IV. INVENTORY AND GIS FINDINGS

A. ENVIRONMENTAL RESOURCES MAP

The Environmental Resources Map component of the Parks and Open Space project provides a map of areas of the County that are identified for protection in the Environmental Element of the Comprehensive Plan. To create the map, a grid or raster based analysis was used to bring the various data formats into a common foundation and allow for the use of powerful spatial analysis tools available in the ESRI ArcMap GIS system. GIS data for the County is currently stored in vector format as lines, polygons or points. A raster format, like the format used for aerial photographs, is made up of pixels or cells that form a continuous surface. Based on the available computer capacity, data, and purposes of analysis, a cell size of 25' x 25' was selected. Fairfax County, in a similar analysis, selected this cell size as well.

Four major components were used in the analysis: slope, soils, vegetation and water protection. The Environmental Resources Map will be an important tool in implementing the first policy of the Environmental Element:

EN-POLICY 1: Consider environmental concerns at all levels of land use-related decision-making.

The ability of the spatial analysis program to combine all of the environmental policies on one map will be an invaluable tool in making macro-level land use-related decisions including one of the goals of the Parks and Open Space Project to identify new park and open space opportunities, in particular, possible parks and open space.

The components of the Environmental Resources Map are identified in Environmental polices four, five, eight, ten, eleven and twelve.

EN-POLICY 4: Protect and manage the County's soils and natural vegetation.

Soils identified in this policy have slopes greater than 15%, high permeability, high erodibility and/or marine clay. Natural vegetation of special value included wooded slopes having a continuous area of 10,000 square feet or greater. Additional criteria include slopes greater that 25% and soils in the 100-year flood plain.

Slopes

Using contour and spot elevation data in the County's GIS system a three-dimensional triangulated irregular network (TIN) was created to model the land surface of the County. Contour and spot elevation data was obtained from aerial photogrammetry flown in 2002 with a 5' contour interval. The TIN was then converted into a raster format using Spatial Analyst with the elevation assigned to each cell. Then, using Spatial Analyst's slope function, a slope analysis was preformed to create a raster data layer representing slope (See Attachment 1 for a sample).

The slope layer is a continuous value data set that allows the user to group slope values in any categories necessary for analysis. Based on the guidance of EN-Policy 4, Action 2:

2. Preservation/conservation of certain natural land forms is important to the County in achieving water quality targets, good community design objectives, and ecological diversity. Accordingly, discourage development adjacent to a perennial stream in the following areas:

    - Wooded slopes of 25 percent and greater with highly erodible soils, permeable soils or marine clay soils.
    - Wooded slopes of 25 percent and greater having a continuous area of 10,000 square feet.
    - Wooded slopes of 15 percent and greater with highly erodible soils, permeable soils, or marine clay soils.
    - Wooded 100-year floodplain.
    - Non-wooded slopes of 25 percent and greater with highly erodible soils, permeable soils, or marine clay soils.
    - Non-wooded slopes of 25 percent and greater having a continuous area of 10,000 square feet.
    - Non-wooded slopes of 15 percent and greater with highly erodible soils, permeable soils or marine clay soils.
    - Non-wooded 100-year floodplain.

Slopes were categorized into three groups:

1. 0-14.99% Slopes
2. 15-24.99% Slopes
3. 25+% Slopes

Natural Vegetation

To create a raster layer representing natural vegetation required the input of several layers of data. The Woods GIS layer provided basis for the analysis. This layer did not distinguish between natural and horticultural vegetation so it was necessary to refine this data. Existing roads (including driveways), railroads and structures (including residential, house trailer, commercial, shed, tank, silo, tower, pool, race track, parking lot and airfield data) were combined to create a developed land layer, streams and lakes were added to create a water layer, and woods polygons with an area less than 10,000 square feet were selected out into a separate layer. The remaining lands in the County that did not fall within any of the previous categories except for some agricultural land were coded as Brush/Grass/Meadow. The agricultural land was selected out of the Brush subset by identifying soils designated as Prime Farmland by the USDA and located within parcels designated in the tax records as Agriculture Services and Agricultural Services with House land uses.

Distinguishing agricultural land in this way will help in implementing Environmental Policy #8, Action item #9:

EN-POLICY 8: Ensure the protection of the County's groundwater and aquifers.

9. Develop guidelines for the preservation of saprolite (soft, earth, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous or metamorphic rock) in areas where land use includes agriculture and where septic systems are used.

The resulting physiography raster layer then had the following categories:

1. Developed Land
2. Brush/Grass/Meadow
3. Agricultural
4. Wooded Areas <10,000 square feet in area
5. Water
6. Wooded Areas 10,000 square feet or larger

The resulting layer that represents the physical characteristics of the land or physiography will have other applications. See Attachment 2 for a sample of this layer.

Soils

Environmental Policy #4 includes protection of three specific soil types: highly erodible soils, highly permeable soils and marine clays. The first two types of soils have already been mapped as part of the 2003 Comprehensive Plan. According to the Watershed Management Branch the Neabsco, Quantico, Dumfries, Lunt and Marr soils may contain marine clays so these soil types were selected to identify potential marine clay soils. The resulting raster layer for sensitive soils was created with the following categories:

1. Highly permeable soil
2. Highly erodible soil
3. Potential marine clay
4. Highly permeable and highly erodible soil
5. Highly permeable and marine clay soil
6. Highly erodible and marine clay soil
7. Highly permeable, erodible and marine clay
8. No sensitive soil.

See Attachment 3 for a sample of this layer.

Certain areas of the County have all three soil categories present. These areas were assigned the highest sensitivity score in our analysis.

Water Protection

Many of the policies in the Environmental Element of the Comprehensive Plan involve protection of water resources. The main protection for water resources is the Chesapeake Bay Preservation Act, which identifies and protects designated Resource Protection Areas (RPAs). RPAs are created by identifying land within 100' of a perennial stream and adding any floodplain or contiguous wetlands. This area is already mapped as part of the GIS data.

In addition to the Actions under Environmental Policy #4, Environmental Policies 5 and 10 have specific actions that can be mapped to protect water quality.

