Prince George's County

and

The City of Laurel

Maryland

Hazard Mitigation Plan

2010 Update

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The Prince George's County, MD, undertook initial development and subsequent update of this *Hazard Mitigation Plan* ("Plan") because of increasing awareness that natural and man-made hazards, especially flood hazards, may affect many people and property in the area. The Plan is a requirement associated with receipt of certain federal mitigation grant program funds administered by the Maryland Emergency Management Agency and the Comprehensive Flood Management Grant Program administered by the Maryland Department of the Environment.

The Plan was prepared by a Mitigation Advisory Committee composed of staff representatives from various County departments and agencies: Environmental Resources; Homeland Security/Emergency Management; Public Works & Transportation, Housing & Community Development; Central Services, The Maryland-National Capital Park & Planning Commission and the Washington Suburban Sanitary Commission. The City of Laurel participated as a separate incorporated municipality. Representatives from the Maryland Emergency Management Agency, the Maryland Department of the Environment and the Maryland Department of Natural Resources were notified of the meetings.

Prince George's County has experienced a number of flood events that resulted in localized damage, most occurring more than 25 years ago. Some of the worst flooding has occurred around Laurel, but other waterways have also risen out of their banks and flooded homes and businesses. Although aggressive programs to identify flood hazards, guide development to other areas and to undertake projects to reduce exposure have been in place for more than 25 years, about 3,700 older buildings are at some risk of flooding. Another 2,100 buildings are in areas protected by levees along the lower Anacostia River, although the levees no longer provide the original level of protection because of significant upland development.

The County and City of Laurel are subject to other hazards. A review of past events and the number and distribution of people and property that are exposed to hazards led to identifying hazards that warranted further consideration: winter storms, high winds, severe storms, drought, streambank erosion, and unstable soils. Wildland fire (brush & forest), though considered a lesser risk due to the County's fire suppression capabilities, could affect some areas of the County.

The *Hazard Mitigation Plan* sets the stage for Prince George's County, the City of Laurel, and the other incorporated municipalities to continue to address long-term disaster resistance through identification of actions that will, over time, continue to reduce the exposure of people and property to natural hazards. Sections of the Plan:

- Provide overviews of the hazards that threaten the area,
- Characterize the people and property that are exposed to some risk due to those hazards,
- Outline the planning process,

- Describe how natural hazards are recognized in the County's normal processes and functions,
- Describe the City of Laurel and its development review with respect to natural hazards, and
- Identify priority mitigation action items.

The final draft of the 2010 update of the Plan was presented at a public meeting on April 12, 2010. It was made available for review and comment on the County web site, in public libraries, at the offices of the Department of Environmental Resources and The Maryland-National Capital Park & Planning Commission, and at the Laurel City Hall.

The final plan was presented and adopted at a public meeting of the County Council on June 1, 2010 and is effective immediately. The Laurel City Council adopted the Plan at a public meeting on April 26, 2010 and is effective immediately. Copies of the adopted plan are available for review at:

- Prince George's County Permits Office; 9400 Peppercorn Place, Largo;
- Maryland-National Capital Park & Planning Information Counter, Governor Oden Bowie Drive, Upper Marlboro; and
- City of Laurel, 8103 Sandy Spring Road.

[INSERT SCAN OF COUNTY'S EXECTUED RESOLUTION OF ADOPTION]

RESOLUTION NO: 8-10

A RESOLUTION OF THE MAYOR AND CITY COUNCIL OF LAUREL TO ADOPT THE HAZARD MITIGATION PLAN OF PRINCE GEORGE'S COUNTY AS THE CITY'S OFFICIAL PLAN.

Sponsored by the President at the request of the Administration.

WHEREAS, the City of Laurel has experienced past flooding and other natural hazard events that pose risks to public health and safety and which may cause serious property damage;

WHEREAS, the planning process fostered by the Maryland Emergency Management Agency (MEMA) and set forth by the Federal Emergency Management Agency (FEMA) offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future impacts of such hazards;

WHEREAS, the State of Maryland provided federal mitigation funds to Prince George's County to support development of a multi-jurisdictional mitigation plan;

WHEREAS, a *Hazard Mitigation Plan* has been developed by the Mitigation Action Committee and staff from the City, County departments, and other entities;

WHEREAS, the *Hazard Mitigation Plan* recommends several mitigation actions that will help minimize and reduce safety threats and damage to private and public property; and

WHEREAS, a public meeting was held on April 12, 2010 by the Prince George's County Department of Environmental Resources (DER) to solicit questions and comments and to present the plan and the proposed mitigation actions.

NOW THEREFORE BE IT RESOLVED, by the Mayor and City Council of the City of Laurel that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official plan of the City of Laurel.
2. The City offices identified in the Plan are hereby directed to pursue implementation of the recommended priority actions that are assigned to their agencies.

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3. Any action proposed in the Plan shall be subject to and contingent upon budget approval, if funding is required and this resolution shall not be interpreted so as to mandate any such appropriations.
4. The Deputy City Administrator acting as the Director of Emergency Services and Emergency Management Coordinator is designated to coordinate with other City offices/departments and Prince George's County and shall periodically report on the activities, accomplishments, and progress, and shall prepare a progress report as required by the Maryland Emergency Management Agency.

AND BE IT FURTHER RESOLVED, that this Resolution shall take effect on its passage.

PASSED this 26th day of April, 2010.

ATTEST:

KIMBERLEY A. RAU, CMC
Clerk to the City Council

GAYLE W. SNYDER
President of the City Council

APPROVED this 26th day of April, 2010.

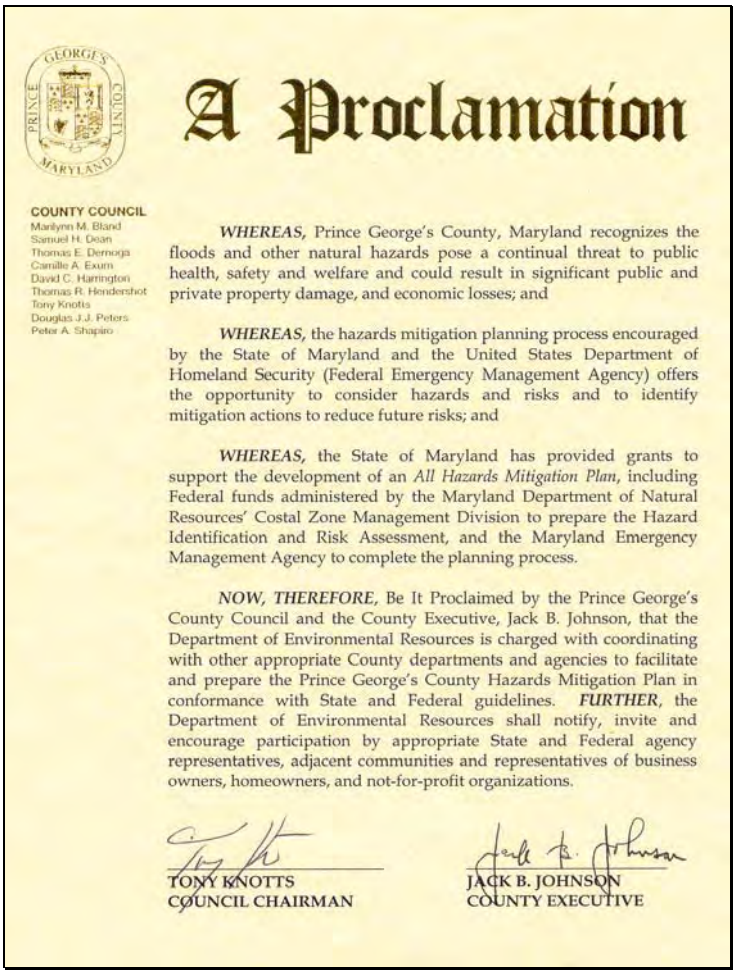
CRAIG A. MOE
Mayor

Chapter 1
Introduction

1.1 Introduction

Prince George's County and the City of Laurel, Maryland, undertook the development of this *Hazard Mitigation Plan*, both the original in 2005 and the 2010 Update ("the Plan") because of awareness that natural and man-made hazards, especially flood hazards, may affect many people and property. The Plan is a requirement associated with receipt of certain federal mitigation grant program funds administered by the Maryland Emergency Management Agency.

1.2 Authority



A Proclamation

COUNTY COUNCIL
Marilynn M. Bland
Samuel H. Dean
Thomas E. Dernoga
Camille A. Exum
David C. Harrington
Thomas R. Hendershot
Tony Knotts
Douglas J.J. Peters
Peter A. Shapiro

WHEREAS, Prince George's County, Maryland recognizes the floods and other natural hazards pose a continual threat to public health, safety and welfare and could result in significant public and private property damage, and economic losses; and

WHEREAS, the hazards mitigation planning process encouraged by the State of Maryland and the United States Department of Homeland Security (Federal Emergency Management Agency) offers the opportunity to consider hazards and risks and to identify mitigation actions to reduce future risks; and

WHEREAS, the State of Maryland has provided grants to support the development of an *All Hazards Mitigation Plan*, including Federal funds administered by the Maryland Department of Natural Resources' Costal Zone Management Division to prepare the Hazard Identification and Risk Assessment, and the Maryland Emergency Management Agency to complete the planning process.

NOW, THEREFORE, Be It Proclaimed by the Prince George's County Council and the County Executive, Jack B. Johnson, that the Department of Environmental Resources is charged with coordinating with other appropriate County departments and agencies to facilitate and prepare the Prince George's County Hazards Mitigation Plan in conformance with State and Federal guidelines. *FURTHER*, the Department of Environmental Resources shall notify, invite and encourage participation by appropriate State and Federal agency representatives, adjacent communities and representatives of business owners, homeowners, and not-for-profit organizations.

TONY KNOTTS
COUNCIL CHAIRMAN

JACK B. JOHNSON
COUNTY EXECUTIVE

By proclamation in 2005, the County Council and the County Executive charged the Department of Environmental Resources (DER) with coordinating with other appropriate departments and agencies to facilitate the development of the Plan in conformance with state and federal guidelines.

The Plan was prepared pursuant to the federal Hazard Mitigation and Pre-Disaster Mitigation Programs (44 CFR Parts 201 and 206), the Flood Mitigation Assistance Program (44 CFR 78.6), and the process outlined in materials prepared by the Federal Emergency Management Agency for the Community Rating System of the National Flood Insurance Program. In addition, it is intended to satisfy planning requirements associated with the Maryland Comprehensive Flood Management Grant Program (Environment Title 5, Subtitle 9).

1.3 Planning Area

Prince George's County and Laurel are part of the greater Washington-Baltimore metropolitan area (Figure 1-1). The County is bounded on the west by the District of

Columbia and Fairfax County, Virginia. To the north are Montgomery and Howard Counties; on the east are Anne Arundel and Calvert Counties, and Charles County is to the south. The City is located midway between Baltimore and Washington, DC.

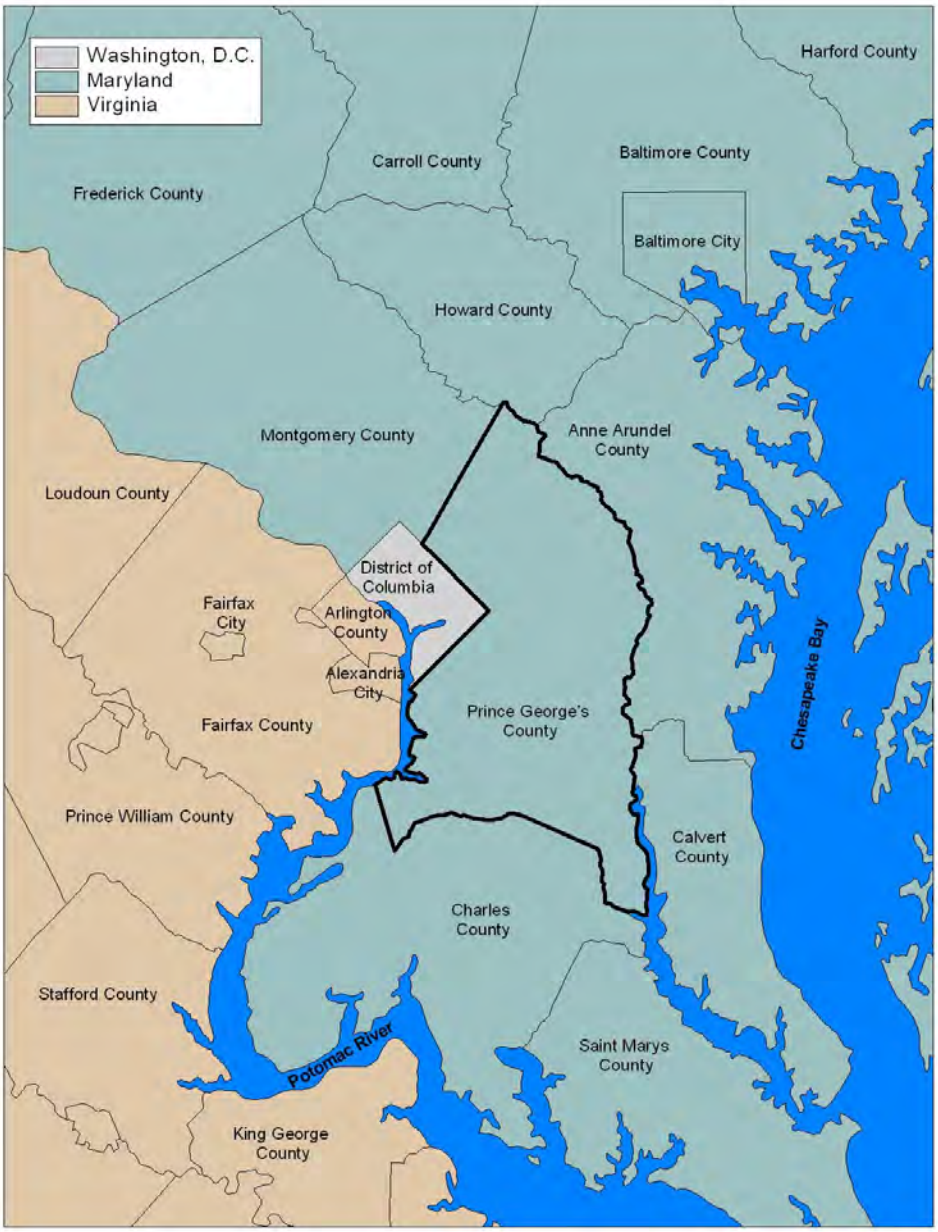


Figure 1-1. Vicinity map of Washington, DC, area.

For the purposes of planning, Prince George's County is divided into 37 planning areas (Figure 1-2). The planning areas are geographically defined by natural or manmade boundaries and represent the smallest geographical area for which a master plan is prepared.

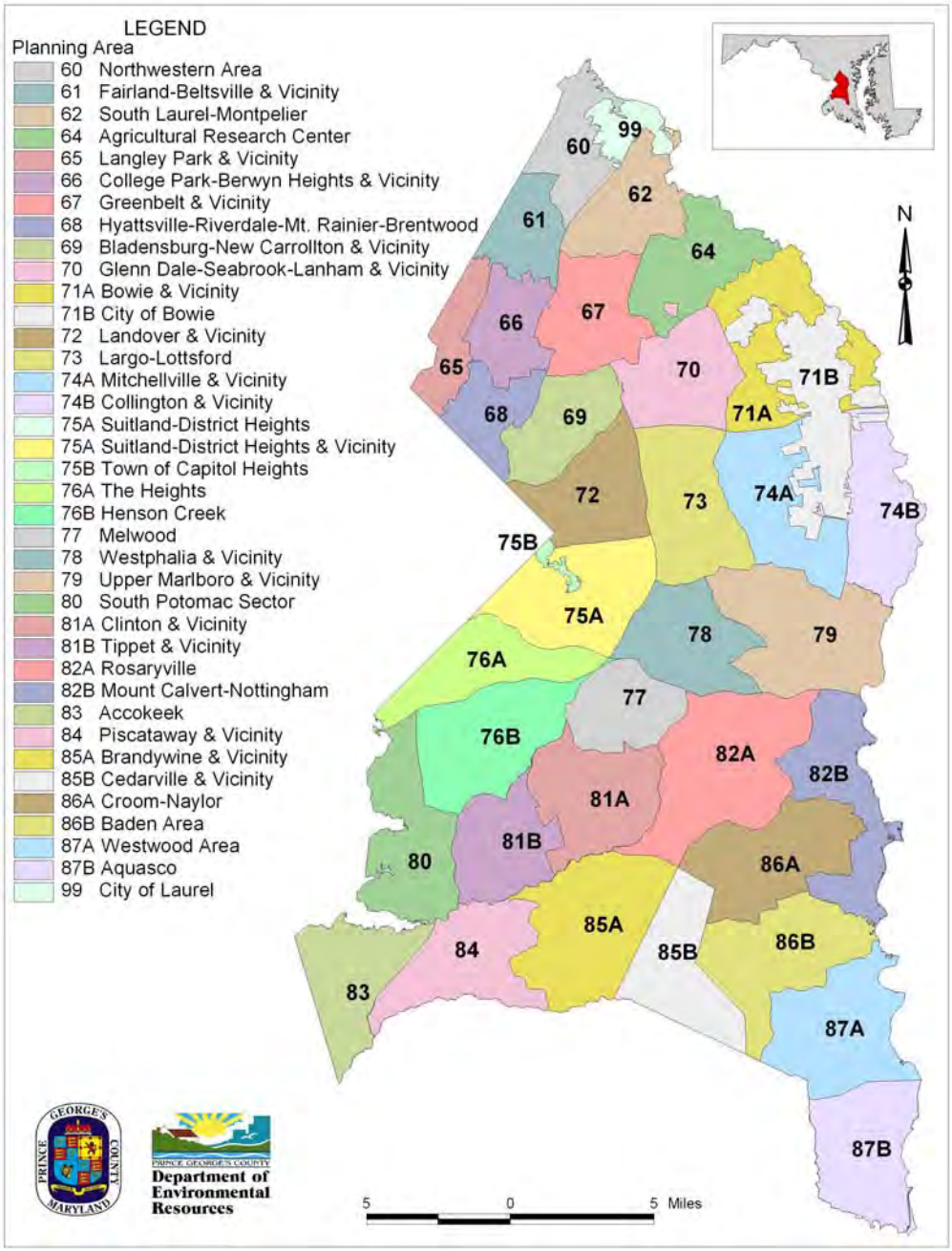


Figure 1-2. Planning areas in Prince George's County.

Planning areas in the north, including Laurel, and west are densely populated with a mix of suburban and urban development. Planning areas in the southern and eastern areas of the County are more sparsely populated and more rural in nature.

Although there are 27 separate incorporated municipalities within the boundaries of Prince George's County, only the City of Laurel and the City of Bowie retain some degree of land use authority. Only the City of Laurel is recognized separately by FEMA

and administers its own floodplain management ordinance, thus the City of Laurel participated as a separate entity in the planning process.

Of the County's estimated 310,472 total acres of land (485 square miles), about 20% is occupied by residential uses (Table 1-1). Over 50% is brush and forest lands and just over 9% is designated for urban green space. Due to the availability of land, the greatest growth potential is in the western and southern portions.

Table 1-1: County Land Use

Land Use Category	Percent of Total Area
Residential	20.7%
Commercial/Industrial	3.9%
Institutional	2.2%
Agricultural/Horticultural	9.8%
Brush/Forested	50.7%
Urban Green Space	9.2%
Other	3.5%
	100%

Source: compiled from County's GIS data layers (2000)

Three large watersheds, with twelve distinct subwatersheds, drain Prince George's County: the Patuxent River Watershed; the Middle Potomac-Anacostia Watershed; and the Lower Potomac Watershed (Figure 1-3).

Prince George's County lies primarily within the Atlantic Coastal Plain physiographic region. The topography ranges from nearly level to gently rolling. A small section of the County along the northwest border with Montgomery County is part of the Piedmont Plateau and is somewhat hillier.

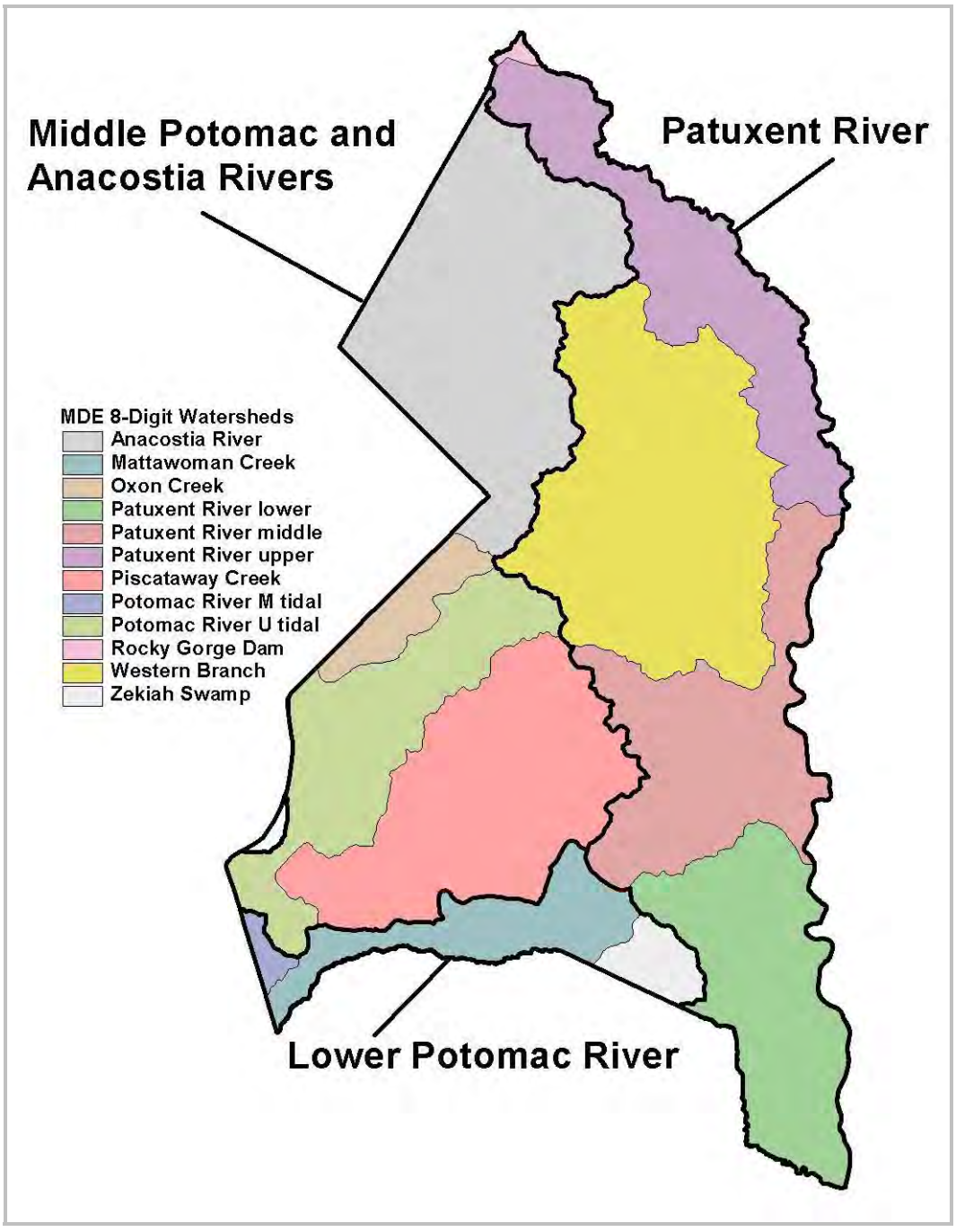


Figure 1-3. Watersheds in Prince George's County.

1.4 Geography, Climate, and Population

Located in the temperate Mid-Atlantic region, Prince George's County has a typically mild climate. Summer and winter temperatures typically average 75.3° and 35.8°, respectively. Average annual rainfall is approximately 43 inches, and the annual snowfall is about 17 inches (Maryland State Office of Climatology, 2002).

In 2008, The County's population was estimated to be 820,852 (indicating a slight increase of 2.4% from the 2000 Census figures). The area experienced a steady population growth trend in the last few decades, increasing 12% between 1990 and 2000. The 2000 Census indicated 52.3% of County residents was female and 47.7% was male. The median age was 33.3 years old; 28.2% was 18 years old or younger and 9.4% is 65 years and older. Based on the 2000 Census, 62.6% of the population was Black or African American, 27.0% White, 3.8% Asian, and approximately 6.6% composed of other races.

The 2000 Census indicated 19,960 people lived in the City of Laurel, of which 52% female and 48% was male. The median age was 33.6 years old; 24% was 20 years old or younger and nearly 8% were 65 years and older. Fifty-two percent of the population was White; 34.5% was Black or African American, 7% Asian, and approximately 6.3% composed of other races.

Historically, development has concentrated in a radial pattern around the County's border with Washington, D.C. (Figure 1-4).

1.5 Planning Committee Membership

The following agencies are designated members of the Mitigation Advisory Committee:

- Environmental Resources (Dr. Mow-Soung Cheng, Special Assistant to the Director, Environmental Services)
- Homeland Security/Emergency Management (Reggie Parks, Director of Office of Emergency Management)
- Housing & Community Development (Greg Anderson, Associate Director)
- Public Works & Transportation (Elizabeth Miller , Associate Director)
- Central Services (John Butler , Administrator, General Services Division)
- Fire/EMS (Rudolph Thomas and Craig Black)
- Prince George's County Public Schools (Eric Walker, Safety & Real Estate Office)
- Maryland-National Capital Park & Planning – Planning (Maria Martin and Kate Fritz, Environmental Planning Section)
- Maryland-National Capital Park & Planning – Park Planning & Development (Charles Montrie)
- Washington Suburban Sanitary Commission (Martin Chandler, Senior Scientist, Environmental Group)
- City of Laurel (Martin Flemion, Deputy City Administrator/Director Emergency Operations and Jack Brock, Deputy Director (Permits))

The following were notified when the planning process was initiated and were asked to review and comment on the Plan before it was finalized:

- The 25 incorporated municipalities located in Prince George's County that do not have separate land use authority and the City of Bowie, which retains some land use authority.
- Interested parties on Planning Board's public notification list of e-mails that is maintained by M-NCPPC (civic associations, neighborhood associations, etc.)
- Adjacent counties (Montgomery, Howard, Charles, Calvert, Anne Arundel)
- University of Maryland
- Prince George's Community College
- American Red Cross (Prince George's Chapter)
- Maryland Emergency Management Agency
- Maryland Department of the Environment
- Maryland Department of Natural Resources, Coastal Resources
- Natural Resources Conservation Service, Prince George's District Conservationist

The Mitigation Advisory Committee participated in the planning process (outlined in Section 2.2) through attendance at a series of meetings, review of materials, comments on draft documents, consideration of hazards and existing programs and policies, and identification of actions that will further reduce the impacts of hazards in Prince George's County and the City of Laurel.

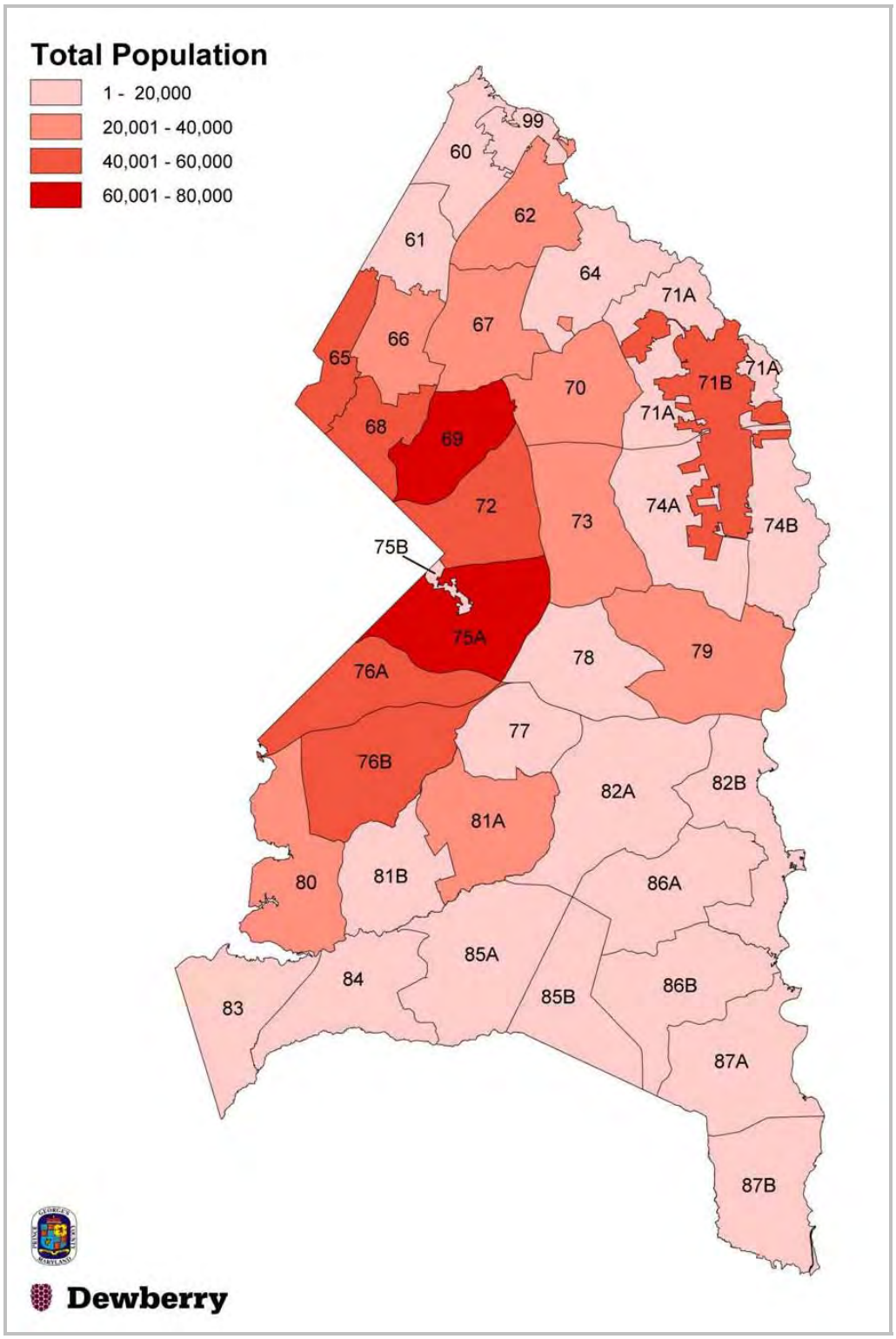


Figure 1-4. Population density, by planning area.

1.6 Acknowledgments

The 2010 Plan update was supported by a Pre-Disaster Mitigation grant program planning grant administered by the Maryland Emergency Management Agency with funding from the Federal Emergency Management Agency. The original 2005 Plan was supported by two planning grants: the Maryland Emergency Management Agency provided funding from the Federal Emergency Management Agency, and the *Prince George's County Hazard Identification and Risk Assessment Report (2005)* was funded through a Maryland Department of Natural Resources and National Oceanic and Atmospheric Administration Coastal Grant. The County appreciates the advice and encouragement of both agencies.

The Prince George's County *Hazard Mitigation Plan (2010 Update)* was facilitated by RCQuinn Consulting, Inc., Charlottesville, VA. The 2005 hazard identification and risk assessment work was performed by Dewberry & Davis, LLC, Fairfax, VA.

1.7 Key Terms & Acronyms

For the most part, terms used in the Plan have the meanings that are commonly associated with them:

- **Disaster** means the occurrence of widespread or severe damage, injury, loss of life or property, or such severe economic or social disruption that supplemental disaster relief assistance is necessary for the affected political jurisdiction(s) to recover and to alleviate the damage, loss, hardship, or suffering caused thereby.
- **Flood Hazard Area** or **Floodplain** is the area adjoining a river, stream, shoreline, or other body of water that is subject to partial or complete inundation. The area predicted to flood during the 1% annual chance flood is commonly called the "100-year" flood.
- **Hazard** is defined as the natural or technological phenomenon, event, or physical condition that has the potential to cause property damage, infrastructure damage, other physical losses, and injuries and fatalities.
- **Mitigation** is defined as actions taken to reduce or eliminate the long-term risk to life and property from hazards. Mitigation actions are intended to reduce the need for emergency response – as opposed to improving the ability to respond.
- **National Flood Insurance Program (NFIP),** located within the U.S. Department of Homeland Security, Emergency Preparedness and Response Directorate (FEMA), is charged with preparing Flood Insurance Rate Maps, developing regulations to guide development, and providing insurance for flood damage.
- **Risk** is defined as the potential losses associated with a hazard. Ideally, risk is defined in terms of expected probability and frequency of the hazard occurring, people and property exposed, and potential consequences.

The following acronyms are used in the document:

- **AASHTO -** American Association of State Highway and Transportation Officials
- **DER** – Prince George's County Department of Environmental Resources
- **DNR** – Maryland Department of Natural Resources
- **FEMA** – U.S. Department of Homeland Security, Federal Emergency Management Agency
- **FIRM** – Flood Insurance Rate Map
- **GIS** – Geographic Information System
- **HMGP** – Hazard Mitigation Grant Program (FEMA)
- **MDE** – Maryland Department of the Environment
- **MEMA** – Maryland Emergency Management Agency
- **M-NCPPC** – The Maryland-National Capital Park & Planning Commission
- **MWCOG** – Metropolitan Washington Council of Governments
- **NFIP** – National Flood Insurance Program (FEMA)
- **NOAA** – National Oceanic and Atmospheric Administration
- **DPW&T** – Department of Public Works & Transportation
- **WSSC** – Washington Suburban Sanitary Commission

1.8 References

American Society of Civil Engineers. 2005. *Minimum Design Loads for Buildings and Other Structures* (SEI/ASCE 7-05). Reston, VA.

Federal Emergency Management Agency. Various Panel Dates. *Flood Insurance Study and Flood Insurance Rate Maps.* Washington, DC. [Available for public review at the Permit Information Counter at 9400 Peppercorn Place, Landover, MD]

Laurel, City of, Maryland. *Master Plan* (2007).

Maryland Emergency Management Agency. *State of Maryland Hazard Mitigation Plan* (October 2008).

The Maryland-National Capital Park & Planning Commission. Prince George's County *Approved General Plan* (October 2002). http://www.mncppc.org

The Maryland-National Capital Park & Planning Commission. Prince George's County *Countywide Green Infrastructure Plan* (2005). http://www.mncppc.org

Prince George's County, Maryland. Floodplain Ordinance (Subtitle 4 Building, Division 2, Floodplain Ordinance).

Prince George's County, Maryland. Subdivision Regulations (Subtitle 24, Division 2, Subdivision Regulations).

Prince George's County, Maryland. Building Code (Subtitle 4 Building, Division 1, Building Code).

1.9 2010 Updates

- Updated population estimates (Section 1.4).

Chapter 2
Mitigation Planning

2.1 Introduction

An important step in the lengthy process of improving resistance to hazards is the development of a hazard mitigation plan. The Prince George's County *2005 Hazard Mitigation Plan* and the 2010 Update were prepared in accordance with the guidelines provided by the Federal Emergency Management Agency, advice from the Maryland Emergency Management Agency, and steps outlined in guidance documents for the National Flood Insurance Program's Community Rating System.

The *Hazard Mitigation Plan* serves several purposes. It sets the stage for long-term disaster resistance through identification of actions that will, over time, reduce the exposure of people and property to hazards. In addition, the Plan establishes eligibility for certain mitigation grant funds.

Sections of the Plan provide overviews of the natural hazards that threaten the County and the City of Laurel, the people and property exposed to those hazards, the planning process, how hazards are recognized in the normal processes and functions of the County and City, and priority mitigation action items. The hazards summary and disaster history help to characterize future hazards. When the magnitude of past events, the number of people and properties affected, and the severity of damage are taken into account, flooding is the most significant natural hazard to threaten the County and the City of Laurel.

2.2 The Mitigation Planning Process

Prince George's County and the City of Laurel followed a well-established planning process to develop this *Hazard Mitigation Plan* and to fulfill multiple requirements. For the original 2005 Plan, four meetings of the Mitigation Advisory Committee were held. For the 2010 Update, the Committee met twice and contributed comments when draft sections where distributed:

- **October 5, 2009.** The Mitigation Advisory Committee met to review the requirement to update the Mitigation Plan; identified and discussed hazard events that have occurred in the previous five years; heard a report on the status of various flood mitigation activities undertaken by the Department of Environmental Resources; and agreed that technological/manmade hazards such as terrorism, hazardous materials, and transportation hazards are adequately handled in other County plans.
- **January 7, 2010.** Prior to this meeting, the hazard identification and risk assessment prepared in 2005 was updated and distributed for Committee comment. The Committee agreed to add streambank erosion as a separate hazard rather than include it as a flood-related hazard; by consensus, streambank erosion is included with a risk level of "medium-high" because it is associated with frequent increases in runoff and impacts are locally significant (water lines, sewer

lines, some buildings). The University of Maryland reported that it developed and adopted a hazard mitigation plan. Additional comments were made regarding specific hazard events that occurred and DER described the ongoing work with the Corps of Engineers on the Anacostia levee situation. The Committee reviewed and discussed the status of the 2005 mitigation actions and identified two new mitigation actions (complete Stream Corridor Assessment and work with the Corps of Engineers to implement levee improvement work).

- **February 18, 2010.** Chapter 8 (Mitigation Actions) was edited to reflect the status of 2005 mitigation actions (reported in new Appendix C) and to include the two new actions. The draft chapter was circulated to the Committee and each member responded to indicate acceptance or to make comments.
- **March 22, 2010.** Solicited committee comments on the Public Review Draft and received concurrence to release it for public review prior to the public meeting.

The overall mitigation planning process for both the 2005 Plan and the 2010 Update, summarized below, was facilitated by a mitigation planning consultant:

- **Get Organized:** Prince George's County's Department of Environmental Resources (DER) was charged with coordinating a committee comprised of County departments and other agencies that are responsible for permits, subdivision approvals, community development, parks and recreation, roads and bridges maintenance, public facilities, and emergency management. The City of Laurel participated as a separate incorporated municipality.
- **Coordinate:** Prior to the first Committee meeting, adjacent counties, incorporated municipalities, civic and neighborhood organizations, The University of Maryland at College Park and Bowie State University (both are Maryland state schools) and some federal and state agencies were notified about the planning process and advised that the Plan will be made available for review prior to adoption.
- **Prepare Hazard Identification and Risk Assessment:** Risk assessments are conducted to provide a measure of the potential loss of life, personal injury, economic injury, and property damage resulting from hazards that are identified as reasonably likely to impact a community. Maps can be used to show hazard-prone areas when hazards are defined with sufficient detail to show spatial or geographic differences in impact. Flood hazards are the most easily identified, due to the availability of floodplain studies and maps for most bodies of water in the County. There are not enough geographic differences within the County to suggest that high winds or tornadoes might affect one area more severely or more frequently than other areas. Chapter 4 summarizes significant hazards other than flood hazards and Chapter 5 summarizes flood hazards. Risks in the City of Laurel that are different than those for the County as a whole are summarized in Chapter 7. For 2010, it was determined that new risk assessment computations were not necessary (see Chapter 4 for more detail).

- **Document How Hazards are Addressed:** Documents, plans and regulations were reviewed and interviews were conducted in order to summarize how County agencies perceive the impacts that past events have had and how hazards are incorporated into routine responsibilities. The County's results are summarized in Chapter 6; Chapter 7 includes a summary for the City of Laurel.
- **Create Goal Statement:** The 2005 mitigation goal statement was discussed and the Committee determined that it is appropriate to retain the statement for the 2010 Update (Chapter 3).
- **Review Mitigation Actions:** The mitigation actions included in the 2005 Plan were based on meetings and interviews, as well as knowledge of successful actions implemented in other communities. For the 2010 Update, the Committee reviewed the status of all actions and new information about hazards to revise the list. Each action was discussed in terms of anticipated support, compatibility with goals, legal authority and technical capability to implement, funding and staff necessary, and a general consideration of cost-effectiveness. Committee members were asked to indicate priorities (Drop, No Opinion, Low, Medium, High) based on their program's functions and priorities. The priorities were compiled into the list shown in Chapter 8.
- **Draft Action Plan:** Information collected and notes from committee meetings were incorporated into the 2005 Plan. The draft was circulated to Mitigation Advisory Committee members and electronic copies were provided to adjacent counties, incorporated municipalities, and pertinent state and federal agencies. Comments were collected and incorporated and a final draft was prepared. In February, Committee members approved the "public review draft" and scheduled the public meeting.
- **Hold Public Meetings:** The draft *Hazard Mitigation Plan* (2010 Update) was made available for public review and a public meeting was held on April 12, 2010 (see Section 2.3).
- **Adopt Plan:** The final Plan was presented for adoption at the June 1, 2010 meeting of the County Council and at the April 26, 2010 meeting of the Laurel City Council. Copies of the resolutions of adoption are found in the front matter.

