

Stream Corridor Assessment Survey for the Prettyboy Reservoir Watershed, Carroll County, Maryland

Prepared by:

**Department of Environmental Protection and Resource Management
Watershed Monitoring and Management Section**

401 Bosley Ave.
Towson MD 21204

August 2006

This project was funded in part by a Section 319 Clean Water Act Grant from the U.S. EPA. Although this project was funded by U.S. EPA, the contents of this report do not necessarily reflect the opinion or position of the EPA.

TABLE OF CONTENTS

LIST OF FIGURES.....	3
LIST OF TABLES.....	3
INTRODUCTION.....	4
RESULTS	8
PIPE OUTFALLS.....	12
FISH MIGRATION BARRIERS.....	14
INADEQUATE BUFFERS.....	16
STREAM EROSION SITES.....	20
UNUSUAL CONDITIONS.....	22
CHANNEL ALTERATIONS.....	24
EXPOSED PIPES.....	26
TRASH DUMPS	28
REPRESENTATIVE SITES	30
DISCUSSION.....	32
REFERENCES.....	33
APPENDIX A: LISTING OF SITES BY SITE NUMBER.....	34
APPENDIX B: LISTING OF SITES BY PROBLEM CATEGORY	37

List of Figures

Figure 1: Map of Prettyboy Watershed	6
Figure 2: Map of the Carroll County SCA subwatersheds and streams walked	7
Figure 3: Histogram of potential problems by subwatershed	11
Figure 4a: Pipe Outfalls, Prettyboy Watershed (Carroll County)	12
Figure 4b: Map of Pipe Outfalls, Prettyboy Reservoir (Carroll County).....	13
Figure 5a. Fish Migration Barriers, Prettyboy Watershed (Carroll County)	14
Figure 5b: Map of Fish Migration Barriers, Prettyboy Watershed (Carroll County).....	15
Figure 6a. Inadequate Buffers, Prettyboy Watershed (Carroll County).....	16
Figure 6b: Map of Inadequate Buffers, Prettyboy Watershed (Carroll County).....	17
Figure 7a. Stream Erosion Sites, Prettyboy Watershed (Carroll County).....	20
Figure 7b: Map of Stream Erosion Sites, Prettyboy Watershed (Carroll County).....	21
Figure 8a: Unusual Conditions, Prettyboy Watershed (Carroll County).....	22
Figure 8b. Map of Unusual Conditions, Prettyboy Watershed (Carroll County).....	23
Figure 9a: Channel Alteration Sites, Prettyboy Watershed (Carroll County).....	24
Figure 9b: Map of Channel Alteration Sites, Prettyboy Watershed (Carroll County).....	25
Figure 10: Map of Exposed Pipes, Prettyboy Watershed (Carroll County).....	27
Figure 11: Map of Trash Dumps, Prettyboy Watershed (Carroll County).....	29
Figure 12: Map of Representative Sites, Prettyboy Watershed (Carroll County).....	31

List of Tables

Table 1. Total stream miles and stream miles surveyed, by sub-watershed.....	8
Table 2. Summary of results from the Prettyboy Reservoir SCA Survey, Carroll County.....	9
Table 3. Summary of results by subwatershed.	10
Table 4. Ranked Very Severe and Severe Potential Problems, Prettyboy Reservoir Watershed, Carroll County.	18

INTRODUCTION

In 1998, the Maryland Clean Water Action Plan identified the Prettyboy Reservoir 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 Environment (MDE) and Baltimore County formed a partnership to develop a Watershed Restoration Action Strategy (WRAS) for the Prettyboy Reservoir watershed. This Stream Corridor Assessment (SCA) survey is part of the WRAS development process.

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

The Prettyboy Reservoir watershed lies in north-central Maryland and southern Pennsylvania, in York (PA), Baltimore (MD), and Carroll (MD) counties (Figure 1). The Prettyboy Reservoir watershed is the second largest and the most remote of the three Baltimore area reservoir watersheds. Prettyboy Reservoir watershed extends about 7 miles from east to west and about 10 miles from north to south. The drainage area extends from the southern reaches of York County, PA and the northeastern corner of Carroll County, MD into the northwestern corner of Baltimore County where it drains into the Prettyboy Reservoir. The municipalities of Hampstead and Manchester make up the western edge of the watershed. Of Maryland's portion of the Prettyboy Reservoir watershed, about 19,500 acres or 45% is located in Carroll County.

SCA surveys in the Prettyboy Watershed were completed in two steps. First, the MDE completed the SCA for the Baltimore County portion of the watershed in 2005 and observed 162 potential problems along the 85 miles of stream corridor they walked (Pellicano, 2006). Secondly, Baltimore County Department of Environmental Protection and Resource Management (DEPRM) carried out the SCA for the Carroll County portion of the watershed in 2006. This report summarizes the second step, the SCA in Carroll County.

In order to ensure consistency with standard SCA protocols (Yetman, 2001), DEPRM staff received a two-day office and field training in SCA goals and methods from MDE. Stream Corridor Assessment (SCA) surveys were carried out in the Carroll County portion of the Prettyboy watershed by Baltimore County DEPRM staff from February to May, 2006. Due to time and personnel constraints, a subset of all available streams was selected for the surveys. The Georges Run and Grave Run 12 digit watersheds were chosen because they effectively represented land use conditions in many parts of the Prettyboy Watershed. These two watersheds were further broken down into four subwatersheds: Indian Run, Grave Run, Georges Run, and Murphy Run (Figure 2). Within this area, field crews were given permission for and walked approximately 18 miles of stream corridor, or 44% of the stream network. Table 1 shows the breakdown of total stream miles and stream miles surveyed for each subwatershed. The

Carroll County portion of the Prettyboy Watershed contains a total of 100 miles of mapped streams.

The Carroll County Stream Corridor Assessment Survey identified 184 potential environmental problems within the 18.3 miles of stream corridor surveyed (Tables 2 and 3). At the time of the survey, the most frequently observed potential problem sites were pipe outfalls, reported at 64 sites. Other potential environmental problems recorded during the survey included: 33 fish barriers, 31 inadequate buffers, 20 erosion sites, 18 unusual conditions, 10 channel alterations, 5 exposed pipes, and 4 trash dumping sites. Because some potential problems are cumulative (e.g. inadequate buffer), the number of sites is only one possible measure of the overall extent of the problem. The severity and spatial extent of potential problems can also be used. Crews also recorded descriptive habitat condition data at 27 representative sites and filled out data sheets for 2 sites that warranted additional comments.

The SCA report for the Baltimore County portion of the Prettyboy Reservoir Watershed contains details on the methodology of the SCA, including the formulation of goals, the training of field crews, the overall ranking system, and the data analysis and presentation. This report and information on the Prettyboy Reservoir Watershed Action Strategy can be found on the Department of Natural Resources' website (www.dnr.maryland.gov/watersheds/wras).

Figure 1. Map of Prettyboy Watershed

Prettyboy Reservoir Watershed and Sub-Watersheds

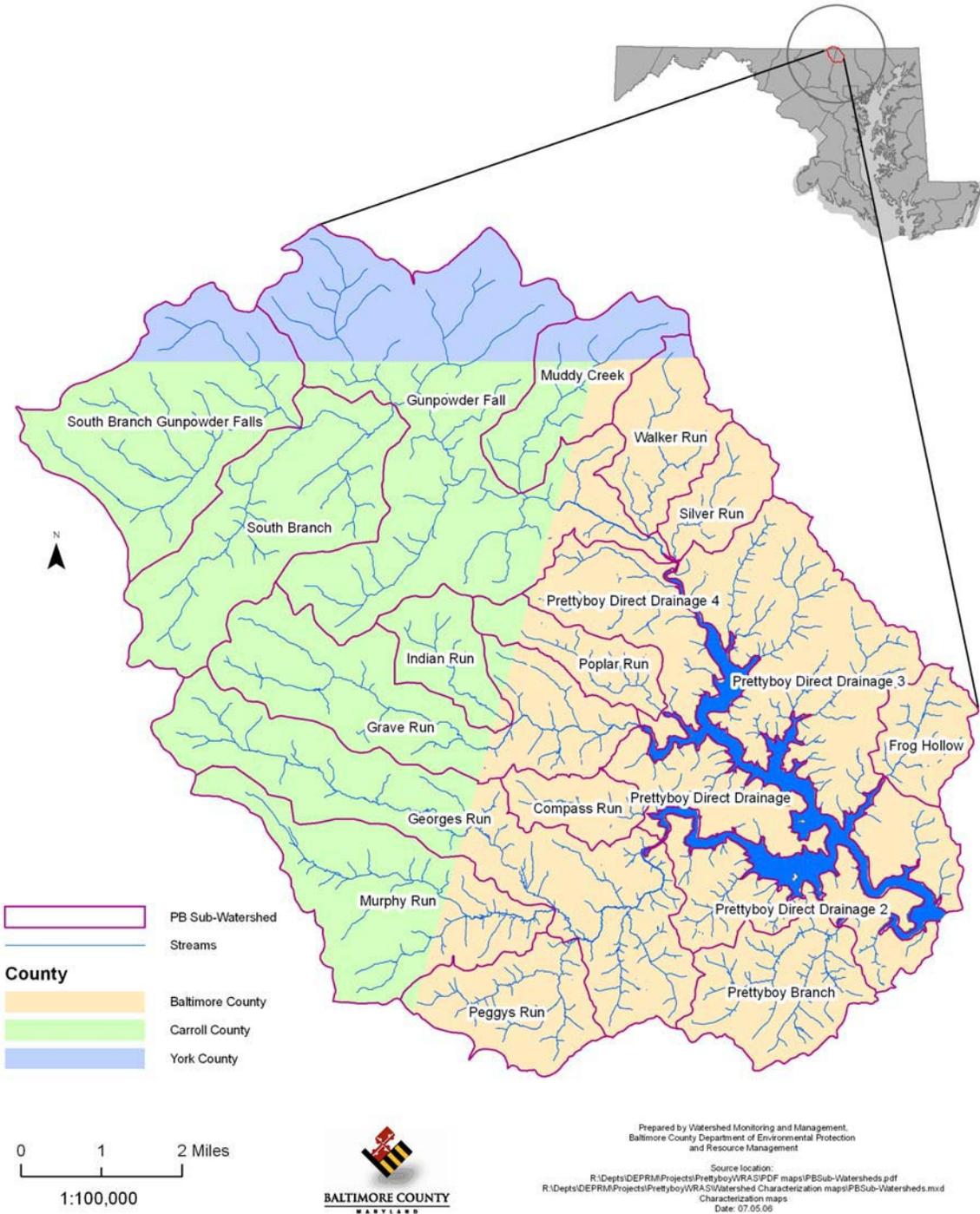
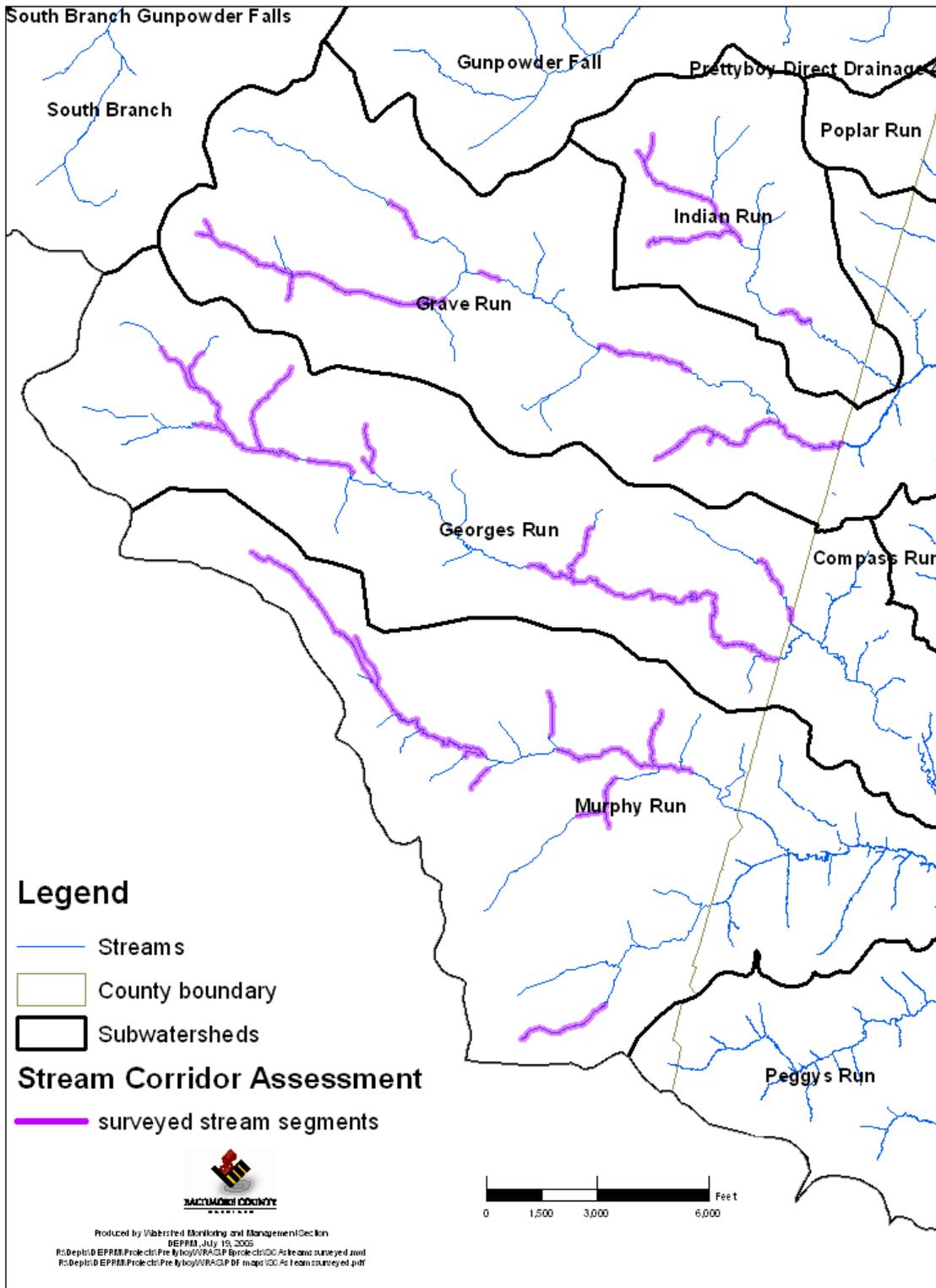


Figure 2. Map of the Carroll County SCA subwatersheds and streams walked



RESULTS

The Carroll County Stream Corridor Assessment crew surveyed 18.3 miles of streams in the four sub-watersheds (Table 1). They identified 184 potential environmental problems (Tables 2 and 3). At the time of the survey, the most frequently observed potential problem sites were pipe outfalls, reported at 64 sites. Other potential environmental problems recorded during the survey included: 33 fish barriers, 31 inadequate buffers, 20 erosion sites, 18 unusual conditions, 10 channel alterations, 5 exposed pipes, and 4 trash dumping sites. Additionally, crews recorded descriptive habitat condition data at 27 representative sites and commented on 2 further sites.