EN-POLICY 5: Maintain or enhance the integrity of surface bodies of water (lakes, ponds, rivers, and streams) and watersheds.

10. Encourage leaving a natural buffer of existing woodland or forestation area of a least 50 feet along each side of all waterways that are not otherwise protected under the Chesapeake Bay regulations or similar legislation.

Accordingly, those waterways (generally, intermittent streams) outside of the RPA were identified and a 50-foot buffer was created using the GIS.

EN-POLICY 10: Ensure the high quality of public drinking water sources, such as Lake Manassas and the Occoquan Reservoir.

3. Where not otherwise required as part of the Chesapeake Bay Preservation Act for designated RPAs, require a minimum 100-foot setback from shorelines of public water sources for development-related ground disturbance activities.

The resulting raster layer then had three categories:

1. Resource Protection Areas (RPA)
2. Intermittent stream buffers
3. Wetlands outside of the RPA

Endangered Species

Environmental Policy #12 addresses endangered species:

EN-POLICY 12: Identify, manage, and protect all ecological communities and wildlife—especially critical habitats—as well as endangered and threatened species, and species of special concern, as identified in official Federal and State lists.

The Virginia Department of Conservation and Recreation has already mapped and categorized critical habitat areas and will provide the County with a raster layer of this information.

Spatial Analysis

Once all of the data is converted to a raster format the spatial analysis can be performed. The discrete data categories identified are assigned a value and then the various raster data sets are added together to create a raster data layer that shows environmental sensitivity. For purposes of example, to create the attached analysis the following values were assigned to the data:

Layer	Category	Value Assigned
Slope		
	0-14.99%	0
	15-24.99%	1
	25+%	2

Natural Vegetation		
	Developed	No Data
	Water	No Data
	Brush/grass/meadow	0
	Agricultural Land	1
	Woods<10,000 square feet	1
	Woods 10,000 square feet or more	2
Soils		
	No sensitive soil	0
	Highly permeable	1
	Highly erodible	1
	Marine clay	1
	Highly permeable/erodible	2
	Highly permeable/marine clay	2
	Highly erodible/marine clay	2
	Highly permeable/erodible/marine clay	3
Water Protection		
	Intermittent stream buffer	1
	Non RPA wetlands	3
	Resource Protection Areas	5

The results of the analysis created a raster layer with values ranging from 0 to 12 with 0 indicating no environmental sensitivity and 12 indicating the highest sensitivity (See Attachment 4). In the calculation, cells coded as No Data return the result No Data so Developed Land and Water are automatically excluded from the map. The values to be assigned to this model for use in the open space analysis will be revised based on input from the Watershed Division, DCR and the Best Practices analysis.

In the example presented here, for ease of reading, the values were grouped into five categories:

Sensitivity	**Values**
Slight	1
Low	2
Moderate	3
High	4
Severe	5-12

Findings

Each twenty-five square foot section of the county was assigned an environmental score and placed into one of five categories. The categories include: slight, low, moderate, high and severe. Multiple environmental features in one location equate to that cell

having a higher environmental sensitivity score. The following table provides a summary of the acreage totals for each classification

Environmental Sensitivity Rank	Acres
Slight	65,408
Low	55,394
Moderate	33,815
High	11,680
Severe	26,619

Areas of severe environmental sensitivity occur mainly along the County's stream corridors. This is mainly due to the high environmental value assigned to Resource Protection Areas in the County. Bull Run Mountain contains significant areas of severe environmental sensitivity. This is due to the area's steep slopes, sensitive soils, and large tracts of continuous forest cover. The Cherry Hill peninsula also contains significant areas of severe environmental sensitivity due to the steep slopes and sensitive soils found in the area.

B. CULTURAL RESOURCES MAP

The Cultural Resources Map component of the Parks and Open Space project provides a map of areas of the County that are identified for protection in the Cultural Resources Component of the Comprehensive Plan. To create the map, a grid or raster based analysis was used to bring the various data formats into a common foundation and allow for the use of powerful spatial analysis tools available in the ESRI ArcMap GIS system. GIS data for the County is currently stored in vector format as lines, polygons or points. A raster format, like the format used for aerial photographs, is made up of pixels or cells that form a continuous surface. Based on the available computer capacity, data, and purposes of analysis, a cell size of 25' x 25' was selected.

Open space is a critical tool to providing protection and preservation of the County's Cultural Resources. It is important to preserve a broad spectrum of cultural resources to ensure a sample of the County's heritage. Cultural Resources consist of districts, sites, buildings, structures, and objects (significant in Prince William County History, American History, architecture, archaeology, engineering, and culture). For planning purposes they are categorized as archaeological resources (below ground resources), architectural resources (above ground resources), and cemeteries (a separate class of above ground resources). The open space necessary for preserving each cultural resource is unique but there are common requirements based on the resource's category (see Buffer section for further discussion).

Why is it Important to Preserve Cultural Resources?

"A country with no respect for its past will do little worth remembering in the future."
(Abraham Lincoln)

The pursuit of knowledge about the past is in the public interest and cultural resources are tangible elements of our past (ACHP 2005). Without preservation of cultural resources the County will lack the ability to add to, and interpret its historical record. The preservation "process unites people and helps them define their heritage, community values, and a sense of place (Hopper 2003)." The cultural resources themselves become symbols of the power of citizen participation and serves as reminders of a communities common heritage and beliefs. Thus it is important to recognize the diversity of people who will benefit from preservation – they include, but are not limited to, the individual, the family, the local community, the academic discipline or professional community, an ethnic or religious group, the County, the nation, and the world. It is also important to preserve what is significant not only to our own time, but to also preserve what we believe will be significant for future generations (Avril et al 2000).

"Given the non-renewable nature of cultural resources it follows that if a cultural resource can be practically preserved in place for future study or other use, it usually should be (ACHP 2005)." Also, preservation of undocumented or poorly documented cultural resources, such as slave sites, free black sites, and Native American sites, should also be recognized as sometimes the only record of these people (ACHP 2005). Preservation and stewardship of cultural resources is historically a function of government. However there are significant examples were private organizations or public-private ventures have preserved our nations heritage, for example Mount Vernon and Jamestown in Virginia, and the Yates Community Archaeology Program (Houston, Texas) and the Levi-Jordan Plantation (Brazoria, Texas).

