

Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

**ROCK CREEK PARK  
AND THE  
ROCK CREEK AND  
POTOMAC PARKWAY**

**Washington, D.C.**

## APPENDIX A: LEGISLATION

## THE ROCK CREEK PARK AUTHORIZATION

FIFTY-FIRST CONGRESS. Sess. I. Ch. 1001. 1890.

|                              |   |
|------------------------------|---|
| September 27, 1890.          | <b>CHAP. 1001.</b> —An act authorizing the establishing of a public park in the District of Columbia.                                       |
| District of Columbia.        | <i>Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,</i> That a tract of land |
| Rock Creek Park established. | lying on both sides of Rock Creek, beginning at Klinge Ford Bridge,   |
| Location.                    | and running northwardly, following the course of said creek, of a   |
| Description.                 | width not less at any point than six hundred feet, nor more than  |
|                              | twelve hundred feet, including the bed of the creek, of which not less  |
|                              | than two hundred feet shall be on either side of said creek, south of   |
|                              | Broad Branch road and Blagden Mill road and of such greater width   |
|                              | north of said roads as the commissioners designated in this act may   |
|                              | select, shall be secured, as hereinafter set out, and be perpetually  |
| Dedication.                  | dedicated and set apart as a public park or pleasure ground for the   |
|                              | benefit and enjoyment of the people of the United States, to be known   |
| Proviso.                     | by the name of Rock Creek Park: <i>Provided, however,</i> That the  |
|                              | whole tract so to be selected and condemned under the provisions of   |
| Maximum size and cost.       | this act shall not exceed two thousand acres nor the total cost thereof   |
| Commission to be appointed.  | exceed the amount of money herein appropriated.   |
|                              | SEC. 2. That the Chief of Engineers of the United States Army,  |
|                              | the Engineer Commissioner of the District of Columbia, and three  |
| Duties.                      | citizens to be appointed by the President, by and with the advice and   |
|                              | consent of the Senate, be, and they are hereby, created a commission  |
|                              | to select the land for said park, of the quantity and within the limits   |
|                              | aforsaid, and to have the same surveyed by the assistant to the said  |
| Executive officer.           | Engineer Commissioner of the District of Columbia in charge of  |
|                              | public highways, which said assistant shall also act as executive   |
|                              | officer to the said commission.   |
|                              | SEC. 3. That the said commission shall cause to be made an accu-  |
|                              | rate map of said Rock Creek Park, showing the location, quantity,   |
| Map to be filed.             | and character of each parcel of private property to be taken for such   |
|                              | purpose, with the names of the respective owners inscribed thereon,   |
|                              | which map shall be filed and recorded in the public records of the  |
| Condemnation.                | District of Columbia, and from and after the date of filing said map  |
| Title.                       | the several tracts and parcels of land embraced in said Rock Creek  |
| Compensation.                | Park shall be held as condemned for public uses, and the title thereof  |
| Proviso.                     | vested in the United States, subject to the payment of just compen-   |
| Acceptance by owners.        | sation, to be determined by said commission, and approved by the  |
| Failure to agree.            | President of the United States: <i>Provided,</i> That such compensation   |
|                              | be accepted by the owner or owners of the several parcels of land.  |
|                              | That if the said commission shall be unable by agreement with   |
| Judicial procedure.          | the respective owners to purchase all of the land so selected and con-  |
| Application for assessment.  | demned within thirty days after such condemnation, at the price ap-   |
|                              | proved by the President of the United States, it shall, at the expira-  |
|                              | tion of such period of thirty days, make application to the supreme   |
| Petition and map.            | court of the District of Columbia, by petition, at a general or spe-  |
|                              | cial term, for an assessment of the value of such land as it has been   |
|                              | unable to purchase.   |
| Notification.                | Said petition shall contain a particular description of the property  |
|                              | selected and condemned, with the name of the owner or owners  |
|                              | thereof, if known, and their residences, as far as the same may be  |
|                              | ascertained, together with a copy of the recorded map of the park;  |
| Appraisal commis-            | and the said court is hereby authorized and required, upon such ap-   |
| sion.                        | plication, without delay, to notify the owners and occupants of the   |
|                              | land, if known, by personal service, and if unknown, by service by  |
| Ascertainment of value.      | publication, and to ascertain and assess the value of the land so   |
|                              | selected and condemned, by appointing three competent and disin-  |
|                              | terested commissioners to appraise the value or values thereof, and   |
|                              | to return the appraisement to the court; and when the value or val-   |
| Payment.                     | ues of such land are thus ascertained, and the President of the   |
| Title.                       | United States shall decide the same to be reasonable, said value or   |
|                              | values shall be paid to the owner or owners, and the United States  |
|                              | shall be deemed to have a valid title to said land; and if in any case  |

the owner or owners of any portion of said land shall refuse or neglect, after the appraisalment of the cash value of said lands and improvements, to demand or receive the same from said court, upon depositing the appraised value in said court to the credit of such owner or owners, respectively, the fee-simple shall in like manner be vested in the United States.

SEC. 4. That said court may direct the time and manner in which possession of the property condemned shall be taken or delivered, and may, if necessary, enforce any order or issue any process for giving possession.

SEC. 5. That no delay in making an assessment of compensation, or in taking possession, shall be occasioned by any doubt which may arise as to the ownership of the property, or any part thereof, or as to the interests of the respective owners. In such cases the court shall require a deposit of the money allowed as compensation for the whole property or the part in dispute. In all cases as soon as the said commission shall have paid the compensation assessed, or secured its payment by a deposit of money under the order of the court, possession of the property may be taken. All proceedings hereunder shall be in the name of the United States of America and managed by the commission.

SEC. 6. That the commission having ascertained the cost of the land, including expenses, shall assess such proportion of such cost and expenses upon the lands, lots, and blocks situated in the District of Columbia specially benefited by reason of the location and improvement of said park, as nearly as may be, in proportion to the benefits resulting to such real estate.

If said commission shall find that the real estate in said District directly benefited by reason of the location of the park is not benefited to the full extent of the estimated cost and expenses, then they shall assess each tract or parcel of land specially benefited to the extent of such benefits as they shall deem the said real estate specially benefited. The commission shall give at least ten days' notice, in one daily newspaper published in the city of Washington, of the time and place of their meeting for the purpose of making such assessment and may adjourn from time to time till the same be completed. In making the assessment the real estate benefited shall be assessed by the description as appears of record in the District on the day of the first meeting; but no error in description shall vitiate the assessment: *Provided*, That the premises are described with substantial accuracy. The commission shall estimate the value of the different parcels of real estate benefited as afore-said and the amount assessed against each tract or parcel, and enter all in an assessment book. All persons interested may appear and be heard. When the assessment shall be completed it shall be signed by the commission, or a majority (which majority shall have power always to act), and be filed in the office of the clerk of the supreme court of the District of Columbia. The commission shall apply to the court for a confirmation of said assessment, giving at least ten days' notice of the time thereof by publication in one daily newspaper published in the city of Washington, which notice shall state in general terms the subject and the object of the application.

The said court shall have power, after said notice shall have been duly given, to hear and determine all matters connected with said assessment; and may revise, correct, amend, and confirm said assessment, in whole or in part, or order a new assessment, in whole or in part, with or without further notice or on such notice as it shall prescribe; but no order for a new assessment in part, or any partial adverse action, shall hinder or delay confirmation of the residue, or collection of the assessment thereon. Confirmation of any part of the assessment shall make the same a lien on the real estate assessed.

Possession.  
Process.

No delay in assessment, etc.

Disputed claims.

Possession.

Proceedings.

Proportionate assessment of cost, etc., on benefited lands.

Notice by publication.

Adjournments of commission.

Record description.

Errors.

Proviso.

Substantial accuracy.

Entries in assessment book.  
Hearings.  
Commission to file assessment.

Application for confirmation.

Notice.

Powers of court in determining, etc.

Confirmation.

