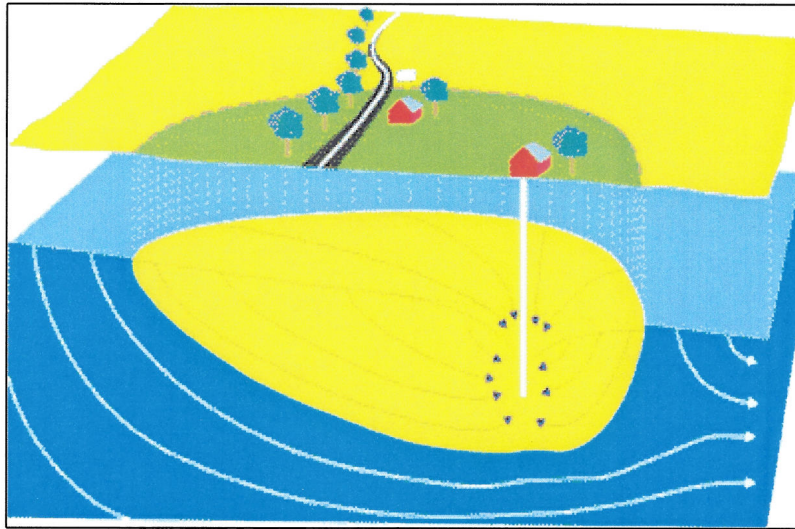


# SOURCE WATER ASSESSMENT

For Transient Water Systems

Somerset County, Maryland



Prepared By  
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Water Supply Program  
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## SUMMARY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-five transient noncommunity water systems in Somerset 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. Twenty-seven wells supply the twenty-five transient systems in Somerset County. Through investigation of MDE records and interviewing system owners, it was concluded that all of the twenty-seven wells are completed in confined aquifers.

The WSP reviewed water quality results, along with the presence of potential sources of contamination within the individual assessment area, the integrity of the system's well, and the inherent vulnerability of the aquifer. It was determined that none of the transient systems are susceptible to contamination by nitrogen compounds. None of the transient systems are susceptible to volatile organic compounds; however, some systems are susceptible to microbiological contaminants through well construction deficiencies. The sanitary integrity of the water supply systems may be maintained by following the protection recommendations at the end of this report. These recommendations include disinfecting a well and system after work is performed on the well or system, installing a two-piece cap on the wells, caulking the electrical conduits and continuing regular sanitary inspections.

## **INTRODUCTION**

The Water Supply Program (WSP) has conducted a Source Water Assessment for twenty-five transient noncommunity water systems in Somerset County (Figure 1). As defined in Maryland's Source Water Assessment Plan (SWAP), a transient noncommunity water system is any noncommunity water system that does not regularly serve at least twenty-five of the same individuals over six months per year. Some good examples of transient water systems include hotels, restaurants, parks, fire departments, and churches. The transient systems must sample for two contaminants. The first is coliform, which is an indicator that other microbiological contaminants could be in the water supply. Systems are required to test for coliform regularly. Additional sampling is required following positive coliform results. The second contaminant is nitrogen in the form of nitrate or nitrite. This SWAP report will focus on these two contaminants, but will address other obvious potential sources of contamination.

Somerset County is located in the lower Eastern Shore portion of the State and is part of the Coastal Plain physiographic province. The Coastal Plain, geologically the youngest province in Maryland, covers nearly half of the State and consists entirely of unconsolidated sediments. All of the transient water supplies obtain their water from wells of various size and depth. All of these wells 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 completed in confined or unconfined aquifers. An accurate determination of the aquifer type is very important because it helps explain how vulnerable the water supply source is to contamination.

## **WELL INFORMATION**

Well information for each system was obtained from the WSP's database, owner interviews, site visits, well completion reports, sanitary survey inspection reports, and published reports. A total of twenty-seven wells are used by the twenty-five transient systems assessed in this report. The well tag number, which provides vital well information, was found for twenty-four of the twenty-seven wells (Table 1). From the well tag information, ground water appropriation data, and with the nitrate sampling data it was concluded that all twenty-seven wells are completed in confined aquifers (Aquifer code "C"). Table 1 contains a summary of the well information for each system.

The well information that was available at the start of this project for the transient systems in Somerset County needed to be supplemented with additional research in order to perform the Source Water Assessment for the county. Using this information, it was determined that all but six of the wells were completed in confined aquifers. Through field investigations, nitrate sampling data and interviews with the system owners it was determined that five of these six systems were using confined wells and one system was closed. Well and contaminant locations were taken with a GPS unit at the six transient systems that required field work. The other wells were located by using both the county sanitary survey and DNR DOQQ photos. Information was found that at least twenty-two

of the twenty-seven wells were completed after 1973, which is when the state adopted the grouting standards for construction of wells.

