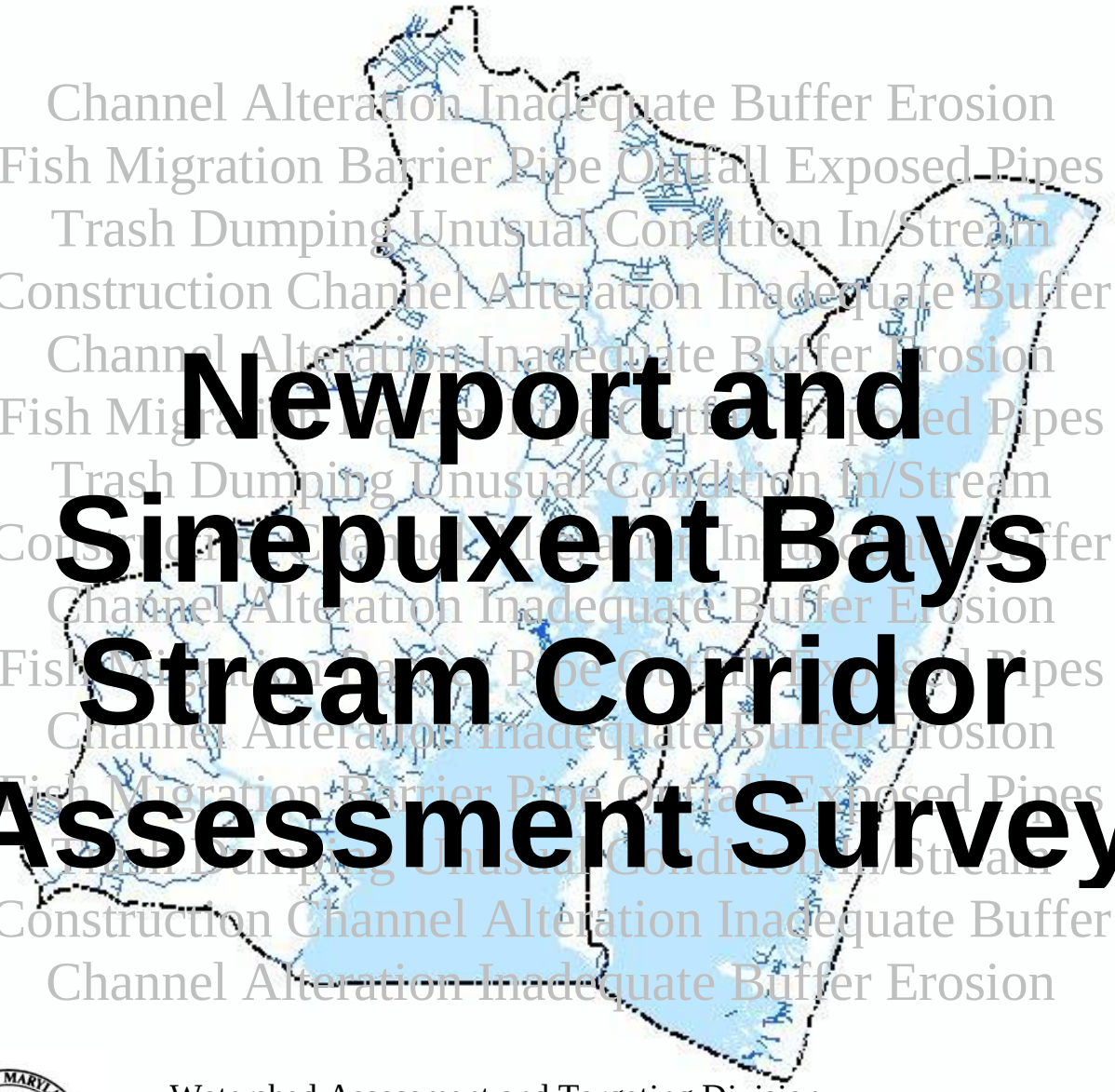

Newport and Sinepuxent Bays Stream Corridor Assessment Survey

Watershed Assessment and Targeting Division
Watershed Services Unit
Maryland Department of Natural Resources
2004

Robert L. Ehrlich, Jr.
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NEWPORT AND SINEPUXENT BAYS STREAM CORRIDOR ASSESSMENT

BY

Anne Patterson & Ken Yetman
Watershed Assessment and Targeting Division
Watershed Services Unit
Maryland Department of Natural Resources

2004

Financial Assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration (NOAA). A report of the Maryland Coastal Zone Management Program, Department of Natural Resources pursuant to NOAA Award No. NA170Z2337

SUMMARY

In 1998, the Maryland Clean Water Action Plan identified the Newport Bay watershed as one of the State's water bodies that did not meet water quality requirements. In response to this finding, the Maryland Department of Natural Resources (DNR) and Worcester County formed a partnership to develop a Watershed Restoration Action Strategy (WRAS) for the Newport Bay watershed and the neighboring Sinepuxent Bay watershed. The following Stream Corridor Assessment (SCA) survey is part of the WRAS development process.

The SCA survey provides descriptive and positional data for potential environmental problems along a watershed's non-tidal stream network. Developed by DNR's Watershed Services Unit, the survey is a watershed management tool to identify environmental problems and help prioritize restoration opportunities on a watershed basis. As part of the survey, specially trained personnel walk a watershed's streams and record data and the location for several environmental problems that can be easily observed within the stream corridor. Each potential problem site is ranked on a scale of one to five for its severity, correctability, and access for restoration work.

SCA survey fieldwork for the Newport and Sinepuxent Bays began in May 2003 and was completed by July 2003. To complete the survey, field crews walked over 130 miles of streams. Survey teams did not have access to all the watersheds' streams and did not survey tidal areas.

Over the streams assessed, survey teams identified 211 potential environmental problem sites. At the time of the survey, the most frequently observed potential problem sites were channel alterations, reported at 72 sites (or 67.26 miles of stream), and inadequately forested stream buffers, reported at 70 sites (or 61.38 miles of stream). Channel alterations ranked from severe to minor in severity, while inadequate buffer sites ranked from very severe to minor. Other potential environmental problems recorded during the survey included: 19 pipe outfalls, 17 fish barriers, 14 erosion sites, 12 unusual conditions, 6 trash dumping sites, 1 exposed pipe, and no in- or near-stream construction sites (Table 1). These sites all ranked from moderate to minor in severity. Opportunities exist to restore potential problem sites in all categories to increase fish and wildlife habitat, other natural resources, and resource services. Additionally, crews recorded descriptive habitat condition data at 43 representative sites.

The Stream Corridor Assessment Survey is a rapid overview of the entire stream network in order to determine the location of potential environmental problems and to collect some basic habitat information about its streams. The value of the present survey is its help in placing individual stream problems into their watershed context and its potential common use among resource managers and land-use planners to cooperatively and consistently prioritize future restoration work. Results of the present survey will be given to the Newport and Sinepuxent Bay Watersheds WRAS committee, which is developing a Watershed Restoration Action Strategy for the Newport and Sinepuxent Bays. Information on the Newport and Sinepuxent Watershed Action Strategy can be found on the Department of Natural Resources' website (www.dnr.state.md.us/watersheds/surf/proj/wras.html).

ACKNOWLEDGEMENTS

Without the hard work and dedication of the Lower Eastern Shore Crew of the Maryland Conservation Corps, this survey would not have been possible. The crew chief during the survey was Angela Baldwin. The crewmembers were Julie Dyer, Christianna Fry, Lydia Menendez, Elizabeth Trosper, Katie Basiotis, and Tina Saunders.

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INTRODUCTION

In 1998, Maryland's Clean Water Action Plan identified bodies of water that failed to meet water quality requirements or other natural resource goals. One of the areas identified in the report was the Newport Bay watershed. This watershed encompasses approximately 46,205 acres of land and water in the Coastal Plain of Maryland's Eastern Shore (Figure 1). In response to the findings of the Maryland Clean Water Action Plan, the Maryland Department of Natural Resources formed a partnership with Worcester County to assess and improve environmental conditions in the Newport Bay and neighboring Sinepuxent Bay watersheds. The main goal of this partnership is to develop and implement a Watershed Restoration Action Strategy (WRAS) for the Newport and Sinepuxent Bays.

The Newport and Sinepuxent Bays are two of Maryland's five coastal bays. Located in central Worcester County, the two watersheds combined cover approximately 34,295 acres of land (72.2 square miles) and 11,909 acres of water (18.6 square miles). According to Maryland Department of Planning land use data (2000), the land use in the two watersheds is 39.5 percent forest, 28.2 percent cropland, 14.3 percent wetlands, 8.12 percent residential, 2.6 percent beaches, 2.4 percent open urban land (including highways), and 2.0 percent commercial. Individually, the Newport Bay watershed encompasses about 27,242 acres of land and approximately 5,251 acres of water and has 84 percent landcover within the watershed boundary. The Sinepuxent Bay watershed includes 7,053 acres of land and approximately 6,658 acres of water and has 51 percent landcover. Figure 2 shows a digital orthophoto map of the watersheds. Figure 3 shows the same watershed boundaries superimposed on a 7.5 minute USGS topographic quadrangle maps.

The first step in developing a Restoration Action Strategy for these two watersheds is to complete an overall assessment of the condition of the watersheds and the streams they contain. This initial step was accomplished using three approaches. First, a watershed characterization was completed that compiles and analyzes existing water quality, land use, and living resource data about the watersheds (Shanks, 2003). Secondly, a synoptic water quality survey, as well as surveys of the fish and macroinvertebrate communities, was conducted at selected stations throughout the Newport and Sinepuxent Bay watersheds to provide information on the present condition of aquatic resources (Primrose, 2003). Lastly, a Stream Corridor Assessment (SCA) survey was completed for the watersheds' non-tidal stream network to provide specific information on the present location of potential environmental problems and restoration opportunities. This report details the results of the Newport and Sinepuxent Bay Stream Corridor Assessment Survey and highlights potential restoration opportunities within the watershed based on the survey.

Survey teams walked over 130 miles of the Newport and Sinepuxent stream network from May 2003 to July 2003. At each site during the survey, field crews collected descriptive data, recorded the location on field maps, and took a photograph to document each potential environmental problem observed. As an aid to prioritizing future restoration work, crews rated all problem sites on a scale of one to five in three categories: 1) how ***severe*** the problem is compared to others in its category; 2) how ***correctable*** the specific problem is using current restoration techniques; and 3) how ***accessible*** the site is for work crews and any machinery necessary to complete restoration work. In addition, field teams collect descriptive data for both

in- and near-stream habitat conditions at representative sites spaced at approximately ½ to 1-mile intervals along the stream.

One of the main goals of the Newport and Sinepuxent Bay SCA survey is to compile a list of observable environmental problems in these watersheds in order to most successfully target future restoration efforts. Once this list is compiled and distributed, county planners, resource managers, and others can initiate a dialog to cooperatively set the direction and goals for the watersheds' management and plan future restoration work at specific problem sites. All of the problems identified as part of the Newport and Sinepuxent Bay Stream Corridor Assessment survey can be addressed through existing State or Local government programs.

To this end, the Maryland Department of Natural Resources is working with Worcester County to develop a Watershed Restoration Action Strategy (WRAS) of the Newport and Sinepuxent Bay Watersheds. As part of this process, data collected during the SCA survey will be used to help define present environmental conditions and possible restoration opportunities in the watershed. This information, combined with the watershed characterization, synoptic water quality surveys, recent biological surveys, and local knowledge of the watershed will be used to develop a Watershed Restoration Action Strategy for the Newport and Sinepuxent Bays. The Watershed Restoration Action Strategy, in turn, will help guide future restoration efforts with the ultimate goals of restoring the area's natural resources and meeting State water quality standards.

Newport and Sinepuxent Bay Watersheds

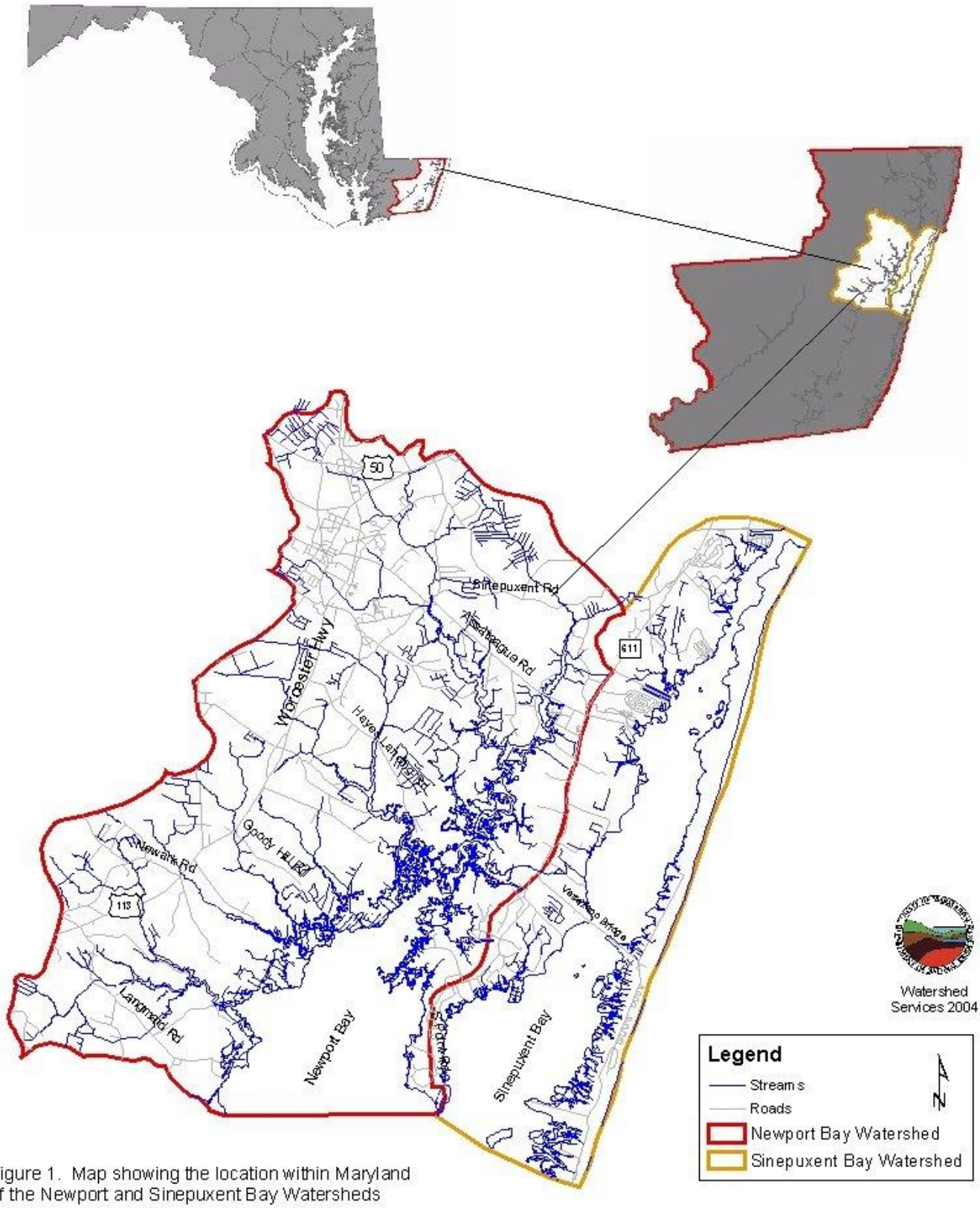


Figure 1. Map showing the location within Maryland of the Newport and Sinepuxent Bay Watersheds

Newport and Sinepuxent Bay Watersheds

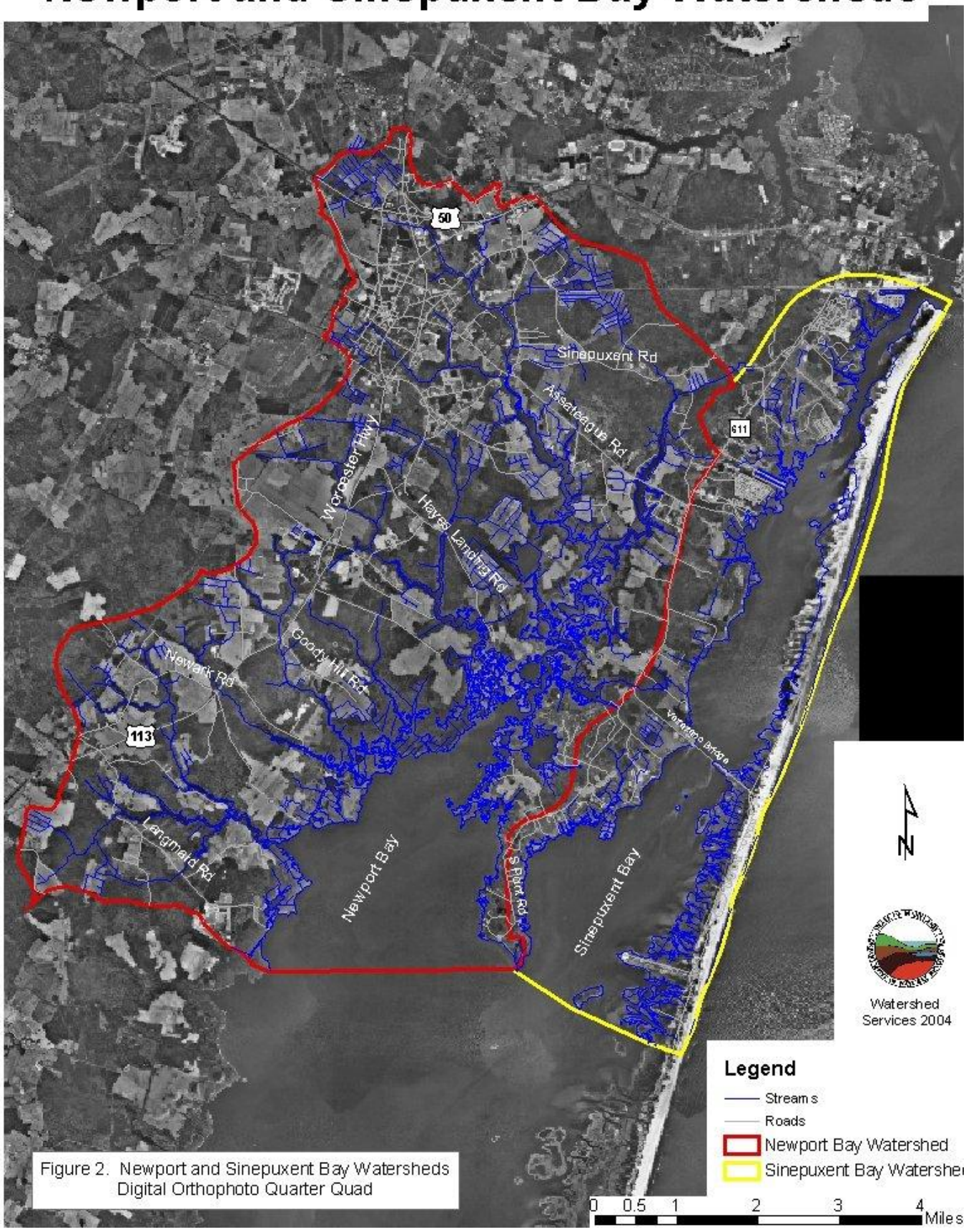


Figure 2. Newport and Sinepuxent Bay Watersheds Digital Orthophoto Quarter Quad

Newport and Sinepuxent Bay Watersheds

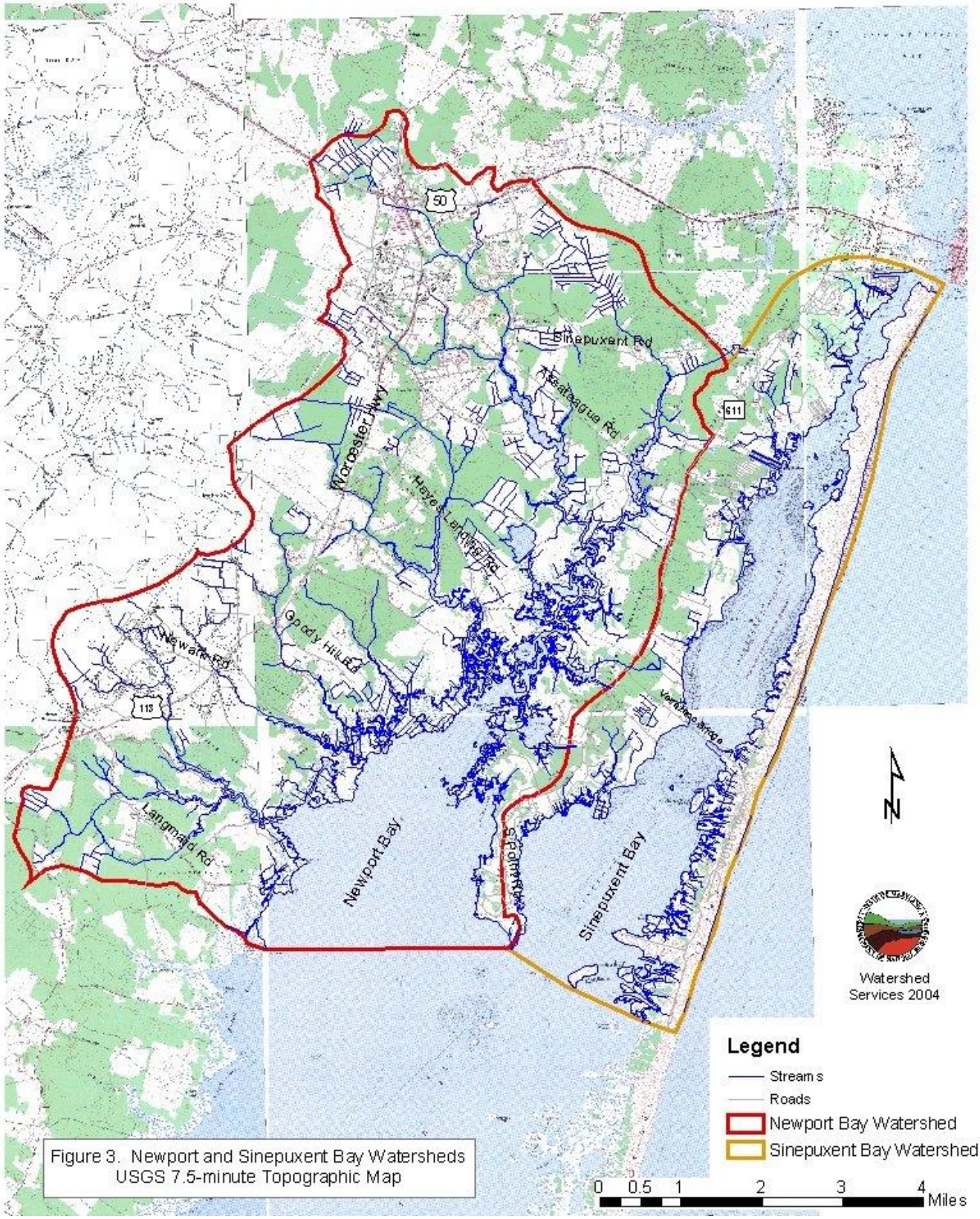


Figure 3. Newport and Sinepuxent Bay Watersheds
USGS 7.5-minute Topographic Map

METHODS

Goals of the SCA Survey

To help identify some of the common problems that affect streams in a rapid and cost effective manner, the Watershed Services Unit of the Maryland Department of Natural Resources developed the Stream Corridor Assessment (SCA) survey. The four main objectives of the survey are to provide:

1. A list of observable environmental problems present within a stream system and along its riparian corridor.

2. Sufficient data on each problem in order to make a preliminary determination of both the severity and correctability of each problem.

3. Sufficient data to prioritize restoration efforts can be prioritized.

4. A quick assessment of both in- and near-stream habitat conditions to make comparisons among the conditions of different stream segments.

The SCA survey provides a rapid method of examining and cataloguing the observable environmental problems within an entire drainage network to better target future monitoring, management and/or conservation efforts. This survey is not a detailed scientific survey, nor will it replace chemical and biological surveys in determining overall stream conditions and health. One advantage of the SCA survey over chemical and biological surveys is that the SCA survey can be done on a watershed basis both quickly and at relatively low cost.

Maryland's SCA survey is both a refinement and systematization of an old approach – the stream walk survey. Many of the common environmental problems affecting streams can be straightforward to identify by an individual walking along a stream. These include: excessive stream bank erosion, blockages to fish migration, stream segments without trees along their banks, or a sewage pipeline exposed by stream bank erosion leaking sewage into the stream. With a limited amount of training, most people can correctly identify these common environmental problems.

Over the years, many groups standardized a stream walk survey approach for their particular purpose or interest. Many earlier approaches, such as EPA's, "Streamwalk Manual" (EPA, 1992), Maryland Save our Stream's "Conducting a Stream Survey," (SOS, 1970) and Maryland Public Interest Research Foundation "Streamwalk Manual" (Hosmer, 1988), focused on utilizing citizen volunteers with little or no training. While these surveys can be a good guide for citizens interested in seeing their community's streams, the data collected during these surveys can vary significantly based on the background of the surveyor. In the ***Maryland Save our Stream*** "Stream Survey," for example, training for citizen groups includes giving guidance on how to organize a survey and a slide show explaining how to complete the field work. After approximately one hour of training, citizen volunteers are sent out in groups to walk designated stream segments. During the survey, volunteers usually walk their assigned stream segment in under a few hours and return their data sheets to the survey organizers for analysis. While these

surveys can help make communities more aware of the problems present in their local stream, citizen groups normally do not have the expertise or resources to properly analyze or fully interpret the collected information. In addition, the data collected from these surveys often only indicates that a potential environmental problem exists at a specific location, but it does not provide sufficient information to judge the severity of the problem.

Other visual stream surveys, such as the National Resources Conservation Service's "Stream Visual Assessment Protocols" (NRCS, 1998), are designed for use by trained professionals analyzing a very specific stream reach type, such as at a stream passing through an individual farmer's property. While this survey can provide useful information on a specific stream segment, it is usually not carried out on a watershed basis.

The Maryland SCA survey bridges the gap between these two approaches. The survey is designed to be completed by a small group of well-trained individuals who walk the entire stream network in a watershed. While those working on the survey are usually not professional natural resource managers, they do receive several days of training in both stream ecology and SCA survey methods.

