



Loudoun County Environmental Policy and Program Assessment

Loudoun County, Virginia

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**Prepared by:
Loudoun County Planning Department
in collaboration with other County Departments and Agencies**

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Abstract

Loudoun County's rich natural and cultural heritage has been an important aspect of the high quality of life enjoyed by residents as well as a direct and indirect contributor to the County's economy. Over the last 20 years, however, the pace and scale of development in the County has put enormous pressure on all aspects of the environment.

The 1991 Choices and Changes General Plan was aggressive in making use of new technology to document environmental resources and recommendations for regulatory strategies, many of which were implemented in the 1993 Zoning Ordinance. With the Revised General Plan (RGP) in 2001, Loudoun's environmental and heritage resources were integrated for the first time into a Green Infrastructure strategy that calls for these resources to be the central organizing element that guides all land use decisions. The Green Infrastructure, as defined in the Plan, includes major rivers, stream corridors, floodplains and wetlands; lakes; reservoirs and impoundments; limestone conglomerate, mineral resources and prime agricultural soils; steep slopes; ridges and mountain-sides; protected forests and vegetative landscapes; wildlife and endangered species habitats; heritage resources; scenic corridors, parks, greenways, trails, and recreational facilities. Among the new, environmentally-sensitive recommendations or outcomes of the RGP were the addition of a river and stream corridor overlay district; a "conservation design" development review approach; and the requirement for clustered residential development in the Transition Policy Area and when using the residential cluster option in the Rural Policy Area. New attention placed on multi-modal options in the 2001 Countywide Transportation Plan and the subsequent adoption of the Bicycle and Pedestrian Mobility Master Plan are also representative of the County's environmentally-focused initiatives.

There are numerous County agencies and departments that are involved with environmental policies and programs. From a regulatory perspective, many of these resources are contained within the Department of Building and Development (B&D) and the Health Department. Non-regulatory initiatives are also managed in B&D but there are other agencies such as General Services, Capital Construction, Parks, Recreation and Community Services, Solid Waste Management and Economic Development that are very involved in such efforts. This report, "*Loudoun County Environmental Policy and Program Assessment*", has been prepared by the Loudoun County Department of Planning in collaboration with other County agencies.

As its name implies, the report is intended to serve as an assessment tool for County decision-makers in future priority setting for plans, programs, and strategies for protecting and enhancing the County's environmental and heritage resources.

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Table of Contents

Executive Summary	vi
Introduction.....	1
Green Infrastructure	3
The Built Environment	13
Group One: Natural Resource Assets	23
A. River and Stream Corridors	23
B. Scenic Rivers and the Potomac River.....	30
C. Surface Water and Groundwater Resources	34
1. Surface Water.....	35
2. Groundwater	37
D. Geologic and Soil Resources	54
1. Limestone Conglomerate Areas.....	55
2. Prime Agricultural Soils	59
3. Mineral Resource Extraction Areas	64
4. Steep Slopes and Moderately Steep Slopes	67
5. Mountainside Areas	69
E. Forests, Trees and Vegetation.....	73
F. Plant and Wildlife Habitats.....	76
Group Two: Heritage Resource Assets.....	80
A. Historic and Archaeological Resources	80
B. Scenic Areas and Corridors	87
Group Three: Open Space Assets	91
A. Greenways and Trails	91
B. Parks and Recreation.....	94
C. Public School Sites	98
D. Open Space Easements	99
Group Four: Complementary Elements	100
A. Air Quality	100
B. Lighting and the Night Sky.....	106
C. Aural Environment.....	108
1. Airport Noise Policies.....	108
2. Highway Noise Policies.....	110
3. Construction Blasting Policy	111
Sources.....	113

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Executive Summary

This report discusses the current state of the environmental and heritage resources in Loudoun County. The Loudoun County Revised General Plan, Chapter 5, The Green Infrastructure: Environmental, Natural, and Heritage Resources, has been used as the baseline document. Relevant policies from other chapters of the Plan along with applicable federal and state regulations that provide the context for local decisions are also discussed.

The report is organized according to the following: Group One: Natural Resource Assets; Group Two, Heritage Resource Assets; Group Three, Open Space Assets; and Group 4, Complementary Elements. For each of these groups, a brief description of the Comprehensive Plan's environmental policies is provided, i.e., *What is the vision for the County's environmental resources?*; followed by a discussion on the progress in implementing the policies, i.e., *Where are we now?*, and concluding with proposed potential next steps, i.e., *Where are we going?* The next steps are not in any particular order and are not intended to imply any prioritization.

Overall, the document reveals that the County is currently engaged to various extents in numerous programs and activities that support the protection and enhancement of the County's environmental resources. These activities range from a variety of programs and initiatives aimed at protecting and managing water resources (including the development of a watershed management plan, source water protection planning, and erosion and sediment control programs), geologic and soils resources, forests and vegetation, and heritage resources. In addition to these, the County is involved with several regional initiatives that promote energy efficiency and reduce greenhouse gas emissions and is actively involved in numerous public/private groups and committees that provide stewardship and leadership for protecting the County's environmental and heritage assets. The County also reviews land development applications for conformance with the environmental policies of the Plan and the regulations of the County's Zoning Ordinance.

The proposed potential next steps suggest a strengthening of these existing efforts to include reviewing and amending County codes, ordinances and regulations where they are inconsistent with the Green Infrastructure policies of the Revised General Plan, including reinstating "Conservation Design" and the environmental overlay districts into the Revised 1993 Loudoun County Zoning Ordinance, and revising the requirements of the Facilities Standards Manual (FSM). The next steps include both new initiatives which would require further public policy discussion, prioritization, and resources needs or deployment as well as recommendations to continue existing efforts and programs. For the latter, staff would proceed as currently planned unless directed otherwise.

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Introduction

Abundant natural resources and a rich cultural heritage have defined Loudoun County's unique sense of place for more than 240 years. The mountainsides, forests, streams, vast stretches of agricultural land, and numerous historical sites are tangible assets that make the County an appealing place to live and work, while contributing directly and indirectly to Loudoun's economy.

For more than two centuries, agriculture was the dominant way of life in Loudoun County, which had a relatively constant population of about 20,000 people. That began to change in the early 1960s when the Dulles International Airport was built in the southeastern part of the County, attracting new businesses, workers and their families to the area. Major road improvements also made commuting from Loudoun County easier. Still, until the mid to late 1980s, much of Loudoun remained primarily as an agricultural area. Since then, Loudoun has grown exponentially to over ten times the pre-1960 population. Over the last decade alone, Loudoun County has added an average of 10,000 residents per year. Today, approximately 280,000 people live in Loudoun County. Current County forecasts project to add nearly 200,000 residents by 2030 for a total population of over 468,000 people¹. Employment growth is also expected to occur over the same time period, with over 163,000 new jobs added over the next twenty years for a total of approximately 316,000 jobs².

With the increase in development, much of the fertile farmland is now gone and Loudoun County is facing new environmental challenges. In a recent County survey, transportation and growth/development were cited as the top two issues in Loudoun County³. Residents also felt that the best things about Loudoun County, after its location and proximity to shopping, activities, jobs and other amenities, was the rural countryside and open space.

With the adoption of the County's Comprehensive Plan ('Revised General Plan') in 2001, Loudoun's natural, environmental, cultural, and heritage resources were integrated for the first time into a Green Infrastructure strategy that calls for these features to be the central organizing element that guides all land use decisions. The Green Infrastructure, as defined in the Plan, includes major rivers, stream

¹ Source: Loudoun County, Board of Supervisors, Fiscal Impact Committee (2008). 2007 Fiscal Impact Committee Guidelines: Demographic, Economic, and Fiscal Assumptions and Forecasts.

² Ibid.

³ Source: Department of Management and Financial Services and Office of Public Information. April 2008. 2007 Survey of Loudoun Residents.

corridors, floodplains and wetlands; lakes; reservoirs and impoundments; limestone conglomerate, mineral resources and prime agricultural soils; steep slopes; ridges and mountain-sides; protected forests and vegetative landscapes; wildlife and endangered species habitats; heritage resources; scenic corridors, parks, greenways, trails, and recreational facilities. The Green Infrastructure strategy is based on three overarching goals:

- *Conservation* – Creating a stronger relationship between natural and built environments;
- *Preservation* – Retaining and protecting existing environmental, natural and heritage resources; and
- *Restoration* – Adding to the Green Infrastructure wherever possible.

The Revised General Plan organizes the components that together form the County's Green Infrastructure into four groups, around which this report is organized: Natural Resource Assets, Heritage Resource Assets, Open Space Assets, and Complementary Elements (see Table 1). In addition to these, policies regarding the Green Infrastructure and the Built Environment are included in Chapter 5.

Table 1. Components of the Green Infrastructure	
Group One: Natural Resource Assets	<ul style="list-style-type: none">• River and Stream Corridors• Scenic Rivers and the Potomac River• Surface and Groundwater Resources• Geologic and Soil Resources• Forests, Trees and Vegetation• Plant and Wildlife Habitats
Group Two: Heritage Resource Assets	<ul style="list-style-type: none">• Historic and Archaeological Resources• Scenic Areas and Corridors
Group Three: Open Space Assets	<ul style="list-style-type: none">• Greenways and Trails• Parks and Recreation• Public School Sites• Open Space Easements
Group Four: Complementary Elements	<ul style="list-style-type: none">• Air Quality• Lighting and the Night Sky• Aural Environment

For each of these groups, a brief description of the Comprehensive Plan's environmental policies is provided, followed by a discussion on the progress in implementing the policies and potential next steps.

Green Infrastructure

The concept of the Green Infrastructure gives order and identity to the natural systems throughout the County. The Green Infrastructure provides essential “ecological services” that sustain life and create opportunities for humans to learn and enjoy the natural surroundings. A healthy Green Infrastructure is also necessary to protect human health and support vibrant communities and a robust economy. The Green Infrastructure resources are interdependent and many of the implementation strategies envisioned by the Revised General Plan are intended to protect integrated systems rather than individual resources.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan recognizes that much of the County’s Green Infrastructure is made up of natural resources that are fragile and irreplaceable and provides a set of overarching policies aimed at conserving, preserving, and restoring them. The Green Infrastructure policies call for a variety of steps to protect and preserve these resources in perpetuity, provide the context in which the built environment relates to the natural environment, and guide where and how development occurs. Under these policies, the preservation and enhancement of these features are to be considered with every new project through the use of conservation design as the preferred project planning technique.

Major implementation steps include the following:

- Identification and mapping of the Green Infrastructure;
- Regulatory protection of the Green Infrastructure and incentives for adding to it;
- Provisions for public and private stewardship; and
- Education programs about the Green Infrastructure.

For a complete list of the overarching Green Infrastructure policies, please see Policies 1 – 9 beginning on pg. 5-1 of the Revised General Plan.

IMPLEMENTATION

- **Mapping of the Green Infrastructure**

The Revised General Plan states that “*The County will prepare and maintain a map of the Green Infrastructure and its elements*” (RGP, Policy 4, pg. 5-2).

The Plan recognizes the importance of providing reliable and updated mapping information on the individual elements of the Green

Infrastructure in order to implement Plan policies.

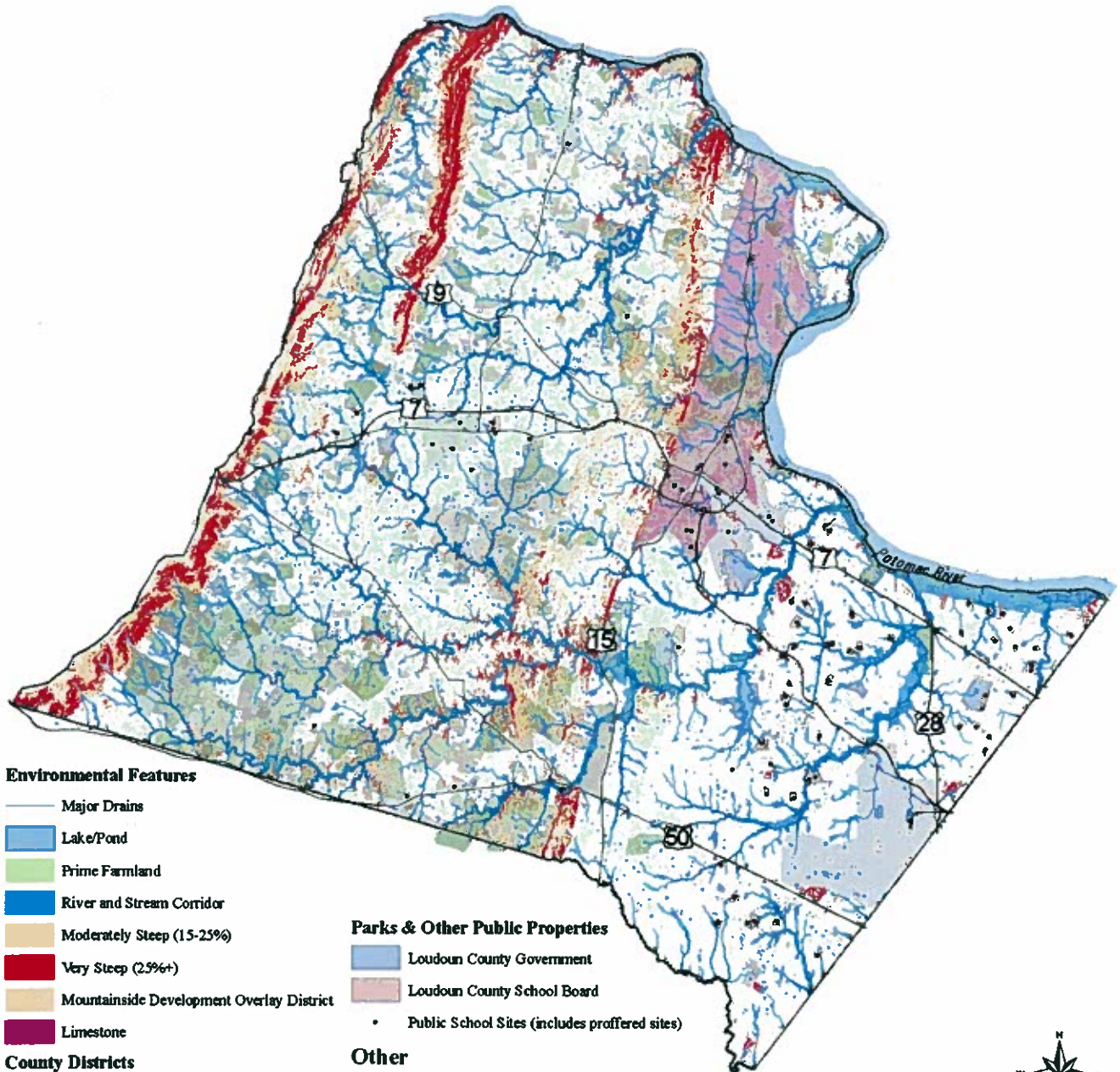
A Green Infrastructure map was developed for the Revised General Plan that depicts natural resources such as floodplains, steep slopes, prime agricultural soils, limestone and mountainsides as well as parks and other public properties, easements, and public school sites. In addition to this static map, updated natural resources mapping is available through the Office of Mapping and Geographic Information (OMAGI) and Loudoun County's On-line Mapping Service. The OMAGI updates the County's basemap data, which includes environmental data layers such as streams, forest boundaries, trees, and water, every three years; see Table 2 for a status of the various Geographic Information System (GIS) layers.

All of the County's basemap GIS data are mapped at a scale of 1:2400 and follow the National Standard for Spatial Data Accuracy. The OMAGI also receives data from other County Departments and outside entities like the departments of Building and Development, General Services, Health, and Fire and Rescue; Loudoun Water (formerly LCSA); and the U.S. Geological Survey (USGS). The Department of Building and Development maintains and regularly updates the soils map (soils layers) to National Cooperative Soil Survey Standards (at the 1:2400 scale) and maintains many layers such as the Limestone Overlay District (LOD), River and Stream Corridor Overlay District (RSCOD)⁴, Mountainside Development Overlay District (MDOD), Airport Impact Overlay District (AI), steep slopes, watersheds, and the predictive wetlands model.

⁴ Please note that several of the zoning districts that have been mapped, specifically the LOD and RSCOD, were removed from the Revised 1993 Loudoun County Zoning Ordinance in 2004 per a Circuit Court of Loudoun County decision and do not currently exist.



LOUDOUN COUNTY, VIRGINIA GREEN INFRASTRUCTURE



Created by the Department of Planning on June 2, 2008

0 2.5 5 10 Miles

<i>Table 2. Status of Environmental GIS Layers</i>	
LAYER	STATUS AND UPDATE PROCESS
Drains	Updated as of 2005.*
Floodplain Cross Sections	Up to date as of 2005. Currently being updated by Building and Development staff.
Floodplain	Up to date as of 2005. Currently being updated by Building and Development staff.
Forest	Updated as of 2005.*
LDN (Airport Impact Overlay)	Needs to be updated due to additional airport runways; Can only be changed as directed by the Board of Supervisors.
Major Watersheds	Up to date as of 1990.
Former Limestone Overlay District	Up to date as of 2002. **
Major Drains	Updated as of 2004.*
Major Water	Updated as of 2004.*
Former Mountainside Overlay District	Up to date as of 1999. **
Former RSCOD	Up to date as of 2002.
Soil Drains	Updated monthly by Building and Development.
Soil Points	Updated monthly by Building and Development.
Soil Lines	Updated monthly by Building and Development.
Soil Polygons	Updated monthly by Building and Development.
Steep Slopes	Up to date as of 2005.
Stormwater Pipes and Culverts	Up to date as of 2008. Updated by General Services.
Stormwater Structures	Up to date as of 2008. Updated by General Services.
Trees	Updated as of 2005.*
Water	Updated as of 2005.*
Wells and pollution sources	Up to date as of 2008. Updated weekly by the Health Department.
Wetlands Model	Up to date as of 6/2007. **

* - Updated by the basemap contract countywide every three years.

** - Not being updated.

***-Updated periodically.

- **Land Development Applications**

The Revised General Plan states that the Green Infrastructure “will provide the context for all development”. Further, “a conservation design method will be applied during the land development and redevelopment processes. Elements of the Green Infrastructure will be identified with the initial submission of each proposal, as a guide to the placement of structures, drainage, utilities, and roads. Regulations will be developed with performance standards that will direct their placement” (RGP, Policies 1 and 5, pg. 5-2).

The Revised General Plan calls for a conservation design approach to be

applied during the land development process to ensure that any growth in the County will be sensitive to the protection of environmentally and culturally sensitive resources. Chapter 11 (*Implementation*) of the Plan describes the conservation design process. The first step of the process is to identify the important natural and cultural resources on site. This initial step delineates areas where land disturbance should be avoided or minimized. Once these areas are delineated for resource protection, development can be planned on the remaining, less-sensitive areas of the property. Conservation design is a flexible and negotiable process so that innovative proposals that give a higher level of resource protection can be encouraged.

After the Board of Supervisors adopted the Revised General Plan on July 23, 2001, revisions to the County's Zoning Ordinance were developed to implement the Plan's Green Infrastructure policies. The revisions to the County's Zoning Ordinance included new regulations for incorporating the conservation design process in all subdivision and site plan applications⁵; the creation of two new overlay districts - a River and Stream Corridor Overlay District (RSCOD) and a Limestone Overlay District (LOD); and revisions to the Mountainside Development Overlay District (MDOD). On January 6, 2003, *ZOAM 2002-0003 and ZMAP 2002-0014 Countywide Remapping and Text Amendments*, which contained these new overlay districts, were adopted as the Revised 1993 Loudoun County Zoning Ordinance.

One year later on March 30, 2004, the Circuit Court of Loudoun County overturned the new environmental overlay districts due to an insufficient descriptive summary of the overlays in the legal notices for the Board of Supervisors Public Hearings on *ZOAM 2002-0003 and ZMAP 2002-0014 Countywide Remapping and Text Amendments*. This resulted in the Revised 1993 Loudoun County Zoning Ordinance reverting back to pre-January 6, 2003 ordinance regulations regarding the three overlay districts. The Limestone Overlay District (LOD) was completely removed from the Zoning Ordinance; the River and Stream Corridor Overlay District (RSCOD) was removed and the Floodplain Overlay District (FOD) guidelines and the Scenic Creek Valley Buffers are instead applied to applicable developments; and the Mountainside Development Overlay District (MDOD) reverted back to the 1993 Loudoun County Zoning Ordinance regulations.

On March 3, 2005, the Virginia Supreme Court ruled that all conservation design policies should also be removed from the Revised 1993 Loudoun

⁵ The Conservation Design regulations (Section 6-2000) were limited to the new zoning districts - Transition (TR), Joint Land Management Area (JLMA) and Rural (AR) districts. They were also only applied to protecting a site's "primary resources", e.g. those features regulated by the environmental overlay zoning districts and the very steep slope regulations (greater than 25%).

County Zoning Ordinance due to an insufficient descriptive summary in the legal notices. The Court remanded the case of *Gas Mart v. Loudoun County Board of Supervisors* back to the Circuit Court of Loudoun County to enter an order consistent with the ruling. This resulted in *ZOAM 2005-0002, Rural Policy Area Remapping*, which removed Section 6-2000 – Conservation Design and the three environmental overlay districts from the Revised 1993 Loudoun County Zoning Ordinance as of December 5, 2006.

On April 19, 2005, in recognition of the Virginia Supreme Court's decision regarding Conservation Design and the lack of a definitive measurement tool to determine whether an application has met the policy and ordinance requirements, the Board of Supervisors voted to immediately suspend staff review of legislative land use applications, including Zoning Map Amendments (ZMAPs) or rezonings, Special Exceptions (SPEX), and Zoning Concept Plan Amendments (ZCPAs), for compliance with the conservation design policies of the Plan. A Comprehensive Plan Amendment (CPAM) to reconsider all references to and requirements for conservation design is pending.

The individual Green Infrastructure policies of the Plan, however, remain in place and continue to be applied during the review of all legislative land use applications considered by the Board of Supervisors. These applications, when submitted to the County for review, are required to provide baseline data delineating and detailing the Green Infrastructure elements present on the property proposed for development. All applications must meet a Checklist of Minimum Requirements, which are available on the County's website.⁶ Some requirements can be waived by the Director of Planning.

The Green Infrastructure policies are applied on a case-by-case basis through site design and proffers depending on the specific property's characteristics and quality of the resource. Similar protections for permitted (i.e., "by-right") developments are unavailable and are limited to the existing regulations per the County's Zoning Ordinance, namely the Floodplain Overlay District (FOD), the Scenic Creek Valley Buffer, the Steep Slope Standards, and the Mountainside Development Overlay District (MDOD).

During the County review of land development applications, environmental issues are reviewed for compliance with Plan policies and existing regulations by staff members from various internal and external

⁶ See the Checklist of Minimum Requirements for Zoning Map Amendment, Special Exception and Zoning Concept Plan Amendment Applications available at <http://www.loudoun.gov/Default.aspx?tabid=327&fmpath=/Documents and Forms>

development and regulatory agencies. The nature and type of the application determines which agencies receive and review the application.

- **Administrative Documents**

The Revised General Plan states that “*the Facilities Standards Manual, the Land Subdivision and Development Ordinance, and other pertinent administrative documents will be revised to implement management strategies and to model development principles based on the Green Infrastructure” (RGP, Policy 7, pg. 5-2).*

Each land development application is reviewed for compliance with the Facilities Standards Manual (FSM) and the Land Subdivision and Development Ordinance (LSDO), both of which are available on the County’s website⁷. Many environmental requirements contained in the Revised 1993 Loudoun County Zoning Ordinance are regulated through the FSM (Chapter 7) which contains standards regarding street and site lighting standards; tree conservation, including requirements for a tree conservation plan, a forest management plan, and the establishment of riparian stream buffers to fulfill Best Management Practices (‘BMP’) credits; landscape plans; wetlands, including mitigation; erosion and sediment control; the placement of utilities; a Preliminary Soils Review (soil mapping); and a Phase 1A Reconnaissance-Level Archaeological Survey. Any requirements in the FSM can be waived by the Director of the Department of Building and Development or his appointee. The LSDO also encourages the preservation of existing trees. The FSM is periodically reviewed by a Facilities Standards Manual Public Review Committee, which is appointed by the Board of Supervisors.

On November 5, 2001 the Board of Supervisors adopted an intent to amend the FSM to implement the Green Infrastructure policies or portions of policies of the Revised General Plan that were not dependent upon pre-requisite amendments to the Zoning Ordinance. Since the adoption of the Plan, the FSM has been amended to include requirements for geotechnical and geophysical requirements; denote the Virginia Stormwater Management (SWM) Handbook as its principal design standard for water quality measures; and newly adopted wetlands requirements.

On July 6, 2004, the Board of Supervisors directed the FSM Public Review Committee to review and update the FSM, to include the Land Subdivision and Development Ordinance (LSDO), in order to improve the land development review process. The Board further directed that the work be accomplished in two phases: a “top ten” list of priority

⁷ The FSM is available at <http://www.loudoun.gov/Default.aspx?tabid=310> and the LSDO is available at <http://www.loudoun.gov/Default.aspx?tabid=310>

amendments (Phase 1), followed by a comprehensive review and update of the entire FSM (Phase 2). Phase 2 (DOAM 2007-0002) was adopted on December 4, 2007. Changes to the FSM included requirements for detailed wetland data when applications (preliminary plats, construction plans and profiles, site plans, and grading permits) are submitted, requirements for when stream and wetland mitigation designs are reviewed, and additional requirements and clarification regarding what needs to be identified and illustrated on Existing Conditions plats.

- **Grants**

The Revised General Plan states that the “*County will proactively promote private, state and federal conservation programs and their allocated resources to advance conservation programs within the County through public and private means such as grants, voluntary easements, dedications, etc.*” (RGP, Policy 9, pg. 5-2).

Loudoun County has successfully leveraged grant money to help fund important environmental and heritage programs and projects throughout the County. For example, the County has received grants from the U.S. Environmental Protection Agency (EPA) to develop the Predictive Wetlands Model and the County’s local wetland program; fund the Loudoun Watershed Management Stakeholders Steering Committee, the Water Resource Monitoring Program (WRMP), and the Comprehensive Watershed Management Plan (CWMP); and develop various outreach programs and brochures. In addition to these, the County has received grant money from the U.S. National Park Service to install signage, interpretive information, and a kiosk along the Potomac Heritage National Scenic Trail. The County has also leveraged matching funds from CLG grants to update the Historic District Guidelines and develop an interactive webpage for the County’s historic districts.

- **Purchase of Development Rights (PDR) Program**

The Revised General Plan encourages the preservation of important environmental resources, including prime farmland, open space corridors along scenic rivers, steep slopes, mountainsides areas, through a Purchase of Development Rights (PDR) program (RGP, Policy 5, pg. 5-25; Policy 4, pg. 5-31; Policy 5, pg. 5-31).

By resolution, the Loudoun County Board of Supervisors (Board) established a Loudoun County Purchase of Development Rights (PDR) Program on February 7, 2000. The resolution addressed the following points:

- protecting open space throughout all of Loudoun County contributes to a high quality of life;

- protecting open space enhances the character of urban areas by preserving natural areas around urban communities;
- preserving open space protects water quality and quantity, air quality, and natural habitat;
- preserving open space helps protect the rural economy, including agriculture, horticulture, equine, and tourism industries; and
- PDRs are an important tool for use in enhancing urban character, the environment, historical resources, and the rural economy.

Following adoption of the resolution, the Board provided funding for the establishment of the PDR Program, setting aside a total of \$8.98 million in FY 01, FY 02 and FY 03 to acquire conservation easements based on the adopted program. At its February 4, 2002 meeting, the Board authorized the use of \$4.4 million to acquire conservation easements on nine properties totaling 1,748 acres. An application for 308 acres was subsequently withdrawn and easement acquisitions on the remaining eight properties resulted in the protection of 1,440 acres. The total amount of PDR Program funds needed for the Round 1 acquisitions was \$3.8 million, a reduction of \$636,000 from the Board's original authorization. The remaining \$5 million was used to fund subsequent acquisitions in FY 02 and FY 03 totaling approximately 2,601 acres.

At its January 7, 2004 Business Meeting, the Board eliminated the County public funding or any taxpayer funding to the PDR Program, and eliminated the PDR Board. Remaining duties that relate to the implementation of private funds or easements, as they relate to PDR's, has been assigned to the County Attorney's Office.

- **Loudoun County Environmental Indicators Project (LEIP)**

The Loudoun County Environmental Indicators Project (LEIP) was a five year project between 1998 and 2003 that was conducted by George Washington University. It was intended to provide scientific analysis to Loudoun County's elected officials and residents to help in making decisions about public policy relating to land use. It later expanded to provide environmental information to the general public.

The project received an initial grant from the Virginia Environmental Endowment, with additional funding from individuals, foundations, corporations and institutions. The Loudoun County Board of Supervisors also provided substantial financial support and the project used the County's Geographic Information System (GIS). A steering committee consisting of local citizens, and local government representatives provided additional oversight. Business people, representatives of foundations and institutions, and developers were also represented on the committee.

The project monitored seventeen locations throughout the County in an effort to establish a baseline of information and assess the environmental changes that occurred over the five-year period. Indicators included forestal areas, agricultural lands, wetlands, riparian areas, impervious surfaces, urbanized areas, listed plant species, key soil types, water quality, air quality, historical and culture sites, and a variety of landscape and aerial imagery. By 2001, LEIP had experienced a change in direction as members were asked by the community for guidance about dealing with the county's rapid development. The forums changed to include displays and use a charette process to better involve the public in discussions. The project resulted in four annual reports that were published between 1999 and 2002, numerous newsletters, several meetings and public policy forums, and a website designed to present information to the public. Information and all the reports developed by the LEIP project are stored at the Thomas Balch Library in Leesburg.

