Water Quality Analyses of Fecal Coliform for Eight Basins in Maryland: Assawoman Bay, Sinepuxent Bay, Newport Bay, and Chincoteague Bay in Worcester County; Monie Bay in Somerset County; Kent Island Bay in Queen Anne's County; Rock Creek in Anne Arundel County; and Langford Creek in Kent County

FINAL

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Table of Contents

List of Figures

List of Tables

List of Abbreviations

COMAR	Code of Maryland Regulations
CWA	Clean Water Act
EPA	Environmental Protection Agency
m	Meter
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MPN/100 ml	Most Probable Number per 100 milliliters
NSSP	National Shellfish Sanitation Program
TMDL	Total Maximum Daily Load
WQA	Water Quality Analysis
WQLS	Water Quality Limited Segment
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Section 303(d) of the federal Clean Water Act (CWA) and the U.S. Environmental Protection Agency's (EPA) implementing regulations direct each state to identify and list waters, known as water quality limited segments (WQLSs), in which current required controls of a specified substance are inadequate to achieve water quality standards. For each WQLS, the State is to either establish a Total Maximum Daily Load (TMDL) of the specified substance that the waterbody can receive without violating water quality standards, or demonstrate that water quality standards are being met.

The following eight-digit basins were identified on the State's 2002 list of WQLSs as impaired by fecal coliform, and not meeting current water quality standards:

1. Assawoman Bay (02-13-01-02)
2. Sinepuxent Bay (02-13-01-04)
3. Newport Bay (02-13-01-05)
4. Chincoteague Bay (02-13-01-06)
5. Monie Bay (02-13-03-02)
6. Kent Island Bay (02-13-05-11)
7. Rock Creek (Patapsco River) (02-13-09-03)
8. Langford Creek (02-13-05-06)

Using best available bacteria data collected by the Maryland Department of the Environment (MDE)'s Shellfish Program, Rock Creek currently meets Use I standards; Monie Bay and Langford Creek are conditionally approved shellfish waters which the State does not list. The remaining basins have never been closed to shellfish harvesting. This report provides analyses of recent monitoring data, which shows that the bacteriological water quality criterion for the designated use is being met at all of these sites. These analyses support the conclusion that TMDLs of fecal coliform are not necessary to achieve water quality standards in these basins. Barring the receipt of any contradictory data, this report will be used to document that the bacteriological criteria is met for the eight basins stated herein, and remove these watersheds from the 2004 impaired waters list.

Public notification of the State's intent to move these waters from Section 5.0 of the State's 2004 integrated list to Section 6.0 was conducted as part of the 45-day public comment period for Maryland's draft 2004 303(d) List of Impaired Waters. The comment period, which was advertised on the Maryland Department of the Environment (MDE)'s World Wide Web Page at http://www.mde.state.md.us, in the Maryland Register, and in the *Washington Post* and *Baltimore Sun*, ran from December 1, 2003 through January 14, 2004. Copies of the draft List of Impaired Waters were made available in local libraries and on MDE's World Wide Web Page. Additionally, three informational meetings were held during the comment period: one in the Central Region (Towson, MD); one in the Eastern Shore Region (Salisbury, MD); and one in the Western Region (Hagerstown, MD).

Identified stakeholders (including local government contacts, tributary team chairs, and interested parties) were formally notified of MDE's intent to develop fecal coliform Water Quality Analyses (WQAs) in June 2004. Following this initial contact, these stakeholders were again notified on July 30, 2004 when the document began Interagency Review. The document went through a public comment period from August 27, 2004 to September 25, 2004, during which the document was placed in the Worcester County Library, Somerset County Library, the Stevensonville branch of the Queen Anne's County Library, the Riviera Beach branch of the Anne Arundel County Library, and the Kent County Library, as well as posted on MDE's website. Notices were published in the Daily Times and Baltimore Sun. Following the public comment period, comments received will be reviewed and addressed in a Comment Response Document (CRD). Both this report and the CRD will be submitted to the EPA Region III, at which time stakeholders will again be notified. Once the document is approved by EPA Region III, the finalized document will be posted on MDE's website and stakeholders will be notified.

1.0 INTRODUCTION

Section 303(d) of the federal Clean Water Act (CWA) and U.S. Environmental Protection Agency (EPA)'s implementing regulations direct each State to identify and list waters, known as water quality limited segments (WQLSs), in which current required controls of a specified substance are inadequate to achieve water quality standards. This list of impaired waters is commonly referred to as the "303(d) list". For each WQLS, the State is to either establish a Total Maximum Daily Load (TMDL) of the specified substance that the waterbody can receive without violating water quality standards, or demonstrate that water quality standards are being met.

A segment identified as a WQLS may not require the development and implementation of a TMDL if current information contradicts the previous finding of an impairment. The most common factual scenarios obviating the need for a TMDL are as follows: 1) more recent data indicating that the impairment no longer exists (i.e., water quality criteria are being met); 2) more recent and updated water quality modeling demonstrates that the segment is now attaining criteria; 3) water quality criteria (or the interpretation of the water quality standards) have been refined, resulting in standards being met; or 4) errors made in the initial listing have been corrected. Scenario one (more recent data indicate impairment no longer exists) or scenario four (correction to errors made in the initial listing) applies to the fecal coliform listing for the eight basins identified in this report:

1. Assawoman Bay (02-13-01-02)
2. Sinepuxent Bay (02-13-01-04)
3. Newport Bay (02-13-01-05)
4. Chincoteague Bay (02-13-01-06)
5. Monie Bay (02-13-03-02)
6. Kent Island Bay (02-13-05-11)
7. Rock Creek (Patapsco River) (02-13-09-03)
8. Langford Creek (02-13-05-06)

Water quality for shellfish waters is determined by an on-going program of bacteriological monitoring using indicators of fecal pollution. All shellfish waters are re-evaluated annually, and the evaluation must include a pollution source survey of the shoreline and other areas adjacent to the shellfish growing waters. This inventory of potential shoreline pollution sources id designed to reveal that the area is not subject to direct contamination with small amounts of fresh sewage which would not ordinarily be revealed by bacteriological examination. The pollution source survey, followed by routine microbiological testing at times of adverse pollution conditions represent the primary evaluation measures. The results of these surveys are then combined with hydrographic studies to detail how the pollution sources affect the water quality at the specific harvesting site. Non-shellfish waters upstream of shellfish waters are not included in the evaluation unless there is a reason to believe that actual or potential pollution sources upstream would impact shellfish waters. For additional information regarding fecal coliform in shellfish waters, please see Section 3.4.1 (Water Body Type Designations) of the State's draft *2004 List of Impaired Surface Waters [303(d) List] and Integrated Assessment of Water Quality in Maryland,* available at

http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/Maryland%20303%20dlist/index.asp.

2.0 ASSAWOMAN BAY (BASIN NUMBER 02-13-01-02)

2.1 General Setting

Assawoman Bay is located in the Coastal Region of Maryland in Worcester County (Figure 2.1), and is one of the "Northern Coastal Bays" protected from the Atlantic Ocean by Fenwick Island. The majority of the freshwater input to the system comes from the St. Martin River. Most of the Northern Coastal Bays watershed is on the mainland of the Delmarva Peninsula, with the remaining area associated with Fenwick Island. The watershed is characterized by low topographic relief, high groundwater tables, poor surface drainage, and sandy soils.

Assawoman Bay is a tidal lagoon 4 miles long and 2 miles wide. The bay has a drainage area of 17,332 acres, with the northernmost one-third of the watershed (4,530 acres) located within Delaware. Assawoman Bay opens on the Atlantic Ocean through Ocean City Inlet.

Land use distribution in the Maryland portion of the watershed is estimated from Maryland Department of Planning (MDP) 2002 land use information. Forest and other herbaceous is the predominant land use in the watershed; however, water and wetlands account for the greatest percentage of the area. The land uses in the Maryland portion of the watershed are provided in Table 2.1.

Table 2.1: Maryland Land Use Distribution for Assawoman Bay Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	1,713	13.4
Mixed Agriculture	1,607	12.6
Water and Wetlands	5,867	46.0
Urban	1,930	15.1
Other	1,685	12.9
Total	12,802	100

Assawoman Bay is part of the Sinepuxent Bay shellfish harvesting area (which also consists of the St. Martin River, Isle of Wight Bay, and the Sinepuxent Bay). Assawoman Bay is bordered by Ocean City on the eastern shore. Ocean City is a large resort community whose population increases significantly during the summer vacation season. Ocean City is served by the Ocean City Wastewater Treatment Plant (WWTP) which discharges to the Atlantic Ocean.

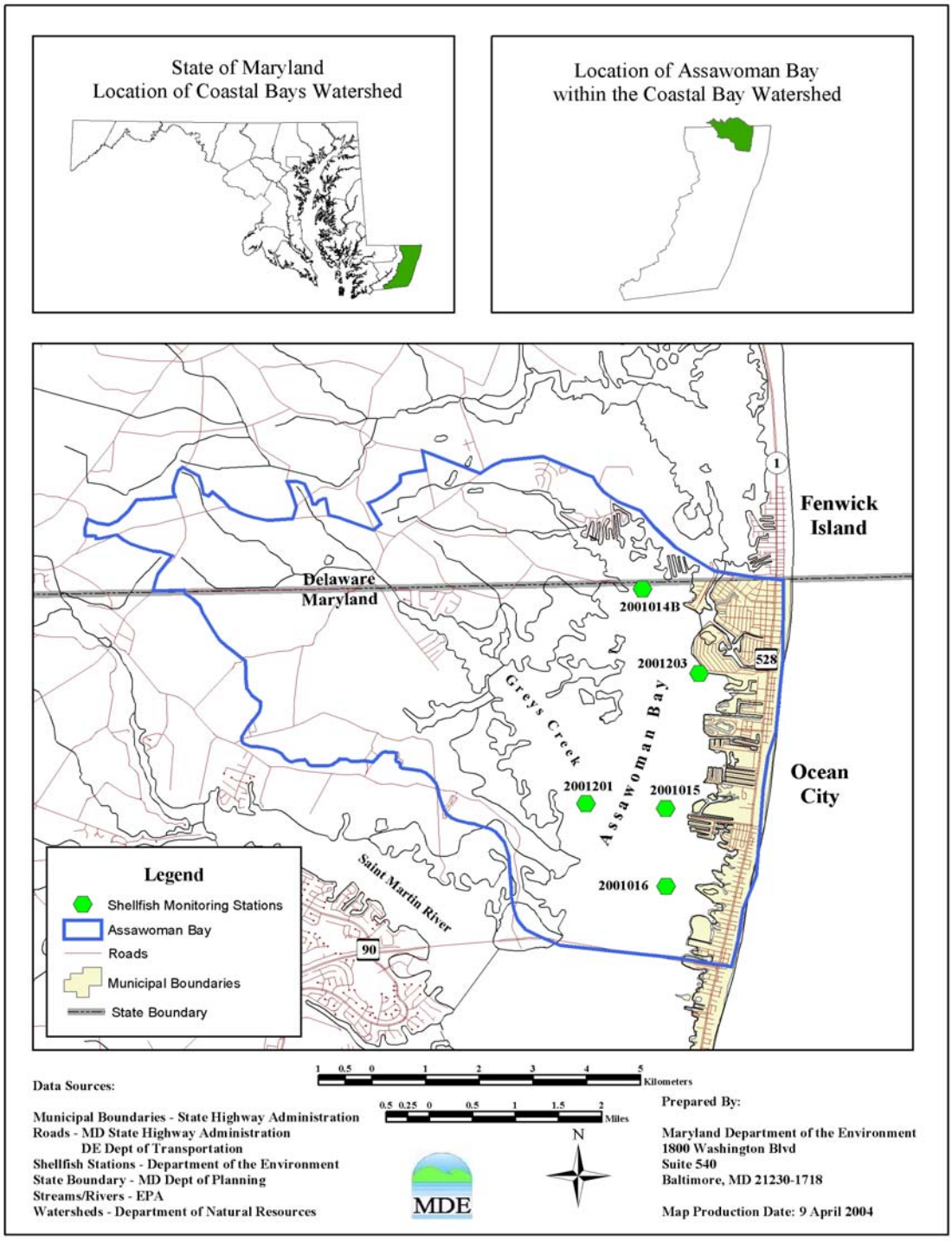

Figure 2.1: Assawoman Bay Watershed Map and Monitoring Stations for the Shellfish Program

2.2 Water Quality Characterization

Maryland Department of the Environment (MDE)'s Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the National Shellfish Sanitation Program (NSSP), with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown in Figure 2.1, there are five shellfish monitoring stations in Assawoman Bay. Observations recorded at each of these stations are provided in Appendix A.

2.3 Water Quality Impairment

Assawoman Bay was first identified on the 1996 303(d) list submitted to EPA by the MDE as impaired by dissolved oxygen, nutrients and fecal coliform bacteria. With the approval of EPA, the Department removed dissolved oxygen impairments from the 2002 303(d) list, because dissolved oxygen is not considered an impairing substance, and then used them as supporting data for previous nutrient 303(d) listings. The nutrient impairment will be addressed at a future date.

The Maryland water quality standards Surface Water Use Designation for Assawoman Bay is Use II - *Shellfish Harvesting Waters* (Code of Maryland Regulations (COMAR) 26.08.02.08B). Assawoman Bay was included on the 2002 Integrated 303(d) List as impaired by fecal coliform and closed to shellfish harvesting. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

The water quality impairment was assessed based on the median and 90th percentile concentrations of the samples collected at the five shellfish monitoring stations within Assawoman Bay. Descriptive statistics of the monitoring data and the water quality criterion are shown in Table 2.2.

Table 2.2: Assawoman Bay Shellfish Monitoring Stations - Median and 90th Percentile Values for Sample Averages

Station	Number of Samples	Median		90th Percentile	
		Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
2001014B	52	9.1	14	48.7	49
2001015	52	3.6	14	15.9	49
2001016	52	1.0	14	12.1	49
2001201	52	3.6	14	27.3	49
2001203	52	3.6	14	36.6	49

Results from the current analysis indicate that Assawoman Bay is currently meeting bacteria water quality criteria associated with its designated use.

2.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 2.2 and recent sanitary survey records, it is determined that the Assawoman Bay watershed does not indicate an impairment for the specified designated use. Therefore, the 303(d) bacteria listing should be moved to Category Six of the integrated 303(d) list as "surface waters that have been de-listed or removed from the 2004 list of impaired surface waters". This recommendation is based on updated information from the monitoring stations, and there is no indication that an impairment existed or that these waters were closed to shellfish harvesting when the original listing occurred in 1996.

3.0 SINEPUXENT BAY (BASIN NUMBER 02-13-01-04)

3.1 General Setting

Sinepuxent Bay is located in the Coastal Region of Maryland in Worcester County (Figure 3.1), and is one of the "Southern Coastal Bays" protected from the Atlantic Ocean by Assateague Island. Most of the Southern Coastal Bays watershed is on the mainland of the Delmarva Peninsula, with the remaining area associated with Assateague Island. The watershed is characterized by low topographic relief, high groundwater tables, poor surface drainage, and sandy soils.

Sinepuxent Bay is a narrow 12 mile (19 km)-long lagoon with a drainage area of 13,710 acres. Sinepuxent Bay drains to Chincoteague Bay to the south and opens on the Atlantic Ocean to the north via the Ocean City Inlet.

