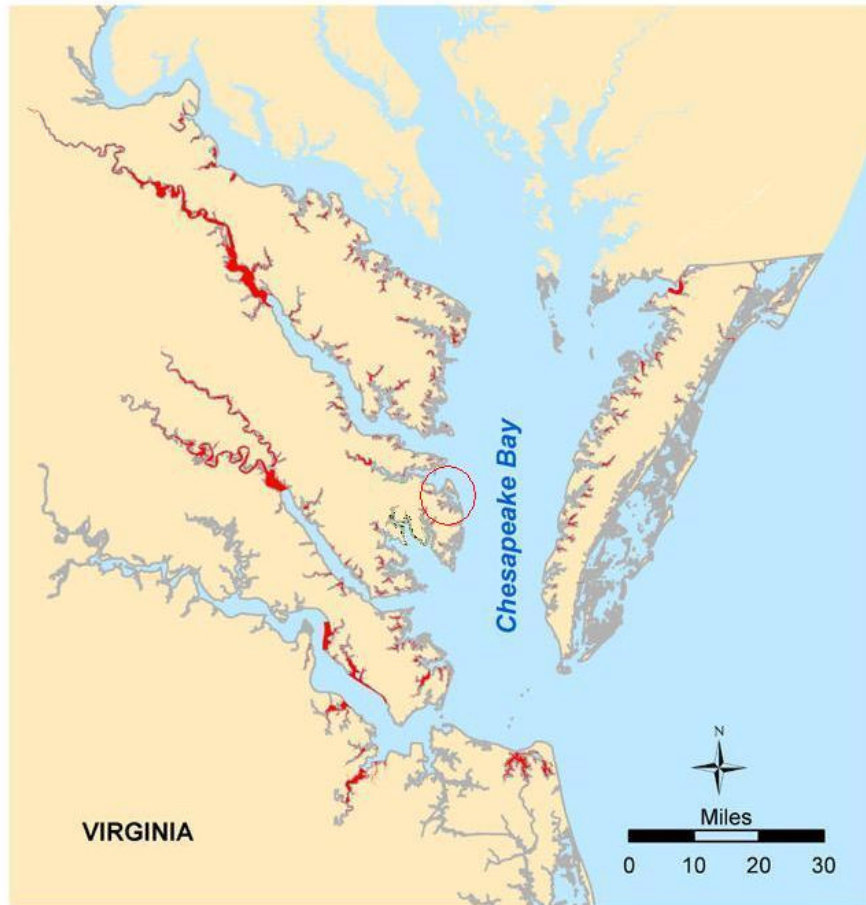


**Total Maximum Daily Load (TMDL) Report
for Shellfish Areas Listed Due to
Bacterial Contamination
Gwynn's Island
and Milford Haven Watersheds**



**Gwynn's Island
and Milford Haven Watersheds
Total Maximum Daily Load (TMDL) Report
for Shellfish Condemnation Areas Listed
Due to Bacteria Contamination**

Virginia Department of Environmental Quality

November 2007



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Total Maximum Daily Load Executive Summary

Total Maximum Daily Load Process

Management of water quality is a process intended to protect waters for a variety of uses. The first step in the process is the identification of desired uses for each waterbody. There are typically a number of physical, chemical and/or biological conditions that must exist in a waterbody to allow for a desired use to exist. In Virginia, most inshore tidal waters are identified as potential shellfish growing waters. In order to support shellfish propagation without risk to human consumers, shellfish waters must have very low levels of pathogenic organisms. Virginia, as most other states, uses fecal coliforms (FC) as an indicator of the potential presence of pathogenic organisms. To maintain the use of a water body for direct shellfish harvesting, the goal is to ensure the concentration of fecal coliforms entering the water body does not exceed a “safe” level. The safe level is set as the standard against which water quality monitoring samples are checked.

When water quality monitoring detects levels of fecal coliforms above allowable, “safe” levels, managers must identify the potential sources and plan to control them. The prescribed method for figuring out what must be controlled to attain the water quality standard is the calculation of a total maximum daily load (TMDL). The TMDL is the amount of fecal coliforms that may be introduced by each potential source without exceeding the water quality standard for fecal coliforms in shellfish growing waters.

The process of developing a shellfish water TMDL may be generalized in the following manner:

1. Water quality monitoring data are used to determine if the bacterial standard for shellfish have been violated;
2. Potential sources of fecal bacteria loading within the contributing watershed are identified;
3. The necessary reductions in fecal bacteria pollutant load to achieve the water quality standard are determined;
4. The TMDL study is presented to the public to garner comment;
5. An implementation strategy to reduce fecal bacteria loads is written into a plan and subsequently implemented;
6. Water quality monitoring data are used to determine if the bacterial standard is being met for shellfish waters.

Different approaches can be used to determine the sources of fecal pollution in a water body. Two distinctly different approaches are watershed modeling and bacterial source tracking (BST). Watershed modeling begins on the land, identifying potential sources based on information about conditions in the watershed (e.g. numbers of residents, estimated wildlife populations, estimated of livestock, etc.). BST begins in the water, identifying sources of fecal coliforms, specifically the dominant fecal coliform *Escherichia coli*, to shellfish waters based on either genetic or phenotypic characteristics of the coliforms. Virginia’s Department of Environmental Quality has decided to utilize BST, and specifically to use a method called antibiotic resistance analysis (ARA). This method assumes that fecal bacteria found in four sources: humans, wildlife, livestock, and domestic animals will all differ in their reactions to antibiotics. Thus, when samples of fecal bacteria collected in the water quality monitoring program are exposed to specific antibiotics the pattern of responses allows matching similarities to the response patterns of bacteria from known sources which have been

accumulated in a “source library”. Through this analysis investigators also estimate the relative proportion of the fecal bacteria derived from each of the four general source classes and assumes this proportion reflects the relative contribution from the watershed.

The resulting estimates of the amount of fecal coliform pollution coming from each type of source can then be used to allocate reductions necessary to meet the water quality standard for shellfish growing waters. Identifying and agreeing on the means to achieve these reductions represent the TMDL implementation plan.

Continued water quality monitoring will tell whether the efforts to control sources of fecal coliforms in the watershed have succeeded.

Fecal Coliform Impairment

This document details the development of bacterial TMDLs for five segments in Milford Haven and Gwynn’s Island in Mathews Counties, Virginia. The five condemned areas in the watershed are condemnation number 197A, Edwards Creek; condemnation number 99B, Queens Creek; condemnation 61A, Stutts Creek; condemnation 61B, Morris Creek and condemnation 204, Billups Creek. In recent years the Stutts Creek condemnation has been expanded to include a larger areas of the creek. The applicable state standard specifies that the number of fecal coliform bacteria shall not exceed a maximum allowable level of geometric mean of 14 most probable number (3-tube MPN) per 100 milliliters (ml) and a 90th percentile geometric mean value of 49 MPN/100ml. (Virginia Water Quality Standard 9-VAC 25-260-5). In development of this TMDL, the 90th percentile 49 MPN/100 ml was used, since it represented the more stringent standard.

Sources of Fecal Coliform

Potential sources of fecal coliform consist primarily of non-point source contributions, as there are no permitted point source discharges in the watershed. Non-point sources include wildlife; livestock; land application of bio-solids; recreational vessel discharges; failed, malfunctioning, or non-operational septic systems, and uncontrolled discharges (straight pipes conveying gray water from kitchen and laundry areas of private homes, etc.).

Water Quality Modeling

A steady state tidal prism model was used for this TMDL study because the character of the water bodies to be modeled is relatively simple from a hydrologic perspective: for example, small in area and volume with a single, unrestricted connection to receiving waters. This approach uses the volume of the water body and adjusts for tidal flushing, freshwater inflow and bacterial decay in order to establish the existing and allocation conditions.

Determination of Existing Loadings

To assist in partitioning the loads from the diverse sources within the watershed, water quality samples of fecal coliform bacteria were collected for one year and evaluated using an antibiotic resistance

analysis in a process called bacterial source tracking. These samples were compared to a reference library of fecal samples from known sources. The resulting data were used to assign portions of the load within the watershed to wildlife, humans, pets or livestock. The results of this analysis indicated that the primary source of fecal coliforms is wildlife with livestock as secondary contributors. The presence of a large signature attributable to one component is sufficient to establish potential directions for remediation under a future implementation plan.

Load Allocation Scenarios

The next step in the TMDL process was to determine the appropriate water quality standard to be applied. This was set as the 90th percentile standard because the data established that the 90th percentile required the greater reduction. Calculated results of the model for each segment were used to establish the existing load in the system. The load necessary to meet water quality standards was calculated in a similar fashion using the water quality standard criterion in place of the ambient water quality value. The difference between these two numbers represents the necessary level of reduction in each segment.

Finally the results of the BST developed for each segment were used to partition the load allocation that would meet water quality standards according to source. The results of the model, the BST source partitioning and the reductions necessary for each segment are shown in the following tables.

TMDL Summary for Five Closures in the Gwynn's Island and Milford Haven Watersheds (geometric mean)

Condemnation Area	Pollutant Identified	TMDL MPN/day	Waste Load Allocation MPN/day	Load Allocation MPN/day	Margin of Safety
36-197A Edwards Creek (VAP-C04E-03)	Fecal Coliform	5.80E+09	N/A	5.80E+09	Implicit
37-99A Queens Creek (VAP-C04E-01)	Fecal Coliform	4.53E+10	N/A	4.53E+10	Implicit
37-61A Stutts Creek (VAP-C04E-05)	Fecal Coliform	1.91E+10	N/A	1.91E+10	Implicit
37-61B Morris Creek (VAP-C04E-04)	Fecal Coliform	5.15E+09	N/A	5.15E+09	Implicit
37-204 Billups Creek (VAP-C04E-07)	Fecal Coliform	1.05E+10	N/A	1.05E+10	Implicit

**TMDL Summary for Five Closures in the
Gwynn's Island and Milford Haven Watersheds (90th percentile)**

Condemnation Area	Pollutant Identified	TMDL MPN/day	Waste Load Allocation MPN/day	Load Allocation MPN/day	Margin of Safety
36-197A Edwards Creek (VAP-C04E-03)	Fecal Coliform	2.03E+10	N/A	2.03E+10	Implicit
37-99A Queens Creek (VAP-C04E-01)	Fecal Coliform	1.59E+11	N/A	1.59E+11	Implicit
37-61A Stutts Creek (VAP-C04E-05)	Fecal Coliform	6.69E+10	N/A	6.69E+10	Implicit
37-61B Morris Creek (VAP-C04E-04)	Fecal Coliform	1.80E+10	N/A	1.80E+10	Implicit
37-204 Billups Creek (VAP-C04E-07)	Fecal Coliform	3.68E+10	N/A	3.68E+10	Implicit

Margin of Safety

In order to account for uncertainty in modeled output, a margin of safety (MOS) was incorporated into the TMDL development process by making very conservative choices. A margin of safety can be incorporated implicitly in the model through the use of conservative estimates of model parameters, or explicitly as an additional load reduction requirement. Individual errors in model inputs, such as data used for developing model parameters or data used for calibration, may affect the load allocations in a positive or a negative way. The purpose of the MOS is to avoid an overall bias toward load allocations that are too large for meeting the water quality target. An implicit MOS was used in the development of this TMDL through selection of a water quality standard providing a high level of protection, utilization of entire segment volumes for model calculations, averaging extreme high and low values to ensure that the more protective condition with the largest available data set was addressed and emphasizing watershed-based implementation measures.

Recommendations for TMDL Implementation

The goal of this TMDL was to develop an allocation plan that achieves water quality standards during the implementation phase. Virginia's 1997 Water Quality Monitoring, Information and Restoration Act states in section 62.1-44.19.7 that the "Board shall develop and implement a plan to achieve fully supporting status for impaired waters".

The TMDL developed for the Milford Haven and Gwynn's Island watershed impairments provides allocation scenarios that will be a starting point for developing implementation strategies. Additional monitoring aimed at targeting the necessary reductions is critical to implementation development. Once established, continued monitoring will aid in tracking success toward meeting water quality milestones.

Public participation is critical to the implementation process. Reduction in non-point source loading is the crucial factor in addressing the problem. These sources cannot be addressed without public understanding of and support for the implementation process. Stakeholder input will be critical from the onset of the implementation process in order to develop an implementation plan that will be truly effective.

Public Participation

During development of the TMDL for the Milford Haven and Gwynn's Island watershed, public involvement was encouraged through a public participation process that included public meetings and stakeholder meetings.

The first public meeting was held on May 22, 2007 in Mathews County. A basic description of the TMDL process and the agencies involved was presented and a discussion was held regarding the source assessment input, bacterial source tracking, and model results. This meeting was followed by development of the final draft TMDL and a review by the stakeholders.

The second public meeting where the TMDL load allocations were presented was held on September 11, 2007. Public involvement in the TMDL implementation planning process was encouraged.

1.0 Introduction

This document details the development of bacterial Total Maximum Daily Load (TMDL) for five segments in the Milford Haven and Gwynn's Island watersheds in Mathew counties, Virginia which are listed as impaired on Virginia's 303(d) Total Maximum Daily Load Priority List. The TMDL is one step in a multi-step process that includes a high level of public participation in order to address water quality issues that can affect public health and the health of aquatic life.

1.1 Listing of Water Bodies under the Clean Water Act

Water quality standards are regulations based on federal or state law that set numeric or narrative limits on pollutants. Water quality monitoring is performed to measure these pollutants and determine if the measured levels are within the bounds of the limits set for the uses designated for the water body. The water bodies which have pollutant levels above the designated standards are considered impaired for the corresponding designated use (e.g. swimming, drinking, shellfish harvest, etc.). The impaired waterways are listed on the §303 (d) list reported to the Environmental Protection Agency. Those waters placed on the list require the development of a TMDL intended to eliminate the impairment and bring the water into compliance with the designated standards.

TMDLs represent the total pollutant loading that a water body can receive without violating water quality standards. The TMDL process establishes the allowable loading of pollutants for a water body based on the relationship between pollution sources and in-stream water quality conditions. By following the TMDL process, states can establish water quality based controls to reduce pollution from both point and non-point sources to restore and maintain the quality of their water resources (EPA, 1991).

Fecal coliform bacteria are the most common cause for the impairments in Virginia shellfish growing waters. This group of bacteria is considered an indicator of the presence of fecal contamination. The most common member of the fecal coliform groups is *Escherichia coli*. Fecal coliforms are associated with the fecal material derived from humans and warm-blooded animals. The presence of fecal coliform bacteria in aquatic environments is an indication that the water may have been contaminated by pathogens or disease-producing bacteria or viruses. Waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis, and hepatitis A. Filter-feeding shellfish can concentrate these pathogens which can be transmitted and cause disease when eaten uncooked. Therefore, the presence of elevated numbers of fecal coliform bacteria is an indicator that a potential health risk exists for individuals consuming raw shellfish. Fecal contamination can occur from point source inputs of domestic sewage or from non-point sources of human, (e.g., malfunctioning septic systems) or animal wastes.

Because the fecal coliform indicator does not provide information on the source or origin of fecal contamination, Agencies of the Commonwealth, including the Department of Environmental Quality (DEQ), the Virginia Department of Health – Division of Shellfish sanitation (VDH-DSS) and the Department of Conservation and Recreation (DCR) have worked together with state universities, the U.S. Geological Survey and the U.S. Environmental Protection Agency to develop methods to assess sources of fecal coliforms to assist in development of TMDLs in impaired shellfish waters.

As a group these methods are usually called bacterial or microbial source tracking (BST or MST). This study utilizes bacteria source tracking (BST) to determine the most probable sources of fecal coliform in the water.

To assist with the analysis and development of the TMDLs for impaired shellfish waters, the Department of Environmental Quality has contracted the Virginia Institute of Marine Science (VIMS).

1.2 Overview of the TMDL Development Process

A TMDL study for shellfish waters is the first part of a phased process aimed at restoring water quality. This study is designed to determine how much of the pollutant input needs to be reduced in order to achieve water quality standards. The second step in the process is the development of an implementation plan that identifies which specific control measures are necessary to achieve those reductions, their timing for implementation and at what cost. The implementation plan will also outline potential funding sources. The third step will be the actual implementation process. Implementation will typically occur in stages that allow a review of progress in reducing pollutant input, refine bacteria loading estimates based upon additional data and to make any identified changes to pollutant control measures.

The TMDL development process also must account for seasonal and annual variations in precipitation, flow, land use, and pollutant contributions. Such an approach ensures that TMDLs, when implemented, do not result in violations under a wide variety of scenarios that affect bacterial loading.

2.0 Applicable Water Quality Standard

Water quality standards are provisions of state or federal law which consist of a designated use or set of uses for the waters and water quality criteria based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§62.1-44.2 et seq. of the Code of Virginia) and the federal Clean Water Act (33 USC §1251 et seq.). According to Virginia Water Quality Standards (9 VAC 25-260-5), the term *“water quality standards means provisions of state or federal law which consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§62.1-44.2 et seq. of the Code of Virginia) and the federal Clean Water Act (33 USC §1251 et seq.).”*

2.1 Designated Uses and Criteria

Generally, all tidal waters in Virginia are designated as shellfish waters. The identification of the applicable river reaches can be found in the river basin tables at 9VAC25-260-390 et seq. For a shellfish supporting water body to be in compliance with Virginia bacterial standards, VADEQ specifies the following criteria (9 VAC 25-260-160): *“In all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, and including those waters on which condemnation or restriction classifications are established by the State Department of Health the following criteria for fecal coliform bacteria shall apply; The geometric mean fecal coliform value for a sampling station shall not exceed an MPN (most probable number) of 14 per 100 milliliters. The 90th percentile shall not exceed an MPN of 43 for a 5 tube, 3 dilution test or 49 for a 3 tube, 3 dilution test.”*

2.2 Classification of Virginia’s Shellfish Growing Areas

The Virginia Department of Health, Division of Shellfish Sanitation (DSS) is responsible for classifying shellfish waters and protecting the health of bivalve shellfish consumers. The VDH- DSS follows the requirements of the National Shellfish Sanitation Program (NSSP), which is regulated by the U.S. Food and Drug Administration. The NSSP specifies the use of a shoreline survey as its primary tool for classifying shellfish growing waters. Fecal coliform concentrations in water samples collected in the immediate vicinity of the shellfish beds function to verify the findings of the shoreline survey and to define the border between approved and condemned (unapproved) waters. Much of the DSS effort is focused on locating fecal contamination, and in this manner minimizing the introduction of human pathogens to shellfish waters.

DSS designs and operates the shoreline survey to locate sources of pollution within the watersheds of shellfish growing areas. This is accomplished through a property-by-property inspection of the onsite sanitary waste disposal facilities of most properties on un-sewered sections of watersheds, and investigations of other sources of pollution such as wastewater treatment plants (WTP), marinas, livestock operations, landfills, etc. The information is compiled into a written report with a map showing the location of the sources of real or potential pollution found and sent to the various agencies that are responsible for regulating these concerns in the city or county. Once an onsite problem is identified, local health departments (LHDs), and/or other state and local agencies may play a role in the process of correcting the deficiencies.

The VDH-DSS collects monthly seawater samples at over 2,000 stations in the shellfish growing areas of Virginia. Though they continuously monitor sample data for unusual events, they formally evaluate shellfish growing areas on an annual basis. The annual review uses data from the most recent 30 samples (typically 30 months), collected randomly with respect to weather. The data are assessed to determine whether the water quality standards are met. If the water quality standards are exceeded, the shellfish area is closed for the harvest of shellfish that go directly to market. Those areas that marginally exceed the water quality standard and are closed for the direct marketing of shellfish are eligible for harvest of shellfish under permit from the Virginia Marine Resources Commission and VDH-DSS. The permit establishes controls that in part require shellfish be allowed to depurate for 15 days in clean growing areas or specially designed licensed on shore facilities. Shellfish in growing areas that may be highly polluted, such as those in the immediate vicinity of a wastewater treatment facility (prohibited waters), are not allowed to be moved to clean waters for self purification.

3.0 Watershed Characterization

The Gywnn’s Island and Milford Haven watersheds are located within Mathews County, Virginia. The five condemned areas in the watershed are condemnation number 36-197A, Edwards Creek; condemnation number 37-99A, Queens Creek; condemnation 37-61A, Stutts Creek; condemnation 37-61B, Morris Creek and condemnation 37-204 Billups Creek, in Mathews County, Virginia. The condemnation notices can be found in Appendix A. The watershed occupies a landscape position at the mouth of the Piankatank River in the south eastern corner and lies between the Chesapeake Bay and the Piankatank River (Figure 3.0).

The drainage area of the Gywnn’s Island watershed is approximately 2.3 square miles; and Milford Haven watershed is approximately 18.7 square miles. Within each sub-watershed drainage areas are as follows: Edwards Creek – 1497 Acres; Queens Creek – 2528 Acres; Stutts Creek – 958 acres; Morris Creek – 517 Acres; and Billups Creek – 4221 Acres. Population estimated by the 2000 US Census is 612 and 2090 respectively. .

A map of the land use for each impaired water segment in the watershed is shown in Figures 3.1A through 3.1E. Estimations of the populations of livestock and wildlife, as well as numbers of septic systems within the watershed are shown in Table 3-1. Land use in the two growing area watersheds is dominated by forested, grassland, agriculture and residential and is summarized in Table 3.2.

Appendix B: Supporting Documentation and Watershed Assessment, provides a description of data and list of data sources for Table 3-1.

**Table 3-1
Estimated Animal Populations and Septic
Systems in Growing Area 36 and 37**

Fecal Coliform Sources	Gwynn's Island Edwards Creek 36-197A (VAP-C04E-03)	Milford Haven, Queens Creek 37-99A (VAP-C04E-01)	Milford Haven Stutts Creek 37-61A (VAP-C04E-05)	Milford Haven Morris Creek 37-61B (VAP-C04E-04)	Milford Haven Billups Creek 37-204 (VAP-C04E-07)
Duck	475	279	263	113	77
Geese	328	192	182	78	53
Chicken	0	16	0	0	0
Pig	1	3	2	0	1
Horse	3	8	3	1	1
Cattle	21	16	38	8	12
Dog	185	192	104	40	21
Deer	22	77	50	19	10
Raccoon	72	162	199	72	45
Septic	106	332	180	68	37

Figure 3.0
Location of the Gwynn's Island and Milford Haven
Watersheds Shellfish Growing Areas 36 and 37