POTENTIAL NEXT STEPS

1. Continue to maintain and update the Geographic Information System (GIS) layers pertaining to Green Infrastructure features.
2. Continue to pursue grant money to help fund environmental and heritage programs.
3. Review and amend county codes, ordinances and regulations where they are inconsistent with the Green Infrastructure policies of the Revised General Plan, including reinstating and updating Conservation Design and the environmental overlay districts into the Zoning Ordinance and enhancing the requirements of the Facilities Standards Manual (FSM).
4. Assess Loudoun County's natural and heritage policies and programs periodically, for example on an annual or bi-annual basis, in order to provide updated information and refine strategies aimed at protecting and enhancing the County's Green Infrastructure resources.
5. Revise the County's fee schedule to fully cover the costs of reviewing land development applications and activities for compliance with environmental policies and regulations.
6. Consider reinstating the Purchase of Development Rights (PDR) program to protect highly sensitive and valuable environmental resources, for instance prime agricultural soils, steep slopes, mountainside areas, and open space corridors.
7. Become a model of environmental and heritage stewardship by fully

incorporating Green Infrastructure policies during the development of all public facilities.

The Built Environment

Promoting a built environment that protects, enhances and helps to sustain the natural world while at the same time protecting the health and safety of the County's residents and visitors, providing for the quiet enjoyment of private property, and promoting the well-being of the County's inhabitants is a key component of the overall Green Infrastructure strategy. A high quality built environment is also important for the County's economy in attracting and sustaining private investment.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan states that the County will achieve and sustain a built environment of high quality. Plan policies emphasize the County's role as a leader, a facilitator, and a source of information regarding environmental design options and procedures, rather than merely a regulator, to achieve this. Plan policies emphasize the use of incentives for innovation and good design, such as the provision of two annual awards of certificates of excellence in environmental design as well as a bonus density for achieving LEED Gold certification in the PD-MUB (Planned Development - Mixed Use Business) zoning district. The County also encourages residential development that uses energy efficient design and construction principles, promotes high performance and sustainable buildings, and minimizes construction waste and other negative impacts.

An important component of achieving a high quality environment is to ensure that communities are pedestrian and bicycle-friendly. Walking and cycling remain the least expensive forms of transportation for all people. The construction of walkable communities helps sustain natural resources, leads to more livable communities, and minimizes the necessity of a car for each trip, mitigating traffic congestion and helping to improve air quality. The County's Bicycle and Pedestrian Mobility Master Plan ('Bike/Ped Plan'), adopted by the Board of Supervisors in 2003, provides the basis for County policies regarding non-motorized transportation. A major component of the Plan is a county-wide network of Baseline Connecting Roadways. The Bicycle and Pedestrian Network Map depicts the primary routes and locations that should be improved to provide a connected bicycle and pedestrian network.

Chapter 2 (Planning Approach) of the Revised General Plan also provides guidance regarding solid waste management and energy.

For a complete list of the Built Environment policies, please see Policies 1 and 2

on pg. 5-5 of the Revised General Plan and Guiding Principle Policy 12 on pg. 4 of the Countywide Housing Policies Comprehensive Plan Amendment (CPAM 2007-0001) For the Solid Waste Management Policies and Energy Policies, see Chapter 2, Policies 1-6 on pg. 2-23 and Policies 1-6 on pg. 2-24. See also the Bicycle and Pedestrian Mobility Master Plan ('Bike/Ped Plan') for pedestrian and bicycle policies.

IMPLEMENTATION

- **'Green Buildings' Initiatives**

The Revised General Plan states that *"in implementing its program for achieving and sustaining a Built Environment of high quality, the County will emphasize its role as a leader and facilitator"* (RGP, Policy 2, pg. 5-5). The recently-adopted housing policies (2006) also state that the County encourages development that uses energy efficient design and construction principles, promotes high performance and sustainable buildings, and minimizes construction waste and other negative impacts.

Loudoun County's Office of Capital Construction (OCC), which oversees all aspects of the county's Capital Improvement Plan (CIP) for general county government projects under \$500,000, including the construction of new facilities, land acquisition, and renovation of existing facilities, has implemented a LEED⁸ silver standard policy for all public buildings, called the Green Building Design Guidelines. The OCC has a goal to attain a minimum of a Silver Certification level of compliance which is 33-38 points out a possible 69. This ensures that all new capital construction projects use energy efficient systems and components.

⁸ The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a voluntary guidance and certification system was developed by the U.S. Green Building Council through a cross-sector stakeholder consensus process. LEED certification is available for new and existing commercial buildings, commercial interiors, homes and schools. Standards for neighborhood development are currently in pilot form with the final standards due out in 2009. Certification is through third-party review. Prerequisite and volunteer points are earned in: Sustainable Site Planning; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Air Quality; and Innovation and Design Process. Certifications are available at Platinum, Gold, Silver, and Certified levels, based on building strategies. The certification process includes registration, ongoing documentation, third-party review, and commissioning.

The OCC is also focused on being energy efficient and works along with Loudoun County Public Schools (LCPS) and Dominion Virginia Power on many other environmentally-friendly initiatives, for example the “Energy Star” challenge which aims at improving the energy efficiency of commercial and industrial buildings by 10% or more. The OCC has a 10 to 15 year vision so that they can make decisions that will benefit the County over a long period of time. The goal of OCC is to use ways that will result in a payback within approximately 5 to 7 years and materials that have reasonable life cycle costs. Important design considerations include building materials, lighting, water reuse, and renewable energy sources are all considered. They are also looking into the coordination of utilities. A full time Energy Manager (formerly within the Department of General Services) has been hired to review all buildings and ensure compliance with the County’s efficiency standards.

The Department of General Services has also identified existing buildings with the poorest performance and has launched a program to improve energy efficiency.

Lastly, to encourage the private sector to participate in green building initiatives, the Board of Supervisors on December 18, 2007 adopted a new zoning district in the Revised 1993 Loudoun County Zoning Ordinance, PD-MUB - Planned Development - Mixed Use Business District, which contains an incentive to increase the permitted FAR by 0.1 above the maximum permitted floor area ratio when at least 20% of the total floor area of the district achieves LEED Gold certification.

- **Ad-Hoc Committee on Energy Efficiency**

On January 3, 2008, the Board of Supervisors created an Ad Hoc Committee on Energy Efficiency to lead efforts in adopting and developing energy efficient and green building practices into the County. The Committee consists of the three Board members - Supervisors McGimsey (Chair), Miller and York. An internal Energy Efficiency Task force was created within the County to develop long-term strategies for green building implementation, education, and promotion.

- **Participation in Regional Efforts**

The Plan states that the County will participate in “*collaborative public/private/community partnerships for program implementation*” (RGP, Policy 2, pg. 5-5).

On April 18, 2008, the Board of Supervisors, with recommendation from the Ad Hoc Committee on Energy Efficiency, voted to participate in three regional efforts designed to increase energy efficiency and reduce

greenhouse gas emissions. By participating in these programs, Loudoun County gains access to tools, information and materials regarding energy solutions which can move the County more quickly from commitment to action; taps into the best practices from other municipalities; promotes cross-sector collaboration; and demonstrates the County's commitment to help reduce greenhouse gas emissions in our region. The three initiatives complement each other and include the endorsement of Metropolitan Washington Council of Governments (COG) Green Building Report and participation in the Cool Capital Challenge and the Go Green Virginia initiative. Other opportunities for regional efforts include participation in the Chesapeake Bay Preservation Act (CBPA).

1. *Metropolitan Washington Council of Governments (COG) Green Building Report*

The Board of Supervisors has endorsed the mission of the Metropolitan Washington Council of Governments (COG) Intergovernmental Green Building Group (IGBG) and its report published on December 12, 2007 entitled *Greening the Metropolitan Washington Region's Built Environment*. Loudoun County staff had opportunities to review the report during 2007 and the final report reflects their input. The report outlines the following key recommendations:

1. Establish Leadership in Energy and Environmental Design (LEED) as the region's preferred green building rating system for new commercial construction and high-rise residential projects.
2. Establish LEED Silver certification as the goals for all local government facilities constructed in the Metropolitan Washington Region.
3. Follow the "COG Regional Green Standard" for Private Development.
4. Collaborate and partner with others to ensure green building goals are achieved.
5. Implement actions to ensure the success of the Region Green Building Policy.

2. *Cool Capital Challenge*

The Board of Supervisors also participates in the Cool Capital Challenge that is endorsed by the Metropolitan Washington Council of Governments (COG). The Cool Capital Challenge was started in 2007 by volunteers from businesses, institutions, government agencies and environmental organizations in the Metropolitan Washington Region. It is a grass-roots campaign designed to elicit commitments to a one-billion-pound reduction in the Washington region's total carbon dioxide emissions by April 2008. Cool Partner organizations should

make their pledge online by Earth Day (April 22) and begin on-the-ground implementation no later than October 2008.

Cool Partners use calculators and tools contained on the website⁹ to help calculate their potential reductions of greenhouse gas emissions and calculate a pledge amount based on actions which can be taken to increase energy efficiency. Each partner has the flexibility to decide what actions are most appropriate for their jurisdiction. Cool Partners then enter their pledges on-line and the website displays the aggregated pledged amounts by all Cool Partners. By becoming a Cool Partner, Loudoun County will be recognized on Cool's website and in other communications.

3. *Virginia Municipal League (VML) Green Government Challenge*

Lastly, the Board of Supervisors directed that the County participate in the Virginia Municipal League (VML) Green Government Challenge. The VML, of which Loudoun County is a member, is a statewide, nonprofit, nonpartisan association that includes 39 cities, 157 towns and 12 counties.

The Green Government Challenge is a friendly competition amongst member local governments that is designed to encourage implementation of specific environmental policies and practical actions that not only reduce carbon emissions, but potentially can save local governments money. To become part of the challenge, local governments are required to register, read over the Challenge, and then start implementing actions and adopting policies to earn points. Local governments will earn "green points" by implementing or adopting policies and actions listed in 11 categories. Amassing at least 100 "green points" out of a possible 200 will earn a certification as a "Green Government". Points can be accumulated for actions already taken by the County prior to endorsing the Green Government Challenge. Staff has reviewed the list and determined that the County has already earned 75 points from 12 actions. Another 18 actions are included on the list, including a category for Innovation Credits, in which to earn the remaining points to achieve certification as a "Green Government".

Awards will be given to the top three jurisdictions in each of three population brackets (less than 15,000; 15,001-90,000; 90,001-plus) that will be presented at the 2008 VML Annual Conference in Norfolk. Challenges must be completed by September 30, 2008. It is envisioned to be an annual activity.

⁹ <http://www.coolcapitalchallenge.org/>

- **Awards and Incentives**

The Plan states that one of the incentives the County will use to promote innovation and good design is the *“provision for two annual awards of certificates of excellence in environmental design; one for the private enterprise meeting standards of excellence established for this award and one for the community group achieving analogous standards of excellence in community-based environmental design and maintenance”* (RGP, Policy 2, pg. 5-5).

The Environmental Review Team (ERT) over the years has worked in cooperation with state and local organizations to present awards to exemplary projects focusing on conservation and preservation of existing natural resources.

The ERT worked cooperatively with the Loudoun County Soil and Water Conservation District and presented the 2006 Urban Conservationist Award, accompanied by a Resolution of Commendation from the Loudoun County Board of Supervisors. They nominated West Dulles Properties, LLC for the award based upon their efforts to mitigate wetland impacts associated with the West Dulles Station office and flex/light industrial project consistent with the County’s no net loss to wetlands policy.

Awards were presented for best Erosion & Sediment Plan and Implementation Controls in 2000. In 2008, the Erosion and Sediment Team in the Department of Building and Development conducted another round of inspections for completed projects. In conjunction with the Virginia Department of Conservation and Recreation (DCR), another award is slated for the winter of 2009.

- **Promoting Pedestrian and Bicycle Circulation**

The Revised General Plan envisions that the built environment will be pedestrian-friendly (RGP, pg. 5-2). Additional regulations are provided in the County’s Bicycle and Pedestrian Mobility Master Plan (the ‘Bike/Ped Plan’).

County staff assesses pedestrian and bicycle connections during the review of all legislative applications, including the provision of paths, trails, sidewalks, crosswalks, and bicycle parking. Typically, 10-foot wide shared use paths are requested on both sides of every major street, consistent with the Bike/Ped Plan. Along minor streets and within residential and commercial developments, 5-foot wide sidewalks on both sides are largely requested. The exact facility that is requested is largely dependent on the site’s particular situation, including proposed use and the

surrounding and adjacent facilities. For permitted or “by-right” developments, the Facilities Standards Manual (FSM) requires 4-foot wide sidewalks on one side of the street.

To assess the adequacy of bicycle and pedestrian facilities, the County relies primarily on data within its Geographic Information Systems. One data layer is for sidewalks. The presence of sidewalks is documented using aerial photography, currently from spring 2007. Due to the resolution of the photography, the data does not precisely capture the width of each sidewalk, although sidewalk edges are depicted, when possible. Although aerial photography is updated each year for the entire County, only one-third of the sidewalk data is updated each year. Another data layer has been created for County trails. The trails data does not, however, differentiate between paved and unpaved trails. Additionally, only trail centerlines are depicted, and not trail edges.

- **Solid Waste Management**

The Revised General Plan states that “*the County will continue to implement an integrated solid waste management strategy that places priority on reduction, reuse, and recycling of solid waste above resource recovery, incineration, and disposal into landfills*” (RGP, Policy 2, pg. 2-23).

In Virginia, local governments have statutory and regulatory responsibility and authority for local solid waste management planning. The County and seven incorporated towns comprise the Loudoun County Solid Waste Management Planning District (LCSWMPD). The District is the State-recognized entity for solid waste management planning and is responsible for developing and implementing the District’s Solid Waste Management Plan (SWMP), available on the County’s website¹⁰. The SWMP is an element of the County’s Comprehensive Plan and is the service plan for delivering solid waste management services, including various recycling components, to the community.

The current SWMP was substantially revised during a public process in 2002-2003 and was approved by the Virginia Department of Environmental Quality (DEQ) in 2004. The SWMP calls for, and members of the LCSWMPD have committed to, a biennial review process to ensure that the plan remains current and relevant. The first biennial review of the SWMP took place in 2006 and the second biennial review is scheduled to occur during CY 2008.

¹⁰ <http://www.loudoun.gov/oswm>

The SWMP describes the County's solid waste management system as a series of solid waste collection, recycling and disposal services (over sixty companies), and facilities (One Transfer Station, Two Material Recovery Facilities, Two Vegetative Waste Facilities, and One Sanitary Landfill) operated by private and public sector entities. The SWMP identifies waste generation by waste type, determines current constructed capacity and future capacity requirements for managing the solid waste, assesses the ability of the current system to handle the community's solid waste needs, and identifies service gaps or improvements that can be made in the system and states goals and initiatives.

It also describes how the District will meet the State's required 25% annual Municipal Solid Waste (MSW) recycling rate. When the SWMP was first submitted in 2004, the County reported less than a 25% recycling rate and it was approved contingent upon semi-annual reporting for a year to demonstrate that steps were being taken to achieve that rate. The County is required to submit annual Recycling Rate reports and in 2005, 2006 and 2007 has reported at or above 25%. The improved rate may be attributed to the addition of staff resources in 2002 for compliance and enforcement and improved reporting under 2002 amendments to Chapter 1084 (Solid Waste Collection and Transportation) of the County's Codified Ordinance for Solid Waste Management.

The key initiatives of the 2004 SWMP, intended to fill service gaps or to improve service, have not been implemented due to budget constraints. The 2006 report to the Board of Supervisors found that the current system is working and affirmed that the initiatives described in the 2004 SWMP remain valid and should be pursued as resources allow. In addition to these initiatives, the Office of Solid Waste Management (OSWM) must meet State environmental requirements. They also conduct compliance and enforcement activities for the County's Solid Waste Management Ordinances.

1. *Compliance with State Environmental Requirements and Activities*

The Office of Solid Waste Management (OSWM) operates the County Solid Waste Management Facility ('Facility'), which contains the only Municipal Solid Waste (MSW) landfill disposal area in the County. Operating under Permit Number 1 with the Virginia Department of Environmental Quality, the Facility receives routine, unannounced quarterly inspections from State inspectors. The County has invested considerable financial and staff resources in acquiring the land, constructing and managing disposal capacity over the nearly forty years of the Facility's life span and anticipates another 45 – 50 years of use under current waste flow scenarios. The Facility is the only County-owned and operated engineered, regulated, and secured

industrial facility and, as such, has to meet stringent State environmental compliance statutory and regulatory requirements for:

- New cell space and closure construction,
- Environmental systems management, monitoring and reporting, and
- Facility operations and maintenance.

Environmental management plans and monitoring systems are in place for leachate, ground and surface water, landfill gas and air.

In addition to the disposal areas, the Facility also includes the largest of the County's nine Recycling Dropoff Centers for cardboard / paper, plastic / glass / plastic container recycling, automotive battery / waste oil and antifreeze recycling. In addition, areas for recycling for scrap metal, yard waste, and tires are located on-site. Staging for wood waste to mulch recycling and clean rubble for reuse on site in interior road and berm construction are also included.

2. Compliance and Enforcement Activities for County Solid Waste Management Ordinances

OSWM is the agency responsible for administering four chapters of the County Codified Ordinance for Solid Waste Management as follows:

- **Chapter 1080 - Solid Waste Management Facilities**
This chapter governs locating, construction and operating requirements for solid waste management facilities (currently six) permitted to locate and operate in the County. It requires the OSWM to conduct quarterly Facility inspections; requires the Facilities to provide quarterly reports; requires the OSWM to issue annual Certificates to Operate and perform five-year permit renewal reviews; and prohibits open dumping.
- **Chapter 1084 - Solid Waste Collection and Transportation**
This chapter was significantly revised in 2002 to require collectors to recycle materials collected for recycling, to specify materials required for collection and to require reporting by collectors. It governs the collection of solid waste, recycling and construction debris waste. Over sixty companies and nearly 500 collection vehicles are permitted to operate in the County. Permitted collectors must renew permits annually and submit quarterly reports.
- **Chapter 1086 - Solid Waste Reduction and Recycling**
This chapter was significantly revised in 2002 to require nonresidential recycling and to specify materials required for

source separation by residential and nonresidential generators. It establishes recycling requirements for residents and business/nonresidential establishments.

- **Chapter 1088 - Litter Prevention and Control**

This chapter requires that property owners maintain their properties litter free, and waste haulers to secure transported wastes. It was enacted in 2004 with no staff resources and the OSWM responds to complaints if time permits.

POTENTIAL NEXT STEPS

1. Continue to participate in regional programs and initiatives that promote energy efficiency and reduce greenhouse gas emissions and consider joining a nationwide initiative like the "Cool Counties" program.
2. Revise the Comprehensive Plan in order to further develop the policy guidance that addresses and promotes energy efficient and green building practices in both the public and private sector. Amend relevant sections of other regulatory documents, including the Zoning Ordinance and the Facilities Standards Manual (FSM), accordingly.
3. Establish a reliable measurement of energy consumption in the County, develop attainable County-wide energy goals aimed at reducing consumption, and monitor and report annual savings for energy efficiency.
4. Use the information, measurement tools and existing outreach programs available by being a participant of the Cool Capital Challenge to promote public and private actions to reduce regional greenhouse gas emissions.
5. For all government-owned facilities, continue to support Green Building programs such as LEED™ (Leadership in Energy and Environmental Design) during the construction and renovation of County buildings and invest in energy efficient upgrades for existing county buildings.
6. Reduce fossil fuel consumption and greenhouse gas emissions with additional purchases of County-owned advanced technology and clean fuel vehicles.
7. Develop green procurement policies for County government purchases.
8. Encourage private-sector conservation by developing additional incentives to the private sector for 'green building' proposals, offering free energy audits to business and homeowners, etc.
9. Set a realistic goal to purchase green power, or energy produced from clean, renewable energy resources (e.g., solar, wind, tidal, geothermal, biomass).

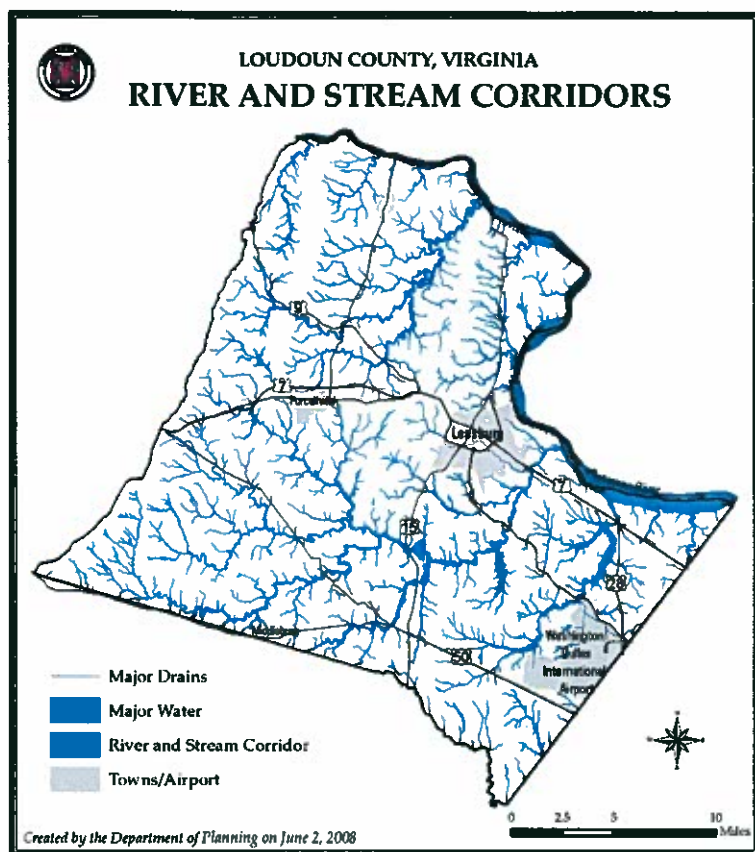
10. Develop a County Climate Action Plan that will anticipate climate change and its potential impacts, conduct preparedness planning, and list contingencies for climate-related events such as drought, flooding, increased storm activity, more air quality alerts per year, potential human health effects, and the stress on the natural systems.
11. Conduct biennial review of the Solid Waste Management Plan in accordance with the Plan.
12. Revise the Facilities Standards Manual (FSM) to require 5-foot sidewalks for “by-right” developments, consistent with requirements for residential and commercial developments as noted in the Bike/Ped Plan.
13. Create separate Geographic Information System (GIS) data layers for paved, shared-use trails (e.g., 10-foot trails along transportation corridors) and for natural hiking trails (e.g., stream valley / linear park trails).
14. Provide capital improvement investment in the expansion of the bicycle and pedestrian circulation network along major transportation corridors.

Group One: Natural Resource Assets

Natural Resource Assets are the elements of the Green Infrastructure that represent the most natural settings in the County, including river and stream corridors; scenic rivers and the Potomac River; surface and groundwater resources; geologic and soil resources; forests, trees and vegetation; plant and wildlife habitats; and outdoor recreational and educational opportunities. The goal for this group of elements is both preservation and, wherever practical, restoration of their natural state.

A. River and Stream Corridors

The land corridors that border and include rivers and streams comprise the County’s largest ecosystem, consisting of nearly 500 miles of perennial streams. The County’s river and stream corridors include wetlands, riparian forests, steep slopes, and many of the County’s important historic and archaeological sites. Where stream corridors have been preserved or reestablished to their natural condition, they help filter pollution from runoff, provide shade and keep stream water cool, detain flood waters and reduce their velocities, and provide food and habitat for fish and wildlife. They also provide many scenic, recreation, and educational opportunities.



Streams that drain 100 acres or more include regulatory floodplain areas that are a critical component of the river and stream corridor. It is necessary to manage floodplain areas wisely in order to protect property and public safety as well as maintain environmental benefits. Floodplain study and floodplain alteration applications associated with development are reviewed to maintain the County's status as a participating community in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP). Due to Loudoun's floodplain policies and ordinances, the vast majority of County residents are not required to purchase flood insurance and those that do receive reduced premiums through NFIP.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan includes a number of river and stream corridor policies that are intended to provide an integrated approach to protecting, conserving and managing the multitude of natural resources found in river and stream corridors. The key strategy in the Plan for protecting these areas is the establishment of a River and Stream Corridor Overlay District (RSCOD) in the Zoning Ordinance that includes all elements of the corridor (including floodplains, adjacent steep slopes, wetlands, riparian forests, and historic and archeological sites) as well as a flexible 50-foot management buffer. Full density credit is provided for the protected area and only those uses that support or enhance the biological integrity and health of the river and stream corridor - including passive and active recreation, paths and trails, road or utility crossings, stormwater management facilities, historic and archaeological sites, non-structural agricultural and silvicultural activities, and conservation - are permitted.

Wetlands are a critical component of river and stream corridors. Plan policies call for the development of a reliable wetlands inventory and map and states that the County will support the federal goal of no net loss to wetlands in the County.

For a complete list of the River and Stream Corridor policies, please see Policies 1 – 24 beginning on pg. 5-6 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that “*the County will protect rivers and streams through the creation of a River and Stream Corridor Overlay District (RSCOD)*” (RGP, Policy 2, pg. 5-6).

The RSCOD was one of the environmental overlay districts adopted with the Revised 1993 Loudoun County Zoning Ordinance on January 6, 2003 that was intended to protect critical resources and implemented the policies of the newly adopted Revised General Plan. Section 4-2000 (RSCOD) established regulatory minimum riparian buffer widths and a list of permitted uses consistent with Plan policies. Special exceptions could be requested for a variety of uses, such as marinas or boat launches and above-ground structures or uses needed for the operation of a public utility. The RSCOD also established performance standards for development within the river and stream corridor and a methodology to offset encroachments into the required 50-foot management buffer.

In correlation with the zoning district, the Office of Mapping and Geographic Information (OMAGI), with the assistance of environmental staff from the Department of Building and Development, developed a RSCOD mapping layer that provided a visual interpretation of the overlay as defined in the Zoning Ordinance. It was composed of floodplain boundaries; steep slopes; a 100 foot buffer around rivers and streams that drain more than 100 acres; a 300 foot buffer around County reservoirs (Beaverdam and Goose Creek,) the Potomac River, and state designated scenic rivers (Goose Creek and Catoctin Creek); and a 50 foot buffer around the floodplain and steep slope areas.

The RSCOD was one of the environmental overlays overturned by the Circuit Court of Loudoun County in March of 2004 due to insufficient public notice. While some of the protections continued to be applied to legislative applications, similar protections for “by-right” development became unavailable. When the RSCOD was overturned, the regulations protecting river and stream corridors reverted to the Floodplain Overlay District (FOD), which regulates the County’s floodplains, and the Scenic Creek Valley Buffer.

The FOD restricts land uses in areas within the County that are designated as floodplain and are subject to severe periodic inundation. Structures

(with very few exceptions) may not be constructed within the regulated floodplain. The County maintains a regulatory floodplain boundary layer that reflects the limits of flooding resulting from a storm having a one percent (1%) probability of occurring in any given year, identified as the 100-year storm. The floodplain boundary was compiled from the Federal Emergency Management Agency's (FEMA) floodplain data and includes Major Floodplains draining 640 acres or more (required by FEMA) and Minor Floodplains draining between 100 and 640 acres (required by the County floodplain ordinance). The floodplain boundaries are updated by Building and Development staff as floodplain studies and alterations are approved and structures are built. The County has a map titled "Floodplain, Topo, and Surface Waters" which includes all of these data layers.

The aforementioned engineering studies, which accompany development applications, map the limits of the floodplain and evaluate if any proposed grading or crossings will impede flood flows or raise flood elevations. The ordinance protects safe passage of flood waters through residential communities and commercial districts. An effective ordinance regulating activities within floodplains, accompanied by proper enforcement are necessary for a community to participate in the National Flood Insurance Program. Unlike RSCOD, the FOD does not include a protective management buffer surrounding the floodplain, does not allow density credit for the area encumbered by Major Floodplain, and does not allow stormwater management facilities to be located within Major Floodplain areas unless such stormwater management facility is associated with uses permitted by-right or special exception in the FOD.

The Scenic Creek Valley Buffer establishes a 250-ft setback along the Potomac River, a 200-ft setback on each side of designated portions of Goose Creek and Catoctin Creek, and a 150-ft setback on each side of each creek or stream where the watershed is greater than 640 acres; in all instances, the setback is measured along the slope of the ground from the channel scar line. A mechanism to reduce this setback by 100 feet is provided for the retention or creation of a forested area or for the use of and retention of stormwater management/BMP practices. These regulations do not limit development density that would otherwise be permitted on a property.

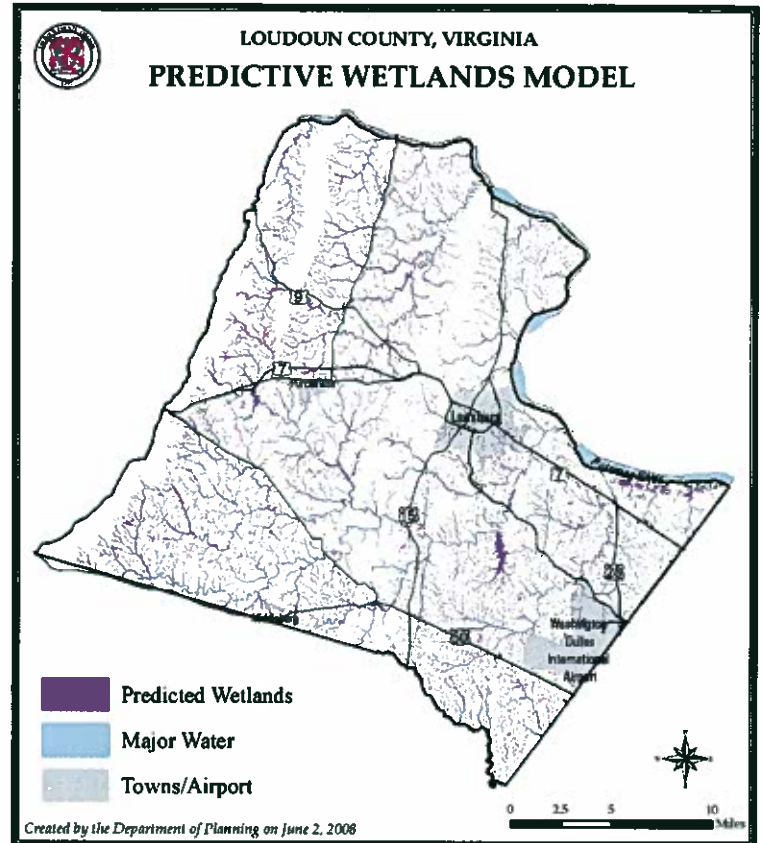
- **Wetlands Inventory and Map**

The Revised General Plan states that "*the County will develop a reliable wetlands inventory and map of wetland areas both inside and outside of the RSCOD Countywide*" and that "*the County will develop a partnership with the U.S. Army Corps of Engineers regional office ... to regulate wetlands outside of the RSCOD*" (RGP, Policies 13 and 22, pg. 5-9 and 5-

10).

