. These aquifers have been studied considerably and hydrologic, lithologic and geochemical data is available in several Maryland Geological Survey reports (1962, 1974, 1976, 1984, 1986, 1991 and 1995). The descriptive material below is summarized from these reports and the reader is referred to them for further information.

Aquia Formation

The Aquia Formation is the aquifer of use by six of the community systems all located in the southern part of the county. The Aquia Formation crops out over a wide area in central Anne Arundel County. The thickness of the Aquia Formation ranges from 100 to 135 feet. The base of the formation ranges from about sea level near Annapolis to about 125 feet below sea level, at the southern end of the Mayo Peninsula. The lithology consists of medium- to coarse-grained, glauconitic quartz sand interbedded with thin layers of silt and iron-cemented sandstone. Based on an aquifer test in Annapolis Neck, the transmissivity was calculated to be in the range of 1,800 to 5600 ft²/day. In southern Anne Arundel County where the aquifer is confined, the Aquia Formation is overlain by the Marlboro Clay.

Magothy Formation

The Magothy Formation is the aquifer of use by ten of the community systems. The Magothy Formation dips southeastward across the county at about 30 to 35 feet per mile. The thickness of the Magothy Formation is about 80 feet near Severndale, whereas near Shadyside the thickness of the formation increases to about 200 feet. The Magothy Formation is a fluviomarine deposit consisting of medium-to-coarse

sand and black-to-gray, lignitic clay. Aquifer tests conducted in the county suggest that transmissivity for the Magothy aquifer ranges from 1,00 to 12,000 ft²/day. The Magothy is overlain by layer of dark clay of the Mattawan Formation which forms a confining unit for the aquifer.

Patapsco Formation

The Patapsco Formation is used as an aquifer by six of the community systems assessed in this report. The Patapsco Formation crops out over a wide area of north-central Anne Arundel County. This formation consists of irregularly stratified interbedded, variegated (gray, brown and red) silt and clay and argillaceous (clayey), subrounded, fine to medium-grained quartzose sand with minor amounts of gravel. The top of the formation dips about 40 feet to the mile in a southeasterly direction. In Anne Arundel County the elevation of the top of the formation ranges from about 200 feet above sea level in the outcrop area to 700 ft below sea level in the southeastern part of the county. The transmissivity of the Patapsco Formation ranges from 700 to 6700 ft²/day. The Patapsco Formation is divided into the upper and lower Patapsco aquifers. The two are separated by confining layer of low permeable clay. Two of the systems located in the northwestern portion of the county pump water from the lower Patapsco aquifer with the remaining four pumping from the upper Patapsco aquifer.

Patuxent Formation

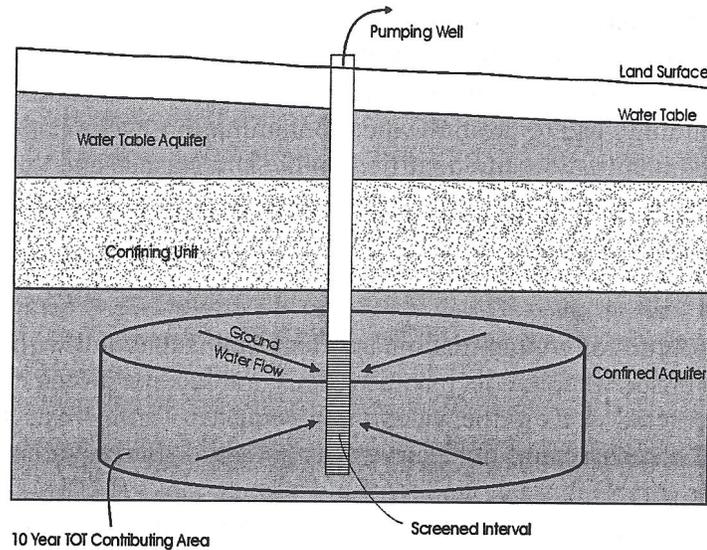
The Patuxent Formation is the deepest and oldest aquifer in Anne Arundel County and is used by four of the community systems. The top of the aquifer varies in depth from about sea level at Indian Head to about 1500 feet below sea level in southeastern Anne Arundel County. The Patuxent Formation consists of irregularly stratified, cross-bedded and lenticular white or light gray to orange-brown, moderately sorted, angular sands and subrounded quartz gravels with gray to ochreous silt and clay beds occurring locally in amounts ranging from less than 25 percent to greater than 75 percent of the formation. The Patuxent Formation is overlain by the Arundel Clay. The Arundel Clay is a dense reddish-brown low permeability clay, interbedded with thin layers of sand.

SOURCE WATER ASSESSMENT AREA DELINEATION

For ground water systems, a Wellhead Protection Area (WHPA) is considered to be the source water assessment area for the system. The WHPAs were delineated using the methodology described in Maryland's Source Water Assessment Plan (MDE, 1999) for confined aquifers in the Coastal Plain, often referred to as the "Florida Method". The area is a radial zone of transport within the aquifer and is based on a 10-yr time of travel (TOT), the pumping rate and the screened interval(s) of the well or wells included in the WHPA, and the porosity of the aquifer (see illustration below for conceptual model). The Florida Method is a modification of Darcy's Law for radial flow to a well and the WHPA's were calculated using the following volumetric equation:

$$r = \sqrt{\frac{Qt}{\pi nH}}$$

- where r = calculated fixed radius (ft)
 Q = pumping rate of well (ft³/yr)
 t = time of travel (yr.)
 n = aquifer porosity (dimensionless)
 H = length of well screen (ft)



Conceptual illustration of a zone of transport for a confined aquifer

Table 3 gives the values used and the calculated radius for each water system's WHPA. The pumping rate (Q) used is generally the permitted daily average. If a water system has more than one well, the wells usually alternate pumpage. Therefore, the total appropriated amount was used in the calculation for each well, since, in theory each well is producing a zone of transport based on the average pumping rate. In some cases, the permitted amount was split between wells that do not alternate and are a significant distance apart, thus the permitted amount was divided amongst the wells based on pumping records for the last year.

A conservative estimate of porosity (n) of 25% was used for each of the aquifers based on published reports. The lengths of the well screens (H) were obtained from well completion reports. In the instance that there were multiple screens, the sum of the individual screen lengths was used. Using these parameters the radius was calculated with the above equation for the WHPA delineation (table 3). Circles around each of the wells the appropriate calculated radius represents the WHPA and are shown in figure 2. The circles represent the aquifer zone of transport in the subsurface as illustrated above.

POTENTIAL SOURCES OF CONTAMINATION

In confined aquifer settings, sources of contamination at land surface are generally not a threat unless there is a pathway for direct injection into the deeper aquifer such as through unused wells or along well casings that are not intact or have no grout seal.

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 land use practices that may lead to ground water contamination over a larger area. All potential sources of contamination are identified at the land surface and therefore have the potential to impact only the shallow water table aquifer. Therefore, as long as there is no potential for direct injection into the deeper confined aquifers, the water supply used by the community systems should be well protected from ground water contamination.

Potential point sources of contamination are identified if they fall within the WHPA for awareness and to ensure that the deep aquifer does not become affected by unused wells or poorly constructed wells in the water supply aquifer. Table 4 lists the facilities identified from MDE databases and field surveys as potential sources of contamination and their locations are shown in Figure 2. Underground storage tanks (USTs) sites are facilities that store petroleum/heating oil in site in underground tanks registered with MDE's Waste Management Administration. Controlled Hazardous Substance Generators (CHS) are facilities that may use or store any hazardous substance on site. Ground Water Discharge Permits (GWD) are issued by MDE's Water Management Administration for discharge of wastewater to ground water.

The contaminants associated with the types of facilities are based on generalized categories and often the potential contaminant depends on the specific chemicals and processes being used at the individual facility. The potential contaminants for an activity may not be limited to those listed in Table 4. Potential contaminants are grouped as Volatile Organic Compounds (VOC), Synthetic Organic Compounds (SOC), Heavy Metals (HM), Radionuclides (R) and Microbiological Pathogens (MP).

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 the MCL, this report 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. Table 5 summarizes the various treatment methods used at the water treatment plants for each of the twenty-four community water systems.

A review of the monitoring data for the twenty-four systems indicates that currently the water supplies meet the drinking water standards. Table 6 summarizes the water quality results for each of the water systems by contaminant group.

Inorganic Compounds (IOCs)

IOCs that were detected at or above 50% of their MCLs at least one time in the water supply are shown in Table 7a. A review of the data shows that shows that eight systems had one detect of one of the following IOCs - arsenic, antimony, nitrate, selenium, thallium and lead (table 7a). Cadmium was detected one time in Crownsville's water supply and twelve times in The Provinces water supply. Eleven of the cadmium detections from the Provinces water supply exceeded the MCL of 0.005 mg/l. The source of these samples was raw water from Well No. 1. At the request of the system, MDE granted permission for use of this well provided its was used in combination with the other wells, and its pumpage did not exceed 38% of the total pumpage. The blended water meets the MCL for cadmium.

Fourteen of the systems have iron removal treatment due to high iron in the raw water. Raw water data was not readily accessible to determine the actual levels of iron. Iron has a secondary MCL of 0.3 mg/l based on taste, color and odor problems in drinking water as well as iron bacteria build-up around the well screen.