## **HYDROGEOLOGY**

Somerset County is located in the Eastern Shore of Maryland. The county is in the Coastal Plain physiographic province, which is characterized by low topography due to the underlying horizontal sedimentary layers. All of the transient wells in Somerset County draw water from unconsolidated sediments. Ground water flows through pores between gravel, sand, and silt grains in unconsolidated sedimentary aquifers. An aquifer is any formation that is capable of yielding a significant amount of water. Confined aquifers are those formations that are overlain by a confining layer consisting of clay or fine silt (Figure 2). This confining layer, generally composed of clay and silt, allows very little water to travel vertically through it. 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. Unconfined aquifers are also known as water table aquifers. Precipitation that falls on the ground surface infiltrates directly into the water table aquifer. Transient water systems in Somerset County pump water from one of two aquifers. The first and shallowest of the two is the Pocomoke Aquifer. This aquifer can be confined or unconfined depending on where in Somerset County the well is drilled. The second aquifer is the Manokin Aquifer and it is confined across Somerset County. (DNR,1987)

### Pocomoke Aquifer (122I)

The Pocomoke aquifer is present only in the southeastern two-thirds of the county. It consists primarily of gray, fine- to medium-grained fossiliferous sand with stringers of small gravel and coarse sand and thin lenses of brown or blue clay. Thickness of the aquifer is variable and ranges from zero at its northwestern limit to more than seventy-five feet in the southeastern part of the county. In recharge areas, the Pocomoke aquifer is generally unconfined and water chemistry is influenced chiefly by the composition of precipitation, aquifer mineralogy, land use, soil type, and position in the ground-water-flow system. In contrast, analyses of water from the confined parts of the aquifer are more similar, probably due to the influence of mineral dissolution on water chemistry. The amount of dissolved constituents, especially calcium and bicarbonate, increases as water moves from subcrop areas to the confined parts of the aquifer. Hardness of water from recharge areas ranges from 11 to 100 mg/L and has a median value of 33 mg/L. In the confined part of the aquifer hardness of the water ranges from 22 to 410 mg/L, and has a median value of 140 mg/L. The pH of the water from recharge areas ranges from 4.5 to 6.4, and has a median of 5.1. In the confined part of the aquifer, pH of the water tends to be higher, ranging from 5.1 to 7.3, and has a median of 6.4. Dissolved-solids concentrations of water from recharge areas range from 90 to 177 mg/L, and have a median of 131 mg/L. In water from the confined part of the aquifer, dissolved-solids concentrations range from 116 to

1,440 mg/L, and have a median of 287 mg/L. Overall, water in the recharge areas is more acidic, softer, and contains lower concentrations of dissolved solids than water in confined parts of the aquifer. These distributions reflect the longer flow paths in the confined system and the longer contact time between water and minerals of the aquifer matrix. The most common quality problems in water from the Pocomoke aquifer are excess iron and manganese concentrations. (MGS, 1990)

### Manokin Aquifer (122G)

The Manokin Aquifer is the primary aquifer used for water supply in Somerset County. It consists principally of gray, fine- to medium-grained sand and contains some shell material. The Manokin aquifer subcrops beneath the Chesapeake Bay west of Deal Island. The thickness ranges from zero, where the aquifer becomes finer grained, to more than 80 feet in the northeastern corner of the county. There is a marked difference in the chemical quality of water from the Manokin aquifer. North of Westover, the water is a sodium-bicarbonate type, dissolved solids range from 173 to 620 mg/L, and hardness ranges from 2 to 97 mg/L. South of Westover, the water is a sodium-chloride type, dissolved solids range from 807 to 1,860 mg/L, and hardness ranges from 76 to 260 mg/L. Dissolved iron is a problem in the Manokin aquifer in the northern part of the county, where concentrations in water samples reach 4.1 mg/L. Iron concentrations are generally greatest in the northeastern corner of the county and progressively decrease toward the south. In Somerset County pH tends to increase in the northeast to west to southwest directions probably because bicarbonate is brought into solution from mineral dissolution (MGS, 1990).

## **SOURCE WATER ASSESSMENT AREA DELINEATION**

As defined in Maryland's SWAP, no delineation area will be created for the transient systems drawing from confined sources. This is because the monitoring of these wells for their regulated contaminants and geologic protection has established that they are not vulnerable to contamination from surface activities. The assessment focuses on the integrity of their water supply well(s).

## **POTENTIAL SOURCES OF CONTAMINATION**

Since all the wells the transient water systems are using are confined, there are no source water assessment areas delineated. Therefore no potential sources of contamination were identified on the land surface.

### Land Use

The Maryland Office of Planning's (MOP) 2002 Land Use map for Somerset County was used to identify the types of land use within the county (Figure 3). The most prevalent land use types within the county are Forest, Wetlands and

Cropland at 39.8%, 25.41% and 23.85% respectively. These types of land use would be expected since Somerset County is rural.

### Sewer

The Maryland Office of Planning 2002 Somerset County Sewer map shows that only 2.2 percent of the county currently has sewer service (Figure 5). Another 2.4 percent is expected to have sewer service in 3 to 5 years. An additional 0.7 percent is scheduled to receive service in 6 to 10 years. At this time there are no plans to provide any new sewer service to the other 94.7 percent of Somerset County.

Somerset County is one of the counties within Maryland that, in certain areas, allows septic effluent contamination of the shallow aquifer. Figure 6 shows the areas within the county and what the requirements are in each area.

## **WATER QUALITY DATA**

Water quality data was reviewed from the Water Supply Program's database for Safe Drinking Water Act (SDWA) contaminants. All data reported is from the water supplied to consumers. Ten of Somerset County's Transient Systems are known to have some type of water treatment. Table 2 summarizes the treatment methods and the reason for that treatment. Only three of the systems use disinfection. If coliforms are not present in the finished water for the other twenty-two systems, this data can be used to evaluate ground water or source water quality. A review of the monitoring data shows that there is some microbiological contamination believed to be caused by well construction, treatment, and/or distribution deficiencies. None of the systems were determined to be susceptible to nitrate or nitrite.

### Nitrogen compounds

Water quality data indicates that the nitrate levels for all of these twenty-five systems are <50% of the SDWA maximum contaminate level (MCL) standards (Table 3). Both Arby's General Store and Barbeque Junction have had a nitrate result exceeding 1 ppm. Barbeque Junction just drilled a new well that is completed in a confined aquifer. After reviewing the other sample results for Arby's General Store it is suspected that the sample result of 2 ppm on 1/22/03 may be a sampling or lab error.