Lien.

|  |   |
|--|---|
| Payment of assessment by installments, etc.    | The assessment, when confirmed, shall be divided into four equal installments, and may be paid by any party interested in full or in one, two, three, and four years, on or before which times all shall be payable, with six per centum annual interest on all deferred payments. All payments shall be made to the Treasurer of the United States, who shall keep the account as a separate fund. The orders of the court shall be conclusive evidence of the regularity of all previous proceedings necessary to the validity thereof, and of all matters recited in said orders. The clerk of said court shall keep a record of all proceedings in regard to said assessment and confirmation. The commission shall furnish the said clerk with a duplicate of its assessment book, and in both shall be entered any change made or ordered by the court as to any real estate. Such book filed with the clerk when completed and certified shall be prima facie evidence of all facts recited therein. In case assessments are not paid as aforesaid the book of assessments certified by the clerk of the court shall be delivered to the officer charged by law with the duty of collecting delinquent taxes in the District of Columbia, who shall proceed to collect the same as delinquent real estate taxes are collected. No sale for any installment of assessment shall discharge the real estate from any subsequent installment; and proceedings for subsequent installments shall be as if no default had been made in prior ones. |
| Interest. Separate Treasury fund.              |   |
| Validity of proceedings.                       |   |
| Court record.                                  |   |
| Duplicate assessment book to be filed.         |   |
| Evidence of recited facts.                     |   |
| Delinquent assessments.                        |   |
| Collection.                                    |   |
| Payment of compensation by Treasurer.          | All money so collected may be paid by the Treasurer on the order of the commission to any persons entitled thereto as compensation for land or services. Such order on the Treasurer shall be signed by a majority of the commission and shall specify fully the purpose for which it is drawn. If the proceeds of assessment exceed the cost of the park the excess shall be used in its improvement, under the direction of the officers named in section eight, if such excess shall not exceed the amount of ten thousand dollars. If it shall exceed that amount that part above ten thousand dollars shall be refunded ratably. Public officers performing any duty hereunder shall be allowed such fees and compensation as they would be entitled to in like cases of collecting taxes. The civilian members of the commission shall be allowed ten dollars per day each for each day of actual service. Deeds made to purchasers at sales for delinquent assessments hereunder shall be prima facie evidence of the right of the purchaser, and any one claiming under him, that the real estate was subject to assessment and directly benefited, and that the assessment was regularly made; that the assessment was not paid; that due advertisement had been made; that the grantees in the deed was the purchaser or assignee of the purchaser, and that the sale was conducted legally.  |
| Commission orders.                             |   |
| Proceeds in excess of cost.                    |   |
| Compensation of public officers.               |   |
| Compensation of civilian commissioners.        |   |
| Delinquent assessment sale deeds.              |   |
| Evidence of.                                   |   |
| Judgment of sale.                              | Any judgment for the sale of any real estate for unpaid assessments shall be conclusive evidence of its regularity and validity in all collateral proceedings except when the assessment was actually paid, and the judgment shall estop all persons from raising any objection thereto, or to any sale or deed based thereon, which existed at the date of its rendition, and could have been presented as a defense to the application for such judgment.   |
| Estoppel, etc.                                 |   |
| Appropriation. For total cost, etc.            | To pay the expenses of inquiry, survey, assessment, cost of lands taken, and all other necessary expenses incidental thereto, the sum of one million two hundred thousand dollars, or so much thereof as may be necessary, is hereby appropriated out of any money in the Treasury not otherwise appropriated: <i>Provided</i> , That one-half of said sum of one million two hundred thousand dollars, or so much thereof as may be expended, shall be re-imbursed to the Treasury of the United States out of the revenues of the District of Columbia, in four equal annual installments, with interest at the rate of three per centum per annum upon the deferred payments: <i>And provided further</i> , That one-half of the sum which shall be annually appropriated and expended for the maintenance and improvement of said   |
| Proviso. Half from the District revenues.      |   |
| Reimbursed in installments.                    |   |
| Interest.                                      |   |
| Maintenance, etc. Half from District revenues. |   |

lands as a public park shall be charged against and paid out of the revenues of the District of Columbia, in the manner now provided by law in respect to other appropriations for the District of Columbia, and the other half shall be appropriated out of the Treasury of the United States.

SEC. 7. That the public park authorized and established by this act shall be under the joint control of the Commissioners of the District of Columbia and the Chief of Engineers of the United States Army, whose duty it shall be, as soon as practicable, to lay out and prepare roadways and bridle paths, to be used for driving and for horseback riding, respectively, and footways for pedestrians; and whose duty it shall also be to make and publish such regulations as they deem necessary or proper for the care and management of the same. Such regulations shall provide for the preservation from injury or spoliation of all timber, animals, or curiosities within said park, and their retention in their natural condition, as nearly as possible.

Control, etc., of park.

Regulations, etc.

Approved, September 27, 1890.

#### THE ROCK CREEK AND POTOMAC PARKWAY AUTHORIZATION

(From the Public Buildings Act of March 4, 1913)

SEC. 22. That for the purpose of preventing the pollution and obstruction of Rock Creek and of connecting Potomac Park with the Zoological Park and Rock Creek Park, a commission, to be composed of the Secretary of the Treasury, the Secretary of War, and the Secretary of Agriculture, is hereby authorized and directed to acquire, by purchase, condemnation, or otherwise, such land and premises as are not now the property of the United States in the District of Columbia shown on the map on file in the office of the Engineer Commissioner of the District of Columbia, dated May seventeenth, nineteen hundred and eleven, and lying on both sides of Rock Creek, including such portion of the creek bed as may be in private ownership, between the Zoological Park and Potomac Park; and the sum of \$1,300,000 is hereby authorized to be expended toward the requirement of such land. That all lands now belonging to the United States or to the District of Columbia lying within the exterior boundaries of the land to be acquired by this act as shown and designated on said map are hereby appropriated to and made a part of the parkway herein authorized to be acquired. One-half of the cost of the said lands shall be reimbursed to the Treasury of the United States out of the revenues of the District of Columbia in eight equal annual installments, with interest at the rate of three per centum per annum upon the deferred payments. That should the commission decide to institute condemnation proceedings in order to secure any or all of the land herein authorized to be acquired, such proceedings shall be in accordance with the provisions of the act of Congress approved August thirtieth, eighteen hundred and ninety, providing a site for the enlargement of the Government Printing Office (United States Statutes at Large, volume twenty-six, chapter eight hundred and thirty-seven).

Washington, D. C. Commission to acquire land adjoining Rock Creek to connect Zoological and Potomac Parks.

Amount authorized.

Public lands added.

One half of cost from District revenue, in installments.

Condemnation proceedings.

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## **APPENDIX B: LAWS AND EXECUTIVE ORDERS**

Laws and executive orders that apply to the management of Rock Creek Park and the Rock Creek and Potomac Parkway are provided below.

### **NATIONAL PARK SERVICE ENABLING LEGISLATION**

Act of August 25, 1916 (National Park Service Organic Act), Public Law (P.L.) 64-235, 16 United States Code (U.S.C.) Section (§)1 *et sequens* (*et seq.* (and the following ones)) as amended

Reorganization Act of March 3, 1933, 47 Statute (Stat.) 1517

General Authorities Act, October 7, 1976, P.L. 94-458, 90 Stat. 1939, 16 U.S.C. §1a-1 *et seq.*

Act amending the Act of October 2, 1968 (commonly called Redwoods Act), March 27, 1978, P.L. 95-250, 92 Stat. 163, 16 U.S.C. Subsection(s) (§§) 1a-1, 79a-q

National Parks and Recreation Act, November 10, 1978, P.L. 95-625, 92 Stat. 3467; 16 U.S.C. §1 *et seq.*

### **OTHER LAWS AFFECTING NPS OPERATIONS**

#### **Accessibility**

Americans with Disabilities Act, P.L. 101-336, 104 Stat. 327, 42 U.S.C. §12101

Architectural Barriers Act of 1968, P.L. 90-480, 82 Stat. 718, 42 U.S.C. §4151 *et seq.*

Rehabilitation Act of 1973, P.L. 93-112, 87 Stat. 357, 29 U.S.C. §701 *et seq.* as amended by the Rehabilitation Act Amendments of 1974, 88 Stat. 1617

#### **Cultural Resources**

American Indian Religious Freedom Act, P.L. 95-341, 92 Stat. 469, 42 U.S.C. §1996

Antiquities Act of 1906, P.L. 59-209, 34 Stat. 225, 16 U.S.C. §432 and 43 Code of Federal Regulations (CFR) 3

Archeological and Historic Preservation Act of 1974, P.L. 93-291, 88 Stat. 174, 16 U.S.C. §469

Archeological Resources Protection Act of 1979, P.L. 96-95, 93 Stat. 712, 16 U.S.C. §470aa *et seq.* and 43 *Code of Federal Regulations* 7, subparts A and B, 36 *Code of Federal Regulations* 79

National Historic Preservation Act as amended, P.L. 89-665, 80 Stat. 915, 16 U.S.C. §470 *et seq.* and 36 *Code of Federal Regulations* 18, 60, 61, 63, 68, 79, 800

Protection of Historic and Cultural Properties, Executive Order (E.O.) 11593; 36 *Code of Federal Regulations* 60, 61, 63, 800; 44 Federal Register (FR) 6068

Public Buildings Cooperative Use Act of 1976, P.L. 94-541, 90 Stat. 2505, 42 U.S.C. §4151-4156

## **Natural Resources**

Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act, Environmental Statement Memorandum (E.S.) 80-3, 08/11/80, 45 FR 59109

Clean Air Act as amended, P.L. Chapter 360, 69 Stat. 322, 42 U.S.C. §7401 *et seq.*

Coastal Zone Management Act of 1972 as amended, P.L. 92-583, 86 Stat. 1280, 16 U.S.C. §1451 *et seq.*

Endangered Species Act of 1973, as amended, P.L. 93-205, 87 Stat. 884, 16 U.S.C. §1531 *et seq.*

Estuaries and Clean Waters Act of 2000, P.L. 106-457, 33 U.S.C. §§ 2901-2909.

