Upper Chester River Stream Corridor Survey

Watershed Assessment and Targeting Division
Watershed Services
Maryland Department of Natural Resources
May 2005

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UPPER CHESTER STREAM CORRIDOR ASSESSMENT

BY

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2005

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SUMMARY

The Upper Chester watershed encompasses approximately 86,541 acres (135.22 mi^2) of land. In 1998, the Maryland Clean Water Action Plan identified the Upper Chester 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 and Kent and Queen Anne's Counties formed a partnership to develop a Watershed Restoration Action Strategy (WRAS) for the Upper Chester River Watershed. As part of the WRAS development process, a Stream Corridor Assessment (SCA) survey was performed on nine streams flowing into the Upper Chester River: Andover Branch, Cypress Branch, Foreman Branch, Mills Branch, Pearl Creek, Red Lion Branch, Sewell Branch, Spry Landing, and Unicorn Branch. The survey began in September 2004 and was completed in November 2004. It is necessary to mention that only the main-stems of these streams were surveyed, with the exception of the Red Lion Branch. At the request of Kent and Queen Anne's Counties, the tributaries of Red Lion Branch were surveyed to provide a more comprehensive picture of the streams in the watershed.

The SCA survey was developed by the Watershed Assessment and Targeting Division of the Maryland Department of Natural Resources to provide a rapid examination of the stream network in a watershed. The survey is done using specially trained field teams that walk streams and note the location of a variety of potential environmental problems. As part of the survey, field teams also collected some basic information about stream habitat conditions at regular intervals. This survey is not intended to be a detailed scientific evaluation, and the data collected about any specific problem is limited. Instead, the survey is designed to give an overview of the condition of the stream system so that future restoration efforts can be better targeted.

Approximately 75 miles of streams were surveyed of the 92.19 miles of targeted streams. In these streams, 224 potential environmental problems were identified. The most common environmental concern seen during the SCA survey was inadequate buffers, which was reported at 82 sites. Other potential environmental problems identified during the survey include: 41 fish barriers, 37 erosion sites, 28 pipe outfalls, 18 channel alteration sites, 9 trash dumping sites, 7 unusual conditions, 1 in/near stream construction site, and 1 exposed pipe. Approximately 42% of the total sites found were found on the Red Lion Branch. This may in part be due to increased development in this area. However, it may be even more influenced by the fact that a more comprehensive survey was completed on Red Lion Branch.

At each site, data was collected about the problem, its location was noted on field maps, and photographs were taken to document existing conditions. To aid in prioritizing future restoration work, field crews rated all problem sites on a scale of 1 to 5 in three categories. They were: 1) the severity of the problem, 2) how correctable the specific problem was, and 3) how accessible the site was. Field teams also collected information on both in and near stream habitat conditions at 75 representative sites that were spaced at approximately ½ to ¾ mile intervals along the streams.

The SCA survey was specifically developed as a watershed management tool. One of the main goals of the SCA survey is to compile a list of observable environmental problems so that

future restoration efforts can be better targeted. It is hoped that once a list of environmental problems has been compiled, a dialog can be initiated among resource managers on the goals and targets of future environmental restoration efforts in the Upper Chester Watershed. It is important to note that all of the problems identified as part of the Upper Chester Stream Corridor Assessment survey can be addressed through existing State or Local government programs. The value of the present survey is that it can help to place the problems in a watershed context and can be used by a variety of resource managers to plan future restoration work. Results of the present survey will be given to the Upper Chester WRAS committee, which is developing a Watershed Restoration Action Strategy for the Upper Chester. Information on the Upper Chester Watershed Action Strategy can be found on DNR's website (www.dnr.state.md.us/watersheds/surf/proj/wras.html).

ACKNOWLEDGEMENTS

Without the hard work and dedication of the Bay Crew of the Maryland Conservation Corps, this survey would not have been possible. The crew chief during the survey was Tina Stevens. The crewmembers were Jim Quinn, Justin Klingler, Chrissy Parenteau, Alex Dewire, and Jamie Hennessey.

We would also like to thank Steven Czwartacki, Robin Pellicano, and Lakesha Coates for their time and assistance in completing the survey and providing office support.

TABLE OF CONTENTS

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 Upper Chester watershed. The watershed encompasses approximately 86,541 acres in the Coastal Plain of Maryland. A map showing the location of the Upper Chester Watershed is presented in Figure 1. In response to the findings of the Maryland Clean Water Action Plan, the Maryland Department of Natural Resources has formed a partnership with Kent and Queen Anne's Counties to work together to assess and improve environmental conditions in the Upper Chester watershed. The main goals of this partnership are to develop and implement a Watershed Restoration Action Strategy (WRAS) for the Upper Chester watershed.

The first step in developing a Restoration Action Strategy for the Upper Chester Watershed is to do an overall assessment of the condition of the watershed and the streams within it. This initial step is being accomplished using three approaches. First, a watershed characterization was done that compiles and analyzes existing water quality, land use, and living resources data about the Upper Chester watershed (Shanks, 2005). Second, a synoptic water quality survey, as well as surveys of the fish and macro invertebrate communities at selected stations throughout the Upper Chester Watershed were done to provide information on the present condition of aquatic resources in the watershed (Primrose, 2005). While both these approaches provide good overall information on environmental conditions within the Upper Chester watershed, for the most part, information on the causes or location of specific environmental problems is limited. To provide specific information on the present location of environmental problems and restoration opportunities, a Stream Corridor Assessment (SCA) survey of the Upper Chester Watershed was also done.

The Stream Corridor Assessment survey has been developed by DNR's Technical and Planning Service as a watershed management tool to identify environmental problems and help prioritize restoration opportunities on a watershed basis. As part of the survey, members of the Technical and Planning Service along with specially trained personnel walk the watershed's streams and record information on a variety of environmental problems that can be easily observed within the stream corridor.

The Upper Chester watershed in Kent and Queen Anne's Counties contains 86,541 acres (135.22 mi^2) of land. Approximately 65% (56,176 acres) of the land in the watershed is categorized as agricultural land, 31% (26,958 acres) of land is forested and 3% (2,932 acres) is designated as urban (Shanks, 2004). There are 246.11 miles of stream in the upper Chester River watershed. Due to funding and time limitations, the SCA survey was completed on nine streams. The streams were chosen by the WRAS committee and consisted of the Andover Branch, Cypress Branch, Foreman Branch, Mills Branch, Pearl Creek, Red Lion Branch, Sewell Branch, Spry Landing, and Unicorn Branch in Kent and Queen Anne's Counties Maryland. The nine streams total

approximately 92 miles in length within the Upper Chester Watershed, which accounted for 37% of the entire watershed. Survey teams walked about 75 miles, or 30.54% of the streams from September 2004 to November 2004. Private landowners within the watershed had the option to deny the field crews access to their properties, resulting in approximately 17 miles of stream that could not be surveyed. A digital orthophoto map of the watershed is shown in Figure 2. Figure 3 shows the same watershed boundary superimposed on a seven and one half minute USGS topographic quadrangle map. Figure 4 shows the boundaries of Red Lion Branch within the Upper Chester watershed because this was the only sub-watershed where the field crews surveyed the entire stream network.

As mentioned earlier, the Maryland Department of Natural Resources is working with Kent and Queen Anne's Counties to develop a Watershed Restoration Action Strategy (WRAS) of the Upper Chester Watershed. As part of this process, data collected during the SCA survey will be used to help define present environmental conditions, as well as possible restoration opportunities in the watershed. This information, combined with the watershed characterization, synoptic water quality surveys, biological surveys, and local knowledge of the watershed, will be used to develop a Watershed Restoration Action Strategy for the Upper Chester River. The Watershed Restoration Action Strategy will help guide future restoration efforts with the ultimate goals of restoring the area's natural resources and meeting State water quality standards.

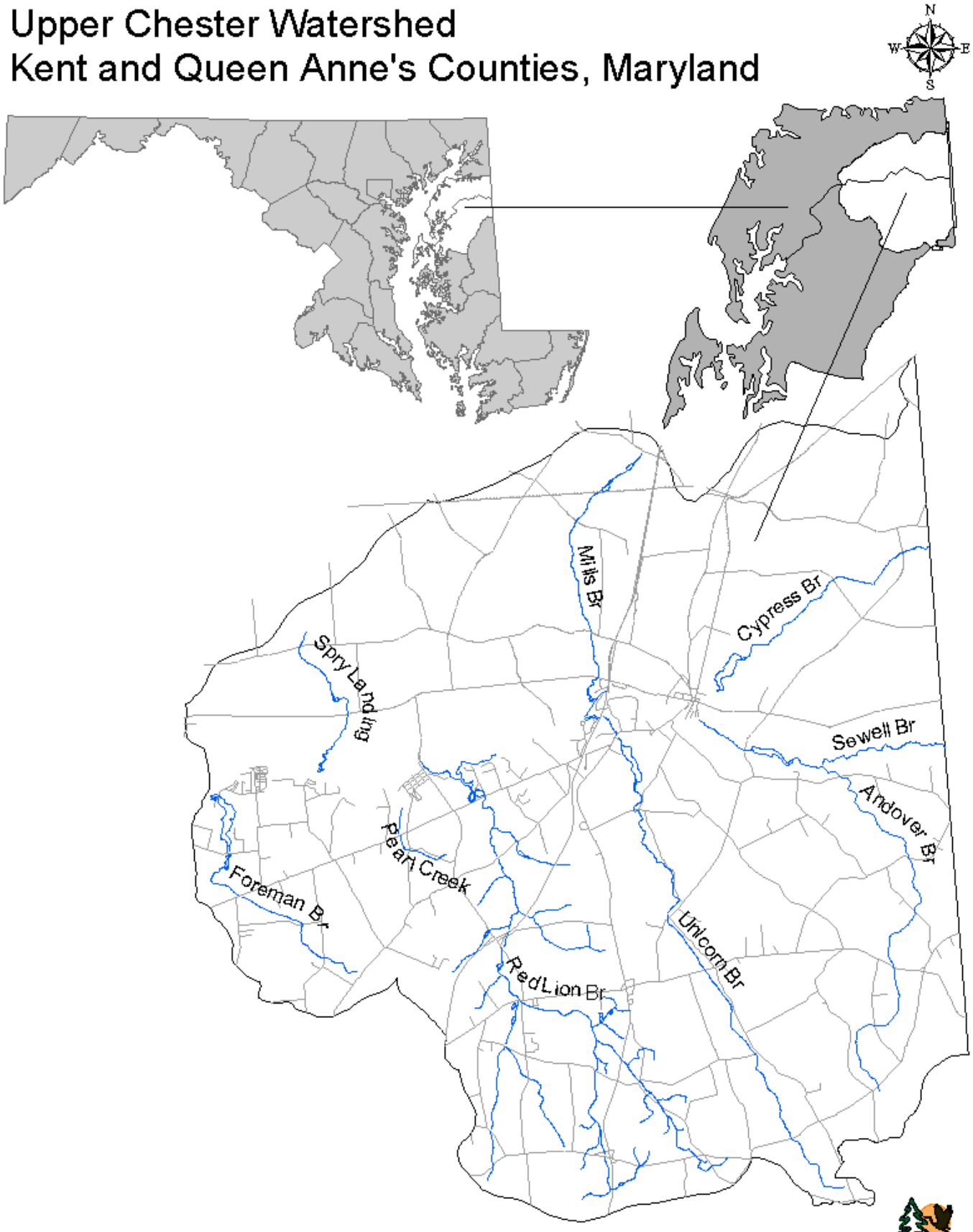

Figure 1: Map showing the location of the Upper Chester Watershed

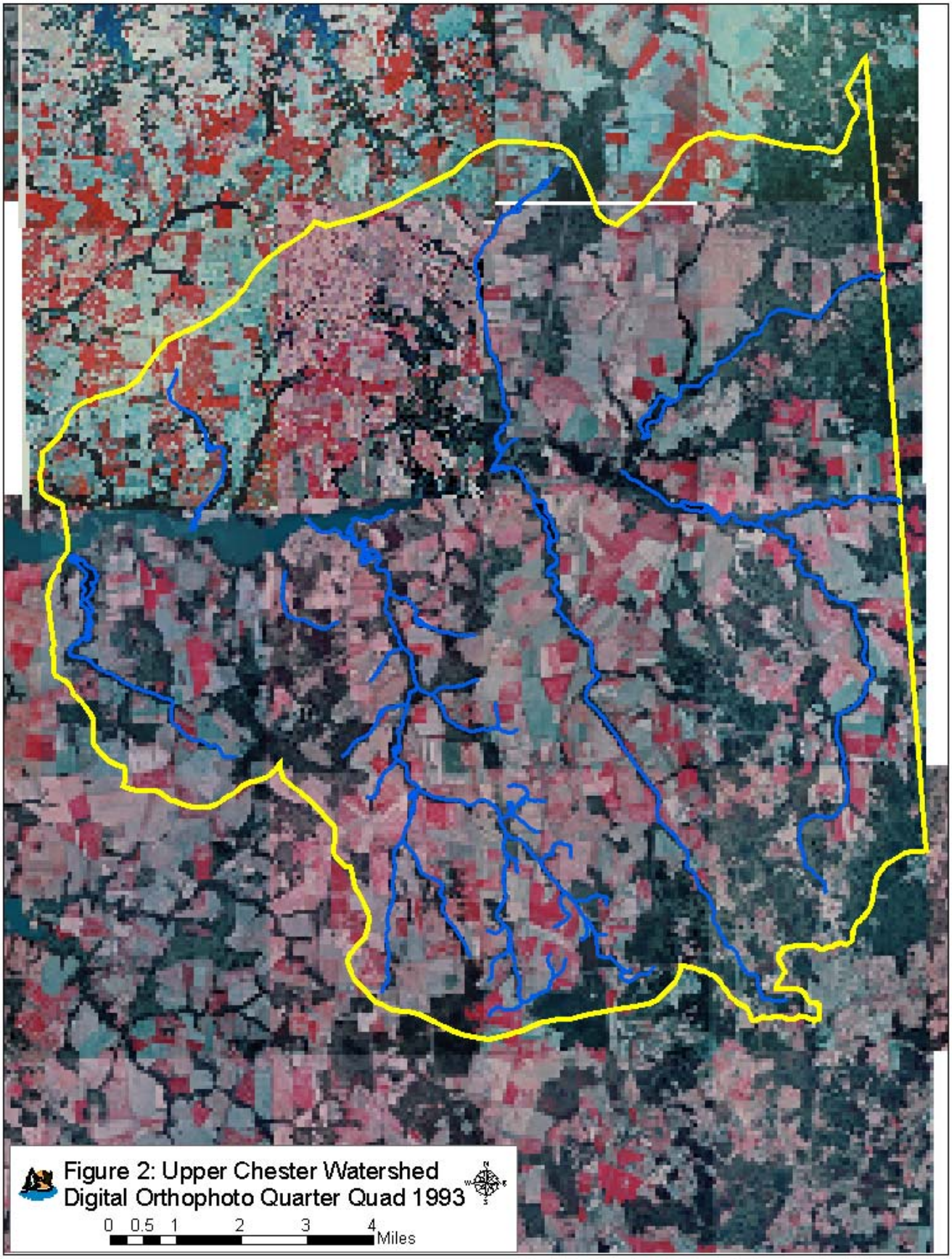
Figure 2: Upper Chester Watershed
Digital Orthophoto Quarter Quad 1993
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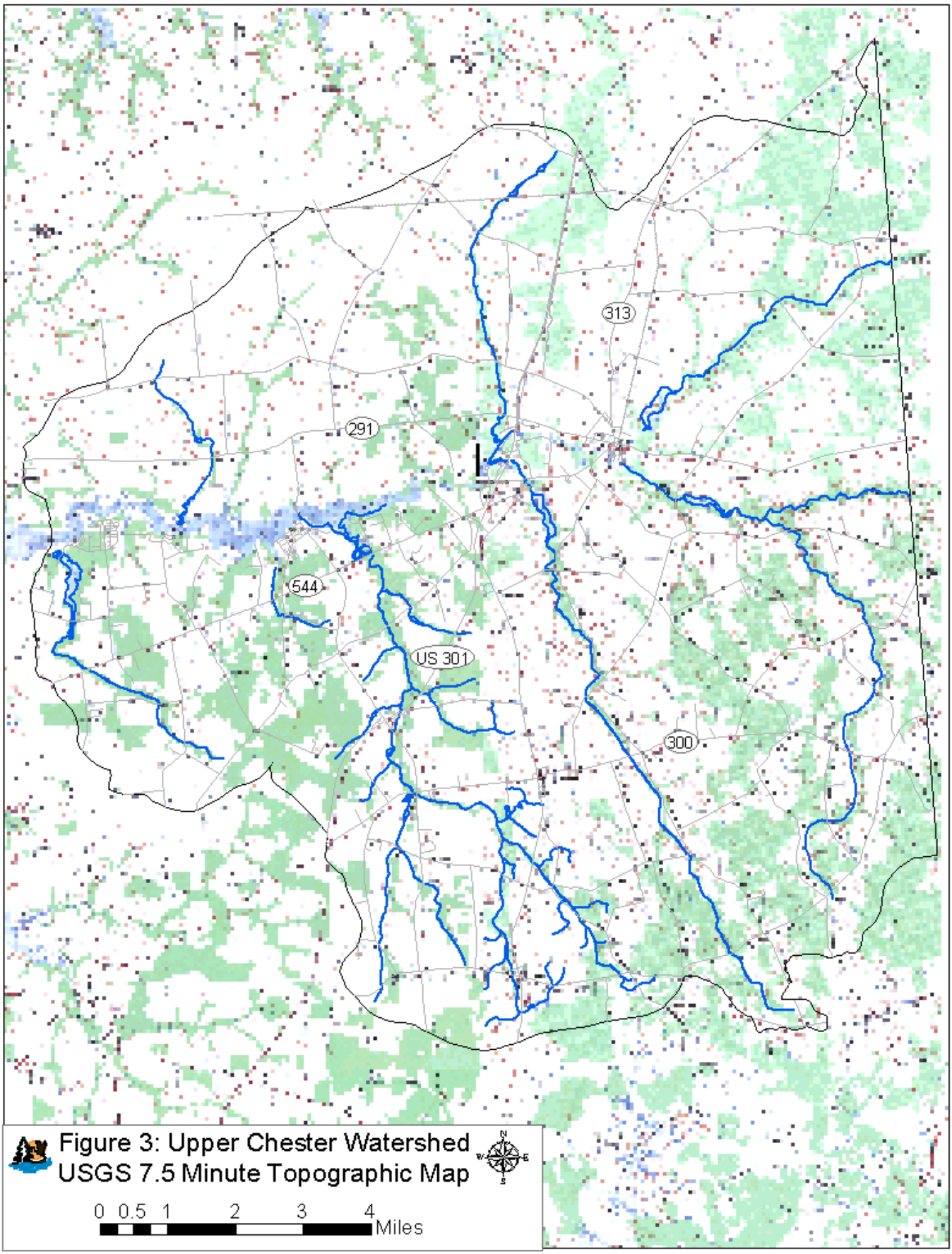
Miles


313
291
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300
Figure 3: Upper Chester Watershed
USGS 7.5 Minute Topographic Map
0 0.5 1 2 3 4
Miles

METHODS

To help identify some of the common problems that affect streams in a rapid and cost effective manner, the Watershed Assessment and Targeting Division of the Maryland Department of Natural Resource has been working for the last several years to develop 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 information on each problem so that a preliminary determination of both the severity and correctability of a problem can be made.

3. Sufficient information so that restoration efforts can be prioritized.

4. A quick assessment of both in- and near-stream habitat conditions so that comparative assessments can be made of the condition of different stream segments.

It is important to note that the SCA survey is not intended to be a detailed scientific survey, nor will it replace the more traditional chemical and biological surveys. Instead, the SCA survey provides a rapid method of examining an entire drainage network so that future monitoring, management and/or conservation efforts can be better targeted. 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 a relatively low cost. A copy of the survey protocols is available on Department of Natural Resources' web site at http://dnrweb.dnr.state.md.us/download/bays/streams/surveyprotocols2.pdf .

Maryland's SCA survey is really not a new concept but a refinement of an old approach, which in its simplest form is often referred to as a stream walk survey. Many of the common environmental problems affecting streams, such as excessive stream bank erosion or blockages to fish migration, are fairly easy to identify by an individual walking along a stream. Furthermore, an advanced degree in forestry is not needed to identify a stream segment that does not have any trees along its banks, nor does one need a degree in sanitary engineering to see that a sewage pipeline has been exposed by stream bank erosion and is leaking sewage into the stream. With a limited amount of training, most people can correctly identify these common environmental problems.

As mentioned earlier, a walking survey of stream systems is not a new concept, and there have been several attempts to standardize this approach over the years. 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) were designed to be done

by citizen volunteers with little or no training. While these surveys can be a good guide for citizens that are interested in looking at their community 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, citizen groups are given some guidance on how to organize a survey and are provided a slide show explaining how to do the survey. After approximately one hour of training, citizen volunteers are then sent out in groups to walk designated stream segments. During the survey, volunteers usually walk their assigned stream segment in a couple of hours and return their data sheets to the survey organizers to be analyzed. 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 information collected. In addition, the data collected is usually only enough to indicate that a potential environmental problem exists at a specific location but 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 trained professionals looking at a very specific stream reach, 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 done on a watershed basis.

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

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, which was started to promote greater involvement of young volunteers in their communities and the environment. DNR's Forest and Park Service manage the MCC program. 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, these young, intelligent and motivated 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 the Upper Chester SCA Survey, the members of the MCC's Chesapeake Bay Crew received several days of training. As part of this training, crewmembers learn how to identify common problems observable within the stream corridor, how to record problem locations on survey maps and how to fill out data sheets for specific problem. Procedures for documenting general stream conditions at reference sites were also reviewed during training. Reference sites are located at approximately

1/2-mile intervals along the stream. In addition to filling out a half page data sheet, field crews took photographs at all problem and reference sites to help document existing conditions. Detailed information on the procedures used in the Maryland SCA survey can be found in, "Stream Corridor Assessment Survey – Survey Protocols" (Yetman, 2001). Copies of the survey protocols can be obtained by contacting the Watershed Assessment and Targeting Division of the Maryland Department of Natural Resources in Annapolis, MD or can be downloaded from the Department's web site at www.dnr.state.md.us/streams/stream_corridor.html.

Several weeks prior to the beginning of the survey, letters were sent out to individuals who own land along the stream. The letter was used to inform property owners that the survey was being done and asked for their permission for survey crews to cross their properties. The letters included a post card with check-off boxes that property owners could use to indicate whether or not they would allow field crews to cross their properties to do the survey. The letter also gave property owners a phone number to call if they did want more information about the survey.

Field surveys of the Upper Chester watershed began in September 2004, and over the next several months the survey teams walked the stream's drainage network collecting information on potential environmental problems. Potential environmental problems commonly identified during the SCA Survey include: channelized stream sections, inadequate stream buffers, fish migration blockages, excessive bank erosion, near stream construction, trash dumping sites, unusual conditions, pipe outfalls. In addition, the survey records information on the location of potential wetlands creation sites and collects data on the general condition of in-stream and riparian habitats.

It is not unusual for an SCA survey to identify large number of problems in each problem category. For example, in an earlier survey of the Swan Creek Watershed in Harford County, a total of 453 potential environmental problems were identified along 96 miles of stream. The most frequently reported problem during the survey was stream bank erosion, which was 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 fairly minor. Based on this experience the SCA survey has 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 crews training is devoted to how to properly rate the different problems identified during the survey.

While the ratings are subjective, they have proven to be very valuable in providing a starting point for more detailed follow-up evaluations. This is because in many cases, resource professionals such as fisheries biologists, foresters, hydrologists and engineers do not have the time to walk hundreds of miles of streams to determine where the problems are. What the SCA survey does is train the MCC and other groups to walk streams for them and collect some very basic information about commonly seen problems. Once the SCA survey has been completed, the data collected can then 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 target future riparian buffer plantings, while the local fishery biologist can use the data on fish blockages to help target future fish passage projects to reestablish spawning runs. The inclusion of a rating system in the survey gives the 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 Protocols (Yetman, 2000). It is important to note that the rating system is designed to contrast problems within a specific problem category. 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. The rating is not intended to be applied across categories. 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** has generally been found to be the most useful rating and indicates how bad a specific problem is relative to others in the same problem category. The severity rating is used to answer 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.

* 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 would 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 appear to be unstable and eroding at a fast rate.

* A moderate severity rating of 3 is used to identify problems that appear to be having some adverse environmental impacts but the severity and/or length of stream affected 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 much worse problems in that specific problem category. Examples would include: a small fish blockage that was 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 had an inadequate forest buffer.