Table 1. Total stream miles and stream miles surveyed, by sub-watershed

Sub-watershed	Total stream miles	Miles surveyed	Percentage
George's Run	12.7	6.1	48
Grave Run	11.1	4.6	41
Indian Run	6.1	2.4	39
Murphy Run	11.5	5.2	45
Total	41.4	18.3	44

Table 2 presents a summary of survey results by problem type and Table 3 and Figure 3 are summaries by subwatershed. Appendices A and B list the data collected during the survey. Appendix A provides a listing of information by site number and location, referenced by both tributary name and the X, Y coordinates using Maryland State Plane 83 feet. Information in this format is useful to determine what problems are present along a specific stream reach. In Appendix B, the data are presented by problem type and lists the collected descriptive data. Presenting the data by problem type allows the reader to see which problems are rated as most severe or easiest to correct within each category. Result categories are discussed further in order of those with the greatest number of sites to those with the least. As mentioned earlier, the number of potential problem sites is not the only measure of the overall extent of the problem, but is used here to order the data.

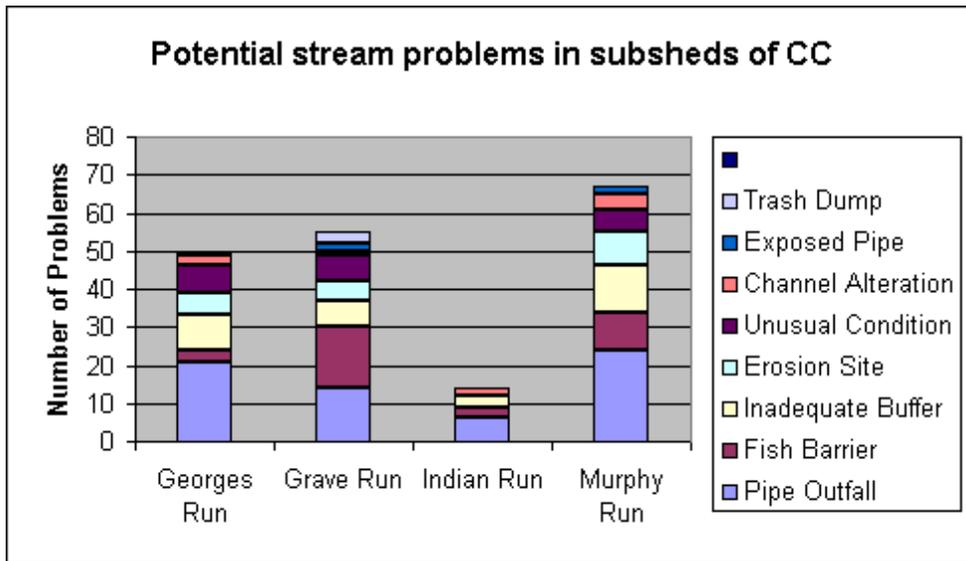
Table 2. Summary of results from the Prettyboy Reservoir SCA Survey, Carroll County

Potential Problems Identified	Number	Estimated Length	Very Severe	Severe	Moderate	Low Severity	Minor
Pipe Outfall	64		0	2	26	24	12
Fish Barrier	32		0	3	6	17	6
Inadequate Buffer	31	41,727 ft (7.9 miles)	2	11	9	6	3
Erosion	20	16,922 ft (3.2 miles)	0	2	9	6	3
Unusual Condition	18		0	5	3	8	2
Channel Alteration	10	10,283 ft (1.9 miles)	0	1	6	3	0
Exposed Pipe	5		0	1	1	2	1
Trash Dumping	4		0	1	1	1	1
Construction	0						
Total	184		2	26	61	67	29
Comments	2						
Representative Sites	27						

Table 3. Summary of potential problems by subwatershed

Point Features	Georges Run		Grave Run		Indian Run		Murphy Run		Total	
	Number of Problems	Problems per mile surveyed	Number of Problems	Problems per mile surveyed	Number of Problems	Problems per mile surveyed	Number of Problems	Problems per mile surveyed	Number of Problems	Problems per mile surveyed
Pipe Outfall	21	3.4	13	2.8	6	2.5	24	4.6	64	3.5
Fish Barrier	3	0.5	16	3.5	3	1.3	10	1.9	32	1.8
Inadequate Buffer	9	1.5	7	1.5	3	1.3	12	2.3	31	1.7
Erosion Site	6	1.0	5	1.1	0	0	9	1.7	20	1.1
Unusual Condition	7	1.2	6	1.3	0	0	5	1.0	18	1.0
Channel Alteration	3	0.5	1	0.2	2	0.8	4	0.8	10	0.5
Exposed Pipe	0	0	3	0.7	0	0	2	0.4	4	0.2
Trash Dump	1	.2	3	0.7	0	0	0	0	4	0.2
Total	50	8.2	54	11.7	14	5.8	66	12.7	184	10.0
Representative Site	9	1.5	8	1.7	3	1.3	7	1.3	27	1.5
Linear Features	Length of Feature	Length per mile surveyed	Length of Feature	Length per mile surveyed	Length of Feature	Length per mile surveyed	Length of Feature	Length per mile surveyed	Length of Feature	Length per mile surveyed
Inadequate Buffer	9657 ft (1.8 miles)	1583 ft	7722' (1.5)	1679'	2747' (0.5)	1145'	19,823 ft (3.8)	3812'	41,727	2280'
Erosion Site	3283' (0.6)	538'	5764' (1.1)	1253'	0	0	7880' (1.5)	1515'	16922	925'
Channel Alteration	2365' (0.5)	388'	2453' (0.5)	533'	1495' (0.3)	623	3971' (0.8)	764'	10283	562'

Figure 3. Histogram of potential problems by subwatershed



Pipe Outfalls

Survey crews identified 64 pipe outfalls. The severity distribution of these outfalls is shown in Figure 4a. Figure 4b shows the location and severity of representative pipe outfall sites. The labels on this and all subsequent maps refer to the unique site number assigned to each potential problem. 50 of the pipe outfalls had a clear discharge, one had a colored discharge, and 13 had no discharge. A pipe outfall warrants a very severe rating when it has a strong discharge and a distinct color or odor, and a minor rating when it is a storm water outfall with no dry weather discharge. Most of the observed pipe outfalls in Carroll County serve as outlets for systems draining agricultural land. Many of these would not be considered potential problems, especially by farmers who installed them as part of the solution to drainage problems in their fields. Therefore, while the number of pipe outfalls in the Carroll County SCA is the greatest of any potential problem type, many of these outfalls are relatively minor or not problems at all. However, they may indicate areas of potential wetland restoration.

Figure 4a. Pipe Outfalls, Prettyboy Watershed (Carroll County)

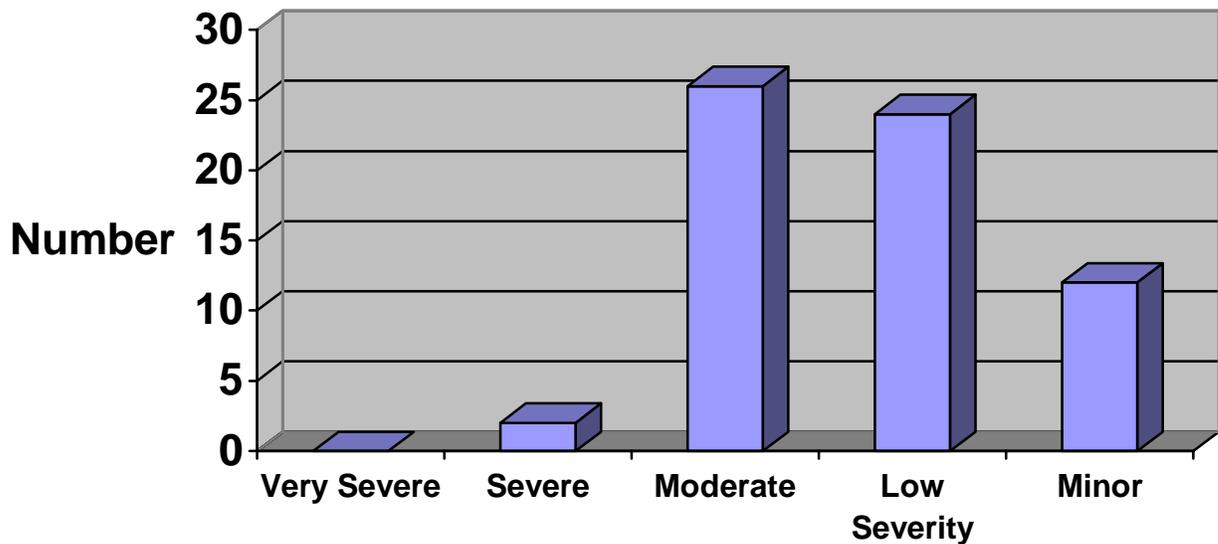
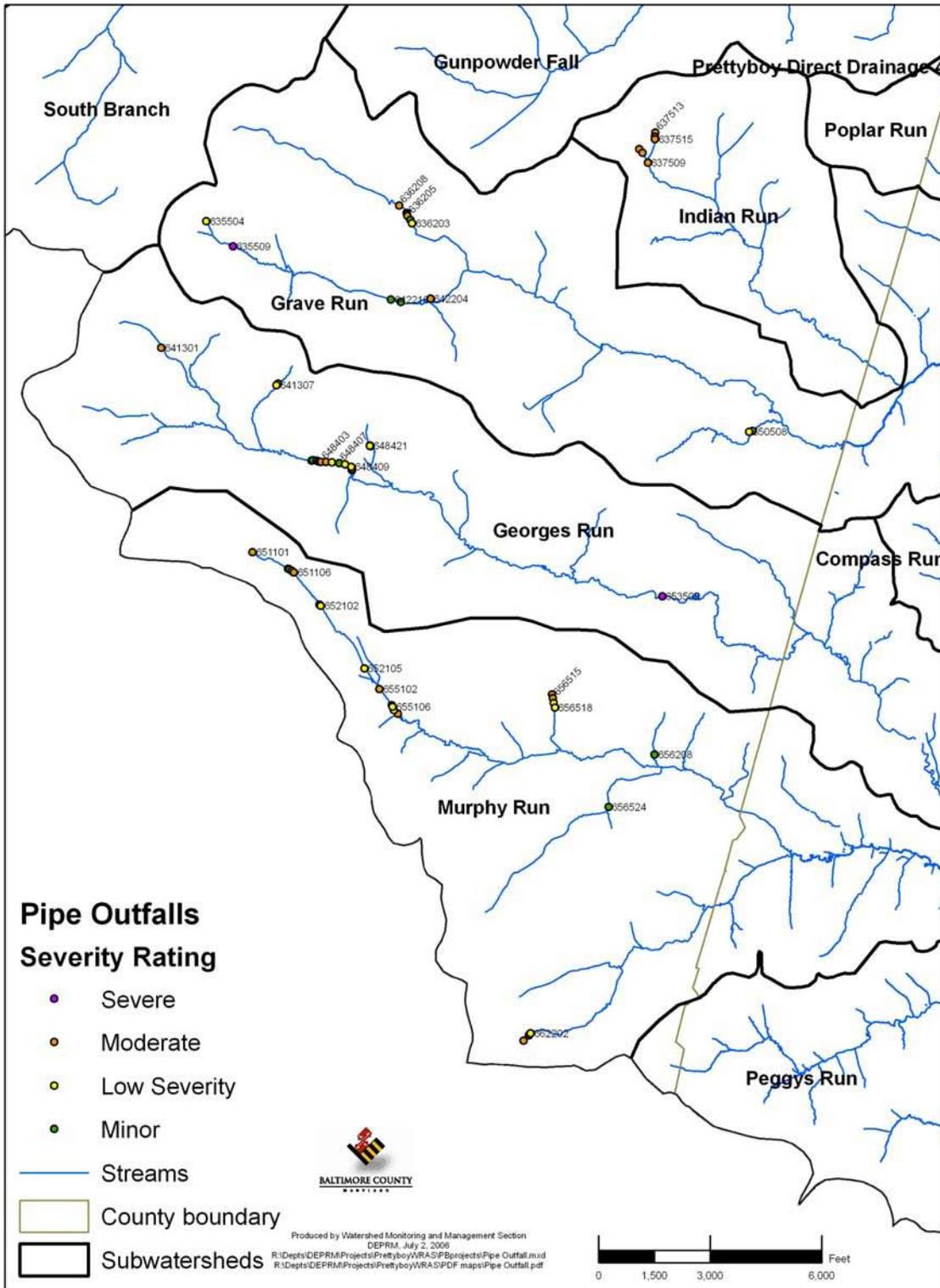


Figure 4b. Map of Pipe Outfalls, Prettyboy Watershed (Carroll County)



Fish Migration Barriers

The Carroll County SCA team identified 32 barriers to fish migration. Figure 5a shows the severity distribution of these barriers, and figure 5b shows their location and severity. About half these barriers are caused by road crossing culverts that result in water that is too shallow or drops that are too high for fish to pass. Other causes include man-made dams, natural falls, and beaver dams. A fish barrier is rated very severe when it is a structure that totally blocks a large stream or river, and is considered minor when it is a temporary barrier that blocks very little in-stream habitat. Most observed fish barriers were minor or low severity problems, with none ranking as very severe, and only 3 as severe.