Radionuclides

Gross alpha was reported above 50% of the MCL in four of the systems assessed in this report (table 7b). Gross alpha is a measure of alpha radiation, which is emitted from certain radioactive minerals like radium-226 and radium-224 found in the aquifer sediments. The requirement for meeting the MCL of 15 pCi/L for gross alpha is that the average of four quarterly samples must be below that level. Radium-224 decays in a very short period (3.64 days), hence in order to determine its presence, short-term alpha measurements were also conducted on samples from Crownsville State Hospital. Gross beta was reported above 50% of the MCL in one system. Gross beta is a measure of the emission from radioactive radium-228, as well as other beta emitters.

Radium-226 and radium-228 were detected at one system above 50% of the MCL.

Radon-222 was reported above 150 pCi/L in five of the community water systems assessed in this report (table 7b). 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 health effects of radon found at levels in ground water are negligible compared to breathing radon. Since an MCL has not been finalized, this report considers the lowest proposed MCL of 300 pCi/L, in an effort

to be more conservative and protective of public health. All the levels reported in table 7c are well below 50% of the higher proposed MCL of 4000 pCi/L.

Volatile Organic Compounds (VOCs)

A review of the data shows that the only VOC detected above 50% of the MCL was carbon tetrachloride from a sample taken on October 16, 1990 from PWSID 0020223. This sample was invalidated due to contamination in the laboratory. Other VOCs like trihalomethanes, which are disinfection by-products have been detected at low levels in several systems.

Synthetic Organic Compounds (SOCs)

A review of the data shows that di(2-ethylhexyl)phthalate is the only SOC detected above 50% of the MCL in one time in two systems (figure 7c). Phthalate was also found in the laboratory blanks and hence does not represent the water quality of the systems. Polychlorinated biphenyls (PCBs), dicamba and 2,4-D have been detected at very low levels one time in three different systems. Subsequent sampling showed no detects of these SOCs.

Microbiological Contaminants

Routine bacteriological monitoring is conducted in the finished water for each water system on a monthly basis and measures total coliform bacteria. Since all the twenty-two systems disinfect their water at the treatment plant, the finished water data does not give much indication of the quality of raw water directly from the well. Total coliform bacteria are not pathogenic, but are used as an indicator organism for other disease-causing microorganisms. A major breach of the system or the aquifer would likely cause a positive total coliform result despite disinfection and would require followup total and fecal coliform analysis. Ten water systems had positive total coliform in their routine bacteriological samples (table 8). Followup sampling conducted on all these systems showed no detections of total coliform.

SUSCEPTIBILITY ANALYSIS

The wells serving the community water systems included in Anne Arundel County pump water from confined aquifers. Confined aquifers are naturally well protected from activity on the land surface due to the confining layers that provide a barrier for water movement from the surface into the aquifer below. A properly constructed well with the casing extended to the confining layer above the aquifer and with sufficient grout should be well protected from contamination at the land surface. The only instance in which a contaminant at the surface would impact the water supply is through direct injection into the aquifer from within the WHPA. This could occur via poorly constructed wells, wells out of use that penetrate the aquifer and underground injection wells drilled into the aquifer.

Some contaminants like radionuclides and other chemical elements (eg. radionuclides and iron) are naturally occurring in the aquifer and in some instances can

reach concentrations that pose a risk to the water supply. In the case of confined aquifers, this is generally more problematic than contaminants at the land surface.

The susceptibility of the source water to contamination is determined for each group of contaminants based on the following criteria: 1) the presence of natural and anthropogenic contaminant sources within the WHPA, 2) water quality data, 3) well integrity, and 4) the aquifer conditions. The susceptibility analysis is summarized for each water system in table 9.

Inorganic Compounds

Inorganic compounds that were detected only one time above 50% of the MCL in different systems were arsenic, antimony, nitrate, thallium, selenium and lead (table 7a). Cadmium was detected only one time at Crownsville State Hospital and several times in the Provinces water supply. Cadmium has an MCL of 0.005 mg/l and was detected above the MCL in Province's Well No.1 raw water. This was the only well in the system that had high levels of cadmium. Cadmium is a naturally occurring mineral and is can also be produced from corrosion of galvanized pipes, metal refinery discharges, and runoff from paints and batteries. The most likely source for cadmium in Province's water supply is from the aquifer sediments, no other sources have been determined. Nitrate is usually not found in confined aquifers at levels greater than 1 mg/l. The nitrate detected in Rio Vista MHP was from an older shallow well which is not longer in service. The nitrate from LakeVillage Townhomes may be the result of well construction defects like casing and grout which may be allowing surface contamination to get into the aquifer.

Due to the naturally protected characteristics of the confined aquifers, the water quality data, and the lack of potential sources of contamination, ten of the community water systems are considered **not** susceptible to inorganic compounds. The Provinces water supply is susceptible to cadmium, based on detections of this compound in Well 1.

Based on the natural occurrence of iron at certain locations within the aquifers and treatment for iron removal, fourteen community systems (see table 9) **may be** susceptible to iron.

Radionuclides

The source of radionuclides in ground water can be traced back to the natural occurrence of uranium and thorium in rocks. Radionuclides are present in ground water due to radioactive decay of uranium and thorium bearing minerals in the sediment that makes up the aquifer material.

Gross alpha radiation was detected in four systems, and radium and gross beta radiation in one system, at above 50% of their MCLs (table 7b).

There is currently no MCL for radon-222, however EPA has proposed an MCL of 300 pCi/L or an alternate of 400 pCi/L if the State has program to address the more

significant risk from radon in indoor air. Using the more conservative lower proposed MCL, five systems had radon levels greater than 50% of 300 pCi/L. Currently, it appears that these five systems may be susceptible to radon if the lower standard is adopted.

Based on the natural occurrence of radionuclides in the aquifer and water quality data, four systems are considered **susceptible** to radiological contaminants. If the lower proposed MCL of 300 pCi/L for radon –222 is taken in to account, an additional five systems **may be susceptible** to radiological contaminants.

Volatile Organic Compounds

Carbon tetrachloride was the only VOC detected one time at 50% of the MCL in one system. This sample was invalidated because of laboratory contamination. Sources of VOCs are present in the WHPAs of several systems (figures 2a-2h), but the water supplies are protected from these contaminants due to the confined nature of the aquifers. Water quality data supports the protective nature of the aquifers.

Based on the above discussion, the community systems are **not susceptible** to contamination by VOCs.

Synthetic Organic Compounds

Di (2-ethylhexyl) phthlate was the only SOC detected one time in two different systems. Phthlate was also found in the laboratory blanks and does not represent the water quality in the systems. The systems have all been issued a confined waiver for monitoring for SOCs. SOC sources are generally pesticides and herbicides and some industrial solvents. Due to the confined nature of the aquifer, these sources do not pose a threat to the water supply.

Based on lack of contaminant sources, water quality data and aquifer type, the water supplies are **not susceptible** to SOCs.

Microbiological Contaminants

Raw water monitoring for microbiological contaminants is not required of water systems in confined aquifers because they are considered naturally protected from sources of pathogens at the land surface. The ten systems had positive total coliform from routine sampling, but repeat sampling showed no detections. Therefore, the community water systems are **not susceptible** to microbiological contaminants.

MANAGEMENT OF THE SOURCE WATER ASSESSMENT AREA

With the information contained in this report, the individual community water systems in Anne Arundel County are in a position to protect their water supplies by staying aware of the areas delineated for source water protection. Specific management recommendations for consideration are listed below:

Public Awareness and Outreach

- The Consumer Confidence Report should report should list that this report is available to the general public through their county library, or by contacting the operator or MDE.

Monitoring

- Continue to monitor for all required Safe Drinking Water Act contaminants
- Annual raw water bacteriological testing is a good check on well integrity.

Contaminant Source Inventory Updates

- Conduct a survey of the WHPA and inventory any potential sources of contamination, including unused wells, that may not have been included in this report. Keep records of new development within the WHPA and new potential sources of contamination that may be associated with the new use.

Well Inspection/Maintenance

- Work with the County Health Department to ensure that there are no unused wells within the WHPA. An improperly abandoned well can be a potential source of contamination to the aquifer. All unused wells must be abandoned and seal as per State well construction regulations.
- Water operation personnel should have a program for periodic inspections and maintenance of the supply wells and backup wells to ensure their integrity and protect the aquifer from contamination.

Changes in Use

- Water system owners are required to notify the MDE Water Supply Program if new wells are to be added or if they wish to increase their water useage. An increase in use or the addition of new wells may require revisions to the WHPA.

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Wilson, J. M., and Achmad, G., 1995, Delineation of wellhead protection areas using particle tracking analysis and hydrogeologic mapping, northern Anne Arundel County, Maryland: Maryland Geological Survey Report of Investigations No. 61, 122 p.

U.S. Environmental Protection Agency, 1991, Wellhead protection strategies for confined-aquifer settings: Office of Ground Water and Drinking Water, EPA/570/9-91-008, 168 p.