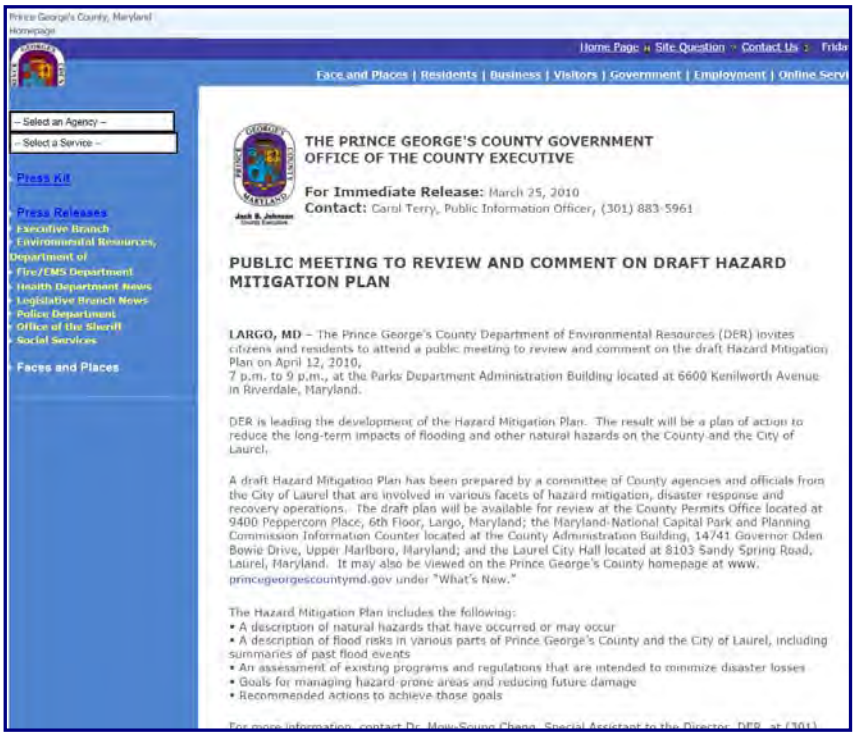
2.3 Public Involvement in Mitigation Planning

Consistent with the County's standing objective to inform and involve citizens, and to fulfill the public involvement requirements of the mitigation planning programs, at the beginning of the update process, The M-NCPPC distributed a notice to its notification list of persons and entities interested in planning in Prince George's County.

After the Committee concurred with release of the public review draft, the County used the same database to invite citizens to review the Plan, submit comments, and attend a public meeting.

2.3.1 Public Informational Meeting

The Public Review Draft of the Prince George's County *Hazard Mitigation Plan* (2010 Update) was presented to the public at a meeting held on April 12, 2010. Notice of the meeting was posted on the County's website (graphic) and in the *Laurel Leader* (graphic). Using The Maryland-National Capital Park & Planning Commission's notification list of persons and entities interested in planning in Prince George's County, more than 400 notices were distributed (418 home owners associations and civic associations; 6 development corporations, 10 economic development/business associations; 9 historic preservation groups; 10 environmental groups; and 4 government agencies (Andrews Air Force Base, National Park Service, State Highway Administration, University of Maryland – Urban Studies/Planning)). In addition, notices were sent to adjacent counties, State agencies (Maryland Emergency Management Agency, Maryland Department of the Environment, and Maryland Department of Natural Resources), and FEMA Region III.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THE PRINCE GEORGE'S COUNTY GOVERNMENT
OFFICE OF THE COUNTY EXECUTIVE

For Immediate Release: March 25, 2010
Contact: Carol Terry, Public Information Officer, (301) 883-5961

PUBLIC MEETING TO REVIEW AND COMMENT ON DRAFT HAZARD MITIGATION PLAN

LARGO, MD – The Prince George's County Department of Environmental Resources (DER) invites citizens and residents to attend a public meeting to review and comment on the draft Hazard Mitigation Plan on April 12, 2010, 7 p.m. to 9 p.m., at the Parks Department Administration Building located at 6600 Kenilworth Avenue in Riverdale, Maryland.

DER is leading the development of the Hazard Mitigation Plan. The result will be a plan of action to reduce the long-term impacts of flooding and other natural hazards on the County and the City of Laurel.

A draft Hazard Mitigation Plan has been prepared by a committee of County agencies and officials from the City of Laurel that are involved in various facets of hazard mitigation, disaster response and recovery operations. The draft plan will be available for review at the County Permits Office located at 9400 Peppercorn Place, 6th Floor, Largo, Maryland; the Maryland-National Capital Park and Planning Commission Information Counter located at the County Administration Building, 14741 Governor Oden Bowie Drive, Upper Marlboro, Maryland; and the Laurel City Hall located at 8103 Sandy Spring Road, Laurel, Maryland. It may also be viewed on the Prince George's County homepage at www.princegeorgescountymd.gov under "What's New."

The Hazard Mitigation Plan includes the following:
- A description of natural hazards that have occurred or may occur
- A description of flood risks in various parts of Prince George's County and the City of Laurel, including summaries of past flood events
- An assessment of existing programs and regulations that are intended to minimize disaster losses
- Goals for managing hazard-prone areas and reducing future damage
- Recommended actions to achieve those goals

For more information, contact Dr. Mow-Soung Cheng, Special Assistant to the Director, DER, at (301)


explorehoward.com

FROM LAUREL LEADER

Review, comment on Draft Hazard Mitigation Plan

Posted 4/01/10

The Prince George's County Department of Environmental Resources will hold a public meeting to review and comment on the draft Hazard Mitigation Plan, April 12, 7-9 p.m., at the Parks Department Administration Building, 6600 Kenilworth Ave., in Riverdale.
DER is leading the development of the Hazard Mitigation Plan. The result will be a plan of action to reduce the long-term impacts of flooding and other natural hazards on the county and the city of Laurel.

Prior to the public informational meeting, copies of the Public Review Draft were made available to the public at the Prince George's County Permits Office counter in Largo, The M-NCPPC Information Counter in Upper Marlboro, and the Laurel City Hall. The Public Review Draft was posted on the County's website.

No citizens attended the public meeting for the 2010 Update and no comments were received from the public.

2.3.2 Public Sessions of County Council & City Council

The *Hazard Mitigation Plan* (2010 Update) was presented and adopted at the June 1, 2010 public session of the County Council. Specific items covered as part of the 2005 plan included:

- How and why the County is undertaking the mitigation planning process;
- Overview of significant natural hazards;
- Mitigation actions recommended by the Mitigation Planning Committee;
- Overview of public involvement and comments; and
- The schedule for completion.

The Department of Environmental Resources was directed to forward the Plan to the Maryland Emergency Management Agency for appropriate review and action.

The *Hazard Mitigation Plan* (2010 Update) was presented for adoption during the April 26, 2010 public session of the Laurel City Council and adopted effective immediately.

2.4 State & Federal Mitigation Planning Requirements

The Prince George's County *Hazard Mitigation Plan* was prepared to address the requirements for mitigation planning that are set forth in five programs administered by the Federal Emergency Management Agency and the Maryland Department of the Environment's Comprehensive Flood Management Grant Program (described below, as of mid-2004). Although there are slight differences, all programs require the same basic planning process (described in Section 2.2):

- **Flood Mitigation Assistance Program.** To qualify to receive grant funds to implement projects such as acquisition or elevation of flood-prone homes, local jurisdictions must have adopted a mitigation plan that is approved by FEMA. The plan must include specific elements and be prepared following the process outlined in the NFIP's Community Rating System.
- **Hazard Mitigation Grant Program.** To qualify for post-disaster mitigation funds, local jurisdictions must have adopted a mitigation plan that is approved by FEMA.
- **Severe Repetitive Loss Program.** To qualify for funds to address certain properties that qualify under the Federal definition of "severe repetitive loss," local jurisdictions must have adopted a mitigation plan that is approved by FEMA.
- **Pre-Disaster Mitigation Grant Program**. To qualify for pre-disaster mitigation funds, local jurisdictions must have adopted a mitigation plan that is approved by FEMA.

- **NFIP's Community Rating System (CRS).** The CRS offers recognition to communities that exceed minimum requirements of the National Flood Insurance Program. Recognition comes in the form of discounts on flood insurance policies purchased by citizens. The CRS offers credit for mitigation plans that are prepared according to a multi-step process.
- **Maryland Comprehensive Flood Management Grant Program.** Provides grants to local jurisdictions to mitigate the effects of floods, including acquisition, elevation-in-place and relocations of flood-prone homes and certain flood management capital projects.

2.5 2010 Update

- Described the meetings of the Mitigation Advisory Committee conducted for the 2010 plan update (Section 2.2).
- Noted that new risk assessment computations were not necessary (Section 2.2).
- Confirmed no change to the mitigation goal statement (Section 2.2).
- Updated all dates (public meeting; adoption) (Section 2.3.1).

Chapter 3
Mitigation Goals

3.1 Introduction

In 2002, the County Council of Prince George's County approved the *General Plan* (see Section 6.2.1). The *General Plan*, which remains in effect in 2010, outlines countywide goals and broad strategies to guide the future growth and development, while providing for environmental protection and preservation of important lands.

***General Plan* Goals (2002)**

- *Encourage quality economic development*
- *Make efficient use of existing and proposed local, state and federal infrastructure and investment*
- *Enhance quality and character of communities and neighborhoods*
- *Preserve rural, agricultural and scenic areas*
- *Protect environmentally sensitive lands*

3.2 The Mitigation Goal

State and federal guidance and regulations pertaining to mitigation planning require the development of a mitigation goal statement that is consistent with other goals, mission statements and vision statements. The Mitigation Advisory Committee developed the Prince George's County mitigation goal after reviewing FEMA's national mitigation goals, the countywide goals in the *General Plan* (Table 3-1) and other county plans, the City of Laurel's *Master Plan*, several examples of goal statements from other states and communities, and the Maryland Mitigation Goal. For the 2010 update, the Committee confirmed the validity of the mitigation goal.

Prince George's County Mitigation Goal

It is the goal of Prince George's County, Maryland, to protect and improve public health, safety and welfare, and to expand livable communities by:

1. *Increasing public awareness of natural hazards and risk reduction measures; and*
2. *Mitigating risks due to natural hazards.*

The goal statement is intentionally broad to allow for a more comprehensive interpretation of its phrasing, for example:

- "Protect and improve public health, safety and welfare" is broad enough to include the concept of applying development controls (permits) in floodplains, to include building according to regulations that reduce the potential for damage. The phrase is also broad enough to include undertaking projects intended to deal with specific properties, such as administering grants for acquisition, protecting park buildings, or working with others if a structural flood control project is deemed appropriate.
- "Increasing public awareness" can include helping citizens to understand hazards, to know how to respond when asked to evacuate, to learn how to protect themselves and their property, to understand the value of flood insurance, and to obtain and comply with permit requirements.
- "Mitigating risk" includes efforts to both eliminate/reduce risks of people and property already exposed to hazards, and to manage growth and development to avoid exposing more people and property to known risks.

Table 3-1: Prince George's County Goals

2010 Hazard Mitigation Goal	2002 *General Plan* Goals
It is the goal of Prince George's County, Maryland, to protect and improve public health, safety and welfare, and to expand livable communities by: 1. Increasing public awareness of natural hazards and risk reduction measures; and 2. Mitigating risks due to natural hazards.	Encourage quality economic development
	Make efficient use of existing and proposed local, state and federal infrastructure and investment
	Enhance quality and character of communities and neighborhoods
	Preserve rural, agricultural and scenic area
	Protect environmentally sensitive lands

3.3 Maryland's Mitigation Goal

The Maryland Emergency Management Agency (MEMA) is designated by the Governor as the state's coordinating agency for disaster preparedness, emergency response, and disaster recovery assistance. MEMA also is tasked to coordinate the state's natural hazard mitigation initiatives and administer grant funding provided by the Federal Emergency Management Agency. A key element in that task is the preparation of the *Maryland Hazard Mitigation Plan* (2008).

The State's plan includes a "single overarching mitigation goal" that is supported by a series of objectives and strategies, some focused on specific hazards.

Maryland Mitigation Goal

To reduce loss of life and damage to property associated with hazard events in the State of Maryland.

3.4 FEMA's Mitigation Goals

FEMA's mitigation strategy was originally prepared in the late 1990s and forms the basis on which FEMA implements mitigation programs authorized and funded by the U.S. Congress. The national mitigation goal statement has two parts:

- To engender fundamental changes in perception so that the public demands safer environments in which to live and work; and
- To reduce, by at least half, the loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from natural disasters.

3.5 2010 Update

- Confirmed the mitigation goal statement (Section 3.2).

Chapter 4
Hazards & Risks in Prince George's County

4.1 Introduction

The *Prince George's County Hazard Identification and Risk Assessment Report* (September 2004, updated 2010) is contained in a separate document (Appendix A). It was reviewed and updated as part of the 2010 plan update. It is noted that the margin of error for most of the analyses performed for the 2005 HIRA are plus or minus 10%; thus, it was determined that it was unnecessary to revise the analyses.

For analyses based on population, the estimate of population for 2008 is 820,852 (indicating a slight increase of 2.4% from the 2000 Census figures). This minor change does not change the outcome of the HIRA and re-computation to account for that minor change would not change the overall risk, nor would it change the relative ranking of the prevalent hazards.

Similarly, while a relatively small number of new buildings have been constructed, compliance with the building code and County regulations limits their vulnerabilities. Therefore although the land use percentages have changed slightly in 5 years, the differences are minor and do not alter the outcome of the HIRA. The Mitigation Advisory Committee anticipates undertaking a reevaluation of the HIRA for the 2015 update, at which time the 2010 census figures will be available.

Risk assessments are conducted to provide a measure of the potential loss of life, personal injury, economic injury, and property damage resulting from hazards. Two major steps are involved:

- **Hazard Identification** identifies, describes and quantifies the natural hazards that are likely to occur.
- **Risk Assessment** is based on a profile of the hazards and quantifies the County's vulnerability using readily accessible information on the types of buildings, infrastructure, and critical facilities, and their distribution throughout the County. The assessment examines the impact of hazards on existing and future land uses, development trends, and demographics.

The historical data used in the risk assessment includes publicly available records of all hazard types. Some hazards have occurred more frequently than others and those that have occurred have resulted in a wide range of impacts. By analyzing the historical frequency of each hazard, along with the associated impacts, the hazards that pose the more significant risks to Prince George's County and the City of Laurel can be identified.

The City of Laurel is identified as Planning Area 99 (Figure 1-2). Although the potential damage due to the hazards considered in the risk assessment vary from planning area to planning area, most hazards themselves do not vary significantly across the entire County. The City of Laurel is identified as Planning Area 99, thus risks to the City can

be viewed in context. Due to the City's location on the Patuxent River, the only hazard for which a separate analysis was performed is riverine flooding.

Prioritizing hazards was based on two separate factors – the probabilities that events of given intensities will affect the County and the potential impacts should events occur. Hazards and impacts were assessed and are tabulated and mapped for the County's 37 planning areas. On a countywide basis, each hazard was assigned one of five risk levels: High, Medium-High, Medium, and Low (Table 4-1). In 2010, the Mitigation Advisory Committee added streambank erosion and changed the risk level of land movement from Medium-Low to Medium-High.

Maryland's Relative Risk Values

The *State of Maryland Hazard Mitigation Plan* (October 2008) developed a method to evaluate 25 natural and technological hazards and risks across the State, resulting in relative risk scores that range from 1 (little to no risk) to 5 (highest risk). Note that the State separately ranked some hazards that the County grouped (e.g., snow and ice are grouped in winter storm).

Flooding, predominantly riverine flooding, is the only hazard assigned the "High" risk level. Because the County manages flood hazards in a consistent manner, coastal flooding and flood-related coastal erosion are included in the category of flooding. Chapter 5 of this Plan outlines flood hazards (including the flood-related hazard of levee failure), past flood events, and summaries of the people and property that are at-risk. Section 4.6 includes overviews of the natural hazards that are assigned Medium-High, Medium, and Medium-Low hazard levels.

The hazards assigned Medium and Low levels are very briefly described in this chapter. Additional detail on these hazards and the risks associated with them are found in Appendix A. The committee determined that seismic hazards pose sufficiently low risks that no further consideration is warranted (see the Appendix for details).

Table 4-1: Results of Hazard & Risk Analyses

Hazard	County's Risk Level	State's Risk Levels
Flooding (all sources)	High	3 – 4 – 5
Streambank Erosion	Medium-High	Not included*
Winter Storm	Medium-High	3 – 5
Wind	Medium-High	4
Severe Storm	Medium-High	3 – 4 – 5
Drought	Medium-High	4
Land Movement	Medium-High	1 – 4
Wildland Fire (brush & forest)	Medium	3
Dam Failure	Medium	4
Extreme Heat	Medium	4
Earthquake	Low	3

* The State considered only shoreline or coastal erosion.

4.2 Overview of the County's Natural Hazards History

Numerous federal agencies maintain a variety of records regarding losses associated with natural hazards. Unfortunately, no single source is considered to offer a definitive accounting of all losses. The Federal Emergency Management Agency maintains records on federal expenditures associated with declared major disasters, which tend to be relatively infrequent events that affect large numbers of people.

Data on Presidential Disaster Declarations, which have been maintained since 1965, characterize only some natural hazards that have affected the area. As of late 2009, seven major disasters and two emergencies had been declared in Prince George's County and incorporated municipalities, and are identified in Table 4-2.

Table 4-2: Events Declared by the President (January 1965 through October 1, 2009)

Date & Disaster (DR/EM#)	Nature of Event
August 17, 1971 (DR 309)	Heavy Rains and Flooding.
June 23, 1972 (DR 341)	Tropical Storm Agnes.
October 4, 1975 (DR 489)	Heavy Rains and Flooding.
March 16, 1994 (DR 1016)	Severe Winter Weather and Ice Storms.
January 11, 1996 (DR 1081)	Blizzard of 1996.
April 10, 2000 (DR 1324)	Severe Winter Storm.
March 14, 2003 (EM 3179)	Severe Snowfall.
September 18, 2003 (DR 1492)	Hurricane Isabel.
September 13, 2005 (EM 3251)	Hurricane Katrina Evacuation

4.3 Losses Due to Major Disasters

While there is no definitive record of all losses – public and private, direct and indirect – due to disasters in Prince George's County, there are some estimates associated with some previous disaster events (see Section 5.4). For the United States as a whole, estimates of the total public and private costs of natural hazards range from $2 billion to over $6 billion per year. Most of those costs can only be estimated. In most declared major disasters, the federal government reimburses 75% of the costs of cleanup and recovery, with the remaining 25% covered by states and affected local jurisdictions. FEMA reimburses expenditures associated with:

- Public assistance for debris removal, emergency services, roads and bridges, flood control facilities, public buildings and equipment, public utilities, and parks and recreational facilities; and
- Assistance paid out for individual assistance grants, emergency food and shelter, and other assistance to individuals.

Table 4-3 summarizes the amounts and categories of public assistance received by county agencies and the City of Laurel for Hurricane Isabel, the only event for which such data are readily available.

4.4 Weather-Related Deaths & Injuries

The National Weather Service maintains data on local storm reports for "extreme weather and climatic events" including tornadoes, thunderstorms/wind, lightning, and floods (online at http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html). The sources of the data are not identified and the data are not verified. Deaths and injuries reported for the County data are shown in Table 4-4 (the period of record varies, but generally includes the last 50 years).

Table 4-3: FEMA Reimbursements for Hurricane Isabel (September 2003)*

County Agencies	Amount	Purpose of Reimbursement
Public Works & Transportation; Housing Authority; MNCPPC; Revenue Authority; Schools	$1,196,700	Remove debris and downed trees from rights-of-way and public properties; public housing sites, parks, public building parking lots, schools.
Homeland Security, Information Technology; MNCPPC; Central Services; Hyattsville Judicial Center; Schools; Police; Corrections	$601,500	Services (repair generator; phone center; operate building systems; communications network; check for building leaks); purchase generators. Increase police patrols/traffic control during power outage. Inmate supervision, replace drug testing materials.
Homeland Security; Public Works & Transportation; Sheriff; Fire; Health	$142,700	Staff Emergency Operations Center, staff nine shelters, purchase emergency materials, and respond to citizens: distribute sandbags; deliver dry ice and food; road blocks.
Environmental Resources	$8,300	Monitor & inspect dams.
Housing Authority; MNCPPC	$5,200	Building and site repairs: patio doors and fences at public housing sites (Kimberly Gardens & Cottage City Tower); fences at two county parks; masonry wall at county park.
City of Laurel	Amount	Purpose of Reimbursement
Public Works	$23,900	Road closings; debris removal
Police; Information Technology	$64,500	Staff overtime; Police generator repair

* Sources: County & City finance offices

Table 4-4: Weather-Related Deaths & Injuries (through 2009)

Event: Date and Nature	Deaths	Injuries
May 1984 – Thunderstorm/Wind	0	2
May 1995 – Tornado	0	2
May 1995 – Tornado	0	3
May 1998 – Lightning	0	1
September 1999 – Flash Flood	0	1
April 2000 – Lightning	0	1
June 2001 – Lightning	0	2
August 2001 – Lightning	0	1
September 2001 – Tornado	2	55
June 2002 – Thunderstorm/Wind	0	3

4.5 Public Awareness of Hazards & Risk

It is widely considered that there is a general misunderstanding of probability (sidebar). For example, all too often, people interpret the phrase "100-year storm" to mean that it only occurs once every 100 years, rather than that such an event has a 1-in-100 chance of happening each year. FEMA reports that, based on insurance statistics, a building in the floodplain is five times more likely to be damaged by flood than to sustain major damage by fire.

Comparing Risks

What is the chance that – in the next year – a person whose house is in the floodplain will:

- Be involved in a car accident? 3 chances in 100
- Be in 100-year flood? 1 chance in 100
- Have a car stolen? 1 chance in 300
- Be a victim of robbery? 1 chance in 1,000
- Have a residential fire? 4 chances in 10,000

www.floodsafety.com
a project of the Texas Environmental Center

With respect to flood hazards, the public becomes aware of flooding in a number of ways:

- Buying property in a floodplain triggers the federal requirement to get flood insurance when obtaining a federally insured and regulated mortgage. Buyers are notified in advance of closing.
- Maryland's real estate disclosure requirement for the sale of residential property includes a question that requires the seller to indicate whether a property is in a flood zone, conservation area, wetland area, Chesapeake Bay Critical Area or Designated Historic Area (although "unknown" is an option).

- Applying for zoning approvals and building permits leads to a determination that the property or construction site is within a mapped floodplain and therefore subject to floodplain management requirements.
- When flooding occurs the news media frequently carries stories about travel being hampered by flooded roads and homes and businesses damaged by floodwaters. Research has shown that many flood victims themselves tend to discount the likelihood that flooding will occur again.
- Flood warnings reach the public as regional warnings from the National Weather Service.

The public becomes aware of hazards in a number of ways, notably when an event actually occurs. In Prince George's County, both the Office of Emergency Management and the Department of Environmental Resources distribute information and materials regarding hazards.

4.6 Hazards in Prince George's County

The Prince George's County Mitigation Advisory Committee considered hazards and risks that were evaluated in the *Hazard Identification and Risk Assessment Report* (Appendix A). Hazards assigned a risk level of Medium-High are described in this section, including streambank erosion, winter storm, wind, severe storm, and drought. Although an analysis of wildland fire risk suggests a Medium-High risk level, it is assigned a Medium level (see discussion below).

Riverine flood hazards (including levee failure) and coastal flood hazards (risk level of High), are covered in Chapter 5.

Potential building damages due to winter storm, wind and severe storm are estimated by applying damage functions that account for the total number of buildings, building replacement values, and percentage of buildings that were built before the adoption of a building code. The age of buildings is important because it is assumed that older buildings are comparatively more susceptible to damage (Figure 4-1). Other assumptions made in estimating damages due to hazards are detailed in the *Hazard Identification and Risk Assessment Report* (Appendix A). Due to density of development and age of buildings, the planning areas with the greatest vulnerability are:

- Planning area 65 – Langley Park & Vicinity;
- Planning area 66 – College Park-Berwyn Heights & Vicinity;
- Planning area 67 – Greenbelt & Vicinity;
- Planning area 68 – Hyattsville-Riverdale-Mt. Ranier-Brentwood;
- Planning area 69 – Bladensburg-New Carrollton & Vicinity;
- Planning area 72 – Landover & Vicinity;
- Planning area 75A – Suitland-District Heights & Vicinity; and

- Planning area 75B – Town of Capitol Heights.
- Planning area 99 – City of Laurel.

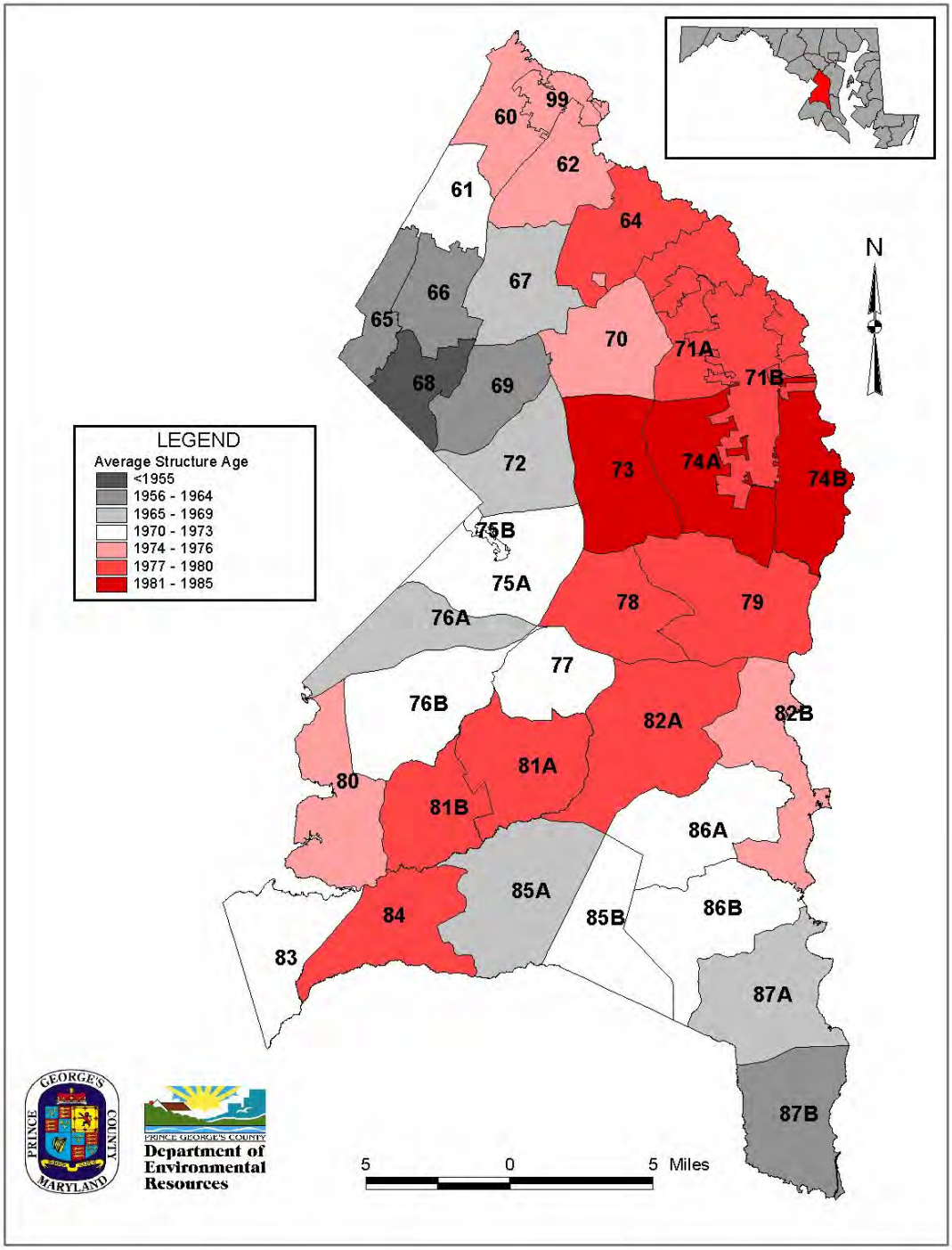


Figure 4-1. Average age of structures, by planning area.

Potential damages associated with drought and wildland fires (brush and forest) are more influenced by land use, and less so by age and other characteristics of the building stock. Drought is predicted to more severely affect planning areas with higher percentages of agriculture. Planning area 78 (Westphalia & Vicinity) would sustain the most damage, followed by 12 other areas. Unlike damage to buildings, crop damage cannot be readily mitigated – few agricultural landowners in Prince George's County irrigate and most growing seasons experience sufficient rainfall.

Wildland fires affect areas with trees, brush, grass fields, and crops. Other than loss of crops (for which the risk is seasonal), economic losses due to wildland fire in forested areas is most likely in planning areas where buildings encroach into such areas: Planning area 71B (City of Bowie); Planning area 79 (Upper Marlboro & Vicinity); and Planning area 82A (Rosaryville). Based on the Prince George's County Fire/EMS Department's review of response capacity, fire statistics, and potential areas impacted, wildland fire is deemed to have a Medium risk level.

4.6.1 Streambank Erosion

Streambank erosion is associated with frequent increases in stream discharge that undermine streambanks as channel morphology attempts to adjust to changes in hydrology. Urban stream hydrology changes over time, as more impervious surfaces are created (roofs and paved areas) and as gutters and stormdrains move water through the watershed more rapidly.

In recent years, County personnel have observed that streambank erosion is causing an increasing number of problems with impacts ranging from minor (increased sediment load) to very severe, damaging infrastructure and encroaching towards privately-owned buildings. The County's standard 50-ft stream buffer is expanded in sensitive areas (floodplains, wetlands, Marlboro Clays). However, it is not explicitly expanded in areas with active streambank erosion.

A Stream Corridor Assessment initiative by the Department of Environmental Resources, Maryland DNR, and The Maryland-National Capital Park & Planning Commission is expected to identify problem areas and produce a county-wide database. As of early 2010, the field work has been completed and the GIS mapping and analysis is underway, with the final report due sometime in 2010.

4.6.2 Winter Storm

Severe winter storms are characterized by three elements: extremely cold air, large amounts of moisture, and lift, which leads to cloud formation and precipitation. Typical winter storms that affect Maryland form when the jet stream is in the middle latitudes across the continental United States, a moist, warm air mass comes in from the south, and a cold air mass with freezing temperatures comes in from the north. The intensity of the storm will vary with the strength of each of the elements and the availability of moisture.

Although the average winter temperature is 41.3°F, the Prince George's County area experiences occasional severe winter storms accompanied with snow, sleet and freezing rain, as well as extremely cold temperatures, strong winds and flooding. The average annual snowfall is around 20 inches, but several storms in the past 30 years have exceeded that amount.

Hazard History

Since 1965 when the federal government began to maintain county-by-county records of major disaster declarations and emergencies, four of eight events declared for Prince George's County were for severe winter storms:

- February 1994 – severe winter weather and an ice storm caused transportation restrictions and wide power outages.
- January 1996 – the Blizzard of 1996 created statewide emergency conditions.
- April 2000 – a severe snow emergency was declared.
- March 2003 – severe snowfall paralyzed much of the Washington, DC, metropolitan area.

The Prince George's County Department of Public Works & Transportation reports that as of early 2010, the snow emergency plan had been activated for 11 events in the winter of 2009-2010 (and 7 and 12 times in the winters of 2008-2009 and 2007-2008, respectively). The Department is responsible for providing "passable" road conditions within certain periods of time after the end of precipitation and based on the classification of the road.

Based on the National Climatic Data Center's online data, 70 "snow & ice' events were recorded between 1950 and mid-2009, indicating an average of 1.2 events per year (although very heavy snow (+12") or ice occurs less frequently). The potential for winter storms is uniform across the County.

Potential Damages and Impacts

Assuming that the average damage caused by severe winter storms is a small percentage of building replacement value and weighted by the percent of buildings that pre-date the building code, the potential damage in Prince George's County is approximately $65 million. The average damage ranges from less than $50 to about $2,000. Generally, the planning areas with the highest concentrations of older buildings are more susceptible (Figure 4-2). The damaging effects of heavy snow and ice loads may be evidenced by:

- Damage to property (collapsed roofs, frozen pipes), more likely sustained by older buildings that may not meet the current building code;
- Damage to above-ground utilities resulting in loss of service;
- Increased vehicle accidents and interruption of normal traffic and mass transit;

- Closures of schools, government services, and public commerce (economic losses);
- Impairment of access for emergency and medical services;
- Adverse health effects (or death) for people who venture outside and some animals;
- Crop losses (especially for early season storms); and
- Localized flooding, especially if temperatures increase rapidly causing snowmelt.

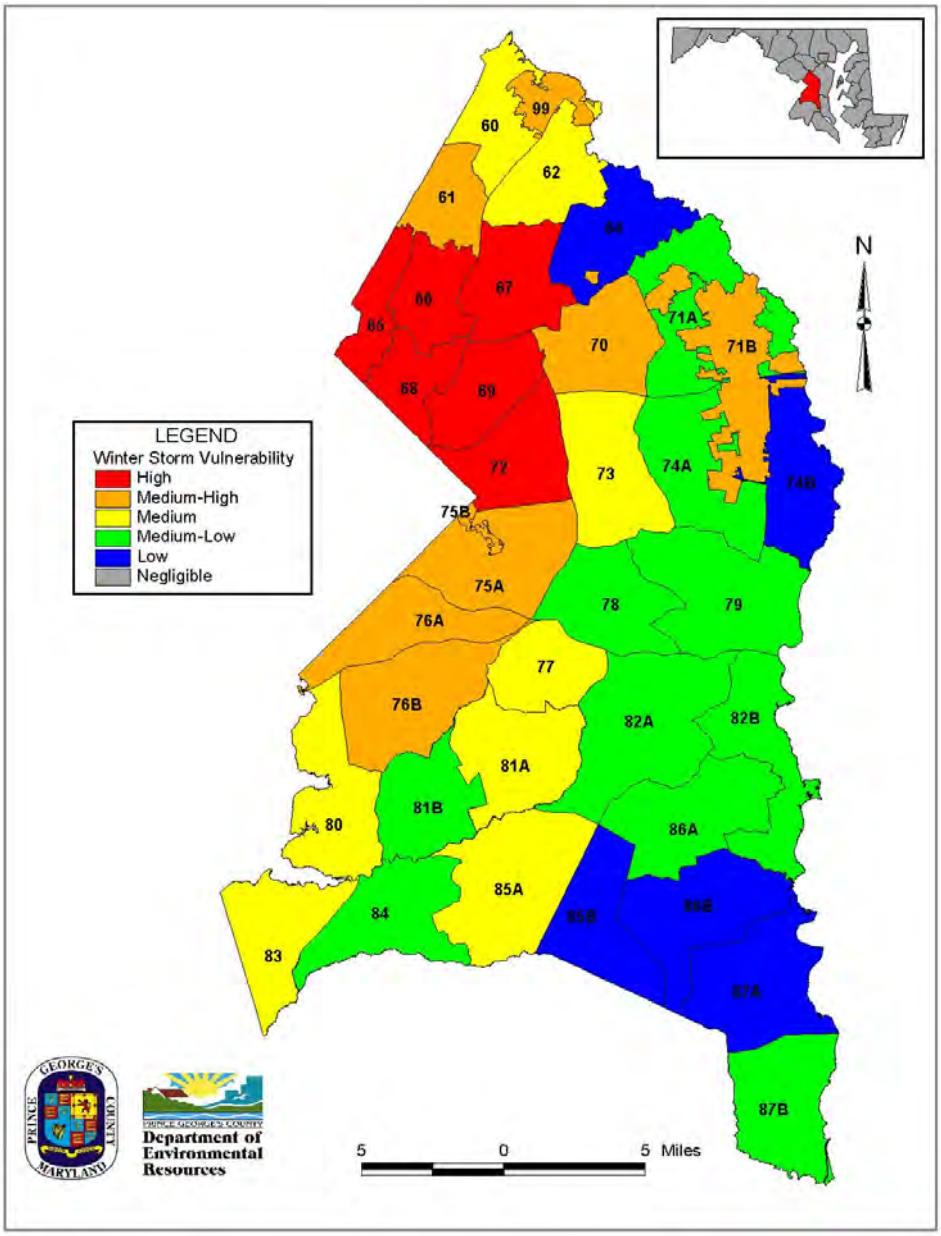


Figure 4-2. Winter storm vulnerability, by planning area.

4.6.3 High Wind/Tornado

Strong damaging winds occur in the form of tornadoes, hurricanes and tropical storms, and microbursts. Although the origins of these storms are different, their effects on the built environment are similar. Strong winds can erode shorelines, topple trees, damage or destroy buildings, and cause tidal surges and subsequent flooding.

Tornadoes

A tornado is a column of rapidly rotating wind that extends from a thunderstorm cloud to the ground. It often appears as a funnel-shaped cloud or a spiraling column of debris. Tornadoes may be only several yards across, or in rare cases, over a mile wide. Most tornadoes that strike Maryland are triggered by severe thunderstorms and are more frequent between April and July.

Tornadoes are classified using the Fujita Scale: weak (F0 or F1), strong (F2 or F3), and violent (F4 or F5). Beginning in February 2007, U.S. scientists and meteorologists implemented an Enhanced Fujita Scale which uses three-second gusts estimated at the point of damage. The Enhanced F-Scale is based on a judgment of 8 levels of damage to 28 indicators such as small barns, strip malls, and metal building systems. These estimates vary with height and exposure. Historic events maintain their Fujita Scale classification, but new events are now rated using the Enhanced F-Scale.

The National Weather Service (NWS) states that weak tornadoes comprise approximately 69% of all tornadoes that occur in the United States, and most weak tornadoes typically touch down only briefly and cause minor damages. Strong tornadoes are longer lasting and account for nearly 29% of all tornado events and caused 30% of fatalities associated with tornadoes. Violent tornadoes account for approximately 2% of all tornadoes and 70% of all tornado fatalities.

Hurricane and Tropical Storm Winds

Tropical cyclones are low-pressure areas of closed circulation that forms over a large body of water. They rotate counterclockwise throughout the Northern Hemisphere and are called tropical depressions when wind speeds are less than 39 miles per hour (mph), tropical storms when wind speeds are between 39 mph and 73 mph, and hurricanes when wind speeds reach 74 mph.

Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles. As a hurricane approaches land, the skies will begin to darken and winds will grow in strength, often accompanied by torrential rains, high winds, and storm surges. A single hurricane can last for more than 2 weeks over open waters and can run a path across the entire length of the Eastern Seaboard. While coastal counties are exposed to storm surge flooding, inland areas experience flooding due to intense and prolonged rainfall. August

and September are peak months for activity during the hurricane season, which lasts from June 1 through November 30.

Microbursts

Microbursts are powerful downdrafts generally associated with heavy precipitation events. According to the National Oceanic and Atmospheric Administration (NOAA), microbursts occur when the weight of heavy precipitation or hail accelerates downward winds to very high velocities. Downdrafts associated with microbursts are typically only a few hundred to a few thousand feet across. When the downdraft reaches the ground, it spreads out horizontally and may form one or more horizontal vortex rings around the downdraft. Produced by only about 5% of all thunderstorms, microbursts typically last just 15 to 20 minutes.

Hazard History

The damage sustained from a wind event, regardless of what it is called, can be wide-ranging and devastating. Past wind events in Prince George's County have broken tree branches and uprooted trees; snapped power, cable, and telephone lines; damaged radio, television, and communication towers; caused flooding; torn roofs off buildings; blown out walls; overturned vehicles; and damaged and destroyed businesses. Downed trees and power lines across roads have blocked key access routes and cut off parts of the County. Extended power outages have resulted from downed power lines and damaged telecommunication lines can result in communication delays for 911 emergency calls.

According to the NOAA's National Climactic Data Center (NCDC) databases, Prince George's County experienced 171 thunderstorm or wind events between 1996 and August 2009 that resulted in 1 death and 7 injuries, and causing an estimated $6.56 million in property damage.

According to the NOAA's Storm Prediction Center (SPC) and National Climactic Data Center (NCDC) databases, Prince George's County experienced:

- 10 tornadoes between 1950 and 1995, all with intensities between F0 and F2 and resulting in a total of 6 injuries.
- 11 tornadoes between 1996 and May 2003, with intensities between F0 and F1, except for an F3 which struck the Hyattsville area on September 24, 2001 (see box on page 4-13); despite the activity during this period, most of the reported consequences are associated with the F3 tornado that resulted in 2 deaths, 55 injuries and approximately $100 million in property damage.
- Three tornadoes between June 2003 and April 2009:

- An F1 tornado on April 20, 2008 that touched down at a water park near the intersection of Sargent Road and Ray Road. The tornado caused tree damage at the water park and intensified (100 mph) as it crossed a wooded area and field behind Peters Adventist Elementary School, lifting the northeast section of the roof. The storms continued north, downing trees along Riggs Road as well as a light pole in the parking lot of a shopping center. Property damage was estimated at $40,000.
- Two EF0 tornados moved through the County on May 8, 2008, affecting portions of the Blackbriar Court and Chandler Drive (structural damage estimated at $100,000), and portions of Camp Springs and Suitland (structural damage estimated at $50,000). Communications with school buses were disrupted and employees in the County Office Building took shelter in the basement.

Tornado hits Northern Prince George's County

On September 24, 2001, severe thunderstorms produced a large multi-vortex tornado that touched down near Hyattsville, tracked along the Route 1 corridor from College Park to Laurel, then crossed into Howard County. Damage all along its path was estimated at $100 million. Two students at the University of Maryland were killed and 55 injuries were reported.

Many of the buildings on campus in the path of the storm were made of brick and suffered only minor to moderate damage, although the bubble roof of the football practice facility was removed. Residential areas near the campus, including the University Courtyard Apartments, sustained damage. A total of 3000 students were left temporarily homeless after two dorms and an off-campus housing unit was evacuated due to damage. Ten trailers used as temporary offices for the Maryland Fire and Rescue Institute were completely destroyed and debris was found up to 60 miles away.