Field Training and Procedure

While almost any group of dedicated volunteers can be trained to do a SCA survey, the Maryland Conservation Corps (MCC) has proven to be an ideal group to do this work in Maryland. The Maryland Conservation Corps is part of the AmeriCorps Program, initiated to promote greater involvement of young volunteers in their communities and the environment. The MCC program is managed by DNR's Forest and Park Service. Volunteers with the MCC are 17-25 years old and can have educational backgrounds ranging from high school to graduate degrees. With the proper training and supervision, MCC volunteers are able to significantly contribute to the State's efforts to inventory and evaluate water quality and habitat problems from a watershed perspective. For more information on the Maryland Conservation Corps call their main office in Annapolis at (410) 260-8166 or visit their web site at: www.dnr.state.md.us/mcc.

Prior to the start of Newport and Sinepuxent SCA Survey, the members of the MCC's Lower Eastern Shore Crew received training in assessing both environmental problem sites and habitat conditions in and along Maryland streams. For problem sites, crewmembers learned how to identify common problems observable within the stream corridor, record problem locations on survey maps, and accurately complete data sheets for each specific problem type. For habitat conditions, the crew learned and practiced assessing stream health based on established criteria indicating both favorable conditions for macroinvertebrates and fish and healthy riparian habitat. These reference sites for habitat condition are located at approximately 1/2- to 1-mile intervals along the stream. In addition, the field crew reviewed a standard procedure for assigning site numbers based on the 3-digit map number, 1-digit team number, and 2-digit problem number for each problem and reference site during the survey. Lastly, in order to have a visual record of existing conditions at the time of the SCA survey, the MCC's Lower Eastern Shore Crew received guidelines for taking photographs at all problem and reference sites.

Several weeks prior to the beginning of the survey, property owners along the stream reach received letters informing them of what the survey is and when it was to be completed. This letter also provided a phone number to call if individuals did not want MCC crews

surveying the stream on their property. In addition, survey crews were not to cross fence lines or enter any areas that are marked "No Trespassing" unless they had specific permission from the property owner.

The MCC crew conducted field surveys of the Newport and Sinepuxent Bay Watersheds from May to July 2003. The survey teams walked most of the Bays' drainage network, collecting information on potential environmental problems. Those commonly identified during the SCA Survey include: inadequate stream buffers, excessive bank erosion, channelized stream sections, fish migration blockages, in or near stream construction, trash dumping sites, unusual conditions, and pipe outfalls. In addition, the survey recorded information on the general condition of in-stream and riparian habitats and the location of potential wetland creation sites.

More detailed information on the procedures used in the Maryland SCA survey can be found in, "Stream Corridor Assessment Survey – Survey Protocols" (Yetman, 2001). A copy of the survey protocols can found on DNR's web site at http://www.dnr.state.md.us/streams/pubs/other.html. Hard copies of the protocols also can be obtained by contacting the Watershed Services Unit of the Maryland Department of Natural Resources, Annapolis, MD.

Overall Ranking System

The SCA survey field crews evaluate and score all problems on a scale of 1 to 5 in three separate areas: problem severity, correctability, and accessibility. A major part of the crew's training on survey methods is devoted to properly rating the different problems identified during the survey. This ranking system developed from an earlier survey that found 453 potential environmental problems along 96 miles of stream of the Swan Creek Watershed in Harford County. The most frequently reported problem during the survey was stream bank erosion, reported at 179 different locations (Yetman et. al., 1996). Follow-up surveys found that while stream bank erosion was a common problem throughout the watershed, the severity of the erosion problem varied substantially among the sites and that the erosion problems at many sites were minor in severity. Based on this experience and its goal of helping to prioritize restoration work, the SCA survey rates the severity, correctibility, and access of each problem site.

While the ratings are subjective, they have proven to be very valuable in providing a starting point for more detailed follow-up evaluations. Once the SCA survey is completed, the collected data can be used by different resource professionals to help target future restoration efforts. A regional forester, for example, can use data collected on inadequate stream buffers to help plan future riparian buffer plantings, while the local fishery biologist can use the data on fish blockages to help target future fish passage projects. The inclusion of a rating system in the survey gives resource professional an idea of which sites the field crew believed were the most severe, easiest to correct and easiest to access. This information combined with photographs of the site can help resource managers focus their own follow up evaluations and fieldwork at the most important sites.

A general description of the rating system is given below. More specific information on the criteria used to rate each problem category is provided in the *SCA – Survey Protocol*s (Yetman, 2000). It is important to note that the rating system is designed to contrast problems within a specific problem category and is not intended to be applied across categories. When

assigning a severity rating to a site with an inadequate stream buffer for example, the rating is only intended to compare the site to other in the State with inadequate stream buffers. A trash dumping site with a very severe rating may not necessarily be a more significant environmental problem than a stream bank erosion site that received a moderate severity rating.

The **severity** rating indicates how bad a specific problem is relative to others in the same problem category. It is often the most useful rating because it answers questions such as: where are the worst stream bank erosion sites in the watershed, or where is the largest section of stream with an inadequate buffer? The scoring is based on the overall impression of the survey team of the severity of the problem at the time of the survey, based on the established criteria for each problem category (Yetman, 2000).

* A very severe rating of 1 is used to identify problems that have a direct and wide reaching impact on the stream's aquatic resources. Within a specific problem category, a very severe rating indicates that the problem is among the worst that the field teams have seen or would expect to see. Examples include a discharge from a pipe that was discoloring the water over a long stream reach (greater than 1000 feet) or a long section of stream (greater than 1000 feet) with high raw vertical banks that are unstable and eroding at a rapid rate.

* A moderate severity rating of 3 is identifies problems that have some adverse environmental impacts but the severity and/or length of affected stream is fairly limited. While a moderate severity rating would indicate that field crews did believe it was a significant problem, it also indicates that they have seen or would expect to see worse problems in the specific problem category. Examples include: a small fish blockage that is passable by strong swimming fish like trout, but a barrier to resident species such as sculpins or a site where several hundred feet of stream has an inadequate forest buffer.

* A minor severity rating of 5 identifies problems that do not have a significant impact on stream and aquatic resources. A minor rating indicates that a problem is present, but compared to other problems in the same category it is considered minor. One example of a site with a minor rating is an outfall pipe from a storm water management structure that is not discharging during dry weather and does not have an erosion problem at the outfall or immediately downstream. Another example is a section of stream with stable banks that has a partial forest buffer less than 50 feet wide along both banks.

The **correctability** rating provides a relative measure on how easily the field teams believe the problem can be corrected. The correctability rating can be helpful in determining which problems can be easily dealt with when developing a restoration plan for a drainage basin. One restoration strategy, for example, would initially target the severest problems that are the easiest to fix. The correctability rating also can be useful in identifying simple projects that can be done by volunteers, as opposed to projects that require more significant planning and engineering efforts to complete.

* A minor correctability rating of 1 indicates problems that can be corrected quickly and easily using hand labor, with a minimal amount of planning. These types of projects would usually not need any Federal, State or local government permits. It is a job that small group of volunteers (10 people or less) could fix in a day or two without using

heavy equipment. Examples include removing debris from a blocked culvert pipe, removing less than two pickup truck loads of trash from an easily accessible area or planting trees along a short stretch of stream.

* A moderate correctability rating of 3 indicates sites that may require a small piece of equipment, such as a backhoe, and some planning to correct the problem. This would not be the type of project that volunteers would usually do alone, although volunteers could assist in some aspects of the project, such as final landscaping. This type of project would usually require a week or more to complete. The project may require some local, State or Federal government notification or permits. However, environmental disturbance would be small and approval should be easy to obtain.

* A very difficult correctability rating of 5 indicates problems that would require a large expensive effort to correct. These projects would usually require heavy equipment, significant amount of funding ($100,000 or more), and construction could take a month or more. The amount of disturbance would be large and the project would need to obtain a variety of Federal, State and/or local permits. Examples include a potential restoration area where the stream has deeply incised several feet over a long distance (i.e., several thousand feet) or a fish blockage at a large dam.

The **accessibility** rating provides a relative measure of how difficult it is to reach a specific problem site. The rating is made at the site by the field survey team, using a survey map and field observations. While factors such as land ownership and surrounding land use can enter into the field judgments of accessibility, the rating assumes that access to the site could be obtained if requested from the property owner.

* A very easy accessibility rating of 1 indicates sites that are readily accessible both by car and on foot. Examples include a problem in an open area inside a public park where there is sufficient room to park safely near the site.

* A moderate accessibility rating of 3 indicates sites that are easily accessible by foot but not easily accessible by a vehicle. Examples would include a stream section that can be reached by crossing a large field or a site that is accessible only by 4-wheel drive vehicles.

* A very difficult accessibility rating of 5 is assigned to sites that are difficult to reach both on foot and by a vehicle. To reach the site it would be necessary to hike at least a mile, and if equipment were needed to do the restoration work, an access road would need to be built through rough terrain. Examples include a site where there are no roads or trails nearby.

Data Analysis and Presentation

Following the completion of the survey, crews entered and information from the field data sheets into a Microsoft Access database and verified the accuracy of the data. Field crews labeled and organized the 690 photographs taken during the survey by site number and placed them in binders in both print and digital form. Members of the Department of Natural Resources' Watershed Services Unit incorporated the map location, recorded data, and digitized

photographs into the ArcGIS computer software. The GIS project is an electronic geodatabase that integrates all the collected problem locations and descriptive data by site number, links photographs to each potential problem site, and produces the maps presented in this report. This data can then be used alongside of other digital geographic datasets available for features within the watersheds. A final copy of the ArcView files was given to the Worcester County Planning Department for their use in developing a Watershed Action Strategy for the Newport and Sinepuxent Bay Watersheds.

RESULTS

The Stream Corridor Assessment identified a total of 211 potential environmental problems within the stream corridor (Table 1). Of these, 13 are considered very severe, 22 severe, 18 moderate, 25 of low severity, and 29 minor within their potential problem category. At the time of the survey, the most frequently observed potential problem sites were channel alterations, reported at 72 sites (or 67.26 miles of stream) and inadequately forested stream buffers, reported at 70 sites (or 61.28 miles of stream). These categories occurred on 58.32 percent and 53.29 percent, respectively, of all streams walked during the survey. Nineteen channel alterations are ranked as severe due to their greater length, ranging from 3,400 to 55,400 feet. Thirty-five inadequate forest buffers are ranked as very severe or severe, due to a forest buffer width of zero on both sides of the stream and a greater length, ranging from 2,200 to 55,400 feet. There are fewer than 20 potential problem sites within each of the additional problem categories recorded during the survey, all ranked from minor to moderate in severity.

Table 1 presents a summary of survey results, Table 2 is a summary by stream reach, and Table 3 lists potential problem sites in separate categories occurring together at the same site. Appendices A and B list the data collected during the survey. Appendix A provides a listing of information by site number and location, referenced by both tributary name and latitude and longitude. Information in this format is useful to determine what problems are present along a specific stream reach. In Appendix B, the data is presented by problem type and lists the collected descriptive data. Presenting the data by problem type allows the reader to see which problems are rated as most severe or easiest to correct within each category. Result categories are discussed further in order of those with the greatest number of sites to those with the least.

Table 1. Summary of results from the Newport and Sinepuxent Bay SCA Survey.

Potential Problems Identified	Number of Sites	Estimated Length	Percentage of Survey Length	Very Severe	Severe	Moderate	Low Severity	Minor
Channel Alteration	72	355,122 feet (67.26 miles)	58.32%	--	20	17	21	14
Erosion	15	14,015 feet (2.65 miles)	2.30%	--	--	4	5	5
Exposed Pipe	1			--	--	--	--	1
Fish Barrier	17			--	--	4	3	10
In- or Near-stream Construction	--			--	--	--	--	--
Inadequate Buffer	70	323,570 feet (61.28 miles)	53.29%	13	22	13	12	10
Pipe Outfall	21			--	--	2	8	11
Trash Dumping	6			--	--	--	2	4
Unusual Condition	12			--	--	2	5	5
Total	**211**			**13**	**31**	**43**	**55**	**59**
Comments	**48**							
Representative Sites	**43**							

Table 2. Summary of results by major stream reach.

Stream Name	Channel Alteration	Erosion	Exposed Pipes	Fish Barrier	In- or Near-stream Construction	Inadequate Buffer	Pipe Outfall	Trash Dumping	Unusual Conditions	TOTAL	Comments	Representative Sites
Ayer Creek	8 (85,340 feet)	--	--	2	--	8 (82,950 feet)	11	1	1	**29**	**4**	**4**
Bassett Creek	3 (2,800 feet)	2 (105 feet)	--	2	--	5 (11,900 feet)	--	--	1	**11**	**2**	**3**
Beavertown Creek	1 (1,400 feet)	--	--	--	--	--	--	1	--	**2**	**2**	**--**
Bottle Branch	1 (15,375 feet)	1 (5 feet)	1	2	--	2 (15,580 feet)	2	1	1	**11**	**2**	**3**
Catbird Creek	2 (2,700 feet)	--	--	--	--	3 (5,700 feet)	--	--	--	**5**	**2**	**--**
Goody Hill Branch	3 (13,100 feet)	1 (40 feet)	--	--	--	2 (3,800 feet)	--	--	--	**6**	**--**	**--**
Holland Creek	--	--	--	--	--	1 (1,000 feet)	--	--	--	**1**	**--**	**--**
Hudson Branch	1 (3,600 feet)	1 (5 feet)	--	--	--	1 (3,640 feet)	--	1	--	**4**	**--**	**--**
Icehouse Branch	4 (13,200 feet)	1 (100 feet)	--	--	--	2 (4,600 feet)	--	--	1	**8**	**1**	**1**
Kitts Branch	6 (81,320 feet)	4 (2,760 feet)	--	3	--	6 (83,580 feet)	9	1	--	**29**	**8**	**7**
Marshall Creek	4 (3,937 feet)	--	--	1	--	6 (12,800 feet)	--	--	1	**12**	**5**	**6**
Massey Branch	8 (9,200 feet)	--	--	2	--	11 (12,250 feet)	--	--	6	**27**	**5**	**9**
Newport Bay	4 (15,800 feet)	--	--	--	--	--	--	--	--	**4**	**8**	**--**
Newport Creek	9 (53,400 feet)	--	--	1	--	6 (22,100 feet)	--	1	1	**19**	**10**	**5**
Orchard Creek	--	--	--	--	--	1 (2,800 feet)	--	--	--	--	**1**	--
Poplartown Branch	1 (1,000 feet)	1 (2,400 feet)	--	--	--	1 (5,400 feet)	--	--	1	**4**	**1**	**2**
Porter Creek	2 (1,500 feet)	1 (6,800 feet)	--	1	--	2 (4,400 feet)	--	--	1	**6**	**1**	**3**
Sinepuxent Bay	11 (23,550 feet)	--	--	--	--	2 (3,100 feet)	--	--	--	**13**	--	**1**
Trappe Creek	6 (26,500 feet)	--	--	3	--	8 (29,300 feet)	--	--	--	**16**	--	**2**
Tukesburgh Branch	--	1 (1,800 feet)	--	--	--	1 (6,600 feet)	1	--	--	**3**	--	**1**

Table 3. Potential problem types occurring at the same site.

Potential Problem Types	Number of Sites	Percentage of Problem Type Total
Channel Alteration with Inadequate Buffer	65	90.28%
Channel Alteration with Erosion	7	9.72%
Erosion with Channel Alteration	7	50.00%
Inadequate Buffer with Channel Alteration	63	90.00%
Inadequate Buffer with Erosion	6	8.57%

Channel Alterations

Channel alterations are sections where the stream's banks or channel are significantly altered from their naturally-occurring structure or condition. These channelized streams are straightened, deepened, and/or the banks hardened using rock, gabion baskets or concrete over a significant length of stream (usually 100 feet or more). Most frequently, channels are altered to decrease the likelihood of flooding by increasing the stream velocity through an area, making stream channelization more common near development or roadways. On Maryland's Eastern Shore, earth channels also are created for drainage purposes.

For the purposes of this survey, there are three types of channel alternations *not* recorded. The first are tributaries where the entire stream branch is piped underground and storm drains replace the stream channel. While these stream sections are significantly altered, it is not possible to know precisely where this was done by walking the stream corridor. Secondly, crews do not specifically record road crossings unless a significant portion of the stream above or below the road is channelized. Lastly, the survey does not report places where a small section of only one side of the stream bank is stabilized to reduce erosion.

Results of this survey show recognizably altered stream channels at 72 sites. The severity and location of channel alteration sites is shown in Figure 4a. The total length of stream affected by channelization is estimated to be 355,122 feet (67.26 miles), or 58.32 percent of streams surveyed. Channel alteration sites occur with inadequate forest buffer sites at 65 sites, or for 90 percent of the channelized stream length (Table 3). Nine of the 20 tributaries in these two watersheds have channel alterations for greater than 10,000 feet of their length. The majority of sites, 71 out of 72, are earth channels, areas where the stream is straightened and/or deepened to increase both surface drainage and water passage. At the remaining site, NS181301, the stream was hardened using rip-rap for about 40 feet below a road crossing.

Severity rankings for the sites range from minor to severe and are fairly evenly distributed over these four rankings (Figure 4b). The severity of channel alterations is based on both the channel type and the length of the site. The presence of hardened stream banks using concrete or rock, or a total length of over a thousand feet, increases the severity of a site. No channel alteration site in these watersheds is ranked as very severe. This is due to the greater habitat potential of earth channels, which can more easily develop and support vegetation, stream sinuosity, and refuge areas for wildlife within the channel bed than areas with a hardened stream channel.

Twenty sites within these watersheds are ranked as severe due to a length of over 3,000 feet. Table 4 presents a summary of the lengths of channel alteration sites in the Newport and Sinepuxent Bay watersheds. In addition to channel type and site length, the potential fish and wildlife habitat available within the channel was a factor in evaluating severity. Sites that showed signs of forming bends, having natural banks, or supporting forest or wetland vegetation over a considerable length of the total site rank as less severe than those sites without these characteristics. The presence of vegetation and sediment in the channel are two factors recorded in the survey that may indicate a higher habitat potential for the earth channel. Fourteen of the 72 channel alteration sites supported both vegetation and sediment in the channel. These 14 sites are over 127,500 feet (24 miles) in length, or about 36 percent of the total length of channel alteration sites in the two watersheds. Table 5 presents a summary of the presence of these two factors within channel alteration sites.

Restoring channel alteration sites can increase fish and wildlife habitat and may allow for more time for nutrient uptake in the waterway. In its simplest form, restoration for earth channels would include allowing vegetation and/or tree roots to stabilize the sediment along the channel, causing sinuosity to re-form naturally. This sinuosity may reform within the bed of the channelization or along its banks, depending on the site and the depth of the channel alteration.

Sites located on tributaries that do not have much other channel alteration already present may be particularly suited to this type of passive restoration process. Areas within the Newport and Sinepuxent Bay watersheds that may be potential restoration sites of this kind include, but are not limited to: NS093301, NS139103, NS148101, NS162201, NS176203, and NS212103. These sites have an existing section of woods or shrubs lining the channel alteration site that could aid in the restoration of the site over time. In addition, many of these sites are in the headwaters of the tributary. In general, improving habitat conditions, such as restoring a sinuous channel flow and providing root stabilization, in the headwaters of a stream can help influence and improve the habitat downstream of the site as well.

Channel alterations that run directly into either the Newport or Sinepuxent Bay also may be particularly beneficial to restore, as it may increase the nutrient uptake of the waterways that directly run into the bays. Sites that are direct into either bay and have existing shrubs or small trees along the banks of the stream include: NS077201, NS099101, NS107102, NS141201, NS173201, NS198101, NS207301, and NS304002. In any area where restoring the channel alteration may not be practical at this time, allowing vegetation and some sinuosity to form in the bottom of the channel may provide more of these same natural resource benefits than an actively altered channel can provide.

Table 4. Summary of channel alteration site lengths.

Site Type	Number of Sites	Mean Length	Most Frequent Length	Median Length	Range of Lengths
Channel Alteration	72	4,786.96 feet	2,400 feet	2,400 feet	40 - 55,400 feet

Table 5. Summary of factors affecting habitat potential in channel alteration sites.

	Vegetation in Channel	Sediment in Channel	Vegetation and Sediment
Number of Sites	57	18	14
Percentage of Sites	79.20%	25.00%	19.40%
Estimated Length	293,730 feet (55.63 miles)	144,940 feet (27.45 miles)	127,540 feet (24.16 miles)
Percentage of Length	82.70%	40.81%	35.90%

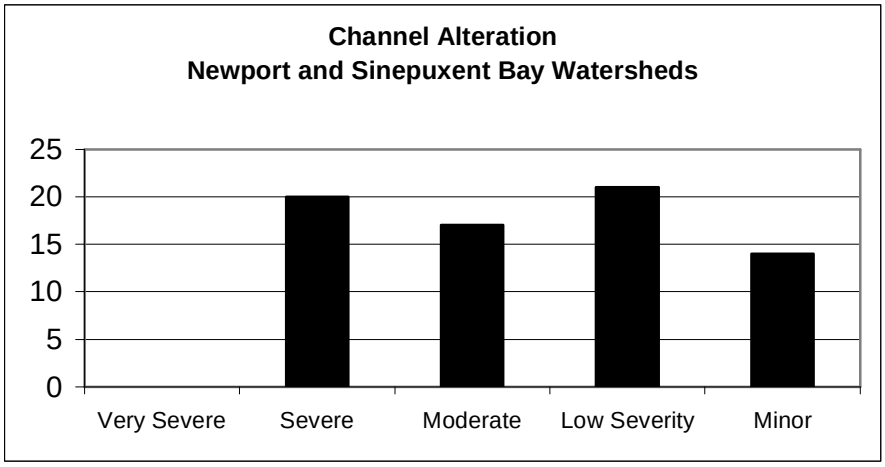


Figure 4b. Histograph showing the frequency of severity ratings given to channel alteration sites during the Newport and Sinepuxent Bays' SCA survey.

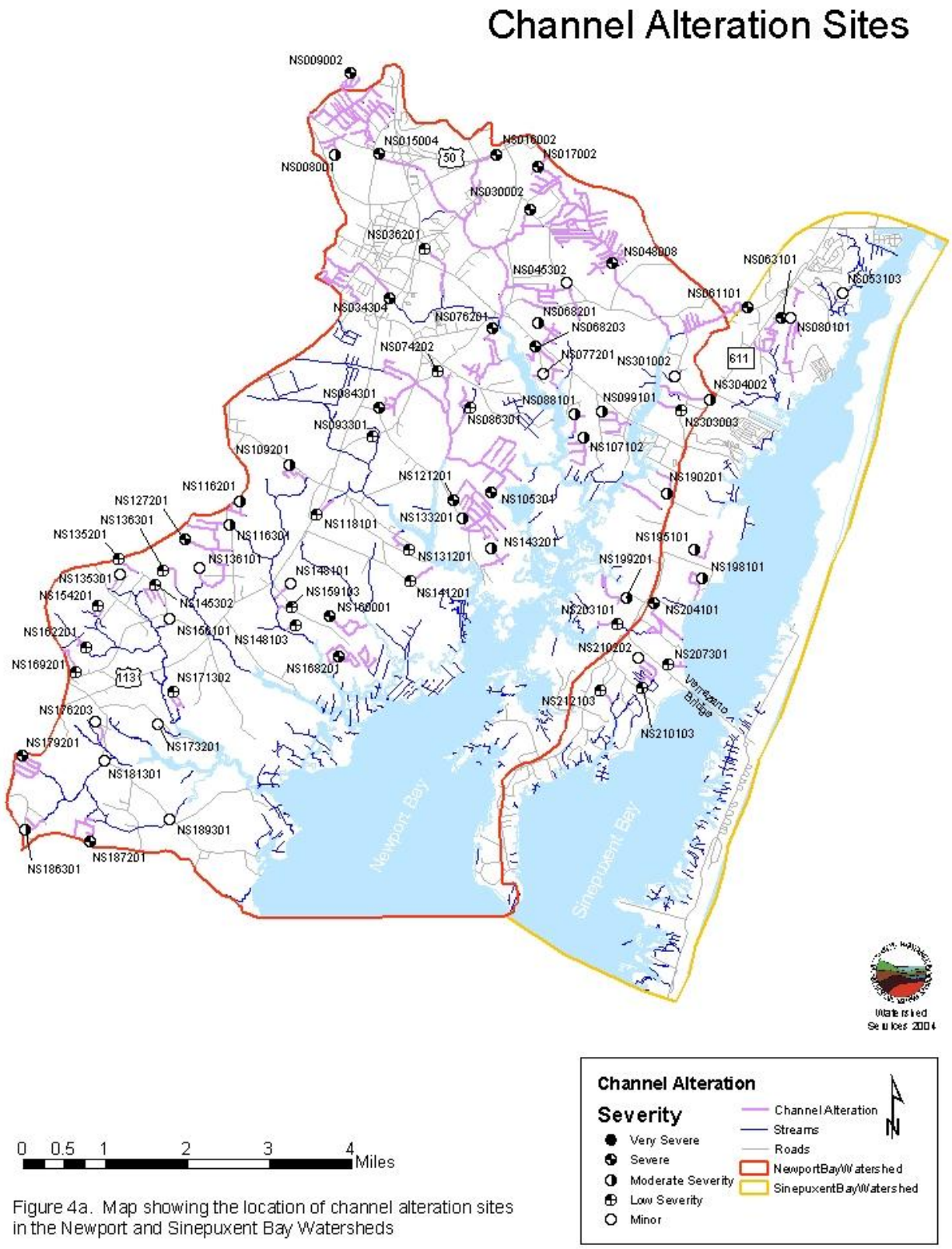


Figure 4a. Map showing the location of channel alteration sites in the Newport and Sinepuxent Bay Watersheds

Inadequate Buffers

Forests are the historically-occurring ecosystem around Maryland streams and are very important for maintaining stream health in Maryland. Forested buffer areas along streams play a crucial role in increasing water quality, stabilizing stream banks, trapping sediment, mitigating floods, and providing the required habitat for all types of stream life, including fish. Tree roots capture and remove pollutants and excess nutrients from shallow flowing water, and their structure helps prevent erosion and slow down water flow, reducing sediment load and the risk of flooding. Shading from the tree canopy provides the cooler water temperatures necessary for most stream life, especially cold-water species like trout. In smaller streams such as those surveyed, terrestrial plant material falling into the stream is the primary source of plant food for stream life. Tree leaves provide seasonal, instant food for stream life, while fallen tree branches and trunks provide a more consistent, slow-release food source throughout the year. Tree roots and snags also provide necessary fish habitat. Maintaining healthy streams and forest buffers are important to reducing the nutrient and sediment loadings to the coastal bays.