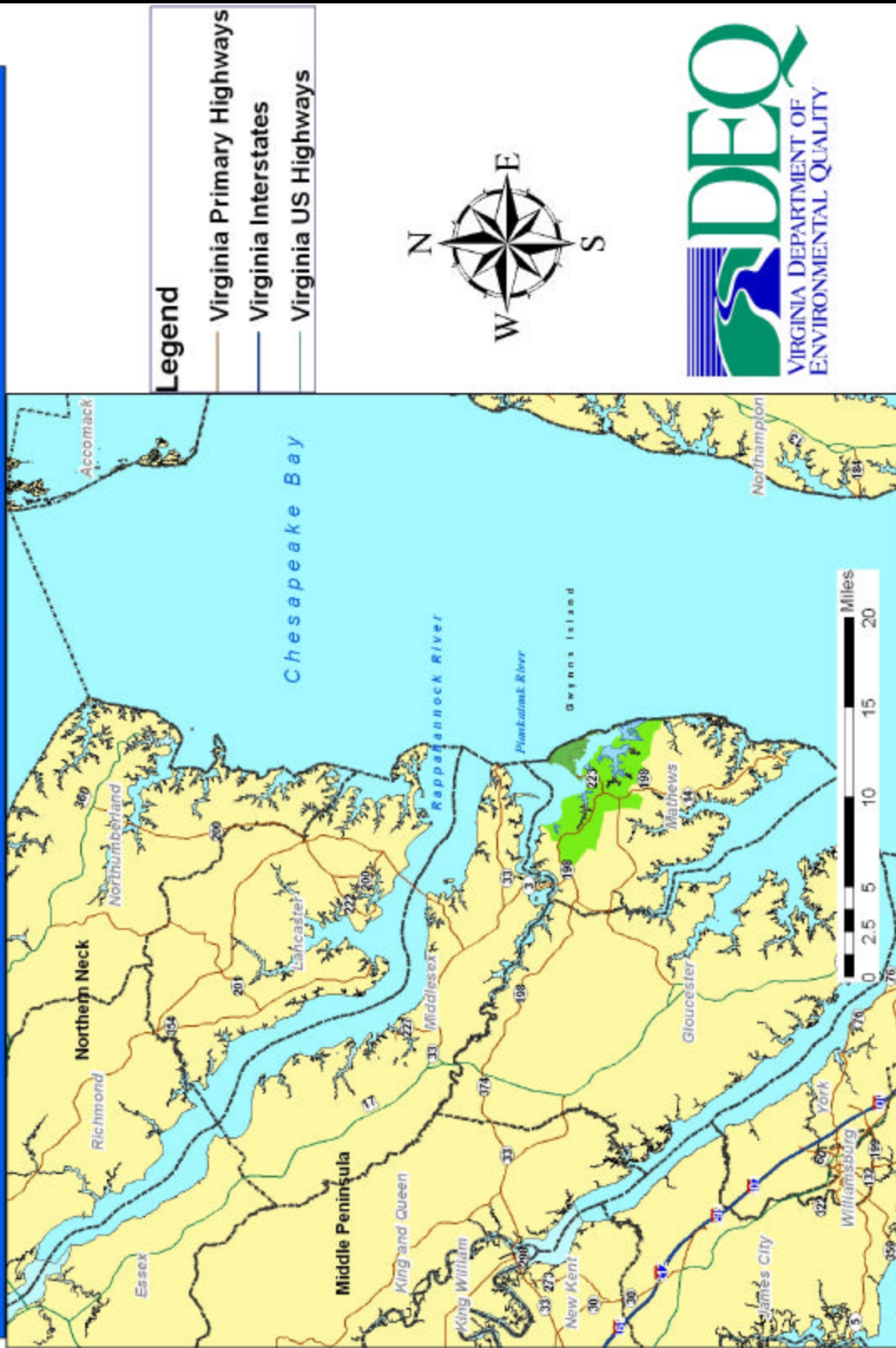


Figure 3.1A
Land Use in Shellfish Growing Area 37, Milford Haven, Queens Creek

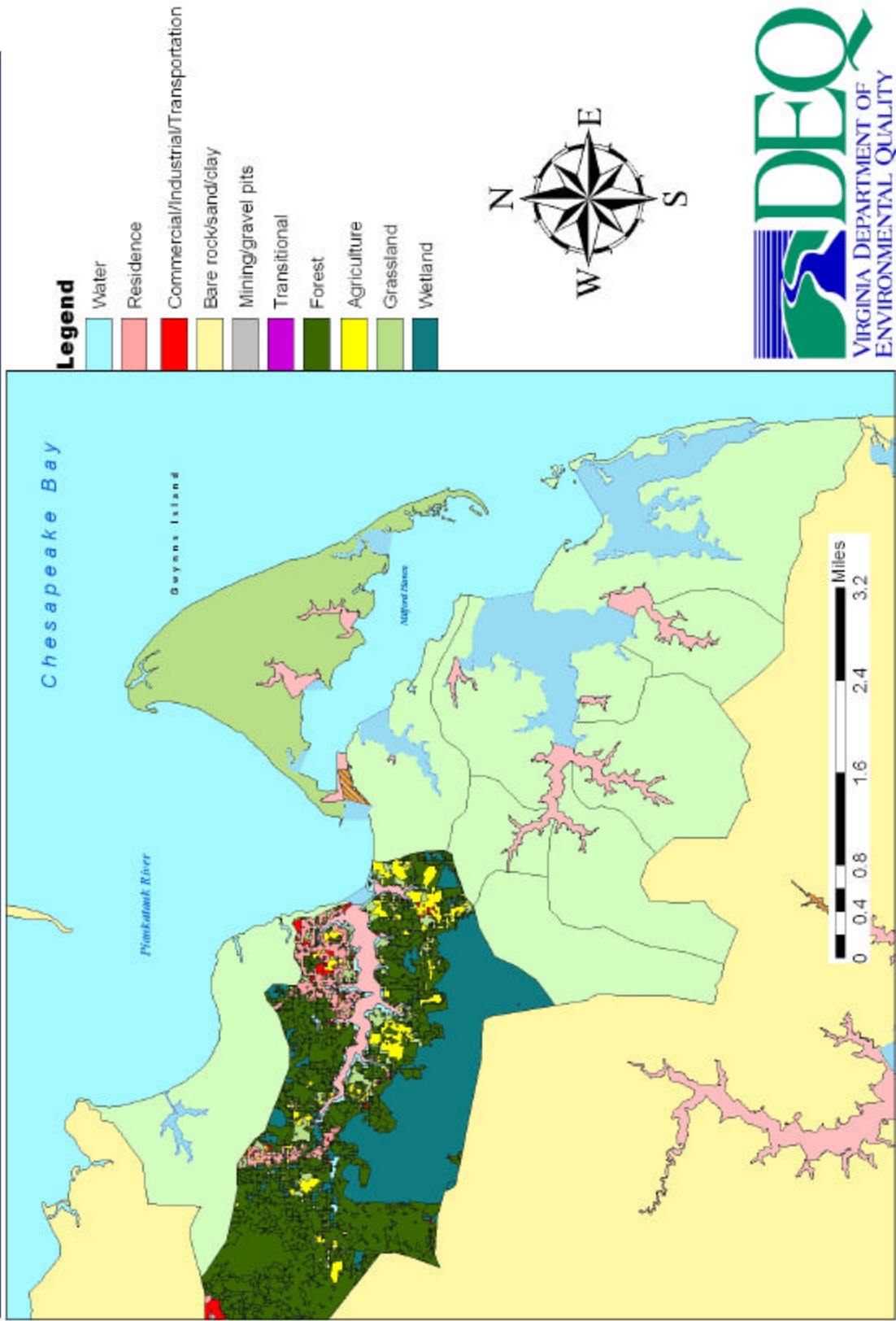


Figure 3.1B
Land Use in Shellfish Growing Area 37, Milford Haven, Stutts Creek

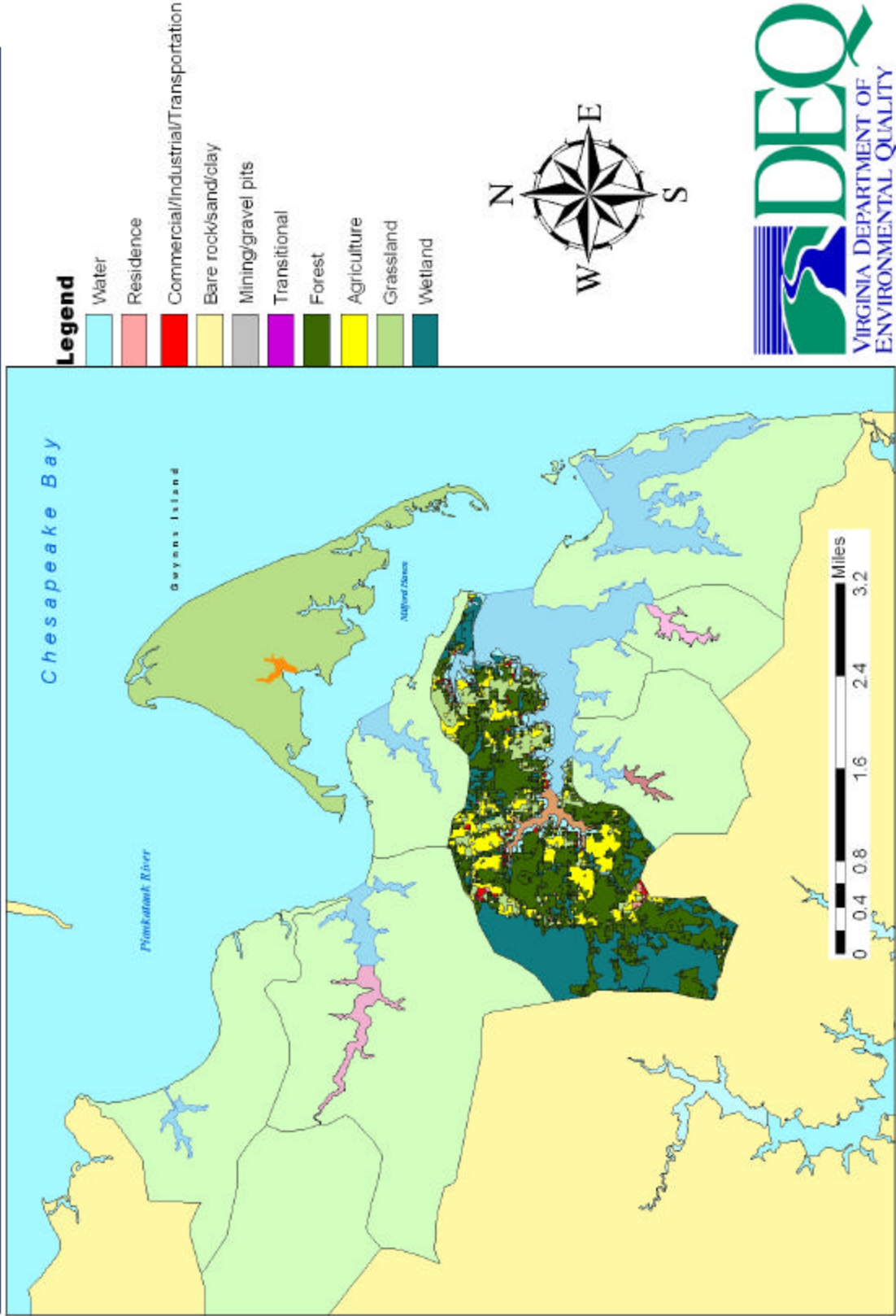


Figure 3.1C
Land Use in Shellfish Growing Area 37, Milford Haven, Morris Creek

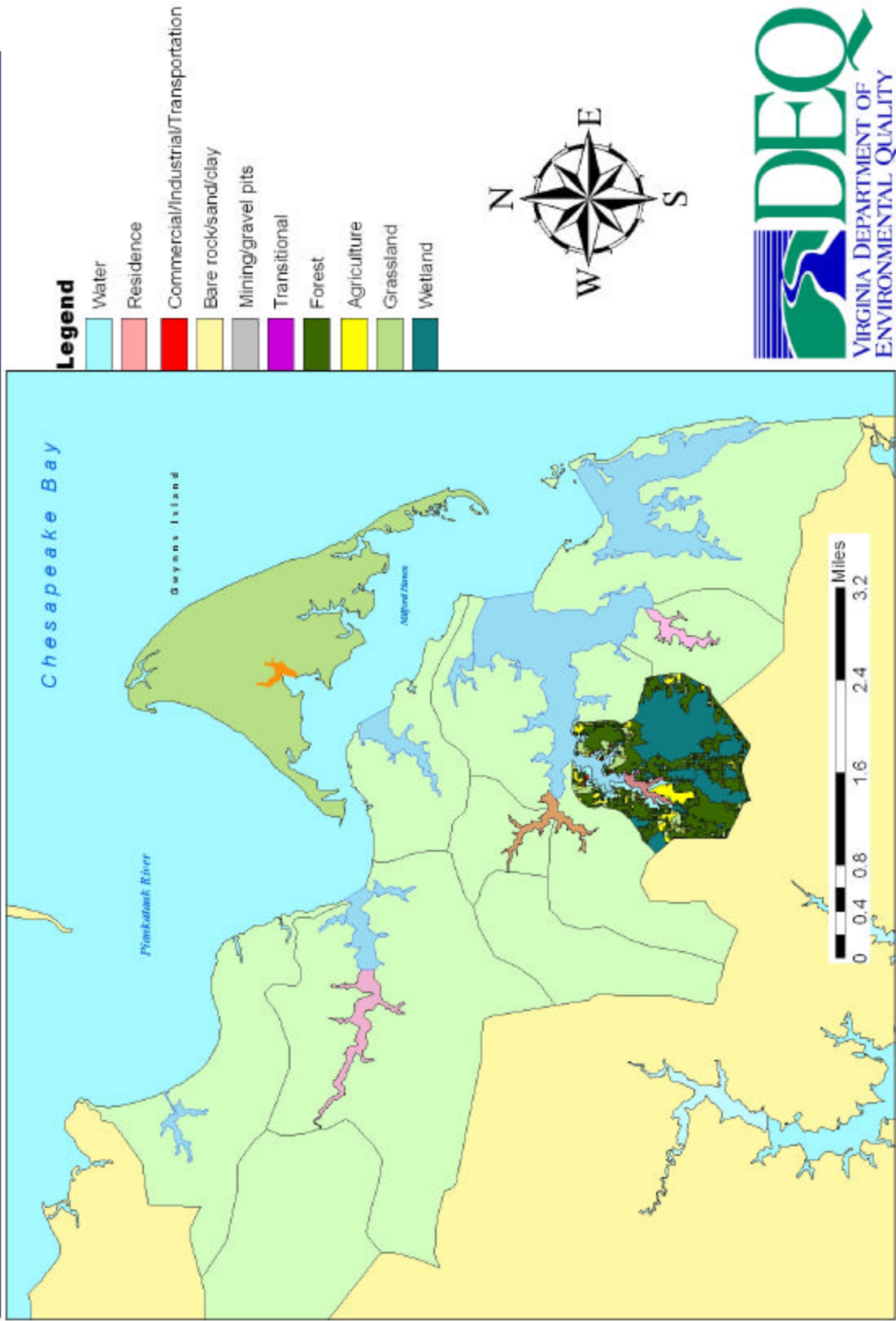


Figure 3.1D
Land Use in Shellfish Growing Area 37, Milford Haven, Billups Creek

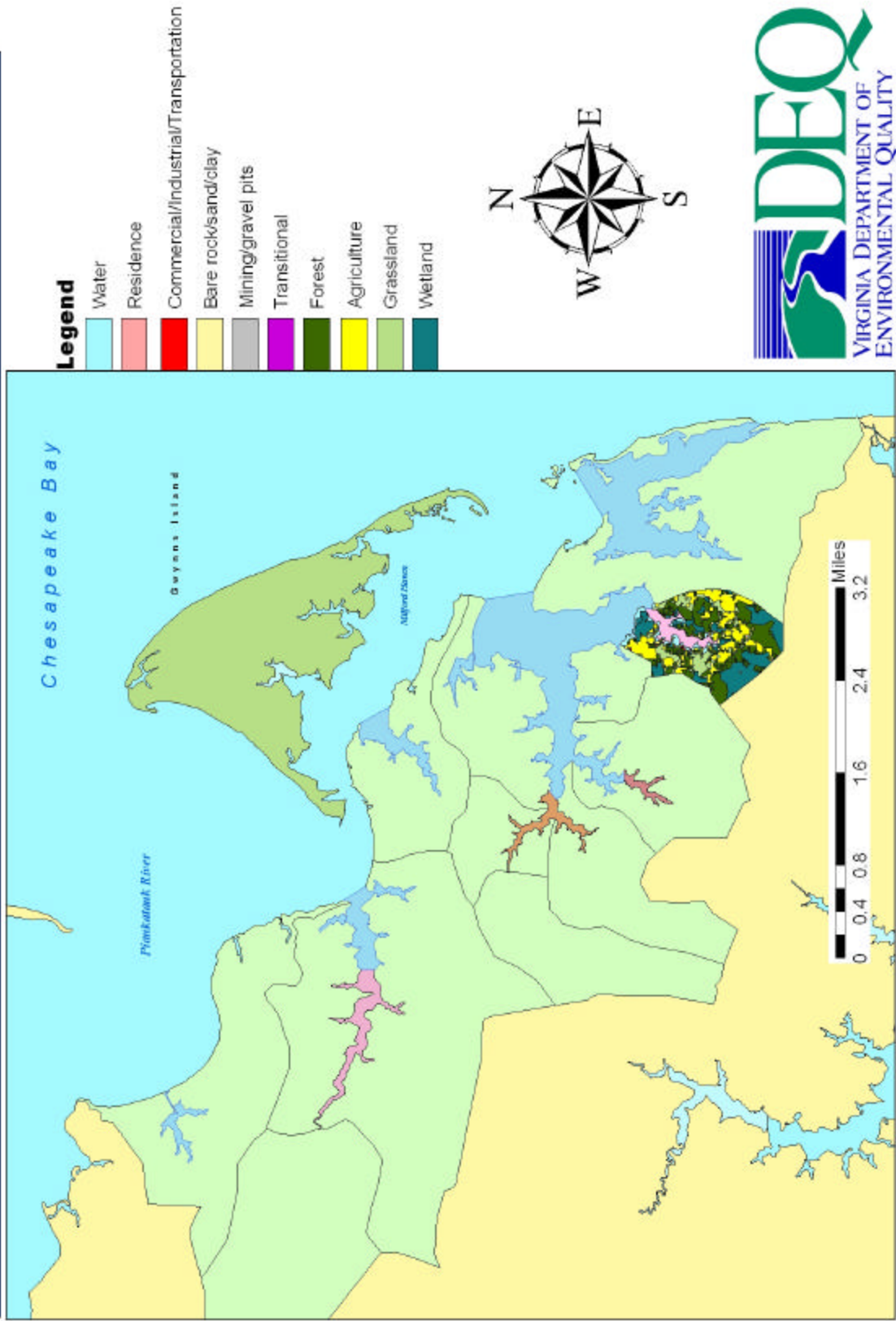
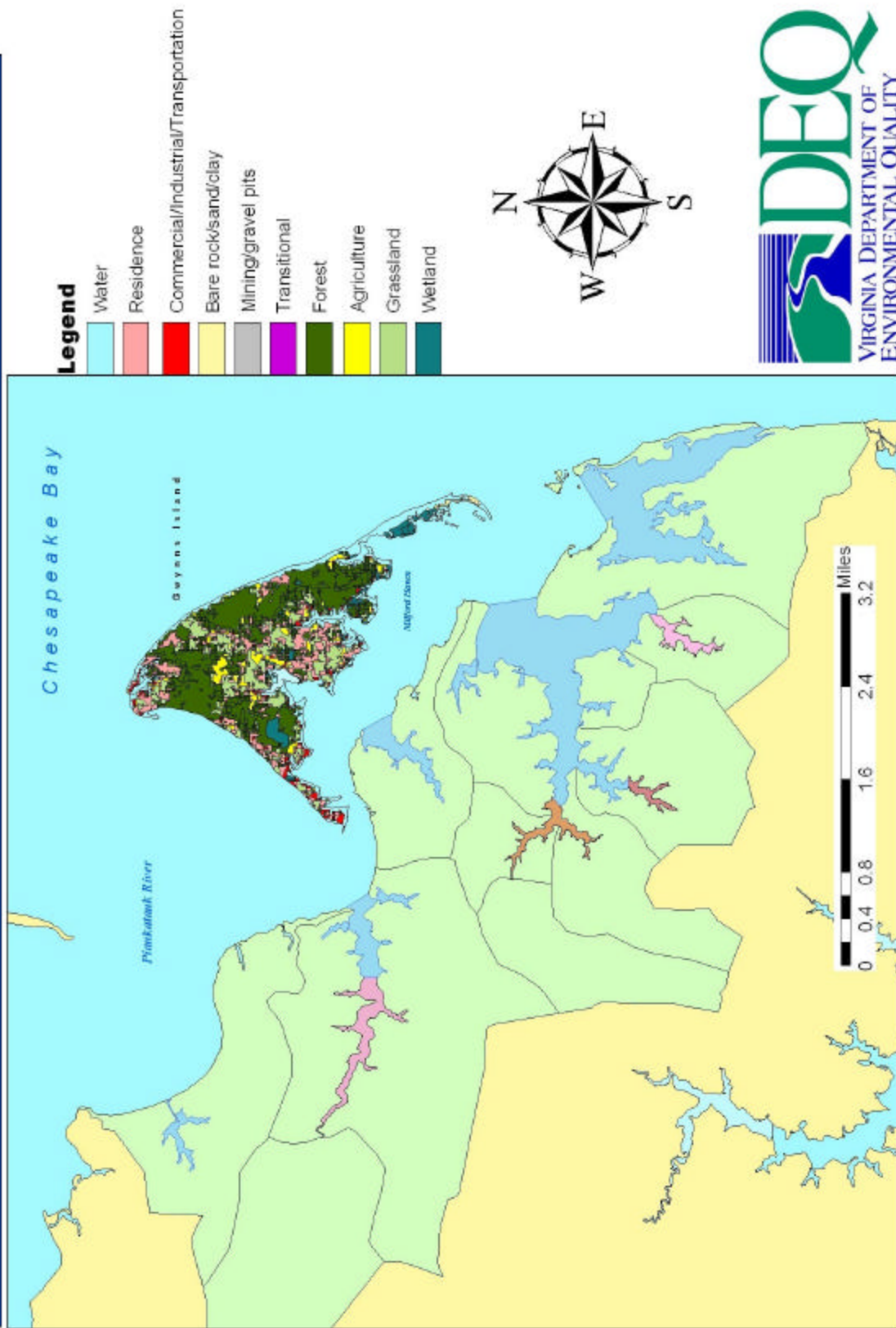


Figure 3.1E
Land Use in Shellfish Growing Area 36, Gwynns Island, Edward's Creek



4.0 Water Quality Impairment and Bacterial Source Assessment

4.1 Water Quality Monitoring

The water quality monitoring network consists of 40 monitoring stations. These stations are monitored by the VDH-DSS for fecal bacteria. The locations of the water quality monitoring stations are shown in Figure 4.1 and the condemned shellfish waters in Figure 4.2. This TMDL study examined bacterial monitoring data at these stations for a period of time from June 2003 through December 2005. A summary of water quality data for the monitoring period preceding the TMDL study is shown in Table 4.1. Graphs depicting the 30 month ambient data, geometric mean, and 90th percentile are shown in Figures 4.3A through 4.3N. Only data for those stations associated with a condemnation from 1998, as indicated by a condemnation number in Table 4.1 are used for the TMDLs in this study.

The closures in the growing areas are characterized based on all monitoring stations (see Figure 4-1) in the closed area. To facilitate an effective assignment of the appropriate level of protection for these systems, the water quality data that reflected the most severely impaired station stations in the condemned area were used. This provides a target that can be easily comprehended and uniformly implemented while retaining the necessary protection for the affected waters.

Table 3.2
Summary of Land Use in the Gwynn's Island
and Milford Haven Watersheds (in Acres)

Land Use Type	Gwynn's Island Edwards Creek 36-197A (VAP-C04E-03)	Milford Haven, Queens Creek 37-99A (VAP-C04E-01)	Milford Haven Stutts Creek 37-61A (VAP-C04E-05)	Milford Haven Morris Creek 37-61B (VAP-C04E-04)	Milford Haven Billups Creek 37-204 (VAP-C04E-07)
Water (tidal flats/ponds)	213	113	46	25	89
Residential	199	40	4	2	248
Commercial/Industrial	36	0	0	0	2
Bare Sand	7	0	0	0	0
Forest	654	1092	445	182	2236
Grassland	208	227	49	56	159
Agriculture	101	335	67	122	255
Wetland	79	721	347	130	1232

Figure 4.1 Shellfish Water Quality Monitoring and Bacteria Source Tracking Stations in Growing Area 36 and Growing Area 37 Gwynns Island, Milford Haven and Vicinity

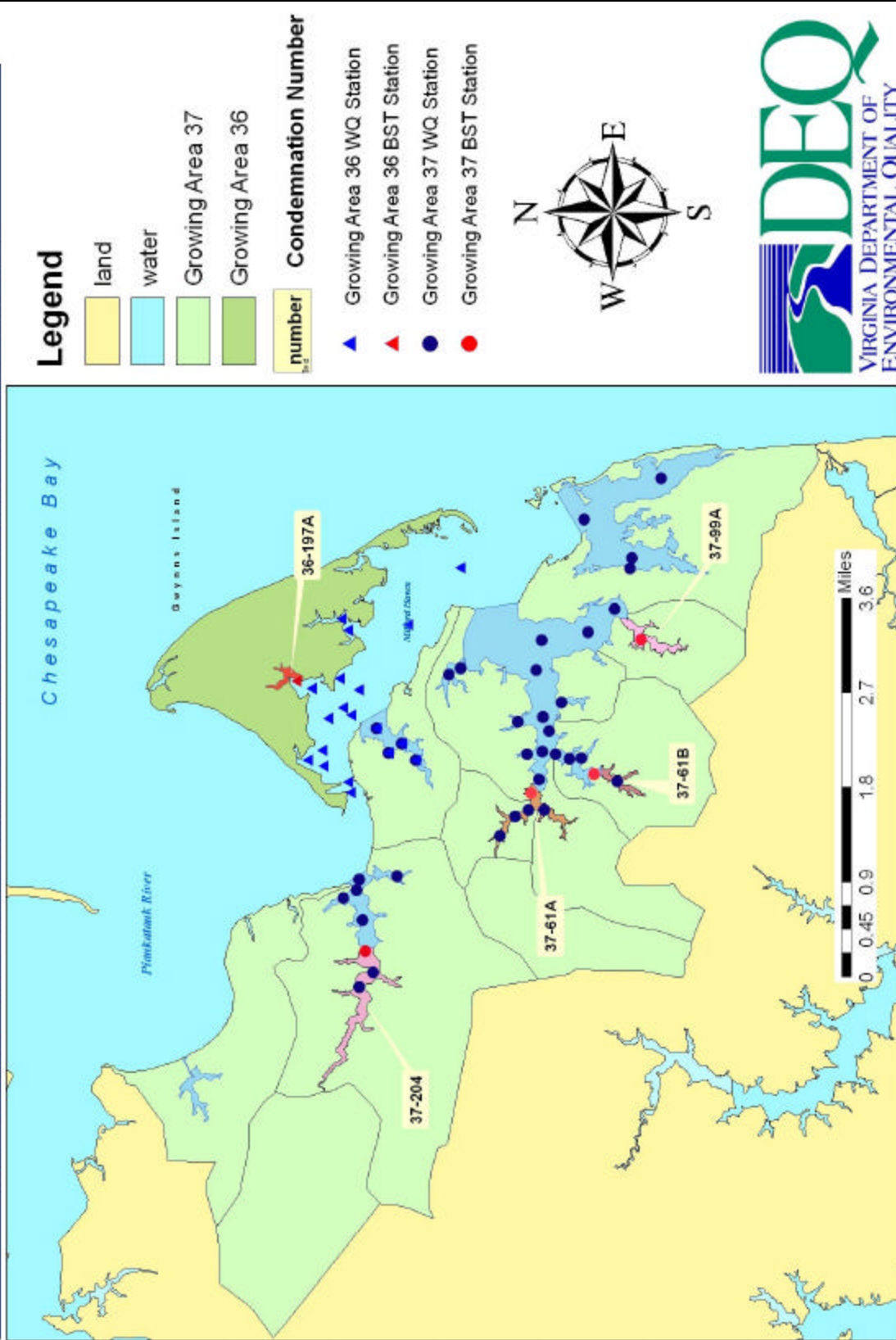
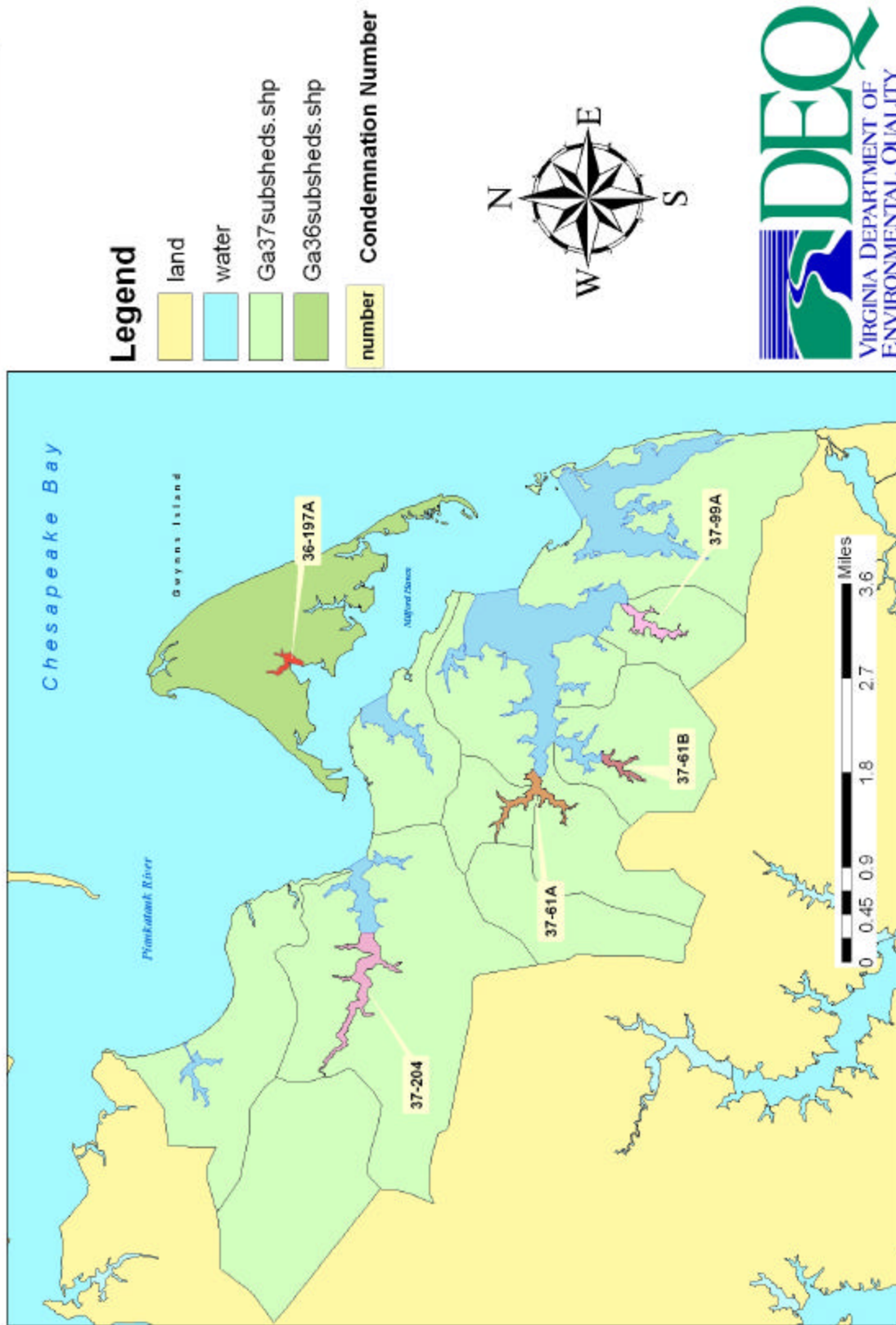


Figure 4.2 Shellfish Condemnation Areas in Growing Area 36 and Growing Area 37 Gwynns Island, Milford Haven and Vicinity



**Table 4.1 Water Quality Data Summary:
Growing Areas 36 and 37 Gwynn's Island and Milford Haven 30 Month Data**

Station	Condemnation Area	Total Observations (one/Month)	Geometric Mean	Station Violates Geometric Standard: 14 MPN	90th Percentile	Station Violates 90th Percentile Standard: 49 MPN
36-11A	36-197A	30	11.3	No	68.2	Yes
36-12	36-197A	30	23.5	Yes	201	Yes
37-4	37-204	30	10.7	No	57.1	Yes
37-4A	37-204	30	35.3	Yes	385.6	Yes
37-5	37-204	30	18.5	Yes	103.9	Yes
37-6	37-204	30	24.2	Yes	184.5	Yes
37-7	37-204	30	34.5	Yes	205.9	Yes
37-7A	37-204	30	42.9	Yes	311.1	Yes
37-23_1	37-61A	30	4.5	No	12.4	No
37-23_2	37-61A	30	6.4	No	28.1	No
37-23_3	37-61A	30	20.0	Yes	106.7	Yes
37-23_4	37-61A	30	25.2	Yes	202.5	Yes
37-26	37-61B	30	16.5	Yes	84.1	Yes
37-26_1	37-61B	30	22.2	Yes	113.3	Yes
37-26_2	37-61B	30	28.1	Yes	166.8	Yes
37-26_3	37-61B	30	39.4	Yes	192.9	Yes
37-27	37-99A	30	17.9	Yes	99.4	Yes
37-28	37-99A	30	25.2	Yes	166.0	Yes
37-29	37-99A	30	30.9	Yes	297.5	Yes
37-30	37-99A	30	47.0	Yes	395.3	Yes

