

Liberty Reservoir Watershed Stream Corridor Assessment

Winter 2012

**Prepared By
Carroll County Bureau of Resource Management**



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I. Introduction

A Stream Corridor Assessment of the Liberty watershed was conducted during the winter of 2012 by Carroll County Bureau of Resource Management staff. The goal of this assessment was to identify current impairments within the watershed, as well as identify locations to implement restoration practices.

The Liberty watershed is located in eastern Carroll County, bordered by Baltimore County, Maryland. Liberty watershed drains into the Liberty Reservoir, which is part of the Baltimore metropolitan area drinking water supply.

The Liberty watershed is managed on the 12-Digit scale and includes 17 subwatersheds. Table 1-1 lists the subwatersheds within Liberty as well as their associated drainage and stream lengths. Figure 1-1 shows the location of the study area within Carroll County.

Table 1-1 Liberty Subwatersheds

DNR 12-Digit	Subwatershed	Area (Acres)	Stream Miles
1060	Aspen Run	3,668	15.37
1057	Beaver Run	9,322	45.23
1061	Cranberry Branch	2,337	10.35
1058	Deep Run	4,154	21.56
1052	East Branch Patapsco	2,937	14.22
1059	East Branch Patapsco	6,781	33.25
1046	Snowden's Run	5,142	16.74
1047	Liberty Reservoir	4,509	13.83
1049	Little Morgan Run	5,529	29.50
1055	Little Morgan Run	2,406	11.37
1056	Middle Run	5,472	25.05
1053	Morgan Run	2,698	13.17
1054	Morgan Run	3,169	14.21
1050	Morgan Run	10,153	56.09
1048	Roaring Run	8,085	34.87
1051	West Branch Patapsco	7,065	36.01
1062	West Branch Patapsco	3,822	13.15
Totals:		87,249	403.97

II. Landowner Participation

This assessment reached out to 2,319 landowners within the Liberty watershed whose property is intersected by a stream corridor. Landowner permission was obtained through a mailing that detailed the assessment (a copy of this letter can be found in Appendix A). A response card was also included for the landowner to send back with their permission response. Only properties with owner permission were assessed. Access was granted for approximately 235 of the 404 stream miles within the Liberty watershed. Figure 1-2 shows where landowner permission was granted to perform the assessment.