While there is no single minimum standard for how wide a stream buffer should be in Maryland, for the purposes of this study a forest buffer is considered inadequate if it is less than 50 feet wide, measured from the edge of the stream. The severity of inadequate forest buffers is based on both the length and width of the site. Those sites over 1,000 feet long with no forest on either side of the stream rank as the most severe.

Survey crews identified 70 inadequate buffer sites with a total length of 323,570 feet (61.28 miles), or approximately 52 percent of streams surveyed. The severity and location of inadequate buffer sites is shown in Figure 5a. Thirty-five of these sites are ranked as very severe or severe, while the other thirty-five sites are moderate, of low severity, or minor (Figure 5b). Fifty-eight of the 70 sites did not have a forest buffer on either side of the stream. The average length of the inadequate buffer was 4,500 feet, and the median length for all sites was 2,300 feet (Table 6). Ayer Creek, Bassett Creek, Newport Creek, and Trappe Creek had inadequate forest buffers for greater than 10,000 feet of their length. Land use along the stream at inadequate buffer sites consisted of cropland (46 sites), lawn (11), shrubs and small trees (8), other (3), pasture (2), and forest (1). Six sites had recent tree plantings along the stream. Four of these are on Trappe Creek (NS068203, NS077201, NS107102, NS199201), one on Ayer Creek (NS099101) and one on the Sinepuxent Bay (NS210103). Crews reported that livestock were present at two sites, NS136101 and NS189301.

Any inadequate buffer site would benefit from the restoration of trees and shrubs along both stream banks. For sites on agricultural land, farmers also may qualify for federal and state government financial incentives for allowing 50-foot forest buffers to grow on their farmland. Those sites that may have particular natural resource value are headwater streams, streams running directly into either bay, or those that form gaps in existing forested buffer areas. An example of a potential restoration site on a headwater stream is NS176203. At this site, shrubs and small trees are already established in and along the stream channel and could be augmented with planting trees at a greater width along its banks as space permits. Examples of potential buffer restoration sites that run directly into the bay are: NS036201, NS080101, NS088101, NS178201, and NS304002. These sites have an existing section of woods, shrubs, or wetlands within or along the stream that could be augmented with tree plantings to restore the site.

In addition, approximately 90 percent of inadequate buffer sites also have channel alterations. Establishing a forested buffer in any of these areas also may passively restore the stream channel function over time by stabilizing its sediment, decreasing its temperature, and possibly increasing fish and wildlife habitat and allowing time for nutrient uptake. In areas where establishing a 50-foot buffer is not possible at this time, allowing shrubs and small trees to grow in and along smaller channels and/or only clearing one side of the channel for scheduled maintenance on larger channels may yield more of the benefits of forest buffers than a stream buffer that is completely cleared of perennial woody vegetation.

Table 6. Summary of Inadequate Buffer widths and lengths.

Site Type	Number of Sites	Mean Length	Median Length	Mean Width Left	Mean Width Right	Range of Widths
Inadequate Buffer	70	4,550 feet	2,300 feet	1 foot	1 foot	0 – 30 feet

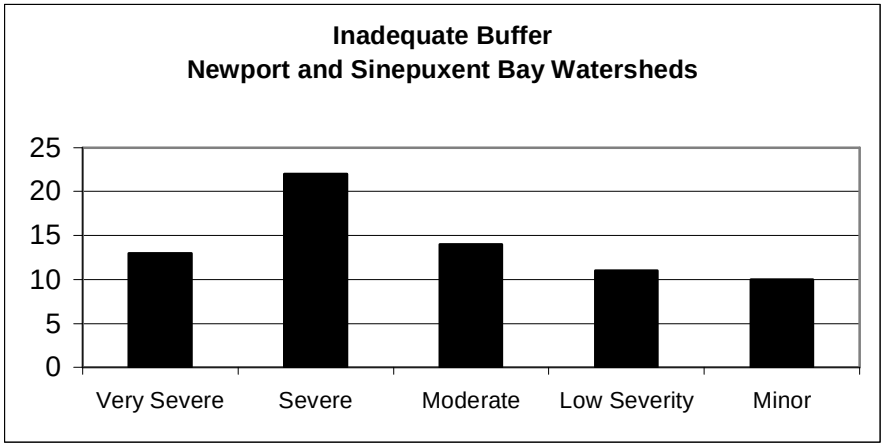


Figure 5b. Histograph showing the frequency of severity ratings given to inadequate buffer sites during the Newport and Sinepuxent Bays' SCA survey.

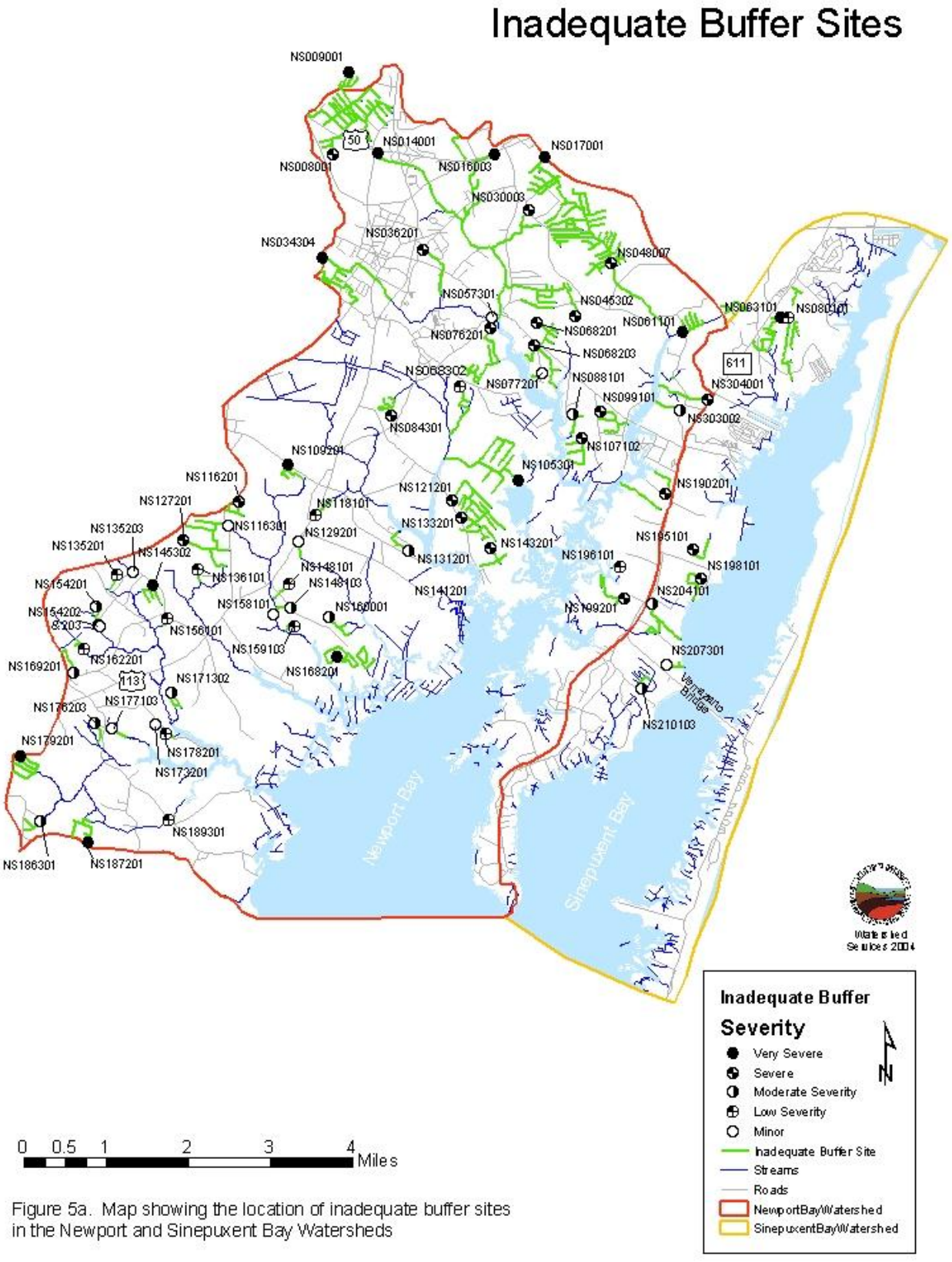


Figure 5a. Map showing the location of inadequate buffer sites in the Newport and Sinepuxent Bay Watersheds

Pipe Outfalls

Pipe outfalls include any pipes or small, constructed channels that discharge into the stream through the stream corridor. Pipe outfalls are considered a potential environmental problem in the survey because they can carry uncontrolled runoff and pollutants such as oil, heavy metals and nutrients to a stream system. The survey crew identified a total of 21 pipe outfalls. The severity and location of pipe outfall sites is shown in Figure 6a, and the distribution of severity ratings in Figure 6b.

Ninety percent, or 19 of 21, of pipe outfalls surveyed were of minor or low severity. These outfalls either drained wetland areas, carried stormwater, or discharged from a small pond or reservoir. No pipe outfalls were cited as potential causes of stream bank erosion. Of the outfalls observed, 11 were dry when surveyed and 8 had a clear discharge with no associated odor. The remaining two pipe outfalls, NS014002 and NS015301, were located on Kitts Branch and were of unknown use. They had a brown discharge with no associated odor and ranked as moderately severe due to the colored discharge.

No immediate follow up actions were taken as part of this study to determine the source of the color coming from the pipe. In some cases, coloration from a storm drainpipe may be a sporadic occurrence; this is especially true in areas where no stormwater management system is present. In addition, we made no estimate of the amount of fluid released from the pipes.

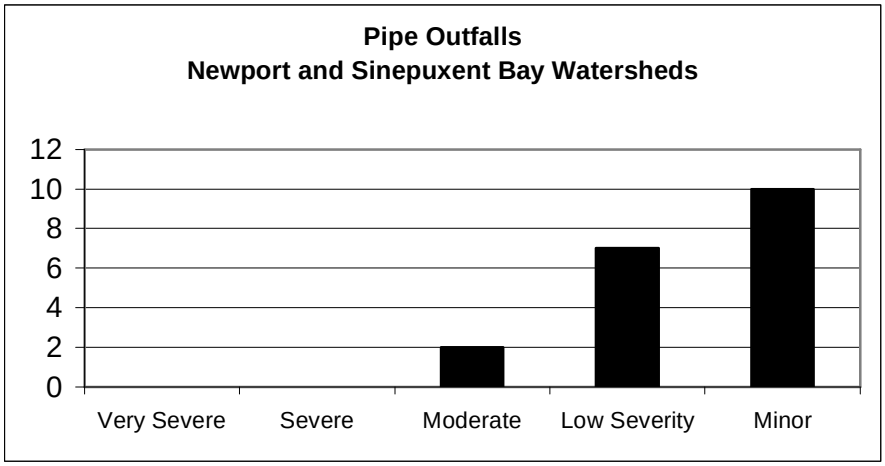


Figure 6b. Histograph showing the frequency of severity ratings given to pipe outfall sites during the Newport and Sinepuxent Bays' SCA survey.

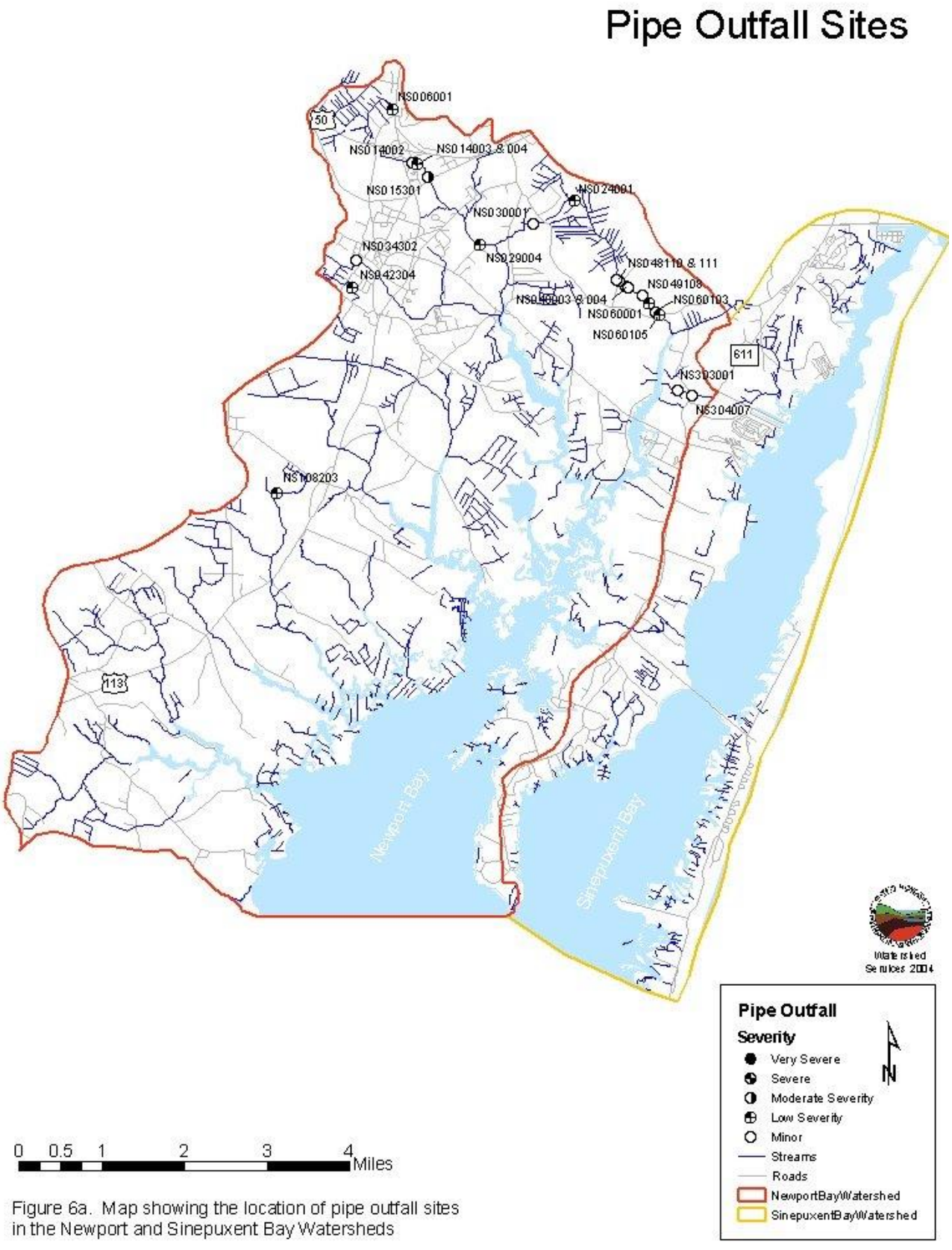


Figure 6a. Map showing the location of pipe outfall sites in the Newport and Sinepuxent Bay Watersheds

Fish Migration Barriers

Fish migration barriers include anything in the stream that significantly interferes with the free, upstream movement of fish. Unimpeded fish passage is especially important for anadromous fish that live most of their lives in tidal waters but must migrate into non-tidal rivers and streams to spawn. Unobstructed upstream movement is also important for resident fish species, many of which also travel both up and down stream during different parts of their life cycle. In addition, without free fish passage, certain sections in a stream network become isolated from others. This becomes detrimental to species survival when a disturbance occurs in an isolated stretch of stream. A sediment discharge from a construction project, for example, or a sewage line break discharging into a small tributary can eliminate some or all of the fish species in an isolated stream stretch. With a fish blockage present, there is no avenue for fish to repopulate the inaccessible section. As a result, the disturbance will reduce diversity of the fish community in the area, and the remaining biological community may deviate from its natural balance and composition.

Fish blockages can be caused by man-made structures such as dams or road culverts and by natural features such as waterfalls or beaver dams. A structure becomes a blockage for fish if the stream water over or under it is too high, shallow, or fast. First, a vertical water drop such as a dam can be too high for fish to migrate over the obstacle. A vertical drop of 6 inches may cause a fish passage problem for some resident fish species, while anadromous fish can usually move through water drops of up to one foot, providing there is sufficient water flow and depth. Second, water too shallow for fish passage can occur in channelized stream sections or at road crossings, where the entire stream volume is spread over a large, flat area. Finally, a structure may be a fish blockage if the water is moving too fast through it for fish to swim through. This can occur at road crossings where the culvert pipe is placed at a steep angle, and the water moving through the pipe has a velocity higher than a fish's swimming ability.

In restoration work, priority is given to removing fish barriers that will yield access to the greatest quality and quantity of upstream habitat per dollar spent. The mainstem is ideally kept as barrier-free as possible, allowing anadromous fish to migrate to spawn and a source of fish species for tributaries in the event of a disturbance. Restoration planning includes targeting barriers for removal that isolate entire tributaries, those that isolate significant portions of the upper tributary, and those that isolate quality fish habitat. The best restoration sites also are far from other existing fish barriers.

The Newport and Sinepuxent Bay SCA survey found 17 fish migration barriers. The locations of fish blockages are shown in Figure 7a, and a comparison of fish barriers with channel alterations and inadequate forest buffers as indicators of potential upstream habitat is shown in Figure 7b. Fish barriers in these watersheds are due to road crossings (10), dams (2), debris (2), a right of way crossing (1), a pipe crossing (1), and sediment accumulation (1). All are within the Newport Bay watershed. The majority of fish migration barriers (13 out of 17) are low to minor in severity (Figure 7c). Of these, 12 of the 13 received this ranking because they isolate only a short section of stream from the rest of the tributary. The remaining minor site, NS165201, received this ranking even though it isolates a more significant length of stream because the barrier is caused by an uneven stream bed due to downcutting erosion (Yetman, 2001). Four barriers received moderate severity rankings because they isolate a significant length of the tributary upstream from the barrier (NS029005, NS029007, NS167101, NS138101).

Three fish barrier sites in the Newport Watershed are on tributaries without major channel alterations or inadequate forest buffers. These sites (NS138101, NS163103, and NS167101) may be more conducive to restoration projects. The fish blockage at site NS167101 is an old concrete structure isolating the non-tidal portion of Bassett Creek from its tidal section. About one mile, or midway upstream, from NS167101 is site NS138101, at the road crossing with Route 113. Restoring two these sites would open the complete length of Bassett Creek for fish migration in a stretch that has both a forest buffer and an unaltered channel along its mainstem. A third potential site for a fish passage project is on Massey Branch at site NS163103. Here there is a road culvert with rock piled approximately three feet high on the downstream side. A restoration project at this site would reconnect the headwaters of Massey Branch (over one mile of stream length) with the rest of the tributary.

In all cases, areas should be assessed for viable fish habitat before restoration work begins, giving preference to sites with the most potential habitat area created.

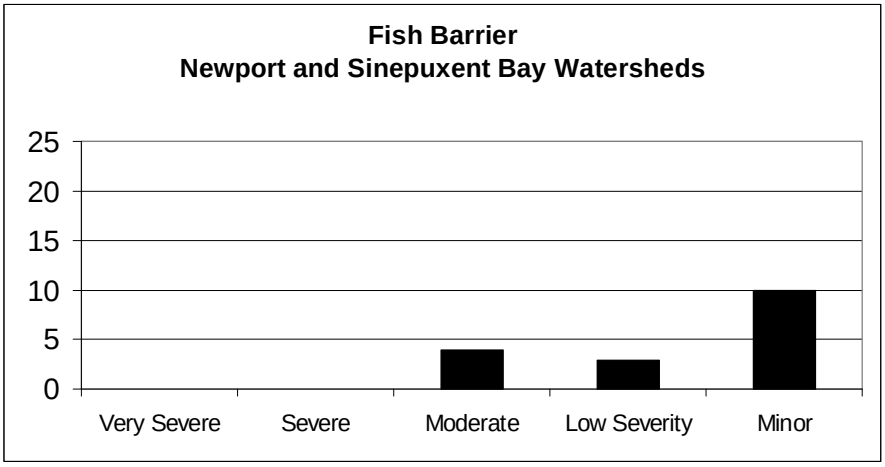


Figure 7c. Histograph showing the frequency of severity ratings given to fish barrier sites during the Newport and Sinepuxent Bay SCA survey.

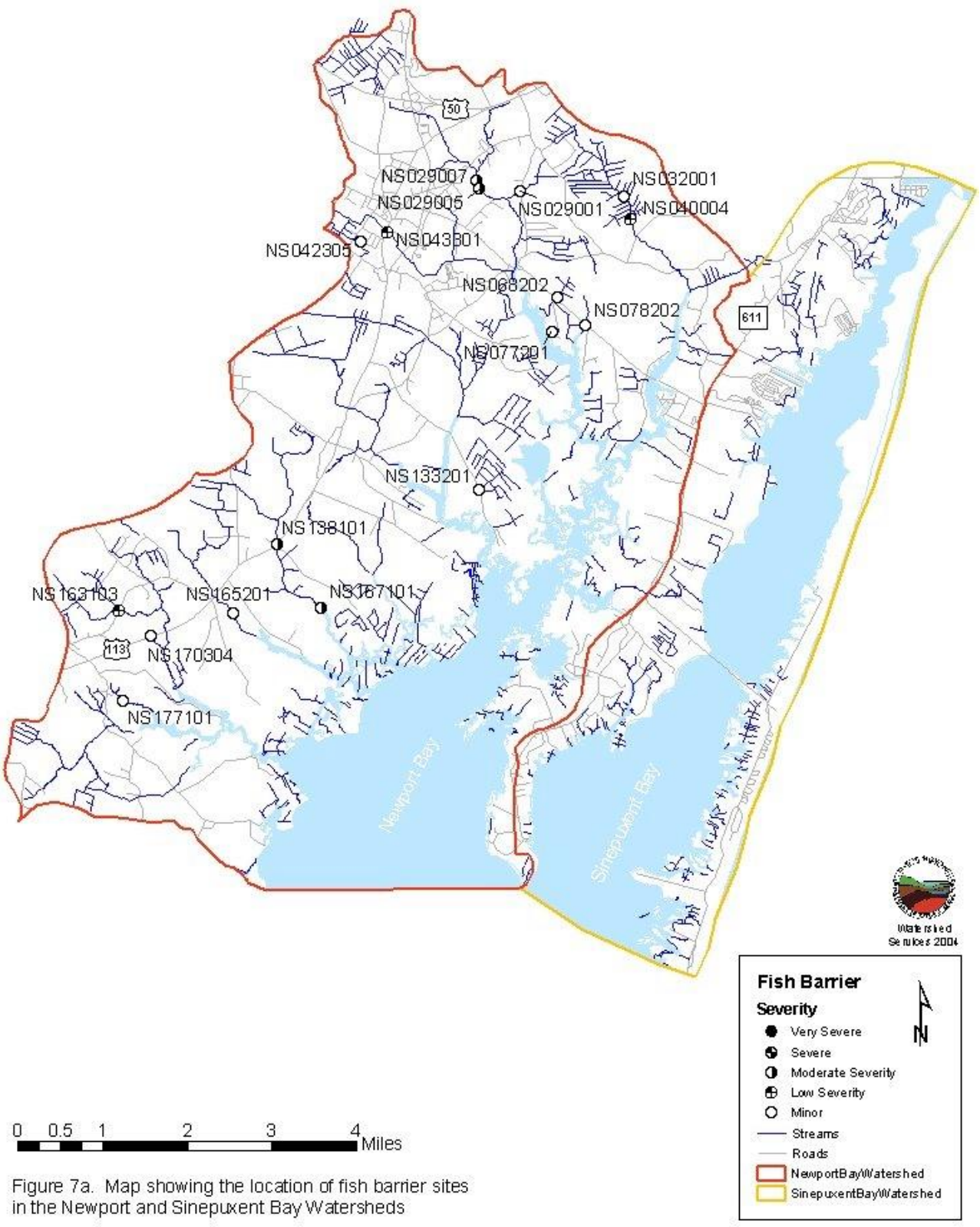


Figure 7a. Map showing the location of fish barrier sites in the Newport and Sinepuxent Bay Watersheds

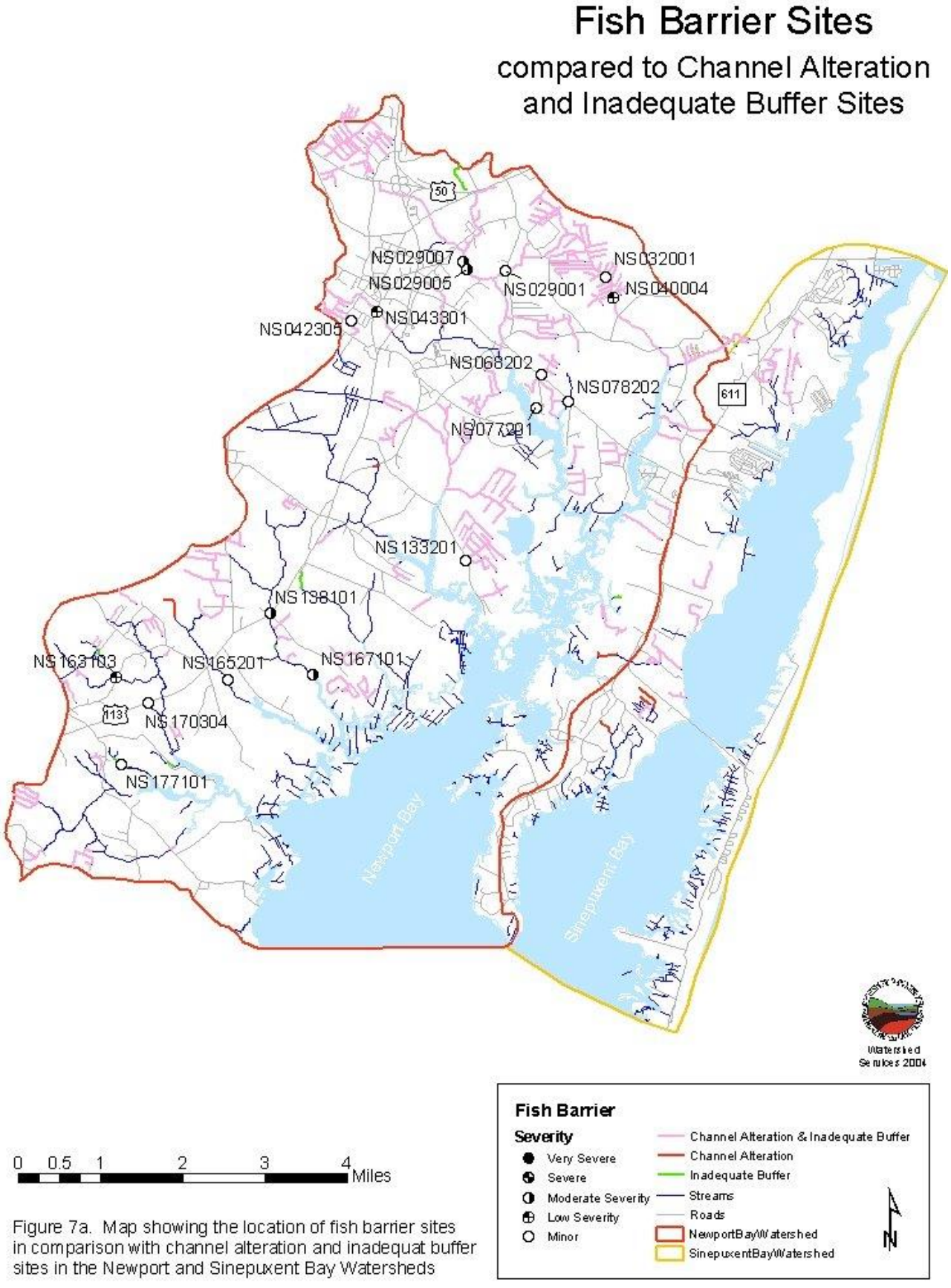


Figure 7a. Map showing the location of fish barrier sites in comparison with channel alteration and inadequat buffer sites in the Newport and Sinepuxent Bay Watersheds

Erosion Sites

Erosion is a natural process necessary to maintain good aquatic habitat. Too much erosion, however, can have the opposite effect on the stream by destabilizing stream banks, destroying in-stream habitat, and causing significant sediment pollution problems downstream. Erosion problems occur when either a stream's hydrology and/or sediment supply are significantly altered. This often occurs below a specific alteration, such as a pipe outfall or road crossing, or when land use in a watershed changes. For example, as a watershed becomes more urbanized, forest and agricultural fields are developed into residential housing complexes and commercial properties. As a result, the amount of impervious surface, or land area where rainwater cannot seep into the groundwater directly, increases in a drainage basin. This causes the amount of runoff entering a stream to increase. Over time, a stream channel will adjust to the greater rain-induced flows by eroding the streambed and banks to raise water-carrying capacity. This channel readjustment can extend over decades, during which time excessive amounts of sediment from unstable eroding stream banks can have very detrimental impacts on a stream's aquatic resources.