At least 200 vehicles in campus parking lots were damaged, including 100 that were blown into and onto other cars. The woods behind the parking lot were nearly flattened.

Prince George's County has been affected by several hurricanes and tropical storms over the past century. The *Maryland Hazard Mitigation Plan* (2008) lists thirteen hurricanes, tropical storms and tropical depressions that passed within 20 miles of the County between 1856 and 2000. Tornadoes, strong winds, and rainfall flooding have resulted from some of these storms.

The potential for adverse impacts of hurricane winds on power distribution was made clear in the aftermath of Hurricane Isabel. According to a September 19, 2003, article in the *Prince George's County Gazette*, more than 140,000 county residents were without power, with the hardest hit areas being Upper Marlboro, Capitol Heights, Camp Springs and Bowie.

The available data suggests the frequency of occurrences of wind events in Prince George's County are estimated as follows:

- Average annual frequency of high wind events is estimated to be approximately 3 events/year; and
- Average annual frequency of hurricanes or tropical storms tracking within 20 miles of the County is less than 10% per year.

Potential Damages and Impacts

The entire County is reasonably expected to experience similar wind hazards because there are no significant changes in topography. Qualitative severe storm and high-wind vulnerability assessments resulted in vulnerability indices for the County's 37 planning areas (Figure 4-3). The estimates were prepared by utilizing previously determined wind damage functions in FEMA's Hurricane Wind Benefit-Cost Module (Full Data Module Version 5.1, December 31, 1997) to anticipate damage to buildings and contents, as well as a loss of function or displacement cost estimate.

Population density, building types, and building age are important factors when analyzing vulnerability to high-wind events. In general, structures built prior to the adoption of a building code are the least likely to resist wind damage. The vulnerability assessments involved assumed damage functions for buildings (by type) and analysis of several parameters, including some or all of the following:

- Number of buildings and building types;
- Age of buildings;
- Building replacement value and contents replacement value;
- Loss of function;
- Number and value of critical facilities; and
- Percentage of pre-building code buildings (approximately 25% pre-date the earliest wind code adopted in 1959).

Considering the likely damage due to a 50-year wind event, including damage to buildings, contents, and loss of function, the potential damage in Prince George's County is approximately $568 million. It is important to note that this level of damage is highly unlikely to result from a single storm; this estimate assumes that the entire County is uniformly affected by high winds. The average damage per residence ranges from less than $500 to just over $15,000.

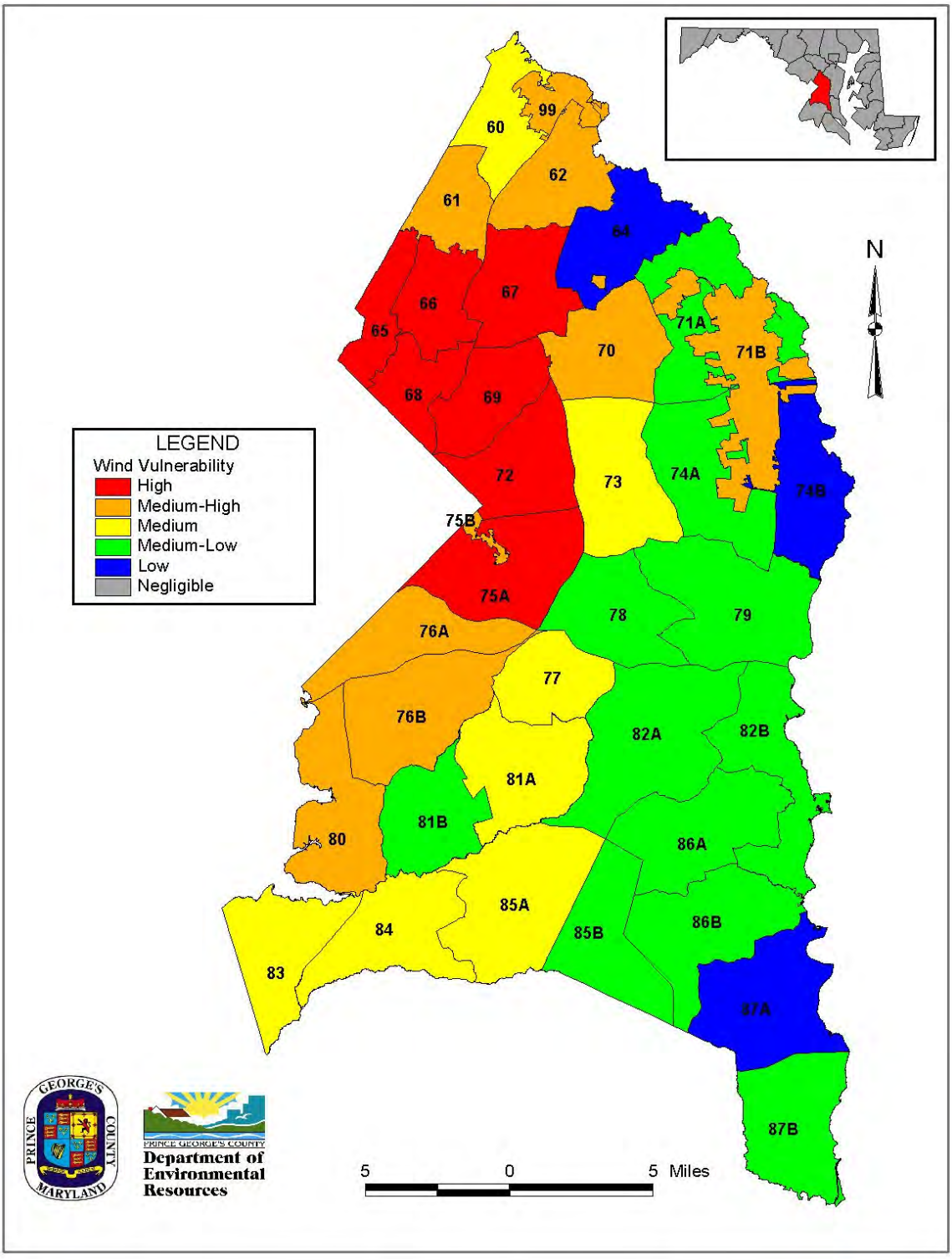


Figure 4-3. Wind vulnerability, by planning area.

4.6.4 Severe Storm

The National Weather Service considers a thunderstorm "severe" if it produces tornadoes, hail of 0.75 inches or more in diameter, or winds of 58 miles per hour or faster. The National Climactic Data Center's Events Geographic Information Systems database for Prince George's County includes more than 250 severe weather events between January, 1950 and mid-2009. The events included flash floods, funnel clouds, high winds, hail, heavy rain, lightning, and tornadoes. Section 4.6.3 addresses high winds (including tornadoes and hurricane winds).

Organized severe thunderstorm episodes can occur anywhere in Prince George's County in any month of the year. Thunderstorms are formed from three basic ingredients: moisture (water vapor) in the lowest levels of the atmosphere; rapid cooling with height; and lift that rapidly moves the moist air upwards. Conditions for severe storms that produce lightning and hail most often occur in the summer months. Thunderstorms may cause the following types of damage:

- Lightning can start forest and wildland fires, brush fires, and building fires.
- Deaths and injuries occur when people caught outside are struck by lightning.
- Hail damages crops, landscaping, vehicles, and buildings (especially aluminum siding).

National Climatic Data Center's online data indicate 171 "thunderstorm & high wind" events, 14 "lightning" events, and 70 "hail" events were recorded between 1950 and mid-2009. The available data suggests the frequencies of occurrences of atmospheric hazard events in Prince George's County are estimated as follows:

- Average annual thunderstorm frequency is approximately 3 events per year;
- Despite the few lightning events recorded in the NCDC database, the average annual frequency for a major lightning storm occurring somewhere in the County is estimated to be nearly once a year; and
- Frequency of occurrence of hail events is about 1 event per year.

Potential Damages and Impacts

Damage to buildings affected by severe storms can be estimated based on number, age, and value of buildings. Densely populated areas that have higher percentages of older buildings are at greater risk of damage. Comparatively, crop and landscape damages due to hail are significantly less costly than damage to buildings and vehicles.

Assuming that the average damage caused by severe storms is a small percentage of building replacement value, weighted by the percent of buildings that pre-date the building code, the potential structural damage in Prince George's County is approximately $15 million. The planning areas with the highest concentrations of older buildings are more susceptible (Figure 4-4). Agricultural losses from a hail storm that uniformly affects the area are estimated at $584,000.

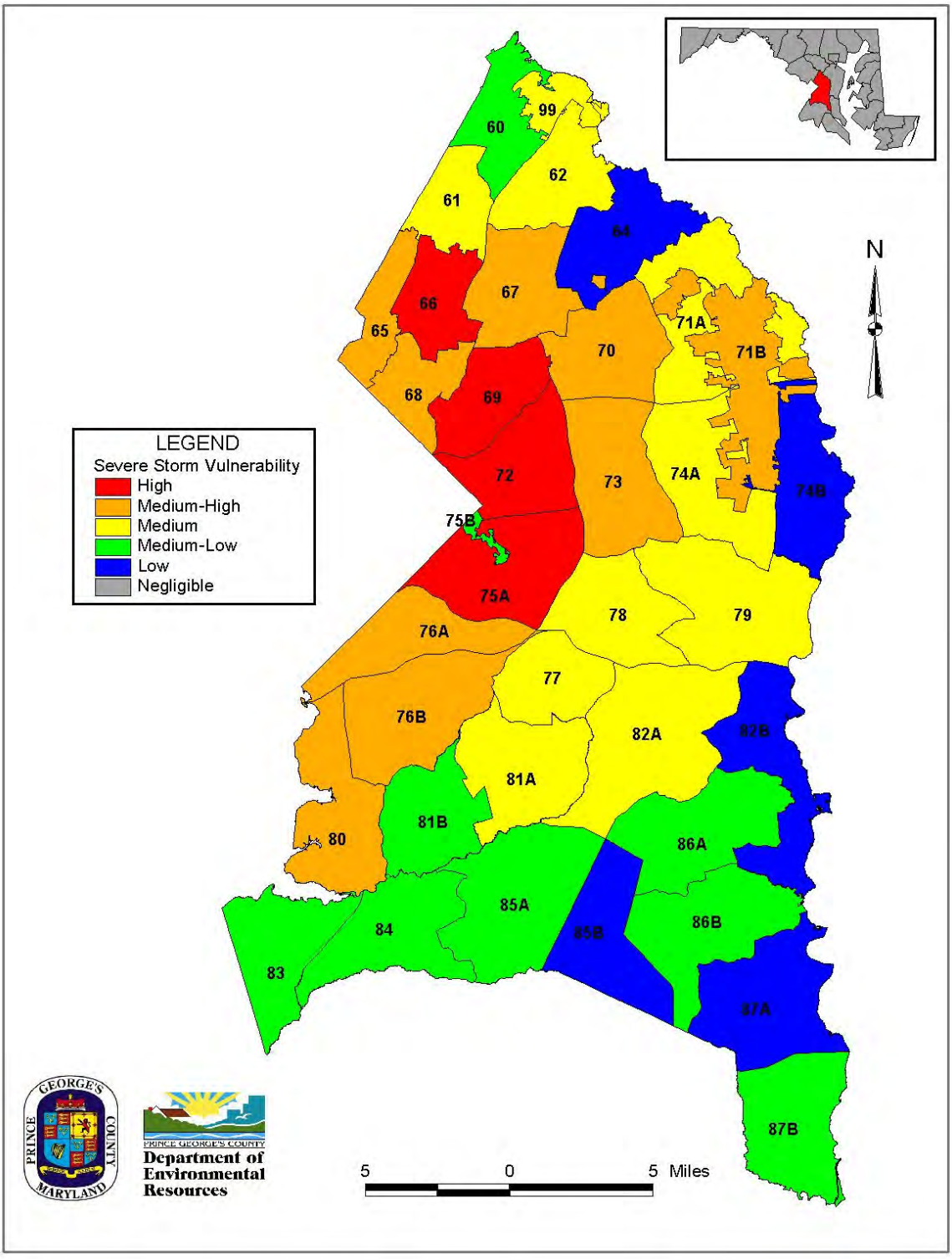


Figure 4-4. Severe storm vulnerability, by planning area.

4.6.5 Drought

Maryland has elected to use the U.S. Army Corps of Engineers' definition of drought: "droughts are periods of time when natural or managed water systems do not provide enough water to meet established human and environmental uses because of natural shortfalls in precipitation or stream flow." Drought may be accompanied by period of extreme heat.

Drought is a natural and expected part of the climate in most areas, but the severity of drought impacts differs based on duration, geographic extent, intensity, human demand for water, and agricultural practices. Drought can be defined as:

- Meteorological drought, an extended period of dry weather.
- Agricultural drought, a shortage of precipitation that affects crops.
- Hydrologic drought, a reduction in water content in lakes, rivers, streams, aquifers, and soils that may affect supplies available for all users.

While some natural hazards can be mapped, such as floodplains or unstable soils, drought as a potential hazard cannot be delineated on a map in the same way. Drought is a temporal hazard that is monitored as a function of temperature and rainfall – but even those characteristics do not predict the severity and impacts on any given period of drought because they are functions of land use and population.

The Maryland Department of the Environment uses four indicators of water sufficiency: precipitation levels; stream flows; groundwater levels; and reservoir storage (under Water Programs and conservation/drought, http://www.mde.state.mde.us). Table 4-5 is a typical example of a monthly summary; behind each hydrologic indicator is another summary that compares current conditions with normal conditions. For example, the rainfall summary compares, by region, the current cumulative rainfall against normal rainfall amounts. Prince George's County is included in the Southern Region.

Table 4-5: Typical Summary of Hydrologic Indicators (September 17, 2002)

Region	Rainfall	Stream Flow	Groundwater	Reservoirs	Overall
Western	Watch	Warning	Normal	Normal	Watch
Central	Warning	Emergency	Emergency	Watch	Emergency
Eastern	Warning	Normal	Normal	N/A	Emergency
Southern	Emergency	N/A	Warning	N/A	Warning

Hazard History

The area's most severe, full-fledged agricultural drought occurred between December 1929 and February 1931, when rainfall was 21.5 inches below normal.

In 1998-1999, portions of Maryland experienced drought conditions, prompting declaration of a drought emergency. Use restrictions were imposed and conservations measures were encouraged. Because of supplies provided by the Washington Suburban Sanitary Commission (WSSC), Prince George's County was not significantly affected.

In February 2002, the WSSC issued a drought watch for its entire service area, including Prince George's County. The watch is the first notification stage for the region's Water Supply and Drought Response Plan that is coordinated by the Metropolitan Washington Council of Governments (see Section 6.14). The watch was lifted in November 2002, when the regions water supplies and conditions reached the 'normal stage' as defined in the Plan.

In August 2007, the Potomac River Basin region experienced ongoing dry conditions as part of a larger drought affecting the mid-Atlantic region. Precipitation in metropolitan Washington was more than 2.67 inches below normal between October 2006 and August 2007, and river flows were well below normal levels. The NOAA Climate Prediction Center declared 66-percent of the Potomac River basin at a moderate to severe drought level. However, the WSSC Drought Coordination Committee emphasized to the public that the region's current drought conditions were still within the "normal" stage, with water supply adequate to meet all demands (WSSC Press Release dated August 8, 2007.) The State did not issue any drought warnings for the WSSC or Southern regions.

National Climatic Data Center's online data indicate 12 periods of drought between mid-1995 and mid-2009, indicating an average of nearly one period per year.

Potential Damages and Impacts

Economic losses associated with drought are associated with reductions in agricultural production, livestock production, fisheries, recreation, tourism, and water consumption. Environmental drought impacts affect both human and animal habitats. Decreased flows in streams and rivers can affect salinity, bacteria, turbidity, pH, and lead to temperature increases.

Based on the U.S. Census (2000), Prince George's County has 30,374 acres in agricultural/horticultural use. In 2001, harvested crops included 4,800 acres of corn, 4,800 acres of oats, 4,900 acres of soybeans and 2,600 acres of wheat (National Agricultural Statistics Database). Crop and revenue losses due to drought could be significant.

Drought-related agricultural losses can be estimated using average crop revenue per acre and assuming a reduction of 50 percent. The most significant damage is likely to occur in planning areas located in southern and western portions of the County, where agricultural lands are a greater percent of the landscape (Figure 4-5). Unlike damage to buildings, crop damage cannot be readily mitigated – few agricultural landowners in Prince George's County irrigate and most growing seasons experience sufficient rainfall. Therefore, despite its ranking as a "medium-high" hazard, landowners make their own

evaluations of cost-effectiveness of supplemental watering capacity and, for the most part, have determined that it is not feasible.

As of late 2009, the most recent crop data from the 2007 Census of Agriculture indicates the total acreage of lands designated for agricultural use has increased 22 percent (from 30,374 acres to 37,005 acres), although the acreage of four harvested crops declined by 50 percent (corn, oats, soybeans and wheat). These changes do not warrant changing the analysis performed for the 2005 plan.

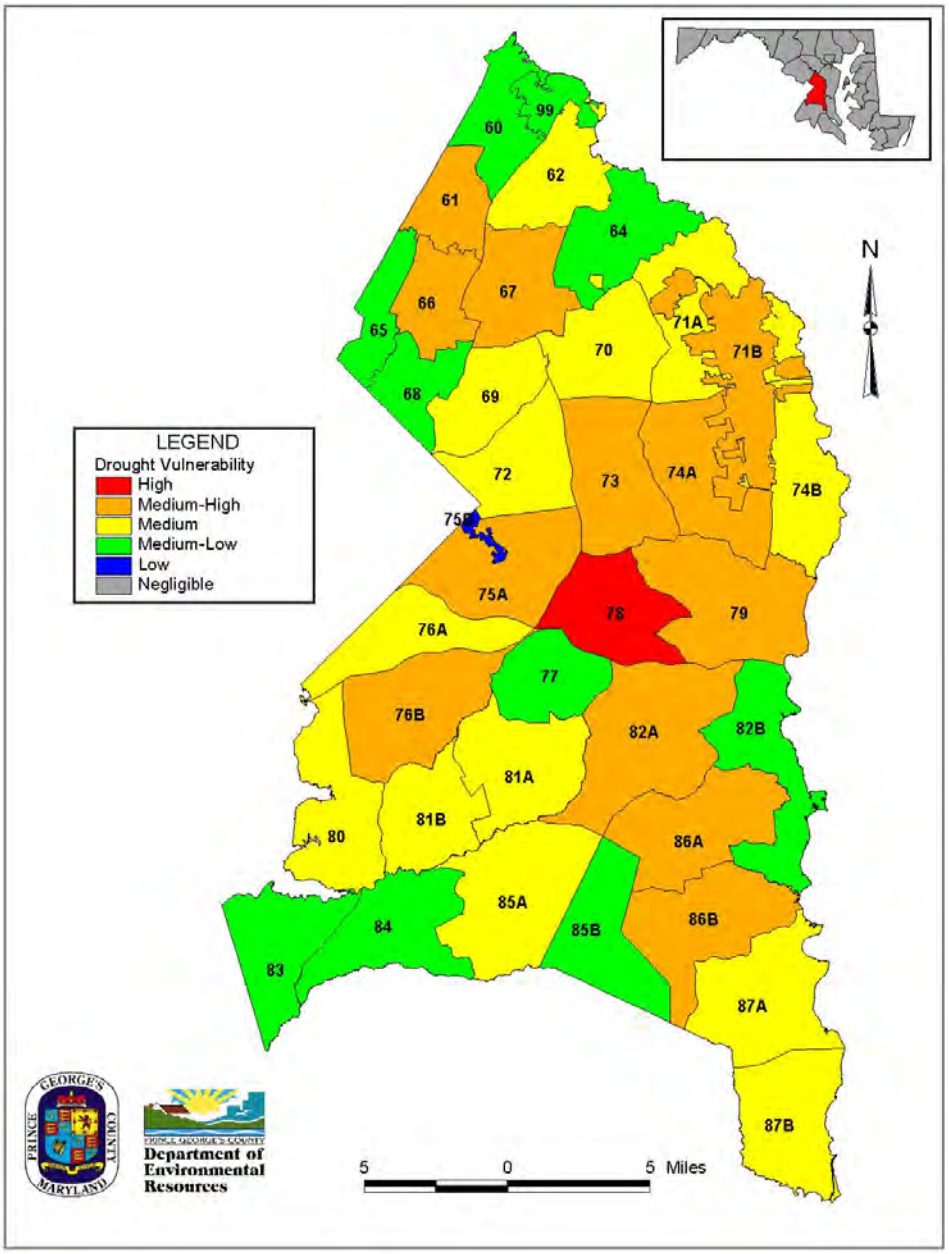


Figure 4-5. Drought vulnerability, by planning area.

4.6.6 Wildland Fire

The term "wildland fire" is used for uncontrolled fire spreading through vegetative fuels (timber and brush) that exposes and possibly destroys buildings. Wildland fires affect areas with trees, brush, grass fields, and crops. The fires are classified as either wildland fires (in relatively undeveloped areas, perhaps with some basic infrastructure such as roads, power lines, and railroads) or an urban-wildland interface fire (areas with buildings and development).

The majority of wildland fires are caused by human actions. In Maryland, arson is the leading cause, accounting for 28% of all wildland fires, the remaining are caused by accidents, carelessness, lightning, and railroad operations.

Usually, certain conditions must be present for a wildland fire hazard to exist: a large source of fuel; conductive weather (generally hot, dry, and windy); and lack of fire suppression capability due to remoteness or other limitations. Once started, steep topography, available fuel, and weather are the principal factors that influence wildland fire behavior. In Prince George's County:

- The topography is relatively flat and accessible by fire suppression forces.
- Based on current land use, more than half of Prince George's County could provide significant fuel sources under some climatic conditions (just over 50% of the County is forest or brush).

Hazard History

The weather conditions in the Maryland region generally are not conducive to large-scale wildland fires and few such events have occurred:

- On April 8, 1947, *The Baltimore Sun* reported that 3,500 firefighters and 1,000 soldiers fought wildfires which burned approximately 5,000 acres in the area, including 2,000 in Anne Arundel County.
- Between 1988 and 1998, only 31 wildland fires in Maryland have been larger than 200 acres.
- Approximately 5,000 wildland fires occur each year in Maryland, affecting between 8,000 and 9,000 acres of forest, marsh and grasslands.
- In an average year, the DNR Forest Service responds to 600 to 700 fires throughout the State; the remaining fires are handled by local professional and volunteer fire services.

The Prince George's County Fire/EMS Department keeps statistics on fire incidents and reports an average of about 1,500 brush fires per year (about 300 per 100 square miles of area), and the *Maryland Hazard Mitigation Plan* (2008) indicates that between 1995 and 2001, more than 7,000 brush fires occurred in the County. The Fire/EMS Department

does not separately distinguish or list fires that affect stands of trees versus those that damage fields and cropland. The Department characterized brush fires as generally small in area and rarely affecting buildings.

Potential Damages and Impacts

Wildland fires can cause significant damage to brush, forest and agricultural lands, and represent a serious threat to human life and property in nearby rural and suburban areas. In Maryland, long-term damage to trees is rare unless preceded by severe drought. Most wildland fires occur in areas without ready access to water for suppression. Urban-wildland interface fires involve other fuel sources such as combustible roofing materials, wood construction, and flammable chemicals.

The County has a combined total of 187,662 acres that are forested or in agricultural usage. The *Maryland Hazard Mitigation Plan* (2008) indicates that 90,700 acres are at extreme or high risk of wildfire incidence. Loss estimates for a major wildland fire in Prince George's County were determined based on the total area of land designated for brush, forest, and agriculture/horticulture in each planning area. In addition to physical damage, an average unit cost for wildland fire suppression per acre was estimated. Because of the County's fire suppression capabilities, it was assumed that buildings and infrastructure would not be affected. The *Hazard Identification and Risk Assessment Report* (Appendix A) contains details on the computation of estimated losses. The most significant amount of damage would occur in planning areas located in southern and western portions of the county, where forest and agricultural lands are greatest (Figure 4-6).

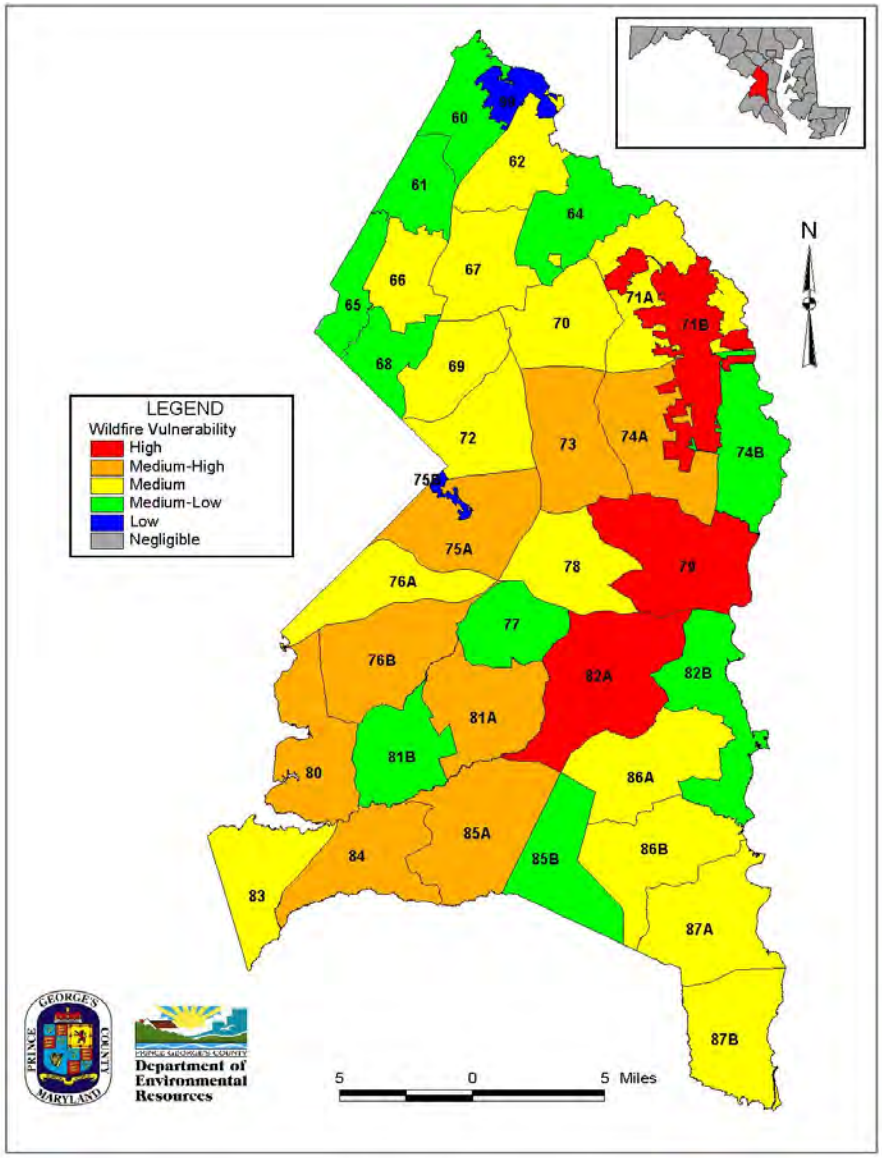


Figure 4-6. Wildland fire vulnerability, by planning area.

4.6.7 Dam Failure

Dams that impound water range from large to small and may be built to create large impoundments or small stormwater management ponds. Dams and ponds in Maryland are regulated by the Maryland Department of the Environment. In Prince George's County, stormwater management facilities are regulated by the Department of Environmental Resources and inspected and maintained by the Department of Public Works & Transportation.

Failures of dams are low probability-high loss events. Most failures are associated with a combination of poor maintenance and rainfall-runoff amounts that significantly exceed the design of the dam.

Dams are classified by the severity of the consequences should a failure occur. Emergency Action Plans are prepared for larger dams to monitor conditions during high flows, to coordinate with downstream authorities, and to notify downstream residents. The likelihood of a failure is extremely low because these dams are regulated and inspected by the State and owners are required to submit inspection reports. Of the 25 dams in Prince George's County:

- Nine are classified as high hazard and listed in Table 4-6 (loss of life, serious damage to buildings and infrastructure);
- Ten are classified as significant hazard (loss of life, extensive damage to no more than two isolated homes and roads); and
- Six are classified as low hazard or are unclassified.

Hazard History

There have been no dam failures in Prince George's County.

WSSC operates and manages the T. Howard Duckett Dam (Rocky Gorge Dam) and Reservoir, which provides approximately 30% of the treated water provided in the WSSC service area. As described more fully in Section 6.7, when large rainfall events are predicted, WSSC may release water in anticipation of large volumes of upstream runoff. Under some release scenarios, buildings in the City of Laurel flood; however, this risk of flooding is not due to failure of the dam itself or to improper management.

Potential Damages and Impacts

The Maryland Department of the Environment, Dam Safety Program, inspects high hazard dams and requires owners to inspect dams. This regular program decreases the likelihood that poor maintenance will lead to failures. Unlike other hazards, probabilities and frequencies are not assigned to dam failures.

Failure of any dam that impounds water has the potential to cause downstream damage. Dam break analyses have been prepared for six high hazard dams that have the potential to impact Prince George's County and the City of Laurel. Analyses examine several scenarios, including "sunny day" failures and failures during flood conditions. Details on the number of people and buildings at risk for the various scenarios are found in the reports on the analyses. These reports are kept at the Environmental Service Group of the Department of Environmental Resources.

Table 4-6: High Hazard Dams

Dam/Impoundment	Waterway	Year Built Primary Purpose	Emergency Action Plan
Contee/Laurel Sand & Gravel Wash Pond	Indian Creek	1973 Gravel Wash	No
Redskins Stadium Stormwater Management	Not on-stream	1997 Stormwater Management	Yes
Rocky Gorge Dam/WSSC T. Howard Duckett Dam & Reservoir	Patuxent River	1953 Water Supply	Yes
City of Laurel, Laurel Lakes	Bear Branch	1986 Stormwater mgnt, water quality, flood control	No
Indian Creek #1 and #2	Indian Creek	1987 Stormwater mgnt, water quality, flood control	No
Northampton Dam (Lake Arbor)	Southwest Branch	1986 Stormwater mgnt, water quality, flood control	No
Lake Largo Town Center Dam	Southwest Branch	1973 Stormwater mgnt, water quality, flood control	Yes
Tall Oak Crossing	Collington Branch	1985 Stormwater mgnt, water quality, flood control	No
Heritage Glen Dam	Southwest Branch	2004 Stormwater mgnt, water quality, flood control	Yes

4.6.8 Extreme Heat

Prolonged periods of unusually high temperatures, generally accompanied by high humidity, characterize the hazard of extreme heat in the Mid-Atlantic region. The "heat index" is a measure of the combined effects of temperature and relative humidity to produce the temperature that is perceived. For example, a temperature of 100°F "feels like" 110°F when the relative humidity is 40%.

Hazard History

National Climatic Data Center's online data indicate 31 periods of excessive heat between mid-1995 and mid-2009, indicating an average of less than one period per year. Two notable periods between 2005 and 2009:

A hot and humid air mass seeped into the Mid-Atlantic region on July 17 and July 18, 2006, driving the heat index value to around 105 degrees. Emergency response officials

reported sporadic incidents of heat-related illness, such as shortness of breath and heat exhaustion around the Washington/Baltimore Metropolitan region. Three deaths in the Maryland suburbs of Washington DC in the counties of Prince Georges, Calvert, and Carroll were attributed to this heat wave. Between August 1-3, 2006, afternoon heat index values rose to as high as 115 degrees. Several deaths in Central Maryland were attributed to the heat.

A strong ridge of high pressure set up across the eastern United States for several days in early to mid June in 2008. High temperatures combined with dew points in the lower 70s allowed heat index values to reach near 105 degrees in lower southern Maryland. The County opened cooling stations. Three heat-related deaths were reported.

Potential Damages and Impacts

Extreme heat has social, economic and environmental impacts. People, especially senior citizens, outdoor laborers, children, and individuals in poor physical health, are vulnerable to heat-related illnesses (heat exhaustion) and death (heat stroke). Prolonged periods of extreme heat would lead to agricultural/horticultural losses (see Section 4.6.5 for description of Drought as a related hazard). The National Climatic Data Center's online data indicate 92 deaths and 432 injuries attributed to excessive heat between mid-1995 and mid-2009.

Although all citizens over 65 are equally at-risk, relative vulnerability of different planning areas may be derived by combining a measure of population of seniors with estimated agricultural losses. The results indicate the following planning areas have relatively higher vulnerability to extreme heat: Langley Park; Greenbelt; Bladensburg-New Carrolton; Bowie; Landover; Largo-Lottsford; Suitland-District Heights; The Heights; and Henson Creek.

Some physical damage to roads and railroads can occur during heat waves, when asphaltic surfaces soften or rails deform.

4.6.9 Land Movement/Unsafe Lands

Pockets of potentially expansive soil formations – Marlboro Clays – are known to cause problems for building foundations and roadbeds. Marlboro Clay formations have low permeability and may have high shrink-swell potential, meaning they are capable of large volume changes when water is added or removed. These clays are found in only about 4,200 acres of land, less than 1.4 percent of the County's total land area. They are found in planning areas Bowie, Mitchellville, Henson Creek, Westphalia, Collington, Upper Marlboro, South Potomac Sector, Tippet, Rosaryville, Mount Calvert-Nottingham, and Accokeek (see Figure 4-7).

Most of the County's topography is relatively flat; less than 5 percent of the total land area has steep slopes (between 15 and 25%) and only 1 percent has severe slopes (greater than 25%). Other forms of land movement, including landslides and slope failures,

would be limited to those small, isolated areas mostly in the western and southeastern parts of the County.

Hazard History

Problems with Marlboro Clays have resulted from development that predates the County's current development requirements. In 1975, land movement damaged or destroyed 25 homes resulting in about $500,000 in damage. In recent years, damage has occurred in the Tor Bryant Estates subdivision in Oxon Hill which is in the Henson Creek planning area.

A significant subsidence incident occurred on May 11-12, 2008, after 12 hours of continuous and relatively uniformly distributed rainfall (average 0.25 inch rain/hour). The area behind five homes on the south side of Yorkville Road was affected, resulting in the formation of a sinkhole approximately 500 feet long, 100 feet wide and 10 feet deep. In 2009, the Department of Environmental Resources obtained HMGP funds to acquire the properties, demolish the homes, stabilize the site, and retain the land in open space.

Potential Damages and Impacts

Because steep slopes and Marlboro Clays are a small part of the County's landscape, and the actual number of buildings that are located in those areas is unknown, vulnerability can only be characterized in broad terms. Combining the two factors, just 411 acres are affected by the two conditions. The planning areas where Marlboro Clays are found are listed above. Existing development review procedures allow the County to impose limitations on new development in these areas. Damage to existing buildings located on Marlboro Clays is expected to continue.

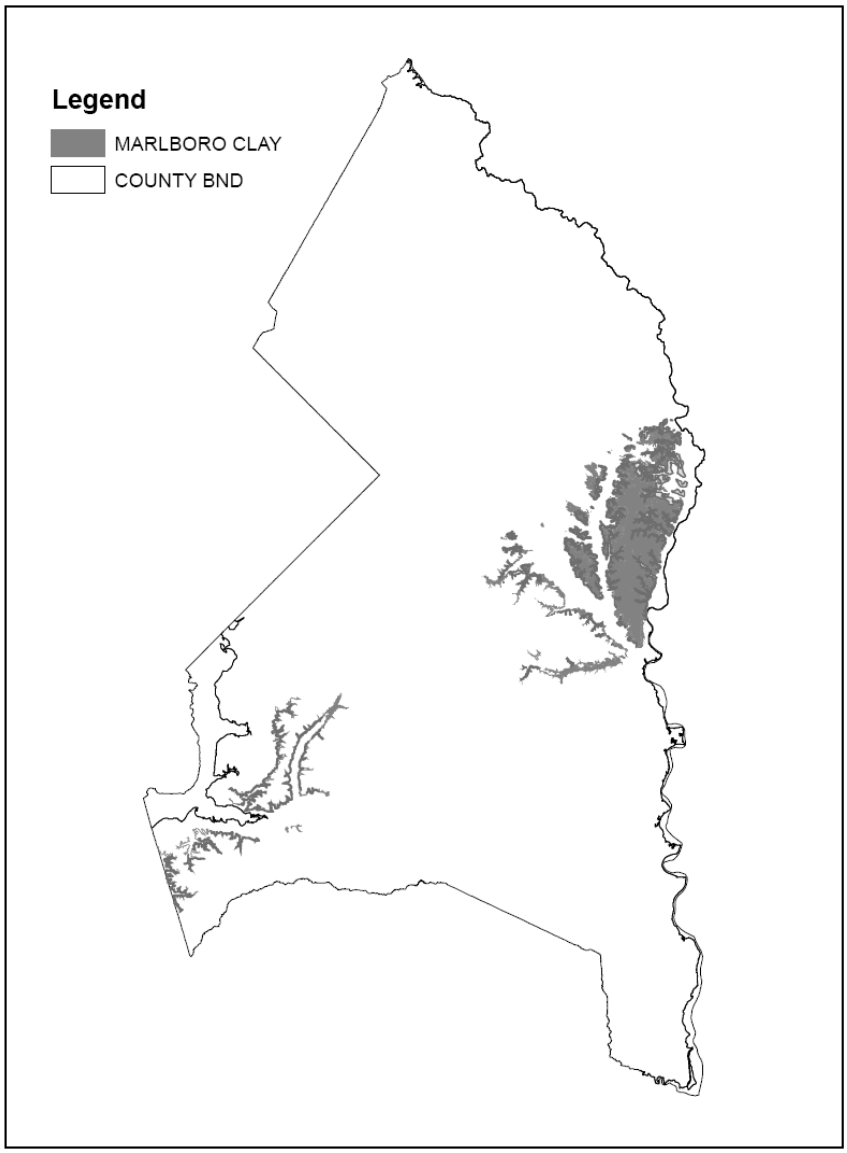


Figure 4-7. Marlboro clays.

4.7 2010 Update

- Added explanation for retaining 2005 HIRA, with minor modification to reflect occurrence of events (Section 4.1).
- Text modified to refer to the State's analysis and note the State's "relative risk values" (Section 4.1).
- Modified the table summarizing the results of the HIRA to add streambank erosion (medium-high risk level) and to change land movement to medium-high in recognition of recent subsidence occurrence (Section 4.1).
- Added Hurricane Katrina to the list of federally-declared events (Section 4.2).

- Added new section to recognize streambank erosion as a separate hazard (Section 4.6.1).
- Updated activations of County's snow emergency plan (Section 4.6.2).
- Revised text on the Enhanced Fujita Scale; updated data on high wind events; noted tornadoes experienced in 2008; modified suggested frequency of high wind events (Section 4.6.3).
- Added NCDC data on thunderstorm, high winds, lightning, and hail events (Section 4.6.4).
- Added description of 2007 drought conditions and NCDC data on droughts; updated crop data (Section 4.6.5).
- Corrected data on dams (Section 4.6.7).
- Updated extreme heat history with two notable events between 2005 and 2009 and number of deaths attributed to extreme heat (Section 4.6.8).
- Added description of 2008 subsidence event and map of Marlboro Clays (Section 4.6.9).

Chapter 5
Flood Hazards and Risks

5.1 Introduction

All waterways and bodies of water are subject to flooding – a condition that occurs when the volume of water exceeds the capacity of waterway channels or when tidal waters are pushed inland by coastal storms:

- Riverine or nontidal bodies of water are those that drain upland areas and are not influenced by coastal and tidal processes. In addition to rivers, nontidal bodies of water include streams and creeks and other small flowing waters. Localized flooding can occur in low spots even if not adjacent to a body of water.
- Coastal flooding affects tidal bodies of water, including the tidal reaches of the Potomac River and the Patuxent River in Prince George's County. The Potomac River is subject to tidal flooding along its entire length in the County and the Patuxent River is subject to tidal flooding up to the confluence of Western Branch.

5.2 Riverine Flooding

City of Laurel
Chapter 7 describes riverine flood hazards and risk in the City of Laurel.

The first Flood Insurance Study and Flood Insurance Rate Maps (FIRMs) for Prince George's County were dated August 4, 1972 and prepared by the U.S. Department of Housing and Urban Development (precursor agency to FEMA). Since that time, updates of several panels have been processed. The most recently revised and reprinted map panel is dated September 6, 1996. In 1999, the Department of Environmental Resources executed a memorandum of agreement to partner with FEMA to create and maintain accurate, up-to-date flood hazard data for the County. Figure 5-1 shows the extent of flooding as depicted on the FIRMs. As of late 2009, the revised maps had not been published; the preliminary FIRM (showing proposed revisions), will be published in 2010 (the anticipated effective date may be 2010 or 2011).

Starting in the 1980s, the Department of Environmental Resources began to obtain state grants and use County funding to prepare more up-to-date watershed studies to delineate floodplains. The County's studies and maps, prepared with detailed base data and detailed engineering models, account for future watershed development. This also is the basis for the State's regulation of nontidal waterways. Watershed studies were prepared for the following:

- Piscataway Creek (1986)
- Henson Creek (1986)
- Western Branch of the Patuxent River (1981, 2001)
- Tinkers Creek (1980)
- Anacostia River (1993; ongoing)

- Folly Branch (1987)
- Collington Branch (1981)
- Bald Hill Branch (1994)
- Southwest Branch (1994)
- Charles Branch (1981)
- Oxon Run (1989, 1995)
- Beaverdam Creek (1992)

Prince George's County recognizes and manages riverine flood hazard areas (see Section 6.3) that are designated in two ways:

- Areas identified as vulnerable to flooding from the 1%-annual-chance flood that are shown on the County's Flood Insurance Rate Maps (FIRMs) prepared by the NFIP; and
- Other flood maps based on studies prepared by the County to evaluate the impact of future development and that may include areas not studied by the NFIP.