* A minor severity rating of 5 is given to problems that do not appear to be having a significant impact on stream and aquatic resources. A minor rating indicates that a problem was present but compared to other problems in the same category

it would be considered minor. Examples would include: an outfall pipe from a storm water management structure that is not discharging during dry weather and does not have any erosion problem either at the outfall or immediately downstream, or a section of stream that has stable banks and some trees along both banks but the forest buffer is less than 50 feet.

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 would initially target the severest problems that are the easiest to fix. The correctability rating can also be useful in identifying simple projects that can be done by volunteers, as opposed to projects that require more significant planning and engineering efforts.

* A minor correctability rating of 1 is assigned to problems that can be corrected quickly and easily using hand labor, with a minimum 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 would be 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 is given to 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 by themselves, 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 is given to problems that would require a large expensive effort to correct. These projects would usually require heavy equipment, significant amount of funding ($100,000.00 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 would 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** is used to provide 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 their field 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 is assigned to sites that are readily accessible both by car and on foot. Examples would 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 is assigned to sites that are easily accessible by foot but not easily accessible by a vehicle. Examples would include a stream section that could be reached by crossing a large field or a site that was 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. Examples would include a site where there are no roads or trails nearby. To reach the site it would be necessary to hike at least a mile. If equipment were needed to do the restoration work, an access road would need to be built through rough terrain.

Following the completion of the survey, information from the field data sheets were entered into a Microsoft Excel database and verified by the field teams. In addition, the 462 digital photographs that were taken during the survey were labeled and organized by site number on a network drive. The photographs were then placed on a photo CD so they can be distributed to interested parties. Finally, all data collected during the survey was incorporated into an ArcView Geographic Information System (GIS). A final copy of the ArcView files were given to the Kent and Queen Anne's Counties Department of Planning and Zoning for their use in developing a Watershed Action Strategy for the Upper Chester.

RESULTS

The Stream Corridor Assessment survey of the Upper Chester watershed streams started in September 2004, and field data collection was completed by November 2004. An overall summary of survey results is presented in Table 1, while Table 2 summarizes the data by major stream segments. All data collected during the survey is presented in Appendices A and B. Appendix A provides a listing of information by problem number along with its location, using Maryland State Plane northing and easting coordinates. The coordinates are meters. Information in this format is useful when working with maps showing the location of problem sites to determine what problems may be present along a specific stream reach. In Appendix B, the data is presented by problem type, with more detailed information about each problem. Presenting the data by problem type allows the reader to see which problems the field crews rated the most severe or easiest to fix within each category.

Table 1. Summary of results from Upper Chester SCA Survey.

Potential Problems Identified	Number	Estimated Length	Very Severe	Severe	Moderate	Low Severity	Minor
Inadequate Buffers	82	67,218 ft (12.73 miles)	17	11	29	16	9
Fish Barriers	41	N/A	-	2	3	16	20
Erosion Sites	37	35,748 ft (6.77 miles)	4	1	10	11	11
Pipe Outfalls	28	N/A	-	-	11	6	11
Channel Alterations	18	62,504 ft (11.84 miles)	3	0	8	5	2
Trash Dumping Sites	9	N/A	-	2	4	2	1
Unusual Conditions	7	N/A	-	2	3	2	-
Exposed Pipes	1	35 ft (.0067 miles)	-	1	-	-	-
In/near Stream Construction	1	500 ft (.095 miles)	-	1	-	-	-
TOTAL	224		24	20	68	58	54
Comments	6	N/A					
Representative Sites*	75	N/A					

*Representative sites are used to document the general condition of both in-stream habitat and the adjacent riparian (stream bank) corridor.

Table 2 Summary of results by major stream segments .

Stream Segment	Channel Alteration	Construction	Erosion	Exposed Pipes	Fish Barrier	Inadequate Buffer	Pipe Outfall	Representative Sites	Trash Dumping	Unusual Conditions	Comments	Total
Andover Branch	2	-	3	-	7	7	3	11	-	1	1	35
Cypress Branch		-	2	-	3	1	-	6	3	-	1	16
Foreman Branch	-	-	4	-	-	6	1	4	-	1	-	16
Mills Branch	-	-	5	-	8	4	2	6	-	1	2	28
Pearl Creek	-	-	3	-	2	5	2	2	-	1	1	16
Red Lion Branch*	12	-	13	1	15	40	12	29	5	2	-	129
Sewell Branch	-	-	-	-	-	-	-	4	-	-	-	4
Spry Landing	1	1	3	-	3	7	3	3	-	-	-	21
Unicorn Branch	3	-	4	-	3	12	5	10	1	1	1	40

* At the request of Kent and Queen Anne's Counties, the tributaries of Red Lion Branch were surveyed to provide a more comprehensive picture of the streams in the watershed. It is necessary to mention that only the main-stems of the remaining streams were surveyed.

Inadequate Buffers

Forested stream buffers are very important for maintaining healthy Maryland streams. They help shade the stream to prevent excessive solar heating and their roots stabilize the stream banks. Forest buffers also help remove nutrients, sediment and other pollutants from runoff, and the leaves from trees are a major component of the stream's food web. Because of the importance of stream buffers, the state of Maryland has set a goal of recreating 1,200 miles of forest stream buffers by the year 2010.

While there is no single minimum standard for how wide a forested stream buffer should be in Maryland, for the purposes of this study a forest buffer is generally considered inadequate if it is less than 50 feet wide on each side of the stream, measured from the edge of the stream's banks. Inadequate buffers were the most frequently reported problem. Survey crews reported inadequate stream buffers at 82 sites in the Upper Chester watershed survey. The locations of the inadequate buffer sites are shown in Figures 4b and 4c.

As part of the data collected by the field crews, a rough estimate of the length of the inadequate stream buffer at each site was made. Based on this data, there is an estimated 67,218 feet (12.73 miles) of inadequately buffered stream banks in the Upper Chester Watershed. This accounts for 17% of the total stream miles that were surveyed by the field crews. The length of inadequate buffers ranged from 50 feet to 11,950 feet. At 29 sites, the field crew reported that inadequate buffers existed on both sides of the stream. At the remaining 53 sites, adequate buffers were present on only one side of the stream. The most commonly reported land use along these inadequately buffered banks was crop fields at 54 sites. Field crews reported livestock at three of the sites. Sites receiving a very severe rating involve areas where the inadequately buffered area totaled over 1000 feet of stream with no buffer on either stream bank**.** The severe sites were sites in which there was no buffer on either side for 500 feet – 1000 feet, or sites where there was a buffer on one side and an inadequate buffer on the other for over 1000 feet.

Red Lion Branch contained 40 inadequate buffer sites, with 10 sites receiving very severe ratings. Forty-two inadequately buffered sites were found in the other streams, with 7 receiving very severe ratings. Site 187902, located on Red Lion Branch, was the most severe inadequately buffered site, measuring 9,900 feet on the right bank and 11,950 feet on the left bank. The stream was un-shaded and was bordered on both sides by crop fields. The channel of the stream, however, contained substantial vegetation. The survey crew observed small reptiles and amphibians as well as wading birds in the stream channel. This site is representative of the other sites in the watershed that received a very severe rating. As mentioned earlier Red Lion was the only stream where all the tributaries were also surveyed.

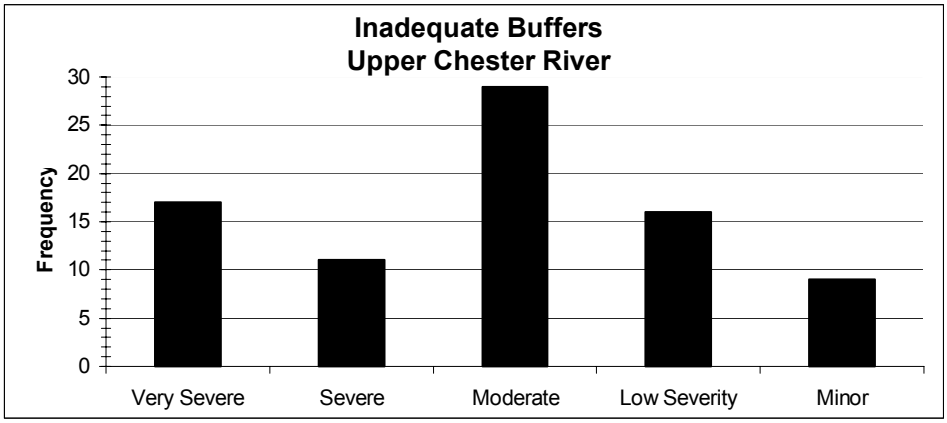

Figure 4a: Histograph showing the frequency of severity ratings given to inadequate buffers during the Upper Chester SCA Survey.

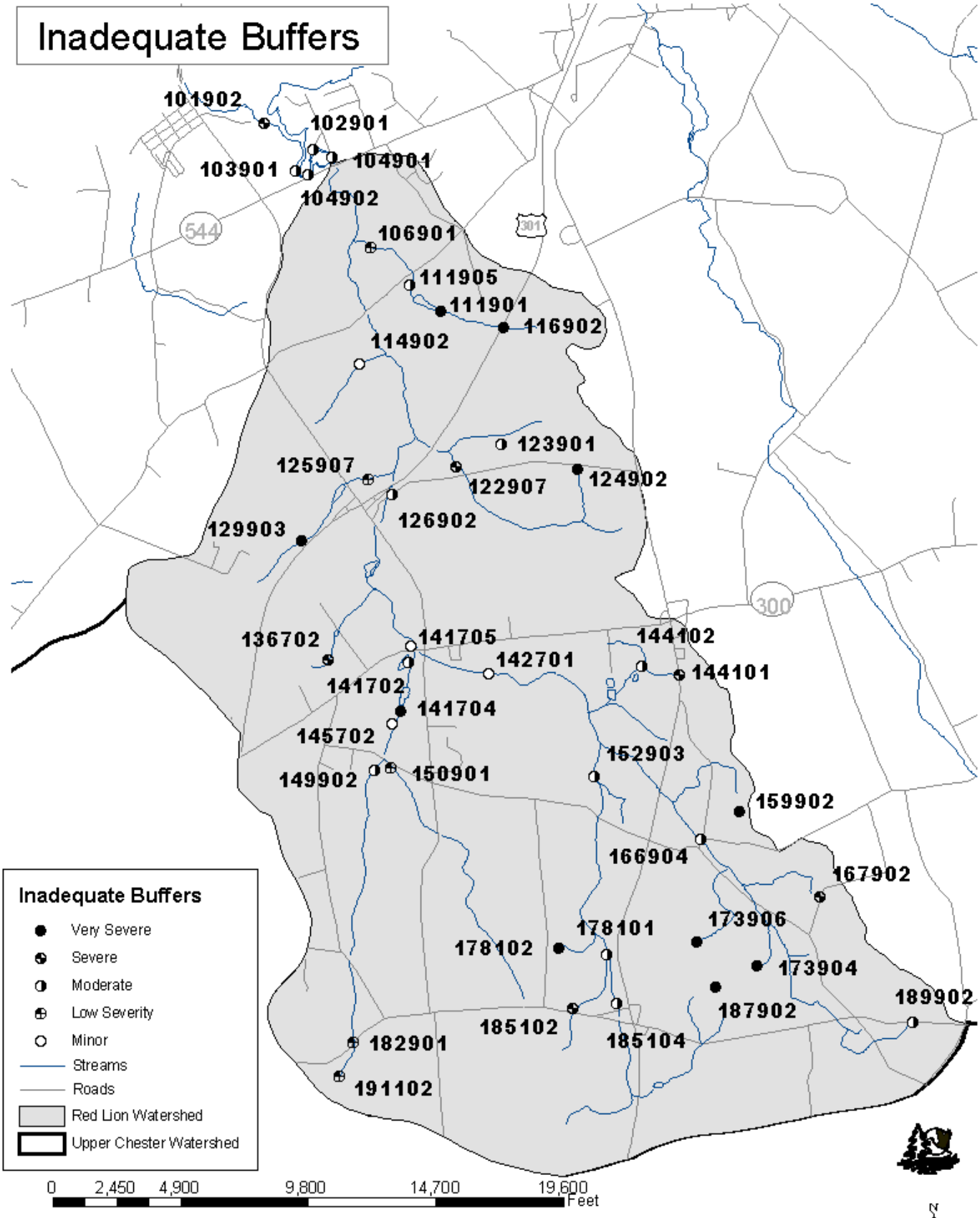

Figure 4b: Map showing the locations of the inadequate buffers in the Red Lion Branch watershed.

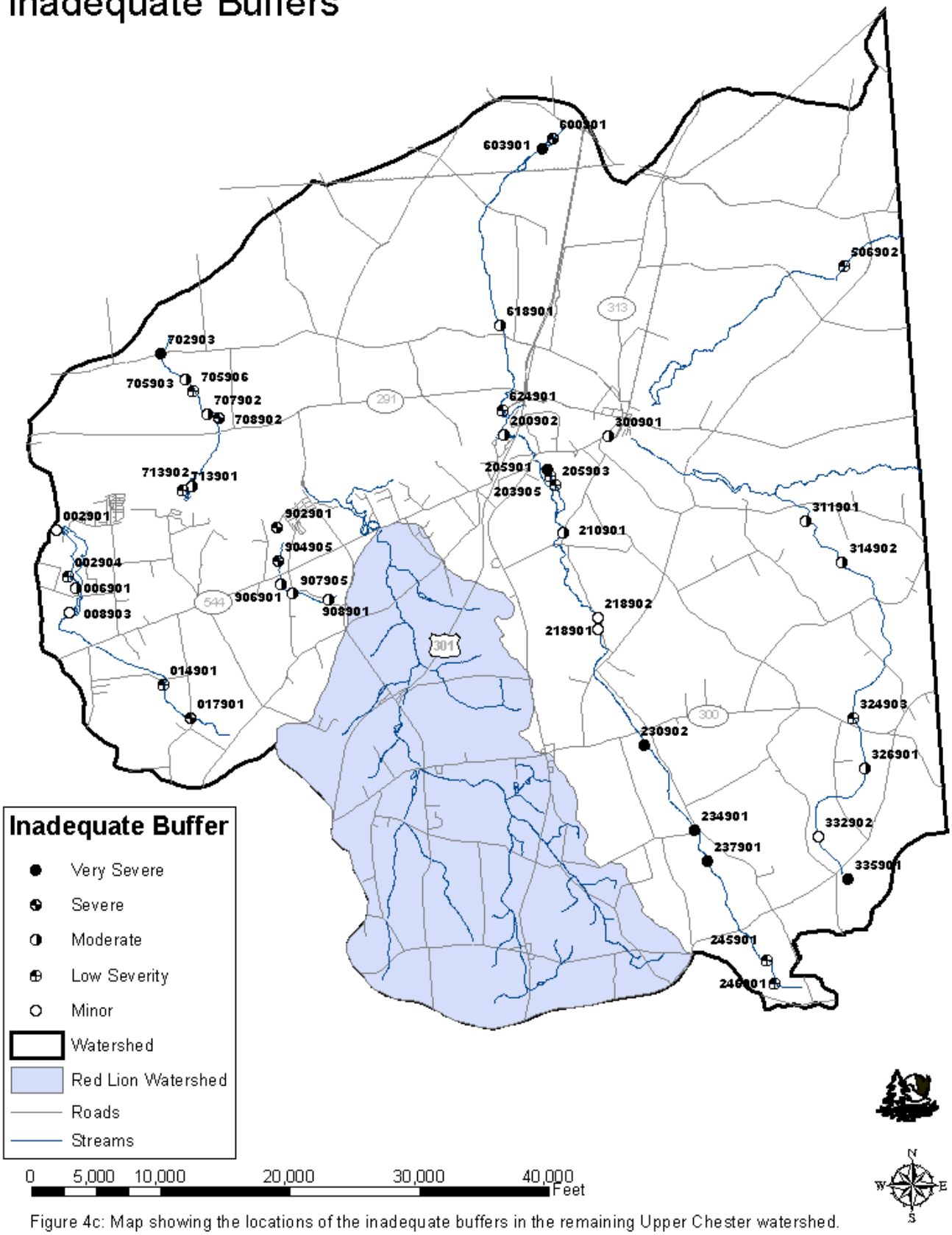

Figure 4c: Map showing the locations of the inadequate buffers in the remaining Upper Chester watershed.

Fish Migration Barriers

Fish migration barriers are anything in the stream that significantly interferes with the free movement of fish upstream. Unimpeded fish passage is especially important for anadromous fish that live much of their lives in tidal waters but must move into non-tidal rivers and streams to spawn. Unimpeded upstream movement is also important for resident fish species, many of which also move both up and down stream during different parts of their life cycle. Without free fish passage, some of the sections in a stream network can become isolated. If a disturbance occurs in an isolated stretch of stream, such as a sewage line break that discharges a large amount of raw sewage into a small tributary, some or all fish species may be eliminated from that section of stream. With a fish blockage present and no natural way for a fish to repopulate the isolated stream section, the diversity of the fish community in an area will be reduced and the remaining biological community may be out of natural balance.

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. Fish blockages occur for three main reasons. First, a vertical water drop such as a dam can be too high for fish to jump or swim 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 1 foot, providing there is sufficient flow and water depth. The second reason a structure may be a fish passage problem is because the water is too shallow. This can often occur in channelized stream sections or at road crossings where the water from a small stream has been spread over a large flat area and the water is not deep enough for fish to swim through. Finally, a structure may be a fish blockage if the water is moving too fast through it for fish to swim through. This is sometimes seen at road crossings where the culvert pipe has been placed at a steep angle and the water moving through the pipe has a velocity that is higher than a fish's swimming ability. Individual fish barriers may vary in severity depending on the amount of flow in the stream, which is dependant on other environmental factors, such as precipitation levels and evaporation rates.

Survey crews identified 41 fish migration barriers during the survey. Most of these were found along the Red Lion Branch because the sub-watershed was surveyed as well as the main stem. The locations of fish migration blockages are shown in Figure 5b and 5c. Beaver dams were cited as the main type of fish barrier and were reported at 23 sites. Other causes of fish barriers in the watershed were debris dams (7), dams (5), in-stream ponds (3), natural falls (2), and 1 road crossing. The majority (31 of 40 sites) of the fish migration blockages were characterized as being temporary fish migration barriers, blocking the whole width of the stream with a temporary structure such as a debris jam or beaver dam. These temporary barriers are most often cleared by high flow events or other natural factors. Structures totally blocking full movement of fish were cited at 7 sites. Lastly, partial barriers were cited in 3 cases to be incompletely blocking the flow of the stream.

The majority of fish barriers were given a low to minor severity rating (Figure 6a). Three sites were given a moderate rating and two sites were given a severe rating. Severity ratings were based on position in the watershed, as well as the type and height/depth of the barrier. There appears to be a thriving population of beavers within this watershed as their dams were seen with great frequency such as at site 122903 and 303902.

Three of the streams in this watershed had fish barriers near the mouths of the main stems and only two of these contained fish passage devices**.** These main stem blockages occurred on Andover, Cypress, and Unicorn Branches. Cypress Branch was the only one of these that did not contain a functional fish ladder. Site 301904 on Andover Branch was a partial blockage consisting of a dam nearly seven feet high. A fish passage device was present, though the dam was very close to the mouth of the stream. Site 522901 was also a dam located on Cypress Branch near its confluence with the Chester River. There was not a fish ladder present at this site and the water drop at the dam was one foot high. It has been noted that migratory fish such as white perch, yellow perch, and herring spawn in some areas of the Upper Chester watershed, with white perch traveling as far as Sewell Branch (Shanks 2004).

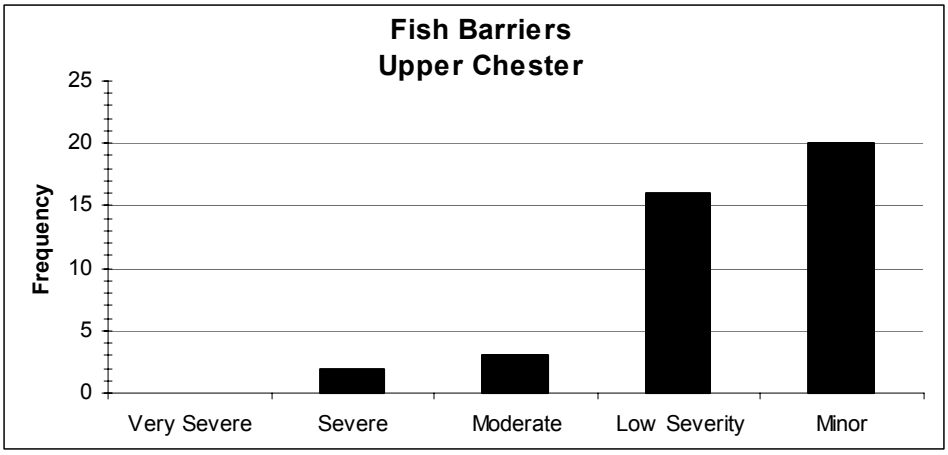

Figure 5a: Histograph showing the frequency of severity ratings given to fish barriers seen during the Upper Chester SCA Survey.

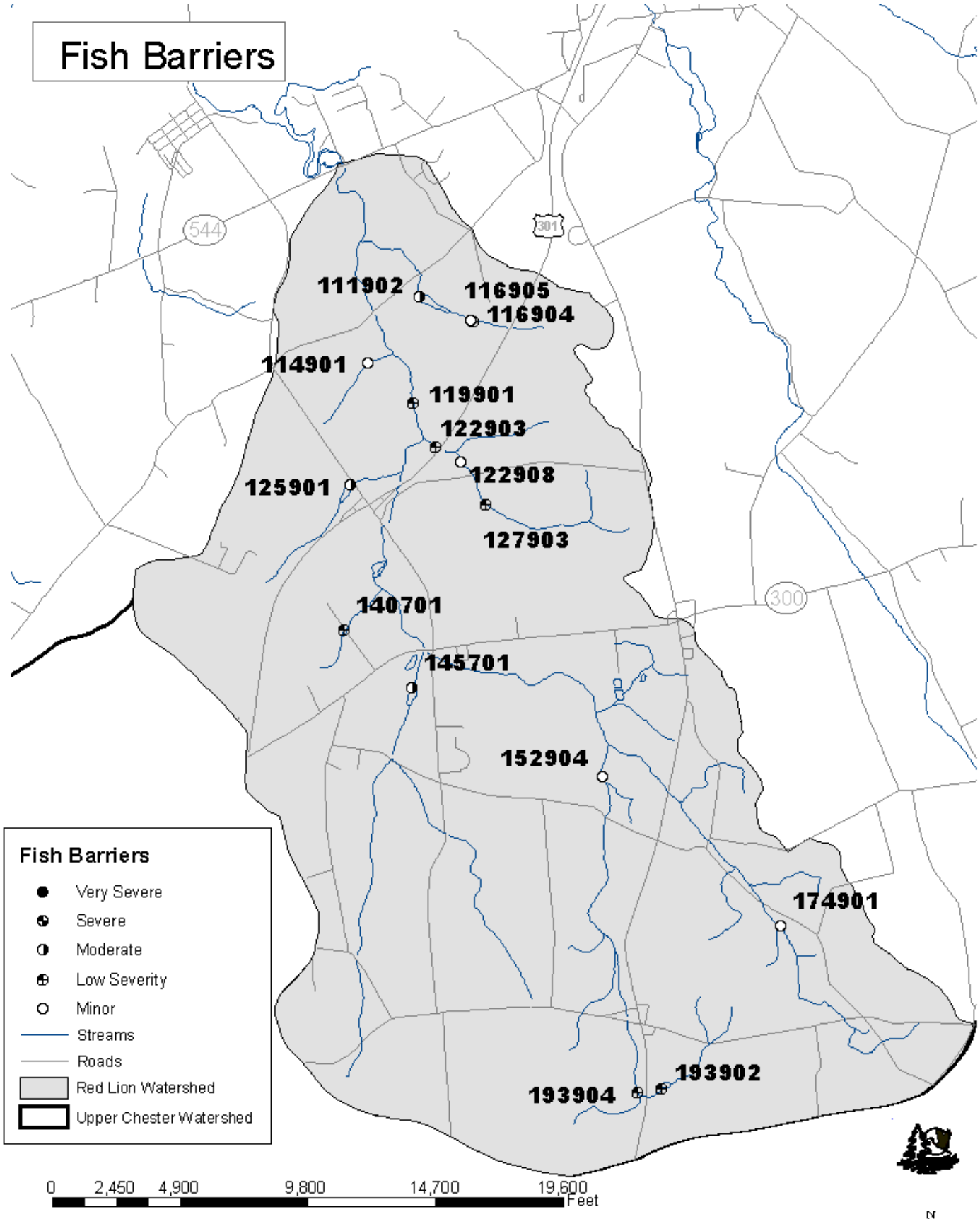

Figure 5b: Map showing the locations of fish barriers in the Red Lion Branch watershed.