OTHER SOURCES OF DATA

Water Appropriation and Use Permits
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
USGS Topographic 7.5 Minute Quadrangles for Anne Arundel County

TABLES

PWSID	System Name	Plant ID	Source ID	Use Code	Well Name	WAPID	Average GPD	Well Permit No.	Well Depth	Casing Depth	Year Drilled	Aquifer
0020008	CROFTON-ODENTON	01	01	S	CROFTON MEADOWS 1	AA1972G005	2500000	AA730086	1150	930	1973	PATUXENT FORMATION
			02	S	CROFTON MEADOWS 2	AA1972G005	2500000	AA730087	1262	1027	1973	PATUXENT FORMATION
			03	P	CROFTON MEADOWS 3	AA1972G005	2500000	AA732802	1000	930	1973	PATUXENT FORMATION
			04	P	CROFTON MEADOWS 4	AA1972G105	3200000	AA817313	728	646	1987	PATAPSCO FORMATION
			05	S	CROFTON MEADOWS 5	AA1972G105	3200000	AA817314	620	520	1987	PATAPSCO FORMATION
0020009	CROWNSVILLE STATE HOSPITAL	01	13	P	CROFTON MEADOWS2, #7	AA1972G005	2500000	AA941172	1195	925	1997	PATUXENT FORMATION
			14	P	CROFTON MEADOWS2, #6	AA1972G105	3200000	AA941174	705	525	1998	PATAPSCO FORMATION
			15	P	CROFTON MEADOWS 2, #8	AA1972G105	3200000	AA941173	755	580	1997	PATAPSCO FORMATION
			16	P	CROFTON MEADOWS 2, #9	AA1972G005	2500000	AA941175	1245	1000	1997	PATUXENT FORMATION
0020011	EPPING FOREST	01	01	P	C S H 1A	AA1954G001	215000	AA880055	267	244	1988	MAGOTHY FORMATION
			02	P	C S H 3	AA1954G001	215000	AA012737	285	255	1953	MAGOTHY FORMATION
			04	P	C S H 4A	AA1954G001	215000	AA885093	312	152	1990	MAGOTHY FORMATION
			05	P	C S H 5	AA1954G001	215000	AA042495	269	244	1961	MAGOTHY FORMATION
			02	P	EPPING FOREST 2	AA1986G028	42000	AA731300	105	85	1973	MAGOTHY FORMATION
0020013	GIBSON ISLAND	01	03	P	EPPING FOREST 3	AA1986G028	42000	AA947471	202	176	2002	MAGOTHY FORMATION
			01	P	GIBSON ISLAND 1	AA1971G034	110000	AA737258	322	263	1977	PATAPSCO FORMATION
0020019	LAKE VILLAGE TOWNHOMES	01	03	P	GIBSON ISLAND 3	AA1971G034	110000	AA887380	325	252	1992	PATAPSCO FORMATION
			01	P	LAKE VILLAGE WELL 1	AA1973G025	160000	AA731957	333	270	1974	PATUXENT FORMATION
0020029	THE PROVINCES	01	01	S	PROVINCES 2	AA1970G046	415000	AA711090	556	510	1971	PATUXENT FORMATION
			02	P	PROVINCES 3	AA1970G046	415000	AA711103	526	491	1971	PATUXENT FORMATION
			03	P	PROVINCES 1	AA1970G046	415000	AA887622	540	470	1992	PATUXENT FORMATION
0020030	ROSE HAVEN	02	03	P	ROSE HAVEN 1	AA1948G001	80000	AA947539	350	260	2002	AQUIA FORMATION
			04	P	ROSE HAVEN 2	AA1948G001	80000	AA947540	353	313	2002	AQUIA FORMATION
0020035	SHERWOOD FOREST WATER COMPANY	01	01	P	SHERWOOD FOREST 1	AA1963G029	100000	AA055132	175	140	1964	MAGOTHY FORMATION
			02	P	SHERWOOD FOREST 2	AA1963G029	100000	AA810866	154	122	1982	MAGOTHY FORMATION
0020037	SYLVAN SHORES	01	01	P	SYLVAN SHORES 2	AA1956G002	55000	AA889823	325	290	1993	MAGOTHY FORMATION
			04	P	USNA 15	AA1932G003	2000000	AA814345	593	498	1985	PATAPSCO FORMATION
			05	P	USNA 16	AA1932G003	2000000	AA884329	598	493	1990	PATAPSCO FORMATION
0020042	U.S. NAVAL ACADEMY	01	06	P	USNA 17	AA1932G003	2000000	AA940548	693	493	1996	PATAPSCO FORMATION
			01	P	HERALD HARBOR 1	AA1982G031	110000	AA736871	726	645	1977	PATAPSCO FORMATION
0020044	HERALD HARBOR	01	02	P	HERALD HARBOR 2	AA1982G031	110000	AA736872	716	656	1977	PATAPSCO FORMATION
			01	P	MAGOTHY WELL	AA1997G027	3200	AA941923	142	132	1997	MAGOTHY FORMATION

Table 2. Well Information

PUBLIC WATER SYSTEM ID (PWSID)	SYSTEM NAME	POPULATION SERVED	OWNER/OPERATOR TYPE
0020008	CROFTON-ODENTON	33,415	LOCAL GOVERNMENT
0020009	CROWNSVILLE STATE HOSPITAL	1,586	STATE
0020011	EPPING FOREST	500	INVESTOR/TRUST/WATER ASSOCIATION
0020013	GIBSON ISLAND	800	LOCAL GOVERNMENT
0020019	LAKE VILLAGE TOWNHOMES	2,400	INVESTOR/TRUST/WATER ASSOCIATION
0020029	THE PROVINCES	3,991	INVESTOR/TRUST/WATER ASSOCIATION
0020030	ROSE HAVEN	480	LOCAL GOVERNMENT
0020035	SHERWOOD FOREST WATER COMPANY	1,153	INVESTOR/TRUST/WATER ASSOCIATION
0020037	SYLVAN SHORES SERVICES CO.	700	INVESTOR/TRUST/WATER ASSOCIATION
0020042	U.S. NAVAL ACADEMY	8,700	FEDERAL
0020044	HERALD HARBOR	2,300	LOCAL GOVERNMENT
0020059	TEBBSTON ON MAGOTHY	52	INVESTOR/TRUST/WATER ASSOCIATION
0020204	KNOLLWOOD MANOR	160	INVESTOR/TRUST/WATER ASSOCIATION
0020205	BELLS TRAILER PARK	150	INVESTOR/TRUST/WATER ASSOCIATION
0020211	HOLIDAY MOBILE ESTATES, INC.	900	INVESTOR/TRUST/WATER ASSOCIATION
0020213	LYONS CREEK ESTATES	750	INVESTOR/TRUST/WATER ASSOCIATION
0020214	MARYLAND MANOR M.H.P.	810	INVESTOR/TRUST/WATER ASSOCIATION
0020217	PATUXENT MOBILE ESTATES	450	INVESTOR/TRUST/WATER ASSOCIATION
0020218	RIO VISTA PLAZA M.H.P.	150	INVESTOR/TRUST/WATER ASSOCIATION
0020221	SUMMERHILL M.H.P.	217	INVESTOR/TRUST/WATER ASSOCIATION
0020223	WAYSON'S MOBILE COURT	540	INVESTOR/TRUST/WATER ASSOCIATION
0020224	WELSH'S TRAILER PARK	50	INVESTOR/TRUST/WATER ASSOCIATION
0020231	BOONES MOBILE ESTATES	650	INVESTOR/TRUST/WATER ASSOCIATION
0020234	MILLENIUM HEALTH AND REHAB - SOUTH RIVER	240	INVESTOR/TRUST/WATER ASSOCIATION

Table 1. Community Water Systems (confined) in Anne Arundel County

PWSID	System Name	Plant ID	Source ID	Use Code	Well Name	WAPID	Average GPD	Well Permit No.	Well Depth	Casing Depth	Year Drilled	Aquifer
0020204	KNOLLWOOD MANOR	01	03	P	KNOLLWOOD C	AA1998G003	4300	AA941048	260	235	1996	PATAPSCO FORMATION
0020205	BELLS TRAILER PARK	01	02	S	BELLS 2	AA1967G006	9700	AA734137	141	136	1975	PATAPSCO FORMATION
			03	P	BELLS 3	AA1967G006	9700	AA816970	256	251	1986	PATAPSCO FORMATION
0020211	HOLIDAY MOBILE ESTATES, INC.	01	01	P	HOLIDAY WELL 1R	AA1963G008	125000	AA922195	307	277	1994	PATUXENT FORMATION
			02	P	HOLIDAY WELL 2R	AA1963G008	125000	AA88277	275	240	1992	PATUXENT FORMATION
0020213	LYONS CREEK ESTATES	01	01	S	LYONS CREEK 1	AA1966G055	38000	AA661582	284	284	1966	AQUIA FORMATION
			02	P	LYONS CR 2	AA1992G022	38000	AA730144	466	451	1972	MAGOTHY FORMATION
0020214	MARYLAND MANOR M.H.P.	01	02	P	MD MANOR 2	AA1965G032	80000	AA735963	285	255	1976	MAGOTHY FORMATION
			03	P	MD MANOR 3	AA1965G032	80000	AA882904	297	277	1989	MAGOTHY FORMATION
			04	S	MD MANOR 4	AA1965G032	80000	AA943435	439	277	1999	MAGOTHY FORMATION
0020217	PATUXENT MOBILE ESTATES	01	01	P	PATUXENT MHP 1	AA1973G013	40000	AA741853	335	325	1980	MAGOTHY FORMATION
			02	P	PATUXENT MHP 2	AA1973G013	40000	AA940921	400	395	1997	MAGOTHY FORMATION
0020218	RIO VISTA PLAZA M.H.P.	01	02	P	NEW WELL	AA1986G045	10000	AA943890	180	160	1999	AQUIA FORMATION
0020221	SUMMERHILL M.H.P.	01	02	P	SUMMERHILL 2	AA1960G021	25000	AA812759	210	203	1984	MAGOTHY FORMATION
			03	P	SUMMERHILL 1	AA1960G021	25000	AA813587	212	205	1984	MAGOTHY FORMATION
0020223	WAYSON'S MOBILE COURT	01	01	P	WAYSONS 1	AA1960G008	47000	AA880718	157	137	1988	AQUIA FORMATION
			02	P	WAYSONS 2	AA1960G008	47000	AA888187	153	127	1992	AQUIA FORMATION
			03	P	WAYSONS 3	AA1960G008	47000	AA930373	156	136	1995	AQUIA FORMATION
			04	P	WAYSONS 4	AA1960G008	47000	AA814346	124	109	1985	AQUIA FORMATION
0020224	WELSH'S TRAILER PARK	01	01	P	WELSH'S TP	AA1954G016	5100	AA883090	100	159	1989	PATAPSCO FORMATION
0020231	BOONES MOBILE ESTATES	01	01	P	TOWER WELL	AA1976G014	75000	AA733368	235	205	1975	AQUIA FORMATION
			03	P	WWTP WELL	AA1976G014	75000	AA813583	223	160	1985	AQUIA FORMATION
			04	P	TENNIS COURT WELL	AA1976G014	75000	AA947668	265	200	2002	AQUIA FORMATION
0020234	MILLENIUM HEALTH AND REHAB - SOUTH RIVER	01	01	+	PLNH 1	AA1981G039	14000	AA940827	304	297	1996	MAGOTHY FORMATION
			02	P	PLNH 2	AA1981G039	14000	AA818744	245	235	1987	MAGOTHY FORMATION

