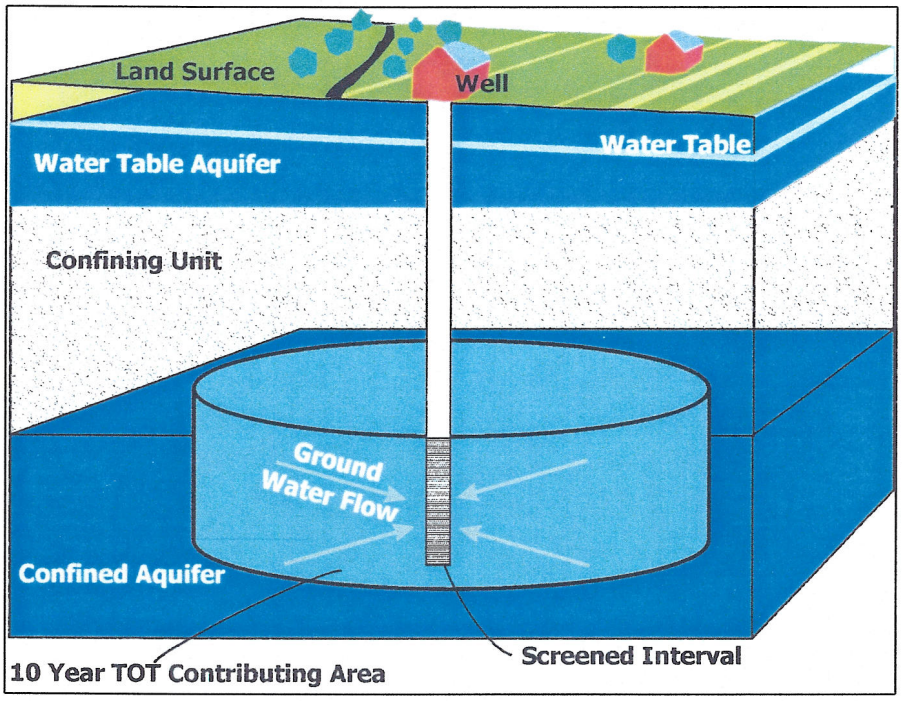
SOURCE WATER ASSESSMENT

FOR 49 NON-TRANSIENT NON-COMMUNITY WATER SYSTEMS IN CALVERT COUNTY, MD



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Summary

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted as Source Water Assessment for 49 non-transient non-community water systems in Calvert 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 the source; 2) identification of potential sources of contamination; and, 3) determination of the susceptibility of the water supply to contamination. Recommendations for protecting the drinking water supply conclude this report.

Confined aquifers protect water supplies from contaminants originating on the land surface. All 49 of these non-transient water supply systems in Calvert County use confined aquifers. Fifty-five wells supply these non-transient systems. The Source Water Assessment Areas for all wells were delineated by the WSP using Environmental Protection Agency (EPA) approved methods specifically designed for each source.

Potential point sources of contamination within the assessment areas were identified from field inspections and contaminant inventory databases. The more common potential sources of contamination are on-site septic systems, ground water discharge sites, underground storage tanks, and hazardous substance generators commonly associated with commercial areas. In confined aquifer settings, sources of contaminant at the 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 have no grout seal. Aerial photographs showing supply wells, and spot satellite images of the wellhead protection areas are enclosed at the end of 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 the inherent vulnerability of the aquifers. Some of the non-transient non-community water systems are susceptible to naturally occurring arsenic (based on the new EPA standard) and some may be susceptible to Radon-222. All 49 systems were determined not to be susceptible to synthetic organic compounds, volatile organic compounds, microbiological contaminants, or other inorganic compounds. This susceptibility could change if the well condition or conditions around the well change. Most of the supply sources were not found to be susceptible to these contaminants and the evidence of proper well construction practices were observed from on-site inspections throughout the county.

INTRODUCTION

The Water Supply Program (WSP) has conducted a Source Water Assessment for 49 non-transient non-community water systems in Calvert County (Figure 1). As defined in Maryland's Source Water Assessment Plan (SWAP), a non-transient non-community water system is any non-community water system that regularly serves at least twenty-five (25) of the same individuals over six months per year. Some good examples of non-transient water systems include schools, large businesses, and shopping malls. The populations served by the non-transient non-community water in Calvert County are shown in Table 1.

Calvert County is located in Southern Maryland and lies on the western shore of the Chesapeake Bay. It is bound by Anne Arundel County to the north and by the Patuxent River on the west. Based on July 2001 data, the total population of Calvert County is 88,000 persons (Md. Assoc. of Counties, 2005/2006). The County lies within the Atlantic Coastal Plain Physiographic Province. The Coastal Plain, geologically the youngest province in Maryland and covers nearly half of the State and consists entirely of unconsolidated sediments. All 49 of the non-transient non-community water systems in Calvert County covered in this report obtain their water supply from wells of various diameter and depth. All of the wells serving these systems are completed in confined aquifers. For the purpose of this report, depth of well, lithology, and nitrate data were used to determine whether the wells are in confined or unconfined aquifers. An accurate determination of the aquifer type is very important in determining the shape of the wellhead protection area (WHPA) or source water assessment area (SWAA).

WELL INFORMATION

Well information for each system was obtained from the Water Supply Program's database, owner interviews, site visits, well completion reports, sanitary survey inspection reports, and published reports. A total of 55 wells are used by the 49 systems assessed in this report. The well tag number, which provides vital well information, was found for 53 of the 55 wells. From the well tag information, ground water appropriation data, and nitrate sampling data it was concluded that all the wells are completed in confined aquifers. Forty-two of the wells were drilled after 1973 and should comply with Maryland's well construction regulations for grouting and casing. A review of the available well completion report data for the other 11 wells drilled between 1951-1972 indicates that four of the wells were grouted around its casing to the screen and two of the wells were partially grouted. The remaining five wells that were drilled prior to 1973, when current regulations went into effect, may not meet the current construction standards. Table 2 contains a summary of well information.

Accurate well location information was needed to delineate the contribution areas for the Calvert County non-transient system wells. This was obtained by using a global positioning system (GPS) unit at 54 of the well locations. The data was then differentially corrected to increase the exactness of the information for each location. If a

well was inside a building a GPS point was taken outside the building and the offset distance was measured. GPS coordinates were not obtained for one well, as the well could not be definitively located at the site.

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. There are some wells observed during field inspections that appear unused or in disrepair. If these wells are screened in the same aquifer as the water supply well, they may represent a potential route for contamination to the water supply. Even if some of these are backup wells, 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 aquifer.

HYDROGEOLOGY

Calvert County is located in Southern Maryland and is underlain by unconsolidated sediments of the Coastal Plain Physiographic Province. This province is characterized by low topography due to the underlying horizontal layers of unconsolidated clastic sediments that are Lower Cretaceous to recent in age and thicken to the southeast. In Calvert County, the non-transient non-community water systems included in this report draw water from three different aquifer systems known as the Piney Point/Nanjemoy, the Aquia, and the Magothy aquifers. These aquifers have been studied considerably and hydrologic, lithologic, and geochemical data is available in several Maryland Geological Survey Reports (1977, 1979, 1983, 1984, 1988, 1996, 2003). A geologic section from Northern Calvert County to Southern St. Mary's County showing the hydrogeologic units beneath Calvert County is shown in Figure 2 (Kapple and Hansen, 1976). Note that the deeper aquifers are overlain by confining clay units of low permeability that may inhibit the infiltration of contaminants from the land surface. The descriptive material below is summarized from these reports.

All of the wells in the Calvert County draw water from unconsolidated sediments. Ground water flows through pores between gravel, sand, and silt grins in unconsolidated sedimentary aquifers. Confined aquifers are those formations that are overlain by a confining layer consisting of clay or fine silt. This confining layer allows very little water to travel vertically through it.

Piney Point Aquifer (124E) / Nanjemoy Formation (124C)

The Piney Point/Nanjemoy system is a significant aquifer used by some of the non-transient non-community water systems in Calvert County due to its accessibility at relatively shallow depths, its generally good transmissivity, and its good water quality. The top of the aquifer in Calvert County ranges from 50 feet below sea level near the northern tip of the county, where its limited thickness prohibits its use, to approximately 250 feet below sea level at the southeastern end of the county. The Piney Point/Nanjemoy does not crop out at the surface in Maryland and is overlain by the Chesapeake Group sediments, which vary in thickness depending on the geographic location. The formations are composed primarily of quartz sand, glauconite, and shell fragments. Clay content tends to increase towards the bottom of the formation. The effective thickness (the thickness of the sandy portion of the formation that produces water) of the Piney Point/Nanjemoy in Calvert County ranges form approximately 0 to 80 feet. Transmissivity values, estimated by modeling and aquifer tests, range from less than 100 to 500 ft^2/day, and are the highest near Solomons in the southern part of the county.