The Department of Building and Development, with assistance from a grant by the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps), developed a Predictive Wetlands Model that identifies areas that are predicted to be wetlands in the County. Released on the County's on-line mapping system on December 4, 2007, the model provides a weighted estimation of the presence of existing wetlands. Its purpose is to assist applicants and staff in identifying potential wetlands in an effort to better guide land use decisions. The data layer is derived from the County's data as well as data from the US Fish and Wildlife Service and is current as of June 2007. The Department of Building and Development plans to expand this effort to evaluate post-development drainage patterns. Development of the County's local wetland program was also funded by this grant, which has been extended to October 31, 2008. Since March 2005, the Environmental Review Team (ERT) in the Department of Building and Development has been meeting every other month with the Corps to discuss wetland delineations, avoidance and minimization, and permit applications associated with active development projects.

An important component in the development of the County's local wetland program was adopted in conjunction with the December 4, 2007 Facilities Standards Manual (FSM) amendments. Section 7.500 was added to the FSM requiring wetland information to be depicted on preliminary plats, construction plans and profiles, and site plans and wetland permit documentation and digital wetland data to be provided prior to the issuance of grading permits.



- **Wetland Banking and Mitigation Efforts**

The Revised General Plan states that *“The County will support the federal goal of no net loss to wetlands in the County and will identify optimum receiving sites with priority to each geographic Policy Area within the RSCOD for the construction of new wetlands in association with adjacent stormwater management best management practices or required as part of federal wetland mitigation programs”* (RGP, Policy 23, pg. 5-10). The Plan also indicates that the County’s Policy is to protect its existing Green Infrastructure elements and to recapture elements where possible (RGP, pg. 6-8).

According to County estimates, approximately 13 acres of wetlands and 20,000 linear feet of streams are lost to development each year in Loudoun County. Analysis of Virginia Department of Environmental Quality permit data indicated that 97 percent of required wetland mitigation (8 acres valued at \$1 million) was exported in 2005, and 96 percent of required wetland mitigation (13 acres valued at \$1.6 million) was exported in 2006¹¹.

Federal and State laws only require that wetlands be replaced in the same large drainage area in which they were impacted, which can span multiple jurisdictions. For legislative applications, the County seeks to mitigate wetlands as close to where they are impacted as possible. The Environmental Review Team (ERT) of the Department of Building and Development recommends a commitment that prioritizes where stream and wetland impacts are to be mitigated within the County, as follows:

- 1) onsite,
- 2) within the same stream watershed within the same Planning Policy Area,
- 3) within the same stream watershed outside the Planning Policy Area, and
- 4) within Loudoun County, subject to approval by the U.S. Army Corps of Engineers (Corps) and the Virginia Department of Environmental Quality (DEQ).

There are currently three stream and wetland mitigation banks located in the County, while three more are pending federal and state approval. A total of 51 acres of wetlands and 13,000 linear feet of stream mitigation have been developed by the three existing banks, with an associated value of \$6.4 million in wetland mitigation and \$5.2 million in stream mitigation. These projects also include 108 acres of riparian buffer planting and 50

¹¹ March 27, 2006 ERT Planning Commission Presentation & April 24, 2006 ERT Transportation/Land Use Committee Presentation.

A-36

acres of riparian buffer preservation.

In 2006, a Wetland Workgroup was created to project the County's future mitigation needs and devise strategies on how to address them. Based upon analysis of wetland permit data from 2003-2006, the Workgroup predicted that the County will need 16 acres of wetland mitigation and 20,000 linear feet of stream mitigation each year to offset impacts associated with development. They estimated that the combined annual market value of the mitigation to be about \$10 million per year based on \$125,000 per acre of wetland mitigation and \$400 per linear foot of stream mitigation. Thus, maintaining stream and wetland mitigation locally provides an annual investment of up to \$10 million in stream restoration, riparian buffer planting, wetland enhancement, and wetland creation that benefits water quality, air quality, and wildlife. This data was presented to the Transportation/Land Use Committee on May 21, 2007. The Wetland Workgroup last met on October 1, 2007. Following staff analysis of 2007 wetland permit data, the Workgroup plans to convene again and prepare an update to the Transportation Land Use Committee.

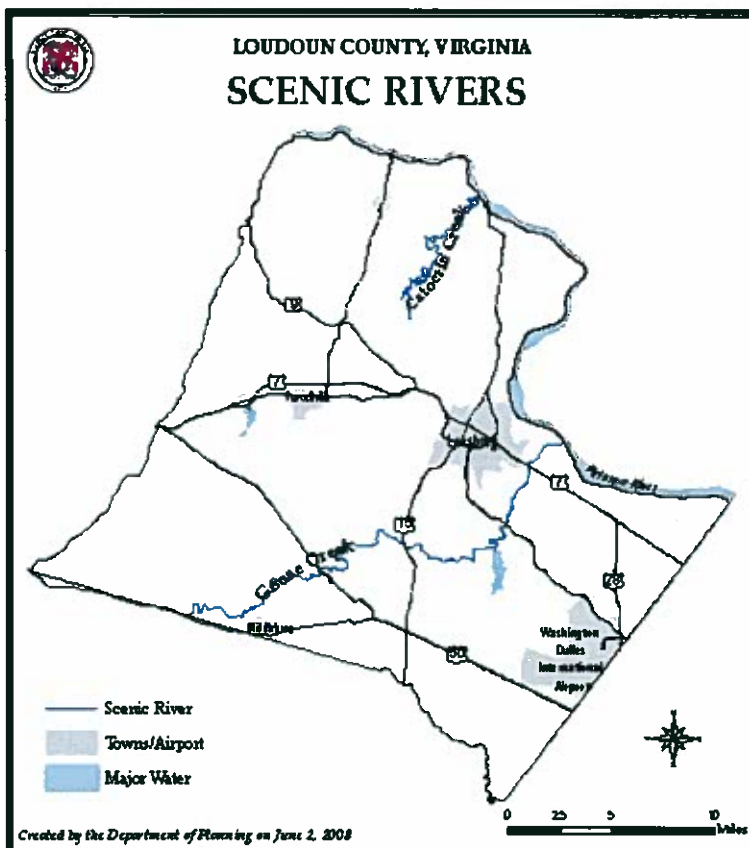
POTENTIAL NEXT STEPS

1. Continue to expand opportunities to mitigate stream and wetland impacts locally, in close proximity to impacts.
2. Continue to encourage wetland and stream mitigation opportunities for anticipated habitat loss due to the expansion of Dulles International Airport.
3. Continue to maintain and use the Predictive Wetlands Model in the review of land development applications.
4. Continue to evaluate opportunities to increase preservation of wetlands and riparian buffers adjacent to jurisdictional waters and wetlands.
5. Continue to support a countywide stream protection strategy and monitoring programs.
6. Investigate whether reinstating the River and Stream Corridor Overlay District (RSCOD) or adopting the Chesapeake Bay Preservation Act (CBPA) would be most valuable in the protection of the Green Infrastructure. Amend the Zoning Ordinance and Facilities Standards Manual (FSM) as necessary.

B. Scenic Rivers and the Potomac River

The Catoctin Creek from Waterford to the Potomac River and Goose Creek from the Fauquier and Loudoun County lines to the Potomac River have been designated as Scenic Rivers by the Commonwealth of Virginia. The Scenic River designations provide these rivers special legislative status and aid in establishing appropriate protection and management standards to maintain their scenic and environmental values.

COMPREHENSIVE PLAN GUIDANCE



The Revised General Plan calls for the protection of Scenic Rivers by surrounding them with a protected, no-build open space area that extends either 300 feet from the edge of the river or the RSCOD (which provides for a 50-foot management buffer surrounding the floodplains and adjacent steep slopes), whichever is greater. The only uses that are permitted within this area are those allowed in the RSCOD. Development potential may be transferred from the no-build buffer according to density transfer guidelines provided by the Plan. Regarding the Potomac River, Plan policies call for the preservation of its scenic character by completing the County's portion of the Potomac Heritage National Scenic Trail (PHNST) through public and private efforts.

For a complete list of the Scenic Rivers and Potomac River policies, please see Policies 1 – 10 on pg. 5-11 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that “the County will protect Scenic Rivers and the Potomac River by defining a protection area as a 300-foot no-build buffer or the RSCOD, whichever is greater. ... The RSCOD

performance standards, best management practice requirements and list of permitted uses will apply to the no-build buffer” (RGP, Policy 1, 5-11).

All projects proposing development adjacent to a Scenic River are required to protect, to varying extents, the scenic waters. The policies contained in the Revised General Plan continue to be applied during the review of legislative applications. However, similar protections for permitted or “by-right” development became unavailable after the RSCOD was overturned by the Circuit Court of Loudoun County in March of 2004 and the regulations for these resources reverted to the Scenic Creek Valley Buffer (Section 5-1000) provisions of the Revised 1993 Loudoun County Zoning Ordinance.

The Scenic Creek Valley Buffer is less restrictive than the protection area called for in the Plan. The Scenic Creek Valley Buffer regulations establish a 250-ft setback along the Potomac River, a 200-ft setback on each side of designated portions of Goose Creek and Catoctin Creek, and a 150-ft setback on each side of each creek or stream where the watershed is greater than 640 acres; in all instances, the setback is measured along the slope of the ground from the channel scar line. A mechanism to reduce this setback by 100 feet is provided for the retention or creation of a forested area or for the use of and retention of stormwater management/BMP practices. These regulations do not limit development density that would otherwise be permitted on a property.

- **Trails along Scenic Creeks and the Potomac River**

The Revised General Plan states that “*the County will establish a strategy to expand passive recreational use of Scenic Rivers and the Potomac River and seek proffers from developers for public access trails along the Potomac River, Goose and Catoctin Creeks*” and “*the County will seek to complete its portion of the Potomac Heritage Trail through public and private efforts as proactively coordinated with County resources*” (RGP, Policies 9 and 10, pg. 5-11).

The Potomac Heritage National Scenic Trail (PHNST) is a partnership to develop a network of locally-managed trails in a 425-mile corridor between the Chesapeake Bay and the Allegheny Highlands of Pennsylvania. As of mid-2007, 17 segments of the PHNST have been officially designated. Within Loudoun County, the PHNST is anticipated to stretch from the Fairfax County line to Harper’s Ferry along the southern bank of the Potomac River. Trailheads can be found at Algonkian Regional Park, Bles Park, Elizabeth Mills Riverfront Park, Kephart Bridge Landing, and the Keep Loudoun Beautiful Park. The trail is intended as a primitive hiking and walking (natural surface) trail in a secluded setting

with some limited equestrian accommodation. It is not intended as a transportation corridor.

In 2002, Loudoun County's Department of Parks, Recreation, and Community Services (PRCS) was designated as the lead agency to develop and manage the corridor in Loudoun County. PRCS has found that the purchase of all corridor properties would be cost-prohibitive and is using the legislative process, including proffers from rezonings and conditions of approval for special exceptions, to obtain corridor links. PRCS has also partnered with other organizations to coordinate acquisition and construction efforts. Partners include the National Park Service (NPS), the Northern Virginia Regional Park Authority (NVRPA), the Town of Leesburg, the Potomac Heritage Trail Association, the Northern Virginia Regional Commission, and individual landowners. As a "primitive" natural-surface trail, volunteers have been able to provide much of the labor to build the trail.

Various segments of the Trail have already been completed and the County continues to acquire other segments. The County has already acquired 95 percent of the 16-mile segment from the Fairfax County line to the Keep Loudoun Beautiful Park. This first phase of the PHNST in eastern Loudoun County was designated by the Regional Secretary of the Department of Interior in a ceremony on Trails Day in June 2006. In addition to the first phase of the Trail, approximately 80 percent of the segment from the Keep Loudoun Beautiful Park to White's Ferry has been acquired, approximately 20 percent from White's Ferry to Point of Rocks, and approximately 60 percent from Point of Rocks to Harper's Ferry.

The County is planning on using portions of National Park Service (NPS) trails as part of the corridor within the Harper's Ferry National Historical Park. Plans also include connecting the PHNST with the Chesapeake and Ohio (C&O) Canal National Historic Park on Maryland-side of the Potomac River, via White's Ferry. Furthermore, the County (PRCS) has partnered with the NPS to provide funding and technical assistance for interpretive and directional signage along the first designated segment of the PHNST from the Fairfax County line to the Keep Loudoun Beautiful Park.

The Potomac Heritage National Scenic Trail could also connect to trails along both Goose Creek and Catoctin Creek, the two scenic rivers in Loudoun County. Trails have been developed on Goose Creek between Route 7 and the Potomac River within the Lansdowne development, and are heavily used. Other segments of the trail have been proffered with legislative applications but are unbuilt. Examples include Evergreen Rural Village (ZMAP 2002-0002), Goose Creek Preserve (ZMAP 2002-0009),

Goose Creek Village (ZMAP 2003-0008), Goose Creek Village South (ZMAP 2003-0009), and Rouse Belmont Glen (ZMAP 2004-0006) rezoning applications. There are limited opportunities to develop trails along Catoctin Creek given this stream's location within the Rural Policy Area, where development largely proceeds through "by-right" applications.

While the Potomac Heritage National Scenic Trail is a high priority trail corridor, the County is also pursuing several other connecting trails throughout the County. These include two "Blue Trails," or water trails, along Goose Creek and some navigable portions of Catoctin Creek. The intent of these trails is for passive, non-motorized recreational use, such as by canoes and kayaks. Routes were mapped out during 2006 and 2007. Travel along these water trails will emphasize links to historic resources and the Potomac Watershed. The County is working with the Goose Creek Scenic River Advisory Committee to plan these routes and public access points along the river corridors.

- **Goose Creek Scenic River Advisory Committee**

The Goose Creek Scenic River Advisory Committee is charged by the Commonwealth of Virginia to protect the scenic beauty of the Goose Creek, its pristine water quality, its utility as a drinking water resource for many residents of our County and the City of Fairfax, and its importance as a recreational resource. The Committee consists of nine members that are appointed by the State and meets every other month to discuss land development applications adjacent to Goose Creek as well as activities along the Creek. The Committee also helped Fauquier County establish a Goose Creek Scenic River Advisory Committee and obtain a designation of their portion of the river within Fauquier County as a Scenic River by the Commonwealth of Virginia. The Catoctin Creek Scenic River Advisory Committee was rescinded in 2003 due to lack of interest.

POTENTIAL NEXT STEPS

1. Continue to pursue the acquisition of property and easements through both the legislative review process by evaluating the impact of new development on planned linear parks and corridors and ensuring adequate access to such facilities from residential and employment communities and land purchases.
2. Continue to partner with organizations, such as the Goose Creek Scenic River Advisory Committee, to fulfill the County's vision regarding scenic rivers and to coordinate the efforts of volunteers to help build the trails.
3. Revise the Scenic Creek Valley Buffer (Section 5-1000) of the Zoning Ordinance to be consistent with Plan policies.

4. Investigate the River and Stream Corridor Overlay District (RSCOD) and the Chesapeake Bay Preservation Act (CBPA) to determine which program would be most valuable in the protection of the Green Infrastructure. Revise the Loudoun County Zoning Ordinance and the Facilities Standards Manual (FSM) as necessary.
5. Consider reinstating the Purchase of Development Rights (PDR) program to protect open space corridors along scenic rivers.
6. Develop and implement a Potomac River Shoreline Management Plan, in conjunction with the Potomac Heritage National Scenic Trail Management Plan.

C. Surface Water and Groundwater Resources

From 1899 to 1972 the Rivers and Harbors Act was the only Federal law protecting water. Growing public awareness and concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act. The Act established the basic structure for regulating discharges of pollutants into the waters of the United States and gave the U.S. Environmental Protection Agency the authority to implement pollution control programs.

In 1988, the Virginia General Assembly enacted the Chesapeake Bay Preservation Act (CBPA). The Chesapeake Bay Preservation Area Designation and Management Regulations were adopted in 1990. This Act requires 84 local governments adjacent to the Chesapeake Bay (i.e., Tidewater Virginia) to implement ordinances designed to protect and restore the quality of perennial streams and their associated non-tidal wetlands, as the conditions in these environments have been determined to directly affect the condition of the Chesapeake Bay. Because Loudoun is not within the Tidewater, it is not required to comply with the CBPA. However, counties other than the 84 required are allowed to voluntarily adopt the CBPA. Furthermore, Section 10.1-2110 of the Act allows local governments outside Tidewater to incorporate protection of the quality of state waters into their comprehensive plans, zoning ordinances, and subdivision ordinances consistent with the Act.

For most of the County's history, the threats to surface and groundwater quality have been from rural land use. The rapid development of eastern Loudoun since the mid-1990s has brought a new set of water resource challenges. Major water resource issues for Loudoun County today include ensuring an adequate supply of drinking water, mitigating the impacts of increasing impervious land cover, protecting groundwater and surface water (i.e., streams and wetlands) from

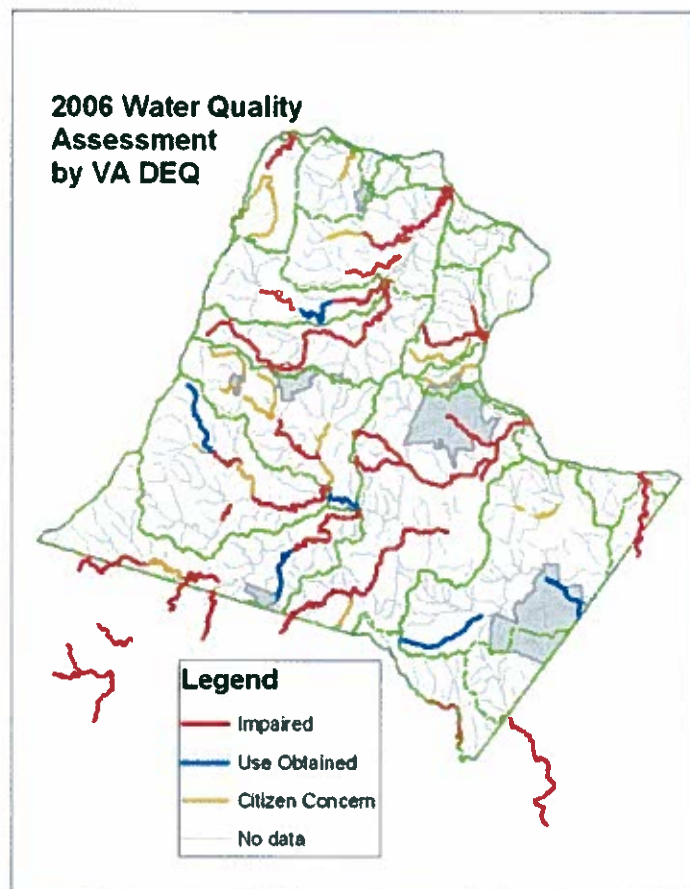
contamination and pollution, and preventing the degradation of water quality in watersheds. Clean and plentiful water resources are critical to the environmental, recreational and economic health of the County and its citizens.

1. Surface Water

Approximately three out of every four people living in Loudoun County are served by water obtained from surface water sources. Loudoun Water (formerly the Loudoun County Sanitation Authority) provides water and sewer service to over 175,000 residents of Loudoun County from two primary sources – Beaverdam Reservoir on the Goose Creek and the Potomac River. The Town of Leesburg supplies over 37,000 residents with water from the Potomac River. In western Loudoun, the Town of Purcellville supplies water to about half of its population from the Hirst Reservoir situated in the headwaters of the Catoctin Watershed.

Loudoun Water currently purchases approximately 90% of its water from Fairfax Water, which draws water from the Potomac, and about 10% from The City of Fairfax, which draws its water from the Goose Creek reservoir which is fed in part by Beaverdam Reservoir. The Beaverdam Reservoir holds about 1.3 billion gallons of water and is routinely drawn down to maintain flows in Goose Creek. Loudoun Water also oversees operation of communal water and wastewater facilities for several residential developments and businesses outside of the suburban service area in the Rural and Transition Policy Areas. Loudoun Water is in the process of investigating how to obtain additional water supply through either the purchase of water or the development of its own water supply and treatment facility.

In Loudoun County, the challenge of today and tomorrow is largely



Source: Department of Building and Development. Created on May 9, 2008.

controlling non-point source pollution rather than point source. "Point source" pollution are "end of pipe" discharges from industry or wastewater treatment plants. In these cases the source can be easily identified and controlled through regulations, permits, and inspections. "Non-point source" pollution, in comparison, comes from many diffuse sources and includes things like excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from urban runoff and energy production; sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks; bacteria and nutrients from livestock, domestic animal and wildlife wastes, and faulty septic systems; and contaminants from air pollution.

Currently, most watersheds within the County have stream segments which have been placed on the state's impaired waters list by the Virginia Department of Environmental Quality (DEQ) or are areas of concern based on data collected by citizen volunteer groups or other organizations. An impaired stream has pollution levels that exceed state water quality standards for its designated use. If a stream is deemed by DEQ to be impaired, it is strictly voluntary to implement a clean-up effort.

The DEQ has only assessed about a third of the perennial stream miles in the County and impairments have been found in 85% (approximately 124 miles) of these assessed stream miles. Most of the impairments identified by DEQ in Loudoun's streams are due to high fecal bacteria levels. There are also two stream segments - lower Goose Creek and lower Broad Run - that have a Fish Consumption Advisory for PCBs (polychlorinated biphenyls). This warning was issued by the Virginia Department of Health in December 2004.

COMPREHENSIVE PLAN GUIDANCE

The Plan's surface water policies call for the protection of the lands that are critical to the quality of key water supplies including reservoirs, the promotion of water conservation measures, protection of the headwaters of the Catoctin and Goose Creeks, and support of community programs that keep shorelines and water bodies litter-free. The policies also call for the establishment of appropriate standards to protect natural streams and drinking water supplies and to control erosion, sedimentation, and stormwater retention and detention. For activities that propose pollution sources, secondary containment, treatment, and emergency response plans are to be required.

The Plan also calls for the adoption of the Virginia Stormwater Management Handbook, the endorsement of the interstate Chesapeake 2000 Agreement, the establishment of a pollution prevention program to improve surface water quality, the development of overall water quality goals and specific standards for individual streams and river and stream corridors. It also states that the County will develop a watershed management plan and a watershed overlay district for all

public water supply reservoir watersheds to include a protection area of 300 feet or the RSCOD, whichever is greater. The need for cooperation with other organizations, including the incorporated Towns, Loudoun Water, and the Loudoun County Soil and Water Conservation District (LSWCD), is also acknowledged.

For a complete list of the Surface Water policies, please see Policies 1 – 21 on pg. 5-17 of the Revised General Plan.

IMPLEMENTATION

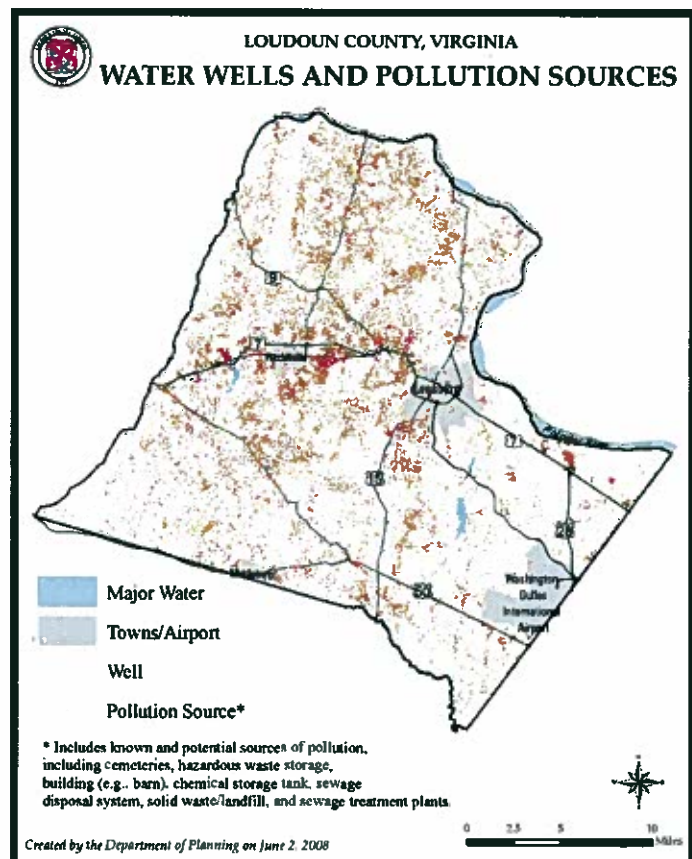
Because surface and groundwater resources are inextricably linked, the County's implementation measures typically address both above and below-ground water resources. For a complete discussion of implementation measures, please see the Implementation section for groundwater below.

POTENTIAL NEXT STEPS

For a complete discussion of Potential Next Steps, please see the Implementation section for groundwater below.

2. Groundwater

Approximately a quarter of the County's residents, primarily those living in the western and northern portions of the County but also in some remaining neighborhoods in the east, depend on groundwater for their domestic water supply. Although community supply wells serve many residents in the various towns, villages, and some of the subdivisions, most of these residents rely on a private well located on their property. Based on the County's available records, there are approximately 120 active community and non-community water supply wells and 14,500 private water supply wells currently in use in Loudoun County. There are additional wells that are used for other purposes such as irrigation, industry, schools, recreation (athletic fields),



geothermal heating and cooling, and monitoring.

In general, the quality of groundwater is good throughout the County. However, groundwater contamination from land uses and the natural geology has occurred in several areas. For example, some wells in the Broad Run Farms subdivision¹² and a few wells in the Richland Acres community¹³ have been impacted by contamination. Additionally, Loudoun Water is currently in the process of investigating possible bacterial impacts within the wells of the Raspberry Falls subdivision. This subdivision is located on limestone conglomerate, a type of terrain that is more susceptible to pollution.

Approximately 12,500 conventional on-site sewage disposal systems and 1,300 non-conventional systems have been installed in the County. Proper siting, installation, and maintenance of these systems are critical to protecting groundwater, surface water and the public's health.

COMPREHENSIVE PLAN GUIDANCE

To protect surface and groundwater resources, the Plan calls for the development and implementation of a comprehensive groundwater protection strategy, a wellhead protection program, and a comprehensive pollution management program. The Plan also states that the County will, for each watershed, periodically assess the recharge rates for groundwater in each watershed and the effects of groundwater consumption on the volume of surface water in streams. Lastly, developments in the Suburban Policy Area are required to connect to available central water and sewer systems according to water and wastewater treatment policies in the Plan.

For a complete list of the Groundwater policies, please see Policies 1 – 6 on pg. 5-18 of the Revised General Plan.

¹² In early 2005, the County discovered several wells in Broad Run Farms that were contaminated with trichloroethylene. The Hidden Lane landfill is the suspected source of the contamination. Filtration systems, at state cost, were installed on affected properties and in March 2008, the U.S. Environmental Protection Agency added the Hidden Lane Landfill site to its Superfund National Priorities List (NPL). Source: U.S. Environmental Protection Agency, Mid-Atlantic Superfund. (April 2008). The Hidden Lane Landfill. Retrieved on April 1, 2008. Available at <http://www.epa.gov/reg3hscd/super/sites/VAD980829030/index.htm>.

¹³ In October 2007, County inspectors identified three private wells located along Lakeland Drive in the community of Richland Acres containing the gasoline additive methyl t-butyl ether, or MTBE, and three others containing amounts of perchloroethylene, or PCE. A fourth homeowner who had his water privately tested also found a very low amount of PCE. In response, the Virginia Department of Environmental Quality (VADEQ) installed filtration systems in the affected homes. The source of the contamination has not been identified.

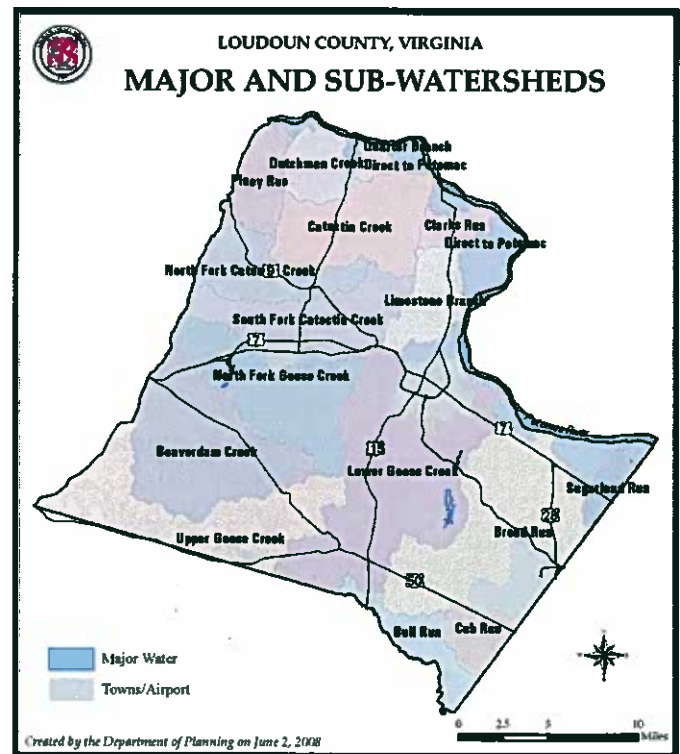
IMPLEMENTATION

There are many Comprehensive Plan policies regarding surface and groundwater that are currently being implemented throughout the County that address watershed management, water supply, monitoring, stormwater management, erosion and sediment control, and education/outreach. Many of these implementation steps are interconnected; however, they are currently not well integrated which may be limiting their potential effectiveness. A detailed plan to help coordinate, integrate, implement, and enhance these efforts is needed. Information on the activities of the various committees involved with water resources is also provided.

