

# Section 1

## Introduction

This report documents the Cub Run and Bull Run Watershed Management Plan. The watershed plan provides strategies for mitigating adverse stream conditions and protecting the watershed from future impacts. The primary issues identified by the residents of the Cub Run and Bull Run watersheds include uncontrolled stormwater runoff, stream bank erosion, habitat degradation, polluted runoff, trash and sedimentation.

### 1.1 Project Background

The combined Cub Run and Bull Run watersheds are among the largest and fastest developing in Fairfax County. Before 1980, the watersheds were largely undeveloped open space with few areas of residential development and little commercial development. The population increased five-fold from 20,000 in 1980 to nearly 100,000 in 2000. As a result, land surface covered by buildings, parking lots, roads, driveways and sidewalks (impervious area) has increased from 7 percent in 1980 to 15 percent today. Currently, the watershed has a wide range in development densities and stream conditions.

Fairfax County has required stormwater ponds to control peak flows from new development since 1972. Since 1980, the county has required stormwater controls that reduce nutrient concentrations from new development within the Occoquan Reservoir watershed by 50 percent to protect the water quality in the reservoir. The reservoir is the drinking water source for more than one million Northern Virginia residents.

These regulations, combined with the time that the development occurred in the watershed, give the Cub Run and Bull Run watersheds one of the greatest density and degree of coverage of stormwater controls within Fairfax County. More than 420 stormwater ponds serve nearly all of the existing development to reduce peak flows and pollutant runoff.

Portions of the Loudoun County watershed are also developing rapidly. Recent farmland is now low-, medium- and high-density residential development within the South Riding development. Loudoun County requires stormwater controls to reduce peak runoff rates and limit pollutant runoff. In response to these requirements, developed areas of Loudoun County include several large wet ponds that manage the runoff from this existing development.

The high density of stormwater ponds is partially responsible for the streams having higher quality than would be expected for the upstream development density. The geology and soils also affect the stream quality. However, the streams have varying levels of impact, including stream erosion and degraded in-stream habitat. This

suggests that current stormwater management programs do not entirely mitigate development impacts.

Based on current development and planned future densities identified in the Fairfax County Comprehensive Land Use Plan and the Loudoun County General Plan, the watersheds' potential for future development varies:

- Areas of the watershed east of Centreville/Walney Road, including Flatlick Branch, Round Lick Branch and Big Rocky Run, are highly developed and have comparatively small potential for additional development. Development will occur within the few remaining vacant areas, and redevelopment or infill development will occur where the existing development density is significantly less than the planned density.
- Areas in Fairfax County west of Centreville/Walney Road, north of Braddock Road and east of Pleasant Valley Road have significant open space that will be developed at a planned land use that includes a mix of industrial, office, commercial, and residential.
- Dulles International Airport comprises 4,500 acres in the headwaters of the watershed (11 percent of the study area). Dulles Airport has a 25-year plan for expansion that includes two new runways, associated taxiways and a new terminal that will affect the Cub Run watershed.
- Approximately 25 percent of the project study area is within Loudoun County. Areas in Loudoun County north of Braddock road will be developed with various land uses, including residential, commercial and industrial. Areas south of Braddock Road have lower-density planned land use.
- Much of the remaining southwestern portions of the watershed is within the re-zoned Residential-Conservation (R-C) District where the maximum density is one house per five acres. Fairfax County implemented the re-zoning of this watershed portion in 1982 to protect the water quality in the Occoquan Reservoir.
- Large areas of the watershed are in Fairfax County Park Authority parkland, Northern Virginia Regional Park Authority Bull Run Regional Park, golf courses and other preserved open space. These areas preserve approximately 23 percent of the total watershed area in Fairfax County as open space, which plays a vital role in preserving uplands and headwater areas as well as much of the floodplain. Much of this protected land is forested.

A regional stormwater plan developed in 1989 identified the location of regional stormwater ponds within the county's developing areas, including Cub Run. This study identified 31 regional pond locations in the watershed with the goal of reducing the number of smaller onsite ponds. Fewer regional ponds were intended to reduce watershed impacts, enhance stormwater protection and lower pond maintenance costs. Seventeen of the proposed regional ponds were constructed, leaving 14

unconstructed planned regional ponds. The watershed plan evaluates these regional ponds and identifies alternative stormwater controls when appropriate.

## 1.2 Watershed Planning Process

The Cub Run and Bull Run Watershed Plan incorporates input from residents and businesses of the two watersheds collected through an extensive public involvement and outreach process.