Figure 5a. Fish Barriers, Prettyboy Watershed (Carroll County)

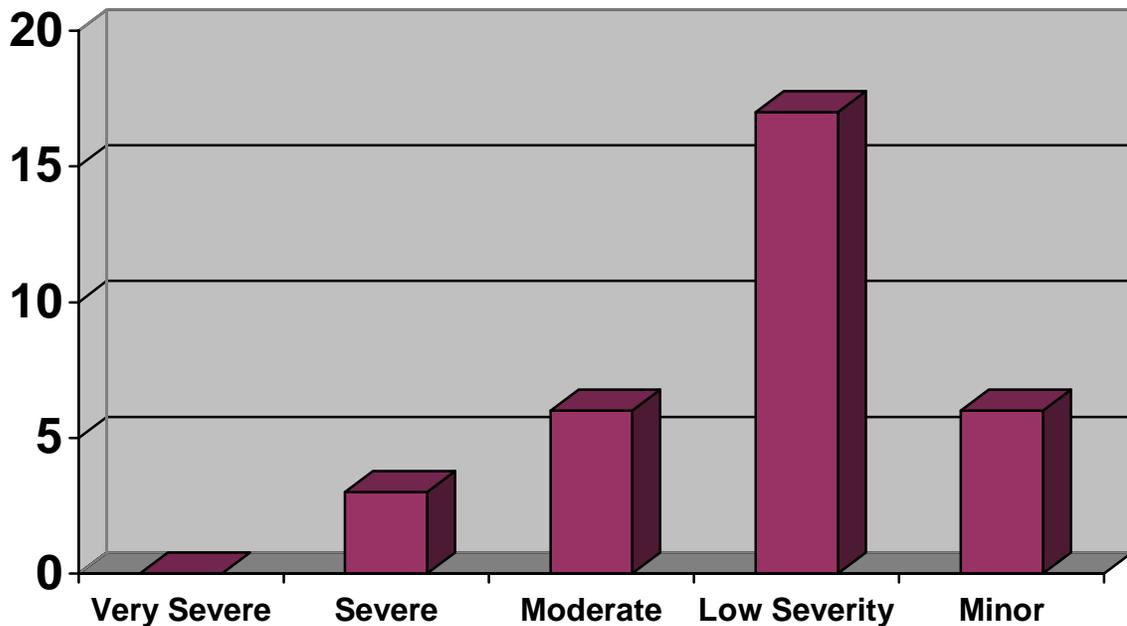
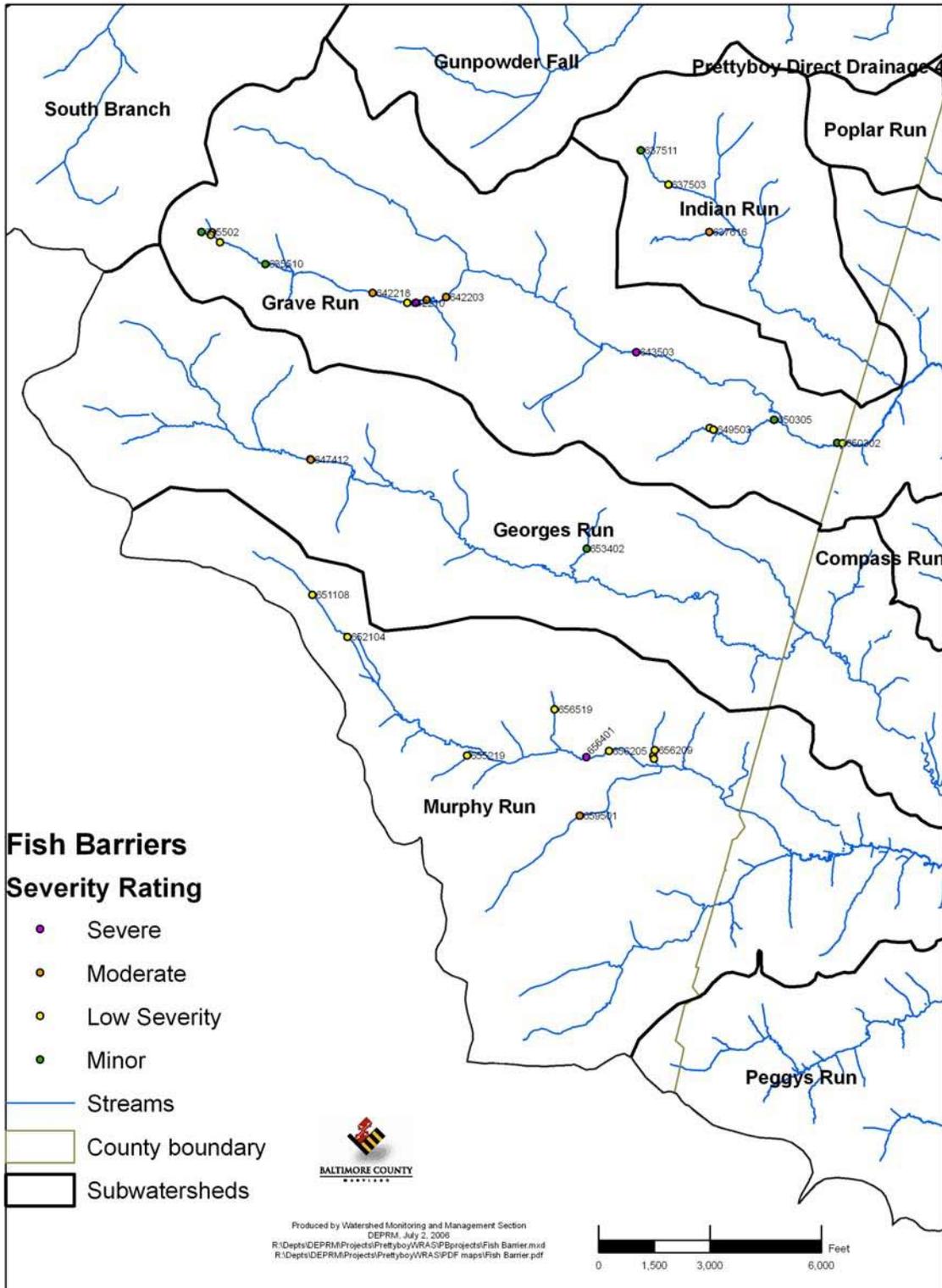


Figure 5b. Map of Fish Barriers, Prettyboy Watershed (Carroll County)



Inadequate Buffers

The Carroll County survey teams identified 31 inadequate buffers in the study area, with a total length of 41,727 ft (7.9 miles). This accounted for approximately 43% of the 18.3 miles surveyed. The severity distribution of these inadequate buffers is shown in Figure 6a, and their location and severity are shown in Figure 6b. While there is no single minimum standard for how wide a stream buffer should be in Maryland, for the purposes of this study a forest buffer is considered inadequate if it is less than 50 feet wide, measured from the edge of the stream. The severity of inadequate forest buffers is based on both the length and width of the site. Those sites over 1,000 feet long with no forest on either side of the stream rank as the most severe. 24 of the 31 sites had inadequate buffers on both sides of the stream, while the other 7 were forested on one side. 10 of the inadequate buffer sites had livestock present, primarily cattle or horses. Livestock in riparian areas are associated with elevated inputs of nutrients and sediment in the associated streams. Land use in the buffers was approximately evenly distributed between crop fields, lawns, pasture, and shrubs and small trees.

Because the inadequate buffer measure is cumulative along the stream segment, the number of inadequate buffers observed is not necessarily the best indication of the level of the problem. One alternative is to examine the most severe potential problems. A ranked order of very severe and severe potential problems (Table 4) shows 13 inadequate buffers in these categories, more than double the next potential problem. The only 2 very severe potential problems that the survey identified were inadequate buffers. As observed above, almost half of all streams surveyed (43%) had inadequate buffers; the comparable figure for the Baltimore County SCA was 32%.

Figure 6a. Inadequate Buffers, Prettyboy Watershed (Carroll County)

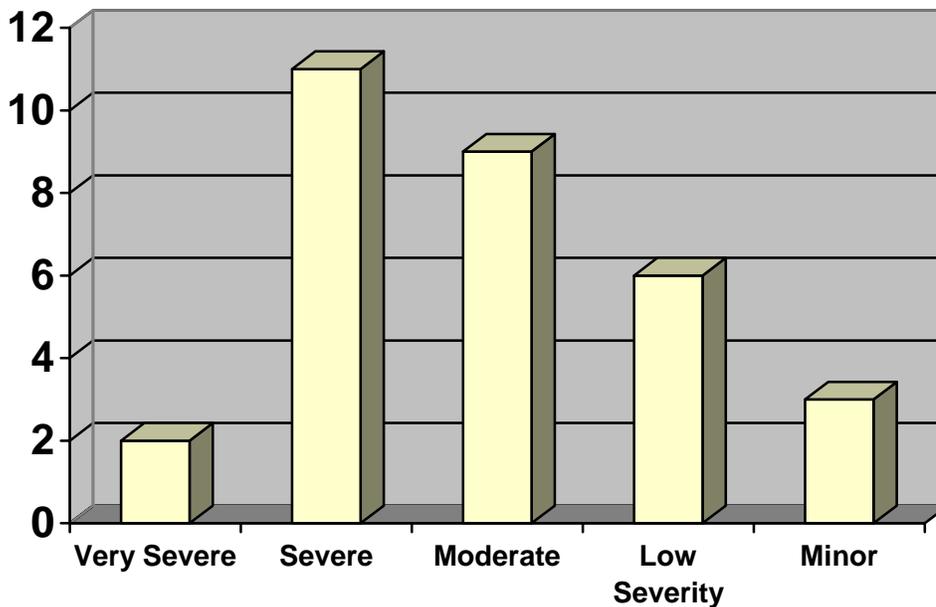


Figure 6b. Map of Inadequate Buffers, Prettyboy Watershed (Carroll County)

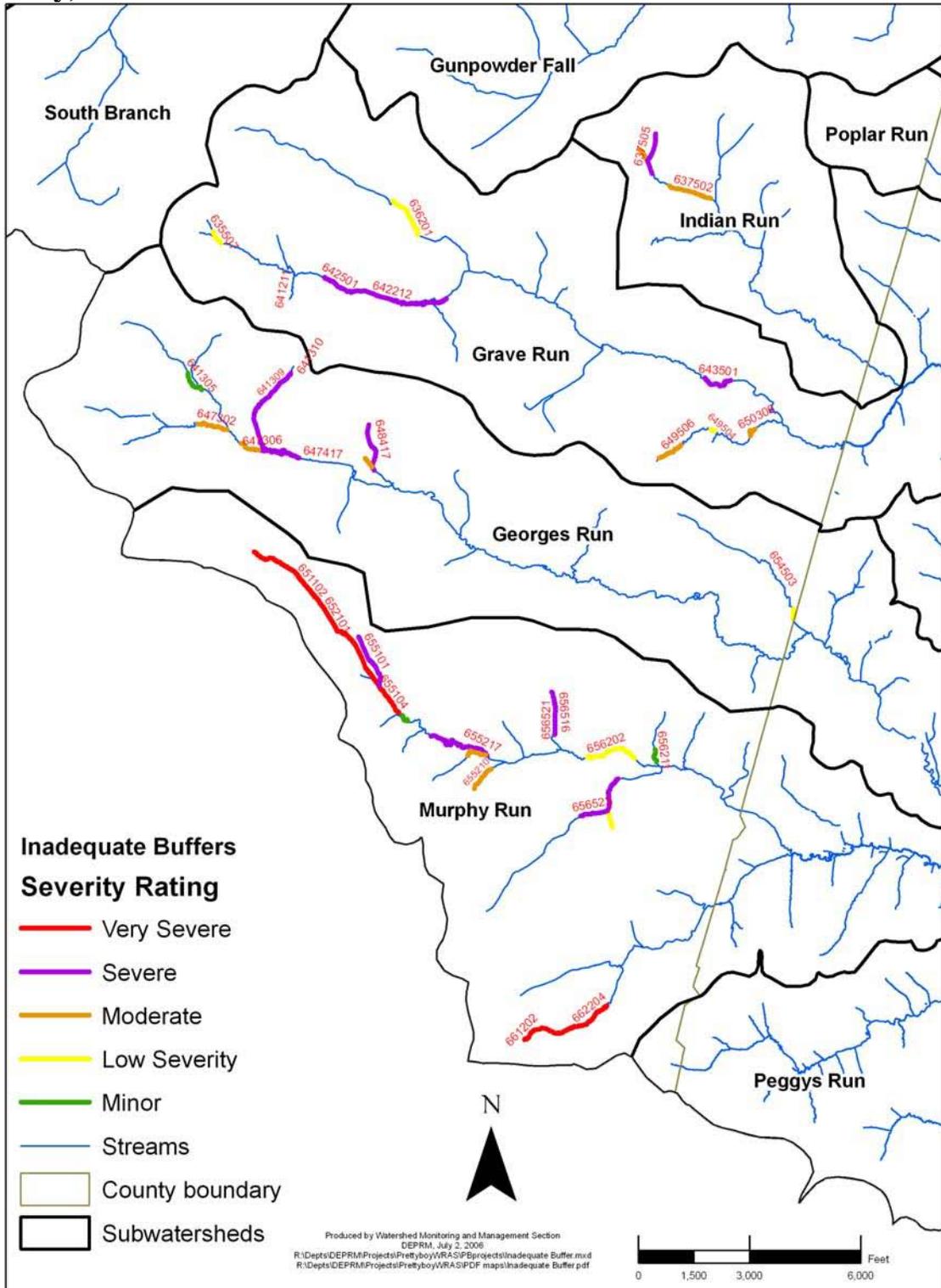


Table 4. Ranked Very Severe and Severe Potential Problems, Prettyboy Reservoir Watershed, Carroll County

Potential Problems Identified	Number	Very Severe	Severe
Inadequate Buffer	13	2	11
Unusual Condition	5	0	5
Fish Barrier	3	0	3
Erosion	2	0	2
Pipe Outfall	2	0	2
Channel Alteration	1	0	1
Exposed Pipe	1	0	1
Trash Dumping	1	0	1

Page left intentionally blank

Stream Erosion Sites

The Carroll County survey teams reported 20 eroding stream banks that totaled 16,922 feet or 3.2 miles (17% of the 18.3 miles surveyed). Figure 7a shows the severity distribution of these sites, and Figure 7b shows their location and severity. In this survey, unstable eroding streams are defined as areas where the stream banks are almost vertical, and the vegetative roots along the stream are unable to hold the soil onto the banks. The severity rating of the site is based on the length and height of the eroding streambank. An erosion site was rated as very severe if it was a long section of stream (>1000 ft.) with unstable banks on both sides; a site was ranked as minor if it was a short section of stream (<300 ft.) with limited bank instability. While survey teams are asked to visually assess whether the stream was down cutting, widening, or headcutting at a specific site, the only way to evaluate the full significance of the erosion processes at a specific site is to do more detailed monitoring over time.

