

1.0 INTRODUCTION

Lower Bush Creek was selected as the first watershed to be assessed under Frederick County's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems Discharge Permit, Permit Number MD0068357. This watershed was considered a high priority for assessment because of the onset of construction at the Villages of Urbana Planned Unit Development (PUD). This new development is within the Peter Pan Run subwatershed, a portion of the Lower Bush Creek watershed (Figure 1-1). Construction at the PUD site, including construction of a sewer line along Peter Pan Run, made it critical to assess baseline conditions in this stream and the surrounding watershed. As part of the overall NPDES support contract for Frederick County, Versar, Inc. began the assessment of Lower Bush Creek watershed in May 1999.

The purpose of the watershed assessment is to establish a baseline, or starting point, against which the efficacy of future Best Management Practices (BMPs) to control non-point source pollution in the Lower Bush Creek watershed can be measured. Although this baseline does not represent natural conditions, it characterizes conditions in the Lower Bush Creek watershed during the initial construction of the PUD in the Peter Pan Run sub-watershed, but before more extensive development occurs elsewhere in the watershed. As BMPs are brought on-line, continued monitoring will provide data that can be compared to this baseline and other historical information. Any reduction in pollutants (i.e., improved water quality) provided by the new BMPs should be evident in the monitoring data. A process of adaptive management (based on the long-term monitoring), refinement of existing BMPs, and the introduction of additional BMPs and source controls, should effectively reduce non-point source pollution within the study area.

Construction of the Urbana PUD will affect a substantial portion of the watershed surrounding Peter Pan Run. This area, north of Urbana Pike (State Route MD 355) and Fingerboard Road (MD 80) in Urbana, was zoned for PUD in 1972 by the Frederick County Department of Planning and Zoning to accommodate two large developments (1993a). Although these developments were never built, the PUD zoning designation remained. The Villages of Urbana is a new development project currently underway in the Urbana PUD area. This development will cover approximately 700 acres with a mix of residential dwelling types in three major sections, totaling just over 3,500 dwelling units (Rodgers & Associates, Inc. 1997; FCDPZ 1995). Several public use lands and park areas will cover an additional 300 acres. At completion, the PUD will include mixed-use town and village centers, two new school sites, and a library site. The developers have also agreed to implement substantial road improvements, including relocation of portions of MD 80 and MD 355 to increase their capacity, as well as extending water and sewer service from Frederick to Urbana (FCDPZ 1995). An additional 348 acres (approximate) of commercial and office/research industrial development is underway as part of the Villages of Urbana project; however, this construction is located south of MD 355 and MD 80, just beyond the Lower Bush Creek watershed boundary.