None of the systems had nitrite results that exceeded even 50% of the MCL of 1ppm. This should be expected since all of the twenty-seven wells are completed in confined aquifers that shouldn't contain much if any nitrate or nitrite.

### Microbiological Contaminants

All of the transient water suppliers are routinely sampled for microbiological contamination. If this routine sample is positive the system must then resample within twenty-four hours or as soon as possible. This bacterial sampling is required by the SDWA (Table 4). Eight of the systems have never had a positive bacterial sample. Nine systems have had more than twenty-five percent of their

## SUSCEPTIBILITY ANALYSIS

Wells serving the Somerset County Transient Water Systems all draw their water from wells in unconsolidated sedimentary aquifers. All twenty-seven of these wells are completed in confined aquifers. The wells drawing from confined aquifers are protected, if the well is maintained and constructed correctly, and are not susceptible to contamination from surface activity. Unconfined aquifer wells are more susceptible to contamination from surface activities. Somerset County's unconsolidated sediments, and soil, provide protection from microbiological contamination as water percolates through the overlying soil and aquifer sediments where the soil is unsaturated. Where the soil is saturated because of the high water table the soil does not filter out the bacteria and viruses as well. Regardless of whether the soil is saturated or unsaturated, nitrate and other water-soluble contaminants can percolate through the soil and contaminate unconfined wells.

### Inorganic Compounds

There were no significant nitrate or nitrite results for the twenty-five systems. This was expected because all of the systems are determined to be confined and the nitrate levels in confined aquifers are very low to nonexistent.

Two of the systems, Arby's General Store and Barbeque Junction, have positive nitrate samples  $\geq 1$ ppm. For both of these systems, only one of the nitrate sample results were at or above 1 mg/L. All other nitrate samples before and after this sample have been no detect or very close to the detection limit.

### Microbiological Contaminants

As stated earlier in this report, Somerset County's unsaturated unconsolidated sediments, and soil, provide protection from microbiological contamination as water percolates through the overlying soil and aquifer sediments. Most, if not all, of the microbiological contamination of unconsolidated wells comes from either well construction problems or contamination of the well water with bacteria in either the treatment or distribution.

Well construction problems can be caused from improper completion of the well by the well driller, but are mostly caused by vehicles hitting unprotected wells. Common problems include cracked or broken well casings, and well caps. Pitless adaptors and the grouting can also be damaged during well vehicle accidents. Wells constructed in pits or low areas that are subject to flooding should be inspected and sampled to ensure their integrity. Waterproof caps are also available to be installed on wells drilled in areas prone to flooding.

All of these construction deficiencies can allow surface water containing microbiological contaminants to enter a well. Two-piece insect proof caps should be installed on all wells to prevent insects from entering the wellhead, which can cause bacterial problems.



Contaminating clean well water with coliform is very easy. Ion-exchange units, and cartridge filters can harbor bacteria that will cause positive bacterial samples. Storage or a distribution problem or repair can also introduce the coliform into the system. Correctly disinfecting the water system is very important after pulling a well pump or completing improvements to the distribution system. Dead ends in the water distribution can also cause bacterial problems.

**Confined Wells with >25% Positive Bacterial Results:**

If there are no well construction problems with a well drawing from a confined aquifer the supply should be safe from microbiological contamination. A review of Table 4 indicates that at least seventeen of the twenty-seven confined systems have had at least one positive total coliform sample in the past eight years. Nine of the systems have had greater than 25% of their samples come back positive for coliform.

The well for Big Apple Seafood was completed in 1986, however, field investigations revealed that it is still fitted with a one-piece cap. This could allow contamination of the well by insects or airborne dust. Also, there is no protection surrounding the well, so if it was struck, the well could have been damaged below grade. This could allow contaminated surface water to enter the well and contaminate the water supply.

The inspection of Eden One Stop revealed that there could be multiple causes of their bacterial problems. The well is very close to the parking lot and is only protected by parking blocks. The well may have been struck and damaged below grade. Efforts should be made to install a protective barrier around the wellhead. The positive bacterial results may be from sampling at the sinks fitted with swivel taps or from the bathroom taps. Also, from a field visit, it was determined that Eden One Stop uses cartridge filters to treat water for the soda machine. If the filters are fouled, this could also be a cause of contamination. The well is fitted with a two-piece cap and the above ground well integrity appears to be good.

The Fire and Rescue Center uses a well with a one-piece cap that should be replaced with an insect proof two-piece style. A thorough sanitary survey of the distribution should be performed identifying dead ends and cross connections. Also, if there are stagnant areas of the distribution system, bacteria may have time to grow, which may cause positive total coliform samples.

Lucky's Market and Walter Polk American Legion use buried wells. The integrity of the wellheads cannot be examined without excavation. These wells should be extended above grade to conform to the well construction regulations. The distribution systems should be inspected to identify possible dead ends and cross connections.

The well for VFW Home #8274 is in an area off of an unpaved road used by tractors. There is no protection around the wellhead, except for a metal guard used to shield the well from gunshot from a nearby target practice field. A vehicle could damage the well unless a protective barrier is installed.

Whites Market replaced the well that had positive bacterial results with a new well. There have been no more positive results since the new well has been used.

Barbeque Junction recently replaced their old well with a new well. The old well should be abandoned once the new well is installed.

