

Introduction

The 1981 *Eastern Montgomery County Master Plan* recognized the importance of land use planning in maintaining water quality in watersheds and established watershed protection as a major goal. It states that “to protect the water quality and quantity of the Anacostia and Patuxent River basins, sound watershed management needs to be practiced to improve existing conditions and control future development” (M-NCPPC, 1981). Recommendations are set forth in the 1981 master plan to reduce negative impacts of human activities on watersheds and help protect stream systems.

The 1981 master plan recognized the importance of the Paint Branch, in particular, as a critical resource for the County, and more specifically, the brown trout fishery in Paint Branch as a feature so valuable as a water quality indicator and unique as a natural resource for the County that special measures were required to protect it. The *Plan* recommended certain amounts of development activity in the watershed, but also recommended special measures, including downzoning in the upper Paint Branch watershed, to achieve a low ultimate impervious land cover. These measures included limiting land disturbance and forest cover loss, recommending additional park acquisition, and the incorporation of extraordinary best management practices in land development projects. It was thought that recommendations of the *Master Plan* would help provide the necessary environmental protection to ensure the continued integrity of the cold water resource.

A. Purpose and Scope of Study

This study comprehensively examines the body of knowledge gained since the adoption of the 1981 master plan on urbanization impacts on the water resources of Paint Branch, estimates future impacts, and formulates a land use and regulatory strategy to ensure continuing protection of these resources. This study is intended to be used in two ways: to help develop land use recommendations in the Paint Branch watershed as part of the work for the Cloverly, White Oak, and Fairland Master Plans and to help guide modifications to current County environmental regulations, guidelines, and programs, as they apply to Paint Branch.

To identify what watershed management measures are needed in Paint Branch, the study looks at the following questions:

- What are the past and current conditions of the streams in Paint Branch?
- What changes in the health and conditions of the streams have been documented over time and how are these changes related to changes in the land uses within the subwatersheds of Paint Branch?
- What are the projected changes in the health and conditions of the various streams if the subwatersheds are developed according to the 1981 master plan, as amended in 1990, land use recommendations?

- Are the projected changes in the streams under the 1981 master plan, as amended, within limits that are acceptable for protection of Paint Branch?
- If the recommendations in the 1981 master plan, as amended, are not adequate to protect the natural resources of Paint Branch, what watershed management measures should be implemented to provide the appropriate level of protection?

B. Description of the Upper Paint Branch Stream System

The Paint Branch is a moderate-sized, fourth order stream. The upper Paint Branch, defined as being roughly upstream of Fairland Road, exhibits high water and habitat quality. These high quality conditions can be seen in the various animal and plant life that live in the stream. One indication of high quality conditions is the presence of large numbers of individuals and variety of different species. This includes species sensitive to pollution such as certain macro-invertebrates. Another, more well-known indicator of a high quality stream system, is the presence of a naturally-reproducing brown trout population.

The presence of brown trout in Paint Branch makes this stream system a unique resource for the County because it is the only stream system in Montgomery County with a *proven, consistent, long-term self-sustaining* trout population. (The other Use III streams are also important and valuable but they have been stocked with juvenile trout in the recent past to supplement low numbers of trout or to establish self-sustaining populations). A self-sustaining trout population had been documented in 1973 and possibly as far back as the late 1930's (Gougeon, 1985). The Paint Branch's ability to support continuously this fishery resource reflects its long history of high quality conditions and its importance in the County's "collection" of unique and valuable natural resources. An excellent and more detailed characterization of Paint Branch can be found in a compendium put together in the early 1980's (Galli, 1983).

The brown trout fishery in Paint Branch extends from the upper reaches of the stream system near Spencerville Road (MD 198) down to the mainstem at I-495 (the Capital Beltway). The indi-

vidual streams in Paint Branch form a network and have inter-related roles and functions in supporting a naturally-reproducing trout fishery. For Paint Branch to remain in a condition that can maintain the trout fishery, the entire stream system must be managed to ensure that high quality conditions are preserved; it is not sufficient to protect only some of the streams in the system.