Figure 7a. Erosion sites, Prettyboy Watershed (Carroll County)

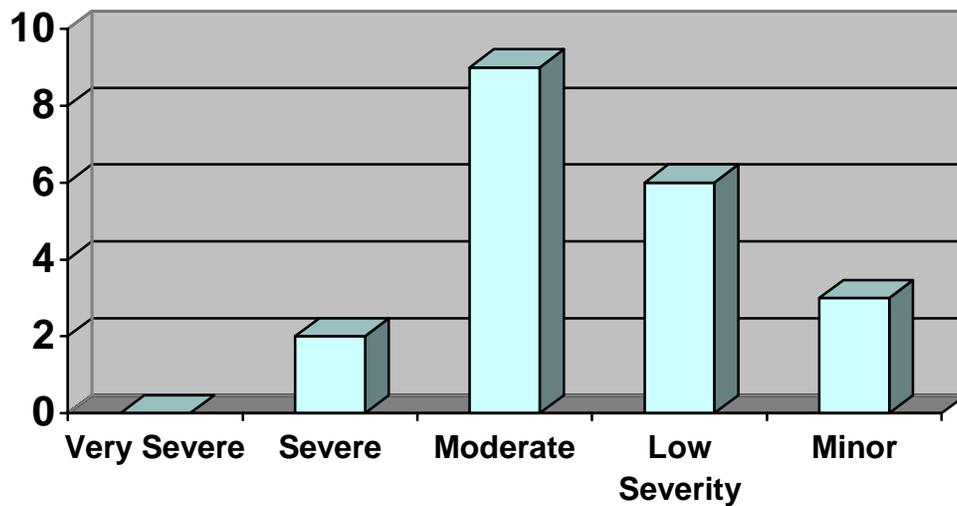
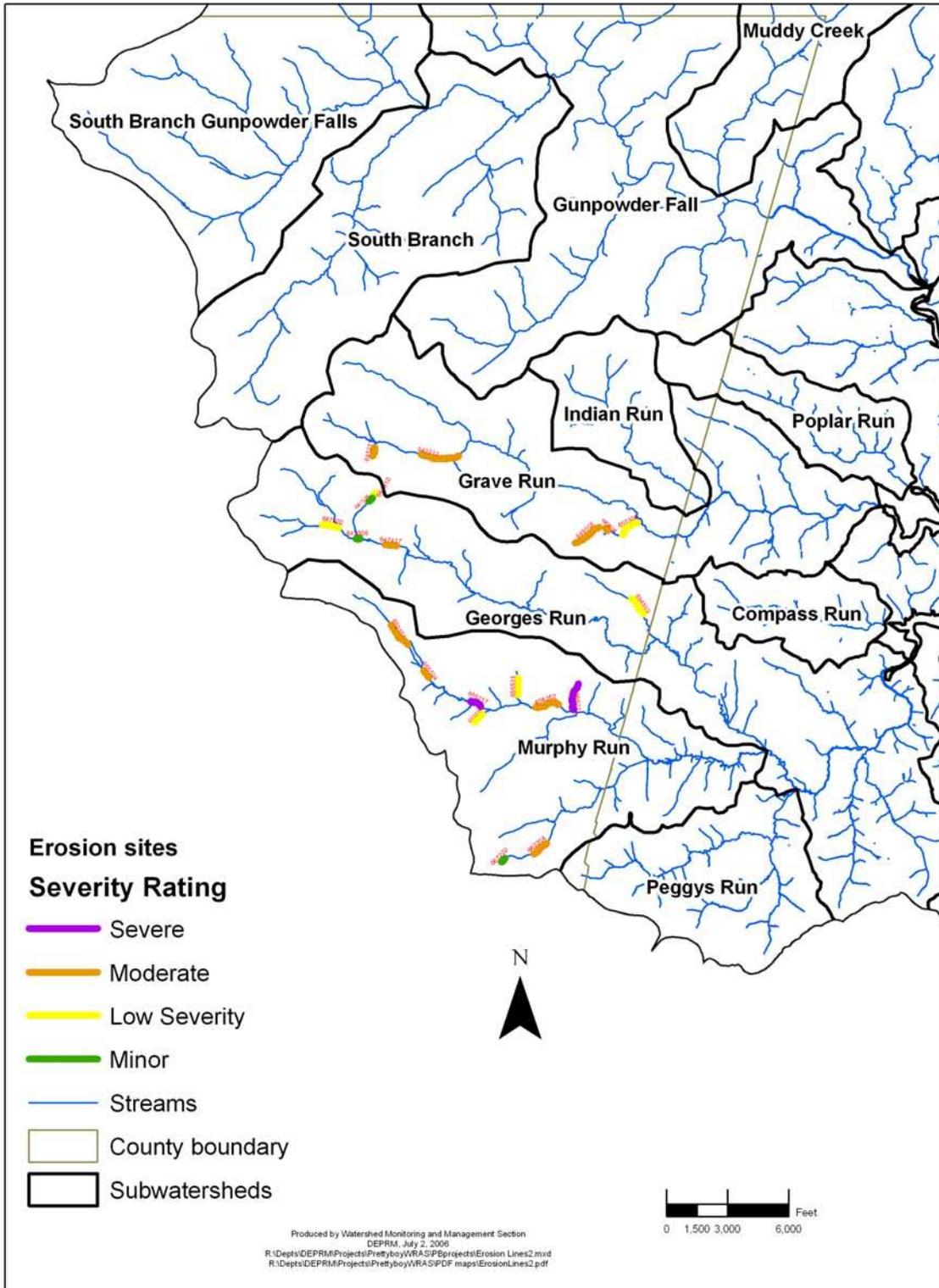


Figure 7b. Map of Erosion sites, Prettyboy Watershed (Carroll County)



Unusual Conditions and Comments

The Carroll County SCA teams documented a total of 18 unusual conditions and filled out comment sheets on a further 2 sites. The most common unusual conditions were excessive algae, reported at 8 sites, and excessive sediment, reported at 5 sites. Figure 8a shows the severity distribution of the unusual condition sites, and Figure 8b shows their location and severity. An unusual condition site was ranked as very severe if the survey crew judged that the potential problem would have a direct and wide-reaching impact on the stream's aquatic resources, and was among the worst that field teams would expect to observe. A site was ranked of minor severity if it was a potential problem that did not appear to have a significant impact on aquatic resources. 5 sites were ranked as being severe.

Field crews also assessed the possible causes for the unusual conditions. In some cases, the causes were apparent. For example, at several stream segments with excessive sediment, all-terrain vehicle (ATV) tracks were observed alongside the streams. Several sites with excessive algae were located downstream from wastewater treatment plants that could be discharging elevated nutrient levels into the stream. In other cases, the causes of the observed unusual condition were not apparent; such sites warrant further investigation.

Figure 8a. Unusual conditions, Prettyboy Watershed (Carroll County)

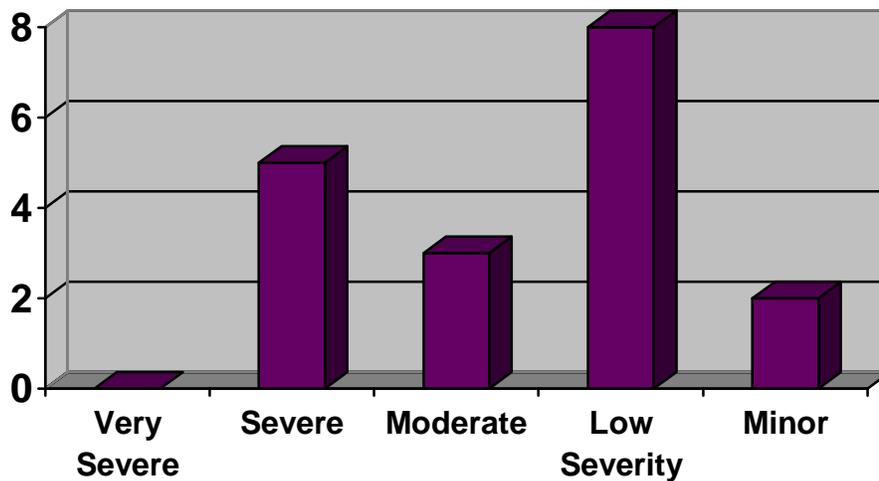
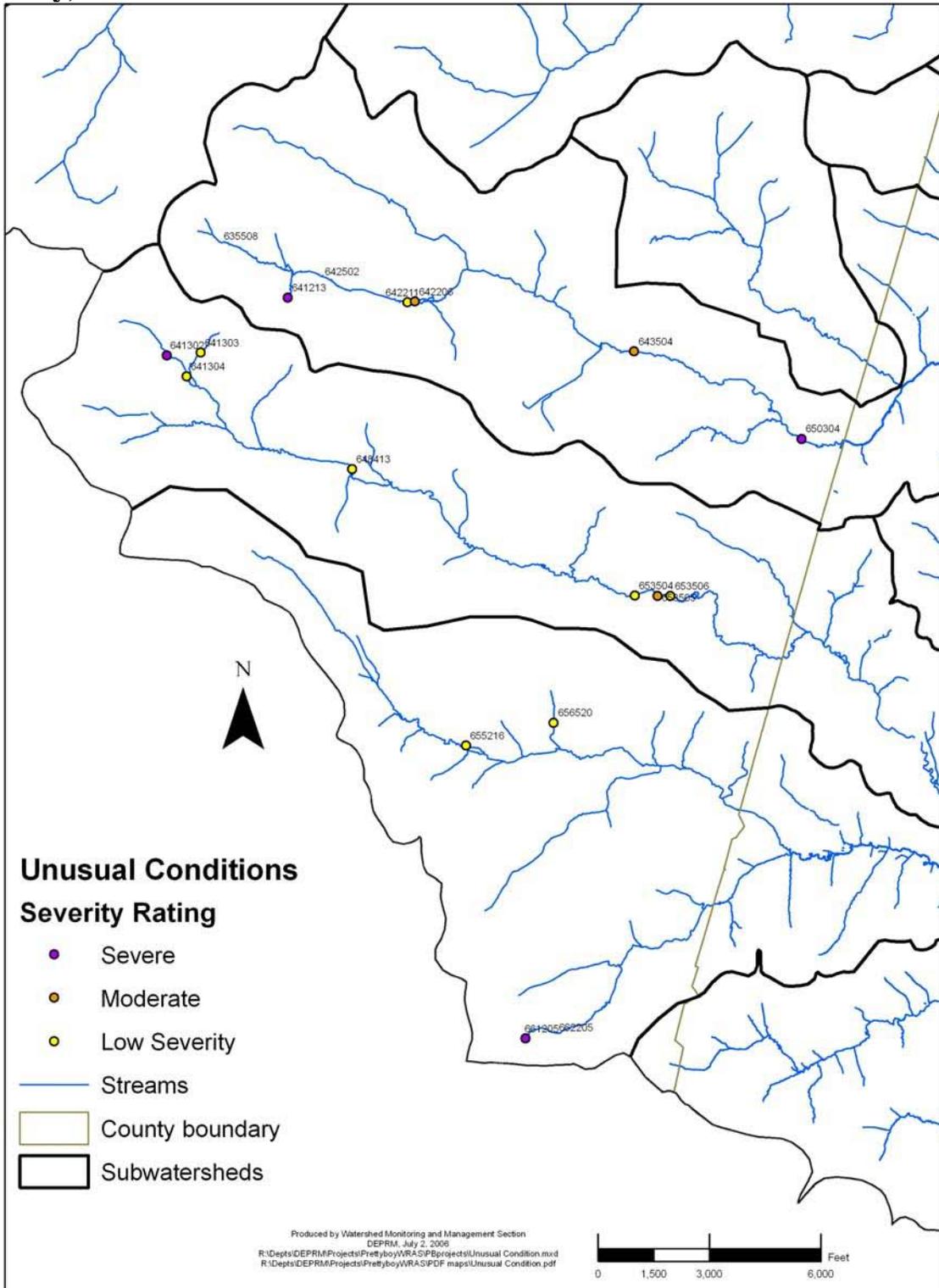


Figure 8b. Map of Unusual conditions, Prettyboy Watershed (Carroll County)



Channel Alterations

Channel alterations are sections where the stream's banks or channel are significantly altered from their naturally occurring structure or condition. The SCA survey teams reported 10 channel alteration sites in the Carroll County portion of the survey. The total length of these channel alterations was 10,283 feet or 1.9 miles. Figure 9a shows the severity distribution of these alterations, and Figure 9b shows their location and severity. A channel alteration is rated very severe when a significant length (>1000 ft.) of stream has been lined with concrete, and minor if it is an earthen channel less than 100 feet long.