5.3 Coastal Flooding

Coastal flooding affects tidal bodies of water in Prince George's County, including the tidal reaches of the Potomac River and the Patuxent River. The Potomac River is subject to tidal flooding along its entire length in the County and the Patuxent River is subject to tidal flooding up to the confluence of Western Branch.

Coastal flooding may be caused by hurricanes, tropical storms, Nor'easters, and when long-duration on-shore winds coincide with high tides. In Prince George's County, storm surges produced by hurricanes and tropical storms depend on storm intensity, forward speed, and timing (with respect to high tide). Surge levels predicted by modeling developed by the National Hurricane Center[1] range from 3 or 4 feet (Category 1 hurricane) to more than 11 feet (Category 4 hurricane).[2]

The County's FIRM shows the 1%-annual-chance (100-year) coastal flood elevations that range from 5 feet at the Patuxent River/Chesapeake Bay confluence to 10 feet at the County boundary on the Potomac River upstream of the Woodrow Wilson Bridge. It is notable that these depths do not account for wind-driven waves which may add several feet. The duration of coastal flooding is influenced by the tidal cycle, and usually lasts 12-14 hours.

[1] Sea Lake and Overland Surges from Hurricanes (SLOSH)
[2] All depths referenced to mean seal level (National American Vertical Datum of 1988)

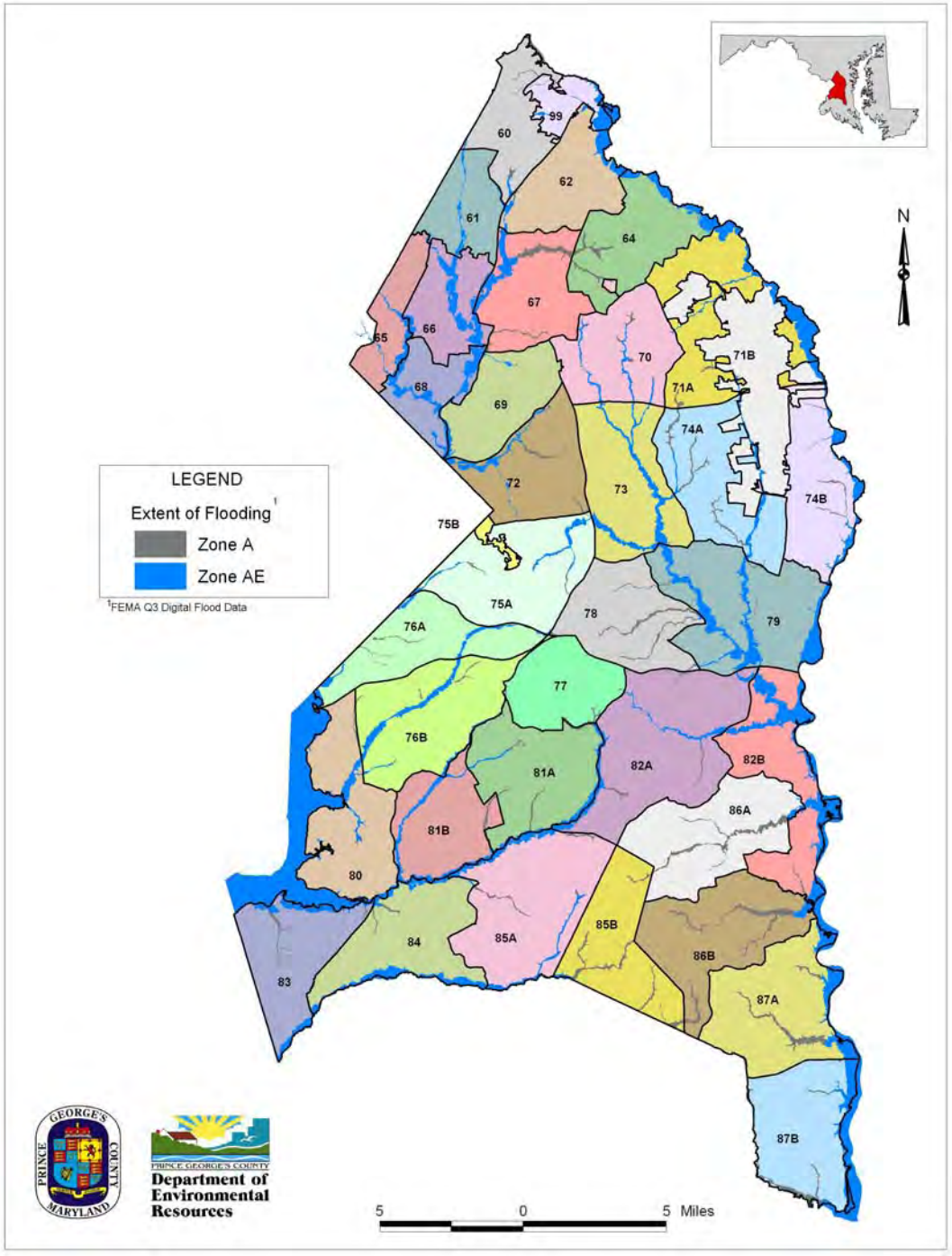


Figure 5-1. Extent of flooding based on effective FIRMs (2005).

Although the risk assessment assessed coastal erosion as a separate hazard (details in Appendix A), erosion is related to coastal storms and thus the County considers it a flood-related risk. Shore erosion rates have been tracked by the Maryland Geological Survey and the U.S. Army Corps of Engineers. While there is no information on erosion rates for much of the County's tidal shoreline, a short reach at the confluence of the

Potomac River and Piscataway Creek is identified as having a "moderate" erosion rate of 2 to 4 feet per year (the affected area is within Piscataway Park, ease of Mockley Point). All together, erosion risks appear to affect only two residences on the Potomac River (Indian Queen Estates) and two roads (King Charles Terrace just east of the Prince George's Yacht Club, and an embankment of I-495 in Oxon Hill near Oxon Creek).

5.4 Flood Hazard History

Prince George's County has experienced some riverine and stream flooding in recent decades, although sound management of flood hazard areas and construction of flood control projects has reduced potential losses. Notable riverine and coastal flooding has occurred several times since 1933:

- August 1933 – this unnamed hurricane caused flooding along the Potomac River and throughout the Chesapeake Bay; the Livingston Bridge on Piscataway Creek was flooded.
- October 1954 – Hurricane Hazel raised water levels in the Potomac River Basin; statewide, the storm caused 6 deaths and an estimated at $11.5 million in damage.-
- August 1955 – Hurricane Connie– caused riverine flooding that inundated a large commercial section of Upper Marlboro and flooded several buildings along Piscataway Creek; surge reached 4 feet above normal at the confluence of Patuxent River with Western Branch.
- August 1971, heavy rain and flooding;
- June 1972 – Tropical Storm Agnes. This storm of record brought high water levels along the Patuxent and Potomac River basins; statewide it caused 19 deaths and $80 million in damage; in Prince George's County, the storm caused more than $10 million in damage (see box on page 5-5).
- September 1975 – Hurricane Eloise, heavy rain and flooding; Prince George's County was included in the major disaster declaration.
- September 1978 – Hurricane David; Prince George's County was included in the major disaster declaration.
- November 1985 – Hurricane Juan affected the Potomac River Basin; Prince George's County was included in the major disaster declaration.
- September 1996 – Hurricane Fran. Remnants of this large storm caused flooding along the Potomac River Basin; Prince George's County was included in the major disaster declaration.
- September 2003 – Hurricane Isabel produced widespread wind damage, power outage, and localized flooding. Damages to private and public property (buildings, trees, vehicles) were estimated at $1.2 million.

- June 2006 – Heavy rains caused flooding when a strong cold front moved from the Ohio Valley across the mid-Atlantic region resulting in severe thunderstorms, damaging wind gusts, and several instances of flash flooding. Numerous cars were stuck in flooded roadways, and property damage from wind and flood was estimated at $40,000.
- April 2007 – A nor'easter impacted the Mid Atlantic region causing flooding and high wind and resulting in fallen trees and power lines across central Maryland. Flooding was reported on Marlboro Racetrack Road in Upper Marlboro and on Governor Bridge Road near the Prince George's County line. An apartment complex in District Heights reported a foot and a half of water flooding some units.
- May 2008 – Prolonged rainfall affected several areas of the County. The most notable consequence was the sinkhole that affected 5 homes on Yorkville Road (see Section 4.6.9).

The Legacy of Tropical Storm Agnes

Leaving behind more than $10 million in damage in Prince George's County and the City of Laurel, Tropical Storm Agnes moved through the area on June 21-22, 1972. Newspaper reports described the aftermath:

- *$1 million damage to public buildings, roads and bridges.*
- *Worst hit areas included along Chillum Road, Lewisdale, the Green Meadows subdivision in Hyattsville, Lakeland section of College Park, Brentwood, the Adelphi Mill area on Riggs Road, Oxon Run Drive, Tucker Road Bridge, and Water Street Bridge in Upper Marlboro.*
- *More than 1,800 people were served at shelters.*
- *Home foundations were braced with sandbags, propane gas tanks became detached, basements were flooded.*
- *County personnel evaluated livability of damaged structures.*
- *WSSC reported erosion damage to some water supply mains; low-lying sewage collection and pump facilities were damaged.*

5.5 Flood Risk Assessment: Introduction

The *Prince George's County Hazard Identification and Risk Assessment Report* (September 2004) is contained in a separate document (Appendix A). It was reviewed as part of the 2010 plan update. It is noted that the margin of error for most of the analyses performed for the 2005 HIRA are plus or minus 10%; thus, it was determined unnecessary to revise the analyses.

The estimate of population for 2008 is 820,852 (indicating a slight increase of 2.4% from the 2000 Census figures). This minor change – and a likely even small change within the floodplain – does not change the outcome of the HIRA and recomputation to account for that minor change would not change the overall risk, nor the relative ranking of the prevalent hazards. In addition, because of the County's rigorous floodplain management program, few proposals to construct in flood hazard areas are submitted.

See Chapter 4 for an explanation as to why the computations were not revised for the 2010 Plan update. The Mitigation Advisory Committee anticipates undertaking a reevaluation of the HIRA for the 2015 update, by which time the revised Flood Insurance Rate Maps will be available.

Between 2005 and 2009, FEMA issued only five Letters of Map Amendment based on Fill. Property owners obtain these letters when they propose to place structural fill in FEMA-mapped floodplains in order to raise a building site above the flood elevation. In riverine floodplains, the County requires that off-setting excavation accompany proposals to place fill in order to compensate for any potential impact in flood elevations:

- Greenbelt Station (riverine)
- 215 Gingrich Drive
- University View Village, Baltimore Avenue (riverine)
- The Varsity at College Park, Baltimore Avenue (riverine)
- National Harbor Place (tidal)

5.5.1 Audit of Selected Flood-Prone Buildings

As part of the FEMA grant awarded to develop this 2010 plan update, DER obtained funds to perform flood audits of selected flood-prone private and public buildings. DER contacted more than 80 owners of private buildings that were identified in the *Flood Damage Reduction Program* (see Section 5.6). Of those, owners of about 15 properties expressed interest in participating. In addition, the two schools that were previously identified as potentially subject to flooding were evaluated as were a number of buildings owned by The Maryland-National Capital Park and Planning Commission. Floodproofing projects to protect nonresidential buildings, including government-owned buildings, are eligible for hazard mitigation grant funding, provided the projects are feasible and cost effective.

Performing the flood audits involved site visits to assess buildings to identify actions that may be undertaken to reduce future flood damage, including action that may be eligible for grant funding. DER developed Field Data Collection Protocols and Data Collection Forms and produced a report for each property audited. A variety of alternatives were considered, ranging from dry floodproofing to protection of service equipment.

The final report of the floodproofing audit project is included in Appendix B.

5.6 Flood Risks – Private Buildings

In 2007, the Department of Environmental Resources updated the *Flood Damage Reduction Program*. It determined that approximately the same number of buildings are subject to flooding as were identified in the hazard identification and risk assessment prepared for the 2005 mitigation plan.

- The 2007 report summarized the data by major watershed, broken down by flood frequency (Table 5-1) and illustrated the distribution of at-risk buildings (Figure 5-2).
- The 2005 evaluation summarized the data by planning area (Table 5-2). This effort identified residential and non-residential buildings that appear to be located "in" the floodplains of Prince George's County (as shown by the digital layer prepared by FEMA using the Flood Insurance Rate Maps). The estimated total damages per planning area are based on computations summarized in the *Hazard Identification and Risk Assessment* (Appendix A).

Historic Resources

Using GIS analyses, the County identified 33 historic sites and resources that have at least a portion of the property within the mapped special flood hazard area. Of those, five are listed on the National Register of Historic Places: Avondale Mill Complex; Piscataway Park Archeological Site; Want Water Ruins; St. John's Episcopal Church & Cemetery; and the D.C. Boundary Marker.

With about 3,700 flood-prone buildings, approximately 2% of all buildings in the County are exposed to some degree of risk. It is important to note that location within a mapped floodplain does not, by itself, suggest that significant damage is likely. It is highly unlikely that any single storm would produce major flooding (e.g., to the 100-year levels) throughout all of the mapped flood hazard areas. It is more common for small and intense storms to affect only one or two watersheds or subwatersheds. A more detailed assessment of flood-prone buildings will be prepared when the County's Flood Insurance Rate Maps are revised, anticipated to be complete sometime in 2010 or 2011.

Table 5-1: Breakdown of Floodprone Addresses by Major County Watersheds (from 2007 *Flood Damage Reduction Program*)

	2 YEAR			10 YEAR			100 YEAR			TOTAL		
Watershed	Res	Non-Res	Total	Res	Non-Res	Total	Res	Non-Res	Total	Res	Non-Res	Total
ANACOSTIA RIVER	2	0	2	9	1	10	2	40	42	13	41	54
BEAVERDAM CREEK	0	0	0	0	0	0	200	86	286	200	86	286
CHARLES BRANCH	0	0	0	1	0	1	30	2	32	31	2	33
HENSON CREEK	0	1	1	6	6	12	12	7	19	18	14	32
INDIAN CREEK	30	43	73	26	56	82	27	18	45	83	117	200
NORTHEAST BRANCH	35	11	46	169	52	221	773	263	1,036	977	326	1,303
NORTHWEST BRANCH	10	4	14	257	17	274	780	88	868	1,047	109	1,156
OXON RUN	16	4	20	40	5	45	61	11	72	117	20	137
PAINT BRANCH	32	14	46	56	57	113	122	38	160	210	109	319
PISCATAWAY CREEK	6	2	8	2	0	2	7	0	7	15	2	17
SOUTHWEST BRANCH	0	1	1	4	3	7	23	6	29	27	10	37
TINKERS CREEK	0	0	0	2	1	3	2	2	4	4	3	7
WESTERN BRANCH	4	6	10	3	3	6	45	43	88	52	52	104
	135	86	221	575	201	776	2,084	604	2,688	2,794	891	3,685

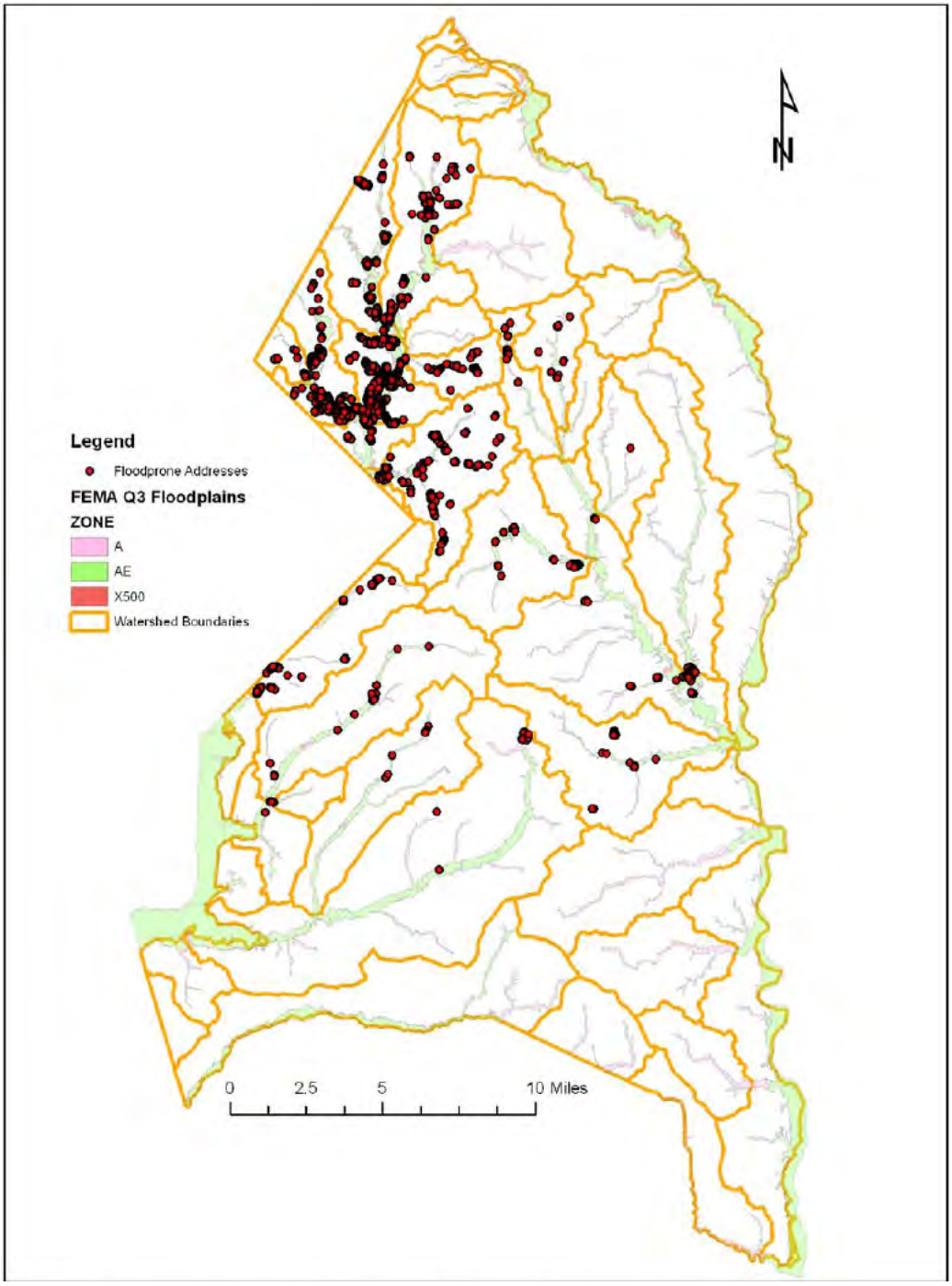


Figure 5-2. Location of flood-prone addresses (from 2007 *Flood Damage Reduction Program*).

Table 5-2: Flood-Prone Structures (fom *2004 Risk Assessment, Appendix A*)

By Planning Area	# Structures (estimated)	Estimated $ Damage
61 Fairland-Beltsville & Vicinity	72 homes 28 nonresid	$6,480,000
62 South Laurel-Montpelier	19 homes 83 nonresid	$5,600,000
65 Langley Park & Vicinity	244 homes 25 nonresid	$22,400,000
66 College Park-Berwyn Heights & Vicinity	287 homes 118 nonresid	$114,700,000
67 Greenbelt & Vicinity	14 homes 19 nonresid	$2,900,000
68 Hyattsville-Riverdale-Mt Rainier-Brentwook	1,559 homes 273 nonresid	$139,700,000
69 Bladensburg-New Carrollton & Vicinity	183 homes 166 nonresid	$49,900,000
70 Glenn Dale-Seabrook-Lanham & Vicinity	22 homes 5 nonresid 2 public	$500,000
72 Landover & Vicinity	144 homes 61 nonresid 3 institutional	$59,400,000
73 Largo-Lottsford	26 homes 1 public	$881,000
75A Suitland-District Heights & Vicinity	41 homes 13 nonresid 1 public	$6,100,000
76A The Heights	96 homes 11 nonresid 2 public	$4,200,000
76B Henson Creek	18 homes 5 institutional 1 public	$1,500,000
77 Melwood	15 homes	$10,000
79 Upper Marlboro & Vicinity	20 homes 39 nonresid	$188,900,000
80 South Potomac Sector	9 nonresid	$1,298,000
82A Rosaryville	31 homes 5 nonresid	$690,000
Total County	3,693 buildings (2,803 homes, 890 others)	$605,159,000

Estimating Losses for Flood

The amount of damage sustained by flood-prone structures depends on a variety of factors, including depth of water, duration of flooding, velocity of flow, degree of exposure (depth of water above the floor), and type of construction. For the 100-year flood, the depths of water that are predicted for individual buildings in Prince George's County range from inches to more than 6 feet.

Applying depth-damage functions developed for the NFIP yields dollar damage estimates for structures, contents, and loss of function or displacement. The depth-damage functions for different construction types are applied to determine potential damage as a percent of building value. The most significant losses are likely to be sustained by commercial properties, largely because of the relatively higher dollar values of such properties.

The results of the 2005 evaluation and the 2007 *Flood Damage Reduction Program* report are not directly comparable because the methodologies are different (and dollars have not been adjusted):

- The 2007 report summarized the total values of improvements (buildings only) in the major watersheds, yielding a total value of $641.6 million (Table 5-3a and 5-3b).
- The 2005 evaluation summarized the data by planning area, yielding $605.2 million (Table 5-2).

Table 5-3a: Breakdown of Flood-Prone Property [Total] Values of Improvements by Major County Watersheds (from 2007 *Flood Damage Reduction Program*)

	2 YEAR			10 YEAR		
Watershed	Res	Non-Res	Total	Res	Non-Res	Total
ANACOSTIA RIVER	$1,651,480	$0	$1,651,480	$802,750	$755,948	$1,558,698
BEAVERDAM CREEK	$0	$0	$0	$0	$0	$0
CHARLES BRANCH	$0	$0	$0	$115,313	$0	$115,313
HENSON CREEK	$0	$296,866	$296,866	$474,400	$1,217,860	$1,692,260
INDIAN CREEK	$2,739,849	$15,346,150	$18,085,999	$2,788,536	$23,473,307	$26,261,843
NORTHEAST BRANCH	$3,567,209	$9,962,289	$13,529,498	$20,841,784	$22,775,823	$43,617,607
NORTHWEST BRANCH	$1,451,754	$444,018	$1,895,772	$23,085,734	$7,114,870	$30,200,604
OXON RUN	$1,322,746	$1,475,400	$2,798,146	$2,359,447	$1,162,568	$3,522,015
PAINT BRANCH	$8,080,415	$4,790,385	$12,870,800	$11,387,625	$71,077,968	$82,465,593
PISCATAWAY CREEK	$841,918	$142,909	$984,827	$303,706	$0	$303,706
SOUTHWEST BRANCH	$0	$78,800	$78,800	$457,330	$910,400	$1,367,730
TINKERS CREEK	$0	$0	$0	$186,819	$425,900	$612,719
WESTERN BRANCH	$342,599	$670,012	$1,012,611	$415,939	$402,709	$818,648
	$19,997,970	$33,206,829	$53,204,799	$63,219,383	$129,317,353	$192,536,736

Table 5-3b: Breakdown of Flood-Prone Property [Total] Values of Improvements by Major County Watersheds (from 2007 *Flood Damage Reduction Program*)

	100 YEAR			TOTAL		
Watershed	Res	Non-Res	Total	Res	Non-Res	Total
ANACOSTIA RIVER	$128,520	$15,001,742	$15,130,262	$2,582,750	$15,757,690	$18,340,440
BEAVERDAM CREEK	$16,053,988	$29,625,068	$45,679,056	$16,053,988	$29,625,068	$45,679,056
CHARLES BRANCH	$2,974,292	$251,468	$3,225,760	$3,089,605	$251,468	$3,341,073
HENSON CREEK	$1,082,120	$1,778,778	$2,860,898	$1,556,520	$3,293,504	$4,850,024
INDIAN CREEK	$3,461,345	$5,918,670	$9,380,015	$8,989,730	$44,738,127	$53,727,857
NORTHEAST BRANCH	$81,860,058	$76,393,592	$158,253,650	$106,269,051	$109,131,704	$215,400,755
NORTHWEST BRANCH	$61,413,763	$23,158,248	$84,572,011	$85,951,251	$30,717,136	$116,668,387
OXON RUN	$4,191,109	$2,906,855	$7,097,964	$7,873,302	$5,544,823	$13,418,125
PAINT BRANCH	$14,579,601	$21,189,853	$35,769,454	$34,047,641	$97,058,206	$131,105,847
PISCATAWAY CREEK	$839,915	$0	$839,915	$1,985,539	$142,909	$2,128,448
SOUTHWEST BRANCH	$2,851,740	$2,803,200	$5,654,940	$3,309,070	$3,792,400	$7,101,470
TINKERS CREEK	$170,066	$152,359	$322,425	$356,885	$578,259	$935,144
WESTERN BRANCH	$4,066,667	$22,967,842	$27,034,509	$4,825,205	$24,040,563	$28,865,768
	$193,673,184	$202,147,675	$395,820,859	$276,890,537	$364,671,857	$641,562,394

NFIP Policies In-Force

In 1968, the U.S. Congress created the National Flood Insurance Program (NFIP). Among the purposes of the program are the reduction of flood damage through management of development proposed in flood hazard areas and having flood-prone property owners contribute towards their own recovery through an insurance mechanism, rather than rely on federal disaster relief.

The NFIP provides online access to certain statistics about flood insurance policies and claims (Table 5-4). The claims data suggests that flooding has not affected many buildings since 1978, although with nearly 3,700 buildings identified as being in the floodplain, clearly many are not covered by NFIP flood insurance. Figure 5-3 and Figure 5-4 show the plotted locations of buildings that were insured as of mid-2004 (and those that have submitted claims, both paid and unpaid) in the County and Laurel. It is notable that a large number of buildings appear to be located outside of flood hazard areas shown on FIRMs. (Note: More recent NFIP policy and claims data were requested for the 2010 Plan update, but were not provided by FEMA.)

Table 5-4: NFIP Policies, Claims Paid & Repetitive Losses (as of December 31, 2009)

	NFIP Policies*	NFIP Claims Paid*	NFIP Repetitive Losses
Prince George's County	2,679	353	1
City of Laurel	127	12	0
City of Bowie	If any, included with County		

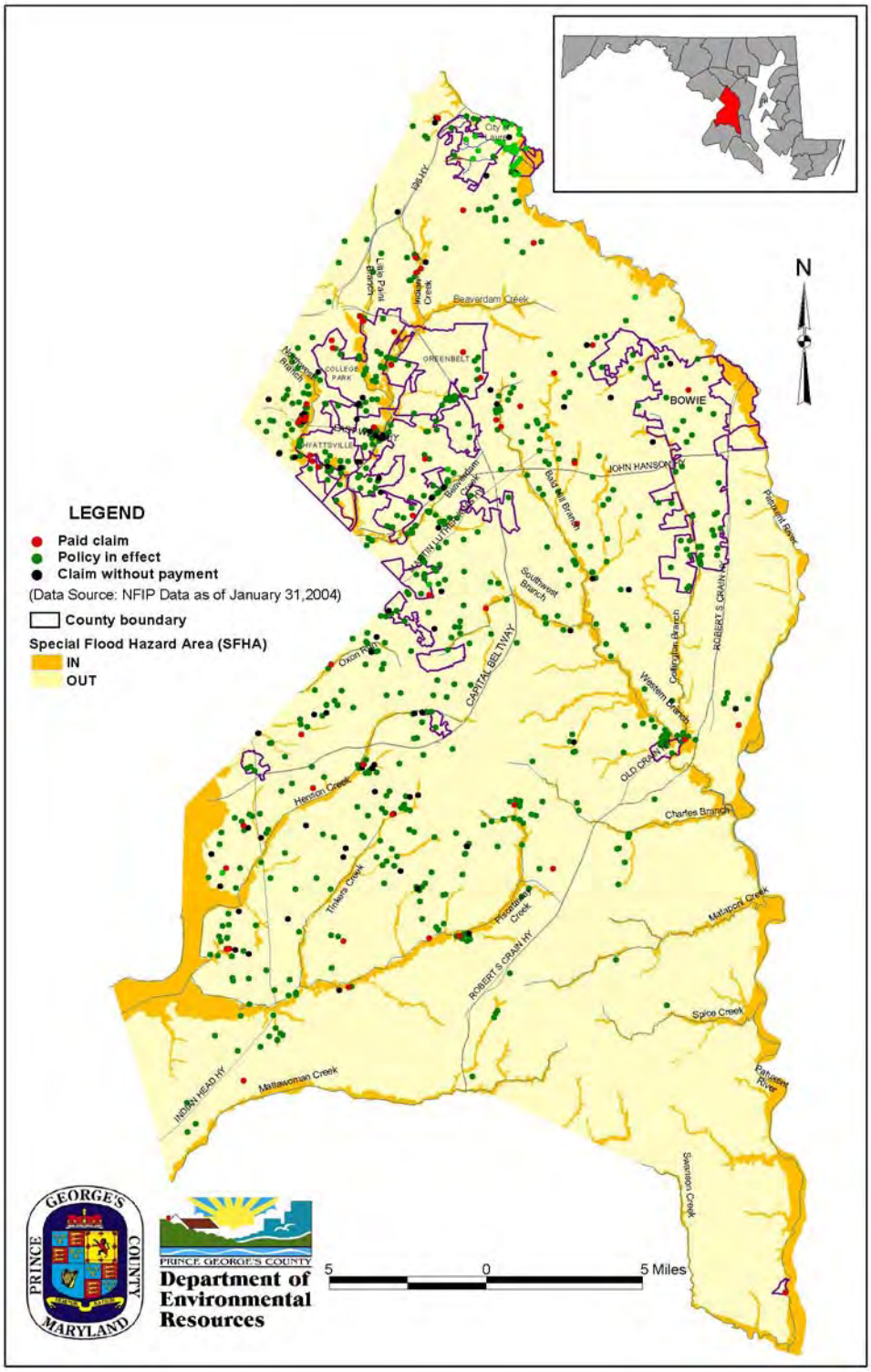


Figure 5-3. NFIP policies & claims (2004): Prince George's County.

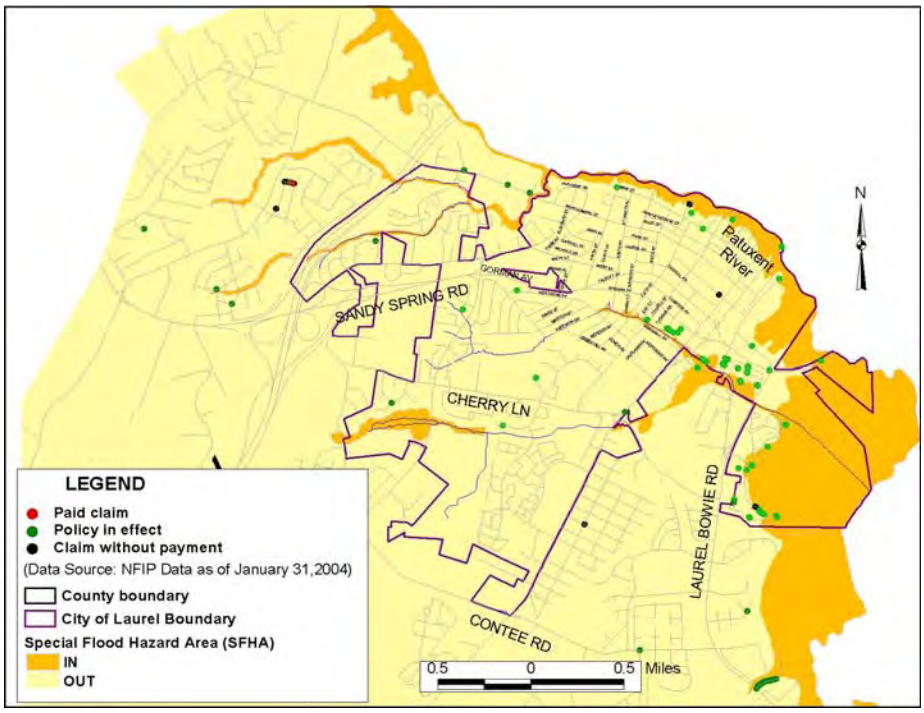


Figure 5-4. NFIP policies & claims (2004): City of Laurel.

NFIP Repetitive Loss Properties

Data provided by FEMA in 2009 identified one privately-owned property as a "repetitive loss property." Repetitive loss properties are those for which two or more NFIP flood insurance claims of at least $1,000 have been paid. The identified property is a commercial building in the floodplain of Piscataway Creek (Figure 5-5). There are no other buildings in the vicinity of this repetitively-flooded building. Due to the nature of the commercial use, the County has determined the property is not a candidate for purchase.

Neither the County nor City of Laurel has any "severe repetitive loss properties." By Federal definition, such properties are insured by the NFIP and have received four or more flood insurance claims of at least $5,000 with a cumulative amount of such claims exceeding $20,000, or at least two separate claims with the cumulative amount exceeding the value of the property.

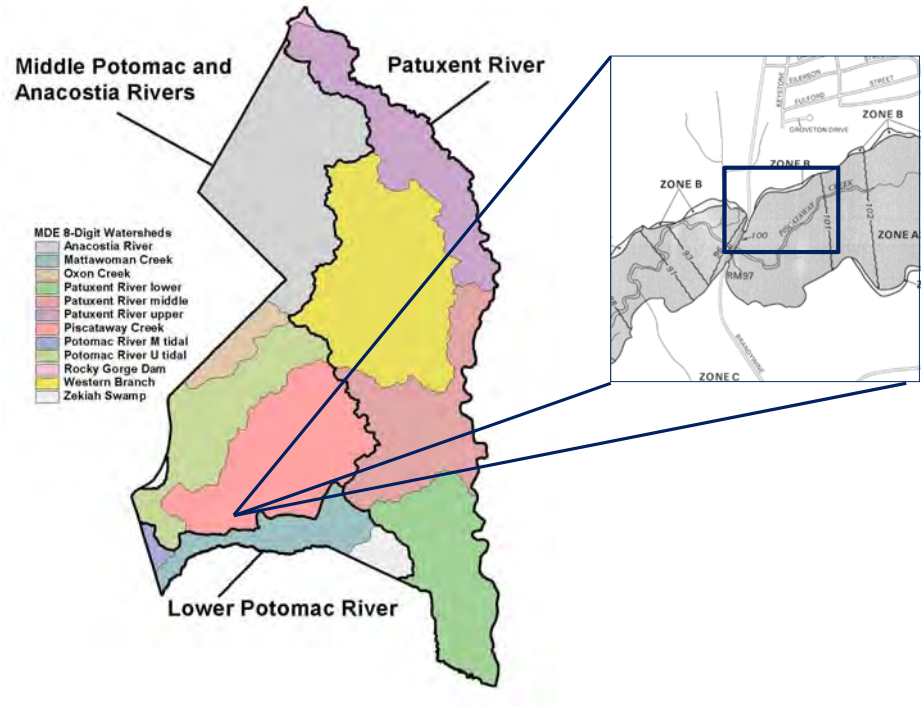


Figure 5-5. NFIP "repetitive loss" area (2009).

5.7 Flood Risks – Public Properties

Several local government agencies own land and buildings in Prince George's County and it appears that at least 30 public properties have some degree of flood risk (Table 5-5). The notes on specific sites are based on information provided by DER or the pertinent agency (see also Chapter 6 for more detail on each agency).

In May 2008, the County Administration Building in Upper Marlboro was closed when the site was affected by flooding of Western Branch.

Table 5-5: Public Facilities & Critical Facilities

Agency	Total # of Buildings or Sites	Notes on Specific Buildings/Sites with Some Degree of Flood Risk*
County Council	1	County Administration Building (Western Branch); site impacts
County Public Schools	5	Riverdale Elementary (Northeast Branch); building may be in mapped floodplain (see Note) Scotchtown Hills Elementary (Patuxent River); building may be in mapped floodplain (see Note) Patuxent Elementary (Patuxent River); minor flooding on lower portion of site (no buildings impacted) Lewisdale Elementary (Northwest Branch); minor flooding on grounds (no buildings impacted) Forest Heights Elementary (Oxon Run); tributary floods site; recent floodwall provides protection
The M-NCPPC	3	Office building at 6600 Kenilworth Avenue (Northeast Branch, Anacostia River); site flooded July 2004 and 2008 (see Note) Clubhouse at Paint Branch Golf Complex (Paint Branch); damaged in 2003 (see Note) Bladensburg Marina (Anacostia River) (see Note)
The M-NCPPC	14	Buildings that may have some flood risk (see Note)
Public Works & Transportation	6	Flood control pump stations (does not include WSSC sewer pump stations)
Hospitals	0	None identified
State Building	1	Maryland Fire and Rescue Institute Training Center

*May be in or near the flood hazard area; based on property tax maps and floodplain studies.

Note: Facility scheduled for flood audit in 2010.

5.8 Flood Risks – Roads

Prince George's County has more than 1,740 miles of roads and a total of 953 bridges and culverts that span streams. Table 5-6 lists roads and intersections identified by the Department of Public Works & Transportation as sufficiently prone to flooding that signs are installed. It is notable that a number of the flood-prone areas are associated with inadequate local drainage, rather than stream flooding. When widespread flooding is predicted, DPW&T crews are deployed to unlock and display the signs.

Table 5-6: Roads Posted with Flood Warning Signs

Flood-Prone Roads	
Springfield Road over Beaverdam Creek	Farmington Creek Road (north of Farmington Road West) local drainage
Sunnyside Avenue (off Edmonston Road) over Indian Creek	Farmington Road West (east of John Clagett Road) local drainage
Ardwick-Ardmore Road (west of Lottsford Vista Road) over Bald Hill Branch	Cherry Tree Crossing Road (south of Tower Road) local drainage
Lottsford Vista Road over Lottsford Branch	Livingston Road over local drainage to Broad Creek
Marlboro Pike (between Oakwood Lane/Suitland Drive) local drainage	Gardner Road (at the Charles County line) over Mattawoman Creek
Brinkley Road (at Lujean Lane) local drainage	Biddle Road (west of Manning Road) local drainage
Forestville Road (north of Capital Beltway) local drainage	Governor Bridge Road (at the Anne Arundel County line) over Patuxent River
White House Road (east of McCarthy Dr) local drainage	Chesterton Drive (west of Wimbleton Street) over Western Branch
Croom Station Road (8000 block, 0.5 mi north of MD 381) over Charles Branch	

Flooding in May 2008 washed out a bridge on Livingston Road and a cross-pipe under Brinkley Road failed. The DPW&T's standard procedures for addressing flooding when repairing or replacing damaged bridges is described in Section 6.6.

The Department's records of declared major disasters since 1990 indicate that no significant physical damage due to flooding has been sustained by the road system and that federal funds were not required for permanent restorative work on roads and bridges.

5.9 Flood Risks – Levees

The levees along the Anacostia River were designed by the U.S. Army Corps of Engineers which started construction in 1954 (Figure 5-6). In 1959, the levees were turned over to the Washington Suburban Sanitary Commission for maintenance. Subsequently, the maintenance responsibilities were assumed by the County. The DPW&T partners with the Corps to conduct annual inspections. Routine maintenance includes cutting, mowing, trimming and repair is preformed several times each year.

In the mid-1990s, the Department of Environmental Resources prepared a watershed study that examined anticipated flood discharges and flood levels. Because of decades of upland development that changed rainfall-runoff patterns, the 100-year flood was determined to be larger than the design flood used by the Corps to design the levees. Therefore, the County expressed concern that the levees no longer provided the intended level of protection. A study determined that in some places, the tops of the levees are

lower than required by current standards. Three areas could be affected by levee overtopping; together, more than 2,100 structures are in these vulnerable areas (Figure 5-7).

In 2009, the Corps and the County held discussions regarding a plan to remove trees that had not previously been identified as problematic and to address vegetation and high grass that obstruct identification of potential erosion and burrowing animals that may weaken the structures.

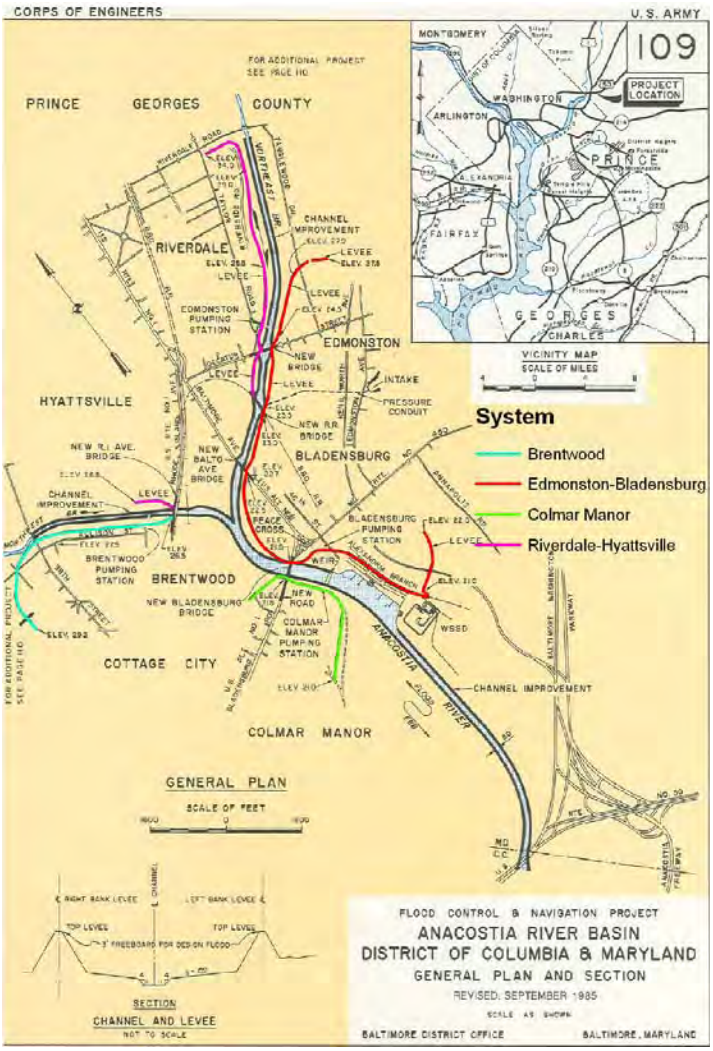


Figure 5-6. Anacostia River levees.