The watershed plan's community advisory committee (CAC) is a diverse group from the local community that includes members of homeowners associations, conservation organizations, local businesses, recreation groups, neighboring local and federal jurisdictions, and other local interest groups. The CAC met with the project team nearly 20 times during development of the watershed plan.

In addition to the CAC meetings, four public forums allowed residents to identify watershed issues, evaluate alternatives to address these issues and comment on the proposed watershed plan elements.

The public information process was important in developing the plan. This information was combined with engineering, cost-benefit analyses and other evaluations to identify the appropriate actions to meet the watershed vision and goals effectively. The plan includes three types of projects:

- Non-structural actions, which include education and outreach programs to improve watershed conditions. These actions, described in Section 4, can be performed under current county policies and have a defined implementation schedule.
- Recommended changes to county policy. These include proposals that may require amendments to the county code and other supporting documents such as the Public Facilities Manual. These recommendations will be evaluated further regarding greater county-wide implications before they can be implemented. The policy recommendations from the Cub Run and Bull Run Watershed Plan will be compared with similar recommendations from the Little Hunting Creek, Popes Head Creek, Cameron Run, Difficult Run and other watershed management plans as they are developed. Based on this review, ordinance amendments and changes in policy may be developed that consider other county initiatives and policies, and address the commonalities among the policy recommendations from these watershed plans. These policy recommendations are described in Section 5.
- Structural actions. These include elements to be constructed in the watersheds to improve stream conditions. These structural actions are described in Section 6.

Although this report provides a recommended schedule for implementation of the actions included in the plan (Section 7), additional factors, which may affect the individual projects and the implementation schedule, include:

- Projects, programs and policy items will first undergo review by county staff and the Board of Supervisors before implementation. Board adoption of the watershed plan will not mean automatic implementation of the plan recommendations.
- The watershed plan is a master list of recommended non-structural actions and structural projects. Each fiscal year, staff will prepare and submit to the board a detailed spending plan that describes the projects and explains their ranking, benefit and need to meet a defined watershed or water quality goal.
- The watershed plan considers visions, goals, issues and needs only within the Cub Run and Bull Run watersheds. Fairfax County will consider stormwater needs and priorities across the entire county when implementing the recommendations included in this and other watershed plans.
- Availability of funding and other resources will affect the implementation of watershed plan projects.
- The initial project implementation phases will include outreach to the community near the proposed projects. The recommended plan elements may become infeasible or need to be modified based on comments from the local residents during this outreach.
- Projects will be value-engineered at the time of implementation to ensure cost-effectiveness. Alternatives such as enlistment of volunteers or alternative funding sources will be considered to reduce county costs.
- Stream-crossing improvements not related to protecting streambeds or banks or preventing structure flooding will not be implemented using county stormwater improvement funds.
- Stream restoration and other projects on private land will be evaluated to determine means for cost sharing with the landowners.

### **1.3 Watershed Plan Vision and Goals**

This watershed plan was prepared to meet a variety of watershed visions and goals. These include the overall watershed goals developed by the CAC and the project team. The order that the vision and goals are presented does not represent their order of importance or rank in preparing the watershed plan.

### 1.3.1 CAC Watershed Vision and Goals

As described in Section 1.2, a CAC was convened to work with the project team to prepare this watershed plan. The CAC prepared the following overall vision for the Cub Run and Bull Run watersheds:

**Waterways in the Cub Run and Bull Run Watersheds are valued pieces of the community fabric. Community members, as trustees of the waterways for succeeding generations, recognize their responsibility to sustain, restore and enhance the waterways. Educational efforts enrich the community's understanding of waterways, the associated riparian areas and their importance to both the local community and the region. Stream corridors contribute to community vibrancy and economic health while providing water quality, stormwater management, flood control, habitat and recreational benefits. Waterways are a clean and safe source of the region's drinking water.**

The CAC identified the following functions of waterways and stream valleys to be recognized and protected by the watershed plan:

- Filtering water and airborne pollutants
- Keeping water temperatures cool
- Storing floodwaters
- Reducing floodway velocities
- Serving as groundwater recharge areas
- Improving and maintaining water quality
- Providing wildlife habitat to include nesting, resting, roosting, feeding and watering areas
- Providing appropriate recreation opportunities
- Providing educational opportunities
- Enhancing community aesthetics

The CAC also recommended the plan should:

- Foster and promote co-existence and constructive beneficial use among people, waterways and riparian areas to enable the widest range of beneficial uses without environmental degradation, risk to health or safety, or other undesirable and unintended consequences to the human community, environment or wildlife