Figure 9a. Channel Alterations, Prettyboy Watershed (Carroll County)

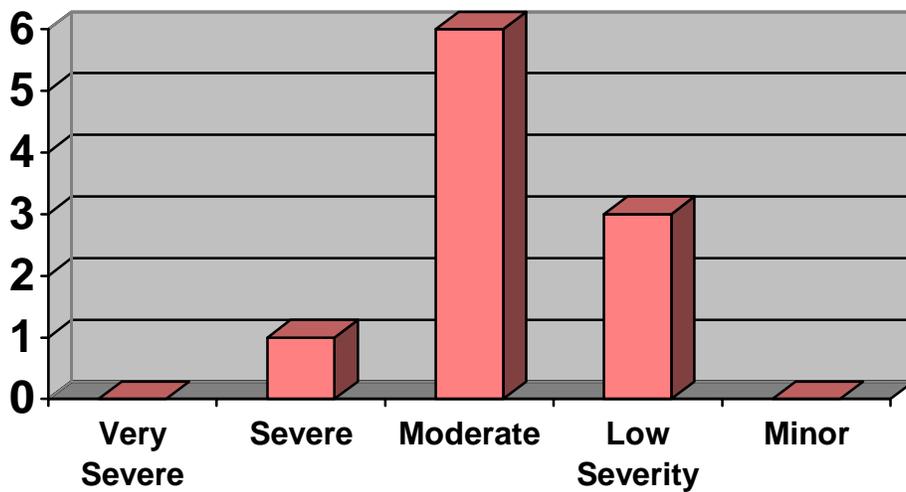
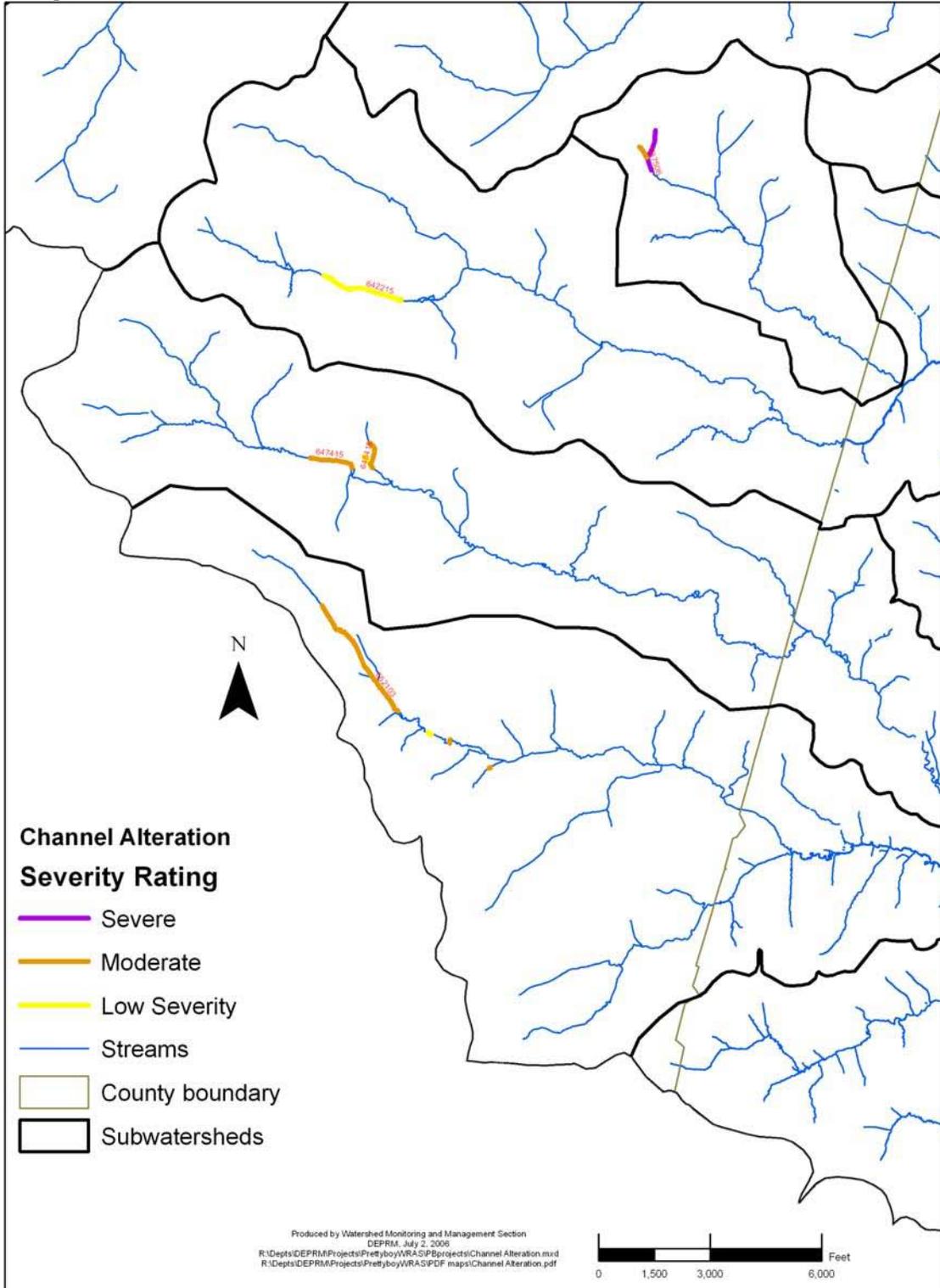


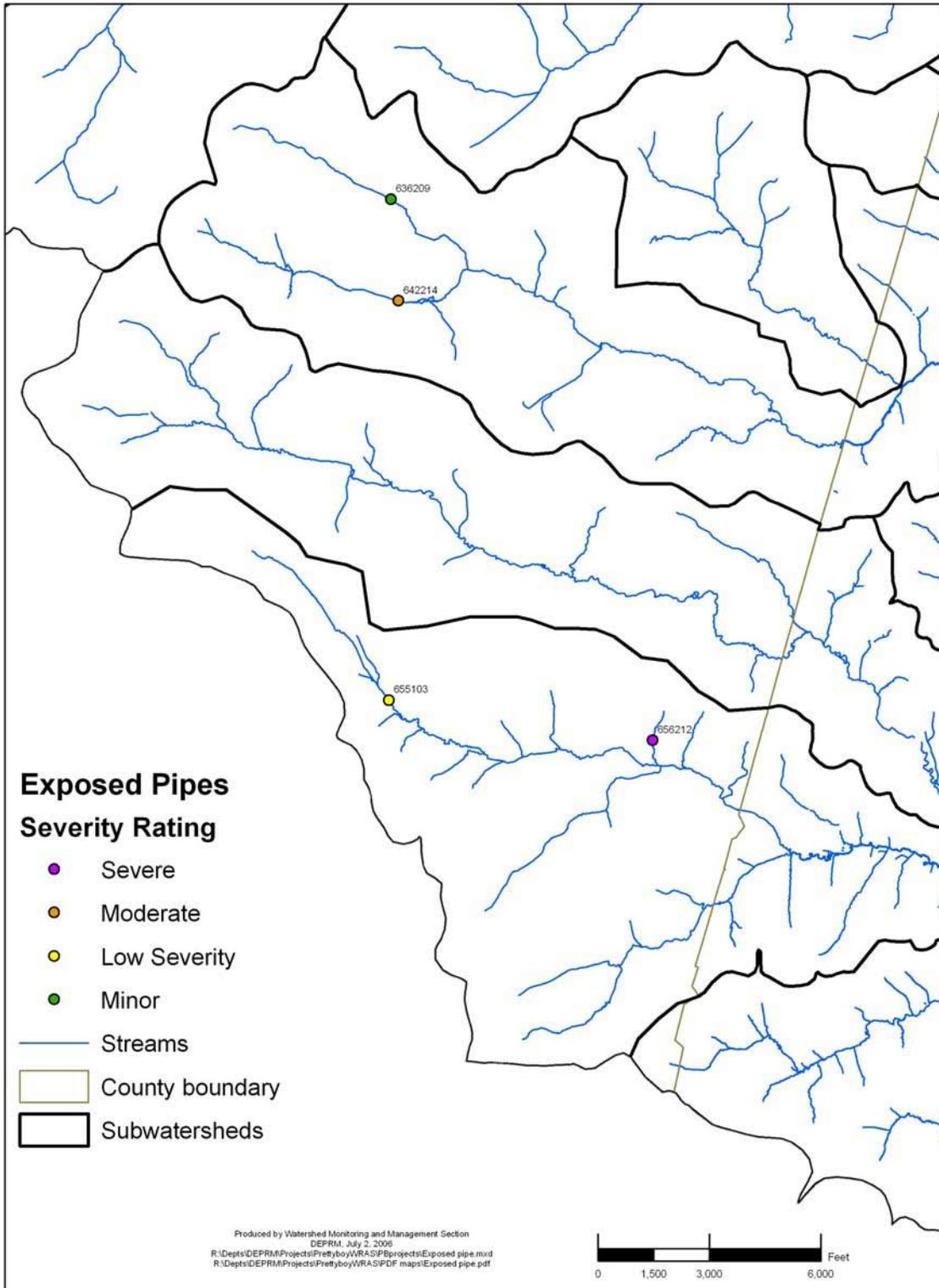
Figure 9b. Map of Channel Alterations, Prettyboy Watershed (Carroll County)



Exposed pipes

The Carroll County SCA survey teams identified 5 exposed pipes, and rated 2 of these as being of low severity, and one each as severe, moderate, and minor. None of the exposed pipes had an apparent discharge. Figure 10 shows the location and severity of the exposed pipes. An exposed pipe is rated very severe when it is significantly discharging into the stream, and is considered minor when it is a small partially exposed stable pipe with no discharge.

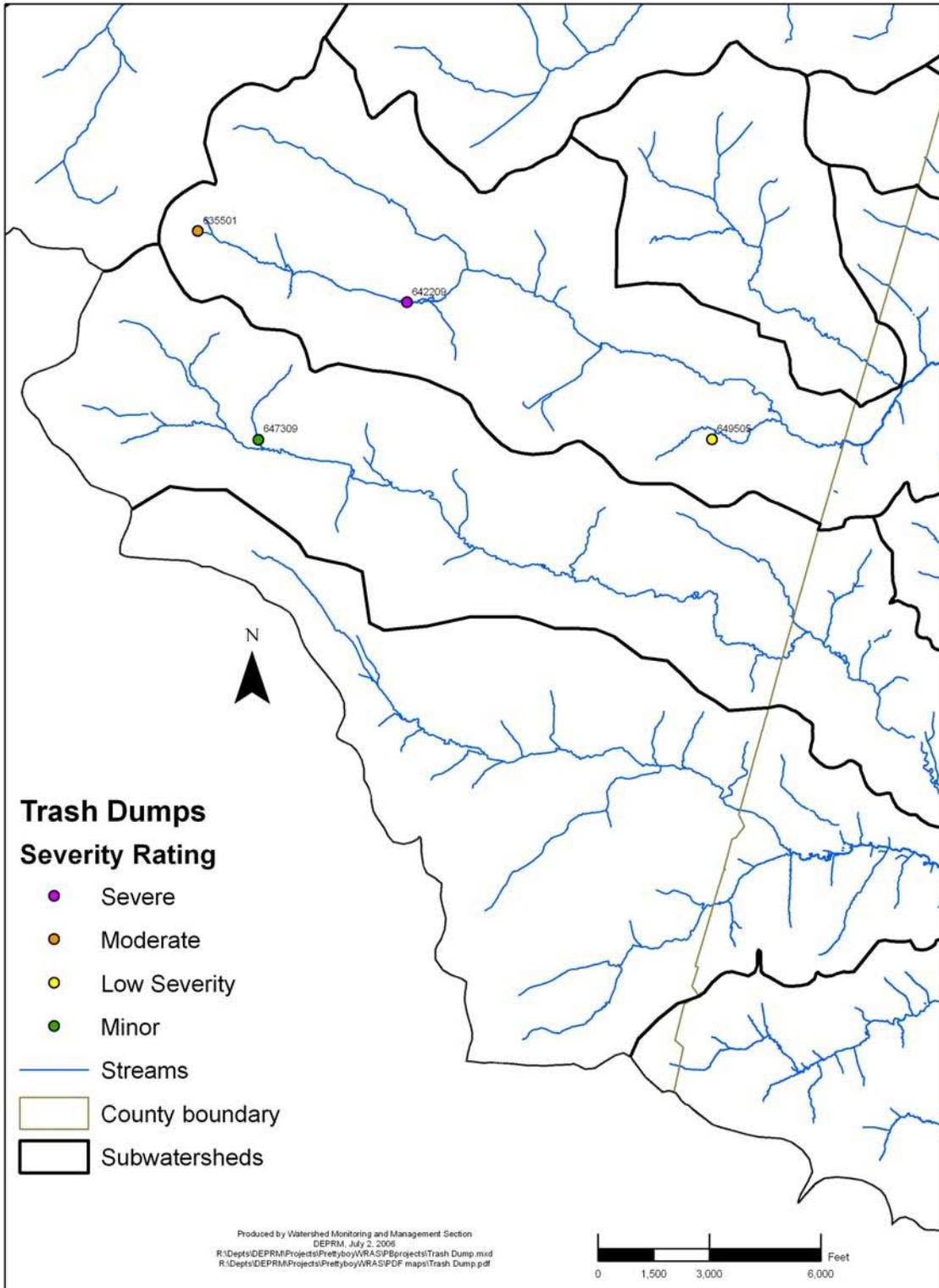
Figure 10. Map of Exposed Pipes, Prettyboy Watershed (Carroll County)



Trash Dumps

Survey crews documented 4 trash-dumping sites, and placed one site in each of the severe, moderate, low, and minor severity categories. Two of the trash-dumping sites were residential, one consisted of construction debris, and one consisted primarily of tires. Figure 11 shows the location and severity of each site. Trash dumps are rated as being of very high severity when there is a large amount of trash spread over a very large and inaccessible area. A site is rated as minor if it is a small amount of trash located inside a park with easy access.