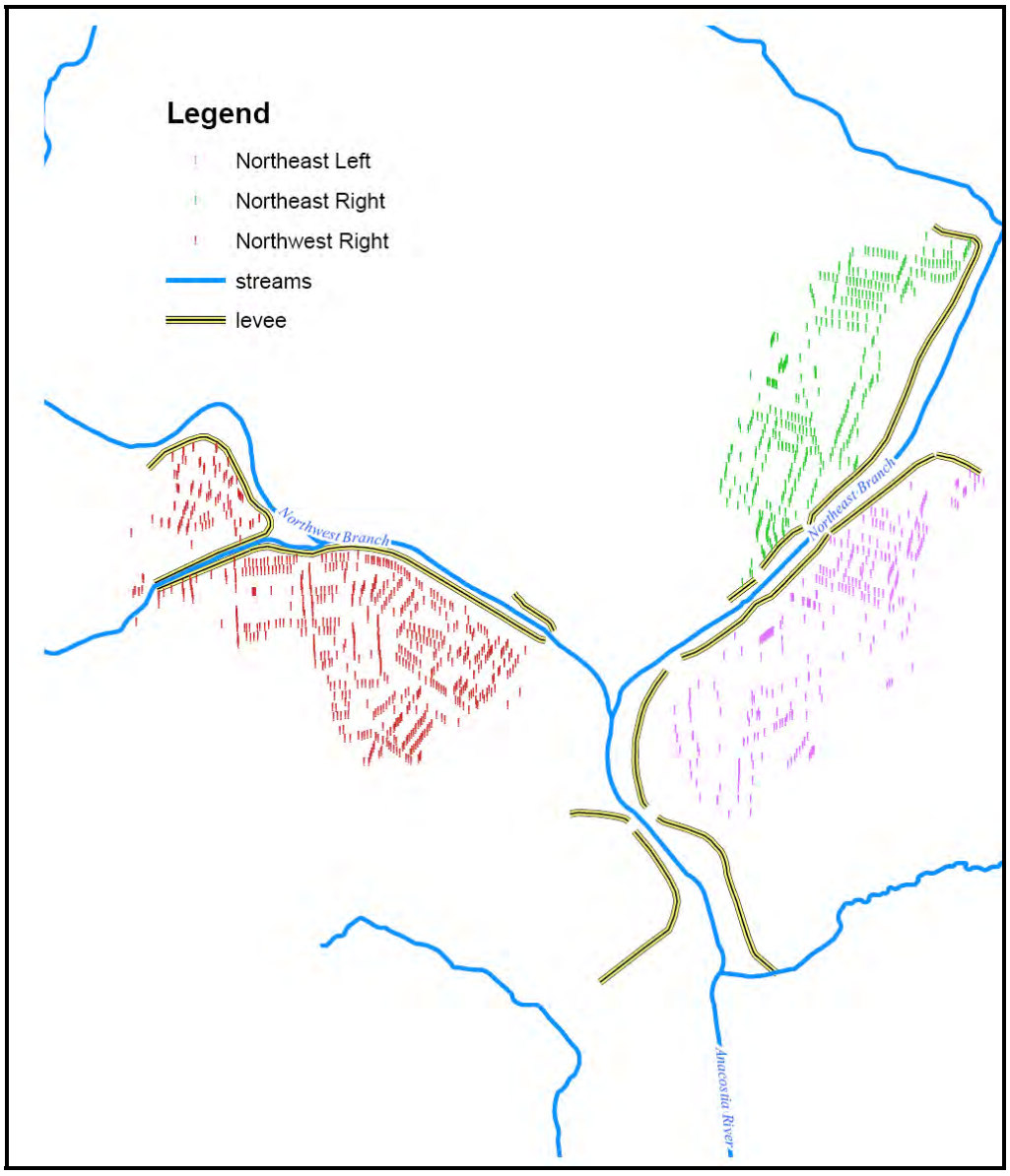


Figure 5-7. Structures prone to flooding if levees overtop.

5.10 Summary: Flood Risks

Table 5-7 summarizes flood risks in Prince George's County. Although the County is growing, with a 10% increase in population between 1990 and 2000, the number of homes and non-residential buildings that are exposed to flooding is not growing at a commensurate rate because of stringent floodplain management requirements.

Table 5-7: Prince George's County:
Summary of Flood Risks

	Totals
People in at-risk residential buildings in SFHA (estimate*)	7,655
Residential Buildings in SFHA(2007 estimate)	2,794
Nonresidential Buildings in SFHA (2007 estimate)	891
Critical/Special Facilities in SFHA (hospitals, schools, fire stations)	2
Other Public Buildings & Facilities in SFHA (building & sites)	28
Roads/Bridges (experience frequent flooding)	17
Buildings at-risk of overtopping Anacostia Levees (residential and nonresidential)	2,100
High Hazard Dams (see Sec. 4.6.7)	6

* Based on US Census estimate of 2.74 people per household

5.11 2010 Update

- Noted that revised FIRMs are expected to become effective in 2010 (Section 5.2).
- Added three flooding events since 2005 (Section 5.4).
- Explained basis for not changing risk assessment (Section 5.5).
- Described the flood-risk audits performed for selected buildings (Section 5.5.1 and Appendix B)
- Incorporated data from the 2007 Flood Damage Reduction Program and compared to the information from the 2005 HIRA (Appendix A). Summarized GIS data identifying historic resources that intersect with floodplain data layer. Updated data on NFIP flood insurance policies and claims; described 2009 repetitive loss data and added figure to show repetitive loss area (Section 5.6).
- Updated the number of public buildings that are in the mapped floodplain; updated history of flooding to include the 2008 event that affected the site of the County Administration Building in Upper Marlboro (Section 5.7).
- Noted that a bridge washed out in 2008 (Section 5.8).
- Added new section on levees (Section 5.9).
- Update summary of data in Table 5-7 (Section 5.10).

Chapter 6
Prince George's County – Capabilities

6.1 County Government Structure

Prince George's County is one of eight charter counties in Maryland. Since 1970, it has had an elected executive and an elected council. A charter county has been granted express powers rule by the Maryland General Assembly. According to the Maryland Association of Counties (www.mdcounties.org), charter counties provide services and facilities for its citizens that are grouped by the general nature of those services and facilities:

- General Government – includes executive and legislative control, judicial support, election supervision, financial administration (budgeting and accounting), legal (counsel and prosecution), personnel administration, planning and zoning, general services, and alcoholic beverage control.
- Public Safety – includes law enforcement, fire protection, corrections, building inspection, animal control, and traffic engineering.
- Public Works – includes road construction and maintenance, sewer, water, storm drains, and solid waste collection and disposal (in Prince George's County, sewer and water services are provided by the Washington Suburban Sanitary Commission).
- Health – includes support of the state required and regulated county health department.
- Education (Kindergarten through 12th grade) – includes support of the state required county board of education that operates under state law.
- Community Colleges – includes support of the county or regional board of trustees of a community college that operates under state law.
- Libraries – includes support of the county board of library trustees that operates under state law.
- Recreation and Parks – includes recreation activities and facilities, and park and open space maintenance and development (The Maryland-National Capital Park and Planning Commission has responsibility for parks and recreation in Prince George's County).
- Development – includes such things as urban and rural development and redevelopment, housing, economic development, and economic opportunity programs.
- Debt Service – includes the annual principal and interest payments on debt issued for the development of public capital facilities (i.e., roads, schools, libraries, parks, etc.).

Prince George's County administers its services and facilities through numerous departments and agencies. The primary agencies that have direct or indirect roles related to mitigation of natural hazards and which are summarized briefly in this section include:

- Department of Environmental Resources;
- The Maryland-National Capital Park & Planning Commission
- Department of Public Works & Transportation;
- Department of Housing & Community Development;
- Homeland Security/Emergency Management;
- Office of Central Services;
- Prince George's County Public Schools;
- Fire/Emergency Medical Services; and
- Department of Family Services.

Two other organizations that have roles related to mitigation of natural hazards are summarized briefly in this section: The Maryland-National Capital Park & Planning Commission and the Washington Suburban Sanitary Commission.

6.2 Planning & Development Processes

Prince George's County is characterized by highly urbanized areas, high growth areas, and outlying rural areas. The comprehensive and long-term planning, zoning, and development review and approval processes are complex and involve several agencies, notably the Department of Environmental Resources and The Maryland-National Capital Park & Planning Commission. At every step of the process, site-specific characteristics are considered, including the presence of mapped flood hazards, wetlands, unstable soils, and steep slopes. This section presents brief overviews of key documents and highlights how natural hazards are addressed in the overall process. More detail is available online: www.co.pg.md.us/government/legislativebranch/counciladministration/plan_develop.asp

The 27 municipalities in Prince George's County participate in planning and regulating development. As shown in Table 6-1, the County and The Maryland-National Capital Park & Planning Commission perform these functions for the cities, with the exception of the city of Laurel.

Table 6-1: Development Authorities in Municipalities

Municipality	NFIP ID#	Planning	Zoning	Building Code	Floodplain Ordinance	Schools	Fire, EMS, Police
Laurel	240053	Yes	Yes	Yes	Yes	Incl*	Yes
Bowie	Incl*	Incl*	Incl*	Yes (also requires County permit)	Incl*	Incl*	Incl*
Berwyn Heights, Bladensburg, Brentwood, Capital Heights, Cheverly, College Park, Colmar Manor, Cottage City, District Heights, Eagle Harbor, Edmondston, Fairmount Heights, Forest Heights, Glenarden, Greenbelt, Hyattsville, Landover Hills, Morningside, Mount Rainier, New Carrollton, North Brentwood, Riverdale Park, Seat Pleasant, University Park, Upper Marlboro	Incl*	Incl*	Incl*	Incl*	Incl*	Incl*	Incl*

* "Incl" means the function is included in the County's process, the municipality thus does not have separate authority, ordinances, or services

6.2.1 *Approved General Plan*

The *Approved General Plan* (October 2002) makes comprehensive recommendations for guiding future development, by establishing policies and objectives for the Developed Tier (generally inside the Beltway), the Developing Tier (a broad band outside the Beltway), and the rural tier (generally along the Patuxent River and the southern part of the County). The goals of the *Approved General Plan* are consistent with the goals established for the *Hazard Mitigation Plan*.

In terms of growth management, undeveloped flood hazard areas are included among environmentally sensitive areas. As a general rule, the plan calls for protection of sensitive areas through a variety of means, including acquisitions, conservation programs, and development regulations and policies. Prince George's County is widely recognized for its progressive approach to guiding development away from flood-prone areas. Table 6-2 identifies, by tier, a number of policies that are consistent with minimizing exposure to certain natural hazards.

Table 6-2: Selected *Approved General Plan* Policies, by Tier

Developed Tier ("Impervious surfaces have claimed much of the land area and some streams"): • Preserve, restore and enhance environmental features and green infrastructure elements • Plan and provide public facilities to support and fit into the Developed Tier's development pattern [including acquisition of remaining stream valley parkland]
Developing Tier ("Woodlands, streams, floodplain and wetlands exist in abundance"): • Preserve and enhance environmental features and green infrastructure elements • Plan and provide public facilities to support the planned development pattern [including programs and criteria related to public infrastructure capacity]
Rural Tier ("Most of the county's remaining farms, extensive woodlands, numerous streams, and diverse wildlife habitat"): • Retain or enhance environmentally sensitive features and agricultural resources • Provide for a Rural Tier transportation system that helps protect open space, rural character, and environmental features and resources • Public funds should not encourage further development in the Rural Tier

The *Approved General Plan* does not explicitly address the other natural hazards that are identified in the *Hazard Identification and Risk Assessment* as having a hazard risk level of medium-high: wind; severe storm; drought; and wildland fire. The effects of wind and severe storm, which are not dependant on location, are appropriately addressed by the building code. Because water supplies are provided by WSSC and drought planning is conducted on a regional basis, drought is not a factor that influences individual development decisions.

6.2.2 Zoning & Planning

The primary elements of the zoning and planning processes are highlighted here. Extensive materials, both printed matter and webpages, are issued by DER and The M-NCPPC to explain and guide citizens and developers through the processes.

The Zoning Ordinance. The ordinance establishes a number of zones which permit residential, commercial, industrial or agricultural uses, or a mixture of those uses. Each zone has specific requirements and limitations. The Chesapeake Bay Critical Area Overlay Zones, required by the State, apply to tidal waters, tidal wetlands, and all land within 1,000 feet of the mean high tide line. Woodland conservation requirements are addressed through the review and approval of tree conservation plans (TCPs), as detailed in the Woodland Conservation Technical Manual. Landscape provisions are also included in the Zoning Ordinance and details and requirements can be found in the Landscape Manual. Variances may be sought to obtain relief from the strict application of the Zoning Ordinance, such as to allow variances to setback or building height limitations.

The Zoning Ordinance contains two specific provisions related to floodplains:

- **Sec. 27-124.01 One hundred year floodplain.** This section defines the floodplain as that which is delineated by the County's watershed management studies (or the FEMA map, at a minimum). Where no studies are available or where DPW&T has determined existing studies to be inapplicable, new studies shall be required and performed to the satisfaction of DWP&T, taking into consideration future land use based on zoning. Watercourses having less than 50 acres of upstream watershed may be excluded.
- **Sec. 27-243.02 Floodplains.** This section addresses nonconforming buildings and structures, and certified nonconforming uses that are located within a one hundred (100) year floodplain. It provides that such buildings and uses may be modified to incorporate flood-proofing measures provided that: (1) the measures do not raise the level of the one hundred (100) year floodplain; and (2) the measures are in conformance with Division 2 of Subtitle 4, "Building," of this Code, entitled "Construction or Changes in Floodplain Areas."

The Planning Process. Through several types of plans the County provides guidance for future physical development. The responsibility for the *General Plan* and other plans rests with The M-NCPPC (see Section 6.4). Area master plans address the adequacy of public facilities and development proposals are analyzed for impacts on schools, police, fire, rescue, libraries, health, parks and trails. They also are used as the basis for decisions on zoning changes, special exceptions and subdivision applications.

Subdivision Review. Highlights of the Subdivision Regulations that are pertinent to natural hazards are summarized in Section 6.2.3. These regulations control the subdivision of land for the purposes of sale or development. Each subdivision proposal is supported by a preliminary plan that depicts such features as lot lines, streets, drainage patterns, stormwater management facilities, topography, building restriction lines, easements and environmental features such as floodplains, wetlands, woodlands, steep slopes and unstable soils. After receiving preliminary plan approval most plans are recorded in the County land records office. This legally recorded document, known as a record plat, depicts lot lines, easements, building setbacks, public right-of-ways and any other encumbrances that restrict the physical development of the land. Section 6.4 provides additional detail on The M-NCPPC's role in the subdivision review process.

Additional Plans and Reviews. Certain development types are subject to the site plan review process to assure conformance with the design guidelines in the Zoning Ordinance and other applicable requirements. Environmental features and constraints are among many aspects that are reviewed and taken into consideration. Detailed site plans show additional detail, including location of buildings, open spaces, landscaping, grading and other physical features. Detailed plans are required for stormwater management (see Section 6.2.4, tree conservation, sediment and erosion control, and utilities.

Floodplain Ordinance. The Prince George's County Floodplain Ordinance (Division 2 of Subtitle 4 Building) meets and exceeds the minimum requirements of the National Flood Insurance Program. Highlights of the ordinance are summarized in Section 6.2.5.

Building Permit, Use and Occupancy. Highlights of the Prince George's County Building Code that are pertinent to natural hazards are summarized in Section 6.2.7. Building permits are required for new construction and certain work on existing buildings.

6.2.3 Subdivision Regulations

The Prince George's County regulations pertaining to the subdivision of land are found in Subtitle 24. The broad purposes are to provide for the public health, safety, and general welfare, including wise use and management of natural resources and provision of open space. A stated objective is that "Significant natural features which are impossible or difficult to reproduce, such as waterways, streams, hills, wooded lands, and specimen trees, should be preserved to the degree practicable." Some highlights pertaining to natural hazards:

- Stormwater management must be addressed in all subdivision proposals (minor subdivisions are four or fewer single-family residential lots; major subdivisions are all others).
- Preliminary plans for subdivision must show flood hazard areas, forest stands, perennial streams, nontidal wetlands, and soil types (including highly erodible soils).
- Minimum lot areas are specified, generally exclusive of any land within the 100-year floodplain.
- For residential subdivisions, a 25-foot setback from the floodplain shall be established as a building restriction line.
- Proposals for most residential subdivisions are required to plat and convey to the County or a municipality suitable and adequate land for active or passive recreation; land shown for preservation as part of a stream valley park on an official master plan may be substituted under certain conditions.
- Developers are encouraged to dedicate floodplain areas for public purpose, otherwise such areas are subject to a floodplain easement.
- The area in the floodplain easement may be used for utility lines and /or storm drainage facilities, open-type fencing, or passive recreation, provided that no structures are built that would interfere with the flood conveyance capacity.
- A 50-foot perennial stream buffer is required.
- The minimum 50-foot perennial stream buffer may be extended to include the floodplain, adjacent slopes of 25% or greater, and highly erodible soils on slopes of 15% or greater and additional area deemed necessary to protect the stream or floodplain.
- The subdivision of land found to be unsafe for development, which may be due to natural conditions such as, but not confined to, flooding, erosive stream action, high water table, unstable soils or severe slopes, or to man-made conditions such as unstable fills or slopes may be restricted or prohibited.

6.2.4 Stormwater & Wetlands Requirements

The Prince George's County regulations pertaining to stormwater management are found in Division 4, Stormwater Management (Subtitle 4 Building). Purpose of the requirements is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse results of increased stormwater runoff associated with land development. Proper management of stormwater runoff will minimize damage to public and private property, reduce the effects of development on land and stream channel erosion, assist in the attainment and maintenance of water quality standards, reduce local flooding, and maintain, as nearly as possible, the predevelopment runoff characteristics of the area.

County agencies are proposing a new subtitle to the County Code, Subtitle 32 Water Resources Protection and Grading Code, that will be acted on by the County Council in mid-2010. Many of the water resources elements that are located in Subtitle 4 (Building Code) will be moved to the new subtitle.

For development proposals, the County emphasizes the use of non-structural stormwater best management practices. Stormwater management requirements may be fulfilled by a variety of techniques, including bio-retention facilities, underground infiltration, on-site ponds, and off-site regional facilities. Protection of existing wetlands and replacement of impacted wetlands are controlled through permitting related to grading and construction activities.

County stormwater management regulations include a number of provisions for the safe conveyance of excess stormwater and floodwaters and to increase groundwater recharge:

- Control of the 10-year storm flow, at a minimum, as per the State of Maryland Stormwater design manual;
- Control of larger storms if there are known flooding and/or stormwater conveyance problems downstream;
- Stormwater management plans to be consistent with approved watershed / flood management plans;
- Use of non-structural best management practices and disconnection of impervious surfaces to the maximum extent practicable;
- Conservation of natural areas to the greatest extent practicable; and
- Safe conveyance of 100-year flows to a natural channel.

The Prince George's County regulations pertaining to nontidal wetlands protection are found in Division 6, Nontidal Wetland Protection Ordinance (Subtitle 4 Building). The goal is to ensure no net loss of nontidal wetland acreage and function and to strive for a new resource gain in the County. Through this program further degradation and losses of nontidal wetlands will be prevented wherever possible. Where losses are unavoidable, these losses will be offset through restoration or creation of nontidal wetlands.

Development proposals that include wetland impacts are subject to the requirements of the Maryland Department of the Environment and the U.S. Army Corps of Engineers.

6.2.5 Floodplain Ordinance

The Floodplain Ordinance (Division 2 of Subtitle 4 Building) was adopted to protect life and health and to minimize public and private property damage. The provisions are intended to address use of appropriate construction practices, to reduce burdens that flooding impose on citizens and the government, to increase public awareness of flooding potential, and to protect the biological and environmental quality of the County's watersheds.

Because of the County's restrictive approach to floodplain development, proposals for new development are not common. Substantial improvements and additions to existing buildings are subject to the ordinance provisions. The following highlight the areas in which the ordinance exceeds minimum requirements:

- The 1%-annual chance floodplain is based upon ultimate conditions hydrology or full build out of the watershed based upon current zoning or land use proposed in an approved Master Plan.
- The lowest floor of any new building or substantial improvement/additions to existing buildings are to be elevated one or more feet above the elevation of the 1%-annual chance floodplain.
- Activities proposed for the mapped floodplain must be evaluated using engineering methodologies to determine the impact on flood elevations; compensatory storage that offsets any impacts is required.
- For any new buildings or substantially improved buildings or additions, enclosures below the lowest floor are not allowed.

6.2.6 Countywide Green Infrastructure Plan

The *2005 Countywide Green Infrastructure Plan* was developed to protect, enhance, and/or restore important environmental features of countywide significance. The plan emphasizes the importance of maintaining connections between environmentally-significant areas for ecosystem protection for future generations.

Within the plan, environmentally-sensitive areas are divided into three assessment categories:

- **Regulated areas:** Areas containing environmentally-sensitive features such as streams, wetlands, buffers, the 100-year floodplain, and steep slopes. These areas currently are protected in the land development process through local, state, or federal regulations.

- **Evaluation areas:** Areas containing non-regulated environmentally-sensitive features, such as unique wildlife habitats. These are considered high-priority preservation areas for on-site woodland and wildlife habitat protection.
- **Network gaps:** Areas critical to the connection of "regulated" and "evaluation" areas that are targeted for restoration in order to support the overall function and connectivity of the green infrastructure network.

These classifications affect development review in Prince George's County, as properties within different categories receive differing levels of consideration according to the category's importance within the overall Green Infrastructure network. Prior to submission of land development applications, the exact location of the green infrastructure network will be delineated on natural resource inventory plans.

The *Green Infrastructure Plan* recognized that "preservation of natural areas generally occurs on a piecemeal basis" as development is planned for individual parcels. Similarly, acquisition for preservation purposes also occurs on a piecemeal basis, with County and state agencies buying land as it becomes available through the land development process and from willing sellers. The plan identifies issues that are related to two of the natural hazards addressed by the *Hazard Mitigation Plan*:

- **Flood Hazards.** Conservation of natural areas, including flood hazard areas, bottomland forests, and wetlands, is currently part of the development process (see Section 6.2.3 on the subdivision ordinance).
- **Wildland Fire.** Reduction of forest fragmentation by preservation of contiguous natural areas is identified as important to the long-term survival of native plants and animals and to the humans living in those areas.

6.2.7 County Building Code

As of early 2010, Prince George's County adopted, with local amendments, the Maryland Building Performance Standards (which are based o the 2006 Editions of the *International Building Code*, the *International Mechanical Code*, the *International Energy Code*, the *International Existing Building Code*, and the *International Residential Code*). By amendment, the County embodies in the building code, certain additional regulations for grading, drainage, surface structures, erosion control, and stormwater management. The codes apply to new construction and work on existing structures.

Prince George's County has adopted some amendments to the Building Code that are specific to wind damage, damage due to heavy winter storms, and geologic hazards and drainage:

- Sec. 4-187. Structural Design; Snow Loads; Section 1608.1, General. References ASCE 7 for design snow loads; but design roof load shall not be less than that determined by Sec. 1607 of the Code, and in no case less than thirty (30) pounds per square foot snow load, plus the drift.

- Sec. 4-188. Structural Design; Wind Loads; Section 1609.3, Basic Wind Speed. References ASCE 7 for determination of wind loads; basic wind speeds shall be in accordance with ASCE 7, but in no case less than 90 miles per hour.
- Sec. 4-191. Damproofing and Waterproofing; among other provisions, modified Section 1807.4, Site Grading, to require ground immediately adjacent to foundations to be sloped away at not less than one unit vertical in 12 units horizontal (1:12) or an alternate method for diverting water may be used if approved.
- Sec. 4-279. Denial of Permit (c) Geological Hazard. "If, in the opinion of the Director, the land area for which grading is proposed is subject to geological hazard to the extent that no reasonable amount of corrective work can eliminate or sufficiently reduce settlement, slope instability, or any other hazard to persons or property, the grading permit shall be denied."
- Sec. 4-308. On-site Drainage (a)(6) ". . . Drainage discharging into natural watercourses may require that such natural ground be protected from erosion by an adequate amount of riprap or by other measures. Flows exceeding five (5) cubic feet per second will not be permitted in open facilities such as swales and ditches, but shall be piped in enclosed systems."
- Sec. 4-308. On-Site Drainage (a)(7) "Overflows [of drainage] from the one hundred (100) year storm shall be traced through the site and intervening area to their locations of discharge into a natural stream and, at critical locations, their hydraulic gradient determined to ascertain that the proposed construction does not flood or damage existing and proposed buildings or structures along the trace."

The residential building code applicable to 1- and 2-family dwellings identifies the wind speed, flood loads, and snow load for prescriptive designs. It also addresses unstable soils, giving the building code office the authority to require additional measures. The County adopted modifications to the residential code that are comparable to the adopted modifications to the building code.

6.3 Department of Environmental Resources

The mission of the Department of Environmental Resources (DER) is to protect and enhance the natural and built environments of Prince George's County by enforcing Federal, State and County laws to create a healthy, safe and aesthetically pleasing environment for all residents and businesses of the County. Its programs, which are some of the most progressive in the Nation, work hand in hand with the County Executive's Livable Communities Initiative to provide healthy, safe, and clean communities for the citizens and residents of Prince George's County. Descriptions of DER's functional groups and initiatives that address natural hazards in some form are briefly described below.

Environmental Services Group. The Environmental Services Group is responsible for environmental stewardship of the County and administers programs for stormwater management, floodplain management and damage assessment, allocation of water and

sewer service, reforestation of designated areas, capital projects construction, and the restoration of degraded streams and ponds. Prince George's County is recognized as a national model for ecosystem management and restoration. Special programs focus on the quality of streams, others on industrial and residential pollution prevention, the revitalization of older communities, the restoration of the Anacostia River and its tributaries, the preservation and replacement of trees, and the protection of the Chesapeake Bay.

The Anacostia Wetlands Creation Project, a partnership initiative with the State of Maryland and the U.S. Environmental Protection Agency created a 23 acre non-wetland area to help reclaim the existing floodplain as part of the Wilson Bridge Project.

The Group is involved with a number of programs associated with land development and revitalization, working closely with the Office of Engineering in the Department of Public Works and Transportation to ensure development projects will meet environmental concerns and the required codes, but at the same time, making sure this process is fairly and practically applied.

The Environmental Services Group is charged with monitoring the County's activities that are related to its continued compliance with and participation in the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System.

Permits and Review Group. The Permits and Review Group provides technical support to review and approve plans for construction, including fire and life safety. The Site Review function was transferred to the Department of Public Works & Transportation in the early 2000s. The law requires that an owner or authorized agent shall obtain a permit to erect, construct, enlarge, alter, move, improve, connect, demolish, use and/or occupy, or raze any building. Other types of projects which require permits include grading, stormwater, installation or construction of chimneys, billboards, carports, chairlifts, escalators, swimming pools, wood burning stoves, certain fences, antennas, and installation or renovation of certain electrical devices and wiring. Section 6.2 outlines the planning and development process, including specific provisions of the Prince George's County Building Code that address natural hazards.

The current building codes are the 2006 International Building Code and the 2006 International Residential Code, both adopted by the State. Although the codes contain building-specific provisions for flood resistance that are consistent with the NFIP, the County relies on the floodplain management regulations summarized in Section 6.2.5.

Licenses and Inspection Group. The Licenses and Inspections Group (LIG) provides regulation of construction, development, and grading activity in the County and incorporated municipalities (except the City of Laurel), through inspection and enforcement. Codes enforced include building, electrical, fire, mechanical, energy, accessibility, grading, stormwater management, zoning, and other applicable State and County codes for construction and development projects. Except for work of a minor nature, commercial projects are required to be certified by third party inspection agents

under the Third Party Inspection Program (TPIP). The Group's Commercial Construction/Life Safety Team oversees the TPIP.

The LIG is also responsible for the straight Use and Occupancy (U&O) Permit program. The Zoning Ordinance requires that all occupied buildings have a U&O permit, and the permits must be obtained by new owners, tenants, etc. This program has been credited with maintaining the properties in a safe and compliant manner. For each case, the inspector must evaluate the available building history to determine that a valid U&O existed for the premise. This may involve several hours of permit research. Then, with the set of plans approved by The Maryland-National Capital Park & Planning, the inspector conducts an inspection to determine if the property continues to be in compliance with requirements of the approved plan. Obtaining the U&O also affects the issuance of business licenses and the Health Department's food service permits. The Group also houses the Business License Team which provides licensing and enforcement activities for numerous businesses in the County, such as electricians, taxi cabs, motor vehicle repair, towing, etc.

Prince George's County has received Building Code Effectiveness Grading Schedule (BCEGS) score 4 for commercial and 4 for residential. These scores indicate the County is among the highest performing communities in terms of administration and enforcement of its codes and staff training program.

Permit and Inspection Activity and Staff Qualifications. The Office of Engineering (DPW&T) and the Licenses and Inspection Group are staffed by professionals who meet or exceed State requirements for certification in their trade/specialty, either through the model code organization or the Maryland Department of Housing & Community Development. Most staff members maintain multiple certifications. To maintain qualifications, staff members attend training offered by the International Code Council, the Maryland Department of Housing & Community Development, and commercial providers.

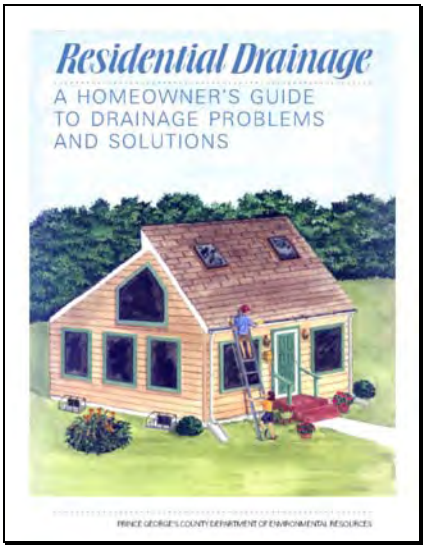
6.3.1 Countywide Flood Reduction Program

Prince George's County has a strong record of dealing with flooding from different perspectives going back to 1972 when Tropical Storm Agnes brought the potential for significant impacts to the attention of elected officials and policymakers. The County joined the National Flood Insurance Program (NFIP) that year, and soon thereafter established a task force to analyze the risks and data on flood control projects, to review flood emergency procedures, and to recommend actions to address flooding. A comprehensive watershed-based stormwater management plan approach was recommended, along with strengthening capabilities to address existing flood-prone development.

Since the mid1980s when the County began to work to reduce flooding of private property:

- 23 homes have been acquired and lots preserved in open space;
- 62 homes have site modifications (floodproofing); and
- small floodwalls have been built.

The initial focus was on developing comprehensive watershed management plans to identify problems and explore solutions. The findings of those individual watershed plans were summarized by the task force and formed the basis of the County's *Flood Damage Reduction Program* (originally prepared in1994 and updated in 2007) and *Countywide Comprehensive Flood Management Plan* (September, 1994). The program outlines the nature of flood problems, damage reduction activities, funding, staffing requirements, and recommendations for implementation. Criteria for prioritizing mitigation of flood-prone structures are outlined to provide a basis for using scarce resources.



Chapter 5 summarizes the results of the hazard identification and risk assessment for flood hazards, which indicates that approximately 2,800 residential buildings and 890 commercial buildings are exposed to some degree of flooding associated with the 1%-annual-chance flood (commonly called the 100-year flood). The degree of flooding ranges from just a few inches to several feet. Most buildings have not experienced flooding in at least the last 30 years (period for which the County has records). Many of the areas where flood-prone development exists are targeted for urban revitalization, especially inside the Beltway along the Anacostia River, Oxon Run, and Beaverdam Creek.

Comprehensive Watershed Management Plans. DER has the responsibility to conduct watershed studies and develop management plans (see Section 5.2 for list of studies). The purposes of the plans include determination of potential flooding based on planned future development, consideration of mitigation alternatives to control flooding and minimize damage, and identification of stormwater management strategies to alleviate water quality impacts and stream channel erosion associated with development. Early studies were guided by an interagency technical group.

Flood hazard mitigation alternatives considered for identified problem areas range from nonstructural (buyout, site modification, elevation) to structural (levees/floodwalls, channel improvements, bridge/culvert improvements, retention/detention structures). Pre-determined criteria are used to evaluate and rank alternatives. Selected projects have been implemented using a mix of County and State funds.

Continued Compliance with the NFIP. Although the County's Floodplain Ordinance is the foundation for its participation in the NFIP, all of its programs and initiatives related to reducing flood hazards are evidence of the commitment to comply with and exceed the requirements of the federal program. The Maryland Department of the Environment's Community Assistance Program conducts periodic Community Assistance Visits to

review community performance. The report of the November 2005 visit highlighted many of the County's initiatives and did not identify any program deficiencies.

NFIP Community Rating System. The NFIP's Community Rating System (CRS) is designed to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. NFIP flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote awareness of flood insurance.

As of October 2009, Prince George's County is rated Class 5 which translates to a 25% reduction in flood insurance rates for local residents and businesses located in mapped special flood hazard areas (and a 10% discount outside of mapped SFHAs). The Class 5 rating places Prince George's County in the top 3% of over 1,000 communities nationwide that participate in the CRS. Activities that yield credit include:

- Maintain Elevation Certificates on all new and substantially improved buildings, in computer format, and make copies available.
- Provide Flood Insurance Rate Map information and information on the purchase of flood insurance to inquirers; inform lenders, insurance agents, and real estate offices about the service.
- Maintain current FIRMs and copies of past effective maps.
- Conduct an annual outreach to floodplain residents.
- Require hazard disclosure as part of real estate transactions.
- Maintain materials on drainage problems and flood protection in the public libraries and provide assistance to inquirers and property owners.
- Develop new flood hazard data as part of the development review process and maintain and update changes to the flood hazard maps.
- Preserve open space in the floodplain (over 13,400 acres in stream valley parks) and maintain lots where buildings were acquired as open space.
- Encourage property owners to retrofit flood-prone buildings.
- Review stormwater management proposals (approximately 500 per year); maintain stormwater management and drainage systems and implement capital projects for drainage and flood control.
- Administer the Floodplain Ordinance which incorporates certain requirements that exceed federal minimums.

Public Information and Outreach. Prince George's County has a robust initiative to inform its citizens about flood hazards and related matters, including:

- Every June is declared "Flood Awareness Month" by the County Executive;
- DER sponsors a booth with flood information at various fairs;

- DER's webpage has numerous pages with flood hazard information, including links to related sites;
- A telephone number is dedicated for citizens to use for questions about flooding and stormwater concerns;
- DER direct mails a letter about flood hazards and mitigation measures to about 3,700 owners of properties that are impacted by mapped flood hazard areas and direct mails a letter and brochures about the NFIP to about 300 insurance agents, mortgage lenders, and real estate agents that do business in the County;
- The Wide Area Rapid Notification (WARN) system is set up for computerized, automated calling to flood-prone property owners; and
- GIS-based flood maps are used to respond to inquiries from homeowners, insurance companies, and lending institutions, about the location of properties and buildings with respect to the mapped floodplain.

Flood Map Modernization. DER has long been actively involved in improving flood hazard maps for Prince George's County and has invested its own funding to prepare studies and improve use of the information. In the 1980s, several watershed studies were funded by the State of Maryland. FEMA has provided funding through its Cooperative Technical Partners program to supplement DER's efforts. As of early 2010, the following are active initiatives and procedures:

- Develop countywide GIS-based 2-foot topography, in partnership with FEMA, the Maryland State Highway Administration, and The Maryland-National Capital Park & Planning Commission.

- Prepare digital FEMA-approved Flood Insurance Study and Flood Insurance Rate Maps using DER's GIS-based floodplain models.
- Establish procedures for technical reviews of all proposed FEMA map amendment and map revision requests and incorporate approved changes into the GIS-based models.
- Conduct floodplain studies for developers using the GIS-based models (fee based).
- Convert the GIS-based floodplain models into a more user-friendly environment to allow easy use.

Flood Warning Activities. Prince George's County recognizes that with approximately 3,800 buildings located in mapped SFHAs scattered throughout the County, many are not subject to frequent or deep flooding and many will remain subject to some degree of flooding. In addition to the weather monitoring and notification activities of the Office of Emergency Management and WSSC, DER has identified and implemented automated flood warning systems in three areas. Automated flood warning systems rely on a network of rain and stream gages, and computer models, to monitor and predict conditions conducive to flooding. The priority areas are:

- **Western Branch at Upper Marlboro**, where an active warning system is operational; gage data is accessible online at http://www.afws.net/data/md/Prince_Georges.htm.
- **Patuxent River at Laurel,** in a cooperative effort with WSSC and the City of Laurel, the County provides telephone-based notifications to impacted residents and businesses.
- **Anacostia River**, where DER has installed a flood warning system that includes 16 stream flow and/or precipitation gages.

Flood-Prone Structures and Elevation Certificates. Elevation certificates are prepared by surveyors and document the ground elevation, floor elevation, and other building characteristics. The County has approximately 760 certificates on file electronically and available to the public. Property owners may use certificates for flood insurance rating purposes and the County uses the detailed information to evaluate mitigation options. As funding permits the County may collect additional elevation certificates.

Residential Mitigation Activities. The County's damage reduction program places considerable emphasis on mitigation of flood damage to residential properties. This emphasis is reflected in the criteria used to prioritize use of mitigation funds for acquisition and site modifications (floodwalls and grading). For the most part, interest in this program is generated after floods that cause damage. Since the mid-1980s, the County has accomplished the following mitigation of homes at various locations:

- **Acquisition of Flood-Prone Homes.** Using combinations of County, State and federal funds, 75 homes have been acquired and the land dedicated to open space. In 2004, a FEMA grant was awarded to support acquisition of two homes.

- **Residential Floodproofing.** Using County funds, measures to protect 62 homes have been constructed, primarily using site grading and flood walls around entrances.
- **Acquisition of Homes Damaged by Sinkholes/Unstable Soils.** In 2009, FEMA grants supported the acquisition of homes in two areas: Tor Bryan Subdivision (8 homes) and Yorkville Road (5 homes).

Non-Residential Floodproofing Audits. Undertaken in 2003 with FEMA funding, the County offered a structural evaluation and floodproofing audit to about 90 commercial properties. Due to low response rate, only about a dozen property owners elected to participate. The report contains details on evaluated structures, including options considered and recommended measures for partial protection (wet floodproofing to protect critical equipment, utilities and contents), and an analysis of the benefits and costs of what is determined to be the optimal set of measures to provide full protection of the structure and contents (usually dry floodproofing or floodwalls).

In 2009-2010, the County undertook another initiative to offer floodproofing audits to the owners of non-residential properties (private and governmental owners). The project has two tasks:

- Task One (in 2009) involved identifying interested owners. That effort yielded the list of buildings on private properties, including a building on a church property and the only FEMA-identified "repetitive loss" property in the County. The Maryland-National Capital Park & Planning Commission identified several park buildings, two schools were identified in the Hazard Mitigation Plan as being in or partially in the flood hazard area, and the City of Laurel requested that a police station be included.
- Task Two (in 2010) is to perform the flood audits, involving site visits to assess buildings to identify actions that may be undertaken to reduce future flood damage, including action that may be eligible for grant funding. The Field Data Collection Protocols and Data Collection Forms developed under Task One will be used and a report will be prepared for each building (or property, if multiple buildings) based on the "Flood Audit Report" template developed under Task One.