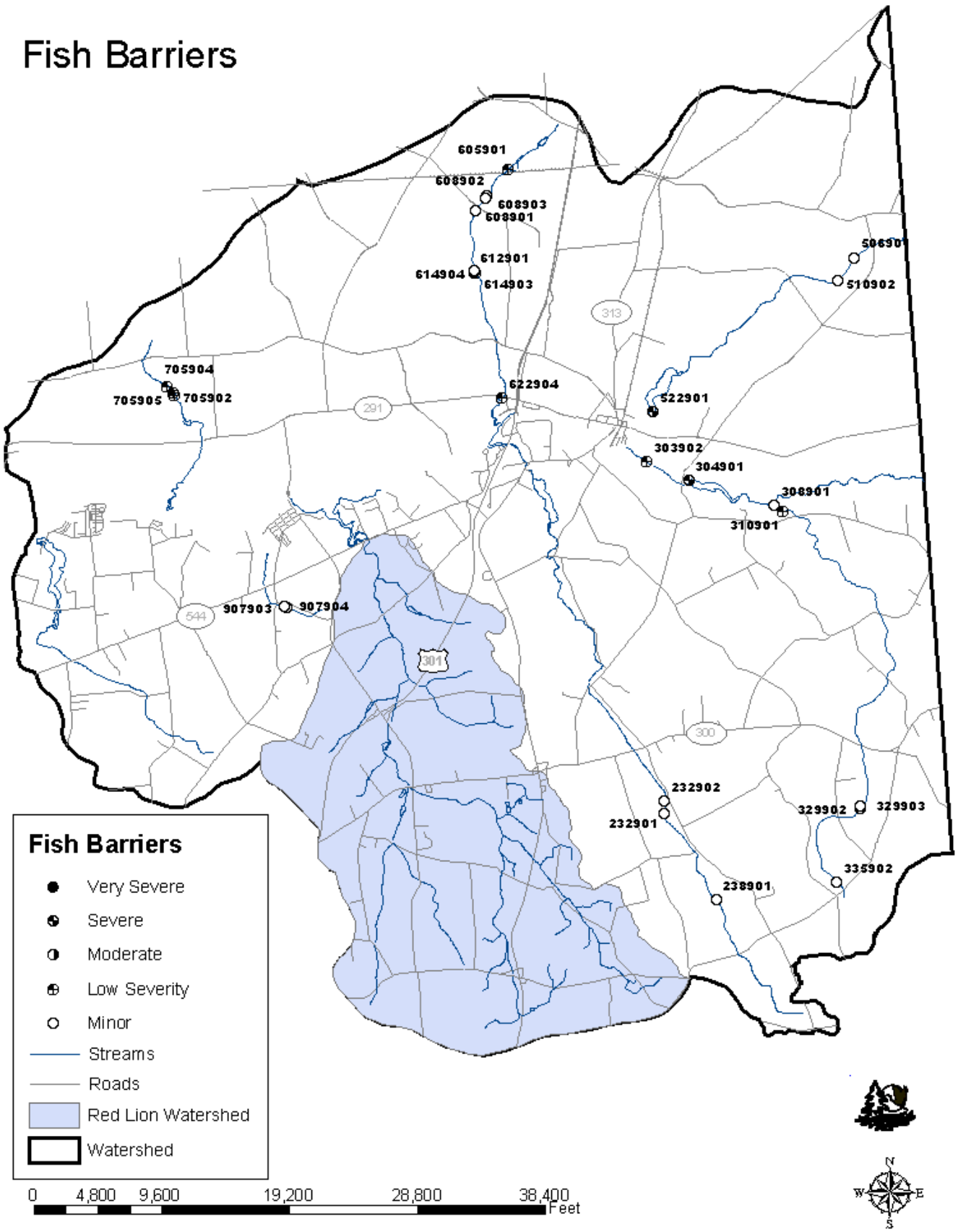

Figure 5c: Map showing the locations of the fish barriers in the remaining Upper Chester watershed.

Erosion Sites

Erosion is a natural process, and it is necessary for the maintenance of good aquatic habitat in a stream. Too much erosion, however, can have the opposite effect, destabilizing stream banks, destroying in-stream habitat and causing significant sediment pollution problems downstream. Severe erosion problems occur when a stream's hydrology, geometry and/or sediment supply have been significantly altered. This often occurs when land use in a watershed changes. Increases in the amount of impervious surfaces, construction in the floodplain and alterations to channel alignments can all destabilize stream banks. These activities can set off a series of channel readjustments that can extend over decades. During this time excessive amounts of sediment from the unstable eroding stream banks can have detrimental impacts on the stream's aquatic resources.

In this survey, unstable eroding streams are defined as areas where the stream banks are almost vertical and the roots from the vegetation along the stream's banks are unable to hold the soil onto banks. Unstable eroding stream banks were reported at 37 sites. Severity rankings for the erosion sites can be found in Figure 6a and locations of each erosion site are shown in Figures 6b and 6c. It is important to note that the SCA survey is only a visual survey of the stream network. While survey teams are asked to comment whether they believed the stream was down-cutting, widening, or headcutting at a specific site, the only way to really know the full significance of the erosion processes at a specific site is to do more detailed monitoring over time.

Thirty-five percent of the erosion sites reported were found within the Red Lion Branch sub-watershed with the remaining sites evenly distributed between the other streams in the watershed. Sewell Branch was the only stream that did not contain any erosion sites. There were 13 reported erosion sites in Red Lion Branch, 5 in Mills Branch, 4 in Unicorn Branch, 3 in Spry Landing, 3 in Pearl Creek, 3 in Andover Branch, and 2 in Cypress Branch. The lengths of the erosion sites ranged from 20 feet to 3,713 feet with bank heights ranging from 1.5 feet to 20 feet.

Red Lion Branch contains 13 erosion sites as identified by this survey. Two of these erosion sites were given very severe ratings. At sites 101903, and 136701, the survey crew reported that the erosion occurred in areas that also had inadequate buffers, which could be contributing to the erosion problems at these sites. The average height of the banks was 12 feet and 5 feet respectively, and extended for lengths of 950 feet and 2,122 feet. Site 136701 was bordered on both sides by crop fields and site 101903 had crop fields on the left side and forest on the right. Site 622902 is located on the Mills Branch and was also given a very severe rating by the survey crew. The site measured 3,200 feet long with an average bank height of 5 feet. Finally, site 203903, located on Unicorn Branch, received a severe rating from the field crew because the farm adjacent to the stream was losing pasture to an erosion problem caused by a bend at a steep slope. The site measured only 50 feet long but the average bank height was reported to be 20 feet.

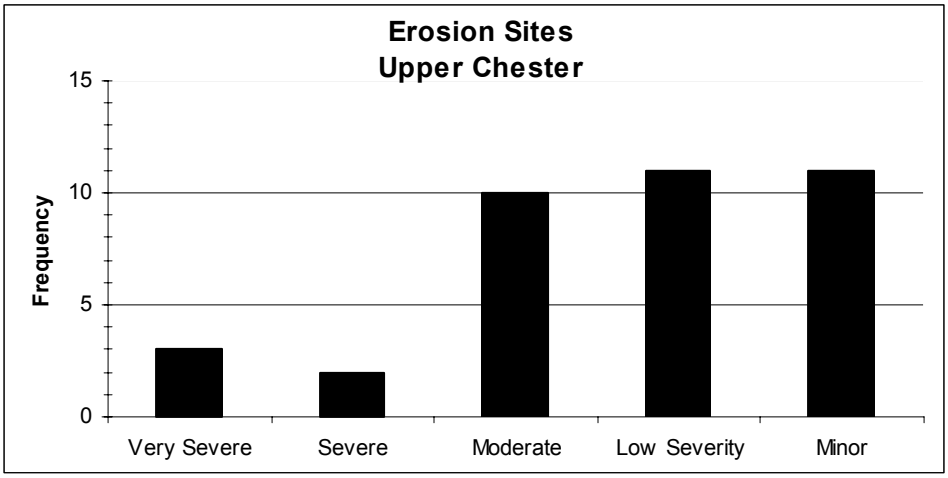

Figure 6a: Histograph showing the frequency of severity ratings given to stream bank erosion sites during the Upper Chester SCA Survey.

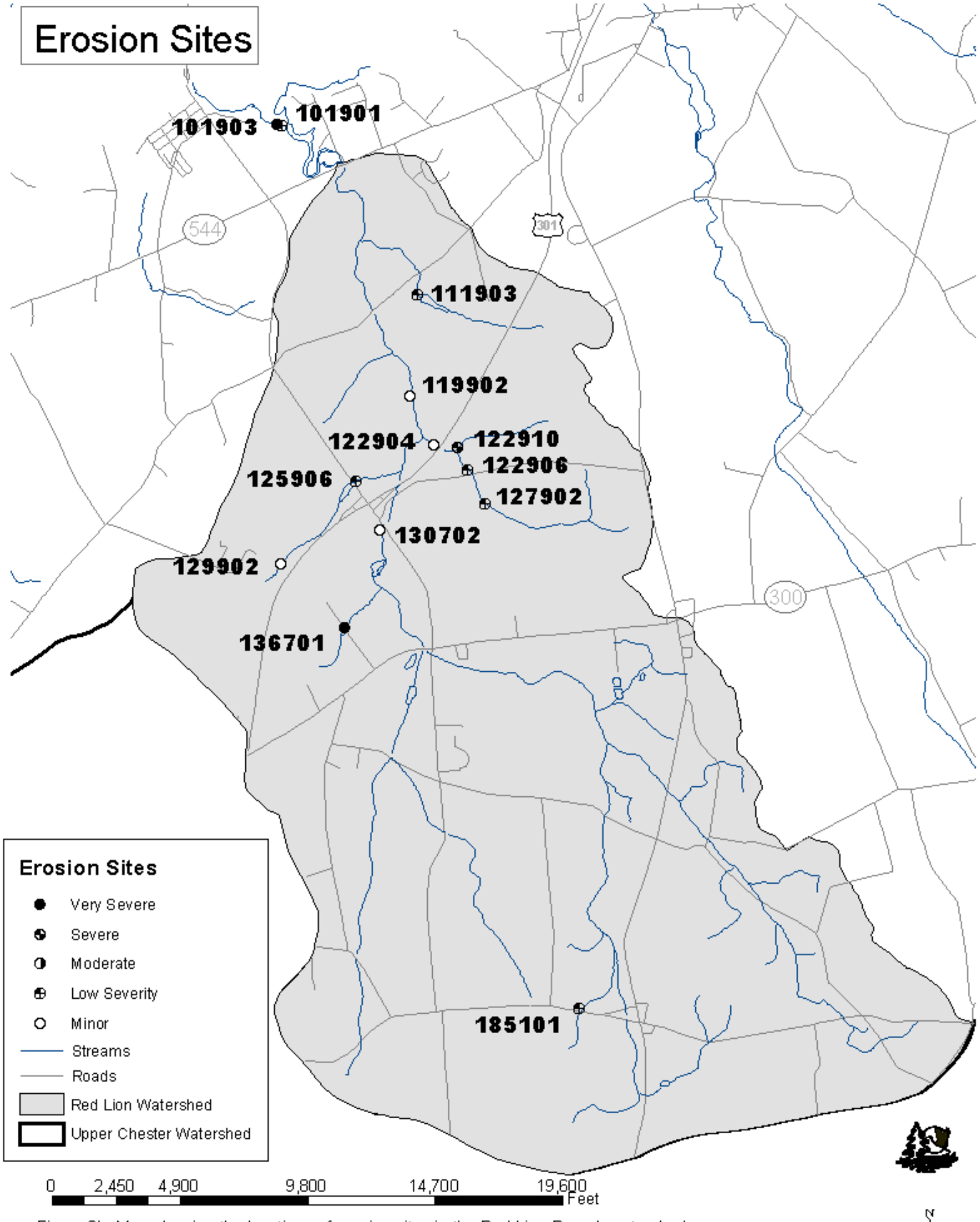

Figure 6b: Map showing the locations of erosion sites in the Red Lion Branch watershed.

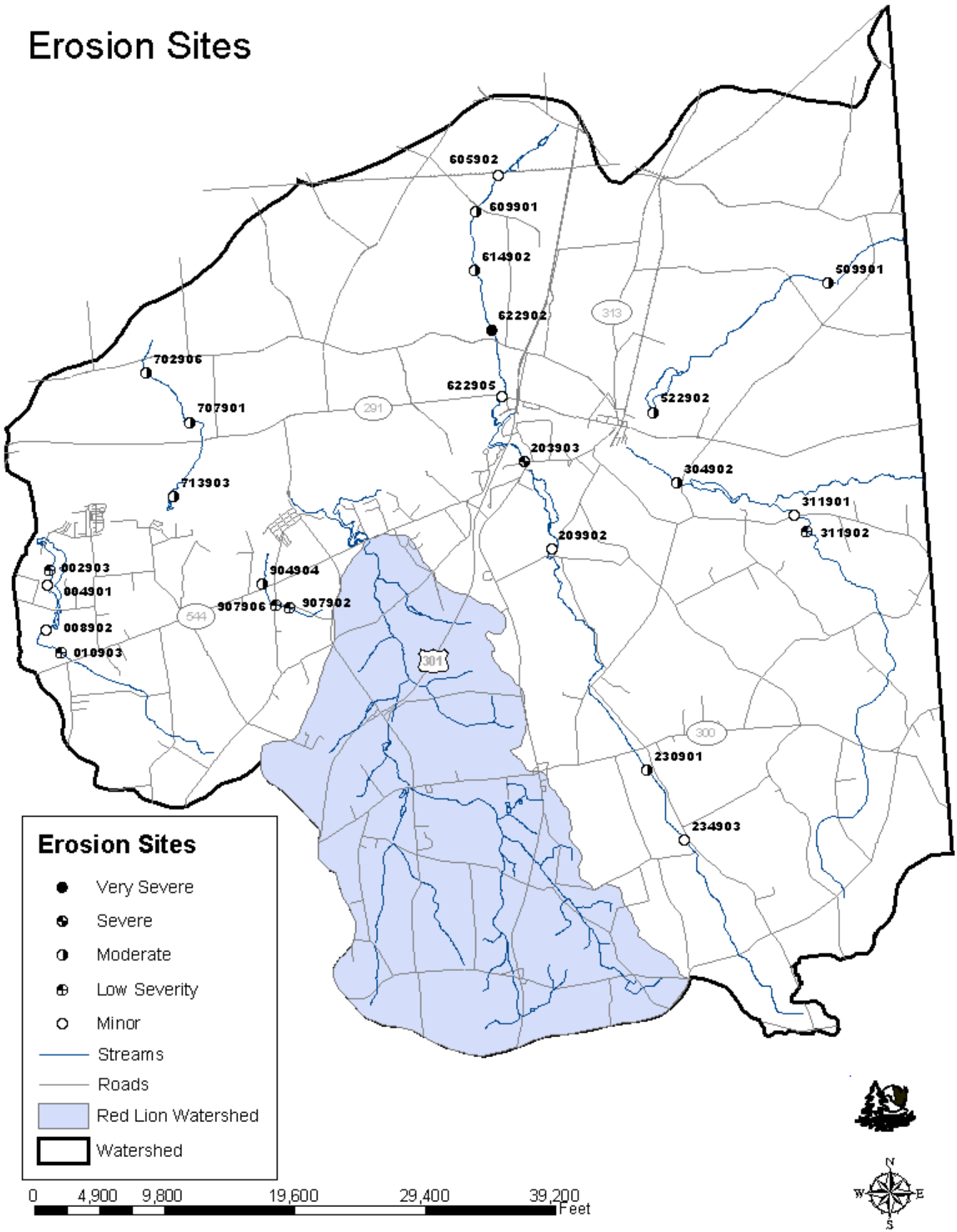

Figure 6c: Map showing the locations of erosion sites in the remaining Upper Chester watershed.

Pipe Outfalls

Pipe outfalls include any pipes or small man-made 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. Twenty-eight pipe outfalls were identified during the Upper Chester survey. The locations of these pipes can be seen in Figures 7b and 7c.

Thirty-nine percent (11) of the pipe outfalls observed in the survey were discharging into the streams. Of these pipes, none of them had an odor or coloration associated with the discharge (Appendix B). A few of these pipes appeared to be discharging reddish liquid but this was red flock, an iron-fixing bacterium found naturally in the streams. High populations of this bacterium are caused by high levels of iron in the water discharging from the pipes. The most frequently reported type of pipe outfall was stormwater drainage structures of which there were 21 sites. There were no estimates of the amount of fluid discharging from the pipes. No immediate follow up actions were taken as part of this study to determine the source of effluent discharging from the pipes. In some cases, discharge from a storm drainpipe may be a sporadic occurrence due to periodic precipitation. Some of these pipes were indicated to be stormwater but this survey can not make a determination of exactly which ones are part of stormwater management control structure.

Severity ratings for pipe outfalls were given based on outfall type, discharge, and type of discharge. In the Upper Chester SCA Survey there were 11 moderate, 6 low severity, and 11 minor sites (Figure 7a). The severity rating of moderate is for pipes with a discharge that is either clear with no odor or has a color and/or odor, but the amount of discharge is very small compared to the stream's base flow and any impact appears to be minor and localized (Yetman, 2001).

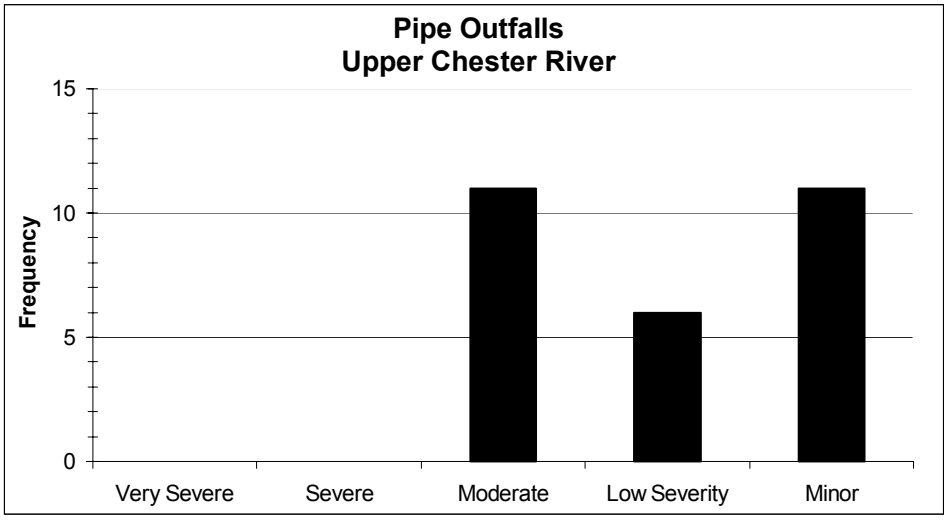

Figure 7a: Histograph showing the frequency of severity ratings given to pipe outfall sites during the Upper Chester SCA survey.

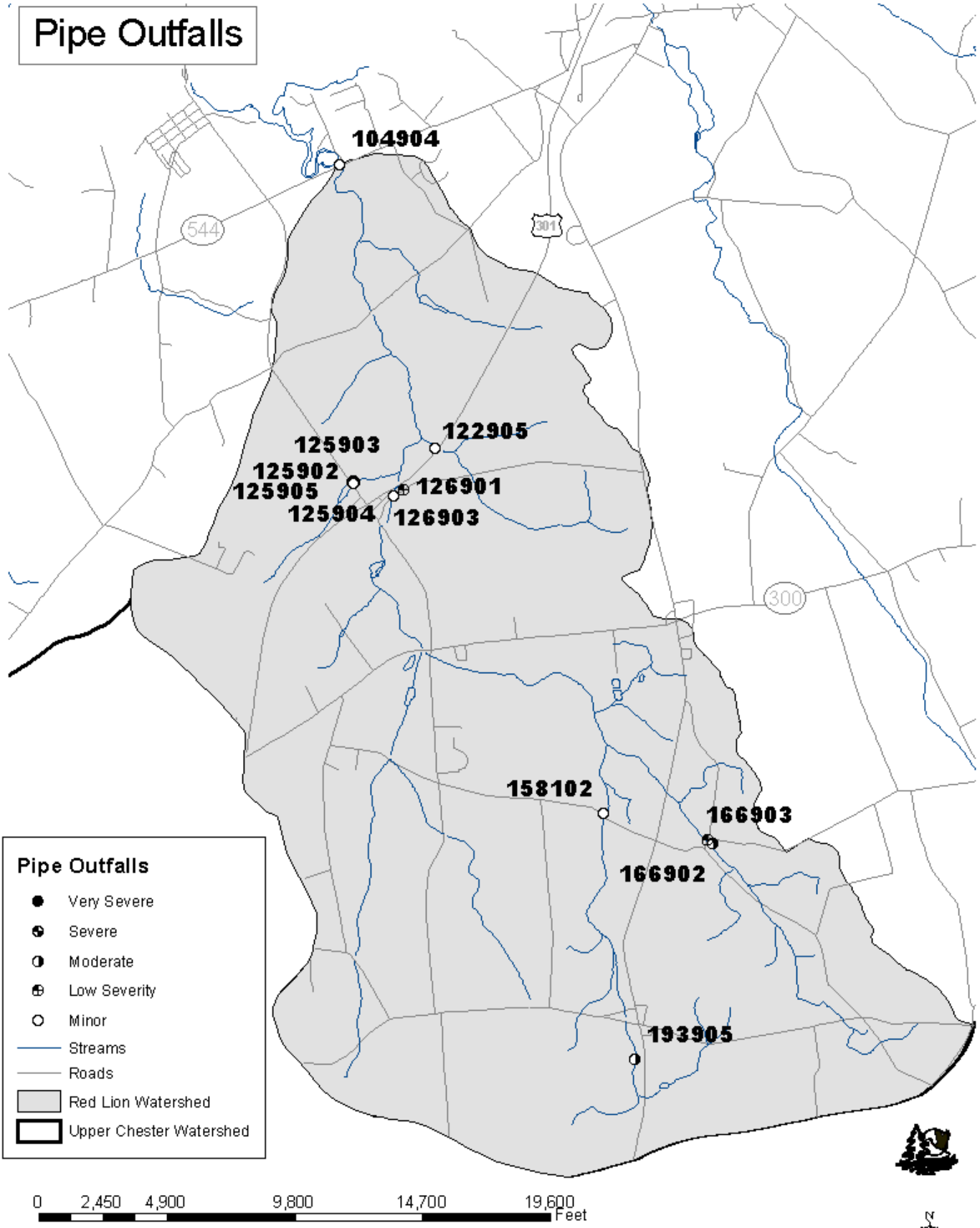

Figure 7b: Map showing the locations of pipe outfalls in the Red Lion Branch watershed.