## **SUMMARY AND RECOMMENDATIONS FOR PROTECTING WATER SUPPLIES**

### Key Findings:

This report identified transient water supplies in Somerset County as being more likely to be contaminated by microbiological contaminants than nitrate or nitrite nitrogen. Sources of microbiological contamination, however, are not believed to be related to ground water contamination, but rather the maintenance of the integrity of the individual water supply system. Forest was the most common type of land use within the county. The recommendations that immediately follow are a result of these key findings.

### Recommendations for Individual Water System Owners

- The sanitary integrity of the water supply system must be maintained. Sanitary defects noted in county sanitary surveys should be corrected. All work on the water system should be performed in a sanitary manner and followed with a one-time disinfection.
- Coliform testing results are a good indication if the sanitary integrity of the system has been affected. All positive results should be investigated to determine the cause of the positive tests. Corrective action should be taken to eliminate the source of the problem. Any sources with confirmed fecal contamination must be rehabilitated or abandoned.
- Installing new two-piece well caps is a good way to reduce potential contamination from insects. Caulking of the electrical conduit is needed to ensure a sanitary seal.
- Any wells in areas subject to flooding or just above grade should be sampled following significant rain events to demonstrate if they are sensitive to flooding impacts. If the wells are sensitive to flooding impacts, a watertight model well cap should be installed.
- Water systems for seasonal facilities should be disinfected and flushed prior to the opening of a new season.
- Wells should be protected from damage by vehicles or other machinery. If a well is or was damaged, it should be repaired. All work on wells should be followed by disinfection to avoid contamination of the water supply.

Recommendations for County Officials

- Continue regular inspection, oversight and testing of transient noncommunity water systems. Ensure that systems correct the cause of positive bacterial test results.
- Test results show that some systems have a high percentage of positive results. Priority should be placed on those systems that have not corrected the root causes of past positive results.

## References

Maryland Department of the Environment. 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.

Werkheiser William, 1990, Hydrogeology and Ground-water Resources of Somerset County, Maryland: (DNR) Bulletin 35.

Rasmussen William, Slaughter Turbit, 1955, The Water Resources of Somerset, Wicomico and Worcester Counties: (DNR) Bulletin 16.

Maryland Code of Regulations (COMAR) 26.04.02.04

## Other Sources of Data

Water Appropriation and Use Permits

Somerset County Sanitary Survey Inspection Reports

MDE Water Supply Program (PDWIS) Database

MDE Waste Management Sites Database

Department of Natural Resources Digital Orthophoto Quarter Quadrangles

USGS Topographic 7.5 Minute Quadrangles

Maryland Office of Planning 2000 Somerset County Land Use Map

Maryland Office of Planning 1983 Somerset County Sewer Map

PWSID	System Name	Source #	Plant #	Use Code	Ground Water Appropriation	Aquifer Code	Aquifer Type	Well Tag #	Casing Depth	Well Depth
1191005	BIG APPLE SEAFOOD	1	1	P	SO1986G004	122G	C	SO810859	120	240
1191006	LUCKY'S MARKET	1	1	P		122G	C	SO810586	120	140
1191012	CRISFIELD AIRPORT	1	1	P	SO1973G001	122G	C	SO731935	130	155
1191019	EDEN ONE STOP	2	1	P	SO1982G003	122G	C	SO940803	240	260
1191032	RIVER MARKET INC	1	1	P	SO1967G010	122I	C	SO670100		78
1191044	LAKE SOMERSET CAMPGROUND	1	1	P		122I	C	SO920099	70	90
1191097	VFW HOME #8274	1	1	P	SO1959G001	122G	C	SO940627	180	200
1191098	WALTER POLK AMERICAN LEGION	1	1	P	SO1998G007	122G	C	SO940346	180	200
1191100	DASH IN	1	1	P	SO1981G004	122G	C	SO811737	200	220
1191102	WHITES MARKET	2	1	P	SO2004G003	122G	C	SO941202	140	160
1191105	413 MINI MART	1	1	P	SO1994G004	122G	C	SO920035	130	150
1191106	ARBYS GENERAL STORE	1	1	P		9999	C			
1191109	BUCKS STORE	1	1	P		9999	C			
1191110	PRINCESS ANNE CAMPGROUND	1	1	P	SO1971G007	122G	C	SO710089	167	187
1191110	PRINCESS ANNE CAMPGROUND	3	1	P		122G	C	SO810421	170	190
1191111	WESTOVER FOOD MART	1	1	P	SO1987G003	122G	C	SO811220	140	230
1191112	FIRE AND RESCUE CENTER	1	1	P	SO1993G020	122G	C	SO940686	165	195
1191113	GREAT HOPE GOLF COURSE	2	1	P	SO1995G004	122G	C	SO940003	118	148
1191113	GREAT HOPE GOLF COURSE	1	1	S	SO1995G004	122I	C	SO920239	78	98
1191115	SOMERSET LABOR CAMP- SECTION A	1	1	P	SO1972G005	122G	C	SO920046	200	230
1191118	BARBEQUE JUNCTION	1	1	P	SO1988G003	9999	C	SO941291		220
1191119	SIX L'S TOMATO PLANT	1	1	P		122I	C	SO940766	50	75
1191120	COMMUNITY CONVENIENCE STORE	1	1	P		122G	C	SO810249	135	160
1191121	JOANNIE'S COUNTRY KITCHEN	1	1	P	SO1990G013	122I	C	SO811972	85	95
1191122	SOMERSET LABOR CAMP - SECTION B	1	1	P	SO1972G005	122G	C	SO880050	200	230
1191123	SOMERSET LABOR CAMP - SECTION C	1	1	P	SO1972G005	122G	C	SO810431	208	238
1191124	SOMERSET LABOR CAMP - SECTION D	1	1	P	SO1972G005	122G	C	SO810442	208	238

Table 1, Well information for Somerset County Transient Systems.