Table 2 (contd). Well Information

WATER SUPPLY PROGRAM DATABASE FIELD NAMES:

PWSID = Public Water System ID Number
 PLANT ID = Water Treatment Plant ID Number
 SOURCE ID = Unique Identifier Number for Well
 USE CODE: P = Production, S = Standby
 WAPID = Water Appropriation Permit Number
 AVE GPD = Average Gallons Per Day (permitted)

PWSID	System Name	Source Name	Well Pumpage (Q) in gpd	Well Pumpage (Q) in ft ³ /yr	Screened Interval in feet	Calculated Radius for WHPA in feet	Acreeage of WHPA	Comments on WHPA
0020008	CROFTON-ODENTON	CROFTON MEADOWS 1	83333.33	4065855.561	100	800	45.923	Wells 1,2,3 & 7 circles merged
		CROFTON MEADOWS 2	83333.33	4065855.561	110	700		
		CROFTON MEADOWS 3	83333.33	4065855.561	100	800		
		CROFTON MEADOWS2, # 7	106666.67	4065855.561	205	600		
		CROFTON MEADOWS 4	106666.67	5204295.489	66	1100		
		CROFTON MEADOWS 5	83333.33	5204295.489	37	1400		
		CROFTON MEADOWS2, #6	106666.67	5204295.489	117	800		
		CROFTON MEADOWS 2, # 8	106666.67	5204295.489	130	800		
		CROFTON MEADOWS 2, #9	83333.33	4065855.561	135	700		
0020009	CROWNSVILLE STATE HOSPITAL	C S H 1A	53750	2622476.942	23	1300	121.267	Wells 1A, 3, 4A & 5 circles merged
		C S H 3	53750	2622476.942	30	1100		
		C S H 4A	53750	2622476.942	25	1200		
		C S H 5	53750	2622476.942	23	1300		
		EPHING FOREST 2	21000	1024595.642	17	900		
0020011	EPHING FOREST	EPHING FOREST 3	21000	1024595.642	16	1000	71.7555	Wells 2 & 3 circles merged
		GIBSON ISLAND 1	55000	2683464.777	26	1200		
0020013	GIBSON ISLAND	GIBSON ISLAND 3	55000	2683464.777	50	900	103.28	Wells 1 & 2 circles merged
0020019	LAKE VILLAGE TOWNHOMES	LAKE VILLAGE WELL 1	160000	7806442.989	40	1600	183.694	
0020029	THE PROVINCES	PROVINCES 2	302950	14781011.9	56	1900	347.296	Wells 1, 2 & 3 circles merged
		PROVINCES 3	302950	14781011.9	45	2100		
		PROVINCES 1	112050	5466949.606	70	1000		
0020030	ROSE HAVEN	ROSE HAVEN 1	80000	3903221.494	35	1200	103.328	Wells 1 & 2 circles merged
		ROSE HAVEN 2	80000	3903221.494	35	1200		
0020035	SHERWOOD FOREST WATER COMPANY	SHERWOOD FOREST 1	100000	4879026.868	35	1400	232.488	Wells 1 & 2 circles merged
		SHERWOOD FOREST 2	100000	4879026.868	20	1800		
0020037	SYLVAN SHORES SERVICES CO.	SYLVAN SHORES 2	76000	3708060.42	35	1200	103.328	
0020042	U.S. NAVAL ACADEMY	USNA 15	666666.67	32526845.95	95	2100	362.391	Wells 15, 16 & 17 circles merged
		USNA 16	666666.67	32526845.95	100	2100		
		USNA 17	666666.67	32526845.95	93	2200		
0020044	HERALD HARBOR	HERALD HARBOR 1	55000	2683464.777	34	1100	86.824	Wells 1 & 2 circles merged
		HERALD HARBOR 2	55000	2683464.777	42	1000		
0020059	TEBBSTON ON MAGOTHY	MAGOTHY WELL	3200	156128.8598	10	500	17.939	
0020204	KNOLLWOOD MANOR	KNOLLWOOD C	4300	209798.1553	20	400	11.481	

Table 3. Parameters used for WHPA delineations

PWSID	System Name	Source Name	Well Pumpage (Q) in gpd	Well Pumpage (Q) in ft ³ /yr	Screened Interval in feet	Calculated Radius for WHPA in feet	Acreage of WHPA	Comments on WHPA
0020205	BELLS TRAILER PARK	BELLS 2	9700	473265.6062	5	1100	86.824	Wells 2 & 3 circles merged
		BELLS 3	9700	473265.6062	5	1100		
0020211	HOLIDAY MOBILE ESTATES, INC.	HOLIDAY WELL 1R	125000	6098783.585	20	2000	207.373	Wells 1R & 2R circles merged
		HOLIDAY WELL 2R	125000	6098783.585	30	1700		
0020213	LYONS CREEK ESTATES	LYONS CREEK 1	38000	1854030.21	20	1100	86.824	
		LYONS CR 2	38000	1854030.21	15	1300	121.267	
0020214	MARYLAND MANOR M.H.P.	MID MANOR 2	40000	1951610.747	30	1000		Wells 2, 3 & 4 circles merged
		MID MANOR 3	40000	1951610.747	20	1200	103.328	
		MID MANOR 4	40000	1951610.747	31	900		
0020217	PATUXENT MOBILE ESTATES	PATUXENT MHP 1	40000	1951610.747	10	1600	379.586	Wells 1 & 2 circles merged
		PATUXENT MHP 2	40000	1951610.747	5	2300		
0020218	RIO VISTA PLAZA M.H.P.	NEW WELL	10000	487902.6868	20	600	25.832	
0020221	SUMMERHILL M.H.P.	SUMMERHILL 2	25000	1219756.717	7	1500	161.450	Wells 1 & 2 circles merged
		SUMMERHILL 1	25000	1219756.717	7	1500		
		WAYSONS 1	11750	573285.657	20	700		
		WAYSONS 2	11750	573285.657	21	600		
		WAYSONS 3	11750	573285.657	20	700	35.160	Wells 1, 2, 3, & 4 circles merged
		WAYSONS 4	11750	573285.657	15	700		
0020224	WELSH'S TRAILER PARK	WELSH'S TP	5100	248830.3703	5	800	45.923	
		TOWER WELL	25000	1219756.717	30	800		
0020231	BOONES MOBILE ESTATES	TENNIS COURT WELL	25000	1219756.717	45	600	45.923	Tower & Tennis Court Wells circles merged
		WWTP WELL	25000	1219756.717	45	600	25.832	
0020234	MILLENNIUM HEALTH AND REHAB - SOUTH RIVER	PLNH 1	14000	683063.7615	7	1200	103.328	Wells 1 & 2 circles merged
		PLNH 2	14000	683063.7615	10	1000		