In this survey, unstable eroding streams are defined as areas where the stream banks are almost vertical, and the vegetative roots along the stream are unable to hold the soil onto the banks. While survey teams are asked to visually assess whether the stream was down-cutting, widening, or headcutting at a specific site, the only way to evaluate the full significance of the erosion processes at a specific site is to do more detailed monitoring over time.

The SCA survey found 15 eroding stream banks over the length of 13,984 feet (2.65 miles) of stream, or about 2.3 percent of streams surveyed. The severity and location of erosion sites is shown in Figure 8a. All sites are within the Newport Bay watershed. Four sites are ranked as moderate, six as of low severity, and five as minor (Figure 8b). Eight of the sites are less than 100 feet in length; three are between 100 and 1,000 feet, and the remaining six sites are greater than 1,000 feet. Half of all erosion sites are three feet in height or less, and two sites are ten feet or greater in height (Appendix B). Table 7 presents a summary of erosion site lengths and heights.

Two erosion sites are specific threats to infrastructure. The first, NS034301, is undercutting a road and backyard near the corner of West Street and Washington Street. Here, the stream bends and the land use along the eroded bank is lawn. The second, NS036203, is undercutting the end of Maple Avenue. This site has similar characteristics to NS034301; the land use is lawn and the stream is eroding around its bends. Further site assessments would be necessary to determine if these sites may benefit from natural design techniques to stabilize the sediment along the stream banks. Potential methods of restoration could include grading the banks and stabilizing them using logs, small rock, and willows, along with establishing at least a small buffer of trees along the bends to stabilize the banks.

Four erosion sites are most likely caused by specific infrastructure placed in the stream. Two sites are below a road crossing (NS015003 and NS116301), one in a channelization (NS136301), and one below a dam (NS029006).

All of the remaining sites are within forests and are related to bends in the stream (6), a steep bank over a short distance (1) or an unknown cause (1). One site (NS157201), is notable because during its 4,200 feet of downcutting it causes the fish barrier site NS165201.

Table 7. Summary of erosion site lengths and widths.

Site Type	Number of Sites	Estimated Stream Length	Mean Length	Median Length	Range of Lengths	Mean Height	Median Height	Range of Heights
Erosion	14	13,984 feet	934.27 feet	100 feet	4 – 4,200 feet	5.13 feet	4 feet	2 – 15 feet

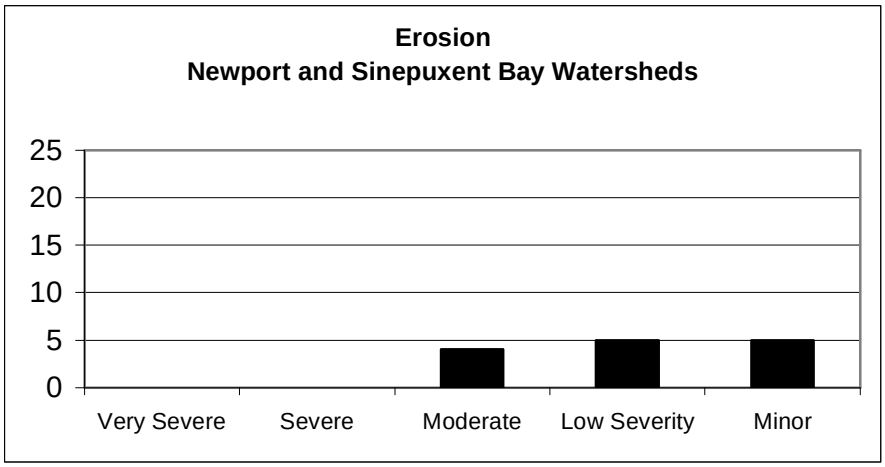


Figure 8b. Histograph showing the frequency of severity ratings given to erosion sites during the Newport and Sinepuxent Bays' SCA survey.

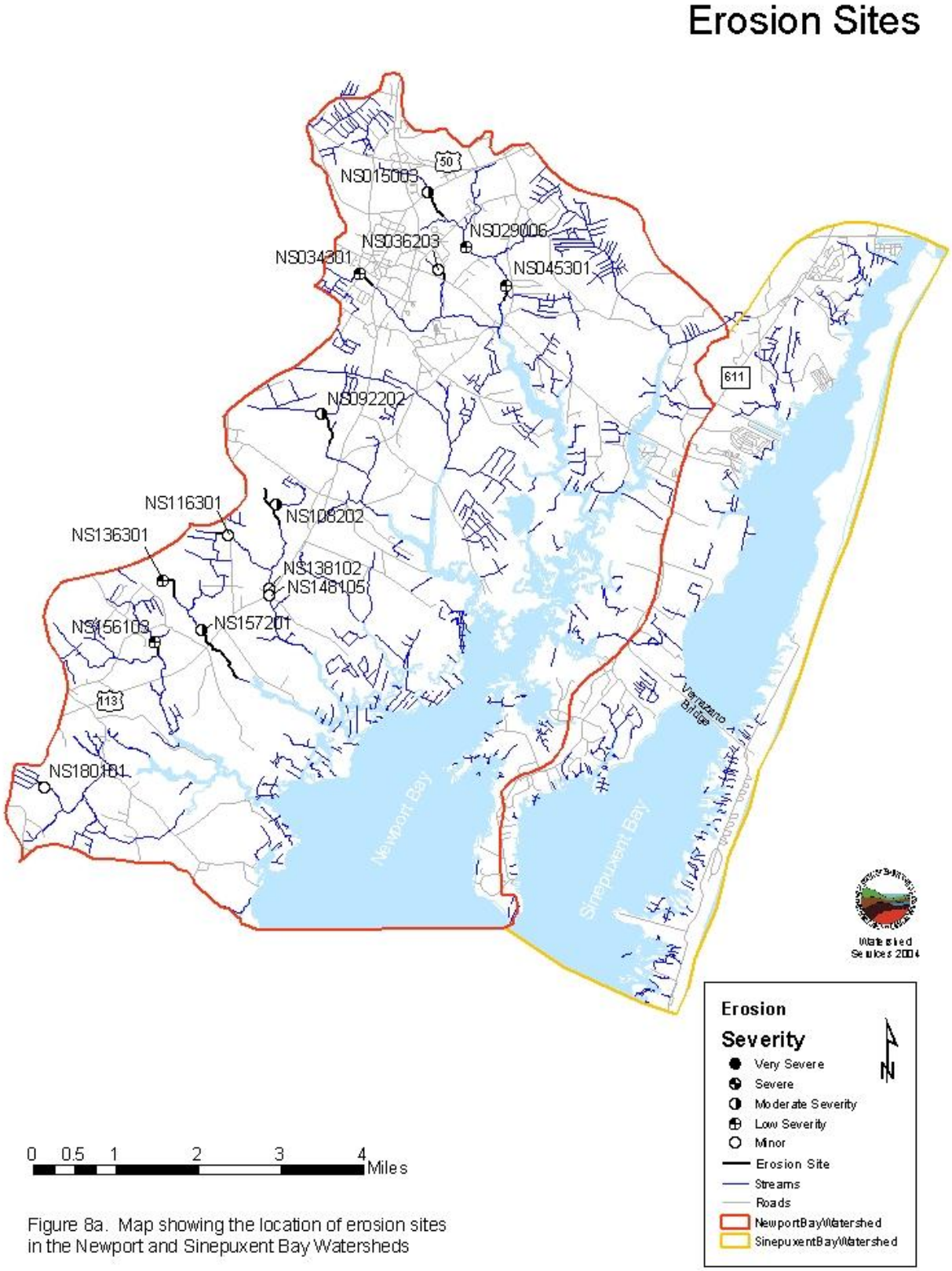


Figure 8a. Map showing the location of erosion sites in the Newport and Sinepuxent Bay Watersheds

Unusual Conditions or Comments

Survey teams record unusual conditions or comments to note the location of anything out of the ordinary observed during the survey or to provide additional written comments on a specific problem site. The survey crew identified 12 unusual conditions and 48 comments throughout the Newport and Sinepuxent Bay watersheds. The severity and location of unusual condition sites is shown in Figure 9a.

The twelve unusual conditions included sites with red flock (5), sediment accumulation (3), scum (2), unusual color/clarity (2), a culvert susceptible to blockage (1), and other (1). The sites ranked as moderate (2), low (5), and minor (5) in severity (Figure 9c). The two moderate sites are NS043303, where a culvert is susceptible to blockage due to woody debris in the stream, and NS162202, where the crew detected a smell of manure along with red flock in the stream.

Comment sites include data on places where survey crews encountered wetland areas (28), streams not on the map (21), the stream on the map could not be found (15), dry streams (9), and formerly channelized streams that had noticeably naturalized (4). One notable comment site is NS210102, where several former channel alterations were restored to wetlands and a forest buffer was planted along remaining stream channels. The type and location of comment sites is shown in Figure 9b.

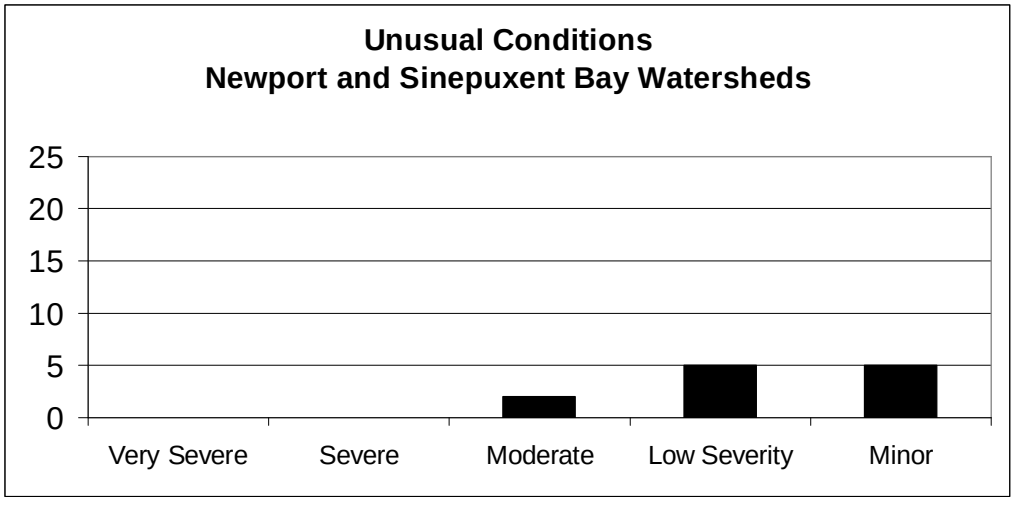


Figure 9c. Histograph showing the frequency of severity ratings given to unusual condition sites during the Newport and Sinepuxent Bays' SCA survey.

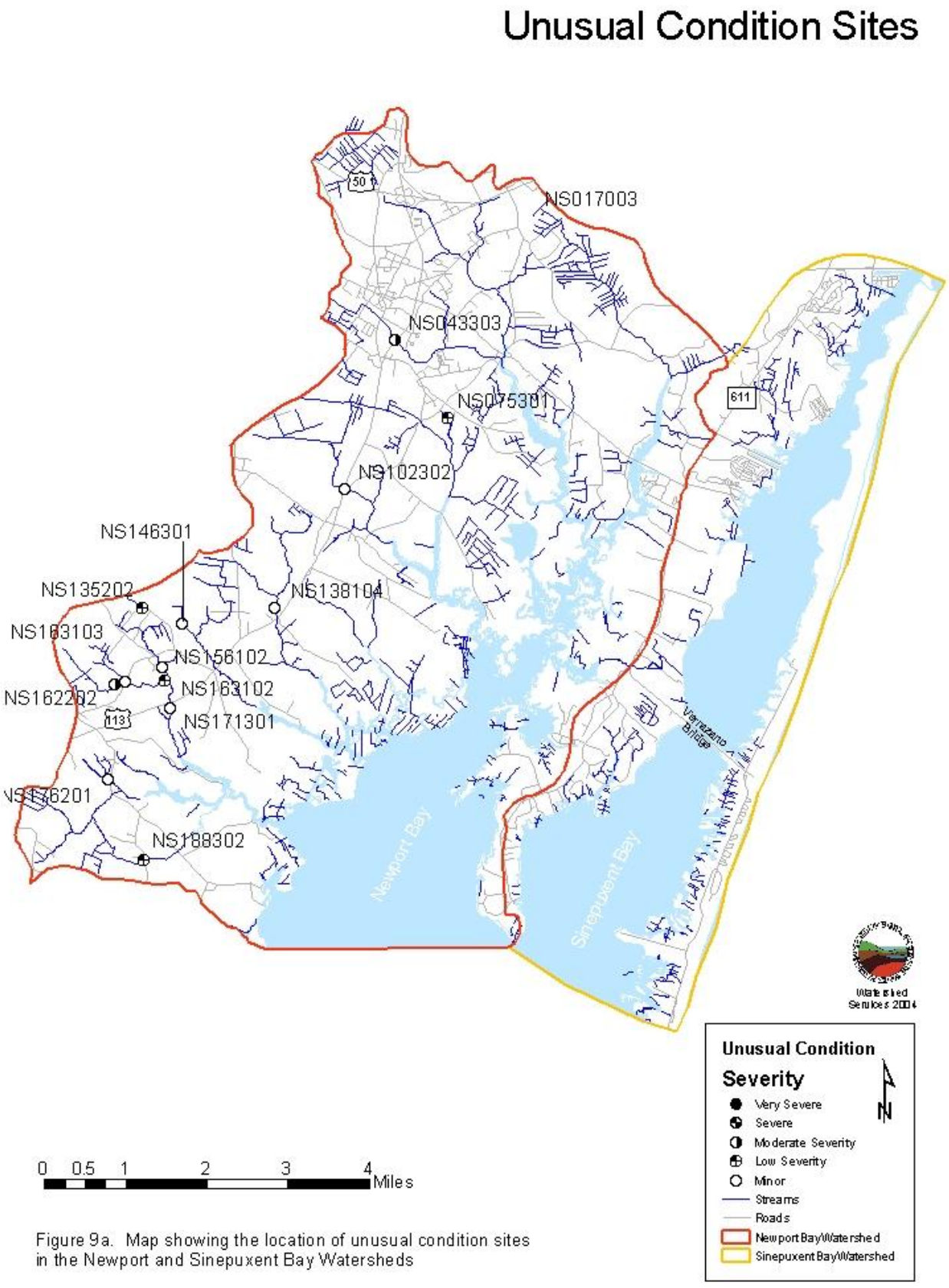


Figure 9a. Map showing the location of unusual condition sites in the Newport and Sinepuxent Bay Watersheds

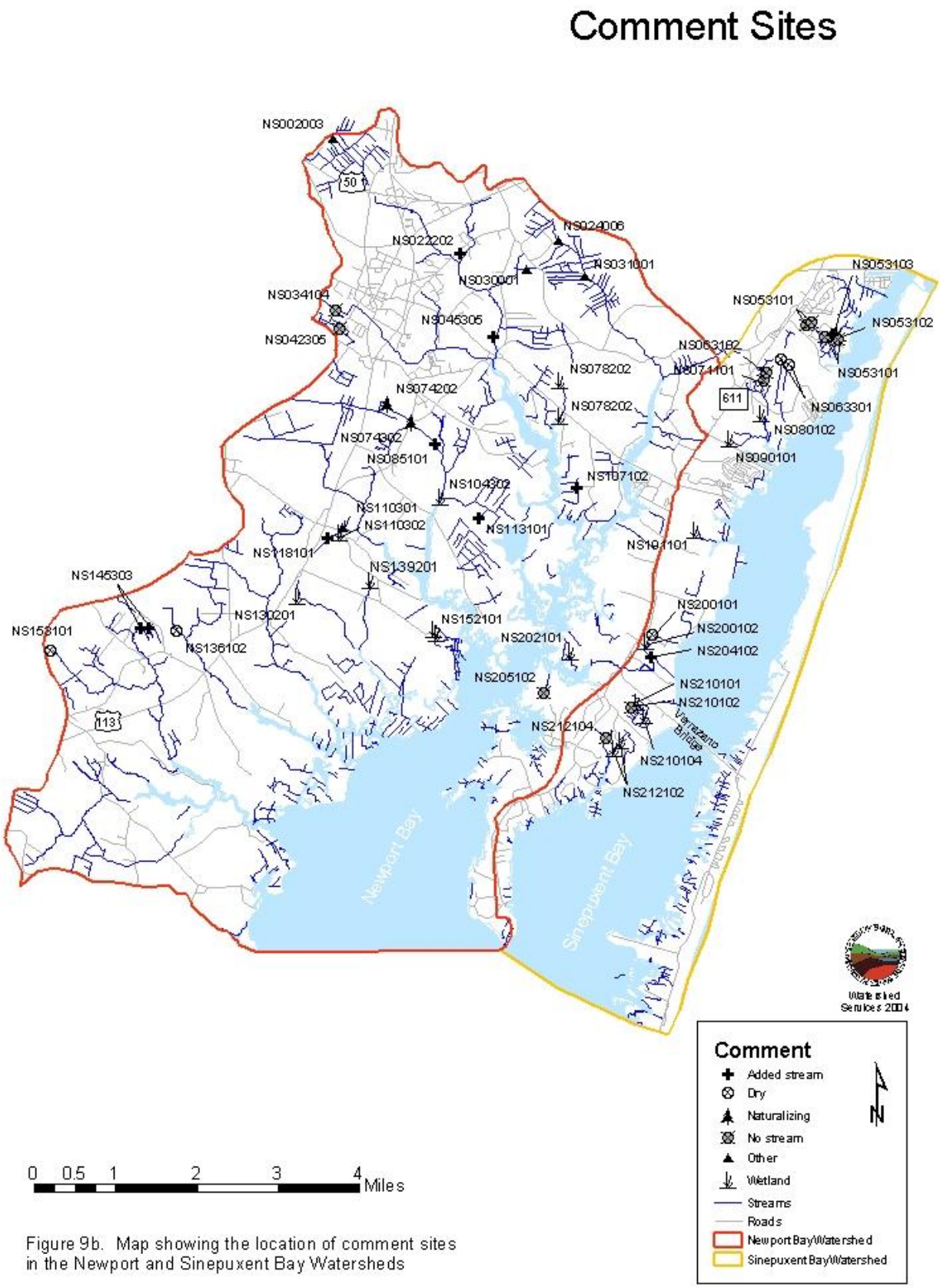


Figure 9b. Map showing the location of comment sites in the Newport and Sinepuxent Bay Watersheds

Trash Dumping

Trash dumping sites are places where large amounts of trash are inside the stream corridor, either as a site of deliberate dumping or as a place where trash tends to accumulate (often a result of storm drainage). Site severity rankings are based on size, contents of trash, and potential impact on the stream.

Survey crews found six trash dumping sites (Figure 10a). This is a very low number of sites compared to other watersheds previously surveyed throughout Maryland. In terms of severity, the six sites are ranked as moderate (1), low severity (2), and minor (3), as shown in Figure 10b. The sites contained residential waste (4), tires (1), shopping carts (1), and cars and residential waste (1). The one moderate site consisted of some cars and residential waste over a larger area within the stream corridor. All other sites were located at confined sites, and three sites, NS016001, NS036202, and NS075301, are potential sites for volunteer clean-up projects.

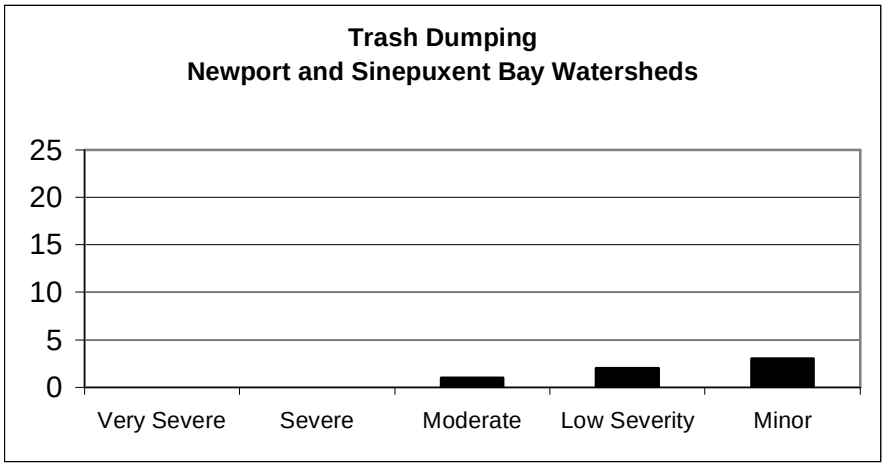


Figure 10b. Histograph showing the frequency of severity ratings given to trash dumping sites during the Newport and Sinepuxent Bays' SCA survey.

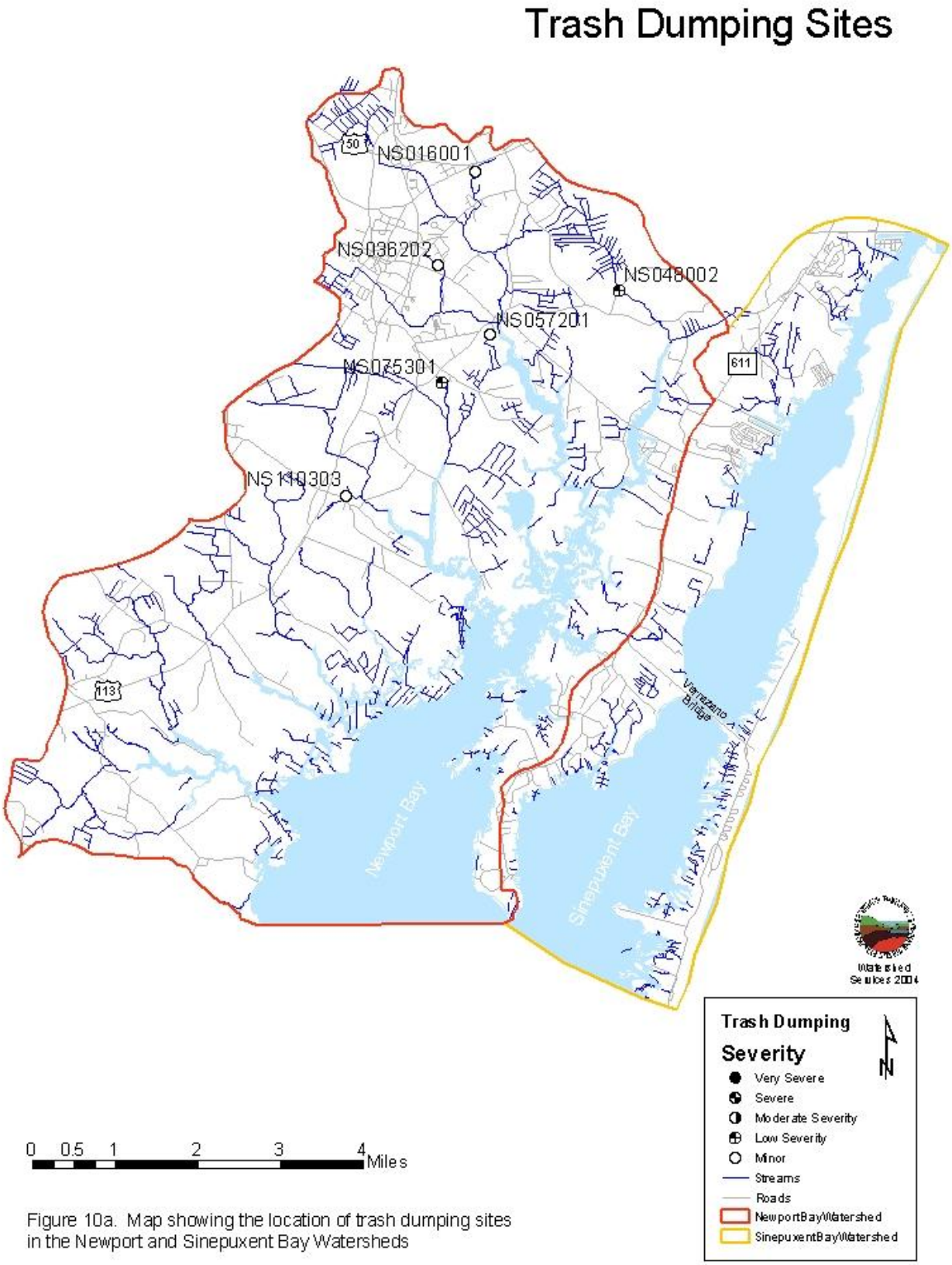


Figure 10a. Map showing the location of trash dumping sites in the Newport and Sinepuxent Bay Watersheds

Exposed Pipes

Any pipes that are in the stream or along the stream's immediate banks that could be damaged by a high flow event are recorded as exposed pipes in the SCA survey. Exposed pipes include: 1) manhole stacks in or along the edge of the stream channel, 2) pipes that are exposed along the stream banks, 3) pipes that run under the stream bed and were exposed by stream down-cutting, and 4) pipes built over a stream that are low enough to be affected by frequent high storm flows. Exposed pipes do not include pipe outfalls, where only the open end of the pipe is exposed to the stream bed.