Land use distribution in the watershed is estimated from MDP 2002 land use information. Forest and other herbaceous is the predominant land use in the watershed; however, water and wetlands account for the greatest percentage of the area. Land use along the western shore of Sinepuxent Bay is predominantly agricultural cropland. There are also several residential developments

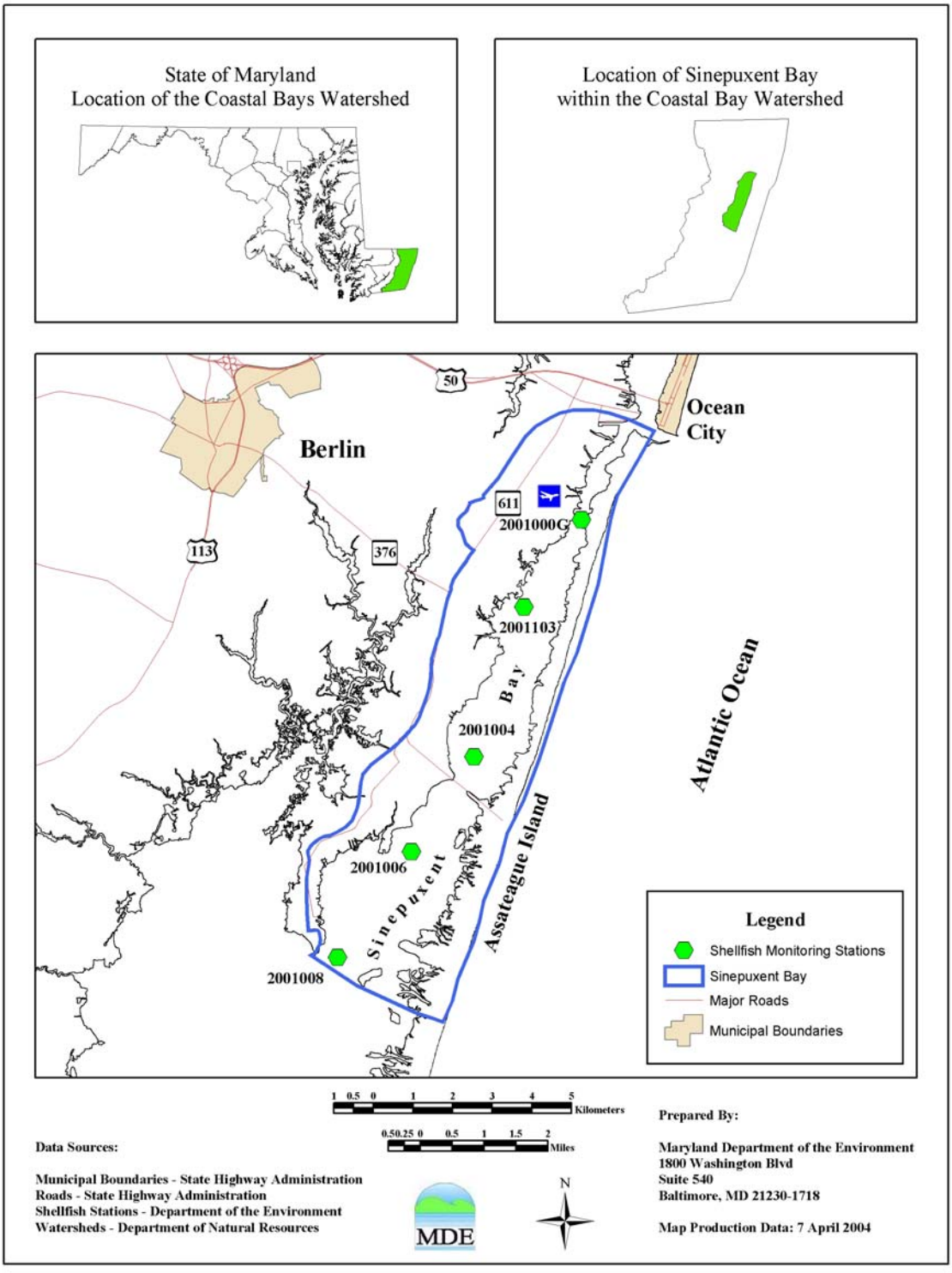

Figure 3.1: Sinepuxent Bay Watershed Map and Monitoring Stations for the Shellfish Program

where most of the stately homes are on large parcels of land. The land uses in the watershed are provided in Table 3.1.

Table 3.1: Land Use Distribution for Sinepuxent Bay Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	2,331	17.0
Mixed Agriculture	850	6.2
Water and Wetlands	7,962	58.1
Urban	1,660	12.1
Other	907	6.6
Total	13,710	100

The Sinepuxent Bay shellfish harvesting area consists of the St. Martins River, Assawoman Bay, Isle of Wight Bay, and the Sinepuxent Bay. According to the National Park Service both commercial and recreational harvesting occurs in Sinepuxent Bay behind Assateague Island.

Sinepuxent Bay is bordered by Assateague Island National Seashore. The National Seashore is an uninhabited barrier island. During the summer the island is host to many visitors who come for bathing beaches and camping. Campers and day visitors are provided with well maintained sanitary facilities including showers and toilets. These facilities are tied into the Assateague Island National Seashore WWTP which discharges to a restricted area in Sinepuxent Bay. Little human activity occurs below the northern section of the island where camping is permitted.

3.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown above in Figure 3.1, there are five shellfish monitoring stations in Sinepuxent Bay. Observations recorded at each of these stations are provided in Appendix A.

3.3 Water Quality Impairment

Sinepuxent Bay was first identified on the 1996 303(d) list submitted to EPA by the Maryland Department of the Environment (MDE) as impaired by dissolved oxygen, nutrients and fecal coliform bacteria. With the approval of EPA, the Department removed dissolved oxygen

impairments from the 2002 303(d) list, because dissolved oxygen is not considered an impairing substance, and then used them as supporting data for previous nutrient 303(d) listings. The nutrient impairment will be addressed at a future date.

The Maryland water quality standards Surface Water Use Designation for Sinepuxent Bay is Use II - *Shellfish Harvesting Waters* (COMAR 26.08.02.08B). Sinepuxent Bay was included on the 2002 Integrated 303(d) List as impaired by fecal coliform and closed to shellfish harvesting. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

The water quality impairment was assessed based on the median and 90th percentile concentrations of the samples collected at the five shellfish monitoring stations within Sinepuxent Bay. Descriptive statistics of the monitoring data and the water quality criteria are shown in Table 3.2.

Table 3.2: Sinepuxent Bay Shellfish Monitoring Stations - Median and 90th Percentile Values for Sample Averages

Station	Number of Samples	Median		90th Percentile	
		Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
2001000G	30	1.0	14	9.1	49
2001004	30	1.0	14	8.0	49
2001006	30	1.0	14	15.4	49
2001008	30	1.0	14	6.7	49
2001103	30	3.6	14	19.3	49

Results from the current analysis indicate that Sinepuxent Bay is currently meeting bacteria water quality criteria associated with its designated use.

3.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 3.2 and recent sanitary survey records, it is determined that the Sinepuxent Bay watershed does not indicate an impairment for the specified designated use. Therefore, the 303(d) bacteria listing should be moved to Category Six of the integrated 303(d) list as "surface waters that have been de-listed or removed from the 2004 list of impaired surface waters". This recommendation is based on updated information from the monitoring stations, and there is no indication that an

impairment existed or that these waters were closed to shellfish harvesting when the original listing occurred in 1996.

4.0 NEWPORT BAY (BASIN NUMBER 02-13-01-05)

4.1 General Setting

Newport Bay is a shallow coastal lagoon located west of Sinepuxent Bay on the Atlantic Coast of Worcester County, Maryland (Figure 4.1). The majority of the freshwater input to the system comes from the upper part of the basin ultimately draining to Chincoteague Bay. Most of the Newport Bay watershed is on the mainland of the Delmarva Peninsula and a small barrier island makes up the remainder. The watershed is characterized by low topographic relief, high groundwater tables, poor surface drainage and sandy soils.

Newport Bay has a drainage area of 32,492 acres (131.5 km^2). Land use distribution in the Newport Bay watershed is estimated from MDP 1997 land use information. Forest and other herbaceous is the predominant land use category in the watershed. The land uses in the watershed are provided in Table 4.1.

Table 4.1: Maryland Land Use Distribution for Newport Bay Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	13,554	42
Mixed Agriculture	10,672	33
Water and Wetlands	5,279	16
Urban	2,987	9
Total	32,492	100

Newport Bay is part of the Chincoteague Bay shellfish harvesting area, consisting of all the tidal waters of Chincoteague Bay, north of the Maryland/Virginia line in Worcester County. It includes the tidal estuaries of Newport Bay, Brockatonorton Bay, Johnson Bay, Parker Bay, Purnell Bay, Green Run Bay and Hope Bay.

Land use is primarily agricultural cropland and woodland along the upper and middle shore. Crops consist of mostly corn and beans. However, there are many poultry operations for commercial production throughout the entire watershed. Waste from the chicken breeding operations is spread on nearby fields and tilled over.

The lower western shore has extensive marshlands. It contains the Ernest A. Vaughn Wildlife Management Area. The entire eastern shore of Chincoteague Bay consists of the Assateague Island National Seashore, which is an uninhabited barrier island. Berlin is the largest town located within the drainage area; however, its wastewater treatment plant discharge has no significant impact on the shellfish waters. Small communities are scattered throughout the

drainage area, including Stockton, Girdletree, Boxiron, Spence, Cedartown, and Newark which has a small sewage treatment plant discharging to non-shellfish waters.

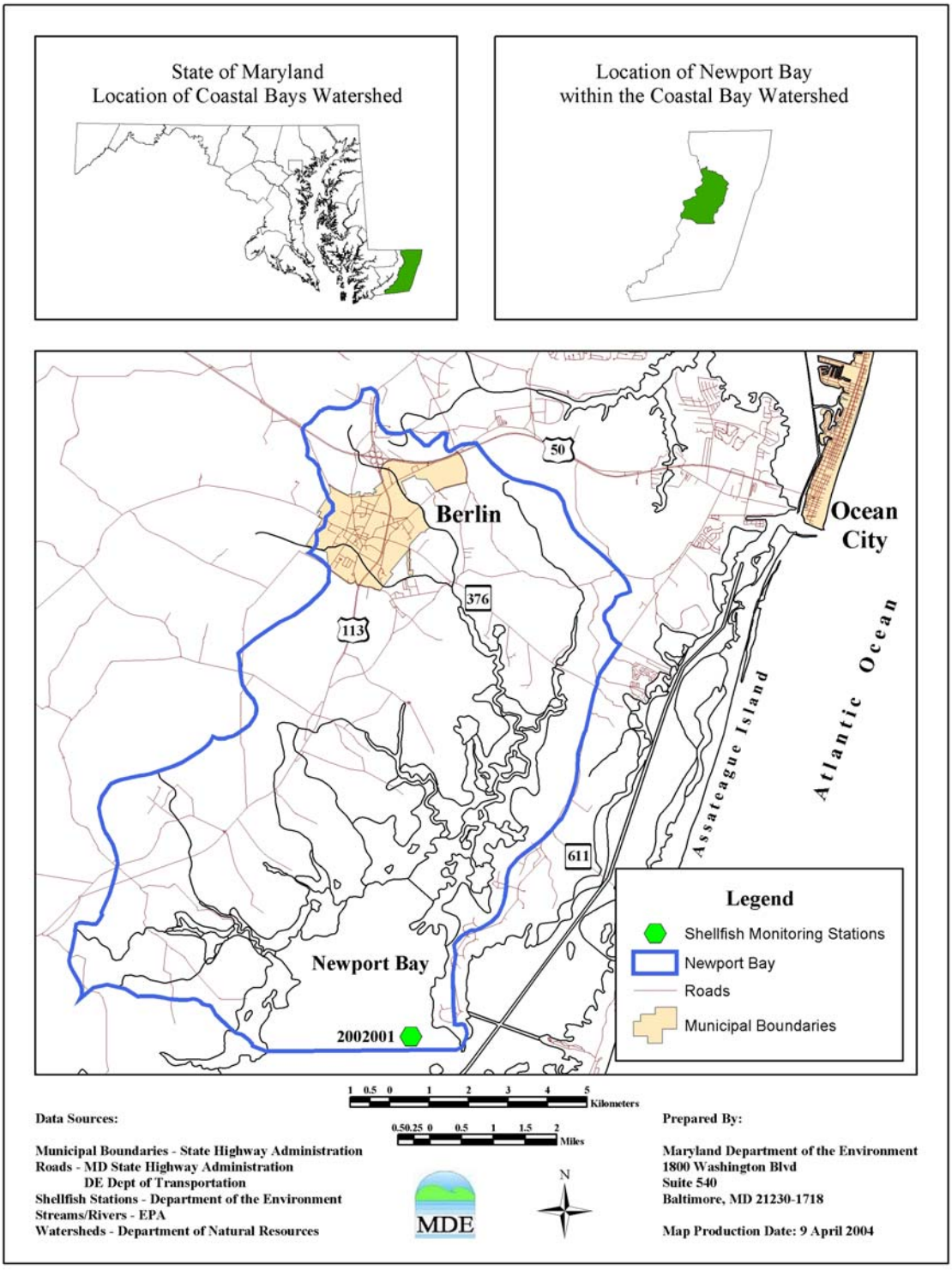

Figure 4.1: Newport Bay Watershed Map and Monitoring Station for the Shellfish Program

4.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown in Figure 4.1, there is one shellfish monitoring station in Newport Bay. Observations recorded at this station are provided in Appendix A.

4.3 Water Quality Impairment

Newport Bay was first identified on the 1996 303(d) list submitted to EPA by the MDE as impaired by dissolved oxygen, nutrients and fecal coliform bacteria. With the approval of EPA, the Department removed dissolved oxygen impairments from the 2002 303(d) list, because dissolved oxygen is not considered an impairing substance, and then used them as supporting data for previous nutrient 303(d) listings. The nutrient impairment was addressed in the document entitled "Total Maximum Daily Loads of Nitrogen for Three Tidal Tributaries and Total Maximum Daily Load of Biochemical Oxygen Demand for One Tributary in the Newport Bay System, Worcester County, Maryland" approved by EPA in October 2003.

The Maryland water quality standards Surface Water Use Designation for Newport Bay is Use II - *Shellfish Harvesting Waters* (COMAR 26.08.02.08B). Newport Bay was included on the 2002 Integrated 303(d) List as impaired by fecal coliform and closed to shellfish harvesting. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

The water quality impairment was assessed based on the median and 90th percentile concentrations of the samples collected at the shellfish monitoring station within Newport Bay. Descriptive statistics of the monitoring data and the water quality criteria are shown in Table 4.2.

Table 4.2: Newport Bay Shellfish Monitoring Stations - Median and 90th Percentile Values for 30 Sample Average

Station	Number of Samples	Median		90th Percentile	
		Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
2002001	30	1.0	14	7.2	49

Results from the current analysis indicate that Newport Bay is currently meeting bacteria water quality criteria associated with its designated use.

4.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 4.2 and recent sanitary survey records, it is determined that the Newport Bay watershed does not indicate an impairment for the specified designated use. Therefore, the 303(d) bacteria listing should be moved to Category Six of the integrated 303(d) list as "surface waters that have been de-listed or removed from the 2004 list of impaired surface waters". This recommendation is based on updated information from the monitoring stations, and there is no indication that an impairment existed or that these waters were closed to shellfish harvesting when the original listing occurred in 1996.

5.0 CHINCOTEAGUE BAY (BASIN NUMBER 02-13-01-06)

5.1 General Setting

Chincoteague Bay is located in the Coastal Region of Maryland in Worcester County (Figure 5.1), and is one of the "Southern Coastal Bays" protected from the Atlantic Ocean by Assateague Island. Most of the Southern Coastal Bays watershed is on the mainland of the Delmarva Peninsula, with the remaining area associated with Assateague Island. The watershed is characterized by low topographic relief, high groundwater tables, poor surface drainage, and sandy soils.

Chincoteague Bay is 23 miles (37 km) long and drains to the Atlantic Ocean via the Chincoteague Inlet. The drainage area is 164,841 acres, with approximately one half of the acreage (75,543 acres) within Virginia. Land use distribution in the watershed is estimated from MDP 2002 land use information. Forest and other herbaceous is the predominant land use; however, water and wetlands account for the greatest percentage of the area. The land uses in the Maryland portion of the watershed are provided in Table 5.1.