Figure 11. Map of Trash Dumps, Prettyboy Watershed (Carroll County)



Representative Sites

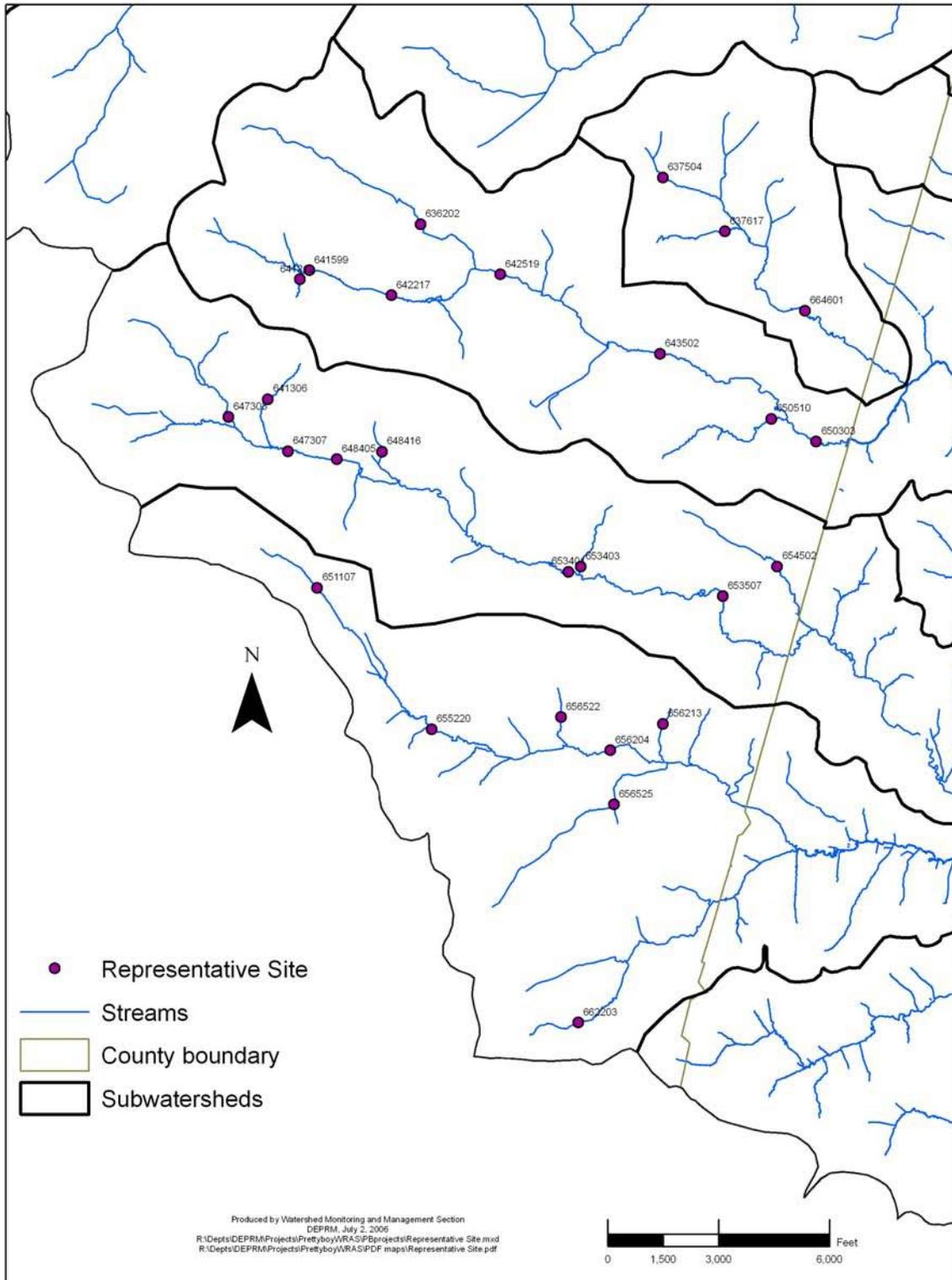
Representative sites are used to document the general condition of both in-stream habitat and the adjacent riparian corridor (including and up to 50 feet beyond the stream bank). The SCA survey's representative site evaluations are based on the habitat assessment procedures outlined in EPA's rapid bioassessment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

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

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

Carroll County survey teams evaluated stream conditions at 27 representative sites. Figure 12 shows the location of these sites. Substrate conditions for macroinvertebrates averaged suboptimal, with none of the sites rating poor. However, some sites were highly embedded by sediment, and the average embeddedness of all sites was marginal-suboptimal. Similarly, shelter conditions for fish showed wide variability, with most sites ranking marginal or suboptimal. Most sites showed no channel alteration. Sediment deposition and stream velocity/depth conditions averaged marginal-suboptimal, with very few sites rating poor or optimal. Channel flow conditions averaged suboptimal and no sites rated poor, perhaps reflecting spring flow conditions. The teams reported only 1 site with poor stream bank vegetation, and the average was suboptimal. There was some stream bank erosion, and most sites were rated marginal or suboptimal. Riparian vegetation conditions showed the opposite pattern, with only 2 sites rating marginal or suboptimal; sites selected to be representative sites either had a complete 50' buffer, or none at all.

Figure 12. Map of Representative Sites, Prettyboy Watershed (Carroll County)



DISCUSSION AND NEXT STEPS

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

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

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

REFERENCES

Pellicano, Robin, 2006. *Prettyboy Reservoir Stream Corridor Assessment*. Maryland Department of Environment, Technical and Regulatory Services.

Plafken, J., M. T. Barbour, K. D. Porter, S. K. Gross and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers. U.S. Environmental Protection Agency (EPA), Office of Water, EPA/444/4-89-001.

Yetman, K.T, 2001. *Stream corridor assessment survey – survey protocols*. Maryland Department of Natural Resources, Annapolis. MD.

Appendix A

Listing of sites by site number

SITE	PROBLEM	SEVERITY	CORRECTABILITY	ACCESS	X	Y	SUBSHED
635501	Trash Dump	3	3	1	1347435	728236	Grave Run
635502	Fish Barrier	5	1	1	1347504	728224	Grave Run
635503	Fish Barrier	4	-1	1	1347769	728149	Grave Run
635504	Pipe Outfall	4	1	2	1347653	728529	Grave Run
635505	Fish Barrier	4	4	1	1347800	728222	Grave Run
635506	Fish Barrier	4	5	1	1348007	727950	Grave Run
635507	Inadequate Buffer	4	2	1	1347899	728064	Grave Run
635508	Unusual Condition Or Comment	-1	-1	3	1348136	727948	Grave Run
635509	Pipe Outfall	2	3	3	1348369	727850	Grave Run
635510	Fish Barrier	5	1	5	1349232	727367	Grave Run
636201	Inadequate Buffer	4	2	2	1352757	728997	Grave Run
636202	Representative Site				1353215	728410	Grave Run
636203	Pipe Outfall	4	2	3	1353191	728472	Grave Run
636204	Pipe Outfall	5	1	3	1353145	728557	Grave Run
636205	Pipe Outfall	3	3	3	1353067	728670	Grave Run
636206	Pipe Outfall	4	2	3	1353050	728703	Grave Run
636207	Pipe Outfall	4	2	3	1353038	728746	Grave Run
636208	Pipe Outfall	3	3	3	1352840	728947	Grave Run
636209	Exposed Pipe	5	-1	1	1352629	729098	Grave Run
637502	Inadequate Buffer	3	2	2	1360745	729325	Indian Run
637503	Fish Barrier	4	3	2	1360082	729508	Indian Run
637504	Representative Site				1359772	729677	Indian Run
637505	Inadequate Buffer	2	2	3	1359591	730311	Indian Run
637506	Channel Alteration	2	3	3	1359675	730516	Indian Run
637507	Inadequate Buffer	3	3	3	1359445	730266	Indian Run
637508	Channel Alteration	3	3	3	1359417	730320	Indian Run
637509	Pipe Outfall	3	2	3	1359526	730103	Indian Run
637510	Pipe Outfall	3	2	3	1359382	730375	Indian Run
637511	Fish Barrier	5	1	3	1359340	730432	Indian Run
637512	Pipe Outfall	3	2	3	1359299	730468	Indian Run
637513	Pipe Outfall	3	2	3	1359725	730913	Indian Run
637514	Pipe Outfall	3	2	3	1359721	730809	Indian Run
637515	Pipe Outfall	3	2	3	1359718	730742	Indian Run
637616	Fish Barrier	3	4	2	1361188	728227	Indian Run
637617	Representative Site				1361449	728212	Indian Run
641211	Erosion Site	3	3	5	1349913	726775	Grave Run
641212	Representative Site				1349954	726917	Grave Run
641213	Unusual Condition Or Comment	2	4	3	1349849	726444	Grave Run
641301	Pipe Outfall	3	3	2	1346443	725115	Georges Run
641302	Unusual Condition Or Comment	2	4	2	1346595	724887	Georges Run
641303	Unusual Condition Or Comment	4	3	3	1347504	724961	Georges Run
641304	Unusual Condition Or Comment	4	3	4	1347128	724312	Georges Run

641305	Inadequate Buffer	5	1	4	1347245	724109	Georges Run
641306	Representative Site				1349089	723663	Georges Run
641307	Pipe Outfall	4	2	4	1349543	724104	Georges Run
641308	Pipe Outfall	3	2	4	1349584	724156	Georges Run
641309	Erosion Site	5	1	4	1349779	724306	Georges Run
641310	Erosion Site	4	3	3	1349940	724591	Georges Run
641599	Representative Site				1350209	727156	Grave Run
642203	Fish Barrier	3	4	1	1354096	726473	Grave Run
642204	Pipe Outfall	3	3	2	1353680	726444	Grave Run
642205	Fish Barrier	3	2	2	1353570	726395	Grave Run
642206	Unusual Condition Or Comment	3	3	3	1353273	726334	Grave Run
642207	Fish Barrier	2	2	3	1353289	726320	Grave Run
642208	Pipe Outfall	4	3	3	1353303	726306	Grave Run
642209	Trash Dump	2	4	2	1353063	726313	Grave Run
642210	Fish Barrier	4	1	2	1353049	726312	Grave Run
642211	Unusual Condition Or Comment	4	1	2	1353077	726315	Grave Run
642212	Erosion Site	3	4	4	1353694	726358	Grave Run
642213	Pipe Outfall	5	2	4	1352881	726350	Grave Run
642214	Exposed Pipe	3	3	5	1352825	726356	Grave Run
642215	Channel Alteration	4	2	5	1351879	726663	Grave Run
642216	Pipe Outfall	5	1	5	1352617	726418	Grave Run
642217	Representative Site				1352430	726479	Grave Run
642218	Fish Barrier	3	3	2	1352119	726580	Grave Run
642501	Inadequate Buffer	2	1	3	1351607	726658	Grave Run
642502	Unusual Condition Or Comment	-1	-1	-1	1350857	726990	Grave Run
642519	Representative Site				1355370	727048	Grave Run
643501	Inadequate Buffer	2	3	2	1361599	724223	Grave Run
643502	Representative Site				1359697	724899	Grave Run
643503	Fish Barrier	2	2	4	1359217	724988	Grave Run
643504	Unusual Condition Or Comment	3	2	4	1359179	724992	Grave Run
647301	Inadequate Buffer	3	1	1	1347672	723036	Georges Run
647302	Erosion Site	4	2	2	1347827	722985	Georges Run
647303	Representative Site				1348016	723182	Georges Run
647304	Inadequate Buffer	3	2	1	1348796	722383	Georges Run
647305	Inadequate Buffer	2	2	2	1349474	722338	Georges Run
647306	Erosion Site	5	1	1	1349137	722369	Georges Run
647307	Representative Site				1349631	722255	Georges Run
647308	Inadequate Buffer	2	4	3	1348978	722916	Georges Run
647309	Trash Dump	5	1	2	1349065	722608	Georges Run
647410	Inadequate Buffer				1351097	722012	Georges Run
647411	Fish Barrier	4	2	1	1350443	722092	Georges Run
647412	Fish Barrier	3	3	1	1350453	722087	Georges Run
647413	Pipe Outfall	3	3	1	1350489	722077	Georges Run
647414	Pipe Outfall	5	2	1	1350518	722079	Georges Run
647415	Channel Alteration	3	3	2	1350795	722038	Georges Run
647416	Pipe Outfall	3	3	2	1350616	722069	Georges Run
647417	Erosion Site	3	3	2	1350661	722051	Georges Run
648401	Pipe Outfall	3	3	2	1350679	722048	Georges Run

648402	Pipe Outfall	3	3	2	1350723	722039	Georges Run
648403	Pipe Outfall	3	3	2	1350743	722039	Georges Run
648404	Pipe Outfall	3	3	2	1350872	722036	Georges Run
648405	Representative Site				1350947	722037	Georges Run
648406	Pipe Outfall	4	2	2	1351025	722024	Georges Run
648407	Pipe Outfall	5	2	2	1351232	722003	Georges Run
648408	Pipe Outfall	4	3	1	1351388	721968	Georges Run
648409	Pipe Outfall	4	2	1	1351557	721902	Georges Run
648410	Pipe Outfall	4	2	1	1351560	721851	Georges Run
648411	Pipe Outfall	4	2	1	1351565	721832	Georges Run
648412	Pipe Outfall	3	2	1	1351579	721815	Georges Run
648413	Unusual Condition Or Comment	4	3	1	1351583	721814	Georges Run
648414	Inadequate Buffer	3	2	1	1351917	722108	Georges Run
648415	Channel Alteration	4	2	1	1351967	722045	Georges Run
648416	Representative Site				1352169	722245	Georges Run
648417	Inadequate Buffer	2	2	1	1351958	722772	Georges Run
648418	Channel Alteration	3	3	1	1352146	722148	Georges Run
648419	Pipe Outfall	4	3	1	1352073	722458	Georges Run
648420	Pipe Outfall	4	3	1	1352052	722485	Georges Run
648421	Pipe Outfall	4	3	3	1352056	722477	Georges Run
649501	Fish Barrier	4	4	1	1361195	722935	Grave Run
649502	Inadequate Buffer	4	2	1	1361252	722905	Grave Run
649503	Fish Barrier	4	3	1	1361301	722896	Grave Run
649504	Erosion Site	3	4	3	1361391	722813	Grave Run
649505	Trash Dump	4	2	2	1361274	722612	Grave Run
649506	Erosion Site	3	3	2	1360607	722667	Grave Run
649507	Inadequate Buffer	3	2	2	1360104	722291	Grave Run
650301	Fish Barrier	5	1	4	1364626	722540	Grave Run
650302	Fish Barrier	4	2	4	1364779	722525	Grave Run
650303	Representative Site				1363923	722514	Grave Run
650304	Unusual Condition Or Comment	2	2	3	1363686	722631	Grave Run
650305	Fish Barrier	5	1	5	1362934	723161	Grave Run
650306	Erosion Site	4	3	4	1362851	723125	Grave Run
650507	Inadequate Buffer	3	-1	2	1362286	722900	Grave Run
650508	Pipe Outfall	4	2	3	1362257	722848	Grave Run
650509	Pipe Outfall	4	2	3	1362343	722876	Grave Run
650510	Representative Site				1362711	723134	Grave Run
651101	Pipe Outfall	3	3	1	1348900	719608	Murphy Run
651102	Inadequate Buffer	1	3	2	1348970	719558	Murphy Run
651103	Pipe Outfall	4	2	2	1349848	719166	Murphy Run
651104	Pipe Outfall	4	2	2	1349893	719141	Murphy Run
651105	Pipe Outfall	5	1	2	1349954	719107	Murphy Run
651106	Pipe Outfall	3	3	2	1350008	719059	Murphy Run
651107	Representative Site				1350422	718554	Murphy Run
651108	Fish Barrier	4	3	1	1350496	718442	Murphy Run
651109	Pipe Outfall	5	1	1	1350693	718200	Murphy Run
651110	Pipe Outfall	5	1	1	1350711	718183	Murphy Run
652101	Erosion Site	3	3	1	1350886	717913	Murphy Run