Executive Order 11988: Floodplain Management, 42 FR 26951, 3 *Code of Federal Regulations* 121 (Supplement (Supp) 177)

Executive Order 11990: Protection of Wetlands, 42 FR 26961, 3 *Code of Federal Regulations* 121 (Supp 177)

Executive Order 11991: Protection and Enhancement of Environmental Quality

Federal Insecticide, Fungicide, and Rodenticide Act, P.L. 92-516, 86 Stat. 973, 7 U.S.C. §136 *et seq.*

Federal Water Pollution Control Act (commonly referred to as Clean Water Act), P.L. 92-500, 33 U.S.C. §1251 *et seq.* as amended by the Clean Water Act, P.L. 95-217

Fish and Wildlife Coordination Act of 1958 as amended, P.L. 85-624, 72 Stat. 563, 16 U.S.C. §661 *et seq.*

Manguson Fishery Conservation and Management Act of 1976, P.L. 94-625, 90 Stat. 331m 16 U.S.C. §1801 *et seq.*

Migratory Bird Conservation Act, P.L. Chapter 257, 45 Stat. 1222, 16 U.S.C. §715 *et seq.*

Migratory Bird Treaty Act of 1918, P.L. 186, 40 Stat. 755

National Environmental Policy Act of 1969, P.L. 91-190, 83 Stat. 852, 42 U.S.C. §4321 *et seq.*

National Park System Final Procedures for Implementing E.O. 11988 and 11990 (45 FR 35916 as revised by 47 FR 36718)

Protection and Enhancement of Environmental Quality, E.O. 11514 as amended, 1970, E.O. 11991, 35 FR 4247; 1977, 42 FR 26967)

Resource Conservation and Recovery Act, P.L. 94-580, 30 Stat. 1148, 42 U.S.C. §6901 *et seq.*

Rivers and Harbors Act of 1899, 33 U.S.C. Chapter 425, as amended by P.L. 97-332, October 15, 1982 and P.L. 97-449, 33 U.S.C. §§401-403

Water Resources Planning Act of 1965 (P.L. 89-80, 42 U.S.C. § 1962 *et seq.*) and Water Resource Council's Principles and Standards, 44 FR 723977

Watershed Protection and Flood Prevention Act, P.L. 92-419, 68 Stat. 666, 16 U.S.C. §100186

### **Other**

Administrative Procedures Act, 5 U.S.C. § 551-559, §§701-706

Concessions Policy Act of 1965, P.L. 89-249, 79 Stat. 969, 16 U.S.C. § 20 *et seq.*

Department of Transportation Act of 1966, P.L. 89-670, 80 Stat. 931, 49 U.S.C. § 303

Energy Supply and Environmental Coordination Act of 1974

Executive Order 12003: Energy Policy and Conservation, 3 *Code of Federal Regulations* 134 (Supp 1977), 42 U.S.C. § 2601

Executive Order 12008: Federal Compliance with Pollution Control Standards

Executive Order 12372: Intergovernmental Review of Federal Programs, 47 FR 30959

Forest and Rangeland Renewable Resources Planning Act, P.L. 95-307, 92 Stat. 353, 16 U.S.C. §1600 *et seq.*

Freedom of Information Act, P.L. 93-502, 5 U.S.C. §552 *et seq.*

Intergovernmental Cooperation Act of 1968, P.L. 90-577, 40 U.S.C. §§ 531-535 and 31 U.S.C. §§6501-6508

Intergovernmental Coordination Act of 1969, 42 U.S.C. §§4101, 4231, 4233

Noise Control Act of 1972 as amended, P.L. 92-574, 42 U.S.C. §4901 *et seq.*

Outdoor Recreation Coordination Act of 1963, P.L. 88-29, 77 Stat. 49

Payment in Lieu of Taxes Act, P.L. 94-565, 90 Stat. 2662, 31 U.S.C. §6901 *et seq.*

Surface Transportation Assistance Act of 1982, 96 Stat. 2097, 23 U.S.C. §§101 and many others

Wildfire Disaster Recovery Act, P.L. 101-286



## **APPENDIX C: RELATIONSHIP OF THE GENERAL MANAGEMENT PLAN TO OTHER PLANNING EFFORTS**

### **OTHER NPS PLANNING EFFORTS**

#### **Rock Creek Park: A Report by Olmsted Brothers**

The first and only previous comprehensive plan for the park was completed in 1918. The Olmsted Brothers firm, headed by landscape architect Frederick Law Olmsted, jr., was commissioned to prepare a report focusing on development and expansion of the park. The report supports protection of the park's natural values, analyzes the scenery, and includes an approach to divide the park into defined landscape units, based on native vegetation. While the report also proposed a system of park drives and thoroughfares as well as landscape treatments, most of the proposals were never implemented. However the plan provided an eloquent vision and philosophy for the management of the park which continue to guide the park today. The Olmsted report set the tone for the park in the opening sentences, stating:

The dominant consideration, never to be subordinated to any other purpose in dealing with Rock Creek Park, is the permanent preservation of its wonderful natural beauty and the making of that beauty accessible to the people without spoiling the scenery in the process.

This general management plan is intended to build on these early ideals and incorporate the direction of its philosophy, while adjusting for current park needs. For instance, some proposals by the Olmsted brothers were never implemented and are recognized today as designs for an earlier generation, not necessarily applicable for the contemporary needs of the public. Many issues facing the park today are not addressed in the 1918 plan. Nevertheless, this general management plan represents an approach based on the Olmsted philosophy of scenic preservation while integrating appropriate management measures to address the pressures and issues that have and will continue to arise in the park.

#### **Rock Creek Tennis Stadium Management Plan**

A separate plan and environmental impact statement was prepared in 1993 to address long-term management of the Rock Creek Park tennis center and associated recreation fields at Brightwood. Because the planning for the area was so recently completed, this Rock Creek Park and Rock Creek and Potomac Parkway general management plan did not revisit issues or propose alternatives related to the tennis stadium.

#### **Park Comprehensive Interpretive Plan**

A comprehensive interpretive plan is underway for the park to identify interpretive themes and strategies for interpretive programs. The plan is being prepared in concert with the general management plan and will complement the management direction of the final general management plan.

## **Management Plan and Environmental Assessment for Fort Circle Parks**

In 2003, the National Park Service completed a management plan and environmental assessment for the ring of Civil War earthen fortifications built on the ridges surrounding Washington, D.C. (NPS 2003b). Several of these historic Civil War resources and remnants are managed by Rock Creek Park, and Fort DeRussy is within the park boundaries.

A new, 23-mile-long trail will link most of the fort sites and connecting green corridor. The trail primarily will be for walking but could include bicycle access as long as cultural and natural resources were sufficiently protected. The trail will use existing trail segments and city sidewalks. Within Rock Creek Park, this trail will cross Beach Drive and several park trails in an east-west direction in the vicinity of Military Road. These connections of linear recreation features will enhance opportunities for nonmotorized recreation throughout the area.

## **Park Studies and Action Plans**

Several studies and plans have been completed for the park and are periodically updated. These include the

Historic Resource Study for Rock Creek (1990)

Park Resources Management Plan (draft 1996)

Statement for Management (1985)

Several cultural/historic properties administered by the staff of Rock Creek Park are outside the geographical area of this general management plan (see “Geographic Area Covered by the General Management Plan”). Management objectives for these properties will continue to be developed on a site-by-site basis. Separate management plans may be developed for these properties at a future date. During 1996-1997, the following major studies were initiated relevant to these cultural/historic properties:

Civil War Defenses of Washington – Fort Circle Parks Management Plan/Environmental Assessment. Completed in 2003.

Historic Resource Study for Civil War Defenses of Washington.-This study, completed in 2002, documents the history of the Civil War forts and related sites that are within the administrative boundaries of Rock Creek Park and within other NPS jurisdictions in the National Capital Region.

Cultural Landscape Report for Montrose Park. Completed in 2004.

Cultural Landscape Report for Meridian Hill Park. Completed in 2001.

Cultural Landscape Report for Dumbarton Oaks Park. Completed in 2001.

Preservation Maintenance Plan for Dumbarton Oaks Park. Completed in 1997.

Other project requests are currently being developed, principal of which is a Historic Structures Report and Preservation Needs Assessment for Battleground National Cemetery.