PWSID	System Name	Plant ID	Known Treatment Methods	Reason for Treatment
1191105	413 MINI MART	1	No Treatment	None
1191106	ARBYS GENERAL STORE	1	Ion Exchange	Inorganics Removal
1191118	BARBEQUE JUNCTION	1	No Treatment	None
1191005	BIG APPLE SEAFOOD	1	No Treatment	None
1191109	BUCKS STORE	1	No Treatment	None
1191120	COMMUNITY CONVENIENCE STORE	1	Ion Exchange	Inorganics Removal
1191012	CRISFIELD AIRPORT	1	No Treatment	None
1191100	DASH IN	1	Ion Exchange	Inorganics Removal
1191019	EDEN ONE STOP	1	No Treatment	None
1191112	FIRE AND RESCUE CENTER	1	No Treatment	None
1191113	GREAT HOPE GOLF COURSE	1	Ion Exchange	Inorganics Removal
1191121	JOANNIE'S COUNTRY KITCHEN	1	Ion Exchange	Inorganics Removal
1191044	LAKE SOMERSET CAMPGROUND	1	Hypochlorination, Post	Disinfection
1191006	LUCKY'S MARKET	1	Ion Exchange	Inorganics Removal
1191110	PRINCESS ANNE CAMPGROUND	1	No Treatment	None
1191032	RIVER MARKET INC	1	Hypochlorination, Post	Disinfection
1191119	SIX L'S TOMATO PLANT	1	Hypochlorination, Post	Disinfection
1191115	SOMERSET LABOR CAMP- SECTION A	1	No Treatment	None
1191122	SOMERSET LABOR CAMP- SECTION B	1	No Treatment	None
1191123	SOMERSET LABOR CAMP- SECTION C	1	No Treatment	None
1191124	SOMERSET LABOR CAMP- SECTION D	1	No Treatment	None
1191097	VFW HOME #8274	1	No Treatment	None
1191098	WALTER POLK AMERICAN LEGION	1	No Treatment	None
1191111	WESTOVER FOOD MART	1	Filtration, Cartridge	Particulate Removal
1191102	WHITES MARKET	1	No Treatment	None

Table 2, Known treatment methods for Somerset County Transient Systems.

PWSID	System Name	Total # of Nitrate Samples	> 1 ppm	>50% MCL	Total # of Nitrite Samples	Number of Nitrite Samples > 50% MCL
1191105	413 MINI MART	7	0	0	4	0
1191106	ARBYS GENERAL STORE	8	1	0	4	0
1191118	BARBEQUE JUNCTION	4	1	0	1	0
1191005	BIG APPLE SEAFOOD	13	0	0	9	0
1191109	BUCKS STORE	8	0	0	4	0
1191120	COMMUNITY CONVENIENCE STORE	3	0	0	1	0
1191012	CRISFIELD AIRPORT	7	0	0	3	0
1191100	DASH IN	8	0	0	4	0
1191019	EDEN ONE STOP	8	0	0	4	0
1191112	FIRE AND RESCUE CENTER	9	0	0	5	0
1191113	GREAT HOPE GOLF COURSE	7	0	0	2	0
1191121	JOANNIE'S COUNTRY KITCHEN	3	0	0	1	0
1191044	LAKE SOMERSET CAMPGROUND	14	0	0	7	0
1191006	LUCKY'S MARKET	10	0	0	5	0
1191110	PRINCESS ANNE CAMPGROUND	9	0	0	4	0
1191032	RIVER MARKET INC	7	0	0	3	0
1191119	SIX L'S TOMATO PLANT	3	0	0	1	0
1191122	SOMERSET LABOR CAMP - SECTION B	3	0	0	1	0
1191123	SOMERSET LABOR CAMP - SECTION C	3	0	0	1	0
1191124	SOMERSET LABOR CAMP - SECTION D	3	0	0	1	0
1191115	SOMERSET LABOR CAMP- SECTION A	26	0	0	16	0
1191097	VFW HOME #8274	7	0	0	2	0
1191098	WALTER POLK AMERICAN LEGION	8	0	0	4	0
1191111	WESTOVER FOOD MART	7	0	0	4	0
1191102	WHITES MARKET	8	0	0	5	0