Aquia Aquifer (125B)

The Aquia aquifer is the most widely used source of water in Calvert County, by both community water systems and non-transient non-community water systems, due to its accessibility in the northern half of the County, its high transmissivity, and its relatively good water quality. The top of the Aquia aquifer in Calvert County ranges from 125 feet below sea level near the northern tip of the county to approximately 450 feet below sea level at the southern end of the county near Solomons Island. The Aquia is overlain by the Nanjemoy formation, which acts as a leaky confining unit, and is between 100 and 200 feet thick, depending on the geographic location. The Aquia is composed of fine to medium-grained sands, of varying composition but are generally quartz and glauconite rich with calcite cementation. Shell material is more abundant in the upper portion of the aquifer. Transmissivity values, as determined by aquifer tests, range from 900 to 1300 ft^2/day, and tend to be highest in the northernmost portions of the county

Magothy Aquifer (211D)

The use of the Magothy aquifer is limited to the northernmost reaches of Calvert County. The top of the Magothy aquifer in this part of the county is approximately 300 to 350 feet below sea level. The Magothy is a primary water source in Anne Arundel County, but is not present in much of southern Calvert County. The overlying confining units are the Severn and Matawan formations. The Magothy is not well studied in this part of the State due to its limited use, but in other parts of Southern Maryland and the Eastern Shore it is a high producing aquifer. Published transmissivity values for this aquifer are as high as 10,000 ft^2/day (MGS, 1984). The Magothy is composed of interbedded silt, sand, and clay and ranges from 350 to 1,700 feet thick depending on geographic location.

SOURCE WATER ASSESSMENT AREA DELINEATION

For ground water systems, a wellhead protection area (WHPA) is considered to be the source water assessment area. Within the EPA approved Maryland SWAP there are four different WHPA delineation methods used for coastal plain wells. Two of the four methods are used in this report. The delineation method to define a WHPA for a well varies with aquifer type and the amount of water pumped from the well. Monthly operation reports (MORs) and semi-annual water withdrawal reports for the past twelve months were used to determine the amount of water withdrawn from a well. If any of the pumpage data for the system was incomplete the withdrawal amounts were divided between the wells.

Confined Wells < 10,000 gpd

Maryland's SWAP prescribes using a circle with a fixed radius of 600 feet for all confined wells pumping less than 10,000 gpd. The 600-foot radius circle was calculated using the following parameters: minimum aquifer thickness of 20 feet, porosity of 0.25, and daily pumpage of less than 10,000 gpd for ten years. A more detailed explanation of this calculation is described under the next method.

This method was used to define the WHPA for 42 of the non-transient non-community water systems.

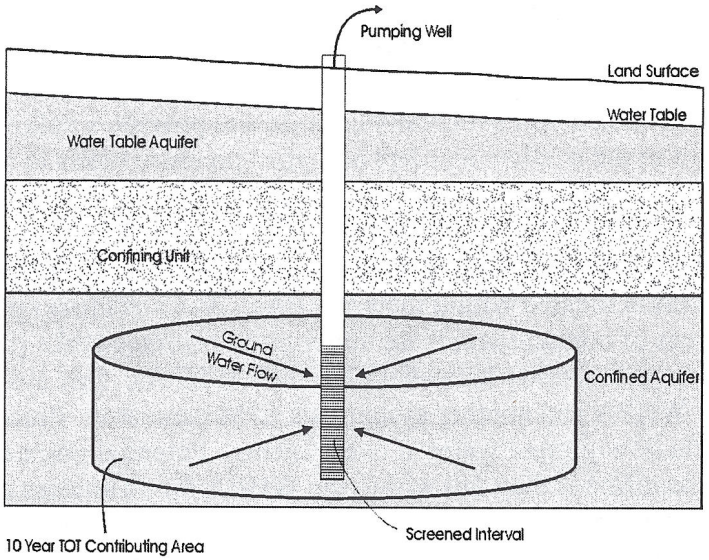
Confined Wells > 10,000 gpd

The "Florida Method" is used to define the WHPA for confined wells pumping more than 10,000 gpd. The area is a radial zone of transport within the aquifer and is based on a 10-year time-of-travel, the pumping rate and the screened interval(s) of the well(s) include in the WHPA, and the porosity of the aquifer (see illustration below for conceptual model). The Florida Method equates the volume of water pumped over 10 years to the volume of aquifer needed to store the quantity pumped assuming horizontal flow. WHPA's were calculated using the following volumetric equation:

$$r = \sqrt{\frac{Qt}{\pi n H}}$$

where: r = calculated fixed radius (ft)
Q = pumping rate of well (ft^3 / yr)
t = time of travel in years (yr)
n = aquifer porosity (dimensionless)
H = length of well screen (ft)

The circle shown in the figure below represents the aquifer zone of transport in the subsurface as illustrated below.



Conceptual illustration of a zone of transport for a confined aquifer

Pumping rates were obtained from the permitted allocation in the water appropriation permit. A conservative estimate of porosity (n) of 25% was used for each of the aquifers based on published reports. The lengths of well screens (H) were obtained from well completion reports. In the instance that a well had multiple screens, the sum of the individual screen lengths was used. The circles represent the aquifer zone of transport in the subsurface as illustrated above.

Using these parameters the radius was calculated with the above equation for the WHPA delineation for seven of the water systems (Table 3). Of these seven, the calculated distance for five of the water systems was less than 600 feet. In these cases, a default radius of 600 feet was used.

POTENTIAL SOURCES OF CONTAMINATION

Potential sources of contamination are classified into two types. The first type is point source contamination. Some examples of point source contamination are leaking underground storage tanks, landfills, ground water discharge permits, feed lots, large scale feeding operations, and known ground water contamination 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. The second type of potential sources of contamination is non-point sources. Non-point sources are associated with certain land use practices such as pesticide and herbicide applications, land application of sludge or animal wastes, and row-crop farming, all of which may lead to ground water contamination over a large are. On-site septic systems are often referred to as non-point pollution as they are very common in areas not served by public sewerage collections systems.

In confined aquifer settings, sources of contamination at the land surface are generally not a threat unless there is a pathway for direct injection into the deeper aquifer such as unused wells or along well casing that are not intact or have no grout seal. Wells that are not being used or maintained will eventually corrode and provide a pathway for contaminants present in the shallow aquifers at higher-pressure heads to migrate to the deeper aquifers.

Twenty of the 49 water systems drawing water from confined aquifers had potential point sources of contamination located within their WHPAs. At 15 of these systems the potential point sources of contamination are underground storage tanks (USTs). Two systems have a solid waste facility located within their WHPAs. One system has a CHS generator within its WHPA and another system is a CHS generator. Process wastewater is discharge to the shallow ground water at two systems. 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 located near the potential sources of contamination. The potential point sources of contamination are listed in Table 4.

WATER QUALTIY DATA

Water quality data was reviewed from the Water Supply Program's (WSP) database for Safe Drinking Water Act (SDWA) contaminants. All data reported is from the finished (treated) water unless otherwise noted. 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. Table 5 summarizes the various treatment methods used at the water treatment plants for each of the 49 non-transient water systems.

A review of the monitoring data was conducted for each non-transient non-community water system. A summary of the water quality sampling results exceeding 50% of the Maximum Contaminant Level (MCL) is shown in Table 6. More detailed water quality sampling results are contained in Appendix A at the end of the report.

Inorganic Compounds (IOCs)

A review of the available data shows that arsenic, chromium, lead and nitrate were the only IOCs detected at or above 50% of their respective MCLs (Table 7). Two of the water systems had nitrates at 50% of the MCL back in 1993. No nitrates have been detected in any other samples for these two systems. Hence, these detections both on the same date are probably lab error. Eighteen water systems detected arsenic at levels equal to or greater than the MCL of 10 parts per billion (ppb). The arsenic standard was recently lowered from 50 ppb to 10 ppb by the USEPA. Chromium, whose MCL threshold is 0.1 ppm, was detected at one water system. And, one water system detected lead, which has an action level of 0.015 ppm.

Arsenic is present in ground water in Maryland's Coastal Plain due to the natural presence of this contaminant in aquifer material. The nineteen systems reporting arsenic above 5 ppb mainly draw water from the Aquia aquifer. However, two systems draw water from the Piney Point aquifer and one system draws water from the Magothy aquifer. A recent study of arsenic concentrations in the major aquifers of the Coastal Plain indicates that arsenic is present at the highest concentrations in the Aquia aquifer on the Eastern Shore of Maryland (MGS, 2003). However, levels above 10 ppb are common in the Aquia in Southern Maryland as shown both in the MGS study and the monitoring data in this report. Arsenic is commonly found in the range of 2-10 ppb in the Piney Point/Nanjemoy aquifer system in Calvert County.

Synthetic Organic Compounds (SOCs)

No SOCs were detected above the 50% threshold at any of the 49 non-transient non-community water systems.

Volatile Organic Compounds (VOCs)

No VOCs were detected at levels above 50% of the MCL at any of the 49 non-transient non-community water systems.