### **Rock Creek Park Transportation/Safety Study**

A special study of transportation in the park and surrounding streets was prepared as part of the planning process (Robert Peccia & Associates 1997; Robert Peccia & Associates *et al.* 1997). The study documented traffic patterns, examined safety, and measured air pollution and noise. As part of the process to thoroughly investigate traffic-related aspects of the park, a traffic model was developed to forecast traffic conditions in the area. Robert Peccia & Associates, a traffic engineering firm contracted by the park service, adapted and refined the MWCOG regional data to build the Rock Creek Park transportation model for the network of streets and roads around the park. Traffic modeling was conducted for the alternatives considered in the draft general management plan. The environmental consequences section incorporates the findings of this study.

### **Implementation Plans**

Listed below are plans and studies that would be developed or updated to implement the general management plan. Many of these plans and studies could occur as part of a park-wide resources management plan. This list is not exclusive or complete. It is intended to indicate work yet to occur over the 10 to 15 year life of the general management plan.

- Air quality monitoring plan
- Water resource management plan
- Integrated pest management plan
- Wildlife management plan
- Vegetation management plan
- Fire management plan
- Inventory of vegetation and wildlife
- Park-wide trail plan
- Park-wide soils survey
- Cultural resource studies
  - Historic structure report, Nature Center
  - Collections management plan for Peirce Mill
  - Cultural landscape report, Peirce Mill area
  - Cultural landscape report, Peirce-Klingel Mansion and the Linnaean Hill area
  - Cultural landscape report, historic trails
  - Design guidelines for Civil War fortifications (called for in the Fort Circle Parks Management Plan)
  - Park-wide archeological overview and assessment

### **NON-NPS PLANNING EFFORTS**

#### **District of Columbia Scenic Byways Program**

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) authorized the National Scenic Byways Program. This program recognizes roads passing through corridors that are of great interest because they are "representative, unique, or irreplaceable" in regard to scenic, his-

toric, natural, cultural, recreational, or archeological qualities. To be designated as a national scenic byway, a road must

be a state-designated scenic byway (or federal land management agency designated with state concurrence)

possess at least one of the six intrinsic qualities listed above

have a completed corridor management plan

accommodate two-wheel-drive passenger vehicles with standard clearances

where feasible, accommodate bicycles and pedestrians

National designation allows access to ISTEA funds for protection of the intrinsic qualities of the road and enhancement of the use of the road by visitors. This is beneficial to many communities and regions for economic development, encouragement of regional pride, and protection of the resources.

The first step toward national designation is designation as a scenic byway by the state or federal agency that manages the road. Beach Drive and the Rock Creek and Potomac Parkway were designated by the District of Columbia and National Park Service jointly in 1994. The National Park Service has been asked by the District of Columbia to seek national designation for these federally managed roads. However, the decision to seek national designation should follow logically from the overall vision and plan for the park. Therefore, the National Park Service will not take action toward national scenic byway designation pending the conclusion of the general management plan process.

#### **Metropolitan Washington Council of Government, National Capital Region Transportation Planning Board, Making the Vision a Reality... Together**

This document was approved by the Metropolitan Washington Council of Government in 1998 after an extensive three year public input process. It was used to create a long range transportation plan. The document outlines regional transportation policies, objectives, and strategies for metropolitan Washington, D.C. The policies advocate an intermodal transportation system that includes rail, bus, ridesharing, and bicycle and pedestrian improvements to reduce reliance on the single-occupant automobile. A complete version of the Vision Document is available on the Internet at:

[http://www.mwcog.org/store/item.asp?PUBLICATION\\_ID=93](http://www.mwcog.org/store/item.asp?PUBLICATION_ID=93).

#### **Metropolitan Washington Council of Government, National Capital Region Transportation Planning Board, Transportation Improvement Program for the Washington Metropolitan Region FY 2004 – 2009**

The Transportation Improvement Program plan is a five year plan by the Metropolitan Washington Council of Government that lists specific transportation projects in accordance with the Long Term Constrained Plan for the region. This shorter term plan is required by the Federal Highway Administration and the Federal Transit Administration in order to receive federal funding for pro-

jects. Some of the roads that enter the park, such as Beach Drive, are included in some of the projects. This plan is available on the Internet at:

[http://www.mwcog.org/publications/departmental.asp?CLASSIFICATION\\_ID=3&SUBCLASSIFICATION\\_ID=17](http://www.mwcog.org/publications/departmental.asp?CLASSIFICATION_ID=3&SUBCLASSIFICATION_ID=17).

### **Metropolitan Washington Council of Government, National Capital Region Transportation Planning Board, Financially Constrained Long Term Transportation Plan for the National Capital Region**

The Long Term Transportation Plan was originally finalized in 1994 by the Metropolitan Washington Council of Government and has since been updated every three years (2003 is the most recent update). It is the overall transportation plan for the Washington, D.C. metropolitan area. identifies the capital improvements, studies, actions and strategies that the region proposes to carry out by the year 2025. It is available on the Internet at:

[http://www.mwcog.org/publications/departmental.asp?CLASSIFICATION\\_ID=3&SUBCLASSIFICATION\\_ID=17](http://www.mwcog.org/publications/departmental.asp?CLASSIFICATION_ID=3&SUBCLASSIFICATION_ID=17).

### **Metropolitan Washington Council of Government, National Capital Region Transportation Planning Board, Bicycle Plan for the National Capital Region**

The Metropolitan Washington Council of Governments' National Capital Regional Transportation Planning Board adopted the National Capital Region Bicycle Plan in July 1995. Although the plan does not call for bicycle improvements within Rock Creek Park, it does advocate improving major corridors near the park and extending the bike trail along Beach Drive from the District line to Maryland State Route 410 (East-West Highway).

### **Bicycle Plan for the District of Columbia**

The District of Columbia Department of Transportation released a draft version of the District of Columbia Bicycle Plan in August of 2004. In the document, the District Department of Transportation states plans to improve existing District of Columbia and National Park Service trails within Rock Creek Park and better link together the bikeway system in the District of Columbia. Also, one of the top priority bridge improvements was for designated bicycle space on Military Road over Beach Road in the park. This document is available on the Internet at:

<http://www.bikemap.com/dcbikeplan/>.

### **Priorities 2000 Metropolitan Washington Greenways**

The Metropolitan Washington Council of Government's Transportation Planning Board released Priorities 2000 Metropolitan Washington Greenways in 2001. This document lays out a regional greenway plan for the metropolitan Washington, D.C. area. Plans for connecting Rock Creek Park to other parks and greenways are outlined within. It is available in full on the Internet at:

<http://www.mwcog.org/uploads/pub-documents/C11d20031105135020.pdf>.

### **Chesapeake Bay Program**

Rock Creek is in the larger Chesapeake Bay watershed. On October 29, 1993, the National Park Service signed a memorandum of understanding with the Environmental Protection Agency and became a formal participant in the Chesapeake Bay Program, along with the District of Columbia and the states of Virginia, Maryland, and Pennsylvania. In part, this agreement calls for a commitment to implement a basin-wide plan or strategy to reduce nutrient inputs to the bay by 40 percent by the year 2000. In joining the program, the National Park Service agreed to contribute to the restoration, interpretation, and conservation of the many valuable resources of the Chesapeake Bay. The most recent goals document of the Chesapeake Bay Program is the Chesapeake 2000 plan, which includes watershed restoration goals for habitat, water quality, land management, and restoration of living resources, such as shellfish and fisheries. This is available on the Internet at:

<http://www.chesapeakebay.net/c2k.htm>.

### **Comprehensive Plan for the National Capital**

The District of Columbia Self-Government and Governmental Reorganization (Home Rule) Act of 1973 called for the District of Columbia and the National Capital Planning Commission (NCPC) to develop a comprehensive plan. The plan elements were adopted in 1984 and 1985 and address all aspects of governing the District. These include parks, open space, and natural features; economic development; housing; environmental protection; transportation; human services; and land use. The federal elements section of the plan was updated in 2004, and the District elements will be updated for 2006. The federal elements section is available on the Internet at:

[http://www.ncpc.gov/publications\\_press/publications.html](http://www.ncpc.gov/publications_press/publications.html).

### **Extending the Legacy: Planning America's Capital for the 21st Century**

The National Capital Planning Commission released its new plan for Washington's Monumental Core in 1997. The plan presents a vision of what the National Mall and surrounding areas may look like in 50 to 100 years. While the plan does not address Rock Creek Park or surrounding neighborhoods, many of the areas along the Rock Creek and Potomac Parkway would be affected. The plan emphasizes providing access to the Potomac River waterfront, developing public open places, expanding public transportation opportunities, and redefining the network of roadways around the monumental core. This document is available on the Internet at:

[http://www.ncpc.gov/publications\\_press/publications.html](http://www.ncpc.gov/publications_press/publications.html).