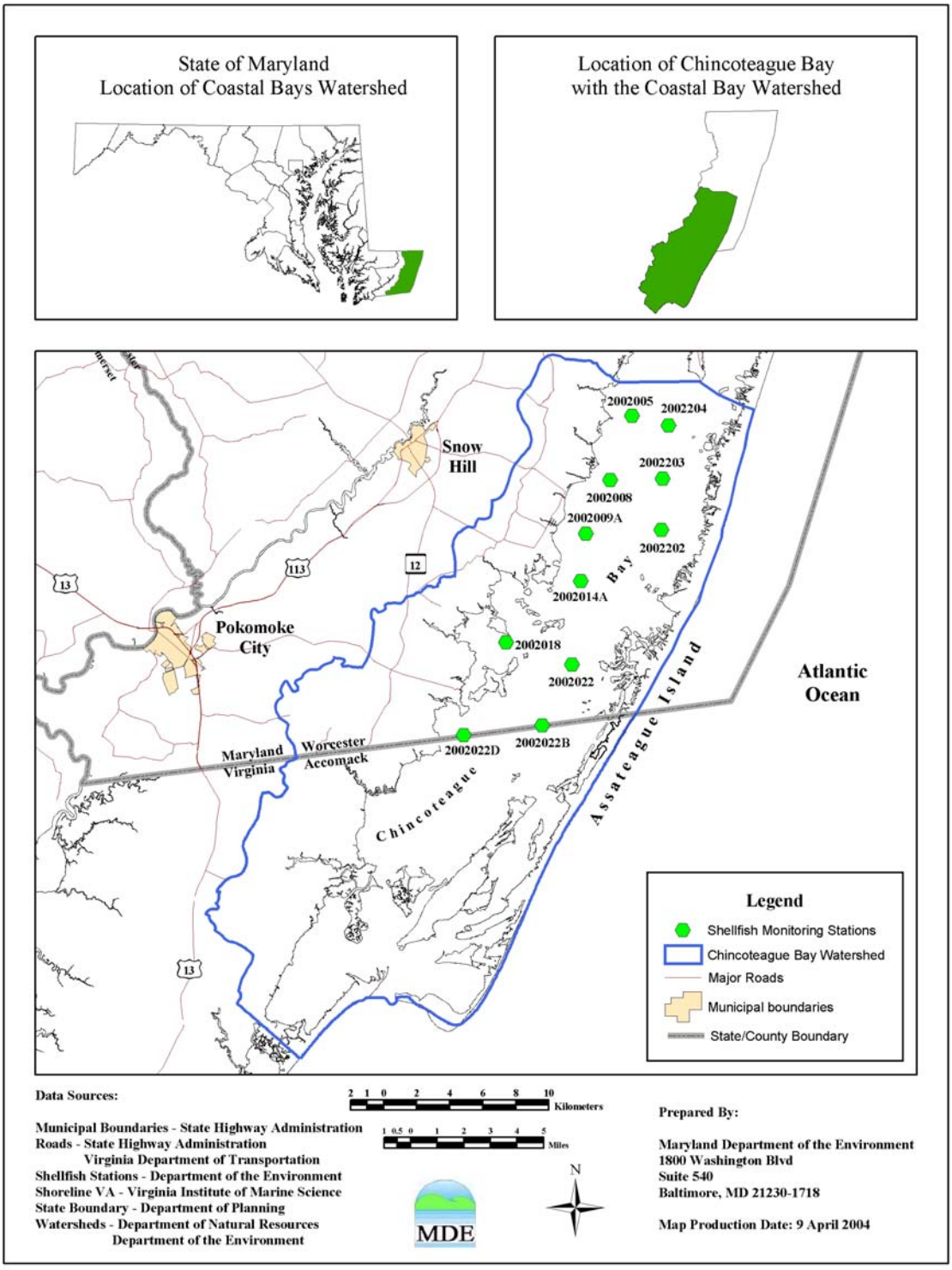

Figure 5.1: Chincoteague Bay Watershed Map and Monitoring Stations for the Shellfish Program

Table 5.1: Maryland Land Use Distribution for Chincoteague Bay Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	17,126	19.2
Mixed Agriculture	14,178	15.9
Water and Wetlands	56,389	63.1
Urban	678	0.8
Other	927	1.0
Total	89,298	100

The Chincoteague Bay shellfish harvesting area consists of all the tidal waters of Chincoteague Bay, north of the Maryland/Virginia line in Worcester County. It includes the tidal estuaries of Newport Bay, Brockatonorton Bay, Johnson Bay, Parker Bay, Purnell Bay, Green Run Bay and Hope Bay.

Land use is primarily agricultural cropland and woodland along the upper and middle shore. Crops consist of mostly corn and beans. However, there are many poultry operations for commercial production throughout the entire watershed. Waste from the chicken breeding operations is spread on nearby fields and tilled over.

The lower western shore has extensive marshlands. It contains the Ernest A. Vaughn Wildlife Management Area. The entire eastern shore of Chincoteague Bay consists of the Assateague Island National Seashore, which is an uninhabited barrier island. There are no major towns located within the drainage area. Small communities are scattered throughout the drainage area, including Stockton, Girdletree, Boxiron, Spence, Cedartown, and Newark which has a small sewage treatment plant discharging to non-shellfish waters.

5.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown above in Figure 5.1, there are eleven shellfish monitoring stations in Chincoteague Bay. Observations recorded at each of these stations are provided in Appendix A.

5.3 Water Quality Impairment

Chincoteague Bay was first identified on the 1996 303(d) list submitted to EPA by the MDE as impaired by dissolved oxygen, nutrients and fecal coliform bacteria. With the approval of EPA, the Department removed dissolved oxygen impairments from the 2002 303(d) list, because dissolved oxygen is not considered an impairing substance, and then used them as supporting data for previous nutrient 303(d) listings. The nutrient impairment will be addressed at a future date.

The Maryland water quality standards Surface Water Use Designation for Chincoteague Bay is Use II - *Shellfish Harvesting Waters* (COMAR 26.08.02.08B). Chincoteague Bay was included on the 2002 Integrated 303(d) List as impaired by fecal coliform and closed to shellfish harvesting. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

The water quality impairment was assessed based on the median and 90th percentile concentrations of the samples collected at the eleven shellfish monitoring stations within Chincoteague Bay. Descriptive statistics of the monitoring data and the water quality criteria are shown in Table 5.2.

Table 5.2: Chincoteague Bay Shellfish Monitoring Stations - Median and 90th Percentile Values for Sample Averages

Station	Number of Samples	Median		90th Percentile	
		Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
2002008	30	3.3	14	40.2	49
2002009A	30	1.0	14	3.7	49
2002014A	30	1.0	14	12.4	49
2002018	30	1.0	14	6.5	49
2002022	30	1.0	14	4.4	49
2002022B	30	1.0	14	1.4	49
2002022D	30	1.0	14	1.4	49
2002202	30	1.0	14	5.8	49
2002203	30	1.0	14	9.3	49
2002005	30	3.0	14	13.0	49
2002204	30	1.0	14	5.0	49

Results from the current analysis indicate that Chincoteague Bay is currently meeting bacteria water quality criteria associated with its designated use.

5.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 5.2 and recent sanitary survey records, it is determined that the Chincoteague Bay watershed does not indicate an impairment for the specified designated use. Therefore, the 303(d) bacteria listing should be moved to Category Six of the integrated 303(d) list as "surface waters that have been de-listed or removed from the 2004 list of impaired surface waters". This recommendation is based on updated information from the monitoring stations, and there is no indication that an impairment existed or that these waters were closed to shellfish harvesting when the original listing occurred in 1996.

6.0 MONIE BAY (BASIN NUMBER 02-13-03-02)

6.1 Location and Description

Monie Bay is located on the lower eastern shore of Maryland and lies entirely in Somerset County (Figure 6.1). Shellfish waters in Monie Bay extend from Wingate Point (near the mouth of the Wicomico River) to just beyond Hall Point where Monie Bay meets Tangier Sound. The entire shoreline is comprised of tidal marsh. Monie Creek and Little Monie Creek are the only tributaries of Monie Bay.

The Monie Bay basin is 29,580 acres. Land use distribution in the watershed is estimated from MDP 2002 land use information. Forest and other herbaceous is the predominant land use category in the watershed; however, water and wetlands account for the greatest percentage of the area. The land uses in the watershed are provided in Table 6.1.

Table 6.1: Land Use Distribution for Monie Bay Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	9,161	30.9
Mixed Agriculture	4,418	14.9
Water and Wetlands	14,830	50.1
Urban	808	2.7
Other	363	1.2
Total	29,580	100

Development in the area adjacent to shellfish waters can be described as rural residential. Several small villages are also located inland, having little impact to shellfish waters. Residences within the drainage basin and adjacent to shellfish waters utilize individual septic systems for on site sewage treatment.

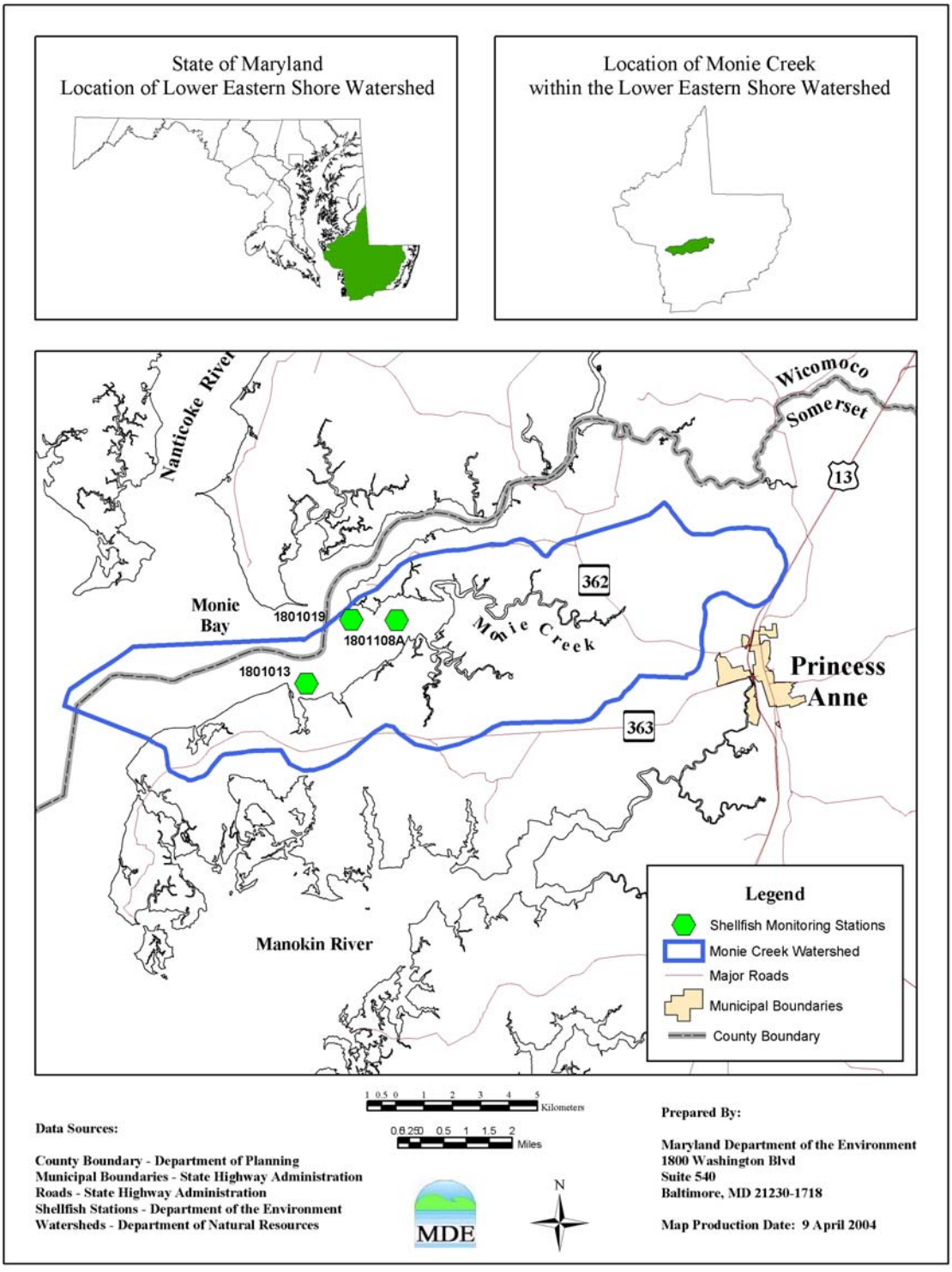

Figure 6.1: Monie Bay Watershed Map and Monitoring Stations for the Shellfish Program

6.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown in Figure 6.1, there are three shellfish monitoring stations in Monie Bay. Observations recorded at each of these stations are provided in Appendix A.

6.3 Water Quality Impairment

The Maryland water quality standards Surface Water Use Designation for Monie Bay is Use II - *Shellfish Harvesting Waters* (COMAR 26.08.02.08D). Monie Bay was first identified on the 1998 303(d) list submitted to EPA by the MDE as impaired by fecal coliform bacteria. The Maryland water quality standards Surface Water Use Designation for Monie Bay is Use II - *Shellfish Harvesting Waters*. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

Monie Bay is classified as conditionally approved. Areas classified as conditionally approved are closed to harvesting for three days following a rainfall event of one inch or more in 24 hours. On average, Monie Bay is closed to harvesting about fifteen times per year. For conditionally approved waters, Maryland uses the "no more than 10 percent of at least 15 samples exceed 49 MPN per 100 ml" criteria.

The water quality impairment was assessed based on the median and percent greater than 49 concentrations at the three shellfish monitoring stations within Monie Bay. Descriptive statistics of the monitoring data and the water quality criterion are shown in Table 6.2.

Table 6.2: Monie Bay Shellfish Monitoring Stations - Median and Percent >49 Values for Sample Averages

Station	Number of Samples	Median		Percent >49	
		Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
1801013	16	1.0	14	0.0	49
1801019	16	5.5	14	0.0	49
1801108A	16	9.1	14	6.3	49

MDE's current listing methodology does not require conditionally approved shellfish waters to appear on the State's list of impaired waters. Upon its review of the Monie Bay analysis, EPA determined that "the monitoring data presented are not sufficient to demonstrate that the designated use is being fully supported, because the minimum sample requirement as stated in COMAR 26.08.02.03-3C was not met" (EPA, May 9, 2005 decision rationale letter).

6.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 6.2 and recent sanitary survey records, EPA has determined that additional data is needed to satisfy the minimum sample requirement. Therefore, the 303(d) bacteria listing should be moved to Category Three of the integrated 303(d) list as "waters with insufficient information to determine if water quality standards are attained".

7.0 KENT ISLAND BAY (BASIN NUMBER 02-13-05-11)

7.1 General Setting

The Kent Island Bay watershed is located along the western shore of Kent Island in Queen Anne's County, Maryland within the Upper Eastern Shore tributary basin (Figure 7.1). The Kent Island Bay shellfish harvesting waters are comprised of waters adjacent to the Chesapeake Bay shoreline along the Kent Island coast from Love Point south to Kent Point.

The Kent Island Bay watershed is 5,755 acres. Land use distribution in the watershed is estimated from MDP 2002 land use information. The predominant land use category in the watershed is urban. The land uses in the watershed are provided in Table 7.1.