Microbiological Contaminants

Raw water testing is not required for any of the non-transient non-community water systems in Calvert County, since the wells draw water from confined aquifers that are considered not at risk to surface water influence.

All of the non-transient non-community systems have quarterly routine bacteriological samples that are collected as required by the Safe Drinking Water Act. Since less than 50% of the water systems disinfect their water, the finished water data may be indicative 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. Twelve of the 49 water systems have had positive total coliform results in at least one sample, between December 1996 and January 2004. Four of these 12 water systems have had positive total coliform since May 2005. Additional sampling and/or repeat sampling at these four systems have shown that the contamination seems to have been addressed.

Total coliform bacteria are ubiquitous in the environment and detection could be a result of a variety of deficiencies in the water system or an indicator of poor well integrity. Loose caps or insufficient seals are common causes of coliform contamination since insects are able to crawl in the wellhead. Many of these situations are easily remedied.

SUSCEPTIBILITY ANALYSIS

Wells serving the Calvert County non-transient water systems all draw water from wells in the unconsolidated sedimentary aquifers. All 49 non-transient non-community water systems reviewed in this report have wells that are in confined aquifers. Confined aquifers are naturally protected from land use activities at the ground surface due to the confining layers that provide a barrier for water movement from the surface into the aquifers below. This protection can be jeopardized by poorly constructed wells, wells out of use that penetrate the aquifer, or underground injection wells drilled into the aquifer.

Some contaminants like arsenic 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.

Confined aquifers are recharged very slowly from the water stored in the confining unit above and from precipitation that infiltrates into the formation where it reaches the ground surface. Generally, water stored in confined aquifers has traveled great distances from it origin at the ground surface. Likewise, the travel time of a contaminant through the very low permeability confining layers above the confined aquifers would take thousands of years.

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 8.

The susceptibility analysis of each system was based on current conditions and sample results. If changes occur within the WHPA or sample results for a system change, the system's susceptibility could change. Some common changes that may occur resulting in changes to a well's susceptibility are land use changes within the WHPA, an underground storage tank starts to leak, the well becomes damaged, or changes in uses of local wells completed in the same aquifer.

Inorganic Compound (IOCs)

The source of inorganic compounds can be either the aquifer material or from human activity. Due to the confined nature of the aquifers, these contaminants are unlikely to originate from the land surface. In addition, the arsenic levels are reported for both aquifers are consistent with naturally occurring levels measured in studies on the occurrence of arsenic in the State.

Arsenic is present in 18 of the non-transient non-community water systems in Calvert County at levels above 50% of the MCL. The source of the arsenic in these water supplies is the natural occurrence and mobility of this contaminant in the aquifer

material. A recent study of the occurrence of arsenic in Coastal Plain aquifers indicates that the Aquia and Piney Point/Nanjemoy aquifer systems have ground water arsenic concentrations that range between non-detectable and 14 ppb in Calvert County (MGS, 2003). The data has not been fully interpreted, but it does not seem to be related to any geochemical indices such as pH or specific conductance. The concentration of arsenic in ground water of these aquifers may simply be dependent on the amount of arsenic in the aquifer at certain locations. Due to the presence and levels of arsenic in the Aquia and Piney Point/Nanjemoy aquifers, many water supplies drawing from these aquifers **are susceptible** to this contaminant. Since arsenic levels are variable within each aquifer, the susceptibility determination is based on the actual levels measured for each water system.

The remaining water systems that did not detect arsenic at levels exceeding 50% of the MCL are determined **not susceptible** to arsenic if they had enough samples results to verify that arsenic levels are consistently below 5 ppb. The 49 non-transient non-community systems **are not susceptible** to other inorganic compounds.

Synthetic Organic Compounds (SOCs)

No SOCs were detected above the 50% threshold at any of the 49 non-transient non-community water systems.

Based on the above analysis, the water supply drawn from confined aquifers for the 49 non-transient non-community water systems **are not susceptible** to SOC contamination.

Volatile Organic Compounds (VOCs)

No VOCs were detected above the 50% threshold at any of the 49 non-transient non-community water systems.

Due to the naturally protected characteristics of the confined aquifers, the water quality data, and the lack of potential sources of contamination in the aquifers, the water supply drawn from confined aquifers for the 49 non-transient non-community water systems **are not susceptible** to VOC contamination.

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. Twelve systems did have positive total coliform in their routine sample collection, however, they did not occur at a significant rate to warrant further investigation. These are likely to be the result of water system distribution or well construction deficiencies and are unlikely to be representative of the water quality of the aquifer. In these instances the wellheads should be inspected and any obvious deficiencies remedied. Due to the confined nature of the aquifers the water supplies **are not susceptible** to microbiological contaminants.

SUMMARY AND RECOMMENDATIONS FOR PROTECTING WATER SUPPLIES

With the information contained in this report, the individual non-transient systems in Calvert 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. The following recommendations are intended for individual water systems.

Monitoring

Systems should continue to monitor for all required Safe Drinking Water Act contaminants. Those whose arsenic concentrations exceed the new lower standard of 0.010 ppm should consider locating water in a different aquifer with acceptable water quality, where possible. 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.

Wells drilled prior to 1973 that do not meet current construction standards should be upgraded to protect them from contamination associated with poor or outdated construction.

Two-piece insect-proof well caps should be installed onto wells that have one-piece caps.

Changes in Use

The system is required to notify the MDE Water Supply Program if new wells are to be added or an increase in water usage is proposed. An increase in use or the addition of new wells may require revisions to the WHPA.

References

Maryland Association of Counties, Directory of County Officials - 2005/2006, 53 pp.

Maryland Department of the Environment (MDE), Water Supply Program, 1999, Maryland's Source Water Assessment Plan.

Maryland Department of Natural Resources (DNR), 1987, The Quantity and Natural Quality of Ground Water in Maryland: DNR Water Resources Administration.

Maryland Geological Survey Report of Investigations No. 38, 1983, by Chapelle, F.H. and D.D. Drummond, Hydrogeology, Digital Simulation, and Geochemistry of the Aquia and Piney Point-Nanjemoy Aquifer System in Southern Maryland, 100 pp.

Maryland Geological Survey Interim Report, 2003, Summary of Ground-Water Arsenic Concentrations in Major Aquifers of the Maryland Coastal Plain, 23 pp.

U.S. Environmental Protection Agency (EPA), 1991, Wellhead Protection Strategies for Confined – Aquifer Settings: Office of Ground Water and Drinking Water, EPA/570/9-91-008, p. 168.

Other Sources of Data

Water Appropriation and User Permits
MDE Water Supply Program (PDWIS) Database
MDE Waste Management Sites Database
2005 AEexpress Photo Index
Department of Natural Resources Digital Orthophoto Quarter Quadrangles
USGS Topographic 7.5-Minute Quadrangles
ADC Maps of Calvert County
SpecPrint Tax Maps of Calvert County
Maryland Department of Assessments and Taxation Real Property Database

TABLES

Table 1. Population Served by Calvert County Non-Transient Non-Community Water Systems		
PWSID	**System Name**	**Population Served**
1040001	APPEAL ELEMENTARY SCHOOL	569
1040004	MS. BEV'S PLACE	75
1040006	BROOKS ADMINISTRATION BUILDING	106
1040011	CALVERT CAREER CENTER	800
1040012	CALVERT COUNTRY & CALVERT ELEMENTARY	900
1040013	CALVERT COUNTY JAIL	150
1040016	CALVERT HIGH SCHOOL	1450
1040018	CALVERT MIDDLE SCHOOL	675
1040022	CALVERTON SCHOOL	500
1040025	HUNTING CREEK ALTERNATIVE SCHOOL	60
1040027	HUNTINGTOWN ELEMENTARY SCHOOL	609
1040030	MT. HARMONY ELEMENTARY SCHOOL	706
1040032	MUTUAL ELEMENTARY SCHOOL	894
1040034	NORTHERN MIDDLE & HIGH SCHOOLS	2470
1040038	SOUTHERN MIDDLE SCHOOL	745
1040041	SUNDERLAND ELEMENTARY SCHOOL	481
1040051	CALVERT CO. INDUSTRIAL PARK	100
1040052	MISS TINA DAY CARE	40
1040053	CHESAPEAKE MONTESSORI LIMITED	77
1040054	FIRST IMPRESSIONS DAYCARE CENTER	40
1040063	PLUM POINT ELEMENTARY SCHOOL	615
1040064	DUNKIRK MARKET PLACE	50
1040065	PLUM POINT MIDDLE SCHOOL	881
1040066	PATUXENT ELEMENTARY SCHOOL	637
1040067	THE TIDEWATER SCHOOL	61
1040068	ISLAND CREEK COMMUNITY CENTER	85
1040069	DUNKIRK SAFEWAY STORE #1129	25
1040070	DUNKIRK MEDICAL CENTER	200
1040071	CARROLL VICTORIA LODGE - HUNTINGTOWN	87
1040074	SLEEPY HOLLOW DAYCARE	65
1040075	HUNTINGTOWN HIGH SCHOOL	1540
1040078	SOLOMONS WWTP	27
1040080	NOAH'S ARK LEARNING CENTER	63
1040081	IMAGINE NATIONS EARLY LEARNING CENTER	60
1040083	CALVERT COUNTY EMERGENCY CENTER	25
1040084	KID'S FARM, INC.	105
1040085	SNEADE'S ACE HARDWARE (LUSBY)	40