Figure 4.3A

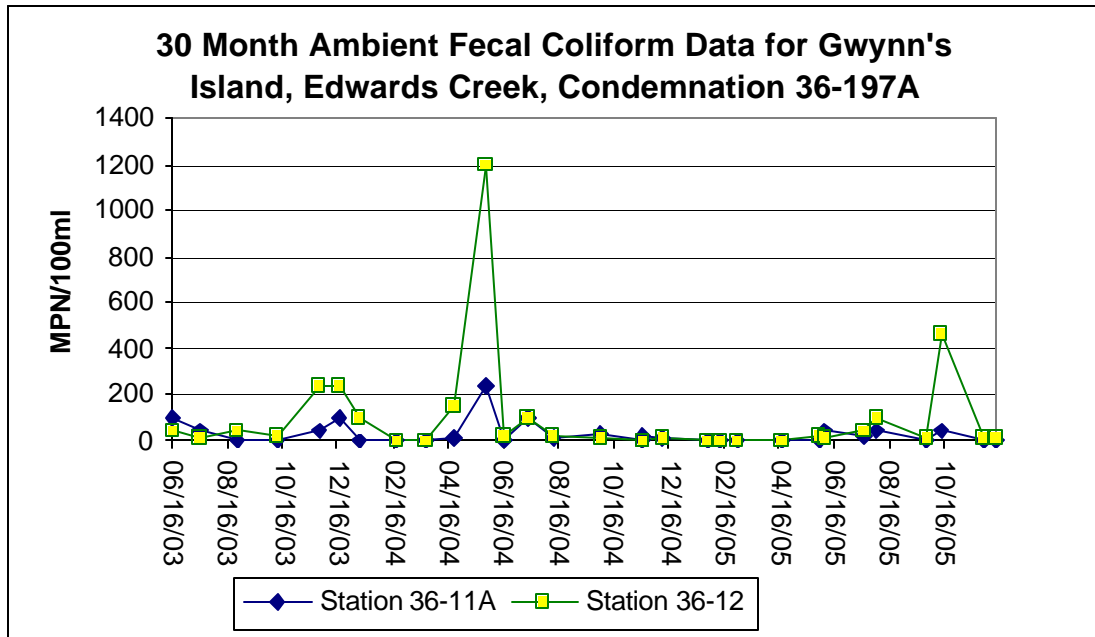


Figure 4.3B

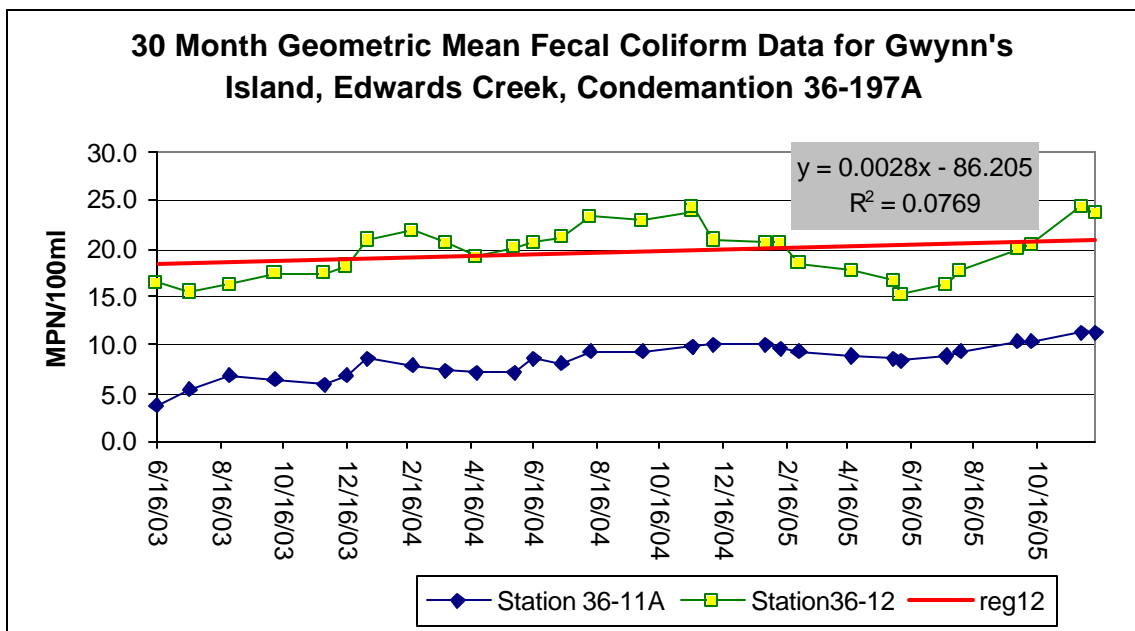


Figure 4.3C

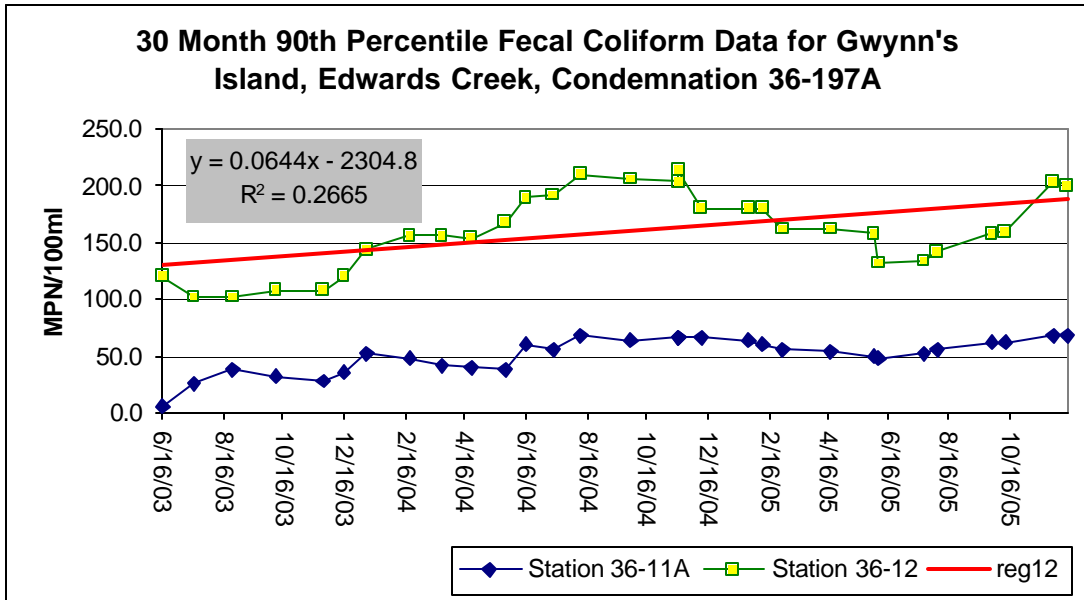


Figure 4.3D

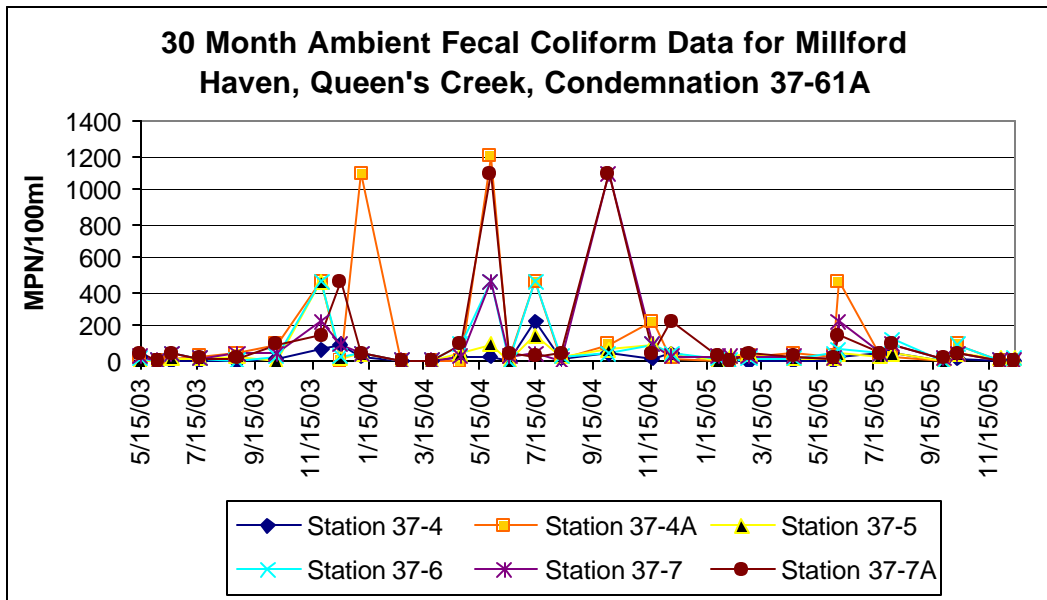


Figure 4.3E

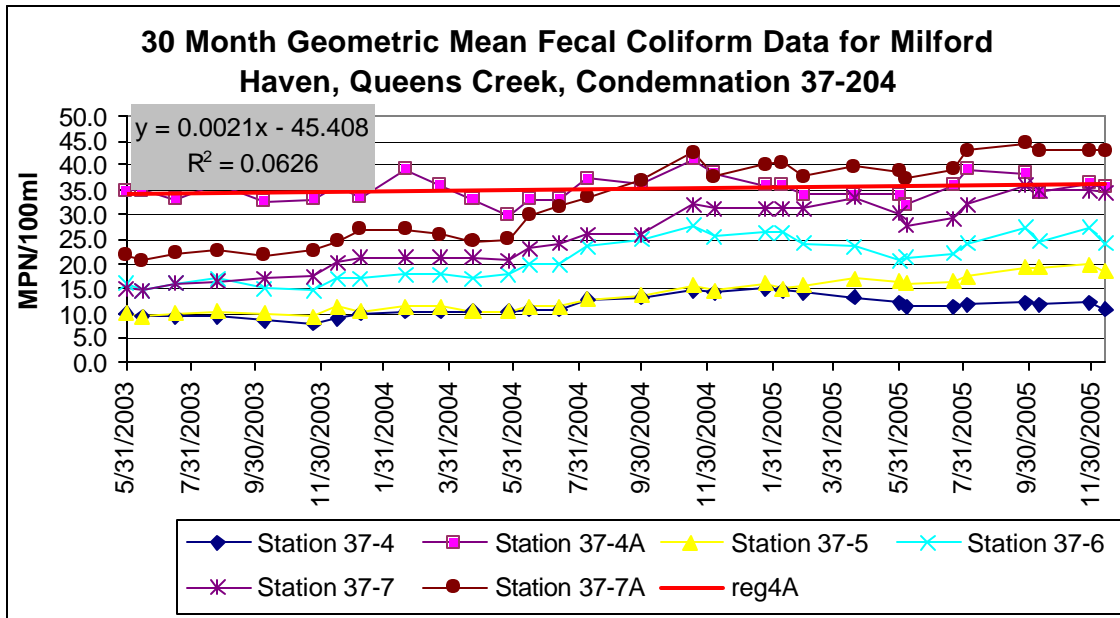


Figure 4.3F

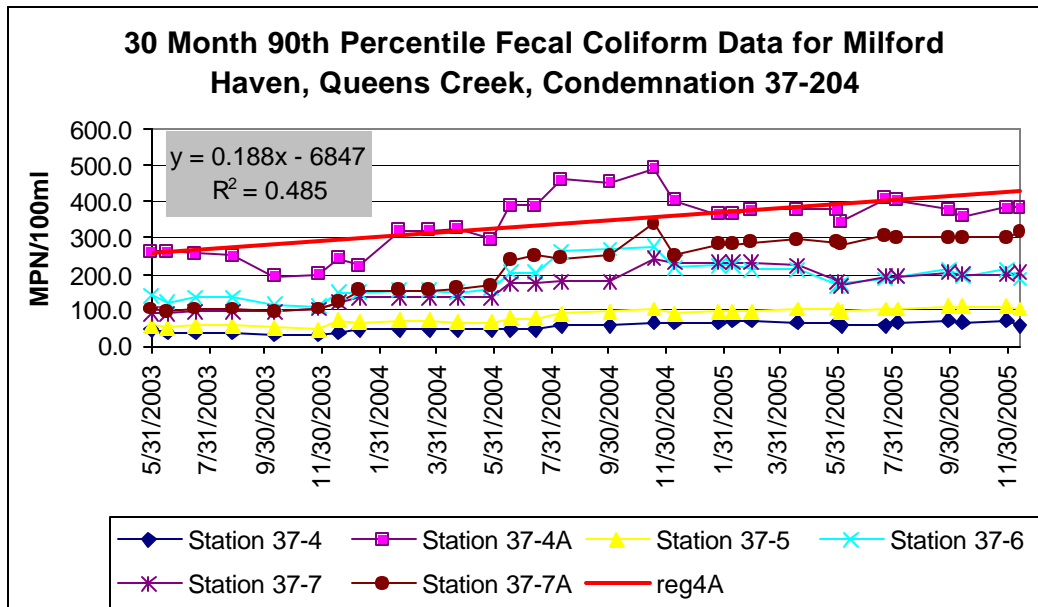


Figure 4.3G

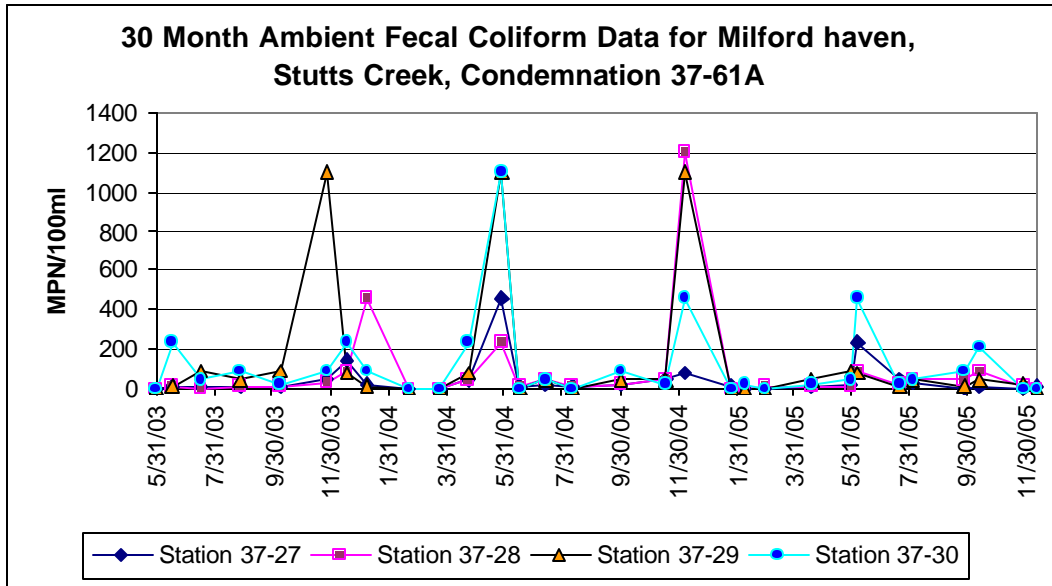


Figure 4.3H

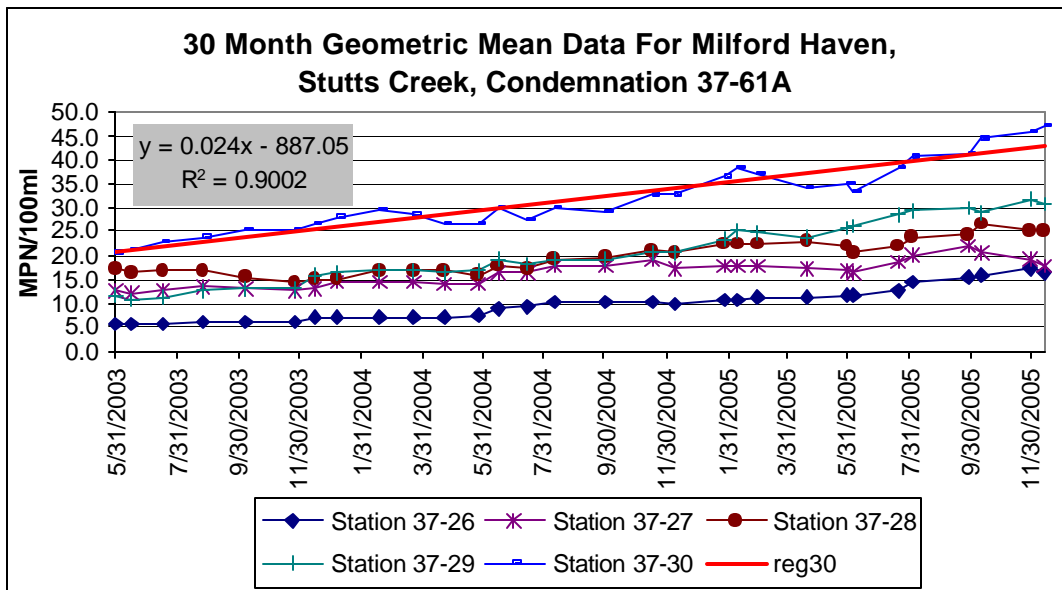


Figure 4.3I

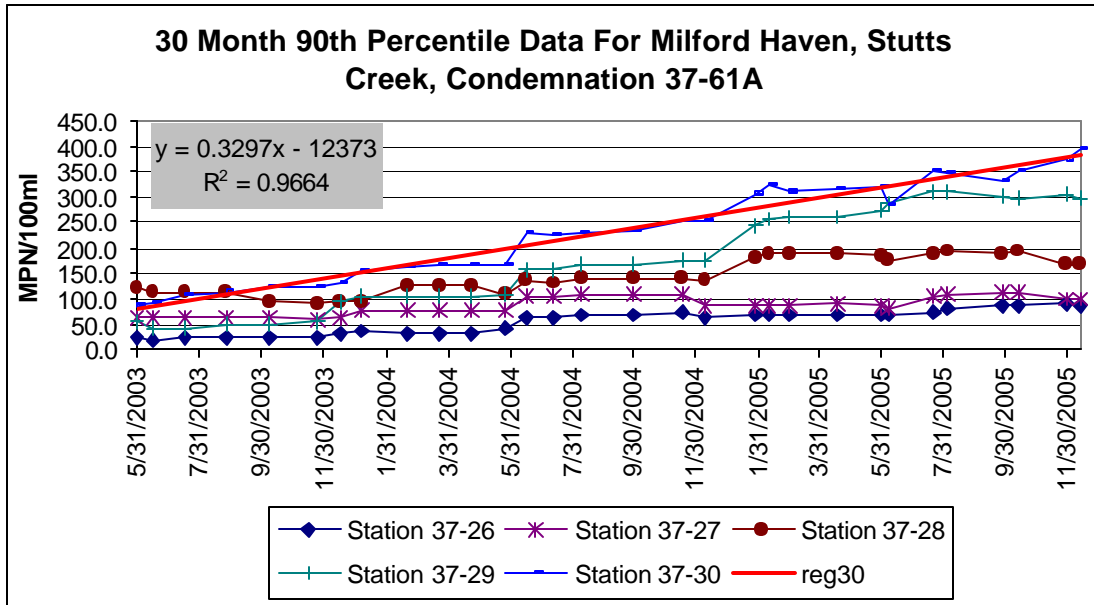


Figure 4.3J

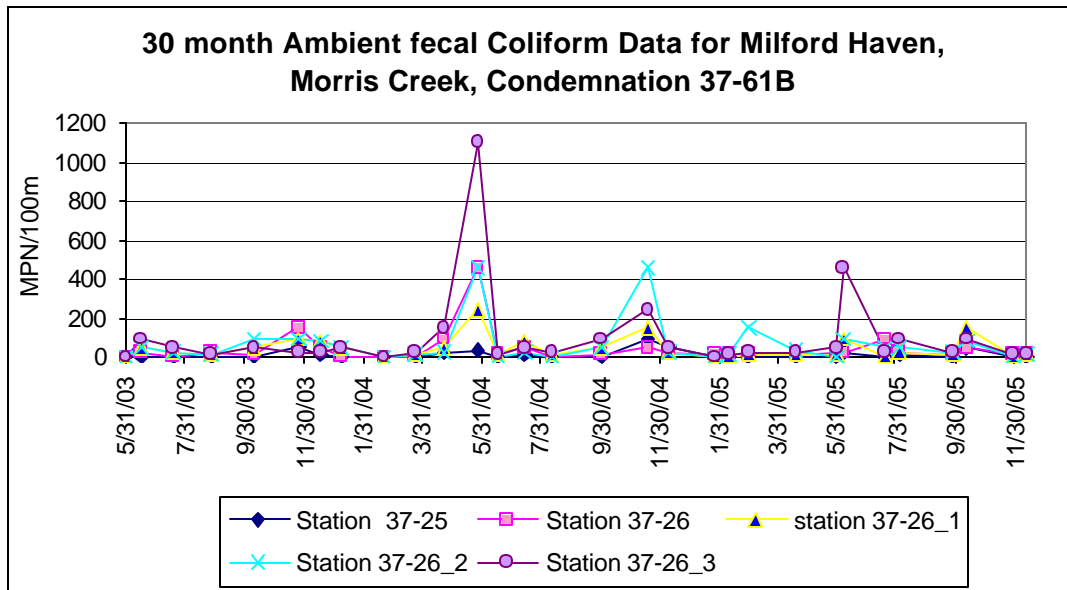


Figure 4.3K

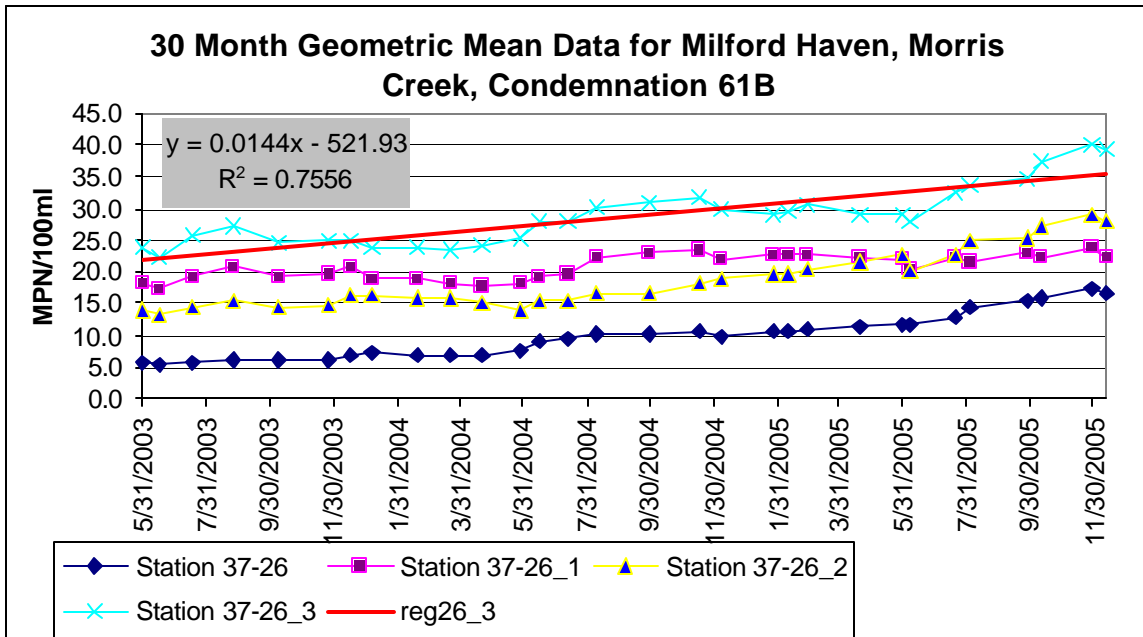


Figure 4.3L

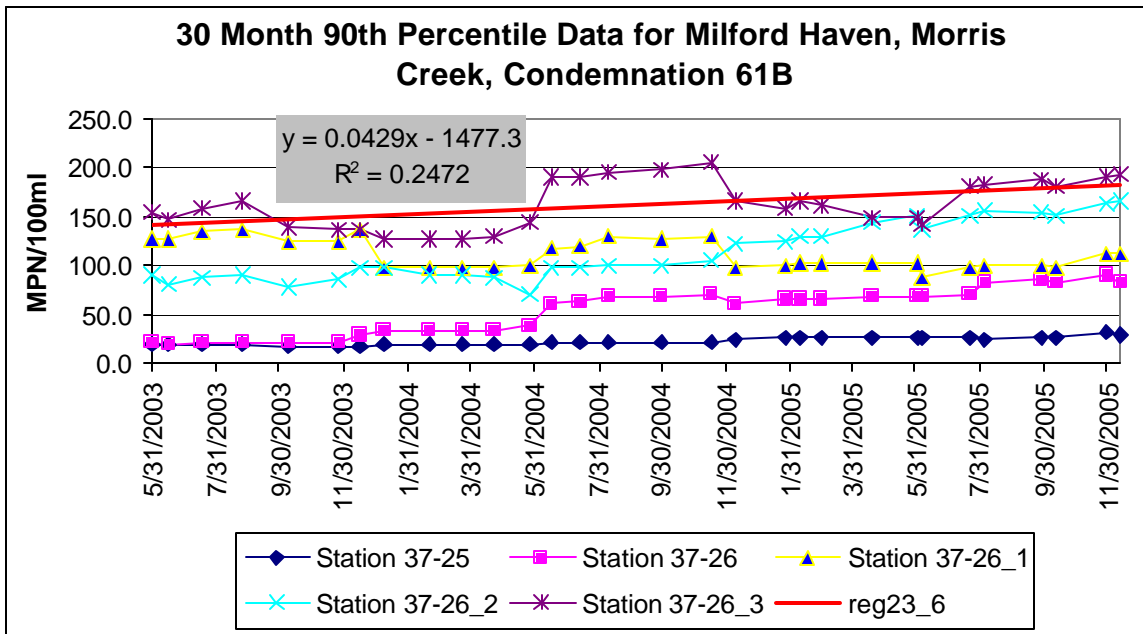


Figure 4.3M

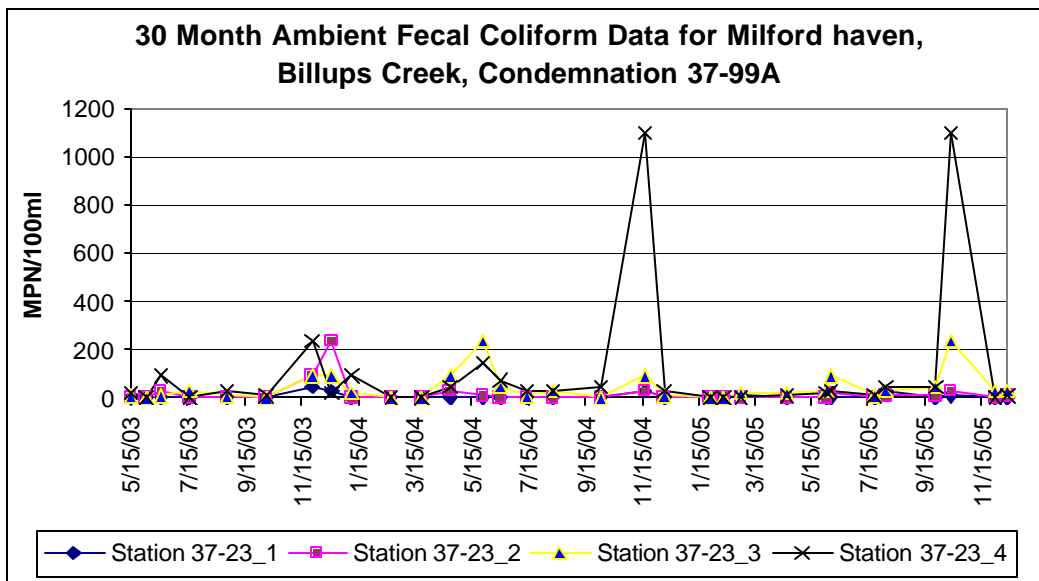


Figure 4.3N

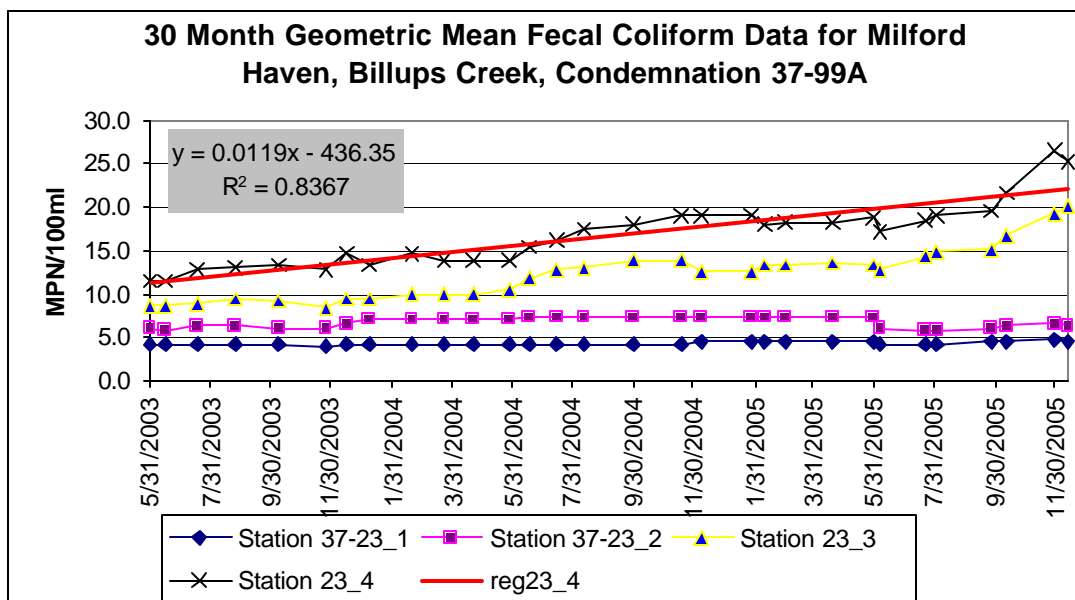
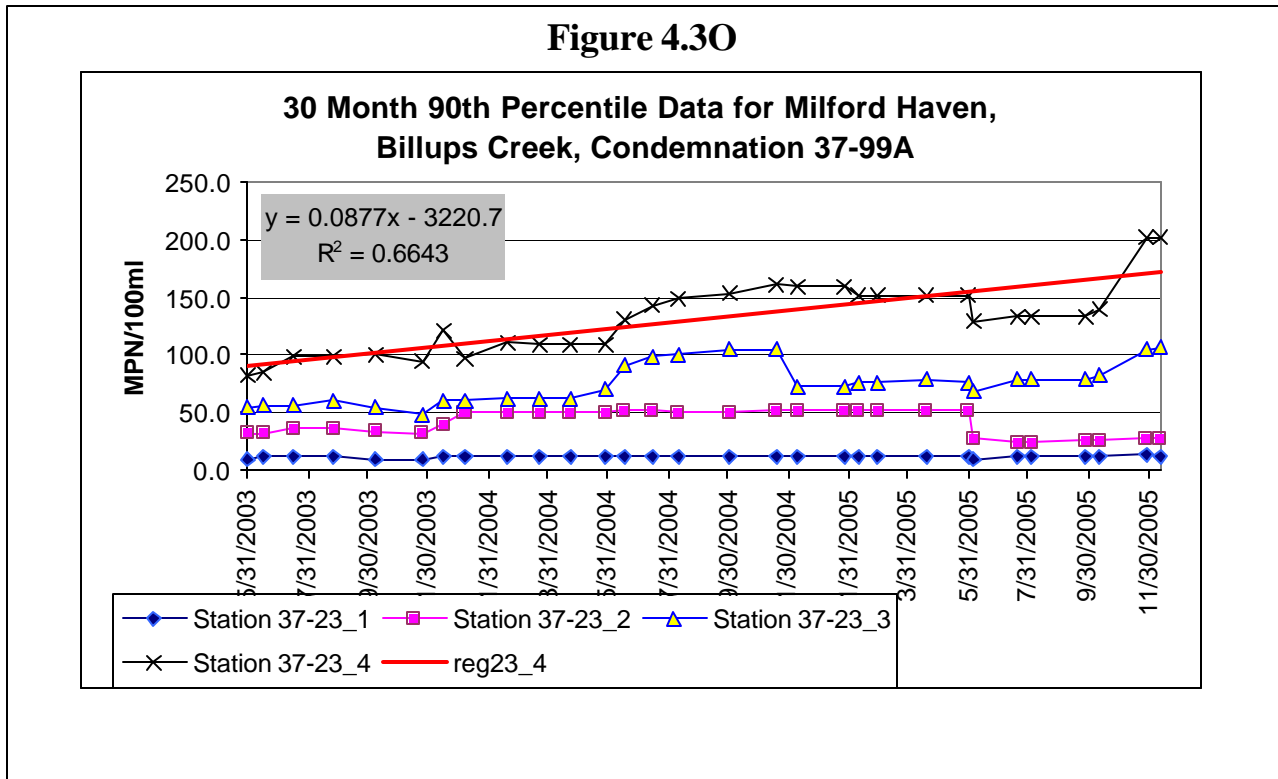


Figure 4.30



4.2 Condemnation Areas

Five segments in the Milford Haven and Gwynn’s Island Watershed were listed as impaired on Virginia’s 1998 303(d) water quality standard for fecal coliform bacteria in shellfish supporting waters. Detailed maps of the shellfish condemnation areas and their associated water quality stations are available from the Virginia Department of Health, Division of Shellfish Sanitation. A map of the condemnation areas is shown in Figure 4.2. Copies of the condemnation notices may be found in Appendix A.