The benefits of in-situ (in-place) preservation are many, including affording the County the opportunity to maintain a resource's integrity of location, design, setting, workmanship, feeling, and association. Cultural resources should be preserved in-situ, because methods of recovering information may, by their nature, be destructive. Therefore management of cultural resources should be conducted in a spirit of stewardship for future generations, with full recognition of each resources non-renewable nature, and its potential multiple uses and public values (ACHP 2005).

Benefits to the County and its communities are equally important. Preservation in place affords the County the opportunity to interpret and educate residents on the history and prehistory of the County, and help foster pride and public support for the County's heritage. Preservation of cultural resources requires development of a stewardship ethos. Preservation and interpretation of the past builds popular support which develops legal procedures for the protection of archaeological and historical properties. Preservation maintains and increases property values and typically maintains and preserves opens space.

The identification of what is important to preserve, that is historical and archaeological research, is a dynamic process featuring constant feedback among field research, background research, and the thought processes of researchers. It is not simply a matter of going out and finding places and things whose interpretation is unambiguous, and

preparing the documents necessary to demonstrate their significance. It is important to clearly understand that "history moves on; it has not ended, and places not regarded as historic today may be so regarded in ten or twenty years because of things happening there now, or that happened there in the very recent past (King 2005)." "A cultural resource may have important values for living communities and cultural descendants in addition to its significance as a resource for learning about the past; its appropriate treatment depends on its research significance, weighed against these other public values (ACHP 2005)." Thus our list of important cultural resources is constantly being evaluated and enlarged. By saving sites today, we can revisit sites tomorrow and make determinations about what constitutes our heritage, how it is used, cared for, interpreted and so on, by whom and for whom.

Best Ownership Practices

The best preservation method is local government ownership of cultural resources. They have the capability, political will, citizen activism, and the labor and materials to best preserve and manage above and below ground resources. Preservation easements, purchase of development rights, and Save-A-Site programs (private citizens volunteer to preserve a resource and are recognized by local governments) can all be effective programs for preservation of open space containing cultural resources. Resource preservation on Home Owner association common land is typically the least effective .

Currently the Historic Preservation Division of Public Works owns all of the actively interpreted cultural resources. Since they have the capability and experience in managing above and below ground resources they are likely best suited to assume future preservation and management roles.

Acquisition of cultural resources can easily extend beyond the County's ability to pay for the fair market value of the land and its improvements. The most inexpensive method is to acquire resources through development proffers, including an endowment for maintenance of all above ground resources. Deeds of gifts with an attached endowment for maintenance and upkeep are a second method.

Data Description and Origin

The data used in this study comes from the Virginia Department of Historic Resources (VDHR) Data Sharing System (DSS), from the County's Cemetery Index, from the County's Historic and Prehistoric sensitivity maps, from County's list of Designated Cultural Resources (DCR), and from County's proposed list of DCRs.

The cultural resource data in DSS was typically prepared by professional archaeologists and architectural historians during state sponsored surveys, transportation survey, and surveys required by County zoning and development ordinances. The remaining data was typically prepared by avocational archaeologists and architectural historians. The County's cemetery data was compiled by Ron Turner under contract to the County Historical Commission. The cemetery data is in two hard copy volumes in the County's

Planning Office. The list of DCRs was prepared by the County Historical Commission with assistance from staff of the County Planning Office. The County Board of County Supervisors approves the list. The County's Historic and Prehistoric Sensitivity maps were prepared in June 2003 and represent high potential areas for fining archaeological resources.

There are several problems with existing data. Most of the County has not been surveyed for archaeological resources. Additionally, most resources currently identified have not been evaluated for their potential for listing on the NRHP and for designation as DCR. The archaeological data we are using represents focused study from surveys of proposed transportation projects, and developments on private, state, and Federal land (such as Leesylvania Park, Quantico Marine Base, and Prince William Forest Park). The architectural data is more representative of the County's above-ground resource, because of a county-wide survey conducted by the Northern Virginia Planning Commission in the late 1970s and early 1980s. However, many of the resources identified during this survey require evaluation for eligibility for listing on the NRHP or as DCR.

Additional data problems are incomplete records in DSS or County files. In particular, the physical size (a resources horizontal and vertical extent) of a resource is missing or incomplete. To take this lack of data into account, we have used buffers to estimate the resources size and the acreage it typically takes to preserve a resource (see buffer section for further discussion). The use of buffers around a resource effectively mitigated this issue. Finally some location data is inaccurate.

Cultural resources data is dynamic and thus the database will never be complete. New resources are constantly being discovered and added to the databases listed above. New investigations add new information, which changes what we know about our history and prehistory, and also changes our perceptions and feelings about our history and prehistory. Preservation of these sites allows us to revisit sites and ask new research questions.

Predictive models of historic and prehistoric site locations were not used to add value to individual cells in this open space plan. Since open space may require the expenditure of public funds, it would be inappropriate to use models as a criteria since they quantify the potential for a resource to be present in a cell but cannot determine the presence or absence of a resource in a cell.

Individual Ranking

Ranking assigns a numerical value to a resource based on its significance. Significance is determined by its eligibility for listing on the National Register of Historic Places (NRHP) or whether it has been recognized as a DCR. The majority of cultural resources in the County have not been evaluated according to the eligibility for listing on the NRHP or as a DCR. Since cultural resources are a non-renewable resource (once they are destroyed they are gone forever) all resources, except those destroyed, received a numerical value. Values were assigned using the criteria below.