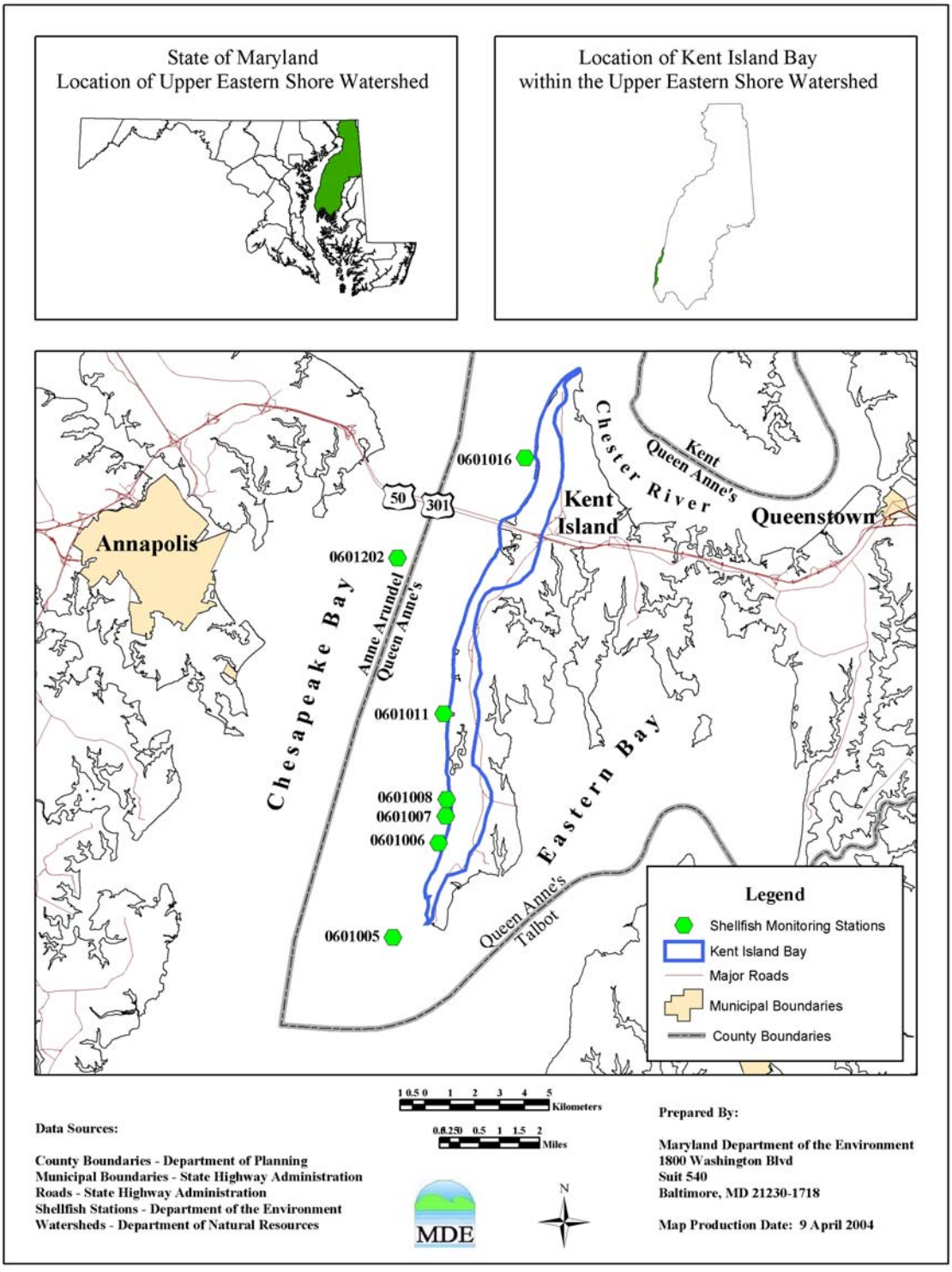

Figure 7.1: Kent Island Bay Watershed Map and Monitoring Stations for the Shellfish Program

Table 7.1: Land Use Distribution for the Kent Island Bay Basin

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	969	16.8
Mixed Agriculture	1,510	26.2
Water and Wetlands	886	15.4
Urban	2,318	40.3
Other	72	1.3
Total	5,755	100

7.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown in Figure 7.1, there are seven shellfish monitoring stations in Kent Island Bay. Observations recorded at each of these stations are provided in Appendix A.

7.3 Water Quality Impairment

Kent Island Bay was first identified on the 1996 303(d) list submitted to EPA by the Maryland Department of the Environment (MDE) as impaired by nutrients, sediments and fecal coliform bacteria. The nutrient and sediment impairments will be addressed at a future date.

The Maryland water quality standards Surface Water Use Designation for Kent Island Bay is Use II - *Shellfish Harvesting Waters* (Code of Maryland Regulations (COMAR) 26.08.02.08F). Kent Island Bay was included on the 2002 Integrated 303(d) List as impaired by fecal coliform and closed to shellfish harvesting. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

The water quality impairment was assessed based on the median and 90th percentile concentrations of the samples collected at the seven shellfish monitoring stations within Kent Island Bay. Descriptive statistics of the monitoring data and the water quality criterion are shown in Table 7.2.

Table 7.2: Kent Island Bay Shellfish Monitoring Stations - Median and 90th Percentile Values for Sample Averages

Station	Number of Samples	Median		90th Percentile	
		Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
0601005	30	1.0	14	2.1	49
0601006	30	1.0	14	10.1	49
0601007	30	1.0	14	4.4	49
0601008	30	1.0	14	4.5	49
0601011	30	1.0	14	9.1	49
0601016	30	1.0	14	4.3	49
0601202	30	1.0	14	4.2	49

Results from the current analysis indicate that Kent Island Bay is currently meeting bacteria water quality criteria associated with its designated use.

7.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 7.2 and recent sanitary survey records, it is determined that the Kent Island Bay watershed does not indicate an impairment for the specified designated use. Therefore, the 303(d) bacteria listing should be moved to Category Six of the integrated 303(d) list as "surface waters that have been de-listed or removed from the 2004 list of impaired surface waters". This recommendation is based on updated information from the monitoring stations, and there is no indication that an impairment existed or that these waters were closed to shellfish harvesting when the original listing occurred in 1996.

8.0 ROCK CREEK (BASIN NUMBER 02-13-09-03)

8.1 General Setting

Rock Creek is a tributary of the Patapsco River and comprises a portion of the Baltimore Harbor basin located within Anne Arundel County, Maryland (Figure 8.1). Baltimore Harbor is a tidal estuary located on the western shore of the Chesapeake Bay in the Patapsco/Back River

watershed. The Patapsco/Back River watershed straddles both the Piedmont Plateau and Coastal Plain Province geological formations.

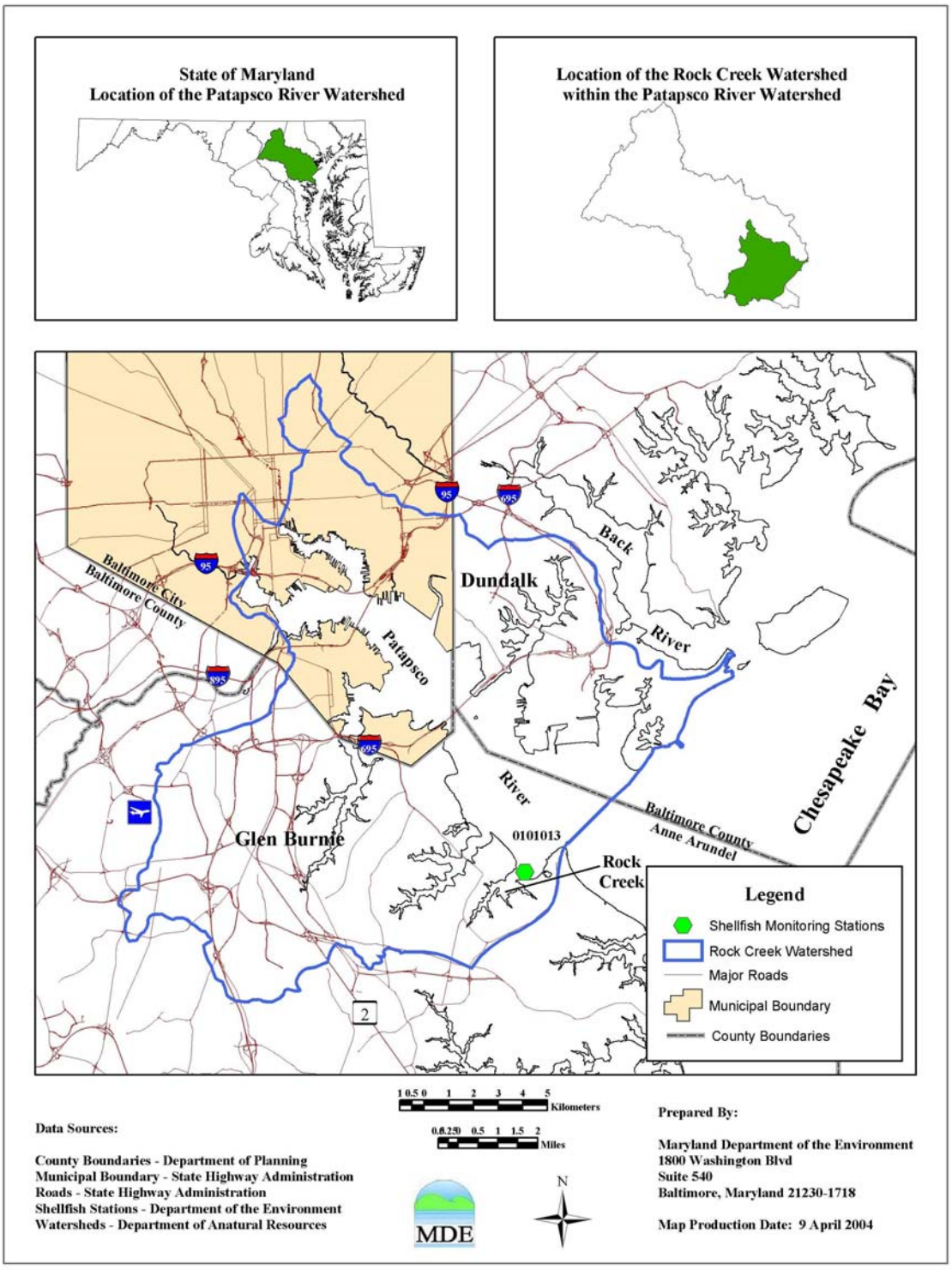

Figure 8.1: Rock Creek Watershed Map and Monitoring Stations for the Shellfish Program

The Rock Creek watershed is 74,899 acres. Land use distribution in the watershed is estimated from MDP 2002 land use information. The predominant land use category in the watershed is urban. The land uses in the watershed are provided in Table 8.1

Table 8.1: Land Use Distribution for the Rock Creek Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	10,097	13.5
Mixed Agriculture	1,110	1.5
Water and Wetlands	20,018	26.7
Urban	42,982	57.4
Other	692	0.9
Total	74,899	100

8.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. The Patapsco River, including Rock Creek, is routinely monitored as part of the MDE's Shellfish Monitoring Program, due to the potential impact to shellfish waters at the mouth of the Patapsco River.

As shown in Figure 8.1, there is one shellfish monitoring station in Rock Creek. Observations recorded at this station are provided in Appendix A.

8.3 Water Quality Impairment

Rock Creek was first identified on the 1998 303(d) list submitted to EPA by the MDE as impaired by fecal coliform bacteria. In 1998, only bathing beaches achieved the frequency of monitoring necessary to assess if segments met Maryland's bacteria standard for Use I waters.

The Maryland water quality standards Surface Water Use Designation for Rock Creek is Use I – *Water Contact Recreation and Protection of Aquatic Life* (COMAR 26.08.02.08J). According to COMAR 26.08.02.03-3A, a waterbody classified as a Use I water where **"there may not be any source of pathogenic or harmful organisms in sufficient quantities to constitute a public health hazard."** This section of COMAR further states that **"A public health hazard will be presumed: a) if the fecal coliform density exceeds a log mean of 200 per 100 milliliters, based on a minimum of not less than five samples taken over any 30-day period; b) if 10**

percent of the total number of samples taken during any 30-day period exceed 400 per 100 milliliters; or c) except when a sanitary survey approved by the Department of the Environment discloses no significant health hazard, provisions a) and b) do not apply." However, based on interpretation of current guidance from EPA, the long-term geometric mean is now applied for assessment of the attainment of criteria (USEPA, 2002). The bacteria listing methodology was adjusted to accommodate this modification under section 8.4.4 INTERPRETATION OF FECAL COLIFORM DATA FOR USE I, II OR IV WATERS (see Appendix C – DRAFT 2004 303(d) List)) by deleting "five-point moving average" from the text and adding "long-term geometric mean". In the 2002 303(d) List states "Data generated by water monitoring programs will be used to plot a five-point moving average geometric mean of fecal coliform levels". In the DRAFT 2004 303(d) List it now states "Data generated by water monitoring programs will be used **to plot a long-term geometric mean** of fecal coliform levels using a minimum of one year and a maximum of five years worth of data".

The water quality impairment was assessed based on the long-term geometric mean of themost recent five years worth of data and 90th percentile concentrations of the samples collected at the shellfish monitoring station within Rock Creek. Descriptive statistics of the monitoring data and the water quality criterion are shown in Table 8.2.

Table 8.2: Rock Creek Shellfish Monitoring Station - Long-Term Geometric Mean for Sample Averages

Station	Number of Samples	Long-Term Geometric Mean	
		Monitoring Data	Criterion
		MPN/100ml	MPN/100ml
0101013	45	8.1	200

Results from the current analysis indicate that the shellfish monitoring station in Rock Creek is currently meeting bacteria water quality standards associated with its designated use.

8.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 8.2 and recent sanitary survey records, it is determined that the Rock Creek watershed available data does not indicate an impairment for the specified designated use. Therefore, the 303(d) bacteria listing should be moved to Category Six of the integrated 303(d) list as "surface waters that have been de-listed or removed from the 2004 list of impaired surface waters". This recommendation is based on updated information from the monitoring station.

9.0 LANGFORD CREEK (BASIN NUMBER 02-13-05-06)

9.1 Location and Description

Langford Creek is located in Kent County, Maryland in the tidal portion of the Chester River watershed and flows south into the Chesapeake Bay (Figure 9.1). Langford Creek originates from wetlands along the southern boundary of the Chester River watershed. A West Fork and an East Fork flow southward nearly parallel to each other and join mid-basin to form Langford Creek. Route 446, transecting the basin, roughly divides the West and East Fork drainage areas. The East Fork of Langford Creek is the larger stream of the two, and has few significant tributaries.

Langford Creek is approximately 14 miles in length, with a watershed area of approximately 27,027 acres. Land use distribution in the watershed is estimated from MDP 2000 land use information. The predominant land use category in the watershed is agriculture. The land uses in the watershed are provided in Table 9.1.

Table 9.1: Land Use Distribution for the Langford Creek Watershed

Land Use Description	Area (Acres)	Percent of Total
Forest and Other Herbaceous	6,125	22.7
Mixed Agriculture	17,344	64.2
Water and Wetlands	2,598	9.6
Urban	960	3.5
Total	27,027	100

Langford Creek is part of the Chester River shellfish harvesting area. The Chester River basin is one of Maryland's largest harvest areas. It drains predominantly agricultural cropland and woodland. Land use along the Chester River shore is mainly well drained fields, woodlands, and in some areas small rural communities. The shoreline surrounding Greys Inn Creek and Langford Creek (East and West Forks) is low lying and often experiences high water tables during the wet months of early spring.

The Chester River drainage basin is very large and relatively sparsely populated. Developed areas draining to harvest areas of the Chester River include the communities of Chestertown, Church Hill, Centreville, Queenstown, and upper Kent Island. Kent Island is the only commercially developed area near the Chester River harvest area. All the above mentioned communities are served by public sewer.