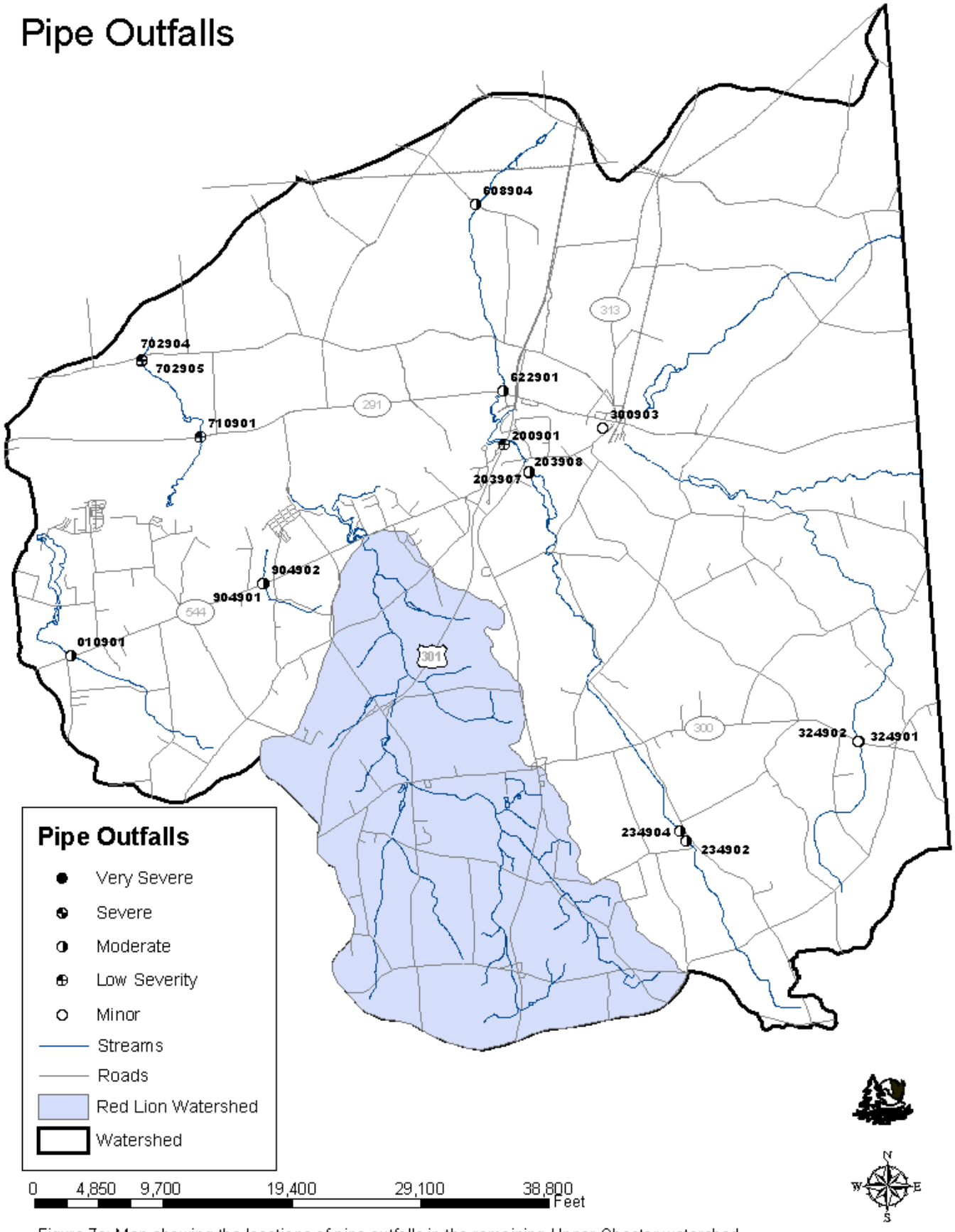

Figure 7c: Map showing the locations of pipe outfalls in the remaining Upper Chester watershed.

Channel Alterations

Channel alteration sites are stream sections where the stream's banks and channel have been significantly altered from natural conditions. This includes areas where the stream may have been straightened and/or where the stream banks have been hardened using rock, gabion baskets or concrete over a significant length. It does not include road crossings unless a significant portion of the stream above or below the road has also been channelized. In addition, places where a small section of only one side of the stream's banks may have been stabilized to reduce erosion were not reported as channel alterations. For the purposes of this survey, channel alteration also does not include tributaries where storm drains were placed in the stream channel, and the entire tributary is now piped underground. While these stream sections have been significantly altered, it is not possible to know by walking the stream corridor exactly where this was done.

In the Upper Chester watershed, survey crews found 18 areas where the stream channel had been recognizably altered. Locations of channel alteration sites are shown in Figure 8b and 8c. The total length of stream affected by channelization was estimated to be 62,504 feet, or about 11.84 miles. The majority of the sites were earth channels (17). The other site was found to be a rip-rap channel. Perennial flow was reported at 16 of the sites, and sediment deposition was reported at 7 sites. Vegetation was found in the channels at 7 sites. Most of the sites in the Upper Chester watershed were given moderate to low severity ratings (Figure 8a). Three sites in the Upper Chester watershed received severe ratings, with all of them being located in the Red Lion Branch sub-watershed. Site 173903 was 12,310 feet long with a channel width of 15 feet. While this section did have perennial flow, there was no sediment depositing in the channel, nor was any vegetation growing in the channel. Site 187901 was 12,480 feet long with a channel bottom width of 3 feet. Though this section of stream had perennial flow and there was vegetation growth in the channel, no sediment deposition was occurring. Site 185103 was the longest channel alteration site in the watershed, with a length of 12,588 feet. In contrast to the previous site, this site had perennial flow and sediment deposition, but there was no vegetation growing in the channel. Many sites of channel alteration in this watershed that received moderate to low severity ratings had been altered long ago and had begun to return to a more natural state.

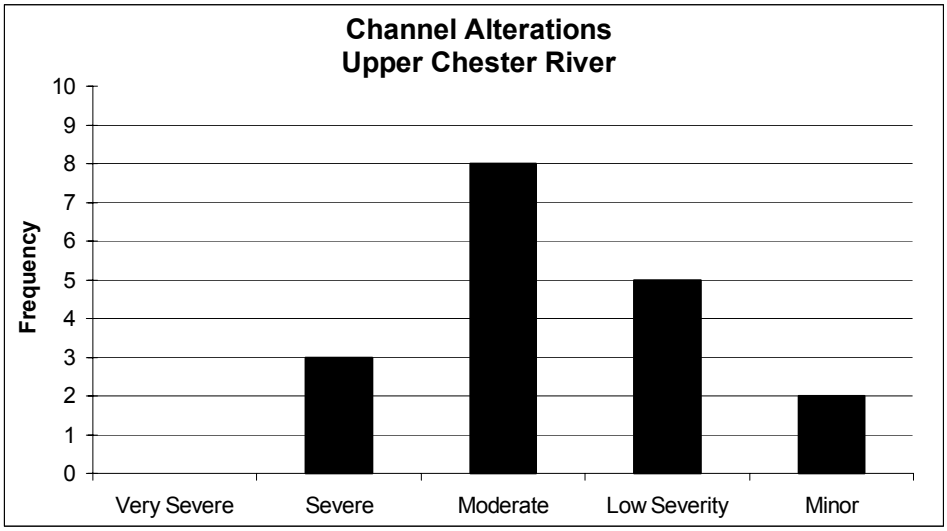

Figure 8a: Histograph showing the frequency of severity ratings given to channel alteration sites during the Upper Chester SCA Survey.

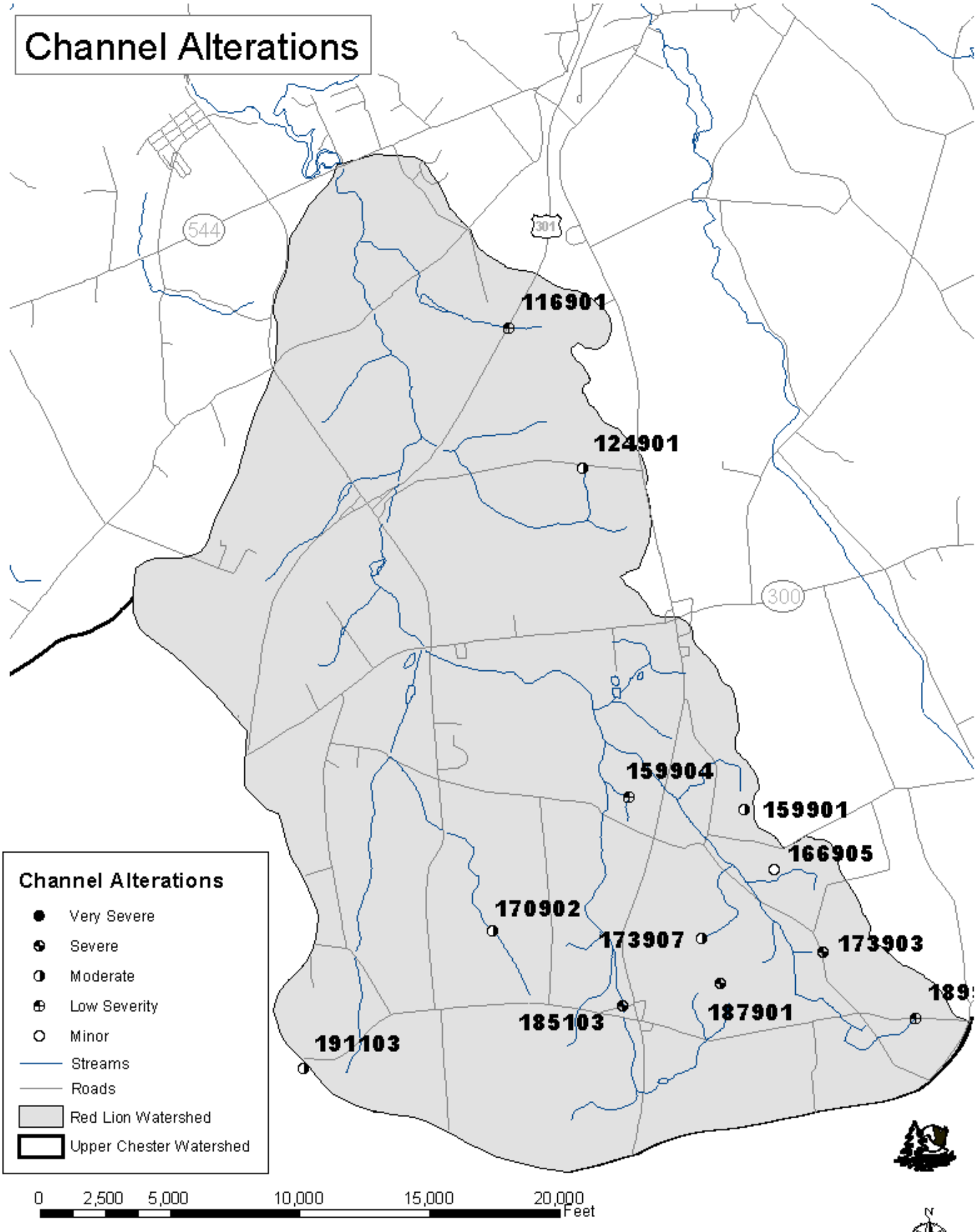

Figure 8b: Map showing the locations of channel alterations in the Red Lion Branch watershed.

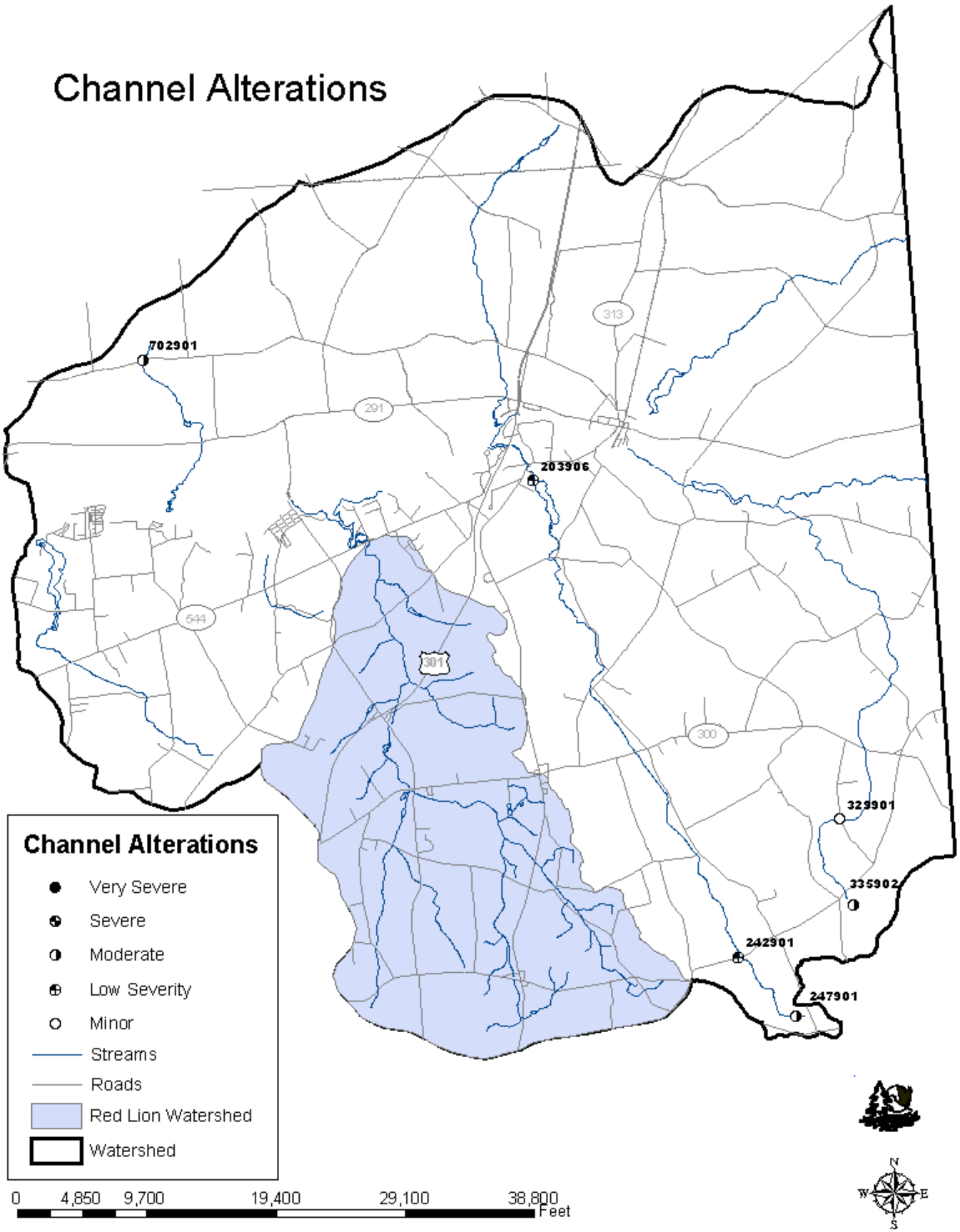

Figure 8c: Map showing the locations of channel alterations in the remaining Upper Chester watershed.

Trash Dumping

Trash dumping data sheets record information on places where large amounts of trash have been dumped inside the stream corridor, or to note places where trash tends to accumulate. The field survey crew found 9 sites where there was excessive trash, and these locations are shown in Figures 9b and 9c. The sites were given severity ratings based on size, type of trash, and potential impact on the stream. Severity ratings for trash dumping sites throughout the surveyed Upper Chester watershed can be found in Figure 9a. Site ratings ranged from severe to minor. Field crews indicated that 4 of the sites might be good volunteer clean up opportunities.

Trash dumping sites were only found on the Red Lion, Cypress, and Unicorn Branches and ranged in size from 2 to 50 plus pickup truckloads. Single site trash dumping sites were recorded at 7 sites, while large area dumping sites were recorded at 2 locations. Types of trash sites found include: residential (7), construction materials (1), and miscellaneous (1). Sites 193906 on the Red Lion Branch and 508902 on the Cypress Branch were the only sites to be given a severe rating. Site 193906 had an estimated 50 plus pickup truck loads of broken lawn mowers concentrated in a small yard. Site 508902 contained approximately 30 truckloads of various old rusty metal objects some of which were old motor vehicles. Another notable site, which received a moderate ranking, was site 193901 on the Red Lion Branch which had 15 truck loads of mostly agricultural refuse. It is worthwhile to note that trash dumping sites 508901 and 508902 are both located in Millington Wildlife Management Area, a state owned property near the town of Massey.

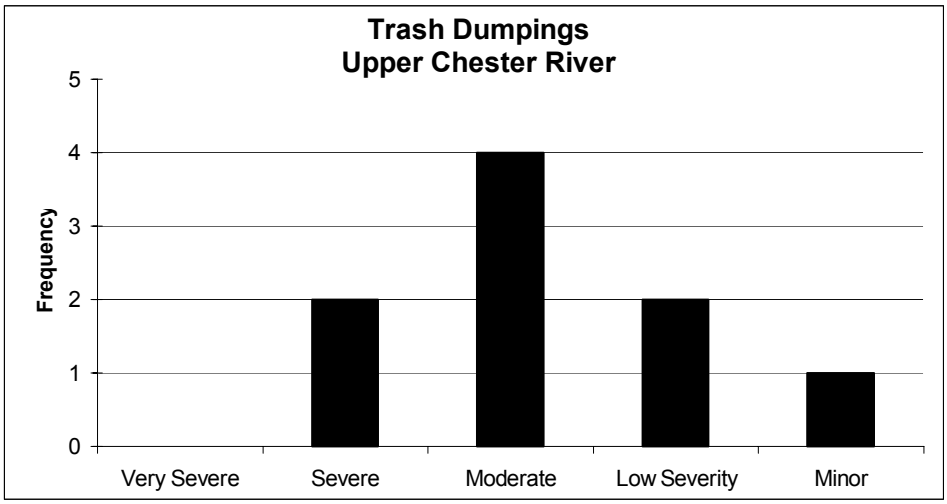

Figure 9a: Histograph showing the frequency of severity ratings given to trash dumping sites seen during the Upper Chester SCA survey

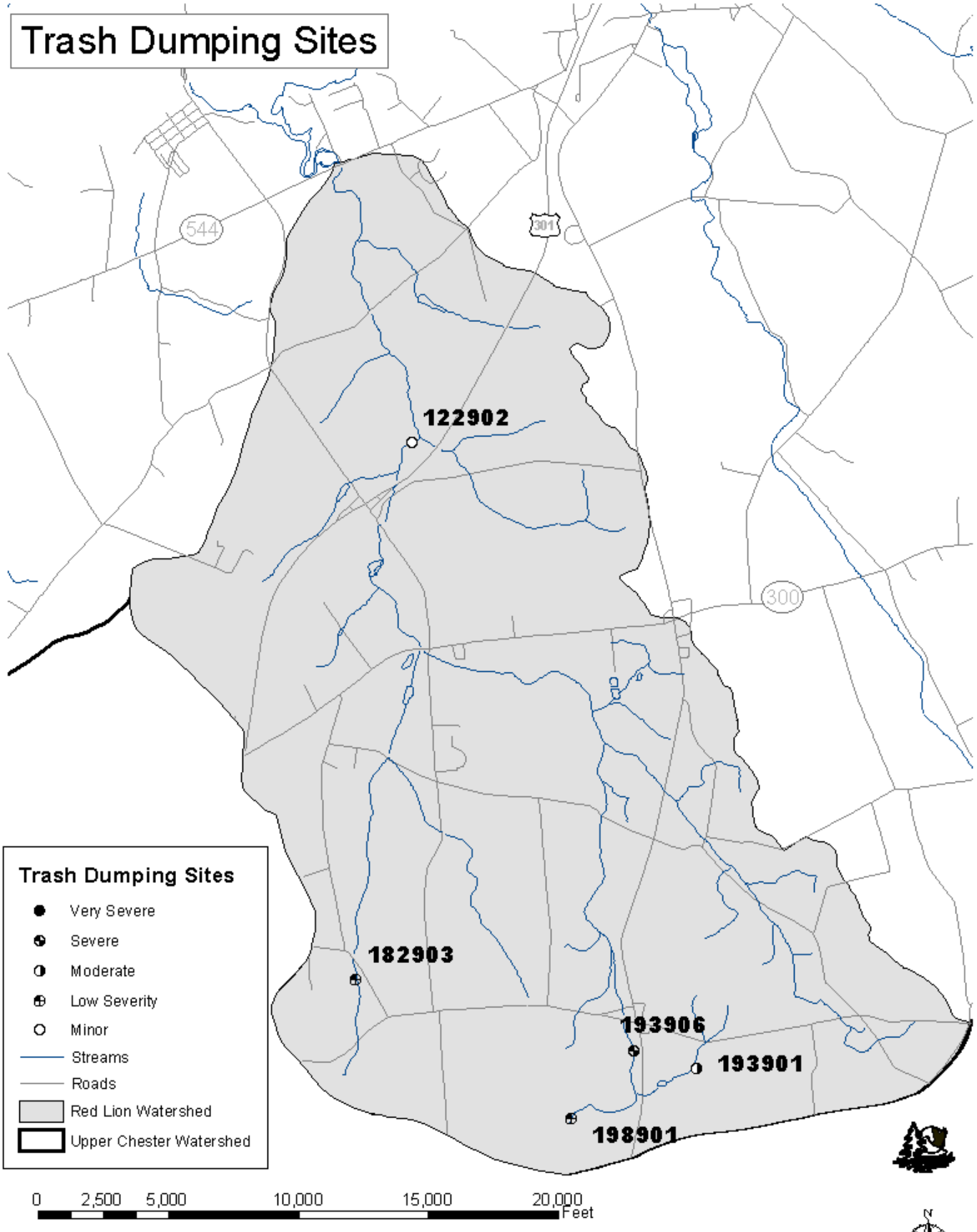

Figure 9b: Map showing the locations of trash dumping sites in the Red Lion Branch watershed.

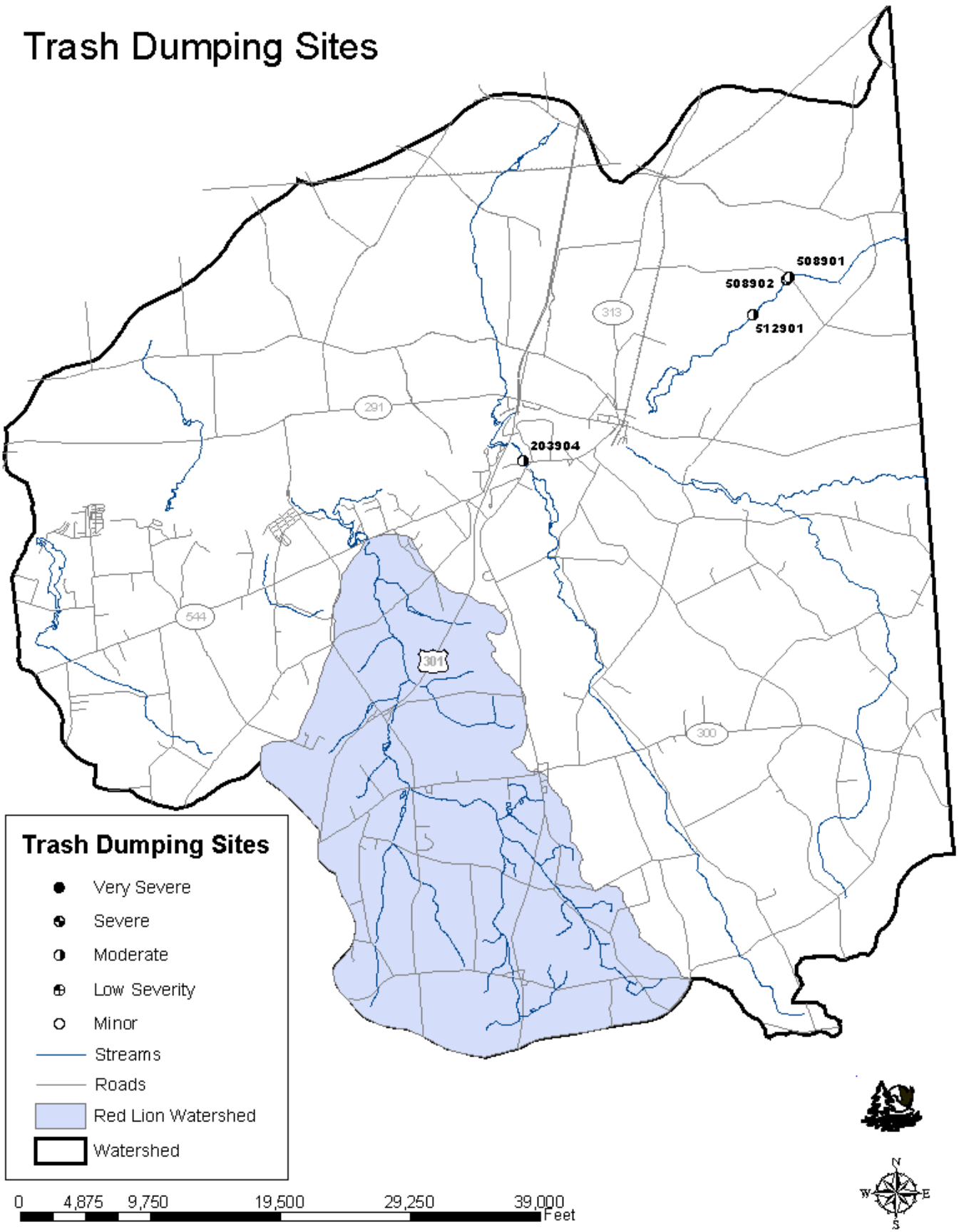

Figure 9c: Map showing the locations of trash dumping sites in the remaining Upper Chester watershed.

Unusual Conditions

The unusual condition/comment data sheets are used to record the location of anything out of the ordinary seen during the survey or to provide some additional written comments on a specific problem. The field crew reported seven unusual condition sites during the Upper Chester survey and six comments were also recorded. The locations of the unusual conditions and comments can be found in Figures 10b and 10c. Severities of the unusual conditions found during the Upper Chester survey can be seen in Figure 10a. Severity rankings ranged from severe to low severity.

Two sites were given a severe rating. Site 136704 (on Red Lion Creek) was a particularly noteworthy site. This site consisted of a severely eroded berm that served as both a bank to the stream and as a levee containing a small pond. The stream was eroding the levee and possibly threatening the stability of the pond edge. Continued erosion of the levee and destabilization of the pond edge would likely cause flooding downstream. The direction of the stream had obviously been altered causing a sharp bend along the side of this pond. The other severely rated site was site 205902 on Unicorn Lake. Here field crews noted an abundance of algal growth in the lake likely caused by eutrophication.