PWSID	System Name	Population Served
1041027	DUNKIRK BUSINESS CENTER I	25
1041077	DUNKIRK VILLAGE SHOPPING CENTER	25
1041094	TOWN SQUARE SHOPPING CENTER	40
1041131	JEFFERSON PATTERSON STATE PARK	35
1041134	SNEADES HARDWARE (OWINGS)	40
1041151	LYONS CREEK SHOPPING CENTER	95
1041152	SHOPPES AT DUNKIRK - COUNTRY PLAZA	60
1041163	CROSSROAD CHRISTIAN CHURCH & DAYCARE	133
1041176	SHILOH CHRISTIAN ACADEMY	74
1041184	CARDINAL HICKEY ACADEMY	380
1041210	MARKETPLACE PROFESSIONAL CENTER	110
1041230	BAYSIDE CHEVROLET BUICK INC.	34

Table 2. Well Information for the Calvert County Non-Transient Non-Community Water Systems

PWSID	System Name	Plant ID	Source ID	Well Tag ID	Well Depth	Casing Depth	Completion Date	Hydro Unit	Aquifer	Aquifer Type	Ground Water Appropriation	Avg GPD
1040001	APPEAL ELEMENTARY SCHOOL	01	01	CA810064	428	408	11/18/1982	124E	PINEY POINT FORMATION	C	CA1973G010	5,300
1040004	MS. BEV'S PLACE	01	01	CA811278	300	250	1/30/1985	125B	AQUIA FORMATION	C	CA2005G020	1,400
1040006	BROOKS ADMINISTRATION BUILDING	01	01	CA007462	563	553	5/5/1951	125B	AQUIA FORMATION	C	CA1973G004	2,000
1040011	CALVERT CAREER CENTER	01	01	CA700097	572	533	4/30/1970	125B	AQUIA FORMATION	C	CA1970G005	27,000
1040012	CALVERT COUNTRY & CALVERT ELEMENTARY	01	01	CA032812	600	552	11/20/1958	125B	AQUIA FORMATION	C	CA1973G005	5,000
1040013	CALVERT COUNTY JAIL	01	01	CA881903	549	509	5/16/1991	125B	AQUIA FORMATION	C	CA1977G016	33,000
			02		0	0		125B	AQUIA FORMATION	C	CA1977G016	33,000
1040016	CALVERT HIGH SCHOOL	01	01	CA042924	581	576	6/15/1961	125B	AQUIA FORMATION	C	CA1970G005	27,000
1040018	CALVERT MIDDLE SCHOOL	01	01		600	220		125B	AQUIA FORMATION	C	CA1973G008	5,000
1040022	CALVERTON SCHOOL	01	01	CA880380	470	420	2/28/1989	125B	AQUIA FORMATION	C	CA1967G006	8,300
1040025	HUNTING CREEK ALTERNATIVE SCHOOL	01	01	CA017071	472	300	4/1/1955	124C	NANJEMOY FORMATION	C	CA1973G003	200
1040027	HUNTINGTOWN ELEMENTARY SCHOOL	01	01	CA710032	493	477	11/19/1970	125B	AQUIA FORMATION	C	CA1971G002	2,000
1040030	MT. HARMONY ELEMENTARY SCHOOL	01	01	CA037127	404	394	11/19/1959	125B	AQUIA FORMATION	C	CA1973G009	5,000
1040032	MUTUAL ELEMENTARY SCHOOL	01	01	CA731193	537	517	12/28/1975	125B	AQUIA FORMATION	C	CA1974G009	3,000
1040034	NORTHERN MIDDLE & HIGH SCHOOLS	01	01	CA720091	641	615	8/8/1972	211D	MAGOTHY FORMATION	C	CA1972G001	18,000
1040038	SOUTHERN MIDDLE SCHOOL	01	01	CA732144	687	617	11/18/1977	125B	AQUIA FORMATION	C	CA1977G008	7,500
1040041	SUNDERLAND ELEMENTARY SCHOOL	01	01	CA811891	520	463	1/10/1986	125B	AQUIA FORMATION	C	CA1985G015	2,200
1040051	CALVERT CO. INDUSTRIAL PARK	01	01	CA720022	448	355	11/17/1971	125B	AQUIA FORMATION	C	CA1970G007	60,000
			02	CA720023	448	355	1/5/1972	125B	AQUIA FORMATION	C	CA1970G007	60,000
1040052	MISS TINA DAY CARE	01	01	CA880266	300	250	12/12/1988	125B	AQUIA FORMATION	C	CA2005G023	700
1040053	CHESAPEAKE MONTESSORI LIMITED	01	02	CA944820	555	520	10/23/2003	125B	AQUIA FORMATION	C	CA2003G021	500
1040054	FIRST IMPRESSIONS DAYCARE CENTER	01	01	CA880682	340	226	8/16/1989	124C	NANJEMOY FORMATION	C	CA1989G013	1,000
1040063	PLUM POINT ELEMENTARY SCHOOL	01	01	CA881157	572	512	1/2/1991	125B	AQUIA FORMATION	C	CA1989G020	6,000
1040064	DUNKIRK MARKET PLACE	01	01	CA882052	580	520	3/29/1991	125B	AQUIA FORMATION	C	CA1990G008	15,000
1040065	PLUM POINT MIDDLE SCHOOL	01	01	CA881849	580	490	2/5/1992	125B	AQUIA FORMATION	C	CA1990G005	5,000
1040066	PATUXENT ELEMENTARY SCHOOL	01	01	CA882736	425	405	6/26/1992	124C	NANJEMOY FORMATION	C	CA1991G028	4,400
1040067	THE TIDEWATER SCHOOL	01	01	CA732849	275	231	8/14/1978	124E	PINEY POINT FORMATION	C	CA2005G006	800

PWSID	System Name	Plant ID	Source ID	Well Tag ID	Well Depth	Casing Depth	Completion Date	Hydro Unit	Aquifer	Aquifer Type	Ground Water Appropriation	Avg GPD
1040068	ISLAND CREEK COMMUNITY CENTER	01	02	CA940945	346	320	3/17/1998	124C	NANJEMOY FORMATION	C	CA1973G011	500
1040069	DUNKIRK SAFEWAY STORE #1129	01	01	CA882731	395	320	5/5/1992	125B	AQUIA FORMATION	C	CA1992G024	8,500
1040070	DUNKIRK MEDICAL CENTER	01	01	CA921043	520	310	4/4/1997	125B	AQUIA FORMATION	C	CA1996G020	2,600
1040071	CARROLL VICTORIA LODGE - HUNTINGTOWN	01	02	CA944765	520	490	9/18/2003	125B	AQUIA FORMATION	C	CA2005G011	900
1040074	SLEEPY HOLLOW DAYCARE	01	01	CA942560	495	484	8/19/2000	125B	AQUIA FORMATION	C	CA2000G011	1,500
		02	02	CA944936	510	440	4/14/2004	125B	AQUIA FORMATION	C	CA2000G011	1,500
1040075	HUNTINGTOWN HIGH SCHOOL	01	01	CA944147	595	483	12/17/2003	125B	AQUIA FORMATION	C	CA2002G001	15,500
1040078	SOLOMONS WWTP	01	01	CA811496	430	378	3/14/1986	124C	NANJEMOY FORMATION	C	CA2003G015	600
1040080	NOAH'S ARK LEARNING CENTER	01	01	CA943676	555	520	4/10/2002	125B	AQUIA FORMATION	C	CA2005G005	900
1040081	IMAGINE NATIONS EARLY LEARNING CENTER	01	01	CA733075	250	100	1/17/1979	124C	NANJEMOY FORMATION	C	CA2005G019	1,100
1040083	CALVERT COUNTY EMERGENCY CENTER	01	01	CA945372	588	518	4/19/2005	125B	AQUIA FORMATION	C	CA1986G015	100
1040084	KID'S FARM, INC.	01	01	CA884008	530	478	4/15/1994	125B	AQUIA FORMATION	C	CA1994G011	1,500
1040085	SNEADE'S ACE HARDWARE (LUSBY)	01	01	CA943607	427	400	5/22/2002	124E	PINEY POINT FORMATION	C	CA2001G001	400
1041027	DUNKIRK BUSINESS CENTER I	01	01	CA881220	465	440	3/15/1990	125B	AQUIA FORMATION	C	CA1989G023	6,100
1041077	DUNKIRK VILLAGE SHOPPING CENTER	01	01	CA730049	342	328	10/12/1972	125B	AQUIA FORMATION	C	CA1973G001	5,500
				CA881039	350	320	4/11/1989	125B	AQUIA FORMATION	C	CA1973G001	5,500
1041094	TOWN SQUARE SHOPPING CENTER	01	01	CA813195	360	301	7/1/1987	125B	AQUIA FORMATION	C	CA1987G005	3,000
1041131	JEFFERSON PATTERSON STATE PARK	01	01	CA883657	315	295	11/4/1993	124E	PINEY POINT FORMATION	C	CA1986G001	1,100
		02	02	CA811979	335	325	3/1/1986	124E	PINEY POINT FORMATION	C	CA1985G001	5,700
1041134	SNEADES HARDWARE (OWINGS)	01	01	CA880679	420	385	10/12/1989	125B	AQUIA FORMATION	C	CA1989G012	500
1041151	LYONS CREEK SHOPPING CENTER	01	01	CA880615	286	160	12/30/1989	125B	AQUIA FORMATION	C	CA1989G011	1,000
1041152	SHOPPES AT DUNKIRK - COUNTRY PLAZA	01	01	CA884576	372	335	2/1/1995	125B	AQUIA FORMATION	C	CA1995G005	5,600
			02	CA732866	320	252	9/11/1978	125B	AQUIA FORMATION	C	CA1995G005	5,600
1041163	CROSSROAD CHRISTIAN CHURCH & DAYCARE	01	01	CA882093	600	400	5/23/1991	125B	AQUIA FORMATION	C	CA1991G005	1,200
1041176	SHILOH CHRISTIAN ACADEMY	01	01	CA880725	270	240	10/17/1989	124C	NANJEMOY FORMATION	C	CA1989G017	1,100
1041184	CARDINAL HICKEY ACADEMY	01	01	CA881376	359	294	6/20/1990	125B	AQUIA FORMATION	C	CA2005G022	2,000
1041210	MARKETPLACE PROFESSIONAL CENTER	01	01	CA940696	315	300	4/22/1998	125B	AQUIA FORMATION	C	CA2005G018	2,500
1041230	BAYSIDE CHEVROLET BUICK INC.	01	01	CA943803	515	500	8/7/2002	125B	AQUIA FORMATION	C	CA2002G009	500