- **Watershed Management**

The Revised General Plan states that: *"The County will develop and implement a watershed management plan"* (RGP, Policy 9, pg. 5-17).

Both the federal government, through Environmental Protection Agency (EPA), and the Commonwealth of Virginia, through the Department of Conservation and Recreation (DCR), recommend watershed management planning as a tool to help local governments integrate and enhance efforts of water resource management. Towards this goal, the County initiated a process to develop a comprehensive watershed management plan in 2002 with the assistance of grants from both the National Fish and Wildlife Foundation and the U.S. EPA. These efforts are based on the recognition that watershed management planning is an iterative, collaborative, and adaptive process.



1. **Strategy for Watershed Management Solutions (SWMS)**

The first step towards the development of a watershed management plan in Loudoun County was the formation of the Loudoun County

Strategy for Watershed Management Solutions (SWMS) Team. Participants in the SWMS effort consisted of representatives of 41 different groups or interested parties that included government, business, farming, development, conservation groups, and citizens.

Following four stakeholder meetings that took place between February and June 2006, a "Declaration of Cooperation" (DOC) was finalized in December 2006 which summarizes and formalizes the results of the SWMS Team's work. The final report, which is available on the County's website¹⁴, includes guiding principles of the planning process - vision, values, and goals for the plan; recommendations for a two-phased work plan approach; recommendations for a "Stakeholder Steering Committee" to guide continued watershed planning efforts and maintain a collaborative approach to decision making; and the designation of a Watershed Coordinator in the County government to be the contact and liaison between the Stakeholder Steering Committee, County staff, and County Administration. The SWMS project was supported by funding from the National Fish and Wildlife Foundation, the U.S. EPA, and Loudoun County.

2. Loudoun Watershed Management Stakeholder Steering Committee

In 2007, the Loudoun Watershed Management Stakeholders Steering Committee was formed in response to one of the recommendations of the SWMS project, described above, to continue the collaborative involvement of County stakeholders in the watershed planning and implementation process. This community-based steering committee was formed with assistance from a grant from the U.S. EPA. The Steering Committee has formed several Standing Committees to address Funding, Data Management, Education and Outreach, and Technical Coordination. The Steering Committee meets monthly and for special meetings. The Board of Supervisors approved a Resolution of Appreciation for the SWMS Stakeholder Team and acknowledged formation of the Steering Committee at its July 3, 2007 meeting. Loudoun Water also participates on this committee.

3. Comprehensive Watershed Management Plan (CWMP)

The Comprehensive Watershed Management Plan (CWMP), which is currently being developed, will provide the County with information and recommendations to help promote the long-term protection and

¹⁴ Source: Loudoun County Department of Building and Development. (2008). Strategy for Watershed Management Solutions. Accessed on May 22, 2008. Available at <http://www.loudoun.gov/Default.aspx?tabid=706#final>

wise use of water resources and integrate existing County water-related initiatives. Data from multiple sources are being compiled and analyzed to identify data gaps and determine a baseline condition of the County's watersheds and water resources. Hydrologic data from multiple sources have been compiled and analyzed and will be presented to the Board of Supervisors in June 2008. Additional data including land cover and land use that further characterize watershed conditions are being analyzed and, together with the hydrologic data, will be assessed to identify data gaps and establish a baseline condition of the county's watersheds.

Once a baseline is established, it can be used to help develop recommendations for a watershed management program and goals to meet water quality standards. An implementation plan will list activities necessary to begin making improvements. The report will provide a rationale for setting priorities and targeting resources where they will have the most impact and will also identify potential funding options. This plan is being developed with the assistance of an independent engineering and environmental contractor and should be completed by late 2008. It is partially funded by a grant from the U.S. EPA.

- **Water Supply**

The Revised General Plan recognizes that "*ensuring an adequate supply of drinking water is one of the major water resource issues for the County*" (RGP, pg. 5-12).

1. **Regional Water Supply Plan**

The State of Virginia requires all local governments to develop a water supply plan that will evaluate future water demand and supply needs over a 30-year planning horizon. The plan is intended to help the Commonwealth and each locality ensure there is adequate safe, clean drinking water for its residents. Loudoun Water, with the assistance of a consultant, is developing a water supply plan designed to address projected demands through the year 2040. The plan will provide a variety of options which include the continued purchase of water from Fairfax Water, as well as options for Loudoun Water to develop its own sources and storage options. The report is scheduled to be completed in 2008. Loudoun Water is also participating in the Virginia Department of Environmental Quality's State-wide Water Supply Plan in coordination with Loudoun County and the Northern Virginia Regional Commission. The plan must be submitted to the Virginia Department of Environmental Quality (DEQ) by 2011 and updated on a five year cycle.

2. *Goose Creek Source Water Protection Program*

Loudoun Water has developed the Goose Creek Source Water Protection Program to protect the Goose Creek Reservoir's drinking water supply. This program was a logical off-shoot of EPA's 1996 Amendments to the Safe Drinking Water Act requiring each State to develop a Source Water Assessment Program. The Virginia Department of Health took the lead in completing the source water assessment for Goose Creek in 2002. The Program provides guidance and recommendations for Best Management Practices for the maintenance and improvement of water quality in Goose Creek.

3. *Broad Run Water Reclamation Facility*

Loudoun Water began operating the Broad Run Water Reclamation Facility (WRF) located adjacent to the Loudoun County Parkway in May 2008. The advanced wastewater treatment facility serves eastern Loudoun County and the facility supplements the treatment currently being provided to Loudoun Water by the District of Columbia Water and Sewer Authority at their Blue Plains facility. The reclaimed water discharge from the facility may be used for irrigation and cooling water by nearby businesses (under a new Water Reuse initiative by Loudoun Water and supported by new Virginia regulation) and to maintain stream flows in the Broad Run, which joins the Potomac River 4.5 miles downstream. Reclaimed water can be counted towards LEED certification.

- **Catoctin Creek TMDL Program**

Catoctin Creek was first identified as impaired by the Virginia Department of Environmental Quality (DEQ) in 1998 due to elevated fecal coliform bacteria levels from livestock, wildlife and human sources and failing onsite wastewater treatment systems. The DEQ created a "TMDL plan" (Total Maximum Daily Load¹⁵) for the creek in 2004, which aims at mitigating the pollution and bringing it back into compliance with Virginia's standards. Local residents were involved in the development of the implementation plan, including representatives from water resource monitoring groups, members of the local farming and agricultural communities, and business representatives. The goal of the plan is to make Catoctin Creek suitable for recreational uses, including swimming and fishing. Setting TMDLs for impaired waters was mandated in Section 303(d) of the Clean Water Act of 1972. Bacteria monitoring has been undertaken by a local volunteer organization, Loudoun Watershed Watch, and is fully supported by volunteers, cash donations and grant funds.

¹⁵ The maximum amount of a specific pollutant that a body of water can assimilate without exceeding the water quality standard for that pollutant

Grant funding is available for the correction of fecal coliform contributions from both livestock and failing onsite wastewater treatment systems. The U.S. Environmental Protection Agency (EPA) with the Virginia Department of Conservation and Recreation (DCR) provides grant money to homeowners to pay for a percent of repairs and upgrades to existing individual wastewater systems, the program is administered locally by the Loudoun County Department of Health. A total of 20 systems have been repaired or upgraded in the watershed to date using approximately \$165,000 in grant monies.

Farmers and landowners in the Catoctin Creek watershed are also eligible for cost-share and tax credit programs funded by the Virginia Department of Environmental Quality (DEQ) and administered through the Loudoun Soil and Water Conservation District for fencing streams, reforestation and other conservation measures aimed at improving water quality in the Catoctin Creek watershed. To date, approximately \$79,000 of cost share money has been used on 22 properties within the watershed¹⁶.

- **Monitoring**

The Revised General Plan calls for water resources to be periodically monitored as an important step in assessing and protecting Loudoun County's valuable water resources (RGP, Policies 4 and 5, pg. 5-19).

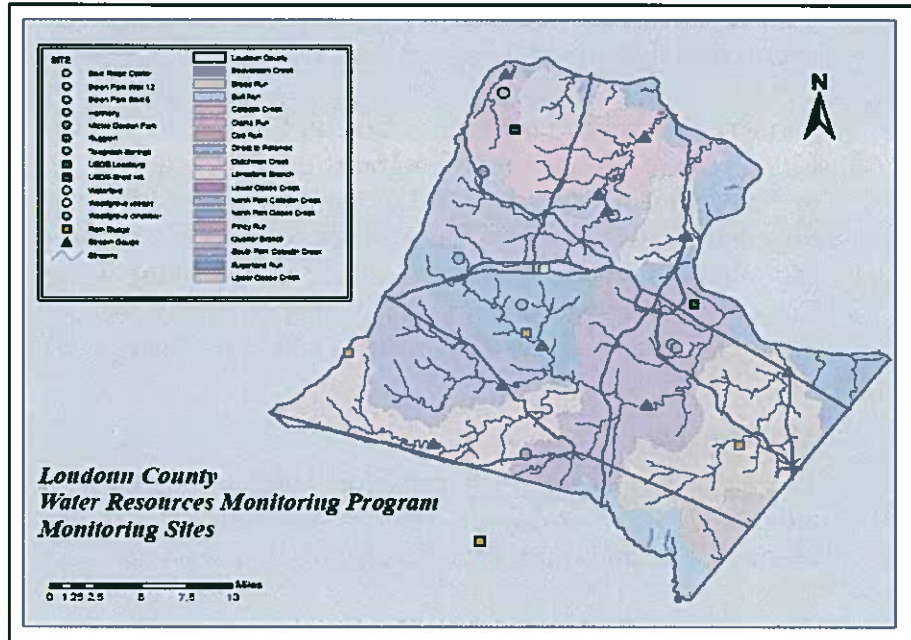
1. ***Water Resources Monitoring Program (WRMP)***

The County has established a network of stream gauging stations and groundwater monitoring wells throughout the County through the Water Resources Monitoring Program (WRMP). The goal of the WRMP, which began in October 2002 and is administered by Loudoun County's Department of Building and Development, is to coordinate and work with various County departments, federal agencies including the U.S. Geologic Survey (USGS), the Virginia Department of Environmental Quality (DEQ), and local citizens groups to assess and protect Loudoun County's valuable water resources. WRMP tracks both precipitation and the quantity and quality of surface and groundwater in the County.

Today, 10 surface water stream gauges monitor stream water levels and flows, 2 rain gauges monitor precipitation, and 11 groundwater monitoring wells provide information on the depth to groundwater and most are available for water quality monitoring. An additional 5 gauges that meet National Weather Service standards collect

¹⁶ Loudoun Soil and Water Conservation District, January 2008

precipitation data within Loudoun County and contributing watersheds and those data are periodically purchased through the National Climatic Data Center. Data from approximately 16,000 well construction records and 5,000 DEQ stream water quality samples have been added to the County's water resources database which is continually updated with new data as it becomes available. Implementation of the WRMP is partially funded by a grant from EPA.



Source: Department of Building and Development

2. Loudoun Watershed Watch

Loudoun Watershed Watch (LWW) was formed in 2000 by citizen groups and government authorities, including the Department of Building and Development and Loudoun Water, concerned about water quality and stream health in Loudoun County. It is an organization devoted to educating Loudoun residents about our local waters and providing them with opportunities to help monitor them. Its primary goal is to develop a comprehensive cooperative program to monitor and protect the water resources of Loudoun County that recognizes the strengths and past work of participating groups and looks to enhancing all contributions through the synergy of effective working relations among citizens of Loudoun County, private organizations, County personnel, and Federal and State agencies.

In order to achieve this mission, LWW promotes environmental stewardship, countywide stream monitoring, watershed management

planning, and water quality and stream habitat protection and restoration. A Comprehensive Stream Monitoring Strategy was created in 2004 to obtain and organize base-line water quality and quantity data on streams throughout Loudoun County to assess current conditions as well as to determine long-term trends. A countywide database will help evaluate and implement policies and procedures to mitigate impacts of land development and other land-use activities. In addition, to educate the public about the County's water resources through user-friendly summary reports, the LWW has developed a report entitled the State of Loudoun Streams: 2005.¹⁷

3. Groundwater Supply

The Loudoun County Department of Health maintains records (location, depth, yield, water quality data, etc.) for wells located in the County and maps the location of these wells on a Geographic Information System (GIS) layer. Most wells are sampled when they are installed and the water quality data are used to evaluate the groundwater resource and are also available to provide baseline data if groundwater contamination should occur in the future. The Loudoun County Department of Health has eleven (2 vacant) Environmental Health positions dedicated to onsite water and wastewater programs.

The Health Department is responsible for the permitting and approval of individual wells and on-site sewage disposal systems (conventional and non-conventional) for all parcels and subdivisions that are not served by public systems within the County. For subdivisions of 10 or more lots to be served by individual or communal wells, or other developments that will use more than 10,000 gallons per day over any 30 day period, the Health Department and the Department of Building and Development require a detailed Hydrogeologic Study to demonstrate that the groundwater system is capable of meeting the water supply demands of the development's future inhabitants or its intended use. The staff of the Health Department conducts site visits to ensure that wells and onsite sewage disposal systems are properly located and installed. If systems are not functioning properly the Department has enforcement powers for violations and can require corrective measures. A total of 229 enforcement actions have occurred since July 1, 2001. These incidents include failing systems, inadequate systems, and direct sewer discharges which have required corrective measures.

¹⁷ Available at http://www.loudounwatershedwatch.org/subitem6_1.html

- **Stormwater Management Program**

The goal of the Stormwater Management (SWM) Program in Loudoun County is to mitigate the impacts of land development on both water quality and quantity. This goal is made up of three components:

- To ensure that the post-developed nonpoint source (NPS) pollutant load shall not exceed the pre-developed load;
- To prevent undue flooding to properties downstream of development projects; and
- To minimize erosion and sedimentation damage to properties and streams by maintaining non-erosive flows from development sites.

Currently, responsibility for Loudoun County's SWM Program is shared by the Department of Building and Development and the Department of General Services. General Services manages the NPDES permit and is responsible for maintenance of SWM facilities, while Building and Development oversees the design and construction of SWM facilities and administers the Erosion and Sediment Control Program.

1. **National Pollutant Discharge Elimination System (NPDES) Permits**

The Revised General Plan states that: *"the County will comply with Phase II National Pollutant Discharge Elimination System (NPDES) stormwater regulations under the federal Clean Water Act, which requires the County's municipal storm sewer system to be regulated as a discrete source of pollution. The County will meet NPDES requirements prior to the permit filing date in 2003. The Clean Water Act requires regulated jurisdictions, including Loudoun, to address six components of a surface water quality management program to obtain an NPDES permit. These include: (1) public outreach and education; (2) public involvement and participation; (3) illicit discharge detection and elimination; (4) construction site stormwater runoff control; (5) post-construction stormwater management; and (6) pollution prevention, or "good housekeeping", for municipal operations"* (RGP, Policy 15, pg. 5-18).

Loudoun County obtained its first NPDES permit in July of 2003 by preparing and submitting an acceptable stormwater management program which addressed each of the minimum control measures in a manner satisfactory to the Virginia Department of Environmental Quality. Program oversight has since migrated to the Virginia Department of Conservation and Recreation (DCR). DCR has promulgated more restrictive requirements, and Loudoun County will be submitting a revised stormwater management program to DCR in

December, 2008 to renew the permit for the next five years. Existing pollution control efforts will be expanded and new measures will be added to treat impairments in Goose Creek and the Occoquan River.

Additional information on the six minimum control measures of the NPDES permit is provided below:

1. *Public outreach and education goals* have been met through the development of a stormwater page on the County website, participation in an annual radio advertising program, distribution of education materials at the public schools, news releases, public information meetings, and airing public service messages on the government access cable channel.
2. *Public involvement and participation goals* have been met through the creation of the Stormwater Hotline for public reporting of system malfunctions or illicit discharges into drains, a storm drain decal program that reminds people not to dump pollutants, and participation in several events with volunteer organizations promoting stormwater awareness.
3. *Illicit discharge detection and elimination* refers to the prohibition of pollutant "dumping" into the stormwater system. The authority to prohibit illicit discharges to the stormwater system was established by Chapter 1096 of the Codified Ordinances of Loudoun County, Stormwater Management, adopted in October of 2003. The entire stormwater system of over 47,000 structures and nearly 700 miles of pipe was mapped, and is regularly updated, so that outfalls can be identified and tested for pollutants and those pollutants traced upstream to possible dumping points.
4. *Construction site stormwater runoff control goals* are met through the Erosion and Sediment Control Program administered by the Department of Building and Development. Details of the program are explained in the Erosion and Sediment Control Program section below.
5. *Post-construction stormwater management* involves the construction of various stormwater management Best Management Practices (BMP's) as well as proper maintenance of those facilities. As noted above, the Department of Building and Development is responsible for design review and construction of such measures, detailed in the Water Quality Best Management Practices (BMPs) section below. The Department of General Services is responsible

for repair and maintenance of stormwater BMP's as well as the entire stormwater conveyance system.

Chapter 1096, Stormwater Management established the policy that stormwater infrastructure lying within easements dedicated to the County will be maintained by the County. The Department of General Services has established an inspection and maintenance program for all stormwater facilities constructed within easements as well as a mechanism to acquire easements where none exist. Additionally, a program has been developed to restore aging infrastructure to its original design capability.

6. *Pollution prevention, or "good housekeeping", for municipal operations* has led to the development of pollution prevention plans and standard operating procedures for activities at the Central Warehouse and Maintenance Facility and the Parks and Recreation Warehouse and Maintenance Facility. Employees at those facilities have been trained in those procedures to eliminate pollutants from our own government activities.

The activities detailed above have not only fulfilled the policy outlined in the Revised General Plan and met the requirements of the Clean Water Act and the NPDES permit, but have also resulted in an improved stormwater system that removes significant amounts of sediment and pollutants previously destined for the Potomac River and the Chesapeake Bay.

2. *Water Quality Best Management Practices (BMPs)*

The Revised General Plan states that: *"the County will establish appropriate standards by which to regulate stormwater detention or retention to better protect the integrity of receiving streams"*, including the adoption of the Virginia Stormwater Management Handbook (RGP, Policies 5 and 17, pg. 5-17 and 5-18).

Stormwater Program components involving the prevention of erosion and flooding have been implemented since the early 1980's. The criteria at that time in Loudoun were derived from the State's Erosion and Sediment Control Program and primarily addressed water "quantity" issues. In the mid-1990's, the County participated with other Northern Virginia localities in the implementation of water "quality" regulations which were derived from efforts to enhance the quality of water in the Occoquan River. These standards became the initial effort to effectively treat runoff to remove NPS pollutants from development sites.

In late 2002, the Loudoun County Facilities Standards Manual (FSM) denoted the Virginia Stormwater Management Handbook as its principal design standard for water quality measures. The requirement for stormwater facilities to meet the handbook criteria was also part of the County Stormwater Management Ordinance, which was adopted in 2003. The adoption of the handbook, along with various FSM changes during the same time period and in December of 2007, currently provide Loudoun with improved water quantity criteria, and specific standards and specifications for water quality BMP's, both structural and vegetative, such as rain gardens, wet ponds, created wetlands, water quality inlets, and buffer strips.

The proper implementation of stormwater management on Loudoun development sites is essential both in order to prevent channel degradation and flooding, and to minimize adverse effects on water quality. Department of Building and Development staff review development applications to ensure that regulated land development activities comply with stormwater management criteria.

Notably, implementation of water quality criteria is guided by the central performance standard noted above which dictates that the post-development NPS pollutant delivery to our streams not exceed pre-development levels. NPS pollution includes nutrients, bacteria, sediment, and metals. It originates from a variety of sources, including those not under the direct control of the County.

Low Impact Development (LID) techniques on development sites in the overall stormwater management plan were required for a period of approximately two years, leading up to a change in the FSM in 2005, which described its use as voluntary. Since that time, County staff has been working with the FSM Committee to develop more specific definitions of LID and criteria to acknowledge when it is accomplished in a development plan. This ongoing effort is concurrent with the State's modification of its own Stormwater Regulations, which will most likely include the incorporation of LID techniques, which may also necessitate modifications to the FSM and Stormwater Management Ordinance.

- **Erosion & Sediment Control Program (E&S)**

The Revised General Plan states: “*The County recognizes that soil erosion and deposits of sediment in receiving streams and water bodies is the single largest contributor to degradation of stream water quality and loss of aquatic habitat. The County will establish appropriate standards by which to regulate erosion and sedimentation*” (RGP, Policy 6, pg. 5-17).

The primary mission of the County's Erosion and Sediment Control Program (E&S), also administered within the Department of Building & Development, is to minimize the degradation of properties, stream channels, waters, and natural resources by establishing requirements for the control of erosion, sediment deposition, and stormwater runoff and to administer and enforce procedures for the health, safety and welfare of Loudoun's citizens. They work to ensure compliance with the Virginia Erosion and Sediment Control Law and are involved in all phases of a development project, including initial plan review, processing of grading permits, on-site inspections, grading bond release process. These regulations fall under Chapter 1220 (Erosion Control) of the Codified Ordinances of Loudoun County and Chapter 7 of the Facilities Standards Manual (FSM). Some of the County regulations are more accurate and stringent than state requirements. For example, the E&S Control Program uses soil erodability factors specific to Loudoun County (versus statewide factors found in the Virginia Erosion and Sediment Control Handbook, or VESCH), based on more accurate County data provided by the Natural Resources Team's Soils Program of Loudoun County.

Notably, a Virginia Stormwater Management Program (VSMP) permit is required for all land development projects which disturb more than one acre. While DCR currently administers the VSMP, it is in the process of delegating this responsibility—including fee collection—to the local Erosion and Sediment Control Programs. This change will necessitate modifications to the Facilities Standards Manual (FSM) as well as the Erosion and Sediment Control Ordinance.

The E&S Control Program of Loudoun County has been found by the Virginia Department of Conservation and Recreation (DCR) to be fully consistent with the requirements of the Virginia Erosion & Sediment Control Law and Regulations (Title 10.1 Article 4 as amended of the Virginia code) which were established after passage of the Clean Water Act and the National Pollutant Discharge Elimination System (NPDES). Only 54% of local E&S Control Programs in Virginia are currently consistent with State regulation; however, 87% of the local programs in

the Northern Virginia District are consistent. Loudoun County's regulations regarding erosion and sediment control are stricter than the requirements of the state law.

Localities have been granted authority by the state to implement a fee-based program. In Loudoun County, the current grading permit fees do not cover the full cost of the program; the fees cover review and approval of grading plans and permit applications but not site inspections, legal enforcement, etc.

Since 2002, the Loudoun County Erosion and Sediment Control Team has inspected and monitored more total disturbed acreage than any other County in the Potomac Watershed Region. In 2002, the E&S Team inspected 6,671 sites. In 2005, that number increased to 11,388 sites. Loudoun County has developed an awards program for Environmental Preservation, an effort that was directed by the E&S Program Administrator in January 2008, to promote sound environmental design while meeting or exceeding the requirements of the FSM and VESCH.

The U.S. Environmental Protection Agency's (EPA) Chesapeake Bay Program, in conjunction with DCR, has awarded small grants to the County E&S Team for outreach programs (such as hosting educational displays at Family Stream Day and Arbor Day) and a brochure "Let's Keep Dirt in its Place". A *Citizen's Guide to Erosion and Sediment Control* in Loudoun County has also been prepared and is available online¹⁸.

- **Secondary Containment, Treatment, and Emergency Response Plans for Pollution Sources**

The Revised General Plan states that "*the County will require secondary containment, treatment, and emergency response plans for activities that propose pollution sources such as the storing and dispensing of petroleum products, chemical storage and sale or transfer of potential contaminants*" (RGP, Policy 21, pg. 5-18).

Activities that propose pollution sources for both legislative and permitted, or "by-right", land development applications must meet the standards contained in the Facilities Standards Manual (FSM) (Section 5.320.E.4), which were revised in December 2007. The FSM requires activities that propose storing, handling and/or dispensing petroleum products and hazardous substances provide a series of measures designed to protect surface water and groundwater quality, including oil/water separators,

¹⁸ <http://www.loudoun.gov/Default.aspx?tabid=636>

secondary containment, and an approved Emergency Response Plan. If discharge to a Loudoun Water (LCSA) sanitary sewer is not available, then a Virginia Pollutant Discharge Elimination System (VPDES) permit is required.

- **Education and Outreach**

The County provides a wide variety of outreach programs aimed at educating and informing the public about water resources. These include information on stormwater management, including the development of a stormwater page on the County's website, participation in an annual radio advertising program, distribution of education materials at the public schools, news releases, public information meetings, and airing public service messages on the government access cable channel.

Loudoun Water (formerly LCSA) also provides a variety of educational programs and offers tours of their facilities to the public. The programs are aimed at providing tools for water conservation and promoting environmental awareness. Loudoun Water is also a charter member of the Loudoun Environmental Stewardship Alliance (LESA), a consortium of Loudoun County environmental groups, educators, and others, whose aim is to assist public and private educators to obtain and deliver environmental education, and meaningful watershed experiences.

In addition, the Loudoun County Health Department provides educational materials about the maintenance and care of individual wells and on-site waste disposal systems through its web-page, brochures and a homeowner education kit that is provided to the owner at the time their wastewater system is approved for use. The Health Department provides information to realtors, homeowner associations and other civic organizations.

- **Advisory Committees**

1. ***Goose Creek Scenic River Advisory Committee***

In addition to protecting the scenic qualities of the Goose Creek, the Goose Creek Scenic River Advisory Committee is charged by the Commonwealth of Virginia to protect its pristine water quality and its importance as a water resource for many residents of our County and the City of Fairfax. As noted above, the Committee consists of nine members that are appointed by the State and meets every other month.

2. ***Water Resources Technical Advisory Committee***

The Water Resources Technical Advisory Committee (WRTAC) was first created by the Board of Supervisors in April 2001 to advise the Board on

matters related to water resources in the County. The roles and responsibilities of this group include the following: (1) Provide a quality control function for the County's groundwater quality and quantity; surface water quality, quantity and habitat; watershed management; flood control management; and stormwater management programs from both the local and regional perspective; (2) Review and provide recommendations for work plan parameters, collected data, staff recommendations, and program enhancements for the County's water resource programs; (3) Provide the Board of Supervisors a quarterly report of the Water Resources Technical Advisory Committee's findings and recommendations related to the County's water resource programs; (4) Provide the Board of Supervisors input and recommendation for policy direction related to programs and associated issues (i.e., land use planning); and (5) Provide technical assistance to staff. The current Board of Supervisors has not yet appointed the required minimum number of members (nine) to the WRTAC for it to become active.

POTENTIAL NEXT STEPS

1. Continue to implement the Goose Creek Source Water Protection Program.
2. Continue to use the Broad Run Water Reclamation Facility.
3. Continue to develop the Regional Water Supply Plan required by the State of Virginia. After it is completed, expand it to include developing a water supply plan for the entire County that includes unincorporated areas as well as those served by Loudoun Water, the Town of Leesburg, and the Town of Purcellville.
4. Continue to develop the Watershed Management Plan and implement its recommendations, including the adoption of a Watershed Overlay District in the Zoning Ordinance and the Facilities Standards Manual (FSM).
5. Continue to support volunteers in watershed programs.
6. Continue the Water Resources Monitoring Program and implement water resources protection strategies, and commit to reliable, long-term funding for operation and maintenance of those programs.
7. Continue to maintain wellhead inventory and regulations.
8. Continue to interact with other stakeholders in the promulgation of Virginia's revised stormwater management regulations.
9. Develop a Source Water Protection Strategy and implement it through revisions to the Zoning Ordinance and the Facilities Standards Manual (FSM).

10. Coordinate with the City of Fairfax to develop passive recreational opportunities in and on the County's reservoirs, including hiking and non-motorized boating.
11. Consider revising Chapter 1220 of the Loudoun County Codified Ordinance to require all land disturbing activities greater than 5,000 sq. ft. to obtain a grading permit.
12. Investigate whether reinstating the River and Stream Corridor Overlay District (RSCOD) or adopting the Chesapeake Bay Preservation Act (CBPA) would be most valuable in the protection of the Green Infrastructure. Amend the Zoning Ordinance and Facilities Standards Manual (FSM) as necessary.

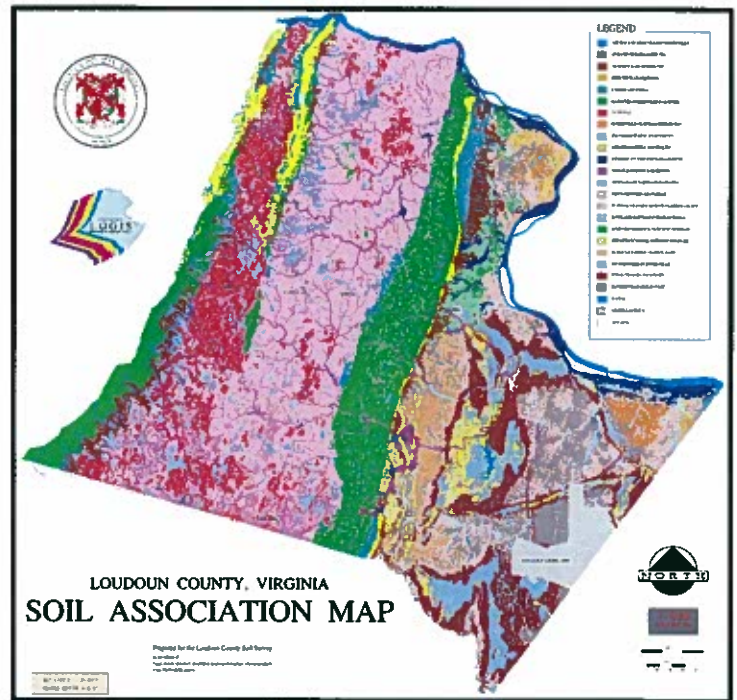
D. Geologic and Soil Resources

Geologic rock formations and soils have a profound impact on the quality of life in Loudoun County. The eastern half of the County is located in the Piedmont physiographic province and the western half in the Blue Ridge physiographic province¹⁹; the eastern footslopes of the Catoctin Ridge form the boundary line between the two. Topography varies significantly in Loudoun, with elevations ranging from 180 to 1,900 feet above sea level. Major draining systems include Broad Run, Goose Creek, Catoctin Creek, Bull Run and numerous minor tributaries to the Potomac. All of these drainage systems are part of the Potomac River Basin.