Another three sites were recorded as moderately severe. Two of these, sites 130901 on the Red Lion Branch and 907901 on Pearl Creek were described as having white foam in the water. No further steps were taken to determine the nature of the foam or its origin. Site 609902, the other moderately ranked site, was described as having a large amount of red flock in the stream along Mills Branch due to high levels of iron in the water.

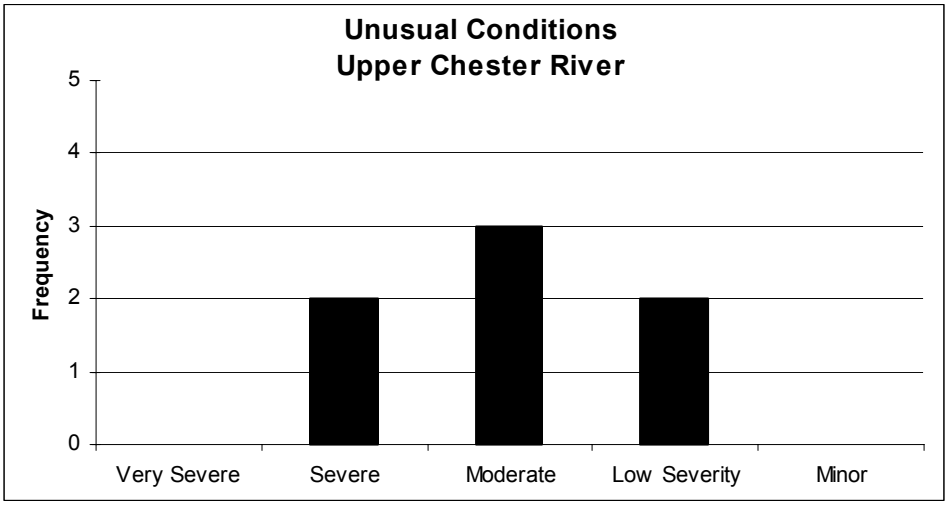

Figure 10a: Histograph showing the frequency of severity ratings given to unusual conditions seen during the Upper Chester SCA survey.

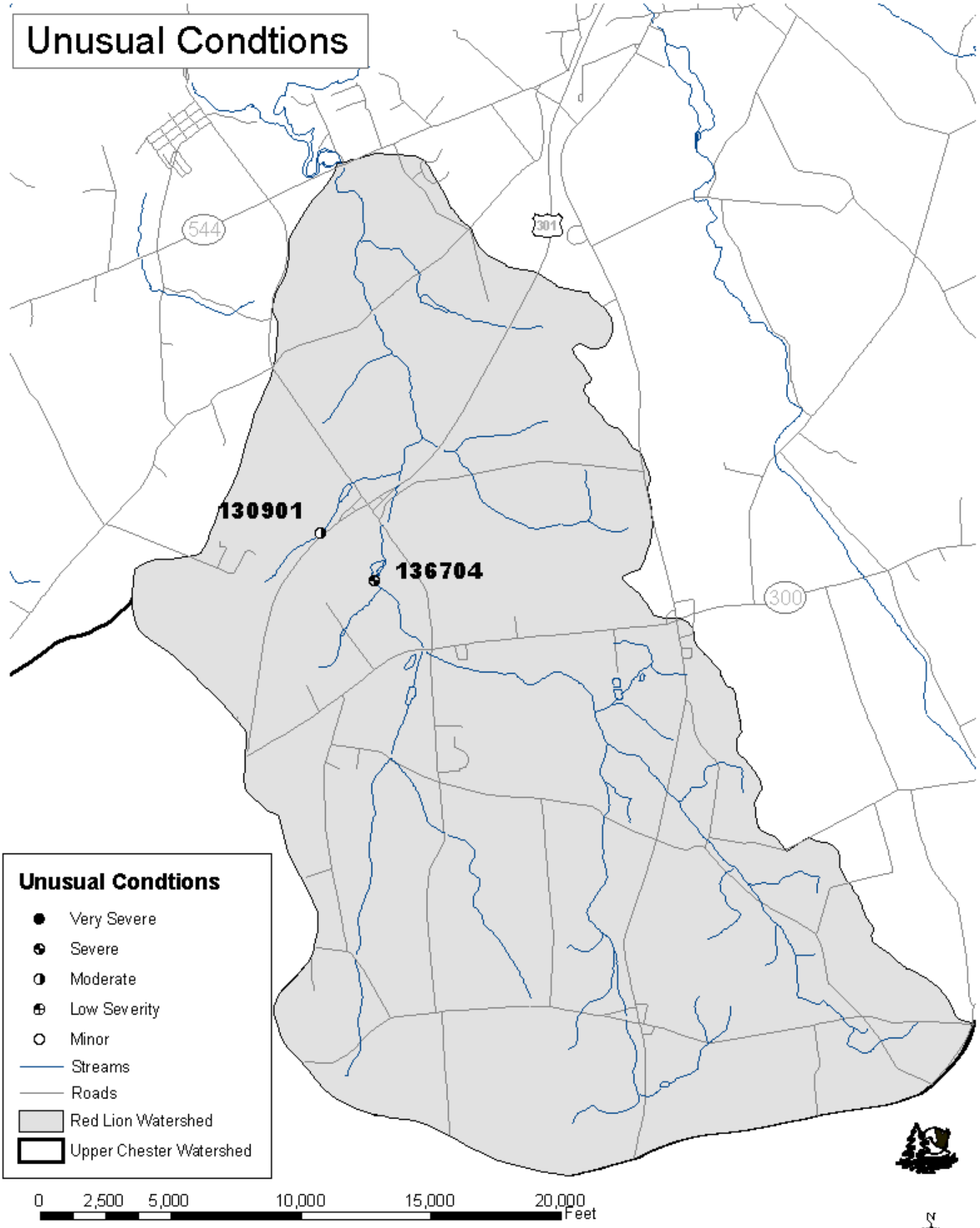

Figure 10b: Map showing the locations of unusual condition sites in the Red Lion Branch watershed.

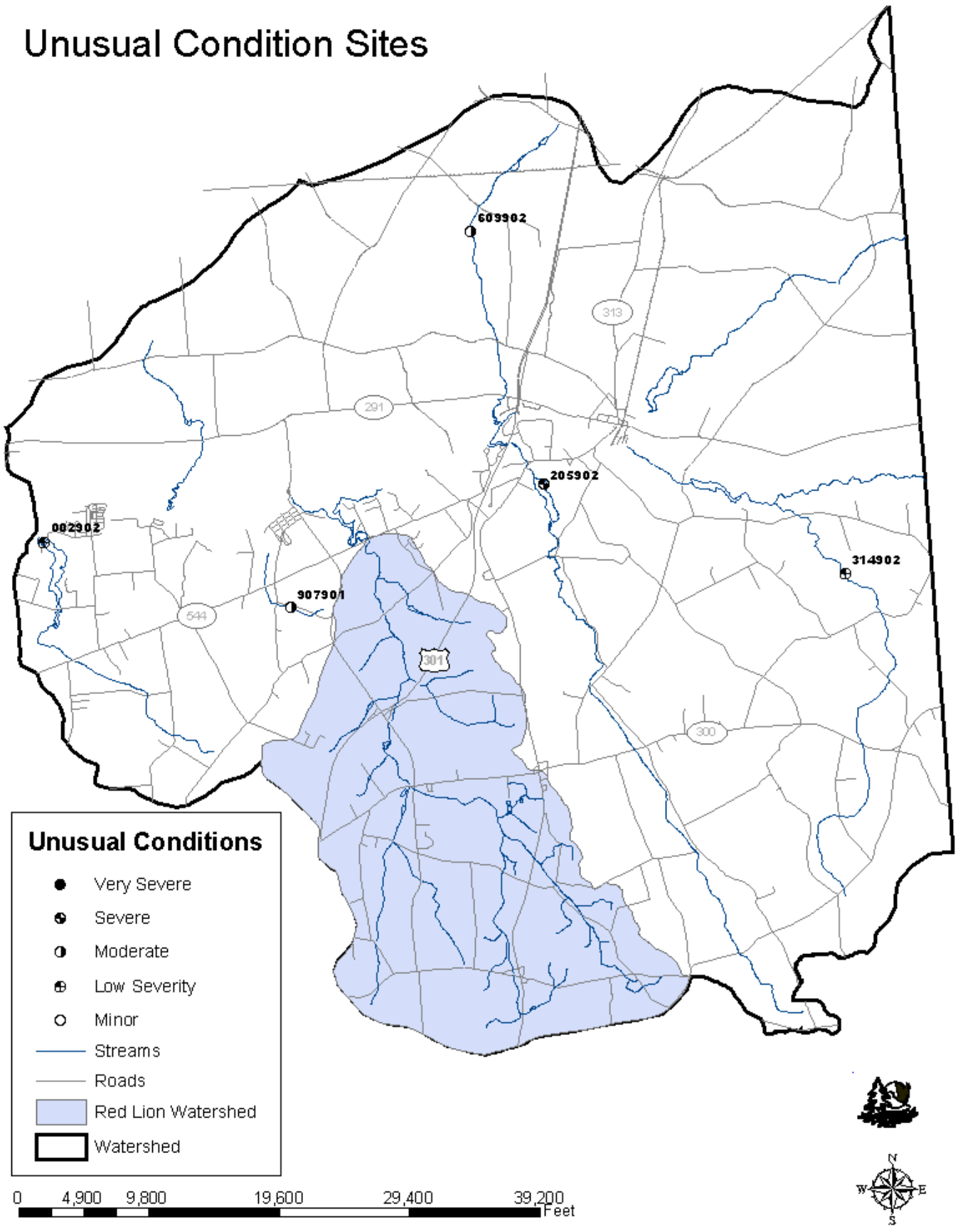

Figure 10c: Map showing the locations of unusual condition sites in the remaining Upper Chester watershed.

Exposed Pipes

Exposed pipes are any pipes that are in the stream or along the stream's immediate banks that could be damaged by a high flow event. It does not include pipe outfalls where only the open end of the pipe is exposed. Exposed pipes do 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's bed and have been exposed by stream down-cutting, and 4) pipes that are built over a stream but are low enough that they could be affected by frequent high storm flows.

In urban areas, it is very common for pipelines and other utilities to be located in the stream corridor. This is especially true for gravity sewage lines that depend on the continuous downward slope of the pipeline to move sewage to a pumping station or treatment plant. Since streams are located at 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 can migrate and over time can expose previously buried pipelines. When this occurs, the pipeline becomes vulnerable to being punctured by debris in the stream. Fluids in the pipelines can be discharged into the stream, causing a serious water quality problem. Severity ratings were given based on how exposed the pipe is, location of the pipe, and contents inside the pipe. Many of these problems are less common in rural areas because of the widespread use of septic systems and well water instead of municipal services. More common instances include electrical utility lines run along roads and above streams that can be damaged by high flow events.

An exposed pipe was reported at one site during the Upper Chester watershed survey. Site 141701 consisted of a pipe, possibly containing electrical wires that had been run along the upstream side of a bridge on Red Lion Branch. Approximately 35 feet of pipe had been placed alongside the bridge but still within the stream's floodplain. The site was given a severe rating by the survey crew due to the possibility of the pipe being punctured by debris during a high flow event in the watershed. The location of this site is shown in Figure 11

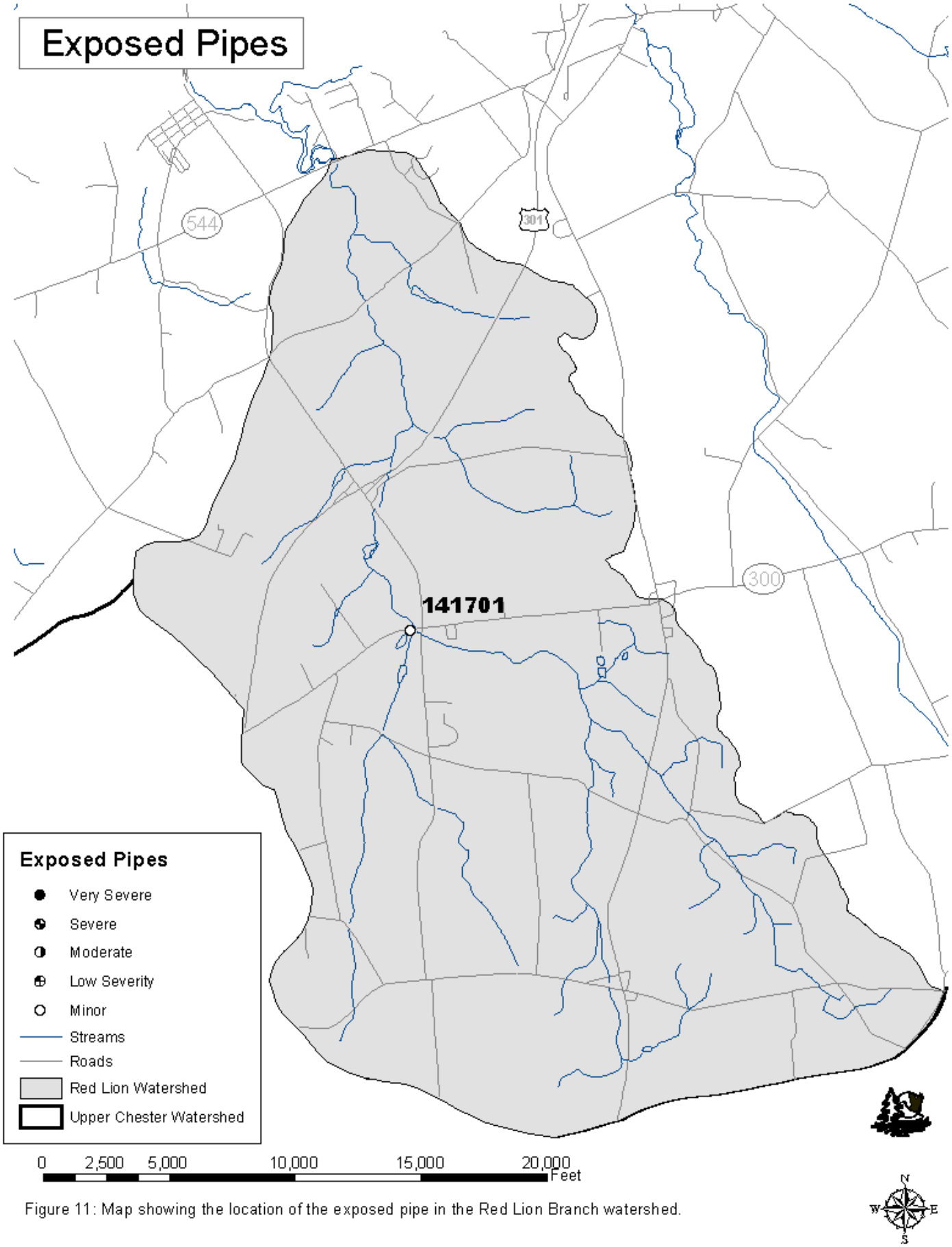

Figure 11: Map showing the location of the exposed pipe in the Red Lion Branch watershed.

In/Near Stream Construction

In or near stream construction data sheets are used to document any construction disturbances seen by the survey teams inside or near the stream corridor. Survey team members are not trained sediment inspectors, but as part of their training they do receive a quick review of the different type of sediment control measures they may see while doing a SCA survey. Survey teams report evidence of inadequate sediment control measures or if sediment pollution from the site has affected the stream. In or near stream construction was reported at one site during the Upper Chester survey. The location of this site is shown in Figure 12.

Site 702902 located at the head of Spry Landing was given a severe rating. It consisted of an approximately 500-foot length of stream that was affected by inadequate sediment control measures. Heavy machinery had been used close to the stream bank. In addition, rills had formed on the adjacent slope due to the destruction of the riparian buffer. These rills delivered large amounts of sediment directly into the stream and were recorded as pipe outfalls.

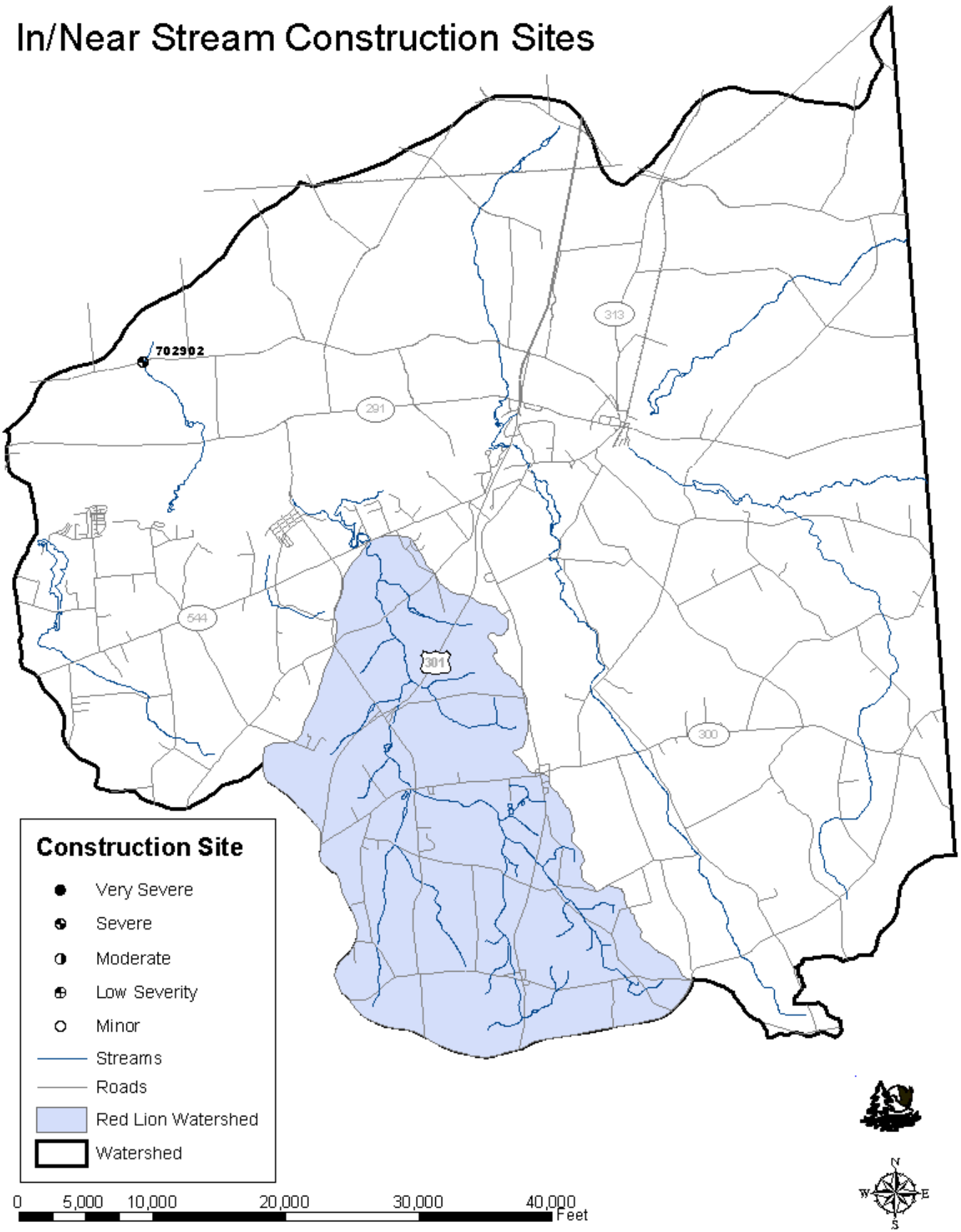

Figure 12: Map showing the location of the in/near stream construction site in the Upper Chester watershed.

Representative Sites

Representative sites are used to document the general condition of both in-stream habitat and the adjacent riparian (stream bank) corridor. The representative site evaluations procedures used during the survey are very similar to the habitat evaluations done as part of the Maryland Save-Our-Stream's Heartbeat Program and are based on the habitat assessment procedures outlined in EPA's rapid bioassessment protocols (Plafkin, et. al., 1989). At each representative site, data was collected on 10 separate parameters. These habitat parameters are:

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

For each of the above categories, a rating of optimal, sub-optimal, marginal or poor was assigned based on the grading criteria developed for each parameter. In addition to the habitat ratings, data was collected on the stream's wetted width and thalweg depths at pools, runs, and riffles at each representative site. At representative sites, field crews also indicated whether the bottom sediments in the area were primarily silts, sands, gravel, cobble, boulders, or bedrock.

Representative site evaluations were done at approximately ½ mile intervals along the stream. Seventy-five representative data sheets were filled out during this survey. Locations of representative sites are shown in Figures 13a and 13b, and the data is presented in Appendix B.

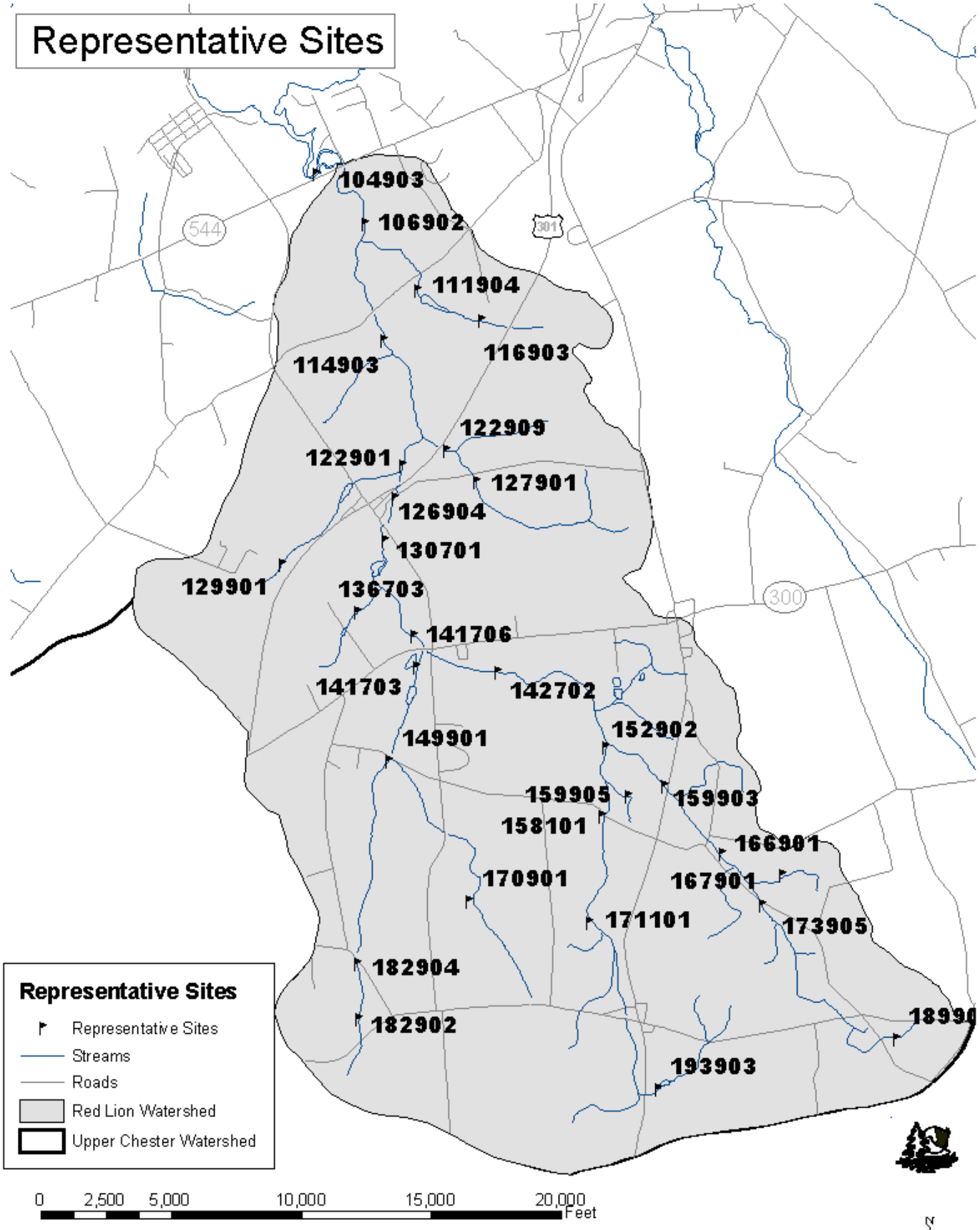

Figure 13a: Map showing the locations of representative sites in the Red Lion Branch watershed.