4.3 Fecal Coliform Bacteria Source Assessment

The locations of shoreline deficiencies from the DSS shoreline survey are shown in Figure 4.4.

A. Point Source

There are no VPDES permitted wastewater treatment plant point source bacteria contributions that impact waters with an ongoing shellfish use in these watersheds.

B. Non-Point Source Contributions

Non-point sources of fecal coliform do not have one discharge point but may occur over the entire length of the receiving water. Fecal coliform bacteria deposited on the land surface can build up over time. During rain events, surface runoff transports water and sediment and discharges to the waterway.

Sources of fecal coliform bacteria include grazing livestock, concentrated animal feeding operations, manure application and wildlife and pet excretion. Direct contribution to the waterway occurs when livestock or wildlife defecate into or immediately adjacent to receiving waters. Non-point source contributions from humans generally arise from failing septic systems and associated drain fields, moored or marina vessel discharges, storm water management facilities, pump station failures and ex-filtration from sewer systems. Contributions from wildlife, both mammalian and avian, are natural conditions and may represent a significant, but background level of bacterial loading. It is therefore likely that human loading is due to the noted failures in septic waste treatment systems from the VDH Sanitary Shoreline Survey and/or potential pollution from recreational vessel discharges.

The shoreline survey is used as a tool to identify non-point source contribution problems and locations. Figure 4.4 shows the results of the DSS sanitary shoreline survey dated June 2006 for Growing Area 36 and March 2002 for Growing Area 37. A copy of the textual portion of these surveys has been included as Appendix A. The Growing Area 36 survey identified 3 on-site sewage deficiencies, 16 non point deficiencies, 46 potential pollution sources, 5 related to boating, 4 related to animal pollution, none for a solid waste site, and 3 were from industrial facilities. The Growing Area 37 survey identified 19 on-site sewage deficiencies, 16 related to boating, 9 related to animal pollution, 3 for a solid waste site, and 5 were from industrial facilities. The number of deficiencies displayed on the map may not agree with the total because of the scale of the map and the possibility of multiple deficiencies at one location.

4.4 Bacterial Source Tracking

Bacterial Source tracking is used to identify sources of fecal contamination from human as well as domestic and wild animals. The BST method used in Virginia is based on the premise that *Escherichia coli* (*E. Coli*) found in human, domestic animal, and wild animals will have significantly different patterns of resistance to a variety of antibiotics. The Antibiotic Resistance Approach (ARA), uses fecal streptococcus or *E. coli* and patterns of antibiotic resistance for separation of sources of the bacterial contribution. The BST analysis used for this TMDL classified the bacteria into one of four source categories: human, pets, livestock, and wildlife. However, BST analysis is an experimental, not approved, technique that is under evaluation and the error involved in correctly assigning *E. coli* isolates to the appropriate fecal sources is unknown.

Figure 4.1 shows the TMDL study stations, subsets of which are the BST monitoring stations for the Milford Haven and Gwynn's Island Growing Areas. The BST data developed for the watershed indicate the potential dominant fecal coliform sources contributing to the Milford Haven and Gwynn's Island are principally wildlife in origin with human and pet populations providing a significant contribution. The next largest contribution is indicated to be from the livestock population. Figures 4.5A through 4.5EE show the mean distribution by month for the source categories and the annual means are shown in Figures 4.6A through 4.6E. The BST sampling period was October 2003 through September 2004. The target sampling interval was once monthly, if the graph does not show 11 months, that means that there were months for which data was not available, or the data obtained was not statistically significant. A data summary data is shown in tabular form in Table 4.2. These annual mean values are used for the source allocation in deriving the Total Maximum Daily Loads for the Milford Haven and Gwynn's Island Growing Areas.

**Table 4.2 Non-point Source Load Distribution using BST
Growing Area 36 and 37 Milford Haven, Gwynn’s Island and Vicinity**

Condemnation Area	Wildlife	Human	Livestock	Pet
Edwards Creek	58%	10%	24%	8%
Queens Creek	74%	8%	9%	9%
Stutts creek	45%	13%	24%	19%
Morris Creek	64%	10%	11%	15%
Billups Creek	31%	30%	16%	26%

5.0 TMDL Development

5.1 Simplified Modeling Approach (Volumetric Model):

Personnel from EPA, Virginia DEQ, Virginia Department of Conservation and Recreation (DCR), Maryland Department of the Environment (MDE), Virginia DSS, Virginia Institute of Marine Sciences (VIMS), United States Geological Survey, Virginia Polytechnic University, James Madison University, and Tetra Tech composed the shellfish TMDL workgroup and developed a procedure for developing TMDLs using either a simplified approach to the development of the TMDL. The goal of the procedure is to use bacteriological source tracking (BST) data to determine the sources of fecal coliform violations and the load reductions needed to attain the applicable criteria.

5.2 The TMDL Calculation

A. Current Fecal Coliform Condition

The fecal coliform concentration in an embayment varies due to the changes in biological, hydrological and meteorological conditions. The current condition was determined based on the 30-sample geometric mean and 90th percentile of fecal coliform values of each condemned area. The period of record for the monitoring data used to determine the current condition is September 2003 to December 2005. The maximum values for geometric mean and 90th percentile were used to represent the current loads. Therefore, the current loads represent the worse case scenario.

B. Geometric Mean Analysis:

The current 30-sample geometric mean was used for the load estimation. The current load was estimated using the geometric mean and 90th percentile of fecal coliform values of each condemned area. The allowable load was calculated using the water quality standard of 14 MPN/100ml. The load reduction needed for the attainment of the water quality standard was determined by subtracting the allowable load from the current load. The process may be described by the word equation as follows. The calculated results are listed in table 5-2.

Figure 4.4 Sanitary Shoreline Survey Results for Growing Areas 37 and 37 Milford Haven and Gwynns Island and Vicinity

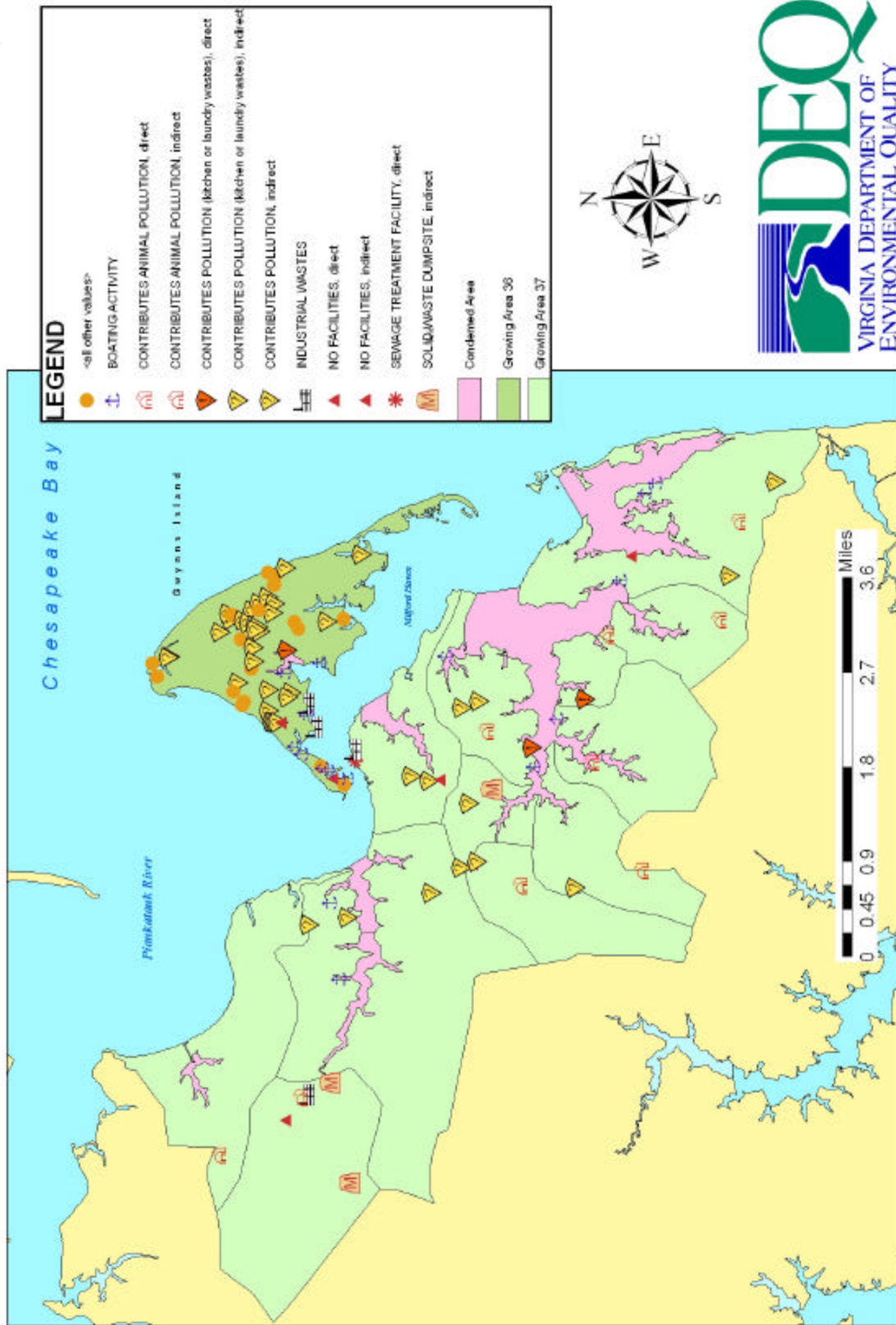


Figure 4.5A

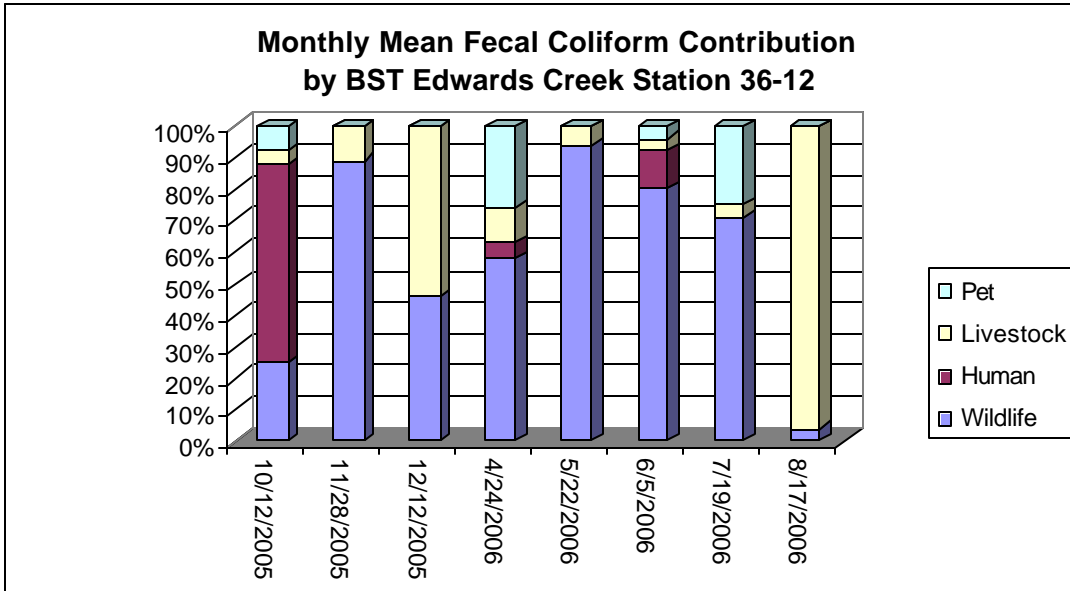


Figure 4.5B

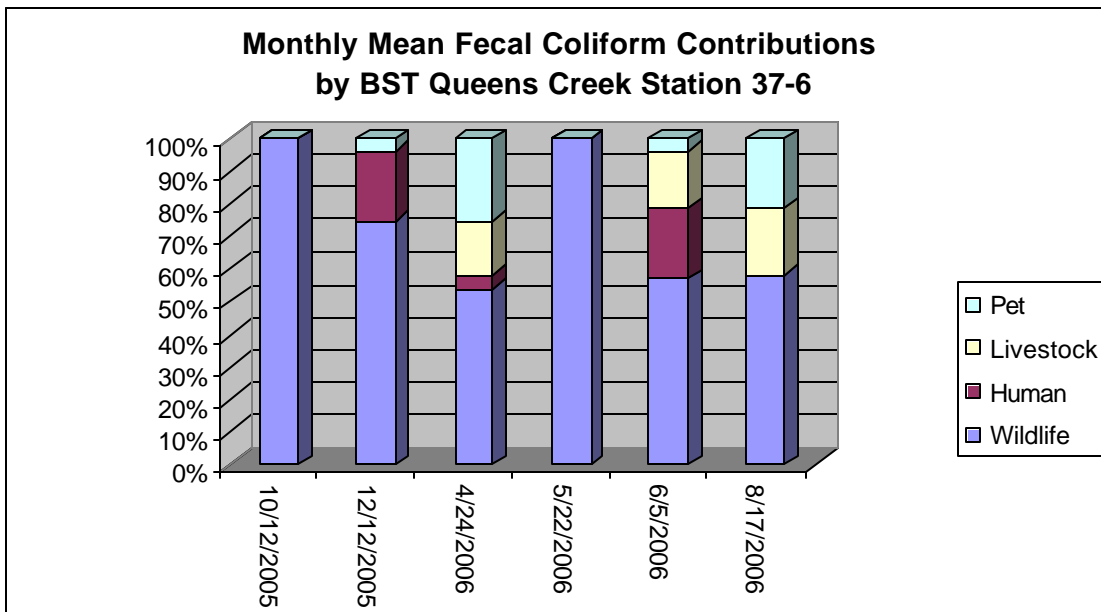


Figure 4.5C

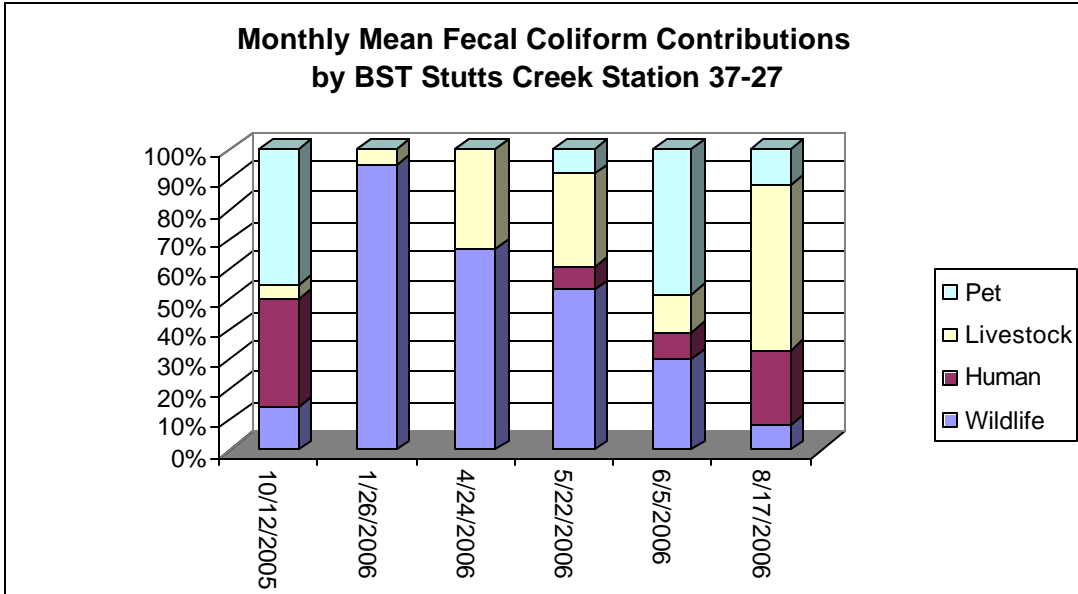


Figure 4.5D

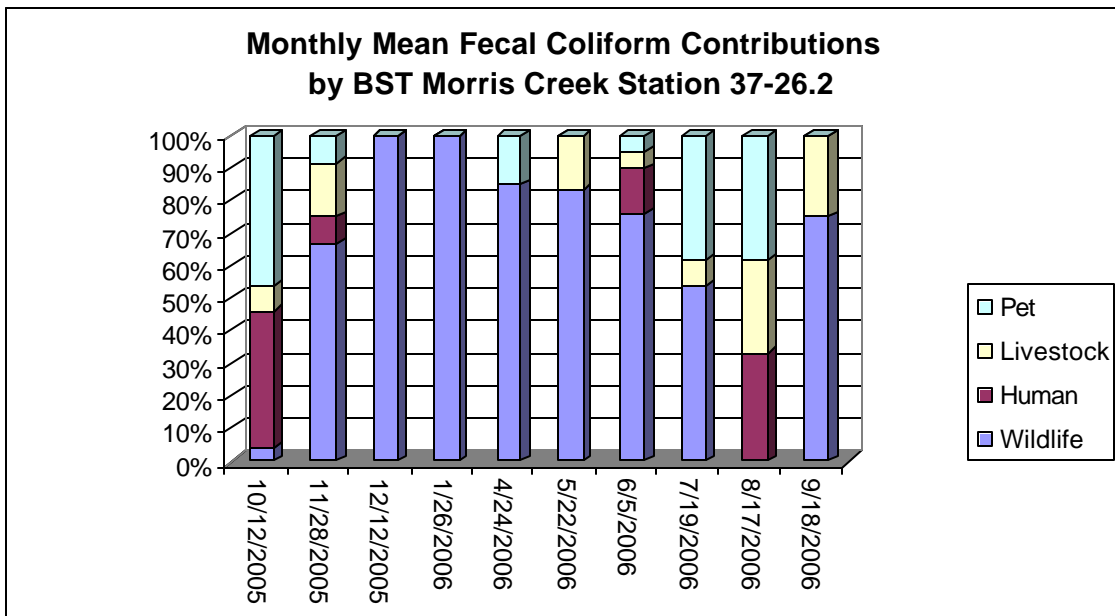


Figure 4.5E

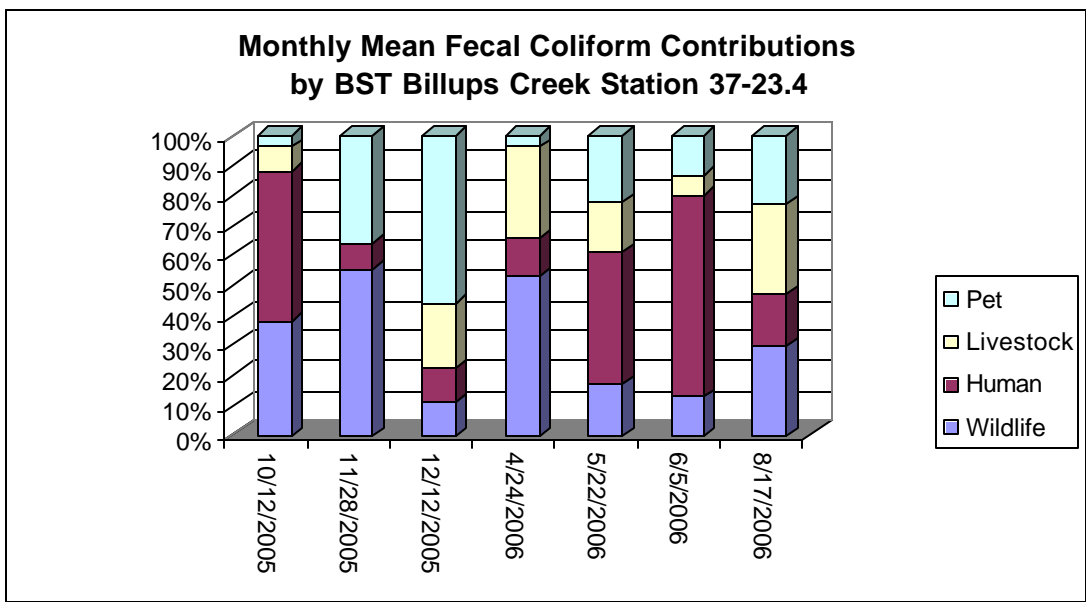


Figure 4.6A

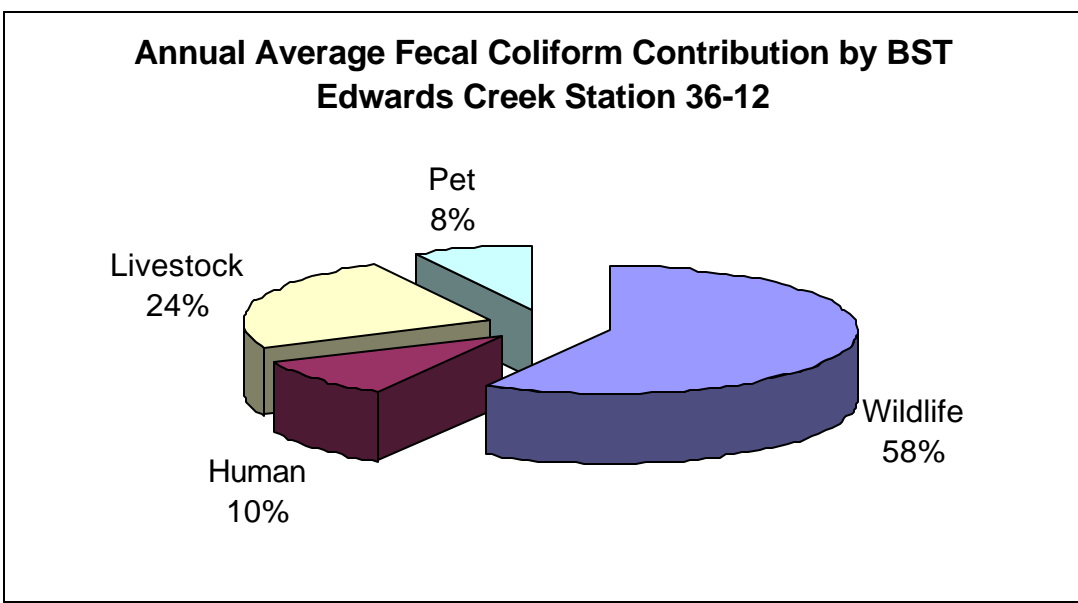


Figure 4.6 B

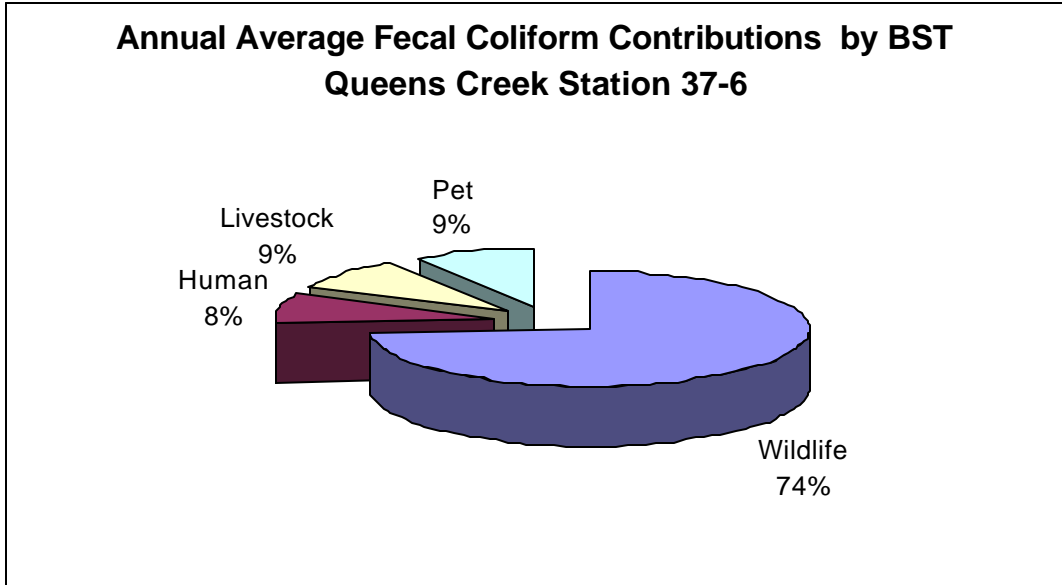


Figure 4.6C

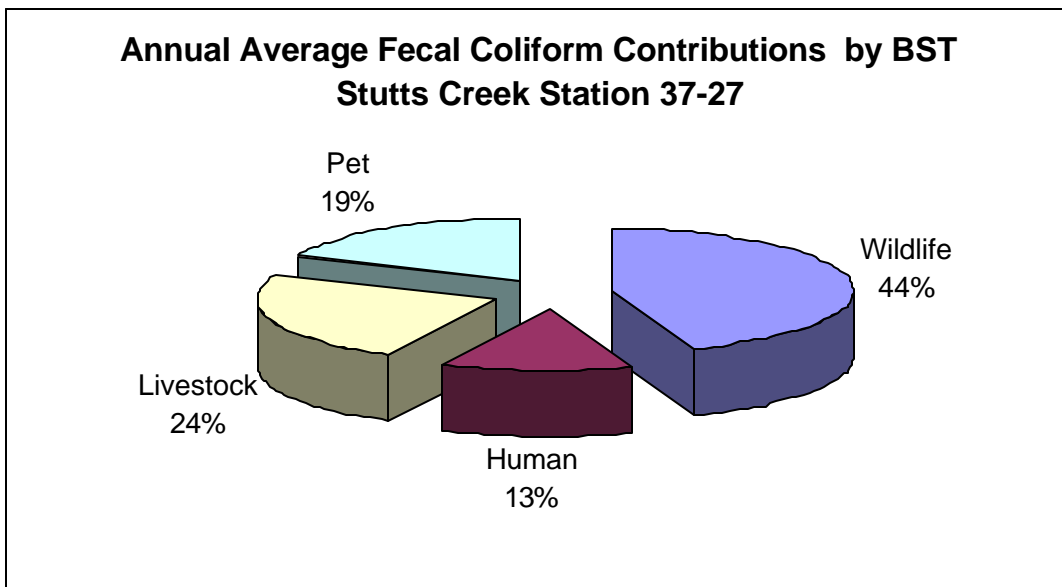


Figure 4.6 D

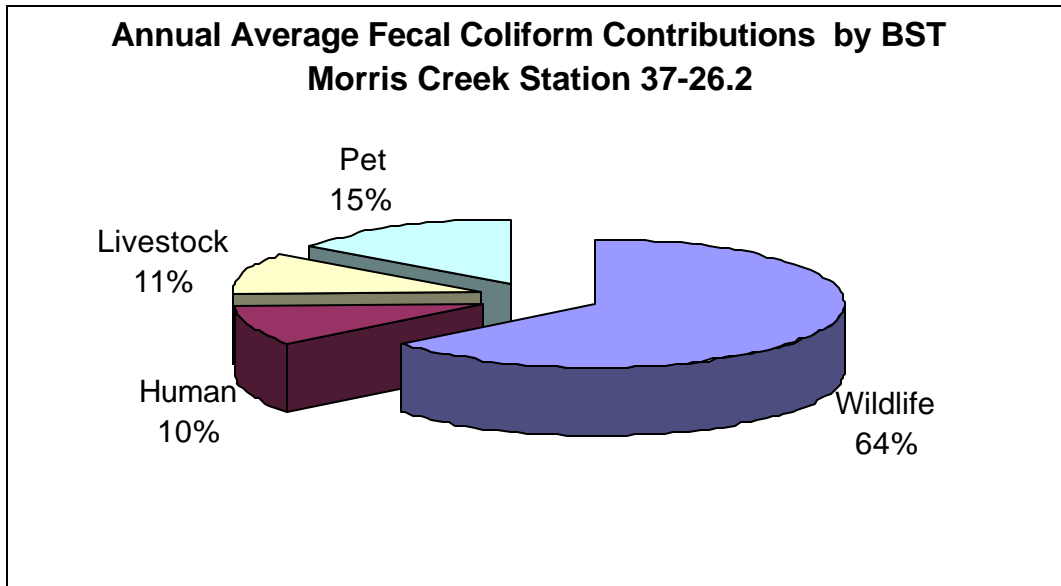
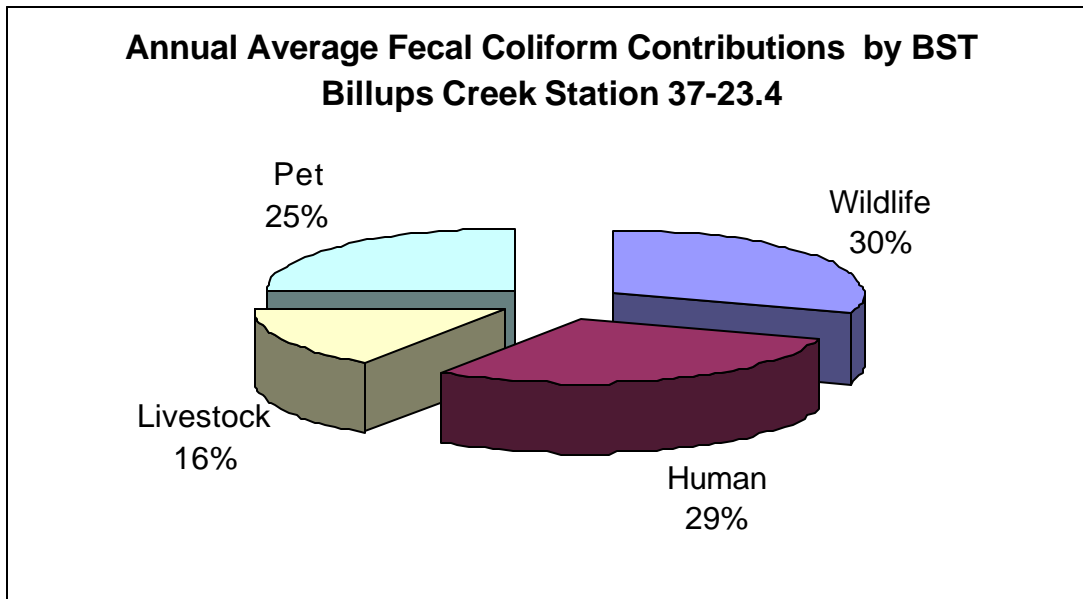


Figure 4.6 E



The load reduction is estimated as follows:

$$\text{Geometric Mean Value (X MPN/100ml)} \times (\text{volume}) = \text{Existing Load}$$

$$\text{Criteria Value (14 MPN/100ml)} \times (\text{volume}) = \text{Allowable Load}$$

$$\text{Load Reduction} = \frac{\text{Current Load} - \text{Allowable Load}}{\text{Current Load}} \times 100 \%$$

Table 5.1 Geometric Mean Analysis of Current Load and Estimated Load Reduction

Condemnation Area	Volume (m ³)	Fecal Coliform (MPN/100ml)	WQ Standard MPN/100 ml	Current Load (MPN/day)	Allowable Load (MPN/day)	Required Reduction (%)
36-197A Edwards Creek (VAP-C04E-03)	41400	23.5	14	9.73E+09	5.80E+09	40%
37-99A Queens Creek (VAP-C04E-01)	323910	47	14	1.52E+11	4.53E+10	70%
37-61A Stutts Creek (VAP-C04E-05)	136620	25.2	14	3.44E+10	1.91E+10	44%
37-61B Morris Creek (VAP-C04E-04)	36810	39.4	14	1.45E+10	5.15E+09	64%
37-204 Billups Creek (VAP-C04E-07)	75150	42	14	3.16E+10	1.05E+10	67%

C. 90th Percentile Analysis

The current 30-sample 90th percentile concentration was used for load estimation. The corresponding 30-sample geometric mean from the station outside the condemned area was used as the boundary condition. The current load was estimated the volumetric model. The allowable load was calculated based on the water quality standard of 49 MPN/100ml. This value was also used as boundary condition for the calculation. The calculated results are listed in Table 5-3.