Table 3. Parameters Used for the Wellhead Protection Area Delineations for Systems Using >10,000 gpd

PWSID	System Name	Source ID	Avg GPD	Well pumpage (Q) in ft^3/yr	Screened interval in feet (H)	Aquifer	Calculated radius for WHPA in feet (r)	Acreage of WHPA	Comments on WHPA
1040011	CALVERT CAREER CENTER	01	13500*	658752	42	AQUIA	458	48	r = 600 ft used *104-0011 & 104-0016 permitted under the same appropriation permit, Q split between the two wells)
1040016	CALVERT HIGH SCHOOL	01	13500*	658752	37	AQUIA	476		
1040013	CALVERT COUNTY JAIL	01	33000	1610088	40	AQUIA	716	52	No well info could be located for Source 2. Assumed Q is pumped from Source 1.
		02	33000	1610088		AQUIA			
1040034	NORTHERN MIDDLE & HIGH SCHOOLS	01	18000	878278	26	MAGOTHY	656	31	-
1040051	CALVERT CO. INDUSTRIAL PARK	01	30,000*	1463796	83	AQUIA	474	38	r = 600 ft used *(Q split between the two wells)
		02	30,000*	1463796	86	AQUIA	466		
1040064	DUNKIRK MARKET PLACE	01	15000	731898	30	AQUIA	557	108	r = 600 ft used WHPA overlaps several other whpa in vicinity (See Figure 9)
1040075	HUNTINGTOWN HIGH SCHOOL	01	15500	756338	95	AQUIA	318	26	r = 600 ft used

Table 4. Potential Contaminant Point Sources Within WHPAs.

ID*	Type	Facility Name	Address	Reference Location	WHPA System Name	Potential Contaminants	Remarks
1	UST	Mt. Harmony Elementary School	900 W. Mt. Harmony Rd	Figure 5	Mt. Harmony Elementary School	VOC	1 tank
2	DISCH	Calvert Meats, Inc.	150 W. Mt. Harmony Rd	Figure 5	Mt. Harmony Elementary School	MP, N	Permit No. 96 DP-3194
3	UST	Betty Sisk, Inc. t/a Sisk Amoco	2975 W. Chesapeake Beach Rd	Figure 6	Lyons Creek Shopping Center	VOC	2 tanks
4	UST	New Dimensions Hair Salon	2755 W. Chesapeake Beach Rd	Figure 6	Lyons Creek Shopping Center	VOC	1 tank
5	UST	Dunkirk Citgo	9880 Southern Md Blvd	Figure 8	Dunkirk Medical Center	VOC	4 tanks
6	UST	Smithville United Methodist Church	Ferry Landing Rd at Souther Md Blvd	Figure 9	Town Square Shopping Center	VOC	1 tank
7	UST	Penwick House	2960 Penwick La	Figure 9	Town Square Shopping Center	VOC	2 tanks
8	CHS	Very Best Cleaners	10363 Southern Md Blvd	Figure 9	The Shoppes at Dunkirk LLC - Country Plaza	VOC	
9	SWF	Southern Md Pt	7659 Keith La	Figure 10	Dunkirk Business Center I		Permit No. 1998-WPT-0540
10	UST	Sunderland Elementary School	150 Clyde Jones Rd	Figure 11	Sunderland Elementary School	VOC	2 tanks
11	UST	Calvert Meeting House	50 Clyde Jones Rd	Figure 11	Sunderland Elementary School	VOC	1 tank
12	UST	Huntingtown Elementary School	4345 Huntingtown Rd	Figure 15	Huntingtown Elementary School and Sleepy Hollow Daycare	VOC	1 tank
13	UST	Hunting Creek Annex	4105 Old Town Rd	Figure 15	Hunting Creek Alternative School	VOC	1 tank
14	UST	Plum Point Elementary School	1245 Plum Point Rd	Figure 16	Plum Point Elementary School	VOC	2 tanks
15	UST	Plum Point Middle School	1475 Plum Point Rd	Figure 16	Plum Point Middle School	VOC	2 tanks
16	UST	Calverton School	2635 Solomons Island Rd	Figure 17	Calverton School	VOC	2 tanks
17	UST	Eugene Walton	2520 Solomons Island Rd	Figure 17	Calverton School	VOC	2 tanks
18	UST	D & S Silpasuvan, MD, PA	1430 Solomons Island Rd	Figure 18	First Impressions Daycare Center	VOC	1 tank
19	UST	Prince Frederick Motor Company	265 Solomons Island Rd N	Figure 19	Calvert Middle School	VOC	1 tank
20	UST	Calvert County Public Schools Maintenance	1305 Dares Beach Rd	Figure 20	Brooks Administration Building	VOC	1 tank
21	DISCH	Calvert County Industrial Park	300 Skipjack Rd	Figure 23	Calvert County Industrial Park	MP, N	Permit No. 95 DP-3173
22	UST	Mutual Elementary School		Figure 25	Mutual Elementary School	VOC	

ID*	Type	Facility Name	Address	Reference Location	WHPA System Name	Potential Contaminants	Remarks
23	CHS	Jefferson Patterson State Park	10515 Mackall Rd	Figure 28	Jefferson Patterson State Park	VOC	
24	SWF	Appeal	Sweetwater Rd	Figure 29	Solomons WWTP		Permit No. 1997-WMF-0531
25	UST	Patuxent Elementary	35 Appeal Lane	Figure 29	Patuxent Elementary School and Appeal Elementary School	VOC	2 tanks

* See referenced figure for location

DISCH = Groundwater Discharge, UST = Underground Storage Tank, CHS = CHS Generator, SWF = Solid Waste Facility