### **Montgomery County Master Plans and Maps**

Each planning area in Maryland is required to create a master plan. The master plans establish specific policy guidelines for land use, transportation, conservation, and open space and parks. The Bethesda/Chevy Chase Master Plan (1990) and North and West Silver Spring (2000) Master Plan address the planning areas adjacent to Rock Creek Park. These plans are available on the Internet at:

<http://www.mc-mncppc.org/publicationdb/findpublication.cfm>.

For the Montgomery and Prince George counties in Maryland, a general plan was developed in 1964, updated in 1969, and since refined in 1993. All three documents are available on the Internet at:

[http://www.mc-mncppc.org/community/general\\_plans/general\\_plans.shtm](http://www.mc-mncppc.org/community/general_plans/general_plans.shtm).

Currently, the Maryland-National Capital Park & Planning Commission is working with Montgomery County to create an updated county-level plan based on these documents.

### **State of Maryland Land Preservation and Recreation Plan**

Maryland's most recent land preservation and recreation plan was completed in March 2001, with the next version due on July 1, 2006. The state-level plan incorporates all of the county-level plans. A copy of the 2001 Maryland Land Preservation and Recreation Plan can be ordered on the Internet at:

[http://www.mdp.state.md.us/pdf/publication\\_order.pdf](http://www.mdp.state.md.us/pdf/publication_order.pdf).

### **Strategic Transportation Plan for the District of Columbia (1997)**

The Strategic Transportation Plan presents the District's vision for the city's transportation system. The plan advocates strategies to improve the efficiency of the current transportation system, reduce dependency on single occupancy vehicle use, intercept automobile traffic at the edges of the city, and provide residents and tourists alternatives to the automobile. The plan calls for bicycle paths along Beach Drive and Rock Creek and Potomac Parkway and identifies portions of the park as "gateway" areas. The District of Columbia is currently in the process of updating the 1997 version of the Strategic Transportation Plan.

### **District of Columbia Water and Sewer Authority Combined Sewer Area Stormwater Overflow Plan**

In 1998, the Water and Sewer Authority began planning a long-term, combined sewer system control plan that would reduce overflow discharges throughout its service area by more than 90 percent (District of Columbia Water and Sewer Authority 2004). This project would construct three 20-foot-diameter, concrete-lined tunnels that together could hold approximately 115 million gallons of mixed storm runoff and sewage. The tunnels would collect and store all of the runoff from all but the largest 5 to 10 storm flows annually and then release it gradually for treatment at the Blue Plains Wastewater Treatment Plant. One of the tunnels, which would be a half-mile long and have a capacity of 5 million gallons, would be constructed along Rock Creek (the Piney Branch Storage Tunnel).

In August 2002, the Water and Sewer Authority prepared and submitted for approval a final plan to the U.S. Environmental Protection Agency and the District of Columbia Department of Health. The Water and Sewer Authority is currently negotiating with the regulatory agencies and is awaiting regulatory approval on this final plan. Under the plan, installation of the Piney Branch Storage Tunnel, which would be located within Rock Creek Park, is estimated to start in 2021 (District of Columbia Water and Sewer Authority 2002 and 2004; Siddique 2004).

## APPENDIX D: LETTER FROM THE MAYOR OF THE DISTRICT OF COLUMBIA REQUESTING ANOTHER ALTERNATIVE

### APPENDIX D: LETTER FROM THE MAYOR OF WASHINGTON, D.C. REQUESTING ANOTHER ALTERNATIVE



**ANTHONY A. WILLIAMS**  
MAYOR

Mr. Terry Carlstrom  
Director, National Capital Region  
National Park Service  
1100 Ohio Drive  
Washington, DC 20242

Dear Mr. Carlstrom:

The District is fortunate to have Rock Creek Park, one of the world's finest urban parks, located in the middle of our city. The park provides a welcome respite from the pressures of city life that in turn greatly enhances the livability of our city.

The value of Rock Creek Park to the residents of the Greater Washington region has been significantly improved by the National Park Service's decision in the 1980's to close portions of upper Beach Drive to automobile traffic on weekends. The weekend closure has allowed recreational use to flourish while maintaining adequate transportation needs to automobile drivers.

With a general management plan for Rock Creek Park currently under development, the Park Service now has an opportunity to make this park an even better resource for recreational opportunities and habitat protection. The District of Columbia government has been discussing with various citizen groups regarding the possibility of reducing automobile traffic in the most sensitive portions of Rock Creek Park, while minimizing any impact on surrounding neighborhoods and commuters.

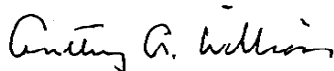
I encourage the National Park Service to work with the surrounding neighborhoods to study the possibility of implementing weekday vehicular traffic restrictions on sections of upper Beach Drive in non-rush hour periods and to start a dialogue with the community to determine the best possible use for the park. It is of vital importance that any restrictions would need to be carefully coordinated between the National Park Service, the District government, and surrounding local governments and neighborhoods.



Mr. Terry Carlstrom  
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The entire project would need to be carefully monitored by the National Park Service and the District government to assess the impacts of this program. If possible, such measures could be incorporated into the forthcoming Rock Creek Park General Management Plan. I have asked Mr. Dan Tangherlini, Acting Director of the Division of Transportation to serve as the District's representative to your offices on this proposed project. I thank you in advance for your consideration.

Sincerely,

A handwritten signature in cursive script, reading "Anthony A. Williams".

Anthony A. Williams  
Mayor

## APPENDIX E: FEDERAL AND STATE-LISTED SPECIAL-CONCERN SPECIES

TABLE E.1: FEDERALLY LISTED SPECIES IN ROCK CREEK PARK

| Common Name   | Scientific Name                 | Federal Status <sup>a/</sup> |
|---------------|---------------------------------|------------------------------|
| CRUSTACEANS   |                                 |                              |
| Hays amphipod | <i>Stygobromus hayi</i>         | LE                           |
| BIRDS         |                                 |                              |
| Bald eagle    | <i>Haliaeetus leucocephalus</i> | LT <sup>b/</sup>             |

a/ Federal status:

LE = Taxa listed as endangered; in danger of extinction throughout all or a significant portion of their range.

LT = Taxa listed as threatened; likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

b/ Bald eagle was proposed for delisting July 1999; delisting is still pending as of April 2005.

TABLE E.2: RARE PLANTS IN ROCK CREEK PARK <sup>a/</sup>

| Common Name                              | Scientific Name                  | Federal Status <sup>c</sup> | D.C. Status <sup>c</sup> | Maryland Status <sup>c</sup> | Maryland Rank <sup>c</sup> |
|--|----------------------------------|-----------------------------|--------------------------|------------------------------|----------------------------|
| Virginia snakeroot                       | <i>Aristolochia serpentaria</i>  | --                          | SX                       | --                           | --                         |
| Solitary pussytoes                       | <i>Antennaria solitaria</i>      | --                          | --                       | T                            | S2                         |
| Hairy rockcress                          | <i>Arabis hirsuta</i>            | --                          | --                       | --                           | SU                         |
| Green dragon <sup>b</sup>                | <i>Arisaema dracontium</i>       | --                          | --                       | --                           | --                         |
| Cornel-leaved aster                      | <i>Aster infirmus</i>            | --                          | --                       | --                           | S3                         |
| Hairy-leaved sedge                       | <i>Carex hirtifolia</i>          | --                          | --                       | --                           | S3                         |
| Chestnut                                 | <i>Castanea dentata</i>          | --                          | --                       | --                           | S2 S3                      |
| Whorled coreopsis                        | <i>Coreopsis verticillata</i>    | --                          | --                       | --                           | S3                         |
| Gold star; green and gold                | <i>Chrysogonum virginianum</i>   | --                          | SX?                      | --                           | S3                         |
| Dandy low kyllinga <sup>b</sup>          | <i>Cyperus tenuifolius</i>       | --                          | --                       | --                           | --                         |
| Pointed-leaved tick-trefoil <sup>b</sup> | <i>Desmodium glutinosum</i>      | --                          | --                       | --                           | --                         |
| Kentucky coffee-tree                     | <i>Gymnocladus dioica</i>        | --                          | --                       | --                           | S1                         |
| Butternut <sup>b</sup>                   | <i>Juglans cinerea</i>           | --                          | --                       | --                           | --                         |
| Two-flowered melic                       | <i>Melica mutica</i>             | --                          | --                       | T                            | S1                         |
| Basil balm                               | <i>Monarda clinopodia</i>        | --                          | --                       | --                           | S3                         |
| Yellow passionflower                     | <i>Passiflora lutea</i>          | --                          | S1                       | --                           | --                         |
| Carolina leaf-flower                     | <i>Phyllanthus caroliniensis</i> | --                          | --                       | --                           | S3                         |
| Elliptic shinleaf                        | <i>Pyrola elliptica</i>          | --                          | SH                       | --                           | --                         |
| Shingle oak                              | <i>Quercus imbricaria</i>        | --                          | --                       | --                           | S3                         |