In urban areas, it is very common for pipelines and other utilities to be placed in the stream corridor. This is especially true for gravity sewage lines, which depend on the continuous downward slope of the pipeline to move sewage to a pumping station or treatment plant. Since streams flow through the lowest points of the local landscape, engineers often build sewage lines paralleling streams to collect sewage from adjacent neighborhoods. While the pipelines are stationary, streams migrate to different areas within the floodplain. Over time, this variance in stream location can expose previously buried pipelines, making them vulnerable to puncture by debris in the stream. Fluids in the pipelines can be discharged into the stream, causing a serious water quality problem.

Field crews observed one exposed pipe during the survey, rated as minor in severity (Figure 11b). Figure 11a shows the location of this site on Bottle Branch. At the time of the survey, the pipe was releasing a clear discharge with no odor. A follow-up visit could made to the site to further evaluate its severity and a means for repairing or replacing the pipe.

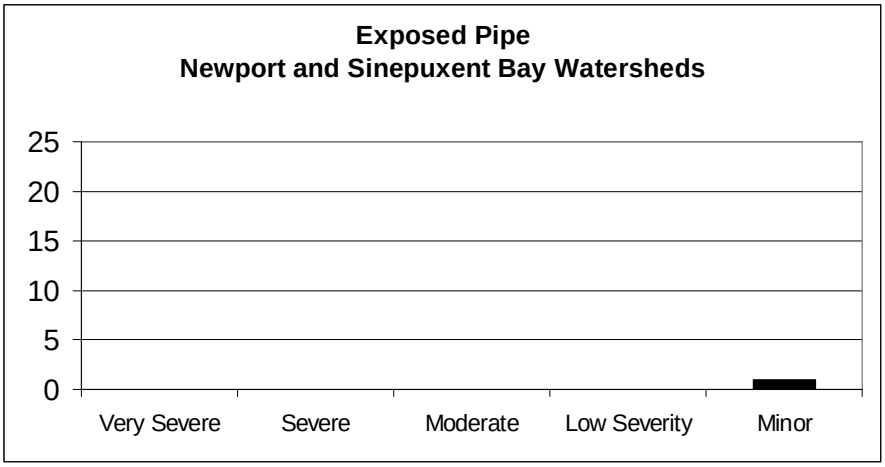


Figure 11b. Histograph showing the severity rating given to exposed pipe site during the Newport and Sinepuxent Bays' SCA survey.

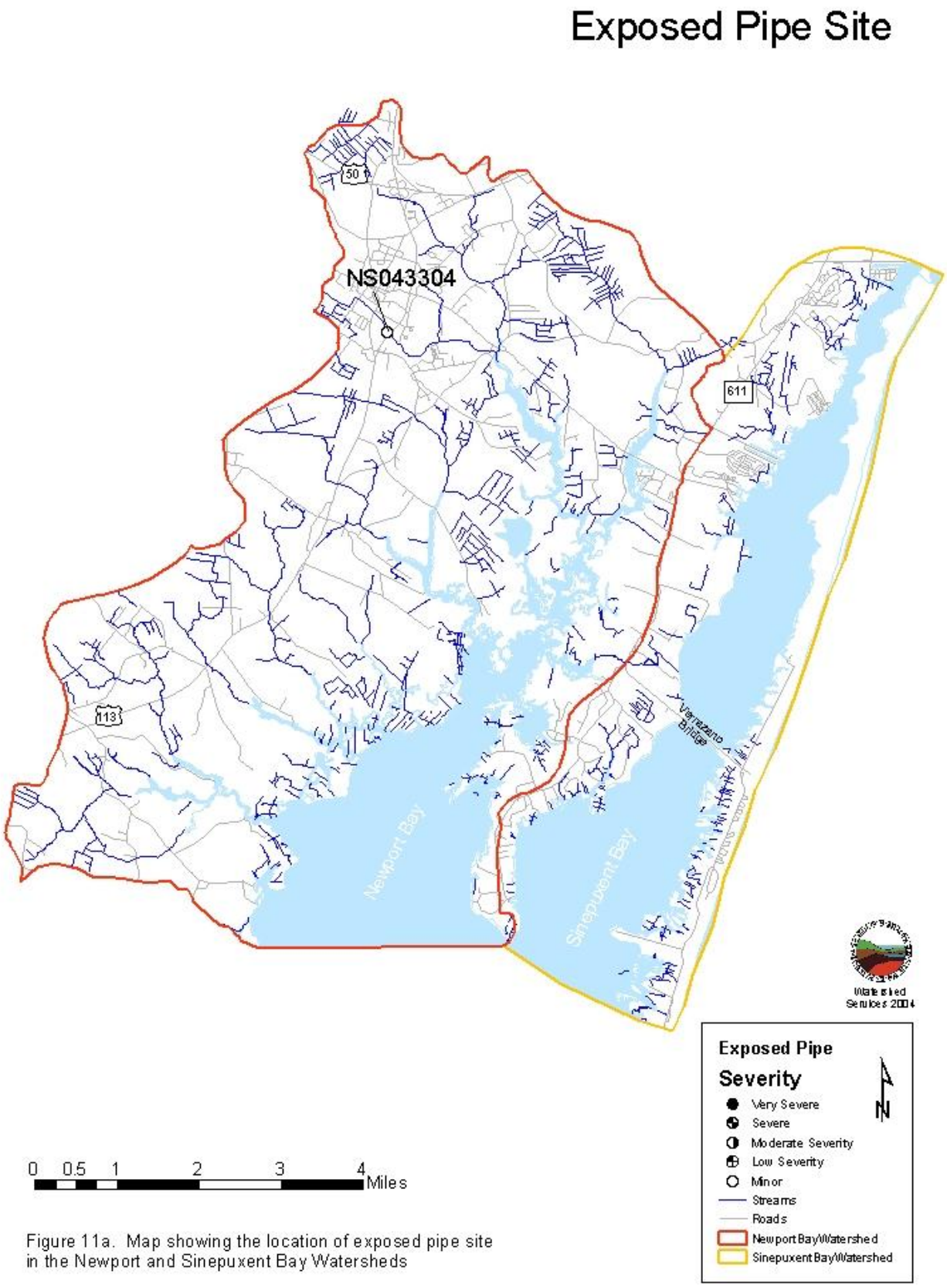


Figure 11a. Map showing the location of exposed pipe site in the Newport and Sinepuxent Bay Watersheds

Representative Sites

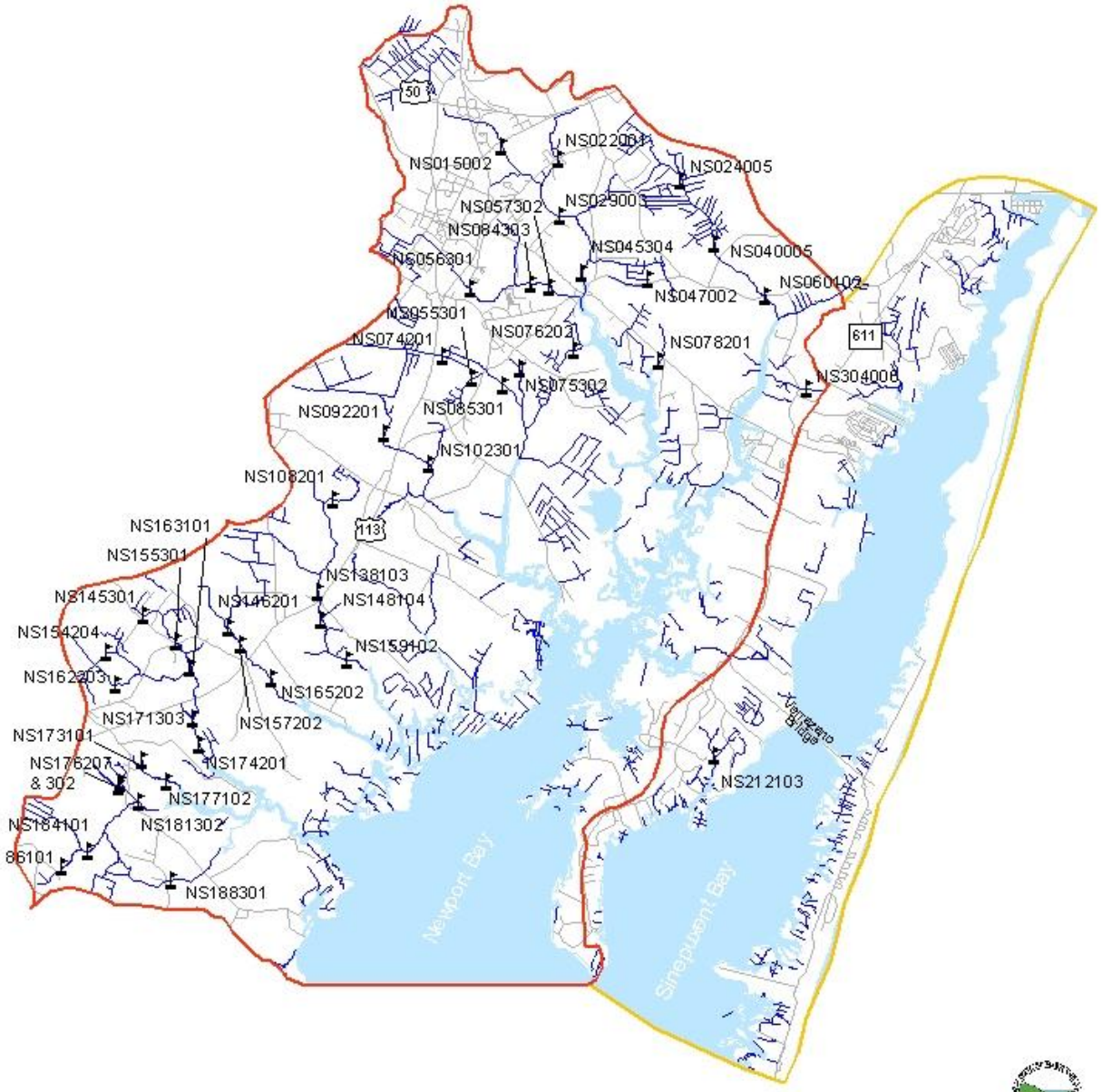
Representative sites are used to document the general condition of both in-stream habitat and the adjacent riparian corridor (including and up to 50 feet beyond the stream bank). The SCA survey's representative site evaluations are based on the habitat assessment procedures outlined in EPA's rapid bioassessment protocols (Plafkin, et. al., 1989), and they are very similar to the habitat evaluations of Maryland Save-Our-Stream's Heartbeat Program. At each representative site, the following 10 separate categories related to stream habitat health are evaluated:

* Attachment Sites for Macroinvertebrates
* Shelter for Fish
* Sediment Deposition
* Channel Flow Status
* Condition of Banks
* Embeddedness
* Channel Alteration
* Velocity and Depth Regime
* Bank Vegetation Protection
* Riparian Vegetative Zone Width

Under each category, field crews base a rating of optimal, suboptimal, marginal or poor on established grading criteria developed to reflect ideal wildlife habitat for rocky bottom streams. In addition to the habitat ratings, teams collect data on the stream's wetted width and pool depths at both runs and riffles at each representative site. Depth measurements are taken along the stream thalweg (main flow channel). At representative sites, field crews also indicate whether the bottom sediments are primarily silt, sand, gravel, cobble, boulder, or bedrock. Representative sites are located at approximately ½- to one-mile intervals along the stream. Survey crews evaluated 43 representative sites in the Newport and Sinepuxent Bay watersheds.

The streams in these watersheds show typical characteristics for coastal plain streams in Maryland. Sand and silt were the two bottom types recorded. As a result, the substrate was poor to marginal for attachement sites for macroinvertebrates and poor to marginal for embeddedness. The sediment deposition was optimal to suboptimal and the channel flow optimal, indicating that most streams filled their channel from bank to bank with few sediment bars forming. The bank condition and the bank vegetation were optimal to suboptimal, but shelter for fish spanned the entire range of ratings, from optimal to poor. In areas with little channel alteration, this characteristic ranked as mostly optimal. Similarly, in areas with few inadequate buffer sites, riparian vegetation ranked as optimal. Locations of representative sites are shown in Figure 12a, and data collected for all categories are listed in Appendix B.

Representative Sites



Watershed Services 2004

0 0.5 1 2 3 4 Miles

N

Representative Site

Representative Site
Streams
Roads
Newport Bay Watershed
Sinepuxent Bay Watershed

Figure 12a. Map showing the locations of representative sites in the Newport and Sinepuxent Bay Watersheds

DISCUSSION

The results of the Newport and Sinepuxent Bay SCA survey list, summarize, and show the location of the observable environmental problems along the stream corridor network in these watersheds. Each potential problem site has a corresponding ranking for severity, correctibility, and access and a photograph of the site. The data from this effort can be used to target future restoration efforts. After this list of potential problem sites is compiled and distributed, county planners, resource managers, and others can initiate a dialog to cooperatively set the direction and goals for the watersheds' management and plan future restoration work at specific problem sites. In addition, this data can be combined with other GIS data and local information to prioritize areas for restoration.

During the SCA survey, the most frequently observed potential problem sites were channel alterations, reported at 72 sites (or 67.26 miles of stream), and inadequately forested stream buffers, reported at 70 sites (or 61.38 miles of stream). Other potential environmental problems recorded during the survey included: 19 pipe outfalls, 17 fish barriers, 14 erosion sites, 12 unusual conditions, 6 trash dumping sites, 1 exposed pipe, and no in- or near-stream construction sites (Table 1). Additionally, crews recorded descriptive habitat condition data at 43 representative sites.

Channel alterations in the form of 71 earth channels constitute approximately 58 percent of streams surveyed in both watersheds, and nine of the 20 tributaries surveyed have alterations for more than 10,000 feet or their length. Fourteen sites had significant vegetation and sediment in the channel, potentially providing habitat value to the stream over other types of channelizations, which harden the banks using rock or concrete. This suggests that passive restoration efforts, including allowing vegetation and tree roots to stabilize sediment along and in the channel, may increase the habitat, natural resource value, and potential nutrient uptake of these and similar channel alteration sites. As discussed previously, some sites may be suitable for complete restoration. Depending on their purpose and use, other sites may be more conducive to allowing some perennial vegetation to grow and sinuosity to form within the channel and/or only clearing one side of the channel for maintenance. Sites can be targeted at headwater streams (whose conditions influence the rest of the tributary), at streams running directly into the bay, or sites that exist on otherwise unaltered stream reaches.

Inadequate forest buffer sites occur at 90 percent of all channel alterations. Inadequate buffers exist at 70 sites, for 52 percent of streams surveyed. In this case, the benefits, methods, and strategies to establishing forest buffers are similar to those of restoring channel alterations. Any inadequate buffer site will benefit from restoration, which can increase sediment stabilization, habitat value, and nutrient uptake. Sites can either be augmented with tree plantings or allowed to establish woody vegetation independently. Forest buffers can be targeted at headwater streams (whose conditions influence the rest of the tributary), at streams running directly into the bay, or at gaps in an otherwise continuous forest buffer.

All other problem types observed had fewer than 20 sites each and ranked as moderate to minor in severity. The majority of pipe outfalls were either dry or discharging a clear discharge with no odor. Two sites had a brown discharge with no odor that could merit further investigation. Of the 17 fish migration barriers, three sites are located on tributaries that are

largely unaltered with an established forest buffer. Due to habitat potential, these three may be better targets for restoration than others in the watershed. However, areas should be assessed for viable fish habitat before restoration work begins. Two erosion sites posed potential threats to property or infrastructure and five sites are most likely caused by infrastructure placed within or near the stream. Further site assessments would be necessary to determine if these sites may particularly benefit from natural design techniques to stabilize the sediment along the stream banks.

Unusual conditions recorded are mostly low to minor in severity, and included sites of sediment accumulation, unusual water color/clarity, red flock, and others. A smell of manure and a culvert susceptible to blockage are two sites that may merit further investigation. Trash dumping sites were very low in number, and three of the six sites may be potential volunteer clean-up projects. The one exposed pipe found by the survey had a clear discharge and may merit further evaluation as to the severity of the site. Representative sites showed characteristics consistent with the soils and slope of Maryland's Eastern Shore. Results indicate that the majority of streams filled their channel bank to bank, had optimal to suboptimal bank stability and vegetation, and a silt or sand bottom with little or no attachment sites for macroinvertebrates. Potential shelter for fish varied throughout the range of optimal to poor throughout the watersheds.

The GIS and attribute data for the sites described in the SCA survey can be combined with other existing GIS datasets to even further prioritize areas for restoration. Projects can be further targeted to restoring areas where rare or threatened species, gaps in continuous forest or the state's Green Infrastructure, or quality fish and wildlife habitat are found. In addition, sites can be prioritized for restoration based on their location in headwater areas, streams that deposit directly into the coastal bays, areas of specific local interest, or sites where the surrounding land use is particularly suited to restoration projects.

As mentioned earlier, the Maryland Department of Natural Resources has formed a partnership with Worcester County to develop a Watershed Restoration Action Strategy (WRAS) for the Newport and Sinepuxent Bay watershed. Results from this survey will be combined with other GIS data and local information about the area to help establish priorities for the types and location of restoration projects that will be pursued in the watershed in the future. The value of the present survey is its help in placing individual stream problems into their watershed context and its potential common use among resource managers and land-use planners to cooperatively and consistently prioritize future restoration work. Results of the present survey will be given to the Newport and Sinepuxent Bay Watersheds WRAS committee, which is developing a Watershed Restoration Action Strategy for the Newport and Sinepuxent Bays. Information on the Newport and Sinepuxent Watershed Action Strategy can be found on the Department of Natural Resources' website (www.dnr.state.md.us/watersheds/surf/proj/wras.html).

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APPENDIX A:
Problem Sites by Site Number

Appendix A- Newport and Sinepuxent Bays

Site	Problem	Severity	Correctability	Access	X-Coordinates	Y-Coordinates	Stream Name
NS002002	Representative Site				555278.52551	77986.31379	Kitts Branch
NS002003	Comment				554920.61477	77743.56662	Kitts Branch
NS006001	Pipe Outfall	4	3	1	555989.71891	77367.09601	Kitts Branch
NS008001	Channel Alteration	3	3	2	554867.27892	76547.41072	Kitts Branch
NS008001	Inadequate Buffer	2	4	2	554867.27892	76547.98899	Kitts Branch
NS009001	Inadequate Buffer	1	4	2	555161.75026	78163.78744	Kitts Branch
NS009002	Channel Alteration	2	4	2	555161.75026	78161.84436	Kitts Branch
NS013004	Representative Site				554985.76404	76087.60156	Kitts Branch
NS014001	Inadequate Buffer	1	3	3	555732.19494	76590.27763	Kitts Branch
NS014002	Pipe Outfall	3	2	1	556383.04609	76326.06762	Kitts Branch
NS014003	Pipe Outfall	5	1	1	556440.67257	76316.61096	Kitts Branch
NS014004	Pipe Outfall	4	1	1	556472.29326	76303.90358	Kitts Branch
NS015002	Representative Site				556733.15468	75918.82892	Kitts Branch
NS015003	Erosion	3	4	1	556702.85378	75996.57831	Kitts Branch
NS015004	Channel Alteration	2	3	3	555731.99351	76589.63558	Kitts Branch
NS015301	Pipe Outfall	3	3	4	556689.42479	76037.85469	Kitts Branch
NS016001	Trash Dumping	5	1	1	557635.73262	76299.00840	Kitts Branch
NS016002	Channel Alteration	2	3	3	558027.71249	76558.12987	Kitts Branch
NS016003	Inadequate Buffer	1	4	2	558027.69944	76558.61862	Kitts Branch
NS017001	Inadequate Buffer	1	4	2	559014.00966	76507.28999	Ayer Creek
NS017002	Channel Alteration	2	4	3	558835.60610	76335.47671	Ayer Creek
NS017003	Unusual Condition				558784.46236	76286.13863	Ayer Creek
NS022001	Representative Site				557684.08792	75710.94554	Kitts Branch
NS022202	Comment				557427.83529	75441.51169	Kitts Branch
NS024001	Pipe Outfall	4	3	3	559552.97397	75597.53344	Ayer Creek
NS024005	Representative Site				559784.16879	75342.93539	Ayer Creek
NS024006	Comment				559374.62826	75707.17297	Ayer Creek
NS029001	Fish Barrier	5	4	1	558220.81473	74883.78780	Kitts Branch
NS029003	Representative Site				557727.02679	74725.23820	Kitts Branch
NS029004	Pipe Outfall	4	3	4	557690.08506	74729.37810	Kitts Branch
NS029005	Fish Barrier	3	3	4	557453.28237	74930.13781	Kitts Branch
NS029006	Erosion	4	4	4	557453.65336	74929.55467	Kitts Branch
NS029007	Fish Barrier	3	4	3	557386.48590	75070.88976	Kitts Branch
NS029201	Comment				558162.92820	74818.55251	Kitts Branch
NS029303	Comment				557581.72646	74771.01928	Kitts Branch
NS030001	Comment				558736.90785	75144.09308	Kitts Branch
NS030001	Pipe Outfall	5	1	2	558745.84435	75145.41928	Kitts Branch
NS030002	Channel Alteration	2			558701.85309	75469.69813	Kitts Branch
NS030003	Inadequate Buffer	2	3	2	558699.84600	75469.69813	Kitts Branch
NS031001	Comment				559902.42904	74995.23034	Ayer Creek
NS032001	Fish Barrier	5	3	2	560183.69561	74765.94647	Ayer Creek
NS034104	Comment				554975.21153	74331.26147	Bottle Branch
NS034301	Erosion	4	1	1	555362.87533	74396.15252	Bottle Branch
NS034302	Pipe Outfall	5	2	1	555283.97935	74417.76025	Bottle Branch
NS034304	Channel Alteration	2	3	2	555940.38113	73736.45592	Bottle Branch
NS034304	Inadequate Buffer	1	3	2	554663.47591	74530.31675	Bottle Branch
NS036201	Channel Alteration	4	2	1	556620.53044	74703.79864	Hudson Branch
NS036201	Inadequate Buffer	2	3	1	556622.95680	74701.32790	Hudson Branch
NS036202	Trash Dumping	5	1	1	556906.65274	74480.17077	Hudson Branch
NS036203	Erosion	5	2	1	556911.34855	74471.65436	Hudson Branch
NS040004	Fish Barrier	4	3	2	560325.47873	74355.68042	Ayer Creek
NS040005	Representative Site				560350.61758	74265.18056	Ayer Creek
NS042304	Pipe Outfall	4	2	1	555208.50460	73903.44337	Bottle Branch
NS042305	Comment				555043.79035	73941.93489	Bottle Branch
NS042305	Fish Barrier	5	4	1	555194.23123	73918.53298	Bottle Branch
NS043301	Fish Barrier	4	3	1	555711.30213	74081.23201	Bottle Branch
NS043303	Unusual Condition	3	2	1	555970.95195	73712.37325	Bottle Branch