Archaeology Site Ranking

4 = Sites eligible for or listed on the NRHP/VLR, Designated Cultural Resources (DCR), sites that are proposed for DCRs status
3 = sites with no Determination of Eligibility (DOE) but based on the list of criteria below may contain information that might make it eligible for listing on the NRHP (see factors below)

Criteria

- All prehistoric sites that are dated to the Paleoindian period or have a Paleoindian component
- All historic sites designated with a single or multiple time period (19th century or earlier) and have historic element of indeterminate
- All prehistoric sites designated with a single or multiple time period other than lithic scatter (except lithic scatters with an assigned time period).
- All prehistoric quarries/industry extraction sites with a designated time period

2 = sites with no DOE that do not meet the criteria above
1 = site determined not eligible for listing on the NRHP
0 = destroyed sites

Architectural Site Ranking

4 = Sites eligible for or listed on the NRHP/VLR, Designated Cultural Resources (DCR), sites that are proposed for DCRs status
3 = sites typically determined eligible for listing on the NRHP but no DOE study has been performed

Criteria

- All structures designated with a time period 19th century or earlier

2 = sites with no DOE that do not meet the criteria above
1 = site determined not eligible for listing on the NRHP
0 = destroyed sites

Historic and Prehistoric Sensitivity Areas

The above mentioned areas are mapped on Map 1and Map 2 of the County Comprehensive Plan. They represent areas in the County that have a high potential for containing prehistoric or historic archaeological sites or above-ground cultural resources. These areas were assigned a rank of 2, because the further study is required to determine whether archaeological or above-ground cultural resources are on the property.

Cemeteries

Cemeteries are not typically listed on the NRHP and not typically eligible for DCR status. However, they are important reminders of our past and are indicators of past historic activity. Cemeteries are also protected from destruction by development by Section 32-250.110 of the Zoning Ordinance. Cemeteries

eligible for listing or listed on the NRHP or designated a DCR were assigned a rank of 4. The remaining cemeteries were assigned a rank of 2.

Aggregate Ranking

The computation of an aggregate score ranking the significance of a cell is not a straightforward process. The cultural resources data in the Open Space GIS only maps recorded resources, not the potential for a cultural resources to be present on any given cell. With this in mind, the following aggregate score have been established and listed below.

Cell Classification	Aggregate Score	Comments
No Data	No Value	Further study is required
Developed Land	No Value	
Low Priority	1	
Medium Priority	2	Further study is required
High Priority	3	Further study may be required
High Priority	4-10	Resource ready for acquisition

Buffers

Buffers estimate a resource's size and its aspects of integrity as it relates to a resource's location, setting, feeling, and association. To establish buffers we need to take into account four out of seven aspects of a resource's integrity. These four aspects of integrity for cultural resources are Location, Setting, Feeling, and Association:

1. Location is the place where the historic property was constructed or the place where the historic event occurred. The relationship between the property and its location is often important to understanding why the property was created or why something happened. The actual location of a historic property, complemented by its setting, is particularly important in recapturing the sense of historic events and persons.

2. Setting is the physical environment of a historic property. Whereas location refers to the specific place where a property was built or an event occurred, setting refers to the *character* of the place in which the property played its historical role. It involves *how*, not just where, the property is situated and its relationship to surrounding features and open space.

   Setting often reflects the basic physical conditions under which a property was built and the functions it was intended to serve. In addition, the way in which a property is positioned in its environment can reflect the designer's concept of nature and aesthetic preferences.

   The physical features that constitute the setting of a historic property can be either natural or manmade, including such elements as:

- Topographic features (a gorge or the crest of a hill);
- Vegetation;
- Simple manmade features (paths or fences); and
- Relationships between buildings and other features or open space. These features and their relationships should be examined not only within the exact boundaries of the property, but also between the property and its *surroundings*. This is particularly important for historic districts.

3. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. For example, a rural historic district retaining original design, materials, workmanship, and setting will relate the feeling of agricultural life in the 19th century. A grouping of prehistoric petroglyphs, unmarred by graffiti and intrusions and located on its original isolated bluff, can evoke a sense of tribal spiritual life.

4. Association is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character. For example, a Revolutionary War battlefield whose natural and manmade elements have remained intact since the 18th century will retain its quality of association with the battle (Excerpted from the *National Register Bulleting 15: How to Apply the National Register Criteria for Evaluation, 1995*).

Unfortunately most resources identified in the County have not been subject to this formal and time-consuming evaluation process. Therefore, we have estimated the size of buffers based on past experience in preserving cultural resources and also using the 10 acre lot size in the rural crescent as a best case scenario for preservation of above ground resources. The size of a resource's buffer may be refined after analysis of a site's location, setting, feeling, and association. The following tables list the buffer size for each resource's rank.

Table CR-1: Cultural Resources Buffer Size (in feet)

Rank	**4**	**3**	**2**	**1**	**0**
Archaeology Buffer*	630	630	420	50	0
Architectural Buffer*	1050	1050	630	210	0
Cemetery Buffer*	420		210		

Comprehensive Plan

The identification and ranking of cultural resources, and the identification, ranking, and buffering of cultural resources cell within the County, address several comprehensive plan policies listed below.

CR-POLICY 1: Identify the significant cultural resources in the County.

The ranking system identifies significant cultural resources, and identifies resources suspected of being significant. Significant cultural resources (Rank = 4) are eligible for acquisition by the County. Resources suspected of being significant (Rank = 3) are likely eligible for County acquisition but may require further study prior to expenditure of funds. The GIS analysis does not differentiate between chronology and typology. The GIS also identifies land and open space for which we have no data and may therefore provide direction for future surveys.

CR-POLICY 2: Protect cultural resources that are important for documenting or demonstrating the prehistory or history of the county.

Early identification of significant resources or resources suspected of being significant helps plan for:

- acquisition,
- establishment of preservation (protective) buffers,
- identification of potential historic districts,
- prioritization of the County's preservation efforts.
- weighing of resources acquisition against other County priorities, and
- public stewardship of resources,
- private stewardship of resources, by identifying property owners,
- data analysis helps identify gaps in our knowledge base

It also will identify groups of resources that may be eligible as a County historic overlay district, and is the first step in identifying resources eligible for a County viewshed preservation policy.

This data can be use to update the prehistoric and historic sensitivity maps.

CR-POLICY 3: Enhance the awareness of Prince William County's history and the importance of the County in the historical development of the Commonwealth of Virginia and the United States.