- Improve and maintain interjurisdictional coordination and collaboration at all levels (federal, state, regional, local) to protect and improve watershed health, integrate services and avoid duplication of effort and expense
- Protect the quality of the Occoquan Reservoir – a major drinking water source for Northern Virginia
- Specify stormwater management, best management practices, low-impact development and other watershed management policies that will restore and maintain watershed health
- Include educational strategies to enrich the community’s understanding of watershed ecological processes and their importance
- Establish clear mechanisms for restoring degraded waterways within the watershed
- Promote stormwater control projects that intercept flows and treat the problems as far upstream in the watershed as possible before they affect stream conditions
- Promote the preservation of open space and support adherence to the Residential-Conservation District zoning to minimize impervious surface area, and protect headwaters and stream corridors
- Promote the mitigation of impacts to streams and wetlands within the local watershed where the impacts occur

The CAC watershed vision and goals provide a comprehensive approach to improving conditions and reducing impacts from future land use changes within the watersheds.

The CAC also defined the following watershed-wide guidelines for siting regional and onsite stormwater ponds:

- Ponds should be used as a last resort and, if possible, located off-channel.
- Alternatives to ponds should be considered, including installation of smaller controls further upstream and natural stormwater controls such as wetland projects. As part of this strategy, all possible wetland mitigation sites in the watershed should be identified.

### **1.3.2 Watershed Plan Vision and Goals**

The project team considered the CAC’s watershed vision and goals in developing those of the overall watershed plan and the framework to evaluate the plan’s progress towards these visions and goals:

**The vision of the Cub Run and Bull Run Watershed Plan is to integrate environmental management, natural resource protection and community needs to restore and protect the Cub Run and Bull Run watersheds; ensure clean and safe drinking water for the region; minimize impacts to downstream water bodies; protect residences, businesses and roadways from flooding; provide safe and appropriate recreation and education opportunities; and ultimately improve the quality of life for all watershed residents.**

The following goals were identified to meet this watershed plan vision:

- Improve and maintain the physical, chemical and ecological characteristics of our stream valleys
- Maintain and preserve the integrity of the Occoquan Reservoir and other downstream bodies of water, including the Potomac River Estuary and Chesapeake Bay
- Improve the quality of life for watershed residents and businesses

### **1.3.3 Fairfax County Goals for Developing Watershed Plans**

The primary goals of developing watershed plans in Fairfax County are summarized below:

1. Restore and protect the county's streams
2. Meet state and federal water quality standards by identifying strategies to prevent and remove pollution
3. Support Virginia's commitment to the Chesapeake 2000 Agreement to restore the Chesapeake Bay
4. Update the current watershed plans to include modern technologies and community concerns
5. Take a comprehensive approach in addressing multiple regulations, commitments and community needs
6. Meet the watershed vision and goals developed by the project's CAC

Priorities of this watershed plan are to meet both the goals for nutrient loading and reduction for the Occoquan Reservoir and those for the Chesapeake embayments. These loads and goals are discussed in Section 3.2.

With input from the Cub Run and Bull Run CAC and other members of the community, this watershed plan addresses these needs and requirements with a strategy for restoring and protecting the watershed.

## 1.4 Plan Report Organization

This watershed plan:

- Provides an overview of the watershed and descriptions of existing conditions based on a review of previous studies and available data (Section 2)
- Assesses the existing and future conditions and identifies watershed issues within major subwatersheds (Section 3)
- Describes the objectives and non-structural actions to support the watershed vision (Section 4). These include roughly 60 non-structural actions that provide public outreach and education, improve interjurisdictional cooperation, promote appropriate recreational opportunities, promote stormwater management and nutrient reduction from existing development and reduce impact of new and infill development. These actions can be implemented within current county policy.
- Recommends changes to county policy to improve watershed conditions, address watershed issues, and meet the watershed vision, goals and objectives (Section 5)
- Provides details on the recommended structural actions that address watershed issues and meet the watershed vision, goals and objectives (Section 6).
- Recommends an implementation program for the non-structural actions, policy recommendations and structural actions (Section 7). Procedures used to prioritize the projects for implementation are described. This section lays out a recommended 25-year implementation plan, in 5-year increments.
- Provides a glossary of technical terms in Appendix A
- Provides detailed modeling results for the major subwatersheds in Appendix B
- Includes in Appendix C detailed fact sheets with cost estimates for each structural project