Appendix A- Newport and Sinepuxent Bays

Site	Problem	Severity	Correctability	Access	X-Coordinates	Y-Coordinates	Stream Name
NS043304	Exposed Pipe	5	3	2	555943.64106	73734.84918	Bottle Branch
NS045301	Erosion	4	3	3	558236.61175	74173.18315	Kitts Branch
NS045302	Channel Alteration	5	2	3	559417.82422	74049.28662	Kitts Branch
NS045302	Inadequate Buffer	2	2	3	559616.03530	73399.08610	Kitts Branch
NS045304	Representative Site				558088.69594	73757.14411	Kitts Branch
NS045305	Comment				558089.38250	73788.15088	Kitts Branch
NS047002	Representative Site				559211.53467	73644.19018	Kitts Branch
NS048002	Trash Dumping	5	3	2	560435.08412	73986.64209	Ayer Creek
NS048003	Pipe Outfall	5	1	2	560531.61730	73917.25886	Ayer Creek
NS048004	Pipe Outfall	5	1	2	560590.94499	73892.12001	Ayer Creek
NS048007	Inadequate Buffer	2	2	3	560300.33988	74438.13585	Ayer Creek
NS048008	Channel Alteration	2	2	1	560303.47162	74429.08587	Ayer Creek
NS048110	Pipe Outfall	5	1	2	560410.00566	74015.03228	Ayer Creek
NS048111	Pipe Outfall	5	2	2	560375.60010	74056.34004	Ayer Creek
NS049108	Pipe Outfall	5	1	2	560866.11451	73741.65298	Ayer Creek
NS052101	Channel Alteration	3	5	4	563946.92029	73907.08297	Sinepuxent Bay
NS052101	Inadequate Buffer	3	5	4	563946.92029	73907.08297	Sinepuxent Bay
NS053101	Comment				564651.57639	73791.69336	Sinepuxent Bay
NS053102	Comment				564915.90495	73886.51975	Sinepuxent Bay
NS053103	Channel Alteration	5	1	1	564815.67571	73860.30862	Sinepuxent Bay
NS053103	Comment				564816.63364	73860.93814	Sinepuxent Bay
NS055301	Representative Site				556191.11058	73491.64257	Bottle Branch
NS056301	Representative Site				557210.78817	73580.85237	Bottle Branch
NS057201	Trash Dumping	5	1	2	557923.02769	73118.37630	Bottle Branch
NS057301	Inadequate Buffer	5	1	1	557973.82752	73367.54875	Bottle Branch
NS057302	Representative Site				557546.89992	73518.79216	Bottle Branch
NS060001	Pipe Outfall	4	1	2	561009.25547	73592.46491	Ayer Creek
NS060102	Representative Site				561218.63715	73349.79533	Ayer Creek
NS060103	Pipe Outfall	4	2	2	561199.71707	73369.30233	Ayer Creek
NS060105	Pipe Outfall	5	1	2	561133.25716	73406.71532	Ayer Creek
NS061101	Channel Alteration	2	3	2	562965.30816	73556.00236	Ayer Creek
NS061101	Inadequate Buffer	1	3	2	561696.76200	73071.36413	Ayer Creek
NS062102	Comment				563507.82387	73078.31028	Sinepuxent Bay
NS063101	Channel Alteration	2	3	3	563626.81236	73355.10516	Sinepuxent Bay
NS063101	Inadequate Buffer	1	2	3	563628.17694	73356.34131	Sinepuxent Bay
NS063102	Comment				563957.02591	73250.46908	Sinepuxent Bay
NS063301	Comment				563794.93178	73362.23987	Sinepuxent Bay
NS068201	Channel Alteration	3	2	1	558846.94712	73262.76123	Trappe Creek
NS068201	Inadequate Buffer	2	3	1	558845.45143	73262.76123	Trappe Creek
NS068202	Fish Barrier	5	4	1	558928.93379	72846.28176	Trappe Creek
NS068203	Channel Alteration	2	4	1	558794.01261	72809.71675	Trappe Creek
NS068203	Inadequate Buffer	2	2	2	558791.39784	72812.12065	Trappe Creek
NS071101	Comment				563453.93056	72921.17912	Sinepuxent Bay
NS073201	Inadequate Buffer	1	3	1	555550.76127	72364.86996	Poplartown Branch
NS074201	Representative Site				555734.18560	72332.29066	Newport Creek
NS074202	Channel Alteration	4	1	5	556873.55342	72304.70097	Newport Creek
NS074202	Comment				556005.62074	72469.90116	Newport Creek
NS074202	Inadequate Buffer				556136.28422	72166.09464	Newport Creek
NS074302	Comment				556469.23878	72078.49063	Newport Creek
NS075301	Trash Dumping	4	2	3	556985.19980	72188.49130	Newport Creek
NS075301	Unusual Condition	4		4	557011.80681	72158.07449	Newport Creek
NS075302	Representative Site				557026.86057	72111.65033	Newport Creek
NS076201	Channel Alteration	2	2	2	557956.29383	73149.99821	Trappe Creek
NS076201	Inadequate Buffer	2	3	2	557956.29383	73149.99821	Trappe Creek
NS076202	Representative Site				557968.16251	72449.68118	Trappe Creek
NS077201	Channel Alteration	5	1	2	558944.44629	72268.50131	Trappe Creek
NS077201	Fish Barrier	5	1	2	558821.51395	72213.60349	Trappe Creek

Appendix A- Newport and Sinepuxent Bays

Site	Problem	Severity	Correctability	Access	X-Coordinates	Y-Coordinates	Stream Name
NS077201	Inadequate Buffer	5	1	2	558944.44629	72266.77219	Trappe Creek
NS078201	Representative Site				559419.39383	72253.06897	Trappe Creek
NS078202	Comment				559405.22357	72224.52207	Trappe Creek
NS078202	Fish Barrier	5	5	1	559456.84068	72331.64234	Trappe Creek
NS080101	Channel Alteration	5	3	1	563793.49256	73358.45365	Sinepuxent Bay
NS080101	Inadequate Buffer	4	5	1	563793.26762	73356.58683	Sinepuxent Bay
NS080102	Comment				563399.84704	72266.40531	Sinepuxent Bay
NS082201	Comment				554747.01760	71674.70995	Poplartown Branch
NS083203	Comment				554994.40645	71963.15022	Poplartown Branch
NS084301	Channel Alteration	2	2	1	555728.89418	71590.21173	Newport Creek
NS084301	Inadequate Buffer	2	3	1	556001.30724	71449.31381	Newport Creek
NS084303	Representative Site				556235.33977	71958.79770	Newport Creek
NS085101	Comment				556945.46216	71665.73132	Newport Creek
NS085301	Representative Site				556756.29222	71834.80808	Newport Creek
NS086301	Channel Alteration	4	1	3	557513.74403	71611.18077	Newport Creek
NS086302	Inadequate Buffer	4	2	2	557353.66234	72012.47701	Newport Creek
NS088101	Channel Alteration	3	1	1	559562.69500	71476.87608	Trappe Creek
NS088101	Inadequate Buffer	3	1	1	559562.85130	71480.49324	Trappe Creek
NS089102	Comment				560669.28817	71518.06636	Ayer Creek
NS090101	Comment				562762.55462	71770.73970	Sinepuxent Bay
NS092201	Representative Site				554725.74319	71026.89264	Poplartown Branch
NS092202	Erosion	3	1	2	554624.00450	71658.03027	Poplartown Branch
NS093301	Channel Alteration	4	3	1	555615.94027	71041.21285	Poplartown Branch
NS098102	Comment				559532.81191	71121.75203	Trappe Creek
NS099101	Channel Alteration	3	1	1	560102.30286	71521.27420	Ayer Creek
NS099101	Inadequate Buffer	2	1	1	560100.51182	71521.16874	Ayer Creek
NS100101	Comment				553383.67820	70576.35621	Tukesburgh Branch
NS102301	Representative Site				555484.05970	70487.53258	Poplartown Branch
NS102302	Unusual Condition	5		2	554975.65977	70741.73254	Poplartown Branch
NS104301	Comment				557065.34276	70728.67860	Newport Creek
NS104302	Comment				557040.91457	70615.11218	Newport Creek
NS105301	Channel Alteration	2	2	2	557939.11837	69931.85511	Newport Creek
NS105301	Inadequate Buffer	1	2	2	558486.22665	70183.61945	Newport Creek
NS105302	Comment				557462.89339	70488.85186	Newport Creek
NS107101	Comment				559554.35542	70374.33999	Trappe Creek
NS107102	Channel Alteration	3	2	2	559735.16460	71003.86540	Trappe Creek
NS107102	Comment				559747.82596	70795.00397	Trappe Creek
NS107102	Inadequate Buffer	2	1	2	559734.41376	71006.21999	Trappe Creek
NS108201	Representative Site				553856.86018	69892.04881	Tukesburgh Branch
NS108202	Erosion	3	3	4	553738.36223	69888.47849	Tukesburgh Branch
NS108203	Pipe Outfall	4	3	4	553739.65590	69890.30429	Tukesburgh Branch
NS109201	Channel Alteration	3	2	1	553976.68173	70480.16597	Catbird Creek
NS109201	Inadequate Buffer	1	3	1	553976.60010	70480.13536	Tukesburgh Branch
NS109202	Comment				554219.83089	69978.02176	Tukesburgh Branch
NS110301	Comment				555112.08374	70005.15503	Beavertown Creek
NS110302	Comment				555053.39002	69920.09167	Beavertown Creek
NS110303	Trash Dumping	4	3	1	555097.62297	69976.23349	Beavertown Creek
NS112301	Comment				556861.16594	70310.60225	Newport Creek
NS113101	Comment				557800.08599	70204.97418	Newport Creek
NS116201	Channel Alteration	3	2	1	553007.11201	69771.28292	Goody Hill Branch
NS116201	Inadequate Buffer	2	3	1	553007.61765	69770.77727	Goody Hill Creek
NS116301	Channel Alteration	3	2	1	552797.81233	69298.71020	Goody Hill Branch
NS116301	Erosion	5	1	1	552797.58539	69298.77456	Goody Hill Branch
NS116301	Inadequate Buffer	5	2	2	552797.62009	69298.90244	Goody Hill Branch
NS118101	Channel Alteration	4	3	1	554515.38756	69498.80728	Catbird Creek
NS118101	Comment				554816.69051	69816.78937	Tukesburgh Branch
NS118101	Inadequate Buffer	4	2	1	554515.20685	69498.62657	Catbird Creek

Appendix A- Newport and Sinepuxent Bays

Site	Problem	Severity	Correctability	Access	X-Coordinates	Y-Coordinates	Stream Name
NS121101	Comment				556662.39063	69603.00534	Newport Creek
NS121201	Channel Alteration	2	2	1	557183.46471	69778.34754	Newport Creek
NS121201	Inadequate Buffer	2	3	1	557183.46471	69778.85957	Newport Creek
NS123101	Comment				558805.70708	69465.80716	Orchard Creek Bay
NS127201	Channel Alteration	2	2	1	551917.64014	69011.27575	Goody Hill Branch
NS127201	Inadequate Buffer	2	3	1	551917.21832	69011.65972	Porter Creek
NS129201	Inadequate Buffer	5	1	1	554196.55388	68986.95238	Catbird Creek
NS130201	Comment				555651.66599	68964.39408	Catbird Creek
NS131201	Channel Alteration	4	2	1	556327.94364	68808.00740	Beavertown Creek
NS131201	Inadequate Buffer	3	2	1	556327.94364	68808.00740	Beavertown Creek
NS132101	Comment				556854.68414	69023.34019	Newport Creek
NS133201	Channel Alteration	3	2	1	557369.51220	69439.65135	Newport Creek
NS133201	Fish Barrier	5	2	1	557451.85591	69199.39002	Newport Creek
NS133201	Inadequate Buffer	2	2	1	557369.58679	69439.29805	Orchard Creek Bay
NS135201	Channel Alteration	4	1	4	550635.26223	68646.21199	Massey Branch
NS135201	Inadequate Buffer	4	2	2	550642.38230	68330.04351	Massey Branch
NS135202	Unusual Condition	4	3	4	550940.98748	68380.42126	Massey Branch
NS135203	Inadequate Buffer	5	1	1	550941.94547	68379.42251	Massey Branch
NS135301	Channel Alteration	5	1	2	550642.49413	68329.59984	Massey Branch
NS136101	Channel Alteration	5	1	1	552208.85396	68449.21162	Porter Creek
NS136101	Comment				552208.31112	68331.01958	Porter Creek
NS136101	Inadequate Buffer	4	3	1	552208.85396	68449.21162	Porter Creek
NS136102	Comment				551819.34802	67959.48355	Porter Creek
NS136301	Channel Alteration	4	2	1	551504.85501	68416.06490	Porter Creek
NS136301	Erosion	4	3	1	551504.51533	68416.06490	Porter Creek
NS136302	Comment				551549.32773	68576.24782	Porter Creek
NS138101	Fish Barrier	3	2	1	553608.78425	68170.73736	Basett Creek
NS138102	Erosion	5	3	2	553592.10496	68247.69673	Basett Creek
NS138103	Representative Site				553582.90867	68313.97713	Basett Creek
NS138104	Unusual Condition	5	3	3	553573.66740	68399.92100	Basett Creek
NS139201	Comment				554219.63258	68638.34591	Catbird Creek
NS141201	Channel Alteration	4	1	1	556347.35565	68218.40980	Newport Creek
NS141201	Inadequate Buffer	3	2	1	556352.34434	68224.06982	Newport Creek
NS143201	Channel Alteration	3	2	1	557935.78895	68855.72788	Newport Creek
NS143201	Inadequate Buffer	2	3	1	557935.78895	68856.06965	Orchard Creek Bay
NS145301	Representative Site				550630.19206	67916.19421	Massey Branch
NS145302	Channel Alteration	4	2	1	551341.61675	68126.36223	Massey Branch
NS145302	Inadequate Buffer	1	3	1	551341.61675	68126.36223	Massey Branch
NS145303	Comment				551109.81463	68018.51369	Massey Branch
NS146101	Comment				551856.13311	67921.73774	Porter Creek
NS146201	Representative Site				552057.86858	67700.84367	Porter Creek
NS146301	Unusual Condition	5		2	551742.27693	68062.47909	Porter Creek
NS148101	Channel Alteration	5	4	1	553994.27256	68157.59300	Basett Creek
NS148101	Inadequate Buffer	4	2	1	553994.27256	68157.59300	Bassett Creek
NS148103	Channel Alteration	4	2	2	554019.21089	67693.52420	Basett Creek
NS148103	Inadequate Buffer	3	2	2	554019.21089	67693.52420	Bassett Creek
NS148104	Representative Site				553656.53021	67837.68663	Basett Creek
NS148105	Erosion	5	3	2	553608.29196	68125.01132	Basett Creek
NS152101	Comment				556920.09547	67988.06005	Newport Bay
NS153101	Comment				549336.77527	67586.22280	Massey Branch
NS154201	Channel Alteration	4	2	1	550213.16978	67714.04432	Massey Branch
NS154201	Inadequate Buffer	3	3	1	550213.16978	67714.04432	Massey Branch
NS154202	Inadequate Buffer	5	1	1	550284.37230	67315.03908	Massey Branch
NS154203	Inadequate Buffer	3	2	2	550258.64058	67347.48342	Massey Branch
NS154204	Representative Site				549991.62547	67292.09296	Massey Branch
NS154205	Comment				550218.39735	67236.82714	Massey Branch
NS155301	Representative Site				551177.08942	67456.88751	Massey Branch

Appendix A- Newport and Sinepuxent Bays

Site	Problem	Severity	Correctability	Access	X-Coordinates	Y-Coordinates	Stream Name
NS156101	Channel Alteration	5	2	2	551628.39930	67469.59653	Massey Branch
NS156101	Inadequate Buffer	4	1	2	551627.75675	67469.59653	Massey Branch
NS156102	Unusual Condition	5	2	3	551344.77928	67213.33749	Massey Branch
NS156103	Erosion	4	3	3	551359.13569	67211.15362	Porter Creek
NS157201	Erosion	3	3	3	552265.21392	67439.70297	Porter Creek
NS157202	Representative Site				552284.45421	67407.41206	Porter Creek
NS158101	Inadequate Buffer	5	1	2	553699.44252	67544.38969	Bassett Creek
NS158102	Comment				553894.66040	67232.50593	Basett Creek
NS159102	Representative Site				554104.03340	67162.56817	Basett Creek
NS159103	Channel Alteration	4	2	2	554099.33270	67330.64422	Basett Creek
NS159103	Inadequate Buffer	4	2	2	554099.33270	67330.64422	Bassett Creek
NS160001	Channel Alteration	2	3	2	554769.12594	67514.28560	Newport Bay
NS160001	Inadequate Buffer	3	2	2	554768.90018	67514.28560	Catbird Creek
NS160202	Comment				555541.03857	67434.52215	Newport Bay
NS161202	Comment				549492.43532	66881.71242	Marshall Creek
NS162201	Channel Alteration	4	3	2	549991.56138	66892.28966	Massey Branch
NS162201	Inadequate Buffer	4	2	2	549991.02341	66892.28966	Massey Branch
NS162202	Unusual Condition	3		4	550407.40845	66860.54971	Massey Branch
NS162203	Representative Site				550159.43748	66741.21089	Massey Branch
NS162204	Comment				550010.97963	66882.79272	Massey Branch
NS163101	Representative Site				551408.77108	67027.14234	Massey Branch
NS163102	Unusual Condition	4	2	3	551403.35007	66957.08443	Massey Branch
NS163103	Fish Barrier	5	3	1	550604.36572	66907.42948	Massey Branch
NS163103	Unusual Condition	5	2	1	550608.45238	66906.37137	Massey Branch
NS164201	Comment				551472.62638	66877.39122	Massey Branch
NS165201	Fish Barrier	5	1	5	552773.21769	66855.89247	Porter Creek
NS165202	Representative Site				552801.25336	66831.54571	Porter Creek
NS167101	Fish Barrier	3	4	2	554445.32477	66969.87960	Basett Creek
NS167201	Comment				554460.73794	66949.77136	Basett Creek
NS168201	Channel Alteration	2	2	2	554931.22241	66728.27245	Newport Bay
NS168201	Inadequate Buffer	1	3	2	554930.85461	66727.76777	Bassett Creek
NS169201	Channel Alteration	4	1	1	549780.27526	66411.69669	Marshall Creek
NS169201	Comment				549807.88311	66341.71420	Marshall Creek
NS169201	Inadequate Buffer	3	2	1	549779.64827	66412.40026	Marshall Creek
NS170304	Fish Barrier	5	4	1	551222.47555	66421.23898	Massey Branch
NS171301	Unusual Condition	4	1	2	551501.98858	66406.08505	Massey Branch
NS171302	Channel Alteration	4	2	3	551690.79765	66030.46385	Massey Branch
NS171302	Inadequate Buffer	3	2	2	551690.79765	66030.46385	Massey Branch
NS171303	Representative Site				551452.10982	66155.63789	Massey Branch
NS173101	Representative Site				550597.85465	65445.05789	Massey Branch
NS173201	Channel Alteration	5	1	1	551395.58662	65397.22542	Marshall Creek
NS173201	Inadequate Buffer	5	3	1	551395.58662	65397.22542	Massey Branch
NS174201	Representative Site				551569.50504	65706.23043	Massey Branch
NS176201	Unusual Condition	5	1	3	550273.39234	64977.98362	Marshall Creek
NS176203	Channel Alteration	5	2	4	550177.83957	65439.25173	Marshall Creek
NS176203	Inadequate Buffer	3	2	3	550177.83957	65439.25173	Marshall Creek
NS176207	Representative Site				550222.40411	65055.04054	Marshall Creek
NS176302	Representative Site				550203.59070	65004.68700	Marshall Creek
NS177101	Fish Barrier	5	1	3	550685.31269	65205.61577	Marshall Creek
NS177102	Representative Site				551018.44653	65077.45063	Marshall Creek
NS177103	Inadequate Buffer	5	1	2	550534.30163	65328.42596	Marshall Creek
NS178201	Inadequate Buffer	4	2	1	551580.71055	65225.54699	Massey Branch
NS179201	Channel Alteration	2	2	1	548737.63397	64776.23494	Icehouse Branch
NS179201	Inadequate Buffer	1	3	1	548738.54367	64776.23494	Marshall Creek
NS180101	Erosion	5	2	4	549191.26570	64386.17142	Icehouse Branch
NS181301	Channel Alteration	5	3	4	550343.38811	64688.71641	Marshall Creek
NS181302	Representative Site				550536.05317	64729.94749	Marshall Creek

Appendix A- Newport and Sinepuxent Bays

Site	Problem	Severity	Correctability	Access	X-Coordinates	Y-Coordinates	Stream Name
NS184101	Representative Site				549665.00116	63894.67903	Marshall Creek
NS184102	Comment				549443.82180	64204.41154	Marshall Creek
NS186101	Representative Site				549231.83161	63628.97734	Marshall Creek
NS186301	Channel Alteration	3	2	1	548795.17336	63332.36734	Icehouse Branch
NS186301	Inadequate Buffer	3	3	1	549129.39281	63522.88178	Marshall Creek
NS187101	Comment				550370.71974	63594.04168	Icehouse Branch
NS187201	Channel Alteration	2	1	2	550053.90253	63108.55927	Icehouse Branch
NS187201	Inadequate Buffer	1	3	2	550053.90253	63107.95692	Icehouse Branch
NS188301	Representative Site				551091.55760	63399.33923	Icehouse Branch
NS188302	Unusual Condition	4	3	1	550984.25011	63381.45464	Icehouse Branch
NS189301	Channel Alteration	5	2	1	551633.55908	63540.96211	Icehouse Branch
NS189301	Inadequate Buffer	4	3	1	551633.55908	63540.96211	Icehouse Branch
NS190201	Channel Alteration	3	2	1	561374.58606	69926.95923	Ayer Creek
NS190201	Inadequate Buffer	2	3	1	561373.40668	69925.77986	Ayer Creek
NS191101	Comment				562091.97675	69960.68216	Sinepuxent Bay
NS195101	Channel Alteration	3	2	1	561905.26788	68819.36720	Sinepuxent Bay
NS195101	Inadequate Buffer	2	3	1	561904.87642	68819.36720	Sinepuxent Bay
NS196101	Comment				560420.81903	68275.92425	Newport Bay
NS196101	Inadequate Buffer	4	3	2	560484.14940	68478.93879	Trappe Creek
NS198101	Channel Alteration	3	2	1	562070.53283	68267.72333	Sinepuxent Bay
NS198101	Inadequate Buffer	2	3	1	562070.53283	68267.72333	Sinepuxent Bay
NS199201	Channel Alteration	3	2	1	560572.61212	67878.38758	Newport Bay
NS199201	Inadequate Buffer	2	1	1	560574.22036	67879.81841	Trappe Creek
NS200101	Comment				561248.45883	67898.24070	Sinepuxent Bay
NS200102	Comment				561112.88552	67770.34134	Sinepuxent Bay
NS202101	Comment				559615.18409	67549.07546	Newport Bay
NS203101	Channel Alteration	4	1	3	560413.39671	67367.71889	Newport Bay
NS203101	Comment				560324.67227	67359.05320	Newport Bay
NS204101	Channel Alteration	2	2	2	561110.21755	67773.21907	Sinepuxent Bay
NS204101	Inadequate Buffer	3	1	2	560416.11058	67367.43997	Holland Creek
NS204102	Comment				561211.36223	67443.56413	Sinepuxent Bay
NS204103	Comment				561320.70945	67329.88509	Sinepuxent Bay
NS205101	Comment				559865.54450	66982.02828	Newport Bay
NS205102	Comment				559096.59257	66744.54464	Newport Bay
NS206101	Comment				560061.07892	66901.00574	Newport Bay
NS207301	Channel Alteration	4	1	2	561397.55454	66583.84909	Sinepuxent Bay
NS207301	Inadequate Buffer	5	1	2	561110.09105	67773.34557	Sinepuxent Bay
NS210101	Comment				561089.10759	66280.32040	Sinepuxent Bay
NS210102	Comment				560918.49851	66562.23594	Sinepuxent Bay
NS210103	Channel Alteration	4	1	2	560894.97442	66102.95232	Sinepuxent Bay
NS210103	Inadequate Buffer	3	1	2	561397.55454	66583.84909	Sinepuxent Bay
NS210104	Comment				560836.38363	66458.08209	Sinepuxent Bay
NS210202	Channel Alteration	5	1	1	560802.81951	66711.37463	Sinepuxent Bay
NS212101	Comment				560470.83076	65625.70914	Sinepuxent Bay
NS212102	Comment				560607.68307	65784.30434	Sinepuxent Bay
NS212103	Channel Alteration	4	1	3	560080.30455	66052.51957	Sinepuxent Bay
NS212103	Representative Site				560363.77445	65526.58235	Sinepuxent Bay
NS212104	Comment				560325.99495	65847.46695	Sinepuxent Bay
NS301001	Inadequate Buffer	5	2	2	560894.97442	66102.95232	Ayer Creek
NS303001	Pipe Outfall	5	2	2	561550.18019	71875.25839	Ayer Creek
NS303002	Inadequate Buffer	3	3	2	561661.13595	71539.65984	Ayer Creek
NS303003	Channel Alteration	4	3	2	561661.13595	71539.65984	Ayer Creek
NS304001	Inadequate Buffer	2	3	2	562206.52160	71759.87216	Ayer Creek
NS304002	Channel Alteration	3	3	2	562206.52160	71759.87216	Ayer Creek
NS304006	Representative Site				561943.32052	71771.23145	Ayer Creek
NS304007	Pipe Outfall	5	1	2	561839.18715	71775.26242	Ayer Creek

APPENDIX B:
Problem Sites by Category

Newport and Sinepuxent Bays--Channel Alteration

Problem	Site	Date	Type	Bottom Width (in)	Length (ft)	PereNNial Flow	Sedimentation	Veg in Channel	Road Crossing	LengthAbove(ft)	Length Below (ft)	Severity	Correctability	Access	Stream Name
Channel Alteration	NS008001	7/2003	Earth channel	36	3520	Yes	Yes	Yes	No			3	3	2	Kitts Branch
Channel Alteration	NS009002	7/2003	Earth channel	48	35150	Yes	No	Yes	No			2	4	2	Kitts Branch
Channel Alteration	NS015004	7/1/2003	Earth channel	72	16000	Yes	Yes	Yes	No			2	3	3	Kitts Branch
Channel Alteration	NS016002	7/2003	Earth channel	48	7440	Yes	Yes	Yes	No			2	3	3	Kitts Branch
Channel Alteration	NS017002	7/2003	Earth channel	48	55400	Yes	Yes	Yes	No			2	4	3	Ayer Creek
Channel Alteration	NS030002	7/2003	Earth channel		5310	Yes	No	Yes	No			2			Kitts Branch
Channel Alteration	NS034304	6/11/2003	Earth channel	40	15375	No	No	No	No	600	1800	2	3	2	Bottle Branch
Channel Alteration	NS036201	6/11/2003	Earth channel	72	3600	Yes	Yes	Yes	No	0	0	4	2	1	Hudson Branch
Channel Alteration	NS045302	6/12/2003	Earth channel	16	13900	Yes	Yes	No	No	0	0	5	2	3	Kitts Branch
Channel Alteration	NS048008	7/2003	Earth channel	60	6530	Yes	No	No	No			2	2	1	Ayer Creek
Channel Alteration	NS052101	6/11/2003	Earth channel	24	2000	No	No	Yes	No	0	0	3	5	4	Sinepuxent Bay
Channel Alteration	NS053103	6/9/2003	Earth channel	24	100	No	Yes	No	No	0	0	5	1	1	Sinepuxent Bay
Channel Alteration	NS061101	6/1/2003	Earth channel		10700	Yes	No	Yes	No			2	3	2	Ayer Creek
Channel Alteration	NS063101	6/11/2003	Earth channel	24	3400	No	No	Yes	No	0	0	2	3	3	Sinepuxent Bay
Channel Alteration	NS068201	5/22/2003	Earth channel	36	6600	Yes	No	No	No	0	0	3	2	1	Trappe Creek
Channel Alteration	NS068203	5/22/2003	Earth channel	12	4000	Yes	No	Yes	No	0	0	2	4	1	Trappe Creek
Channel Alteration	NS074202	5/19/2003	Earth channel	12	14600	Yes	Yes	Yes	No	0	0	4	1	5	Newport Creek
Channel Alteration	NS074302	6/8/2003	Earth channel	36	500	Yes	No	No	No	0	0	5	3	3	Newport Creek
Channel Alteration	NS076201	5/22/2003	Earth channel	24	6000	Yes	No	Yes	No	0	0	2	2	2	Trappe Creek
Channel Alteration	NS077201	5/22/2003	Earth channel	12	800	Yes	No	Yes	No	0	0	5	1	2	Trappe Creek
Channel Alteration	NS080101	6/11/2003	Earth channel	24	400	No	No	Yes	No	0	0	5	3	1	Sinepuxent Bay
Channel Alteration	NS084301	6/5/2003	Earth channel	36	5400	Yes	No	Yes	No	0	0	2	2	1	Newport Creek
Channel Alteration	NS086301	6/8/2003	Earth channel	24	6000	Yes	No	No	No	0	0	4	1	3	Newport Creek
Channel Alteration	NS088101	6/9/2003	Earth channel	36	5500	Yes	Yes	Yes	No	0	0	3	1	1	Trappe Creek
Channel Alteration	NS093301	6/5/2003	Earth channel	12	1000	No	No	Yes	No	0	0	4	3	1	Poplartown Branch
Channel Alteration	NS099101	6/9/2003	Earth channel	4	4700	No	No	Yes	No	0	0	3	1	1	Ayer Creek
Channel Alteration	NS105301	6/8/2003	Earth channel	24	16100	No	No	Yes	No	0	0	2	2	2	Newport Creek
Channel Alteration	NS107102	6/9/2003	Earth channel	24	3600	No	No	Yes	No	0	0	3	2	2	Trappe Creek
Channel Alteration	NS109201	6/9/2003	Earth channel	36	1500	No	No	Yes	No	0	0	3	2	1	Catbird Creek
Channel Alteration	NS116201	5/23/2003	Earth channel	36	2800	Yes	No	Yes	No	0	0	3	2	1	Goody Hill Branch
Channel Alteration	NS116301	5/21/2003	Earth channel	8	1300	Yes	No	Yes	Both	1200	100	3	2	1	Goody Hill Branch
Channel Alteration	NS118101	6/9/2003	Earth channel	24	1200	Yes	No	Yes	No	0	0	4	3	1	Catbird Creek

