

**FIELD APPLICATION OF A METHOD TO DETERMINE THE  
FEASIBILITY AND POTENTIAL BENEFITS OF IMPLEMENTING LOW  
IMPACT DEVELOPMENT TECHNIQUES AND RETROFITTING  
CONVENTIONAL STORM WATER PRACTICES IN DEVELOPED AREAS**

**PART TWO: PRINCE GEORGE'S COUNTY RESULTS**

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# CONTENTS

	<u>Page</u>
1. INTRODUCTION .....	1
2. SITE SELECTION .....	2
3. SITE EVALUATION FORMS.....	4
4. SITE EVALUATION .....	6
5. SITE RANKING.....	10
6. PILOT SITES.....	14
APPENDIX A: Data Collection Forms	
APPENDIX B: Data Collection Form Guidance	
APPENDIX C: Site Ranking Components and Derivation	
APPENDIX D: Completed Site Data Collection Forms	
APPENDIX E: Completed Pilot Site Data Collection Forms	

## 1. INTRODUCTION

The Upper Patuxent River Watershed is located in northeastern Prince George's County and western Anne Arundel County. The main stem of the river forms the boundary between the counties of Prince George's and Anne Arundel. The watershed has a drainage area of 88 square miles, with 52 square miles in Prince George's County. In the State's 1998 Unified Watershed Assessment, the Upper Patuxent was listed as a Category 1 Priority Watershed when it failed two of the five water quality indicators. Watershed landscape indicators of water quality that had poor scores included percent of impervious surface, population density, soil erodibility, benthic index of biotic integrity, in-stream habitat and imperiled aquatics species indicator. All these watershed indicators can be directly correlated with urban and transportation corridor-related development.

To address the identified water quality issues, Prince George's and Anne Arundel Counties developed a Watershed Restoration Action Strategy (WRAS) proposal for the Upper Patuxent River. The Counties proposed to develop a plan to target areas for the development of potential storm water management sites. Implementation of the plan will help mitigate the effects of uncontrolled runoff to the Patuxent River through the use of innovative and environmentally-sensitive development techniques and state-of-the-art storm water management practices. Targeting of the mitigation efforts will be based on stream corridor, biological and water quality assessments. These assessments will help to identify stream reaches in need of physical rehabilitation and provide needed information to be used in the prioritization of stream rehabilitation projects.

Together, Prince George's and Anne Arundel Counties received a grant from the Maryland Department of Natural Resources (DNR) to develop a watershed plan for the Upper Patuxent River Watershed (HUC No. 02131104). The Dewberry & Davis LLC (Dewberry) role in this effort was to perform the following tasks: (1) development of a site evaluation procedure, (2) completion of the site evaluation, and (3) site ranking. This report was prepared to document and to summarize these efforts. The site rankings will help the County set funding priorities for future storm water management retrofits in the watershed. The work performed in the Prince George's County portion of the Upper Patuxent River watershed is summarized in this document. The results of the Anne Arundel County portion of the watershed are summarized in Part One.

## 2. SITE SELECTION

The selection of viable sites was needed to facilitate the management of restoration efforts and to support the targeting of limited assessment resources. The initial step in the site selection process was the subdivision of the State's Upper Patuxent River Watershed into subwatersheds based on drainage area and land use criteria. The subdivision of the Upper Patuxent River watershed resulted in 17 subwatersheds ranging in size from 350 to 4330 acres, with an average subwatershed size of 1250 acres. The subdivided subwatersheds had relatively homogenous land uses. The location of the 17 subwatersheds within the Upper Patuxent River Watershed in the County may be seen in Figure 1.

Following the development of final subwatershed delineation, metrics from the Basin Condition Scoring (BCS) methodology developed for the Upper Patuxent River Watershed were completed (Victoria, et al, 2003).