The load reduction is estimated as follows:

$$\text{Load Reduction} = \frac{\text{Current Load} - \text{Allowable Load}}{\text{Current Load}} \times 100 \%$$

Table 5.2 90th Percentile Analysis of Current Load and Estimated Load Reduction

Condemnation Area	Volume (m³)	Fecal Coliform (MPN/100mL)	WQ Standard MPN/100 ml	Current Load (MPN/day)	Allowable Load (MPN/day)	Required Reduction (%)
36-197A Edwards Creek (VAP-C04E-03)	41400	201	49	8.32E+10	2.03E+10	76%
37-99A Queens Creek (VAP-C04E-01)	323910	395.3	49	1.28E+12	1.59E+11	88%
37-61A Stutts Creek (VAP-C04E-05)	136620	202.5	49	2.77E+11	6.69E+10	76%
37-61B Morris Creek (VAP-C04E-04)	36810	192.9	49	7.10E+10	1.80E+10	75%
37-204 Billups Creek (VAP-C04E-07)	75150	311.1	49	2.34E+11	3.68E+10	84%

5.3 Load Allocation

A comparison of the reductions based on geometric mean load and on the 90th percentile load shows that the 90th percentile load is the critical condition. This is consistent with water quality analysis. The 90th percentile criterion is most frequently exceeded. Therefore the 90th percentile loading is used to allocate source contributions and establish load reduction targets among the various contributing sources that will yield the necessary water quality improvements to attain the water quality standard.

Based on source assessment of the watershed, the percent loading for each of the major source categories is estimated. These percentages are used to determine where load reductions are needed. The loadings for each source are determined by multiplying the total current and allowable loads by the representative percentage. The percent reduction needed to attain the water quality standard or criterion is allocated to each source category. This is shown in Table 5-4 and serves to fulfill the TMDL requirements by ensuring that the criterion is attained.

The TMDL seeks to eliminate 100% of the human derived fecal component regardless of the allowable load determined through the load allocation process. Human derived fecal coliforms are a serious concern in the estuarine environment and discharge of human waste is precluded by state and federal law. According to the preceding analysis, reduction of the controllable loads; human, livestock and pets, will result in achievement of the water quality standard for all condemned areas. Absent any other anthropogenic sources, any additionally required reduction is allocated to wildlife. Through an iterative implementation of actions to reduce the controllable loads, subsequent monitoring may indicate that further reductions are not necessary, or that revisions in implementation strategies may be

appropriate. Continued violations may result in the process of Use Attainment Analysis, UAA, for the water body (see Chapter 6 for a discussion of UAA). The allocations presented demonstrate how the TMDLs could be implemented to achieve water quality standards; however, the state reserves the right to allocate differently, as long as consistency with the achievement of water quality standards is maintained.

5.3.1 Development of Wasteload Allocations

There are no permitted point source discharges in the watershed. No waste load is considered in this TMDL.

5.4 Consideration of Critical Conditions and Seasonal Variation

EPA regulations at 40 CFR 130.7 (c) (1) requires TMDLs to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the water body is protected during times when they are most vulnerable. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards. The current loading to the water body was determined using a long-term record of water quality monitoring (observation) data. The period of record for the data was 1995 to 2002. The resulting estimate is quite robust.

A comparison of the geometric mean values and the 90th percentile values against the water quality criteria will determine which represents the more critical condition or higher percent reduction. If the geometric mean values dictate the higher reduction, this suggests that, on average, water sample counts are consistently high with limited variation around the mean. If the 90th percentile criterion requires a higher reduction, this suggests an occurrence of the high fecal coliform due to the variation of hydrological conditions. For this study, the 90th percentile criterion is the most critical condition. Thus, the final load reductions determined using the 90th percentile represents the most stringent conditions and it is the reductions based on these bacterial loadings that will yield attainment of the water quality standard. Seasonal variations involve changes in surface runoff, stream flow, and water quality as a result of hydrologic and climatologic patterns. Variations due to changes in the hydrologic cycle as well as temporal variability in fecal coliform sources, such as migrating duck and goose populations are accounted for by the use of the long-term data record to estimate the current load.

5.5. Margin of Safety

A Margin of Safety (MOS) is required as part of a TMDL in recognition of uncertainties in the understanding and simulation of water quality in natural systems. For example, knowledge is incomplete regarding the exact nature and magnitude of pollutant loads from various sources and the specific impacts of those pollutants on the chemical and biological quality of complex, natural water bodies. The MOS is intended to account for such uncertainties in a manner that is conservative from the standpoint of environmental protection. Due to the very conservative assumptions made in this modeling effort the margin of safety is considered to be implicit in the load allocations the model establishes

**Table 5.3 Reduction and Allocation Based Upon 90th Percentile
Standard: Growing Area 36 and 37**

Condemnation Area	Source	BST Allocation % of Total Load	Current Load MPN/ day	Load Allocation MPN/ day	Reduction Needed
36-197A Edwards Creek (VAP-C04E-03)	Wildlife	58%	4.83E+10	2.03E+10	58%
	Human	10%	8.32E+09	0.00E+00	100%
	Livestock	24%	2.00E+10	0.00E+00	100%
	Pets	8%	6.66E+09	0.00E+00	100%
	Total	100%	8.32E+10	2.03E+10	76%
37-99A Queens Creek (VAP-C04E-01)	Wildlife	74%	9.48E+11	1.59E+11	83%
	Human	8%	1.02E+11	0.00E+00	100%
	Livestock	9%	1.15E+11	0.00E+00	100%
	Pets	9%	1.15E+11	0.00E+00	100%
	Total	100%	1.28E+12	1.59E+11	88%
37-61A Stutts Creek (VAP-C04E-05)	Wildlife	45%	1.24E+11	6.69E+10	46%
	Human	13%	3.60E+10	0.00E+00	100%
	Livestock	24%	6.64E+10	0.00E+00	100%
	Pets	19%	5.26E+10	0.00E+00	100%
	Total	100%	2.77E+11	6.69E+10	76%
Morris Creek 37-61A (VAP-C04E-04)	Wildlife	64%	4.54E+10	1.80E+10	61%
	Human	10%	7.10E+09	0.00E+00	100%
	Livestock	11%	7.81E+09	0.00E+00	100%
	Pets	15%	1.07E+10	0.00E+00	100%
	Total	100%	7.10E+10	1.80E+10	75%
37-204 Billups Creek (VAP-C04E-07)	Wildlife	31%	7.25E+10	3.68E+10	49%
	Human	30%	7.01E+10	0.00E+00	100%
	Livestock	16%	3.74E+10	0.00E+00	100%
	Pets	26%	6.08E+10	0.00E+00	100%
	Total	100%	2.34E+11	3.68E+10	84%

5.6 TMDL Summary

To meet the water quality standards for both geometric mean and 90th percentile criteria, TMDLs for Milford Haven and Gwynn’s Island Watershed are defined for the geometric mean load and the 90th percentile load. The TMDLs are summarized in the table 5.4 and 5.5.

Table 5.4 TMDL Summary for Five Closures in the Gwynn's Island and Milford Haven Watersheds (geometric mean)

Condemnation Area	Pollutant Identified	TMDL MPN/day	Waste Load Allocation MPN/day	Load Allocation MPN/day	Margin of Safety
36-197A Edwards Creek (VAP-C04E-03)	Fecal Coliform	5.80E+09	N/A	5.80E+09	Implicit
37-99A Queens Creek (VAP-C04E-01)	Fecal Coliform	4.53E+10	N/A	4.53E+10	Implicit
37-61A Stutts Creek (VAP-C04E-05)	Fecal Coliform	1.91E+10	N/A	1.91E+10	Implicit
37-61B Morris Creek (VAP-C04E-04)	Fecal Coliform	5.15E+09	N/A	5.15E+09	Implicit
37-204 Billups Creek (VAP-C04E-07)	Fecal Coliform	1.05E+10	N/A	1.05E+10	Implicit

Table 5.5 TMDL Summary for Five Closures in the Gwynn's Island and Milford Haven Watersheds (90th percentile)

Condemnation Area	Pollutant Identified	TMDL MPN/day	Waste Load Allocation MPN/day	Load Allocation MPN/day	Margin of Safety
36-197A Edwards Creek (VAP-C04E-03)	Fecal Coliform	2.03E+10	N/A	2.03E+10	Implicit
37-99A Queens Creek (VAP-C04E-01)	Fecal Coliform	1.59E+11	N/A	1.59E+11	Implicit
37-61A Stutts Creek (VAP-C04E-05)	Fecal Coliform	6.69E+10	N/A	6.69E+10	Implicit
37-61B Morris Creek (VAP-C04E-04)	Fecal Coliform	1.80E+10	N/A	1.80E+10	Implicit
37-204 Billups Creek (VAP-C04E-07)	Fecal Coliform	3.68E+10	N/A	3.68E+10	Implicit

6.0 TMDL Implementation

The goal of the TMDL program is to establish a three-step path that will lead to attainment of water quality standards. The first step in the process is to develop TMDLs that will result in meeting water quality standards. This report represents the culmination of that effort for the bacteria impairments in the Milford Haven and Gwynn's Island watersheds. The second step is to develop a TMDL implementation plan. The final step is to implement the TMDL implementation plan, and to monitor water quality to determine if water quality standards are being attained.

Once a TMDL has been approved by EPA, measures must be taken to reduce pollution levels in the water body. These measures, which can include the use of better treatment technology and the installation of best management practices (BMPs), are implemented in an iterative process that is described along with specific BMPs in the implementation plan. The process for developing an implementation plan has been described in the recent "TMDL Implementation Plan Guidance Manual", published in July 2003 and available upon request from the DEQ and DCR TMDL project staff or at <http://www.deq.virginia.gov/tmdl/implans/ipguide.pdf> With successful completion of implementation plans, Virginia will be well on the way to restoring impaired waters and enhancing the value of this important resource. Additionally, development of an approved implementation plan will improve a locality's chances for obtaining financial and technical assistance during implementation.

6.1 Staged Implementation

In general, Virginia intends for the required reductions to be implemented in an iterative process that first addresses those sources with the largest impact on water quality. For example, in agricultural areas of the watershed, the most promising management practice is livestock exclusion from water bodies. This has been shown to be very effective in lowering fecal coliform concentrations in water bodies, both by reducing the cattle deposits themselves and by providing additional riparian buffers.

Additionally, in both urban and rural areas, reducing the human fecal loading from failing septic systems should be a primary implementation focus because of its health implications. This component could be implemented through education on septic tank pump-outs as well as a septic system repair/replacement program and the use of alternative waste treatment systems. In urban areas, reducing the loading from leaking sewer lines could be accomplished through a sanitary sewer inspection and management program.

The iterative implementation of BMPs in the watershed has several benefits:

1. It enables tracking of water quality improvements following BMP implementation through follow-up monitoring;
2. It provides a measure of quality control, given the uncertainties inherent in computer simulation modeling;
3. It provides a mechanism for developing public support through periodic updates on BMP implementation and water quality improvements;

4. It helps ensure that the most cost effective practices are implemented first; and
5. It allows for the evaluation of the adequacy of the TMDL in achieving water quality standards.

Watershed stakeholders will have opportunity to participate in the development of the TMDL implementation plan. Specific goals for BMP implementation will be established as part of the implementation plan development.

6.2 Link to ongoing Restoration Efforts

Implementation of this TMDL will contribute to on-going water quality improvement efforts aimed at restoring water quality in the Chesapeake Bay. A tributary strategy has been developed for the Coastal Basins. Up-to-date information on tributary strategy development can be found at <http://www.snr.virginia.gov/Initiatives/TributaryStrategies/>.

6.3 Reasonable Assurance for Implementation

6.3.1 Follow-Up Monitoring

VDH-DSS will continue sampling at the established bacteriological monitoring stations in accordance with its shellfish monitoring program. VADEQ will continue to use data from these monitoring stations and related ambient monitoring stations to evaluate improvements in the bacterial community and the effectiveness of TMDL implementation in attainment of the general water quality standard.

6.3.2. Regulatory Framework

While section 303(d) of the Clean Water Act and current EPA regulations do not require the development of TMDL implementation plans as part of the TMDL process, they do require reasonable assurance that the load and waste load allocations can and will be implemented. Additionally, Virginia's 1997 Water Quality Monitoring, Information and Restoration Act (the "Act") directs the State Water Control Board to "develop and implement a plan to achieve fully supporting status for impaired waters" (Section 62.1-44.19.7). The Act also establishes that the implementation plan shall include the date of expected achievement of water quality objectives, measurable goals, corrective actions necessary and the associated costs, benefits and environmental impacts of addressing the impairments. EPA outlines the minimum elements of an approvable implementation plan in its 1999 "Guidance for Water Quality-Based Decisions: The TMDL Process." The listed elements include implementation actions/management measures, timelines, legal or regulatory controls, time required to attain water quality standards, monitoring plans and milestones for attaining water quality standards.

Once developed, DEQ intends to incorporate the TMDL implementation plan into the appropriate Water Quality Management Plan (WQMP), in accordance with the Clean Water Act's Section 303(e). In response to a Memorandum of Understanding (MOU) between EPA and DEQ, DEQ also submitted a draft Continuous Planning Process to EPA in which DEQ commits to regularly updating the WQMPs. Thus, the WQMPs will be, among other things, the repository for all TMDLs and TMDL implementation plans developed within a river basin.

6.3.3. Implementation Funding Sources

One potential source of funding for TMDL implementation is Section 319 of the Clean Water Act. Section 319 funding is a major source of funds for Virginia's Non-point Source Management Program. Other funding sources for implementation include the U.S. Department of Agriculture's Conservation Reserve Enhancement and Environmental Quality Incentive Programs, the Virginia State Revolving Loan Program, and the Virginia Water Quality Improvement Fund. The TMDL Implementation Plan Guidance Manual contains additional information on funding sources, as well as government agencies that might support implementation efforts and suggestions for integrating TMDL implementation with other watershed planning efforts.

6.3.4 No Discharge Zones for Vessels

Many tributaries as well as the Chesapeake Bay are utilized by private and commercial vessels as routes of transportation and as areas of safe anchorage. In some tributaries large concentrations of these vessels may be present as vessels in transit and at anchor, vessels secured by moorings, or vessels either resident or transient at marinas located in the watershed. While the discharge of untreated human sewage is illegal under the Clean Water Act and under Virginia law, discharges from Coast Guard approved Marine Sanitation Devices has remained. These devices are not able to adequately treat human waste discharged into small watersheds and embayments and results in an unabated discharge of viruses, nitrogen, phosphorus and oxygen demanding wastes. While use of MSD's may be appropriate for waters in open near coastal areas, other waters, particularly tributaries to the Chesapeake Bay may be adversely affected by such discharges. Sewage discharges from marine sanitation devices in small confined watersheds or anchorages where shellfish harvest or contact recreation use is the designated and actual use of these waters, can contaminate important shellfish resources and expose humans to inadequately treated human sewage. In such waters seeking a no-discharge designation may be the best means to preclude discharges of inadequately treated sewage from all vessels which may transit or seek shelter in the water body of concern. Such no-discharge designations currently exist in Smith Mountain Lake and are applicable to other inland lakes and rivers and have been approved by Virginia and submitted to the U.S. Environmental Protection Agency for Lynnhaven, Broad, and Linkhorn Bays, tributaries to the Chesapeake Bay. In this watershed holding tanks and pump out facilities must be used and the discharge of treated human waste from vessels is prohibited. Procedures for establishing such NDZ's and the state and federal regulations regarding vessel discharges can be found in the Appendix. No discharge zones are recommended for the waters addressed by this TMDL report due to the high volume of boating activity, ample pump out facilities and presence of a U.S. Coast Guard Station capable of enforcing the NDZ in the watershed.

6.3.5 Addressing Wildlife Contributions

In some waters for which TMDLs have been developed, water quality modeling indicates that even after removal of all of the sources of bacteria (other than wildlife), the stream will not attain standards under all flow regimes at all times. **However, neither the Commonwealth of Virginia, nor EPA is proposing the elimination of wildlife to allow for the attainment of water quality standards.**

This is obviously an impractical and wholly undesirable action. While managing over-populations of wildlife remains as an option to local stakeholders, the reduction of wildlife or changing a natural background condition is not the intended goal of a TMDL.

Based on the above, EPA and Virginia have developed a TMDL strategy to address the wildlife issue. The first step in this strategy is to develop a reduction goal. The pollutant reductions for the interim goal are applied only to controllable, anthropogenic sources identified in the TMDL, setting aside any control strategies for wildlife. During the first implementation phase all controllable sources would be reduced to the maximum extent practicable using the staged approach outlined above. Following completion of the first phase, DEQ would re-assess water quality in the stream to determine if the water quality standard is attained. This effort will also evaluate if the technical assumptions were correct. If water quality standards are not being met, a UAA may be initiated to reflect the presence of naturally high bacteria levels due to uncontrollable sources. In some cases, the effort may never have to go to the second phase because the water quality standard exceedances attributed to wildlife may be very small and fall within the margin of error.

If water quality standards are not being met, a special study called a Use Attainability Analysis (UAA) may be initiated to reflect the presence of naturally high bacteria levels due to uncontrollable sources. The outcomes of the UAA may lead to the determination that the designated use(s) of the waters may need to be changed to reflect the attainable use(s). To remove a designated use, the state must demonstrate 1) that the use is not an existing use, 2) that downstream uses are protected, and 3) that the source of bacterial contamination is natural and uncontrollable by effluent limitations and by implementing cost-effective and reasonable best management practices for non-point source control (9 VAC 25-260-10). All site-specific criteria or designated use changes must be adopted as amendments to the water quality standards regulations. Watershed stakeholders and EPA will be able to provide comment during this process. Additional information can be obtained at <http://www.deq.virginia.gov/wqs/WQS03AUG.pdf>

7.0. Public Participation

During development of the TMDL for Gwynn's Island and Milford Haven comprising Growing Areas 36 and 37, public involvement was encouraged through a public participation process that included public meetings and stakeholder meetings.

The first public meeting was held on May 22, 2007. A basic description of the TMDL process and the agencies involved was presented and a discussion was held regarding the source assessment input, bacterial source tracking, and model results. This meeting was followed by development of the final draft TMDL. Input from these meetings was utilized in the development of the TMDL and improved confidence in the allocation scenarios and TMDL process.

The second public meeting where the TMDL load allocations were presented was held on September 11, 2007. Public involvement in the TMDL implementation planning process was encouraged.

8.0 Glossary

303(d). A section of the Clean Water Act of 1972 requiring states to identify and list water bodies that do not meet the states' water quality standards.

Allocations. That portion of receiving water's loading capacity attributed to one of its existing or future pollution sources (non-point or point) or to natural background sources. (A wasteload allocation [WLA] is that portion of the loading capacity allocated to an existing or future point source, and a load allocation [LA] is that portion allocated to an existing or future non-point source or to natural background levels. Load allocations are best estimates of the loading, which can range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading.)

Ambient water quality. Natural concentration of water quality constituents prior to mixing of either point or non-point source load of contaminants. Reference ambient concentration is used to indicate the concentration of a chemical that will not cause adverse impact on human health.

Anthropogenic. Pertains to the [environmental] influence of human activities.

Bacteria. Single-celled microorganisms. Bacteria of the coliform group are considered the primary indicators of fecal contamination and are often used to assess water quality.

Bacterial source tracking (BST). A collection of scientific methods used to track sources of fecal contamination.

Best management practices (BMPs). Methods, measures, or practices determined to be reasonable and cost-effective means for a landowner to meet certain, generally non-point source, pollution control needs. BMPs include structural and nonstructural controls and operation and maintenance procedures.

Clean Water Act (CWA). The Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972), Public Law 92-500, as amended by Public Law 96-483 and Public Law 97-117, 33 U.S.C. 1251 et seq. The Clean Water Act (CWA) contains a number of provisions to restore and maintain the quality of the nation's water resources. One of these provisions is section 303(d), which establishes the TMDL program.

Concentration. Amount of a substance or material in a given unit volume of solution; usually measured in milligrams per liter (mg/L) or parts per million (ppm).

Contamination. The act of polluting or making impure; any indication of chemical, sediment, or biological impurities.

Cost-share program. A program that allocates project funds to pay a percentage of the cost of constructing or implementing a best management practice. The remainder of the costs is paid by the producer(s).

Critical condition. The critical condition can be thought of as the "worst case" scenario of environmental conditions in the water body in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence.

Designated uses. Those uses specified in water quality standards for each water body or segment whether or not they are being attained.

Domestic wastewater. Also called sanitary wastewater, consists of wastewater discharged from residences and from commercial, institutional, and similar facilities.

Drainage basin. A part of a land area enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into a receiving water. Also referred to as a watershed, river basin, or hydrologic unit.

Existing use. Use actually attained in the water body on or after November 28, 1975, whether or not it is included in the water quality standards (40 CFR 131.3).

Fecal Coliform. Indicator organisms (organisms indicating presence of pathogens) associated with the digestive tract.

Geometric mean. A measure of the central tendency of a data set that minimizes the effects of extreme values.

GIS. Geographic Information System. A system of hardware, software, data, people, organizations and institutional arrangements for collecting, storing, analyzing and disseminating information about areas of the earth. (Dueker and Kjerne, 1989)

Infiltration capacity. The capacity of a soil to allow water to infiltrate into or through it during a storm.

Interflow. Runoff that travels just below the surface of the soil.

Loading, Load, Loading rate. The total amount of material (pollutants) entering the system from one or multiple sources; measured as a rate in weight per unit time.

Load allocation (LA). The portion of a receiving waters loading capacity attributed either to one of its existing or future non-point sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which can range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and non-point source loads should be distinguished (40 CFR 130.2(g)).

Loading capacity (LC). The greatest amount of loading a water body can receive without violating water quality standards.

Margin of safety (MOS). A required component of the TMDL that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving water body (CWA section 303(d)(1)(C)). The MOS is normally incorporated into the conservative assumptions used to develop TMDLs (generally within the calculations or models) and approved by EPA either individually or in state/EPA agreements. If the MOS needs to be larger than that which is allowed through the conservative assumptions, additional MOS can be added as a separate component of the TMDL (in this case, quantitatively, a TMDL = LC = WLA + LA + MOS).

Mean. The sum of the values in a data set divided by the number of values in the data set.

Monitoring. Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements and/or pollutant levels in various media or in humans, plants, and animals.

Narrative criteria. Non-quantitative guidelines that describe the desired water quality goals.

Non-point source. Pollution that originates from multiple sources over a relatively large area. Non-point sources can be divided into source activities related to either land or water use including failing septic tanks, improper animal-keeping practices, forest practices, and urban and rural runoff.

Numeric targets. A measurable value determined for the pollutant of concern, which, if achieved, is expected to result in the attainment of water quality standards in the listed water body.

Point source. Pollutant loads discharged at a specific location from pipes, outfalls, and conveyance channels from either municipal wastewater treatment plants or industrial waste treatment facilities. Point sources can also include pollutant loads contributed by tributaries to the main receiving water body or river.

Pollutant. Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. (CWA section 502(6)).

Pollution. Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.

Privately owned treatment works. Any device or system that is (a) used to treat wastes from any facility whose operator is not the operator of the treatment works and (b) not a publicly owned treatment works.

Public comment period. The time allowed for the public to express its views and concerns regarding action by EPA or states (e.g., a Federal Register notice of a proposed rule-making, a public notice of a draft permit, or a Notice of Intent to Deny).

Publicly owned treatment works (POTW). Any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature that is owned by a state or municipality. This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Raw sewage. Untreated municipal sewage.

Receiving waters. Creeks, streams, rivers, lakes, estuaries, ground-water formations, or other bodies of water into which surface water and/or treated or untreated waste are discharged, either naturally or in man-made systems.

Riparian areas. Areas bordering streams, lakes, rivers, and other watercourses. These areas have high water tables and support plants that require saturated soils during all or part of the year. Riparian areas include both wetland and upland zones.

Riparian zone. The border or banks of a stream. Although this term is sometimes used interchangeably with floodplain, the riparian zone is generally regarded as relatively narrow compared to a floodplain. The duration of flooding is generally much shorter, and the timing less predictable, in a riparian zone than in a river floodplain.

Runoff. That part of precipitation, snowmelt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into receiving waters.

Septic system. An on-site system designed to treat and dispose of domestic sewage. A typical septic system consists of a tank that receives waste from a residence or business and a drain field or subsurface absorption system consisting of a series of percolation lines for the disposal of the liquid effluent. Solids (sludge) that remain after decomposition by bacteria in the tank must be pumped out periodically.

Sewer. A channel or conduit that carries wastewater and storm water runoff from the source to a treatment plant or receiving stream. Sanitary sewers carry household, industrial, and commercial waste. Storm sewers carry runoff from rain or snow. Combined sewers handle both.

Slope. The degree of inclination to the horizontal. Usually expressed as a ratio, such as 1:25 or 1 on 25, indicating one unit vertical rise in 25 units of horizontal distance, or in a decimal fraction (0.04), degrees (2 degrees 18 minutes), or percent (4 percent).

Stakeholder. Any person with a vested interest in the TMDL development.

Surface area. The area of the surface of a water body; best measured by planimetry or the use of a geographic information system.

Surface runoff. Precipitation, snowmelt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of non-point source pollutants.

Surface water. All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors directly influenced by surface water.

Topography. The physical features of a geographic surface area including relative elevations and the positions of natural and man-made features.

Total Maximum Daily Load (TMDL). The sum of the individual waste load allocations (WLAs) for point sources, load allocations (LAs) for non-point sources and natural background, plus a margin of safety (MOS). TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures that relate to a state's water quality standard.

VADEQ. Virginia Department of Environmental Quality.

VDH. Virginia Department of Health.

Virginia Pollutant Discharge Elimination System (NPDES). The national program for issuing, modifying, revoking and re-issuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Clean Water Act.

Waste load allocation (WLA). The portion of a receiving waters' loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation (40 CFR 130.2(h)).

Wastewater. Usually refers to effluent from a sewage treatment plant. See also **Domestic wastewater.**

Wastewater treatment. Chemical, biological, and mechanical procedures applied to an industrial or municipal discharge or to any other sources of contaminated water to remove, reduce, or neutralize contaminants.