652102	Pipe Outfall	4	2	2	1350734	718159	Murphy Run
652103	Channel Alteration	3	3	2	1351110	717528	Murphy Run
652104	Fish Barrier	4	2	2	1351443	717309	Murphy Run
652105	Pipe Outfall	4	2	2	1351905	716471	Murphy Run
653401	Representative Site				1357214	718987	Georges Run
653402	Fish Barrier	5	4	2	1357882	719688	Georges Run
653403	Representative Site				1357550	719127	Georges Run
653504	Unusual Condition Or Comment	4	4	1	1359195	718407	Georges Run
653505	Unusual Condition Or Comment	3	3	1	1359809	718393	Georges Run
653506	Unusual Condition Or Comment	4	3	4	1360156	718394	Georges Run
653507	Representative Site				1361396	718324	Georges Run
653508	Pipe Outfall	2	4	2	1359913	718415	Georges Run
654501	Inadequate Buffer	4	2	1	1363449	717941	Georges Run
654502	Representative Site				1362867	719130	Georges Run
654503	Erosion Site	4	3	4	1362773	719318	Georges Run
655101	Inadequate Buffer	2	3	2	1352275	716129	Murphy Run
655102	Pipe Outfall	5	3	2	1352306	715916	Murphy Run
655103	Exposed Pipe	4	3	1	1352571	715589	Murphy Run
655104	Erosion Site	3	3	1	1352483	715711	Murphy Run
655105	Pipe Outfall	5	1	2	1352637	715489	Murphy Run
655106	Pipe Outfall	4	2	2	1352667	715445	Murphy Run
655107	Pipe Outfall	4	-1	2	1352700	715355	Murphy Run
655108	Pipe Outfall	3	3	1	1352811	715256	Murphy Run
655109	Unusual Condition Or Comment				1352315	715900	Murphy Run
655209	Inadequate Buffer	3	3	1	1355134	713637	Murphy Run
655210	Erosion Site	4	2	1	1355033	713507	Murphy Run
655211	Channel Alteration	3	3	1	1355292	713758	Murphy Run
655212	Inadequate Buffer	5	1	1	1352919	715131	Murphy Run
655213	Channel Alteration	4	5	1	1353650	714653	Murphy Run
655214	Inadequate Buffer	2	3	1	1353765	714646	Murphy Run
655215	Channel Alteration	3	2	3	1354200	714460	Murphy Run
655216	Unusual Condition Or Comment	4	2	2	1354653	714358	Murphy Run
655217	Erosion Site	2	4	2	1355005	714287	Murphy Run
655218	Inadequate Buffer	3	3	1	1354866	714197	Murphy Run
655219	Fish Barrier	4	4	1	1354663	714106	Murphy Run
655220	Representative Site				1353521	714722	Murphy Run
656202	Erosion Site	3	3	1	1358016	714053	Murphy Run
656203	Inadequate Buffer	4	2	-1	1358654	714284	Murphy Run
656204	Representative Site				1358354	714146	Murphy Run
656205	Fish Barrier	4	2	1	1358484	714231	Murphy Run
656206	Fish Barrier	4	2	2	1359701	714016	Murphy Run
656207	Fish Barrier	4	2	1	1359677	714096	Murphy Run
656208	Pipe Outfall	5	1	2	1359712	714154	Murphy Run
656209	Fish Barrier	4	2	2	1359716	714252	Murphy Run
656210	Inadequate Buffer	5	1	1	1359691	714125	Murphy Run
656211	Erosion Site	2	4	1	1359662	714394	Murphy Run
656212	Exposed Pipe	2	3	4	1359669	714502	Murphy Run
656213	Representative Site				1359777	714867	Murphy Run

656401	Fish Barrier	2	3	2	1357873	714061	Murphy Run
656514	Pipe Outfall	3	3	1	1356948	715768	Murphy Run
656515	Pipe Outfall	3	3	-1	1356976	715671	Murphy Run
656516	Inadequate Buffer	2	4	2	1357016	715123	Murphy Run
656517	Pipe Outfall	4	4	1	1357001	715538	Murphy Run
656518	Pipe Outfall	4	4	1	1357026	715415	Murphy Run
656519	Fish Barrier	4	2	1	1357022	715353	Murphy Run
656520	Unusual Condition Or Comment	4	4	3	1357012	714978	Murphy Run
656521	Erosion Site	4	3	2	1357006	715205	Murphy Run
656522	Representative Site				1357014	715050	Murphy Run
656523	Inadequate Buffer	2	1	2	1358510	713264	Murphy Run
656524	Pipe Outfall	5	1	2	1358469	712741	Murphy Run
656525	Representative Site				1358452	712682	Murphy Run
659501	Fish Barrier	3	3	3	1357695	712482	Murphy Run
659502	Inadequate Buffer	2	3	2	1358535	712269	Murphy Run
659503	Unusual Condition Or Comment				1358482	712407	Murphy Run
661201	Inadequate Buffer	1	1	1	1356423	706676	Murphy Run
661202	Erosion Site	5	1	1	1356290	706502	Murphy Run
661203	Pipe Outfall	3	3	1	1356182	706442	Murphy Run
661204	Pipe Outfall	3	3	1	1356334	706581	Murphy Run
661205	Unusual Condition Or Comment	2	1	1	1356248	706460	Murphy Run
662201	Pipe Outfall	5	1	1	1356362	706630	Murphy Run
662202	Pipe Outfall	4	2	1	1356376	706640	Murphy Run
662203	Representative Site				1357482	706771	Murphy Run
662204	Erosion Site	3	3	2	1357815	706844	Murphy Run
662205	Unusual Condition Or Comment	-1	-1	-1	1357158	706610	Murphy Run
664601	Representative Site				1363620	726062	Indian Run

Appendix B, Listing of sites by problem category

Pipe Outfalls

GIS_Site	Outfall Type	Pipe Type	Location of Pipe	Diameter (in)	Channel Width	Discharge	Color	Odor	Severity	Correctability	Access
636204	groundwater drainage	Plastic	Right bank	10		NO		None	5	1	3
662201	Agricultural	Smooth Metal Pipe	Left bank	18		NO		None	5	1	1
642213	Stormwater	Smooth Metal Pipe	Right bank	5		NO			5	2	4
642216	Other	terra cotta	Left bank	5		NO			5	1	5
656208	Other	other	Right bank	2		YES	Clear	None	5	1	2
656524	groundwater	other	Right bank	10		NO			5	1	2
651105	Stormwater	Concrete Pipe	Left bank	18		NO			5	1	2
651109	Stormwater	Earth Channel	Right bank		2	NO		None	5	1	1
655105	Other	Plastic	Left bank	4		NO			5	1	2
648407	groundwater drainage	Plastic	Left bank	6		NO		None	5	2	2
647414	groundwater drainage	Smooth Metal Pipe	Left bank	4		YES	Clear	None	5	2	1
651110	Stormwater	Concrete Pipe	Right bank	36		NO			5	1	1
648420	groundwater drainage	Corrugated Metal	Left bank	10		NO		None	4	3	1
655106	Other	Plastic	Left bank	4		YES	Clear	None	4	2	2
635504	groundwater	Smooth Metal Pipe	other	1.5		YES	Clear	None	4	1	2
655107	Other	Plastic	Right bank	4		YES	Clear	None	4	-1	2
652105	Stormwater	Plastic		4		YES	Clear	None	4	2	2
656517	groundwater	Plastic	Left bank	6		YES	Clear	None	4	4	1
648419	groundwater drainage	Plastic	Left bank	10		NO		None	4	3	1
648421	unknown	Plastic	Left bank	6		YES	Medium Brown	None	4	3	3
648411	groundwater drainage	Plastic	Right bank	6		YES	Clear	None	4	2	1
648410	groundwater drainage	Plastic	Right bank	6		YES	Clear	None	4	2	1
648409	Agricultural	Earth Channel	Right bank		2	YES	Clear	None	4	2	1
648408	Agricultural	Earth Channel	Left bank		1	YES	Clear	None	4	3	1
648406	groundwater drainage	Plastic	Left bank	6		YES	Clear	other	4	2	2
641307	Stormwater	Plastic	Right bank	4		YES	Clear	None	4	2	4

656518	groundwater	Plastic	Left bank	6		YES	Clear	None	4	4	1
652102	Stormwater	Corrugated Metal	Right bank	48		YES	Clear	None	4	2	2
636203	groundwater drainage	Plastic	Right bank	10		YES	Clear	None	4	2	3
650509	pond outfall	Plastic	Left bank	10		NO			4	2	3
651104	Stormwater	Concrete Channel	Left bank	18		YES	Clear	None	4	2	2
651103	Stormwater	Plastic	Left bank	9		YES	Clear	None	4	2	2
662202	Agricultural	Plastic	Left bank	3		YES	Clear	None	4	2	1
636206	groundwater drainage	Plastic	Right bank	10		YES	Clear	None	4	2	3
650508	Stormwater	Plastic	Left bank	18		YES	Clear	None	4	2	3
636207	groundwater	Plastic	Right bank	10		YES	Clear	None	4	2	3
648402	pond drain	Plastic	Right bank	6		YES	Clear	None	3	3	2
637509	groundwater drainage	other	Right bank	4		YES	Clear	None	3	2	3
637510	groundwater drainage	other	Right bank	4		YES	Clear	None	3	2	3
637512	groundwater drainage	other	Right bank	4		YES	Clear	None	3	2	3
647413	groundwater drainage	Smooth Metal Pipe	Left bank	4		YES	Clear	None	3	3	1
648401	pond drainage	Plastic	Right bank	6		YES	Clear	None	3	3	2
648403	groundwater discharge	Plastic	Left bank	4		YES	Clear	None	3	3	2
637513	groundwater drainage	Plastic	Left bank	4		YES	Clear	None	3	2	3
648404	pond drain	Plastic	Left bank	10		YES	Clear	None	3	3	2
641301	Pumping Station	Smooth Metal Pipe	Right bank	12		YES		None	3	3	2
641308	Stormwater	Plastic	Right bank	4		YES	Clear	None	3	2	4
637514	groundwater drainage	Plastic	Left bank	4		YES	Clear	None	3	2	3
647416	groundwater discharge	Plastic	Left bank	4		YES	Clear	None	3	3	2
642204	pond outfall	Plastic	Left bank	8		YES	Clear	None	3	3	2
636205	groundwater drainage	Plastic	Left bank	10		YES	Clear	None	3	3	3
655102	Stormwater	Corrugated Metal	Right bank	36		YES	Clear	None	3	-1	2
636208	groundwater drainage	Plastic	Right bank	8		YES	Clear	None	3	3	3
661204	Agricultural	other	Left bank			YES	Clear	None	3	3	1
661203	Agricultural	Smooth Metal Pipe	Head of stream	6		YES	Clear	None	3	3	1
656514	groundwater	Plastic	Left bank	6		YES	Clear	None	3	3	1

656515	groundwater	Plastic	Right bank	6		YES	Clear	None	3	3	-1
651101	Stormwater	Concrete Pipe	Head of stream	36		YES	Clear	None	3	3	1
637515	groundwater drainage	Plastic	Right bank	4		YES	Clear	None	3	2	3
655108	Stormwater	Corrugated Metal	Left bank	12		YES	Clear	None	3	3	1
651106	Stormwater	Plastic	Right bank	4		YES	Clear	None	3	3	2
648412	groundwater drainage	Plastic	Right bank	8		YES	Clear	None	3	2	1
653508	groundwater	Plastic	Left bank	3		YES	Clear	None	2	4	2
635509	pond outfall	Smooth Metal Pipe	Left bank	8		YES	Clear	None	2	3	3

