

1.0 INTRODUCTION

This report documents a Watershed Assessment and Watershed Water Quality Plan for Lower Linganore Creek watershed that was prepared for the Frederick County Division of Public Works (DPW). The report summarizes the work performed, findings, and recommendations for watershed protection measures in the Lower Linganore Creek watershed. Lower Linganore Creek is located in eastern Frederick County and consists primarily of agricultural and suburban areas; however, a quarter of the watershed remains forested.

The focus of this study was to assess current conditions in the Lower Linganore Creek watershed, and then use this information to identify opportunities to improve water quality. Because geology, vegetation, and land use all influence watershed hydrology, water quality, and aquatic habitat, the watershed assessment was tailored to gather data on the watershed's natural resources and then to consider rural and urban stormwater impacts. Information on present and future stormwater impacts was then used to develop recommendations that will help Frederick County implement long-term strategies for stormwater management (SWM).

The Watershed Water Quality Plan focuses primarily on stormwater runoff because runoff from excess precipitation falling on rural, suburban, and urban areas carries many pollutants, including nutrients, oil and grease, heavy metals, and organic pollutants such as residues from pesticides. Because pollutants carried by stormwater runoff typically enter surface water bodies from diffuse locations at intermittent times during and after rainfall, it is usually referred to as "nonpoint source pollution" or "nonpoint pollution." Runoff volume and quantities and types of nonpoint pollution are commonly related directly to the amount of imperviousness associated with each land use category within the drainage area. For example, compacted soils, roads, rooftops, parking lots, driveways, and other impervious surfaces are major sources of nonpoint pollution. This nonpoint pollution contributes to water quality degradation and loss of aquatic habitat and is the major threat to water quality in the Lower Linganore Creek watershed.

Data gathered in this assessment will also serve as a baseline against which the efficacy of future best management practices (BMPs) to control nonpoint source pollution can be measured. As BMPs are implemented, continued monitoring will provide data that can be compared to this baseline and other historical information. Reductions 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), maintenance of existing BMPs, and the introduction of additional BMPs and source controls should effectively reduce nonpoint source pollution within the study area.

1.1 DESCRIPTION OF THE STUDY AREA

Lower Linganore Creek was selected as the third 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 its close proximity to the rapidly growing

City of Frederick has caused the watershed to experience significant residential development in the Lake Linganore area. In 1968, construction of Lake Linganore and an eventual 8,900-units around the lake was approved (FCDPZ 1993). Current zoning maps indicate that a large majority of the remaining agricultural and forested land around Lake Linganore has been zoned for Planned Unit Development (PUD), indicating that the intensity of land use will continue to increase in this area. Adding to the mix of older and newer development, future development threatens to adversely affect stream and water quality by increasing the cumulative impacts to the watershed. Without appropriate attention to stormwater management and other BMPs, continuing urbanization of the watershed could lead to degradation of existing conditions.

Agriculture has played an important role in this region and a large majority of the watershed is classified as farmland of statewide importance. However, agricultural practices can play a significant role in influencing watershed water quality. As noted by the Frederick County Department of Planning and Zoning (1995), Linganore Creek has been a priority watershed for the State because of its agricultural land use and its erodible soil. Research and extension programs have focused on voluntary use of best management practices to reduce sediment - a major pollutant of the Monocacy River. Lake Linganore itself acts as a sediment trap and thereby loses potential water storage...@

Linganore Creek also plays a critical role in providing drinking water to citizens living in the Frederick region. The City of Frederick operates a water treatment facility that withdraws water from the Creek just downstream from Lake Linganore. The County operates a facility with an intake 1,200 feet upstream from the Lake Linganore dam. A third drinking water intake is located immediately upstream of Lake Linganore and is operated by the Westwinds Country Club (FCDPZ 1993; 1995). As such, stormwater pollution entering Linganore Creek can adversely affect this source of drinking water and raise human health concerns (MDE 2002).

Recreation within the watershed may also be somewhat affected by the alteration of watershed hydrology and water quality brought about by agricultural uses and increasing development. Linganore Creek has been classified by the State as Class IV, Recreational Trout Waters, and typical stormwater impacts such as increased turbidity and sediment load often cause decreases in trout populations. The role of Lake Linganore as a regional recreational attraction for boaters, swimmers, and anglers also raises health concerns as people ingest fish from or come into direct contact with water potentially containing elevated levels of stormwater pollutants.

1.2 STUDY ELEMENTS

Major elements of this study included the following:

- Characterizing existing conditions within the Lower Linganore Creek watershed
- Monitoring biological and physical habitat conditions at ten representative stream segments across the watershed and assessing ecological condition using existing Piedmont reference stream conditions

- Screening land use and other available data to identify and inventory potential pollutant sources and problem areas in the watershed
- Site visits for visual inspection of potential stressors of stream quality, outfall screening for water quality problems, and source identification
- Analysis of land use patterns, infrastructure, and population trends
- Hydrological and water quality modeling analysis using a modified version of the United States Environmental Protection Agency's (USEPA's) Stormwater Management Model (SWMM) to assess watershed and subwatershed runoff and loading characteristics
- Development of prioritized management measures for the reduction of nonpoint source pollution and other watershed problems

1.3 SCOPE OF REPORT

This report integrates existing and new data and presents recommendations for the protection of water quality in the Lower Linganore Creek watershed. Existing data were drawn from multiple sources. Frederick County DPW supplied data for geographic information systems (GIS) analysis, including information on the watershed boundary, land use, roads, stream network, and stormwater management facilities. Zoning, soils, wetlands, and other information utilized in this assessment was obtained from other County, State, and Federal Agencies, as described below. New information was collected in focused field surveys of physical and biological conditions, and did not include the collection and analysis of stormwater chemical monitoring data. However, existing data were sufficient to support the water quality model used in this investigation.

In this report, Section 2 describes existing physical and biological characteristics of the watershed, including information on land use, population, infrastructure, impervious surfaces, stormwater management and point source outfalls. Section 3 summarizes stormwater modeling in the watershed. Section 4 prioritizes opportunities to improve water quality in the watershed. Section 5 contains recommendations and an implementation schedule to improve water quality, and references may be found in Section 6.