Paint Branch downstream of Fairland Road supports limited numbers of juvenile (known as young-of-year) and adult trout down to US 29, and only adult trout down to I-495. The numbers of adult trout decline downstream because the quality of the water and habitat become less suitable for the trout. Much of the lower Paint Branch has been developed at fairly high densities with associated high impervious cover; this pattern of land use has significantly degraded the downstream sections of the stream system, as compared to the upper sections. Although the lower Paint Branch's quality is not as high as the upper Paint Branch, it is still important to maintain *and improve* the conditions in lower Paint Branch to ensure that the stream quality remains high enough to sustain a viable adult trout population in this part of the stream system.

The highest quality conditions and most critical part of the stream system occur in the upper Paint Branch, defined as that part of the system roughly north of Fairland Road. The majority of high quality trout habitat exists here, as does a large part of the watershed's seeps, springs, and wetlands that contribute to the cold, steady, high quality stream baseflow of the system. Many of the streams in upper Paint Branch, especially those tributaries that are critical to the brown trout population, historically share several common characteristics: cold steady stream baseflow; relatively low pollutant, sand, silt, and sediment loads; stream channel and bank erosion changes that are near natural levels; abundance of clean riffle/pool/run segments; high abundance and diversity of aquatic macroinvertebrates; and near stream vegetation largely composed of forest cover.

In addition to the mainstem above Fairland Road, there are four trout spawning/nursery tributaries that support the brown trout fishery located in upper Paint Branch:

Good Hope Tributary

Good Hope Tributary is responsible for the greatest, most consistent natural reproduction of brown trout in Paint Branch. Unlike any other portion of Paint Branch, it has been successful in recruiting young-of-the-year trout each year for the past 16 years (1979 to 1994) (Gougeon, 1994). Roughly 75 percent of trout young-of-year are produced in Good Hope Tributary each year.

Gum Springs Tributary

Gum Springs Tributary is the second most important trout spawning and nursery stream in Paint Branch. It has historically supported significantly more trout reproduction than it currently does. The upper Gum Springs (upstream of the Oak Springs tributary) is of very high quality, both from a habitat and water quality perspective. The lower Gum Springs has been significantly degraded due to subdivisions that were constructed between 1980 and 1987; heavy sediment input during the construction phases has severely degraded trout spawning habitat in lower Gum Springs. In addition, the Oak Springs stormwater management (SWM) facility is a continuing source of high volumes of warm water to the stream during the summer months, when warm water temperatures can become a limiting factor for the survival of trout in Paint Branch.

Right Fork Tributary

The Right Fork has the highest water quality of all the streams in Paint Branch. It is important to the stream system as a source of high quality water for the downstream sections of the

system. This high quality water is important in providing suitable conditions for adult trout to live in the mainstem. It supports limited trout spawning, but not as much as in Good Hope or Gum Springs Tributaries because it does not naturally have as much adult trout habitat (e.g., at baseflow conditions, streamflow is low and there are few quality deep pools with overhead cover created at undercut stream banks) (Gougeon, 1995).

Left Fork Tributary and Mainstem

In addition to the three tributaries that provide the majority of the trout spawning and nursery areas, there are other parts of the stream system that play an important role in the maintenance of the trout fishery. The Left Fork Tributary and the mainstem above Fairland Road help maintain high quality conditions in upper Paint Branch. Left Fork Tributary is not consistently used as a trout spawning and nursery area. However, it is of high enough quality to provide limited young-of-year and adult trout habitat. The mainstem above Fairland Road, which is fed by the above four major tributaries and some smaller, minor tributary streams, also provides high quality conditions for adult trout; and in the past, it has been documented by DNR to provide some limited trout spawning and nursery areas.

The inter-related and sometime overlapping functions that these streams provide for the brown trout gives the trout the resiliency and redundancy it needs to maintain a healthy population. This network of high quality streams also provides other aquatic life with a similar ability to be resilient and maintain healthy and diverse populations.