Table 3 (contd). Parameters used for WHPA delineations

ID*	Type	Facility Name	Address	Reference Location*	WHPA System Name	Poetential Contaminants	Remarks
1	UST	Crofton Meadows Elementary School	2020 Tighman Dr.	2a	Crofton Odenton	VOC	1 tank
2	CHS	Crowsville Hospital	1520 Crowsville Rd.	2b	Crowsville Hospital	VOC, HM, SOC, R	
3	GWD	Crowsville Hospital	1520 Crowsville Rd.	2b	Crowsville Hospital	NN, MP	
4	CHS	One Hour Martinizing	2649 E. Ridgeview Plaza	2c	The Provinces	VOC	
5	CHS	Verizon	Fort Meade	2c	The Provinces	SOC, VOC	
6	UST	Fort Meade Texaco # 650	2631 Annapolis Rd.	2c	The Provinces	VOC	3 tanks
7	UST	Exxon # 27414	7910 Ridge Rd.	2c	The Provinces	VOC	4 tanks
8	CHS	Riva VFD	3123 Riva Rd.	2d	Sylvan Shores	VOC	
9	CHS	Sylvan Shores	Orchard Rd.	2d	Sylvan Shores	VOC, SOC	
10	UST	Gibsons Citgo	210 Ridgely Ave.	2e	US Naval Academy	VOC	3 tanks
11	UST	MD State Police Barracks "J"	610 Taylor Ave	2e	US Naval Academy	VOC	1 tank
12	UST	MD Office of Publications Bldg.	29 Saint John St.	2e	US Naval Academy	VOC	5 tanks
13	UST	Ancient City Lodge # 175	91 Northwest St	2e	US Naval Academy	VOC	1 tank
14	CHS	Norge Laundry & Dry Cleaning	Taylor Ave. & Rowe Blvd.	2e	US Naval Academy	VOC	
15	CHS	MD Dept. of Natural Resources	580 Taylor Ave.	2e	US Naval Academy	VOC, SOC	
16	CHS	MD Office of Publications Bldg.	29 Saint John St.	2e	US Naval Academy	VOC, SOC, HM	
17	CHS	Maryland Environmental Service	Rowe Blvd.	2e	US Naval Academy	VOC,	
18	CHS	Verizon	9 Northwest St.	2e	US Naval Academy	SOC, VOC	
19	CERCLA	Annapolis Plant (MD-063)	Calvert & Saint John St.	2e	US Naval Academy	VOC, SOC, HM	
20	CERCLA	US Naval Academy	Off King's St.	2e	US Naval Academy	VOC, SOC, HM	
21	UST	Knollwood Manor Nursing Home	899 King's Street	2f	Knollwood Manor	VOC	2 tanks
22	UST	Millersville Student Services	1681 Millersville Rd	2f	Knollwood Manor	VOC	1 tank
23	UST	Maryland Manor MHP	1500 Berkley Ct.	2g	Maryland Manor	VOC	1 tank
24	UST	Edgewater Elementary School	121 Washington Rd.	2h	Millenium Health	VOC	1 tank
25	UST	Lee Airport	3090 Solomons Island Rd.	2h	Millenium Health	VOC	1 tank
26	UST	Edgewater Xtra Mart	3078 Solomons Island Rd.	2h	Millenium Health	VOC	5 tanks
27	UST	Edgewater Texaco Food Mart # 084	3075 Solomons Island Rd.	2h	Millenium Health	VOC	5 tanks
28	UST	Edgewater Sunoco	3071 Solomons Island Rd.	2h	Millenium Health	VOC	3 tanks
29	CHS	Exxon Co. USA #22456	Mayo Rd. & Solomons Island Rd.	2h	Millenium Health	VOC, HM	

Table 4. Potential Contaminant Point Sources within the WHPAs.

*see referenced figure for location

Contaminant Type: UST- Underground Storage Tank; CHS- Controlled Hazardous Substance; GWD - Ground Water Discharge

Potential Contaminants: VOC- Volatile Organic Compounds; SOC- Synthetic Organic Compounds; HM - Heavy Metals; NN - Nitrate/Nitrite; MP - Microbiological Pathogens

PWSID	SYSTEM NAME	PLANT ID	TREATMENT METHODS	PURPOSE
0020008	CROFTON-ODENTON	01	pH ADJUSTMENT	CORROSION CONTROL
			GASEOUS CHLORINATION, POST	DISINFECTION
			AERATION, CASCADE	IRON REMOVAL
			FILTRATION, PRESSURE SAND	IRON REMOVAL
			GASEOUS CHLORINATION, PRE	DISINFECTION
			SEDIMENTATION	IRON REMOVAL
			COAGULATION	IRON REMOVAL
			FLOCCULATION	IRON REMOVAL
		FLUORIDATION	FLUORIDE ADDITION	
		04	pH ADJUSTMENT	CORROSION CONTROL
			GASEOUS CHLORINATION, POST	DISINFECTION
			AERATION, CASCADE	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL
			COAGULATION	IRON REMOVAL
FLOCCULATION	IRON REMOVAL			
FLUORIDATION	FLUORIDE ADDITION			
0020009	CROWNSVILLE STATE HOSPITAL	01	pH ADJUSTMENT	CORROSION CONTROL
			GASEOUS CHLORINATION, POST	DISINFECTION
			FILTRATION, RAPID SAND	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL
			ION EXCHANGE	RADIUM REMOVAL
0020011	EPPING FOREST	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, PRE	DISINFECTION
			FILTRATION, PRESSURE SAND	IRON REMOVAL
0020013	GIBSON ISLAND	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
			AERATION, CASCADE	IRON REMOVAL
			HYPOCHLORINATION, PRE	DISINFECTION
			COAGULATION	IRON REMOVAL
			FLOCCULATION	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL
FLUORIDATION	FLUORIDE ADDITION			
0020019	LAKE VILLAGE TOWNHOMES	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
0020029	THE PROVINCES	01	pH ADJUSTMENT	CORROSION CONTROL
			GASEOUS CHLORINATION, POST	DISINFECTION
			AERATION, CASCADE	IRON REMOVAL
			FILTRATION, PRESSURE SAND	IRON REMOVAL
			FLOCCULATION	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL
FLUORIDATION	FLUORIDE ADDITION			
0020030	ROSE HAVEN	01	HYPOCHLORINATION, POST	DISINFECTION
		02	HYPOCHLORINATION, POST	DISINFECTION
			FLUORIDATION	FLUORIDE ADDITION
0020035	SHERWOOD FOREST WATER COMPANY	01	pH ADJUSTMENT	CORROSION CONTROL
			GASEOUS CHLORINATION, POST	DISINFECTION
			HYPOCHLORINATION, PRE	DISINFECTION
			FILTRATION, RAPID SAND	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL

Table 5. Treatment Methods for the Community Water Systems

PWSID	SYSTEM NAME	PLANT ID	TREATMENT METHODS	PURPOSE
0020037	SYLVAN SHORES SERVICES CO.	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
			ION EXCHANGE	IRON REMOVAL
0020042	U.S. NAVAL ACADEMY	01	pH ADJUSTMENT	CORROSION CONTROL
			GASEOUS CHLORINATION, POST	DISINFECTION
			AERATION, SLAT TRAY	IRON REMOVAL
			COAGULATION	IRON REMOVAL
			FLOCCULATION	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL
			FLUORIDATION	FLUORIDE ADDITION
0020044	HERALD HARBOR	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
			AERATION, CASCADE	IRON REMOVAL
			GASEOUS CHLORINATION, PRE	DISINFECTION
			COAGULATION	IRON REMOVAL
			FLOCCULATION	IRON REMOVAL
			SEDIMENTATION	IRON REMOVAL
FLUORIDATION	FLUORIDE ADDITION			
0020059	TEBBSTON ON MAGOTHY	01	HYPOCHLORINATION, PRE	DISINFECTION
			ION EXCHANGE	IRON REMOVAL
0020204	KNOLLWOOD MANOR	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
0020205	BELLS TRAILER PARK	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
0020211	HOLIDAY MOBILE ESTATES, INC.	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
			ION EXCHANGE	SOFTENING
0020213	LYONS CREEK ESTATES	01	HYPOCHLORINATION, POST	DISINFECTION
0020214	MARYLAND MANOR M.H.P.	01	GASEOUS CHLORINATION, POST	DISINFECTION
			FILTRATION, GREENSAND	IRON REMOVAL
0020217	PATUXENT MOBILE ESTATES	01	GASEOUS CHLORINATION, POST	DISINFECTION
			GASEOUS CHLORINATION, PRE	DISINFECTION
			FILTRATION, GREENSAND	IRON REMOVAL
0020218	RIO VISTA PLAZA M.H.P.	01	HYPOCHLORINATION, POST	DISINFECTION
0020221	SUMMERHILL M.H.P.	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
			ION EXCHANGE	IRON REMOVAL
0020223	WAYSON'S MOBILE COURT	01	HYPOCHLORINATION, POST	DISINFECTION
		02	HYPOCHLORINATION, POST	DISINFECTION
		03	HYPOCHLORINATION, POST	DISINFECTION
0020224	WELSH'S TRAILER PARK	01	pH ADJUSTMENT	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION

Table 5 (contd). Treatment Methods for the Community Water Systems

PWSID	SYSTEM NAME	PLANT ID	TREATMENT METHODS	PURPOSE
0020231	BOONES MOBILE ESTATES	01	HYPOCHLORINATION, POST	DISINFECTION
			SEQUESTRATION	IRON REMOVAL
			INHIB., POLYPHOSPHATE	CORROSION CONTROL
		02	HYPOCHLORINATION, POST	DISINFECTION
			SEQUESTRATION	IRON REMOVAL
			INHIB., POLYPHOSPHATE	CORROSION CONTROL
		03	HYPOCHLORINATION, POST	DISINFECTION
			SEQUESTRATION	IRON REMOVAL
			INHIB., POLYPHOSPHATE	CORROSION CONTROL
		04	HYPOCHLORINATION, POST	DISINFECTION
			SEQUESTRATION	IRON REMOVAL
			INHIB., POLYPHOSPHATE	CORROSION CONTROL
0020234	MILLENIUUM HEALTH AND REHAB	01	HYPOCHLORINATION, POST	DISINFECTION
			ION EXCHANGE	SOFTENING