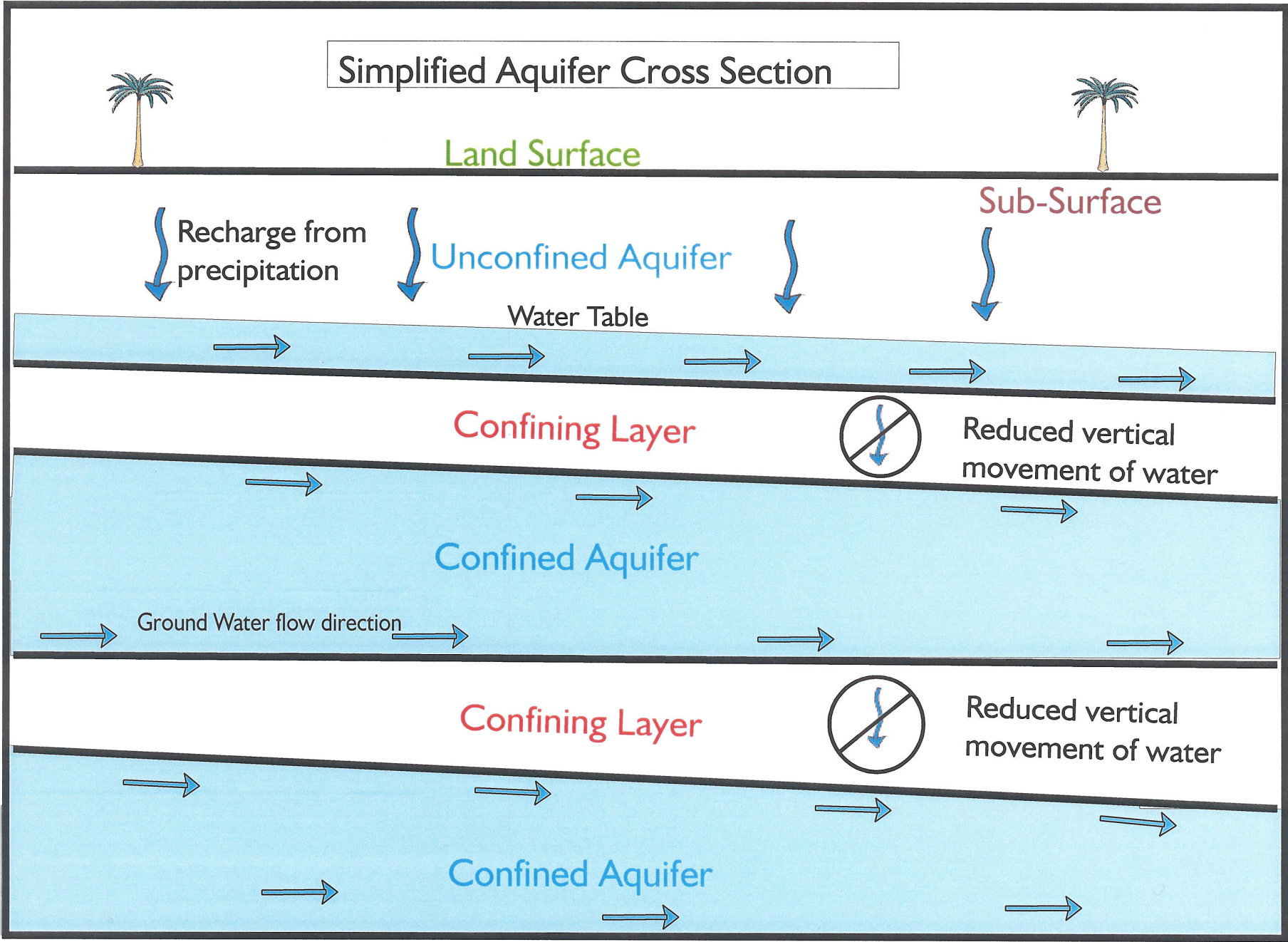
Table 3, Total IOC water quality samples collected for transient systems.

<b>PWSID</b>	<b>System Name</b>	<b>Total Number of Samples Taken</b>	<b>Number of Positive Bacti. Samples</b>	<b>Percentage of Total Samples Positive</b>	<b>Number of Positive Fecal Samples</b>
1191105	413 MINI MART	18	0	0	0
1191106	ARBYS GENERAL STORE	27	1	4	0
1191118	BARBEQUE JUNCTION	36	20	56	0
1191005	BIG APPLE SEAFOOD	44	11	25	0
1191109	BUCKS STORE	41	11	27	0
1191120	COMMUNITY CONVENIENCE STORE	12	1	8	0
1191012	CRISFIELD AIRPORT	22	0	0	0
1191100	DASH IN	12	0	0	0
1191019	EDEN ONE STOP	68	26	38	0
1191112	FIRE AND RESCUE CENTER	61	19	31	0
1191113	GREAT HOPE GOLF COURSE	18	2	11	0
1191121	JOANNIE'S COUNTRY KITCHEN	7	0	0	0
1191044	LAKE SOMERSET CAMPGROUND	25	1	4	0
1191006	LUCKY'S MARKET	62	17	27	0
1191110	PRINCESS ANNE CAMPGROUND	23	0	0	0
1191032	RIVER MARKET INC	27	1	4	0
1191119	SIX L'S TOMATO PLANT	15	2	13	0
1191122	SOMERSET LABOR CAMP - SECTION B	5	0	0	0
1191123	SOMERSET LABOR CAMP - SECTION C	4	0	0	0
1191124	SOMERSET LABOR CAMP - SECTION D	14	1	7	0
1191115	SOMERSET LABOR CAMP- SECTION A	49	7	14	0
1191097	VFW HOME #8274	64	18	28	0
1191098	WALTER POLK AMERICAN LEGION	63	24	38	0
1191111	WESTOVER FOOD MART	16	0	0	0
1191102	WHITES MARKET	69	33	48	0

Table 4, Routine and repeat bacteriological samples for each system since 1996.