9.2 Water Quality Characterization

MDE's Shellfish Certification Program is responsible for classifying shellfish harvesting waters to ensure oysters and clams are safe for human consumption. MDE adheres to the requirements of the NSSP, with oversight by the U.S. Food and Drug Administration. MDE conducts the

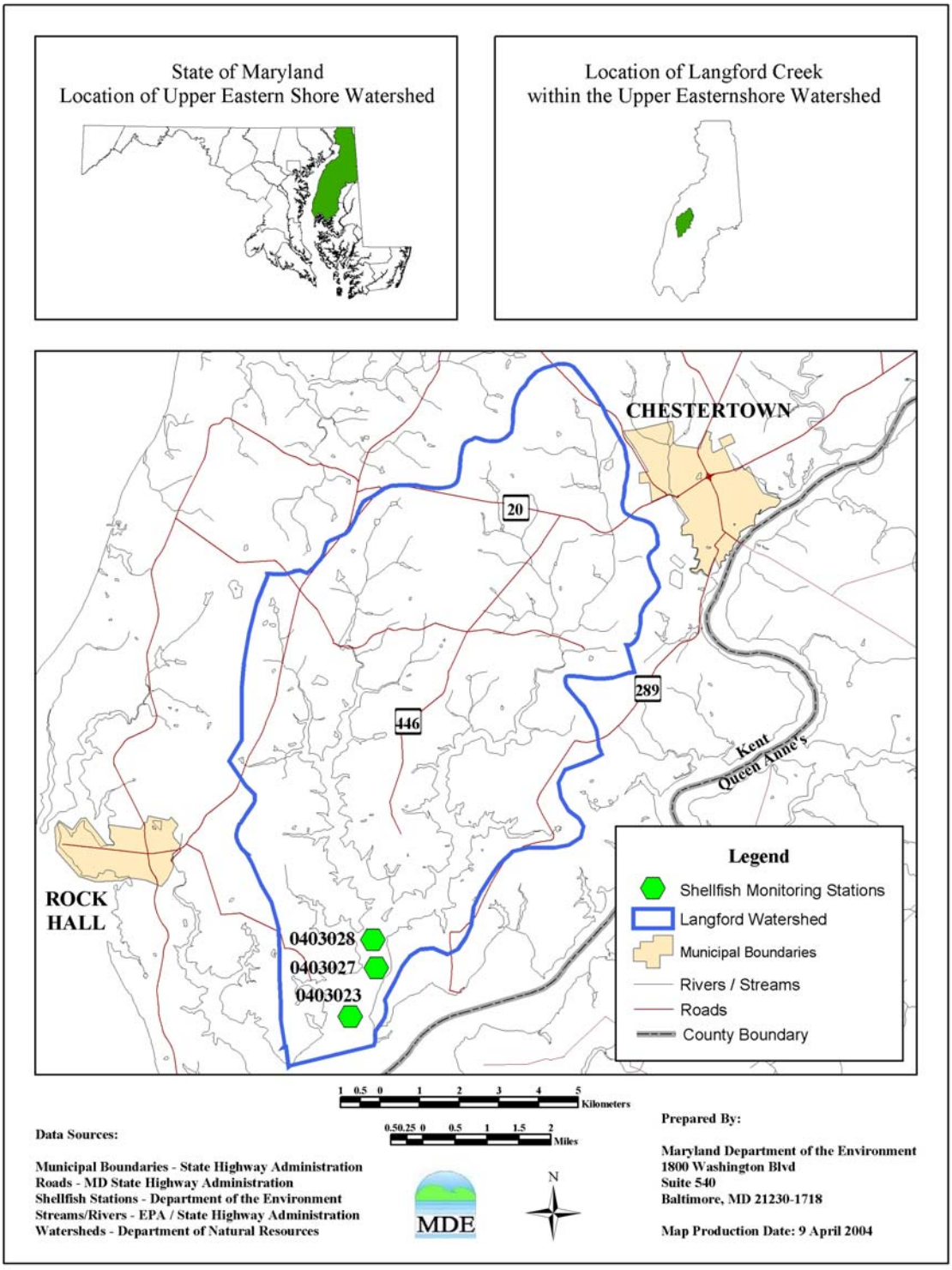

Figure 9.1: Langford Creek Watershed Map and Monitoring Stations for the Shellfish Program

shoreline surveys and collects routine bacteria water quality samples in the shellfish-growing areas of Maryland. These data are used to determine the status of the shellfish waters. If the water quality criteria are exceeded, the shellfish areas are closed to harvest. Areas that do comply with criteria remain approved or are reclassified as approved.

MDE's Shellfish Certification Division has monitored shellfish growing regions throughout Maryland for the past several decades. As shown above in Figure 9.1, there are three shellfish monitoring stations in Langford Creek. Observations recorded at each of these stations are provided in Appendix A.

9.3 Water Quality Impairment

Langford Creek was first identified on the 1996 303(d) list submitted to EPA by the MDE as impaired by nutrients, suspended sediments and fecal coliform bacteria; a listing of evidence of biological impairments was added in 2002. The nutrient impairment was addressed in the document entitled "Water Quality Analysis of Eutrophication for the Tidal Langford Creek in Kent County, Maryland", which received EPA concurrence in January 2003. The suspended sediment and biological impairment listings will be addressed at a future date.

The Maryland water quality standards Surface Water Use Designation for Langford Creek is Use II – *Shellfish Harvesting Waters* (Code of Maryland Regulations (COMAR) 26.08.02.08F). Langford was included on the 2002 Integrated 303(d) List as impaired by fecal coliform and not meeting shellfish water quality standards. Waters classified as Use II, according to COMAR Section 26.08.02.03-3C (criteria for Use II waters - shellfish harvesting), must meet the following criteria for an "approved" classification: **"the median fecal coliform MPN of at least 30 water sample results taken over a three year period to incorporate inter-annual variability shall not exceed 14 per 100 milliliters, and**

(i) In areas affected by point source discharges, not more than 10 percent of the samples shall exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test; or

(ii) In other areas, the 90th percentile of water sample results shall not exceed an MPN of 43 per 100 ml for a five tube decimal dilution test or 49 MPN per 100 ml for a three tube decimal dilution test."

Langford Creek is classified as both approved and conditionally approved. The conditionally approved portion is closed to harvesting for three days following a rainfall event of one inch or more in 24 hours. On average, conditional areas of Langford Creek are closed to harvesting about fifteen times per year.

For the waters of the Langford Creek classified as approved, Maryland uses the 90th percentile to determine if shellfish waters meet the "approved" classification. For conditionally approved waters, Maryland uses the "no more than 10 percent of at least 15 samples exceed 49 MPN per 100 ml" criteria.

The water quality impairment was assessed based on the median, percent greater than 49 and 90th percentile concentrations of samples collected at the three shellfish monitoring stations within

Langford Creek. Descriptive statistics of the monitoring data and the water quality criterion are shown in Table 9.2.

Table 9.2: Langford Creek Shellfish Monitoring Stations - Median, Percent >49 and 90th Percentile Values for Sample Averages

Station	Number of Samples	Median		Percent >49		90th Percentile	
		Monitoring Data	Criterion	Monitoring Data	Criterion	Monitoring Data	Criterion
		MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml	MPN/100ml
0403023	30	3.3	14	NA	49	33.0	49
0403027	30	3.6	14	NA	49	40.9	49
0403028	18	3.3	14	5.6	49	NA	49

NA = Not Applicable

MDE's current listing methodology does not require conditionally approved shellfish waters to appear on the State's list of impaired waters. Upon its review of the Langford Creek analysis, EPA determined that "the monitoring data presented are insufficient to demonstrate that the designated use is being fully supported, because the minimum sample requirement as stated in COMAR 26.08.02.03-3C was not met" (EPA, May 9, 2005 decision rationale letter).

9.4 Conclusion

Based on an assessment of recent bacteria monitoring information summarized in Table 9.2 and recent sanitary survey records, EPA has determined that additional data is needed to satisfy the minimum sampling requirement. Therefore the 303(d) bacteria listing should be moved to Category Three of the integrated 303(d) list as "waters with insufficient information to determine if water quality standards are attained".

REFERENCES

Code of Maryland Regulations 26.08.02.08, 26.08.02.08B, 26.08.02.08F, 26.08.02.08J, 26.08.02.08D, 26.08.02.03-3C, 26.08.02.03-3A.

Maryland Department of Planning, 2002. Land Use Data (Assawoman Bay, Chincoteague Bay, Kent Island Bay, Monie Creek Bay, Rock Creek, Sinepuxent Bay).

Maryland Department of Planning, 2000. Land Use Data (Langford Creek).

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National Shellfish Sanitation Program Model Ordinance, 1999 Revision (Interstate Shellfish Sanitation Conference (ISSC), US Department of Health & Human Services.

U.S. Environmental Protection Agency, 1986. Ambient Water Quality Criteria for Bacteria.

U.S. Environmental Protection Agency, 2003. Draft Implementation Guidance for Ambient Water Quality Criteria for Bacteria.

U.S. Environmental Protection Agency, May 9, 2005. Decision rationale letter from John M. Capacasa (Director, Water Protection Division) to Richard Eskin (Director, MDE Technical and Regulatory Services Administration) regarding the draft final report entitled "Water Quality Analyses of Fecal Coliform for Eight Basins in Maryland: Assawoman Bay, Sinepuxent Bay, Newport Bay, and Chincoteague Bay in Worcester County; Monie Bay in Somerset County; Kent Island Bay in Queen Anne's County; Rock Creek in Anne Arundel County; and Langford Creek in Kent County"

Appendix A: Fecal Coliform Data Collected from the MDE's Shellfish Program Monitoring Stations

Table A1: Assawoman Bay Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100 ml)
Assawoman Bay	20-01-014B	04/15/1999	1
Assawoman Bay	20-01-014B	04/27/1999	3.6
Assawoman Bay	20-01-014B	05/13/1999	9.1
Assawoman Bay	20-01-014B	05/18/1999	3.6
Assawoman Bay	20-01-014B	06/02/1999	3.6
Assawoman Bay	20-01-014B	06/22/1999	9.1
Assawoman Bay	20-01-014B	07/19/1999	9.1
Assawoman Bay	20-01-014B	08/03/1999	7.3
Assawoman Bay	20-01-014B	08/16/1999	3
Assawoman Bay	20-01-014B	09/20/1999	3
Assawoman Bay	20-01-014B	10/25/1999	3.6
Assawoman Bay	20-01-014B	05/04/2000	1
Assawoman Bay	20-01-014B	05/17/2000	7.3
Assawoman Bay	20-01-014B	06/05/2000	3.6
Assawoman Bay	20-01-014B	06/19/2000	3.6
Assawoman Bay	20-01-014B	08/29/2000	3
Assawoman Bay	20-01-014B	09/13/2000	3
Assawoman Bay	20-01-014B	10/17/2000	9.1
Assawoman Bay	20-01-014B	11/16/2000	1
Assawoman Bay	20-01-014B	04/24/2001	3.6
Assawoman Bay	20-01-014B	05/17/2001	3
Assawoman Bay	20-01-014B	06/14/2001	3.6
Assawoman Bay	20-01-014B	07/18/2001	3.6
Assawoman Bay	20-01-014B	08/09/2001	3.6
Assawoman Bay	20-01-014B	08/22/2001	5
Assawoman Bay	20-01-014B	09/24/2001	3
Assawoman Bay	20-01-014B	10/25/2001	3.6
Assawoman Bay	20-01-014B	11/08/2001	9.1
Assawoman Bay	20-01-014B	01/16/2002	3
Assawoman Bay	20-01-014B	03/11/2002	9.1
Assawoman Bay	20-01-014B	05/20/2002	9.1
Assawoman Bay	20-01-014B	06/03/2002	1
Assawoman Bay	20-01-014B	06/18/2002	9.1
Assawoman Bay	20-01-014B	07/09/2002	5
Assawoman Bay	20-01-014B	08/07/2002	5
Assawoman Bay	20-01-014B	09/11/2002	3
Assawoman Bay	20-01-014B	10/02/2002	3
Assawoman Bay	20-01-014B	11/20/2002	5
Assawoman Bay	20-01-014B	01/15/2003	3
Assawoman Bay	20-01-014B	03/11/2003	1
Assawoman Bay	20-01-014B	04/15/2003	3

Assawoman Bay	20-01-014B	05/13/2003	9.1
Assawoman Bay	20-01-014B	06/12/2003	9
Assawoman Bay	20-01-014B	07/07/2003	1
Assawoman Bay	20-01-014B	07/24/2003	3
Assawoman Bay	20-01-014B	08/28/2003	3
Assawoman Bay	20-01-014B	09/15/2003	3
Assawoman Bay	20-01-014B	09/29/2003	3
Assawoman Bay	20-01-014B	10/14/2003	3
Assawoman Bay	20-01-014B	10/28/2003	3
Assawoman Bay	20-01-014B	11/24/2003	3.6
Assawoman Bay	20-01-014B	12/04/2003	3.6
Assawoman Bay	20-01-015	04/15/1999	9.1
Assawoman Bay	20-01-015	04/27/1999	9.1
Assawoman Bay	20-01-015	05/13/1999	3.6
Assawoman Bay	20-01-015	05/18/1999	1
Assawoman Bay	20-01-015	06/02/1999	1
Assawoman Bay	20-01-015	06/22/1999	3.6
Assawoman Bay	20-01-015	07/19/1999	1
Assawoman Bay	20-01-015	08/03/1999	1
Assawoman Bay	20-01-015	08/16/1999	9.1
Assawoman Bay	20-01-015	09/20/1999	3.6
Assawoman Bay	20-01-015	10/25/1999	1
Assawoman Bay	20-01-015	05/04/2000	1
Assawoman Bay	20-01-015	05/17/2000	1
Assawoman Bay	20-01-015	06/05/2000	9.1
Assawoman Bay	20-01-015	06/19/2000	1
Assawoman Bay	20-01-015	08/29/2000	7.3
Assawoman Bay	20-01-015	09/13/2000	1
Assawoman Bay	20-01-015	10/17/2000	1
Assawoman Bay	20-01-015	11/16/2000	1
Assawoman Bay	20-01-015	04/24/2001	1
Assawoman Bay	20-01-015	05/17/2001	7.3
Assawoman Bay	20-01-015	06/14/2001	3.6
Assawoman Bay	20-01-015	07/18/2001	9.1
Assawoman Bay	20-01-015	08/09/2001	3.6
Assawoman Bay	20-01-015	08/22/2001	1
Assawoman Bay	20-01-015	09/24/2001	1
Assawoman Bay	20-01-015	10/25/2001	1
Assawoman Bay	20-01-015	11/08/2001	3
Assawoman Bay	20-01-015	01/16/2002	3
Assawoman Bay	20-01-015	03/11/2002	3
Assawoman Bay	20-01-015	05/20/2002	3
Assawoman Bay	20-01-015	06/03/2002	1
Assawoman Bay	20-01-015	06/18/2002	1
Assawoman Bay	20-01-015	07/09/2002	9.1