Table 5 (contd). Treatment Methods for the Community Water Systems

PWSID	SYSTEM NAME	PLANT ID	IOCs		Radionuclides		VOCs		SOCs	
			No. of samples	No. of samples > 50% MCL	No. of samples	No. of samples > 50% MCL	No. of samples	No. of samples > 50% MCL	No. of samples	No. of samples > 50% MCL
0020008	CROFTON-ODENTON	01	7	0	2	0	8	0	1	0
0020009	CROWNSVILLE STATE HOSPITAL	04	8	0	10	1	6	0	1	0
0020011	EPPING FOREST	01	14	1	32	27	4	0	1	0
0020013	GIBSON ISLAND	01	28	1	3	0	5	0	1	0
0020019	LAKE VILLAGE TOWNHOMES	01	12	1	8	0	4	0	1	0
0020029	THE PROVINCES	01	20	1	3	0	11	0	2	0
0020030	ROSE HAVEN	01	28	12	5	1	4	0	2	0
		01	19	0	4	0	5	0	2	0
		02	3	0	0	0	2	0	0	0
0020035	SHERWOOD FOREST WATER COMPANY	01	13	1	3	0	4	0	1	0
0020037	SYLVAN SHORES SERVICES CO.	01	13	1	4	0	7	0	1	0
0020042	U.S. NAVAL ACADEMY	01	19	0	4	0	11	0	10	0
0020044	HERALD HARBOR	01	12	0	9	0	5	0	1	0
0020059	TEBBSTON ON MAGOTHY	01	7	0	6	1	8	0	1	1*
0020204	KNOLLWOOD MANOR	01	16	0	3	0	9	0	3	0
0020205	BELLS TRAILER PARK	01	16	0	3	0	8	0	2	0
0020211	HOLIDAY MOBILE ESTATES, INC.	01	19	0	3	0	4	0	2	1*
0020213	LYONS CREEK ESTATES	01	17	0	4	1	4	0	1	0
0020214	MARYLAND MANOR M.H.P.	01	25	0	6	1	6	0	1	0
0020217	PATUXENT MOBILE ESTATES	01	14	0	6	0	5	0	1	0
0020218	RIO VISTA PLAZA M.H.P.	01	15	2	4	1	9	0	3	0
0020221	SUMMERHILL M.H.P.	01	16	0	3	0	4	0	1	0
0020223	WAYSON'S MOBILE COURT	01	19	0	5	0	9	1**	3	0
		02	15	0	3	1	4	0	1	0
0020224	WELSH'S TRAILER PARK	03	16	0	3	1	6	0	4	0
		01	12	1	4	0	6	0	2	0
0020231	BOONES MOBILE ESTATES	01	14	0	4	0	5	0	3	0
		02	12	0	3	1	3	0	1	0
		03	12	0	2	1	4	0	1	0
		04	1	0	1	0	2	0	0	0
0020234	MILLENIUM HEALTH AND REHAB	01	16	0	4	0	7	0	1	0

Table 6. Summary of Water Quality Results

* also found in laboratory blanks, ** sample invalidated

PWSID	SYSTEM NAME	PLANT ID	CONTAMINANT NAME	MCL (mg/l)	SAMPLE DATE	RESULT (mg/l)
0020009	CROWNSVILLE STATE HOSPITAL	01	CADMIUM	.005	22-Nov-95	0.004
0020011	EPPING FOREST	01	ARSENIC	.01	11-Aug-00	0.005
0020013	GIBSON ISLAND	01	ANTIMONY	.006	16-Aug-95	0.005
0020019	LAKE VILLAGE TOWNHOMES	01	NITRATE	10	16-Dec-93	5.32
0020029	THE PROVINCES	01	CADMIUM	.005	9-Nov-92	0.12*
0020029	THE PROVINCES	01	CADMIUM	.005	28-Jan-93	0.011*
0020029	THE PROVINCES	01	CADMIUM	.005	9-Aug-93	0.015*
0020029	THE PROVINCES	01	CADMIUM	.005	17-Dec-93	0.0091*
0020029	THE PROVINCES	01	CADMIUM	.005	17-Dec-93	0.055*
0020029	THE PROVINCES	01	CADMIUM	.005	24-Feb-94	0.0095*
0020029	THE PROVINCES	01	CADMIUM	.005	18-Apr-94	0.025*
0020029	THE PROVINCES	01	CADMIUM	.005	08-Au-94	0.044*
0020029	THE PROVINCES	01	CADMIUM	.005	10-Aug-94	0.080*
0020029	THE PROVINCES	01	CADMIUM	.005	11-Aug-94	0.034*
0020029	THE PROVINCES	01	CADMIUM	.005	12-Aug-94	0.031*
0020029	THE PROVINCES	01	CADMIUM	.005	26-Sep-01	0.0036
0020037	SYLVAN SHORES	01	THALLIUM	.002	14-Mar-96	0.005**
0020218	RIO VISTA PLAZA M.H.P.	01	NITRATE	10	11-Oct-99	8.4
0020218	RIO VISTA PLAZA M.H.P.	01	SELENIUM	.05	11-Apr-02	0.025
0020224	WELSH'S TRAILER PARK	01	LEAD	.015	17-May-90	0.07

Table 7a. Results of Inorganic Compounds above 50% of their MCL

* Raw Water

** No confirmation sample

PWSID	SYSTEM NAME	PLANT ID	CONTAMINANT NAME	MCL (mg/l)	SAMPLE DATE	RESULT (mg/l)
0020008	CROFTON-ODENTON	04	GROSS ALPHA	15	22-Jun-99	14.5
0020009	CROWNSVILLE STATE HOSPITAL	01	GROSS ALPHA	15	14-May-98	14
		01	GROSS ALPHA	15	23-Jun-98	8
		01	GROSS ALPHA	15	25-May-99	11.6
		01	GROSS ALPHA	15	25-May-99	13.7
		01	GROSS ALPHA	15	30-Sep-99	10.2
		01	COMBINED RADIUM (226 & 228)	5	25-May-99	6.7
		01	COMBINED RADIUM (226 & 228)	5	25-May-99	7.6
		01	COMBINED RADIUM (226& 228)	5	25-May-99	6.1
		01	COMBINED RADIUM (226 & 228)	5	30-Sep-99	7.4
		01	COMBINED RADIUM (226 & 228)	5	19-Jul-01	4.55
		01	RADIUM-226	5	20-Oct-98	3.5
		01	RADIUM-226	5	20-Oct-98	3.2
		01	RADIUM-226	5	20-Oct-98	4.3
		01	RADIUM-226	5	28-Oct-98	5.3
		01	RADIUM-226	5	10-Nov-98	3.1
		01	RADIUM-226	5	1-Apr-99	3.2
		01	RADIUM-226	5	25-May-99	2.8
		01	RADIUM-226	5	25-May-99	3
		01	RADIUM-226	5	30-Sep-99	3
		01	RADIUM-226	5	19-Jul-01	2.74
		01	RADIUM-228	5	20-Oct-98	3.9
		01	RADIUM-228	5	20-Oct-98	4.9
		01	RADIUM-228	5	20-Oct-98	3.8
		01	RADIUM-228	5	28-Oct-98	7.1
		01	RADIUM-228	5	10-Nov-98	4.4
		01	RADIUM-228	5	1-Apr-99	4
		01	RADIUM-228	5	1-Apr-99	5.2
		01	RADIUM-228	5	25-May-99	3.9
		01	RADIUM-228	5	25-May-99	4.4
		01	RADIUM-228	5	25-May-99	4.6
		01	RADIUM-228	5	30-Sep-99	4.4
		01	RADIUM-228	5	23-Jan-02	2.6
		01	GROSS ALPHA (SHORT TERM)	15	14-May-98	35
		01	GROSS ALPHA (SHORT TERM)	15	23-Jun-98	27
		01	GROSS ALPHA (SHORT TERM)	15	23-Jun-98	29
		01	GROSS ALPHA (SHORT TERM)	14	23-Jun-98	34
		01	GROSS ALPHA (SHORT TERM)	15	23-Jun-98	28
		01	GROSS ALPHA (SHORT TERM)	15	23-Jun-98	25
		01	GROSS ALPHA (SHORT TERM)	15	25-May-99	20.1
		01	GROSS ALPHA (SHORT TERM)	15	30-Sep-99	20.3
		01	GROSS BETA (SHORT TERM)	50	14-May-98	33
0020029	THE PROVINCES	01	GROSS ALPHA (SHORT TERM)	15	6-May-98	9
0020059	TEBBSTON ON MAGOTHY	01	GROSS ALPHA	15	12-Jul-00	14
0020213	LYONS CREEK ESTATES	01	RADON-222	300/4000*	9-Feb-99	235
0020214	MARYLAND MANOR M.H.P.	01	RADON-222	300/4000*	30-Jul-98	250
0020218	RIO VISTA PLAZA M.H.P.	01	RADON-222	300/4000*	9-Feb-99	210

Table 7b. Results of Radionuclides above 50% of their MCLs.

*Proposed MCLs

PWSID	SYSTEM NAME	PLANT ID	CONTAMINANT NAME	MCL (mg/l)	SAMPLE DATE	RESULT (mg/l)
0020223	WAYSON'S MOBILE COURT	01	RADON-222	300/4000*	1-Feb-99	220
		02	RADON-222	300/4000*	1-Feb-99	165
		03	RADON-222	300/4000*	1-Feb-99	275
0020231	BOONES MOBILE ESTATES	02	RADON-222	300/4000*	22-Feb-99	205
		03	RADON-222	300/4000*	22-Feb-99	165

Table 7b (contd). Results of Radionuclides above 50% of their MCLs.