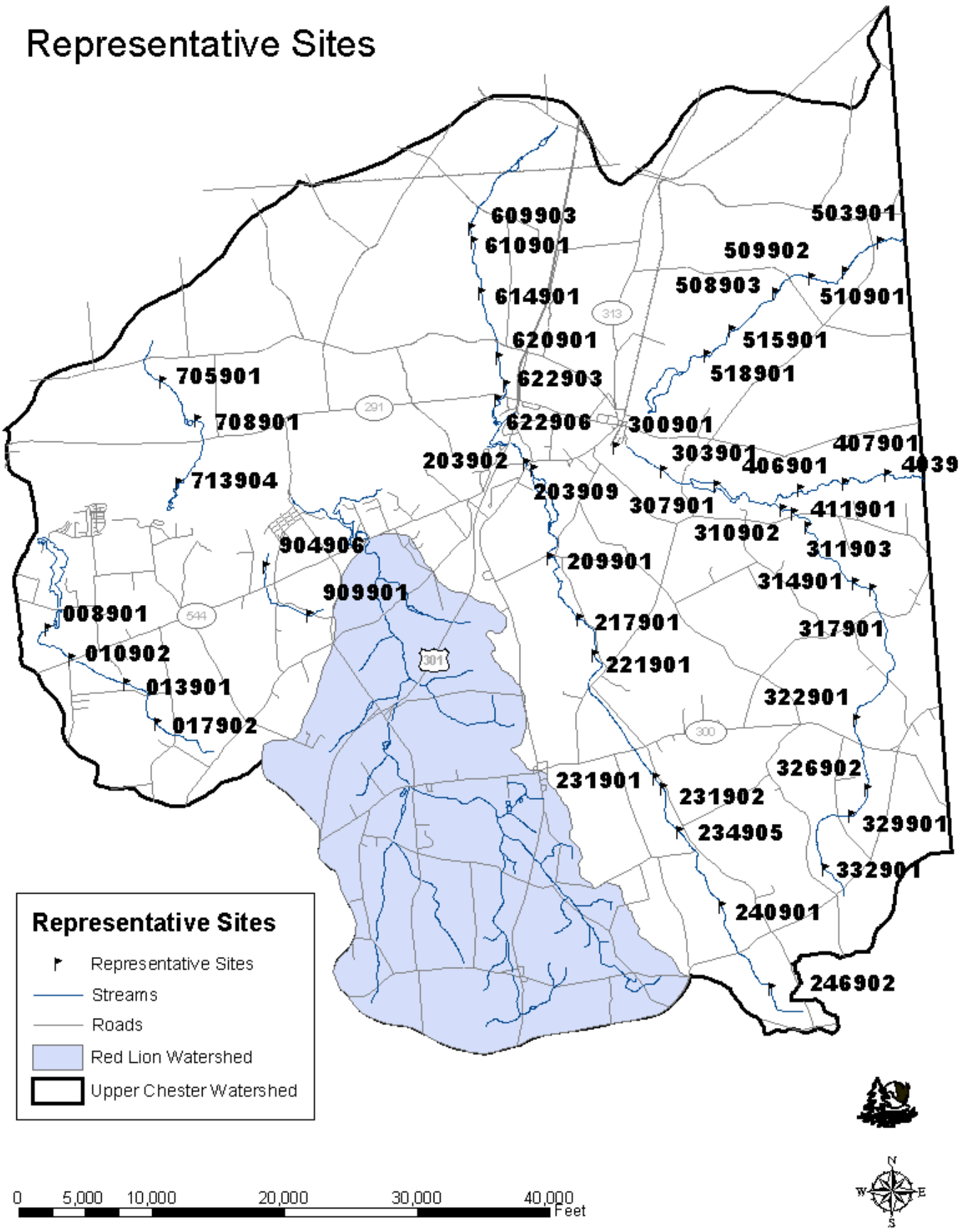

Figure 13b: Map showing the locations of representative sites in the Upper Chester watershed.

DISCUSSION

One of the main objectives of the Upper Chester Stream Corridor Assessment survey was to walk the stream network quickly and identify potential environmental problems in or along the edge of the streams. The survey was completed in the autumn of 2004, and over 75 miles of stream were walked. During the SCA survey 224 potential environmental problems were identified. The most common environmental concern seen during the SCA survey was inadequate riparian buffers, which were reported at 82 sites. Other potential environmental problems identified during the survey include**:** 41 fish barriers, 37 erosion sites, 28 pipe outfalls, 18 channel alterations, 13 unusual conditions, 9 trash dumping sites, 1 exposed pipe, and 1 in/near-stream construction site.

As mentioned earlier, inadequate buffers were the most commonly reported problems in the Upper Chester watershed. This is typical in an agricultural area and often occurs in conjunction with channel alterations and associated downstream erosion sites. Many of the streams in the watershed have been converted to agricultural drainage ditches, which greatly reduces the ecological health of the stream system. These converted streams have a high incidence of eutrophication due to nutrient run-off from the agricultural fields, as well as very low biodiversity. During hot weather, the un-shaded stream is vulnerable to severe solar heating, which can kill large numbers of aquatic life. The lack of adequate buffers also has a significant influence on erosion in the stream, as demonstrated by the large number of long erosion sites in the watershed. Water running from the fields into the streams has the potential to reach high velocities, especially during late fall, winter, and early spring when there is very little plant growth in the fields. The high velocity flow over the fields and through the streams can potentially scour away large amounts of topsoil from the fields along with material from the stream banks. This scouring results in large amounts of sediment pollution in the stream, further reducing biodiversity. Without the benefit of trees and other perennial vegetation, this problem worsens. Some of the more minor erosion sites may be cured with buffer plantings, though the larger, more severe sites will probably require costly engineering solutions to stabilize the stream and control upstream runoff.

As mentioned earlier, the Maryland Department of Natural Resources has formed a partnership with Kent and Queen Anne's Counties to develop a Watershed Restoration Action Strategy (WRAS) for the Upper Chester watershed. Results from this survey will be combined with other information about the area to help establish priorities for the types and location of restoration projects that will be pursued in the future on the Upper Chester and its tributaries. Information on the Upper Chester Watershed Action Strategy can be found on DNR's website (www.dnr.state.md.us/watersheds/surf/proj/wras.html).

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Appendix A

Listing of sites by site number

Appendix A - Upper Chester Stream Corridor Assessment Sites

Site	Problem	Severity	Correctability	Access	Easting	Northing	Stream
002901	Inadequate Buffer	5	1	2	487021.96793	174663.26349	Foreman Branch
002902	Unusual Condition	4	3	2	487227.89628	174643.80570	Foreman Branch
002903	Erosion Site	4	3	3	487364.10085	174017.91325	Foreman Branch
002904	Inadequate Buffer	4	2	4	487291.29627	173558.70925	Foreman Branch
004901	Erosion Site	5	4	3	487310.59191	173656.32253	Foreman Branch
006901	Inadequate Buffer	3	2	2	487461.22769	173305.75790	Foreman Branch
008901	Representative Site				487280.91877	172626.03221	Foreman Branch
008902	Erosion Site	5	3	4	487282.21596	172640.30126	Foreman Branch
008903	Inadequate Buffer	5	1	2	487336.69779	172729.80713	Foreman Branch
010901	Pipe Outfall	3	4	1	487846.67128	171939.30914	Foreman Branch
010902	Representative Site				487827.07481	171946.52890	Foreman Branch
010903	Erosion Site	4	3	4	487612.54498	172116.70881	Foreman Branch
013901	Representative Site				489075.98907	171384.62578	Foreman Branch
014901	Inadequate Buffer	4	3	2	489545.47934	171019.09996	Foreman Branch
017901	Inadequate Buffer	2	2	2	490179.81466	170208.46639	Foreman Branch
017902	Representative Site				489778.12762	170447.85563	Foreman Branch
101901	Erosion Site	4	4	3	493935.89331	175167.23276	Red Lion Branch
101902	Inadequate Buffer	2	1	2	493815.07221	175186.11106	Red Lion Branch
101903	Erosion Site	1	4	3	493880.51698	175184.85250	Red Lion Branch
102901	Inadequate Buffer	3	2	2	494391.48955	174880.28264	Red Lion Branch
103901	Inadequate Buffer	3	1	2	494178.79407	174637.38189	Red Lion Branch
104901	Inadequate Buffer	3	5	1	494604.18503	174792.18392	Red Lion Branch
104902	Inadequate Buffer	3	5	1	494326.04479	174584.52265	Red Lion Branch
104903	Representative Site				494318.49347	174595.84963	Red Lion Branch
104904	Pipe Outfall	5	2	1	494635.64886	174714.15363	Red Lion Branch
106901	Inadequate Buffer	4	3	3	495058.52272	173736.25784	Red Lion Branch
106902	Representative Site				494893.65226	174013.13953	Red Lion Branch
111901	Inadequate Buffer	1	4	3	495891.68490	172984.90161	Red Lion Branch
111902	Fish Barrier	3	4	3	495539.29002	173161.09905	Red Lion Branch
111903	Erosion Site	4	2	3	495526.70449	173176.20169	Red Lion Branch
111904	Representative Site				495514.11896	173225.28526	Red Lion Branch
111905	Inadequate Buffer	3	2	2	495519.15317	173297.02279	Red Lion Branch
114901	Fish Barrier	5	1	3	494937.39313	172384.22385	Red Lion Branch
114902	Inadequate Buffer	5	1	3	494923.99006	172376.91309	Red Lion Branch
114903	Representative Site				495118.94379	172649.84832	Red Lion Branch
116901	Channel Alteration	4	2	2	496614.22222	172800.68089	Red Lion Branch
116902	Inadequate Buffer	1	4	2	496611.76411	172803.13900	Red Lion Branch
116903	Representative Site				496267.62849	172874.42424	Red Lion Branch
116904	Fish Barrier	4	2	3	496179.13647	172876.88235	Red Lion Branch
116905	Fish Barrier	5	2	3	496149.63913	172886.71480	Red Lion Branch
119901	Fish Barrier	4	2	4	495464.98667	171922.42720	Red Lion Branch
119902	Erosion Site	5	3	4	495439.39900	171987.00562	Red Lion Branch
122901	Representative Site				495340.28482	171168.35224	Red Lion Branch
122902	Trash Dumping	5	4	5	495495.44819	171444.79055	Red Lion Branch
122903	Fish Barrier	4	1	2	495728.17421	171413.11056	Red Lion Branch
122904	Erosion Site	5	2	4	495720.86345	171419.20287	Red Lion Branch
122905	Pipe Outfall	5	4	1	495750.10651	171385.08596	Red Lion Branch
122906	Erosion Site	4	3	4	496120.51861	171134.08303	Red Lion Branch
122907	Inadequate Buffer	2	3	2	496057.15864	171173.07378	Red Lion Branch
122908	Fish Barrier	5	1	2	496020.60482	171230.34144	Red Lion Branch
122909	Representative Site				495853.67568	171352.18752	Red Lion Branch
122910	Erosion Site	2	4	4	495993.79868	171385.08596	Red Lion Branch
123901	Inadequate Buffer	3	3	2	496583.53372	171431.38748	Red Lion Branch
124901	Channel Alteration	3	2	1	497476.66552	171147.48610	Red Lion Branch

Appendix A - Upper Chester Stream Corridor Assessment Sites

Site	Problem	Severity	Correctability	Access	Easting	Northing	Stream
124902	Inadequate Buffer	1	3	2	497477.88398	171145.04918	Red Lion Branch
125901	Fish Barrier	3	5	1	494741.76353	170964.64082	Red Lion Branch
125902	Pipe Outfall	5	2	1	494776.74668	170998.91003	Red Lion Branch
125903	Pipe Outfall	5	2	1	494793.88129	171006.52541	Red Lion Branch
125904	Pipe Outfall	5	2	1	494801.49667	170991.29465	Red Lion Branch
125905	Pipe Outfall	5	3	1	494791.97744	170983.67927	Red Lion Branch
125906	Erosion Site	4	3	2	494801.49667	170998.91003	Red Lion Branch
125907	Inadequate Buffer	4	3	3	495035.66961	171029.37155	Red Lion Branch
126901	Pipe Outfall	4	3	1	495381.18688	170905.07456	Red Lion Branch
126902	Inadequate Buffer	3	2	1	495316.12436	170856.50677	Red Lion Branch
126903	Pipe Outfall	5	4	1	495265.72381	170835.43017	Red Lion Branch
126904	Representative Site				495242.81447	170794.19336	Red Lion Branch
127901	Representative Site				496200.93702	170982.99389	Red Lion Branch
127902	Erosion Site	4	2	3	496315.47234	170738.08326	Red Lion Branch
127903	Fish Barrier	4	3	3	496319.12772	170735.64634	Red Lion Branch
129901	Representative Site				493927.86977	170017.95386	Red Lion Branch
129902	Erosion Site	5	2	3	493933.58130	170027.94905	Red Lion Branch
129903	Inadequate Buffer	1	5	1	494259.13881	170300.67486	Red Lion Branch
130701	Representative Site				495128.26778	170300.26802	Red Lion Branch
130702	Erosion Site	5	1	2	495090.69646	170417.56383	Red Lion Branch
130901	Unusual Condition	3		1	494401.92719	170389.20365	Red Lion Branch
136701	Erosion Site	1	4	3	494676.49561	169274.84601	Red Lion Branch
136702	Inadequate Buffer	2	3	3	494563.78167	168911.96208	Red Lion Branch
136703	Representative Site				494811.20253	169455.37160	Red Lion Branch
136704	Unusual Condition	2	4	3	495022.88482	169841.16486	Red Lion Branch
140701	Fish Barrier	4	4	1	494662.75001	169260.18403	Red Lion Branch
141701	Exposed Pipe	5	2	1	495558.04698	169017.34504	Red Lion Branch
141702	Inadequate Buffer	3	2	2	495499.39907	168886.30362	Red Lion Branch
141703	Representative Site				495492.06808	168806.57912	Red Lion Branch
141704	Inadequate Buffer	1	3	2	495418.75819	168309.90465	Red Lion Branch
141705	Inadequate Buffer	5	2	1	495528.72302	169073.24382	Red Lion Branch
141706	Representative Site				495465.49325	169177.71041	Red Lion Branch
142701	Inadequate Buffer	5	2	2	496435.21397	168755.98405	Red Lion Branch
142702	Representative Site				496448.61784	168745.93115	Red Lion Branch
144101	Inadequate Buffer	2	2	1	498673.65959	168740.90470	Red Lion Branch
144102	Inadequate Buffer	3	2	2	498234.68298	168844.78466	Red Lion Branch
145701	Fish Barrier	3	3	3	495458.16226	168583.90034	Red Lion Branch
145702	Inadequate Buffer	5	2	3	495316.12436	168169.69950	Red Lion Branch
149901	Representative Site				495175.91920	167712.42909	Red Lion Branch
149902	Inadequate Buffer	3	2	2	495102.60932	167624.45723	Red Lion Branch
150901	Inadequate Buffer	4	2	2	495298.56279	167651.19552	Red Lion Branch
152902	Representative Site				497710.25672	167876.35535	Red Lion Branch
152903	Inadequate Buffer	3	3	3	497678.42254	167552.98708	Red Lion Branch
152904	Fish Barrier	5	2	2	497679.09860	167551.83494	Red Lion Branch
158101	Representative Site				497676.74706	167065.42146	Red Lion Branch
158102	Pipe Outfall	5	1	1	497708.58124	167119.03692	Red Lion Branch
159901	Channel Alteration	3	3	4	499377.42240	167138.71816	Red Lion Branch
159902	Inadequate Buffer	1	2	3	499377.42240	167139.74976	Red Lion Branch
159903	Representative Site				498407.72254	167411.05940	Red Lion Branch
159904	Channel Alteration	4	2	3	498018.54564	167283.23428	Red Lion Branch
159905	Representative Site				497981.68501	167293.28718	Red Lion Branch
166901	Representative Site				499076.19648	166615.69919	Red Lion Branch
166902	Pipe Outfall	3	2	2	498985.41607	166763.21736	Red Lion Branch
166903	Pipe Outfall	4	2	1	498936.93108	166811.70236	Red Lion Branch

Appendix A - Upper Chester Stream Corridor Assessment Sites

Site	Problem	Severity	Correctability	Access	Easting	Northing	Stream
166904	Inadequate Buffer	3	2	1	498921.45714	166810.67076	Red Lion Branch
166905	Channel Alteration	5	1	4	499725.07011	166430.01199	Red Lion Branch
167901	Representative Site				499794.18702	166370.17944	Red Lion Branch
167902	Inadequate Buffer	2	3	3	500320.30077	166134.97565	Red Lion Branch
170901	Representative Site				496116.87215	166065.15796	Red Lion Branch
170902	Channel Alteration	3	3	3	496419.72774	165697.91595	Red Lion Branch
171101	Representative Site				497527.56953	165810.43354	Red Lion Branch
173903	Channel Alteration	2	4	2	500299.66886	165449.99617	Red Lion Branch
173904	Inadequate Buffer	1	3	1	499577.55194	165329.29948	Red Lion Branch
173905	Representative Site				499554.85684	166011.18417	Red Lion Branch
173906	Inadequate Buffer	1	2	2	498880.19332	165609.89349	Red Lion Branch
173907	Channel Alteration	3	4	2	498879.16172	165609.89349	Red Lion Branch
174901	Fish Barrier	5	2	2	499774.58670	165796.61229	Red Lion Branch
178101	Inadequate Buffer	3	2	3	497819.32361	165460.42174	Red Lion Branch
178102	Inadequate Buffer	1	2	3	497263.02146	165530.74436	Red Lion Branch
182901	Inadequate Buffer	4	3	2	494853.63289	164436.92980	Red Lion Branch
182902	Representative Site				494819.89413	164686.07756	Red Lion Branch
182903	Trash Dumping	4	2	2	494841.95409	165153.22963	Red Lion Branch
182904	Representative Site				494799.13182	165325.81636	Red Lion Branch
185101	Erosion Site	4	1	1	497418.73583	164825.00664	Red Lion Branch
185102	Inadequate Buffer	2	2	3	497431.29344	164838.82001	Red Lion Branch
185103	Channel Alteration	2	4	3	497952.37185	164822.64019	Red Lion Branch
185104	Inadequate Buffer	3	3	3	497937.36516	164887.79469	Red Lion Branch
187901	Channel Alteration	2	4	2	499105.22295	165087.46070	Red Lion Branch
187902	Inadequate Buffer	1	4	2	499105.22295	165086.20494	Red Lion Branch
189901	Channel Alteration	4	2	2	501398.31817	164676.29947	Red Lion Branch
189902	Inadequate Buffer	3	3	2	501395.22339	164675.26788	Red Lion Branch
189903	Representative Site				501122.88215	164452.44323	Red Lion Branch
191102	Inadequate Buffer	4	2	2	494699.21318	164046.33877	Red Lion Branch
191103	Channel Alteration	3	3	2	494198.32236	164086.56575	Red Lion Branch
193901	Trash Dumping	3	3	2	498822.67671	164121.78044	Red Lion Branch
193902	Fish Barrier	4	3	2	498371.85849	163896.99920	Red Lion Branch
193903	Representative Site				498330.41837	163858.07061	Red Lion Branch
193904	Fish Barrier	4	3	1	498088.05648	163849.28028	Red Lion Branch
193905	Pipe Outfall	3	4	2	498085.54496	164244.84502	Red Lion Branch
193906	Trash Dumping	2	4	2	498089.31225	164322.70221	Red Lion Branch
198901	Trash Dumping	4	2	2	497354.69202	163530.31697	Red Lion Branch
200901	Pipe Outfall	4	3	1	497814.72951	176822.16267	Unicorn Branch
200902	Inadequate Buffer	3	1	2	497582.27311	176922.14392	Unicorn Branch
203901	Comment			1	498264.64512	176388.49401	Unicorn Branch
203902	Representative Site				498270.89395	176425.98698	Unicorn Branch
203903	Erosion Site	2	3	2	498257.14652	176498.47338	Unicorn Branch
203904	Trash Dumping	3	2	3	498220.90332	176527.21799	Unicorn Branch
203905	Inadequate Buffer	1	3	1	498626.53196	176091.98614	Unicorn Branch
203906	Channel Alteration	4	4	1	498431.28820	176109.31547	Unicorn Branch
203907	Pipe Outfall	3	3	1	498405.87185	176169.39048	Unicorn Branch
203908	Pipe Outfall	3	3	1	498407.02714	176184.40923	Unicorn Branch
203909	Representative Site				498423.20118	176296.47222	Unicorn Branch
205901	Inadequate Buffer	4	1	2	498697.45384	175958.87123	Unicorn Branch
205902	Unusual Condition	2	4	2	498674.86154	175989.67892	Unicorn Branch
205903	Inadequate Buffer	4	1	2	498800.14616	175724.73275	Unicorn Branch
209901	Representative Site				498795.79549	174276.39017	Unicorn Branch
209902	Erosion Site	5	2	4	498869.81514	174485.50139	Unicorn Branch
210901	Inadequate Buffer	3	5	1	498987.36419	174610.76528	Unicorn Branch

Appendix A - Upper Chester Stream Corridor Assessment Sites

Site	Problem	Severity	Correctability	Access	Easting	Northing	Stream
217901	Representative Site				499480.66703	172859.15600	Unicorn Branch
218901	Inadequate Buffer	5	1	2	499829.35163	172331.75492	Unicorn Branch
218902	Inadequate Buffer	5	5	3	499821.85304	172580.45827	Unicorn Branch
221901	Representative Site				499843.04574	172044.98309	Unicorn Branch
230901	Erosion Site	3	4	3	501064.12003	169428.70568	Unicorn Branch
230902	Inadequate Buffer	1	1	1	500923.52140	169592.73742	Unicorn Branch
231901	Representative Site				501229.71397	169191.25022	Unicorn Branch
231902	Representative Site				501415.61660	168969.41683	Unicorn Branch
232901	Fish Barrier	5	1	2	501449.98515	168421.08218	Unicorn Branch
232902	Fish Barrier	5	1	3	501470.29385	168706.96606	Unicorn Branch
234901	Inadequate Buffer	1	1	1	502117.04754	167558.74392	Unicorn Branch
234902	Pipe Outfall	3	2	2	502001.44422	167694.65593	Unicorn Branch
234903	Erosion Site	5	1	2	501918.64725	167825.88132	Unicorn Branch
234904	Pipe Outfall	3	3	2	501863.97001	167897.74284	Unicorn Branch
234905	Representative Site				501788.98407	167971.16657	Unicorn Branch
237901	Inadequate Buffer	1	4	4	502403.11770	166826.74994	Unicorn Branch
238901	Fish Barrier	5	2	4	502657.38793	166446.51097	Unicorn Branch
240901	Representative Site				502758.32710	166240.93858	Unicorn Branch
242901	Channel Alteration	4	4	4	503125.97363	165199.60462	Unicorn Branch
245901	Inadequate Buffer	4	3	4	503817.54656	164484.18434	Unicorn Branch
246901	Inadequate Buffer	4	3	3	504004.35075	163935.69546	Unicorn Branch
246902	Representative Site				503897.03770	164353.02396	Unicorn Branch
247901	Channel Alteration	3	4	4	504415.86813	163840.09644	Unicorn Branch
300901	Inadequate Buffer	3	3	2	500068.76972	176883.12516	Andover Branch
300901	Representative Site				500311.94221	176816.80539	Andover Branch
300903	Pipe Outfall	5	2	1	500090.87631	177181.56412	Andover Branch
303901	Representative Site				501413.95572	176274.45705	Andover Branch
303902	Fish Barrier	4	2	4	501060.25028	176495.52295	Andover Branch
304901	Fish Barrier	2	3	3	502023.68494	176079.82945	Andover Branch
304902	Erosion Site	3	4	4	501744.79528	176007.39058	Andover Branch
307901	Representative Site				502632.17148	175931.32976	Andover Branch
308901	Fish Barrier	5	2	4	503994.02231	175507.56235	Andover Branch
310901	Fish Barrier	4	1	3	504171.49755	175357.85534	Andover Branch
310902	Representative Site				504142.52200	175366.30655	Andover Branch
311901	Erosion Site	5	2	2	504438.31406	175278.17258	Andover Branch
311901	Inadequate Buffer	3	2	2	504723.38233	174873.30630	Andover Branch
311902	Erosion Site	4	2	4	504714.73819	174903.56080	Andover Branch
311903	Representative Site				504724.82302	174972.71395	Andover Branch
314901	Representative Site				505809.89995	173698.03150	Andover Branch
314902	Inadequate Buffer	3	2	2	505589.63866	173907.92755	Andover Branch
314902	Unusual Condition	4	4	3	505589.63866	173905.33624	Andover Branch
317901	Representative Site				506211.55289	173534.77901	Andover Branch
317902	Comment				505988.70029	173609.92698	Andover Branch
322901	Representative Site				505838.40435	170557.36463	Andover Branch
324901	Pipe Outfall	5	3	2	505972.32789	169974.62273	Andover Branch
324902	Pipe Outfall	5	3	2	505948.77065	169982.47514	Andover Branch
324903	Inadequate Buffer	4	1	2	505854.54168	170218.04756	Andover Branch
326901	Inadequate Buffer	3	1	2	506110.67665	169022.62228	Andover Branch
326902	Representative Site				506098.85238	168931.40653	Andover Branch
329901	Channel Alteration	5	1	5	505439.67248	168349.17305	Andover Branch
329901	Representative Site				505722.35938	168342.19313	Andover Branch
329902	Fish Barrier	5	1	5	505949.20689	168551.59083	Andover Branch
329903	Fish Barrier	5	1	5	505970.14666	168586.49045	Andover Branch
332901	Representative Site				505125.32126	167104.55764	Andover Branch