Identification of cultural resources is the first step in increasing the public's awareness of its history and prehistory. Establishing resource significance, either through recognition as a DCR or a resource's determination of eligibility for listing on the NRHP, tangibly links the resource to the County's, the states, and possible the nation's history and prehistory.

The open space plan may also identify research projects, important to understanding the County's history and prehistory.

CR-POLICY 4: Encourage preservation of the County's most significant historic properties through use of the Designated Cultural Resource (DCR) classification.

A property may only be designated as a "Designated Cultural Resource" (DCR) site if meets one or more of the following criteria:

- **Has been determined to be eligible for listing in the National Register of Historic Places or Virginia Landmarks Register by the Virginia Department of Historic Resources or the National Park Service.**
- **Has been included in the Historic American Building Survey (HABS) or the Historic American Engineering Record (HAER).**
- **Is in a preservation easement.**
- **Is part of a Historic Overlay District.**
- **Has been selected for inclusion on the list of DCRs in the annual evaluation and update of such list by the Historical Commission during the past 12 months.**

DCRs have been given the highest ranking and priority and thus identifies the cell in which they are situated as a high priority for conversion to or maintenance of current open space.

The open space GIS identifies cultural resources and cells that may be significant but require further evaluation for listing as a DCR.

CR-POLICY 5: Encourage preservation of known (but ill-defined) or expected significant historic properties through application of the Historic Resource Management Overlay.

The Historic Resources Management Overlay designation is an overlay that is applied to Comprehensive Plan land use classifications that are described in the Long-Range Land Use Plan and shown on the Long-Range Land Use Plan Map. In an area with a Historic Resource Management Overlay there is concern about:

- **The presence of known but often ill-defined—such as where there is a suspected presence, where exact boundaries are not delineated—cultural resources, or where the exact location is unknown of potentially significant cultural resources.**
- **The presence of expected significant cultural resources.**
- **Potential impacts to important historic viewsheds.**

The ranking system used in this plan identifies resource suspected of being significant, but require further study.

Most cultural resources identified in the open space plan do not have well defined boundaries. The ranking graphically identifies some of those resources (resources

typically assigned a rank of 3 fall into this category, this however is not inclusive). The buffers estimate resource protection boundaries.

The open space plan graphically shows the relationship of affects on each resource's estimated viewshed.

CR-POLICY 6: Encourage preservation and maintenance of known or discoverable cemeteries and gravesites, whether marked or unmarked.

Identification of cemeteries affords the County the opportunity to notify the landowners and future landowners of their responsibilities for maintenance and upkeep of cemeteries on their land.

In regards to land development, identification prior to land acquisition for development provides landowners and developers time to comply with Zoning Ordinance 32-250.110 Preservation of Existing Cemeteries.

Preliminary Findings

As of July 2005, the County has a total of 2,802 Cultural Resources. Table V-1 illustrates the totals for each resource category.

Categories of Cultural Resources in Prince William County

Above Ground Resources	771
Below Ground Resources	1603
Cemeteries	428
County Total	**2802**

[Aggregate scoring findings to be inserted]

What could we have done.

Identified resources on land currently owned by the County.

C. PARK NEEDS MAP

The Parks and Open Space chapter of the comprehensive plan identifies the following goals:

GOAL: Provide a park system and programs of a quantity, variety, and quality appropriate to meet the needs of the residents of Prince William County.

GOAL: Meet established level of service standards to ensure adequate sites and facilities needed to carry out an effective park and recreation program are provided.

To meet these goals the first policy of the chapter states:

REC-POLICY 1: Ensure the consistency and coordination of interagency planning techniques to provide for an appropriate quantity, variety, and quality of park sites and facilities.

Action Strategy 4 of REC-Policy 1 in the Comprehensive Plan states:

> Apply current and future population data by Metropolitan Washington Council of Governments (MWCOG) Analysis Zones to determine needs analysis based on individual park LOS, rather than by magisterial district. Provide current and updated demographic data relevant to parks and facilities to the Park Authority on a regular and ongoing basis. [1]

With this guidance the Planning Office established the following methodology to create a Park Needs Map. The Park Needs Map component of the Parks and Open Space project provides a map of areas of the County that are underserved or will be underserved by park facilities. These areas were identified by applying the level of service standards from the Parks and Open Space Element of the Comprehensive Plan and the Prince William County Park Authority Comprehensive Plan 2000-2005. These documents identify four types of parks – neighborhood parks, community parks, regional parks and specialty parks. Since the service area for specialty parks is the whole county these types of parks were not analyzed. The park levels of service for the three park types analyzed, as identified in the Comprehensive Plan (REC- Policy 1), are as follows:

ACREAGE STANDARDS FOR PARK SITES:

Neighborhood Parks:

General Definition: Relatively small local parks designed to serve densely populated areas and that include specialized equipment and facilities.

- Acres/1000 persons:---------- 1.0 acres
- Size: ---------- 5 to 20 acres
- Service Area:---------- 1.5 to 2 miles
- Population served:---------- 3,000 - 7,000

Community Parks:

General Definition: Larger recreation parks designed to serve urban and rural residents and that include wider range of equipment and facilities.

- Acres/1000 persons:---------- 4.0 acres
- Size:---------- 20 to 100 acres
- Service Area:---------- 2 to 10 miles

[1] Prince William County Comprehensive Plan; Parks and Open Space Chapter Adopted June 23, 2003

- Population served:---------- 7,000 - 17,000

Regional Parks:

General Definition: Large parks designed to serve a wide geographic area with a diverse range of equipment and facilities.

- Acres/1000 persons:---------- 6.0 acres
- Size:---------- 100+ acre
- Service Area:---------- 10+ miles
- Population served:---------- 17,000+

Using these definitions the Park Authority categorized their existing parks.

Neighborhood Parks

Mapping neighborhood park needs is the most complex of the analyses. Using the County's geographic information system (GIS) the Planning Office with the assistance of the GIS Division of the Office of Information Technology has created a map of park needs in the County using the following data:

- Neighborhood Parks
- Community, Regional, and Special Use Parks if they satisfy the Neighborhood Parks needs
- Elementary and Middle School sites
- Homeowner's Association (HOA) properties with recreational equipment and facilities
- Current and projected population
- Current and projected household density
- Park acreage
- Number of parks serving an area

The use of each of these data items in the analysis is discussed below.