Newport and Sinepuxent Bays--Channel Alteration

Problem	Site	Date	Type	Bottom Width (in)	Length (ft)	PereNNial Flow	Sedimentation	Veg in Channel	Road Crossing	LengthAbove(ft)	Length Below (ft)	Severity	Correctability	Access	Stream Name
Channel Alteration	NS121201	5/23/2003	Earth channel	24	4000	Yes	No	Yes	No	0	0	2	2	1	Newport Creek
Channel Alteration	NS127201	5/23/2003	Earth channel	30	9000	Yes	Yes	Yes	No	0	0	2	2	1	Goody Hill Branch
Channel Alteration	NS131201	6/2/2003	Earth channel	24	1400	Yes	No	Yes	No	0	0	4	2	1	Beavertown Creek
Channel Alteration	NS133201	5/22/2003	Earth channel	18	2800	Yes	No	Yes	Both	200	2600	3	2	1	Newport Creek
Channel Alteration	NS135201	6/12/2003	Earth channel	48	2200	Yes	Yes	No	No	0	0	4	1	4	Massey Branch
Channel Alteration	NS135301	5/19/2003	Earth channel	36	600	No	No	Yes	No	0	0	5	1	2	Massey Branch
Channel Alteration	NS136101	6/13/2003	Earth channel	36	300	No	No	Yes	No	0	0	5	1	1	Porter Creek
Channel Alteration	NS136301	6/12/2003	Earth channel	18	1200	Yes	Yes	No	No	0	0	4	2	1	Porter Creek
Channel Alteration	NS141201	6/2/2003	Earth channel	30	1400	Yes	Yes	Yes	No	0	0	4	1	1	Newport Creek
Channel Alteration	NS143201	5/23/2003	Earth channel	36	2600	Yes	No	Yes	No	0	0	3	2	1	Newport Creek
Channel Alteration	NS145302	5/19/2003	Earth channel	48	1400	Yes	No	Yes	No	0	0	4	2	1	Massey Branch
Channel Alteration	NS148101	6/6/2003	Earth channel	24	900	Yes	Yes	Yes	Below	0	900	5	4	1	Basett Creek
Channel Alteration	NS148103	6/6/2003	Earth channel	24	1000	Yes	Yes	Yes	Below	0	1000	4	2	2	Basett Creek
Channel Alteration	NS154201	5/27/2003	Earth channel	8	1500	Yes	No	No	No	0	0	4	2	1	Massey Branch
Channel Alteration	NS156101	6/19/2003	Earth channel	24	500	Yes	No	Yes	No	0	0	5	2	2	Massey Branch
Channel Alteration	NS156103	6/6/2003	Earth channel	18	800	Yes	Yes	Yes	No	0	0	5	4	1	Massey Branch
Channel Alteration	NS159103	6/6/2003	Earth channel	12	900	Yes	No	Yes	No	0	0	4	2	2	Basett Creek
Channel Alteration	NS160001	12/1/2003	Earth channel	48	4000	Yes	No		No			2	3	2	Newport Bay
Channel Alteration	NS162201	6/2003	Earth channel		1200	Yes			No			4	3	2	Massey Branch
Channel Alteration	NS168201	6/2/2003	Earth channel	48	7800	Yes	No	Yes	No	0	0	2	2	2	Newport Bay
Channel Alteration	NS169201	6/13/2003	Earth channel	12	1400	No	No	Yes	No	0	0	4	1	1	Marshall Creek
Channel Alteration	NS171302	6/13/2003	Earth channel	36	1000	No	No	Yes	No	0	0	4	2	3	Massey Branch
Channel Alteration	NS173201	5/27/2003	Earth channel	8	100	Yes	No	No	No	0	0	5	1	1	Marshall Creek
Channel Alteration	NS176203	5/21/2003	Earth channel	36	2400	No	Yes	Yes	No	0	0	5	2	4	Marshall Creek
Channel Alteration	NS179201	5/23/2003	Earth channel	12	6500	No	Yes	Yes	No	0	0	2	2	1	Icehouse Branch
Channel Alteration	NS181301	5/20/2003	Rip-rap	24	37	Yes	No	No	Below	0	37	5	3	4	Marshall Creek
Channel Alteration	NS186301	5/20/2003	Earth channel	12	1900	No	No	Yes	No	0	0	3	2	1	Icehouse Branch
Channel Alteration	NS187201	6/16/2003	Earth channel	24	4200	No	No	Yes	No	0	0	2	1	2	Icehouse Branch
Channel Alteration	NS189301	5/21/2003	Earth channel	24	600	Yes	No	Yes	Below	0	600	5	2	1	Icehouse Branch
Channel Alteration	NS190201	5/29/2003	Earth channel	36	2400	Yes	No	Yes	No	0	0	3	2	1	Ayer Creek
Channel Alteration	NS195101	5/27/2003	Earth channel	48	2400	Yes	No	Yes	No	0	0	3	2	1	Sinepuxent Bay
Channel Alteration	NS198101	5/27/2003	Earth channel	48	2800	Yes	No	Yes	No	0	0	3	2	1	Sinepuxent Bay

Newport and Sinepuxent Bays--Channel Alteration

Problem	Site	Date	Type	Bottom Width (in)	Length (ft)	PereNNial Flow	Sedimentation	Veg in Channel	Road Crossing	LengthAbove(ft)	Length Below (ft)	Severity	Correctability	Access	Stream Name
Channel Alteration	NS199201	5/29/2003	Earth channel	12	2000	Yes	No	Yes	No	0	0	3	2	1	Newport Bay
Channel Alteration	NS203101	5/27/2003	Earth channel	30	2000	Yes	No	Yes	No	0	0	4	1	3	Newport Bay
Channel Alteration	NS204101	5/27/2003	Earth channel	48	4200	Yes	No	Yes	No	0	0	2	2	2	Sinepuxent Bay
Channel Alteration	NS207301	6/16/2003	Earth channel	30	1050	Yes	No	No	No	0	0	4	1	2	Sinepuxent Bay
Channel Alteration	NS210103	5/27/2003	Earth channel	48	2400	Yes	No	Yes	No	0	0	4	1	2	Sinepuxent Bay
Channel Alteration	NS210202	5/27/2003	Earth channel	36	3200	Yes	No	Yes	No	0	0	5	1	1	Sinepuxent Bay
Channel Alteration	NS212103	5/21/2003	Earth channel	36	1600	Yes	No	No	No	0	0	4	1	3	Sinepuxent Bay
Channel Alteration	NS301002	7/2003	Earth channel	36	280	No	Yes	Yes	No			5	3	2	Ayer Creek
Channel Alteration	NS303003	7/2003	Earth channel	36	1820	Yes	No	Yes	No			4	3	2	Ayer Creek
Channel Alteration	NS304002	7/2003	Earth channel	72	3510	Yes	No	Yes	No			3	3	2	Ayer Creek

Newport and Sinepuxent Bays--Erosion

Problem	Site	Date	Type	Possible Cause	Length (ft)	Height (ft)	Land Use Right	Land Use Left	Infrastructure Threatened?	Describe	Severity	Correctability	Access	Stream Name
Erosion	NS015003	7/2003	Widening	Below road crossing	1880	3	Shrubs & Small Trees	Shrubs & Small Trees	No		3	4	1	Kitts Branch
Erosion	NS029006	7/2003	Widening	Below dam	50	7	Shrubs & Small Trees	Forest	No		4	4	4	Kitts Branch
Erosion	NS029302	6/11/2003	Widening	Steep bank	30	15	Shrubs & Small Trees	Shrubs & Small Trees	No		4	3	2	Kitts Branch
Erosion	NS034301	6/11/2003	Downcutting	Unknown	5	6	Lawn	Lawn	Yes	Undercutting road; sinking house near stream	4	1	1	Bottle Branch
Erosion	NS036203	6/11/2003	Widening	Unknown	5	5.5	Paved	Paved	Yes	Undercutting end of Maple Avenue	5	2	1	Hudson Branch
Erosion	NS045301	6/11/2003	Widening	Bend at slope	800	4	Forest	Lawn	No		4	3	3	Kitts Branch
Erosion	NS092202	6/11/2003	Widening	Unknown	2400	5	Forest	Shrubs & Small Trees	No		3	1	2	Poplartown Branch
Erosion	NS108202	6/9/2003	Headcutting	Bend at slope	1800	3	Forest	Forest	No		3	3	4	Tukesburgh Branch
Erosion	NS116301	5/21/2003	Downcutting	Below road crossing	40	4	Shrubs & Small Trees	Shrubs & Small Trees	No		5	1	1	Goody Hill Branch
Erosion	NS136301	6/12/2003	Downcutting	Below channelization	1200	2	Forest	Other	No		4	3	1	Porter Creek
Erosion	NS138102	6/6/2003	Headcutting	Bend at slope	100	3	Forest	Forest	No		5	3	2	Basett Creek
Erosion	NS148105	6/6/2003	Widening	Bend at slope	5	3	Forest	Forest	No		5	3	2	Basett Creek
Erosion	NS156103	5/19/2003	Widening	Bend at slope	1400	3	Forest	Forest	No		4	3	3	Porter Creek
Erosion	NS157201	5/21/2003	Downcutting	Unknown	4200	3	Forest	Forest	No		3	3	3	Porter Creek
Erosion	NS180101	6/16/2003	Widening	Bend at slope	100	10	Forest	Forest	No		5	2	4	Icehouse Branch

Newport and Sinepuxent Bays--Exposed Pipe

Problem	Site	Date	Type	Diameter (in)	Length (ft)	Purpose	Discharge	Color	Odor	Severity	Correctability	Access	Stream Name
Exposed Pipe	NS043304	7/16/2003	Eroding pipe with minimal, non-harmful discharge		5	Unknown	Yes	Clear	No	5	3	2	Bottle Branch

Newport and Sinepuxent Bays--Fish Barriers

Problem	Site	Date	Blockage	Type	Reason	Drop (in)	Depth (in)	Severity	Correctability	Access	Stream Name
Fish Barrier	NS042305	6/11/2003	Total	Dam	Too high	36		5	4	1	Bottle Branch
Fish Barrier	NS029005	7/25/2003	Total	Dam	Too high	80		3	3	4	Kitts Branch
Fish Barrier	NS177101	6/13/2003	Partial	Debris dam	Too high	6		5	1	3	Marshall Creek
Fish Barrier	NS165201	5/21/2003	Partial	Debris dam; stream underground	Too shallow		2	5	1	5	Porter Creek
Fish Barrier	NS032001	7/2003	Partial	Pipe crossing	Too high	6		5	3	2	Ayer Creek
Fish Barrier	NS040004	7/23/2003	Total	Right of way crossing	Too shallow		1	4	3	2	Ayer Creek
Fish Barrier	NS167101	6/6/2003	Total	Road crossing	Too high	24		3	4	2	Basett Creek
Fish Barrier	NS043301	6/10/2003	Total	Road crossing	Too high	4		4	3	1	Bottle Branch
Fish Barrier	NS029001	7/25/2003	Total	Road crossing	Too high	18		5	4	1	Kitts Branch
Fish Barrier	NS029007	7/25/2003	Total	Road crossing	Too fast			3	4	3	Kitts Branch
Fish Barrier	NS163103	5/20/2003	Total	Road crossing	Too high	24	1	5	3	1	Massey Branch
Fish Barrier	NS170304	6/13/2003	Total	Road crossing	Too high	14		5	4	1	Massey Branch
Fish Barrier	NS133201	5/22/2003	Total	Road crossing	Too shallow		2	5	2	1	Newport Creek
Fish Barrier	NS138101	6/6/2003	Total	Road crossing	Too shallow		1	3	2	1	Basett Creek
Fish Barrier	NS068202	5/22/2003	Total	Road crossing	Too high	12		5	4	1	Trappe Creek
Fish Barrier	NS078202	5/22/2003	Partial	Road crossing	Too high	6		5	5	1	Trappe Creek
Fish Barrier	NS077201	5/22/2003	Partial	Sediment and Vegetation	Too shallow	0.5		5	1	2	Trappe Creek

Newport and Sinepuxent Bays--Inadequate Forest Buffer

Problem	Site	Date	Sides	Unshaded	Width Left(ft)	Width Right (ft)	Length Left (ft)	Length Right (ft)	Land Use Right	Land Use Left	Recently Established	Livestock	Severity	Correctability	Access	Wetland	Stream Name
Inadequate Buffer	NS008001	7/2003	Both	Both	0	0	3520	3520	Crop field	Crop field	No	No	2	4	2	2	Kitts Branch
Inadequate Buffer	NS009001	7/2003	Both	Both	0	0	35150	35150	Crop field	Crop field	No	No	1	4	2	2	Kitts Branch
Inadequate Buffer	NS014001	7/2003	Both	Both	0	0	16000	16000	Shrubs & small trees	Shrubs & small trees	No	No	1	3	3	2	Kitts Branch
Inadequate Buffer	NS016003	7/2003	Both	Both	0	0	9600	9600	Crop field	Crop field	No	No	1	4	2	3	Kitts Branch
Inadequate Buffer	NS017001	7/2003	Both	Both	0	0	55400	55400	Crop field	Crop field	No	No	1	4	2	3	Ayer Creek
Inadequate Buffer	NS030003	7/2003	Both	Both	20	20	5310	5310	Crop field	Crop field	No	No	2	3	2	3	Kitts Branch
Inadequate Buffer	NS034304	7/2003	Both	Both	0	0	15380	15380	Lawn	Lawn	No	No	1	3	2	3	Bottle Branch
Inadequate Buffer	NS036201	7/2003	Both	Both	5	5	3640	3640	Lawn	Lawn	No	No	2	3	1	3	Hudson Branch
Inadequate Buffer	NS045302	6/12/2003	Both	Both	0	0	14000	14000	Crop field	Crop field	No	No	2	2	3	4	Kitts Branch
Inadequate Buffer	NS048007	7/2003	Both	Both	0	0	5690	5690	Shrubs & small trees	Shrubs & small trees	No	No	2	2	3	2	Ayer Creek
Inadequate Buffer	NS052101	6/11/2003	Both	Both	0	0	2000	2000	Other	Other	No	No	3	5	4	3	Sinepuxent Bay
Inadequate Buffer	NS057301	6/10/2003	Right	Right	>100	0	200	200	Lawn	Forest	No	No	5	1	1	2	Bottle Branch
Inadequate Buffer	NS061101	6/11/2003	Both	Both	0	0	9240	9240	Crop field	Crop field	No	No	1	3	2	3	Ayer Creek
Inadequate Buffer	NS063101	6/11/2003	Both	Both	0	0	7070	7070	Lawn	Forest	No	No	1	2	3	3	Sinepuxent Bay
Inadequate Buffer	NS068201	5/22/2003	Both	Both	0	0	6600	6600	Crop field	Crop field	No	No	2	3	1	3	Trappe Creek
Inadequate Buffer	NS068203	5/22/2003	Both	Both	0	30	3200	3200	Lawn	Lawn	Yes	No	2	2	2	4	Trappe Creek
Inadequate Buffer	NS073201	6/12/2003	Both	Both	0	0	5400	5400	Crop field	Crop field	No	No	1	3	1	3	Poplartown Branch
Inadequate Buffer	NS074202	6/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Newport Creek
Inadequate Buffer	NS076201	5/22/2003	Both	Both	0	0	10200	10200	Crop field	Crop field	No	No	2	3	2	2	Trappe Creek
Inadequate Buffer	NS077201	5/22/2003	Left	Left	10	>100	800	0	Shrubs & small trees	Lawn	Yes	No	5	1	2	2	Trappe Creek
Inadequate Buffer	NS080101	6/11/2003	Both	Neither	3	3	400	400	Other	Other	No	No	4	5	1	3	Sinepuxent Bay
Inadequate Buffer	NS084301	6/5/2003	Both	Both	0	0	3800	3800	Crop field	Crop field	No	No	2	3	1	4	Newport Creek
Inadequate Buffer	NS086302	6/8/2003	Both	Both	5	5	1000	1000	Other	Other	Yes	No	4	2	2	1	Newport Creek
Inadequate Buffer	NS088101	6/9/2003	Both	Neither	5	5	2200	2200	Lawn	Lawn	No	No	3	1	1	4	Trappe Creek
Inadequate Buffer	NS099101	6/9/2003	Both	Neither	5	5	4700	4700	Shrubs & small trees	Shrubs & small trees	Yes	No	2	1	1	1	Ayer Creek
Inadequate Buffer	NS105301	6/8/2003	Both	Both	0	0	12800	12800	Crop field	Crop field	No	No	1	2	2	4	Newport Creek
Inadequate Buffer	NS107102	6/9/2003	Both	Both	5	5	3600	3600	Crop field	Crop field	Yes	No	2	1	2	1	Trappe Creek
Inadequate Buffer	NS109201	6/9/2003	Both	Both	0	0	6600	6600	Multiflora Rose	Crop field	No	No	1	3	1	2	Tukesburgh Branch
Inadequate Buffer	NS116201	5/23/2003	Both	Both	0	0	2500	2500	Crop field	Crop field	No	No	2	3	1	2	Goody Hill Creek
Inadequate Buffer	NS116301	5/21/2003	Both	Neither	0	0	1300	1300	Forest	Forest	No	No	5	2	2	2	Goody Hill Creek Branch
Inadequate Buffer	NS118101	6/9/2003	Both	Both	0	0	400	400	Crop field	Crop field	No	No	4	2	1	2	Catbird Creek
Inadequate Buffer	NS121201	5/23/2003	Both	Both	0	0	3000	3000	Crop field	Crop field	No	No	2	3	1	2	Newport Creek
Inadequate Buffer	NS127201	5/23/2003	Both	Both	0	0	3800	3800	Crop field	Crop field	No	No	2	3	1	2	Porter Creek
Inadequate Buffer	NS129201	6/2/2003	Right	Right	>100	0	600	600	Pasture	Forest	No	No	5	1	1	5	Catbird Creek
Inadequate Buffer	NS131201	6/2/2003	Both	Both	0	0	1500	1500	Crop field	Crop field	No	No	3	2	1	4	Beavertown Creek
Inadequate Buffer	NS133201	5/22/2003	Both	Both	0	0	2800	2800	Crop field	Crop field	No	No	2	2	1	4	Orchard Creek Bay
Inadequate Buffer	NS135201	5/19/2003	Both	Both	0	0	1200	1200	Crop field	Crop field	No	No	4	2	2	3	Massey Branch
Inadequate Buffer	NS135203	6/12/2003	Right	Right	>100	0	200	200	Pasture	Forest	No	No	5	1	1	4	Massey Branch
Inadequate Buffer	NS136101	6/13/2003	Both	Both	0	0	600	600	Crop field	Lawn	No	Yes	4	3	1	2	Porter Creek
Inadequate Buffer	NS141201	6/2/2003	Both	Neither	0	0	1500	1500	Shrubs & small trees	Shrubs & small trees	No	No	3	2	1	2	Newport Creek

Newport and Sinepuxent Bays--Inadequate Forest Buffer

Problem	Site	Date	Sides	Unshaded	Width Left(ft)	Width Right (ft)	Length Left (ft)	Length Right (ft)	Land Use Right	Land Use Left	Recently Established	Livestock	Severity	Correctability	Access	Wetland	Stream Name
Inadequate Buffer	NS143201	5/23/2003	Both	Both	0	0	2600	2600	Crop field	Crop field	No	No	2	3	1	2	Orchard Creek Bay
Inadequate Buffer	NS145302	5/19/2003	Both	Both	0	0	3600	3600	Crop field	Crop field	No	No	1	3	1	3	Massey Branch
Inadequate Buffer	NS148101	6/6/2003	Both	Both	0	0	1400	1400	Crop field	Crop field	No	No	4	2	1	1	Bassett Creek
Inadequate Buffer	NS148103	6/6/2003	Both	Both	0	0	1000	1000	Crop field	Crop field	No	No	3	2	2	2	Bassett Creek
Inadequate Buffer	NS154201	5/27/2003	Both	Both	0	0	1500	1500	Crop field	Crop field	No	No	3	3	1	1	Massey Branch
Inadequate Buffer	NS154202	5/27/2003	Left	Neither	5	>100	400	400	Forest	Crop field	No	No	5	1	1	1	Massey Branch
Inadequate Buffer	NS154203	5/27/2003	Left	Left	0	>100	2000	2000	Forest	Crop field	No	No	3	2	2	3	Massey Branch
Inadequate Buffer	NS156101	5/19/2003	Both	Both	0	0	500	500	Crop field	Crop field	No	No	4	1	2	1	Massey Branch
Inadequate Buffer	NS158101	6/11/2003	Left	Left	0	>100	100	100	Forest	Crop field	No	No	5	1	2	3	Bassett Creek
Inadequate Buffer	NS159103	6/6/2003	Both	Both	0	0	900	900	Crop field	Crop field	No	No	4	2	2	4	Bassett Creek
Inadequate Buffer	NS160001	7/2003	Both	Both	0	0	4700	4700	Crop field	Crop field	No	No	3	2	2	2	Catbird Creek
Inadequate Buffer	NS162201	6/2003	Right	Right	>100	0		1250	Crop field	Crop field	No	No	4	2	2	1	Massey Branch
Inadequate Buffer	NS168201	6/2/2003	Both	Both	0	0	8500	8500	Crop field	Crop field	No	No	1	3	2	2	Bassett Creek
Inadequate Buffer	NS169201	6/13/2003	Both	Both	0	0	1400	1400	Lawn	Crop field	No	No	3	2	1	2	Marshall Creek
Inadequate Buffer	NS171302	6/13/2003	Both	Neither	2	2	1000	1000	Crop field	Crop field	No	No	3	2	2	3	Massey Branch
Inadequate Buffer	NS173201	5/27/2003	Both	Both	0	0	200	200	Shrubs & small trees	Shrubs & small trees	No	No	5	3	1	1	Massey Branch
Inadequate Buffer	NS176203	5/21/2003	Both	Both	0	0	1800	1800	Crop field	Forest	No	No	3	2	3	5	Marshall Creek
Inadequate Buffer	NS177103	6/13/2003	Left	Neither	10	>100	200	0	Forest	Crop field	No	No	5	1	2	3	Marshall Creek
Inadequate Buffer	NS178201	5/27/2003	Both	Neither	5	5	400	400	Shrubs & small trees	Shrubs & small trees	No	No	4	2	1	1	Massey Branch
Inadequate Buffer	NS179201	5/23/2003	Both	Both	0	0	6500	6500	Crop field	Crop field	No	No	1	3	1	2	Marshall Creek
Inadequate Buffer	NS186301	5/20/2003	Both	Both	0	0	1900	1900	Crop field	Crop field	No	Yes	3	3	1	3	Marshall Creek
Inadequate Buffer	NS186301	6/16/2003	Both	Both	0	0	1000	1000	Shrubs & small trees	Shrubs & small trees	No	No	4	1	2	1	Marshall Creek
Inadequate Buffer	NS187201	6/16/2003	Both	Neither	0	0	4200	4200	Crop field	Crop field	No	No	1	3	2	2	Icehouse Branch
Inadequate Buffer	NS189301	5/21/2003	Left	Left	0	>100	400	400	Forest	Crop field	No	Yes	4	3	1	2	Icehouse Branch
Inadequate Buffer	NS190201	5/29/2003	Both	Both	1	1	2400	2400	Crop field	Crop field	No	No	2	3	1	2	Ayer Creek
Inadequate Buffer	NS195101	5/27/2003	Both	Both	0	0	2400	2400	Crop field	Crop field	No	No	2	3	1	2	Sinepuxent Bay
Inadequate Buffer	NS196101	12/2/2003	Both	Both	0	0	500	500	Crop field	Crop field	No	No	4	3	2	1	Trappe Creek
Inadequate Buffer	NS198101	5/27/2003	Both	Both	0	0	2800	2800	Lawn	Crop field	No	No	2	3	1	2	Sinepuxent Bay
Inadequate Buffer	NS199201	5/29/2003	Both	Both	0	0	2200	2200	Crop field	Crop field	Yes	No	2	1	1	1	Trappe Creek
Inadequate Buffer	NS204101	5/27/2003	Right	Right	>100	0	1000	1000	Lawn	Forest	No	No	3	1	2	2	Holland Creek
Inadequate Buffer	NS207301	6/16/2003	Both	Neither	20	20	300	300	Crop field	Crop field	No	No	5	1	2	3	Sinepuxent Bay
Inadequate Buffer	NS210103	5/27/2003	Right	Right	>100	0	2400	2400	Lawn	Forest	Yes	No	3	1	2	1	Sinepuxent Bay
Inadequate Buffer	NS301001	7/2003	Both	Neither	0	0	200	200	Lawn	Lawn	No	No	5	2	2	4	Ayer Creek
Inadequate Buffer	NS303002	7/2003	Both	Both	0	0	1820	1820	Crop field	Crop field	No	No	3	3	2	3	Ayer Creek
Inadequate Buffer	NS304001	7/2003	Both	Neither	0	0	3500	3500	Crop field	Forest	No	No	2	3	2	2	Ayer Creek