Fish Barriers

GIS_Site	Blockage	Type	Reason	Drop(In)	Depth(In)	Severity	Correctability	Access
642207	Total	Dam	Too high	12		2	2	3
656401	Partial	Road crossing	Too fast			2	3	2
643503	Total	Dam	Too high	48		2	2	4
647412	Total	Road crossing	Too high	12		3	3	1
659501	Partial	Road crossing	Too high	5		3	3	3
637616	Total	Dam	Too high	120		3	4	2
642218	Total	Road crossing	Too high	18		3	3	2
642203	Partial	Road crossing	Too high	9		3	4	1
642205	Total	Dam	Too high	24		3	2	2
656207	Total	Other	Too high	18		4	2	1
651108	Partial	Road crossing	Too fast			4	3	1
656209	Total	Other	Too high	30		4	2	2
655219	Total	Road crossing	Too high	30		4	4	1
656519	Partial	Road crossing	Too shallow		0.5	4	2	1
637503	Total	Road crossing	Too shallow		0.125	4	3	2
635505	Partial	Road crossing	Too shallow		0.5	4	4	1
642210	Partial	Road crossing	Too high	8		4	1	2
652104	Total	Other	Too shallow		0.5	4	2	2
656206	Total	Other	Too high	24		4	2	2
649503	Total	Natural falls	Too high	48		4	3	1
647411	Partial	Road crossing	Too fast			4	2	1
649501	Total	Road crossing	Too high	18		4	4	1
635503	Total	Road crossing	Too high	18	0.5	4	-1	1
650302	Temporary	Beaver dam	Too high	36		4	2	4
656205	Partial	Road crossing	Too high	8		4	2	1
635506	Total	Dam	Too high	600		4	5	1
653402	Total	Road crossing	Too high	9		5	4	2
635510	Partial	Natural falls	Too high	6		5	1	5

650305	Partial	Natural falls	Too high	8	5	1	5
650301	Temporary	Beaver dam	Too high	8	5	1	4
637511	Partial	Channelized	Too high	9	5	1	3
644602	Partial	Debris dam	Too high	9	5	1	5
635502	Total	Natural falls	Too high	20	5	1	1

Inadequate Buffers

GIS_Site	Sides	Unshaded	Width Left(ft)	Width Right(ft)	Length Left(ft)	Length Right(ft)	Land Use Left	Land Use Right	Recently established buffer	Live-stock	Severity	Correctability	Access	Wetland
651102	Both	Both	0	0	5600	5600	Other	Other	No	No	1	3	2	3
661201	Both	Both	0	10	2500	2500	Pasture	Pasture	No	Cattle	1	1	1	3
648410	Both	Left	15	0	1300	1300	Lawn	Pasture	No	Cattle	2	3	2	2
647305	Both	Both	5	5	1000	1000	Lawn	Lawn	No	No	2	2	2	2
637505	Both	Both	0	0	800	800	Crop field	Crop field	No	No	2	2	3	4
656516	Both	Both	0	0	800	600	Crop field	Crop field	No	No	2	4	2	3
656523	Both	Both	0	0	1300	1300	Other	Other	Yes	No	2	1	2	1
648417	Both	Both	5	5	1000	1000	Pasture	Pasture	No	Yes	2	2	1	2
655101	Both	Both	0	0	1200	1200	Other	Other	No	No	2	3	2	2
642501	Both	Neither	0	0	3600		Shrubs & small trees	Shrubs & small trees	Yes	No	2	1	3	2
647308	Both	Both	20	25	2400	2400	Multiflora Rose	Lawn	No	No	2	4	3	2
655214	Both	Both		20	2000	2000	Shrubs & small trees	Paved	No	Yes	2	3	1	3
643501	Both	Both	0	0	800	800	Pasture	Pasture	No	Horses	2	3	2	-1
655209	Both	Right	10	0	800	800	Shrubs & small trees	Lawn	No	No	3	3	1	2
655218	Both	Both	0	0	600	600	Pasture	Pasture	No	Yes	3	3	1	1
647304	Right	Neither		0		500	Forest	Lawn	No	No	3	2	1	2
648414	Both	Both	0	0	300	300	Pasture	Pasture	No	Horses	3	2	1	2
647301	Right	Right		0		700	Forest	Lawn	No	No	3	1	1	3
650507	Left	Left	0		400		Pasture	Forest	Yes	Horses	3	-1	2	4
649507	Both	Left	2	20	500	200	Crop field	Pasture	No	Cattle	3	2	2	4
637507	Both	Both	0	0	400	400	Crop field	Crop field	No	No	3	3	3	2
637502	Left	Neither	10		1200		Other	Forest	No	No	3	2	2	3

654501	Both	Both	0	0	300	300	Pasture	Pasture	No	Donkey	4	2	1	2
659502	Both	Both	0	0	500	500	Other	Other	Yes	No	4	1	2	1
635507	Left	Left	0		300		Lawn	Forest	No	No	4	2	1	5
636201	Both	Both	0	0	1200	1200	Shrubs & small trees	Shrubs & small trees	Yes	No	4	2	2	1
656203	Both	Both	15	10	500	500	Lawn	Lawn	No	No	4	2	-1	2
649502	Both	Both	0	0	125	125	Lawn	Lawn	No	No	4	2	1	5
656210	Both	Both	0	0	200	200	Lawn	Lawn	No	No	5	1	1	1
655212	Right	Neither		20		300	Forest	Lawn	No	No	5	1	1	4
641305	Right	Neither		25		500	Forest	Crop field	No	No	5	1	4	3

Erosion Sites

GIS_Site	Type	Possible Cause	Length(ft)	Height(ft)	Land use left	Land use right	Infrastructure Threatened?	Severity	Correctability	Access
656211	Widening	Land use change upstream	500	4	Lawn	Lawn		2	4	1
655217	Widening	Land use change upstream	800	4	Other	Pasture	No	2	4	2
647417	Widening	Below channelization	300	4	Lawn	Pasture	No	3	3	2
662204	Widening	Livestock	800	4.5	Pasture	Forest	No	3	3	2
656202	Widening	Land use change upstream	300	3	Lawn	Lawn	No	3	3	1
652101	Widening	Land use change upstream	900	3	Other	Other	No	3	3	1
655104	Widening	Bend at steep slope	500	4	Other	Other	No	3	3	1
649504	Widening	Land use change upstream	200	3.5	Forest	Forest	No	3	4	3
642212	Widening	Land use change upstream	500	3	Pasture	Pasture	No	3	4	4
641211	Downcutting	Other	300	4	Multiflora Rose	Forest	No	3	3	5
649506	Widening	Land use change upstream	800	3	Forest	Forest	No	3	3	2
641310	Widening	Land use change upstream	200	3	Forest	Forest	No	4	3	3
654503	Widening	Land use change upstream	400	2.5	Forest	Forest	No	4	3	4
656521	Widening	Land use change upstream	250	205	Crop field	Crop field	No	4	3	2
655210	Widening	Land use change upstream	600	2.5	Shrubs & Small Trees	Lawn	No	4	2	1
650306	Widening	Land use change upstream	400	3.5	Forest	Forest	No	4	3	4
647302	Downcutting	Land use change upstream	150	2	Forest	Lawn	No	4	2	2

661202	Downcutting	Livestock	300	3	Pasture	Pasture	No	5	1	1
641309	Widening	Land use change upstream	100	2.5	Forest	Crop field	No	5	1	4
647306	Widening	Land use change upstream	100	3	Lawn	Lawn	No	5	1	1

Unusual Conditions

GIS_Site	Type	Describe	Description	Potential Cause	Severity	Correctability	Access
642502	Comment		Here there is a recently planted buffer strip in which cattle have been fenced out; however, many of the trees in the tubes appear dead. The stream is choked with multiflora rose.		-1	-1	-1
635508	Unusual Condition		foam	could be natural or could be from something in pond	-1	-1	3
662205	Comment		Recent riparian and wetland restoration installed along stream; this property has been sold to CC Parks		-1	-1	-1
650304	Unusual Condition		excessive sedimentation and streambank destruction and riparian zone destruction	ATV crossings at 6 or 8 sites across stream	2	2	3
641213	Unusual Condition	Odor	Excessive sediment and many white flatworms in stream	runoff from Manchester sewage sprayfields	2	4	3
659502	Unusual Condition	Excessive Algae		excessive nutrients	2	3	2
661205	Unusual Condition	Excessive Algae	scum, excessive algae, and red flock all present in this watering area	cattle in stream, occurs for length of pasture	2	1	1
641302	Unusual Condition	Excessive Algae	algae and red flock below sewage treatment effluent discharge pipe, foam in some areas	excess nutrients from sewage discharge	2	4	2
642206	Unusual Condition	altered channel	altered channel, stream diverted	the natural channel has been dammed to divert the stream, which now flows in 2 channels	3	3	3
653505	Unusual Condition	Excessive Algae		there is a seepage coming into stream, possibly houses above stream are the cause	3	3	1
643504	Unusual Condition		stream has been dammed in multiple areas and a large pond created. Stream channel has been completely altered.		3	2	4
653504	Unusual Condition	Excessive Algae		excessive nutrients?	4	4	1
655216	Unusual Condition		Excessive sediment input	4WD dirt road/trail crossing; on or near a DNR Cooperative Wildlife area (Gwynnbrook office)	4	2	2

641304	Unusual Condition		excessive sedimentation due to ATV activity	ATV's crossing stream	4	3	4
641303	Unusual Condition		excessive sediment in stream	several ATV crossings of stream	4	3	3
648413	Unusual Condition	Excessive Algae		excessive nutrients from pasture drainage system	4	3	1
656520	Unusual Condition	Excessive Algae	extends entire stream segment	nutrient runoff from farm fields, only correctible through BMP's	4	4	3
642211	Unusual Condition		a 'bridge' has been constructed by laying railroad ties in a stream to gain access to an open field; this is next to Trash Dump 642209		4	1	2
653506	Unusual Condition	excessive sediment	excessive sediment	ATV's driving in and along stream	4	3	4
655102	Unusual Condition	Excessive Algae	Green filamentous	Nutrients from golf course pond	5	3	2

Channel Alterations

Site	Type	Bottom Width(in)	Length(ft)	Perennial Flow	Sedimentation	Vegetation in Channel	Road Crossing	Length Above(ft)	Length Below(ft)	Severity	Correctability	Access
637506	Earth channel	12	800	Yes	Yes	No	No			2	3	3
637508	Earth channel	12	400	Yes	Yes	No				3	3	3
647415	Earth channel	8	1300	Yes	Yes	Yes	No			3	3	2
648418	Earth channel	36	700	Yes	Yes	Yes	No			3	3	1
655211	Concrete	24	50	Yes	No	No	Above	50	0	3	3	1
655215	Other	0	100	Yes	Yes	No	No			3	2	3
652103	Earth channel	36	3000	Yes	Yes	No	No			3	3	2
642215	Earth channel	48	1900	Yes	Yes	No	No			4	2	5
648415	Earth channel	10	300	No	Yes	Yes	No			4	2	1
655213	Rip-rap	0	125	Yes	Yes	No	Above	125		4	5	1

Exposed Pipes

GIS_Site	Location of Pipe	Type	Diameter(in)	Length(ft)	Purpose	Discharge	Color	Odor	Severity	Correctability	Access
7E+05	Exposed across bottom of stream	other	10	10	unknown	no			2	3	4
6E+05	Exposed across bottom of stream	Terra cotta	6	0	unknown	no			3	3	5
6E+05	Exposed across bottom of stream	Terra cotta	12	5	unknown	no			4	3	3
7E+05	Exposed across bottom of stream	plastic	4	4	other	no			4	3	1
6E+05	Exposed across bottom of stream	plastic	8	8	other	no			5	-1	1

Trash Dumps

GIS_Site	Type	Truckloads	Extent	Volunteer Project?	Owner Type	Owner Name	Severity	Correctability	Access
642209	Residential	20	Large Area	TRUE	Private		2	4	2
635501	Construction	20	Large Area	FALSE	Public	City of Manchester	3	3	1
649505	Residential	5	Single Single	TRUE	Private		4	2	2
647309	Tires	2	Single Single	FALSE	Private		5	1	2

Representative Sites

GIS_Site	Substrate	Em-bed-ded-ness	Shelter for Fish	Channel Alteration	Sedi-ment Deposition	Velocity-Depth	Flow	Vege-tation	Bank Con-dition	Ripa-rian Vegetation	Width Riffle	Width Run	Width Pool	Depth Riffle	Depth Run	Depth Pool	Bottom Type
636202	3	3	1	3	3	2	3	2	2	0	36	36	40		6	12	Gravel
637504	2	2	3	2	2	2	2	3	2	3	48	51	84	2	3	14	Cobble
637617	1	2	1	3	1	1	1	3	2	3	84	96		1	2		Gravel
641212	1	0	0	3	0	0	1	2	1	3	24	24		1	3		Silt
641306	2	1	1	2	1	1	1	2	2	0	36	36		1	2		
641514	3	2	3	3	2	2	2	2	2	3	60	84		48	9		Sand
642217	2	1	1	2	2	1	2	2	1	0	72	60	72	3	4	12	Silt
642519	2	1	2	3	1	2	2	2	1	3	168	96	120	2	10	16	
643502	2	2	3	3	2	2	2	3	3	3	216	216	174	3	4	36	Cobble
644601	3	2	3	3	2	2	2	3	3	3	84	156	156	3	5	22	
647303	2	1	1	3	1	1	2	1	1	3	96	60		4	6		Gravel
647307	2	1	2	3	2	2	3	2	2	0	42	84	96	4	8	8	Sand
648405	3	2	1	1	2	1	3	1	2	0	72	72		4	6		Cobble
648416	1	0	0	0	1	1	3	1	2	0	36	30		2	4		Sand
650303	3	3	3	3	2	3	2	3	3	3	156	180	300	4	8	32	Gravel
650510	2	1	1	2	1	1	2	1	1	3	84	72		2	8		Gravel
651107	1	0	2	3	2	2	3	3	2	0	36	24	48	2	6	18	Silt
653401	3	3	3	3	2	3	3	3	2	3	84	120	132	4	7	13	Cobble
653403	2	2	2	3	2	2	2	3	2	3	30	36	48	2	4	12	Gravel
653507	3	3	3	3	2	2	3	2	2	3	96	120	180	6	12	36	Cobble
654502	2	2	2	3	2	2	2	1	1	3	36	48		2	2		Gravel
655220	2	2	2	2	1	2	2	2	1	1	140	80	50	2	5	12	Gravel
656204	2	2	1	2	2	2	2	1	1	0	72	120	120	5	12	12	Sand
656213	1	1	0	3	1	0	1	0	0	3	36	30		2	3		Gravel
656522	1	1	1	2	0	1	2	1	1	0	36	48		1.5	2		Silt
656525	2	2	2	2	2	1	2	1	2	0	30	36		3	4		
662203	1	0	0	3	2	1	3	1	2	1	15	15	24	1	4	6	Silt