Parks

Neighborhood parks serve as a basis for this analysis. Neighborhood parks have a service range of 1.5 to 2 miles. However, functionally several other types of open spaces meet neighborhood park needs. For people within 2 miles of a community park or regional park, the community and regional park can serve their neighborhood park needs as well. For people within 2 miles of a special use park, the special use park can serve their neighborhood park needs as long the special use park meets the neighborhood park service needs.

Park boundaries were available in the County's GIS and using data provided by the Park Authority the boundaries were classified into the four park types: neighborhood, community, regional, and special use.

Schools
The recreational facilities and equipment of public schools also serve the neighborhood park needs of many county residents. Elementary and middle schools have recreational facilities and equipment that can be used by the neighborhood. Public high schools do not have the same types of equipment as a neighborhood park (e.g., playground equipment) and their facilities are heavily used by the school. Therefore, high schools were not included in the analysis. School properties, available in the County data set, are coded by type to permit identification of the elementary and middle school types. The use of schools in this analysis is also consistent with REC-Policy 3 Action Strategy 7 of the Comprehensive Plan.

REC-POLICY 3: Ensure that park sites are located and designed in a manner that optimizes their accessibility, safety, and usefulness to the populations intended to be served.

ACTION STRATEGIES:

7. Collocate parks and schools to optimize the shared use of facilities.

HOA Land
Many of the larger residential subdivisions provide recreational facilities and equipment on HOA lands. These facilities serve the neighborhood park needs of the subdivision's population and are included in this analysis. The Design and Construction Standards Manual (DCSM) requires residential developments to provide parks and recreation facilities. One, method to meet this requirement is to dedicate land or facilities to a homeowners' association or condominium association for the purpose of establishing a private park and recreation area (DCSM 902.01.B.3). HOA land was identified in the GIS using data from the Office of Information Technology and Real Estate Assessments. Staff used the acreage standards from the Parks and Open Space chapter of the Comprehensive Plan to determine whether HOA land could be considered a neighborhood park. The cultural data layer was created using 2002 aerial ortho-photography. To capture HOA lands with facilities built between 2002 and 2004, a visual inspection using 2004 aerial photography was necessary to determine whether or not the site contained any recreation facilities (courts and tot lots). HOA land greater than 5 acres in size and containing a basketball court, tennis court, tot lot or walking trail was determined to meet the suitability requirement for a neighborhood park.

Comment [J1]: Repetitive. Same thing in last sentence of paragraph.

Current and Projected Population
Geographic areas with one household or more for 2.5 acres of land area are intended to be served by neighborhood parks. Neighborhood parks are intended to serve a population of 3,000 to 7,000 with a minimum of one park acre per 1,000 persons. Using current population and household estimates and future forecasts, the County Demographer determined if the density of households was in the targeted range. The County Demographer also determined if the population and park acreage per 1000 persons was within within the targeted range for a park's service area. The population estimates and

forecasts were also used to determine where and how many additional parks were needed throughout the County.

Current (Dec. 2004) population estimates for individual park service areas were derived as follows. U.S. Census Bureau 2000 census block population data was used as a base. County occupancy permit along with average household size by unit type data from the 2000 census was used to estimate a park service area's population growth from 2000 to December 2004. Forecasts for 2005 to 2030 for park service areas were determined using the Round 7.0 Version III traffic analysis zone forecasted growth for the park service area and adding the population growth data to the December 2004 estimated population. The 2000 census block data and the 2005 to 2030 Traffic analysis zones do not follow the park service area boundaries. Therefore, population was estimated based on the assumption that the population is evenly distributed throughout the census block and traffic analysis zone.

The 2005 and 2030 population and household density assessment of all lands in the county, which is different than the assessment of individual parks, solely utilized the 2005 and 2030 Round 7.0 Version III traffic analysis zone forecasts.

Needs Analysis

The Neighborhood Park Needs map presents the results of the analysis. To create the map, a grid or raster based analysis was used to bring the various data formats into a common foundation and allow for the use of powerful spatial analysis tools in a GIS system. A raster format, like the format used for aerial photographs, is made up of pixels or cells that form a continuous surface. Based on the available computer capacity, data, and purposes of analysis, a cell size of 25' x 25' was selected. Fairfax County did a similar analysis and they selected this cell size as well.

Two models were used to assess neighborhood park needs. Each model assigns a value to each cell based on the demographic data. The results of these two models were then averaged and reclassified to derive the final result of the amount of need for a neighborhood park for each 25' x 25' cell area in the County. Areas with a final score of 5 are very well served by park facilities and do not have a need for additional parks through 2030. Areas with a final score of 4 are fairly well served by park facilities and do not need additional parks through 2030. Areas with a score of 3 are adequately being served by park facilities and do not need additional parks through 2030. A score of 2 for an area means that the area is moderately under served by park facilities between 2005 and 2030 and there is a need for additional parks. A score of 1 for an area signifies that the area is well under served by park facilities between 2005 and 2030 and has the greatest need for additional parks.

The following are the models that were used to assess the amount of need for a neighborhood park.

<u>Model 1</u>

The following is the first model. It models the level of service need based on population and number of parks currently serving an area.

Values were assigned as follows:

1.5 to 2 mile buffer population of County lands (i.e., serving 3,000 to 7,000 people)	2005 Number of Parks Needed	2030 Number of Parks Needed
Below 3,000 persons	0	0
3,000 to 7,000 persons	1	1
Over 7,000 persons	2 or more (depending on population)	2 or more (depending on population)

Values were them assigned based on a comparison of the number of parks needed and number of parks currently serving an area. The values assigned were as follows:

Comparison of number of parks needed (as determined in population analsysis above) minus the number of parks serving an area.	2005	2030
Below Zero (over served)	12	12
0 (adequately served)	6	6
1 to 3 parks needed (moderately under served)	3	3
4 or more parks needed (well under served)	1	1

The level of service scores in the immediate preceding table were the final scores for this first model.