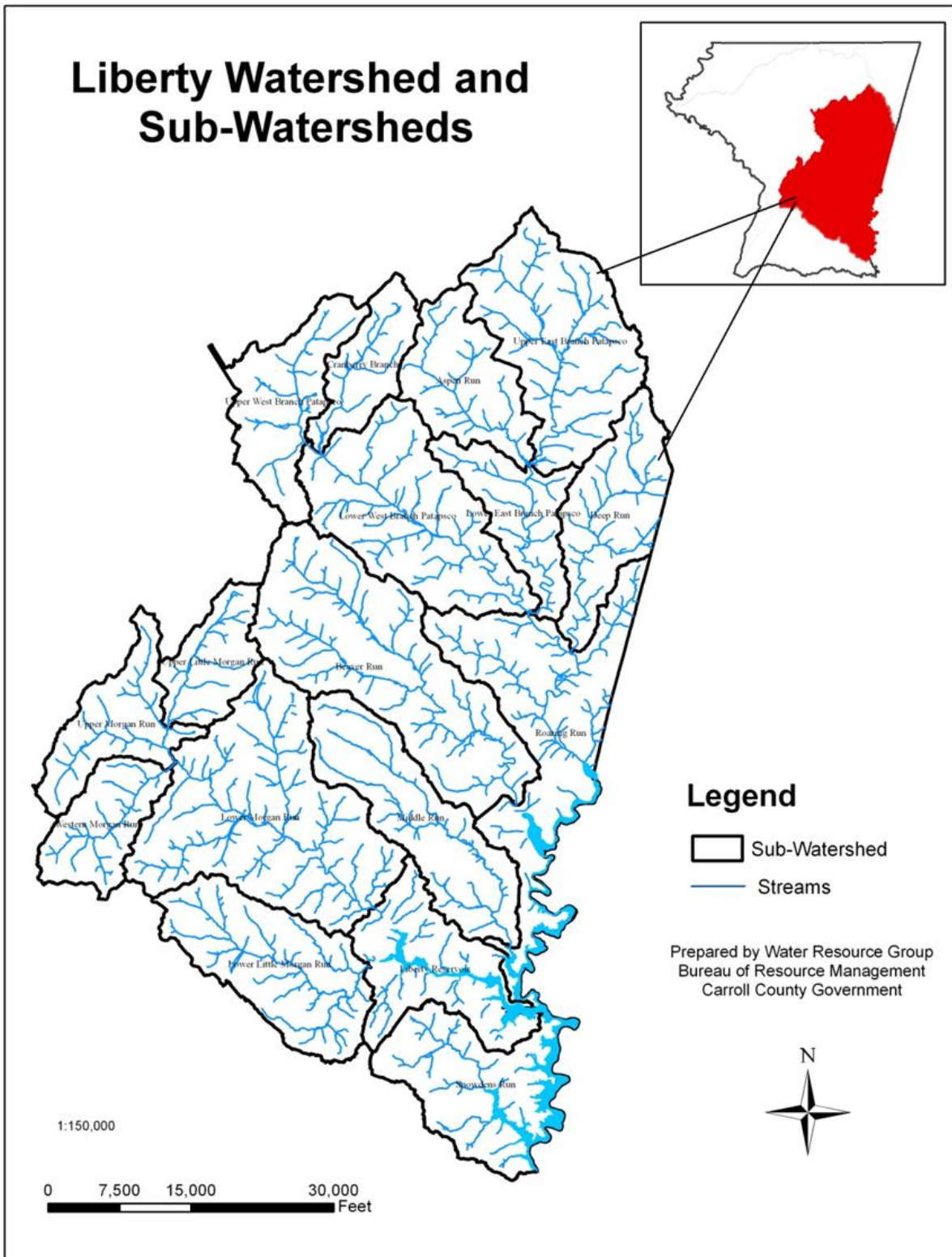


Figure 1-1: Liberty Watershed Location Map

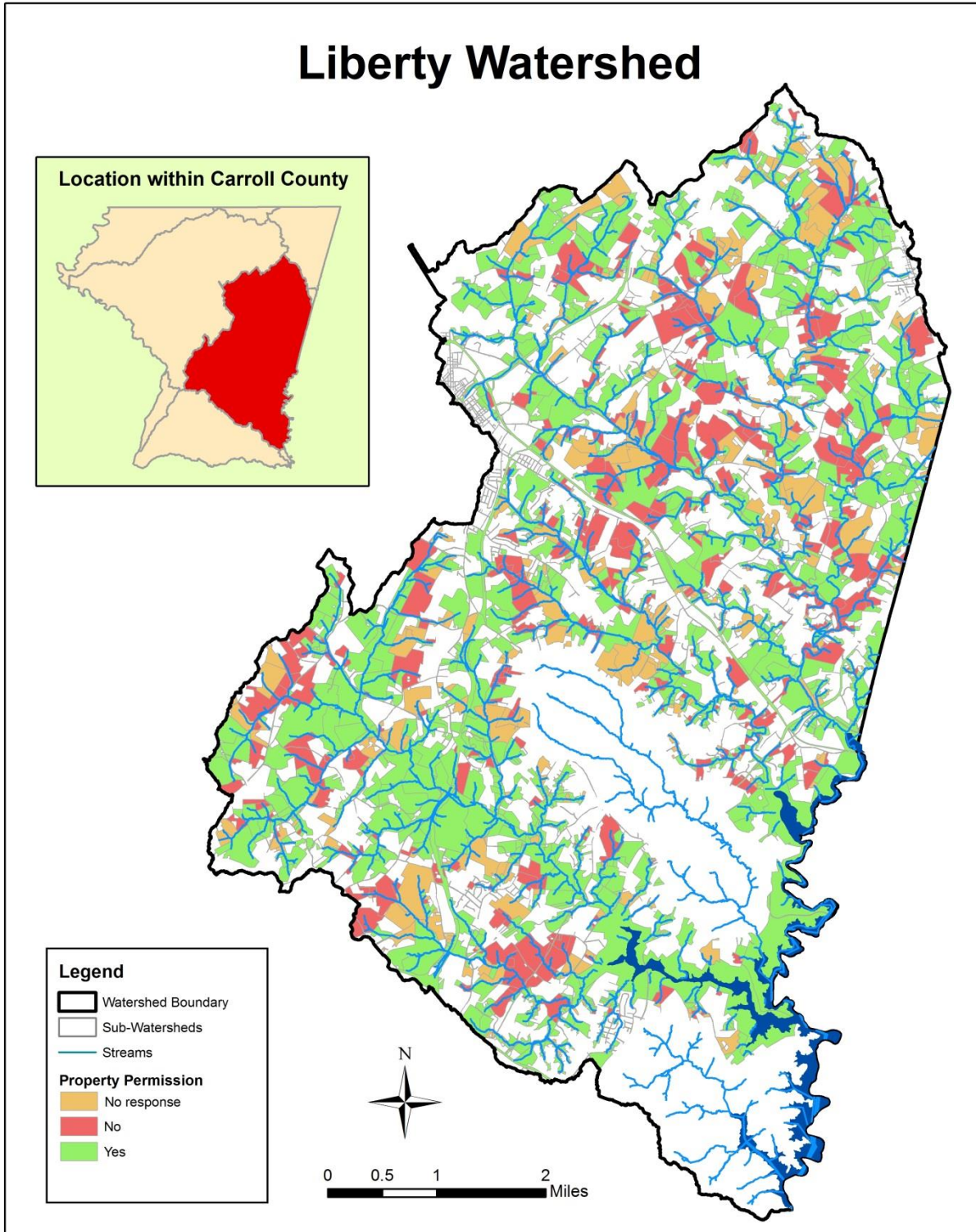


Figure 1-2: Landowner Participation

III. Methods

The field investigation consisted of two-person teams walking within the stream channel in order to visually assess potential environmental impacts to the stream corridor. Field teams carry Global Position System (GPS) enabled Toughbooks® that allow identified impacts to be recorded on site into an ArcGIS® database where it is assigned a unique ID number.

All stream corridors are assessed based on the survey protocols outlined by the Maryland Department of Natural Resources (DNR) watershed restoration division using standard stream corridor assessment protocols as outlined in the “Stream Corridor Assessment Survey: SCA Protocols” (MDNR, 2001). Field teams collect information relating to eroded stream banks, channel alterations, exposed utility pipes, drainage pipe outfalls, fish barriers (debris jams), inadequate streamside buffers, trash dumps, and construction activity that are either in or near the stream. Any unusual conditions are also noted. Each impairment is then ranked on a scale of 1 to 5 in relation to the impairment’s severity, accessibility, and correctability. These numeric rankings are used to prioritize areas for restoration.

IV. Results

A total of 1,041 data points were collected across the watershed. Inadequate buffers and stream bank erosion were the most frequently identified problems. Drainage pipe outfalls were also regularly present throughout the watershed. Table 1-2 lists the data points by severity across the entire watershed. The most commonly identified impacts are shown in Figure 1-3 and Table 1-3 presents a summary of the number of impacts identified in each subwatershed. Criteria for ranking each impairments severity can be found in Appendix B.

Table 1-2: Data Points by Severity

Identified Impacts	Total	Very Severe	Severe	Moderate	Low	Minor
Erosion	415	11	31	64	20	289
Inadequate Buffer	272	64	75	70	43	20
Pipe Outfall	68	6	4	15	16	27
Fish Barrier	138	7	6	27	20	78
Trash Dump	27	1	3	8	4	11
Channel Alteration	13	3	4	2	4	0
Construction	0	0	0	0	0	0
Exposed Pipe	11	0	2	1	2	6
Unusual Condition	19	1	5	11	2	0
Total	963	93	130	198	111	431

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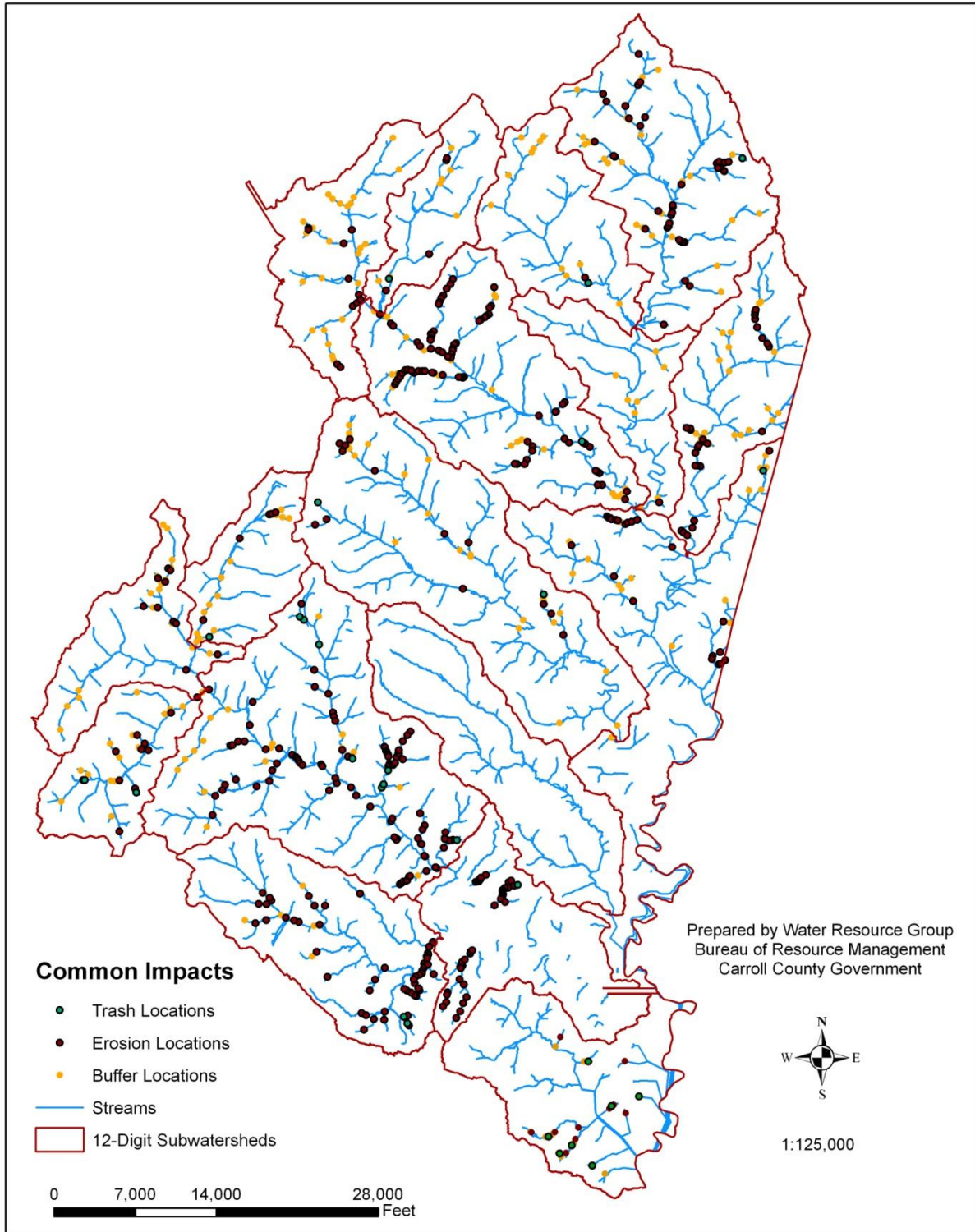