Water quality. The biological, chemical, and physical conditions of a water body. It is a measure of a water body's ability to support beneficial uses.

Water quality criteria. Levels of water quality expected to render a body of water suitable for its designated use, composed of numeric and narrative criteria. Numeric criteria are scientifically derived ambient concentrations developed by EPA or states for various pollutants of concern to protect human health and aquatic life. Narrative criteria are statements that describe the desired water quality goal. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water quality standard. Law or regulation that consists of the beneficial designated use or uses of a water body, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular water body, and an antidegradation statement.

Watershed. A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.

WQIA. Water Quality Improvement Act.

9.0 References

US EPA Shellfish Workshop Document (2002).

VA DEQ 1998 303(d) List of Impaired Waters.

Bacteria Source Tracking Analysis to Support Virginia's TMDLs. December 2007. MapTech Inc. Blacksburg, Virginia.

10.0 Appendices

Appendix A Growing Areas 36 and 37: Shoreline Sanitary Surveys and Condemnation Notices

Appendix B Supporting Documentation and Watershed Assessment

Appendix C 1) Vessel Sewage Discharge Program

2) DEQ Guidance on Establishing No Discharge Zones

Appendix D Code of Virginia §62.1-194.1 Obstructing or contaminating state waters.

Appendix A:

Growing Area 36, Gwynn's Island: 1) Shoreline Sanitary Survey Growing



COMMONWEALTH of VIRGINIA

Department of Health
DIVISION OF SHELLFISH SANITATION
109 Governor Street, Room 614-B
Richmond, VA 23219

Ph: 804-864-7487
Fax: 804-864-7481

GWYNN ISLAND Growing Area # 036 Mathews County Shoreline Survey

Date: 14 June 2006
Survey Period: April 17, 2006 – June 6, 2006
Total Number of Properties Surveyed: 786
Surveyed By: D.R. Beuchelt

SECTION A: GENERAL

This survey area begins at the drawbridge located at the northern end of State Route 223, Cricket Hill Road, and proceeds in a counter clockwise direction and includes all properties along the perimeter of Gwynn Island shoreline and includes all properties and tributaries within this perimeter and ends at the drawbridge.

It is recognized that the name of the island is recognized as both "Gwynn Island" and "Gwynn's Island". A majority of mapping sources including the USGS Topographic Quad maps, NOAA Bluewater charts, VMRC oyster lease maps, and the Mathews County authored 911 map book pages title the island as "Gwynn Island". While the Division of Shellfish Sanitation acknowledges many individuals and entities will recognize the title as "Gwynn's Island", this report will use the title as "Gwynn Island".

The topography of the area is characterized by elevations ranging from 5' along the shoreline to a maximum of 10' in Grimstead. Other areas on the island reach 6 to 8'. The island is fairly populated with full-time residents, but has seasonal dwellings that are frequented by residents during the warmer months. New homes are being erected while older homes are either undergoing renovation or have been destroyed with new construction replacing the older homes. Some of the residents, part-time and full-time, have commented that some housing establishments have a restriction on the use of the property. One resident commented that the development in which he owned property was issued a week-end only sewage permit. Found during this survey were newer systems such as Clearstream, Puroflow, Advantex, etc. replacing the older conventional septic systems. Unfortunately, when some properties were sold or inherited, papers explaining the new systems were not transferred to the new owners. Some of the homeowners were not aware that the newer systems require frequent maintenance in order to function properly and effectively. Mathews County Health Department was alerted and Tammy Faulkner went back to the files and made copies of the health department records for some of the new property owners.

There are two towns on the island, Grimstead and Gwynn. All mail received on the island is through the post office at Grimstead or Gwynn. The economy on the island is based on boating/recreational facilities, the seafood industry and tourism. However, the Islander Restaurant and Motel was destroyed during Hurricane Isabel and has not been in use since that time. Both are unusable at this point and no plans had been made to renovate the facility at the time of the survey.

According to the Virginia Employment Commission (via VELMA) during the 3rd Quarter 2005 time period industry figures show the largest major industrial group in Mathews as Construction with 47 establishments followed by Retail trade with 33 establishments, other services (except Public Administration) with 28 establishments, Professional, Scientific and Technical services with 21 establishments and Transportation and Warehousing with 17 establishments. The total civilian labor force in Mathews County for the April 2006 time period was 4,547 of which 4,412 were employed and 135 were unemployed giving the county an unemployment rate of 3.0 percent. The average weekly wage was \$438. Finfish and shellfish are harvested from the waters surrounding Mathews County and are integral to the local economy and culture.

The most current population figure available (2002) showed 9,207 in Mathews County with an estimate of 9,194 for July 2005.

Meteorological data recorded at the Division of Shellfish Sanitation office in White Stone indicated that 7.02" of rain fell during the survey period. A monthly breakdown follows:

April 17-30	2.99"
May 1-31	3.52"
June 1-6	0.51"
Total	7.02"

According to Mike Burchell, a resident of Gwynns' Island, his rain gauge has measured 5", 3", ½", 5/8", and 1 ½" of rain during the same time period from line squalls that have moved through the region. One of the heavy rainfalls (5") was reflected in a seawater collection of 24 April 2006. Bacteriological data showed unsatisfactory MPN's (Most Probable Number) on all stations. Special attention during the survey was given to the areas where the MPN figures were significantly higher. Also, it is important to note that major flooding occurred during Hurricane Isabel in September 2003.

One sewage treatment facility (with discharge to an absorption field) was found during the survey. This facility was originally installed to serve the Islander Restaurant/Motel and the Marina. As mentioned, Hurricane Isabel left the restaurant and motel in ruins and at the time of the survey neither were being used and plans to repair the facility had not been initiated. Currently, the STF serves the Narrows Marina and Repair.

Also, found during the survey were 16 on-site deficiencies, 46 properties marked as potential deficiencies, 3 industrial sites, 14 boating activity sites, and 4 sites marked for animal pollution.

Available on Gwynn Island are a draw-bridge allowing access to the island, a restaurant, a small store with a deli, a campground, a public boat ramp, and a small beach.

Copies of Bacteriological, Hydrographic and Shellfish Closure data are available at the area office for review. Copies of the current condemnation notices and maps are available via the internet at <http://www.vdh.virginia.gov/oehs/shellfish/>.

This report lists only those properties that have a sanitary deficiency or have other environmental significance. "*DIRECT*" indicates that the significant activity or deficiency has a direct impact on shellfish waters. Individual field forms with full information on properties listed in this report are on file in the Richmond office of the Division of Shellfish Sanitation and are available to local health departments and other agencies to address items that may be out of compliance with their regulatory programs.

SECTION B: SEWAGE POLLUTION SOURCES

SEWAGE TREATMENT FACILITIES

2. Narrows Marina and Marine Repair, Location 85 and 27 Old Ferry Rd, Owner: Preston Jenkins, PO Box 340, Grimstead 23064. The STF (currently serving the Marina and Marine Repair facility) consists of an influent lift station, Aer-O-Flow package plant, an absorption field which is 150' from the Narrows at a 3' elevation, sludge holding tanks, and a sludge drying bed. The unit was designed to treat 15,400 GPD.

ON-SITE DEFICIENCIES

3. CONTRIBUTES POLLUTION – Location: 1253 Old Ferry Rd., PO Box 477, Grimstead 23064. Dwelling – 2 story white with green shutters and metal roof. No Contact. Effluent is to ground surface directly from septic tank via garden hose and electric pump. Sanitary Notice issued on 4/18/06 to Field# 34. Tax Map # 11A3 A 43.
12. CONTRIBUTES POLLUTION – Location: 100 Seaside Way, Mailing address: 9351 Hoke Brady Rd. Richmond 23131. Dwelling – 1 ½ story cream colored wood siding with green shutters and gray shingles. No Contact. Lid is cracked on tank. Sanitary Notice issued on 5/2/06 to Field # 226. Tax Map # 11A2 A 22.
15. NO FACILITIES – Location: 11 N. Bay Haven Rd., PO Box 1, Gwynn 23066. Dwelling – 1 story cinder block, gray and white trim. 1 person. Sanitary Notice issued on 5/1/06. Tax Map # 11A4 A 109.
18. CONTRIBUTES POLLUTION – Location: 188 Saunders Lane, Mailing address: 108 Carriage Pt. Lane, Glenn Allen 23059. Dwelling – 1 story cinderblock, light gray with white trim and gray shingles. No Contact. Open area in rear of house (< 10' from vent pipe) is open, water standing, and covered with plywood. Possible septic tank maintenance. Sanitary Notice issued on 5/3/06 to Field # 332. Tax Map # 11A4 9 12.
19. CONTRIBUTES POLLUTION – Location: 2711 Old Ferry Rd., PO Box 54, Gwynn 23066. Dwelling – 1 story white with brown shingles and brick foundation. No Contact. Lid on tank is broken. Sanitary Notice issued on 5/3/06 to Field # 337. Tax Map # 11A4 A 185.

20. **DIRECT** - CONTRIBUTES POLLUTION – Location: 301 Buckschase Rd., Mailing address 1294 Stoney Creek Rd., Edinburg 22824. Dwelling – 1 story, light gray with white shutters and light gray shingles. No Contact. Lid is broken on septic tank, part missing.
- DIRECT** - CONTRIBUTES POLLUTION (Kitchen or Laundry Wastes) – Lid is broken on grease trap, part missing. Tanks are <100' (septic) and <75' (grease trap) at 5' elevation from the Chesapeake Bay. During heavy rainfalls and or flooding, effluents can wash into the bay. Sanitary Notice issued on 5/5/06 to Field #374. Tax Map # 12A 1 9.
23. **DIRECT** - CONTRIBUTES POLLUTION – Location: 551 Buckschase Rd., Mailing address: 99 Acorn Lane, Mathews 23109. Dwelling – bathhouse at GwynnIsland Campers Haven Campground. No Contact. Lid on tank is broken with pieces missing. Sanitary Notice issued on 5/15/06 to Field # 395. Tax Map # 12A 1 13.
51. CONTRIBUTES POLLUTION – Location: 1074 Gum Thicket Rd. Gwynn 23066. Mailing address: General Delivery. Dwelling – 1 ½ story, brick with white trim and gray shingles. No Contact. Effluent to ground surface. Sanitary Notice issued on 5/15/06 to Field # 505. Tax Map # 11A6 1 1 5.
56. CONTRIBUTES POLLUTION – Location: 177 Shell Point Lance, PO Box 234, Gwynn 23066. Dwelling – 1 ½ story yellow vinyl siding with white trim, brown shingles and a double car garage. No Contact. Housing around the PVC clean out port is broken. Sanitary Notice issued on 5/18/06 to Field # 573. Tax Map # 11A6 15 B.
59. CONTRIBUTES POLLUTION – Location: Location: 456 Gwynnsville Rd., PO Box 75, Gwynn 23066. Dwelling – 1 story white vinyl siding with black shutters and light gray shingles. No Contact. Clean out cap is broken and covered with black tape. Sanitary Notice issued on 5/19/06 to Field # 601. Tax Map # 11A4 A.
69. CONTRIBUTES POLLUTION – Location: 78 Powell Lane, Mailing address: 1036 Spirea Rd., Richmond 23236. Dwelling – 2 story white with gray shingles and black shutters. No Contact. 3" PVC pipe runs from house along the ground to underground in yard. A section of the pipe is broken with pieces missing. No signs of discharge or malfunction. Origin of pipe unknown. Sanitary Notice issued on 5/25/06 to Field # 700. Tax Map # 11A4 A 20D.
71. CONTRIBUTES POLLUTION – Location: 364 Risby Town Rd., PO Box 10, Gwynn 23066. Dwelling – 1 story white cinderblock with gray shingles. No Contact. A concrete tank, approximately 4' in diameter is covered with an old metal ESSO sign. This tank was filled with effluent. Sanitary Notice issued on 6/6/06 to Field # 715. Tax Map # 11A5 6 B.
72. **DIRECT** - CONTRIBUTES POLLUTION (Kitchen or Laundry Wastes) – Location: 71 Callis Wharf Rd., PO Box 384 Grimstead 23064. Dwelling – 1 story white siding with black shutters. 1 person. Kitchen wastes empties into a ditch which is located 0.3 mile from Milford Haven. During heavy rains/floods the ditches may empty into the watershed. The homeowner has in hand a repair permit, which was issued in March of 2005. She states that she has called several contractors but has not been able to lock in one for the job. Sanitary Notice issued on 5/31/06 to Field # 728. Tax Map # 11A3 A 30.

74. CONTRIBUTES POLLUTION (Kitchen or Laundry Wastes) – Location: 107 Callis Wharf Rd., PO Box 400, Grimstead 23064. Dwelling – 1 story white siding with black shutters. No Contact. Lid on grease trap is cracked. Sanitary Notice issued on 5/31/06 to Field # 730. Tax Map # 11A3 A 32.
77. CONTRIBUTES POLLUTION – Location: 390 Callis Wharf Rd., PO Box 449, Grimstead 23064. Dwelling – 2 ½ story, light yellow siding with faded blue shutters. No Contact. In rear of property, is located a small house which has a 3" PVC pipe running, open to ground surface. No discharge or odor was detected, however, on the opposite end of the small house was located a clean-out port. Sanitary Notice issued on 5/31/06 to Field # 745. Tax Map # 11A5 A 23.

POTENTIAL POLLUTION

6. Location: 306 Old Farm Rd., Mailing address: 12719 Old 40 Rd., Waverly 23890. Dwelling – 1 story beige vinyl siding with cream colored trim and light gray shingles. No Contact. Located inside a covered picnic area is a sink, which discharges (via hose) onto ground surface. Fish scales were found on ground surface at the end of the hose.
7. Location: 168 Gaten Rd., PO Box 95, Gwynn 23066. Dwelling – 1 story blue with white trim and light gray shingles. No Contact. Grass is dark over absorption trench. No signs of malfunction.
9. Location: 80 Triangle Rd., PO Box 241, Gwynn 23066. Dwelling – 1 story, white with blue shutters and white shingles. 2 persons. Area over absorption field shows dark grass on top of the absorption trench. No signs of malfunction.
11. Location: 153 Pine Rd., PO Box 369, Grimstead 23064. Dwelling – 1 story on piers, tan siding with cream colored trim, black shutters and brown shingles. 5 persons. Area over drain lines is low and holding rainwater from weekend precipitation (5 – 6 inches recorded by local residents). No odor detected.
13. Location: 10 Cottage Way, Gwynn 23066. Dwelling – 1 story with white vinyl siding with glass enclosed porch and green metal roof. No Contact. House closed for winter. 2" PVC pipe found of unknown origin. No signs of effluent or odor.
14. Location: 547 Chesapeake Drive, Gwynn 23066. Dwelling – 1 story white cinderblock. No Contact. Appears septic system has been upgraded or lines replaced.
16. Location: 133 N. Bay Haven Rd., Gwynn 23066. Dwelling – 1 ½ story white vinyl siding with gray shingles. No Contact. Located adjacent to sewer pipes is a 2" PVC pipe of unknown origin. No signs of discharge at time of survey.
17. Location: 154 N. Bay Haven Rd., PO Box 321, Gwynn 23066. Dwelling – 2 story white vinyl siding with black shutters. 1 person. Owner states the system (Clearstream) works slow and the alarm keeps going off.

At the time of the survey, the alarm was not sounding the system was not malfunctioning. While questioning the property owner, it was found that papers on the system were not transferred to her and she did not know that the system requires periodic maintenance in order to operate effectively and properly. A visit was made to Mathews County Health Department where Tammy Faulkner pulled the files and made copies for the property owner.

21. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot D 12. RV-Terry-white/gray with blue/gray/pink trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
22. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot A 17. RV-Terry – Taurus - white with brown/tan trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
24. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot A 25. RV-Seaview - white with blue/agua trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
25. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot A 27. RV-Prowler Regal - white with brown/tan trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
27. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot A 30. RV-Yukon - beige with brown/tan trim. Tote-a-long needs to be capped. No signs of discharge or odor.
28. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot C 6. RV-Mallard - white with aqua/blue/brown trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
29. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot B 13. RV-Sportsman - white with green/brown/maroon trim. Tote-a-long needs to be capped. No signs of discharge or odor.
30. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot B 15. RV-Seahawk - white with purple/blue/aqua trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
31. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot B 23. RV-Sprinter - white with blue/brown trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
32. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot C 10. RV-Mallard - white with green/brown/blue trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
33. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot B 16. RV-Marander Traveler beige with orange/yellow trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.

34. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot C 15. RV-Wilderness - white with gold/green/maroon trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
35. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 21/22. RV-Safari - beige with orange/brown trim. Sewer hose runs on ground surface in direction of marsh (< 5' of marsh). A plastic cup covers the end of the sewer hose and is taped onto the end of the hose by duct tape. No signs of discharge or odor. No signs of discharge or odor.
36. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 26. RV-Mallard - white with aqua/brown/blue trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
37. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 27. RV-Dutchman - white with blue/gold/green metallic trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
38. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 39. RV-Coachmen Catalina - white with green/fushia/gold trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
39. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 2. RV-Prowler - beige with orange trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
40. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 10. RV-Mountaineer - white with mocha/aqua/blue trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
41. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 11. RV-Prowler - white with aqua/blue/purple trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
42. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot F 4. RV-Terry - white with red/gold/blue trim. Sewer hose is disconnected from tote-a-long which is uncapped and upright. No signs of discharge or odor.
43. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot F 5. RV-Wildwood - white with brown/black trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.

44. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot E 6. RV-Prowler - white with purple/blue trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
45. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. 1 person. Lot H 5. RV-Terry - white with rust/brown/tan trim. Sewer hose is broken and is disconnected from tote-a-long. Owner had new hose ready to install as we spoke. No signs of discharge or odor.
46. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot G 6. RV-Sierra - white with brown/mocha trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
47. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot G 10. RV-Shasta - white with green/gold/blue trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
48. Location: 551 Buckschase Rd. Mailing address: 99 Acom Lane, Mathews 23109. Dwelling – campground. No Contact. Lot G 5. RV-Terry - white with brown/rust/blue trim. Sewer hose is disconnected from tote-a-long. No signs of discharge or odor.
49. Location: 227 Gumthicket Rd., Mailing address: 12503 Reed Grass Lane, Midlothian 23114. Dwelling – 1 story, yellow vinyl siding with green shutters and light gray shingles. No Contact. Rainwater is pooling in yard from heavy rainfall over weekend. No signs of malfunction.
50. Location: 249 Gumthicket Rd., Mailing address: 1628 Park Ave., Richmond 23220. Dwelling – 2 story with kitchen and porch additions, white vinyl siding with blue shutters and light gray shingles. No Contact. Sewer pipe runs into ground under flower bed. Tank not found, but is likely under flower bed. No signs of malfunction.
52. Location: 79 Gwynnsville Rd., Gwynn 23066. Dwelling – 2 story, white siding with blue shutters and metal roof. 1 story addition on rear of house. No Contact. Rainwater is pooling in low spots on yard. No signs of malfunction.
53. Location: 167 Henry's Rd., Gwynn 23066. Dwelling – 2 ½ stories, white vinyl siding with black shingles. No Contact. House is under renovation. Rainwater is pooling on top of ground. No signs of malfunction.
54. Location: 468 Henry's Rd., Gwynn 23066. Dwelling – 2 ½ stories, green siding w/white trim and unattached garage. 2 persons. On an extreme high tide, tank holding washing machine wastes could be flooded.
55. Location: 276 Henry's Rd., Gwynn 23066. Dwelling – 1 ½ story gray siding with white trim and red shutters. 4 persons. Area over absorption field is soft. No signs of effluent or odor.

57. Location: 249 Shell Point Lane, Gwynn 23066. Dwelling – 2 story, white vinyl siding with green shutters and metal roof. No Contact. Old Terra Cotta pipe runs from absorption field to watershed. No signs of discharge or recent activity. This pipe is barely visible on high tide. Shellfish Specialists checked the pipe out on the 5/22/06 seawater collection run. The specialists found no evidence of recent activity.
58. Location: 678 Gwynnsville Rd., Gwynn 23066. Dwelling / Garage – 1 story, gray with white trim and metal roof. No Contact. A PVC pipe of unknown origin exits the rear of the garage and runs to a ditch. No signs of discharge at time of survey.
60. Location: 125 S. Bay Haven Rd., Mailing address: PO Box 1188, Gloucester 23061. Dwelling – 1 story, gray siding with white trim and gray shutters. No Contact. A gray PVC pipe extends from the rear of the house to a ditch. Origin unknown. No discharge at time of survey.
63. Location: 162 S. Bay Haven Rd., Mailing address: PO Box 316, Gwynn 23066. Dwelling – 1 story, white with black shutters. 2 persons. A white PVC pipe allows rain water to drain from under the house. Also found was an older black pipe. Neither showed discharge at time of survey. Owner states that all wastewater goes into the septic system.
66. Location: 41 Powell Lane, Mailing address: 2702 Mallard's Crossing, Richmond 23131. Dwelling – 1 ½ yellow vinyl siding with gray shingles and gray shutters. No Contact. Area over absorption field shows dark grass. Ground is solid and no signs of malfunction are present.
73. Location: 87 Callis Wharf Rd., Mailing address: 7249 Rural Point Rd., Mechanicsville 23116. Dwelling – white mobile home with black shutters. No Contact. A 1" white PVC pipe runs from house to ditch. No discharge at time of survey.

SECTION C: NON-SEWAGE WASTE SITES

INDUSTRIAL WASTES

70. **DIRECT**-Location: 407 Risby Town Rd., Mailing address: PO Box 10, Gwynn 23066. Crabmeat Processing Plant, VA215C. 16 employees. Processing and washdown wastes discharge into Milford Haven under General Permit No. VAG524053, Expiration date: 24 July 2006.
76. **DIRECT**-Location: Callis Wharf, LLC., 427 Callis Wharf Rd., Mailing address: 7101 Hillsdale Dr., Richmond 23229. No Contact. Located < 400' from Milford Haven are three fuel tanks, (2 tanks approximate 1000 gallons each and 1 tank approximate 500 gallons), without berms, contents unknown.
79. **DIRECT**-Location: 616 Old Ferry Rd., Mailing address: PO Box 430, Grimstead 23064. Pulleys Marine, Inc. 2 persons. Boat sales and repair facility. Located beside dock is a fuel tank, approximately 1000 gallons without berm.

SOLID WASTE DUMPSITES
- None -

SECTION D: BOATING ACTIVITY

MARINAS

2. Location: Narrows Marina, 85 Old Ferry Rd., Mailing address: PO Box 340, Grimstead 23064. Manager: Preston Jenkins. Services available are fuel, electricity, water, 138 slips, and sewage holding tank pump-out, solid waste containers, restroom facilities, repair service, plus 7 slips and a ramp from the Elizabeth Graham Jenkins Pier (formerly Facility No. 1163). Facility No 1421.

OTHER PLACES WHERE BOATS ARE MOORED

61. Location: Edwards Marine Railway, 768 S. Bay Haven Dr., Gwynn 23066. Manager: Bobby Edwards. Services include repair, electricity, water, and a privy. Owner has an exemption to the requirement to provide boat holding tank pump-out facilities. Facility No. 454.
67. Location: Powell's Boat Yard, 67 Powell Lane, Grimstead 23064. Manager: Winnifred Powell. Services include electricity and water. Records indicate that boats on site are owned by family members who have access to restroom facilities. Facility No. 488.
68. Location: 173 Powell Lane, PO Box 210, Gwynn 23066. Manager: Franklin Furey. Services include repair and restroom facilities. Facility No. 458.
75. Location: Gwynn's Island Condominiums, 375 Callis Wharf Rd., Grimstead 23064. Manager: Lou Lawrence. Services include electricity and water to residents who reside at the condominiums. Facility No. 462.
79. Location: Pulleys Marine, Inc., 616 Old Ferry Rd., Grimstead 23064. Manager: Ed Davis. Services available are fuel, restroom facilities and repair. Facility No. 459.

UNDER SURVEILLANCE

1. Location: 244 Old Ferry Rd., Grimstead 23064. Private dock/crabbing facility.
8. Location: C.P.P.O.A. (Cherry Point Property Owners Association) next to 90 Gaten Rd. Private dock and boat ramp for residents.
10. Location: G.I.E.P.O.A., on Pine Rd. off E. Shore Dr. Private dock for use by residents.
26. Location: Gwynn's Island Campers Haven, 551 Buckschase Rd., Gwynn 23066. Services available are loading dock, ramp and restroom facilities for campers.
62. Location: Edwards Creek Public Boat Dock, off of Route 672 at the end of Edwards Landing Road. Manager: Mathews County Administrator Stephen K. Whiteway. Public dock used for loading, unloading and emergency mooring only. Facility No. 489.

70. Location: Island Seafood Co., 407 Risby Town Rd., Gwynn 23066. Services provided are a loading/unloading dock for oyster/crab boats and restroom facilities. Facility No. 503.
76. Location: Callis Wharf, LLC, 427 Callis Wharf Rd., Unable to access dock. Fuel tanks were present on property. Formerly Facility No. 498.
78. Location: 111 Wharf Creek Rd., Grimstead 23064. Private dock with restroom facilities, electricity and water available.
80. Location: Wharf Creek Public Boat Dock, off of Route 223, next to the Seabreeze Restaurant. Loading/unloading pier. 25 spaces adjacent to the restaurant are available to park vehicles and trailers. Facility No. 1426.

SECTION E: CONTRIBUTES ANIMAL POLLUTION

4. Location: 135 Rose Lane, Grimstead 23064. Dwelling – 1 ½ story white with green shutters and black shingles. 2 persons. 3 horses, 2 dogs and 4 cats. Owner collects and composts the manure.
5. *DIRECT*- Location: 499 Cherry Point Rd, Grimstead 23064. Dwelling – 1 story, tan with green shutters and brown shingles. 3 persons. 14 hunting dogs. Kennels maintained. Kennel is < 20' at 6 elevation from marsh.
64. Location: 2292 Old Ferry Rd., Gwynn 23066. Dwelling – 2 ½ story, white siding with gray shingles. No Contact. 3 horses seen in pasture, total unknown.
65. *DIRECT* - Location: 52 Spirit Branch Rd., Gwynn 23066. Dwelling – 1 story, gray with red shutters and light gray shingles. No Contact. 7 dogs kennels < 10' from watershed.

SUMMARY

Area # 036
Gwynn Island
14 June 2006

SECTION B: SEWAGE POLLUTION SOURCES

1. SEWAGE TREATMENT FACILITIES

0 - DIRECT- None
1 - INDIRECT - # 2
1 - B.1. TOTAL

2. ON-SITE SEWAGE DEFICIENCIES - Correction of deficiencies in the section is the responsibility of the local health department.

3 - CONTRIBUTES POLLUTION, DIRECT - # 20, 23, 69
9 - CONTRIBUTES POLLUTION, INDIRECT - # 3, 12, 18, 19, 51, 56, 59, 71, 77
1 - CP - (Kitchen or Laundry Wastes), DIRECT - # 20
2 - CP - (Kitchen or Laundry Wastes), INDIRECT - # 72, 74
0 - NO FACILITIES, DIRECT - None
1 - NO FACILITIES, INDIRECT - # 15
16 - B.2. TOTAL

3. POTENTIAL POLLUTION

Periodic surveillance of these properties will be maintained to determine any status change.

46 - POTENTIAL POLLUTION - # 6, 7, 9, 11, 13, 14, 16, 17, 21, 22, 24, 25, 27, 28, 29,
30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50,
52, 53, 54, 55, 57, 58, 60, 63, 66, 73

SECTION C: NON-SEWAGE WASTE SITES

1. INDUSTRIAL WASTE SITES

3 - # 70, 76, 79
0 - None
3 - C.1. TOTAL

2. SOLID WASTE SITES

0 - DIRECT - None
0 - INDIRECT - None
0 - C.2. TOTAL

SECTION D: BOATING ACTIVITY

1 - MARINAS - # 2
5 - OTHER PLACES WHERE BOATS ARE MOORED - # 61, 67, 68, 75, 79
8 - UNDER SURVEILLANCE - # 1, 8, 10, 26, 62, 70, 76, 78, 80
15

SECTION E: CONTRIBUTES ANIMAL POLLUTION

2 - DIRECT - # 5, 65
2 - INDIRECT - # 4, 64
4 - E.TOTAL

Appendix A:
Growing Area 37, Milford Haven: 1) Shoreline Sanitary Survey Growing



COMMONWEALTH of VIRGINIA

Department of Health
DIVISION OF SHELLFISH SANITATION
109 Governor Street, Room 614-B
Richmond, VA 23219

Ph: 804-864-7487
Fax: 804-864-7481

STUTTS, QUEENS, AND WHITES CREEKS
Growing Area # 037
Mathews County
Shoreline Sanitary Survey

Date: 6 March 2002
Survey Period: June 8 – November 30, 2001
Total Number of Properties Surveyed: 1442
Surveyed By: J.M. Smither, R.M. Thomas, D.B. Geeson, and R.S. Morris

SECTION A: GENERAL

This survey area extends from Reference Point 37 at Iron Point to Reference point 38 at the end of Rt. 645 including the Chesapeake Bay shoreline between these two points, Godfrey Bay (Chapel Creek), Hills Bay, Queens Creek, (Kenney Creek, Miller Cove), Winder Creek, The Narrows, Middle Grounds, Milford Haven, Lanes Creek, Stutts Creek (Callis Creek, Morris Creek, Hudgins Creek), Billups Creek, Whites Creek (Stoakes Creek, Back Creek), south side of The Hole in the Wall and all of their tributaries.