Table 5. Calvert County Non-Transient Non-Community Water Systems Treatment Methods				
PWSID	**System Name**	**Plant ID**	**Treatment Method**	**Reason for Treatment**
1040001	APPEAL ELEMENTARY SCHOOL	1	NO TREATMENT	
1040004	MS. BEV'S PLACE	1	HYPOCHLORINATION, POST	DISINFECTION
1040006	BROOKS ADMINISTRATION BUILDING	1	NO TREATMENT	
1040011	CALVERT CAREER CENTER	1	NO TREATMENT	
1040012	CALVERT COUNTRY & CALVERT ELEMENTARY	1	INHIB., ORTHOPHOSPHATE	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
1040013	CALVERT COUNTY JAIL	1	HYPOCHLORINATION, POST	DISINFECTION
1040016	CALVERT HIGH SCHOOL	1	NO TREATMENT	
1040018	CALVERT MIDDLE SCHOOL	1	INHIB., ORTHOPHOSPHATE	CORROSION CONTROL
1040022	CALVERTON SCHOOL	1	NO TREATMENT	
1040025	HUNTING CREEK ALTERNATIVE SCHOOL	1	HYPOCHLORINATION, POST	DISINFECTION
1040027	HUNTINGTOWN ELEMENTARY SCHOOL	1	INHIB., ORTHOPHOSPHATE	CORROSION CONTROL
1040030	MT. HARMONY ELEMENTARY SCHOOL	1	NO TREATMENT	
1040032	MUTUAL ELEMENTARY SCHOOL	1	HYPOCHLORINATION, POST	DISINFECTION
1040034	NORTHERN MIDDLE & HIGH SCHOOLS	1	INHIB., POLYPHOSPHATE	CORROSION CONTROL
1040038	SOUTHERN MIDDLE SCHOOL	1	HYPOCHLORINATION, POST	DISINFECTION
1040041	SUNDERLAND ELEMENTARY SCHOOL	1	INHIB., ORTHOPHOSPHATE	CORROSION CONTROL
			HYPOCHLORINATION, POST	DISINFECTION
1040051	CALVERT CO. INDUSTRIAL PARK	1	HYPOCHLORINATION, POST	DISINFECTION
1040052	MISS TINA DAY CARE	1	NO TREATMENT	-
1040053	CHESAPEAKE MONTESSORI LIMITED	1	NO TREATMENT	-
1040054	FIRST IMPRESSIONS DAYCARE CENTER	1	NO TREATMENT	-
1040063	PLUM POINT ELEMENTARY SCHOOL	1	INHIB., POLYPHOSPHATE	CORROSION CONTROL
1040064	DUNKIRK MARKET PLACE	1	HYPOCHLORINATION, POST	DISINFECTION
			ULTRAVIOLET RADIATION	DISINFECTION
1040065	PLUM POINT MIDDLE SCHOOL	1	INHIB., ORTHOPHOSPHATE	CORROSION CONTROL
1040066	PATUXENT ELEMENTARY SCHOOL	1	HYPOCHLORINATION, POST	
1040067	THE TIDEWATER SCHOOL	1	NO TREATMENT	-
1040068	ISLAND CREEK COMMUNITY CENTER	1	NO TREATMENT	
1040069	DUNKIRK SAFEWAY STORE #1129	1	NO TREATMENT	-

PWSID	System Name	Plant ID	Treatment Method	Reason for Treatment
1040070	DUNKIRK MEDICAL CENTER	1	HYPOCHLORINATION, POST	DISINFECTION
			ION EXCHANGE	IRON MANAGEMENT
1040071	CARROLL VICTORIA LODGE - HUNTINGTOWN	1	NO TREATMENT	-
1040074	SLEEPY HOLLOW DAYCARE	1	NO TREATMENT	
		2	ION EXCHANGE	IRON MANAGEMENT
1040075	HUNTINGTOWN HIGH SCHOOL	1	HYPOCHLORINATION, POST	DISINFECTION
1040078	SOLOMONS WWTP		HYPOCHLORINATION, POST	DISINFECTION
1040080	NOAH'S ARK LEARNING CENTER	1	NO TREATMENT	-
1040081	IMAGINE NATIONS EARLY LEARNING CENTER	1	ION EXCHANGE	IRON MANAGEMENT
1040083	CALVERT COUNTY EMERGENCY CENTER	1	ION EXCHANGE	
1040084	KID'S FARM, INC.	1	NO TREATMENT	
1040085	SNEADE'S ACE HARDWARE (LUSBY)	1	NO TREATMENT	-
1041027	DUNKIRK BUSINESS CENTER I	1	NO TREATMENT	
1041077	DUNKIRK VILLAGE SHOPPING CENTER	1	NO TREATMENT	
1041094	TOWN SQUARE SHOPPING CENTER	1	NO TREATMENT	
1041131	JEFFERSON PATTERSON STATE PARK	1	NO TREATMENT	
		2	FILTRATION, CARTRIDGE	INORGANICS REMOVAL
1041134	SNEADES HARDWARE (OWINGS)	1	NO TREATMENT	-
1041151	LYONS CREEK SHOPPING CENTER	1	NO TREATMENT	
1041152	SHOPPES AT DUNKIRK LLC - COUNTRY PLAZA	1	NO TREATMENT	
1041163	CROSSROAD CHRISTIAN CHURCH & DAYCARE	1	NO TREATMENT	
1041176	SHILOH CHRISTIAN ACADEMY	1	NO TREATMENT	
1041184	CARDINAL HICKEY ACADEMY AKA JESUS THE GO	1	NO TREATMENT	
1041210	MARKETPLACE PROFESSIONAL CENTER	1	NO TREATMENT	-
1041230	BAYSIDE CHEVROLET BUICK INC.	1	NO TREATMENT	-

Table 6 . Summary of Water Quality Samples for Calvert County Non-Transient Non-Community Water Systems.

PWSID	PWS_NAME	PLANT ID	IOCs		SOCs		VOCs		Radionuclides	
			No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL
1040001	APPEAL ELEMENTARY SCHOOL	1	14	1	-	-	7	-	-	-
1040004	MS. BEV'S PLACE	1	13	-	1	-	5	-	-	-
1040006	BROOKS ADMINISTRATION BUILDING	1	18	7	-	-	9	-	1	-
1040011	CALVERT CAREER CENTER	1	19	5	-	-	7	-	1	-
1040012	CALVERT COUNTRY & CALVERT ELEMENTARY	1	19	6	-	-	7	-	1	-
1040013	CALVERT COUNTY JAIL	1	23	3	-	-	7	-	1	-
1040016	CALVERT HIGH SCHOOL	1	18	3	-	-	8	-	1	-
1040018	CALVERT MIDDLE SCHOOL	1	18	-	-	-	7	-	1	-
1040022	CALVERTON SCHOOL	1	16	4	-	-	4	-	-	-
		2	4	-	1	-	3	-	-	-
1040025	HUNTING CREEK ALTERNATIVE SCHOOL	1	17	-	1	-	6	-	-	-
1040027	HUNTINGTOWN ELEMENTARY SCHOOL	1	16	2	-	-	7	-	1	-
1040030	MT. HARMONY ELEMENTARY SCHOOL	1	17	-	-	-	7	-	1	-
1040032	MUTUAL ELEMENTARY SCHOOL	1	15	1	1	-	9	-	-	-
1040034	NORTHERN MIDDLE & HIGH SCHOOLS	1	15	-	-	-	6	-	-	-
1040038	SOUTHERN MIDDLE SCHOOL	1	14	-	-	-	7	-	-	-
1040041	SUNDERLAND ELEMENTARY SCHOOL	1	16	-	-	-	7	-	1	-
1040051	CALVERT CO. INDUSTRIAL PARK	1	22	1	-	-	10	-	1	-
1040052	MISS TINA DAY CARE	1	11	-	1	-	7	-	-	-
1040053	CHESAPEAKE MONTESSORI LIMITED	1	17	2	1	-	7	-	-	-
1040054	FIRST IMPRESSIONS DAYCARE CENTER	1	12	-	1	-	4	-	-	-
1040063	PLUM POINT ELEMENTARY SCHOOL	1	15	6	-	-	4	-	1	-
1040064	DUNKIRK MARKET PLACE	1	19	1	2	-	3	-	-	-
1040065	PLUM POINT MIDDLE SCHOOL	1	16	3	-	-	4	-	1	-
1040066	PATUXENT ELEMENTARY SCHOOL	1	14	-	-	-	7	-	-	-
1040067	THE TIDEWATER SCHOOL	1	12	-	1	-	6	-	-	-

PWSID	PWS_NAME	PLANT ID	IOCs		SOCs		VOCs		Radionuclides	
			No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL
1040068	ISLAND CREEK COMMUNITY CENTER	1	13	1	1	-	6	-	-	-
1040069	DUNKIRK SAFEWAY STORE #1129	1	17	1	1	-	4	-	-	-
1040070	DUNKIRK MEDICAL CENTER	1	11	-	-	-	8	-	-	-
1040071	CARROLL VICTORIA LODGE - HUNTINGTOWN	1	8	-	1	-	5	-	-	-
1040074	SLEEPY HOLLOW DAYCARE	1	6	-	1	-	8	-	-	-
		2	2	2	-	-	6	-	-	-
1040075	HUNTINGTOWN HIGH SCHOOL	1	2	1	-	-	1	-	-	-
1040078	SOLOMONS WWTP	1	4	-	1	-	5	-	-	-
1040080	NOAH'S ARK LEARNING CENTER	1	3	2	1	-	3	-	-	-
1040081	IMAGINE NATIONS EARLY LEARNING CENTER	1	2	-	1	-	4	-	-	-
1040083	CALVERT COUNTY EMERGENCY CENTER	1	1	1	2	-	1	-	1	1
1040084	KID'S FARM, INC.	1	-	-	-	-	-	-	-	-
1040085	SNEADE'S ACE HARDWARE (LUSBY)	1	2	1	-	-	-	-	-	-
1041027	DUNKIRK BUSINESS CENTER I	1	8	-	-	-	-	-	-	-
1041077	DUNKIRK VILLAGE SHOPPING CENTER	1	8	-	-	-	-	-	-	-
1041094	TOWN SQUARE SHOPPING CENTER	1	5	-	-	-	-	-	-	-
1041131	JEFFERSON PATTERSON STATE PARK	1	11	-	1	-	7	-	-	-
		2	7	-	-	-	-	-	-	-
1041134	SNEADES HARDWARE (OWINGS)	1	8	-	-	-	-	-	-	-
1041151	LYONS CREEK SHOPPING CENTER	1	8	-	-	-	-	-	-	-
1041152	SHOPPES AT DUNKIRK - COUNTRY PLAZA	1	8	-	-	-	-	-	-	-
1041163	CROSSROAD CHRISTIAN CHURCH & DAYCARE	1	5	-	-	-	-	-	-	-
1041176	SHILOH CHRISTIAN ACADEMY	1	7	-	2	-	5	-	-	-
1041184	CARDINAL HICKEY ACADEMY	1	9	-	-	-	-	-	-	-
1041210	MARKETPLACE PROFESSIONAL CENTER	1	17	-	1	-	7	-	-	-
1041230	BAYSIDE CHEVROLET BUICK INC.	1	7	-	-	-	-	-	-	-