Assawoman Bay	20-01-015	08/07/2002	1
Assawoman Bay	20-01-015	09/11/2002	3.6
Assawoman Bay	20-01-015	10/02/2002	1
Assawoman Bay	20-01-015	11/20/2002	5
Assawoman Bay	20-01-015	01/15/2003	3
Assawoman Bay	20-01-015	03/11/2003	1
Assawoman Bay	20-01-015	04/15/2003	9.1
Assawoman Bay	20-01-015	05/13/2003	3.6
Assawoman Bay	20-01-015	06/12/2003	1
Assawoman Bay	20-01-015	07/07/2003	1
Assawoman Bay	20-01-015	07/24/2003	1
Assawoman Bay	20-01-015	08/28/2003	1
Assawoman Bay	20-01-015	09/15/2003	1
Assawoman Bay	20-01-015	09/29/2003	3
Assawoman Bay	20-01-015	10/14/2003	9.1
Assawoman Bay	20-01-015	10/28/2003	3.6
Assawoman Bay	20-01-015	11/24/2003	3.6
Assawoman Bay	20-01-015	12/04/2003	3.6
Assawoman Bay	20-01-016	04/15/1999	3.6
Assawoman Bay	20-01-016	04/27/1999	1
Assawoman Bay	20-01-016	05/13/1999	3.6
Assawoman Bay	20-01-016	05/18/1999	1
Assawoman Bay	20-01-016	06/02/1999	1
Assawoman Bay	20-01-016	06/22/1999	1
Assawoman Bay	20-01-016	07/19/1999	1
Assawoman Bay	20-01-016	08/03/1999	1
Assawoman Bay	20-01-016	08/16/1999	1
Assawoman Bay	20-01-016	09/20/1999	1
Assawoman Bay	20-01-016	10/25/1999	3.6
Assawoman Bay	20-01-016	05/04/2000	1
Assawoman Bay	20-01-016	05/17/2000	1
Assawoman Bay	20-01-016	06/05/2000	1
Assawoman Bay	20-01-016	06/19/2000	1
Assawoman Bay	20-01-016	08/29/2000	1
Assawoman Bay	20-01-016	09/13/2000	1
Assawoman Bay	20-01-016	10/17/2000	3.6
Assawoman Bay	20-01-016	11/16/2000	3.6
Assawoman Bay	20-01-016	04/24/2001	1
Assawoman Bay	20-01-016	05/17/2001	1
Assawoman Bay	20-01-016	06/14/2001	1
Assawoman Bay	20-01-016	07/18/2001	1
Assawoman Bay	20-01-016	08/09/2001	1
Assawoman Bay	20-01-016	08/22/2001	1
Assawoman Bay	20-01-016	09/24/2001	9.1
Assawoman Bay	20-01-016	10/25/2001	3

Assawoman Bay	20-01-016	11/08/2001	3
Assawoman Bay	20-01-016	01/16/2002	3
Assawoman Bay	20-01-016	03/11/2002	3
Assawoman Bay	20-01-016	05/20/2002	1
Assawoman Bay	20-01-016	06/03/2002	1
Assawoman Bay	20-01-016	06/18/2002	1
Assawoman Bay	20-01-016	07/09/2002	1
Assawoman Bay	20-01-016	08/07/2002	3.6
Assawoman Bay	20-01-016	09/11/2002	1
Assawoman Bay	20-01-016	10/02/2002	3
Assawoman Bay	20-01-016	11/20/2002	9.1
Assawoman Bay	20-01-016	01/15/2003	9.1
Assawoman Bay	20-01-016	03/11/2003	3.6
Assawoman Bay	20-01-016	04/15/2003	3.6
Assawoman Bay	20-01-016	05/13/2003	3.6
Assawoman Bay	20-01-016	06/12/2003	1
Assawoman Bay	20-01-016	07/07/2003	1
Assawoman Bay	20-01-016	07/24/2003	3
Assawoman Bay	20-01-016	08/28/2003	3.6
Assawoman Bay	20-01-016	09/15/2003	3.6
Assawoman Bay	20-01-016	09/29/2003	3
Assawoman Bay	20-01-016	10/14/2003	3.6
Assawoman Bay	20-01-016	10/28/2003	1
Assawoman Bay	20-01-016	11/24/2003	3.6
Assawoman Bay	20-01-016	12/04/2003	3.6
Assawoman Bay	20-01-201	04/15/1999	1
Assawoman Bay	20-01-201	04/27/1999	1
Assawoman Bay	20-01-201	05/13/1999	1
Assawoman Bay	20-01-201	05/18/1999	1
Assawoman Bay	20-01-201	06/02/1999	1
Assawoman Bay	20-01-201	06/22/1999	3.6
Assawoman Bay	20-01-201	07/19/1999	1
Assawoman Bay	20-01-201	08/03/1999	3.6
Assawoman Bay	20-01-201	08/16/1999	3
Assawoman Bay	20-01-201	09/20/1999	1
Assawoman Bay	20-01-201	10/25/1999	1
Assawoman Bay	20-01-201	05/04/2000	1
Assawoman Bay	20-01-201	05/17/2000	1
Assawoman Bay	20-01-201	06/05/2000	1
Assawoman Bay	20-01-201	06/19/2000	3.6
Assawoman Bay	20-01-201	08/29/2000	3
Assawoman Bay	20-01-201	09/13/2000	7.2
Assawoman Bay	20-01-201	10/17/2000	1
Assawoman Bay	20-01-201	11/16/2000	3.6
Assawoman Bay	20-01-201	04/24/2001	1

Assawoman Bay	20-01-201	05/17/2001	3.6
Assawoman Bay	20-01-201	06/14/2001	1
Assawoman Bay	20-01-201	07/18/2001	1
Assawoman Bay	20-01-201	08/09/2001	1
Assawoman Bay	20-01-201	08/22/2001	3
Assawoman Bay	20-01-201	09/24/2001	3
Assawoman Bay	20-01-201	10/25/2001	3
Assawoman Bay	20-01-201	11/08/2001	3.6
Assawoman Bay	20-01-201	01/16/2002	1
Assawoman Bay	20-01-201	03/11/2002	7.3
Assawoman Bay	20-01-201	05/20/2002	3.6
Assawoman Bay	20-01-201	06/03/2002	1
Assawoman Bay	20-01-201	06/18/2002	1
Assawoman Bay	20-01-201	07/09/2002	1
Assawoman Bay	20-01-201	08/07/2002	1
Assawoman Bay	20-01-201	09/11/2002	3.6
Assawoman Bay	20-01-201	10/02/2002	1
Assawoman Bay	20-01-201	11/20/2002	5
Assawoman Bay	20-01-201	01/15/2003	1
Assawoman Bay	20-01-201	03/11/2003	3.6
Assawoman Bay	20-01-201	04/15/2003	3.6
Assawoman Bay	20-01-201	05/13/2003	3.6
Assawoman Bay	20-01-201	06/12/2003	1
Assawoman Bay	20-01-201	07/07/2003	1
Assawoman Bay	20-01-201	07/24/2003	1
Assawoman Bay	20-01-201	08/28/2003	3
Assawoman Bay	20-01-201	09/15/2003	3
Assawoman Bay	20-01-201	09/29/2003	0
Assawoman Bay	20-01-201	10/14/2003	3
Assawoman Bay	20-01-201	10/28/2003	9.1
Assawoman Bay	20-01-201	11/24/2003	9.1
Assawoman Bay	20-01-201	12/04/2003	5
Assawoman Bay	20-01-203	04/15/1999	1
Assawoman Bay	20-01-203	04/27/1999	1
Assawoman Bay	20-01-203	05/13/1999	7.3
Assawoman Bay	20-01-203	05/18/1999	3.6
Assawoman Bay	20-01-203	06/02/1999	1
Assawoman Bay	20-01-203	06/22/1999	3.6
Assawoman Bay	20-01-203	07/19/1999	1
Assawoman Bay	20-01-203	08/03/1999	1
Assawoman Bay	20-01-203	08/16/1999	9
Assawoman Bay	20-01-203	09/20/1999	9.1
Assawoman Bay	20-01-203	10/25/1999	3.6
Assawoman Bay	20-01-203	05/04/2000	3.6
Assawoman Bay	20-01-203	05/17/2000	1

Assawoman Bay	20-01-203	06/05/2000	3.6
Assawoman Bay	20-01-203	06/19/2000	1
Assawoman Bay	20-01-203	08/29/2000	7.3
Assawoman Bay	20-01-203	09/13/2000	1
Assawoman Bay	20-01-203	10/17/2000	1
Assawoman Bay	20-01-203	11/16/2000	3
Assawoman Bay	20-01-203	04/24/2001	3.6
Assawoman Bay	20-01-203	05/17/2001	1
Assawoman Bay	20-01-203	06/14/2001	1
Assawoman Bay	20-01-203	07/18/2001	3.6
Assawoman Bay	20-01-203	08/09/2001	1
Assawoman Bay	20-01-203	08/22/2001	9.1
Assawoman Bay	20-01-203	09/24/2001	3
Assawoman Bay	20-01-203	10/25/2001	1
Assawoman Bay	20-01-203	11/08/2001	3.6
Assawoman Bay	20-01-203	01/16/2002	3
Assawoman Bay	20-01-203	03/11/2002	1
Assawoman Bay	20-01-203	05/20/2002	3
Assawoman Bay	20-01-203	06/03/2002	9.1
Assawoman Bay	20-01-203	06/18/2002	3.6
Assawoman Bay	20-01-203	07/09/2002	1
Assawoman Bay	20-01-203	08/07/2002	1
Assawoman Bay	20-01-203	09/11/2002	3
Assawoman Bay	20-01-203	10/02/2002	1
Assawoman Bay	20-01-203	11/20/2002	3
Assawoman Bay	20-01-203	01/15/2003	3.6
Assawoman Bay	20-01-203	03/11/2003	3.6
Assawoman Bay	20-01-203	04/15/2003	3.6
Assawoman Bay	20-01-203	05/13/2003	3.6
Assawoman Bay	20-01-203	06/12/2003	5
Assawoman Bay	20-01-203	07/07/2003	3.6
Assawoman Bay	20-01-203	07/24/2003	1
Assawoman Bay	20-01-203	08/28/2003	3
Assawoman Bay	20-01-203	09/15/2003	9.1
Assawoman Bay	20-01-203	09/29/2003	0
Assawoman Bay	20-01-203	10/14/2003	3
Assawoman Bay	20-01-203	10/28/2003	0
Assawoman Bay	20-01-203	11/24/2003	3.6
Assawoman Bay	20-01-203	12/04/2003	1

Table A2: Sinepuxent Bay Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Sinepuxent Bay	20-01-000G	06/14/2001	1
Sinepuxent Bay	20-01-000G	07/18/2001	1
Sinepuxent Bay	20-01-000G	08/09/2001	1
Sinepuxent Bay	20-01-000G	08/22/2001	3.6
Sinepuxent Bay	20-01-000G	09/24/2001	1
Sinepuxent Bay	20-01-000G	10/25/2001	1
Sinepuxent Bay	20-01-000G	11/08/2001	3.6
Sinepuxent Bay	20-01-000G	01/16/2002	3.6
Sinepuxent Bay	20-01-000G	03/11/2002	1
Sinepuxent Bay	20-01-000G	05/20/2002	1
Sinepuxent Bay	20-01-000G	06/03/2002	1
Sinepuxent Bay	20-01-000G	06/18/2002	1
Sinepuxent Bay	20-01-000G	07/09/2002	1
Sinepuxent Bay	20-01-000G	08/07/2002	9.1
Sinepuxent Bay	20-01-000G	09/11/2002	1
Sinepuxent Bay	20-01-000G	10/02/2002	1
Sinepuxent Bay	20-01-000G	11/20/2002	3.6
Sinepuxent Bay	20-01-000G	01/15/2003	23
Sinepuxent Bay	20-01-000G	03/11/2003	1
Sinepuxent Bay	20-01-000G	04/15/2003	1
Sinepuxent Bay	20-01-000G	05/13/2003	3.6
Sinepuxent Bay	20-01-000G	06/12/2003	1
Sinepuxent Bay	20-01-000G	07/07/2003	1
Sinepuxent Bay	20-01-000G	07/24/2003	9.1
Sinepuxent Bay	20-01-000G	08/28/2003	9.1
Sinepuxent Bay	20-01-000G	09/15/2003	3.6
Sinepuxent Bay	20-01-000G	09/29/2003	93
Sinepuxent Bay	20-01-000G	10/14/2003	1
Sinepuxent Bay	20-01-000G	10/28/2003	1
Sinepuxent Bay	20-01-000G	11/24/2003	1
Sinepuxent Bay	20-01-004	07/18/2001	1
Sinepuxent Bay	20-01-004	08/09/2001	1
Sinepuxent Bay	20-01-004	08/22/2001	3.6
Sinepuxent Bay	20-01-004	09/24/2001	1
Sinepuxent Bay	20-01-004	10/25/2001	1
Sinepuxent Bay	20-01-004	11/08/2001	23
Sinepuxent Bay	20-01-004	01/16/2002	1
Sinepuxent Bay	20-01-004	03/11/2002	9.1
Sinepuxent Bay	20-01-004	05/20/2002	1
Sinepuxent Bay	20-01-004	06/03/2002	1
Sinepuxent Bay	20-01-004	06/18/2002	1

Sinepuxent Bay	20-01-004	07/09/2002	1
Sinepuxent Bay	20-01-004	08/07/2002	1
Sinepuxent Bay	20-01-004	09/11/2002	1
Sinepuxent Bay	20-01-004	10/02/2002	3.6
Sinepuxent Bay	20-01-004	11/20/2002	3.6
Sinepuxent Bay	20-01-004	01/15/2003	23
Sinepuxent Bay	20-01-004	03/11/2003	1
Sinepuxent Bay	20-01-004	04/15/2003	1
Sinepuxent Bay	20-01-004	05/13/2003	1
Sinepuxent Bay	20-01-004	06/12/2003	1
Sinepuxent Bay	20-01-004	07/07/2003	1
Sinepuxent Bay	20-01-004	07/24/2003	1
Sinepuxent Bay	20-01-004	08/28/2003	1
Sinepuxent Bay	20-01-004	09/15/2003	1
Sinepuxent Bay	20-01-004	09/29/2003	1
Sinepuxent Bay	20-01-004	10/14/2003	1
Sinepuxent Bay	20-01-004	10/28/2003	3.6
Sinepuxent Bay	20-01-004	11/24/2003	7.3
Sinepuxent Bay	20-01-004	12/04/2003	43
Sinepuxent Bay	20-01-006	06/14/2001	1
Sinepuxent Bay	20-01-006	07/18/2001	9.1
Sinepuxent Bay	20-01-006	08/09/2001	1
Sinepuxent Bay	20-01-006	08/22/2001	1
Sinepuxent Bay	20-01-006	09/24/2001	1
Sinepuxent Bay	20-01-006	10/25/2001	1
Sinepuxent Bay	20-01-006	11/08/2001	43
Sinepuxent Bay	20-01-006	01/16/2002	460
Sinepuxent Bay	20-01-006	03/11/2002	1
Sinepuxent Bay	20-01-006	05/20/2002	1
Sinepuxent Bay	20-01-006	06/03/2002	1
Sinepuxent Bay	20-01-006	06/18/2002	3.6
Sinepuxent Bay	20-01-006	07/09/2002	1
Sinepuxent Bay	20-01-006	08/07/2002	3.6
Sinepuxent Bay	20-01-006	09/11/2002	1
Sinepuxent Bay	20-01-006	10/02/2002	1
Sinepuxent Bay	20-01-006	11/20/2002	3.6
Sinepuxent Bay	20-01-006	01/15/2003	3.6
Sinepuxent Bay	20-01-006	03/11/2003	1
Sinepuxent Bay	20-01-006	04/15/2003	1
Sinepuxent Bay	20-01-006	05/13/2003	1
Sinepuxent Bay	20-01-006	06/12/2003	3.6
Sinepuxent Bay	20-01-006	07/07/2003	1
Sinepuxent Bay	20-01-006	07/24/2003	43
Sinepuxent Bay	20-01-006	08/28/2003	7.3
Sinepuxent Bay	20-01-006	09/15/2003	3.6