6.3.2 The Capital Improvement Program

The Environmental Services Group is involved in construction projects that range from small corrective drainage projects to large community revitalization initiatives. Those that specifically address flood hazards, whether as a primary purpose or adjunct component, include:

- **COE County Restoration.** This program is a partnership with the U.S. Army Corps of Engineers and will involve the design and construction of environmental enhancement and flood control projects in the Anacostia and Patuxent River watersheds. At least 15 projects are in planning and design, including levee improvements, water quality measures, wetland creation, reforestation and fish blockage removal.
- **Environmental Protection Program.** This comprehensive effort builds or retrofits existing stormwater management facilities and rehabilitates streams and wetlands to correct serious water quality problems.
- **Environmental Revitalization Program.** This program entails the use of new and creative technologies to monitor, model, restore and protect the environment in highly urbanized settings. Projects include tree boxes in College Park, municipal storm inlet retrofit program, retrofit of the Port Town's Industrial Park, Port Towns EcoGarden, bio-retention facilities, stormwater retrofits, and stream restoration projects. The program contributes to the restoration of the Anacostia River, and serves as a pilot program to meet requirements of the EPA's NPDES permit.
- **Flood Protection and Drainage Improvement Program.** This program consists of flood protection and drainage relief projects that are estimated to cost less than $500,000. Eligible projects are those which correct home flooding, alleviate road flooding, correct residential yard drainage deficiencies, and improve/implement flood warning systems. Where possible, water quality enhancements are included. Correction of deficiencies that cannot be corrected through the County's Department of Public Works and Transportation's Storm Drain Maintenance program may be considered.
- **Floodplain Acquisition Program.** This program will facilitate environmental restoration and economic revitalization measures in floodplains. Restoration of floodplain areas is pursued through acquisition, with the acquired land set aside for open space compatible uses such as green space, wetland banking, flood mitigation, reforestation, and selective redevelopment.
- **Major Reconstruction Program.** DER may participate in DPW&T initiatives to redesign, reconstruct and rehabilitate major drainage and flood control projects.
- **Forest Heights/Oxon Run Flood Control Structures**. Under construction in 2004, this corrective project involves 1,200 linear feet of floodwall, channels and ditches, as well as replacing and modifying road culverts. The project protects about 55 homes and one public school site from flooding associated with a tributary to Oxon Run.

- **Water Quality Planning & Implementation.** This program involves a coordinated and systematic approach to improve the water quality of local streams and watersheds, and is a component of the County's effort to improve the Chesapeake Bay. It will focus on improving degraded watersheds through planning, monitoring, studies and structural and nonstructural measures. Emphasis will be on existing development and redevelopment for industrial, commercial, and residential land uses, particularly in high density, older communities.

The Capital Improvement Program includes a number of flood reduction projects in the Oxon Run watershed that, as of October 2009, are in different phases of design and study.

- In the Design Phase:
  - Hill Crest Heights; construct ditch/berm system to protect 2 condominium buildings from overland flow (70% design completion).
  - Boulevard Heights Subdivision; protect 16 residences by construction 1,150-foot long floodwall (50% design completion).
- Design Study Partially Complete (structural controls, floodproofing, drainage improvements):
  - Delta House; 4 residences and 1 commercial property.
  - South View (floodwall); 15 residences, 2 condominium buildings, and 2 commercial properties.
- Feasibility Study Completed (structural controls, floodproofing, drainage improvements).
  - Dupont Heights; one building owned by faith-based organization.
  - Martin Park; 2 residences.
  - Barnaby Run Estates; one residence.

6.4 The Maryland-National Capital Park & Planning Commission (Planning)

The Maryland-National Capital Park and Planning Commission (The M-NCPPC) is a bi-county agency, created by the General Assembly of Maryland in 1927. The Commission's geographic authority extends to the great majority of Montgomery and Prince George's Counties. It has three major functions:

- The preparation, adoption, and, from time to time, amendment or extension of the *General Plan* for the physical development of The Maryland-Washington Regional District;

- The acquisition, development, operation, and maintenance of a public park system; and
- In Prince George's County only, the operation of the entire County public recreation program.

The M-NCPPC's Prince George's County Planning Department is managed to help preserve and protect the County's resources by providing planning services and growth management guidance, and by facilitating effective intergovernmental and citizen involvement through education and technical assistance.

To fulfill its responsibilities, the Planning Department undertakes a wide range of planning activities and is responsible for certain reviews of development proposals. Because those activities are so extensive, Section 6.4 summarizes only the responsibilities of the two key offices involved in development review, and the role of the environmental planning and special project's sections in long-range planning. Section 6.4.2 highlights how natural hazards are recognized and addressed. Sections 6.2.1 and 6.2.6 summarize elements of the *General Plan* and the *Green Infrastructure Plan* that touch on natural hazards.

6.4.1 Development Review

The M-NCPPC's Planning Department has a significant role in the review of development proposals for compliance with certain requirements contained in the Zoning Ordinance (Section 6.2.2) and the Subdivision Ordinance (Section 6.2.3). Two divisions in the department are mainly responsible for these reviews: the Development Review Division and the Countywide Planning Division.

The Development Review Division is focused on implementation – the phase of review where the policies, land uses, zoning activities, and design guidelines are joined to ordinance requirements, private market development proposals, and land-planning practices. It makes recommendations to the Planning Board, the ultimate decision-making body, whose decisions directly influence the built environment through application of the Zoning Ordinance and the Subdivision Regulations, by bringing together all technical facts, positions of involved parties, potential of the sites, and workable solutions concerning individual development proposals. The Development Review Division consists of six sections:

- **The Zoning Review Section** processes zoning map amendments, special exceptions, variances, special permits, certification of nonconforming uses, departures from parking and loading schedules, parking lot and loading area design, landscaping and sign standards. Reviews result in recommendations to the Planning Board, Zoning Hearing Examiner and District Council as to how projects fulfill the purposes, intent, standards and design criteria set forth in the Zoning Ordinance and appropriate County policies.

- **The Subdivision Section** processes preliminary plans and final plats of subdivision; reservation and vacation plats; and premise addressing. Preliminary Plans are reviewed to ensure that adequate public facilities are available, or will be available in the future, to serve the proposed development. Final plats, reservation plats and vacation petitions include all pertinent engineering data necessary to locate every street, lot, block and boundary on the ground.
- **The Urban Design Review Section** processes comprehensive and specific design plans, conceptual and detailed site plans, and applications for alternative compliance from the Landscape Manual. Certain proposed uses require Comprehensive and Specific Design Plans which are part of a three-phase review process for Comprehensive Design Zones.
- **The Permit Review Section** reviews submittals for site grading, building construction, signs, and use and occupancy permits.
- **The Planning Information Services Section** provides zoning, planning, land use and development information to the public.
- **The Application Section** which processes applications filings handles referral coordination.

The Countywide Planning Division consists of five sections that work together on countywide issues providing planning services and technical support to the Planning Department and other County, State and regional agencies: Environmental Planning, Historic Preservation, Special Projects and Research, Public Facilities, and Transportation Planning. The sections that have a role in addressing hazards are:

- The Environmental Planning Section prepares an overall review of environmental conditions affecting the site, using information as submitted in the natural resource inventory (NRI), the tree conservation plans (TCPs), and in-house GIS databases and aerial photographs. This section evaluates each development case based on air quality, noise, landscape features, habitat, and natural resource conservation. This section works to mitigate negative impacts to the above-referenced resources. This section also prepares environmental impact reports (EIR) for all surface mining special exceptions in accordance with state law. EPS is responsible for the Woodland Conservation and Chesapeake Bay Critical Area programs in Prince George's County.
- The Special Projects Section of the Countywide Planning Division provides environmental support for the long range plans of the Community Planning Divisions. Through the community outreach process for these plans, local environmental issues are identified, such as flooding (surface and groundwater). These issues can be identified in the plans and brought to the attention of the appropriate county agencies for investigation and resolution. They can also be identified for future investigation during the development review process.

6.4.2 Development Review and Natural Hazards

Section 6.2.3 summarizes the Subdivision Regulations and Section 6.2.5 summarizes the Floodplain Ordinance. The following capture some aspects encountered during reviews:

- Initial submissions in the subdivision review process are required to have wetlands and floodplain areas delineated as part of lot layout and tree conservation plans.
- Lot layout requirements are intended to result in a buildable site outside of certain constraints, including wetlands, floodplains, steep slopes, and unstable soils (including Marlboro Clays).
- In subdivisions, environmentally sensitive lands may be retained in private ownership if placed within conservation easements (e.g., homeowners association) or deeded to The M-NCPPC (see Section 6.2.6 on the Countywide Green Infrastructure Plan).
- Floodplains are delineated with a buffer that ranges from 25-feet to 50-feet or more. The Subdivision Ordinance requires delineation of a 25-foot building restriction line from the floodplain boundary.
- Trees in the floodplain are not counted towards woodland conservation requirements.
- With respect to woodlands, leaving isolated small stands of trees is discouraged because it fragments habitat and isolated trees are more susceptible to wind damage.
- Some proposals have involved development in 100-year floodplain; DER requires restoration and compensatory storage to offset floodplain fills.
- An inventory of sites suitable for wetlands and woodland mitigation is being developed.
- Proposals in the Chesapeake Bay Critical Area are reviewed jointly with DER.

6.5 The Maryland-National Capital Park & Planning Commission (Parks)

The Maryland-National Capital Park and Planning Commission, Department of Parks & Recreation (The M-NCPPC) is charged with managing the public park and recreation system within Prince George's County. With more than 25,000 acres of parkland, the Commission strives to provide a balance between natural, undeveloped open space and land that is developed with recreational facilities and trails. The Department's improved properties include athletic fields and tennis courts, playgrounds, fitness trails, golf courses, outdoor pools, a trap and skeet range, an equestrian center, several lakes, a marina, an airport and miles of paved surface trails. Buildings include community center facilities, nature centers, many historic structures and sites, cultural arts facilities, and the aviation museum in College Park.

6.5.1 Land Acquisition, Park Planning and Development

The M-NCPCC Park Planning & Development Division (PP&D) within the Department of Parks and Recreation provides the planning, engineering, design, landscape plan development, and construction management functions involved in bringing new parks and recreation facilities to the public. Each year, the Division acquires about 300-500 acres of land through The M-NCPPC capital improvement, grants, mandatory dedication (subdivisions), and surplus property programs. Design, engineering, and management of park construction are the responsibility of the professional in-house staff comprised of planners, landscape architects, engineers and architects.

Stream valley parks are a major component of the park system. Much of this land was dedicated to The M-NCPPC through the land development process outlined in the County's subdivision ordinance. These parks are primarily composed of environmentally sensitive features, including floodplains and wetland areas and associated buffers where application of federal, State and local requirements guide development away from these areas.

Long-term plans for the stream valley park system include protection of sensitive habitats, conservation, and where appropriate, development of recreational facilities that include trails, athletic fields, and buildings. Dedications and acquisitions along streams that are least 50-feet wide are preferred.

The M-NCPPC recognizes the potential for flood damage given the number and extent of its stream valley parks. Planning for new facilities includes delineation of wetlands and floodplains and, where feasible, buildings and site developments are located outside of those areas. When this is not possible, appropriate mitigation is provided to offset negative environmental impacts and to provide added protection to the new facility. The M-NCPPC complies with all federal, State and local regulations.

To meet life and safety codes, building permits for The M-NCPPC construction projects are issued by the Prince George's County Department of Environmental Resources. All work must comply with the design and construction provisions of the local building code and meet industry standards. This applies not only to new buildings, but to work on existing buildings.

6.5.2 Existing Facilities and Weather-Related Hazards

The M-NCPPC monitors weather conditions and receives severe weather alerts from the Office of Emergency Management and the National Weather Service and the decisions of County Government regarding closures and delays are followed, except that programs for school children follow the notifications issued by the Prince George's County Public School System. Employees and constituents are advised to listen to local broadcasts for closures.

In unusual or specific circumstances, The M-NCPPC has full authority to close or regulate access to facilities depending on weather conditions. In these cases, the Park

Police force is called upon to facilitate evacuation of park visitors and closing and ensuring the safety of particular facilities or areas. For example, the Waterfront Park may be closed due to dangerous high water conditions. Closing or evacuating buildings would be prompted if structural damage was sustained as a result of unusual winds, heavy snows, fallen trees or other occurrences. These determinations are made on a case-by-case basis and the assessments and recommendations of professional staff.

The Department of Parks and Recreation has a diverse force of maintenance personnel and equipment that allows it to deal with the effects of natural hazard events:

- Recovery from Hurricane Agnes in 1972 took many years and a comparable event has not occurred in the past 30 years; for the lesser events, the existing resources have been adequate to handle recovery work in-house.
- Snow removal on The M-NCPPC's properties is a routine seasonal function. The M-NCPPC is part of the County's snow emergency plan and crews can be diverted to support snow removal on public streets. Priority is given to office buildings, community centers, and all operating and programmed facilities. Athletic fields, playgrounds, community and neighborhood parks are plowed after the programmed facilities are deemed accessible.
- Removal of tree debris from high winds or heavy snows is managed by in-house forces, either by chipping and spreading or disposal at the landfill. Sites are prioritized based on impacts. Area Operations staff are equipped with chain saws and tree removal gear and generally handle smaller, less complex tree and debris removals. Priority is given to blocked building entrances, sidewalks, access roads, and parking lots, followed by trails and woodland areas.
- Maintenance personnel are mobilized when major events are predicted, such as Hurricane Isabel. They are responsible for checking roof drains, securing buildings, and, if flooding is predicted, pulling docks at the Waterfront Park and Patuxent River sites.
- Mobilization of forces for preemptive maintenance is based on the predicted severity of an event, given up-to-date weather information.

The M-NCPPC is self-insured for damage to its buildings, although flood damage is not explicitly covered. Table 6-3 identifies buildings that are located in mapped flood hazard areas and buildings for which The M-NCPPC requested flood audits.

Table 6-3: M-NCPPC Buildings with Identified or Suspected Flood Hazards

Building/Location	Watershed/Flooding Source
Office building at 6600 Kenilworth Avenue	Northeast Branch
Clubhouse at Paint Branch Golf Complex	Paint Branch
Waterfront Park	Anacostia River
Palmer Park CC	Beaverdam Creek
College Park CP	Paint Branch

Building/Location	Watershed/Flooding Source
Jesse J. Warr, Jr. NRC	Beaverdam Creek
Kentland NRC	Beaverdam Creek
Riverdale CRC	Anacostia River
Lane Manor CRC	Northwest Branch
Adelphi Manor CRC	Northwest Branch
Snow Hill Manor Historic Site	Patuxent River
Adelphi Mill Historic Site	Northwest Branch
Nottingham School Historic Site	Patuxent River
Hamilton Aquatic Center	Northwest Branch
Ellen E. Linson Aquatic Center	Northeast Branch

Existing parklands and facilities have sustained physical damage due to natural hazard events. Notable instances in the past fifteen years include the following:

- The Parks & Recreation Administration Building at 6600 Kenilworth Avenue is in the 100-year floodplain of the Northeast Branch. This building has received water in the basement and parking lot. A storm on July 4, 2004, dumped more than 5 inches of rain and caused localized flooding. The most significant cost associated with the event was the loss of 6 vehicles that were in the lot because the storm occurred after hours.
- Trails along streams are frequently inundated because of their close proximity to the water. It appears that the frequency of flooding has increased, most likely due to increased upland development. In the upper reaches of watersheds, asphalt trails are more likely to be damaged by moving water, leading to erosion and failure of the gravel base. In the lower reaches, asphalt trails are more likely to be under floodwater that has heavy sediment loads, resulting in deposition that must be removed.
- The Paint Branch Golf Complex has some areas that are subject to relatively frequent flooding. An older building sustained considerable damage due to an intense storm that occurred on July 28, 2004. While the building remains structurally sound, the interior losses included the carpeting, drywall, insulation, and fixtures totaled $100,000.
- Hurricane Isabel in September 2003, left behind considerable debris clean-up at multiple M-NCPPC's facilities, but did not cause any significant or structural damage. Some facilities where shut down due to loss of electricity all across the County and poor driving conditions. As a result, The M-NCPPC's facilities remained closed, rental fees for scheduled events were returned, and operational income was lost during the period of closure. Hurricane Isabel was declared a major disaster and The M-NCPPC applied for a total reimbursement of more than $250,000.

- Prolonged drought conditions affect parkland, especially golf courses that rely on irrigation to keep tee boxes, fairways and greens in good condition, and ponds that are stocked with fish. The M-NCPPC complies with water restrictions, and focuses limited water supplies on maintaining unique horticultural resources, including champion and historic trees and irreplaceable resources. Flower beds and other seasonal aesthetic gardens are not maintained during severe droughts.
- Tidal flooding on the Anacostia River affects the Waterfront Park, although notable physical damage has not been sustained since The M-NCPPC began operating the property in the 1980s. Debris and trash collect in the parking lot and along the shoreline. A fairly frequent occurrence is when the capacity of the nearby pump station is exceeded and raw sewage overflows across the entrance road and prompts cleanup.
- Streambank erosion on property owned by The M-NCPPC has in recent years begun to affect adjacent private property and structures. On the Paint Branch tributary for example, adjacent commercial businesses have been threatened with damage as the stream erodes close to the buildings. Significant private investment in stream realignment and restoration has been necessary to protect structures and parking lots. Small-scale mitigation projects are underway in a number of locations with public and non-profit partners, including the Anacostia Watershed Society, State Highway Administration, City of College Park, and the University of Maryland.

6.6 Department of Public Works & Transportation

The Prince George's County Department of Public Works and Transportation (DPW&T) administers a comprehensive transportation system that includes local public transit services. The Department:

- Designs, constructs and maintains county's transportation infrastructure inclusive of roads, bridges, sidewalks, curbs, gutters, and roadside drainage.
- Plans, installs and maintains street lights, roadway regulatory signs, pavement markings and traffic management devices.
- Landscapes and maintains grassy areas and trees in public rights-of-way including litter collection, debris removal, mowing, tree trimming and emergency tree removal.
- Reviews and issues permits for site development projects that include site grading, construction of roadway infrastructure, stormwater management facilities, street lighting and landscaping, as well as inspects and approves all construction before release of permit to ensure compliance to the County Code.
- Maintains flood control facilities, including pumping stations and the storm drainage network.
- Administers the county's Capital Improvement Project (CIP) Program regarding transportation infrastructure.

- Coordinates with the Maryland State Highway Administration (SHA) on the planning, design, construction and operation of state highways within the county.
- Oversees the county's public transportation system (*TheBus*, Call-A-Bus and Call-A-Cab) and coordinates regional public transit services (rail and bus) with the Washington Metropolitan Area Transit Authority.
- Administers and enforces the county's Critical Area, Sediment and Erosion Control and Stormwater Management programs.
- Coordinates with Maryland National Capital Park and Planning Commission on the planning and design of site development projects in the county.
- Evaluates and test construction materials used on CIP and permitted construction sites.
- Coordinates with local Soil Conservation District on site grading when applicable.

6.6.1 Requirements for Roads and Drainage

The Office of Engineering issues permits for site grading, stormwater management, roadway construction, utility construction within the rights-of-way or for construction within the Critical Area to those planning to develop a property or to perform work within the public right-of-way or on private property that will impact on the public road rights-of-way and/or the Chesapeake Bay area or its tributaries.

Requirements imposed through the permit process are intended to ensure that adequate and safe transportation infrastructure is constructed, effective sediment and erosion control is maintained, and requisite stormwater management design requirements are met. The Office of Engineering inspects all permitted construction projects throughout the construction period to ensure county code compliance.

Standards and specifications for bridges, roads, utilities and drainage facilities, whether constructed by the county or by private entities are set forth in design manuals issued by SHA and the American Association of State Highway and Transportation Officials (AASHTO). Stormwater management requirements are set forth in the county's Stormwater Management Ordinance and Design Manual, which meets all requirements as forth by the Maryland Department of the Environment.

Flood-Resistance Requirements for Roads and Bridges. In addition to meeting County requirements, road and bridge construction that impacts flood hazard areas or nontidal wetlands must also be approved by the Maryland Department of the Environment. Bridges and culverts are expected to be stable during passage of the discharge equal to the 100-year flood. The above-referenced design standards include provisions for evaluating the potential for scour and providing appropriate protection against scour of abutments, piers, wingwalls, and culvert inlets and outlets.

Unstable Soils Requirements. Due to pothole and road damage from freezing and thawing cycles in areas with poor drainage (including Marlboro and Christiana clays), the Department determined it appropriate to mitigate damage by requiring deeper excavation, increased base thickness and additional underdrainage. Design requirements are found in the AASHTO and SHA manuals and apply to roads improved by the county and those built by private developers.

Snow. The AASHTO bridge design criteria include accounting for anticipated snow load.

6.6.2 Road and Drainage Maintenance

Prince George's County maintains over 1820 miles of roadways ranging from low-volume rural and secondary roads to high-volume primary collector and arterial roadways. A total of 953 bridges and culverts carry roads over waterways (157 have spans longer than 20-feet; 233 have spans between 6- and 20-feet in width; and 563 are less than 6-feet wide). The Office of Project Management is responsible for inspection and improvement of bridges and drainage channels. The inspection reports help identify required maintenance work and are used to prioritize projects.

Routine maintenance work is authorized by a Regional Letter of Authorization from the Maryland Department of the Environment and the Corps of Engineers. Work that alters the hydraulic capacity of waterway crossings must be authorized by individual permits that are coordinated by the Department of Environmental Resources.

The Office of Highway Maintenance (OHM) is responsible for a wide range of services that help to keep County roads safe, clean, and aesthetically attractive. The work is undertaken by several specialized crews with a total of more than 140 crew members. OHM is charged with roadway patching and surfacing; bridge maintenance; pipe repair and replacement; ditch and channel maintenance and inlet and drainage pipe cleaning; driveway aprons; sidewalk, curb and gutter maintenance; and stormwater management facility maintenance. Additional responsibilities include snow and ice removal, maintaining street trees, and maintenance of various flood control facilities. The following activities are specifically related to maintaining clear storm drainage and flowing streams:

- Cutting, mowing and weeding of various sites;
- Cleaning of streams and other stormwater maintenance sites (removal of debris, sediment and materials foreign to the natural vegetation);
- Applying herbicides along improved channels and within pumping stations to aid in vegetation management; and
- Cleaning County-owned and maintained earthen and concrete channels to remove obstructions, cut out heavy woody growth, and perform repairs.

The County's storm drainage system includes:

- 457 stormwater management facilities (ponds);
- Over 56,704 stormdrain inlets and catch basins;
- Approximately 5.5 million linear feet of storm drainage pipes and numerous culverts (ranging from 12" to 96" in diameter); and
- 3 levee segments and 6 flood control facilities/pumping stations (see Section 6.6.3).

The inspection program is an important aspect of maintenance of the system. More than 2,400 service requests are received from County residents each year. Inspectors respond within three working days, unless an emergency is reported, in which case the response is immediate. After high water events, especially if water overtops a road or bridge, an inspection is performed to determine if maintenance and repairs are warranted. A 24-hour emergency on-call program covers emergency service requests, and flood control and pumping station responses.

6.6.3 Flood Control Facility Maintenance

In the 1940s, the U.S. Army Corps of Engineers constructed the Anacostia Flood Control Project which includes just over 3 miles of levees (combined length along both sides of the Anacostia River). To manage drainage on the land-side of the levees, the Corps installed four pumping stations (Bladensburg, Colmar Manor, North Brentwood, Edmonston). The Department operates and maintains the stations that are instrumented. Signals are transmitted when the pumps turn on automatically based on water levels. The Corps and the Department conduct an annual inspection of the levees, floodway channel and pumping stations. The Department is responsible for maintenance, including mowing, vegetation control, debris removal, and stabilization of erosion. The pumping stations receive quarterly and annual maintenance and testing of the electrical and mechanical equipment.

The U.S. Army Corps of Engineers constructed two other Flood Control Projects. The Upper Marlboro Flood Control project completed in 1964, which included approximately 1,950 linear feet (lf) of levee, 3,000 lf of channel improvements, 1,413 lf of new channels, and 4,430 lf of floodway clearing. The Forest Heights Flood Control project completed in 1964 included 4,160 lf of channel improvements, 2,250 lf of levee, and two (2) drop structures. As with the Anacostia Project, the Corps and the Department conduct an annual inspection of the levee systems.

Because the Edmonston pump station was undersized, and given the volume and timing of runoff experienced in recent years resulting in extensive flooding of homes and streets in the area, a $6 million upgrade was completed to provide adequate capacity for at least the 10-year storm. Due to higher than average yearly rainfall and increased impervious areas in the watershed, other pumping stations within the Anacostia Watershed are being studied for capacity levels.

Two other stormwater management pumping stations help to drain collected rainwater to protect homes and businesses from flooding:

- Allison Street Pumping Station (in Mt. Rainier) was built by the Washington Suburban Sanitary Commission in 1975.
- Paint Branch Parkway Pump Station (in College Park) was built by the Washington Metropolitan Area Transportation Authority in 1993.

In addition to maintaining the Anacostia Flood Control Project, the County manages, and maintains several non-federal flood control projects:

- Sligo Creek Flood Control levee, built by the Washington Suburban Sanitary Commission in 1973.
- Northeast Branch Flood and Erosion Control Channelization (above East-West Highway), built by the Washington Suburban Sanitary Commission in 1976.
- Henson Creek Flood Control Levee and Channelization near Morningside, built by the Washington Suburban Sanitary Commission in 1972.
- Oxon Run Flood Control Levee near Green Valley Drive, built by the Washington Suburban Sanitary Commission in 1982.
- Oxon Run Tributary Floodwall, built by the County to protect homes and a school (completed 2004).
- Northeast Branch Flood Control Levee near Allison Street, built by the Washington Suburban Sanitary Commission.

6.6.4 DPW&T Public Information

The Department's Webpage provides topical information to the public, which includes, but is not limited to: snow and ice conditions, traffic management, planned and ongoing Capital Improvement Program road improvements, street repairs, traffic signals, signs and markings, street light repair and installation, storm drainage and other services such as litter and debris removal. The site includes contact numbers for customer service requests, as well as a state-of-the-art traffic center information, and press releases concerning emergency conditions, road closings, outreach activities, etc., are posted The Department also implemented a Community Partnering Program that includes more than 900 members in an effort to facilitate communication and improve services.

A section of the Web site is devoted to *Frequently Asked Questions*. A specific section is about storm drainage:

- The storm drain inlet in front of my house is clogged. Who do I contact to clean it out?
- The stormwater management facility (pond) behind my house is full of trash and debris. Who is responsible for maintenance of the facility?
- The stream behind my house is blocked with tree limbs and debris. Who is responsible for cleaning the stream?
- Sinkholes have formed in my yard. Who is responsible for filling them?

- The small drain near my basement door is blocked and causing my house to flood. What can be done?
- The opening to the storm drain in front of my house appears to be large enough for a child to go through. Who is responsible for fixing this?

6.6.5 DPW&T and Natural Hazards

Weather is an important influence on the County's road system and stormwater management facilities in terms of the physical infrastructure and how the County prepares for and responds to events. Weather is monitored through the local news media and the National Weather Service and Accu-Weather. Four weather-related conditions are influential: snow/ice; heavy rain/flooding; extreme heat; and coastal erosion.

Snow/Ice. The County administers a comprehensive Snow Emergency Plan that is coordinated with adjacent jurisdictions and the Maryland State highway Administration. When a snow event occurs, the Department is responsible for providing "passable" road conditions. Clearing roadways consists of plowing and/or salting or sanding, as warranted by weather conditions, and also includes clearing tree and other roadway debris, which often accompanies severe winter conditions.

Guidelines for citizens are posted on the Webpage to facilitate snow response. In addition to advice regarding snow safety and snow removal, the anticipated response times are noted (see Table 6-4). Actual response times depend on the road type and the characteristics of the precipitation (wet, powdery or icy), the temperature and wind conditions, and the duration and intensity of storms.

Table 6-4: Snow Removal Response Times (after precipitation stops)

Accumulation	Road Type	Response Time
0-4 inches	Primary Roads	Bare pavement within 12 hours
	Residential Streets	Bare pavement within 24 hours
4-8 inches	Primary Roads	Bare pavement within 12 hours
	Residential Streets	Passable within 24-36 hours
8-12 inches	Primary Roads	Bare pavement within 24 hours
	Residential Streets	Passable within 36-48 hours
12-18 inches	Primary Roads	Bare pavement within 24-36 hours
	Residential Streets	Passable within 48-72 hours
18-24 inches	Primary Roads	Bare pavement within 36-48 hours
	Residential Streets	Passable within 48-96 hours

The Department's Community Partners have been included as an integral part of the Snow and Ice Removal Program. Partners are called by staff at the Snow Information

Center to assess roadway conditions. If there is a reported concern, an available truck or inspector can be dispatched to the site to take care of a situation before it becomes a major problem. And, the Department staffs a Snow Information Center for citizens to call with questions or requests for snow/ice removal.

Debris management is an important post-storm function managed by the Department. Depending upon conditions, debris may be chipped on-site or off-site after it has been hauled away. A vendor is responsible for permanent disposal of woody and leafy debris.

The Department reports that severe winter storms exacerbate the number and size of potholes, especially on older stretches of roads that have poor drainage and are subject to freeze-thaw cycles.

Heavy Rain/Flooding. A major part of the Department's objective is the development and maintenance of the local road and drainage system so that it is resistance to damage during intense rainfall-runoff and flood conditions. Standards for roads and drainage are established to achieve this goal. Rain events increase the amount of debris that collects in the drainage system and thus increases maintenance demands. Damage to due runoff and flooding has included:

- In past years, several road washouts at stream crossings occurred; all were older, undersized structures that failed when overtopping flows undermined and eroded the embankments. The crossings were replaced and upgraded to current County standards.
- Minor erosion damage has occurred at culvert inlets and outlets and drainage channels; no major repair projects have been required.

The Department's standard operating procedures for flooding are activated when weather conditions are likely to produce flooding rains. The inland streams rise and fall rapidly, while flooding along the Patuxent River and the Potomac River may occur days after a storm. Key short-term responses include:

- Deploying crews to the flood control pumping stations to monitor performance and, in some cases, to manually start the pumps in order to try to "get ahead" of collected drainage;
- Deploying crews to unlock and display flood warning signs at selected road locations;
- Deploying crews to floodprone areas prior to a forecasted severe storm to inspect and provide necessary maintenance and removal of debris and other obstructions to minimize flooding;
- Deploying flood response crews to respond to drainage and flooding complaints within the rights-of-way during severe storm events;
- Monitoring sites to try to remove debris as it washes downstream; and
- Inspecting toads, bridges and culverts to determine if inundation and overtopping caused structural damage or scour.

Extreme Heat. Prolonged heat waves contribute primarily to damage of concrete sidewalks and some roads when joints fail and expansion forces cause fracturing damage. The County's current standards for expansion joint and improvements in joint materials minimize this type of damage.

Coastal Erosion. The Department reports no damage to the local road and drainage systems due to coastal erosion. However, using long-term erosion rates determined by the Maryland Geological Survey to delineate a "50-year erosion hazard" area, the Hazard Identification and Risk Assessment identifies potential problems for two roads:

- I-495 Interstate (Inner Loop) in Oxon Hill near Oxon Creek (where the rate of erosion is characterized as less than 2 feet per year); and
- King Charles Terrace just east of Prince George's Yacht Club along Piscataway Creek (where the rate of erosion is characterized as less than 2 feet per year).

6.7 Washington Suburban Sanitary Commission

The Washington Suburban Sanitary Commission (WSSC), a bi-county water and sewer agency, was established on May 1, 1918 to serve Montgomery County and Prince George's County. It is the 8th largest water and wastewater utilities in the country, serving 460,000 customer accounts and 1.8 million residents. WSSC's bi-county infrastructure includes:

- Three reservoirs (Triadelphia, T. Howard Duckett, Little Seneca) and cooperative agreements with the U.S. Army Corps of Engineers at Jennings Randolph on the upper Potomac River. The total holding capacity is 14 billion gallons (Little Seneca and Jennings Randolph are regionally shared);
- Two water filtration plants produce an average of 170 million gallons per day of safe drinking water (maximum capacity ranges between 298.5 million gallons per day in the winter and 356.5 million gallons per day in the summer): the Patuxent plant (located in Prince George's) and the Potomac plant (located in Montgomery County);
- Six wastewater treatment plants with a total capacity to handle 89 million gallons of wastewater per day: Western Branch, Piscataway, and Parkway (located in Prince George's County) and Seneca, Damascus and Hyattstown (located in Montgomery County). The District of Columbia's Blue Plains Advanced Wastewater Treatment Plant handles as much as an additional 169 MGD under a cost sharing agreement with the WSSC;
- Forty-seven wastewater pumping stations and 13 water pumping stations, together with almost 60 water storage facilities; and
- More than 10,000 miles of water and sewer mains.

Dam and Reservoir Operations. WSSC maintains its three reservoirs to comply with all federal and/or State requirements concerning the safety of the dam structures. The

dams are periodically inspected and maintenance is performed regularly to assure safe functioning.

The only dam on a waterway in Prince George's County is the T. Howard Duckett Dam on the Patuxent River, which is rated as a "high hazard" dam because of the possible adverse incremental consequences that could result from the release of water due to failure of the dam or rainfall-runoff that exceeds design events in the watershed above the dam. Dams rated as "high hazard" are required by the MDE Dam Safety Division to be capable of safely passing the Probable Maximum Flood (PMF). At the time it was constructed in 1954 the Duckett Dam could pass the PMF. Since that time the PMF has been increased to 32 inches of rain in a 72 hour period. The statistical probability of such a storm is once every 10,000 years. The average annual rainfall in Central Maryland is 42 inches. The change to a more stringent requirement has resulted in Duckett Dam being deemed inadequate to safely pass this theoretical storm, mainly due to potential erosion of earth slopes and foundations. Due ***only*** to the dam's inability to safely pass such a storm, MDE characterizes the dam as "unsafe" (such designation does not imply any imminent threat). In August 2008, WSSC began a design project for downstream slab scour protection to allow the dam to safely pass the PMF, which will remove the "unsafe" label from the dam. Construction is currently planned to be started in the fall of 2010 and be completed by the fall of 2012. An Emergency Response Plan, approved by the Maryland Department of the Environment, is coordinated with downstream jurisdictions.

The reservoirs are managed to optimize water supplies, not as a flood control system. WSSC's operating protocols specifically address monitoring of weather conditions and management of water levels to minimize flood impacts when feasible. Water level is typically maintained with 3 feet of freeboard (corresponds to runoff from about 1 inch of rainfall in watershed). Water may be released from the reservoir if major runoff events are forecast. Under some release scenarios flooding occurs in the City of Laurel and other downstream areas in the County. WSSC notifies city and county officials in advance of any releases that could cause flooding.

Construction of Water Supply & Sewer Lines. WSSC constructs about 82.3 miles of new (or replacement) water supply lines and 80.9 miles of new (or replacement) sewer lines each year. Developers install water and sewer lines to WSSC specifications; WSSC takes ownership if inspections during construction indicate compliance with WSSC requirements. Construction in the waters of the State, including installation of utility lines under streams and floodplains, as well as activities that impact nontidal wetlands, is required to satisfy State regulatory requirements administered by the Maryland Department of the Environment (MDE). WSSC administers the delegated State sediment control program for all utility construction in Montgomery and Prince George's Counties. Much of WSSC's own routine work in sensitive environments is authorized by a Regional Letter of Authorization jointly issued by MDE and the U.S. Army Corps of Engineers. U

Water Supply Adequacy and Drought Plans. WSSC has determined that water supplies on the Potomac River are "more than adequate" to meet current and future water needs (until 2030) of its service area (includes portions of Prince George's County and Montgomery County). WSSC works with the Interstate Commission on the Potomac River Basin (ICPRB) CO-Op, a regional cooperative with the U.S. Army Corps of Engineers and Fairfax Water, monitoring all municipal and utility requests to withdraw additional waters from the Potomac River. The ICPRB prepares demand forecasts every five years to monitor the Washington metropolitan area's water needs with available flows. Three reservoirs in the Potomac River watershed are managed to supplement supplies during low flow periods: Little Seneca in Montgomery County and Jennings Randolph and Savage in Garrett County. WSSC also draws water from two reservoirs on the Patuxent River, the T. Howard Duckett and Tridelphia reservoirs. With three feet of freeboard between the water surface and spillway elevations, the two Patuxent River reservoirs provide 10.4 billion gallons of water storage.

Water conservation is an important message that WSSC conveys to its customers. WSSC is a member of the Metropolitan Washington Council of Governments' Regional Task Force on Water Supply Issues. The Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System was prepared in 2000 and updated in 2001. WSSC staff also contributed to an Advisory Committee Report on the Management and Protection of the State's Water Resources *Water for Maryland's Future: What We Must Do Today* (Wolman Report), which was released in 2008.

WSSC and Natural Hazards. With respect to impacts caused by urban drainage and flood hazards, WSSC has determined that:

- The two filtration plants are on high ground to facilitate distribution of water and are not subject to flooding, although large flooding events could damage water intake structures (Hurricane Agnes runoff raised the Patuxent River level downstream of the T. Howard Duckett Dam almost to the top of the Rocky Gorge raw water pumping station);
- Although the wastewater treatment plants are located in low areas to facilitate gravity flow, only small portions of the properties of the three plants located in Prince George's County are located within mapped flood hazard areas. The majority of critical plant infrastructure is above the 100-year flood elevation.
- 47 sewage pumping stations are located throughout the bi-county region; several may be located within the mapped 100-year flood hazard area, but critical operating equipment is set on floors above the flood elevation in accordance with state design guidelines. None has been damaged by flooding.
- Nearly all pumping stations have dual feed power supply or emergency generators as back up during power failures, which can occur during storm events.
- Urban streams experience erosion and course changes, which occasionally expose water and sewer lines and manholes; infrastructure protection measures for stream crossings are undertaken in compliance with State permit requirements.

- Some projects to stabilize erosion and restore streams have been undertaken, typically in association with major sewer construction projects that are aligned along watercourses.
- Wet weather infiltration into the sewer collection system is evidenced by increased treatment volumes and costs; backups can occur although ruptures are infrequent.
- Water supply distribution lines may be mounted on bridges to cross waterways.

With respect to other natural hazards:

- WSSC buildings and plants have protection against lightning strikes.
- Severe prolonged cold winter weather and aging water pipes have led to an increase in water main breaks; research to better understand water main breaks during freezing weather is underway.
- Heavy snow and ice can limit access by WSSC crews to pump stations and facilities.
- The T. Howard Duckett Dam has been determined, in an engineering study, to be safe from failure under seismic (i.e., earthquake) conditions typically experienced in the central and eastern United States.

6.8 Department of Housing & Community Development

The Department of Housing and Community Development (HCD) and the Housing Authority expands access to a broad range of quality housing by creating safe, well planned, attractive residential communities and enabling families to become self-sufficient and communities to become stable. Individuals and families with housing or community improvement needs are served. Special emphasis is given to low and moderate income people who live or work in the County. HCD carries out its mission through aggressive grantsmanship, creative financing, innovative planning, and productive partnerships with public, private and community based organizations.

The Department's work is accomplished by two divisions and through two quasi-independent authorities:

- The Community Planning and Development Division oversees and manages the HUD planning and reporting documents. The Division is responsible for coordinating and preparing the County's 5-year Consolidated Plans and Annual Action Plans for Housing and Community Development, and the Consolidated Annual Performance and Evaluation Reports. The Division is also responsible for oversight and management of the Federal programs: CDBG, HOME, and ESG funds, including the American Dream Downpayment Initiative (ADDI), Community Development Block Grant Recovery (CDBG-R) and Homelessness Prevention and Rapid Re-housing Program (HPRP). The primary grant administration functions are oversight, monitoring, compliance and technical assistance.

- The Rental Assistance Division enables low-income families to rent from any landlord with Section 8 rental assistance.
- The Public Housing Authority is described in Section 6.8.1.
- The Redevelopment Authority is described in Section 6.8.2.

6.8.1 Housing Authority

The Housing Authority provides housing projects, housing rehabilitation projects, integrally-related commercial structures, and financing for such projects. On behalf of the Authority, the HCD Property Management Branch maintains about 400 public housing and assisted living units. The buildings include a 7-story building, a 6-story building, several single-family homes, and many townhouses. Because the current emphasis to meet the County's housing needs is placed on homeownership and privately-owned rental housing, new public housing is not being developed. The last public housing project was constructed in 1982.

Work undertaken to improve the existing inventory of public housing units is handled by architectural firms under contract to the County. County building permits are required to assure that the work meets current code.

The County's public housing buildings are insured by the Housing Authority Insurance Group, an insurance pool serving housing authorities throughout the nation. Property insurance covers damage from natural hazards, with the exception of flooding.

In terms of natural hazards, the Property Management Branch reported the following:

- A project to replace windows in the 6-story Cottage City Towers was specified with window units that comply with the wind provisions of the current building code. After Hurricane Isabel, no damage or rain seepage was reported.
- In 2007, an emergency generator with 80 KW Prime Power rating and 100 KW Standby Power Rating was installed at Cottage City Towers. It is hooked up to the fire annunciation system, elevators, and all common areas including hallways, offices, community room, stairwells and electronic building entry system. At the same time, egress lighting was installed in all dwelling unit. [In the 2005 plan, this project was High Priority Action I.]
- Hurricane Isabel, the most severe wind event in at least a decade, generated tree debris on public housing properties and blew down some fencing. Winds did not damage any buildings.
- Debris and leaves can block some storm drain inlets in the vicinity of some public housing properties.

6.8.2 Redevelopment Authority

The Redevelopment Authority, established in 1998, is charged with planning and coordinating improvements for revitalization of the County's older communities. Its

mission is to contribute to the creation of a diverse and vibrant economy and living environment using community building techniques and providing responsible and responsive development and redevelopment that is designed to enhance quality of life, balanced growth and job creation for diverse sustainable communities.

The Authority acts as a facilitator of redevelopment through partnerships with other private and public sector partners. It acquires properties that are subsequently turned over to private interests for residential, commercial or industrial development or redevelopment. The Authority supports planning for community development and neighborhood revitalization, implements and facilitates neighborhood improvements, facilitates development and redevelopment of real estate, provides technical assistance to other organizations, and coordinates revitalization and redevelopment efforts.

In terms of natural hazards, the Redevelopment Authority reported the following:

- Properties sold by the Authority are subject to environmental assessments, which may be conducted by the private development sectors when determining site constraints, including the presence of flood-prone areas, wetlands, or unstable soils.
- All projects that flow from the Authority's programs or undertaken on property conveyed by the Authority are subject to all County requirements and development permits.
- Since it began operations, properties owned by the Authority have not been damaged by wind, rain, lightning or flooding.
- While properties are in the Authority's ownership, they are insured under a blank commercial policy (some individual properties may be insured under individual commercial policies).