Using stream, biological and water quality assessment information, and BCSs, individual parcels were identified for evaluation as potential retrofit sites. It was expected that focusing on a single parcel would increase the homogeneity of features recorded on site evaluation forms. Homogeneous features on a parcel were needed to facilitate the ranking of sites. The parcels had various levels of urban and suburban land uses and some already had storm water management (SWM) within their watersheds or downstream. The parcels had various ownership types and opportunity criteria.

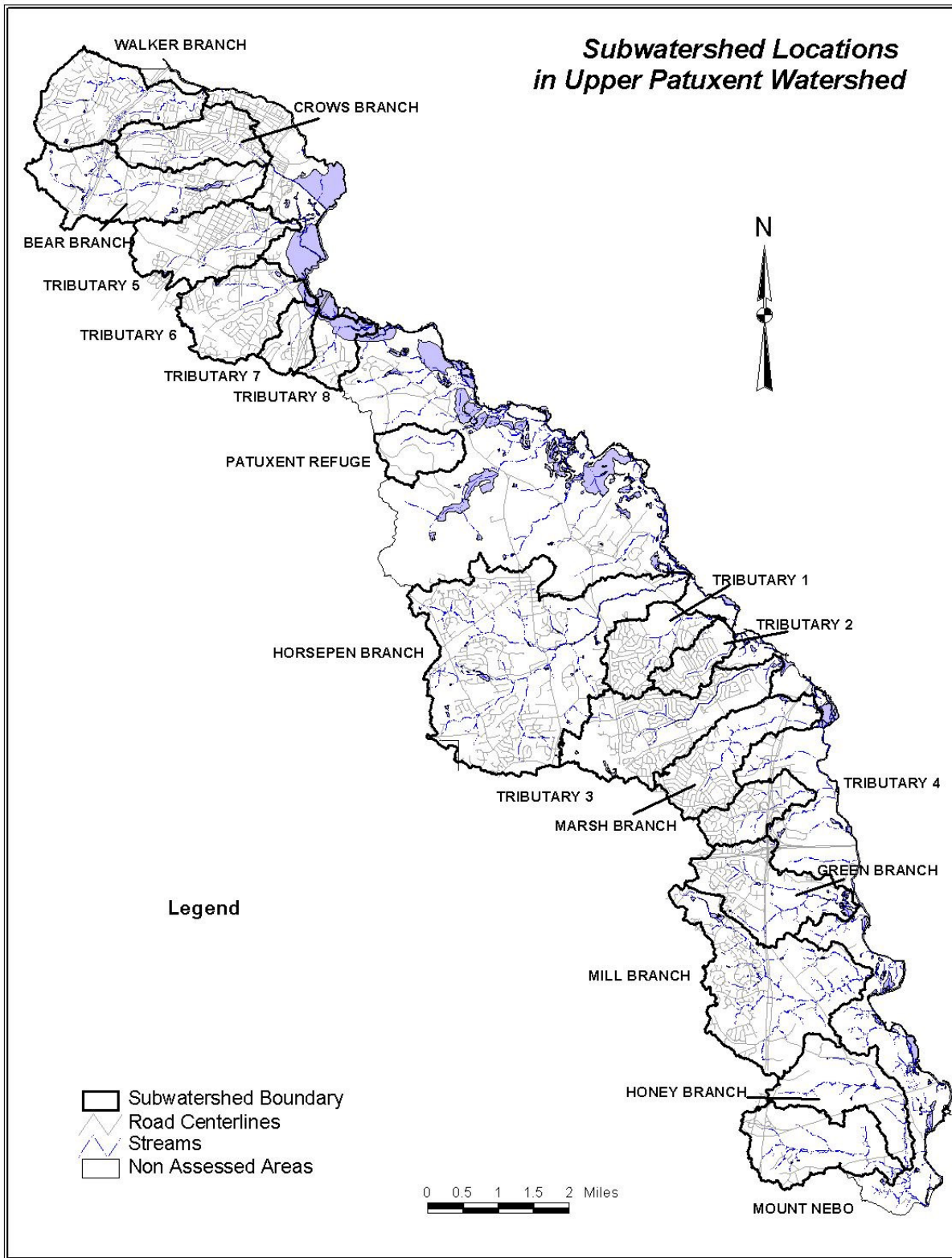


Figure 1. Locations of the 17 Subwatersheds in the Upper Patuxent River Watershed.