Table 7. Regulated Inorganic Compounds (IOCs) Exceeding 50% of the MCL

PWSID	System Name	PL	Contaminant Name	MCL*	Sample Date	Result*
1040001	APPEAL ELEMENTARY SCHOOL	1	ARSENIC	0.01	6-Jun-02	0.0053
1040006	BROOKS ADMINISTRATION BUILDING	1	ARSENIC	0.01	9-Feb-98	0.012
					31-Jan-01	0.006
					14-Mar-01	0.0089
					18-Dec-01	0.007
					29-Mar-04	0.008
					21-Jan-05	0.0053
					27-Apr-05	0.0075
1040011	CALVERT CAREER CENTER	1	ARSENIC	0.01	14-Mar-01	0.011
					25-Sep-01	0.008
					29-Mar-04	0.007
					21-Jan-05	0.0058
					27-Apr-05	0.0062
1040012	CALVERT COUNTRY & CALVERT ELEMENTARY	1	ARSENIC	0.01	14-Mar-01	0.012
					25-Sep-01	0.007
					10-Jun-04	0.008
					21-Jan-05	0.0062
					27-Apr-05	0.0062
					22-Jul-05	0.0088
1040013	CALVERT COUNTY JAIL	1	ARSENIC	0.01	24-Sep-98	0.01
					16-Oct-01	0.009
					26-Jul-04	0.009
1040016	CALVERT HIGH SCHOOL	1	ARSENIC	0.01	14-Mar-01	0.0087
					25-Sep-01	0.007
					29-Mar-04	0.007
1040022	CALVERTON SCHOOL	1	ARSENIC	0.01	8-Nov-99	0.01
					12-Feb-03	0.009
					25-May-05	0.015
					10-Aug-05	0.013
			CHROMIUM	0.1	25-May-05	0.1
1040027	HUNTINGTOWN ELEMENTARY SCHOOL	1	ARSENIC	0.01	14-Mar-01	0.0094
					29-Mar-04	0.007
1040032	MUTUAL ELEMENTARY SCHOOL	1	ARSENIC	0.01	6-Jun-02	0.0087
1040051	CALVERT CO. INDUSTRIAL PARK	1	ARSENIC	0.01	16-Oct-01	0.007
1040053	CHESAPEAKE MONTESSORI LIMITED	1	ARSENIC	0.01	24-May-05	0.006
					28-Jun-05	0.0085
1040063	PLUM POINT ELEMENTARY SCHOOL	1	ARSENIC	0.01	14-Mar-01	0.012
		1			28-Aug-01	0.008
		1			22-Mar-04	0.008
		1			21-Jan-05	0.0058
		1			27-Apr-05	0.007
		1			22-Jul-05	0.0066
1040064	DUNKIRK MARKET PLACE	1	NITRATE	10	5-Jan-93	5.2

PWSID	System Name	PL	Contaminant Name	MCL*	Sample Date	Result*
1040065	PLUM POINT MIDDLE SCHOOL	1	ARSENIC	0.01	14-Mar-01	0.0098
					28-Aug-01	0.007
					22-Mar-04	0.008
1040068	ISLAND CREEK COMMUNITY CENTER	1	LEAD	0.015	3-Apr-98	0.008
1040069	DUNKIRK SAFEWAY STORE #1129	1	NITRATE	10	5-Jan-93	5.2
1040074	SLEEPY HOLLOW DAYCARE	2	ARSENIC	0.01	29-Dec-04	0.005
					23-May-05	0.006
1040075	HUNTINGTOWN HIGH SCHOOL	1	ARSENIC	0.01	23-May-05	0.008
1040080	NOAH'S ARK LEARNING CENTER	1	ARSENIC	0.01	23-May-05	0.007
					6-Jul-05	0.007
1040083	CALVERT COUNTY EMERGENCY CENTER	1	ARSENIC	0.01	12-May-05	0.0064
1040085	SNEADE'S ACE HARDWARE (LUSBY)	1	ARSENIC	0.01	19-Apr-05	0.005

* in mg/l

Table 8. Susceptibility Analysis Summary

PWSID	SYSTEM NAME	Is the Water System Susceptible to....				
		Inorganic Compounds (except arsenic)	Arsenic	Volatile Organic Compounds	Synthetic Organic Compounds	Microbiological Contaminants
1040001	APPEAL ELEMENTARY SCHOOL	NO	YES	NO	NO	NO
1040004	MS. BEV'S PLACE	NO	NO	NO	NO	NO
1040006	BROOKS ADMINISTRATION BUILDING	NO	YES	NO	NO	NO
1040011	CALVERT CAREER CENTER	NO	YES	NO	NO	NO
1040012	CALVERT COUNTRY & CALVERT ELEMENTARY	NO	YES	NO	NO	NO
1040013	CALVERT COUNTY JAIL	NO	YES	NO	NO	NO
1040016	CALVERT HIGH SCHOOL	NO	YES	NO	NO	NO
1040018	CALVERT MIDDLE SCHOOL	NO	NO	NO	NO	NO
1040022	CALVERTON SCHOOL	NO	YES	NO	NO	NO
1040025	HUNTING CREEK ALTERNATIVE SCHOOL	NO	NO	NO	NO	NO
1040027	HUNTINGTOWN ELEMENTARY SCHOOL	NO	YES	NO	NO	NO
1040030	MT. HARMONY ELEMENTARY SCHOOL	NO	NO	NO	NO	NO
1040032	MUTUAL ELEMENTARY SCHOOL	NO	YES	NO	NO	NO
1040034	NORTHERN MIDDLE & HIGH SCHOOLS	NO	NO	NO	NO	NO
1040038	SOUTHERN MIDDLE SCHOOL	NO	NO	NO	NO	NO
1040041	SUNDERLAND ELEMENTARY SCHOOL	NO	NO	NO	NO	NO
1040051	CALVERT CO. INDUSTRIAL PARK	NO	YES	NO	NO	NO
1040052	MISS TINA DAY CARE	NO	NO	NO	NO	NO
1040053	CHESAPEAKE MONTESSORI LIMITED	NO	YES	NO	NO	NO
1040054	FIRST IMPRESSIONS DAYCARE CENTER	NO	NO	NO	NO	NO
1040063	PLUM POINT ELEMENTARY SCHOOL	NO	YES	NO	NO	NO
1040064	DUNKIRK MARKET PLACE	NO	NO	NO	NO	NO
1040065	PLUM POINT MIDDLE SCHOOL	NO	YES	NO	NO	NO
1040066	PATUXENT ELEMENTARY SCHOOL	NO	NO	NO	NO	NO
1040067	THE TIDEWATER SCHOOL	NO	NO	NO	NO	NO
1040068	ISLAND CREEK COMMUNITY CENTER	NO	NO	NO	NO	NO
1040069	DUNKIRK SAFEWAY STORE #1129	NO	NO	NO	NO	NO
1040070	DUNKIRK MEDICAL CENTER	NO	NO	NO	NO	NO
1040071	CARROLL VICTORIA LODGE - HUNTINGTOWN	NO	NO	NO	NO	NO
1040074	SLEEPY HOLLOW DAYCARE	NO	YES	NO	NO	NO
1040075	HUNTINGTOWN HIGH SCHOOL	NO	YES	NO	NO	NO
1040078	SOLOMONS WWTP	NO	NO	NO	NO	NO
1040080	NOAH'S ARK LEARNING CENTER	NO	YES	NO	NO	NO
1040081	IMAGINE NATIONS EARLY LEARNING CENTER	NO	NO	NO	NO	NO
1040083	CALVERT COUNTY EMERGENCY CENTER	NO	YES	NO	NO	NO
1040084	KID'S FARM, INC.	NO	NO	NO	NO	NO
1040085	SNEADE'S ACE HARDWARE (LUSBY)	NO	YES	NO	NO	NO
1041027	DUNKIRK BUSINESS CENTER I	NO	NO	NO	NO	NO
1041077	DUNKIRK VILLAGE SHOPPING CENTER	NO	NO	NO	NO	NO
1041094	TOWN SQUARE SHOPPING CENTER	NO	NO	NO	NO	NO
1041131	JEFFERSON PATTERSON STATE PARK	NO	NO	NO	NO	NO
1041134	SNEADES HARDWARE (OWINGS)	NO	NO	NO	NO	NO
1041151	LYONS CREEK SHOPPING CENTER	NO	NO	NO	NO	NO
1041152	SHOPPES AT DUNKIRK - COUNTRY PLAZA	NO	NO	NO	NO	NO
1041163	CROSSROAD CHRISTIAN CHURCH & DAYCARE	NO	NO	NO	NO	NO
1041176	SHILOH CHRISTIAN ACADEMY	NO	NO	NO	NO	NO
1041184	CARDINAL HICKEY ACADEMY	NO	NO	NO	NO	NO
1041210	MARKETPLACE PROFESSIONAL CENTER	NO	NO	NO	NO	NO
1041230	BAYSIDE CHEVROLET BUICK INC.	NO	NO	NO	NO	NO