Soils are considered a non-renewable natural resource, and understanding the nature, properties and distribution of them provides valuable information for many other County initiatives. In Loudoun County, geologic and soil resources include limestone conglomerate areas, prime agricultural areas, mineral resource extraction areas, steep slopes, wetlands, and mountainside areas. Many of these areas are difficult to develop or are specifically protected by County regulations in order to preserve naturally existing areas and protect the health and safety of residents.

The soils information (including soils maps, interpretive guide and information provided by the Natural Resources Team, or NRT) is intensely updated, maintained and used in a variety of applications. The quality of Loudoun County soils information is uniquely high and as a result, serves as a basis for many programs and reviews. The County soils information is a key component in the criteria for overlays such as the Mountainside Development Overlay District, programs like the wetlands model and Erosion and Sediment Control, and long term planning and land use.

¹⁹ A contiguous area with similar landscape, geology, and subsequently, biota.



The Loudoun County Facilities Standards Manual (FSM) was revised July 1, 2002 to require a Preliminary Soils Review (PSR) (a soils map update at 1:2400 scale developed by a Certified Professional Soil Scientist to the National Cooperative Soil Survey Standards) prior to any subdivision of land. This review allows the County to acquire the best information possible about the existing soil conditions prior to potentially irreversible change and disturbance. This information is then used for planning and regulatory purposes as well as to provide accurate customer service once the use is established.

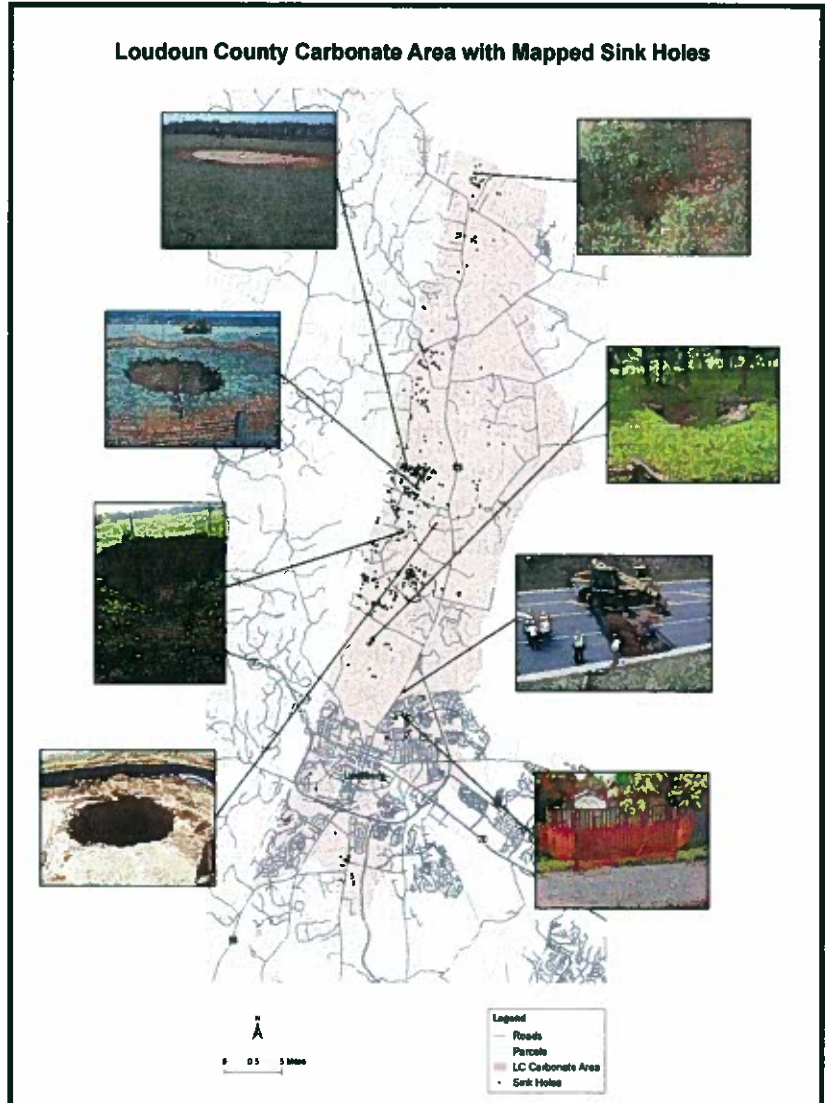
A belt of limestone conglomerate (often referred to as karst terrain) lies north of Leesburg and east of the Catoctin Ridge. In these areas, the underlying limestone and other carbonate rocks have been dissolved over time, creating a landscape characterized by underground cavities, sinkholes, and springs. These areas are

vulnerable to sinkholes, cavity collapse and ground slippage and cannot environmentally or structurally support land development activities without performance standards and monitoring.

The groundwater in karst areas is also more susceptible to pollution. This is due to the fact that sinkholes, rock outcrops and solution channels can provide a direct connection between surface waters and contaminants to the groundwater resource without the beneficial filtering normally provided by the slow percolation of water through soil. In the Raspberry Falls subdivision, located within the limestone conglomerate area, Loudoun Water is in the process of investigating possible bacterial impacts within their wells. A similar situation occurred at the Lucketts Community Center, where bacterial contamination resulted in the abandonment of the existing well. In this case, the community center was able to hook up to an adjacent school site.

Building on limestone conglomerate, like steep slopes and mountainsides, has its own set of unique challenges. Ground slippage may threaten the stability of foundations and structures built on these natural features and overlying soils. Conventional stormwater control methods such as wet or dry ponds concentrate pollutants and may contaminate groundwater. Modifications to the landscape could redirect surface flows contributing to sink holes and solution channels in the soft carbonate material beneath the surface.

Particularly in those areas where the surface has been altered, irrigation systems tax the fragile geologic lattice and can potentially lead to increasing subsidence from excessive groundwater withdrawal and the



Source: Department of Building and Development

reintroduction of water to the surface, exceeding natural hydrologic flow. Intensive nutrient and fertilizer use, as well as animal waste from residential development, can detrimentally affect groundwater resources. Individual waste treatment systems and erosion control methods both require special attention to the surface-subsurface connection to prevent surface or groundwater contamination. Geophysical and geotechnical investigations characterize and identify underlying features prior to construction permitting so that hazards may be mitigated to reduce the risk of structural damage.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan calls for the protection and preservation of the unique geologic characteristics, natural beauty, tourism potential, and the quality of groundwater in the County's limestone conglomerate areas. The key step towards this is the creation of a Limestone Conglomerate Overlay District based on soil and geologic characteristics. Plan policies also call for the development of performance standards and environmental protection performance standards. In general, developments within these areas are limited to large lot or clusters to avoid development in areas of identified karst features. Surface and groundwater in these areas should be periodically monitored for negative impacts. If negative impacts are found, then County staff should present the information to the Board of Supervisors for appropriate action, which may include an adjustment to the land use policies within the impacted areas.

For a complete list of the Limestone Conglomerate policies, please see Policies 1 – 8 on pg. 5-19 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that “*The County will define and delineate a Limestone Conglomerate Overlay District based on soil and geologic characteristics*” (RGP, Policy 1, pg. 5-19). The other policies contained in the Plan refer, with the exception of monitoring of water resources, to the performance standards, permitted uses, and land development restrictions that were adopted with the LOD.

In 1991, a mapped Limestone Overlay District (LOD) was initially proposed and incorporated into the County's Zoning Ordinance. This ordinance was overturned by the Board of Supervisors in 1992. In 2000, the County with the help of the US Geological Survey (USGS) re-drew the limestone boundary based on soils, the USGS map, rock outcrop mapping units and known sinkholes. The Loudoun County Facilities Standards Manual (FSM) was corrected to include requirements for geotechnical and

geophysical testing in karst areas. In January 2003, the Board of Supervisors of Loudoun County adopted the Revised 1993 Loudoun County Zoning Ordinance that included a Limestone Conglomerate Overlay District (LOD). In general, this district was designed to protect the environmentally sensitive areas of the County that are underlain by various kinds of limestone. In March 2004, the Circuit Court of Loudoun County voided the portion of the Zoning Ordinance that contained the Limestone Conglomerate Overlay District due to notice issues.

Although the regulatory means of implementing the limestone policies were overturned, these policies continue to be applied on a case-by-case basis during the review of legislative applications. However, there are very limited opportunities to apply these policies given that most limestone areas are located within the Rural Policy Area, which is largely planned for “by-right” development. For these applications, the requirements for geotechnical and geophysical investigations contained in the Facilities Standards Manual (FSM) are applied.

The Natural Resources Team (NRT) in the Department of Building and Development reviews land development applications within areas underlain by limestone (formerly the Limestone Overlay District) and are responsible for assuring that issues related to geomorphic instability have been adequately addressed. Unchecked, the result of any subsidence event involving a building or road improperly placed could cause serious damage to property or personal injury. Other areas this program covers include: failing building foundations or retaining walls that may have been inappropriately placed on shrink-swell/expansive clays or on unconsolidated fill material. The NRT also continues to update and identify karst features such as sinkholes, springs, caves and rock outcrops through the Preliminary Soils Review process. These karst features are found on the soils map.

- **Monitoring**

The Revised General Plan states that “*The County will monitor groundwater and surface water in the Limestone Conglomerate Overlay District, and if monitoring recognizes negative impacts, the County will present the information to the Board of Supervisors for appropriate action, which may include an adjustment to the land use policies within the impacted area*” (RGP, Policy 7, pg. 5-20).

The Natural Resources Team (NRT) and the Geographic Information System (GIS) Team in the Department of Building and Development continually monitor, with Global Positioning Devices (GPS), known active sinkholes and rims of sinkholes adjacent to development pressures

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and respond to resident reports of sinkholes and drainage issues related to the underlain limestone conglomerate.

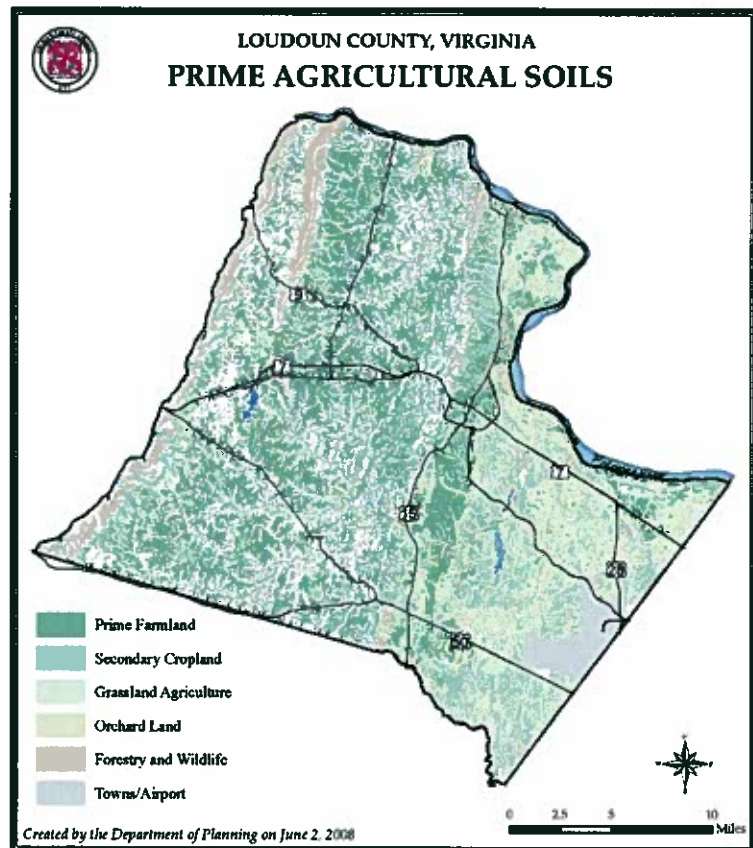
POTENTIAL NEXT STEPS

1. Revise and reinstate the Limestone Conglomerate Overlay District (LOD) in Loudoun County's Zoning Ordinance. Revise the Facilities Standards Manual (FSM) for consistency.
2. Develop a system to track the review of locational clearances within the Limestone Conglomerate Overlay District (LOD) in the County's database (i.e., the Land Management Information System).

2. Prime Agricultural Soils

Prime agricultural soils account for approximately 19% of Loudoun County's soils and are usually found in areas that are nearly level, well drained and watered. Loudoun's best agricultural soils are generally located in the Rural Policy Area, which consists of approximately 227,904 acres (or 67% of Loudoun's total land area) in the western part of the County²⁰. In December 2006, the Board of Supervisors remapped much of the Rural Policy Area to the AR-1 and AR-2 zoning districts which are intended to support the rural economy and a variety of residential development options including conventional subdivisions, spin-off lots and rural clusters. The amendments offer several subdivision options that enable the preservation of open space.

Because the County has emphasized the rural economy as an important part of its overall economic health, prime farmland and agricultural soils are especially valuable. However, like other natural resources in the County, prime



²⁰ Department of Building and Development, Natural, Environmental & Cultural Resources brochure.

agricultural soils are being threatened by residential development. This is because the best agricultural land, being well-drained, generally found on mildly sloping terrain, and with good drainfield potential, is also well-suited for development. Soil erosion from development and improper soil management are other significant threats to this resource.

COMPREHENSIVE PLAN GUIDANCE

To encourage preservation of prime agricultural soils for agricultural uses, the Revised General Plan calls for the County to use the Use Value Assessment Program, Agricultural and Forestal Districts, the Purchase of Development Rights (PDR) program and other incentive-based efforts at its disposal. Where development is allowed on prime agricultural soils, the County will require cluster development and a conservation design so that the development will take place on the least desirable soils on the site and the prime soils will be retained for agricultural purposes. Policies also call for the development of a public education program that will focus on communicating incentive advantages associated with private protection of Prime Agricultural Soils and the use of the stormwater management and erosion control policies and ordinances to enhance conservation of Prime Agricultural Soils for agricultural uses. The County will improve the Loudoun County Erosion and Sediment Control Ordinance, if necessary, to better achieve these purposes.

For a complete list of the Prime Agricultural Soils policies, please see Policies 1 – 5 beginning on pg. 5-20 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that “Where development is allowed on prime agricultural soils, the County will require cluster development so that the development will take place on the least desirable soils on the site and the prime soils will be available for agricultural purposes. The quality of soils will be considered in the conservation design process established by the Zoning Ordinance” (RGP, Policy 2, pg. 5-20).

The prime agricultural soils policies are applied on a case-by-case basis during the review of legislative applications; however, there are limited opportunities to apply these policies given that most of these soils are located in the Rural Policy Area which is largely planned for “by-right” development. In addition, the regulatory means of implementing these policies envisioned by the Plan, namely the Conservation Design regulations in the Revised 1993 Loudoun County Zoning Ordinance, were overturned in 2004 and only applied to protecting a site’s “primary

resources” which did not include prime agricultural soils. It is, however, important to note that the AR-1 and AR-2 zoning districts encourage the preservation and agricultural use of such soils by supporting rural economy uses and limited residential development in these districts.

- **Incentives**

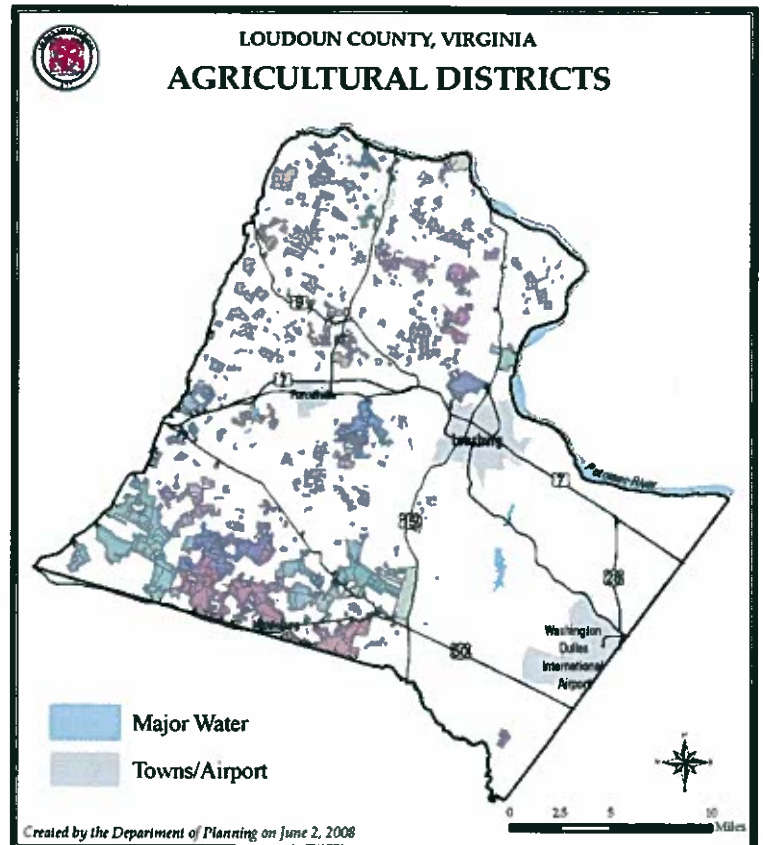
The Revised General Plan states that: “*The County will use the Use Value Assessment Program, Agricultural and Forestal Districts and other incentive-based efforts at its disposal to encourage preservation of Prime Agricultural Soils for agricultural uses. The County will improve the Use Value Assessment Program and will develop and implement additional incentive-based regulations, if necessary, to better achieve these purposes*” (RGP, Policy 1, pg. 5-20).

1. **Land Use Assessment Program**

The Office of the County Assessor administers the Land Use Assessment Program which provides for the deferral of real estate taxes on property that qualifies for agricultural, horticultural, forestry and/or open space uses. The purpose of the program is to further the public interest by encouraging the preservation of land, to conserve and protect the county’s natural resources, to protect safe water supplies, and to promote orderly land use planning and development. Assessed property values under the program are generally less than those estimated at fair market value. Loudoun County adopted the Land Use Assessment Program in 1973 and currently more than 173,000 acres are enrolled in the program.

2. **Agricultural and Forestal Districts**

The Loudoun County Department of Economic Development administers the County’s Agricultural



and Forestal District program (the 'Ag District Program'). The Ag District Program was formed in 1979 under State enabling legislation. The voluntary districts secure land for agricultural production, forestal and environmental stewardship uses for a fixed period of time. Loudoun currently has over 53,000 acres enrolled in over 23 districts throughout the county.

The Agricultural District Advisory Committee (ADAC) consists of ten members (four landowners engaged in agriculture or forestal production; four other landowners of the locality; one commissioner of revenue or property assessment officer; one member of the local governing board) that are appointed at-large by the Board of Supervisors. The ADAC makes recommendations to the Planning Commission regarding new agricultural districts, renewal of existing districts, additions to districts and withdrawals from districts. This committee renders expert advice as to the nature of farming and forestry as well as agricultural and forestal resources within the district and their relation to the entire locality.

- **Promotion of the Rural Economy**

The Revised General Plan states that: "*The County will develop a private education program that will focus on communicating incentive advantages associated with private protection of Prime Agricultural Soils. ... The program will also provide information on the donation of easements, tax and estate planning, and other advantages related to voluntary protection*" (RGP, Policy 4, pg. 5-25).

There are no County programs specifically oriented towards the preservation and use of prime agricultural soils for crop and agricultural production. In general, the Loudoun County Department of Economic Development promotes the Rural Economy through a variety of tourist-oriented publications and activities, including the Wine Tour, Farm Tours and the Christmas Product Guide. The department also provides outreach and works closely with leaders in the public and private sectors to stimulate business development in the Rural Policy Area. The department also provides assistance to farmers and rural business owners in establishing direct marketing opportunities for their products and services. Examples of the direct marketing of products includes local farmers markets, food and wine sales to restaurants and at trade events, connecting horticultural producers with buyers and encouraging livestock producers to upgrade their animals through vaccinations and other disease prevention practices so they sell a more valuable product. The Virginia Cooperative Extension also plays the lead role in providing technical assistance to farmers in the County

The Loudoun Convention and Visitors Association (LCVA) promotes rural tourism opportunities to all types of visitors. Agri-tourism through the wine country, farm-to-table dining, pick-your own, and visiting the farms for individuals or groups is all part of the marketing mix promoted to visitors. Additionally, many of the bed and breakfast accommodations and wedding or family reunion venues are located within the rural policy area and are supported through marketing, advertising, and training programs coordinated through the LCVA. Working with the heritage sites, driving tours, and recreational oriented businesses and tourism attractions, the LCVA connects the visitor experiences in the Rural Policy Area to the towns and villages as well as the accommodations throughout the county. The LCVA also assists many of the meetings and conventions who seek locations to hold special events away from their hotel facilities and help them schedule events and outings in rural Loudoun venues.

In addition, the Loudoun Valley Home Grown Markets Association (LVHMA) sponsors six Farmers Markets in Loudoun County from May through October, along with a Winter Farmers Market in Leesburg. The farmers markets are located in Ashburn (June 2008), Cascades, Leesburg, Lovettsville, Middleburg and Purcellville. The Loudoun County Department of Economic Development provides administrative and advertising assistance for the farmers markets. The farmers markets support local agriculture and the rural economy.

The Loudoun County Board of Supervisors on July 31, 1997 directed the creation of a Rural Economic Development Task Force consisting of Loudoun citizens to construct a rural economic development plan to foster sustainable rural economic growth, develop high-value agricultural production, support the equine and tourism industries, maintain high quality farmland and keep planned residential growth at low density. The Rural Economic Development Task Force adopted as its goal the development of a plan to double the value of Loudoun's rural economy in a decade. On November 18, 1998, the Rural Economic Development Task Force presented the Board with the *200,000 Acre Solution: Supporting and Enhancing a Rural Economy for Loudoun's 21st Century* which outlined a strategy for achieving these goals.

In January of 2002 the Board of Supervisors created the Rural Economic Development Council (REDC) to promote the economic growth and vitality of Loudoun County's agricultural, horticultural, and equine industries. The nineteen member board of the REDC serves the community and the Board by furnishing information and providing recommendations to the Loudoun County Board of Supervisors relative to programs, policies and zoning ordinances affecting the economic growth

and development of Rural Loudoun County. In addition, the REDC coordinates the rural economic development, marketing, and promotion activities among the several public and private groups engaged in such activities throughout the county and works closely with the County's Department of Economic Development. The REDC through its annual report provides a snapshot of the Rural Economy, recognizing trends and changes within the farm based economy of the County.

POTENTIAL NEXT STEPS

1. Continue to promote the rural economy through the Land Use Assessment Program, the Agricultural and Forestal Districts program and other means.
2. Consider reinstating the Purchase of Development Rights (PDR) program or implementing a conservation design approach during the review of land development applications to encourage the protection of prime agricultural soils.
3. Develop an incentive program that promotes the preservation of prime farmland during the review of all land development applications and encourages the redesign of already subdivided, but not yet developed, properties.
4. Pursue the Conservation Reserve Enhancement Program which is a USDA - Land Retirement Program that helps agricultural producers protect environmentally sensitive land through Federal and State Incentives.

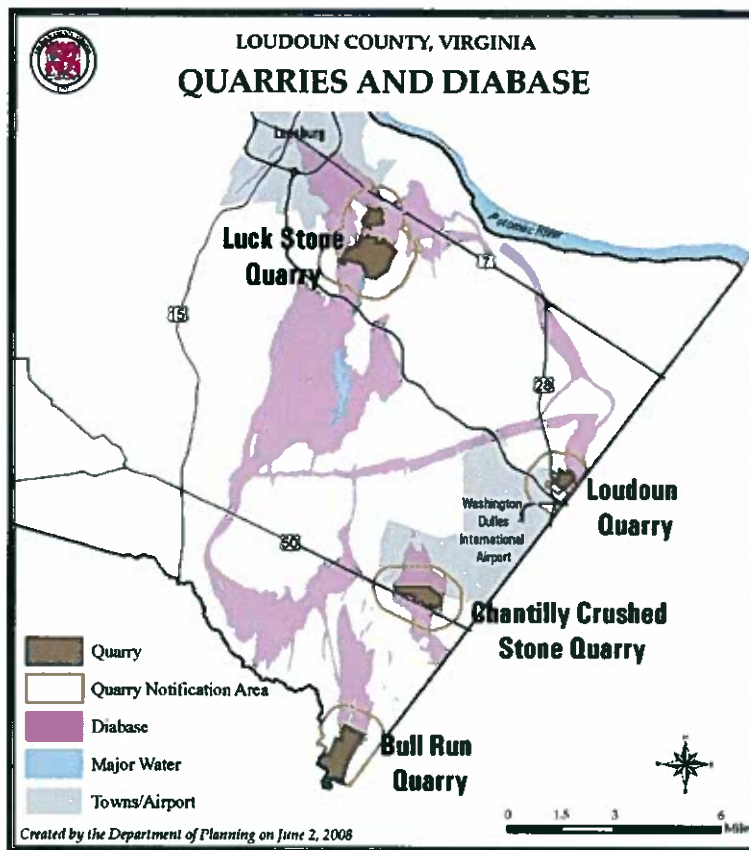
3. Mineral Resource Extraction Areas

Diabase is a hard, brittle rock used as a base component for the construction of roads and building foundations. There are defined belts of this rock, also known as trap rock, south of Leesburg and near Washington Dulles International Airport. Soils with high shrink-swell characteristics often lie on top of these diabase belts and can cause cracked foundations and severe structural damage to buildings. Quarrying operations and related activities in diabase resource areas are a substantial economic resource in the County but also present challenges to the environment and local residents due to the nature of heavy industrial activities and transport truck traffic. The County currently contains four rock quarries: (1) Luck Stone Quarry located east of Leesburg, (2) Chantilly Crushed Stone Quarry located south of Dulles Airport, (3) Bull Run Quarry located in the southern most portion of the county and bisected by Gum Springs Road, and (4) Loudoun Quarry, east of Dulles Airport and south of Route 606.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan states that the County will protect viable quarries and

its diabase resource areas from incompatible neighboring uses and that new



development will take existing quarries into account. It also states that the County will develop and apply standards that seek to protect existing and planned neighboring uses from the negative impacts of resource extraction activities (such as threats to property values, public health and safety, as well as short- and long-term environmental degradation) through buffer requirements, noise mitigation requirements, and other mitigation techniques. The Plan also calls at least 800 acres in Loudoun County to be set aside for extraction and associated activities through the maintenance of a quarry zoning district that makes quarrying a permitted

use, prohibits residential development, and allows compatible industrial development. Lastly, the County will facilitate the long-range planning of quarry sites, including setting aside sufficient land for extraction and creating an environment that will be attractive for future users once the quarrying use is no longer viable. For example, quarries could be converted for water storage purposes.

For a complete list of the Mineral Resource Extraction policies, please see Policies 1 – 9 beginning on pg. 5-25 of the Revised General Plan.

IMPLEMENTATION

The Revised General Plan states that “The County will recognize and protect its viable extraction industry. The County will protect viable quarries and its diabase resource areas from incompatible neighboring uses. New development will take existing quarries into account” and “The County will develop and apply standards that seek to protect existing and planned neighboring uses from the negative impacts of resource extraction activities. Such negative impacts might include threats to property values, public health and safety, as well as short- and long-term environmental degradation. Such impacts will be mitigated by buffer

requirements, noise mitigation requirements, and other mitigation techniques.” (RGP, Policies 2 and 6, pg. 5-25 and 5-26).

The diabase and quarry policies in the Plan are applied during the review process for legislative applications that propose a new or expanded quarry use as well as development adjacent or in close proximity to an existing quarry. These policies are applied on a case-by-case basis depending on the specific property's characteristics and surrounding development.

Two sections of the Revised 1993 Loudoun County Zoning Ordinance regulate mineral resource extraction areas in the County – Section 4-1800, the Quarry Notification (QN) Overlay District and Section 3-1000, the Mineral Resource-Heavy Industrial (MR-HI) zoning district. Performance standards are also provided in Section 5-1506.

Three of Loudoun's four quarries are located within the Mineral Resource-Heavy Industrial (MR-HI) zoning district; Loudoun Quarry, located within the Route 28 Tax District, is zoned Industrial (I1) under the 1972 Zoning Ordinance. The purpose of MR-HI is to protect the County's diabase rock as a mineral resource, to provide for diabase resource extraction operations at appropriate locations, and to co-locate heavy industrial uses compatible with resource extraction with quarries; to permit continued agricultural practices; and to permit residential and other uses only to the extent that they may be compatible with resource extraction. The district establishes a list of Permitted and Special Exception uses that are allowed within the district as well as specific requirements for stone quarrying operations.

For applications proposing development adjacent or in close proximity to quarrying activities, compatibility of uses and mitigation of negative impacts are typically discussed, for instance greater setbacks adjacent to the quarry, enhanced buffering, etc. The specific techniques that are ultimately implemented are geared to the specific proposal and surrounding uses. Conditions of approval and/or proffers are suggested to ensure that affected residential property owners are notified about the potential noise levels generated by neighboring quarry operations and commitments to performance standards that limit quarries' hours of operation are anticipated. Similar protections for permitted (i.e., “by right”) developments are limited to the existing regulations per the County's Zoning Ordinance.

The Quarry Notification (QN) Overlay District requires notification to property owners about the potential noise levels generated by neighboring quarry operations. The district is mapped and includes all parcels within 3,000 feet of any property approved for quarrying operations regardless of whether or not blasting operations occur on such property. Extraction and mining uses are limited to land that is 50 acres or greater; however, this shall not preclude a permit to enlarge or extend existing uses to contiguous parcels. The ordinance also sets

performance standards to limit hours of operation and blasting times. Further, the performance standards provide for landscaping and screening, preservation of existing trees and groundcover, and the maintenance of such areas.