### 3. SITE EVALUATION FORMS

Concurrent with the site selection process, a data needs and available information assessment was also completed. The assessment of the data needs and available information was needed to develop a procedure to evaluate the sites with the objective to rank the sites as to their potential for storm water management (SWM) retrofits. Data needs include mapping, impervious area, storm drain system layout, utilities, topography, parcel ownership, land use, and existing storm water management. Available information includes the County's GIS and soils information. The parcel evaluation procedure included the development of data collection forms. The data collection forms were structured to facilitate collection of information and to rank the sites in a consistent manner.

Three forms were developed to facilitate collection of data and subsequent analysis.

Form 1 was used to record information concerning a catchment. As used here, a catchment is defined as a portion of the subwatershed. It was originally envisioned that a catchment would encompass an area of between 2 to 50 acres. However, as the assessments were initiated, the catchments were made smaller so that they were only as large as necessary to capture as much of the parcel area as possible. However, it is possible for one catchment to include one or more parcels. It is also possible that a catchment may not include the entire parcel area for a site, usually because of topography or the layout of the storm water drainage system. Form 1 is populated using existing information.

For each parcel, a catchment area was delineated. If possible, the outlet of the catchment was a defined storm water conveyance such as a channel, storm drain inlet or SWM facility. However, there were instances where no defined storm water conveyance was present, especially in flat areas or areas that border streams. If there was no defined storm water conveyance, it was necessary to use an arbitrary catchment outlet. As used here, a site is the portion of the parcel located within the catchment boundary. One catchment may also contain two or more sites. Conversely, one parcel may be contained within two or more catchments. In this instance, each portion of the parcel within a catchment is considered a unique site.

Form 2 is used to collect site information. Form 2 was populated mainly from site visits. Because storm drain information was frequently unavailable for the site, final catchment boundaries could not be determined until after the site visit. Therefore, Form 1 was not completed until after the site visit was conducted.

Form 3 was used to evaluate the opportunities and constraints of potential management practices for each site. All sites contained two or more proposed management practices. The relationship between the three data collection forms is presented in Figure 2.

Blank data collection forms are found in Appendix A. Guidance for the completion of the three data collection forms is presented in Appendix B. The guidance presented in Appendix B describes each data item.