FIGURES

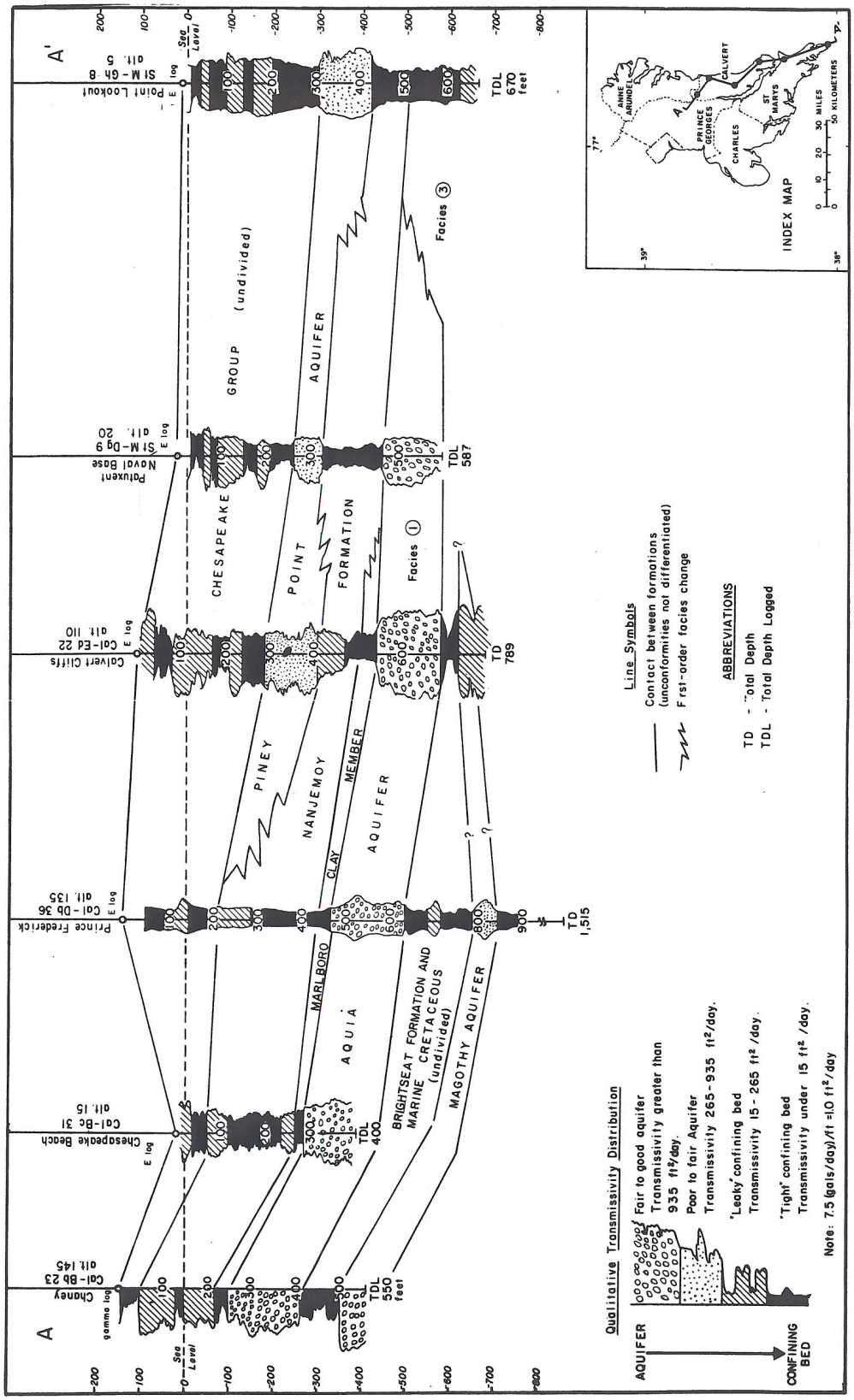


Figure 2 · Geologic Section from Northern Calvert County to Southern St. Mary's County (Kapple and Hansen, 1976)

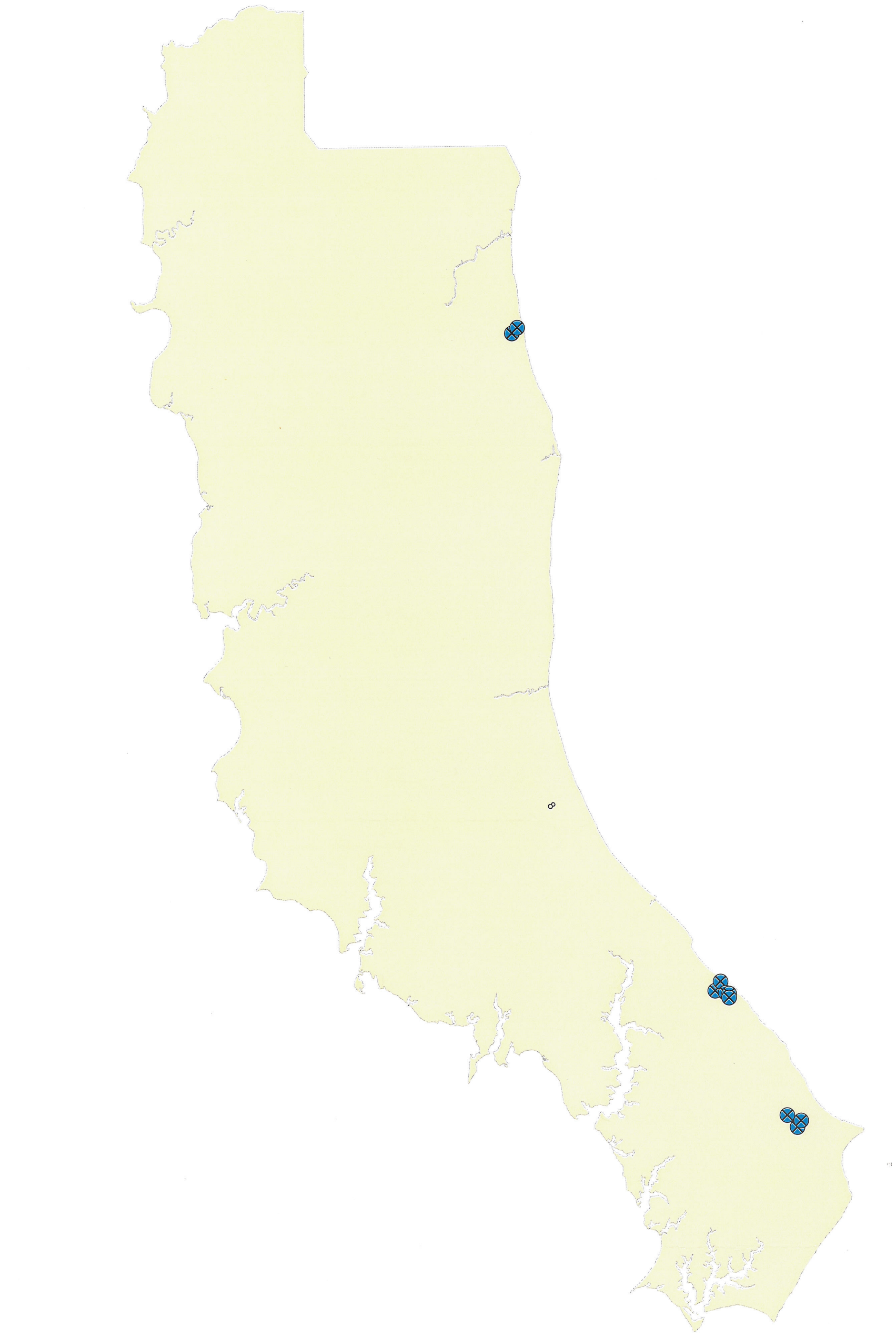


Figure 1. Location of Calvert County Non-Transient Non-Community Water Systems Addressed in this Report