POTENTIAL NEXT STEPS

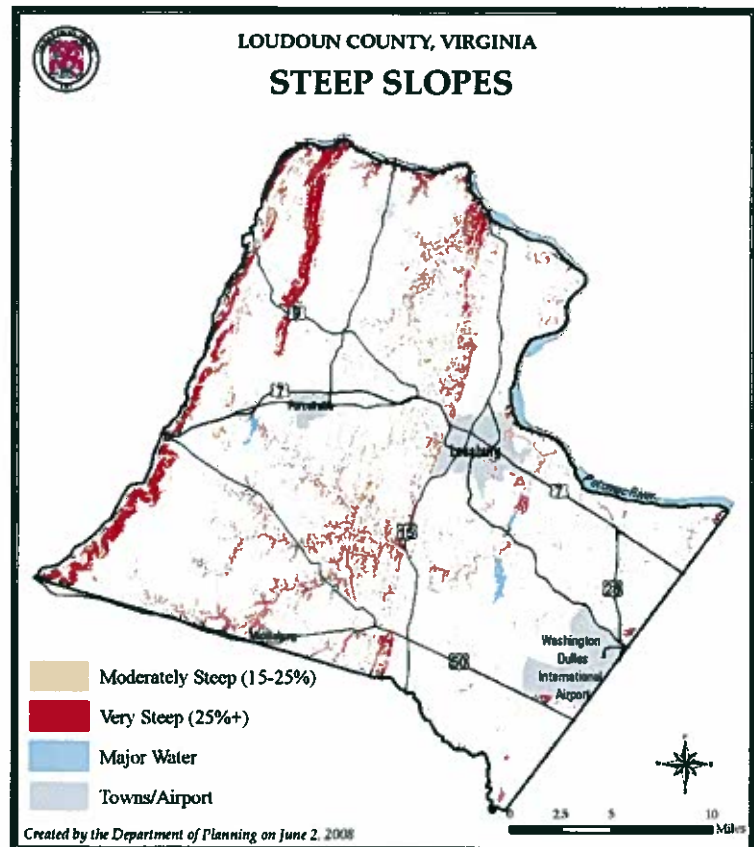
1. Continue to pursue conformance with the Revised General Plan policies through the application review process.
2. Explore potential sensitive reuse of quarries that could be included in the Zoning Ordinance.
3. Determine the extent of the County's long-term needs for aggregate stone and ensure that enough acreage in the County be set aside for resource extraction and activities associated with quarrying.

4. Steep Slopes and Moderately Steep Slopes

Most of the steep slopes within the County are associated with mountainside areas and river and stream corridors. Steep slopes have many of the same construction challenges found on the mountainsides such as increased area required to excavate for a use and providing suitable accesses. The grade of a steep slope is also often a factor of unstable soils and erosion into the County's surface waters. Altogether, approximately 50,000 acres in the County are designated as Very Steep (over 25% grade) or Moderately Steep (with a 15 to 25% grade).

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan recognizes that steep slopes are both a resource to the County and a constraint to development. The steep slope standards are applied to all slopes. If these areas are located in a river and stream corridor or on a mountainside, the more protective regulation



applies. Plan policies state that the County will prohibit any land disturbance on very steep slopes and calls for special performance standards, including best management practices, locational clearances for clearing and grading, and approval of natural drainageways, to be used to protect moderately steep slopes. The Plan also states that the County will encourage development rights to be sold, donated or proffered from land with moderately steep slopes.

For a complete list of the Steep Slopes and Moderately Steep policies, please see Policies 1 – 5 beginning on pg. 5-26 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that “the County will prohibit land disturbance on slopes with a grade of more than 25 percent and/or with the soil Slope Class of E” and “special performance standards are to be used to protect slopes with grades from 15 to 25 percent and/or with the soil Slope Class of D. These standards will include best management practices, locational clearances for clearing and grading, and approval of natural drainageways” (RGP, Policies 1 & 3, pg. 5-26).

The Steep Slope Standards (Section 5-1508 of the Revised 1993 Loudoun County Zoning Ordinance) implement the policies of the Revised General Plan by defining steep slopes, requiring their avoidance to the greatest extent possible, and including performance criteria for construction on or across steep slopes. These standards apply to all steep slope areas in the County that exceed 5,000 square feet of contiguous area.

Development is prohibited on Very Steep Slopes areas, defined as those areas with a grade of more than 25%. Only a few limited uses, including passive recreation, open space, utilities, roads, driveways, municipal drinking water supply reservoirs, sanitary sewer lines, water lines, and land-disturbing activities less than 5,000 sq ft in area, are permitted in these areas with special performance standards that address grading, revegetation, excavation, the use of retaining walls, the construction of roads, driveways, and minor utilities, and stormwater management.

Development standards for Moderately Steep Slopes areas (defined as those areas with a 15 to 25% grade) are also required, including obtaining a site-specific locational clearance and a grading permit from the Department of Building and Development and incorporating stormwater management Best Management Practices and erosion and sedimentation control practices as defined in the Facilities Standards Manual (FSM).

Any applications that have steep slopes within the parcel boundaries are reviewed by the Natural Resources Team (NRT) in the Department of Building and Development for locational clearance. The NRT Team Leader is charged, as directed by the Zoning Administrator, with making any necessary cartographic interpretation of the mapped resource when reviewing applications for locational clearance. As such, the NRT provides technical review and determinations for land development applications based on the steep slopes. Additionally, the NRT reviews all required geotechnical reports with steep slopes and is responsible for assuring that land development applications have adequately addressed the issues related to land disturbing activity on Very Steep Slopes. Unchecked, the result of any failure event involving a building or road improperly placed could cause serious damage to property or personal injury. Other areas this program covers include failing building foundations or retaining walls that may have been inappropriately placed on steep slopes or on unconsolidated fill material.

POTENTIAL NEXT STEPS

1. Consider reinstating the Purchase of Development Rights (PDR) program to protect steep slope areas.
2. Develop a system to track the review of locational clearances on steep slopes in the County's database (i.e., the Land Management Information System).
3. Evaluate the need to revise the Steep Slope Standards in the Loudoun County Zoning Ordinance to allow for appropriate, limited development on very steep slope areas by Special Exception.
4. Consider a cooperative agreement with the Virginia Department of Forestry to adequately fund a full time position to assist in the review of Ordinance-required forest management plans.

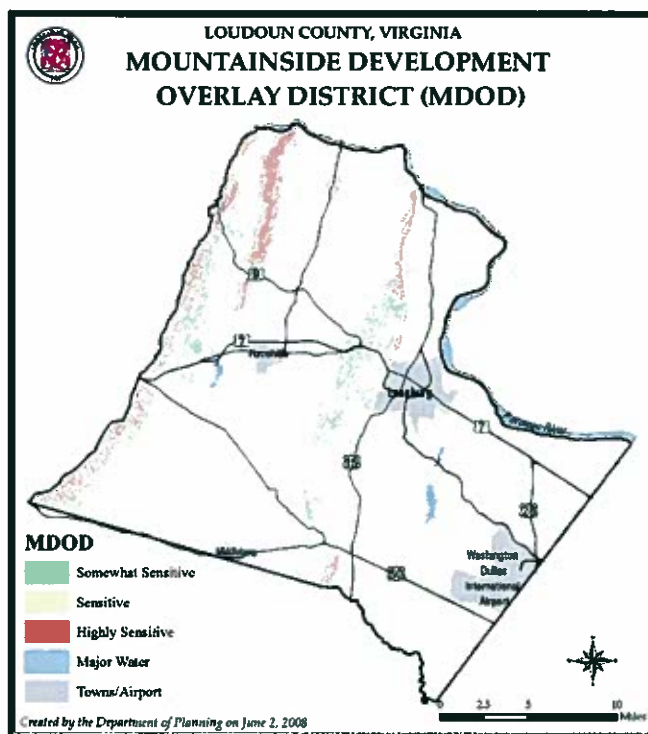
5. Mountainside Areas

The County's mountains and mountainside areas are geologically unique, contribute to its beauty and quality of life, and are valued by residents and visitors alike. Loudoun's mountains contain the County's largest area of contiguous forest, feed headwater streams, recharge groundwater, support unique plants and wildlife, and provide outdoor recreational opportunities. They are also an important part of the character of the landscape by framing the Loudoun Valley and lending vistas to residents and visitors. Altogether, the features of the mountainside create an environmental system that is unique to this region and that contributes to the scenic character of rural Loudoun County. All of the mountainside areas within the County are located in the Rural Policy Area and include the Short Hill, Blue

Ridge, Catoctin, Hogback, and Bull Run mountains.

In addition to protecting the mountainside for aesthetic purposes, there are unique challenges to developing in mountainside areas. Steep slopes (see previous section) are prevalent in many areas of the mountainside and disturbance of soils and vegetation present stability and erosion hazards not generally encountered in other areas of the County. Steep slopes and certain soils lead to high rates of soil erosion when mountainsides are cleared or disturbed and can have impacts that extend far beyond the construction footprint. Some mountainside areas also have a potential for rock slides, land slides and slope slippage.

COMPREHENSIVE PLAN GUIDANCE



The Revised General Plan calls for the protection of mountainsides through a Mountainside Development Overlay District (MDOD) that contains land use restrictions and performance standards to minimize the destruction of individual resources and the disturbance of the ecological balance of these resources. The County also encourages that mountainside areas be placed under permanent open space easement using voluntary donation and public investment through the Purchase of Development Rights program and the expansion of recreational opportunities in mountainside areas, including the development of public park sites and improving access to existing recreational facilities such as the Appalachian Trail.

For a complete list of the Mountainside policies, please see Policies 1 – 6 beginning on pg. 5-31 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that the “County will manage development in mountainside areas using performance standards and

regulations to minimize negative environmental impacts, minimize land disturbance, protect the ridgelines, maintain woodlands, plant, and wildlife habitats; and preserve natural features and rural character as requirements for approval of the location of proposed development” (RGP, Policy 3, pg. 5-31). The Plan also states that “All subdivisions of three lots or more will require a Special Exception in Sensitive and Highly Sensitive defined areas” (RGP, Policy 2, pg. 5-31).

The Mountainside Development Overlay District (MDOD) is a zoning overlay district (see Section 4-1600) which regulates development on the mountainsides of the County. It contains land use restrictions and performance standards to minimize the destruction of individual resources and the disturbance of the ecological balance of these resources. The boundaries of the MDOD are based on a range of both technical and aesthetic factors.

First adopted by the Board of Supervisors in December 1987, the original regulations were based on elevation and were not specific to health, safety, or protecting environmental conditions. During this time, any subdivision within the mountainside boundary required a Special Exception.

In 1991, a soil survey was conducted for the mountainous areas of the County which resulted in the development of new mountainside boundaries that were based on soil, tree cover, groundwater recharge, slope, slippage potential, and elevation. These regulations were adopted in the 1993 Loudoun County Zoning Ordinance. The mountainside was classified into three categories (somewhat sensitive, sensitive, and highly sensitive) based upon the following criteria: critical elevation, debris flow (slippage) potential, groundwater recharge, soils, slope, and forest values. Critical elevation areas are determined from the County's digital topography, soil and slope values are based upon the County's soil layer and forested areas are based upon the digital forest data.

The County's mountainside regulations were revised and adopted as part of the Revised 1993 Loudoun County Zoning Ordinance. Specifically, the six parameters defining a mountainside area were reevaluated and weighted, which resulted in more areas being identified as highly sensitive due to doubling the value for slopes. In March 2004, the Circuit Court of Loudoun County overturned the Mountainside Development Overlay District in the Revised 1993 Zoning Ordinance due to notice issues, thus reverting back to the 1993 Zoning Ordinance regulations. The current regulations do not fully implement the Revised General Plan. For example, the Zoning Ordinance does not require that all subdivisions of three or more lots in sensitive and highly sensitive defined areas obtain a Special Exception. (Please note that a Special Exception is required for all land

disturbing activity in highly sensitive areas.)

A site-specific locational clearance that is reviewed by the Natural Resources Team (NRT) in the Department of Building and Development must be obtained from the county prior to any land disturbing activity or issuance of a zoning permit within the MDOD. The NRT Team Leader is charged, as directed by the Zoning Administrator, with making any necessary cartographic interpretation of the mapped resource when reviewing applications for locational clearance. As such, the NRT provides technical review and determinations for land development applications based on the MDOD. Due to the criteria that defines the MDOD, updates to the soils map can change the delineations of the MDOD. Preliminary Soils Reviews (PSR) are required if known slippage areas occur within the property boundaries. PSRs are also required for any subdivision or SPEX within the MDOD or may be requested by the landowner. The PSRs specifically identify and assess the slippage areas, areas of groundwater recharge and discharge (springs) and other mountainside soils and features.

The NRT also reviews all required geotechnical reports due to mountainside issues and is responsible for assuring that land development applications have adequately addressed the issues related to land disturbing activity on the mountainside. Unchecked, the result of any failure event involving a building or road improperly placed could cause serious damage to property or personal injury. Other areas this program covers include failing building foundations or retaining walls that may have been inappropriately placed on unstable mountainside soils or on unconsolidated fill material.

POTENTIAL NEXT STEPS

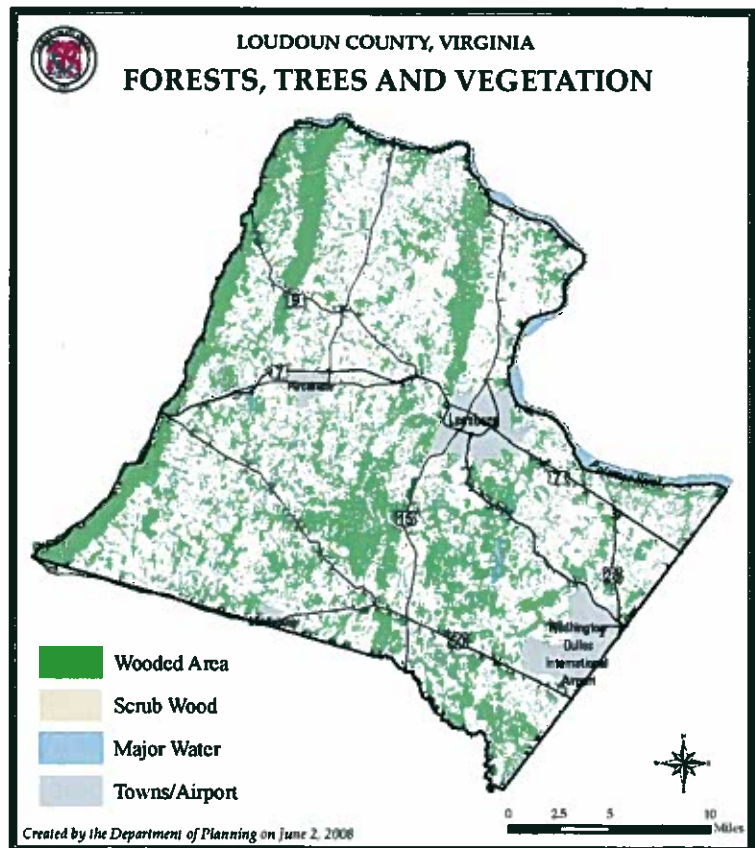
1. Continue to explore ways to expand public recreational opportunities in mountainside areas, including the development of public park sites and improving access and connectivity to existing recreational facilities such as the Appalachian Trail.
2. Reinstate an updated Mountainside Development Overlay District (MDOD) that is consistent with and implements the Revised General Plan.
3. Consider reinstating the Purchase of Development Rights (PDR) program to protect mountainside areas.
4. Develop a system to track the review of locational clearances within the Mountainside Development Overlay District (MDOD) in the County's database (i.e., the Land Management Information System).

5. Consider a cooperative agreement with the Virginia Department of Forestry to adequately fund a full time position to assist in the review of Ordinance-required forest management plans.

E. Forests, Trees and Vegetation

Loudoun County has some of the finest hardwood stands found in the Commonwealth of Virginia. Based on County Geographic Information System (GIS) records, approximately 127,000 acres, or a third of the County, is forested with the great majority of the acreage found on the Blue Ridge, Short Hill and Catoclin mountain ranges. This forest cover is protected to a large extent by the provisions found within the Mountainside Development Overlay District (MDOD) and the Steep Slope Standards.

The County's forests and trees improve air and water quality, offer important habitat for birds, small mammals and other wildlife, and are excellent buffers between communities providing both visual screening and modest noise abatement. Forests and trees also provide microclimate benefits in an urban setting, conserving energy by providing shade and evaporative cooling through transpiration. Additionally, they reduce wind speed and redirect airflow; reduce stormwater runoff and soil erosion; and can increase real property values. Maintaining canopy in critical environmental locations, such as steep slopes and along stream corridors, is of paramount importance in the urban environment where significant environmental impacts and alteration occur. Riparian forests along streams provide the greatest single protection of water quality by filtering pollutants from stormwater runoff, decreasing stream bank erosion, and maintaining the physical, chemical, and biological condition of the stream environment.



Based on a review of aerial maps, it appears that the Loudoun gained forest cover in the western portion of the County from 1957 to 2005 due to the abandonment of farming. However, much of the forest cover in the eastern third of Loudoun has been lost to suburban development, including Dulles Airport. In recent years, an average of five acres of forest cover has been lost each day due to development. County records indicate that deforestation in eastern Loudoun between 2006 and 2008 resulted in the loss of approximately 2,847 acres of forested land (2.2% of the total land area). During the same time period, reforestation resulted in the gain of about 370 acres (0.29% of the total land). The vast majority of reforestation is natural and not the result of "tree planting". It is also important to note that the quality of the forest being lost (e.g., 100 to 200 year old hardwood forests) is typically higher than the forest being gained, which tends to be dominated by scrub pines and other early successional species.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan calls for the preservation, protection and management of forest resources for their economic and environmental benefits through a variety of regulatory and incentive-based means.

The Plan states that the development and adoption of a Tree Preservation Ordinance that protects large forest areas, urban forests, and individual trees, while preserving existing vegetation and protecting plant and wildlife habitats, is a priority. The County will inventory, map, and maintain a database of trees and indigenous vegetative resources – including old growth forests, significant tree stands, specimen trees, heritage trees, and State or National Champion trees – that should be preserved or managed in accordance with County standards. Incentive-based approaches to encourage the preservation of existing vegetation and wildlife habitat on developing properties and along roadways should also be developed and applied. Lastly, the Plan states that a Forest Management Plan will be required prior to any land development.

For a complete list of the Forest, Trees and Vegetation policies, please see Policies 1 – 11 beginning on pg. 5-32 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Forest, Trees and Vegetation policies of the Plan are applied on a case-by-case basis during the review of legislative applications (e.g. rezonings, special exceptions, and zoning concept plan amendments). When an application is submitted to the County for review, information regarding the location and a general description of the vegetation and tree

cover, including specimen trees and endangered species habitat, is required. Specific recommendations largely depend on the quality and location of the tree cover that is present on the particular site that is proposed for development. Particular attention is given to preserving high-quality old growth forests, specimen trees, and tree cover in the "left-over" spaces (buffers, open space areas, etc.) of the proposed development.

For permitted or "by-right" developments, the Revised 1993 Loudoun County Zoning Ordinance promotes preservation of existing tree canopy for buffering, landscaping, open space, and to meet overall canopy requirements. In addition, Chapter 7 of the Facilities Standards Manual (FSM) requires tree conservation and preservation as well as the development of Tree Conservation Plans for all site plans, construction plans and profiles, and grading permits. The County has one part-time forester/arborist position on staff who reviews tree conservation plans, forest management plans, complaint responses, monitors tree health related to insect and disease damage, and maintains updates to the County Geographic Information System (GIS) forest cover layer. (In comparison, Fairfax County has 15 full-time employees arborists/foresters on staff.)

POTENTIAL NEXT STEPS

1. Investigate whether the County should adopt a "Tree Preservation Ordinance" as a means to protect existing high-quality forests and trees or strengthen the Facilities Standards Manual (FSM) to improve protection of existing forest cover, wood lots and mature trees.
2. Reforest public land. Identify public land such as parks, schools, open space where trees can be planted as community projects in order to increase overall canopy.
3. Investigate an incentive program for landowners and developers that encourage them to retain existing forest cover and/or supplement existing trees to increase overall canopy.
4. Set a realistic goal to increase tree canopy countywide.
5. Consider creating a more detailed map and inventory of forest/vegetative areas in the County in order to identify and prioritize viable tree save areas and to facilitate the preservation of high quality forest types.
6. Consider a cooperative agreement with the Virginia Department of Forestry to adequately fund a full time position to assist in the review of Ordinance-required forest management plans.

F. Plant and Wildlife Habitats

Plants and animals play an important role in nature's lifecycle and its ecosystems. For wildlife habitats, large, contiguous parcels of natural open space are preferable to more numerous, smaller, disconnected areas.

The County operates under the framework of the Endangered Species Act (ESA) which was first passed by Congress in 1973. It was designed to protect critically imperiled species from extinction as a "consequence of economic growth and development untended by adequate concern and conservation". The ESA only protects species which are officially listed as "threatened" or "endangered". The Virginia Natural Area Preserves Act of 1989 protects Natural Heritage Resources throughout the state, defined as the habitats of rare, threatened, and endangered plant and animal species; exemplary natural communities, habitats, and ecosystems; and other natural features of the Commonwealth.

While many high-quality plant and animal habitats have already been lost or altered due to land development, the County still has a number of unique and natural habitat areas. The largest contiguous areas of forest and naturally vegetated land are on mountainsides and along stream channels. These areas play a key role in preserving the abundance and diversity of the County's remaining plant and animal species. An integrated Green Infrastructure approach will help to prevent habitat fragmentation, while enhancing ecological connections with larger natural areas.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan calls for the County to protect the habitat of rare, threatened and endangered plant and animal species in accordance with the Federal Endangered Species Act and through open space, passive recreation, and nature preserves. The County also promotes the preservation and management of existing vegetative cover as well as riparian habitat and wildlife travel corridors (i.e., stream valleys and fencerows) for their native biological diversity and to protect wildlife access to streams and other water sources. To accomplish this, a variety of guidelines and incentives should be developed and used.

Planting of indigenous vegetation will be encouraged, including the incorporation of indigenous vegetation into the landscape design of new development and encouraging a compact, concentrated development pattern. The County will encourage the study of the biological processes within the natural resource elements of the Green Infrastructure.

For a complete list of the Plant and Wildlife Habitats policies, please see Policies 1 – 9 on pg. 5-23 of the Revised General Plan.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that *“the County will use the Virginia Department of Conservation and Recreation, Division of Natural Heritage’s Biological and Conservation Data system to identify Loudoun County’s natural heritage resources. These resources include rare, threatened and endangered plant and animal species; exemplary natural communities, habitats, and ecosystems; and other natural features of the County. The County will apply this information in the evaluation of development proposals. For those development applications that have a likely presence of one or more natural heritage resource, the County will require the applicant to conduct a species assessment and develop a plan for impact avoidance in cases where the presence of the species is identified”* (RGP, Policy 8, pg. 5-33).

For legislative applications, information regarding endangered species habitat is required at checklist when an application is first submitted to the County for review. This allows staff to assess whether such habitat is present on the property proposed to be developed and recommend that such resources be avoided. This local review is especially important for rare species which are not protected by any statute. For permitted or “by-right” applications, the Facilities Standards Manual (FSM) requires a letter from the Virginia Department of Conservation and Recreation, Division of Natural Heritage Resources identifying occurrences of natural heritage resources on the property to be submitted with Preliminary Plats, Construction Plans and Profiles, and Site Plans. The FSM also requires copies of any endangered and threatened species surveys completed for the property to be submitted with the application.

- **Nature Preserves**

The Revised General Plan states that *“the County will promote and support the establishment of public and private nature preserves throughout the County, in addition to Banshee Reeks, as part of the protection of the Green Infrastructure”* (RGP, Policy 3, pg. 5-33).

Over 1,600 acres in Loudoun County are protected in both public and private nature preserves. In addition to the County’s Banshee Reeks Nature Preserve, there are several privately-operated nature preserves in Loudoun County, including the 894-acre Blue Ridge Environmental Center that is owned and operated by the Legget Foundation and the 68-acre Rust Nature Sanctuary in Leesburg that is owned and operated by the Audubon Naturalist Society.

The Banshee Reeks Nature Preserve is the only public nature preserve in Loudoun County. It is a 722-acre property on the banks of the Goose Creek that has been owned and operated by Loudoun County Department of Parks, Recreation, and Community Services (PRCS) since 1999. On April 16, 2001, the Board of Supervisors designated it as a Nature Preserve for the purposes of promoting environmental and historical education. It is the only nature preserve in the State that is owned and operated by a local government.

As part of the Piedmont ecosystem, Banshee Reeks protects many different types of habitats, including riparian zones, successional fields, ponds, mixed hardwood forests of oak/hickory, hedge rows, meadows and wetlands. It contains over two miles of Goose Creek frontage, over twenty miles of trails, and every habitat found within the Virginia Piedmont ecosystem (including grasslands, shrubs, forest, and aquatic), forty natural springs, over 250 bird species, over 250 herbaceous species, and several historic and cultural resources, including an 1830's log cabin and bank barn.

The County is in the process of completing grassland, forest, aquatic and cultural resources management plans to devise detailed tactical and strategic methodologies to further protect and manage the preserve's many important resources. Restoration efforts include extensive tree planting (over 2,000 trees have been planted since the County purchased the property), remediation of hazardous materials sites, removal of invasive plant species, and proposed control of the deer population. A Phase 1 Archaeological Survey was completed for the property. The Preserve is included as part of the Virginia Birding and Wildlife Trail, the first statewide wildlife viewing trail in the United States.

Banshee Reeks Nature Preserve is open to the general public on the weekends. Year-round programs and nature walks are offered to the public by members of wildlife organizations, school teachers, conservancies and facility staff. A primitive camping area (Leave No Trace) is also available for organized groups such as the Boy Scouts and Girl Scouts. Banshee Reeks also offers an outdoor education center where classes and meetings can be offered.

The Virginia Department of Game and Inland Fisheries (DGIF) maintains a regional office at the site. Through non-profit partners, the Preserve hosts a number of nature study programs, bird walks, flower walks, workshops and seminars and conducts archaeological excavations on the property. Banshee Reeks is also home to the local chapter of the Virginia Master Naturalist Program. Furthermore, the local chapter of the Archaeological Society of Virginia currently meets onsite. These groups

use the education center and the surrounding grounds for their meetings, activities, and research.

POTENTIAL NEXT STEPS

1. Continue to support the Banshee Reeks Nature Preserve as a model of stewardship and conservation and as a center for community education on the County's environmental and cultural resources with sufficient access and compatible surroundings with neighboring uses.
2. Continue to pursue additional opportunities to establish public nature preserves.
3. Continue to coordinate with the Virginia Department of Conservation and Recreation (DCR), Division of Natural Heritage Resources and the Department of Game and Inland Fisheries (DGIF) to obtain access to databases containing information pertaining to rare, threatened, and endangered species. In cases where natural heritage resources are identified, refer applications to DCR and DGIF for review and comment. Encourage in-depth surveys, when appropriate, during the land development review process.
4. Develop a definition for nature preserves in the Zoning Ordinance to facilitate the operation and formation of them throughout the County.
5. Explore additional protections for preserving unique habitats and promoting wildlife travel corridors, including reinstating the River and Stream Corridor Overlay District (RSCOD) or adopting the Chesapeake Bay Preservation Act (CBPA).
6. Coordinate with local environmental groups to develop additional wildlife databases and Geographic Information System (GIS) layers based on citizen monitoring data (e.g. Loudoun Wildlife Conservancy's Amphibian Monitoring Program).

Group Two: Heritage Resource Assets

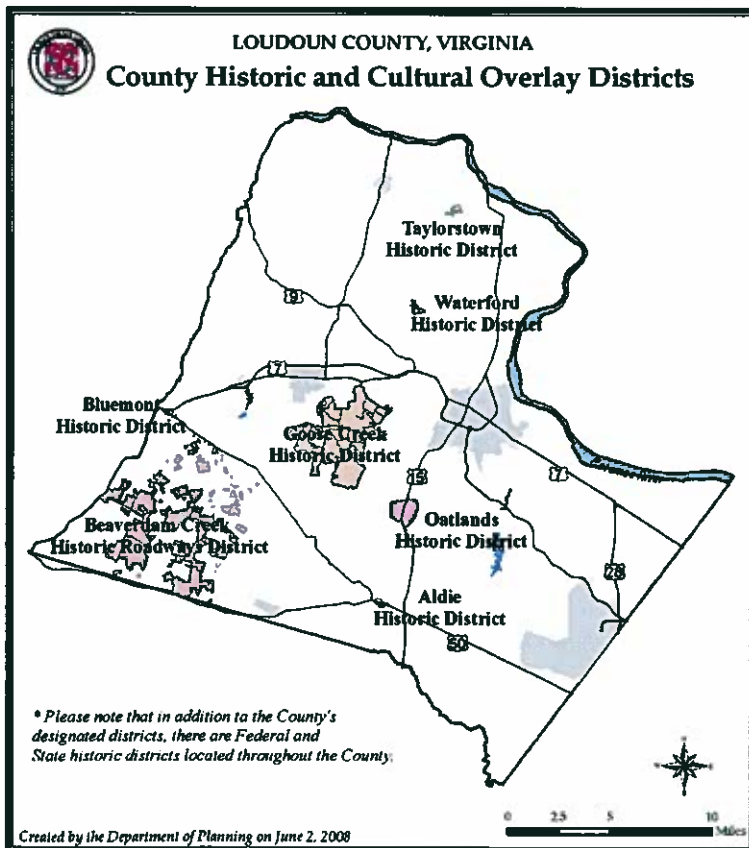
This group includes elements of the Green Infrastructure that have past or present cultural or heritage significance for the County. The identified historic, archaeological and scenic resources, through their preservation and inclusion in the Green Infrastructure, will enrich and perpetuate the County's heritage.

A. Historic and Archaeological Resources

The County has an unusually high number of previously recorded archaeological sites and historic standing structures, along with significant scenic resources and cultural historic landscapes. The vast majority of the archaeological sites that have been recorded in the County are prehistoric Native American sites, some of which date to 8,000 BC. Most of these previously identified prehistoric sites are east of Leesburg and are threatened by considerable development pressure. The County's heritage resources comprise a valuable resource that has enormous cultural,

aesthetic, and economic value to the residents of the County. Along with the scenic landscape in which they are set, historic sites represent the County's largest tourist attraction.