Newport and Sinepuxent Bays--Pipe Outfall

Problem	Site	Date	Outfall Type	Pipe Type	Location	Diameter (in)	Channel Width	Discharge	Color	Odor	Severity	Correctability	Access	Stream name
Pipe Outfall	NS006001	7/2003	Stormwater	Concrete Pipe	Head of stream	24		Yes	Clear	None	4	3	1	Kitts Branch
Pipe Outfall	NS014002	7/2003	Unknown	Plastic	Right bank	6	1	Yes	Medium Brown	None	3	2	1	Kitts Branch
Pipe Outfall	NS014003	7/22/2003	Stormwater	Concrete Channel	Right bank		1	No		None	5	1	1	Kitts Branch
Pipe Outfall	NS014004	7/22/2003	Stormwater	Corrugated Metal	Right bank	18		Yes	Clear	None	4	1	1	Kitts Branch
Pipe Outfall	NS015301	6/12/2003	Unknown	Corrugated Metal	Left bank	12	36	Yes	Yellow Brown	None	3	3	4	Kitts Branch
Pipe Outfall	NS024001	7/23/2003	Agricultural	Plastic	Right bank	12		Yes	Clear	None	4	3	3	Ayer Creek
Pipe Outfall	NS029004	7/24/2003	Reservoir	Rip-Rap Channel	Left bank		3	Yes	Clear	None	4	3	4	Kitts Branch
Pipe Outfall	NS030001	7/24/2003	Wetland Drainage	Corrugated Metal	Left bank	18		No		None	5	1	2	Kitts Branch
Pipe Outfall	NS034302	6/11/2003	Stormwater	Plastic	Right bank	8	3	No		None	5	2	1	Bottle Branch
Pipe Outfall	NS042304	6/11/2003	Stormwater	Corrugated Metal	Head of stream	12	1	Yes	Clear	None	4	2	1	Bottle Branch
Pipe Outfall	NS048003	7/23/2003	Wetland Drainage	Plastic	Left bank	18		No		None	5	1	2	Ayer Creek
Pipe Outfall	NS048004	7/23/2003	Wetland Drainage	Plastic	Right bank	18		No		None	5	1	2	Ayer Creek
Pipe Outfall	NS048110	3/10/2003	Wetland Drainage	Plastic	Right bank	18		No		None	5	1	2	Ayer Creek
Pipe Outfall	NS049108	3/10/2003	Wetland Drainage	Plastic	Right bank	18		No		None	5	1	2	Ayer Creek
Pipe Outfall	NS060105	3/10/2003	Wetland Drainage	Plastic	Left bank	18		No		None	5	1	2	Ayer Creek
Pipe Outfall	NS108203	6/9/2003	Stormwater	Plastic	Head of stream	8	4	Yes	Clear	None	4	3	4	Tukesburgh Branch
Pipe Outfall	NS304007	7/24/2003	Wetland Drainage	Corrugated Metal	Left bank	12		No		None	5	1	2	Ayer Creek
Pipe Outfall	NS060001	7/24/2003	Wetland Drainage	Concrete Pipe	Left bank	12		Yes	Clear	None	4	1	2	Ayer Creek
Pipe Outfall	NS060103	3/10/2003	Wetland Drainage	Concrete Pipe	Left bank	18		Yes	Clear	None	4	2	2	Ayer Creek
Pipe Outfall	NS048111	3/10/2003	Wetland Drainage	Plastic	Left bank	24		No		None	5	2	2	Ayer Creek
Pipe Outfall	NS303001	7/24/2003	Wetland Drainage	Plastic	Left bank	24		No		None	5	2	2	Ayer Creek

Newport and Sinepuxent Bays--Representative Sites

Problem	Site	Date	Substrate	Embeddedness	Shelter for Fish	Channel Alteration	Sediment Deposition	Velocity/Depth	Flow	Vegetation	Bank Condition	Riparian Vegetation	Width Riffle	Width Run	Width Pool	Depth Riffle	Depth Run	Depth Pool	Bottom Type	Stream Name
Representative Site	NS029003	7/24/2003	Poor	Poor	Suboptimal	Suboptimal	Optimal	Marginal	Optimal	Optimal	Optimal	Suboptimal		80	90		6	15	Sand	Kitts Branch
Representative Site	NS045304	6/12/2003	Poor	Poor	Marginal	Optimal	Optimal	Poor	Optimal	Optimal	Optimal	Optimal	0	206	0	0	36	0	Sand	Kitts Branch
Representative Site	NS055301	6/10/2003	Poor	Marginal	Optimal	Optimal	Suboptimal	Poor	Suboptimal	Suboptimal	Suboptimal	Optimal		72	72		12	24	Sand	Bottle Branch
Representative Site	NS060102	3/10/2003	Poor	Poor	Poor	Suboptimal	Optimal	Poor	Optimal	Suboptimal	Optimal	Poor		36	40		6	10	Sand	Ayer Creek
Representative Site	NS074201	5/19/2003	Marginal	Poor	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	30	30	362	2	6	12	Sand	Newport Creek
Representative Site	NS075302	6/8/2003	Suboptimal	Poor	Marginal	Suboptimal	Optimal	Suboptimal	Optimal	Suboptimal	Suboptimal	Optimal	36	36		14	7		Sand	Newport Creek
Representative Site	NS076202	5/22/2003	Optimal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	12	96		1	20		Sand	Trappe Creek
Representative Site	NS078201	5/22/2003	Optimal	Poor	Suboptimal	Optimal	Optimal	Marginal	Optimal	Optimal	Optimal	Optimal		60			6		Sand	Trappe Creek
Representative Site	NS084303	6/5/2003	Poor	Poor	Poor	Poor	Suboptimal	Poor	Optimal	Marginal	Suboptimal	Optimal		360			3		Sand	Newport Creek
Representative Site	NS092201	6/11/2003	Suboptimal	Optimal	Suboptimal	Optimal	Suboptimal	Suboptimal	Suboptimal	Suboptimal	Marginal	Optimal	24	60	60	2	10	18	Sand	Poplartown Branch
Representative Site	NS102301	6/5/2003	Suboptimal	Poor	Optimal	Optimal	Suboptimal	Marginal	Optimal	Marginal	Suboptimal	Optimal	28	44		1	3		Sand	Poplartown Branch
Representative Site	NS105301	6/5/2003	Suboptimal	Poor	Marginal	Optimal	Suboptimal	Poor	Optimal	Marginal	Suboptimal	Poor	28	44		1	3		Sand	Newport Creek
Representative Site	NS108201	6/9/2003	Suboptimal	Marginal	Suboptimal	Optimal	Poor	Marginal	Optimal	Optimal	Suboptimal	Optimal	8	36	36	5	4	2	Sand	Tukesburgh Branch
Representative Site	NS138103	6/6/2003	Optimal	Optimal	Optimal	Optimal	Poor	Suboptimal	Marginal	Suboptimal	Marginal	Optimal	18	48	24	4	18	4	Sand	Basett Creek
Representative Site	NS145301	5/19/2003	Suboptimal	Marginal	Optimal	Optimal	Optimal	Marginal	Optimal	Suboptimal	Optimal	Optimal	24	64		2.5	7		Sand	Massey Branch
Representative Site	NS146201	5/27/2003	Poor	Marginal	Poor	Optimal	Optimal	Poor	Optimal	Poor	Poor	Optimal	1	120	120	1	8	12	Sand	Porter Creek
Representative Site	NS148104	6/6/2003	Optimal	Marginal	Suboptimal	Optimal	Suboptimal	Suboptimal	Optimal	Marginal	Poor	Marginal	30	48	24	6	4	5	Sand	Basett Creek
Representative Site	NS155301	5/19/2003	Marginal	Poor	Marginal	Optimal	Optimal	Marginal	Optimal	Optimal	Optimal	Optimal		32	21		8	11	Sand	Massey Branch
Representative Site	NS157202	5/27/2003	Marginal	Suboptimal	Suboptimal	Optimal	Optimal	Marginal	Optimal	Suboptimal	Marginal	Optimal	12	240	120	2	24	48	Sand	Porter Creek
Representative Site	NS162203	6/13/2003	Suboptimal	Poor	Suboptimal	Optimal	Poor	Marginal	Suboptimal	Suboptimal	Suboptimal	Marginal	12	14	36	4	4	4	Sand	Massey Branch
Representative Site	NS163101	5/19/2003	Suboptimal	Marginal	Suboptimal	Optimal	Marginal	Optimal	Suboptimal	Suboptimal	Marginal	Optimal	24	24	18	2	12	60	Sand	Massey Branch
Representative Site	NS165202	5/21/2003	Suboptimal	Poor	Marginal	Optimal	Optimal	Suboptimal	Optimal	Suboptimal	Poor	Optimal	10	48		0.5	6.5		Sand	Porter Creek
Representative Site	NS171201	5/27/2003	Poor	Marginal	Marginal	Optimal	Optimal	Poor	Optimal	Suboptimal	Suboptimal	Optimal		72	36		20	20	Sand	Massey Branch
Representative Site	NS176207	5/21/2003	Suboptimal	Poor	Marginal	Optimal	Suboptimal	Marginal	Marginal	Optimal	Suboptimal	Suboptimal	68	108		1	4	0	Sand	Marshall Creek
Representative Site	NS181302	5/20/2003	Marginal	Poor	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Marginal	Optimal	44	240	37	2	11	3	Sand	Marshall Creek
Representative Site	NS002002	7/2003	Poor	Poor	Poor	Poor	Suboptimal	Poor	Optimal	Optimal	Optimal	Marginal		48			12		Silt	Kitts Branch
Representative Site	NS013004	7/25/2003	Poor	Poor	Suboptimal	Poor	Poor	Marginal		Optimal	Optimal	Poor		24			1		Silt	Kitts Branch
Representative Site	NS015002	7/22/2003	Poor	Poor	Suboptimal	Suboptimal	Optimal	Poor	Optimal	Optimal	Marginal	Poor		80	80		6	36	Silt	Kitts Branch
Representative Site	NS022001	7/22/2003	Poor	Poor	Poor	Marginal	Suboptimal	Poor	Optimal	Suboptimal	Suboptimal	Poor		36	72		10	32	Silt	Kitts Branch
Representative Site	NS024005	7/23/2003	Poor	Poor	Poor	Poor	Optimal	Poor	Optimal	Optimal	Suboptimal	Poor		80			48		Silt	Ayer Creek
Representative Site	NS040005	7/23/2003	Poor	Poor	Poor	Poor	Suboptimal	Poor	Optimal	Optimal	Suboptimal	Poor		80			24		Silt	Ayer Creek
Representative Site	NS047002	7/25/2003	Poor	Poor	Poor	Poor	Optimal	Poor	Marginal	Optimal	Suboptimal	Poor		36			12		Silt	Kitts Branch
Representative Site	NS056301	6/10/2003	Poor	Marginal	Optimal	Optimal	Suboptimal	Poor	Suboptimal	Suboptimal	Optimal	Optimal		36	48		20	24	Silt	Bottle Branch
Representative Site	NS057302	6/10/2003	Poor	Marginal	Optimal	Optimal	Suboptimal	Poor	Suboptimal	Suboptimal	Optimal	Optimal		120	120		36	48	Silt	Bottle Branch
Representative Site	NS085301	6/8/2003	Marginal	Poor	Suboptimal	Suboptimal	Optimal	Marginal	Optimal	Suboptimal	Suboptimal	Optimal	24	48		12	10		Silt	Newport Creek
Representative Site	NS154204	5/27/2003	Poor	Marginal	Suboptimal	Optimal	Suboptimal	Poor	Optimal	Optimal	Optimal	Optimal		180	15		6	6	Silt	Massey Branch
Representative Site	NS159102	6/6/2003	Poor	Poor	Poor	Suboptimal	Suboptimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal		144			20		Silt	Basett Creek
Representative Site	NS171303	6/13/2003	Poor	Poor	Suboptimal	Optimal	Optimal	Poor	Optimal	Suboptimal	Marginal	Optimal		36	72		24	36	Silt	Massey Branch
Representative Site	NS173101	6/13/2003	Poor	Poor	Optimal	Suboptimal	Optimal	Poor	Suboptimal	Optimal	Optimal	Optimal		120			12		Silt	Massey Branch
Representative Site	NS176302	6/13/2003	Poor	Poor	Suboptimal	Optimal	Suboptimal	Suboptimal	Optimal	Suboptimal	Marginal	Optimal	2	36	24	1	96	12	Silt	Marshall Creek
Representative Site	NS177102	6/13/2003	Poor	Poor	Suboptimal	Optimal	Optimal	Poor	Suboptimal	Marginal	Suboptimal	Optimal		36	48		6	12	Silt	Marshall Creek
Representative Site	NS184101	6/16/2003	Poor	Marginal	Optimal	Optimal	Optimal	Poor	Optimal	Suboptimal	Marginal	Optimal		72	48		6	12	Silt	Marshall Creek
Representative Site	NS186101	6/16/2003	Marginal	Poor	Poor	Poor	Marginal	Poor	Optimal	Optimal	Optimal	Optimal		36			2		Silt	Marshall Creek
Representative Site	NS188301	5/21/2003	Marginal	Suboptimal	Optimal	Optimal	Optimal	Poor	Optimal	Optimal	Optimal	Optimal	60	480		2	5		Silt	Icehouse Branch
Representative Site	NS212103	5/27/2003	Poor	Poor	Poor	Suboptimal	Optimal	Poor	Optimal	Optimal	Optimal	Optimal		120			19		Silt	Sinepuxent Bay
Representative Site	NS304006	7/24/2003	Poor	Poor	Poor	Marginal	Optimal	Poor	Optimal	Optimal	Suboptimal	Marginal		48			2		Silt	Ayer Creek
Representative Site	NS174201		Marginal	Marginal	Suboptimal	Optimal	Optimal	Poor	Optimal	Suboptimal	Suboptimal	Suboptimal								Massey Branch

Newport and Sinepuxent Bays--Trash Dumping

Problem	Site	Date	Type	Truckloads	Other measure	Extent	Volunteer Project?	Owner Type	Name	Severity	Correctability	Access	Stream Name
Trash Dumping	NS016001	7/2003	Shopping carts	2		Single site	Yes	Private	Save-a-Lot/Bank	5	1	1	Kitts Branch
Trash Dumping	NS036202	6/11/2003	Residential	2		Single site	Yes	Public		5	1	1	Hudson Branch
Trash Dumping	NS048002	7/24/2003	Residential		20 dumptrucks	Large area	No	Private		5	3	2	Ayer Creek
Trash Dumping	NS057201	5/22/2003	Tires	1		Single site	No	Private		5	1	2	Bottle Branch
Trash Dumping	NS075301	6/8/2003	Residential	5		Single site	Yes	Unknown		4	2	3	Newport Creek
Trash Dumping	NS110303	7/15/2003	Residential	3		Single site	No	Private		4	3	1	Beavertown Creek

Newport and Sinepuxent Bays--Unusual Condition and Comment

Problem	Site	Date	Type	Description	Potential Cause	Severity	Correctability	Access	Stream name
Comment	NS022202	6/18/2003	Added stream	a stream branch exists unlabeled off of the labeled stream					Kitts Branch
Comment	NS029303	6/18/2003	Added stream	unlabeled stream exists off of the labeled branch					Kitts Branch
Comment	NS045305	6/12/2003	Added stream	stream found not marked on map					Kitts Branch
Comment	NS053103	6/18/2003	Added stream	stream continues longer than shown on map					Sinepuxent Bay
Comment	NS062102	6/11/2003	Added stream	channel exists that was not oringally drawn on map					Sinepuxent Bay
Comment	NS083203	6/18/2003	Added stream	additional ditch along field edge	irrigation ditch				Poplartown Branch
Comment	NS085101	6/18/2003	Added stream	stream rerouted					Newport Creek
Comment	NS098102	6/9/2003	Added stream	stream was channelized around farm instead of through field	owners recently established ponds and buffer systems on land				Trappe Creek
Comment	NS098104	6/18/2003	Added stream	ditches added					Trappe Creek
Comment	NS100101	6/18/2003	Added stream	unlabeled branch exists					Tukesburgh Branch
Comment	NS105302	6/18/2003	Added stream	stream found that was not shown on map					Newport Creek
Comment	NS107102	6/18/2003	Added stream	unlabeled channels exist					Trappe Creek
Comment	NS109202	6/18/2003	Added stream	unlabeled branch exists					Tukesburgh Branch
Comment	NS113101	6/18/2003	Added stream	portions of channels don't exist and others do exist but are not shown					Newport Creek
Comment	NS118101	6/18/2003	Added stream	unlabeled stream exists					Tukesburgh Branch
Comment	NS146101	6/18/2003	Added stream	stream continues beyond where shown					Porter Creek
Comment	NS158102	6/18/2003	Added stream	unlabeled stream exists					Basett Creek
Comment	NS160202	6/18/2003	Added stream	channel exists where not shown on map					Newport Bay
Comment	NS167201	6/18/2003	Added stream	stream exists beyond where shown					Basett Creek
Comment	NS204102	5/27/2003	Added stream	additional channelized stream channels present					Sinepuxent Bay
Comment	NS145303	11/14/2003	Added stream	ditches not on original stream layer					Massey Branch
Unusual Condition	NS075301	6/8/2003	Color/clarity	Orange/rust covering complete bottom of channel for approximately 200 feet	unknown	4		4	Newport Creek
Unusual Condition	NS102302	6/5/2003	Color/clarity	murky red water	erosion upstream, sediment	5		2	Poplartown Branch
Comment	NS063301	6/16/2003	Dry	dry ditches (airport runway, limited access)					Sinepuxent Bay
Comment	NS136102	6/18/2003	Dry	stream was rerouted (not on original map) and dried up					Porter Creek
Comment	NS153101	6/18/2003	Dry	stream dry					Massey Branch
Comment	NS161202	6/18/2003	Dry	streambed dried up					Marshall Creek
Comment	NS164201	6/18/2003	Dry	streambed dried up					Massey Branch
Comment	NS169201	6/13/2003	Dry	dry ditch					Marshall Creek
Comment	NS184103	6/18/2003	Dry	dry ditch					Marshall Creek
Comment	NS200101	6/18/2003	Dry	dry ditch with vegetation growing					Sinepuxent Bay
Comment	NS204103	6/18/2003	Dry	dry ditch					Sinepuxent Bay
Comment	NS074202	5/19/2003	Naturalizing	channelized stream turning back to natural wetland within forested area					Newport Creek
Comment	NS074302	6/8/2003	Naturalizing	area formerly channelized but presently returning to natural; wooded on both sides					Newport Creek
Comment	NS104301	6/8/2003	Naturalizing	channelized stream turning into natural state in forested area					Newport Creek
Comment	NS304004	7/23/2003	Naturalizing	forest begins 20ft away from ditch on IB 300001 Shrubs & Small trees growing in ditch					Ayer Creek
Comment	NS001304	6/18/2003	No stream	stream not present, wetland inlet of 400ft					Kitts Branch
Comment	NS034104	6/18/2003	No stream	stream not present	housing development				Bottle Branch
Comment	NS042305	6/18/2003	No stream	stream is dammed and not present	dam				Bottle Branch
Comment	NS053101	6/9/2003	No stream	This stream was not found; located in housing development.	housing development				Sinepuxent Bay
Comment	NS063102	6/18/2003	No stream	stream not present	driving range				Sinepuxent Bay
Comment	NS071101	6/11/2003	No stream	stream not present, trap/lake exists where stream used to be	golf course				Sinepuxent Bay
Comment	NS082201	6/18/2003	No stream	stream not present	channelized into field				Poplartown Branch
Comment	NS098103	6/18/2003	No stream	stream not present	housing development				Trappe Creek
Comment	NS136302	6/18/2003	No stream	could not find this section of stream	stream dried up				Porter Creek
Comment	NS154205	6/18/2003	No stream	a labeled channel not found					Massey Branch
Comment	NS175101	6/18/2003	No stream	could not find stream as shown					Marshall Creek
Comment	NS205102	6/18/2003	No stream	no stream exists	golf course				Newport Bay
Comment	NS210101	5/27/2003	No stream	channels and ditches not present	area restored as wetland project with DNR and Assat. National park				Sinepuxent Bay
Comment	NS212101	5/27/2003	No stream	could not find defined stream channel	rum pointe golf course and pond exist				Sinepuxent Bay
Comment	NS212104	5/27/2003	No stream	stream ends at golf course path	golf course				Sinepuxent Bay
Comment	NS210104	5/27/2003	No stream	golf course built over stream area	golf course				Sinepuxent Bay
Unusual Condition	NS043303	7/15/2003	Other	culvert susceptible to blockage	Debris, tree branches, litter	3	2	1	Bottle Branch
Unusual Condition	NS163102	5/19/2003	Other	excessive sediment coming downstream from unknown source		4	2	3	Massey Branch

Newport and Sinepuxent Bays--Unusual Condition and Comment

Problem	Site	Date	Type	Description	Potential Cause	Severity	Correctability	Access	Stream name
Unusual Condition	NS171301	6/13/2003	Other	major sand accumulation, sediment block	fallen tree dam	4	1	2	Massey Branch
Unusual Condition	NS188302	5/21/2003	Other	sand accumulation in marsh area downstream of road where stream is piped under	road made of sand, sediment wash, 190 ft long	4	3	1	Icehouse Branch
Comment	NS029201	6/12/2003	Other	stream goes underground for about 50 ft before joining the Kitts Branch					Kitts Branch
Comment	NS110301	6/5/2003	Other	a livestock roadway with an electric fence along it crosses the stream	Livestock walkway from a bordering farm			3	Beavertown Creek
Comment	NS187101	6/18/2003	Other	could not contact owners to get permission					Icehouse Branch
Comment	NS002003	7/21/2003	Other	wetland plants in channel					Kitts Branch
Unusual Condition	NS017003	7/23/2003	Other	duckweed 100% cover over water					Ayer Creek
Comment	NS024006	7/23/2003	Other	stream sinuosity occurring with vegetation in ditch					Ayer Creek
Comment	NS030001	7/24/2003	Other	wetland plants in channel					Kitts Branch
Comment	NS031001	7/24/2003	Other	wetland plants in channel					Ayer Creek
Unusual Condition	NS162202	6/13/2003	Red flock	smell of manure, scum oily, slick		3		4	Massey Branch
Unusual Condition	NS138104	6/6/2003	Red flock			5	3	3	Basett Creek
Unusual Condition	NS146301	6/12/2003	Red flock			5		2	Porter Creek
Unusual Condition	NS156102	5/19/2003	Red flock	flowing downstream, 4 ft wide channel		5	2	3	Massey Branch
Unusual Condition	NS163103	5/20/2003	Red flock		flowing donwstream	5	2	1	Massey Branch
Unusual Condition	NS135202	6/12/2003	Scum	reddish water, thin clear film on surface	unknown	4	3	4	Massey Branch
Unusual Condition	NS176201	5/21/2003	Scum	foam		5	1	3	Marshall Creek
Comment	NS003303	6/16/2003	Wetland	wetland inlet from ayers creek, no stream leading in					Kitts Branch
Comment	NS053102	6/11/2003	Wetland	no defined stream, wetland area, possibly wetland					Sinepuxent Bay
Comment	NS078202	5/22/2003	Wetland	flooding, ground saturation	rainstorm				Trappe Creek
Comment	NS080102	6/18/2003	Wetland	stream is wetland					Sinepuxent Bay
Comment	NS089102	6/18/2003	Wetland	wetland area					Ayer Creek
Comment	NS090101	6/18/2003	Wetland	wetland area					Sinepuxent Bay
Comment	NS104302	6/18/2003	Wetland	unknown branch exits off stream and area is wetland					Newport Creek
Comment	NS107101	6/9/2003	Wetland	area where streams are shown is surrounded by wetlands					Trappe Creek
Comment	NS110302	6/5/2003	Wetland	no defined stream, area wetland					Beavertown Creek
Comment	NS112301	6/8/2003	Wetland	wetland area both sides of Hayes Landing Rd					Newport Creek
Comment	NS121101	6/18/2003	Wetland	wetland area					Newport Creek
Comment	NS123101	6/18/2003	Wetland	wetland area					Orchard Creek Bay
Comment	NS132101	6/18/2003	Wetland	wetland area					Newport Creek
Comment	NS136101	6/13/2003	Wetland	wetland area					Porter Creek
Comment	NS139201	6/2/2003	Wetland	flooding, no definable stream bed					Catbird Creek
Comment	NS152101	6/18/2003	Wetland	wetland area					Newport Bay
Comment	NS162204	6/18/2003	Wetland	swampy, undefined streambed					Massey Branch
Comment	NS184102	6/18/2003	Wetland	area flooded, no defined streambed					Marshall Creek
Comment	NS191101	6/18/2003	Wetland	wetland area					Sinepuxent Bay
Comment	NS196101	6/18/2003	Wetland	wetland area					Newport Bay
Comment	NS200102	6/18/2003	Wetland	area is wetland and ponds with no stream channel					Sinepuxent Bay
Comment	NS202101	6/18/2003	Wetland	wetland area, marsh					Newport Bay
Comment	NS203101	5/27/2003	Wetland	wetland marsh					Newport Bay
Comment	NS205101	6/18/2003	Wetland	wetland area					Newport Bay
Comment	NS206101	6/18/2003	Wetland	wetland area					Newport Bay
Comment	NS210102	5/27/2003	Wetland	restored wetland exists between ditches					Sinepuxent Bay
Comment	NS212102	5/27/2003	Wetland	marsh					Sinepuxent Bay
Comment	NS130201	6/2/2003	Wetland	flooding, undefined stream bed	flooding				Catbird Creek