6.9 Homeland Security/Emergency Management

The Prince George's County Office of Homeland Security develops and maintains comprehensive emergency management programs through planning with federal, State, local officials, and the private sector, to develop a coordinated safety and preparedness strategy. The objective of this office is to protect life, property, and the environment from the effects of natural and man-made disasters, including terrorist acts.

Within the Office of Homeland Security, the Office of Emergency Management (OEM) responds to natural hazard events by providing shelter for displaced persons and facilitates rapid restoration of normal conditions. OEM coordinates volunteer programs to assist staff with its responsibilities during emergency incidents and disasters. The Office of Emergency Management is responsible for:

- Coordinating the County's emergency response during times of crisis or disaster;
- Developing and maintaining Prince George's County's Emergency Response Plan;

- Operating the County's emergency operations center;
- Radio Amateur Civil Emergency Services and Amateur Radio Emergency Services program, consisting of licensed amateur radio operators that meet FCC qualifications who provide emergency communication services when normal communications are unavailable;
- Representation on the Metropolitan Washington Council of Governments' Emergency Managers Committee;
- Providing information and educational materials to County residents to improve awareness of and preparation for disasters and other emergency events;
- Opening shelters in cooperation with the American Red Cross; and
- Coordination of the resources provided by the federal, State, and County agencies during major emergencies and disasters.

OEM routinely monitors weather conditions and forecasts reported by the National Weather Service and commercial television. When conditions warrant, the NWS directly contacts the County and conference calls are conducted with neighboring counties and the State.

The County's message regarding evacuation is consistent – because so many conditions may affect wide areas or may vary from location to location, the message to citizens is to tune in to radio and television for instructions. Formal evacuation plans for certain areas are not prepared because actual instructions may change depending on the circumstances. With nearly 200 public school buildings, sites selected for shelters may vary from event to event.

Prince George's County participated in FEMA's Project Impact Disaster Resistant Community initiative. Project Impact supported OEM's purchase of the Wide Area Rapid Notification© (W.A.R.N.) system. The system allows authorized users to issue and control voice and text messaging to office or personal telephones, cell phones, beepers, pagers, faxes and emails with details of disasters or other incidents. The telephone contact database is built from commercial sources and the County plans to allow residents to sign up for notification via other devices.

The following highlights were reported by OEM:

- In mid-2004, about 100,000 copies of the "Your Guide to Emergency Preparedness," a resident's brochure, were distributed through direct mail and newspaper insert, and is available online.
- General and safety information about storms, tornadoes and flooding and flash flooding are handed out during public events such as the County fair.
- A presentation titled "Guide to Developing an Emergency Action Plan" is available online and periodically runs on the County's cable access channel.
- OEM is notified by the Department of Environmental Resources when the flood warning system gages transmit alerts.

- County emergency management personnel participate in local, regional and state exercises conducted by the Maryland Emergency Management Agency and various regional entities, for example the Washington Suburban Sanitary Commission's dam safety exercises.
- Six shelters were opened for Hurricane Isabel, but fewer than 60 people were served.

6.10 Office of Central Services

The Office of Central Services administers centralized support services for the County, including facilities operation and management, contract administration and procurement, fleet management, real estate, construction, and administrative services.

The Facilities Operation & Management Division is responsible for building operations, renovations, maintenance services, real estate and lease matters, and space management. Prior to the purchase of a site the Division checks with the Department of Environmental Resources and The Maryland-National Capital Park & Planning Commission to identify site constraints. The policy is to avoid sites with floodplains, wetlands, and unstable soils because complying with applicable requirements drives up the cost of development.

All work on County buildings, including construction of new buildings, work inside existing buildings, and additions to existing buildings, must comply with the Prince George's County Building Code and all other County requirements. Building permits are obtained and DER conducts inspections during construction.

The County is self-insured. In the past 5 years, county-owned buildings have not sustained significant damage due to lightning, wind, rain, snow/ice, or hail. County-owned buildings that are located in or near mapped flood hazard areas are listed in Section 5.6; no flood damage has been sustained in more than 30 years.

The General Services Division manages printing and graphics, records maintenance, mail and courier services, warehousing and inventory management of materials and supplies. Natural hazards and terrorist incidents have had the following impacts:

- Severe winter storms prompt heavy demand for sidewalk deicing materials, flares, flashlights, flashlight batteries, and snow shovels;
- Power outages, regardless of cause, trigger emergency power in certain facilities and requests for generators –generators are not are kept in stock;
- Hurricanes, tornados, thunderstorms, and winter storms that damage trees and generate debris prompt demand for chain saws which are kept in inventory;
- The County's preparation for the turn of the century, Y2K, revealed a need to maintain vendors on contract for certain long-lead tme materials; and

- The September 11 attack on the Pentagon increased awareness that the County's fire and rescue services could be called upon to provide significant support, including supplies and materials, to help respond to incidents in other jurisdictions.

6.11 Prince George's County Public Schools

Prince George's County Public Schools (PGCPS) is the 18th largest school system in the nation. As outlined in the Quality Schools Program Strategic Plan, the PGCPS faces opportunities and challenges as it pursues it mission to serve the education needs of the County's citizens. The PGCPS functions as an agency of the State Department of Education. The operating budget is funded by the Prince George's County Government; the capital budget is funded by both State and County funds.

The PGCPS owns its inventory of buildings, which includes 198 schools, of which 26 were built in the past 7 years. The Department of Planning and Architectural Services is responsible for the capital improvement program, including acquisition of land for new facilities, planning renovations and additions to existing facilities, and disposal of surplus property. The PGCPS is self-insured for property damage.

Site Selection and Planning. Planning for new schools is a complicated process that generally starts with identification of sites that meet the need. The Board of Education owns undeveloped parcels of land and parcels may become available during the planning of new subdivisions. Other parcels owned by the County or The Maryland-National Capital Park and Planning Commission may be examined for suitability. As a last resort, privately-owned parcels may be considered.

Structured evaluations are undertaken to determine whether sites are suitable. Other than location with respect to the student population, site constraints are evaluated through a formal environmental screening process. The process includes topographic survey, soil borings, and identification of environmentally sensitive areas, including flood-prone areas. Sensitive areas are excluded from the "useable" portion of a parcel, in large part because of increased site work costs associated with complying with regulatory requirements. Only minimal State funding is available for site work

The Board of Education receives donations of land under several scenarios. In the past, donated parcels have included areas of nontidal wetlands and mapped floodplains and a number of these parcels have been disposed of as surplus property.

Compliance with Building Code. The PGCPS is required to obtain permits from the County for new construction and additions to, or major improvements of, existing buildings. Compliance with the Building Code is a minimum requirement addressed by the consulting architects and engineers and DER conducts code compliance inspections during construction.

Schools and Emergencies. All of PGCPS schools are available for use as short-term shelters, but most are not pre-identified to serve specific areas. Specific needs are

identified in cooperation with the Office of Emergency Management when shelter capacity is needed. Seven schools have the capacity to serve larger numbers of people and may be opened depending on the event. Shelters are managed by the American Red Cross, which also furnishes cots and blankets. Cafeterias always keep supplies sufficient for three-days of normal lunch service.

Routine and emergency communication channels are maintained with each public school. Radio communication is provided by equipment in the main office of each school; the system is used on a daily basis and is available for emergency situations. Telephone, email and cell phone communications are available depending on the circumstances and whether power is available.

The Board of Education maintains the services of a commercial weather information vendor and is in constant contact with the Office of Emergency Management. When major storms are predicted, such as Hurricane Isabel, the Board may decide to close schools early in order to assure safe transportation of students.

The PGCPS owns more than 1,300 school buses and all drivers are employees. A week-long driver training program includes information about severe weather conditions.

Hazard Experience. In the past decade public schools in Prince George's County have not sustained any significant physical damage due to weather events. The following were reported:

- High winds associated with the 2001 tornado that tracked from College Park to the City of Laurel caused some roof damage at the Laurel High School. Some interior water damage was caused by infiltration of rain due to the force of winds.
- Hurricane Isabel in September 2003 caused no major structural damage, but left behind some debris on some school properties.
- Heavy winter snow and ice storms have not damaged buildings, although cleanup of broken tree branches is required.
- Weather related power outages have affected some schools. Schools have short-term generators to power emergency lights for evacuation; the generators are not intended to support continued operation of facilities. Generators are tested annually.
- Droughts have not affected school function because all facilities are serviced by WSSC.
- Five schools sites are identified as having some degree of risk (Table 6-5). Since at least the early 1970s, flooding has not directly impacted any school buildings or school property.

Table 6-5: School Properties Impacted by Mapped Flood Hazards

School	Watershed/Flooding Source	Description
*Riverdale Elementary	Northeast Branch	DER indicates building at 5006 Riverdale Road is in/near the mapped floodplain
*Scotchtown Hills Elementary	Patuxent River	DER indicates building at 15950 Dorset Road is in/near the mapped floodplain
Patuxent Elementary	Patuxent River	Minor flooding on lower portion of site (no buildings impacted)
Lewisdale Elementary	Northwest Branch	Minor flooding on grounds (no buildings impacted)
Forest Heights Elementary	Oxon Run tributary	Tributary floods site; floodwall provides protection

* Included in 2010 floodproofing audit initiative.

6.12 Fire/Emergency Medical Services

The Fire/EMS Department is responsible for fire suppression, emergency medical services, fire prevention, fire and rescue communications, research, training and the coordination of the volunteer fire companies. The Department serves a population of over 833,000 residents. The call volume for 2003 exceeded 133,000 calls, of which nearly 70% were emergency medical responses. Over 700 active career personnel and 1,100 volunteers staff 44 Fire/EMS stations. In addition to responding to structural fires, the department is responsible for coordinating the County's response to hazardous materials incidents and wildland fires.

Hazardous Materials. The Fire/EMA Department maintains the County's hazardous materials response plan and coordinates the Local Emergency Preparedness Committee, a federally-mandated organization that operates under "community right to know" rules established by the federal government, primarily focusing on public awareness and hazardous materials. A database of the physical locations of certain hazards materials as reported in the Tier II reports required by the U.S. Environmental Protection Agency is maintained. Hazardous materials incidents are largely associated with transportation of materials.

Forest & Brush Fire. At the state level, response to forest and brush fires is coordinated by the Maryland Forest Service, which also operates the Statewide Fire Monitoring System to collect fire weather data and determine fire danger ratings. Some department personnel are trained in wildland fire suppression.

The following highlights were reported:

- In the past decade, the State has not been on alert for wildland fire in Prince George's County and the Fire/EMS Department has not been required to respond to a forest fire incident. Approximately 1,500 small brush fires occurred each year.
- While it is recognized that bad weather and poor road conditions may increase the likelihood of transportation incidents involving hazards materials, the Fire/EMS Department does not maintain records that specifically characterize the role of weather.

6.13 Department of Family Services

The Department of Family Services ensures the development and provision of a comprehensive, responsible and effective community-based human service delivery system that enhances the quality of life for individuals and families of Prince George's County.

The Department's five major agencies are directly involved with citizens, many with special needs and vulnerabilities. Each major agency has an affiliated board or commission which provides the opportunity for citizens to have direct input and a voice in the services made available to the county more vulnerable citizens. The five agencies are:

- Area Agency on Aging;
- Division for Children, Youth and Families;
- Office for Disabilities Resources;
- Mental Health Authority; and
- Office of Women's Resources.

The Department of Family Services activates outreach to its constituencies when extreme heat or prolonged cold spells may threaten health and safety.

6.14 Metropolitan Washington Council of Governments

Founded in 1957, MWCOG is an independent nonprofit association and is a regional organization of 10 local governments in the Washington, D.C., area plus members of the Maryland and Virginia legislatures, the U.S. Senate, and the U.S. House of Representatives. The MWCOG provides a focus for action and develops sound regional responses to such issues as the environment, affordable housing, economic development, health and family concerns, human services, population growth, public safety, and transportation.

For the purpose of this Plan, only the MWCOG's role in drought planning and response is described. In this role, the MWCOG coordinates with regional governments and other

organizations to plan for and respond to regional droughts. Prince George's County, the City of Laurel, and other incorporated municipalities in the County participate. The region has taken several steps to coordinate allocation of water in times of drought:

- **Low Flow Allocation Agreement** to recognize the need to maintain a minimum flow in the Potomac River sufficient to sustain aquatic resources; establishes stages for low river flow that prompt action to monitor and eventually restrict water withdrawals; establishes a formula for allocating Potomac River water during times of shortage. The Agreement's low-flow stages have never been triggered, and a subsequent agreement minimized the likelihood that they would ever be triggered.
- **Water Supply Coordination Agreement** requires the major water suppliers to coordinate operations during droughts in order to minimize the possibility of triggering the restrictive stages in the Low Flow Allocation Agreement; agency actions are coordinated through a Drought-Related Operations Manual administered by the Interstate Council on the Potomac River Basin. The agreement calls for preparation of a 20-year supply-demand study every five years. Under the terms of the agreement, cooperating partners agreed to share the costs for supply augmentation facilities and constructed the Jennings Randolph and Little Seneca Reservoirs that serve to augment the region's water supply during droughts.
- **Water Supply Emergency Agreement** is designed to implement the restrictive stages of the Low Flow Allocation Agreement; encourages signatories to adopt local ordinances that follow the specific conservation measures detailed in the Water Supply Emergency Plan and to implement these actions in the event of a water supply shortage.
- **Water Supply Emergency Plan** was developed in the wake of the region's 1993 boil-water order; deals primarily with sudden, unexpected disruptions in water supply.

The MWCOG's Drought Stage Guide is based on four levels of warning. Defined for each warning level are the audience targeted for public messages, the conditions that triggers the level, the actions that are to be taken, and the messages to be distributed. The warning levels are:

- Normal – Wise water use is encouraged;
- Watch – Voluntary water conservation is emphasized and the Drought Coordination Committee meets;
- Warning – Voluntary water restrictions are announced and the public and businesses are asked to voluntarily implement water restrictions; and
- Emergency – Mandatory water restrictions are imposed.

6.15 Summary of Existing Mitigation Activities

This chapter highlights measures and programs in Prince George's County government that reduce the impact of natural hazards. Table 6-6 summarizes those measures for ready reference.

Table 6-6: Summary: Activities that Reduce Hazard Impacts

FLOOD
• DER provides online/handout information to inquirers; site-specific flood hazard information, advice on flood insurance and measures to minimize damage • DER booth at festivals includes flood mitigation and safety materials • June is Flood Hazard Awareness Month • *Master Plan* sets forth policies to preserve environmental features • *Zoning Ordinance* includes Chesapeake Bay Critical Area Overlay Zone • *Green Infrastructure Plan* calls for conservation of natural areas, including flood hazard areas • Developers required to delineate flood hazard areas and wetlands as part of subdivision review layouts and building permits • Flood hazard area protection and damage-resistant measures imposed through subdivision regulations and floodplain management code requirements • County participates in the NFIP's Community Rating System • Management of increased stormwater runoff required as part of new development • DER identifies, designs and implements structural and nonstructural projects to reduce flood damage • DER partnering with FEMA to revise flood maps • DER and OEM operate flood-threat recognition and warning capabilities • DPW&T and State standards minimize flood risks and damage for roads, bridges and culverts • DPW&T operates flood control pump stations • DPW&T inspects drainageways, maintains channels and levees • County and U.S. Army Corps of Engineers in discussions regarding maintenance and upgrades of the Anacostia River levees (Section 5.9) • WSSC monitors weather and predicted storm activity to manage reservoirs • The M-NCPPC acquires and maintains open space, including active recreational areas and passive open space • Prince George's County Public Schools avoids selecting new school sites that are affected by mapped flood hazard areas
STREAMBANK EROSION
• DER, Maryland DNR, and The M-NCPPC completing Stream Corridor Assessment (Section 4.6.1)

WINTER STORM
• State building code specifies design snow load for buildings and structures • Bridge designs account for snow load • DPW&T has snow removal plans and capacity • DPW&T has brochures and online content related to snow emergencies and snow removal (in English and Spanish) • Several agencies monitor weather and developing conditions • Family Services has outreach to elderly residents
HIGH WIND/TORNADO
• State building code specifies design wind load for buildings and structures • Several agencies monitor weather and developing conditions • OEM coordinates with other agencies to operate W.A.R.N. system for citizen notification; recovery presentations online/cable • Housing Authority retrofit public housing facility with code-compliant window assemblies
SEVERE STORM
• State building code specifies wind design load for buildings and structures • Lightning protection requirements in building code for nonresidential • Several agencies monitor weather and developing conditions • OEM coordinates with other agencies to operate W.A.R.N. system for citizen notification; recovery presentations online/cable
DROUGHT
• WSSC manages reservoirs for water supply • MWCOG Water Supply and Drought Awareness Response Plan • County and City participate in regional planning initiatives • The M-NCPPC complies with water restrictions, focusing limited water supplies on unique horticultural resources, including champion and historic trees and irreplaceable resources
DAM FAILURE
• Fire/EMS coordinates with DNR for wildland fire response • Fire/EMS has some personnel trained in wildland fire suppression
DAM FAILURE
• WSSC periodically inspects dams and performs regular maintenance to assure safe functioning • WSSC's Emergency Response Plan for Rocky Gorge Dam (Duckett) is approved by the Maryland Department of the Environment and is coordinated with downstream jurisdictions • WSSC notifies Laurel in advance of releases that may cause flooding
EXTREME HEAT
• Family Services has outreach to elderly residents • DPW&T's road and bridge standards for expansion joint and improvements in joint materials minimize damage due to extreme heat

LAND MOVEMENT/UNSAFE LANDS
• DWP&T requires roads to have deeper excavation, increased base thickness and additional underdrainage in areas with poor drainage (Marlboro and Christiana Clays) • Preliminary plans for subdivisions must depict steep slopes and unstable soils • Subdivision of land may be restricted or prohibited if found to be unsafe for development, which may be due to natural conditions such as, but not confined to . . . unstable soils or severe slopes • State building code addresses unstable soils, giving the code office authority to require special measures • Grading permits may be denied no reasonable corrective work will eliminate or reduce settlement, slope instability or geological hazards to persons or property

6.16 2010 Update

All departments and agencies reviewed and updated the pertinent sections. Some of the more significant changes include:

- In Table 6-1, clarified that planning and zoning functions in Bowie are included in the County's process (Section 6.2).
- Clarified the woodland conservation requirements under the Zoning Ordinance (Section 6.2.2).
- Noted that changes in the stormwater regulations have been proposed; clarified that the County emphasizes the use of non-structural stormwater management best management practices (Section 6.2.4).
- Revised the description of the Countywide Green Infrastructure Plan (Section 6.2.6).
- Noted that the State building code now includes a code based on the IEBC (Section Added to the list of County code amendments an amendment related to drainage away from buildings and a change in the basic wind speed from 80 to 90 mph (6.2.7).
- Noted the transfer of Site Review function from DER to the DPW&T. Completely updated the description of the Licenses and Inspections Group (Section 6.3).
- Revised to recognize the 2007 update of the floodplain management plan; acquisition of 5 homes subject to sinkhole/unstable soils; and the 2010 floodproofing audit initiative (Section 6.3.1).
- Updated the descriptions of the Development Review Division and the Countywide Planning Division (Section 6.4.1).
- The M-NCPPC updated the list of possible flood-prone buildings and identified increasing occurrence of streambank erosion (Section 6.5.2).
- DPW&T added description of the requirements for roads in unstable soils (Section 6.6.1).

- Expanded description of Corps of Engineers activities and to describe completion of a pump station upgrade (Section 6.6.3).
- WSSC expanded the description of the T. Howard Duckett Dam on the Patuxent River and reported on the results of an engineering study that found the dam is safe from failure under seismic conditions; updated description of Water Supply Adequacy and Drought Plans (Section 6.7).
- Housing Authority reported on installation of an emergency generator at Cottage City Towers, identified in 2006 as a high priority action (Section 6.8.1).
- Updated Table 6-6.

Chapter 7
City of Laurel

7.1 Overview of the City

The City of Laurel, Maryland, (www.laurel.md.us), is governed by a Mayor and City Council form of government in accordance with its Charter, adopted on April 4, 1870. The elected officials consist of the Mayor, serving a four-year term, and five Council members who serve two-year terms. The Mayor and City Council provide community leadership, develop policies to guide the City in delivering services and achieving community goals, and encourage citizen awareness and involvement:

- **Office of the Mayor.** The Mayor is the Chief Executive of the City with all the powers necessary to secure the enforcement of all ordinances and resolutions passed by the City Council. As the leading elected official of the City, the Mayor is empowered to approve or veto legislation, prepare the annual budget, and directly supervise the administration of the City. The Mayor has authority to declare emergencies and has broad emergency powers during a declared emergency.
- **City Council.** The City Council, as the legislative body of the City of Laurel, appropriates funds, considers and enacts resolutions, and adopts regulations and ordinances for the protection of rights and privileges, peace and good government, and safety and health of all citizens.

With respect to planning for and responding to natural hazard events, and regulation of development, the key elements of the City's organization are:

- **City Administrator.** The City Administrator carries out the charges of the Mayor and City Council through day-to-day management, support, and oversight of all City departments and functions.
- **Police Department.** The Laurel Police Department is a Nationally Accredited, full-service law enforcement agency. In addition to its law enforcement responsibilities, the department works with the Emergency Services Department to alert citizens to pending flooding. Police officers have the authority to provide control during situations that may create threats to life and property.
- **Community Planning and Business Services.** The Community Planning and Business Services Office is responsible for land use planning and zoning, and administration of the fire code and building code, including inspections and enforcement. It enforces ordinances related to dangerous or substandard buildings, the Property Standards Code, environmental health issues, and zoning laws. The City's zoning authority is independent of Prince George's County. Section 7.4 outlines how the City regulates development, with particular emphasis on how natural hazards are addressed, especially flood hazards.

- **Public Works.** Public Works provides engineering planning, design, and construction administration for street rehabilitation and construction projects on City property. Technical support is provided to other City departments. It conducts engineering review of plats and plans for subdivisions and site plans for single lot developments. To assure compliance with City requirements, subdivision improvements are inspected during construction. The department maintains record drawings of construction improvements and topographic maps, develops and implements the Capital Improvement Program (CIP), provides project management and oversight of projects approved by the City Council, including approximately 41 miles of road, bridges, and public buildings. Additional public services include: residential and commercial waste and recycling collection; street and sidewalk maintenance and repair; tree management; engineering solutions for public safety; automotive fleet maintenance; and snow and ice removal. The Director or Pubic Works is specifically charged with the authority to close roads, for example when flooding conditions are imminent.
- **Budget and Personnel Services.** The Department is responsible for ensuring adequate controls to protect the City's funds and to maintain adequate and accurate records of all financial transactions. It strives for the performance necessary to achieve a favorable certified audit in order to maintain the City's A-1 A+ bond rating and eligibility for federal grant funds.
- **Parks and Recreation.** Parks and Recreation maintains the City's 12 park and recreation facilities and approximately 168 acres of parkland and associated equipment. It is responsible for developing and implementing recreational programs. During times of emergency the department is responsible for opening shelters and procuring food. The City's two shelters have been certified by the American Red Cross (and both are outside the mapped floodplain).
- **Emergency Services Department.** The Emergency Services Department reports to the City Administrator's Office and the Deputy City Administrator is the Director of Emergency Services and the Emergency Management Coordinator. The department coordinates emergency management and response, maintains the City's emergency management programs, and maintains the City's Emergency Management Guide in accordance with local, state and federal standards. The department is responsible for the Emergency Operations Center (EOC), coordinates emergency response to disasters, and conducts disaster-training exercises. To respond to all types of crises, the EOC operates under the Incident Command Structure in accordance with Federal Directives. Storms, flooding and a tornado in recent years magnified the need for a centralized Emergency Response Center, prompting the City to open a state-of-the-art EOC in July 2003. Utilizing Disaster Incident Management Software and WebEOC, the City can communicate needs throughout the United States. The department brings together resources and personnel to make decisions and coordinate the flow of information and strategy required to deal effectively with emergencies. A number of agencies and organizations participate during EOC activation, depending upon the severity and nature of the emergency.

7.2 Communicating with Citizens

The City of Laurel actively communicates with its residents using a variety of media, each of which can be used to convey information about preparing for and responding to natural hazards:

- The monthly newsletter, MayorGram, is posted on the City's web page, emailed to all residents and businesses that sign up for it, and is available in hardcopy at all City facilities. The newsletter reports on City activities and progress on various initiatives, and informs readers about upcoming activities and events. It is available to convey information important to the residents relating to hazard and how to mitigate the effects. Content related to flooding and flood safety has been addressed.
- Several documents related to preparing for disasters and emergencies can be downloaded from City's web page, including brochures specific to tornadoes, winter storms, heat waves, and hurricanes (also in Spanish).
- The City's regulations are accessible through the web page and public access to GIS maps is provided through the Prince George's County's online application, www.pgatlas.com.
- The Streets & Drainage page on the County's web site includes answers to typical questions posed by citizens.
- The local government public access video channel is accessible to residents who subscribe to Comcast Cable and through the City's streaming video link (www.laurel.md.us/streaming). Mayor and City Council meetings, other public meetings and critical watches, warnings and mitigation efforts are shown on this channel.
- After major flooding, the City posts information on the public access video channel, including information about the City's post-disaster permitting requirements.
- Local AM/FM radio station broadcasts emergency information on an as-needed basis (AM 600, 630, 980, 1090, 1500 and FM 88.1, 95.5, 103.5.
- Door hangers, email, telephonic messages and targeted direct mailings have been used after floods to inform people of their post-flood responsibilities; the contact/mailing list is considered to be comprehensive, including addresses in the floodplain and other homes that have flooded.
- After the September 25, 2001, tornado and Tropical Storm Isabel in September, 2003, City officials held public meetings to give citizens the opportunity to get answers and information about recovery.
- City Emergency Response staff offer briefings to residential associations and business groups to improve awareness of natural and man-made hazards.

7.3 Natural Hazards in Laurel

The Prince George's County *Hazard Identification and Risk Assessment* (Appendix A), summarized in Chapter 4 and Chapter 5) describes the hazards that were investigated and the likely impacts throughout the County. The City of Laurel is identified as Planning Area 99. Four hazards are characterized as uniformly affecting the entire County, including the City, and are not separately described in this section: winter storms; high winds/tornadoes; severe storms, and drought. The hazard of wildfire is relatively minor in Laurel because there are no significant agricultural areas in or around the City and forested and open areas largely are confined to the floodplain and open space along the Patuxent River on the east and Fairland Regional Park on the west side of the City. Flood hazards are described.

7.3.1 Flood Hazards in Laurel

The most significant natural hazard that impacts Laurel is flooding, particularly flooding of the Patuxent River (Figure 7-1). A large water supply dam that is owned and operated by the Washington Suburban Sanitary Commission (WSSC) is located immediately upstream of I-95 above the City. Three Patuxent tributaries flow through the City: Walker, Crow and Bear Branches.

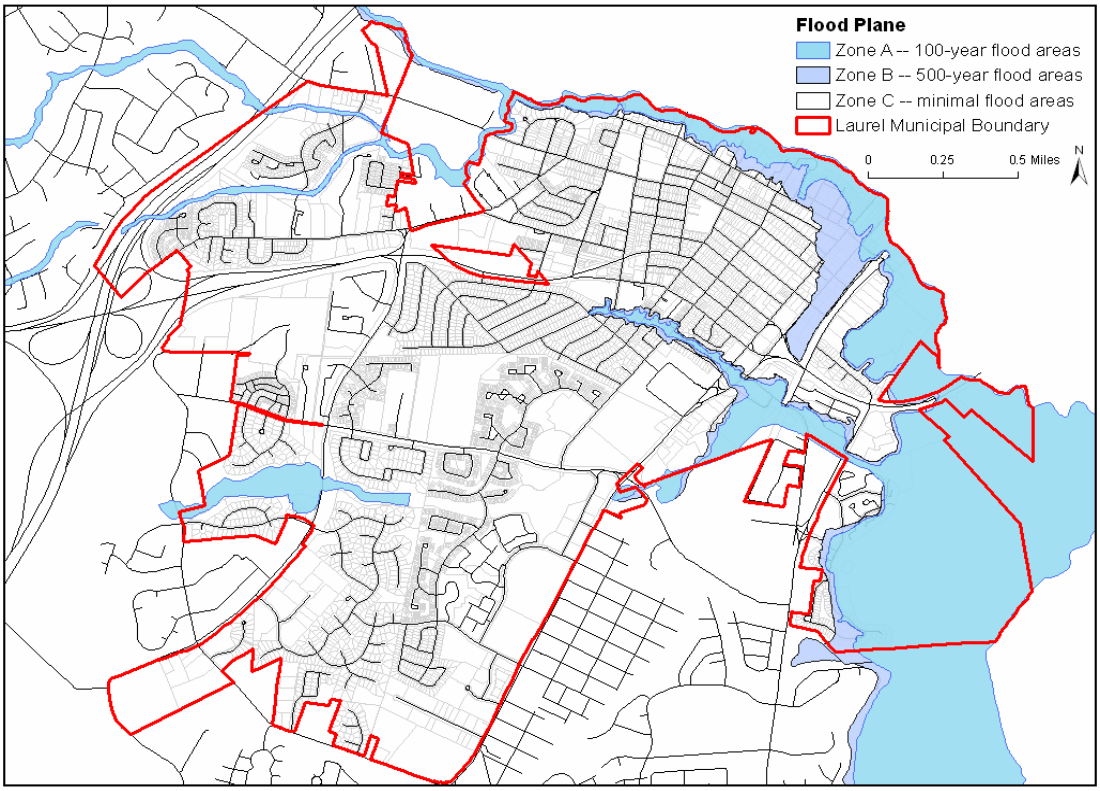


Figure 7-1. Flood hazard areas: City of Laurel.

Tropical Storm Agnes in June 1972 generated the flood of record in Laurel where WSSC measured high water marks that indicated the recurrence interval of the event was slightly greater than the 1 percent-annual-chance flood (100 years). This event continues to influence the City's approach to floodplain management.

Laurel has two distinct types of flood risk. The more probable risk is riverine flooding due to prolonged rainfall that causes waterways to overflow their banks and which may prompt WSSC to open floodgates. Although failure of the dam is extremely unlikely, the consequences associated with dam breach have been examined. Because of the City's proximity to the dam, City officials are in regular communications with WSSC and participate in periodic exercises of the emergency plan and notification procedures.

The City of Laurel does not have any properties that are designated by FEMA as "repetitive loss properties" (insured by the NFIP and have received two or more flood insurance claims of at least $1,000).

The Legacy of Tropical Storm Agnes

Leaving behind more than $10 million in damage in Prince George's County and the City of Laurel, Tropical Storm Agnes moved through the area on June 21-22, 1972. Newspaper reports described the aftermath in Laurel:

- *The Ninth Street bridge washed out, as did the pedestrian Laurel Race Track bridge.*
- *Laurel Rescue Squad and Fire Department used boats to evacuate Mistletoe Gardens apartments.*
- *Home foundations were braced with sandbags, propane gas tanks became detached, basements were flooded.*
- *In Laurel, damage to the Swimming Pool, park facilities, storm drainage and the City's sanitary landfill was estimated at $35,000.*

Table 7-1 lists the number of residential dwelling units and other buildings that have been determined to be within areas shown as subject to flooding on the City's current effective Flood Insurance Rate Map (FIRM) and on a proposed revised map. Buildings are affected by flooding of the Patuxent River and Crows Branch; the floodplains of Walker Branch and Bear Branch are undeveloped. The three City buildings are associated with the Laurel Municipal Swimming Pool. The essential facilities are an existing building that was purchased by the City in 2007 and converted to the Police Station (partially encroaches) and two buildings owned by the Laurel Volunteer Rescue Squad (one pre-

dates the City's flood map and is subject to relatively shallow flooding; the new building, built in 20005, is in compliance with State and City floodplain requirements).

Table 7-1: Buildings in Laurel's Floodplains

Occupancy	Current Effective Flood Map	Proposed Revised Flood Map
1-4 family residential	17*	38*
Multifamily residential	35*	60*
Commercial/industrial	4	33
City-owned buildings	3	3
Essential facilities	3	3
Other buildings (accessory)	21	50
Totals	82	186

* Dwelling Units

Since 2000, Patuxent River flooding has affected some residential and commercial structures. Although floodwaters overtopped some roads, no structural damage was sustained. The most recent impacts of flooding occurred in July 2004 and included:

- Five families were evacuated from flooded apartments; the damage was limited to contents and non-structural elements of the building.
- Commercial Body Shop at #1 Main Street was flooded; the building was constructed with flood vents alleviating any structural or property damage.
- In Riverfront Park, some trash receptacles were damaged and picnic tables floated downstream a short distance (they were recovered).

7.4 Growth and Development

The City of Laurel regulates development in a well-planned manner that is consistent with the City's vision for its future. As a growing community, the City is committed to development to serve the best interests of all citizens. The City Code, Zoning Regulations and Subdivision Regulations are available online through the City's web page.

The City of Laurel Planning Commission is composed of five members appointed by the Mayor and confirmed by the City Council. It serves as an advisory board to the Mayor and City Council on land use matters and is the decision-making authority on matters related to subdivision plat approval and conventional site plans. The Commission's fundamental powers include the power to:

- Amend, extend and add to the master plan for the physical development of the City;

- Approval or disapproval of plats for proposed subdivisions;
- Recommend the approval or disapproval of proposed changes in the zoning plan;
- Recommend the clearance and rebuilding of slum districts and blighted areas;
- Recommend to the City Council the amendment, extension and revision of the building code; and
- Submit an annual prioritized list of recommendations for capital improvements.

7.4.1 *Master Plan*

The Laurel *Master Plan* (2007) outlines the City's overall development goals, objectives, policies, and criteria for physical growth. The plan is a decision-making tool to help staff evaluate proposals for new land use and development. It is a flexible document that can be evaluated and adjusted for changing conditions that occur over time. An update was prepared in 1997 to incorporate a sensitive area element in accordance with state requirements. An update of entire plan was completed and adopted in 2007.

The 2007 *Master Plan* recognizes the constraints required due to the presence of floodplain should development occur on several undeveloped parcels of land along the Patuxent River. The plan identifies enactment of a conservation/open space zone as an objective. The purpose for the zone would be to identify and preserve certain areas specifically designed for low intensity development, including certain recreational uses and floodplain areas.

7.4.2 Capital Improvement Program (2010-2015)

The Capital Improvement Program (CIP) is a fiscal plan or schedule for financing public projects and improvements over time. It balances the need for improvements with the City's ability to finance them. Developed using the guidelines set forth in the Master Plan, the CIP addresses not only current needs but needs that can be anticipated due to growth. A number of projects have bearing on flood hazards:

- **Base Map Update.** This project produces photometric maps and an asset inventory for use in the City's Geographic Information System. It will provide a valuable base for the City's planning and maintenance activities. The work will be done in phases, with the first phase focused on updating the current base map in 2009 and preparing property and parcel overlays linked to property assessment records in 2010.
- **Riverfront Park Improvements, Acquisition, and Trail Extension.** Unspecified acquisitions are anticipated to expand the park. The trail expansion is proposed to link the Train Station and Recreation Center site, extending along the Patuxent River. In addition to replacement of two park pavilions, FY05 funding will address some riverbank erosion.

- **Reconstruction Program: Major Drainage and Flood Control.** Included in the County's CIP, this on-going program is available to redesign, reconstruct and rehabilitate projects throughout the county. The program may, under certain circumstances, aid the City.
- Flood Protection & Drainage Improvement. Included in the County's CIP, this program funds projects whose estimated cost is less than $500,000, including projects that address flooding of private homes, roads, and drainage deficiencies. The program may be a source to help the City correct other property flooding problems.

7.4.3 Building Codes, Permits & Inspections

In January 2004, the City adopted the 2006 International Building Code and the 2006 International Residential Code, including subsequent revisions. In 2009, the City adopted the 2008 International Electric Code. To address concerns about residential fire, since 1990 the City has administered an Ordinance requiring sprinkler systems in all residential development.

The building codes include provisions to ensure that buildings are designed and constructed to resist certain environmental loads. The minimum design must account for loads associated with a basic wind speed (3-second gust) of 90 miles per hour. The minimum snow load for roof design is 25 pounds per square foot.

The City of Laurel has experienced moderate residential growth in since 2003 and little commercial construction in the past few years. (Table 7-2).

Table 7-2: Building and Development Permits; Inspections

(2006, 2007, 2008)

Year	Single Family	Multi-Family DUs*	Commercial	Total Permits	Number of Construction Inspections	Number of Rental Inspections
2006	81	451	9	129**	2,327	363
2007	93	455	2	123**	2,169	1,177
2008	45	0	2	94	2,008	466

* Dwelling Units

** A single Building Permit was issued for several multi-family units

Staff Capabilities

The City employs two building inspectors and three code enforcement officers. All are certified or licensed by the State.

The City conducts inspections of all permitted development (Table 7-2). Multiple inspections are conducted on every building under construction, ranging from foundation and framing, to electrical and mechanical. Plumbing inspections are conducted by the Washington Suburban Sanitary Commission (WSSC). In 2006 the City took over review and inspection of fire code compliance from Prince George's County. Certified and licensed consultants perform the review and certified contract inspectors conduct independent inspections.

In July 2003, the City expanded its requirement for inspection of rental housing to include all rental units, including multi-family, single-family detached, townhouse, duplex, condominium, apartment units above or below businesses, and individual rooms rented to anyone other than blood relatives. As a consequence of recent growth and new rental licensing requirements, the total number of inspections has risen significantly in recent years.

7.4.4 Regulating Flood Hazard Areas

The City of Laurel administers regulations and ordinances to regulate flood hazard areas to minimize exposure of people and property. Administration of these provisions is the joint responsibility of the City's Floodplain Manager (Director of Community Planning and Business Services) and the Chief Building Official/Fire Marshal.

The effective Flood Insurance Rate Map is currently under review by FEMA for revisions to reflect new development and mitigation efforts. The current Flood Insurance Rate Map (Panel #240053 0001D, revised 8/19/1985) is used as the minimum flood hazard area within which development must conform to floodplain management regulations. For development and rehabilitations occurring in areas recently annexed into the City of Laurel, staff uses the Flood Insurance Rate Map for Prince George's County, Unincorporated Areas (Panel # 245208 0010C, revised 6/18/1987). If a floodplain has not been delineated, the City may require applicants to provide a survey that evaluates and defines the flood hazard area.

All proposals for work in flood hazard areas are subject to the requirements of the Maryland Department of the Environment. The City requires applicants to obtain all State permits prior to issuing the local permit.

Processing Floodplain Development Proposals. The City's standard procedure for determining the extent of the mapped flood hazard area "on the ground" is to measure off of the centerline of the waterway shown on the flood hazard map and apply that distance to the applicant's site plan. Where Base Flood Elevations are shown, there is no cross check with the topography and the flood zone is superimposed on the site plan.

For individual building permits issued for single lot development, the City requires owners to submit an Elevation Certificate to document compliance before the Use and Occupancy Permits are issued. In the past 5 years, only 4 permits have been issued for floodplain activities.

Reviewing and Approving Subdivisions. The Subdivision Regulations of the City of Laurel outline the requirements for the design, review and approval of subdivisions. The City expressly restricts the subdivision for development of any real property which lies within the fifty-year floodplain of any streams or drainage courses. Preliminary plans (plat plans) are required to show waterways, drainage structures, and flood elevations and boundaries of flood-prone areas (including floodways). Where a proposed subdivision includes a floodplain area and the area is to be left in open space, the area is placed in a floodplain easement or made available for public park or recreation uses. Areas under a floodplain easement may be used for utility lines or storm drainage facilities.

In approved subdivisions that include floodplain areas, development permits are not issued for any type of new construction within the area delineated as floodplain. Platted lots may include flood hazard areas (or other areas deemed to be "unsafe land") provided proposed building sites meet zoning setbacks, plus an additional 25-foot setback from the floodplain. If the proposal includes fills or other structure elevating techniques, levees, channel modifications, or other methods to overcome flood or erosion-related hazards, they must be designed in compliance with the City's flood hazard prevention requirements.

Permitting for Substantial Improvements. Applicants for work on existing buildings are required to submit the value of work proposed. For work on floodplain buildings, that value is compared to the assessed value as a screening for whether the proposed work constitutes a substantial improvement (50% or more of market value). Every application for renovation, improvement, or repair of existing buildings is checked to determine if the building is located in the mapped flood hazard areas. The City's Floodplain Manager or an authorized designee must review and sign-off on any permits for work on existing flood-prone buildings.

For the rehabilitation of structures within the floodplain, the City requires mitigation efforts where possible. Most structures already in the floodplain are slab-on-grade. Elevation Certificates are required before any permits are issued to insure that, in as much as possible, that floor elevation changes are such that the grade of the finished first floor is above the floodplain elevation and that all electrical outlets are at least 1.5 feet above the flood elevation.

Stormwater Management. Prince George's County is responsible for review and approval of stormwater management measures on development in the City of Laurel. In, 1993, the Mayor and City Council approved Ordinance Number 1106 amending the City of Laurel Code to adopt the Prince George's County Stormwater Management Regulations and authorized the administration, inspection and enforcement of the regulations by the Prince George's County Department of Environmental Resources. The City coordinates with County staff regarding the permitting, review and approval process for new developments.

The City's Public Works Department conducts a biannual inspection of stormwater management facilities to check for debris, and cleans out silt and debris to improve performance of the system in the event of heavy rainfall.