The topography in this area varies from 5' or less along the shoreline to a maximum of 35' at the northwest edge of the survey boundary.

The economy of the area is dependent primarily on agriculture, recreation, and commerce. Population is moderate around the shoreline and along Routes 198 and 14, but sparse inland.

During this survey period, meteorological data indicated that 27.89" of precipitation was recorded. A monthly breakdown follows:

June 8-30	6.11"	August	8.81"	October	1.67"
July	8.62"	September	2.53"	November	0.15"

There was one drawbridge tender station in the survey which is served by a Destroilet incinerator that was in good working condition. There was only one sewage treatment facility and it serves the U.S. Coast Guard Station. All properties surveyed are served by on-site sewage disposal systems. There is a small portion of the survey near Mathews Courthouse that is sewerred. The sewage treatment plant serving these dwellings is located in the East River survey area.

Report copies are provided to the local health department for corrective action of deficiencies listed on the summary page in Section B.2 and the Department of Environmental Quality, Water Regional Office for possible action at the properties listed on the summary page in Sections C.1 and C.2. The Division of Soil and Water Conservation is provided information on possible sources of animal pollution found in Section E.



Copies for Bacteriological, Hydrographic and Shellfish Closure data are available at the area office for review. Copies of the current condemnation notices and maps are available via the internet at <http://www.vdh.virginia.gov/environmentalhealth/shellfish/>.

This report lists only those properties that have a sanitary deficiency or other environmental significance. "DIRECT" indicates that the significant activity or deficiency has a direct impact on shellfish waters. Individual field forms with full information on properties listed in this report are on file in the Richmond Office of the Division of Shellfish Sanitation and available for reference until superseded by a subsequent resurvey of the area.

SECTION B: SEWAGE POLLUTION SOURCES

SEWAGE TREATMENT FACILITIES

17. **DIRECT** – Occupant: Milford Haven U.S. Coast Guard Station, HC 02, Box 2200, Hudgins 23076. Owner: U.S. Government, Washington D.C. Business- U.S. Coast Guard patrol boat base. 30 employees. VPDES Permit #VA0022373. Treatment facility consists of .003 MGD extended aeration package plant, two intermittent flooding sand filters and 12,000 gallon holding tank. Chlorine contact tanks were replaced by an ultraviolet (UV) disinfection system. Final effluent is discharged to Milford Haven to an outfall at a 4' depth with a diffuser. The treatment plant has a generator to provide auxiliary power for all pumping operations and treatment equipment. Also provided is a connection for ship-to-shore pumping of sewage from U.S. Coast Guard vessels. A copy of the most recent DEQ inspection report for this facility is attached to the back of this report.

ON-SITE SEWAGE DEFICIENCIES

4. CONTRIBUTES POLLUTION – Location: General Delivery, Halliford 23068. Dwelling- yellow asbestos siding 2 story with white trim. 5 persons. Effluent erupting from drainfield onto ground surface. Sanitary Notice issued 8-27-01 to field # A338.
6. CONTRIBUTES POLLUTION – Location: PO Box 1, Halliford 23068. Dwelling- white and brown house trailer. 5 persons. Effluent erupting from drainfield onto ground surface. Sanitary Notice issued 8-30-01 to field # A346.
10. NO FACILITIES – Location: PO Box 473, Cobbs Creek 23035. Dwelling- gray asphalt siding and frame 1 story. No contact. Sanitary Notice issued 6-27-01 to field # A106.
14. CONTRIBUTES POLLUTION (Kitchen or Laundry Wastes) – Location: PO Box 22, Mathews 23109. Dwelling- white frame 2 story. 2 persons. Unapproved lid on grease trap. Sanitary Notice issued 7-27-01 to field # B267.
15. CONTRIBUTES POLLUTION – Location: PO Box 184, Hudgins 23076. Dwelling- frame with yellow asbestos shingle 2 story. 6 persons. Effluent erupting from septic tank onto ground surface. Sanitary Notice issued 6-29-01 to field # B76.
16. NO FACILITIES – Location: United States Post Office, PO Box 9998, Hudgins 23076. Owner: Jackie Rowe, PO Box 4, Gwynn 23066. Dwelling- white cement block 1 story. 1 person. Sanitary Notice issued 6-22-01 to field # B73.

20. CONTRIBUTES POLLUTION – Location: PO Box 86, Hudgins 23076. Dwelling- white vinyl siding 1½ story with black shutters. No contact. Effluent erupting from drainfield onto ground surface. Sanitary Notice issued 6-22-01 to field # C46.
21. CONTRIBUTES POLLUTION – Location: PO Box 71, Hudgins 23076. Dwelling- white frame 1 story with green shutters. 2 persons. Pit privy full to riser and seeping onto ground surface. Sanitary Notice issued 6-22-01 to field # C53.
22. NO FACILITIES – Location: PO Box 262, Hudgins 23076. Dwelling- white cement block 1 story with green trim and shutters. 1 person. Pit privy floor collapsed and not usable. Sanitary Notice issued 6-29-01 to field # C76.
25. CONTRIBUTES POLLUTION (Kitchen or Laundry Wastes) – Location: PO Box 102, Hudgins 23076. Dwelling- yellow aluminum siding 1 story with white trim and shutters. No contact. Grease trap effluent erupting onto ground surface. Sanitary Notice issued 7-27-01 to field # C126.
26. CONTRIBUTES POLLUTION (Kitchen or Laundry Wastes) – Location: General Delivery, Redart 23076. Dwelling- white vinyl siding and brick 1½ story. No contact. Unapproved plywood lid to grease trap. Sanitary Notice issued 7-27-01 to field # C142.
28. CONTRIBUTES POLLUTION (Kitchen and Laundry Wastes), DIRECT – Location: PO Box 371, Mathews 23109. Dwelling- brick 1 story with white trim. 3 persons. Laundry wastes discharge through a 4" terra cotta pipe onto ground surface 25' from Stutts Creek at 6' elevation. Sanitary Notice issued 8-10-01 to field # C210.
31. CONTRIBUTES POLLUTION (Kitchen and Laundry Wastes) – Location: 302 Wells Road, Newport News 23602. Dwelling- white wood siding 1½ story with red shutters and a green shingle roof. No contact. Grease trap wastes discharge through an underground pipe into a hole in back yard 50' from drainage ditch at 6' elevation. Sanitary Notice issued 9-7-01 to field # C232.
32. CONTRIBUTES POLLUTION – Occupant: Zooms, Route 223, Hudgins 23076. Owner: Scott Shipley, V.P. of Operations, 2451 West Pembroke Avenue, Hampton 23661. Dwelling- yellow brick 1 story convenience store/gas station. 2 persons. Broken lids to septic tank and distribution box. Sanitary Notice issued 7-9-01 to field # C249.
34. CONTRIBUTES POLLUTION – Location: PO Box 234, Cobbs Creek 23035. Dwelling- tan vinyl siding 1 story with white trim. No contact. Effluent erupting from broken/improperly fitting septic tank lid onto ground surface. Sanitary Notice issued 10-5-01 to field # C318.
38. CONTRIBUTES POLLUTION, (Kitchen or Laundry Wastes), **DIRECT** – Location: PO Box 35, Moon 23119. Dwelling- cream wood siding 1 story with brown shutters. 2 persons. Laundry wastes discharges through a 2" pipe to ditch with direct access to Hudgins Creek. Sanitary Notice issued 8-24-01 to field # D249.
42. NO FACILITIES, **DIRECT** – Beaugard Turner Pier, end of State Route 644, Moon 23119. Harbor and ramp for subdivision residents. 20 slips/moorings. No contact. Sanitary Notice issued 3-01-02 to field # D86.

43. CONTRIBUTES POLLUTION, (Kitchen or Laundry Wastes) – Location: PO Box 28, Diggs 23045. Dwelling- faded asbestos 2½ story with white trim. 5 persons. Laundry wastes discharges through broken 3” pipe onto ground surface. Sanitary Notice issued 6-29-01 to field # D65.
47. CONTRIBUTES POLLUTION, (Kitchen or Laundry Wastes) – Location: PO Box 4145, Diggs 23045. Dwelling- tan vinyl 1½ story with white trim and silver metal roof. 2 persons. Laundry waste discharges through a 2” pipe onto ground surface. Sanitary Notice issued 6-8-01 to field # D6.

POTENTIAL POLLUTION

-None-

SECTION C: NON-SEWAGE POLLUTION SOURCES

INDUSTRIAL WASTE SITES

8. Occupant: Tucker’s Marine. Owner: Richard Tucker, PO Box 382, Hudgins 23076. Dwelling- blue steel fabricated building 1 story. 3 persons. Fourteen 55-gallon drums for waste oil collection. Pumped by Safety Kleen, 4545 Bainbridge Boulevard, Chesapeake, 23320.
12. Occupant: Tom Hearn Auto Service. Owner: Tom Hearn, PO Box 156, Hudgins 23076. Dwelling - frame with gray T-111 siding 1 story. 2 persons. 2 X 300 gallon storage tanks for waste oil collection.
17. Occupant: Milford Haven U.S. Coast Guard Station, HC 02, Box 2200, Hudgins 23076. Owner: U.S. Government, Washington D.C. Business - U.S. Coast Guard patrol boat base. 30 employees. Observed on-site was one 5000-gallon diesel fuel tank 20’ from Milford Haven without a berm.
18. Gwynn’s Island Boatel (Robert R. Payne), PO Box 209, Hudgins 23076. Business - commercial dry storage marina. 4 employees. Observed on-site was one 2000-gallon unleaded fuel tank inside a cement block berm.
19. **DIRECT** – Occupant: Sea Farms, Inc., Route 669, Hudgins 23076. Owner: Ronald T. Sopko, PO Box 309, Hudgins. Business- Commercial shellfish processing plant (VA-889SP). 12-20 employees. Processing wastes and floor drains discharge wastes to an approved holding tank and also overboard to Milford Haven. Has permit # VAG524046 from DEQ/PRO. Permit expires 7-24-06.

SOLID WASTE DUMPSITES

11. Location: Right side of State Route 626, Blakes 23020. Owner: Mathews County, c/o Mr. Steve Whiteway, County Administrator, Mathews 23109. Public– Solid waste Sanitary Landfill. No contact. Landfill was permanently closed in October 1993. Monitoring wells have been installed since last survey to test ground water.
12. Occupant: Tom Hearn Auto Service. Owner: Tom Hearn, PO Box 156, Hudgins 23076. Dwelling- frame with gray T-111 siding 1 story. 2 persons. 25-30 junked autos over 2 acres.

30. John V. Slaughter, HC 02, Box 2657, Hudgins 23076. No contact. Observed on-site were junked vehicles, engine parts, tires, and various other debris scattered throughout approximately 1 acre.

SECTION D: BOATING ACTIVITY

MARINAS

13. Queens Creek Marina. Owner: Mike and Anita Uliasz, PO Box 2352, Mechanicsville 23116. Commercial Marina. 36 slips/2 moorings available. Present at time of survey were 11 pleasure boats under 26' and 19 pleasure boats over 26'. In dry storage there was 1 pleasure boat over 26'. Boating services provided are water and electricity. Containers are provided for solid waste collection. Sanitary facilities provided are 2 commodes, 2 lavatories, and 2 showers for men; and 2 commodes, 2 lavatories, and 2 showers for women. Sewage disposal is by septic tank with drainfield, which appeared to be working satisfactorily at time of inspection. Boat holding tank pump-out facilities and portable toilet dump station facilities are provided at this location.
18. Gwynn's Island Boatel (Robert R. Payne), PO Box 209, Hudgins 23076. Commercial dry storage marina. 4 employees. 6 slips/moorings and 200 dry storage spaces available. Present at time of survey were 142 boats under 26' in wet slips and 14 boats over 26' in dry storage. Boating services provided are fuel, electricity, water, boat sales, repair, and a forklift for putting boats in and out of the water. Containers are provided for solid waste collection. Sanitary facilities provided are 1 commode, 1 lavatory, and 1 shower for men; and 1 commode, 1 lavatory, and 1 shower for women. Sewage disposal is to a septic tank with drainfield, which appeared to be in satisfactory condition at time of inspection. Boat holding tank pump-out facilities and portable toilet dump station facilities are provided at this location.
29. Mathews Yacht Club, PO Box 671, Mathews 23109. Private marina. No contact. 50 slips/moorings available. Present at time of survey were 6 boats under 26' and 15 boats over 26'. Boating services provided are fuel, water, electricity, and an in-out ramp. Containers are available for solid waste collection. Sanitary facilities provided are 2 commodes, 2 urinals, 2 lavatories, and 2 showers for men; and 4 commodes, 1 lavatory, and 1 shower for women. Sewage disposal is to a septic tank with drainfield, which appeared to be in satisfactory condition at time of inspection. Boat holding tank pump-out facilities are provided. Portable toilet dump station facilities are not available at this location.
41. Ruth W. Downs, HC 69, Box 3780, Moon 23119. Private boat harbor. 13 slips/moorings. Present at time of survey were 14 pleasure boats under 26'. Boating services provided are water and electricity. There are no solid waste containers provided. Sanitary facilities provided are two commodes (1 male, 1 female). Sewage disposal is to septic tank with drainfield, which appeared to be in satisfactory condition at time of inspection. There are no boat holding tank pump-out facilities or portable toilet dump station facilities provided at this location.

42. Beaugard Turner Pier, end of State Route 644, Moon 23119. Harbor and ramp for subdivision residents. 20 slips/moorings. No contact. Present at time of survey were 18 pleasure boats under 26'. Boating services provided include fuel, water, and electricity. There are no sanitary facilities, no boat holding tank pump-out facilities, no solid waste containers and no portable toilet dump station facilities available at this location.

OTHER PLACES WHERE BOATS ARE MOORED

5. Mathews Public Boat Dock, end of State Route 626, Halliford 23068. Owner: Mathews County, Mathews 23109. Public Landing. No contact. 14 slips/moorings available. Present at time of survey were 2 work boats and 2 pleasure under 26' and 2 pleasure boats over 26'. No boating services are provided. There are no containers available for solid waste collection, no sanitary facilities, no boat holding tank pump-out facilities and no portable toilet dump station facilities at this location.
7. Sail Cove Community pier and ramp, off of State Route 626, Halliford 23068. Owner: J. Senyk, Halliford 23068. Community ramp and pier. No contact. 4 slips/moorings available. There were no boats present at time of survey. The only boating service provided is an in-out ramp. Containers are provided for solid waste collection. There are no sanitary facilities, boat holding tank pump-out facilities or portable toilet dump station facilities at this location.
17. Owner: U.S. Government, Washington D.C. Occupant: Milford Haven U.S. Coast Guard Station, HC 02, Box 2200, Hudgins 23076. Patrol boat base. 30 employees. 5 slips/moorings; 6 dry storage spaces. Present at the time of survey were 6 boats under 26' in dry storage and 3 boats over 26' in wet slips. Boating services provided are fuel, water, electricity, repair, an in-out ramp, marine and grocery supplies, and 3 laundry washers connected to an on-site sewage treatment plant. Sanitary facilities provided are 9 commodes, 9 lavatories, and 7 showers for men; and 3 commodes, 3 lavatories, and 3 showers for women, all in good condition. Sewage disposal is by on-site sewage treatment plant. Boat holding tank pump-out facilities are not provided, but there is a sewage receiving station at this location.
19. Sea Farms, Inc., Route 669, Hudgins 23076. Owner: Ronald T. Sopko, PO Box 309, Hudgins. Private boat docking facility. 12-20 employees. 6 slips/moorings available. No boats were present at the time of survey. No boating services are provided. Containers are provided for solid waste collection. Sanitary facilities provided are 2 unisex vault privies, which appeared to be in satisfactory condition at time of inspection. Privies are used as a portable toilet dump station facility. A sanitary facility is under construction which will provide 1 commode, 1 lavatory, and 1 shower for men. Sewage disposal will be to a septic tank with "puraflo" peat mound. There are no boat holding tank pump-out facilities available at this location.
23. Edwin R. and Dorothy Haufler, 7636 Cherokee Road, Richmond 23225. No contact. 9 slips/moorings available. Present at time of survey were 3 boats under 26' and 1 boat over 26' in wet slips; and in dry storage there were 2 boats under 26'. Boating services provided are electricity and water. Containers are not provided for solid waste collection. Sanitary facilities are available in each of 2 house trailers. There are no portable toilet dump station facilities or boat holding tank pump-out facilities available at this location.

24. Ann R. Condrey, PO Box 115, Hudgins 23076. 1 person. 10 slips/moorings and 3 dry storage spaces available. Present at time of survey were 2 boats under 26' and 4 boats over 26' in wet slips; and in dry storage there were 3 boats under 26'. Boating services provided are water, electricity, and an in-out ramp. Containers are available for solid waste collection. There are no sanitary facilities, boat holding tank pump-out facilities or portable toilet dump station facilities provided at this location. Owner's son has house across road with sanitary facilities available for use at above location.
37. Fleetwood Properties, Moon 23119. No contact. 22 slips/1 mooring. Present at time of survey were 2 pleasure boats over 26', and 7 pleasure boats under 26'. Boating services provided are water and electricity. Sanitary facilities provided are 1 commode and 1 lavatory for men. Boat holding tank pump-out facilities are available to boaters at this location, but were locked at the time of inspection. There are no containers available for solid waste collection.
44. Marine – private pier and ramp, end of dirt lane off of State Route 682, Mathews 23109. Owner: Mary Owens Clements, PO Box 633, Gloucester 23061. No contact. 20 slips/3 moorings. Present at time of survey were 6 work boats under 26'. There are no boating services, no sanitary facilities, no boat holding tank pump-out facilities and no portable toilet dump station facilities available at this location.

UNDER SURVEILLANCE

2. Misty Cove Subdivision, off of State Route 626, Halliford 23068. Owner: Misty Cove Partners, 608 Williams Street, Fredericksburg 22401. Private Community pier for subdivision. No Contact. 5 slips/moorings available. Present at time of survey was 1 pleasure boat under 26'. No boating services are provided. There are no containers available for solid wastes collection, no sanitary facilities, no boat holding tank pump-out facilities and no portable toilet dump station facilities at this location.
3. Nelson Land Trust, off of State Route 626, Halliford 23068. Owner: Robert B. Nelson, 1618 Keiths Valley Road, Charlottesville 22901. Private pier. No contact. 7 slips/moorings available. Present at time of survey were 2 pleasure boats under 26' and 1 pleasure boat over 26'. Boating services provided are electricity and water. There are no containers available for solid waste collection, no sanitary facilities, no boat holding tank pump-out facilities and no portable toilet dump station facilities at this location.
45. Mathews County Public Boat Ramp and Pier, end of State Route 682, Mathews 23109. No contact. There were no boats present at time of survey. The only boating service provided is an in-out ramp. There are no containers available for solid waste collection, no sanitary facilities, no boat holding tank pump-out facilities and no portable toilet dump station facilities at this location.

SECTION E: CONTRIBUTES ANIMAL POLLUTION

1. Milford Haven Kennels, Mathews 23109. Dog boarding and training facility consisting of 28-30 runs and houses. No Contact. Present at time of survey were 25 dogs. Manure disposal is unknown.
9. Location: PO Box 753, Cobbs Creek 23035. Dwelling-frame with white vinyl 1 story. 3 persons. 18 ducks, 25 chickens, 2 turkeys, 2 geese, 2 peacocks, 2 guineas, and 1 pig in fenced area 20' from ditch at 15' elevation. Manure is left on ground.

27. Location: HCR 75 Box 2874, Redart 23076. Dwelling- gray vinyl siding 1½ story with black shutters and white trim. 2 persons. Present at time of survey were 10 goats, 3 emu and approximately 15 domestic fowl in enclosed pens. Manure is left on the ground.
33. Location: HCR 75, PO Box 1165, Mathews 23109. Dwelling- gray house trailer. 3 persons. 11 goats in fenced area at 10' elevation. Manure is left on ground.
35. Location: PO Box 71, Mathews 23109. Dwelling- white frame 2 story. 2 persons. 15 cows with direct access to drainage ditch. Manure is left on ground.
36. **DIRECT** – Location: HCR 75 Box 30, Mathews 23109. Dwelling- red brick 2½ story with white trim. No contact. Present at time of survey were 25 domestic fowl. There were 20 fowl in enclosed pens 50' from Morris Creek at 6' elevation and 5 fowl wandering the property. Manure is left on the ground.
39. **DIRECT** – Location: end of State Route 690, PO Box 45, Mathews 23109. Dwelling- tan vinyl trailer with dark brown trim. 2 persons. Present at time of survey were 6 horses in a fenced pasture with direct access to Billups Creek. Manure is left on ground.
40. Location: S.R. Box 21A, Moon 23119. Dwelling- yellow frame 2 story with red shutters. 2 persons. Present at time of survey were 35 chickens and 5 geese. Manure is left on ground.
46. Location: PO Box 944, Mathews 23109. Dwelling- white vinyl 2 story with green shutters. No contact. Present at time of survey were 5 cows. Manure is left on ground.

SUMMARY

Area # 037
Stutts, Queens, and Whites Creeks
6 March 2002

SECTION B: SEWAGE POLLUTION SOURCES

1. SEWAGE TREATMENT WORKS

- 1 – DIRECT – # 17
- 0 – INDIRECT – NONE
- 1 – B.1. TOTAL

2. ON-SITE SEWAGE DEFICIENCIES – Correction of deficiencies in this section is the responsibility of the local health department.

- 0 – CONTRIBUTES POLLUTION, DIRECT – None
- 7 – CONTRIBUTES POLLUTION, INDIRECT – # 4, 6, 15, 20, 21, 32, 34
- 2 – CP (Kitchen or Laundry Wastes), DIRECT – # 28, 38
- 6 – CP (Kitchen or Laundry Wastes), INDIRECT – # 14, 25, 26, 31, 43, 47
- 1 – NO FACILITIES, DIRECT – # 42
- 3 – NO FACILITIES, INDIRECT – # 10, 16, 22
- 19 – B.2 TOTAL

3. POTENTIAL POLLUTION – Periodic surveillance of these properties will be maintained to determine any status change.

- 0 – POTENTIAL Pollution – None

SECTION C: NON-SEWAGE WASTE SITES

1. INDUSTRIAL WASTE SITES

- 1 – DIRECT – # 19
- 4 – INDIRECT – # 8, 12, 17, 18
- 5 – C.1. TOTAL

2. SOLID WASTE DUMPSITES

- 0 – DIRECT – None
- 3 – INDIRECT – # 11, 12, 30
- 3 – C.2. TOTAL

SECTION D: BOATING ACTIVITY

- 5 – MARINAS – #13, 18, 29, 41, 42
- 8 – OTHER PLACES WHERE BOATS ARE MOORED – # 5, 7, 17, 19, 23, 24, 37, 44
- 3 – UNDER SURVEILLANCE – # 2, 3, 45
- 16 – D. TOTAL

SECTION E: CONTRIBUTES ANIMAL POLLUTION

- 2 – DIRECT – # 36, 39
- 7 – INDIRECT – # 1, 9, 27, 33, 35, 40, 46
- 9 – E. TOTAL

Appendix A: Shellfish Area Condemnation Notices:



REGISTRAR OF REGULATIONS
05 SEP -7 AM 10:41

COMMONWEALTH of VIRGINIA

Department of Health
DIVISION OF SHELLFISH SANITATION
109 Governor Street, Room 614-B
Richmond, VA 23219

Ph: 804-864-7487
Fax: 804-864-7481

NOTICE AND DESCRIPTION OF SHELLFISH AREA CONDEMNATION NUMBER 036-197, MILFORD HAVEN AND EDWARDS CREEK

EFFECTIVE 15 SEPTEMBER 2005

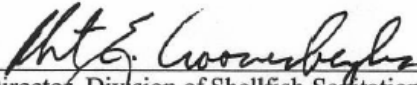
Pursuant to Title 28.2, Chapter 8, §§28.2-803 through 28.2-808, §32.1-20, and §9-6.14:4.1, B.16 of the *Code of Virginia*:

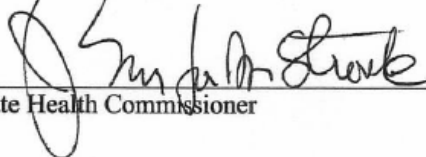
1. The "Notice of Establishment and Description of Shellfish Area Condemnation Number 036-197, Milford Haven: Edwards Creek," effective 10 February 2005, is cancelled effective 15 September 2005.
2. Condemned Shellfish Area Number 036-197, shown as Sections A through D, is established, effective 15 September 2005. As to Sections A, B and C, it shall be unlawful for any person, firm, or corporation to take shellfish from these sections for any purpose, except by permit granted by the Marine Resources Commission, as provided in Section 28.2-810 of the Code of Virginia. As to Section D, it shall be unlawful for any person, firm, or corporation to take shellfish from this section for any purpose. The boundaries of these sections are shown on the map titled "Milford Haven and Edwards Creek, Condemned Shellfish Area Number 036-197, 15 September 2005" which is part of this notice.
3. The seasonal shellfish condemnation area defined as area number 036-197, shown as Sections M1, M2 and M3 is hereby established, effective 15 September 2005, and shall remain in force annually thereafter for the period beginning the first day of April through the last day of October until rescinded. It is unlawful for any person, firm, or corporation to take shellfish from this area during such period for any purpose, except by permit granted by the Marine Resources Commission, as provided in §28.2-810 of the *Code of Virginia*. The boundaries of these sections are shown on the map titled "Milford Haven and Edwards Creek, Condemned Shellfish Area Number 036-197, 15 September 2005" which is part of this notice.
4. The Department of Health will receive, consider and respond to petitions by any interested person at any time with respect to reconsideration or revision of this order.

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BOUNDARIES OF CONDEMNED AREA NUMBER 036-197

- A. The condemned area shall include all of that portion of Milford Haven enclosed by a line drawn from latitude/longitude map coordinate (37°29'19.4",-76°18'15.9") on the south shoreline, then northerly to map coordinate (37°29'23.5",-76°18'15.3"), then westerly to map coordinate (37°29'23.2",-76°18'36.9") on the north end of the bridge on Gwynn Island, then westerly along the shoreline to map coordinate (37°29'20.0",-76°18'41.9"), then easterly to map coordinate (37°29'23.2",-76°18'25.4"), then southerly to map coordinate (37°29'18.3",-76°18'24.7"), then along the shoreline to the point of beginning.
- B. The condemned area shall include all of Edwards Creek and its tributaries lying upstream of a line drawn from latitude/longitude map coordinate (37°29'39.8",-76°17'40.9") to map coordinate (37°29'33.5",-76°17'34.0").
- C. The condemned area shall include all of Barn Creek and its tributaries lying upstream of a line drawn from latitude/longitude map coordinate (37°29'17.7",-76°17'04.3") to map coordinate (37°29'14.9",-76°16'57.9").
- D. The condemned area shall include all of that portion of Milford Haven enclosed by a line drawn from latitude/longitude map coordinate (37°29'18.3",-76°18'24.7") on the south shoreline, then north to map coordinate (37°29'23.2",-76°18'25.4"), then southwestly to map coordinate (37°29'20.0",-76°18'41.9"), then southerly to map coordinate (37°29'08.4",-76°18'45.2") then easterly along the shoreline to the point of beginning.
- M1. The seasonally condemned area shall include that portion of Milford Haven west of a line drawn from latitude/longitude map coordinate (37°29'21.1",-76°18'53.6") to map coordinate (37°29'07.9",-76°18'53.1"), and east of a line drawn from map coordinate (37°29'20.0",-76°18'41.9") to map coordinate (37°29'08.4",-76°18'45.2").
- M2. The seasonally condemned area shall include that portion of Milford Haven enclosed by a line drawn from latitude/longitude map coordinate (37°29'40.8",-76°18'27.7") to map coordinate (37°29'36.0",-76°18'13.4").
- M3. The condemned area shall include all of Edwards Creek and its tributaries lying upstream of a line drawn from latitude/longitude map coordinate (37°29'39.8",-76°17'40.9") to map coordinate (37°29'27.1",-76°17'39.3"), but excluding the area defined as Section B.

Recommended by: 
Director, Division of Shellfish Sanitation

Ordered by:  9/2/08
State Health Commissioner Date



REGISTRAR OF REGULATIONS

07 JAN 28 PM 11: 20

COMMONWEALTH of VIRGINIA

Department of Health DIVISION OF SHELLFISH SANITATION

109 Governor Street, Room 614-B
Richmond, VA 23219

Ph: 804-864-7487

Fax: 804-864-7481

NOTICE AND DESCRIPTION OF SHELLFISH AREA CONDEMNATION NUMBER 037-061, STUTTS CREEK AND VICINITY

EFFECTIVE 9 FEBRUARY 2007

Pursuant to Title 28.2, Chapter 8, §§28.2-803 through 28.2-808, §32.1-20, and §9-6.14:4.1, B.16 of the *Code of Virginia*:

1. The "Notice of Establishment and Description of Shellfish Area Condemnation Number 037-061, Stutts Creek and Vicinity," effective 28 October 2005, is cancelled effective 9 February 2007.
2. The shellfish condemnation area Number 037-061, shown as Sections A, B, and C, is established, effective 9 February 2007. It shall be unlawful for any person, firm, or corporation to take shellfish from these areas for any purpose, except by permit granted by the Marine Resources Commission, as provided in Section 28.2-810 of the *Code of Virginia*. The boundaries of these areas are shown on the map titled "Stutts Creek and Vicinity, Condemned Shellfish Area Number 037-061, 28 October 2005 which is part of this notice.
3. The seasonal shellfish condemnation area Number 037-061, shown as Section MI, is hereby established, effective 1 April 2007, and shall remain in force annually thereafter for the period beginning the first day of April through the last day of October until rescinded. It shall be unlawful for any person, firm or corporation to take shellfish from these areas during such period for any purpose, except by permit granted by the Marine Resources Commission, as provided in § 28.2-810 of the *Code of Virginia*. The boundaries of this area are shown on the map titled "Stutts Creek and Vicinity, Condemned Shellfish Area Number 037-061, 9 February 2007 which is part of this notice.
4. The Department of Health will receive, consider and respond to petitions by any interested person at any time with respect to reconsideration or revision of this order.