# Simplified Aquifer Cross Section



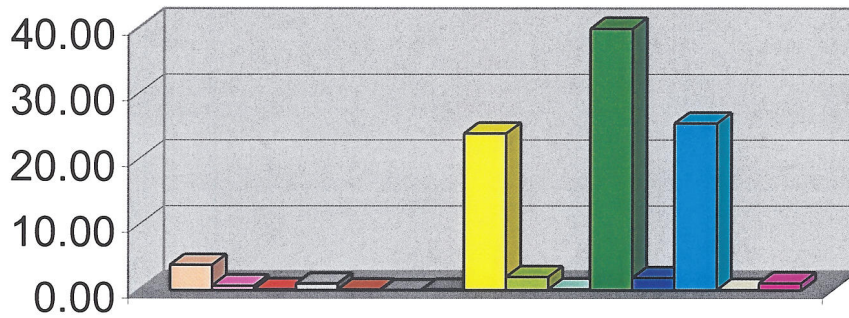
-15-

Figure 2

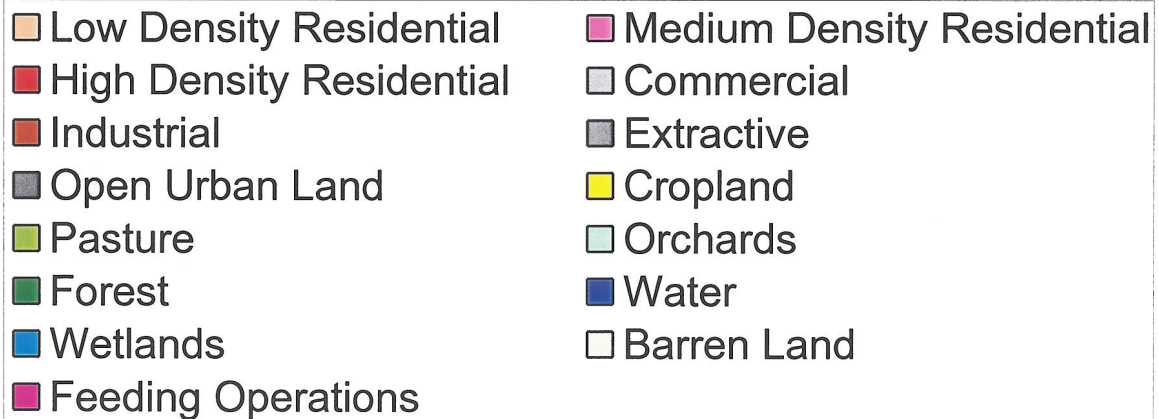
### Dorchester County Land Use Summary

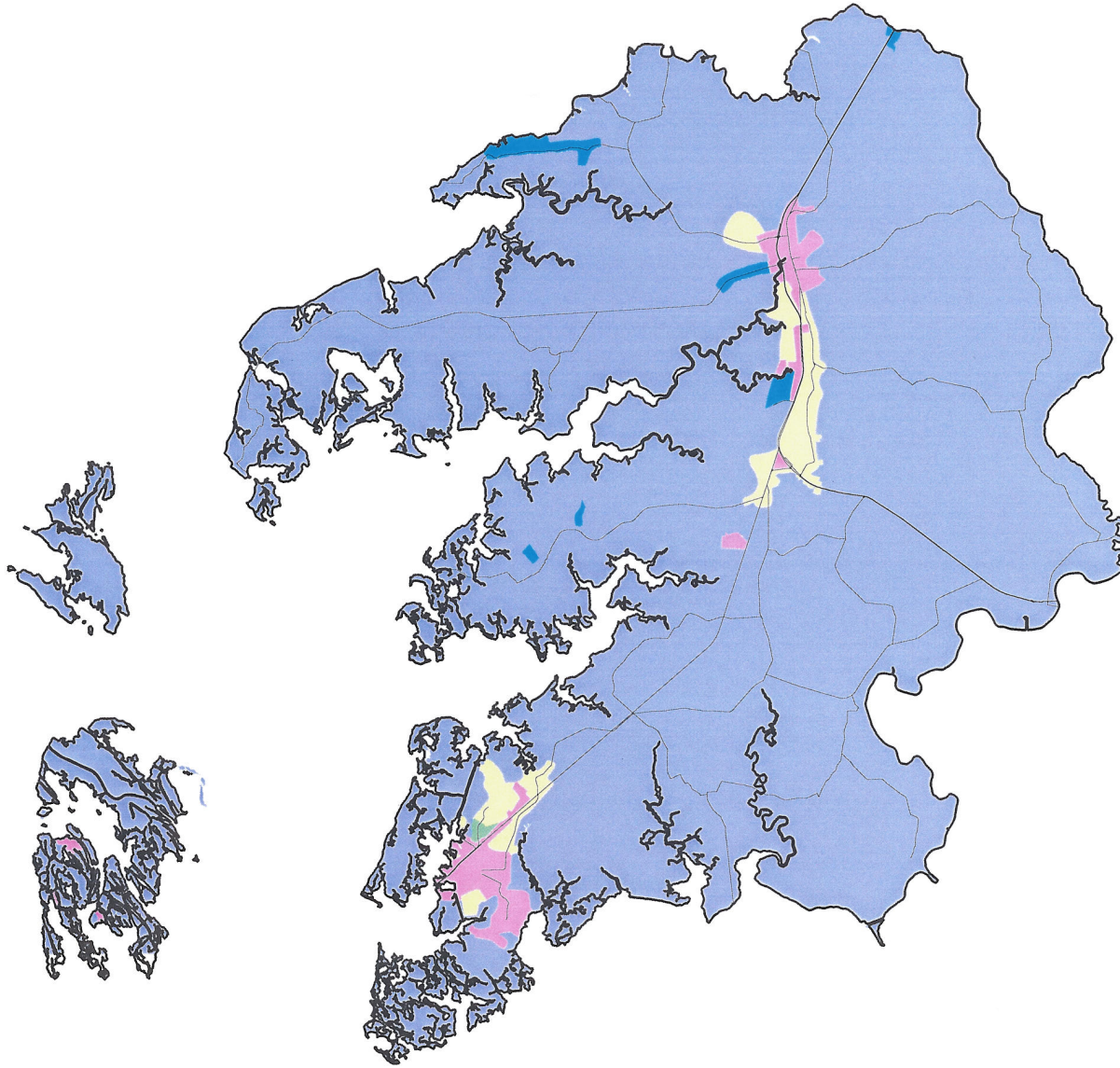
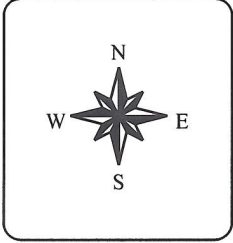
Land Use Type	Land Use Code	Counts in County	Acres in County	% of Total Area
Low Density Residential	11	327	7924.77	3.83
Medium Density Residential	12	88	1426.54	0.69
High Density Residential	13	19	275.41	0.13
Commercial	14, 16	163	2049.30	0.99
Industrial	15	7	137.66	0.07
Extractive	17	1	6.67	0.003
Open Urban Land	18	5	203.03	0.10
Cropland	21	213	49386.02	23.85
Pasture	22	114	4163.37	2.01
Orchards	23	1	253.58	0.12
Forest	41, 42, 43, 44	689	82409.09	39.80
Water	50	44	3873.76	1.87
Wetlands	60	313	52625.02	25.41
Barren Land	71, 73	11	125.84	0.06
Feeding Operations	241, 242	182	2213.26	1.07
Totals		2177	207073.32	100