Continued Compliance with the NFIP. Participation in the National Flood Insurance Program (NFIP) is important to the City of Laurel. This is evidenced by the City's commitment to regulating development and redevelopment, by its adoption of provisions that exceed the minimum NFIP requirements, and by its active pursuit of mitigation opportunities. The City is firmly committed to continued compliance with the NFIP.

Laurel satisfied requirements for initial participation in the NFIP and joined the Emergency Program in 1978. Upon issuance and final approval of the Flood Insurance Rate Map in July 1984, the City joined the Regular Program.

Community Assistance Visit. The Maryland Department of the Environment periodically conducts a compliance audit of the City's floodplain permitting and review activities. The City has consistently been found in compliance since 1978 (confirmed by the most recent visit in November 2005), when the City began participation in the National Flood Insurance Program.

7.5 Ongoing & Previous Mitigation Initiatives

Revised Flood Insurance Rate Maps. Engineering studies to revise the floodplain maps are under review by FEMA and are expected to be ready for adoption in mid- to late-2010. The revised maps are expected to show higher flood elevations than shown on the current maps. As part of the adoption process, a new project information page will be created for the City's web page, to notify residents about attending public hearings and to link to the National Flood Insurance Program's web site.

Dealing with flood hazards, the most significant natural hazard in Laurel, is not a new proposition for the City. In addition to the project to revise the flood maps, two of the 2009-2010 goals for the Department of Community Planning and Business Services are directly related to flooding:

- Promote flood awareness through public meetings and media announcements, due to anticipated increase in the extent of the FEMA-mapped floodplain and more than doubling of the number of buildings that will be in the designated flood hazard area.
- Upon completion of the revised flood maps, pursue funds to mitigate impacts to residential and commercial properties.

Stormwater Management. Working with The Maryland Department of Environmental Resources and Prince George's County Department of Environmental Resources, the City will attempt to alleviate several concerns relating to stormwater runoff that affects several residential areas that are outside of the floodplain as shown on the FEMA map.

Carroll/Laurel Avenue Drainage Project. Residential structures in the 300 and 400 blocks of Carol Avenue and Laurel Avenue are inundated with stormwater runoff during prolonged rain storms. These areas do not benefit from formal stormwater management structures or devices. Working with Prince George's County, the City is attempting to design and construct measures to channel and control stormwater. These areas have been inspected by the County and are under consideration for minor project funding.

Geographic Information System Project. The City's GIS project is being developed in stages. Several of the layers will contain data to assist in development and rehabilitation projects and will also enable more effective evaluation of hazards and mitigation efforts. The baseline data compiled includes hydraulic/hydrologic information, roads, FEMA floodplains, habitat types, wetlands and biological areas, ground elevations and contours, stream cross-sections, cultural resources, recreational facilities, Census information, and structural inventory information. Work on an environmental impact review based on this data will begin in late 2009-2010. This information will provide enhanced data for the development of additional projects to help in the City's mitigation efforts.

Drainage Maintenance. Prince George's County is responsible for public drainage infrastructure in the City. However, due to its proximity to the Patuxent River, the City recognizes the critical importance of adequate drainage and biannual inspections of storm drains and cleans inlets to reduce blockage.

Insurance for Public Buildings. The City maintains property insurance coverage on its buildings to cover damage due to structural fire, wind and lightning and flood. For losses other than those due to flooding the City carries $27 million in coverage ($22 million for structure, $5 million for contents). Three NFIP flood insurance policies are in effect for buildings that form the Laurel Municipal Swimming Pool which is in the floodplain of the Patuxent River.

7.6 Natural Resources

The City of Laurel values its open space and encourages protection of trees and wetlands in its development processes. Activities proposed within wetland areas must be approved

by the Maryland Department of the Environment under state statute, and by the U.S. Army Corps of Engineers under the authority of Section 404 of the Clean Water Act.

Open Space. Open Space is addressed in the City's Subdivision Ordinance (Sections 15-7 and 15-8). The City may require up to 10% of gross area or water frontage for park, school or recreational purposes. The location of set-aside areas are to be approved by the Parks and Recreation Director using a ratio of one acre of park for every 100 dwelling units. Areas must be appropriate in area, shape and terrain for intended park uses. City may elect to accept a fee as alternate to dedication, in whole or in part, to maximize accessible locations.

Forest Conservation (Ordinance No. 1079). In 1992, the Mayor and City Council adopted the Forest Conservation ordinance to comply with State requirements. Applications for subdivisions and plan approvals, site plan approvals, development plan approvals, grading permits or sediment control permits for an area of land of forty thousand (40,000) square feet or greater shall submit a forest stand delineation and a forest conservation plan. Methods to protect delineated forest stands and trees during construction shall be accomplished using methods approved by the department, as provided in the Forest Conservation Technical Manual. The City submits Forest Stand Delineations and Forest Conservation Plans to the Maryland Department of Natural Resources for review of all development proposals.

7.7 2010 Update

- Updated the map that illustrates SFHAs in the City and added the recently-purchased Police Station to the list of public facilities (Section 7.3.1).
- Updated the Master Plan information (Section 7.4.1) and Capital Improvement Program information (Section 7.4.2).
- Updated permit statistics (Section 7.4.3).
- Deleted text about the Community Rating System subsequent to a determination that the City will not pursue participation in the CRS (Section 7.4.4).

Chapter 8
Mitigation Actions

8.1 Overview of Mitigation Measures

Mitigation measures or actions generally are grouped in six broad categories or approaches (Table 8-1). Some measures affect processes (such as zoning), while others may be projects that affect a specific location (retrofit of structures). As described in Chapter 6 (Prince George's County) and Chapter 7 (Laurel) – and annotated in Table 8-1 – many of these actions are already part of normal processes and thus additional discussion was not warranted.

After the prevalent (high priority) hazards and associated risks are identified, and the mitigation goals are established, the range of actions is considered to identify specific actions that are reasonable, feasible, and cost-effective.

Table 8-1. Categories of Mitigation Measures. *(Selected annotations added 2010)*

PREVENTIVE MEASURES keep problems from getting started or getting worse. When hazards are known and can be factored in to development decisions early in the process, risks are reduced and future property damage is minimized. Building, zoning, planning, and/or code enforcement officials usually administer these activities: • Planning and zoning – *Implemented through the County and City* • Open space preservation – *Extensive public lands and development guidelines to encourage open space* • Building codes and enforcement – *Enforcement of the Maryland building codes* • Infrastructure design requirements – *Road designs account for flooding and winter conditions; water and sewer design accounts for flood hazards (State requirements)*
PROPERTY PROTECTION measures are actions that go directly to permanently reducing risks that are present due to development that pre-dates current codes and regulations and include: • Property acquisition in floodplains – *County determines on case-by-case basis* • Relocation out of hazard-prone areas • Elevation of structures in floodplains • Retrofit of structures in high wind zones – *Not located in high wind zone*
EMERGENCY SERVICES MEASURES are taken immediately before or during a hazard event to minimize impacts. These measures are the responsibility of city or county emergency management staff, operators of major and critical facilities, and other local emergency service organizations and include: • Alert warning systems – *County has flood warning in selected watersheds; uses wide-area warning network for wide variety of public notifications, including related to hazard events* • Hazard/weather monitoring systems – *Multiple departments monitor weather* • Emergency response planning • Evacuation • Critical facilities protection • Preservation of health and safety

STRUCTURAL PROJECTS are usually designed by engineers and managed and maintained by public entities. They are designed to reduce or redirect the impact of natural disasters (especially floods) away from at-risk population areas: • Levees, floodwalls, dunes and berms– *County has constructed flood control works* • Drainage diversions • Storm water management facilities – *State requirements apply in County and City*
NATURAL RESOURCE PROTECTION projects preserve or restore natural areas or their natural functions. Park and recreation organizations, conservation agencies or wildlife groups may implement such measures: • Wetland protection or restoration – *State requirements apply in County and City* • Beach and dune protection – *Not applicable* • Erosion and sediment control – *State requirements apply in County and City*
PUBLIC INFORMATION PROGRAMS advise property owners, potential property owners, and others of prevalent hazards and ways to protect people and property. A public information office usually implements these activities, often with private partner support: • Flood maps and data – *County is Cooperating Technical Partner* • Public information and outreach – *County distributes annual mailing to SFHA property owners* • Technical assistance for property owners – *County responds to inquiries* • Real estate disclosure information – *State requirements apply in County and City* • Education and outreach – *County undertakes selected activities*

***** Source: FEMA 386-3, State and Local Mitigation Planning How-to-Guide: Developing the Mitigation Plan.

8.2 Identifying Priority Actions

Throughout the planning process, the Mitigation Advisory Committee considered hazards, the number of people and types of property that are exposed, and the development review process. For the 2010 Update, the Committee reviewed and discussed the status of the 2005 mitigation actions and whether to modify or retain the actions (see Appendix C for the status report on the actions identified in the 2005 Plan). The actions considered by the Committee intentionally are broad and comprehensive in scope.

As outlined in Chapter 6 and Chapter 7, the County and the City incorporate recognition of natural hazards in their private development review processes and regulations pertinent to privately-installed infrastructure. The public agencies responsible for public infrastructure deliberately design to minimize damage due to natural hazards. Therefore, it was determined unnecessary to identify new actions that are specific to new private development and new public infrastructure.

Based on a review of the background materials (including the 2005 *Hazard Identification and Risk Assessment Report*, Appendix A) and the Committee's understanding, potential actions were identified, circulated, reviewed, and prioritized. Factors that influenced prioritizing included the Committee's review of available information on flood hazards, other hazards, past hazard events, the number of people and types of property exposed to those hazards, and the elements of the development approval process. Committee members were asked to indicate priorities (Drop, No Opinion, Low, Medium, High) based on their program's functions and priorities. Composites were made of the priorities indicated by each Committee member in the context of his or her agency's responsibilities.

High priority was placed on those actions that are considered consistent with current County policies, those that are technically feasible, that are likely to have high political and social acceptance, and those that can be achieved using existing authorities, budget levels, and staff. Projects for which Federal mitigation grant funds are sought must be eligible activities and have a cost-to-benefit ratio of 1.0 or higher.

The City of Laurel's Deputy City Administrator coordinated setting priorities for the City's mitigation actions. High priority was placed on those actions that are considered consistent with current County policies, those that are technically feasible, that are likely to have high political and social acceptance, and those that can be achieved using existing authorities, budget levels, and staff. Projects for which Federal mitigation grant funds are sought must be eligible activities and have a cost-to-benefit ratio of 1.0 or higher.

The actions outlined below do not consider a wide range of measures for site-specific flood mitigation projects because the Department of Environmental Resources manages an ongoing and mature program (see Section 6.3.1). A scheme for prioritizing specific flood-prone areas for implementation of site-specific solutions is outlined in the 2007 update of the *Countywide Comprehensive Flood Management Plan.* The scheme sets forth four criteria: severity of flooding; number of structures that can be handled by a solution; economic considerations (benefit:cost ratio); and community impacts. A point system establishes ranges of points for each criterion. For example, buildings that are affected by flooding from the 10-year flood receive more points than those that are flooded by less frequent events. The criteria may be modified if necessary to conform to the requirements of external grant funding.

8.3 High Priority Mitigation Actions

The Mitigation Advisory Committee determined it appropriate to delete 6 actions (some completed) and to add two new mitigation actions to address two hazards that were added to the 2010 Update. The order of the following list does not further imply priority.

Action A. Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. The County's partnership with FEMA and MDE to revise FEMA Flood Insurance Rate Maps was initiated under a Cooperative Technical Partnership agreement executed in 1999. The revised flood studies have been

completed and approved by FEMA. The delineation of the flood elevations and floodplain boundaries is underway; the preliminary FIRM (showing proposed revisions), will be published in 2010 (the anticipated effective date may be 2010 or 2011).

- **County Action A-1. Public Information.** Use the revised flood maps to refine DER's mailing list for public information efforts to owners of property determined to be impacted by flood hazards.
- **County Action A-2. At-Risk Buildings.** Use the revised flood maps to refresh details on at-risk buildings, such as predicted depths of water for different frequency flood events.
- **County Action A-3. Private Nonprofit Buildings.** Search the updated list of flood-prone properties to determine if any are owned by private nonprofit organizations (see Action C).
- **Laurel Action A-4. Continue to Pursue Flood Map Revision.** Use the revised flood maps to encourage property owners to purchase flood insurance and take steps to mitigate future flood damage.

Action B. Stream Corridor Assessment. Streambank erosion has been causing an increasing number of problems with impacts ranging from minor to major. A Stream Corridor Assessment initiative by the Department of Environmental Resources, Maryland DNR, and The Maryland-National Capital Park & Planning Commission is expected to identify problem areas and produce a county-wide database. **County Action:** Work with The M-NCPPC to analyze the Stream Corridor Assessment data in order to generate a report of the Assessment. Use the resulting report to prioritize stabilization projects, especially if funding from outside resources is available for mitigation of environmental impacts.

Action C. Conduct Flood Audits of Selected Buildings. Using the most recent flood hazard maps and studies, the public buildings that have been identified as being "in" the floodplain can be examined in more detail to determine the degree of risk. Examinations, or audits, identify potential damage to buildings and contents, and evaluate whether feasible changes would be cost-effective in order to protect against future flood damage. Audits can be offered to private nonprofit organizations if their buildings are identified as being located in mapped flood hazard areas. Although few owners of privately-owned nonresidential buildings accepted the County's offer to perform floodproofing audits, interest may change over time. The limitations on federal disaster assistance for flood-damaged public and private nonprofit buildings that are not insured for flood damage should be taken into consideration by risk managers of such facilities.

- **County Action. Flood Audits.** Conduct flood audits of +16 public buildings (County, The M-NCPPC, and City of Laurel) and 14 non-residential buildings of owners who accept an offer for the audit. Additional audits may be conducted if more owners express interest. See Section 5.5.1 and Appendix B for the final report of audits conducted in Spring 2010.

Action D. Anacostia Levee Improvements. A County study and subsequent work by the U.S. Army Corps of Engineers determined that in some places, the tops of the levees along the Lower Anacostia River are lower than required by current standards. Three areas could be affected by levee overtopping; together, more than 2,100 structures are in these vulnerable areas. **County Action:** Work with the Corps of Engineers to pursue funding to implement the levee improvement work.

Action E. Expansion of Flood Warning Notifications.

- **County Action E-1.** Update the flood warning system notification lists used in the W.A.R.N. system with the list of flood-prone properties based on revised flood maps.
- **Laurel Action E-2.** Provide new floodplain mapping to WSSC and update coordination and flood warning notification procedures.

Action F. Hazardous Materials, Pollutants, and Flood Hazard Areas. The Fire/EMS Department maintains a database of the physical locations of certain hazardous materials and other land uses maybe identified through the National Pollutant Discharge Elimination System are known to be potential sources of waterborne pollution (e.g., gas stations). Although no flood-related pollution incidents have been reported in at least 10 years, it is known that some pollutant sources are located in mapped flood hazard areas (car recycler, gas stations, former Bowie landfill site). **County Action:** Using the revised Flood Maps, check locations of HazMat sites, NPDES sites, and other land uses; if found to be in flood hazard areas, communicate with owner/handler regarding risk and appropriate response and protection measures.

Action G. Continue to Support Regional Drought Response and Planning. The Metropolitan Washington Council of Governments, in cooperation with water suppliers and local governments, has prepared the "Metropolitan Washington Water Supply and Drought Awareness Response Plan." That plan identifies actions based on defined triggers for four conditions: normal, watch, warning, and emergency. Specific audiences, specific actions, and specific messages are identified for each condition.

- **County Action G-1.** Continue the County's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated.
- **Laurel Action G-2.** Continue the City's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated. Examine appropriate water conservation measures for City Office buildings.

Action H. Senior Citizens and Extreme Weather. About 8% of the County's residents are over 65. **County Action:** Family Services should continue its outreach to seniors about health and safety during periods of extreme heat and extreme cold. Information could be added to the Family Services' web page. Status (2010): Ongoing.

Action I. Evaluate Options to Address Existing Buildings Subject to Unstable Soils. Marlboro Clays affect a small percentage of the County's land area. The impacts on existing buildings, often occurring slowly over a long period of time, can be significant.

County Action: Identify existing buildings that are located on Marlboro Clays and that are reported to be experiencing or likely to experience foundation damage. Examine and share information about options that may be considered by owners, including foundation stabilization, foundation reconstruction, relocation of buildings, or demolition/acquisition. If determined appropriate, pursue funding to facilitate mitigating future damage.

Action J. Coordinate the Building Code & Floodplain Ordinance. The County's building code is based on the 2006 editions of the *International Building Code* and the *International Residential Code*. The 2006 I-Codes include flood provisions that, in part, satisfy the minimum requirements of the National Flood Insurance Program. A comparison of the code provisions and the County's Floodplain Ordinance (Division 2 of Subtitle 4 Building) will identify inconsistencies that can be resolved (see "Reducing Flood Losses through the *International Code Series*: Meeting the Requirements of the National Flood Insurance Program.") **County Action:** Review materials to be provided by the Maryland Department of the Environment to compare the flood-resistant provisions of the Maryland building code and the County's Floodplain Ordinance and determine the best way to avoid conflicts.

8.4 Implementation of Actions

Table 8-2 identifies the above-described mitigation actions that are high priority for implementation by the County in the next five years. For each high priority action, the Committee identified the lead office, characterized anticipated support by elected officials and the community at-large, discussed funding limitations and status, and developed a qualitative statement regarding cost effectiveness. In this context, the cost of accomplishing the action was compared to the perceived benefits, including community-wide safety.

Table 8-2: Prince George's: High Priority Mitigation Actions (2010 – 2015)

MITIGATION ACTIONS & NOTES ON IMPLEMENTATION	
HIGH PRIORITY: Time Period (2005 – 2010)	
Action A. Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction.	
Lead Office	Lead: Department of Environmental Resources Support: Maryland-National Capital Park & Planning
Support[1]	Well-received; compatible with present and future goals
Hazard Addressed	Riverine Flooding; Coastal Flooding
Status & Funding Notes	Legal authority and technical capability in-place. Resources required through period of performance (some funding provided by FEMA). Existing resources available for use of new maps and data upon completion.
Cost Effectiveness[2]	Already determined to be effective use of County resources; supports long-term commitment to floodplain management.
Action B. Stream Corridor Assessment.	
Lead Office	Department of Environmental Resources The Maryland-National Capital Park & Planning Commission
Support	Generally well-received, especially by the M-NCPPC (Parks) and property owners whose properties may be eroding.
Hazard Addressed	Streambank Erosion
Status & Funding Notes	Assessment is funded; implementation as planning tool within existing budget; implementation of stabilization projects will vary
Cost Effectiveness	Depends on potential impact of unstabilized eroding banks
Action C. Conduct Flood Audits of Selected Buildings (Public and Nonprofit Buildings; Private Nonresidential Buildings).	
Lead Office	Department of Environmental Resources
Support	Generally well-received although individual property owners may decline (perceptions may change post-flood)
Hazard Addressed	Riverine Flooding; Coastal Flooding
Status & Funding Notes	Legal authority and technical capability in-place. FEMA grant funds obtained n 2009 to implement audits.
Cost Effectiveness	Low cost, given availability of grant funds; unknown if any feasible and cost-effective floodproofing options will be identified.

[1] Estimate of community support (elected officials and citizens).
[2] Based on qualitative assessment of costs/effort and long-term benefits.

MITIGATION ACTIONS & NOTES ON IMPLEMENTATION	
Action D. Anacostia Levee Improvements.	
Lead Office	Department of Environmental Resources Department of Public Works & Transportation
Support	High level of support in County government
Hazard Addressed	Riverine Flooding/Levee Failure
Status & Funding Notes	Implementation will involve both Federal funds (Corps of Engineers) and County funds (cost-share).
Cost Effectiveness	Achieve appropriate level of protection for 2,100 structures and as many as 6,000 people.
Action E. Expansion of Flood Warning Notifications.	
Lead Office	Department of Environmental Resources Office of Emergency Management
Support	Well-received; public health and safety
Hazard Addressed	Riverine Flooding; Coastal Flooding
Status & Funding Notes	Legal authority and technical capability in-place (W.A.R.N.).
Cost Effectiveness	Already determined to be effective use of County resources.
Action F. Hazardous Materials, Pollutants, and Flood Hazard Areas.	
Lead Office	Fire/EMS Department of Environmental Resources Maryland Department of the Environment
Support	Well-received generally; individual property owners may not perceive risk
Hazard Addressed	Riverine Flooding; Coastal Flooding
Status & Funding Notes	Legal authority and technical capability in-place; may require additional technical resources depending on types/quantities that may be found to be at-risk.
Cost Effectiveness	Identification of at-risk sites is low-cost effort; cost of implementation of site-specific mitigation unknown.
Action G. Continue to Support Regional Drought Response and Planning.	
Lead Office	Department of Environmental Resources Washington Suburban Sanitary Commission
Support	Well-received; established program
Hazard Addressed	Drought
Status & Funding Notes	Legal authority and technical capability in-place
Cost Effectiveness	Existing staff resources; implementation of plan not constrained by cost-effectiveness

MITIGATION ACTIONS & NOTES ON IMPLEMENTATION	
Action H. Senior Citizens and Extreme Weather.	
Lead Office	Department of Family Services
Support	Well-received; established program
Hazard Addressed	Winter Storm
Status & Funding Notes	Legal authority and technical capability in-place
Cost Effectiveness	Included in basic budget
Action I. Evaluate Options to Address Existing Buildings Subject to Unstable Soils.	
Lead Office	Department of Environmental Resources
Support	Well-received given history of damage
Hazard Addressed	Land Movement/Unsafe Lands
Status & Funding Notes	Existing resources to identify options and share information; some owners may need grant funds to pursue mitigation
Cost Effectiveness	Identifying options is low-cost; implementing site-specific options may be costly (must meet program requirements if grant funds are sought).
Action J. Coordinate the Building Code & Floodplain Ordinance.	
Lead Office	Department of Environmental Resources Department of Public Works & Transportation
Support	Avoids inadvertent conflicts.
Hazard Addressed	Riverine Flooding and Coastal Flooding
Status & Funding Notes	Legal authority and technical capability in-place.
Cost Effectiveness	Avoids inadvertent conflicts which could otherwise be costly to resolve if arise during permitting of a specific project.

Table 8-3 identifies the above-described mitigation actions that are high priority for implementation by Laurel in the next five years. For each high priority action, the City identified the lead office, characterized anticipated support by elected officials and the community at-large, discussed funding limitations and status, and developed a qualitative statement regarding cost effectiveness. In this context, the cost of accomplishing the action was compared to the perceived benefits, including community-wide safety.

The City's medium priority actions are listed in Table 8-4. They will be considered further when the City undertakes the comprehensive review and evaluation of the Plan in five years. Lead offices and other factors will be discussed and documented during the Plan revision. At that time, it is expected that new actions will be identified and a process to prioritize all remaining actions will be undertaken.

Table 8-3: Laurel: High Priority Mitigation Action (2010 – 2015)

MITIGATION ACTIONS & NOTES ON IMPLEMENTATION	
Action A-4. Continue to Pursue Flood Map Revision.	
Lead Office	Development Management Office; City Administrator's Office
Support	Some concern from property owners not currently in mapped flood hazard areas
Hazard Addressed	Riverine Flooding; Coastal Flooding.
Status & Funding Notes	Engineering completed and map revision pending with FEMA; formal adoption process required upon approval by FEMA
Cost Effectiveness	Little additional cost

Table 8-4: Laurel: Medium Priority Mitigation Actions (2010-2015)

Action D-2. Expansion of Flood Warning Notifications. Pending approval of new flood maps. Hazard Addressed: Riverine Flooding and Coastal Flooding.
Action G-2. Continue to Support Regional Drought Response and Planning. Hazard Addressed: Drought.

8.5 Links to Mitigation Goal Statement

Prince George's County Mitigation Goal

It is the goal of Prince George's County, Maryland, to protect and improve public health, safety and welfare, and to expand livable communities by:

1. *Increasing public awareness of natural hazards and risk reduction measures; and*
2. *Mitigating risks due to natural hazards.*

Table 8-5 shows how the proposed actions directly support the Mitigation Goal. A number of actions support both elements of the goal.

Table 8-5: Linking Mitigation Goals & Actions

It is the goal of Prince George's County, Maryland, to protect and improve public health, safety and welfare, and to expand livable communities by:	Actions Relating to Goal
Increasing public awareness of natural hazards and risk reduction measures; and	A, C, E, G, H
Mitigating risks due to natural hazards.	A, B, C, D, E, F, I, J

8.6 2010 Update

- Moved description of mitigation measures from the *Hazard Identification and Risk Assessment* into the plan and added selected annotations to restate activities already part of the County's procedures and initiatives (Section 8.1).
- Updated mitigation actions by deleting 6 completed actions, modifying the remaining actions to reflect current status, and adding 2 actions (Section 8.3).
- Reported on the status of the actions identified in the 2005 Mitigation Plan in Appendix B.

Chapter 9
Implementation & Maintenance

9.1 Distribution

Upon adoption, the *Hazard Mitigation Plan* 2010 Update will be posted on the Department of Environmental Resource's web site and notices of its availability will be distributed to the following:

- The federal and state agencies that were notified and invited to participate in Plan development;
- Adjacent counties and cities;
- Citizens who attended public meetings and provided contact information; and
- The organizations, agencies, and elected officials who received notices of public meetings.

9.2 Implementation

Through the mitigation planning process, the County agencies and the City of Laurel that are involved in managing hazards and implementing measures to minimize future risk considered a range of mitigation actions. Mitigation actions were identified and prioritized and are shown in Section 8.2. Each action is assigned a lead agency (and support agency in some instances); each lead agency is responsible for factoring the action into its work plan and schedule over the indicated time period.

9.3 Monitoring & Reporting Progress

The Prince George's County Department of Environmental Resources, Environmental Services Division, is charged with monitoring mitigation activities and preparing annual progress reports. The City of Laurel's Deputy City Administrator is charged with monitoring activities and preparing progress reports. In each jurisdiction, the lead agencies will be contacted and asked to report on the status of implementation, including obstacles to progress and recommended solutions.

DER will compile an annual report to document progress on the mitigation actions. The reports shall be submitted to the Maryland Emergency Management Agency. To monitor progress, DER may convene a meeting of the appropriate agencies to discuss and determine progress, and to identify obstacles to progress, if any.

In addition to the scheduled reports, DER will convene meetings after damage-causing natural hazard events to review the effects of such events. Based on those effects, adjustments to the mitigation actions and priorities may be made or additional event-specific actions may be identified. Such revisions shall be documented as outlined in Section 9.4.

9.4 Evaluation & Revisions

Revisions that warrant changing the text of this Plan or incorporating new information may be prompted by a number of other circumstances, including identification of specific new mitigation projects, completion of several mitigation actions, or to satisfy requirements to qualify for specific funding. Minor revisions may be handled by addenda.

Major comprehensive review of and revisions to this Plan will be considered on a five-year cycle. This Plan was first adopted in 2005 and the first updated was adopted in 2010. The County and City will enter the next evaluation and review cycle sometime in 2014, with adoption of revisions anticipated in 2015. The Mitigation Advisory Committee will be convened to conduct the comprehensive evaluation and revision. At that time, natural hazard events that have occurred will be incorporated and the risk assessment will be updated if such events indicate new or altered exposures.

Particular attention will be given to progress made on the mitigation actions. Actions that have not been completed and additional actions will be re-prioritized and examined in terms of feasibility given authorities, staff resources, County and City goals, and budget limitations that will need to be taken into account at the time.

The Mitigation Advisory Committee will involve the public in the plan maintenance process and during the major comprehensive review to the Plan in the same ways used during the original plan development. The public will be notified when the revision process is started and provided the opportunity to review and comment on changes to the Plan and the priority action items. It is expected that a combination of informational public meetings and draft documents posted on the web site, and/or public Council meetings may be undertaken.

9.5 Incorporating Mitigation Plan Requirements into Other Local Planning Mechanisms

Chapter 6 and Chapter 7 describe how Prince George's County and the City of Laurel address hazards as part of their current planning mechanisms and processes, including land development, infrastructure design, and public outreach. The development of the *Hazard Mitigation Plan* did not reveal any significant gaps in how hazards are addressed in existing planning mechanisms and processes.

Appendix A
Hazard Identification & Risk Assessment

The Hazard Identification and Risk Assessment is a separate volume. See CD titled "Appendix A Hazard Identification and Risk Assessment."

Appendix B
Flood Audits – Final Report

This appendix will include the final report of the on-going flood audits (expected August-September 2010).

Appendix C
Status Report of 2005 Actions

This appendix includes the actions from the 2005 Plan, with status notes shown underlined.

8.2.1 High Priority Actions (2005–2010)

Action A. Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. The DER project to revise FEMA Flood Insurance Rate Maps was initiated under a Cooperative Technical Partnership agreement executed in 1999. DER is preparing the maps on a watershed basis; the date for completing the revised maps for the entire County is unknown as it depends on the availability of the FEMA funding. Status (2010): As of December 2009: The revised flood studies have been completed and approved by FEMA. The delineation of the flood elevations and floodplain boundaries is underway and the preliminary Flood Insurance Rate Maps are expected to be released in early 2010.

- **County Action A-1. Public Information.** Use the revised flood maps to refine DER's mailing list for public information efforts to owners of property determined to be impacted by flood hazards. Status (2010): No action pending completion of the revised maps; DER uses its existing list of at-risk buildings to distribute a mailing each June.
- **County Action A-2. At-Risk Buildings.** Use the revised flood maps to refresh details on at-risk buildings, such as predicted depths of water for different frequency flood events. Status (2010): No action pending completion of the revised maps.
- **County Action A-3. Private Nonprofit Buildings.** Search the updated list of flood-prone properties to determine if any are owned by private nonprofit organizations (see Action C). Status (2010): No action pending completion of the revised maps.
- **Laurel Action A-4. Continue to Pursue Flood Map Revision.** Use the revised flood maps to encourage property owners to purchase flood insurance and take steps to mitigate against future flood damage. Status (2010): No action pending completion of the revised maps; add potential use to outreach to property owners.

Action B. Evaluate and Update Countywide Flood Reduction Program. The County's flood reduction program is extensive and progressive (see Section 6.3). Developed in 1994, the program has not been evaluated, updated to reflect accomplishments, and reviewed to determine whether changes are appropriate. For example, it may be appropriate to determine the effectiveness of the prioritization system and make adjustments based on eligibility criteria in potential funding sources, such as

those available from FEMA and HUD. Identify other agencies that may influence priorities (e.g., Parks, which seeks land inside the Beltway). With FEMA support, DER is preparing revised flood maps (see Action A) that will reflect all the best information that currently is used for regulatory purposes (including "ultimate development" flood hazard areas based on zoning and projected increases in runoff). The data from County Action A-2 will provide a sound basis for an evaluation and update of the program. Status (2010): The report of flood-prone structures, with identification of apparently feasible mitigation options, was completed in 2007 using available flood studies. Delete for 2010.

- **County Action B-1.** Reconvene the interagency work group to evaluate and update the Countywide Flood Reduction Program.
- **County Action B-2.** Continue to pursue grant funds to implement flood mitigation projects that are identified based on the prioritization and eligibility criteria in the Countywide Flood Reduction Program. Such projects involving privately-owned buildings may include acquisition (with dedication to compatible open space uses), elevation, relocation, or floodproofing, and other measures as a function of the funding source. Status (2010): Specific flood mitigation projects were not identified.

Action C. Conduct Flood Audits of Selected Buildings. Using the most recent flood hazard maps and studies, the public buildings that have been identified as being "in" the floodplain can be examined in more detail to determine the degree of risk. Examinations, or audits, identify potential damage to buildings and contents, and evaluate whether feasible changes would be cost-effective in order to protect against future flood damage. Audits can be offered to private nonprofit organizations if their buildings are identified as being located in mapped flood hazard areas. Although few owners of privately-owned nonresidential buildings accepted the County's offer to perform floodproofing audits, interest may change over time. The limitations on federal disaster assistance for flood-damaged public and private nonprofit buildings that are not insured for flood damage should be taken into consideration by risk managers of such facilities. Status (2010): The County obtained grant funds to support this action. Using the existing flood data to identify buildings predicted to have flood depths of more than 3 feet during the future-condition, 100-year flood, more than 80 nonresidential property owners were contacted and offered free flood audits. Owners of 14 properties accepted the initial offer, including a church. A number of public buildings in the County have been identified for audit, including 16 buildings and structures and the two schools that were identified in the 2005 Plan as having some degree of flood risk. The City of Laurel requested inclusion of the building recently acquired for the police station.

- **County Action C-1. Public and Nonprofit Buildings.** Conduct flood audits of public and private nonprofit buildings determined to be located in mapped flood hazard areas. Determine the implications with respect to flood insurance and disaster assistance. Status (2010): See above.
- **County Action C-2. Private Buildings & Redevelopment Authority.** Consult with the Redevelopment Authority and share information on flood-prone non-residential buildings based on revised flood maps (see Action A). Survey owners to determine interest in information and advice on flood risk, flood insurance and flood audits.–Status (2010): No action pending completion of the revised maps. Deleted proposed survey of owners.
- **Laurel Action C-3.** Coordinate with DER to contact owners of nonresidential buildings and multifamily apartment buildings to offer flood audits (see County Action C-2). Status (2010): Deleted proposed survey of owners.

Action D. Expansion of Flood Warning Notifications.

- **County Action D-1.** Update the flood warning system notification lists used in the W.A.R.N. system with the list of flood-prone properties based on revised flood maps. Status (2010): No action pending completion of the revised maps.
- **Laurel Action D-2.** Provide new floodplain mapping to WSSC and update coordination and flood warning notification procedures. Status (2010): The City has implemented a new auto-dial warning system and pre-designated areas for call notification in the event WSSC issues a warning.

Action E. Seek Next Higher Classification under NFIP's Community Rating System. At present, citizens who purchase federal flood insurance enjoy a 25% reduction in premium because of the County's progressive efforts to reduce existing flood problems and to avoid future at-risk development. Achieving the next higher classification (Class 4) will yield another 5% reduction, saving current policyholders approximately $246,000 per year. Additional activities that may be considered may accomplish multiple goals: (a) expanding stream buffers, including along streams that do not have designated flood hazard area maps; (b) cooperating with M-NCPPC to identify flood-prone properties in areas with high recreational demand (e.g., inside the Beltway) that, if acquired, would contribute to recreational needs; and (c) require that key staff involved in floodplain management become Certified Floodplain Managers.

- **County Action E-1.** After the release of a new manual for the Community Rating System scheduled for mid-2005, conduct a complete review to identify activities that may help achieve the next classification. Status (2010): An evaluation determined that it is not feasible for the County to achieve Class 4 because of the pre-conditions for that CRS classification; delete for 2010.

- **Laurel Action E-2.** Develop and submit an application to the NFIP's Community Rating System to qualify for reductions in flood insurance premiums. Status (2010): The City determined that the low number of flood insurance policies and the strict enforcement of floodplain management regulations does not warrant the effort required to develop the CRS application. The feasibility will be re-examined with the revised FIRMs are available. Delete for 2010.

Action F. Hazardous Materials, Pollutants, and Flood Hazard Areas. The Fire/EMS Department maintains a database of the physical locations of certain hazardous materials and other land uses maybe identified through the National Pollutant Discharge Elimination System are known to be potential sources of waterborne pollution (e.g., gas stations). Although no flood-related pollution incidents have been reported in at least 10 years, it is known that some pollutant sources are located in mapped flood hazard areas (car recycler, gas stations, former Bowie landfill site). **County Action:** Using the revised Flood Maps, check locations of HazMat sites, NPDES sites, and other land uses; if found to be in flood hazard areas, communicate with owner/handler regarding risk and appropriate response and protection measures. Status (2010): No action pending completion of the revised maps.

Action G. Continue to Support Regional Drought Response and Planning. The Metropolitan Washington Council of Governments, in cooperation with water suppliers and local governments, has prepared the "Metropolitan Washington Water Supply and Drought Awareness Response Plan." That plan identifies actions based on defined triggers for four conditions: normal, watch, warning, and emergency. Specific audiences, specific actions, and specific messages are identified for each condition.

- **County Action G-1.** Continue the County's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated. Status (2010): The County attends MWCOG's period meetings and cooperates with regional water conservation activities.
- **Laurel Action G-2.** Continue the City's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated. Examine appropriate water conservation measures for City Office buildings. Status (2010): The City continues to cooperate with MWCOG and WSSC and supports the implementation of water conserving plumbing codes.

Action H. Improve Debris Management. Severe storms, winter storms and wind events can generate large volumes of woody debris. The County and M-NCPPC remove debris from public roads, public parking lots, building grounds, and park properties. The combined federal reimbursement for debris removal after Hurricane Isabel was approximately $1.9 million (the non-federal share paid by the County and M-NCPPC exceeded $500,000). Debris disposal after flood events involves material other than

woody debris; material to be removed by County services includes construction materials from damaged buildings and damaged furnishings and personal property.

- **County Action H-1.** Participate in regional initiative to be facilitated by the Washington Council of Governments to evaluate development of debris management operations plans (2005). Status (2010): No action with MWCOT; Public Works & Transportation updated the County's debris management plan. Delete for 2010.
- **Laurel Action H-2.** Participate in regional initiative to be facilitated by the Washington Council of Governments to evaluate development of debris management operations plans (2005). Status (2010): No action. Delete for 2010.

Action I. Protection at Cottage City Towers (Housing Authority). Cottage City Towers is a County-owned residential facility for elderly residents. As part of scheduled improvements, impact resistant windows were installed to mitigate potential damage due to wind-borne debris during wind storms and hurricanes. During power outages, which have been experienced as a result of wide-spread outages after severe winter storms and Hurricane Isabel, movement of residents from the upper stories is hampered by inadequate emergency egress lighting. In addition, the current generator capacity is insufficient to maintain minimal livability and food service for more than a short period of time. **County Action:** Install egress lighting and install larger generators to improve capacity to shelter in place at Cottage City Towers. Status (2010): Completed July 2007. An emergency generator with 80 KW Prime Power rating and 100 KW Standby Power Rating was installed. It is hooked up to the fire annunciation system, elevators, and all common areas including hallways, offices, community room, stairwells and electronic building entry system. At the same time, egress lighting was installed in all dwelling units.

Action J. Senior Citizens and Extreme Weather. About 8% of the County's residents are over 65. **County Action:** Family Services should continue its outreach to seniors about health and safety during periods of extreme heat and extreme cold. Information could be added to the Family Services' web page. Status (2010): Ongoing.

Action K. Evaluate Options to Address Existing Buildings Subject to Unstable Soils. Marlboro Clays affect a small percentage of the County's land area. The impacts on existing buildings, often occurring slowly over a long period of time, can be significant. **County Action:** Identify existing buildings that are located on Marlboro Clays and that are reported to be experiencing or likely to experience foundation damage. Examine and share information about options that may be considered by owners, including foundation stabilization, foundation reconstruction, relocation of buildings, or demolition/acquisition. If determined appropriate, pursue funding to facilitate mitigating

future damage. Status (2010): The County received FEMA mitigation grant funding to acquire homes in two areas: Tor Bryan Subdivision (8 homes) and Yorkville Road (5 homes).

Action L. Enhance the Effectiveness of the Maryland Real Estate Disclosure Law. The Maryland Real Estate Disclosure Law requires homeowners to fill out a property disclosure or disclaimer when listing a house for sale. There have been numerous problems associated with homebuyers purchasing a home and then subsequently learning of problems associated with flooding, floodplains, and natural resources conservation areas. The present law appears insufficient to adequately notify homeowners of potential problems associated with floodplains and potential property restrictions associated with easement areas. **County Action:** Develop local legislation to augment the Maryland Real Estate Disclosure Law. The local legislation would strengthen the notification requirements pertaining to floodplains and other natural resources conservation areas for real estate transactions. Status (2010): No action. Delete for 2010.

8.2.2 Medium Priority Actions

Action M. Coordinate the Building Code & Floodplain Ordinance. The County's building code is based on the 2000 editions of the *International Building Code* and the *International Residential Code*. The 2000 I-Codes include flood provisions that, in part, satisfy the minimum requirements of the National Flood Insurance Program. A comparison of the code provisions and the County's Floodplain Ordinance (Division 2 of Subtitle 4 Building) will identify inconsistencies that can be resolved (see "Reducing Flood Losses through the *International Code Series*: Meeting the Requirements of the National Flood Insurance Program.") **County Action:** Prepare a side-by-side comparison of the flood-resistant provisions of the IBC and IRC and the County's Floodplain Ordinance and determine the best way to avoid conflicts. Status (2010): Move to high priority. Update to reflect enforcement of the 2006 codes. The Maryland Department of the Environment is developing materials to support this action.

Action N. Flood Risk Perception. Based on current digital flood maps, approximately 3,700 buildings appear to be located in the County's floodplains, yet less than 30% are covered by flood insurance. In 2003, few owners of non-residential properties in mapped floodplains accepted the County's offer to prepare audits of flood risk that also identify options to reduce exposure to future flood damage. As an adjunct to Action B (evaluate and revise the Countywide Flood Damage Reduction Program), insight can be gained by learning more from at-risk property owners, both homeowners and business owners, to better understand their perception of risk and what influences their decisions with respect

to flood insurance and flood damage reduction. **County Action:** Survey owners of flood-prone properties about perception of risk, understanding of flood insurance, etc. Partner with the Redevelopment Authority to distribute surveys to nonresidential property owners. Status (2010): Letters are sent to property owners every June to remind them of flood hazards and to encourage the purchase of flood insurance. A survey has not been conducted. Delete for 2010.