Model 2

The following is the second model. It models the level of service need based on the acres per 1000 population for existing/planned parks and household density throughout the County.

The level of service based on acres per 1000 population was similarly scored as follows:

Year park does not meet acreage standard (i.e., less than 1 acre/1000 people)	1.5 Mile Service Area	1.5 to 2.0 mile Service Area
Dec. 2004	2	1
2010	4	3
2015	6	5
2020	8	7
2025	10	9
2030	12	11

Areas outside any park service area were coded zero. In areas where the level of service overlapped, the highest value was used.

The level of service based on 2.5 acres of land per household scored as follows:

Acres per household	2005	2030
0 to 2.4	0	0
2.5 or more	12	12

The level of service scores based on acres per 1000 population and 2.5 acres of land per household were averaged to determine a final score for this second model.

Final Modeling Result

The values from the two models were then added to obtain a level of service score for the areas of the county served by neighborhood parks. The final scores ranged from 0 to 24. These final scores were then divided into five final categories as follows:

Additive Score	Final Score	Final Score Definition
0 to 5	1	Well Under Served – Additional Parks Needed
6 to 11	2	Moderately Under Served – Additional Parks Needed
12	3	Adequately Served (Meets Standards) – No Additional Parks Needed
13 to 18	4	Moderately Over Served – No Additional Parks Needed
19 to 24	5	Well Over Served – No Additional Parks Needed

Because the demographic information is tied to larger geographic areas than subdivisions (i.e., census block groups or TAZs) the capacity analysis for each park was not adjusted if it served a subdivision with HOA facilities. To account for the park service provided by HOA facilities, areas within the boundaries of subdivisions having adequate HOA lands and facilities were revalued to 5.

The resulting model provides a geographic distribution of park needs that will help identify potential locations for new neighborhood parks.

Community Parks

Mapping neighborhood park needs is the most complex of the analyses. Using the County's geographic information system (GIS) the Planning Office with the assistance of the GIS Division of the Office of Information Technology has created a map of park needs in the County using the following data:

- Community Parks
- Regional and Special Use Parks if they satisfy the Community Parks needs
- Current and projected population
- Current and projected household density
- Park acreage
- Number of parks serving an area

The use of each of these data items in the analysis is discussed below.

Parks
Community parks serve as a basis for this analysis. Community Parks have a wider service range than neighborhood parks at 2 to 10 miles. To reflect this range, analysis was preformed at a 2, 5 and 10-mile service range. Functionally several other types of open spaces meet community park needs. For people within 10 miles of a regional park the regional can serve their community park needs as well. For people within 10 miles of a special use park, the special use park can serve their community park needs as long the special use park meets the community park service needs. The community, regional, and special use parks, hereafter, will be referred to as "community parks" for the community parks analysis.

Current and Projected Population
Geographic areas with one household or more for 2.5 acres of land area are intended to be served by community parks. Community parks are intended to serve a population of 7,000 to 17,000 with a minimum of four park acres per 1,000 persons. Using current population and household estimates and future forecasts , the County Demographer determined if the density of households was in the targeted range. The County Demographer also determined if the population and park acreage per 1000 persons was within within the targeted range for a park's service area. The population estimates and forecasts were also used to determine where and how many additional parks were needed throughout the County.

Current (Dec. 2004) population estimates for individual park service areas were derived as follows. U.S. Census Bureau 2000 census block population data was used as a base. County occupancy permit along with average household size by unit type data from the 2000 census was used to estimate a park service area's population growth from 2000 to December 2004. Forecasts for 2005 to 2030 for park service areas were determined using the Round 7.0 Version III traffic analysis zone forecasted growth for the park service area and adding the population growth data to the December 2004 estimated population. The 2000 census block data and the 2005 to 2030 Traffic analysis zones do not follow the park service area boundaries. Therefore, population was estimated based on the assumption that the population is evenly distributed throughout the census block and traffic analysis zone.

The 2005 and 2030 population and household density assessment of all lands in the county, which is different than the assessment of individual parks, solely utilized the 2005 and 2030 Round 7.0 Version III traffic analysis zone forecasts.

Needs Analysis
The Community Needs map presents the results of the analysis. To create the map, a grid or raster based analysis was used to bring the various data formats into a common foundation and allow for the use of powerful spatial analysis tools in a GIS system. A raster format, like the format used for aerial photographs, is made up of pixels or cells that form a continuous surface. Based on the available computer capacity, data, and

purposes of analysis, a cell size of 25' x 25' was selected. Fairfax County did a similar analysis and they selected this cell size as well.

Two models were used to assess community park needs. Each model assigns a value to each cell based on the demographic data. The results of these two models were then averaged and reclassified to derive the final result of the amount of need for a neighborhood park for each 25' x 25' cell area in the County. Areas with a final score of 5 are very well served by park facilities and do not have a need for additional community parks through 2030. Areas with a final score of 4 are fairly well served by park facilities and do not need additional community parks through 2030. Areas with a score of 3 are adequately being served by park facilities and do not need additional community parks through 2030. A score of 2 for an area means that the area is moderately under served by park facilities between 2005 and 2030 and there is a need for additional community parks. A score of 1 for an area signifies that the area is well under served by park facilities between 2005 and 2030 and has the greatest need for additional community parks.

The following are the models that were used to assess the amount of need for a community park.

Model 1

The following is the first model. It models the level of service need based on population and number of parks currently serving an area.

Values were assigned as follows:

2 to 10 mile buffer population of County lands (i.e., serving 7,000 to 17,000 people)	2005 Number of Parks Needed	2030 Number of Parks Needed
Below 7,000 persons	0	0
7,000 to 17,000 persons	1	1
Over 17,000 persons	2 or more (depending on population)	2 or more (depending on population)

Values were them assigned based on a comparison of the number of parks needed and number of parks currently serving an area. The values assigned were as follows:

Comparison of number of parks needed (as determined in population analsysis above) minus the number of parks serving an area.	2005	2030
Below Zero (over served)	12	12
0 (adequately served)	6	6
1 to 2 parks needed (moderately under served)	3	3
3 or more parks needed (well under served)	1	1

The level of service scores in the immediate preceding table were the final scores for this first model.