*Proposed MCLs

PWSID	SYSTEM NAME	PLANT ID	CONTAMINANT NAME	MCL (mg/l)	SAMPLE DATE	RESULT (mg/l)
0020059	TEBBSTON ON MAGOTHY	01	DI(2-ETHYLHEXYL)PHTHALATE	6	24-Jan-02	4.1
0020211	HOLIDAY MOBILE ESTATES	01	DI(2-ETHYLHEXYL)PHTHALATE	6	26-Sep-95	6

Table 7c. Results of SOCs above 50% of their MCLs

PWSID	SYSTEM NAME	No. of Samples	No. of Positive Samples	Disinfection Treatment?
0020008	CROFTON-ODENTON	87	0	Yes
0020009	CROWNSVILLE STATE HOSPITAL	87	1	Yes
0020011	EPPING FOREST	88	0	Yes
0020013	GIBSON ISLAND	87	0	Yes
0020019	LAKE VILLAGE TOWNHOMES	84	0	Yes
0020029	THE PROVINCES	86	0	Yes
0020030	ROSE HAVEN	86	1	Yes
0020035	SHERWOOD FOREST	86	2	Yes
0020037	SYLVAN SHORES	87	0	Yes
0020042	U.S. NAVAL ACADEMY	87	1	Yes
0020044	HERALD HARBOR	87	1	Yes
0020059	TEBBSTON ON MAGOTHY	50	0	Yes
0020204	KNOLLWOOD MANOR	86	0	Yes
0020205	BELLS TRAILER PARK	86	0	Yes
0020211	HOLIDAY MOBILE ESTATES, INC.	87	0	Yes
0020213	LYONS CREEK ESTATES	86	0	Yes
0020214	MARYLAND MANOR M.H.P.	85	0	Yes
0020217	PATUXENT MOBILE ESTATES	86	1	Yes
0020218	RIO VISTA PLAZA M.H.P.	86	0	Yes
0020221	SUMMERHILL M.H.P.	88	2	Yes
0020223	WAYSON'S MOBILE COURT	84	4	Yes
0020224	WELSH'S TRAILER PARK	84	1	Yes
0020231	BOONES MOBILE ESTATES	86	1	Yes
0020234	MILLENIUM HEALTH AND REHAB	85	0	Yes

Table 8. Routine Bacteriological Monitoring Results from System Distribution

PWSID	SYSTEM NAME	Is the Water System Susceptible to....				
		Inorganic Compounds	Radionuclides	Volatile Organic Compounds	Synthetic Organic Compounds	Microbiological Contaminants
0020008	CROFTON-ODENTON	NO**	YES	NO	NO	NO
0020009	CROWNSVILLE STATE HOSPITAL	NO**	YES	NO	NO	NO
0020011	EPPING FOREST	NO**	NO	NO	NO	NO
0020013	GIBSON ISLAND	NO**	NO	NO	NO	NO
0020019	LAKE VILLAGE TOWNHOMES	NO	NO	NO	NO	NO
0020029	THE PROVINCES	YES	YES	NO	NO	NO
0020030	ROSE HAVEN	NO	NO	NO	NO	NO
0020035	SHERWOOD FOREST	NO**	NO	NO	NO	NO
0020037	SYLVAN SHORES	NO**	NO	NO	NO	NO
0020042	U.S. NAVAL ACADEMY	NO**	NO	NO	NO	NO
0020044	HERALD HARBOR	NO**	NO	NO	NO	NO
0020059	TEBBSTON ON MAGOTHY	NO**	YES	NO	NO	NO
0020204	KNOLLWOOD MANOR	NO	NO	NO	NO	NO
0020205	BELLS TRAILER PARK	NO	NO	NO	NO	NO
0020211	HOLIDAY MOBILE ESTATES, INC.	NO	NO	NO	NO	NO
0020213	LYONS CREEK ESTATES	NO	YES*	NO	NO	NO
0020214	MARYLAND MANOR M.H.P.	NO**	YES*	NO	NO	NO
0020217	PATUXENT MOBILE ESTATES	NO**	NO	NO	NO	NO
0020218	RIO VISTA PLAZA M.H.P.	NO	YES*	NO	NO	NO
0020221	SUMMERHILL M.H.P.	NO**	NO	NO	NO	NO
0020223	WAYSON'S MOBILE COURT	NO	YES*	NO	NO	NO
0020224	WELSH'S TRAILER PARK	NO	NO	NO	NO	NO
0020231	BOONES MOBILE ESTATES	NO**	YES*	NO	NO	NO
0020234	MILLENIUM HEALTH AND REHAB -	NO	NO	NO	NO	NO

Table 9. Susceptibility Analysis Summary

* Based on the lower proposed MCL of 300 pCi/L for Radon-222

** System has treatment for iron removal, which suggests source water is susceptible to iron

APPENDIX

EXECUTIVE SUMMARY CROFTON-ODENTON

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Crofton-Odenton 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Crofton-Odenton water system is currently using nine wells with five of the wells pumping water from the Patuxent Formation and the other four well from the Patapsco Formation. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems and figure 2a potential sources of contamination specific to the Crofton-Odenton water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Crofton-Odenton water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since the system has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY CROWNSVILLE STATE HOSPITAL

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Crownsville State Hospital 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Crownsville State Hospital water system is currently using four wells that pump water from the Magothy Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems and figure 2b potential sources of contamination specific to the Crownsville State Hospital water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Crownsville State Hospital water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply is susceptible to naturally occurring radium and iron, both of which are being removed from the raw water through treatment.

EXECUTIVE SUMMARY EPPING FOREST

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Epping Forest 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Epping Forest water system is currently using two wells that pump water from the Magothy Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Epping Forest water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since it has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY GIBSON ISLAND

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for fifty-seven community water systems in Anne Arundel County, including the Gibson Island 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Gibson Island water system is currently using two wells that pump water from the Patapsco Formation. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Gibson Island water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since the system has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY LAKE VILLAGE TOWNHOMES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for fifty-seven community water systems in Anne Arundel County, including the Lake Village Townhomes 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Lake Village Townhomes water system is currently using one well that pumps water from the Patuxent Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. . It was determined that the Lake Village Townhomes water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

EXECUTIVE SUMMARY THE PROVINCES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Provinces 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Provinces water system is currently using three wells that pump water from the Patuxent Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems and figure 2c potential sources of contamination specific to the Provinces water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Provinces water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply is susceptible to naturally occurring cadmium and iron, both of which are being removed from the raw water through treatment.

EXECUTIVE SUMMARY HERRINGTON HARBOUR

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Herrington Harbour 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Herrington Harbour water system is currently using two wells that pump water from the Aquia Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that Herrington Harbour water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

EXECUTIVE SUMMARY SHERWOOD FOREST

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Sherwood Forest 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Sherwood Forest water system is currently using two wells that pump water from the Aquia and Patapsco Formations, respectively. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Sherwood Forest water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since the system has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY SYLVAN SHORES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Sylvan Shores 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Sylvan Shores water system is currently using one well that pumps water from the Magothy Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems and figure 2d the potential sources of contamination specific to the Sylvan Shores water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Sylvan Shores water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since the system is has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY U. S. NAVAL ACADEMY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the U. S. Naval Academy 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The U. S. Naval Academy water system is currently using three wells that pump water from the Patapsco Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems and figure 2e the potential sources of contamination specific to the U.S. Naval Academy water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the U. S. Naval Academy water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since the system has treatment for removal of high iron in the raw water.

EXECUTIVE SUMMARY HERALD HARBOR

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Herald Harbor 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Herald Harbor water system is currently using two wells that pumps water from the Patapsco Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Herald Harbor water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring iron, since the system has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY TEBBSTON ON THE MAGOTHY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Tebbston On The Magothy 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Tebbston On The Magothy water system is currently using one well that pumps water from the Magothy Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Tebbston On The Magothy water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply is susceptible to naturally occurring radionuclides. The water supply may also be susceptible to naturally occurring iron, since the system has treatment for removal of high iron in its raw water.

EXECUTIVE SUMMARY KNOLLWOOD MANOR

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Knollwood Manor 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Knollwood Manor water system is currently using one well that pumps water from the Patapsco Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems and figure 2f the potential sources of contamination specific to the Knollwood Manor water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Knollwood Manor water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

EXECUTIVE SUMMARY BELLS TRAILER PARK

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Bells Trailer 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Bells Trailer Park water system is currently using two wells that pump water from the Patapsco Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Bells Trailer Park water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

EXECUTIVE SUMMARY HOLIDAY MOBILE ESTATES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Holiday Mobile Estates 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Holiday Mobile Estates water system is currently using two wells that pump water from the Patuxent Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Holiday Mobile Estates water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

EXECUTIVE SUMMARY LYONS CREEK ESTATES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Lyons Creek Estates 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Lyons Creek Estates water system is currently using two wells, one pumping water from the Aquia and the other from the Magothy Formation. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Lyons Creek Estates water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply may be susceptible to radon, a naturally occurring element, if the lower proposed MCL for it is adopted.

EXECUTIVE SUMMARY

MARYLAND MANOR MOBILE HOME PARK

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Maryland Manor MHP 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Maryland Manor MHP water system is currently using three wells that pump water from the Magothy Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections and contaminant and well inventory databases. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems, and Figure 2g the potential point sources of contamination specific to the Maryland Manor MHP water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Maryland Manor MHP water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply maybe susceptible to naturally occurring radon, if the lower proposed MCL for it is adopted. The water supply may also be susceptible to naturally occurring iron, since it has treatment for removal of high iron in its raw water.

EXECUTIVE SUMMARY PATUXENT MOBILE ESTATES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Patuxent Mobile Estates 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Patuxent Mobile Estates water system is currently using two wells that pump water from the Magothy Formation. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Patuxent Mobile Estates water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply may be susceptible to naturally occurring iron, since the system has treatment for removal of high iron in its raw water.