Sinepuxent Bay	20-01-006	09/29/2003	1
Sinepuxent Bay	20-01-006	10/28/2003	1
Sinepuxent Bay	20-01-006	11/24/2003	1
Sinepuxent Bay	20-01-006	12/04/2003	1
Sinepuxent Bay	20-01-008	07/18/2001	1
Sinepuxent Bay	20-01-008	08/09/2001	1
Sinepuxent Bay	20-01-008	08/22/2001	1
Sinepuxent Bay	20-01-008	09/24/2001	3.6
Sinepuxent Bay	20-01-008	10/25/2001	1
Sinepuxent Bay	20-01-008	11/08/2001	1
Sinepuxent Bay	20-01-008	01/16/2002	9.1
Sinepuxent Bay	20-01-008	03/11/2002	9.1
Sinepuxent Bay	20-01-008	05/20/2002	1
Sinepuxent Bay	20-01-008	06/03/2002	1
Sinepuxent Bay	20-01-008	06/18/2002	23
Sinepuxent Bay	20-01-008	07/09/2002	1
Sinepuxent Bay	20-01-008	08/07/2002	1
Sinepuxent Bay	20-01-008	09/11/2002	1
Sinepuxent Bay	20-01-008	10/02/2002	1
Sinepuxent Bay	20-01-008	11/20/2002	9.1
Sinepuxent Bay	20-01-008	01/15/2003	9.1
Sinepuxent Bay	20-01-008	03/11/2003	1
Sinepuxent Bay	20-01-008	04/15/2003	3.6
Sinepuxent Bay	20-01-008	05/13/2003	1
Sinepuxent Bay	20-01-008	06/12/2003	3.6
Sinepuxent Bay	20-01-008	07/07/2003	1
Sinepuxent Bay	20-01-008	07/24/2003	1
Sinepuxent Bay	20-01-008	08/28/2003	1
Sinepuxent Bay	20-01-008	09/15/2003	3.6
Sinepuxent Bay	20-01-008	09/29/2003	1
Sinepuxent Bay	20-01-008	10/14/2003	1
Sinepuxent Bay	20-01-008	10/28/2003	1
Sinepuxent Bay	20-01-008	11/24/2003	9.1
Sinepuxent Bay	20-01-008	12/04/2003	1
Sinepuxent Bay	20-01-103	06/14/2001	1
Sinepuxent Bay	20-01-103	07/18/2001	1
Sinepuxent Bay	20-01-103	08/09/2001	1
Sinepuxent Bay	20-01-103	08/22/2001	1
Sinepuxent Bay	20-01-103	09/24/2001	1
Sinepuxent Bay	20-01-103	10/25/2001	1
Sinepuxent Bay	20-01-103	11/08/2001	9.1
Sinepuxent Bay	20-01-103	01/16/2002	23
Sinepuxent Bay	20-01-103	03/11/2002	1
Sinepuxent Bay	20-01-103	05/20/2002	1
Sinepuxent Bay	20-01-103	06/03/2002	3.6

Sinepuxent Bay	20-01-103	06/18/2002	1
Sinepuxent Bay	20-01-103	07/09/2002	1
Sinepuxent Bay	20-01-103	08/07/2002	3.6
Sinepuxent Bay	20-01-103	09/11/2002	15
Sinepuxent Bay	20-01-103	10/02/2002	3.6
Sinepuxent Bay	20-01-103	11/20/2002	1
Sinepuxent Bay	20-01-103	01/15/2003	11
Sinepuxent Bay	20-01-103	03/11/2003	43
Sinepuxent Bay	20-01-103	04/15/2003	1
Sinepuxent Bay	20-01-103	05/13/2003	9.1
Sinepuxent Bay	20-01-103	06/12/2003	9.1
Sinepuxent Bay	20-01-103	07/07/2003	1
Sinepuxent Bay	20-01-103	07/24/2003	9.1
Sinepuxent Bay	20-01-103	08/28/2003	93
Sinepuxent Bay	20-01-103	09/15/2003	9.1
Sinepuxent Bay	20-01-103	09/29/2003	3.6
Sinepuxent Bay	20-01-103	10/14/2003	9.1
Sinepuxent Bay	20-01-103	10/28/2003	7.3
Sinepuxent Bay	20-01-103	11/24/2003	3.6

Table A3: Newport Bay Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Newport Bay	20-02-001	05/15/2000	1
Newport Bay	20-02-001	06/20/2000	1
Newport Bay	20-02-001	08/03/2000	1
Newport Bay	20-02-001	08/30/2000	1
Newport Bay	20-02-001	09/20/2000	1
Newport Bay	20-02-001	10/05/2000	3
Newport Bay	20-02-001	11/14/2000	3
Newport Bay	20-02-001	05/10/2001	1
Newport Bay	20-02-001	05/16/2001	1
Newport Bay	20-02-001	06/20/2001	1
Newport Bay	20-02-001	07/17/2001	1
Newport Bay	20-02-001	08/07/2001	1
Newport Bay	20-02-001	09/10/2001	1
Newport Bay	20-02-001	10/11/2001	1
Newport Bay	20-02-001	10/30/2001	1
Newport Bay	20-02-001	11/15/2001	3
Newport Bay	20-02-001	02/14/2002	1
Newport Bay	20-02-001	04/08/2002	1
Newport Bay	20-02-001	06/17/2002	1
Newport Bay	20-02-001	08/05/2002	1
Newport Bay	20-02-001	09/04/2002	3
Newport Bay	20-02-001	11/21/2002	1
Newport Bay	20-02-001	03/18/2003	1
Newport Bay	20-02-001	05/27/2003	3
Newport Bay	20-02-001	06/24/2003	1
Newport Bay	20-02-001	07/28/2003	1
Newport Bay	20-02-001	09/11/2003	1
Newport Bay	20-02-001	09/25/2003	3
Newport Bay	20-02-001	10/09/2003	1
Newport Bay	20-02-001	10/30/2003	460

Table A4: Chincoteague Bay Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Chincoteague Bay	20-02-005	05/15/2000	3
Chincoteague Bay	20-02-005	06/20/2000	1
Chincoteague Bay	20-02-005	08/03/2000	3
Chincoteague Bay	20-02-005	08/30/2000	3
Chincoteague Bay	20-02-005	09/20/2000	3
Chincoteague Bay	20-02-005	10/05/2000	3
Chincoteague Bay	20-02-005	11/14/2000	1
Chincoteague Bay	20-02-005	05/10/2001	1
Chincoteague Bay	20-02-005	05/16/2001	1
Chincoteague Bay	20-02-005	06/20/2001	1
Chincoteague Bay	20-02-005	07/17/2001	1
Chincoteague Bay	20-02-005	08/07/2001	1
Chincoteague Bay	20-02-005	09/10/2001	1
Chincoteague Bay	20-02-005	10/11/2001	3
Chincoteague Bay	20-02-005	10/30/2001	23
Chincoteague Bay	20-02-005	11/15/2001	1
Chincoteague Bay	20-02-005	02/14/2002	1
Chincoteague Bay	20-02-005	04/08/2002	1
Chincoteague Bay	20-02-005	06/17/2002	3
Chincoteague Bay	20-02-005	08/05/2002	1
Chincoteague Bay	20-02-005	09/04/2002	23
Chincoteague Bay	20-02-005	11/21/2002	9
Chincoteague Bay	20-02-005	03/18/2003	1
Chincoteague Bay	20-02-005	05/27/2003	3
Chincoteague Bay	20-02-005	06/24/2003	1
Chincoteague Bay	20-02-005	07/28/2003	3
Chincoteague Bay	20-02-005	09/11/2003	3
Chincoteague Bay	20-02-005	09/25/2003	3
Chincoteague Bay	20-02-005	10/09/2003	3
Chincoteague Bay	20-02-005	10/30/2003	240
Chincoteague Bay	20-02-204	05/15/2000	1
Chincoteague Bay	20-02-204	06/20/2000	1
Chincoteague Bay	20-02-204	08/03/2000	1
Chincoteague Bay	20-02-204	08/30/2000	1
Chincoteague Bay	20-02-204	09/20/2000	1
Chincoteague Bay	20-02-204	10/05/2000	23
Chincoteague Bay	20-02-204	11/14/2000	3
Chincoteague Bay	20-02-204	05/10/2001	1
Chincoteague Bay	20-02-204	05/16/2001	1
Chincoteague Bay	20-02-204	06/20/2001	1
Chincoteague Bay	20-02-204	07/17/2001	1

Chincoteague Bay	20-02-204	08/07/2001	1
Chincoteague Bay	20-02-204	09/10/2001	3
Chincoteague Bay	20-02-204	10/11/2001	1
Chincoteague Bay	20-02-204	10/30/2001	3
Chincoteague Bay	20-02-204	11/15/2001	1
Chincoteague Bay	20-02-204	02/14/2002	3
Chincoteague Bay	20-02-204	04/08/2002	1
Chincoteague Bay	20-02-204	06/17/2002	9
Chincoteague Bay	20-02-204	08/05/2002	1
Chincoteague Bay	20-02-204	09/04/2002	3
Chincoteague Bay	20-02-204	11/21/2002	3
Chincoteague Bay	20-02-204	03/18/2003	1
Chincoteague Bay	20-02-204	05/27/2003	1
Chincoteague Bay	20-02-204	06/24/2003	1
Chincoteague Bay	20-02-204	07/28/2003	1
Chincoteague Bay	20-02-204	09/11/2003	1
Chincoteague Bay	20-02-204	09/25/2003	1
Chincoteague Bay	20-02-204	10/09/2003	1
Chincoteague Bay	20-02-204	10/30/2003	9

Table A5: Monie Bay Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Monie Bay	18-01-013	05/13/2002	3
Monie Bay	18-01-013	06/04/2002	1
Monie Bay	18-01-013	07/17/2002	1
Monie Bay	18-01-013	07/30/2002	1
Monie Bay	18-01-013	08/22/2002	1
Monie Bay	18-01-013	08/26/2002	1
Monie Bay	18-01-013	09/30/2002	3
Monie Bay	18-01-013	11/26/2002	23
Monie Bay	18-01-013	01/08/2003	1
Monie Bay	18-01-013	04/30/2003	9
Monie Bay	18-01-013	05/22/2003	1
Monie Bay	18-01-013	06/03/2003	1
Monie Bay	18-01-013	06/17/2003	1
Monie Bay	18-01-013	07/02/2003	1
Monie Bay	18-01-013	07/10/2003	1
Monie Bay	18-01-013	09/04/2003	1
Monie Bay	18-01-013	09/10/2003	1
Monie Bay	18-01-019	05/13/2002	3
Monie Bay	18-01-019	06/04/2002	3
Monie Bay	18-01-019	07/17/2002	3
Monie Bay	18-01-019	07/30/2002	1
Monie Bay	18-01-019	08/22/2002	3
Monie Bay	18-01-019	08/26/2002	7
Monie Bay	18-01-019	09/30/2002	9
Monie Bay	18-01-019	11/26/2002	39
Monie Bay	18-01-019	01/08/2003	23
Monie Bay	18-01-019	04/30/2003	15
Monie Bay	18-01-019	05/22/2003	1
Monie Bay	18-01-019	06/03/2003	9
Monie Bay	18-01-019	06/17/2003	9
Monie Bay	18-01-019	07/02/2003	1
Monie Bay	18-01-019	07/10/2003	3
Monie Bay	18-01-019	09/04/2003	9
Monie Bay	18-01-019	09/10/2003	3
Monie Bay	18-01-108A	05/13/2002	3
Monie Bay	18-01-108A	06/04/2002	1
Monie Bay	18-01-108A	07/17/2002	1
Monie Bay	18-01-108A	07/30/2002	7
Monie Bay	18-01-108A	08/22/2002	75
Monie Bay	18-01-108A	08/26/2002	43
Monie Bay	18-01-108A	09/30/2002	9

Monie Bay	18-01-108A	11/26/2002	9
Monie Bay	18-01-108A	01/08/2003	43
Monie Bay	18-01-108A	04/30/2003	9
Monie Bay	18-01-108A	05/22/2003	1
Monie Bay	18-01-108A	06/03/2003	15
Monie Bay	18-01-108A	06/17/2003	3
Monie Bay	18-01-108A	07/02/2003	1
Monie Bay	18-01-108A	07/10/2003	3
Monie Bay	18-01-108A	09/04/2003	23
Monie Bay	18-01-108A	09/10/2003	43

Table A6: Kent Island Bay Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Kent Island Bay	06-01-005	04/26/2001	1
Kent Island Bay	06-01-005	05/09/2001	1
Kent Island Bay	06-01-005	06/13/2001	1
Kent Island Bay	06-01-005	07/31/2001	3.6
Kent Island Bay	06-01-005	08/14/2001	1
Kent Island Bay	06-01-005	08/23/2001	1
Kent Island Bay	06-01-005	09/27/2001	1
Kent Island Bay	06-01-005	10/30/2001	3.6
Kent Island Bay	06-01-005	12/12/2001	1
Kent Island Bay	06-01-005	01/29/2002	1
Kent Island Bay	06-01-005	03/28/2002	1
Kent Island Bay	06-01-005	04/11/2002	1
Kent Island Bay	06-01-005	04/22/2002	1
Kent Island Bay	06-01-005	05/29/2002	1
Kent Island Bay	06-01-005	06/26/2002	1
Kent Island Bay	06-01-005	07/10/2002	1
Kent Island Bay	06-01-005	08/28/2002	1
Kent Island Bay	06-01-005	09/24/2002	3.6
Kent Island Bay	06-01-005	10/15/2002	1
Kent Island Bay	06-01-005	11/20/2002	1
Kent Island Bay	06-01-005	01/09/2003	1
Kent Island Bay	06-01-005	03/25/2003	3.6
Kent Island Bay	06-01-005	04/14/2003	1
Kent Island Bay	06-01-005	06/10/2003	1
Kent Island Bay	06-01-005	07/17/2003	1
Kent Island Bay	06-01-005	08/13/2003	1
Kent Island Bay	06-01-005	08/27/2003	1
Kent Island Bay	06-01-005	09/15/2003	1
Kent Island Bay	06-01-005	10/28/2003	1
Kent Island Bay	06-01-005	11/24/2003	1
Kent Island Bay	06-01-006	04/26/2001	1
Kent Island Bay	06-01-006	05/09/2001	1
Kent Island Bay	06-01-006	06/13/2001	1
Kent Island Bay	06-01-006	07/31/2001	1
Kent Island Bay	06-01-006	08/14/2001	1
Kent Island Bay	06-01-006	08/23/2001	1
Kent Island Bay	06-01-006	09/27/2001	3.6
Kent Island Bay	06-01-006	10/30/2001	9.1
Kent Island Bay	06-01-006	12/12/2001	3.6
Kent Island Bay	06-01-006	01/29/2002	1
Kent Island Bay	06-01-006	03/28/2002	1

Kent Island Bay	06-01-006	04/11/2002	1
Kent Island Bay	06-01-006	04/22/2002	1
Kent Island Bay	06-01-006	05/29/2002	1
Kent Island Bay	06-01-006	06/26/2002	1
Kent Island Bay	06-01-006	07/10/2002	1
Kent Island Bay	06-01-006	08/28/2002	1
Kent Island Bay	06-01-006	09/24/2002	3.6
Kent Island Bay	06-01-006	10/15/2002	93
Kent Island Bay	06-01-006	11/20/2002	43
Kent Island Bay	06-01-006	01/09/2003	1
Kent Island Bay	06-01-006	03/25/2003	23
Kent Island Bay	06-01-006	04/14/2003	1
Kent Island Bay	06-01-006	06/10/2003	9.1
Kent Island Bay	06-01-006	07/17/2003	1
Kent Island Bay	06-01-006	08/13/2003	1
Kent Island Bay	06-01-006	08/27/2003	1
Kent Island Bay	06-01-006	09/15/2003	1
Kent Island Bay	06-01-006	10/28/2003	1
Kent Island Bay	06-01-006	11/24/2003	3.6
Kent Island Bay	06-01-007	04/26/2001	3.6
Kent Island Bay	06-01-007	05/09/2001	1
Kent Island Bay	06-01-007	06/13/2001	1
Kent Island Bay	06-01-007	07/31/2001	3.6
Kent Island Bay	06-01-007	08/14/2001	1
Kent Island Bay	06-01-007	08/23/2001	1
Kent Island Bay	06-01-007	09/27/2001	3.6
Kent Island Bay	06-01-007	10/30/2001	1
Kent Island Bay	06-01-007	12/12/2001	1
Kent Island Bay	06-01-007	01/29/2002	1
Kent Island Bay	06-01-007	03/28/2002	1
Kent Island Bay	06-01-007	04/11/2002	3.6
Kent Island Bay	06-01-007	04/22/2002	3.6
Kent Island Bay	06-01-007	05/09/2002	1
Kent Island Bay	06-01-007	06/26/2002	1
Kent Island Bay	06-01-007	07/10/2002	1
Kent Island Bay	06-01-007	08/28/2002	1
Kent Island Bay	06-01-007	09/24/2002	1
Kent Island Bay	06-01-007	10/15/2002	1
Kent Island Bay	06-01-007	11/20/2002	1
Kent Island Bay	06-01-007	01/09/2003	1
Kent Island Bay	06-01-007	03/25/2003	7.2
Kent Island Bay	06-01-007	04/14/2003	1
Kent Island Bay	06-01-007	06/10/2003	3
Kent Island Bay	06-01-007	07/17/2003	3.6
Kent Island Bay	06-01-007	08/13/2003	1