### Percent of Total Land Use









### Land Use Type



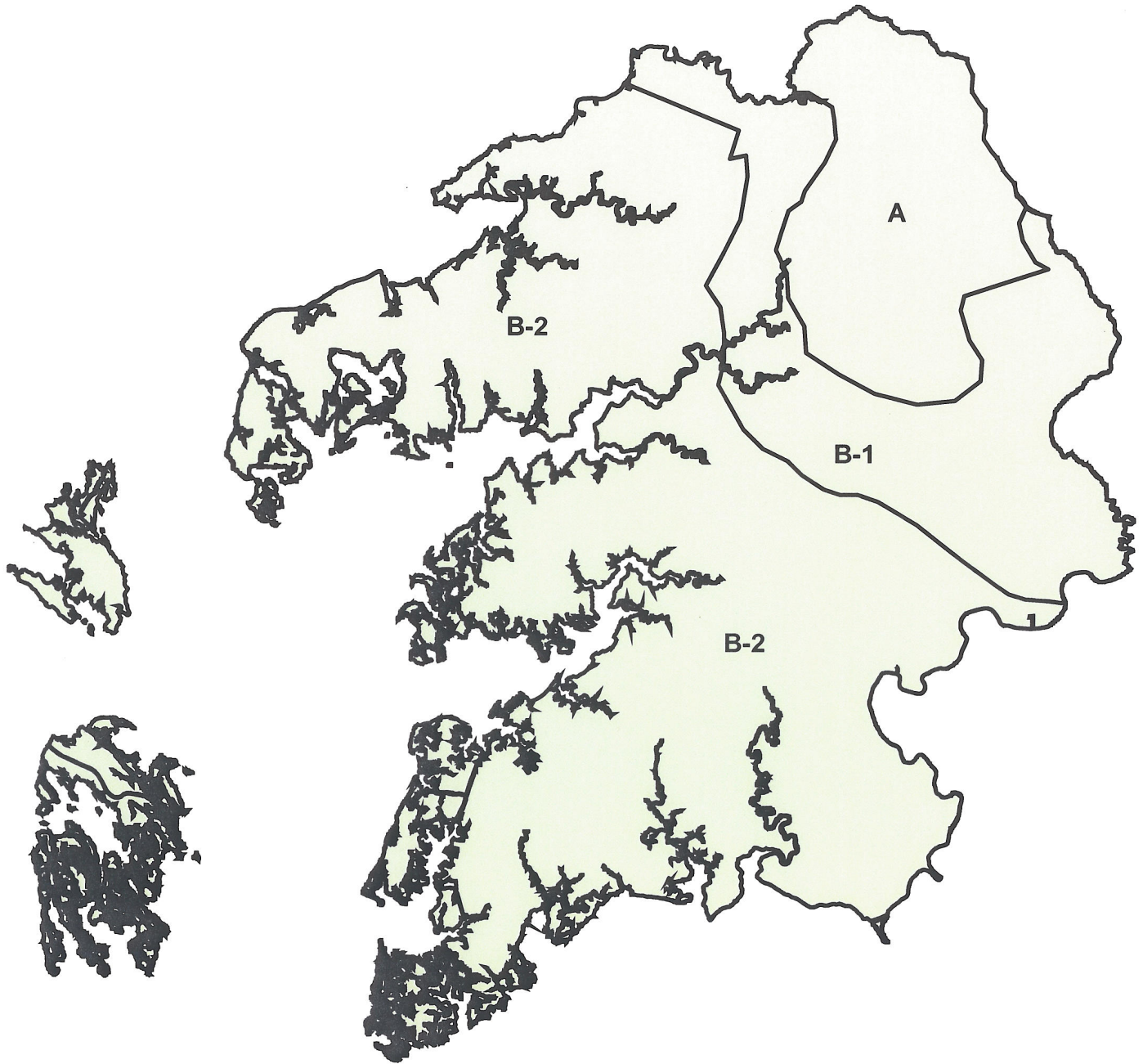


### Sewer Service Map of Somerset County

-  Major Roads
-  No Planned Service
-  Existing Service Area or Under Construction
-  Immediate Priority Area
-  Area Programmed for Service within 3-5 or 6yrs.
-  Area Programmed for Service within 6-7 to 10 yrs.



# Management Areas for Somerset County



## Legend

- Area A:** Wells Completed in Unconfined Aquifers Allowed
- Area B1:** Wells must be Completed in Confined Aquifers unless there is a 200 ft. Separation from the Unconfined Well to the Septic System
- Area B2:** Wells must be Completed in Confined Aquifers