EXECUTIVE SUMMARY RIO VISTA PLAZA MOBILE HOME PARK

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Rio Vista Plaza MHP 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-two community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Rio Vista Plaza MHP water system is currently using one well that pumps water from the Aquia Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Rio Vista Plaza MHP water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply may be susceptible to naturally occurring radon, if the lower proposed MCL for is adopted.

EXECUTIVE SUMMARY

SUMMMERHILL MOBILE HOME PARK

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Summerhill MHP 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-two community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Summerhill MHP water system is currently using two wells that pump water from the Magothy Formation. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Summerhill MHP water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply may be susceptible to naturally occurring iron, since the system has treatment for removal of high iron from its raw water.

EXECUTIVE SUMMARY WAYSONS MOBILE COURT

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Waysons Mobile Court 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Waysons Mobile Court water system is currently using four wells that pump water from the Aquia Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Waysons Mobile Court water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply may be susceptible to naturally occurring radon, if the lower proposed MCL for it is adopted.

EXECUTIVE SUMMARY WELSHS TRAILER PARK

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Welshs Trailer 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Welshs Trailer Park water system is currently using one well that pumps water from the Patapsco Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Welshs Trailer Park water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

EXECUTIVE SUMMARY BOONES MOBILE ESTATES

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Boones Mobile Estates 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Boones Mobile Estates water system is currently using two wells that pumps water from the Aquia Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Boones Mobile Estates water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers. The water supply may be susceptible to naturally occurring iron, since the system has treatment for removal of high iron in its raw water. The water supply may also be susceptible to naturally occurring radon if the lower proposed MCL for it is adopted.

EXECUTIVE SUMMARY MILLENNIUM HEALTH AND REHAB CENTER

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-four community water systems in Anne Arundel County, including the Millennium Health and Rehab Center 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 each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The water supply sources of the twenty-four community systems in Anne Arundel County are naturally protected confined aquifers of the Atlantic Coastal Plain physiographic province. The Millennium Health and Rehab Center water system is currently using two wells that pump water from the Magothy Formation. The Source Water Assessment area was delineated by the WSP using U.S. EPA approved methods specifically designed for supplies in confined aquifers.

Potential point sources of contamination were researched and identified within the assessment areas from field inspections, contaminant and well inventory databases, and land use maps. Well information and water quality data were also reviewed. Figure 1 shows the Source Water Assessment areas for all the water systems, and figure 2h potential sources of contamination specific to the Millennium Health and Rehab Center water supply.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and aquifer characteristics. It was determined that the Millennium Health and Rehab Center water supply is not susceptible to contaminants originating at the land surface due to the protected nature of confined aquifers.

FIGURES

Table 1. Generalized stratigraphic, lithologic, and hydrologic characteristics of geologic formations underlying Anne Arundel County, Maryland (modified from Mack and Andreasen, 1991, table 1)

SYSTEM	SERIES	GROUP	FORMATION	AVERAGE THICKNESS (FEET)	GENERAL LITHOLOGY	HYDROLOGIC CHARACTER	GEOHYDROLOGIC UNIT
Quaternary	Holocene and Pleistocene		Alluvium and terrace deposits	20	Sand, gravel, silt, and clay.	Confining unit in most places, limited aquifer in some places.	Not recognized
	Pleistocene		Talbot Formation	20	Clay, silt, brown to gray with some glauconite and pebbles.	Confining unit	Talbot confining unit
Tertiary	Pliocene (?) or Miocene (?)		Brandywine Formation	30	Sand, pebbly sand, and gravel; extremely limited distribution.	Aquifer	Not recognized
	Miocene	Chesapeake	Calvert Formation	75	Sandy clay and fine sand, fossiliferous, diatomaceous earth.	Limited aquifer	Not recognized
	Eocene	Pamunkey	Nanjemoy Formation	50	Glauconitic sand, silt, and clay.	Confining unit	Not recognized
	Paleocene		Marlboro Clay	15	Clay, silvery gray to pink	Confining unit	Marlboro confining unit
			Aquia Formation	130	Glauconitic, greenish to brown sand with thin indurated or "rock" layers, and silt layers.	Aquifer	Aquia aquifer
			Brightseat Formation	15	Silt and clay, olive-gray to black, glauconitic.	Leaky confining unit	Brightseat confining unit
Cretaceous	Upper Cretaceous		Severn Formation	45	Sand, silty to fine, with some glauconite.	Limited aquifer	Monmouth aquifer
			Matawan Formation	60	Silt and fine sand, clayey, dark-green to black, glauconitic.	Confining unit	Matawan confining unit
			Magothy Formation	120	Sand, light-gray to white, with interbedded thin layers of organic black clay.	Aquifer	Magothy aquifer
	Lower Cretaceous	Potomac	Patapsco Formation	25	Clay, tough, variegated.	Confining unit	Confining unit
				750	Sand, fine to coarse, brown, and tough, variegated clay.	Multiple-layer aquifer	Upper Patapsco aquifer
					Clay, tough, variegated.	Confining unit	Confining unit
					Sand, fine to coarse, brown, and tough variegated clay.	Multiple-layer Aquifer	Lower Patapsco aquifer
			Arundel Clay	250	Clay, red, brown, and gray, contains some ironstone nodules, plant remains, and thin sandy layers.	Confining unit	Arundel confining unit
			Patuxent Formation	300	Sand, gray and yellow, with interbedded clay; kaolinized feldspar, pyrite, and lignite common; locally clay layers predominate.	Multiple-layer aquifer	Patuxent aquifer
	Triassic (?) and/or Paleozoic (?) to Precambrian			Basement	Unknown	Shale, sandstone,	Confining unit

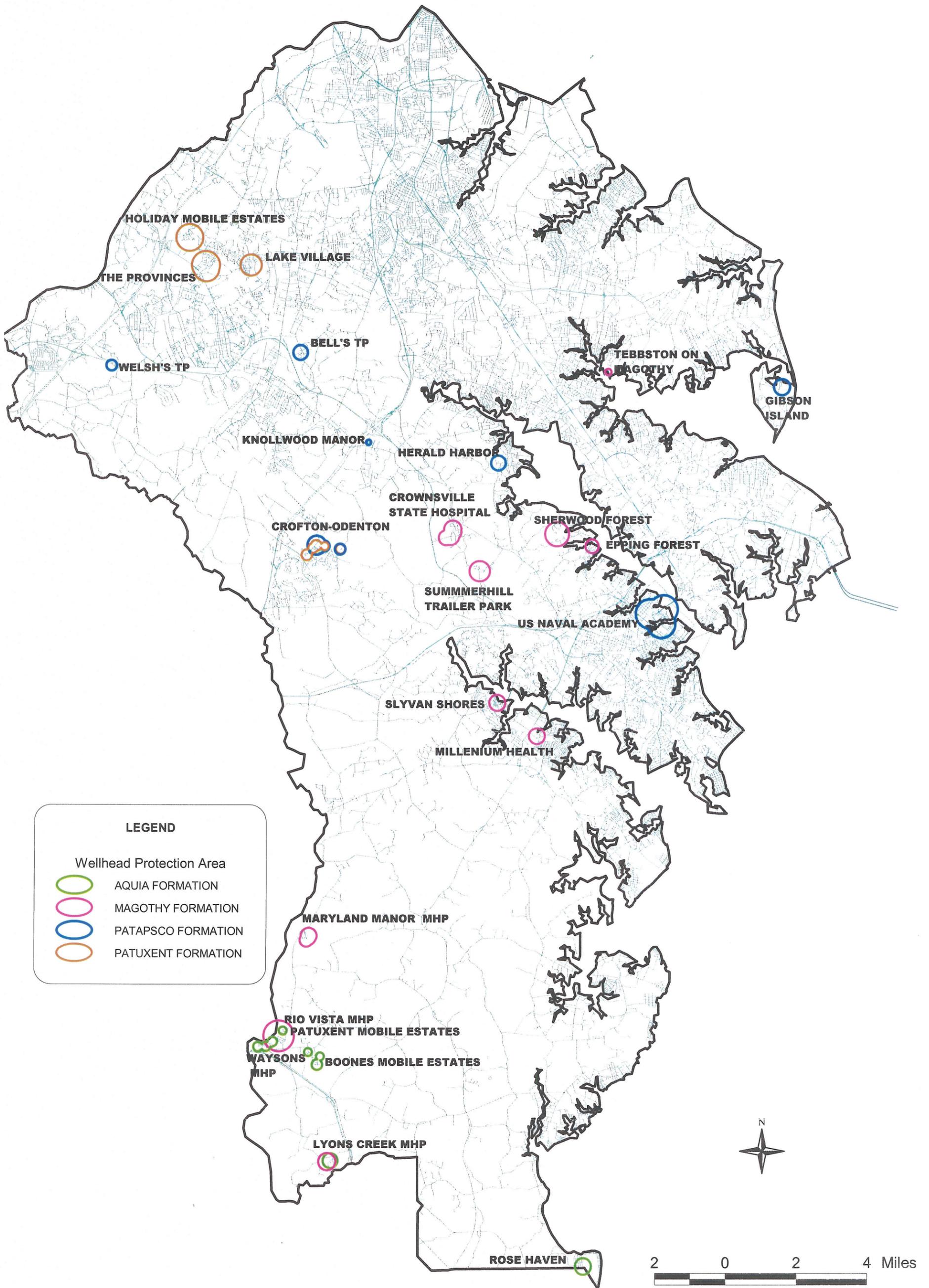


Figure 1. Wellhead Protection Areas for Community Water Systems (confined) in Anne Arundel County