Figure 1-3: Most Commonly Identified Impacts

Table 1-3: Stream Corridor Assessment – Identified Impacts

DNR 12-Digit	In-Stream Construction	Erosion	Fish Barrier	Inadequate Buffer	Trash Dump	Channel Alteration	Pipe Outfall	Exposed Pipe	Total
1060	0	1	2	11	2	0	0	0	16
1057	0	13	8	28	2	1	6	1	59
1061	0	4	1	8	2	2	2	2	21
1058	0	26	2	26	0	0	3	0	57
1052	0	1	0	8	0	0	0	0	9
1059	0	37	15	31	1	1	8	1	94
1046	0	34	13	15	7	12	19	0	100
1047	0	42	22	0	1	0	0	1	66
1049	0	54	16	9	2	1	2	0	84
1055	0	5	4	14	1	0	2	0	26
1053	0	11	0	19	2	0	0	0	32
1054	0	10	0	20	0	0	0	0	30
1050	0	96	31	19	12	2	15	1	176
1048	0	22	15	17	1	0	0	0	55
1051	0	80	21	33	1	0	9	1	145
1062	0	11	1	28	0	6	21	4	71
1056	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total	0	447	151	286	34	25	87	11	1,041

A. Erosion

The most common problem identified through the Stream Corridor Assessment was erosion. A total of 17.8 miles (8%) of the 235 miles assessed were found to have an erosion problem, with approximately 2 percent of the watershed categorized as having a severe erosion problem. Figure 1-4 shows the location of active erosion sites identified during the Stream Corridor Assessment.

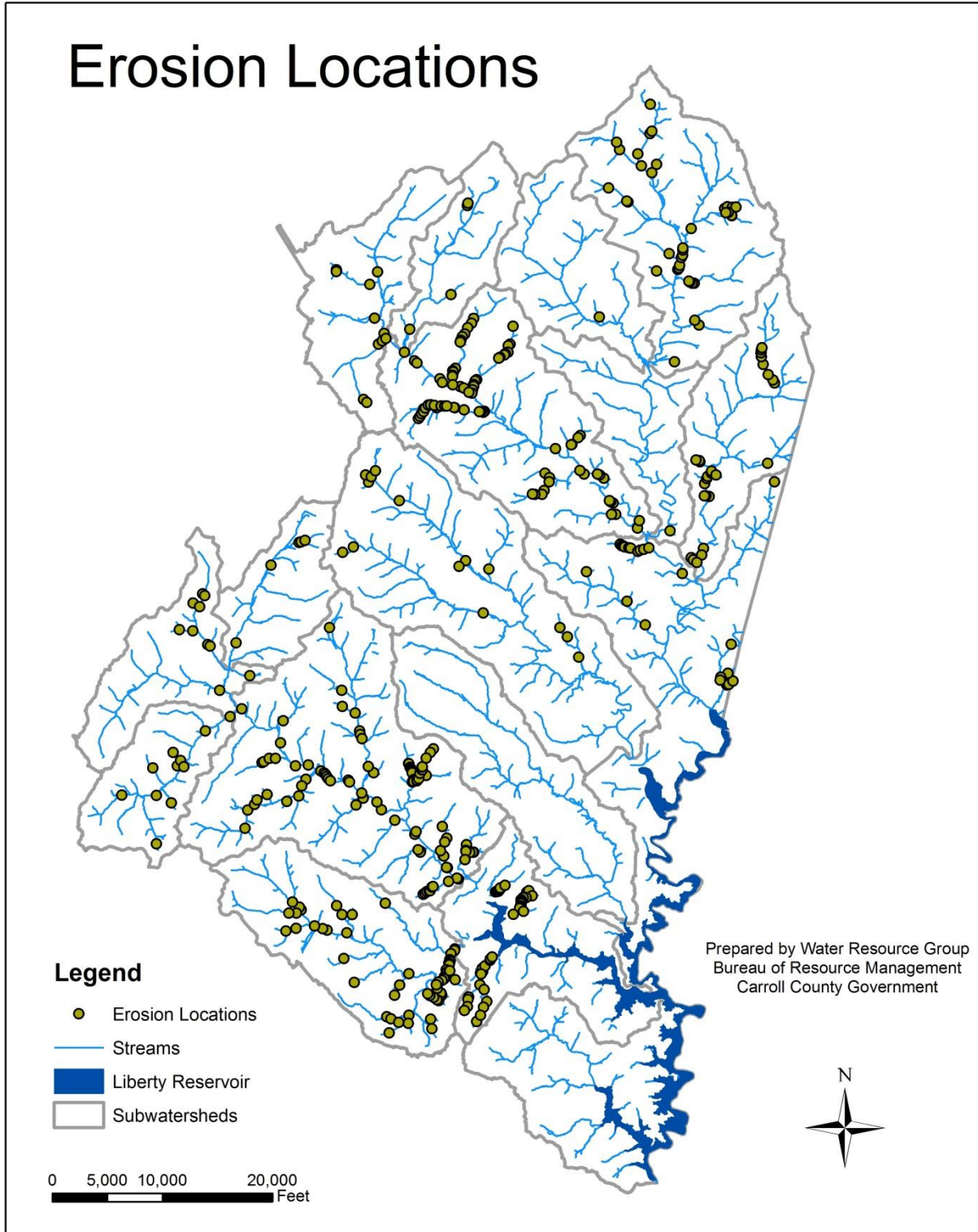


Figure 1-4: Erosion Locations

B. Inadequate Buffer

Buffer areas were identified as inadequate for 58 miles (25%) of the streams assessed, with 17 percent of the entire watershed classified as severely un-buffered. 118 of the sites identified both sides of the stream as completely unshaded, and livestock was noted to be present at 27 different sites. Of the 272 sites identified, 10 had been recently planted but were not yet established. Figure 1-5 shows the location of identified inadequate buffers.