Loudoun County was one of the first jurisdictions in the United States to adopt rural historic districts when the first Aldie, Waterford and Oatlands districts were adopted in 1972, followed by the nearly 11,000-acre Goose Creek District in 1977. There are now seven County-administered districts, including Aldie, Bluemont, Goose Creek, Oatlands, Taylorstown, Waterford and the Beaverdam Historic Roads District. The incorporated Towns of Leesburg, Purcellville and Middleburg also administer local historic districts through their zoning ordinances. The County has over 70 sites that



are on both the Virginia Historic Landmarks Register and the National Register of Historic Places. There are also five National Historic Landmarks in the County;

including Balls Bluff Battlefield, Dodona Manor, Oatlands Plantation, Oak Hill, and Waterford.

COMPREHENSIVE PLAN GUIDANCE

Plan policies call for the County to continue to be aggressive in its efforts to preserve both its heritage and cultural history for the benefit of present and future citizens. This includes not only conserving the archaeological sites and historic structures themselves, but also their settings, major publicly-accessible geological features such rock outcrops which reveal the County's geologic evolution and heritage, and historic, open space and scenic viewsheds.

To achieve this, the Revised General Plan calls on the County to develop a Preservation Plan as the primary planning tool for the protection and preservation of heritage resources and will include strategies for public education. A first step towards this is a comprehensive survey of the County's heritage base. Plan policies also call for the County to create a County Historic Landmarks Inventory by continually updating its historic and archaeological database with information generated through land development process as well as individual archaeological and architectural surveys.

In an effort to protect its archaeological and architectural resources, the County will work with landowners to convey the historic value of the resource to the community and preserve these resources during the land development process. Regarding historic districts, the Plan states that the County will work with residents to identify and establish additional Historic Districts and update the *Historic District Guidelines*. Plan policies also call for the County to develop and implement a program of easements and other programs as methods of ensuring preservation and conservation. In addition, a local program should be implemented to give partial tax credits for historic residential and commercial renovations as an incentive to encourage adaptive re-use and the preservation of historic structures.

For a complete list of Historic and Archaeological Resources policies, please see Policies 1 – 17 beginning on pg. 5-35 of the Revised General Plan.

IMPLEMENTATION

Several Loudoun County departments, including Planning, Building and Development, and Parks, Recreation and Community Services, provide administrative and professional support towards the preservation of Loudoun's historic and cultural resources.

- **Land Development Applications**

The Revised General Plan recognizes that archaeological and historic sites represent an important link to the County's past, and every effort should be made to map and record them before they are lost to development. Towards this end, the Plan states that *"the County will require an archaeological and historic resources survey as part of all development applications. This survey must include a plan for recordation and preservation of identified resources and measures for mitigation and adaptive reuse"* (RGP, Policies 11, pg. 5-35).

For most types of land development applications, an archaeological survey is required to determine if the proposed development will negatively impact significant historic and archaeological sites. Archaeological survey reports must be submitted to the County for review and must meet professional standards set forth by the Virginia Department of Historic Resources. To achieve the identification, recordation and assessment of archaeological resources, a Phase 1A or Phase 1 archaeological report²¹ is the minimum submission requirement for all land development applications proceeding through the County's legislative process and for administrative applications requiring preliminary plats of subdivision and preliminary/record plats. The Phase 1A and Phase 1 survey data is considered by the County to be part of the "existing conditions" of a property. The surveys are used by land developers and the County to identify archaeological sites and then to make informed decisions on the best areas suited for development to avoid and preserve archaeological sites or to develop mitigation strategies related to archaeological sites.

Beginning in 2002, the County through its Facilities Standards Manual (FSM) required a Phase 1 archaeological survey for preliminary plats for subdivision land development applications; however, in 2005, the requirements were lessened to require only a Phase 1A archaeological survey. A Phase 1A survey is a probability study based on archival

²¹ A Phase 1A archaeology survey involves limited archival research and a pedestrian reconnaissance survey of a property to search for indications of historic use or occupation and to identify high probability areas. A Phase 1 archaeological survey, in contrast, requires archival research and regular interval shovel testing across portions of the property that possess the characteristics of high to moderate probability for human occupation. Additionally, excavations referred to as Phase 2 archaeological evaluations and Phase 3 data recoveries may be needed to fully evaluate an archaeological site if the site cannot be avoided by development. However, the County cannot require Phase 2 and Phase 3 investigations so early identification through the Phase 1 survey provide the best opportunities for the avoidance and preservation of archaeological sites during the land development process.

investigations and does not yield site specific information regarding on-site resources because no shovel testing is conducted. It is not recognized by the Virginia Department of Historic Resources because of its limited informational value. As a result, more than 90% of the Phase 1A survey reports submitted to the County recommend that a Phase 1 survey be conducted in order to gather more information. This can result in archaeological resources not being identified until later in the land development project, potentially leading to the loss of archaeological sites (since the bulk of the engineering and site design work will have already been completed prior), a longer review process for applications, and additional cost to applicants.

- **Surveys**

The Revised General Plan states that *"the County will conduct a comprehensive survey of its heritage resource base"* as a step towards preparing and implementing a heritage resource plan (RGP, Policy 1, pg. 5-35).

In total, over 1,500 archaeological sites and 4,500 historic structures have been surveyed, recorded and mapped within the County over the last 35 years. The majority of the archaeological sites have been surveyed as part of the land development process (see discussion below) whereas the surveys of historic structures have been mostly conducted by state and county-funded efforts beginning in the 1970s.

The County has funded a series of architectural surveys which targeted specific underrepresented resources that included a survey of 210 properties related to African Americans in the County and a 750 building survey which focused on resources in eastern Loudoun and post Civil-War resources in western Loudoun. The surveys were completed in 2003 and 2004. The County through a partnership with the towns of Hamilton, Purcellville, Round Hill and Lovettsville in 2003 also funded preliminary architectural surveys of the towns to define their historic districts and determine if they were eligible for listing on the National Register of Historic Places. All four towns were determined to have National Register eligible Historic Districts, portions of the Towns of Purcellville have subsequently been officially designated as a National Register National Register Historic District and the Town of Round Hill is in the process of completing a nomination.

- **Heritage Preservation Plan**

The Revised General Plan states that *"concurrent with the countywide cultural resource inventory and evaluation, the County will formalize its research materials and general policies by developing a Preservation*

Plan for review and adoption by the Board of Supervisors. The Preservation Plan will be incorporated into the County's Comprehensive Plan as the primary planning tool for the protection and preservation of the County's vast cultural resources. Strategies for public education will be addressed in the Plan" (RGP, Policy 6, pg. 5-35).

In 2002 the Board of Supervisors appointed a Citizens Advisory Committee (CAC) to draft a Heritage Preservation Plan to implement the Heritage Resource Policies of the Revised General Plan. The committee worked with County staff for more than six months to develop a draft plan with input from citizens, public and private organizations, and professionals working in various fields related to preservation. The Loudoun County Heritage Preservation Plan was adopted in 2003 but the policies in the Plan were never implemented. In February 2008, the Loudoun County Board of Supervisors resolved to re-affirm the Plan and has tasked the Planning Commission with review of the document for updates and edits.

The Heritage Preservation Plan builds on the specific policies outlined in the Revised General Plan for historic and archeological resources as well as scenic corridors. It provides an overview of the heritage resources and preservation challenges unique to the County as well implementation strategies aimed at resource protection, community education and heritage tourism. The Heritage Preservation Plan recognizes that its successful implementation ultimately rests in the hands of the community. It also:

- provides a series of incentive-based and education-oriented strategies to assist groups and property owners in efforts to protect and preserve heritage resources;
- calls for the creation of a "Heritage Commission" to bring together public and private preservation interests active in the County and lead community education and heritage tourism efforts. The Heritage Commission is recommended as the appropriate body to establish revolving funds and channel monies from the County's expanding heritage tourism program into a variety of preservation efforts;
- proposes implementation strategies for the creation of County Heritage Register as called for in the Revised General Plan;
- addresses the need for government action to protect significant resources threatened by development pressures with the recognition that an expansion of state enabling legislation is necessary to do so effectively; and
- contains policies and implementation strategies that aim to preserve the County's many remaining resources.

- **Archaeology Education and Outreach**

The Revised General Plan promotes the use of public education and outreach as an important strategy to ensure the protection and preservation of historic and archaeological resources (RGP, Policies 1 and 6, pg. 5-35).

The vast majority of all archaeological surveys conducted in the County are prepared for land development projects and are conducted by preservation professionals. While the policies of the Revised General Plans support archaeological and historic resources survey for all land development application, the County recognizes that the educational and heritage tourism benefits related to the County's vast and varied archaeological resources are rarely conveyed to the public during this process.

The County in conjunction with several private and public organizations is providing public outreach, training and education for the community pertaining to archaeological resources. Some of these outreach efforts performed by the County Archaeologist include lectures and drop-in artifact identification events at local venues as well as performing public digs on County owned properties.

- **Historic Districts**

The Revised General Plan states that *"the County will work with residents to identify and establish additional Historic Districts;" "The Historic District Guidelines will be updated to include new districts as they are established and to recognize and give appropriate importance to the current rural-suburban character of the Goose Creek Historic District;" and that "the boundaries of the County's Historic Cultural Conservation Districts will be amended or extended to coincide with the boundaries of the state's corresponding Historic Districts. This applies to Bluemont, Goose Creek, and Waterford. The County will work with the state to extend the state-registered boundary of Aldie to meet the County Aldie Historic District boundary"* (RGP, Policies 13 -15, pg. 5-36).

In effect since 1972, the Historic District Ordinance of the Loudoun County Zoning Ordinance allows for the designation, review and protection of heritage resources through the creation of historic overlay districts. Loudoun County currently administers six Historic and Cultural Conservation (HCC) Districts (Aldie, Bluemont, Goose Creek, Oatlands, Taylorstown and Waterford) two individual Historic Site (HS) Districts (Welbourne and the Ruins of the Broad Run Bridge and Toll House) and one Historic Roadway (HR) District known as the Beaverdam Creek Historic Roadway District, located in the southwestern portion of the County. All of these districts were formed at the request of property

owners who recognized the unique historic character of the communities in which they lived and sought to preserve the historic buildings, landscapes and viewsheds associated with their communities.

The County's historic districts are administered by a seven-member Historic District Review Committee (HDRC), as required in the Revised 1993 Loudoun County Zoning Ordinance, who are appointed by the Board of Supervisors, delegated by the Zoning Administrator and supported by staff from the Department of Planning. The review by the HDRC is intended to ensure architectural compatibility and harmony within these districts. The HDRC review is based on the County's Historic District Guidelines adopted as part of the Zoning Ordinance in 1987. The Historic District Guidelines are currently being updated to reflect current preservation practices, in particular the introduction new building materials, as well as provide a more thorough discussion of several architectural principles including illustrations. The updates to the Historic District Guidelines are scheduled to be completed in 2008, and were partially funded through a CLG grant awarded by the Virginia Department of Historic Resources.

The boundaries of the County historic districts and those of the state and National Register historic districts do not align in the Aldie, Bluemont, Goose Creek and Waterford Historic Districts. The Revised General Plan calls for actions to rectify these boundary discrepancies but to date no action has been taken (RGP, Policy 15, p 5-36) The Plan also states that the County will work with property owners to identify and establish additional historic districts. The Beaverdam Creek Historic Roadways District, created in 2002, is the most recently formed historic district overlay in the County. Additionally a pre-application meeting was held at the request of the Waterford Foundation and citizens to incorporate and/or add additional parcels into the Waterford Historic overlay district.

- **Certified Local Government (CLG) Status**

The Revised General Plan states that the "*County will pursue certified local government status to be eligible to receive grant money earmarked for heritage resource preservation efforts*" (RGP, Policy 17, pg. 5-36).

Loudoun County became a Certified Local Government (CLG) in 2003. CLG status gives the county standing with the State Preservation Office to comment on nominations of property to the national and state registers and allows the county to apply for federal grant money specifically earmarked for local preservation projects. The County has leveraged matching funds from CLG grants to update the Historic District Guidelines and develop an interactive webpage for the County's historic districts, as discussed above.

The County annually pursues CLG money to fund heritage resource projects.

POTENTIAL NEXT STEPS

1. Continue to require Archeological and Historic resources surveys and consider regulations to strengthen the protection of those resources.
2. Continue to establish partnerships with private organizations to ensure proper artifact curation and recordation and to promote the exhibition and interpretation of significant artifacts for the benefit of County residents and visitors.
3. Continue to periodically update the Historic District Guidelines.
4. Revise the Facilities Standards Manual (FSM) to require a Phase 1 Archaeological Survey.
5. Pursue grant funding in order to conduct additional archaeological and architectural surveys.
6. Implement the Heritage Preservation Plan.
7. Create a Heritage Commission.
8. Fund, develop and implement a Stewardship Plan for all county-owned sites that contain significant archaeological or historic resources.
9. Develop and implement a Local Heritage Register to include important heritage resources.
10. Consider tourism programs for county-owned historic properties.
11. Implement the State Code that enables the County to give partial tax credits for historic residential and commercial renovations.
12. Update and strengthen Historic District Ordinance within the Zoning Ordinance.

B. Scenic Areas and Corridors

Scenic areas and places often include many of the same resources that are addressed as part of the County's Green Infrastructure. Often, significant scenic resources coexist with historic structures or are a part of a mountainside area, stream valley or other natural setting. Scenic views are often associated with the roads, highways, rivers, and streams from which they are most often enjoyed; as

well as with agricultural lands, mountainsides and other features that make up these vistas. Loudoun's rural roads, river and streams, agricultural fields, hedgerows, crop fields, farmhouses, barns, crossroad churches, and villages all contribute to the scenic areas and corridors in the County.

The state has designated over 32 road segments in western Loudoun as Virginia Byways. This designation recognizes the aesthetic and/or cultural value associated with the roadway and the natural, scenic and/or historic character of the land surrounding the roadway. Once designated, a Virginia byway becomes part of a statewide promotional strategy, which consists of special roadway signs and highlights on State road maps oriented towards tourism. Additionally in Loudoun County the entirety of Goose Creek and a segment of Catoctin Creek, north of Waterford to the Potomac, have been designated as State Scenic Rivers. The Potomac River which forms the boundary between Loudoun County and Maryland is also a state-designated scenic river. However, like the Virginia Byway Program, the State Scenic River designation does not bring protection or provide incentives to preserve these resources; that responsibility lies with the local governments.

Loudoun County also has within its boundaries two nationally recognized heritage areas - *The Journey Through Hallowed Ground* and the *Mosby Heritage Area*. *The Journey Through Hallowed Ground* follows Route 15/20 from Gettysburg in Pennsylvania, through Loudoun County, to Monticello in Charlottesville Virginia. The area has been deemed so significant that it has been listed by the federal government as a National Heritage Area. By a resolution of the Board of Supervisors in February 2008, Loudoun County became a full partner with the other counties, cities and towns along the corridor actively supporting the *Journey Through Hallowed Ground* National Heritage Area. The *Mosby Heritage Area*, the first heritage area to be designated in the Commonwealth of Virginia, was formed in 1995 to increase awareness of the historic, cultural and natural qualities of the region. The area, named for Confederate Colonel John S. Mosby, encompasses parts of four counties, including all of western Loudoun and all the towns in the County. These heritage areas provide the County with both cultural and economical benefits. For example, on the economic front alone, the heritage tourism industry supported by the *Mosby Heritage Area* employs more than 15,000 people and contributes \$20 million each year in local taxes.

COMPREHENSIVE PLAN GUIDANCE

The policies of the Revised General Plan provide guidance for the protection and designation of scenic areas and corridor within the County. The policies call for special provisions such as additional setback depths, protections against clearing frontage vegetation, and for maintaining stone walls and other features in designated scenic areas and corridors. Plan policies also call on the County to prepare and implement corridor management plans for the County's Virginia

Byways; work proactively with residents to identify potential roadways for Virginia Byway designation by the Commonwealth and to define and designate Historic Roadway Districts and Historic Access Corridor Districts; and conduct public education and outreach efforts.

For a complete list of the Scenic Areas and Corridors Policies, please see policies 1 – 6 on pg. 5-39 of the Revised General Plan.

IMPLEMENTATION

The vast majority of policies of the Revised General Plan rely entirely on individual property owners to maintain and protect the scenic corridors and areas associated with County's roads, streams and rivers. While state and local programs continue to identify and recognize some of the County's key scenic and heritage corridors, protection of these corridors is limited at state and federal levels.

- **Provisions and Incentives**

The Revised General Plan states that "*The County will prepare special provisions such as additional setback depths, protections against clearing frontage vegetation, and for maintaining stonewalls and other features in designated scenic areas and corridors*" (RGP, Policy 3, pg. 5-39).

A combination of regulatory and incentive-based voluntary tools is necessary to promote an awareness and appreciation of these resources and facilitate their protection and preservation of these corridors. Currently there are no regulations protecting scenic areas and corridors, although the Plan's policies are coordinated during the application review process.

The only incentive available for property owners having frontage on a Virginia Byway or Scenic River is through the Land Use Assessment Program administered by the Office of the County Assessor. The program provides for the deferral of real estate taxes on properties that have a minimum of 300' feet of road frontage on a Virginia Byway or have frontage on a Scenic River. The purpose of the program is to further the public interest by encouraging the preservation of land, to conserve and protect the county's natural resources, to protect safe water supplies, and to promote orderly land use planning and development. Assessed property values under the program are generally less than those estimated at fair market value.

- **Virginia Byways**

The Revised General Plan states that *"The County will pursue Virginia Byways designation by the Commonwealth for Charles Town Pike (Route 9), Harper's Ferry Road (Route 671), Edwards Ferry Road (Route 773), Route 50 (through the Mosby Heritage Area), and Route 626 in its entirety"* (RGP, Policy 3, pg. 5-39).

Both Charles Town Pike (Route 9) and Harper's Ferry Road (Route 671) have been designated as a Virginia Byways. Additional efforts by the County in conjunction with citizen support are needed to designate the remaining roadways (Edwards Ferry Road, Route 50, and Route 626) as well as other eligible roadway in the County.

- **Historic Roadway Districts**

The Revised General Plan states that *"The County will work proactively with residents to define and designate Historic Roadway Districts. Through public education and outreach efforts, the County will stress the importance of heritage resource protection and preservation as a means to protect and preserve the character of the County's rural roads"* (RGP, Policy 3, pg. 5-39).

On December 16, 2002, the Loudoun County Board of Supervisors approved the creation of the county's first historic roadways district - the Beaverdam Creek Historic Roadways District. The district exists along nearly 80 miles of mostly rural, unpaved roads north of Middleburg and applies to 189 properties whose owners have voluntarily agreed to be included within the zoning overlay district. The district encompasses roadways which offer scenic views of woodlands, pastures, farms, streams, and mountain vistas surrounding the roadway. The historic roadway district guidelines are administered by the Historic District Review Committee (HDRC) appointed by the Board of Supervisors. However, it should be noted that a majority of the properties within the boundaries of the Beaverdam Creek Historic Roadway District are not included since the owners of those properties did not opt in to the district, creating a patchwork of non-contiguous properties.

POTENTIAL NEXT STEPS

1. Continue to work proactively with residents to identify potential roadways for Virginia Byway designation by the Commonwealth.
2. Continue to pursue additional Historic Roadway Districts in addition to the Beaverdam Historic Roadway District.

3. Continue to work with residents of the Beaverdam Creek Historic Roadways District to add properties into the district.
4. Work proactively with residents to define and designate historic access corridor districts.
5. Prepare and implement corridor management plans for the County's Virginia Byways.

Group Three: Open Space Assets

Group Three includes elements of the Green Infrastructure that are best described as man-made open space, including greenways and trails, parks and recreation, public school sites, and open space easements. These elements can enhance the vibrancy of communities by providing public interaction with nature and opportunities for outdoor activity. Open space assets may be held in either private or public ownership or a combination thereof, although public ownership predominates in parks, sport complexes, athletic fields, and greenways and trails. Regulation of protective buffers, donation of open-space easements, purchase-of-development rights, and performance standards will be used by the County and individual property-owners to manage these elements.

A. Greenways and Trails

The County is committed to establishing an integrated greenways and trails system that will provide for walking, hiking, bicycling, and equestrian use. The greenways and trails system will provide the vital link between communities and the larger open space assets and natural elements of the Green Infrastructure.

COMPREHENSIVE PLAN GUIDANCE

The County will prepare and implement a Greenways and Trails Plan that will be made a part of the Comprehensive Plan. It will serve as a linking element in all policy areas to other components of the Green Infrastructure and may be used for refuge, recreation, and education. Priority trails will be designated that include extensions of existing trails, trail linkages, linear park connections, regional park connections, networks of sidewalks and multi-use trails with Towns, bicycle/pedestrian bridge crossings, connections within communities and from communities to other transportation corridors. The County will seek through public purchase, proffer, density transfer, donation or open-space easement, the preservation of greenways and the development of trails.

For a complete list of the Greenways and Trails policies, please see Policies 1 – 4

on pg. 5-39 of the Revised General Plan.

IMPLEMENTATION

- **Greenways and Trails Plan**

The Revised General Plan states that “*The County will prepare and implement a Greenways and Trails Plan identifying desired locations of future greenways and trails and desired connections to neighboring jurisdictions’ greenways and trails. Trails may include hiking, biking and equestrian trails. Greenways include areas along rivers and streams that are often ideal for trails. This plan, updated periodically, will be made a part of the Comprehensive Plan*” (RGP, Policy 1, pg. 5-39).

The Greenways and Trails Policies (CPAM 1992-0010) were adopted in 1994 and are used today as a stand-alone document to the Revised General Plan. It provides the County’s vision for greenways and trails and describes the County’s strategy for acquiring these areas. This plan, which could provide greater details on natural recreation trails and greenways than the Revised General Plan, has not been updated. The County’s Bicycle and Pedestrian Mobility Master Plan (‘Bike/Ped Plan’), adopted in 2003, provides additional policy guidance regarding non-motorized transportation and focuses on paved, shared-use transportation trails.

- **Acquiring Greenways and Trails**

The Revised General Plan states that “*the County will seek through public purchase, proffer, density transfer, donation or open space easement, the preservation of greenways and the development of trails*” (RGP, Policy 4, pg. 5-40).

Implementation of County Greenways and Trails policies are largely accomplished through the legislative review process and through negotiations with private landowners to purchase easements and land. The County’s approach to trails planning is to primarily use Stream Valley Corridors as the building blocks for a linear recreational park system to be owned and maintained by the County. These corridors are intended to form an integrated parks network that connects to the Potomac River. Trails are intended to serve multiple purposes. In addition to recreation and transportation purposes, trails are intended as educational opportunities, which expose residents and visitors to the County’s wealth of cultural and natural resources, and as ecological corridors, providing habitat for a wide range of plants and animals. The trail corridor can also highlight the importance of conservation to the community.

Two such corridors, along Goose Creek and Broad Run, are currently under development. As with the Potomac Heritage National Scenic Trail (PHNST), the County envisions a series of contiguous linear parks along Goose Creek and Broad Run, using easements and park lands. The County already has a trail connection along Broad Run from the Potomac River to Route 7 through Bles Park. Eventually, the "Broad Run Trail" could pass under Route 7 and stretch nearly to Route 50. The County is also working with property owners, including Luck Stone and the City of Fairfax, for a linear park along Goose Creek. Several easements and parcels have been acquired along Goose Creek through the legislative application process, stretching from Evergreen Rural Village to the Goose Creek Reservoir. Beaverdam Reservoir, owned by the City of Fairfax, is another location with trails and the potential for connections to the Goose Creek Corridor. Another stream corridor to consider is Bull Run, which still includes portions of a historic millrace. A linear park could extend along Loudoun banks of Bull Run from the Manassas National Battlefield Historic Park to the Bull Run Mountains and the future trail between Aldie Mill and Beverly Mill.

In addition to stream corridors, the County contains other resources, such as historic roadbeds, that can also serve as trail corridors. Adaptive reuse and preservation of historic corridors for linear parks can provide a recreational venue while preserving a piece of the County's heritage. An example is the Vestal's Gap Trail in the Claude Moore Park, which was used by Native Americans, George Washington, General Braddock, and early settlers such as Daniel Boone.

The Department of Parks, Recreation and Community Services (PRCS) has also partnered with the horse enthusiasts and associations in the development of equestrian trails throughout the County. The Evergreen Mills Equestrian and Hiking Trail was developed by PRCS in 2002 as a circuitous trail system around the County Landfill. A trailhead was developed for horse trailer parking with funding from the Board of Supervisors. In addition, several miles of public equestrian trail easements have been secured by PRCS for future use at the Waterford View and Fieldstone Farm subdivisions.

An important facet of linear parks and recreational trail management is the presence of a land manager dedicated to those parks and trails. Currently, PRCS manages public linear park and trail acquisition, easements, maintenance, and the coordination of trail volunteers.

POTENTIAL NEXT STEPS

1. Continue to manage linear park and trail acquisition, easements, maintenance, and the coordination of trail volunteers.
2. Continue to pursue the acquisition of greenways and trails through the legislative review process, land purchases and grants.
3. Update the Greenways and Trails Policies within the Revised General Plan to reflect current conditions and strategies and include distinctions between paved, shared-use transportation trails and natural recreation trails / greenways. As part of this effort, a Trails Commission should be established.
4. Coordinate with the Parks, Recreation and Open Space Advisory Board (PROS) to develop and implement the proposed County Greenways, Blueways and Open Space Master Plan. The Plan should incorporate linear parks along the five major County stream corridors (Sugarland Run, Broad Run, Goose Creek, Catoctin Creek, and Bull Run) and consider opportunities for recreational pedestrian, mountain biking, and equestrian uses.

B. Parks and Recreation

Parks are important man-made open space assets of the Green Infrastructure that not only serve their passive and active recreational purposes, but also provide a link between communities and other Green Infrastructure elements. Many of the parks in Loudoun contain historical and archeological significant features and unique natural resources. Interpretive opportunities are provided to the public by the Loudoun County Department of Parks, Recreation and Community Services (PRCS), the Northern Virginia Regional Park Authority (NVRPA) and United States National Park Service (NPS). County-owned parks are administered by PRCS while regional parks are administered by the NVRPA.

As part of the 2007 Virginia Outdoors Plan, the Virginia Department of Conservation and Recreation commissioned a survey and held 40 input sessions across the Commonwealth in 2006. The top ranking recreational activities were walking for pleasure (72%), visiting historic sites (56%), driving for pleasure (55%), swimming (44%), and visiting natural areas and/or parks (44%). The 2006 Virginia Outdoors Survey highlighted the desire for additional public access to Virginia's waters and trails for walking and bicycling. Other trends included the "Nature-Deficit Disorder" (the lack of interaction with our natural world in a meaningful way, as coined by author Richard Louv), preserving water quality, and providing livable and walkable communities.

In 2007, PRCS and the NVRPA commissioned a "*Community Attitude & Interest*

Survey” conducted by Leisure Vision. The top recreation facility needs listed by survey respondents were paved walking and biking trails (75%), nature centers and natural areas (59%), historical sites and museums (59%), and unpaved hiking trails (46%). Approximately 83% of those surveyed were either supportive of purchasing land for open space and chose developing trails and purchasing open space as actions they would be most willing to fund with their tax dollars. When asked to choose what they would be most willing to fund with their tax dollars from a list of 17 possible actions to improve parks and recreation services in Loudoun County, residents cited the development of new walking/ biking trails and connections to existing trails and the purchase of land to preserve open space most frequently.

The County currently operates 26 parks, 1 recreation center, 1 museum, 1 performing and visual arts center, 12 senior, community and/or multipurpose centers, 8 cultural and historic facilities, 1 nature preserve, and 1 equestrian and hiking trail throughout the County, providing both passive and active recreational opportunities to residents²². Altogether, over 2,000 acres are protected in a County park or recreation facility. Some of the County’s most environmentally and culturally-valuable land is protected through the County’s park and recreation system.

PRCS provides a variety of educational and informative classes and events aimed at educating the public about natural and culture resources. Claude Moore Park has a full-time staff naturalist that provides programs to grade-school children and the general public throughout the year. Banshee Reeks Nature Preserve is home to a chapter of the Virginia Master Naturalist (VMN) Program, which is an eight-month training and certification course. The VMN supports a statewide corps of volunteers providing education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within the community.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan states that conservation design techniques are incorporated in the design of new parks and athletic facilities. Furthermore, they will be located in order to provide links between public facilities and communities, protect environmental integrity, and provide buffers between different land uses.

For a complete list of policies, please see Parks and Recreation Policy 1 on pg. 5-41 of the Revised General Plan.

²² Source: Loudoun County Department of Parks, Recreation, and Community Services (2008). *Activity Guide Summer 2008*. Accessed on May 22, 2008. Available at <http://www.loudoun.gov/Default.aspx?tabid=700>.

IMPLEMENTATION

- **Land Development Applications**

The Revised General Plan states that “*The County will apply conservation design techniques in the design of new parks and athletic facilities and will locate them to provide links between public facilities and communities, to protect environmental integrity, and to provide buffers between different land uses*” (RGP, Policy 1, pg. 5-41).

As with greenways and trails, implementation of County’s Parks and Recreation policies are largely accomplished through the legislative review process and land purchases. The PRCS Administration Division and the Division of Facilities Planning and Development reviews most legislative and administrative land development applications for input on the adequacy of proposed recreational amenities, project impacts to existing or future public recreation facilities, and project impacts to natural resources.

PRCS negotiates rezoning proffers and special exception conditions for the dedication of land, the construction of new active, athletic and/or passive recreation facilities, and the improvement and/or addition of amenities at existing or future public recreation facilities. To date, the land and/or amenities of at least 20 different PRCS facilities have been acquired through the proffer system. PRCS also receives proffered cash contributions for the development and/or improvement of PRCS facilities. In addition, approximately 25 new public parks, trails, and facilities have been proffered for future construction and conveyance.

- **PRCS Planning Initiatives**

Following up on the aforementioned survey, PRCS began the development of a new departmental Strategic Plan. The Strategic Plan, currently in the data analysis phase, is intended to further address community recreational and leisure needs, incorporate new market trends, demonstrate departmental efficiency, leverage current resources and partnerships, and to manage by best practices. PRCS held 6 public and agency staff input sessions to gather information concerning departmental strengths and weaknesses, the availability to meet the community’s needs, the desire for any additional services, and to forecast future recreational and community service trends. A draft of the Plan will be developed by PRCS Staff, and is anticipated by the end of 2008.