Appendix A - Upper Chester Stream Corridor Assessment Sites

Site	Problem	Severity	Correctability	Access	Easting	Northing	Stream
332902	Inadequate Buffer	5	1	3	505026.41035	167408.42248	Andover Branch
335901	Inadequate Buffer	1	1	2	505728.35876	166401.29543	Andover Branch
335902	Channel Alteration	3	3	1	505728.35876	166398.29244	Andover Branch
335902	Fish Barrier	5	1	3	505422.05400	166854.74659	Andover Branch
403901	Representative Site				506555.22743	176180.25934	Sewell Branch
406901	Representative Site				504565.87967	175824.01843	Sewell Branch
407901	Representative Site				505575.10129	175970.83573	Sewell Branch
411901	Representative Site				504410.15933	175303.07332	Andover Branch
503901	Representative Site				506380.80824	181532.77929	Cypress Branch
506901	Fish Barrier	5	2	3	505826.44990	181180.84225	Cypress Branch
506902	Inadequate Buffer	4	3	3	505628.62908	180900.21271	Cypress Branch
508901	Trash Dumping	3	4	1	504296.78891	180711.59286	Cypress Branch
508902	Trash Dumping	2	4	2	504246.18358	180674.78899	Cypress Branch
508903	Representative Site				503979.35550	180348.15461	Cypress Branch
509901	Erosion Site	3	3	4	505219.18599	180605.78172	Cypress Branch
509902	Representative Site				504823.54435	180706.99237	Cypress Branch
510901	Representative Site				505584.92448	180840.40642	Cypress Branch
510902	Fish Barrier	5	2	2	505428.50802	180658.68729	Cypress Branch
512901	Trash Dumping	3	2	4	503466.40151	179858.20304	Cypress Branch
515901	Representative Site				502976.44994	179487.86406	Cypress Branch
518901	Representative Site				502415.19087	178922.00451	Cypress Branch
518902	Comment				501748.12067	178524.06263	Cypress Branch
522901	Fish Barrier	2	3	4	501214.46450	177649.97063	Cypress Branch
522902	Erosion Site	3	5	3	501216.76474	177631.56870	Cypress Branch
600901	Inadequate Buffer	2	2	2	498760.79811	183939.89284	Mills Branch
601901	Comment				499162.59589	184565.10043	Mills Branch
601902	Comment				498813.53818	183992.64577	Mills Branch
603901	Inadequate Buffer	1	3	3	498501.31418	183680.40890	Mills Branch
605901	Fish Barrier	4	4	4	497887.15090	183209.91925	Mills Branch
605902	Erosion Site	5	4	3	497650.15596	183059.51861	Mills Branch
608901	Fish Barrier	5	2	4	497136.85682	182264.21828	Mills Branch
608902	Fish Barrier	5	1	3	497403.47613	182592.36512	Mills Branch
608903	Fish Barrier	5	1	3	497372.71236	182547.92857	Mills Branch
608904	Pipe Outfall	3	3	1	497171.03878	182349.67319	Mills Branch
609901	Erosion Site	3	3	4	497133.43862	182247.12730	Mills Branch
609902	Unusual Condition	3		4	496996.71077	181765.16163	Mills Branch
609903	Representative Site				496986.45618	181836.94375	Mills Branch
610901	Representative Site				497068.49289	181532.72428	Mills Branch
612901	Fish Barrier	5	2	4	497109.51125	180900.35797	Mills Branch
614901	Representative Site				497239.40271	180356.86476	Mills Branch
614902	Erosion Site	3	4	4	497109.51125	180886.68518	Mills Branch
614903	Fish Barrier	4	1	4	497123.18403	180825.15765	Mills Branch
614904	Fish Barrier	4	2	4	497116.34764	180869.59420	Mills Branch
618901	Inadequate Buffer	3	1	2	497503.88564	179518.55213	Mills Branch
620901	Representative Site				497634.83612	178856.81010	Mills Branch
622901	Pipe Outfall	3	3	1	497791.38346	178042.55467	Mills Branch
622902	Erosion Site	1	4	3	497503.88564	179521.11578	Mills Branch
622903	Representative Site				497792.69129	178251.80759	Mills Branch
622904	Fish Barrier	4	1	1	497737.76240	177965.39266	Mills Branch
622905	Erosion Site	5	4	1	497749.53288	177981.08663	Mills Branch
622906	Representative Site				497610.90282	177898.69329	Mills Branch
624901	Inadequate Buffer	4	3	1	497565.12874	177494.57359	Mills Branch
702901	Channel Alteration	3	4	3	489508.70447	178859.79186	Spry Branch
702902	In/Near Stream Construction	2			489473.41678	178817.02212	Spry Branch

Appendix A - Upper Chester Stream Corridor Assessment Sites

Site	Problem	Severity	Correctability	Access	Easting	Northing	Stream
702903	Inadequate Buffer	1	3	3	489498.25082	178845.67678	Spry Branch
702904	Pipe Outfall	4	1	1	489482.96834	178773.08496	Spry Branch
702905	Pipe Outfall	4	2	2	489488.69927	178748.25092	Spry Branch
702906	Erosion Site	3	3	3	489572.75296	178532.38577	Spry Branch
705901	Representative Site				489912.78833	178312.69999	Spry Branch
705902	Fish Barrier	4	2	2	490056.06166	178230.55662	Spry Branch
705903	Inadequate Buffer	3	2	2	490065.61321	178219.09475	Spry Branch
705904	Fish Barrier	4	1	2	490197.42468	178068.18018	Spry Branch
705905	Fish Barrier	4	1	2	490241.36183	178010.87084	Spry Branch
705906	Inadequate Buffer	4	1	2	490262.37525	177957.38213	Spry Branch
707901	Erosion Site	3	2	2	490575.66627	177403.39192	Spry Branch
707902	Inadequate Buffer	3	2	2	490583.30751	177403.39192	Spry Branch
708901	Representative Site				490709.38804	177426.31566	Spry Branch
708902	Inadequate Buffer	2	3	2	490850.75106	177311.69699	Spry Branch
710901	Pipe Outfall	4	3	3	490839.28920	176983.12349	Spry Branch
713901	Inadequate Buffer	4	3	3	490017.85544	175605.78920	Spry Branch
713902	Inadequate Buffer	3	4	4	490205.06592	175701.30476	Spry Branch
713903	Erosion Site	3	4	4	490208.88654	175707.03569	Spry Branch
713904	Representative Site				490268.10619	175978.29986	Spry Branch
902901	Inadequate Buffer	2	3	2	492243.36362	174724.02421	Pearl Creek
904901	Pipe Outfall	3	2	1	492287.41110	173607.17604	Pearl Creek
904902	Pipe Outfall	3	3	1	492279.58044	173604.23955	Pearl Creek
904903	Comment		3	1	492261.96145	173641.43519	Pearl Creek
904904	Erosion Site	3	4	2	492244.34246	173702.12282	Pearl Creek
904905	Inadequate Buffer	2	3	2	492267.83444	173927.25435	Pearl Creek
904906	Representative Site				492288.38993	174052.54494	Pearl Creek
906901	Inadequate Buffer	3	3	3	492321.67024	173390.85401	Pearl Creek
907901	Unusual Condition	3		3	492875.68958	173136.35749	Pearl Creek
907902	Erosion Site	4	3	3	492861.98592	173144.18816	Pearl Creek
907903	Fish Barrier	5	1	3	492809.12895	173160.82831	Pearl Creek
907904	Fish Barrier	5	1	2	492767.03914	173168.65897	Pearl Creek
907905	Inadequate Buffer	3	3	2	492608.85354	173170.76251	Pearl Creek
907906	Erosion Site	4	4	1	492541.90761	173219.55828	Pearl Creek
908901	Inadequate Buffer	3	2	1	493445.37024	173032.60122	Pearl Creek
909901	Representative Site				493278.96867	172952.33694	Pearl Creek

Appendix B

Listing of sites by problem category

Inadequate Buffers- Upper Chester River

Problem	Site Number	Buffer inadequate on	Stream Unshaded on?	Buffer Width Left	Buffer Width Right	Length Left (ft)	Length Right (ft)	Land use left	Land use right	Recent buffer?	Livestock?	Type of Livestock	Severity	Correctability	Access	Wetland Pote
Inadequate Buffer	111901	Both	Both	0	0	1200	400	Crop field	Crop field	No	No		1	4	3	2
Inadequate Buffer	116902	Left	Neither	5		1200		Crop field	Forest	No	No		1	4	2	4
Inadequate Buffer	124902	Both	Both	0	0	1250	1250	Crop field	Crop field	No	No		1	3	2	3
Inadequate Buffer	129903	Both	Right	30	7	1450	2600	Forest	Paved	No	No		1	5	1	5
Inadequate Buffer	141704	Right	Neither	0	35	800	1908	Crop field	Shrubs/Small Trees	No	No		1	3	2	3
Inadequate Buffer	159902	Both	Neither	5	5	3750	4700	Crop field	Crop field	No	No		1	2	3	4
Inadequate Buffer	173904	Both	Both	0	0	2750	4000	Crop field	Crop field	No	No		1	3	1	3
Inadequate Buffer	173906	Both	Both	0	0	2500	2500	Crop field	Crop field	No	No		1	2	2	4
Inadequate Buffer	178102	Both	Both	0	0	1000	1400	Crop field	Crop field	No	No		1	2	3	4
Inadequate Buffer	187902	Both	Both	0	0	9900	11950	Crop field	Crop field	No	No		1	4	2	4
Inadequate Buffer	203905	Both	Both	0	0	1000	1100	Lawn	Lawn	No	No		1	3	1	3
Inadequate Buffer	230902	Left	Left	10		1650		Crop field	Shrubs/Small Trees	No	No		1	1	1	4
Inadequate Buffer	234901	Right	Neither		2		4350	Shrubs/Small Trees	Crop field	No	No		1	1	1	4
Inadequate Buffer	237901	Both	Neither	20	10	600	2100	Pasture	Pasture	No	Yes	Cattle	1	4	4	5
Inadequate Buffer	335901	Both	Both	2	2	2600	2600	Crop field	Crop field	No	No		1	1	2	3
Inadequate Buffer	603901	Both	Both	15	15	5940	5940	Crop field	Crop field	No	No		1	3	3	2
Inadequate Buffer	702903	Both	Neither	4	4	2434	1720	Crop field	Lawn	No	No		1	3	3	3
Inadequate Buffer	017901	Both	Both	20	10	1585	1585	Crop field	Crop field	No	No		2	2	2	3
Inadequate Buffer	101902	Left	Neither	5		725		Crop field	Forest	No	No		2	1	2	5
Inadequate Buffer	122907	Left	Neither	15		1115		Crop field	Forest	No	No		2	3	2	3
Inadequate Buffer	136702	Both	Neither	25	30	1800	2600	Crop field	Crop field	No	No		2	3	3	4
Inadequate Buffer	144101	Both	Neither	4	4	1100	1100	Crop field	Crop field	No	No		2	2	1	4
Inadequate Buffer	167902	Left	Neither	5		800		Crop field	Forest	No	No		2	3	3	2
Inadequate Buffer	185102	Both	Neither	5	5	800	800	Shrubs/Small Trees	Crop field	No	No		2	2	3	3
Inadequate Buffer	600901	Both	Both	0		400		Pasture	Pasture	No	Yes	Cattle	2	2	2	1
Inadequate Buffer	708902	Left	Both	10		900		Crop field	Forest	No	No		2	3	2	4
Inadequate Buffer	902901	Right	Neither		30		450	Shrubs/Small Trees	Crop field	No	No		2	3	2	5
Inadequate Buffer	904905	Left	Neither	15		1100		Crop field	Shrubs/Small Trees	No	No		2	3	2	5
Inadequate Buffer	006901	Right	Neither	20	5	280	750	Crop field	Lawn	No	No		3	2	2	5
Inadequate Buffer	102901	Right	Right		0		200	Lawn	Forest	No	No		3	2	2	2
Inadequate Buffer	103901	Both	Neither	30	10	200	850	Crop field	Lawn	No	No		3	1	2	5
Inadequate Buffer	104901	Right	Neither		40		300	Forest	Paved	No	No		3	5	1	4
Inadequate Buffer	104902	Left	Left	10		250		Paved	Forest	No	No		3	5	1	5
Inadequate Buffer	111905	Left	Neither	20		1476		Lawn	Forest	No	No		3	2	2	5
Inadequate Buffer	123901	Left	Neither	30		220		Crop field	Forest	No	No		3	3	2	3
Inadequate Buffer	126902	Left	Neither	3		246		Lawn	Forest	No	No		3	2	1	3
Inadequate Buffer	141702	Left	Left	5		200		Lawn	Forest	No	No		3	2	2	3
Inadequate Buffer	144102	Both	Both	10	10	1100	1100	Crop field	Crop field	Yes	No		3	2	2	3

Inadequate Buffers- Upper Chester River

Problem	Site Number	Buffer inadequate on	Stream Unshaded on?	Buffer Width Left	Buffer Width Right	Length Left (ft)	Length Right (ft)	Land use left	Land use right	Recent buffer?	Livestock?	Type of Livestock	Severity	Correctability	Access	Wetland Pote
Inadequate Buffer	149902	Right	Both		10		400	Swamp	Crop field	No	No		3	2	2	2
Inadequate Buffer	152903	Left	Left	0		500		Crop field	Forest	No	No		3	3	3	1
Inadequate Buffer	166904	Both	Left	5	30	300	300	Lawn	Crop field	No	No		3	2	1	3
Inadequate Buffer	178101	Both	Both	0	0	400	400	Crop field	Shrubs/Small Trees	No	No		3	2	3	3
Inadequate Buffer	185104	Left	Left	0		800		Crop field	Forest	No	No		3	3	3	2
Inadequate Buffer	189902	Right	Neither		5		850	Forest	Lawn	No	No		3	3	2	4
Inadequate Buffer	200902	Right	Neither		7		400	Shrubs/Small Trees	Lawn	No	No		3	1	2	4
Inadequate Buffer	210901	Right	Neither		10		540	Shrubs/Small Trees	Paved	No	No		3	5	1	5
Inadequate Buffer	300901	Both	Neither	10	0	800	200	Lawn	Forest	No	No		3	3	2	4
Inadequate Buffer	311901	Left	Neither	30		200		Shrubs/Small Trees	Forest	No	No		3	2	2	5
Inadequate Buffer	314902	Right	Neither		5		150	Forest	Crop field	No	No		3	2	2	5
Inadequate Buffer	326901	Left	Neither	15		150		Shrubs/Small Trees	Lawn	No	No		3	1	2	5
Inadequate Buffer	618901	Left	Neither	15		400		Crop field	Forest	No	No		3	1	2	4
Inadequate Buffer	705903	Left	Neither	20		810		Crop field	Forest	No	No		3	2	2	3
Inadequate Buffer	707902	Left	Both	20		330		Crop field	Shrubs/Small Trees	No	No		3	2	2	5
Inadequate Buffer	713902	Left	Neither	5	30	660	600	Crop field	Marsh	No	No		3	4	4	5
Inadequate Buffer	906901	Left	Neither	20		800		Crop field	Forest	No	No		3	3	3	5
Inadequate Buffer	907905	Both	Right	10	13	75	400	Forest	Crop field	No	No		3	3	2	5
Inadequate Buffer	908901	Both	Both	0	0	300	300	Lawn	Lawn	No	No		3	2	1	2
Inadequate Buffer	002904	Left	Neither	40		1500		Crop field	Lawn	No	No		4	2	4	4
Inadequate Buffer	014901	Left	Neither	15		253		Lawn	Forest	No	No		4	3	2	3
Inadequate Buffer	106901	Left	Neither	30		150		Lawn	Forest	No	No		4	3	3	5
Inadequate Buffer	125907	Both	Neither	30	20	500	500	Crop field	Lawn	No	No		4	3	3	4
Inadequate Buffer	150901	Right	Neither		10		250	Shrubs/Small Trees	Lawn	No	No		4	2	2	2
Inadequate Buffer	182901	Both	Left	15	10	200	200	Crop field	Lawn	No	No		4	3	2	3
Inadequate Buffer	191102	Both	Neither	20	5	400	400	Crop field	Crop field	No	Yes	Horses	4	2	2	4
Inadequate Buffer	205901	Right	Neither		25		210	Forest	Crop field	No	No		4	1	2	3
Inadequate Buffer	205903	Right	Neither		20		425	Forest	Crop field	No	No		4	1	2	4
Inadequate Buffer	245901	Left	Neither	20		125		Crop field	Forest	No	No		4	3	4	4
Inadequate Buffer	246901	Left	Neither	20		600		Crop field	Forest	No	No		4	3	3	4
Inadequate Buffer	324903	Left	Neither	30		250		Lawn	Shrubs/Small Trees	No	No		4	1	2	5
Inadequate Buffer	506902	Right	Neither		30		950	Forest	Crop field	No	No		4	3	3	4
Inadequate Buffer	624901	Left	Neither	0		70		Lawn	Forest	No	No		4	3	1	5
Inadequate Buffer	705906	Both	Both	0	0	250	250	Lawn	Lawn	No	No		4	1	2	3
Inadequate Buffer	713901	Right	Neither		20		100	Marsh	Crop field	No	No		4	3	3	3
Inadequate Buffer	002901	Left	Left	2		100		Lawn	Forest	No	No		5	1	2	2
Inadequate Buffer	008903	Left	Neither	30		50		Crop field	Forest	No	No		5	1	2	5
Inadequate Buffer	114902	Right	Neither		40		400	Shrubs/Small Trees	Crop field	No	No		5	1	3	4

Inadequate Buffers- Upper Chester River

Problem	Site Number	Buffer inadequate on	Stream Unshaded on?	Buffer Width Left	Buffer Width Right	Length Left (ft)	Length Right (ft)	Land use left	Land use right	Recent buffer?	Livestock?	Type of Livestock	Severity	Correctability	Access	Wetland Pote
Inadequate Buffer	141705	Left	Left	10		50		Lawn	Shrubs/Small Trees	No	No		5	2	1	2
Inadequate Buffer	142701	Right	Neither		30		300	Lawn	Forest	No	No		5	2	2	2
Inadequate Buffer	145702	Left	Neither	30		200		Crop field	Forest	No	No		5	2	3	2
Inadequate Buffer	218901	Left	Neither	40		230		Crop field	Shrubs/Small Trees	No	No		5	1	2	3
Inadequate Buffer	218902	Right	Neither		35		440	Shrubs/Small Trees	Paved	No	No		5	5	3	5
Inadequate Buffer	332902	Left	Neither	30		100		Pasture	Forest	No	Yes		5	1	3	3

Fish Barriers- Upper Chester River

Problem	Site Number	Fish Blockage	Type of Barrier	Blockage Because	Water Drop (in)	Water Depth (in)	Severity	Correctability	Access
Fish Barrier	304901	Partial	Dam	Too High	80		2	3	3
Fish Barrier	522901	Total	Dam	Too High	12		2	3	4
Fish Barrier	111902	Partial	Dam	Too High			3	4	3
Fish Barrier	125901	Total	Dam	Too High	72		3	5	1
Fish Barrier	145701	Total	Instream Pond	Only overflow can pass			3	3	3
Fish Barrier	116904	Temporary	Beaver Dam	Too High	18		4	2	3
Fish Barrier	119901	Temporary	Beaver Dam	Too High	30		4	2	4
Fish Barrier	122903	Temporary	Debris Dam	Too High	20		4	1	2
Fish Barrier	127903	Partial	Natural Falls	Too High	12		4	3	3
Fish Barrier	140701	Total	Instream Pond	Only overflow can pass			4	4	1
Fish Barrier	193902	Total	Dam	Completely Blocked	0	0	4	3	2
Fish Barrier	193904	Total	Road Crossing	Both	6	1	4	3	1
Fish Barrier	303902	Temporary	Beaver Dam	Too High	10		4	2	4
Fish Barrier	310901	Temporary	Beaver Dam	Too High	6		4	1	3
Fish Barrier	605901	Total	Instream Pond	Only overflow can pass			4	4	4
Fish Barrier	614903	Temporary	Beaver Dam	Too High	9		4	1	4
Fish Barrier	614904	Temporary	Beaver Dam	Too High	60		4	2	4
Fish Barrier	622904	Temporary	Beaver Dam	Too High	12		4	1	1
Fish Barrier	705902	Temporary	Beaver Dam	Too High	18		4	2	2
Fish Barrier	705904	Temporary	Beaver Dam	Too High	24		4	1	2
Fish Barrier	705905	Temporary	Beaver Dam	Too High	18		4	1	2
Fish Barrier	114901	Temporary	Natural Falls	Too High	12		5	1	3
Fish Barrier	116905	Temporary	Beaver Dam	Too High	10		5	2	3
Fish Barrier	122908	Temporary	Debris Dam	Too High	18		5	1	2
Fish Barrier	152904	Temporary	Beaver Dam	Too High	36		5	2	2
Fish Barrier	174901	Temporary	Debris Dam	Too Shallow	0		5	2	2
Fish Barrier	232901	Temporary	Beaver Dam	Too High	1.5	0	5	1	2
Fish Barrier	232902	Temporary	Beaver Dam	Too High	12		5	1	3
Fish Barrier	238901	Temporary	Beaver Dam	Too High	30		5	2	4
Fish Barrier	308901	Temporary	Debris Dam	Too High	10		5	2	4
Fish Barrier	329902	Temporary	Beaver Dam	Too High	10		5	1	5
Fish Barrier	329903	Temporary	Beaver Dam	Too Shallow		0.25	5	1	5
Fish Barrier	335902	Temporary	Debris Dam	Too High	12		5	1	3
Fish Barrier	506901	Temporary	Beaver Dam	Too High	20		5	2	3
Fish Barrier	510902	Temporary	Beaver Dam	Too High	20		5	2	2
Fish Barrier	608901	Temporary	Beaver Dam	Too High	36		5	2	4

Fish Barriers- Upper Chester River

Problem	Site Number	Fish Blockage	Type of Barrier	Blockage Because	Water Drop (in)	Water Depth (in)	Severity	Correctability	Access
Fish Barrier	608902	Temporary	Beaver Dam	Too High	30		5	1	3
Fish Barrier	608903	Temporary	Beaver Dam	Too High	24		5	1	3
Fish Barrier	612901	Temporary	Beaver Dam	Too High	12		5	2	4
Fish Barrier	907903	Temporary	Debris Dam	Too High	10		5	1	3
Fish Barrier	907904	Temporary	Debris Dam	Too High	18		5	1	2