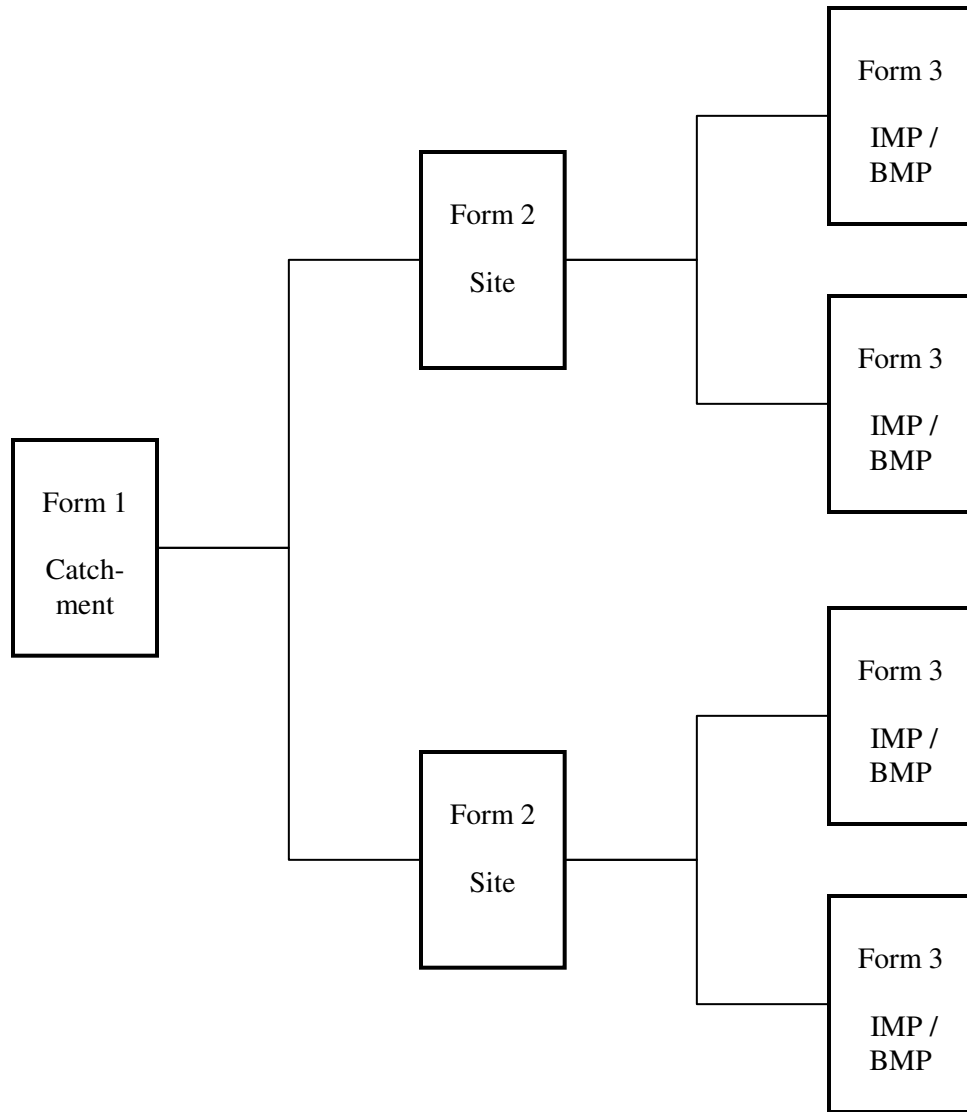


Figure 2. Relationship Between the Three Data Collection Forms

#### 4. SITE EVALUATION

The initial step of the site evaluation was to prepare a map of the site using the County's GIS data. A copy of the map, which included an image from aerial photography, was printed for use in the field. An approximate catchment boundary was also shown on the map. This catchment boundary was then revised based on observations made during the field visit. Although the County GIS data included utility, storm drain and SWM information, this information frequently did not extend onto individual parcels and was unavailable for use during the site visit.

The site maps were used during the field visit for reference and for annotation. The location of storm drain inlets were noted on the map. Connectivity of the storm drain system was investigated but could not always be determined. The location of existing SWM facilities were also noted on the map. Based on the topography and storm drain inlet information, the drainage boundary was recorded on the site map. The presence of utilities could be determined from meters, junction boxes, valve boxes, transformers, or manholes. In some instances, where there were recent construction projects in the area, the utilities were marked. If observed, the presence of utilities was noted. Photographs were taken to document the site and its characteristics. The portion of Form 2 requiring field data was completed. Form 2 is used to assess the site characteristics as they apply to suitability for potential SWM retrofits.

Following the field assessment, the information from the forms is entered into the electronic version. Information recorded on the site map is entered into the County's GIS data base. The data collected in the field is used to complete the forms. All information is recorded electronically.

Forty-eight sites were assessed. The location and distribution of the sites within the County is shown on Figure 3. The majority of sites were concentrated around the urbanized areas of the Cities of Bowie and Laurel. The location of the sites in the vicinity of the City of Bowie is shown on Figure 4 and the sites around Laurel are shown on Figure 5. The completed forms (Forms 1 and 2) are found in Appendix D. The forms (Forms 1, 2 and 3) associated with the five pilot sites are found in Appendix E.