Table 1-4 presents the linear feet of inadequate buffer and stream erosion identified in each subwatershed.

Table 1-4: Linear feet of Inadequate Buffer and Stream Erosion

Stream Segment (DNR 12-Digit)	Erosion	Inadequate Buffer*
Aspen Run (1060)	1,500	16,050
Beaver Run (1057)	7,675	36,105
Cranberry Branch (1061)	1,950	7,330
Deep Run (1058)	2,060	28,045
East Branch Patapsco (1052)	70	6,750
East Branch Patapsco (1059)	11,975	36,640
Snowden's Run (1046)	13,159	11,701
Liberty Reservoir (1047)	2,570	0
Little Morgan Run (1049)	10,460	11,470
Little Morgan Run (1055)	1,410	9,360
Morgan Run (1053)	1,340	14,360
Morgan Run (1054)	1,050	15,230
Morgan Run (1050)	20,720	26,670
Roaring Run (1048)	3,521	21,320
West Branch Patapsco (1051)	9,332	19,075
West Branch Patapsco (1062)	5,200	44,880
Middle Run (1056)	n/a	n/a
Total	93,992	304,986

*Linear footage includes both right and left banks of stream

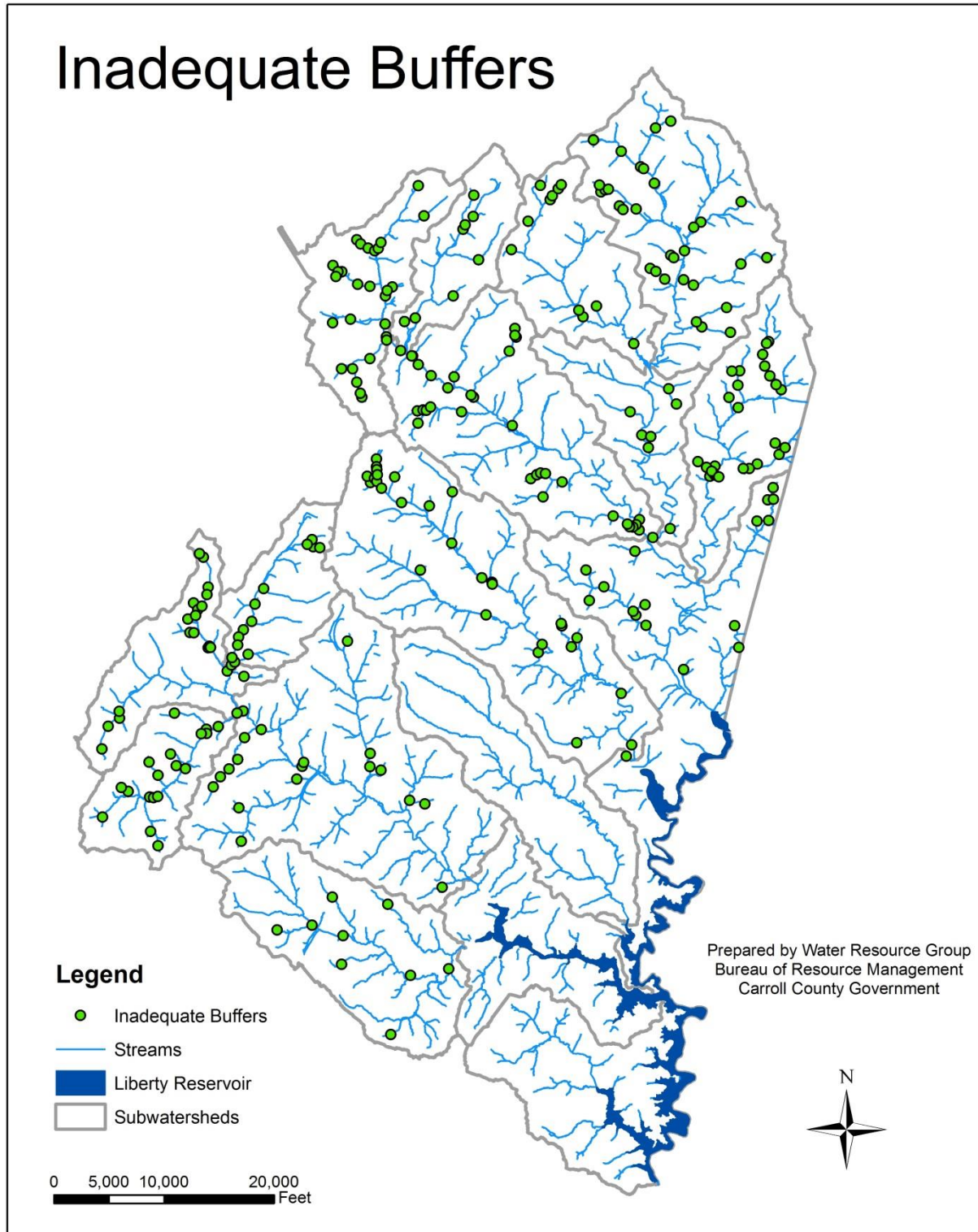


Figure 1-5: Inadequate Buffers

C. Pipe Outfalls

Outfalls were found throughout the entire watershed, but the highest concentrations were located in the West Branch Patapsco River subwatershed. This higher concentration can be attributed to the city of Westminster, which makes up the headwaters of this subwatershed. The majority of the outfalls identified were 6” or less in diameter and were given a low impact rating. The location of identified pipe outfalls can be found in Figure 1-6.

D. Exposed Pipes

Exposed pipes were identified at 11 different locations within the watershed, with the majority being concentrated around the City of Westminster. Any exposed pipe identified during the SCA is reported to the appropriate public works department for additional investigation.

E. Channel Alteration

Impacts from channel alterations were found at 13 different sites within the watershed and totaled 4,995 linear feet. The alterations identified were associated with the protection of infrastructure and were given a minor severity ranking. Figure 1-7 shows the location of identified channel alterations within the watershed.

F. Fish Barriers

There were 138 fish barriers identified during the survey; all of the sites were associated with temporary debris dams, perched road culverts, or natural falls. Thirty-four of the identified sites significantly restricted upstream fish movement and received a moderate severity rating. Figure 1-8 shows the location of identified fish barriers.

G. Trash Dumps

Impacts from trash were minimal with 27 identified locations within the watershed; all of the sites had a moderate to minor severity rating, with the largest site estimated to have approximately 5 truckloads of waste. The location of identified trash sites can be found in Figure 1-9.

H. In or Near Stream Construction

No in or near stream construction sites were identified during the assessment.

I. Unusual Conditions/Comments

Field crews identified 19 unusual conditions during the assessment. The majority of the unusual conditions were comment based, noting or describing something out of the ordinary. The location of these can be found in Figure 1-10.