Kent Island Bay	06-01-007	08/27/2003	1
Kent Island Bay	06-01-007	09/15/2003	1
Kent Island Bay	06-01-007	10/28/2003	9.1
Kent Island Bay	06-01-007	11/24/2003	9.1
Kent Island Bay	06-01-008	04/26/2001	1
Kent Island Bay	06-01-008	05/09/2001	1
Kent Island Bay	06-01-008	06/13/2001	1
Kent Island Bay	06-01-008	07/31/2001	1
Kent Island Bay	06-01-008	08/14/2001	3.6
Kent Island Bay	06-01-008	08/23/2001	3.6
Kent Island Bay	06-01-008	09/27/2001	1
Kent Island Bay	06-01-008	10/30/2001	1
Kent Island Bay	06-01-008	12/12/2001	1
Kent Island Bay	06-01-008	01/29/2002	1
Kent Island Bay	06-01-008	03/28/2002	1
Kent Island Bay	06-01-008	04/11/2002	1
Kent Island Bay	06-01-008	04/22/2002	1
Kent Island Bay	06-01-008	05/29/2002	1
Kent Island Bay	06-01-008	06/26/2002	1
Kent Island Bay	06-01-008	07/10/2002	1
Kent Island Bay	06-01-008	08/28/2002	1
Kent Island Bay	06-01-008	09/26/2002	1
Kent Island Bay	06-01-008	10/15/2002	3.6
Kent Island Bay	06-01-008	11/20/2002	1
Kent Island Bay	06-01-008	01/09/2003	3.6
Kent Island Bay	06-01-008	03/25/2003	3.6
Kent Island Bay	06-01-008	04/14/2003	1
Kent Island Bay	06-01-008	06/10/2003	9.1
Kent Island Bay	06-01-008	07/17/2003	1
Kent Island Bay	06-01-008	08/13/2003	3.6
Kent Island Bay	06-01-008	08/27/2003	3.6
Kent Island Bay	06-01-008	09/15/2003	9.1
Kent Island Bay	06-01-008	10/28/2003	1
Kent Island Bay	06-01-008	11/24/2003	7.3
Kent Island Bay	06-01-011	04/26/2001	1
Kent Island Bay	06-01-011	05/09/2001	1
Kent Island Bay	06-01-011	06/13/2001	1
Kent Island Bay	06-01-011	07/31/2001	3.6
Kent Island Bay	06-01-011	08/14/2001	43
Kent Island Bay	06-01-011	08/23/2001	1
Kent Island Bay	06-01-011	09/27/2001	1
Kent Island Bay	06-01-011	10/30/2001	1
Kent Island Bay	06-01-011	12/12/2001	1
Kent Island Bay	06-01-011	01/29/2002	1
Kent Island Bay	06-01-011	03/28/2002	1

Kent Island Bay	06-01-011	04/11/2002	1
Kent Island Bay	06-01-011	04/22/2002	9.1
Kent Island Bay	06-01-011	05/29/2002	1
Kent Island Bay	06-01-011	06/26/2002	1
Kent Island Bay	06-01-011	07/10/2002	1
Kent Island Bay	06-01-011	08/28/2002	1
Kent Island Bay	06-01-011	09/26/2002	1
Kent Island Bay	06-01-011	10/15/2002	3.6
Kent Island Bay	06-01-011	11/20/2002	1
Kent Island Bay	06-01-011	01/09/2003	1
Kent Island Bay	06-01-011	03/25/2003	93
Kent Island Bay	06-01-011	04/14/2003	3.6
Kent Island Bay	06-01-011	06/10/2003	23
Kent Island Bay	06-01-011	07/17/2003	1
Kent Island Bay	06-01-011	08/13/2003	1
Kent Island Bay	06-01-011	08/27/2003	1
Kent Island Bay	06-01-011	09/15/2003	1
Kent Island Bay	06-01-011	10/28/2003	1
Kent Island Bay	06-01-011	11/24/2003	3.6
Kent Island Bay	06-01-016	04/26/2001	1
Kent Island Bay	06-01-016	05/09/2001	1
Kent Island Bay	06-01-016	06/13/2001	1
Kent Island Bay	06-01-016	07/31/2001	1
Kent Island Bay	06-01-016	08/14/2001	1
Kent Island Bay	06-01-016	08/23/2001	1
Kent Island Bay	06-01-016	09/27/2001	1
Kent Island Bay	06-01-016	10/30/2001	1
Kent Island Bay	06-01-016	12/12/2001	1
Kent Island Bay	06-01-016	01/29/2002	1
Kent Island Bay	06-01-016	03/28/2002	1
Kent Island Bay	06-01-016	04/11/2002	1
Kent Island Bay	06-01-016	04/22/2002	1
Kent Island Bay	06-01-016	05/29/2002	3.6
Kent Island Bay	06-01-016	06/26/2002	1
Kent Island Bay	06-01-016	07/10/2002	1
Kent Island Bay	06-01-016	08/28/2002	1
Kent Island Bay	06-01-016	09/26/2002	1
Kent Island Bay	06-01-016	10/15/2002	1
Kent Island Bay	06-01-016	11/20/2002	1
Kent Island Bay	06-01-016	01/09/2003	9.1
Kent Island Bay	06-01-016	03/25/2003	23
Kent Island Bay	06-01-016	04/14/2003	3.6
Kent Island Bay	06-01-016	06/10/2003	3.6
Kent Island Bay	06-01-016	07/17/2003	2.3
Kent Island Bay	06-01-016	08/13/2003	1

Kent Island Bay	06-01-016	08/27/2003	1
Kent Island Bay	06-01-016	09/15/2003	7.3
Kent Island Bay	06-01-016	10/28/2003	1
Kent Island Bay	06-01-016	11/24/2003	1
Kent Island Bay	06-01-202	04/26/2001	1
Kent Island Bay	06-01-202	05/09/2001	1
Kent Island Bay	06-01-202	06/13/2001	1
Kent Island Bay	06-01-202	07/31/2001	1
Kent Island Bay	06-01-202	08/14/2001	1
Kent Island Bay	06-01-202	08/23/2001	1
Kent Island Bay	06-01-202	09/27/2001	3.6
Kent Island Bay	06-01-202	10/30/2001	1
Kent Island Bay	06-01-202	12/12/2001	1
Kent Island Bay	06-01-202	01/29/2002	1
Kent Island Bay	06-01-202	03/28/2002	1
Kent Island Bay	06-01-202	04/11/2002	1
Kent Island Bay	06-01-202	04/22/2002	3.6
Kent Island Bay	06-01-202	05/29/2002	1
Kent Island Bay	06-01-202	06/26/2002	3.6
Kent Island Bay	06-01-202	07/10/2002	1
Kent Island Bay	06-01-202	08/28/2002	1
Kent Island Bay	06-01-202	09/26/2002	1
Kent Island Bay	06-01-202	10/15/2002	1
Kent Island Bay	06-01-202	11/20/2002	1
Kent Island Bay	06-01-202	01/09/2003	3.6
Kent Island Bay	06-01-202	03/25/2003	43
Kent Island Bay	06-01-202	04/14/2003	1
Kent Island Bay	06-01-202	06/10/2003	3.6
Kent Island Bay	06-01-202	07/12/2003	1
Kent Island Bay	06-01-202	08/13/2003	1
Kent Island Bay	06-01-202	08/27/2003	1
Kent Island Bay	06-01-202	09/15/2003	1
Kent Island Bay	06-01-202	10/28/2003	1
Kent Island Bay	06-01-202	11/24/2003	3.6

Table A7: Rock Creek Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Rock Creek	01-01-013	04/21/1999	1
Rock Creek	01-01-013	06/07/1999	1
Rock Creek	01-01-013	07/06/1999	1
Rock Creek	01-01-013	07/20/1999	9.1
Rock Creek	01-01-013	08/04/1999	9.1
Rock Creek	01-01-013	08/18/1999	9.1
Rock Creek	01-01-013	09/20/1999	43
Rock Creek	01-01-013	10/28/1999	1
Rock Creek	01-01-013	12/08/1999	9.1
Rock Creek	01-01-013	05/03/2000	9.1
Rock Creek	01-01-013	05/17/2000	43
Rock Creek	01-01-013	06/07/2000	23
Rock Creek	01-01-013	06/21/2000	23
Rock Creek	01-01-013	07/10/2000	43
Rock Creek	01-01-013	07/25/2000	3.6
Rock Creek	01-01-013	09/14/2000	9.1
Rock Creek	01-01-013	05/02/2001	1
Rock Creek	01-01-013	05/16/2001	3.6
Rock Creek	01-01-013	06/06/2001	1
Rock Creek	01-01-013	07/10/2001	3.6
Rock Creek	01-01-013	07/24/2001	23
Rock Creek	01-01-013	08/23/2001	1
Rock Creek	01-01-013	09/10/2001	3.6
Rock Creek	01-01-013	09/24/2001	3.6
Rock Creek	01-01-013	11/01/2001	9.1
Rock Creek	01-01-013	03/04/2002	1
Rock Creek	01-01-013	04/18/2002	1
Rock Creek	01-01-013	05/21/2002	23
Rock Creek	01-01-013	06/05/2002	43
Rock Creek	01-01-013	06/18/2002	43
Rock Creek	01-01-013	07/10/2002	23
Rock Creek	01-01-013	07/31/2002	9.1
Rock Creek	01-01-013	08/07/2002	23
Rock Creek	01-01-013	09/23/2002	9.1
Rock Creek	01-01-013	11/20/2002	43
Rock Creek	01-01-013	12/18/2002	93
Rock Creek	01-01-013	04/03/2003	1
Rock Creek	01-01-013	04/23/2003	43
Rock Creek	01-01-013	05/29/2003	43
Rock Creek	01-01-013	07/09/2003	23
Rock Creek	01-01-013	08/18/2003	1

Rock Creek	01-01-013	09/08/2003	23
Rock Creek	01-01-013	10/06/2003	21
Rock Creek	01-01-013	10/22/2003	7.3
Rock Creek	01-01-013	12/04/2003	23

Table A8: Langford Creek Fecal Coliform Observations

Basin Name	Station #	Sampling Date	Concentration (MPN/100ml)
Langford Creek	04-03-023	10/11/2001	9.1
Langford Creek	04-03-023	10/29/2001	9.1
Langford Creek	04-03-023	11/14/2001	3
Langford Creek	04-03-023	12/19/2001	9.1
Langford Creek	04-03-023	01/14/2002	1
Langford Creek	04-03-023	03/14/2002	3.6
Langford Creek	04-03-023	04/09/2002	1
Langford Creek	04-03-023	05/20/2002	3.6
Langford Creek	04-03-023	06/25/2002	1
Langford Creek	04-03-023	07/09/2002	1
Langford Creek	04-03-023	07/31/2002	1
Langford Creek	04-03-023	08/20/2002	1
Langford Creek	04-03-023	09/23/2002	1
Langford Creek	04-03-023	10/08/2002	1
Langford Creek	04-03-023	10/28/2002	15
Langford Creek	04-03-023	11/19/2002	43
Langford Creek	04-03-023	12/12/2002	3.6
Langford Creek	04-03-023	01/16/2003	3
Langford Creek	04-03-023	03/04/2003	3.6
Langford Creek	04-03-023	04/15/2003	1
Langford Creek	04-03-023	05/01/2003	1
Langford Creek	04-03-023	05/14/2003	15
Langford Creek	04-03-023	06/09/2003	240
Langford Creek	04-03-023	06/26/2003	23
Langford Creek	04-03-023	07/14/2003	1
Langford Creek	04-03-023	08/12/2003	1
Langford Creek	04-03-023	08/25/2003	3.6
Langford Creek	04-03-023	09/10/2003	1
Langford Creek	04-03-023	09/23/2003	460
Langford Creek	04-03-023	11/19/2003	9.1
Langford Creek	04-03-027	10/11/2001	9.1
Langford Creek	04-03-027	10/29/2001	9.1
Langford Creek	04-03-027	11/14/2001	1
Langford Creek	04-03-027	12/19/2001	9.1
Langford Creek	04-03-027	01/14/2002	1
Langford Creek	04-03-027	03/14/2002	1
Langford Creek	04-03-027	04/09/2002	1
Langford Creek	04-03-027	05/20/2002	3.6
Langford Creek	04-03-027	06/25/2002	1
Langford Creek	04-03-027	07/09/2002	23
Langford Creek	04-03-027	07/31/2002	1

Langford Creek	04-03-027	08/20/2002	1
Langford Creek	04-03-027	09/23/2002	3.6
Langford Creek	04-03-027	10/08/2002	7.3
Langford Creek	04-03-027	10/28/2002	43
Langford Creek	04-03-027	11/19/2002	240
Langford Creek	04-03-027	12/12/2002	3.6
Langford Creek	04-03-027	01/16/2003	1
Langford Creek	04-03-027	03/04/2003	3.6
Langford Creek	04-03-027	04/15/2003	1
Langford Creek	04-03-027	05/01/2003	9.1
Langford Creek	04-03-027	05/14/2003	23
Langford Creek	04-03-027	06/09/2003	240
Langford Creek	04-03-027	06/26/2003	3
Langford Creek	04-03-027	07/14/2003	1
Langford Creek	04-03-027	08/12/2003	1
Langford Creek	04-03-027	08/25/2003	1
Langford Creek	04-03-027	09/10/2003	3
Langford Creek	04-03-027	09/23/2003	75
Langford Creek	04-03-027	11/19/2003	23
Langford Creek	04-03-028	05/20/2002	15
Langford Creek	04-03-028	06/25/2002	1
Langford Creek	04-03-028	07/09/2002	3
Langford Creek	04-03-028	07/31/2002	1
Langford Creek	04-03-028	08/20/2002	1
Langford Creek	04-03-028	09/23/2002	1
Langford Creek	04-03-028	10/08/2002	3
Langford Creek	04-03-028	10/28/2002	93
Langford Creek	04-03-028	11/19/2002	240
Langford Creek	04-03-028	12/12/2002	1
Langford Creek	04-03-028	01/16/2003	1
Langford Creek	04-03-028	03/04/2003	9
Langford Creek	04-03-028	04/15/2003	3
Langford Creek	04-03-028	05/01/2003	1
Langford Creek	04-03-028	05/14/2003	9
Langford Creek	04-03-028	06/09/2003	460
Langford Creek	04-03-028	06/26/2003	7
Langford Creek	04-03-028	07/14/2003	1
Langford Creek	04-03-028	08/12/2003	3
Langford Creek	04-03-028	08/25/2003	1
Langford Creek	04-03-028	09/10/2003	7
Langford Creek	04-03-028	09/24/2003	43