Erosion Sites- Upper Chester River

Problem	Site Number	Type	Cause	Avg bank height ft	Length ft.	Land use left	Land use right	Threats infrastruct?	Describe Threat	Severity	Correctability	Access
Erosion Site	101903	Unknown	Unknown	12	950	Crop field	Forest	No		1	4	3
Erosion Site	136701	Unknown	Inadequate Buffer	5	2122	Crop field	Crop field	No		1	4	3
Erosion Site	622902	Unknown	Unknown	5	3200	Shrubs/Small Trees	Forest	No		1	4	3
Erosion Site	122910	Unknown	Bend at steep slope	3	2772	Forest	Forest	No		2	4	4
Erosion Site	203903	Unknown	Bend at steep slope	20	50	Forest	Pasture	Yes	losing pasture	2	3	2
Erosion Site	230901	Unknown	Unknown	4.5	700	Shrubs/Small Trees	Shrubs/Small Trees	No		3	4	3
Erosion Site	304902	Unknown	Below Road Crossing	4	275	Forest	Forest	No		3	4	4
Erosion Site	509901	Unknown	Unknown	2	1640	Forest	Forest	No		3	3	4
Erosion Site	522902	Unknown	Below Dam	6	698	Forest	Forest	No		3	5	3
Erosion Site	609901	Unknown	Unknown	5	1250	Shrubs/Small Trees	Shrubs/Small Trees	No		3	3	4
Erosion Site	614902	Unknown	Unknown	3	1500	Forest	Forest	No		3	4	4
Erosion Site	702906	Unknown	Unknown	4	1135	Crop field	Shrubs/Small Trees	No		3	3	3
Erosion Site	707901	Headcutting	Below Falls	1.5	1486	Marsh	Marsh	No		3	2	2
Erosion Site	713903	Unknown	Unknown	4	201	Crop field	Marsh	No		3	4	4
Erosion Site	904904	Widening	Below pond	4	1500	Lawn	Lawn	No		3	4	2
Erosion Site	002903	Widening	Unknown	5	1400	Shrubs/Small Trees	Shrubs/Small Trees	No		4	3	3
Erosion Site	010903	Unknown	Below Stone Revetment	2.25	928	Forest	Forest	No		4	3	4
Erosion Site	101901	Unknown	Unknown	10	30	Crop field	Forest	No		4	4	3
Erosion Site	111903	Unknown	Below Dam	3	3713	Forest	Forest	No		4	2	3
Erosion Site	122906	Unknown	Below Road Crossing	3	470	Crop field	Crop field	No		4	3	4
Erosion Site	125906	Unknown	Below Road Crossing	3	500	Shrubs/Small Trees	Shrubs/Small Trees	No		4	3	2
Erosion Site	127902	Unknown	Unknown	2	869	Forest	Forest	No		4	2	3
Erosion Site	185101	Widening	Below Road Crossing	3	600	Shrubs/Small Trees	Shrubs/Small Trees	No		4	1	1
Erosion Site	311902	Widening	Inadequate Buffer	3	275	Shrubs/Small Trees	Forest	No		4	2	4
Erosion Site	907902	Unknown	Bend at steep slope	3	650	Forest	Forest	No		4	3	3
Erosion Site	907906	Unknown	Below Road Crossing	3	886	Forest	Crop field	No		4	4	1
Erosion Site	004901	Widening	Landuse Change	3	1000	Crop field	Shrubs/Small Trees	No		5	4	3
Erosion Site	008902	Unknown	Bend at steep slope	3	656	Forest	Forest	No		5	3	4
Erosion Site	119902	Unknown	Unknown	3	20	Forest	Forest	No		5	3	4
Erosion Site	122904	Unknown	Below Road Crossing	2	358	Forest	Forest	No		5	2	4
Erosion Site	129902	Unknown	Unknown	2	2000	Forest	Forest	No		5	2	3
Erosion Site	130702	Unknown	Unknown	3	262	Forest	Forest	No		5	1	2
Erosion Site	209902	Unknown	Below Road Crossing	1.5	750	Shrubs/Small Trees	Shrubs/Small Trees	No		5	2	4
Erosion Site	234903	Unknown	Unknown	2	150	Shrubs/Small Trees	Crop field	No		5	1	2
Erosion Site	311901	Unknown	Below Road Crossing	2.5	125	Forest	Forest	No		5	2	2
Erosion Site	605902	Unknown	Inadequate Buffer	3.5	558	Crop field	Shrubs/Small Trees	No		5	4	3
Erosion Site	622905	Unknown	Below Beaver Dam	3	69	Forest	Forest	No		5	4	1

Pipe Outfalls- Upper Chester River

Problem	Site Number	Type of Outfall	Type of Pipe	Location	Pipe Diameter (in)	Channel Width (ft)	Evidence Discharge?	Color	Odor	Severity	Correctability	Access
Pipe Outfall	010901	Stormwater	Earth Channel	Right Bank		1	Yes	Clear	None	3	4	1
Pipe Outfall	166902	Stormwater	Earth Channel	Right Bank		1	Yes	Clear	None	3	2	2
Pipe Outfall	193905	Unknown	Unknown	Right Bank	8		Yes	Clear	None	3	4	2
Pipe Outfall	203907	Unknown	Corrugated Metal	Left Bank	12		Yes	Clear	None	3	3	1
Pipe Outfall	203908	Unknown	Corrugated Metal	Left Bank	10		Yes	Clear	None	3	3	1
Pipe Outfall	234902	Unknown	Corrugated Metal	Right Bank	8		Yes	Clear	None	3	2	2
Pipe Outfall	234904	Unknown	Corrugated Metal	Right Bank	8		Yes	Clear	None	3	3	2
Pipe Outfall	608904	Stormwater	Earth Channel	Right Bank		2	Yes	Clear	None	3	3	1
Pipe Outfall	622901	Stormwater	Riprap Channel	Left Bank		1.5	Yes	Clear	None	3	3	1
Pipe Outfall	904901	Stormwater	Plastic	Right Bank	6		Yes	Clear	None	3	2	1
Pipe Outfall	904902	Stormwater	Concrete Channel	Left Bank		8	Yes	Clear	None	3	3	1
Pipe Outfall	126901	Unknown	Plastic	Right Bank	8		No			4	3	1
Pipe Outfall	166903	Stormwater	Earth Channel	Right Bank		1	No			4	2	1
Pipe Outfall	200901	Stormwater	Concrete Channel	Left Bank		1.5	No			4	3	1
Pipe Outfall	702904	Stormwater	Earth Channel	Right Bank		3	No			4	1	1
Pipe Outfall	702905	Stormwater	Earth Channel			2	No			4	2	2
Pipe Outfall	710901	Stormwater	Riprap Channel	Right Bank		5	No			4	3	3
Pipe Outfall	104904	Stormwater	Concrete Channel	Right Bank		24	No			5	2	1
Pipe Outfall	122905	Unknown	Concrete Pipe	Left Bank	24		No			5	4	1
Pipe Outfall	125902	Stormwater	Riprap Channel	Left Bank		1	No			5	2	1
Pipe Outfall	125903	Stormwater	Earth Channel	Right Bank		10	No			5	2	1
Pipe Outfall	125904	Stormwater	Earth Channel	Left Bank		1	No			5	2	1
Pipe Outfall	125905	Stormwater	Earth Channel	Right Bank		1	No			5	3	1
Pipe Outfall	126903	Stormwater	Earth Channel	Left Bank		1	No			5	4	1
Pipe Outfall	158102	Stormwater	Earth Channel	Left Bank		2	No			5	1	1
Pipe Outfall	300903	Stormwater	Corrugated Metal		34		No			5	2	1
Pipe Outfall	324901	Stormwater	Plastic	Right Bank	4		No			5	3	2
Pipe Outfall	324902	Stormwater	Plastic	Left Bank	4		No			5	3	2

Channel Alteration- Upper Chester River

Problem	Site Number	Type	Bottom width (in.)	Length (ft.)	Perennial Flow?	Sediment Depositing	Vegetation growing?	Part of Road Crossing?	Length above road crossing	Length below road crossing	Severity	Correctability	Access
Channel Alteration	173903	Earth Channel	180	12310	Yes	No	No	No			2	4	2
Channel Alteration	185103	Earth Channel	72	12588	Yes	Yes	No	No			2	4	3
Channel Alteration	187901	Earth Channel	36	12480	Yes	No	Yes	No			2	4	2
Channel Alteration	124901	Earth Channel	12	1250	Yes	No	Yes	No			3	2	1
Channel Alteration	159901	Earth Channel	72	4050	Yes	No	No	No			3	3	4
Channel Alteration	170902	Earth Channel	48	2900	Yes	Yes	No	No			3	3	3
Channel Alteration	173907	Earth Channel	36	2800	No	No	Yes	No			3	4	2
Channel Alteration	191103	Earth Channel	36	1000	Yes	Yes	Yes	Below		1000	3	3	2
Channel Alteration	247901	Earth Channel	36	1200	No	Yes	Yes	No			3	4	4
Channel Alteration	335902	Earth Channel	24	2600	Yes	Yes	Yes	No			3	3	1
Channel Alteration	702901	Earth Channel	24	1588	Yes	Yes	Yes	Both	1500		3	4	3
Channel Alteration	116901	Earth Channel	24	1200	Yes	No	No	No			4	2	2
Channel Alteration	159904	Earth Channel	36	863	Yes	No	No	No			4	2	3
Channel Alteration	189901	Earth Channel	36	1300	Yes	No	No	No			4	2	2
Channel Alteration	203906	Rip-rap	45	425	Yes	No	No	No			4	4	1
Channel Alteration	242901	Earth Channel	90	800	Yes	Yes	No	No			4	4	4
Channel Alteration	166905	Earth Channel	96	2200	Yes	No	No	No			5	1	4
Channel Alteration	329901	Earth Channel	144	950	Yes	No	No	No			5	1	5

Trash Dumping- Upper Chester River

Problem	Site Number	Type of Trash	Amount (# pickup truck loads)	Other Measure	Confined to?	Site for Volunteers?	Land Ownership	If Public, name	Severity	Correctability	Access
Trash Dumping	193906	Residential	50+	Mostly old lawn mowers	Single site	No	Private		2	4	2
Trash Dumping	508902	Residential	30	2 or 3 cars Present	Large area	No	Public	Millington Wildlife Management Area	2	4	2
Trash Dumping	193901	Miscellaneous	15		Single site	Yes	Private		3	3	2
Trash Dumping	203904	Residential	7		Single site	Yes	Private		3	2	3
Trash Dumping	508901	Residential	5		Single site	No	Public	Millington Wildlife Management Area	3	4	1
Trash Dumping	512901	Residential	4		Large area	Yes	Unknown		3	2	4
Trash Dumping	182903	Residential	4		Single site	Yes	Private		4	2	2
Trash Dumping	198901	Residential	6		Single site	No	Private		4	2	2
Trash Dumping	122902	Construction	2		Single site	No	Private		5	4	5

Unusual Conditions/Comments- Upper Chester River

Problem	Site Number	Describe	More Description	Potential Cause	Severity	Correctability	Access
Unusual Condition	136704		Flow from stream eating away a berm on side of pond	Man-made pond, high flows, sharp bend in stream	2	4	3
Unusual Condition	205902	Excessive Algae	tons of green algae	eutrophication due to lack of adequate buffer	2	4	2
Unusual Condition	130901		Mysterious white foam in stream	Soap? Car fluids? Bacteria?	3		1
Unusual Condition	609902	Red Flock	leaching out of eroding bank		3		4
Unusual Condition	907901		Looks like soap suds, maybe from detergent		3		3
Unusual Condition	002902		Foreman is dammed with a levy, a pipe connects Foreman to the Chester		4	3	2
Unusual Condition	314902		Farmer pumping water from stream for irrigation, created side pond by diverting part of stream flow		4	4	3
Comment	203901		Red pipe sticking straight up out of stream by road	Unknown purpose			1
Comment	317902		Found SAV in stream. Good indication of stream habitat				
Comment	518902		Farmer pumping water from stream for irrigation				
Comment	601901		Stream drains from farm pond just north of Route 313, there is an inadequate buffer from it to Rt 313				
Comment	601902		Cows pasture runs over stream, has forested buffer but cows can still walk in stream				
Comment	904903		Bulkhead around pond, pump on side, no buffer			3	1

Exposed Pipes- Upper Chester River

Problem	Site Number	Where is Pipe Exposed	Type of Pipe	Pipe Diameter	Length Exposed	Purpose of pipe	Evidence of Discharge?	Color	Odor	Severity	Corectability	Access
Exposed Pipe	141701	Above stream	Smooth metal	12	35	Unknown	No			5	2	1

In/Near Stream Construction- Upper Chester River

Problem	Site Number	Type of Activity	Sediment Control	If inadequate, why?	Excess sediment in stream?	Length Affected (ft)	Company	Location	Severity
In/Near Stream Construction	702902	Unknown	Inadequate	None Present	Yes	500	Unknown	Where sream intersects Morgnec Rd	2

Representative Sites A- Upper Chester River

Problem	Site Nimber	Macro Substrata	Embeddedness	Shelter for Fish	Channel Alteration	Sediment Deposition	Velocity/Depth	Channel Flow	Bank Vegetation	Bank Condition	Riparian Vegetation
Foreman											
Representative Site	008901	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal	Optimal
Representative Site	010902	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	013901	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	017902	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Red Lion											
Representative Site	104903	Marginal	Poor	Optimal	Optimal	Optimal	Marginal	Optimal	Optimal	Suboptimal	Marginal
Representative Site	106902	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	111904	Optimal	Optimal	Optimal	Optimal	Marginal	Suboptimal	Suboptimal	Suboptimal	Marginal	Optimal
Representative Site	114903	Marginal	Optimal	Optimal	Optimal	Marginal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	116903	Poor	Poor	Suboptimal	Suboptimal	Optimal	Poor	Suboptimal	Optimal	Optimal	Optimal
Representative Site	122901	Suboptimal	Optimal	Marginal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	122909	Suboptimal	Optimal	Marginal	Optimal	Suboptimal	Poor	Optimal	Optimal	Marginal	Marginal
Representative Site	126904	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	127901	Optimal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Representative Site	129901	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Suboptimal	Optimal	Suboptimal	Suboptimal	Optimal
Representative Site	130701	Suboptimal	Optimal	Suboptimal	Optimal	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Optimal
Representative Site	136703	Optimal	Optimal	Optimal	Optimal	Marginal	Suboptimal	Suboptimal	Optimal	Poor	Marginal
Representative Site	141703	Poor	Poor	Suboptimal	Suboptimal	Optimal	Marginal	Optimal	Optimal	Optimal	Marginal
Representative Site	141706	Suboptimal	Optimal	Optimal	Optimal	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Suboptimal
Representative Site	142702	Marginal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal	Suboptimal
Representative Site	149901	Poor	Poor	Suboptimal	Poor	Suboptimal	Marginal	Marginal	Marginal	Marginal	Marginal
Representative Site	152902	Marginal	Marginal	Marginal	Marginal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Representative Site	158101	Marginal	Poor	Poor	Marginal	Optimal	Marginal	Optimal	Marginal	Marginal	Marginal
Representative Site	159903	Poor	Poor	Poor	Marginal	Optimal	Suboptimal	Poor	Poor	Poor	Poor
Representative Site	159905	Poor	Poor	Poor	Poor	Optimal	Poor	Poor	Poor	Poor	Poor
Representative Site	166901	Poor	Poor	Poor	Poor	Suboptimal	Marginal	Optimal	Optimal	Optimal	Optimal
Representative Site	167901	Poor	Poor	Poor	Poor	Optimal	Poor	Optimal	Optimal	Optimal	Optimal
Representative Site	170901	Poor	Poor	Marginal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	171101	Marginal	Poor	Poor	Marginal	Optimal	Marginal	Suboptimal	Marginal	Marginal	Marginal
Representative Site	173905	Poor	Poor	Poor	Poor	Optimal	Poor	Poor	Marginal	Optimal	Poor
Representative Site	182902	Poor	Poor	Poor	Suboptimal	Suboptimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal
Representative Site	182904	Poor	Poor	Poor	Suboptimal	Suboptimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal
Representative Site	189903	Poor	Poor	Poor	Poor	Optimal	Poor	Poor	Optimal	Optimal	Optimal
Representative Site	193903	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor

Representative Sites A- Upper Chester River

Problem	Site Nimber	Macro Substrata	Embeddedness	Shelter for Fish	Channel Alteration	Sediment Deposition	Velocity/Depth	Channel Flow	Bank Vegetation	Bank Condition	Riparian Vegetation
Unicorn											
Representative Site	203902	Optimal	Optimal	Optimal	Optimal	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Optimal
Representative Site	203909	Optimal	Optimal	Suboptimal	Marginal	Suboptimal	Optimal	Suboptimal	Optimal	Suboptimal	Suboptimal
Representative Site	209901	Suboptimal	Suboptimal	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Suboptimal	Optimal
Representative Site	217901	Optimal	Optimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	221901	Poor	Poor	Marginal	Optimal	Suboptimal	Marginal	Suboptimal	Optimal	Optimal	Optimal
Representative Site	231901	Poor	Poor	Suboptimal	Suboptimal	Suboptimal	Marginal	Suboptimal	Optimal	Suboptimal	Optimal
Representative Site	231902	Marginal	Marginal	Suboptimal	Optimal	Suboptimal	Marginal	Suboptimal	Optimal	Suboptimal	Optimal
Representative Site	234905	Marginal	Marginal	Suboptimal	Poor	Suboptimal	Poor	Optimal	Marginal	Optimal	Poor
Representative Site	240901	Poor	Poor	Optimal	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Representative Site	246902	Poor	Poor	Optimal	Suboptimal	Optimal	Marginal	Optimal	Optimal	Optimal	Optimal
Andover											
Representative Site	300901	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	303901	Suboptimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	307901	Poor	Poor	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	310902	Marginal	Marginal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	311903	Suboptimal	Poor	Suboptimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Suboptimal	Optimal
Representative Site	314901	Suboptimal	Poor	Optimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Representative Site	317901	Suboptimal	Poor	Marginal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Suboptimal	Optimal
Representative Site	322901	Optimal	Optimal	Optimal	Optimal	Optimal	Poor	Suboptimal	Optimal	Optimal	Optimal
Representative Site	326902	Poor	Poor	Marginal	Suboptimal	Marginal		Marginal	Suboptimal	Optimal	Optimal
Representative Site	329901	Suboptimal	Poor	Suboptimal	Poor	Optimal	Poor	Suboptimal	Optimal	Optimal	Optimal
Representative Site	332901	Poor	Poor	Poor	Marginal	Suboptimal	Marginal	Suboptimal	Optimal	Optimal	Optimal
Sewell											
Representative Site	403901	Suboptimal	Marginal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal
Representative Site	406901	Poor	Poor	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Suboptimal	Optimal
Representative Site	407901	Marginal	Marginal	Suboptimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Representative Site	411901	Marginal	Marginal	Optimal	Optimal	Suboptimal	Suboptimal	Optimal	Optimal	Marginal	Optimal
Cypress											
Representative Site	503901	Poor	Poor	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	508903	Suboptimal	Suboptimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	509902	Poor	Poor	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal	Optimal
Representative Site	510901	Poor	Poor	Optimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Suboptimal
Representative Site	515901	Marginal	Marginal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	518901	Marginal	Poor	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal

Representative Sites A- Upper Chester River

Problem	Site Nimber	Macro Substrata	Embeddedness	Shelter for Fish	Channel Alteration	Sediment Deposition	Velocity/Depth	Channel Flow	Bank Vegetation	Bank Condition	Riparian Vegetation
Mills											
Representative Site	609903	Suboptimal	Optimal	Marginal	Optimal	Marginal	Suboptimal	Suboptimal	Optimal	Marginal	Optimal
Representative Site	610901	Suboptimal	Optimal	Suboptimal	Optimal	Optimal	Marginal	Optimal	Optimal	Optimal	Optimal
Representative Site	614901	Suboptimal	Optimal	Optimal	Optimal	Marginal	Suboptimal	Marginal	Suboptimal	Marginal	Optimal
Representative Site	620901	Optimal	Optimal	Suboptimal	Optimal	p	Optimal	Suboptimal	Suboptimal	Marginal	Optimal
Representative Site	622903	Optimal	Optimal	Suboptimal	Optimal	Marginal	Optimal	Suboptimal	Suboptimal	Marginal	Optimal
Representative Site	622906	Suboptimal	Suboptimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Spry											
Representative Site	705901	Poor	Poor	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Representative Site	708901	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal	Poor	Poor
Representative Site	713904	Poor	Poor	Optimal	Optimal	Optimal	Suboptimal	Optimal	Optimal	Optimal	Optimal
Pearl											
Representative Site	904906	Poor	Marginal	Suboptimal	Optimal	Suboptimal	Optimal	Suboptimal	Suboptimal	Marginal	Marginal
Representative Site	909901	Marginal	Optimal	Marginal	Optimal	Suboptimal	Marginal	Optimal	Optimal	Optimal	Marginal

Representative Sites B- Upper Chester River

Problem	Site Nimber	Riffle Wetted Width (in)3	Riffle Thalweg Depth (in)3	Run Wetted Width (in)2	Run Thalweg Depth (in)2	Pool Wetted Width (in)	Pool Thalweg Depth (in)	Bottom Type
Foreman								
Representative Site	008901	60	6	72	12			Sands
Representative Site	010902	24	5	36	20	48	20	Sands
Representative Site	013901	96	4	73	10	73	18	Gravel
Representative Site	017902			84	3			Gravel
Red Lion								
Representative Site	104903			72	48			Sands
Representative Site	106902			144	24			Gravel
Representative Site	111904	90	1	30	3	55	9	Gravel
Representative Site	114903	144	11	72	20	156	36	Sands
Representative Site	116903					120	48	Silts
Representative Site	122901	48	4	84	32	96	15	Gravel
Representative Site	122909			72	2			Sands
Representative Site	126904	110	4	96	24	140	40	Gravel
Representative Site	127901	48	1	72	3	72	14	Gravel
Representative Site	129901	30	.25	60	20			Gravel
Representative Site	130701	84	24	72	12	144	45	Gravel
Representative Site	136703	24	1.5	72	12	96	24	Gravel
Representative Site	141703			180	36			Sands
Representative Site	141706	60	3	96	15			Sands
Representative Site	142702	36	3	84	30			Sands
Representative Site	149901			72	24			Silts
Representative Site	152902	92	4	92	11			Sands
Representative Site	158101			144	36			Sands
Representative Site	159903			72	6			Silts
Representative Site	159905					24	6	Silts
Representative Site	166901			144	7			Silts
Representative Site	167901					96	7	Silts
Representative Site	170901	72	1	36	3	60	2	Silts
Representative Site	171101			120	24			Sands
Representative Site	173905					180	36	Sands
Representative Site	182902			50	2			Sands
Representative Site	182904	72	2	55	6			Sands
Representative Site	189903					48	11	Silts
Representative Site	193903							Sands

Representative Sites B- Upper Chester River

Problem	Site Nimber	Riffle Wetted Width (in)3	Riffle Thalweg Depth (in)3	Run Wetted Width (in)2	Run Thalweg Depth (in)2	Pool Wetted Width (in)	Pool Thalweg Depth (in)	Bottom Type
Unicorn								
Representative Site	203902	168	2	168	12	168	15	Cobble
Representative Site	203909	144	5	84	20	180	30	Gravel
Representative Site	209901	48	5	144	24	120	30	Sands
Representative Site	217901	108	8	132	18	132	24	Cobble
Representative Site	221901	84	1.5	144	1.5	84	1.5	Sands
Representative Site	231901	120	10	120	10	120	10	Sands
Representative Site	231902	60	1.5	60	1.5	60	1.5	Sands
Representative Site	234905	120	1.5	120	1.5	120	1.5	Sands
Representative Site	240901	100	30					Silts
Representative Site	246902					85	23	Silts
Andover								
Representative Site	300901	200	24	200	24	200	24	Gravel
Representative Site	303901	200	36	200	36	200	36	Gravel
Representative Site	307901	2400	36	2400	36	2400	36	Sands
Representative Site	310902	120	36	120	36	120	36	Gravel
Representative Site	311903			180	10			Sands
Representative Site	314901			144	36			Sands
Representative Site	317901			120	30			Sands
Representative Site	322901			240	36			Sands
Representative Site	326902	30	4	60	5	96	12	Sands
Representative Site	329901			144	24			
Representative Site	332901	42	1	42	1	42	1	Sands
Sewell								
Representative Site	403901	12	28	48	36	60	40	Silts
Representative Site	406901	48	3	60	9	96	11	Silts
Representative Site	407901	24	30	144	36	100	36	Silts
Representative Site	411901	240	60	240	60	240	60	Silts
Cypress								
Representative Site	503901			12	15	60	26	Silts
Representative Site	508903			144	24			Gravel
Representative Site	509902			120	48			Silts
Representative Site	510901			288	40			Silts
Representative Site	515901			144	36			Sands
Representative Site	518901	80	20	120	24	144	28	Gravel

Representative Sites B- Upper Chester River

Problem	Site Nimber	Riffle Wetted Width (in)3	Riffle Thalweg Depth (in)3	Run Wetted Width (in)2	Run Thalweg Depth (in)2	Pool Wetted Width (in)	Pool Thalweg Depth (in)	Bottom Type
Mills								
Representative Site	609903	24	3	72	10	144	18	Gravel
Representative Site	610901			84	30			Gravel
Representative Site	614901	40	6	72	10	168	22	Gravel
Representative Site	620901	48	6	84	30	120	24	Gravel
Representative Site	622903	50	3	96	5	180	14	Gravel
Representative Site	622906	48	5	60	7	100	18	
Spry								
Representative Site	705901			96	48			Clay
Representative Site	708901	96	2	48	16			Gravel
Representative Site	713904			120	36			Silts
Pearl								
Representative Site	904906			120	10			Sands
Representative Site	909901			24	2			Sands