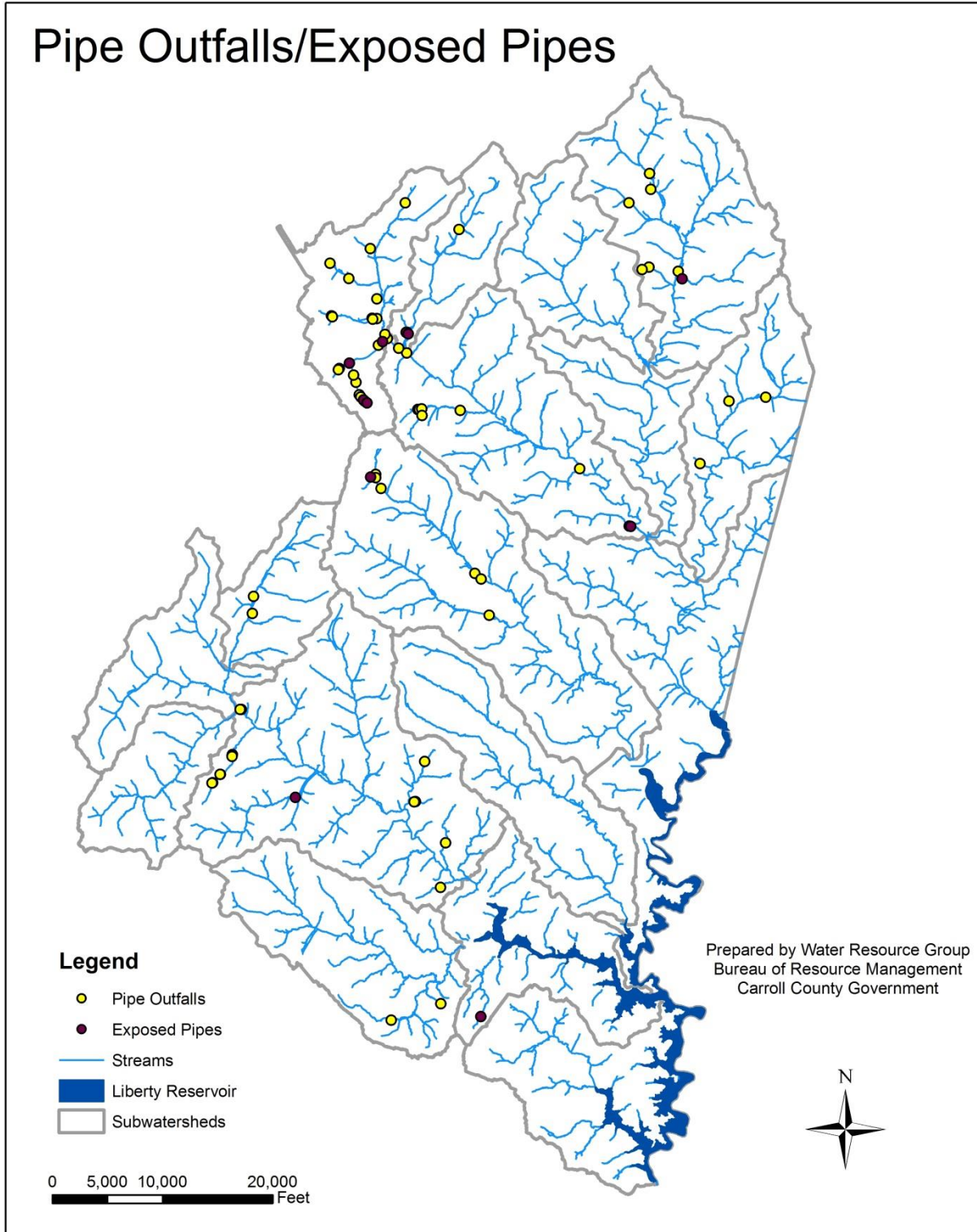


Figure 1-6: Pipe Outfalls and Exposed Pipes

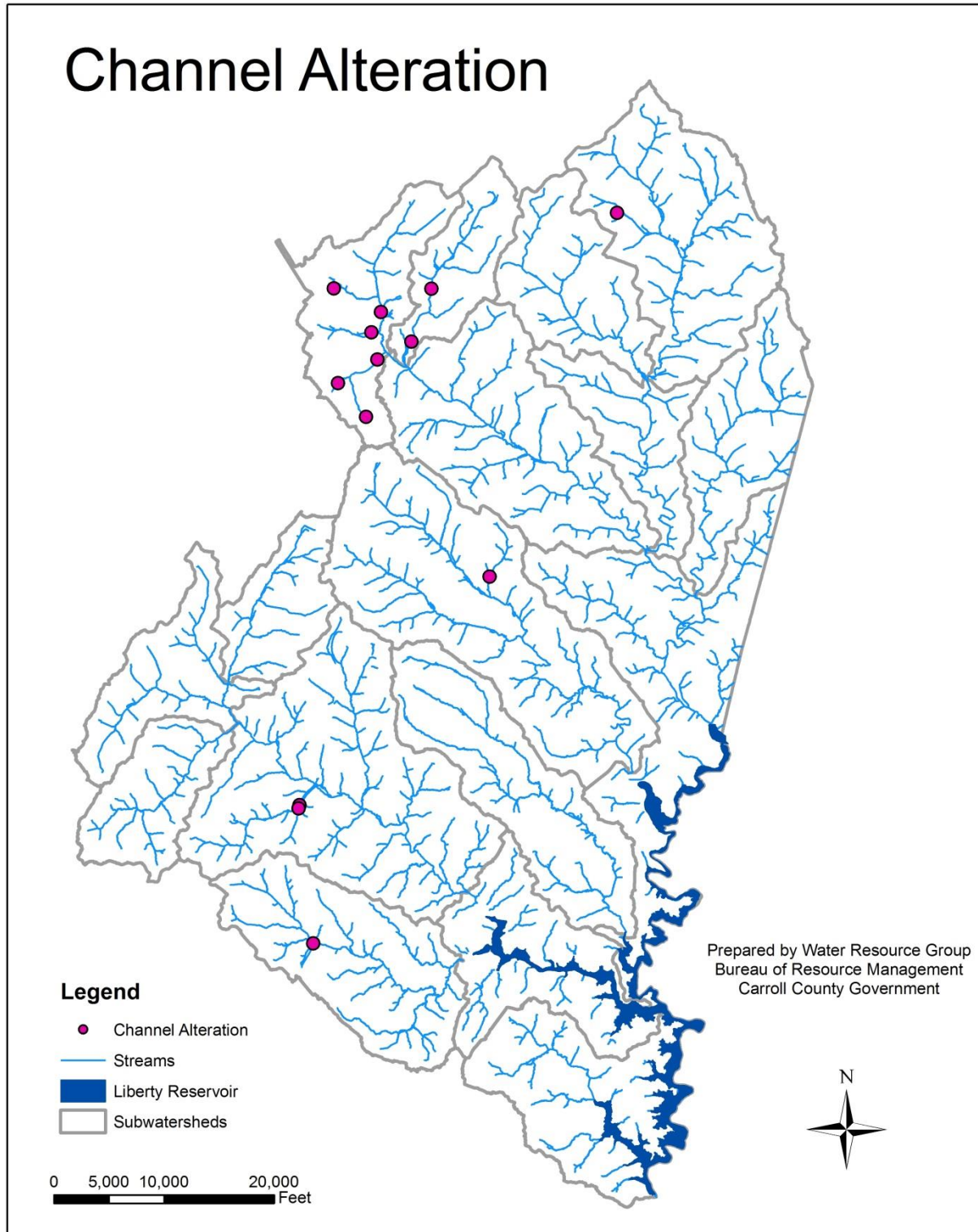


Figure 1-7: Channel Alteration

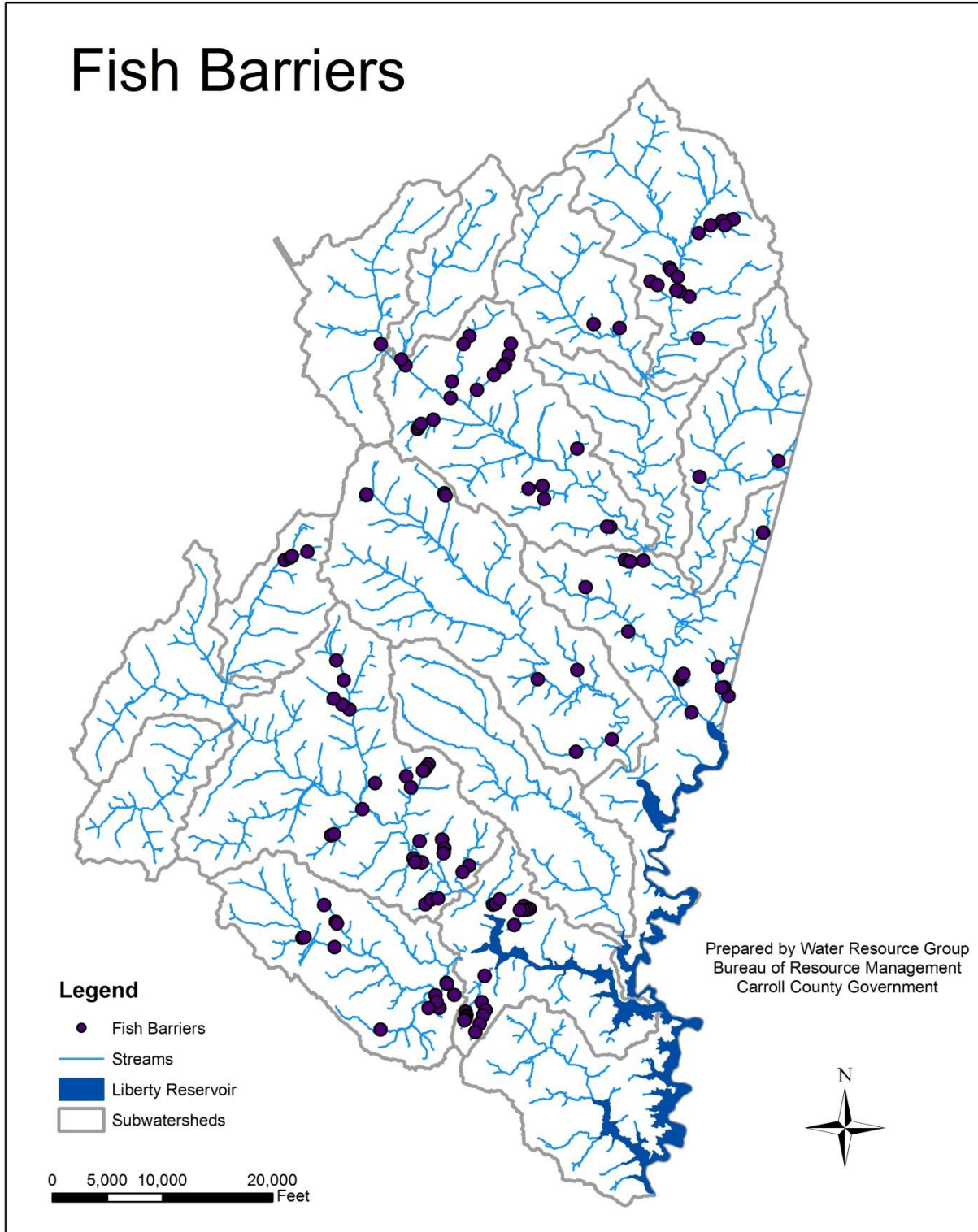


Figure 1-8: Fish Barriers

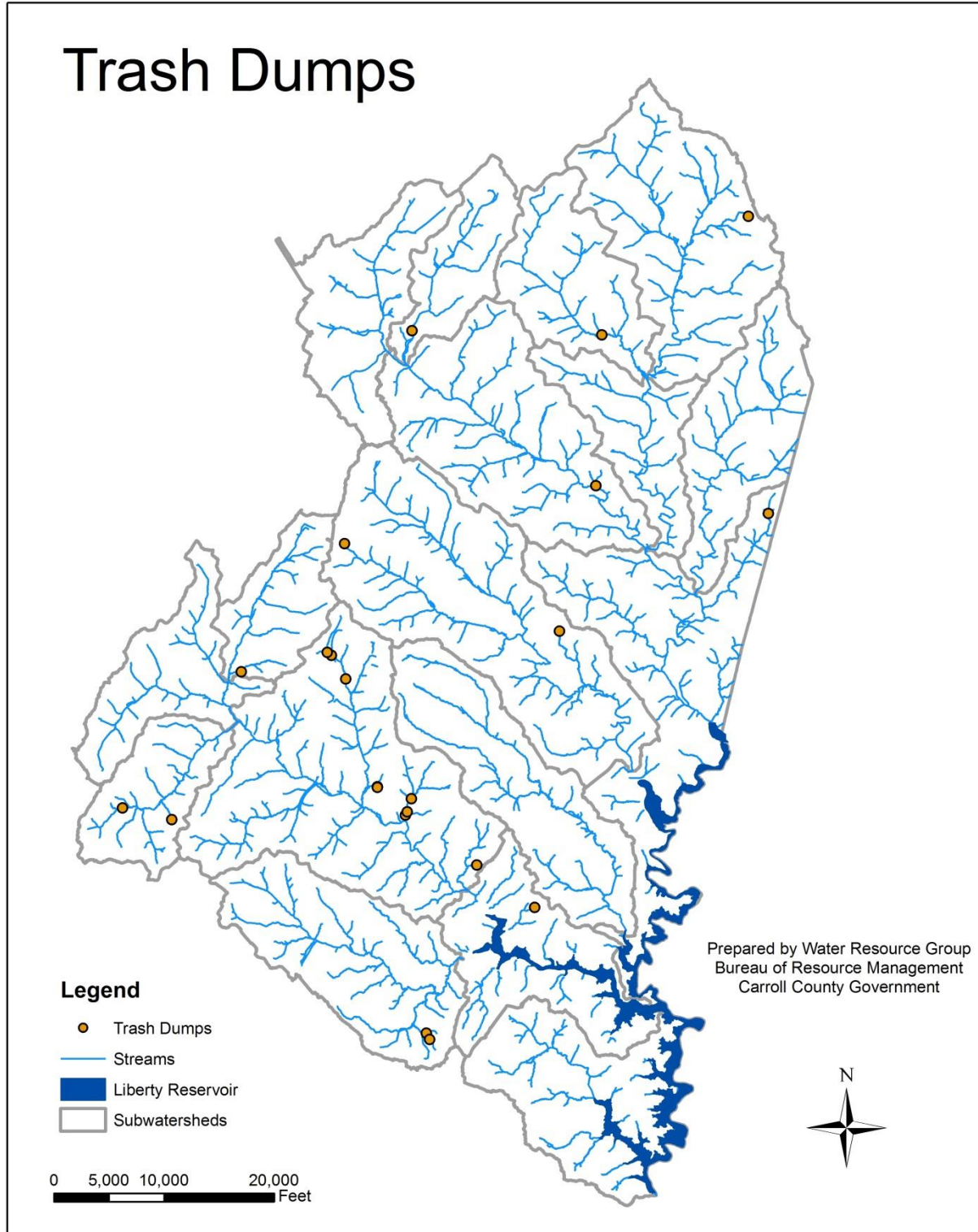


Figure 1-9: Trash Dumps

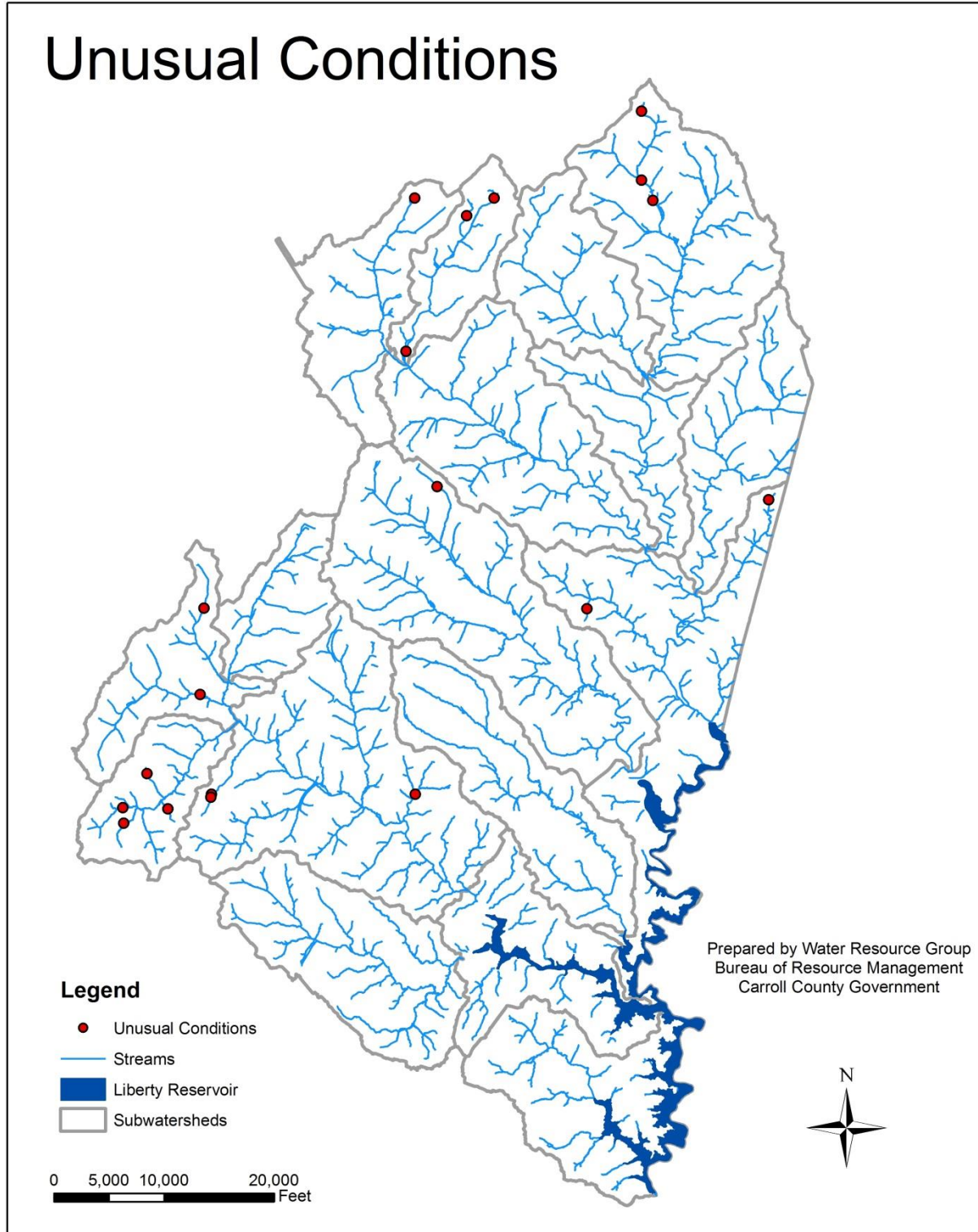


Figure 1-10: Unusual Conditions

V. Subwatershed Summary

Aspen Run: Erosion problems were identified along 1,500 linear feet (<1%) of the stream channel, with the entire 1,500 feet classified as severely eroded. Inadequate buffers were identified along 16,050 linear feet (10%) of the streambank, with 8,800 feet (55%) classified as severe.

Beaver Run: Erosion Problems were identified along 7,675 linear feet (3%) of the stream channel, with 1,100 feet (14%) classified as severely eroded. Inadequate buffers were identified along 36,105 linear feet (8%) of the streambank, with 27,700 feet (77%) classified as severe.