BOUNDARIES OF CONDEMNED AREA NUMBER 037-061

- A. The condemned area shall include that portion of Stutts Creek and its tributaries lying upstream of a line drawn between latitude/longitude map coordinate (37°27'48.7", -76°17'46.6") and map coordinate (37°27'36.7", -76°17'43.5").

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- B. The condemned area shall include that portion of Billups Creek and its tributaries lying upstream of a line drawn between latitude/longitude map coordinate (37°27'22.1", -76°16'50.3") and map coordinate (37°27'10.1", -76°16'56.5").
- C. The condemned area shall include all of the water body named Hole in the Wall lying upstream of a line drawn between latitude/longitude map coordinate (37°28'23.1", -76°17'23.5") and map coordinate (37°28'22.8", -76°17'24.5").
- M1. The seasonally condemned area shall include that portion of Stoakes Creek inshore of a line drawn between latitude/longitude map coordinate (37°27'04.0", -76°16'19.7") and map coordinate (37°26'55.2", -76°16'21.1").

Recommended by: *Robert E. Cronenberg*
Director, Division of Shellfish Sanitation

Ordered by: *David B. Shover* *01/26/2007*
State Health Commissioner Date

Appendix B: Supporting Documentation and Watershed Assessment

- 1. Fecal Production Literature Review**
- 2. Geographic Information System Data: Sources and Process**
- 3. Watershed Source Assessment**

B-1. Fecal Production Literature Review

	Concentration in feces		Fecal coliform production rate		Comments
	FC/g	Ref.	FC/day (seasonal)	Ref.	
Cat	7.9E+06	1	5.0E+09	4	
Dog	2.3E+07	1	5.0E+09	4	
Chicken	1.3E+06	1	1.9E+08	4	
Chicken			2.4E+08	9	
Cow	2.3E+05	1	1.1E+11	4	average of dairy and beef
Beef cattle			5.4E+09	9	
Deer	1.0E+02	6	2.5E+04	6	assume 250 g/day
Deer	?		5.0E+08	9	best prof. judgement
Duck			4.5E+09	4	average of 3 sources
Duck	3.3E+07	1	1.1E+10	9	
Canada Geese			4.9E+10	4	
Canada Geese	3.6E+04	3	9.0E+06	3	
Canada Geese	1.5E+04	8	3.8E+06	8	assume 250 g/day (3)
Horse			4.2E+08	4	
Pig	3.3E+06	1	5.5E+09	4	
Pig			8.9E+09	9	
Sea Gull	3.7E+08	8	3.7E+09	8	assume 10 g/day
Sea gull			1.9E+09	5	mean of four species
Rabbit	2.0E+01	2	?		
Raccoon	1.0E+09	6	1.0E+11	6	assume 100 g/day
Sheep	1.6E+07	1	1.5E+10	4	
Sheep			1.8E+10	9	
Turkey	2.9E+05	1	1.1E+08	4	
Turkey			1.3E+08	9	
Rodent	1.6E+05	1	?		
Muskrat	3.4E+05	6	3.4E+07	6	
Human	1.3E+07	1	2.0E+09	4	
Septage	4.0E+05	7	1.0E+09	7	assume 70/gal/day/person

1. Geldreich, E. and E. A. Kenner. 1969. Concepts of fecal streptococci in stream pollution. *J. Wat. Pollut. Control Fed.* 41:R336-R352.
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Table B-2 GIS Data Elements and Sources

Data Element	Source	Date
Watershed boundary	Division of Shellfish Sanitation, VA Department of Health	Various dates
Subwatershed boundary	Center for Coastal Resources Management	2003
Land use	National Land Cover Data set (NLCD), US Geological Survey	1999
Elevation	Digital Elevation Models and Digital Raster Graphs, US Geological Survey	Various dates
Soils	SSURGO and STATSGO, National Resource Conservation Service	Various dates
Stream network	National Hydrography Dataset	1999
Precipitation, temperature, solar radiation, and evapotranspiration	Chesapeake Bay Program, Phase V	2002
Stream flow data	Gauging stations, US Geological Survey	Various dates
Shoreline Sanitary Survey deficiencies	Division of Shellfish Sanitation, VA Department of Health	Various dates
Wastewater treatment plants	VA Department of Environmental Quality	Various dates
Sewers	Division of Shellfish Sanitation, VA Department of Health	Various dates
Dog population	US Census Bureau American Veterinary Association	2000 2002
Domestic livestock	National Agricultural Statistics Service, USDA	1997/2001
Wildlife	Virginia Department of Game and Inland Fisheries, US Fish and Wildlife Service	2004 2004
Septic tanks (from human population)	Division of Shellfish Sanitation, VA Department of Health US Census Bureau	Various dates 2000
Water quality monitoring stations	Division of Shellfish Sanitation, VA Department of Health	Various dates
Water quality segments	Center for Coastal Resources Management	2003
Tidal prism segments	Department of Physical Sciences, VIMS	2003
Water body volumes	Bathymetry from Hydrographic Surveys, National Ocean Service, NOAA	Various dates
Condemnation zones	Division of Shellfish Sanitation, VA Department of Health	Various dates
Tidal data	NOAA tide tables	2004

A. GIS Data Description and Process

Watershed boundary determined by VDH, DSS. There are 105 watersheds in Virginia.

Subwatershed boundaries were delineated based on elevation, using digital 7.5 minute USGS topographic maps. There are 1836 subwatersheds.

The original land use has 15 categories that were combined into 3 categories: urban (high and low density residential and commercial); undeveloped (forest and wetlands); and agriculture (pasture and crops).

Descriptions of Shoreline Sanitary Survey deficiencies are found in each report. Contact DSS for more information. Digital data layer generated by CCRM from hardcopy reports.

Wastewater treatment plant locations were obtained from DEQ and digital data layer was generated by CCRM. Design flow, measured flow, and fecal coliform discharges were obtained from DEQ.

Sewers data layer was digitized from Shoreline Sanitary Surveys by CCRM.

Dog numbers were obtained using the American Vet Associations equation of #households * 0.58.

See website for additional information—

<http://www.avma.org/membshp/marketstats/formulas.asp#households1>.

Database was generated by CCRM.

Domestic livestock includes cows, pigs, sheep, chickens, turkeys, and horses. Database was generated by CCRM.

Wildlife includes ducks and geese, deer, and raccoons. Animals were chosen based on availability of fecal coliform production rates and population estimates. Database was generated by CCRM.

Ducks and geese—US FWS, DGIF

Deer—DGIF

Raccoons—DGIF

Human input was based on DSS sanitary survey deficiencies and US Census Bureau population data (number of households).

Water quality monitoring data are collected, on average, once per month. Digital data layer of locations was generated by DSS. Water quality data was mathematically processed and input into a database for model use.

Water bodies were divided into segments based on the location of the monitoring stations (midway between stations). If a segment contained >1 station, the FC values were averaged. If a segment contained 0 stations, the value from the closest station(s) was assigned to it. Digital data layer of segments was generated by CCRM. FC loadings in the water were obtained by multiplying FC concentrations by segment volume.

Bathymetry data were used to generate a depth grid that was used to estimate volumes for each water quality segment and tidal prism segment.

The 1998 303d report was used to set the list of condemnation zones that require TMDLs. The digital data layer was generated by CCRM from hardcopy closure reports supplied by DSS.

B. Population Numbers

The process used to generate population numbers used for the non-point source contribution analysis part of the watershed model for the four source categories: human, livestock, pets and wildlife is described for each below.

Human:

The number of people contributing fecal coliform from failing septic tanks were developed in two ways and then compared to determine a final value.

- 1) Deficiencies (septic failures) from the DSS shoreline surveys were counted for each watershed and multiplied by 3 (average number of people per household).
- 2) Numbers of households in each watershed were determined from US Census Bureau data. The numbers of households were multiplied by 3 (average number of people per household) to get the total number of people and then multiplied by a septic failure rate* to get number of people contributing fecal coliform from failing septic tanks.

*The septic failure rate was estimated by dividing the number of deficiencies in the watershed by the total households in the watershed. The average septic failure rate was 12% and this was used as the default unless the DSS data indicated that septic failure was higher.

Livestock:

US Census Bureau data was used to calculate the livestock values. The numbers for each type of livestock (cattle, pigs, sheep, chickens (big and small), and horses) were reported by county. Each type of livestock was assigned to the land use(s) it lives on, or contributes to by the application of manure, as follows:

Cattle	cropland and pastureland
Pigs	cropland
Sheep	pastureland
Chickens	cropland
Horses	pastureland

GIS was used to overlay data layers for several steps:

- 1) The county boundaries and the land uses to get the area of each land use in each county. The number of animals was divided by the area of each land use for the county to get an animal density for each county.
- 2) The subwatershed boundaries and the land uses to get the area of each land use in each subwatershed.
- 3) The county boundaries and the subwatershed boundaries to get the area of each county in each subwatershed. If a subwatershed straddled more than one county, the areal proportion of each county in the subwatershed was used to determine the number of animals in the subwatershed.

Using MS Access, for each type of livestock, the animal density by county was multiplied by the area of each land use by county in each subwatershed to get the number of animals in each subwatershed. If more than one county was present in a subwatershed, the previous step was done for each county in the subwatershed, then summed for a total number of animals in the subwatershed. The number of animals in each subwatershed was summed to get the total number of animals in each watershed.

Pets:

The dog population was calculated using a formula for estimating the number of pets using national percentages, reported by the American Veterinary Association:

dogs = # of households * 0.58.

US Census Bureau data provided the number of households by county. The number of dogs per county was divided by the area of the county to get a dog density per county. GIS was used to overlay the subwatershed boundaries with the county boundaries to get the area of each county in a subwatershed. If a subwatershed straddled more than one county, the areal proportion of each county in the subwatershed was calculated. Using MS Access, the area of each county in the subwatershed was multiplied by the dog density per county to get the number of dogs per subwatershed. If more than one county was present in a subwatershed, the previous step was done for each county in the subwatershed, then summed for a total number of dogs in the subwatershed. The number of dogs in each subwatershed was summed to get the total number of dogs in each watershed.

Wildlife:

Deer—

The number of deer were calculated using information supplied by DGIF, consisting of an average deer index by county and the formula:

#deer/mi² of deer habitat = (-0.64 + (7.74 * average deer index)).

Deer habitat consists of forests, wetlands, and agricultural lands (crop and pasture). GIS was used to overlay data layers for the following steps:

- 1) The county boundaries and the subwatershed boundaries to get the area of each county in each subwatershed. If a subwatershed straddled more than one county, the areal proportion of each county in the subwatershed was calculated.
- 2) The subwatershed boundaries and the deer habitat to get the area of deer habitat in each sub-watershed.

Using MS Access, numbers of deer in each sub-watershed were calculated by multiplying the #deer/mi² of deer habitat times the area of deer habitat. If more than one county was present in a sub-watershed, the previous step was done for each county in the sub-watershed, then summed for a total number of deer in the sub-watershed. The number of deer in each sub-watershed was summed to get the total number of deer in each watershed.

Ducks and Geese—

The data for ducks and geese were divided into summer (April through September) and winter (October through March).

Summer

The summer numbers were obtained from the Breeding Bird Population Survey (US Fish and Wildlife Service) and consisted of bird densities (ducks and geese) for 3 regions: the south side of the James River, the rest of the tidal areas, and the salt marshes in both areas. The number of ducks and geese in the salt marshes were distributed into the other 2 regions based on the area proportion of salt marshes in them using the National Wetland Inventory data and GIS.

Winter

The winter numbers were obtained from the Mid-Winter Waterfowl Survey (US Fish and Wildlife Service) and consisted of population numbers for ducks and geese in several different areas in the tidal region of Virginia. MS Access was used to calculate the total number of ducks and geese in each area and then these numbers were grouped to match the 2 final regions (Southside and the rest of tidal Virginia) for the summer waterfowl populations. Winter populations were an order of magnitude larger than summer populations.

Data from DGIF showed the spatial distribution of ducks and geese for 1993 and 1994. Using this information and GIS a 250m buffer on each side of the shoreline was generated and contained 80% of the birds. Wider buffers did not incorporate significantly more birds, since they were located too far inland. GIS was used to overlay the buffer and the watershed boundaries to calculate the area of buffer in each watershed. To distribute this information into each sub-watershed, GIS was used to calculate the length of shoreline in each sub-watershed and the total length of shoreline in the watershed. Dividing the length of shoreline in each sub-watershed by the total length of shoreline gives a ratio that was multiplied by the area of the watershed to get an estimate of the area of buffer in each sub-watershed. MS Excel was used to multiply the area of buffer in each sub-watershed times the total numbers of ducks and geese to get the numbers of ducks and geese in each sub-watershed. These numbers were summed to get the total number of ducks and geese in each watershed. To get annual populations, the totals then were divided by 2, since they represent only 6 months of habitation (this reduction underestimates the total annual input from ducks and geese, but is the easiest conservative method to use since the model does not have a way to incorporate the seasonal differences).

Raccoons—

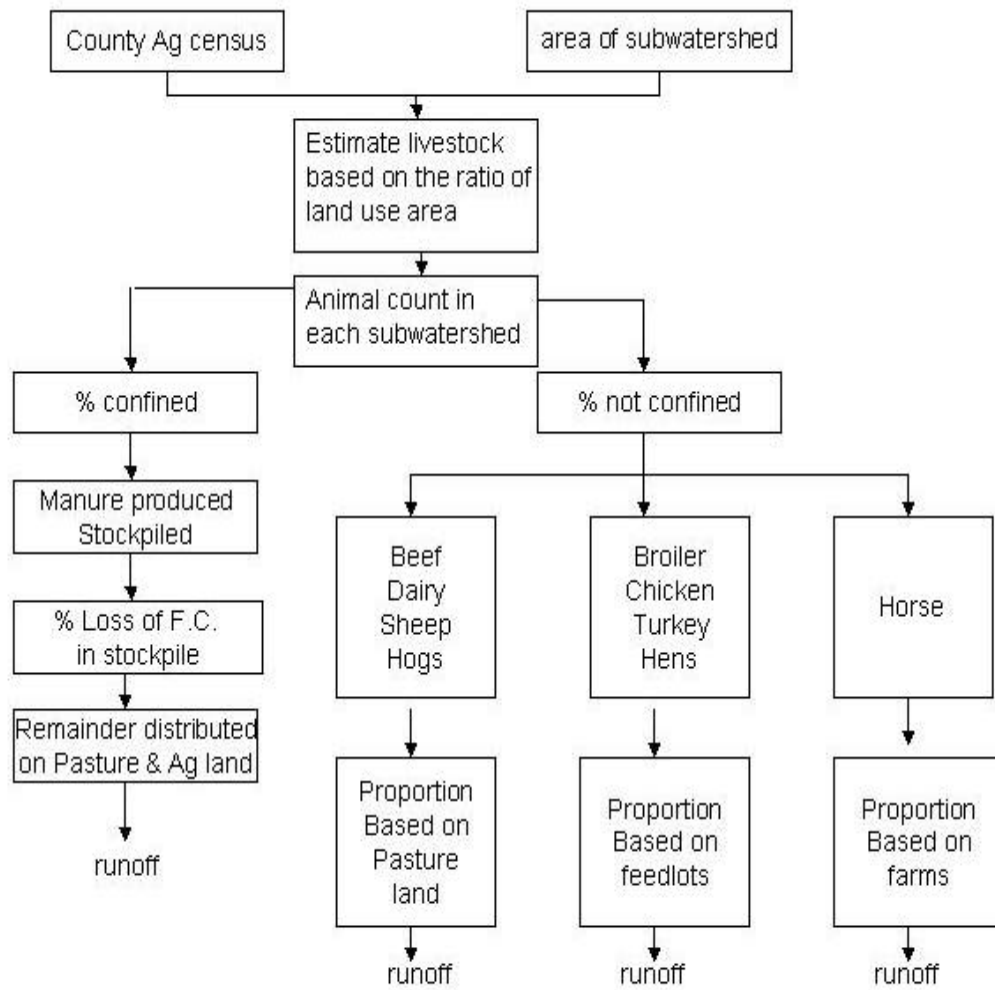
Estimates for raccoon densities were supplied by DGIF for 3 habitats—wetlands (including freshwater and saltwater, forested and herbaceous), along streams, and upland forests. GIS was used to generate a 600ft buffer around the wetlands and streams, and then to overlay this buffer layer with the sub-watershed boundaries to get the area of the buffer in each sub-watershed. GIS was used to overlay the forest layer with the sub-watershed boundaries to get the area of forest in each sub-watershed. MS Access was used to multiply the raccoon densities for each habitat times the area of each habitat in each sub-watershed to get the number of raccoons in each habitat in each sub-watershed. The number of raccoons in each sub-watershed was summed to get the total number of raccoons in each watershed.

B-4. Watershed Source Assessment

The watershed assessment calculates fecal coliform loads by source based on geographic information system data. A geographic information system is a powerful computer software package that can store large amounts of spatially referenced data and associated tabular information. The data layers produced by a GIS can be used for many different tasks, such as generating maps, analyzing results, and modeling processes. The watershed model requires a quantitative assessment of human sewage sources (i. e., malfunctioning septic systems) and animal (livestock, pets and wildlife) fecal sources distributed within each watershed.

The fecal coliform contribution from livestock is through the manure spreading processes and direct deposition during grazing. This contribution was initially estimated based on land use data and the livestock census data. In the model, manure was applied to both cropland and pasture land depending on the grazing period. Figure B-1 shows a diagram of the procedure for estimating the total number of livestock in the watershed and fecal coliform production. A description of the process used to determine the source population values for wildlife, pets and human used in the calculation of percent loading is found in Appendix B.

FIGURE B-1 Diagram to Illustrate Procedure Used to Estimate Fecal Coliform Production from Estimated Livestock Population



Appendix C:

Vessel Sewage Discharge Program

Marine Sanitation Device Standard--Establishment of Drinking Water Inake No Discharge Zone(s) Under Section 312(f)(4)(B) of the Clean Water Act; Final Rule.

As of January 30, 1980, if a vessel has an installed toilet (technically referred to as a marine sanitation device (MSD)), it must be equipped with one of three types of MSDs (<http://www4.law.cornell.edu/uscode/33/1322.html>).

The MSDs (Type I, Type II, Type III) are designed to meet different needs and effluent level requirements. Since portable toilets can be moved on and off a vessel, they are not considered installed toilets; therefore, vessels that have portable toilets are not subject to the MSD regulations.

Types of Marine Sanitation Devices		
Sewage Treatment Device	Vessel Length	Standard
Type I- Flow-through device (maceration and disinfection)	equal to or less than 65 feet in length	The effluent produced must not have a fecal coliform bacteria count greater than 1000 per 100 milliliters and have no visible floating solids.
Type II- Flow-through device (maceration and disinfection)	greater than 65 feet in length	The effluent produced must not have a fecal coliform bacteria count greater than 200 per 100 milliliters and suspended solids not greater than 150 milligrams per liter .
Type III- Holding tank	any length	This MSD is designed to prevent the overboard discharge of treated or untreated sewage.

- Type I MSDs rely on maceration and disinfection for treatment of the waste prior to its discharge into the water.
- Type II MSDs are similar to the Type I; however, the Type II devices provide an advanced form of the same type of treatment and discharge wastes with lower fecal coliform counts and reduced suspended solids.
- Type III MSDs are commonly called holding tanks because the sewage flushed from the marine head is deposited into a tank containing deodorizers and other chemicals. The contents of the holding tank are stored until it can be properly disposed of at a shore-side pump out facility. (Type III MSDs can be equipped with a discharge option, usually called a Y-valve, which allows the boater to direct the sewage from the head either into the holding tank or directly overboard. Discharging the contents directly overboard is legal only outside the U.S. territorial waters which is 3 or more miles from shore.)

Houseboats

In accordance with the FWPCA, a State may adopt and enforce a statute or regulation with respect to the design, manufacture, or installation or use of any MSD on a houseboat, if such statute or regulation is stricter than EPA and USCG requirements. The term "houseboat" refers to a vessel which, for a period of time determined by the State in which the vessel is located, is used primarily as a residence and is not used primarily as a means of transportation. For example, a State may require that houseboats less than 65 feet (19.7 meters) in length with an installed Type I device update to a Type II or III device. **Reference: Section 1322(f)(1)(B) FWPCA**

DEQ Guidance on Establishing No Discharge Zones

MEMORANDUM


DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF WATER QUALITY PROGRAMS

P.O. Box 10009

Richmond, VA 23240-0009

SUBJECT: Guidance Memo No. 04-2022
Procedures for Establishing Boating No Discharge Zones

TO: Regional Directors

FROM: Ellen Gilinsky, Ph.D., Director 

DATE: November 29, 2004

COPIES: Rick Weeks, Jon Van Soestbergen and Cindy Berndt

Summary:

The purpose of this guidance is to provide a procedure for handling public or internal requests for the establishment of boating No Discharge Zones, and for establishing the No Discharge Zones in accordance with federal regulation 40 CFR Part 140 (2004) and state regulation 9 VAC 25-71 (2004).

Electronic Copy:

An electronic copy of this guidance in PDF format is available for staff internally on DEQNET and for the general public on DEQ's website at: <http://www.deq.virginia.gov/water/>.

Contact information:

Please contact Mike Gregory, Office of Water Permit Support, (804) 698-4065 or mbgregory@deq.virginia.gov if you have any questions about this guidance.

Disclaimer:

This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate any particular method nor does it prohibit any particular method for the analysis of data, establishment of a wasteload allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

PROCEDURE FOR DEQ REVIEW OF SECTION 312 NO DISCHARGE ZONE DESIGNATION REQUESTS

Background

Section 312 of the Clean Water Act and EPA regulations at 40 CFR Part 140 address sewage discharges from boats. The federal regulations control these discharges by requiring boats with installed toilets to have treatment units called Marine Sanitation Devices or "MSDs". Type I and Type II MSDs consist of two levels of treat and discharge units, while Type III MSDs are holding tanks that do not discharge and must be pumped out at pump out facilities. Pump out facilities are usually located at marinas and are regulated by the Virginia Department of Health. Most recreational boats with installed toilets have the holding tanks. Discharging raw sewage from boats, from holding tanks or portable toilets for example, is not directly addressed by federal regulations, but state law prohibits it and this is now clarified in our state regulation 9 VAC 25-71.

Federal law prohibits a state from adopting regulations regarding MSDs that are more stringent than federal regulations, but it allows a state to petition EPA for designation of No Discharge Zones (NDZs), where all sewage discharges, treated or untreated, are banned. The process is for the state to demonstrate that the particular water body requires special protection and that there are adequate pump out facilities in the area, since boat sewage wastes in NDZs would have to be held until pumped out. EPA does not have a specific application but has developed informational documents and a loosely structured process for applying for NDZ designation. Any citizen can initiate the process but the final request must be signed by the governor or chief environmental officer of the state.

Note that since untreated sewage discharges from boats are illegal, the only difference in a NDZ with respect to the law is that boats with treat and discharge units (MSD Type I or II) cannot use them. Since most boats on the water have holding tanks anyway, this is not a significant difference. It might be considered, however, that the public outreach and increased law enforcement efforts in NDZs provide for more protection of the waters with regard to previously undetected illegal discharges. Another consideration is that in areas where there is a considerable amount of commercial boat traffic there are more likely to be boats operating with treat and discharge type units (e.g., tug boats in the Chesapeake Bay).

As of the date of this guidance Smith Mountain Lake is the only designated NDZ in the state. This resulted from a bill that was passed by the General Assembly directing the State Water Control Board to petition EPA for NDZ designation. The designation was received and a new boating regulation, 9 VAC 25-71, was adopted that provides for NDZ identification and enforcement. Since the Smith Mountain Lake NDZ designation inquiries have been received from various groups in the Chesapeake Bay watershed wishing to pursue NDZ designation for other water bodies of concern. In order to handle these requests consistently and in accordance with State Water Control Law at Section 62.1-44.33 the following procedure should be followed.

Procedure

The procedure for designating Section 312 Boating No Discharge Zones will be as follows.

1. When an interested party, local government or state agency proposes No Discharge Zone (NDZ)

designation for a waterbody within the state it should submit a proposal including the following information to the Director of the DEQ Division of Water Quality Programs. The Division of Water Quality Programs will develop this information for DEQ initiated proposals:

- A. Name and contact information for the person or group making the request.
- B. Name and location of the waterbody.
- C. Exact boundaries of the area to be designated, using latitude and longitude of boundaries, any bordering landmarks or delineating features (e.g., bridges or mean low water elevations) or other means of identifying the area.
- D. A map of the area to be designated.
- E. Reason why designation is being sought, i.e., why the water body requires greater environmental protection, including:
 - (1) Nature of the waterbody (estuary, river, lake, etc.) and a description of its features (e.g., heavily populated area, major port or boating area, pristine bay with little surrounding development, enclosed embayment, deep mountain lake);
 - (2) any unique features or qualities (including high quality waters) or environmental importance (e.g. shellfish waters) that necessitate stronger resource protection;
 - (3) information on contact recreational use (e.g., swimming);
 - (4) any specific water quality problems existing, including 303(d) listing and TMDL status if applicable.

Note that greater environmental protection might be considered necessary to maintain the status of a high quality resource or to improve the status of a low quality one.

- F. Indication if the waterbody is:
 - (1) in an established sanctuary, national or state park, wilderness area, recreation area or if the waterbody is used by endangered or threatened species;
 - (2) a public water supply.
- G. A statement or rough estimate of the availability of boat sewage holding tank pump-outs in the area (more exact information will be developed for the EPA application).
- H. A statement or rough estimate of the amount of boat traffic in the waterbody and the type of boat traffic, recreational or commercial (more exact information will be developed for the EPA application).
- I. Indication, if available, of any public support or interest for or against the NDZ designation.
- J. Information on any local enforcement capability (e.g., police boats).
- K. Information on any local public outreach capability (provision of signs, pamphlets or other public awareness efforts).

- 2. DEQ will review the proposal and obtain more information if necessary.
- 3. If DEQ decides it is not appropriate to proceed, it will indicate why and what options are available to the individual or group if they wish to continue (e.g., approach the State Water Control Board or petition EPA directly).
- 4. If DEQ decides to proceed with the proposal it will set up a public meeting and provide public notice by publication in a paper local to the waterbody and by such other means as deemed necessary, notifying the public of the intent to designate the waters and what that means, and

- providing public meeting information. A 30-day public notice period will follow.
5. After the public meeting and upon completion of the public notice period a review of public comments will be summarized and DEQ staff will present the proposal for NDZ and the summary of public comments to the State Water Control Board with a recommendation on pursuing the NDZ designation from EPA. Disapproval would mean that the individual or group wishing the designation would have to pursue it directly from EPA, obtaining the governor's signature without DEQ endorsement.
 6. If the State Water Control Board approves pursuing the designation, DEQ will assist the individual or group in preparing an application to EPA and will coordinate with the Virginia Department of Health, the Department of Game and Inland Fisheries and the Virginia Marine Resources Commission (62.1-44.33 requires consultation with these agencies in formulating boating regulations) as well as with EPA Region III.
 7. Once the application is prepared and the draft reviewed by EPA (EPA will indicate if it is sufficient for approval prior to formal submittal), DEQ will route the application through to the Executive Office for signature by the Secretary of Natural Resources and transmittal to EPA.
 8. EPA will publish the proposal in the federal register.
 9. Upon final publication in the federal register, the new NDZ will be established at the federal level.
 10. DEQ will amend 9 VAC 25-71 by adding the new NDZ to the list of state designated NDZs, and will present it to the State Water Control Board as final exempt (required to conform to federal law).
 11. Publication of the 9 VAC 25-71 amendment will be made in the Virginia Register and the final 30-day notice period will follow, after which the new NDZ is established at the state level.
 12. Public awareness and enforcement efforts can begin.

Appendix D

Code of Virginia §62.1-194.1 Obstructing or contaminating state waters.

§62.1-194.1. Obstructing or contaminating state waters .

Except as otherwise permitted by law, it shall be unlawful for any person to dump, place or put, or cause to be dumped, placed or put into, upon the banks of or into the channels of any state waters any object or substance, noxious or otherwise, which may reasonably be expected to endanger, obstruct, impede, contaminate or substantially impair the lawful use or enjoyment of such waters and their environs by others. Any person who violates any provision of this law shall be guilty of a misdemeanor and upon conviction be punished by a fine of not less than \$100 nor more than \$500 or by confinement in jail not more than twelve months or both such fine and imprisonment. Each day that any of said materials or substances so dumped, placed or put, or caused to be dumped, placed or put into, upon the banks of or into the channels of, said streams shall constitute a separate offense and be punished as such. In addition to the foregoing penalties for violation of this law, the judge of the circuit court of the county or corporation court of the city wherein any such violation occurs, whether there be a criminal conviction therefore or not shall, upon a bill in equity, filed by the attorney for the Commonwealth of such county or by any person whose property is damaged or whose property is threatened with damage from any such violation, award an injunction enjoining any violation of this law by any person found by the court in such suit to have violated this law or causing the same to be violated, when made a party defendant to such suit. (1968, c. 659.)