Model 2

The following is the second model. It models the level of service need based on the acres per 1000 population for existing/planned parks and household density throughout the County.

The level of service based on acres per 1000 population was similarly scored as follows:

Year facility does not meet acreage standard (i.e., less than 1 acre/1000 people)	2 Mile Service Area	2 to 5 mile Service Area	5 to 10 mile Service Area
Dec. 2004	2	1.5	1
2010	4	3.5	3
2015	6	5.5	5
2020	8	7.5	7
2025	10	9.5	9
2030	12	11.5	11

Areas outside any park service area were coded zero. In areas where the level of service overlapped, the highest value was used.

The level of service based on 2.5 acres of land per household scored as follows:

Acres per household	2005	2030
0 to 2.4	0	0
2.5 or more	12	12

The level of service scores based on acres per 1000 population and 2.5 acres of land per household were averaged to determine a final score for this second model.

Final Modeling Result

The values from the two models were then added to obtain a level of service score for the areas of the county served by neighborhood parks. The final scores ranged from 0 to 24. These final scores were then divided into five final categories as follows:

Additive Score	Final Score	Final Score Definition
0 to 5	1	Well Under Served – Additional Parks Needed
6 to 11	2	Moderately Under Served – Additional Parks Needed
12	3	Adequately Served (Meets Standards) – No Additional Parks Needed
13 to 18	4	Moderately Over Served – No Additional Parks Needed
19 to 24	5	Well Over Served – No Additional Parks Needed

The resulting model provides a geographic distribution of park needs that will help identify potential locations for new community parks.

Regional Parks

The Prince William County Park Authority maintains x regional parks. Regional Parks have no upper limit on population served or area served. The Comprehensive Plan does set a standard of 6 acres per 1000 population.

A geographic analysis was performed to determine the service area for each park. A 10 mile buffer was created around each of the regional parks. This analysis shows that all areas of the county are within 10 miles of a regional park. Due to the open ended standard for regional parks, the impact of state and federal parks on service levels, and regional park services available outside the County, a model of this level of service could not be established with the data available.

Findings

[TO BE PROVIDED]

D. OPEN SPACE INVENTORY MAP

Classification	Feature	Acres
Federal		
	Prince William Forest Park	12,089
	Manassas National Battlefield	4,339
	Occoquan Bay National Wildlife Area	646
	Featherstone National Wildlife Area	338
	total federal	**17,412**
State		
	Leesylvania State Park	509
	Conway Robinson Memorial State Forest	442
	total state	**951**
County		
	Park Authority	3,250
	Board of County Supervisors (vacant)	1,244
	Service Authority	34
	Public Schools Open Space	733
	total county	**5,261**
Other		
	Signal Hill Park (Manassas Park)	105
	Northern Virginia Regional Park Authority	81
	Golf Courses	4,078
	HOA Property	6,629
	Virginia Outdoors Foundation Conservation Easements	1,579
	Civil War Preservation Trust	270
	Northern Virginia Conservation Trust	78
	Chesapeake Bay Resource Protection Areas	33,558
	Agricultural & Forestal District	3,012

other total	**49,390**

combined total	**73,014**

Layer	Gis Acreage	Data Source	Updated
Existing Open Space Resources			
Manassas National Battlefield	4,339.0	PWC Planning Office(Map of Existing National Park Service Properties & Authorized Boundary for properties located within PWC)… as of 6/9/2003	1/27/05
Prince William Forest Park	12,089.0	OIT data plus additions from National Park Service Map(10/04)	3/31/05
Occoquan Bay National Wildlife Refuge	646.0	Real Estate Assessment Data, U.S. Fish & Wildlife Service	2/7/05
Featherstone National Wildlife Refuge	338.0	Real Estate Assessment Data, U.S. Fish & Wildlife Service	2/7/05
Leesylvania State Park	509.0	OIT & Real Estate Assessment data	10/18/04
Conway Robinson Memorial State Park	442.0	OIT & Real Estate Assessment data	10/19/04

County Parks	3,250.0	PWC Real Estate Assessment data, PWC Park Authority	2/7/05
Schools Open Space	733.0	OIT & Real Estate Assessment data	2/1/05
Vacant PWC Service Authority owned Land	34.0	OIT, Public Works & Real Estate Assessment data	2/15/05
Vacant BOCS owned land	1,244.0	OIT, Public Works & Real Estate Assessment data	2/15/05
NOVA Conservation Easements	78.0	NOVA Conservation Trust & Real Estate Assessment data	2/12/05
VA Outdoors Foundation Easements	1,579.0	DCR & OIT	10/18/04
Golf Courses	4,078.0	OIT, Real Estate Assessment data, 2003 Aerial Photos	11/4/04
HOA land	6,629.0	Real Estate Assessment Data, OIT	1/19/05
NOVA Regional Park Authority Land	81.0	OIT & Real Estate Assessment Data	1/19/05
Signal Hill Park (Manassas Park)	105.0	OIT & Real Estate Assessment Data	8/31/05
Existing Environmental Resources			
RPA	33,558.0	OIT & Public Works Watershed Division	10/4/04

E. FACILITIES INVENTORY MAP

[TO BE PROVIDED]

F. PRIME OPEN SPACE ANALYSIS

The environmental, cultural resources and park needs rasters were combined to derive a final open space score for each twenty-five square foot cell in the County. The addition of the three individual raster layers resulted in a cumulative score for each cell. Final grid cell values ranged from 3 to 13. The scale was reclassified and the results were grouped the following way: cells with a value of three or four were assigned a value of one; cells with values of five or six were assigned values of 2; cells with values of seven

or eight were reassigned values of three; cells with values of nine or ten were reassigned a value of four; and cells with values of eleven, twelve or thirteen were reassigned a value of five.

It is important to understand that this analysis can be rerun using different parameters. The spatial analyst software allows staff to assign weights to the different map inputs. Assigning different weights to each map input will produce a variety of individual maps.