Cranberry Branch: Erosion Problems were identified along 1,950 linear feet (4%) of the stream channel, with 100 feet (5%) classified as severely eroded. Inadequate buffers were identified along 7,330 linear feet (7%) of the streambank, with 6,500 feet (89%) classified as severe.

Deep Run: Erosion Problems were identified along 2,060 linear feet (2%) of the stream channel, with none being classified as severely eroded. Inadequate buffers were identified along 28,045 linear feet (12%) of the streambank, with 19,700 feet (70%) classified as severe.

East Branch Patapsco (1052): Erosion Problems were identified along 70 linear feet (<1%) of the stream channel, with none being classified as severely eroded. Inadequate buffers were identified along 6,750 linear feet (4%) of the streambank, with 1,500 feet (22%) classified as severe.

East Branch Patapsco (1059): Erosion Problems were identified along 11,975 linear feet (7%) of the stream channel, with 6,085 feet (51%) classified as severely eroded. Inadequate buffers were identified along 36,640 linear feet (10%) of the streambank, with 28,140 feet (77%) classified as severe.

Snowden's Run: Erosion Problems were identified along 13,159 linear feet (15%) of the stream channel. Inadequate buffers were identified along 11,701 linear feet (7%) of the streambank.

Liberty Reservoir: Erosion Problems were identified along 2,570 linear feet (4%) of the stream channel, with 230 feet (9%) classified as severely eroded. No inadequate buffers were identified within this subwatershed.

Little Morgan Run (1049): Erosion Problems were identified along 10,460 linear feet (7%) of the stream channel, with 4,540 feet (43%) classified as severely eroded. Inadequate buffers were identified along 11,470 linear feet (4%) of the streambank, with 5,450 feet (48%) classified as severe.

Little Morgan Run (1055): Erosion Problems were identified along 1,410 linear feet (2%) of the stream channel, with none being classified as severely eroded. Inadequate buffers were identified along 9,360 linear feet (8%) of the streambank, with 4,660 feet (50%) classified as severe.