PRCS has also recently revised their Design and Construction Standards Manual, and is working on developing a Comprehensive Sign Plan and Manual. It is intended that these documents will guide the location and development of PRCS facilities, as well as providing the public with an

enhanced visitor experience.

PRCS continues to partner with the Loudoun County Public Schools in providing athletic fields and facilities at elementary and middle schools. PRCS is working with the schools to improve existing and planned athletic facilities to serve the vast need for active recreational fields serving youth and adult athletic leagues, which is an example of public facility collocation. In addition, PRCS is working to address the needs of residential connectivity to school sites through park facilities and trails.

- **Advisory Committees**

1. ***Parks, Recreation and Open Space (PROS) Advisory Board***

The Parks Recreation and Open Space Advisory Board is made up of 8 members appointed by the Board of Supervisors from each election district, 1 at-large member, 2 open space members, 1 liaison from the Town of Leesburg, and 2 liaisons from the Board of Supervisors. The PROS Board meets once a month, and works with the PRCS Administration to implement departmental initiatives. In early 2008, the Board of Supervisors combined the separate Parks and Recreation Advisory Board and the Open Space Advisory Committee into the PROS Board.

2. ***Other Site-Specific Advisory and "Friends of" Committees***

PRCS also partners with different advisory committees and "friends of" groups, representing specific PRCS sites. Many of these groups are involved with historic properties and facilities under development. These groups provide technical assistance, fund-raising, and other volunteer services.

POTENTIAL NEXT STEPS

1. Continue to pursue the acquisition and construction of parks and recreational facilities through the legislative review process, land purchases, grants and partnerships.
2. Continue to apply the Green Infrastructure policies during the legislative review of applications proposing park and recreation facilities.
3. Complete and implement the Parks, Recreation and Community Services (PRCS) Strategic Plan.
4. Complete Parks, Recreation and Community Services (PRCS) comprehensive signage plan and design and construction manuals for implementation.

5. Develop and implement site-specific Resource Management Plans for County-owned parks and facilities.
6. Pursue additional grant funding for the development and improvement of County-owned parks and facilities.
7. Pursue additional volunteer and civic resources to partner for the development and improvement of County-owned parks and facilities.
8. Develop connectivity and co-location plans with public school sites.

C. Public School Sites

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan recognizes that school facilities are used not only for their primary educational purpose. The siting and planning of public schools creates opportunities to provide extensive open space that links to existing elements of the Green Infrastructure through greenways and trails. With the right location, schools play a special role in neighborhoods and communities by becoming focal points for active recreation. This benefits the public at-large and offer opportunities for the co-location of active open space and recreation facilities such as athletic fields, program space and meeting space with the County's park and recreation facilities which should be encouraged between schools and the County's Department of Parks, Recreation, and Community Services (PRCS).

For a complete list of policies, please see pg. 5-41 of the Revised General Plan.

IMPLEMENTATION

When identifying school sites, the existing Green Infrastructure is taken into consideration. The design and siting of school facilities, drainage, utilities, and recreational fields at school sites are planned to link with elements of the Green Infrastructure. Public schools also provide opportunities for outdoor recreation for students, the surrounding neighborhood and the larger community. For instance, elementary schools typically provide playground(s) and outdoor athletic fields. Middle schools and high schools, in contrast, provide a large number of specific athletic fields to meet the growing demand of high school athletic programs and events.

POTENTIAL NEXT STEPS

1. Continue to apply the Green Infrastructure policies during the legislative review of applications proposing school and other public facilities.

2. Develop connectivity and co-location plans with parks, recreation and community facilities.
3. Encourage environmental and heritage educational opportunities in public schools.

D. Open Space Easements

COMPREHENSIVE PLAN GUIDANCE

A number of open space easements can be found throughout the County. Many complement and protect natural features like rivers and streams, others protect historic locations or key agricultural areas, while others provide recreational and educational opportunities in the form of parks and nature preserves. The County will continue to encourage the use of open space easements as a way to complement and enhance the Green Infrastructure and its elements.

For a complete list of policies, please see Parks and Recreation Policy 1 on pg. 5-41 of the Revised General Plan.

IMPLEMENTATION

In 2007, approximately 2,087 acres in Loudoun County were placed in some form of conservation easement, bringing the grand total to more than 42,000 acres of privately conserved land in the County²³.

- **Advisory Committee**

Parks, Recreation and Open Space (PROS) Advisory Board

The Parks Recreation and Open Space Advisory Board is made up of 8 members appointed by the Board of Supervisors from each election district, 1 at-large member, 2 open space members, 1 liaison from the Town of Leesburg, and 2 liaisons from the Board of Supervisors. The PROS Board meets once a month, and works with the PRCS Administration to implement departmental initiatives. In early 2008, the Board of Supervisors combined the separate Parks and Recreation Advisory Board and the Open Space Advisory Committee into the PROS Board.

²³ Department of Building and Development, Natural, Environmental & Cultural Resources brochure.

POTENTIAL NEXT STEPS

1. Continue to encourage the use of open space easements as a way to complement and enhance the Green Infrastructure and its elements.
2. Revise the Zoning Ordinance and Facilities Standards Manual (FSM) to define and address the different types of open space.
3. Develop a public education and outreach campaign to encourage additional land to be placed in an open space easements.
4. Develop and implement the proposed County Greenways, Blueways, and Open Space Master Plan to address the definition, acquisition, and management of open space.
5. Consider reinstating the Purchase of Development Rights Program to acquire and protect open space.
6. Consider the creation of an open space standard to measure the amount of open space necessary to support the population (eg. for every citizen you need X amount of open space).



Air Pollution Non-attainment Area includes Loudoun County

Group Four: Complementary Elements

Group Four includes elements that are not directly a part of the land-based Green Infrastructure but instead, complement it. They include air quality, lighting and the night sky, and the aural environment.

A. Air Quality

The Clean Air Act was first passed in 1970 and amended in 1990. This law requires the U.S. Environmental Protection Agency (EPA) to set national air quality standards to reduce harmful

pollutants. These national standards limit the concentrations of six air pollutants: carbon monoxide, lead, nitrogen dioxide, ground-level ozone, particulate matter, and sulfur dioxide. Loudoun is within the Metropolitan-Washington non-attainment area for ground-level ozone and fine particle pollution, meaning that this area that does not meet the federal standards for these pollutants designated in the Clean Air Act²⁴. The current standards have been in place since 1997.

In 2004, the Metropolitan Washington Air Quality Committee approved a regional plan (State Implementation Plan or "SIP") to meet EPA's standard for ozone. The plan demonstrated that the region would meet the standard by 2005. The region did meet the ozone standard in 2005, but by then EPA had revised the ozone standard. The Clean Air Act requires EPA to revise the National Ambient Air Quality Standards about every five years to reflect the latest research about air pollution and its effects on human health.

The Metropolitan Washington Air Quality Committee (MWAQC) recently submitted two regional air quality plans to the State of Virginia. The State then submitted the plans to the U.S. Environmental Protection Agency (EPA) for approval. Once the administrator of the EPA approves a state plan, the plan is enforceable as a state law and as federal law. The plans, called State Implementation Plans (SIPs), include a list of regulations and programs to clean the air, and modeling results to demonstrate that the regulations and programs will in fact clean the air by EPA's deadline. The two plans recently submitted show how the region will meet the federal standards for ozone and fine particles by the fall of 2009.

States are required to adopt the plan's regulations to reduce air pollution. These programs and regulations include requiring car inspections & maintenance, reformulation of consumer products (such as aerosols), permitting and regulation of power plants, printing presses, and dry cleaners. The federal government has promulgated other air quality regulations regarding such items as low-sulfur fuels, gasoline vapor capture, and VOCs and NOX in vehicle emissions. County actions are generally voluntary.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan recognizes that Loudoun County's air quality is threatened by air pollution from automobile and aircraft emissions, heating furnaces, and power plants and provides a set of policies targeted at:

- promoting more efficient and better planned transportation and pedestrian networks (e.g., reducing single occupancy vehicle trips, vehicle miles traveled, and associated emissions in order to improve air quality while at the same time creating pedestrian and bicycle facilities, park-and-ride lots,

²⁴ Source: Metropolitan Washington Council of Governments. Air Quality. <http://www.mwcog.org/environment/air/>. Accessed on May 14, 2008.

- and mass transit options);
- encouraging tree planting, preservation, and restoration;
- enforcing State laws that prohibit open burning;
- complying with the Federal Clean Air Act Amendments of 1990; and
- continuing to play an active role to implement the Phase II Attainment Plan for the Washington Metropolitan Non-Attainment Area, as well as future emissions reduction programs.

In addition to these policies, the Plan has provisions for compact development and mixed uses which are intended to reduce vehicle trips.

For a complete list of policies, please see Air Quality Policies 1 – 5 on pg. 5-41 of the Revised General Plan.

IMPLEMENTATION

Loudoun County has taken the following steps towards reducing air pollution:

- **Air Quality Action Days**
Loudoun County participates in the Air Quality Action Days program which is administered by Clean Air Partners, a nonprofit partnership chartered by the Metropolitan Washington Council of Governments and the Baltimore Metropolitan Council. On Air Quality Action Days, all County employees are notified by e-mail that conditions for the next day are expected to reach Code Red or Code Orange. The County also posts air quality data on its web site. County employees are encouraged to carpool, bike, or ride transit on these days; consider teleworking; cancel or postpone outdoor programs and activities; postpone the use of any gasoline or diesel powered equipment; cancel or postpone, or significantly reduce any long-distance use of



AIR QUALITY ACTION GUIDE

Your "how to" guide
for cleaner air

Air Quality Rating	Steps to Protect Your Health and Our Environment
GOOD 0-50	Enjoy the great outdoors
MODERATE 51-100	Some Pollution - poses risk to the highly sensitive <ul style="list-style-type: none">• Carpool, use public transit, bike, or walk• Limit driving, consolidate trips• Reduce car idling
UNHEALTHY for Sensitive Groups 101-150	Pollution levels harmful to children, the elderly, and anyone with respiratory or heart conditions - limit activity outdoors <ul style="list-style-type: none">• Follow all action steps above• Refuel after dusk, use fuel-efficient vehicles• Avoid driving, use transit, telework• Avoid using aerosol products
UNHEALTHY 151-200	Pollution levels harmful to all - sensitive groups should avoid outdoor activities, others should limit outdoor exertion <ul style="list-style-type: none">• Follow all action steps above• Avoid using any gas-powered equipment• Wait to paint until air quality improves
VERY UNHEALTHY 201-300	Pollution levels very unhealthy for everyone - avoid any physical activity outdoors

Source: Clean Air Partners

vehicles; and refuel all business and personal vehicles after dusk or the day before when Code Red or Orange is anticipated. On Code Red action days, buses operating in Northern Virginia are free, including the Loudoun County commuter bus service and Virginia Regional Transit fixed route.

- **TDM/Transit**

The County continues to provide commuting alternatives to residents, visitors and employees. These options include local (fixed route) buses, commuter buses, car and vanpooling, NuRide (a private ride-sharing program), and bicycles, including support of the annual Bike-to-Work Day in May.

Local (fixed route) service has grown from one fixed route and 44 daily passenger trips in 2002 to nine fixed routes and 1,483 average daily passenger trips in 2007. Virginia Regional Transit is the County's designated rural transit provider and operates all local and demand-response services in Loudoun County. All local buses are wheel-chair accessible and equipped with bike racks. Loudoun County employees can ride this local fixed route bus service for free.

Like local bus service, commuter bus service has grown since 1994, when the County assumed responsibility for commuter services. At that time the County contracted for 3 buses. In 2003, the service model was changed, so that the County would acquire the buses and contract for their operation, storage, and maintenance. The County now owns 35 buses. In 2007, the commuter bus service handled 652,347 passenger trips. These trips amount to more than 21 million annual passenger Vehicle Miles Traveled (VMT) saved. These distances translate into 16.9 tons of automobile Nitrogen Oxides (NOx) emissions saved and 5.2 tons of Volatile Organic Compounds (VOC) saved. Chemical reactions between oxides of nitrogen and volatile organic compounds in the presence of sunlight result in the production of ground-level ozone. All commuter buses can accommodate bicycles in their cargo bins. Buses are also wheel-chair accessible and equipped with electronic fareboxes that allow riders to pay fares with SmarTrip cards. County employees can also ride the commuter bus service for free.

An integral part of transit services in the County is the provision of Park-and-Ride spaces, for both bus-served and carpool/vanpool lots. Currently, the County has 1,773 bus-served spaces and 408 carpool/vanpool spaces, for a total of 2,181 spaces. Carpool spaces are also provided in the parking garage at the County Government Center.

Another growing commuting program is the NuRide Program, a private ride-sharing program. Loudoun County Government has 132 active riders

in the program. In 2007, involvement of County employees in the program generated 6,702 trips, reducing car trips by 10,684, VMT by 371,944 miles, and emissions (NO_x, VOC, & carbon dioxide (CO₂)) by 160.9 tons.

Rail service is expected in Loudoun County by 2015. Three (3) stops are planned: the Dulles International Airport, Route 606 along the Dulles Greenway, and at the Loudoun Station/Moorefield Station developments. Rail is to be operated by the Washington Metropolitan Area Transit Authority (WMATA). Loudoun County is currently a non-contributing member of WMATA. Once rail arrives, Loudoun County will become a contributing member of the WMATA Compact.

Loudoun County is in the process of preparing its first Transit Plan, which will be a technical addendum to the Countywide Transportation Plan. The Transit Plan is expected to be completed in November or December of 2008. The addendum will help guide future transit service in the County for the next 20 years. The County also encourages and facilitates the accommodation of bicycles and pedestrians, as discussed in the Built Environment section.

- **Hybrid and Alternative Fuel Vehicles**

Loudoun County offers tax incentives to citizens for hybrid vehicles. In addition, the Department of General Services, in partnership with Loudoun County Public Schools (LCPS), manages the County's consolidated fleet. Since 2002, over 60 hybrid vehicles have been added to the fleet and more are being phased in as older, less-fuel-efficient vehicles are replaced. Currently, hybrid vehicles are generally available to replace only sedans and small sport-utility vehicles in the fleet. For these vehicle types, approximately 29% of the School's fleet are hybrids (40 of 136) and about 10% of the County's non-public safety fleet are hybrids (23 of 234).

Other types of vehicles such as bio-diesel-fueled, CNG (Compressed Natural Gas) powered and electric powered vehicles are being considered for the consolidated fleet. None have been added to date due to unresolved technical issues with the technology, the absence of the fueling infrastructure in the County, limited vehicle availability and high cost.

- **Telework**

Since 1996, the County government has participated in a telework program that gets cars off the roads, frees up office and parking spaces and reduces emissions into the air. In 2006, the Board of Supervisors and the County Administrator relaunched its telework program with a goal set at 20% participation among non-public safety employees. Employees participating in this program can arrange to work from home one or more

days each month under a signed agreement with the County. As of May 2008, 430 people, or approximately 17% of County employees, and most departments participate in the program. Several work groups, such as the Building Inspectors are equipped to complete their work in the field, eliminating the need to commute to the office to receive assignments or enter inspection results.

It is estimated that the County's telework program saves 119,967 vehicular miles traveled and 3,441 hours of commuting time each month. In the future, the County is aiming to increase participation by FY 2009 to 25% of non-public safety employees. The County is also part of a pilot program with Commuter Connections this summer to promote participation prior to "Code Red" or "Code Orange" days.

- **Other Measures**

General Services and Loudoun County Public Schools (LCPS), who together manage the County's fleets, participate in many "green" initiatives that help to improve air quality. For example, they have purchased environmentally friendly school buses which are equipped with diesel oxidation catalysts and they have begun to use ultra-low sulfur diesel fuel to reduce emissions. They are using synthetic transmission fluids which reduce the frequency of transmission flushes thereby reducing the amount of hazardous waste. The County crushes used oil filters to eliminate oil from being placed in the landfill and recycles all motor oils, antifreeze, tires, and steel. The County also has a "No Idle" policy which was established to reduce fuel consumption and harmful emissions.

POTENTIAL NEXT STEPS

1. Continue to enforce open burning Virginia State Laws.
2. Continue to play an active role on the Metropolitan Washington Air Quality Committee.
3. Continue to play an active role on the National Capital Region Transportation Planning Board.
4. Continue to support the extension of rail service to Loudoun County. Become a contributing member of Washington Metropolitan Area Transit Authority (WMATA) once rail arrives to the County.
5. Complete the County's Transit Plan.
6. Continue to implement the Bike/Ped Plan for the development of additional

- bicycle and pedestrian facilities.
7. Continue working toward compliance with the Federal Clean Air Act Amendments through the approved State Implementation Plans (SIPs).
 8. Continue pursuing the addition of park-and-ride spaces in the County to accommodate commuters through a variety of means, including proffers from land development applications, seeking opportunities to lease parking spaces during typical business hours from the owners of underused commercial parking lots, etc. The County may need to pursue changes to the Zoning Ordinance to facilitate such leases.
 9. Expand transit opportunities such as commuter transit routes to Tyson's Corner, Herndon, Reston and other major employment areas.
 10. Promote local businesses and farmers through a "Buy Local" campaign that helps reduce vehicle miles on our roads and reduces energy and emissions generated by transporting goods from distant suppliers.
 11. Enhance initiatives that get cars off the road – public transit, carpooling, teleworking, flexible work schedules, complete bicycle and pedestrian networks, etc.
 12. Pursue developing land use and transportation policies and measures to improve air quality.
 13. Promote tree planting and preservation to improve air quality.

B. Lighting and the Night Sky

The beauty of the County's night sky is threatened by excessive and improper lighting. Application of sound night-lighting standards will reduce light pollution such as glare, energy waste, light trespass, and the deterioration of the natural nighttime environment.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan states that the County will develop appropriate regulations and performance standards to promote quality and energy-efficient lighting that will also preserve the natural beauty of the night skies. Artificial lighting and light pollution should be minimized while maintaining the primary purpose of lighting for public safety and visibility. Plan policies also state that the County will adopt a lighting ordinance to promote the use of lighting for convenience and safety without the nuisance associated with light pollution, promote a glare-free environment, conserve energy, and prohibit unnecessary and

intrusive light trespass.

For a complete list of policies please see Lighting and Night Sky Policies 1a-1d on pg. 5-52 of the Revised General Plan and Signs and Lighting Policies 1 and 2 on pg. 21 of the Retail Plan.

IMPLEMENTATION

During the application review process, the lighting policies are applied on a case-by-case basis depending on the specific property's characteristics and surrounding development. Conditions of approval and/or proffers are suggested that ensure lighting that is downward directed and fully shielded, provides a glare-free environment, is powered down during the night if possible, is confined to the site, has illumination levels that are no greater than necessary for a light's intended purpose, and precludes deterioration of the nighttime environment. Similar protections for permitted (i.e., "by right") developments are limited to the existing regulations per the County's Zoning Ordinance and the Facilities Standards Manual (FSM).

The Revised 1993 Loudoun County Zoning Ordinance and the Facilities Standards Manual (FSM) both contain regulations concerning lighting in the County. All permitted and special exception uses in the County must comply with the Light and Glare Standards found in Section 5-1504 of the Zoning Ordinance with the exception of street lighting and lighting at publicly-owned facilities used for athletic competitions. A special exception can be sought to exceed these standards. In general, the Light and Glare Standards prohibit all sources of glare exceeding 0.25 foot candles above background light levels at property boundaries adjacent to a residential district or use. This section also establishes how the illumination levels are to be measured and requires lights in the A-3, A-10, AR-1, AR-2 and CR districts to be shielded so that the direct glare of the bulb is not visible from the property lines. Additional exterior lighting standards are provided in Section 5-652A for certain specific uses, including bed and breakfasts, country inns, kennels, small businesses, recycling drop off centers, etc. These standards are only applied when expressly referenced in the standards for the specified use (see Section 5-600).

In addition, the Facilities Standards Manual (FSM) also provides street and site lighting standards (Section 7.100) that are applicable to lighting required in conjunction with subdivision and/or site plan development.

POTENTIAL NEXT STEPS

1. Continue to pursue conformance with Plan policies through the application review process.

2. Continue to enforce existing regulations per the Zoning Ordinance and the Facilities Standards Manual (FSM).
3. Update the lighting standards contained in the County's Zoning Ordinance.

C. Aural Environment

Loudoun County's efforts to protect existing and future residents from increased levels of environmental noise have focused primarily on airport noise surrounding Washington Dulles International Airport and Leesburg Executive Airport. Sources of other noise related impacts include construction noise, quarry noise and highway noise.

1. Airport Noise Policies

In order to ensure a high-quality environment for both existing and future residents, as well as maintaining the economic viability of these important transportation and economic development resources, an Airport Impact (AI) Overlay District was established in the Revised 1993 Loudoun County Zoning Ordinance to impose development restrictions within specified areas affected by aircraft noise.

COMPREHENSIVE PLAN GUIDANCE

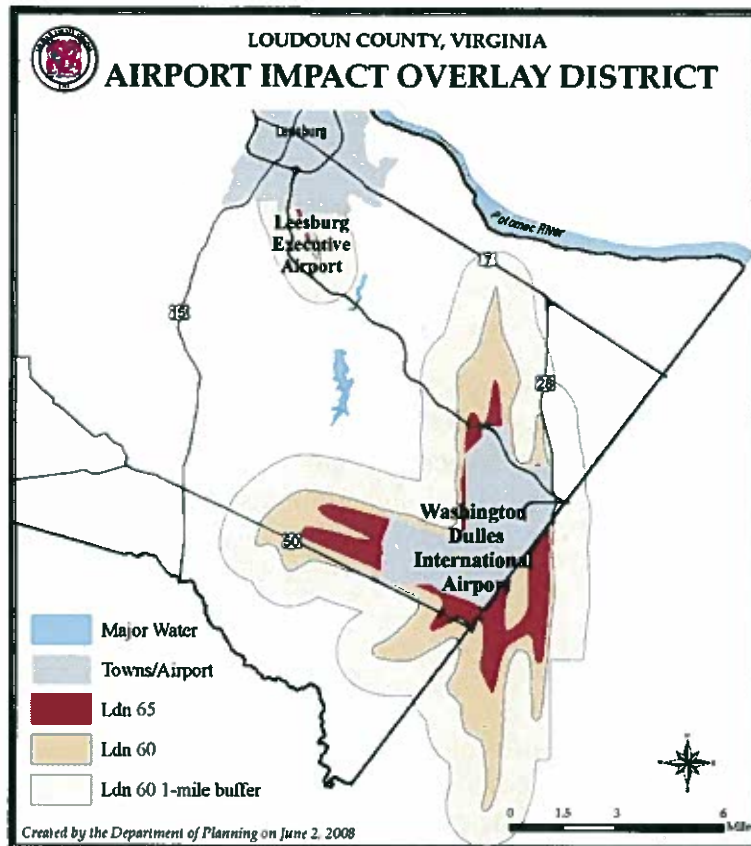
The Revised General Plan recognizes the Washington Dulles International Airport and the Leesburg Executive Airport as important economic assets and provides a number of policies intended to ensure that residential development will not create pressure for reductions in the intensity of service or prohibit the expansion of service at the airport. The Plan provides the policy basis for the Airport Impact Overlay District (AI) and outlines three policy areas within the airport noise contours. Policies have been established for each area requiring a combination of and/or all of the following: disclosure statements or restrictions for new residential developments, acoustical treatments, and aviation easements. Plan policies also state that the County will continue to enforce and update, as appropriate, the AI Overlay District.

In addition, the Plan states that the County will work with the Metropolitan Washington Airports Authority (MWAA) and the Town of Leesburg to analyze long-term airport noise potential. The County will continue to work with MWAA to refine airport operations and routes at Washington Dulles International Airport to minimize the effects of noise on multiple and single family lots, schools, and churches, public parks and recreational open space.

For a complete list of Airport Noise Policies, please see Policies 1-9 on pgs. 5-45-

46 of the Revised General Plan. See also Chapter 4 (Economic Development), Policies 9 – 12 on pg. 4-9.

IMPLEMENTATION



All new development proposed within the airport noise contours is regulated by the Airport Impact (AI) Overlay District (Section 4.1400) of the Revised 1993 Zoning Ordinance. The AI district regulates the siting of noise sensitive uses, ensures that the heights of structures are compatible with airport operations, and complements the Federal Aviation Administration's (FAA) regulations regarding noise and height. The AI Overlay District boundaries are based on the 60 and 65 Ldn²⁵ noise contours and an area that extends one mile beyond the 60 Ldn contours.

For areas exposed to aircraft noise of greater than Ldn 65

(the loudest areas), the County prohibits the construction of new residential or other types of noise sensitive uses within those areas. New residential uses are permitted in both the Ldn 60 and the Ldn 60 1-mile buffer. However, acoustical treatments, avigation easements, and full disclosure statements notifying residents of aircraft overflights and aircraft noise are required for residences that are built between the Ldn 60-65 aircraft noise contours. Full disclosure statements are also required in the Ldn 60 1-mile buffer.

Additionally, legislative applications proposing new construction within or in close proximity to the airport noise contours are reviewed for conformance with Plan policies. In such instances, conditions of approval and/or proffers may be recommended as appropriate to the specific situation. For instance, noise sensitive uses employ mitigation measures designed to reduce interior noise levels.

²⁵ Ldn stands for Day-Night Average Sound Level and is used to describe the cumulative noise exposure during an average annual day. Ldn does not represent the sound level heard at any particular time, but rather represents the total sound exposure.

POTENTIAL NEXT STEPS

1. Continue to pursue conformance with Plan policies through the application review process.
2. Continue to enforce and update the Airport Noise Impact Overlay District in the Zoning Ordinance.
3. Continue to work with Metropolitan Washington Airports Authority (MWAA) and the Town of Leesburg to analyze long-term airport noise potential.
4. Ensure that future development will not impede airport operations and routes at the Washington Dulles International Airport.

2. Highway Noise Policies

The County recognizes that it is important to protect certain land uses near or adjacent to major collector roadways. Plan policies recommend that all land development applications that propose land uses adjacent to any of the existing and/or proposed arterial and major collector roads be designed to ensure that no residential or other type of noise-sensitive use will have traffic noise impacts which occur when the predicted traffic noise levels approach or exceed the noise abatement criteria.

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan encourages the use of passive noise abatement measures such as adequate setbacks, earthen berms, wooden fences, and dense tree vegetation rather than structural noise abatement measures such as concrete walls. The Plan also states that appropriate noise mitigation measures will be incorporated into the overall project design for proposed noise-sensitive development in order to protect residents adjacent to major highways. The Plan further states that the County will use noise policies in the Revised Countywide Transportation Plan to further outline noise avoidance and mitigation requirements for residential uses, parks and recreational facilities, as well as for public and quasi-public or other noise-sensitive land uses along arterial and major collector roads.

For a complete list of Highway Noise Policies please see Policies 1-3 on pgs. 5-46-47 of the Revised General Plan.

IMPLEMENTATION

During the legislative application review process, the Highway Noise Policies are applied on a case-by-case basis depending on the specific property's characteristics and surrounding development. All land development applications

that propose land uses adjacent to any of the existing and/or proposed arterial and major collector roads are reviewed to ensure that no residential or other type of noise-sensitive use will be subject to traffic noise impacts which approach or exceed the noise abatement criteria on the Noise Abatement Criteria (NAC) Hourly A-weighted Sound Levels table, or when predicted traffic noise levels substantially exceed existing noise levels.

To determine the predicted highway noise levels and to assess noise impacts at a particular location, a land development applicant is required to use the latest version of the Federal Highway Administration's Highway Traffic Noise Prediction Model (FHWA-RD-77-108, as amended) and take into consideration the ultimate state of the roadway system adjacent to the subject property. If the proposed land development application is determined to approach or exceed the noise abatement criteria, conditions of approval and/or proffers are suggested. These typically include noise abatement strategies ensuring that residences or other noise-sensitive development will not be adversely impacted by current and future highway traffic noise (e.g., the construction of berms, increased setbacks, and/or supplemental landscaping). Structural noise abatement measures such as concrete walls are discouraged.

Similar protections for permitted (i.e., "by right") developments are not available. While noise standards are contained in Section 5-1507 of the 1993 Revised Zoning Ordinance, they only address stationary noise sources and not highway noise. The Zoning Ordinance has a section reserved for a Transportation Impact (TI) Overlay District (Section 4-1700); however, such a district has not been developed.

POTENTIAL NEXT STEPS

1. Continue to pursue conformance with Revised General Plan policies through the application review process.
2. Update the Loudoun County Zoning Ordinance to include protection of noise sensitive uses from highway noise.

3. Construction Blasting Policy

COMPREHENSIVE PLAN GUIDANCE

The Revised General Plan states that the County will strengthen policies regulating noise produced by large-scale construction projects (e.g., use of explosives should be limited by operating hours and/or decibel levels). It also states that developers using explosives within 500 feet of a structure are required to do a pre-and post-blast survey to determine if any damage was done to nearby homes. The survey should include the impact on wells and drainfields, if

applicable.

The Construction Blasting policy is located on pg. 5-47 of the Revised General Plan.

IMPLEMENTATION

During the application review process, the Construction Blasting Policy is applied on a case-by-case basis depending on the specific property's characteristics and surrounding development. Conditions of approval and/or proffers are suggested to ensure that blasting activities within 500 feet of a structure provide a pre-and post-blast survey to determine if any damage has occurred to nearby homes. Section 5-1505 of the Revised 1993 Loudoun County Zoning Ordinance provides performance standards regulating earthborn vibrations associated with blasting activities. These include measurement methods, vibration levels, and hours of operation.

POTENTIAL NEXT STEPS

1. Continue to pursue conformance with Revised General Plan policies through the application review process.
2. Continue to enforce blasting regulations as found in the Revised 1993 Loudoun County Zoning Ordinance.
3. Consider additional noise policies for large-scale construction projects.

Sources

The information in this report was obtained through numerous sources, including County reports, interviews with County staff and other organizations and agencies (including Loudoun Water and the Loudoun Convention & Visitors Association), technical analyses, and published web pages and is presumed to be correct. The following specific sources were used in this report:

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