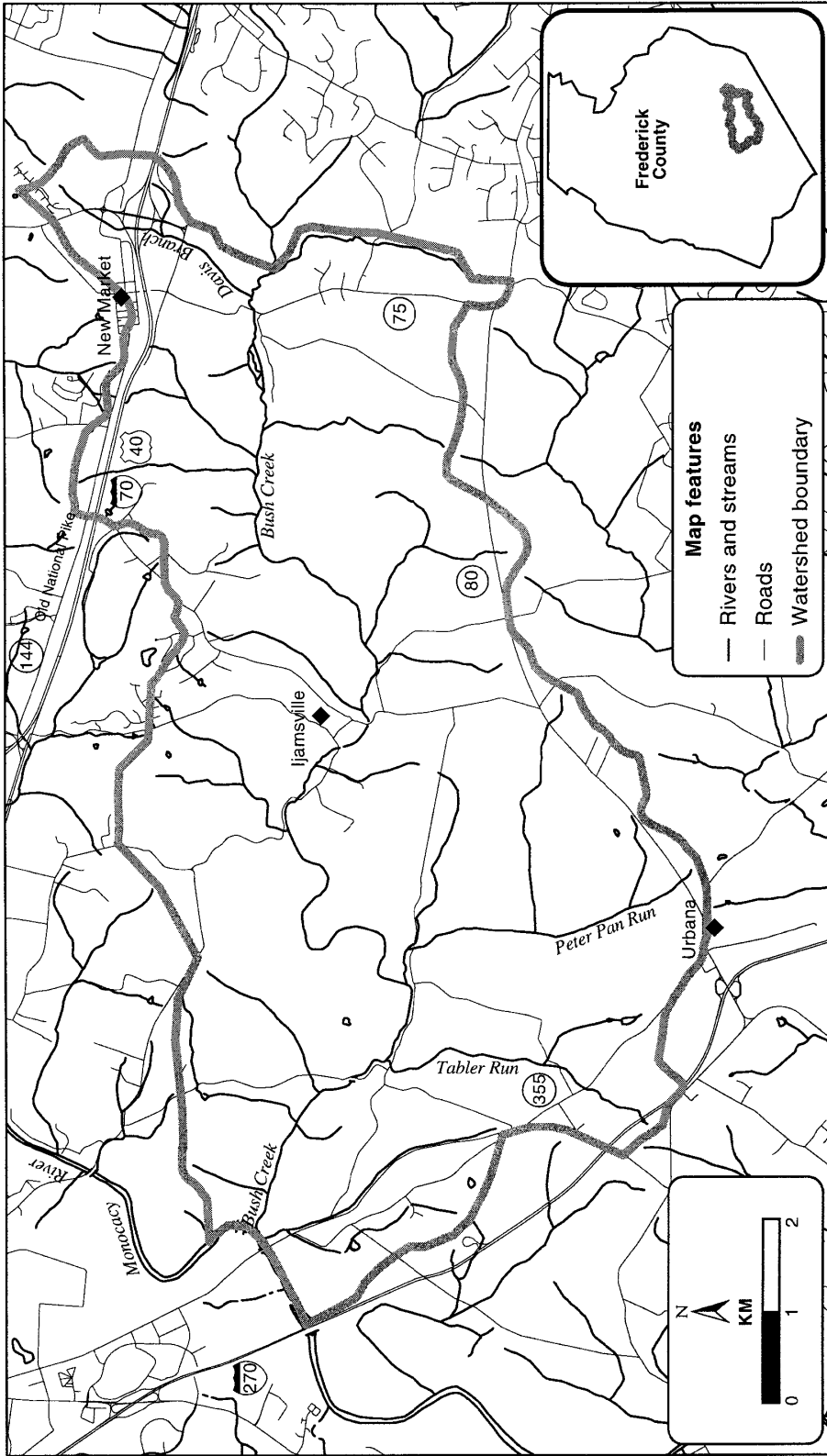


Figure 1-1. Lower Bush Creek watershed, Frederick County, Maryland

The focus of this watershed assessment is on assessing existing conditions in the Lower Bush Creek watershed and identifying water quality problems and opportunities to improve water quality. Because much of the Lower Bush Creek watershed is currently undeveloped and not extensively affected by urban stormwater impacts, this assessment was specifically tailored to also consider projected future land uses and their potential impacts. Although the current amount of impervious surface in the watershed is relatively small, future urbanization is likely to occur in this rapidly-developing part of Frederick County. This assessment of current conditions thus incorporates a wide range of potential stressors, including both urban and agricultural land use activities. Projections of future development make it possible to estimate future impervious surface, potential future stormwater impacts, and requirements for proper stormwater management.

Impacts on stream quality usually become apparent when the extent of impervious surface exceeds 10 percent (Schueler 1994). Impervious surfaces, such as roads, parking lots, sidewalks, and rooftops, cause a rapid increase in the rate at which water is transported from the watershed to its stream channels. Common effects include more variable stream flows, increased erosion from runoff, habitat degradation caused by channel instability, increased nonpoint source pollutant loading, elevated temperatures, and losses of biological diversity. Effects on sensitive species may occur at levels even below 10 percent. With even more impervious surface, most notably at about 25-30 percent of catchment area, numerous aspects of stream quality (including biological integrity, water quality, and physical habitat quality) may become degraded (Center for Watershed Protection 1998; Schueler 1994). Although our estimates show that the Lower Bush Creek watershed currently includes less than 10 percent impervious surface, it is highly likely that portions of the watershed will exceed this threshold within 20 years.

Other effects of urbanization include the loss of natural vegetation throughout the watershed and particularly the loss of riparian vegetation, which supports many important stream processes. Riparian vegetation stabilizes streambanks and reduces the inputs of nutrients, sediment, and other pollutants. Riparian vegetation also provides shade and contributes to shoreline and stream habitat quality by supplying rootwads and other woody debris that serve as cover for amphibians, reptiles, mammals, fish, and invertebrates.

This report documents the findings of the Lower Bush Creek watershed assessment conducted from May to November 1999. Assessment components include a description of methods (Section 2), general description of the watershed (Section 3), an assessment of existing conditions in the watershed (through environmental evaluation of field surveys and other data, infrastructure analysis, growth projections, and pollution source inventories) (Section 4), an assessment and ranking of water quality problems (Section 5), identification of opportunities to improve water quality (Section 6), and development of a watershed water quality plan (Section 7).