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Morgan Run (1053): Erosion Problems were identified along 1,340 linear feet (2%) of the stream channel, with 870 feet (65%) classified as severely eroded. Inadequate buffers were identified along 14,360 linear feet (10%) of the streambank, with 8,970 feet (62%) classified as severe.

Morgan Run (1054): Erosion Problems were identified along 1,050 linear feet (1%) of the stream channel, with 100 feet (10%) classified as severely eroded. Inadequate buffers were identified along 15,230 linear feet (10%) of the streambank, with 10,600 feet (70%) classified as severe.

Morgan Run (1050): Erosion Problems were identified along 20,720 linear feet (7%) of the stream channel, with 5,740 feet (28%) classified as severely eroded. Inadequate buffers were identified along 26,670 linear feet (5%) of the streambank, with 18,200 feet (68%) classified as severe.

Roaring Run: Erosion Problems were identified along 3,521 linear feet (2%) of the stream channel, with 1,150 feet (33%) classified as severely eroded. Inadequate buffers were identified along 21,320 linear feet (6%) of the streambank, with 15,400 feet (72%) classified as severe.

West Branch Patapsco (1051): Erosion Problems were identified along 9,332 linear feet (5%) of the stream channel, with none being classified as severely eroded. Inadequate buffers were identified along 19,075 linear feet (5%) of the streambank, with 8,100 feet (42%) classified as severe.

West Branch Patapsco (1062): Erosion Problems were identified along 5,200 linear feet (7%) of the stream channel, with 1,000 feet (19%) classified as severely eroded. Inadequate buffers were identified along 44,880 linear feet (32%) of the streambank, with 42,480 feet (95%) classified as severe.

VI. Summary

The Bureau is currently developing two plans for the Liberty Reservoir watershed. The first is a Characterization Plan that references the natural and human characteristics of the watershed and discusses any water quality data that has been collected within the watershed. The second is a Restoration Plan that will define the Bureau's goals for addressing environmental concerns within the watershed. The focus will be to address erosion problems through stormwater management and tree planting.

Appendix A: SCA Permission Letter

Liberty Reservoir Watershed Stream Corridor Assessment

Gale J. Engles, Bureau Chief
Bureau of Resource Management
410-386-2321, Fax: 410-386-2924
Environmental Inspection Services
410-386-2210



**Department of Land Use, Planning
and Development**
Carroll County Government
225 North Center Street
Westminster, MD 21157
1-888-302-8978; TT 410-848-9747

October 15, 2011

Dear Watershed Resident:

The Carroll County Bureau of Resource Management will be conducting a stream corridor assessment of the streams located in the Liberty Reservoir watershed. The goal of this assessment is to identify locations that would benefit from potential water quality improvement efforts. The County is contacting all landowners within the watershed who own land adjacent to a stream corridor, and requesting permission from the landowner to survey the stream on their property during the winter of 2012.

County staff will be performing the fieldwork for this survey. Teams of two to three field crew members will be walking the stream corridors in the watershed, making field observations of various characteristics such as erosion, undermined pipes, un-shaded stream corridors, trash dumps and other related environmental concerns that may impact water quality. Each team will pass through your property for a short time and will not be altering the landscape in any way. Each member of the team will be appropriately identified and observe proper protocols.

The information collected from this survey will be used to help direct future stream restoration and protection efforts. Please use the enclosed card to indicate your choice for permission and return the card to our office by December 15, 2011. For more information about this study, please contact me at (410) 386-2167. Thank you in advance for your participation.

Sincerely,

Byron Madigan

Byron R. Madigan
Water Resources Technician
Department of Land Use, Planning and Development
Carroll County Government
bmadigan@carr.org

Appendix B: Impairment Severity Criteria

1) BF-Inadequate Buffer

- a) Severe
 - i) Length of stream (>1000') w/ no trees on either side
- b) Moderate
 - i) Moderate length of stream with trees on only one side
- c) Minor
 - i) Stream section with trees on both sides, but with buffer <50'

2) ER-Erosion Site

- a) Severe Rating of 1
 - i) Long section >1000' w/ unstable banks on both sides
 - ii) Incised several feet and eroding very fast
 - iii) Stream bank is eroded below the root zone
- b) Moderate Rating of 3
 - i) Long section >1000' w/ moderate erosion problems
 - ii) **OR** shorter reach 300-400' w/ high banks >4'
- c) Minor Rating of 5
 - i) Short section of stream <300' w/ erosion at one or two meander bends

3) EX-Exposed Pipe (Sewer Line, etc.)

- a) Severe Rating of 1
 - i) Any pipe that is leaking or being undermined
 - ii) Or suspended above the stream bed
- b) Moderate Rating of 3
 - i) Long section of pipe that is partially exposed but no immediate threat the pipe will be undermined
- c) Minor Rating of 5
 - i) Small section of top of pipe exposed
 - ii) Stream bank appears stable

4) FB- Fish Barrier

- a) Severe Rating of 1
 - i) Dam or road culvert on large stream (3rd order or >) totally blocking upstream movement
- b) Moderate Rating of 3
 - i) Total fish blockage on a tributary significantly isolating a reach of stream
- c) Minor Rating of 5
 - i) Temporary barrier such as beaver dam

5) OF- Pipe Outfall (storm discharge, field drain, etc.)

- a) Severe Rating of 1
 - i) Outfall with strong discharge and distinct color/smell
 - ii) Discharge causing significant impact downstream
- b) Moderate Rating of 3
 - i) Outfall with small discharge
- c) Minor Rating of 5
 - i) Storm water pipes that have no dry weather discharge

6) CH- Channel Alteration

- a) Severe Rating of 1
 - i) Concrete channel w/ shallow water
 - ii) Significant section channelized >1000'
- b) Moderate Rating of 3
 - i) Channel >500' previously channelized
 - ii) Beginning to stabilize with vegetation
- c) Minor Rating of 5
 - i) Earthen channel <100'
 - ii) Size and shape of un-channelized reaches

7) TR- Trash Dump (within 50 feet of stream)

- a) Severe Rating of 1
 - i) Large amount scattered over large area, difficult access
 - ii) Chemical drums or hazmat regardless of amount
- b) Moderate Rating of 3
 - i) Large amount in small area with easy access
 - ii) Able to be cleaned up in a few days
- c) Minor Rating of 5
 - i) Small amount less than two pickups with easy access

8) UN- Unusual Condition

- a) Severe Rating of 1
 - i) Has direct and wide reaching impact on aquatic life
- b) Moderate Rating of 3
 - i) Has some adverse impacts at site
 - ii) Significant problem, but not the worst seen
- c) Minor Rating of 5
 - i) Problem does not appear to be affecting stream

9) CO- Stream Construction

- a) Severe Rating of 1
 - i) Large construction site w/ large amount of disturbance
 - ii) Absence of sediment control measures
- b) Moderate Rating of 3
 - i) Site near stream w/ little disturbance to banks
 - ii) Within riparian w/ some sediment entering stream
- c) Minor Rating of 5
 - i) Site away from stream and outside riparian
 - ii) Sediment control adequate no evidence sediment in stream