TABLE E.2: RARE PLANTS IN ROCK CREEK PARK (CONTINUED) <sup>a/</sup>

| Common Name              | Scientific Name               | Federal Status <sup>c</sup> | D.C. Status <sup>c</sup> | Maryland Status <sup>c</sup> | Maryland Rank <sup>c</sup> |
|--------------------------|-------------------------------|-----------------------------|--------------------------|------------------------------|----------------------------|
| Overcup oak <sup>b</sup> | <i>Quercus lyrata</i>         | --                          | --                       | --                           | --                         |
| Orange coneflower        | <i>Rudbeckia fulgida</i>      | --                          | --                       | --                           | S3                         |
| Pearlwort <sup>b</sup>   | <i>Sagina decumbens</i>       | --                          | --                       | --                           | --                         |
| Long-beaked arrowhead    | <i>Sagittaria longirostra</i> | --                          | --                       | --                           | SU                         |
| Showy skullcap           | <i>Scutellaria serrata</i>    | --                          | --                       | --                           | S3                         |
| Three-leaved rosinweed   | <i>Silphium trifoliatum</i>   | --                          | --                       | --                           | S3                         |
| Hairy goldenrod          | <i>Solidago hispida</i>       | --                          | --                       | X                            | SH                         |
| Little ladies' tresses   | <i>Spiranthes tuberosa</i>    | --                          | --                       | --                           | S3                         |
| Golden alexanders        | <i>Zizia aurea</i>            | --                          | --                       | --                           | S3                         |

a/ Source: Unpublished table dated May 9, 2000 that was prepared by park staff and volunteers. Updated November 16, 2004 by park staff.

b/ Denotes species that were in Table E.2 of the draft version of the Rock Creek Park GMP/EIS, but have since been delisted by U.S. Fish and Wildlife Service or Maryland Department of Natural Resources.

c/ Status and rank definitions:

Maryland status - This is the status of a species as determined by the Maryland Department of Natural Resources, in accordance with the Nongame and Endangered Species Conservation Act. Definitions for the following categories have been taken from Code of Maryland Regulations (COMAR) 08.03.08.

E = Endangered; a species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.

C = Candidate species in decline.

-- indicates no special status

Maryland rank:

S1 = Highly State rare. Critically imperiled in Maryland because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres in the State) or because of some factor(s) making it especially vulnerable to extirpation.

S2 = State rare. Imperiled in Maryland because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres in the State) or because of some factor(s) making it vulnerable to becoming extirpated. Species with this rank are actively tracked by the Heritage & Biodiversity Conservation Programs.

S3 = Watch List. Rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with this rank are not actively tracked by the Heritage & Biodiversity Conservation Programs.

SH = Historically known from Maryland, but not verified for an extended period (usually 20 or more years), with the expectation that it may be rediscovered.

SX = Believed to be extirpated in Maryland with virtually no chance of rediscovery.

SU = Possibly rare in Maryland, but of uncertain status for reasons including lack of historical records, low search effort, cryptic nature of the species, or concerns that the species may not be native to the State. Uncertainty spans a range of 4 or 5 ranks as defined above.

**TABLE E.3: STATE-LISTED SPECIES IN ARLINGTON COUNTY, VIRGINIA<sup>a/</sup>**

| <b>Common Name</b>                                    | <b>Scientific Name</b>                            | <b>Federal Status<sup>b/</sup></b> | <b>Virginia Status<sup>b/</sup></b> | <b>Virginia Rank<sup>b/</sup></b> |
|---|---|------------------------------------|-------------------------------------|-----------------------------------|
| <b>CRUSTACEA (AMPHIPODS, ISOPODS, &amp; DECAPODS)</b> |   |                                    |                                     |                                   |
| Pizzini's amphipod                                    | <i>Stygobromus pizzinii</i>                       | --                                 | SC                                  | S1S2                              |
| A groundwater amphipod                                | <i>Stygobromus sp. 15</i>                         | SOC                                | --                                  | S1                                |
| <b>PLANTS</b>   |   |                                    |                                     |                                   |
| Yellow nailwort                                       | <i>Paronychia virginica</i> var. <i>virginica</i> | SOC                                | --                                  | S1                                |
| Blue scorpion-weed                                    | <i>Phacelia covillei</i>                          | SOC                                | --                                  | S1                                |
| Torrey's mountain-mint                                | <i>Pycnanthemum torrei</i>                        | SOC                                | --                                  | S2?                               |
| Virginia mallow                                       | <i>Sida hermaphrodita</i>                         | SOC                                | --                                  | S1                                |

a/ Information from Virginia Natural Heritage Program web site, <http://www.dcr.state.va.us/dnh/nhrinfo>, current as of November 2004. Species listed are specific to Arlington County, Virginia, proximate to Rock Creek Park.

b/ Status and rank definitions:

S1 = Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.

S2 = Very rare; usually between 5 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.

ST = State threatened; a species of flora or fauna which appears likely, within the foreseeable future, to become endangered in the State.

SOC = Species of concern; an informal term referring to species which the U.S. Fish and Wildlife Service believes might be in need of concentrated conservation actions. There is no legal status associated with this status.

-- = no special status.

TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup>

| Common Name                     | Scientific Name                 | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|---------------------------------|---------------------------------|-----------------------------|------------------------------|----------------------------|
| PLANARIANS                      |                                 |                             |                              |                            |
| A planarian                     | <i>Phagocata virilis</i>        | --                          | --                           | S1                         |
| A planarian                     | <i>Planaria dactyligera</i>     | --                          | --                           | S2                         |
| A planarian                     | <i>Procotyla typhlops</i>       | --                          | E                            | S1                         |
| Hoffmaster's cave planarian     | <i>Sphalloplana hoffmasteri</i> | --                          | E                            | S1                         |
| A planarian                     | <i>Sphalloplana sp 1</i>        | --                          | --                           | S1S2                       |
| MOLLUSKS                        |                                 |                             |                              |                            |
| Dwarf wedge mussel              | <i>Alasmidonta heterodon</i>    | LE                          | E                            | S1                         |
| Triangle floater                | <i>Alasmidonta undulata</i>     | --                          | E                            | S1                         |
| Brook floater                   | <i>Alasmidonta varicosa</i>     | --                          | E                            | S1                         |
| Alewife floater                 | <i>Anodonta implicata</i>       | --                          | --                           | S3                         |
| Angular disc                    | <i>Discus catskillensis</i>     | --                          | --                           | S1                         |
| Northern lance                  | <i>Elliptio fisheriana</i>      | --                          | --                           | S3                         |
| Yellow lance                    | <i>Elliptio lanceolata</i>      | --                          | --                           | SU                         |
| Atlantic spike                  | <i>Elliptio producta</i>        | --                          | --                           | S2S3                       |
| Appalachian spring snail        | <i>Fontigens bottimeri</i>      | --                          | --                           | S2                         |
| Blue Ridge spring snail         | <i>Fontigens orolibas</i>       | --                          | E                            | S1                         |
| Rader's snail                   | <i>Glypyalinia raderi</i>       | --                          | X                            | SH                         |
| Cherrydrop snail                | <i>Hendersonia occulta</i>      | --                          | I                            | S2                         |
| Yellow lampmussel               | <i>Lampsilis cariosa</i>        | --                          | X                            | S1                         |
| Eastern lampmussel              | <i>Lampsilis radiata</i>        | --                          | --                           | SU                         |
| Green floater                   | <i>Lasmigona subviridis</i>     | --                          | E                            | S1                         |
| Tidewater mucket                | <i>Leptodea ochracea</i>        | --                          | --                           | SU                         |
| Eastern pondmussel              | <i>Ligumia nasuta</i>           | --                          | --                           | SU                         |
| Bear creek slitmouth            | <i>Strenotrema simile</i>       | --                          | --                           | SU                         |
| Squawfoot                       | <i>Strophitus undulatus</i>     | --                          | T                            | S2                         |
| Spruce knob threetooth          | <i>Triodopsis picea</i>         | --                          | --                           | S1                         |
| Paper pondshell                 | <i>Utterbackia imbecillis</i>   | --                          | --                           | S3                         |
| Cylindrically-ornate wood snail | <i>Vertigo ventricosa</i>       | --                          | --                           | SU                         |
| Striped whitelip                | <i>Webbhelix multilineata</i>   | --                          | --                           | S1                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| Common Name              | Scientific Name                     | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|--------------------------|-------------------------------------|-----------------------------|------------------------------|----------------------------|
| CRUSTACEANS              |                                     |                             |                              |                            |
| A entocytherid ostracod  | <i>Ankylocythere tridentata</i>     | --                          | --                           | SX                         |
| A harpacticoid copepod   | <i>Attheyella spinipes</i>          | --                          | --                           | SU                         |
| Franz's cave isopod      | <i>Caecidotea franzi</i>            | --                          | E                            | S1                         |
| Price's cave isopod      | <i>Caecidotea pricei</i>            | --                          | --                           | S3                         |
| An isopod                | <i>Caecidotea sp 1</i>              | --                          | --                           | S1                         |
| An isopod                | <i>Caecidotea sp 2</i>              | --                          | --                           | S1                         |
| An isopod                | <i>Caecidotea sp 3</i>              | --                          | --                           | S1                         |
| An isopod                | <i>Caecidotea sp 4</i>              | --                          | --                           | S1                         |
| An isopod                | <i>Caecidotea sp 5</i>              | --                          | --                           | S1                         |
| An isopod                | <i>Caecidotea sp 6</i>              | --                          | --                           | S2                         |
| A crayfish               | <i>Cambarus acuminatus</i>          | --                          | --                           | S3                         |
| Dearolf's cave isopod    | <i>Crangonyx dearolfi</i>           | --                          | E                            | S1                         |
| An entocytherid ostracod | <i>Dactylocythere scotos</i>        | --                          | --                           | S1                         |
| A cyclopoid copepod      | <i>Diacyclops palustris</i>         | --                          | --                           | SU                         |
| A crayfish               | <i>Orconectes obscurus</i>          | --                          | --                           | S3                         |
| Allegheny cave amphipod  | <i>Stygobromus allegheniensis</i>   | --                          | I?                           | S2S3                       |
| Biggers' cave amphipod   | <i>Stygobromus biggersi</i>         | --                          | E                            | S1                         |
| Greenbrier cave amphipod | <i>Stygobromus emarginatus</i>      | --                          | E                            | S1                         |
| Franz's cave amphipod    | <i>Stygobromus franzi</i>           | --                          | I                            | S2S3                       |
| Shenandoah cave amphipod | <i>Stygobromus gracilipes</i>       | --                          | E                            | S1                         |
| Tidewater amphipod       | <i>Stygobromus indentatus</i>       | --                          | --                           | S1                         |
| Pizzini's cave amphipod  | <i>Stygobromus pizzinii</i>         | --                          | --                           | S1                         |
| Barrelville amphipod     | <i>Stygobromus sp 5</i>             | --                          | --                           | S1                         |
| An amphipod              | <i>Stygobromus sp 6</i>             | --                          | --                           | S1                         |
| Roundtop amphipod        | <i>Stygobromus sp 14</i>            | --                          | --                           | S1                         |
| Potomac amphipod         | <i>Stygobromus tenuis potomacus</i> | --                          | --                           | S3                         |
| Tenuis amphipod          | <i>Stygobromus tenuis tenuis</i>    | --                          | --                           | SU                         |

TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)

| Common Name                        | Scientific Name                    | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|------------------------------------|------------------------------------|-----------------------------|------------------------------|----------------------------|
| SPIDERS                            |                                    |                             |                              |                            |
| Snivelys cave spider               | <i>Oreonetides sp 1</i>            | --                          | --                           | SU                         |
| Appalachian cave spider            | <i>Porhomma cavernicola</i>        | --                          | --                           | S2                         |
| Red-legged purse-web spider        | <i>Sphodros rufipes</i>            | --                          | --                           | S1S2                       |
| INSECTS                            |                                    |                             |                              |                            |
| <i>Collembola</i>                  |                                    |                             |                              |                            |
| Crabtree cave springtail           | <i>Arrhopalites sp 1</i>           | --                          | --                           | SU                         |
| <i>Homoptera</i>                   |                                    |                             |                              |                            |
| A cicadellid leafhopper            | <i>Chlorotettix sp 1</i>           | --                          | --                           | SU                         |
| Eastern sedge barrens planthopper  | <i>Limotettix minuendus</i>        | --                          | --                           | S1                         |
| <i>Coleoptera</i>                  |                                    |                             |                              |                            |
| A tiger beetle                     | <i>Cicindela abdominalis</i>       |                             | E                            | S1                         |
| A tiger beetle                     | <i>Cicindela ancocisconensis</i>   | --                          | E                            | S1                         |
| Northeastern beach tiger beetle    | <i>Cicindela dorsalis dorsalis</i> | LT                          | E                            | S1                         |
| White tiger beetle                 | <i>Cicindela dorsalis media</i>    | --                          | E                            | S1                         |
| Big sand tiger beetle              | <i>Cicindela formosa</i>           | --                          | --                           | SU                         |
| Little white tiger beetle          | <i>Cicindela lepida</i>            | --                          | E                            | S1                         |
| Cobblestone tiger beetle           | <i>Cicindela marginipennis</i>     | --                          | --                           | SP                         |
| Green-patterned tiger beetle       | <i>Cicindela patruela</i>          | --                          | E                            | S1?                        |
| Puritan tiger beetle               | <i>Cicindela puritana</i>          | LT                          | E                            | S1                         |
| A tiger beetle                     | <i>Cicindela purpurea</i>          | --                          | --                           | S3                         |
| A tiger beetle                     | <i>Cicindela scutellaris</i>       | --                          | --                           | S3                         |
| A tiger beetle                     | <i>Cicindela splendida</i>         | --                          | --                           | S3                         |
| A tiger beetle                     | <i>Cicindela unipunctata</i>       | --                          | --                           | S3                         |
| Six-banded longhorn beetle         | <i>Dryobius sexnotatus</i>         | --                          | E                            | S1                         |
| A dytiscid beetle                  | <i>Hoperius planatus</i>           | --                          | --                           | S2                         |
| A hydrophilid beetle               | <i>Hydrochara occultus</i>         | --                          | --                           | SU                         |
| Seth forest water scavenger beetle | <i>Hydrochus spangleri</i>         | --                          | E                            | S1                         |
|                                    | <i>Hydrocolus deflatus</i>         | --                          | --                           | S?                         |
| Schwarz' diving beetle             | <i>Laccophilus schwarzi</i>        | --                          | --                           | SX                         |
| Giant stag beetle                  | <i>Lucanus elephas</i>             | --                          | --                           | S1                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| Common Name                | Scientific Name                  | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|----------------------------|----------------------------------|-----------------------------|------------------------------|----------------------------|
| A coccinellid beetle       | <i>Nephus gordonii</i>           | --                          | --                           | SU                         |
| American burying beetle    | <i>Nicrophorus americanus</i>    | LE                          | X                            | SX                         |
| A lampyrid firefly         | <i>Photuris bethaniensis</i>     | --                          | --                           | SP                         |
| A cave beetle              | <i>Pseudanophthalmus</i> sp 15   | --                          | --                           | S1                         |
| A hydrophilid beetle       | <i>Sperchopsis tessellatus</i>   | --                          | --                           | S2                         |
|                            | <i>Diptera</i>                   |                             |                              |                            |
| Pitcher-plant mosquito     | <i>Wyeomyia smithii</i>          | --                          | --                           | S2                         |
|                            | <i>Ephemeroptera</i>             |                             |                              |                            |
| Walker's tusked sprawler   | <i>Potamanthus walkeri</i>       | --                          | --                           | SU                         |
|                            | <i>Lepidoptera</i> - Butterflies |                             |                              |                            |
| Pepper and salt skipper    | <i>Amblyscirtes hegon</i>        | --                          | I                            | S2                         |
| Great purple hairstreak    | <i>Atlides halesus</i>           | --                          | T                            | S1S2                       |
| Golden-banded skipper      | <i>Autochton cellus</i>          | --                          | X                            | SH                         |
| Silver-bordered fritillary | <i>Boloria selene</i>            | --                          | --                           | S3                         |
| Northern metalmark         | <i>Calephelis borealis</i>       | --                          | T                            | S2                         |
| Hoary elfin                | <i>Callophrys polios</i>         | --                          | --                           | S1                         |
| Dusky azure                | <i>Celastrina ebenina</i>        | --                          | E                            | SH                         |
| Appalachian blue           | <i>Celastrina neglectamajor</i>  | --                          | --                           | S3S4                       |
| Harris' checkerspot        | <i>Chlosyne harrisii</i>         | --                          | T                            | S2                         |
| Pink-edged sulphur         | <i>Colias interior</i>           | --                          | --                           | S1                         |
| Early hairstreak           | <i>Erora laeta</i>               | --                          | E                            | S1                         |
| Mottled duskywing          | <i>Erynnis martialis</i>         | --                          | E                            | S1                         |
| Persius duskywing          | <i>Erynnis persius persius</i>   | --                          | --                           | SH                         |
| Olympia marble             | <i>Euchloe olympia</i>           | --                          | I                            | S2                         |
| Baltimore checkerspot      | <i>Euphydryas phaeton</i>        | --                          | --                           | S3                         |
| Two-spotted skipper        | <i>Euphyes bimacula</i>          | --                          | E                            | S1                         |
| Dion skipper               | <i>Euphyes dion</i>              | --                          | --                           | S3                         |
| Northern hairstreak        | <i>Fixsenia ontario</i>          | --                          | E                            | S1S2                       |



TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)

| Common Name                       | Scientific Name                   | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-----------------------------------|-----------------------------------|-----------------------------|------------------------------|----------------------------|
| Silvery blue                      | <i>Glaucopsyche lygdamus</i>      | --                          | I                            | S2                         |
| Carolina satyr                    | <i>Hermeuptychia sosybius</i>     | --                          | --                           | S1S3                       |
| Dotted skipper                    | <i>Hesperia attalus slossonae</i> | --                          | --                           | SH                         |
| Indian skipper                    | <i>Hesperia sassacus</i>          | --                          | --                           | S3                         |
| Frosted elfin                     | <i>Incisalia irus</i>             | --                          | E                            | S1                         |
| Bog copper                        | <i>Lycaena epixanthe</i>          | --                          | E                            | S1                         |
| Hessel's hairstreak               | <i>Mitoura hesseli</i>            | --                          | X                            | SH                         |
| Mitchell's satyr                  | <i>Neonympha mitchellii</i>       | LE                          | --                           | SR                         |
| Compton's tortoiseshell           | <i>Nymphalis vaualbum</i>         | --                          | E                            | S1B                        |
| Giant swallowtail                 | <i>Papilio cresphontes</i>        | --                          | I                            | S2                         |
| Palamedes swallowtail             | <i>Papilio palamedes</i>          | --                          | E                            | S1                         |
| Tawny crescent                    | <i>Phyciodes batesii</i>          | --                          | X                            | SH                         |
| Chermock's mulberry wing          | <i>Poanes massasoit chermocki</i> | --                          | E                            | S1                         |
| Long dash                         | <i>Polites mystic</i>             | --                          | --                           | S3                         |
| Rare skipper                      | <i>Problemata bulenta</i>         | --                          | T                            | S1                         |
| Southern grizzled skipper         | <i>Pyrgus wyandot</i>             | --                          | E                            | S1                         |
| Hickory hairstreak                | <i>Satyrium caryaevorum</i>       | --                          | E                            | S1                         |
| Edwards' hairstreak               | <i>Satyrium edwardsii</i>         | --                          | E                            | S1                         |
| King's hairstreak                 | <i>Satyrium kingi</i>             | --                          | E                            | S1                         |
| Atlantis fritillary               | <i>Speyeria atlantis</i>          | --                          | T                            | S1                         |
| Regal fritillary                  | <i>Speyeria idalia</i>            | --                          | X                            | SH                         |
| <i>Lepidoptera – Moths</i>        |                                   |                             |                              |                            |
| A noctuid moth                    | <i>Apamea apamiformis</i>         | --                          | --                           | S2S3                       |
| A noctuid moth                    | <i>Apamea mixta</i>               | --                          | --                           | S1                         |
| A noctuid moth                    | <i>Apamea plutonia</i>            | --                          | --                           | SU                         |
| A noctuid moth                    | <i>Capis curvata</i>              | --                          | --                           | S1S2                       |
| Marbled underwing                 | <i>Catocala marmorata</i>         | --                          | --                           | SH                         |
| Precious underwing                | <i>Catocala pretiosa pretiosa</i> | --                          | --                           | SH                         |
| A geometrid moth                  | <i>Cyclophora nanaria</i>         | --                          | --                           | S1?                        |
| A lymantriid moth                 | <i>Dasychira atrivenosa</i>       | --                          | --                           | SU                         |
| American chestnut nepticulid moth | <i>Ectoedemia castaneae</i>       | --                          | --                           | SH                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| Common Name                          | Scientific Name              | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|--------------------------------------|------------------------------|-----------------------------|------------------------------|----------------------------|
| Phleophagan chestnut nepticulid moth | <i>Ectoedemia phleophaga</i> | --                          | --                           | SH                         |
| A noctuid moth                       | <i>Elaphria georgei</i>      | --                          | --                           | SU                         |
| A noctuid moth                       | <i>Hadena ectypa</i>         | --                          | --                           | SU                         |
| The buckmoth                         | <i>Hemileuca maia maia</i>   | --                          | --                           | SU                         |
| Cypress sphinx moth                  | <i>Isoparce cupressi</i>     | --                          | --                           | SU                         |
| Sinuuous lytrosis                    | <i>Lytrosis sinuosa</i>      | --                          | --                           | S1S3                       |
| A noctuid moth                       | <i>Meropleon titan</i>       | --                          | --                           | SU                         |
| Seaside goldenrod stem borer         | <i>Papaipema duovata</i>     | --                          | --                           | SU                         |
| Polymnia stalk borer                 | <i>Papaipema polymniae</i>   | --                          | --                           | SH                         |
| A noctuid moth                       | <i>Schinia parmeliana</i>    | --                          | --                           | SH                         |
| Franck's sphinx                      | <i>Sphinx franckii</i>       | --                          | --                           | S1S2                       |
| Chestnut clearwing moth              | <i>Synanthedon castaneae</i> | --                          | --                           | SX                         |
| A noctuid moth                       | <i>Xestia bollii</i>         | --                          | --                           | SU                         |
| <i>Odonata</i>                       |                              |                             |                              |                            |
| Canada darner                        | <i>Aeshna canadensis</i>     | --                          | --                           | S2                         |
| Lance-tipped darner                  | <i>Aeshna constricta</i>     | --                          | --                           | SH                         |
| Spring blue darner                   | <i>Aeshna mutata</i>         | --                          | --                           | S1                         |
| Black-tipped darner                  | <i>Aeshna tuberculifera</i>  | --                          | --                           | S2                         |
| Green-striped darner                 | <i>Aeshna verticalis</i>     | --                          | --                           | S2                         |
| Eastern red damsel                   | <i>Amphiagrion saucium</i>   | --                          | --                           | S3                         |
| Comet darner                         | <i>Anax longipes</i>         | --                          | --                           | S3                         |
| Great spreadwing                     | <i>Archilestes grandis</i>   | --                          | --                           | S3                         |
| Seepage dancer                       | <i>Argia bipunctuata</i>     | --                          | --                           | S3                         |
| Blue-ringed dancer                   | <i>Argia sedula</i>          | --                          | --                           | S3                         |
| Ocellated darner                     | <i>Boyeria grafiana</i>      | --                          | --                           | S1                         |
| Four-spotted pennant                 | <i>Brachymesia gravida</i>   | --                          | --                           | S3S4                       |
| River jewelwing                      | <i>Calopteryx aequabilis</i> | --                          | --                           | S1                         |
| Superb jewelwing                     | <i>Calopteryx amata</i>      | --                          | --                           | S2                         |
| Sparkling jewelwing                  | <i>Calopteryx dimidiata</i>  | --                          | --                           | SH                         |
| Faded pennant                        | <i>Celithemis ornata</i>     | --                          | --                           | S1                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)**

| <b>Common Name</b>       | <b>Scientific Name</b>          | <b>Federal Status <sup>b</sup></b> | <b>Maryland Status <sup>b</sup></b> | <b>Maryland Rank <sup>b</sup></b> |
|--------------------------|---------------------------------|------------------------------------|-------------------------------------|-----------------------------------|
| Double-ringed pennant    | <i>Celithemis verna</i>         | --                                 | --                                  | S2                                |
| Aurora damsel            | <i>Chromagrion conditum</i>     | --                                 | --                                  | S3S4                              |
| Brown spiketail          | <i>Cordulegaster bilineata</i>  | --                                 | --                                  | S2                                |
| Delta-spotted spiketail  | <i>Cordulegaster diastatops</i> | --                                 | --                                  | S3                                |
| Tiger spiketail          | <i>Cordulegaster erronea</i>    | --                                 | --                                  | S2                                |
| Arrowhead spiketail      | <i>Cordulegaster obliqua</i>    | --                                 | --                                  | S2                                |
| American emerald         | <i>Cordulia shurtleffi</i>      | --                                 | --                                  | S3                                |
| Petite emerald           | <i>Dorocordulia lepida</i>      | --                                 | --                                  | SH                                |
| Rainbow bluet            | <i>Enallagma antennatum</i>     | --                                 | --                                  | S1                                |
| Azure bluet              | <i>Enallagma aspersum</i>       | --                                 | --                                  | S3S4                              |
| Tule bluet               | <i>Enallagma carunculatum</i>   | --                                 | --                                  | SH                                |
| Attenuated bluet         | <i>Enallagma daeckii</i>        | --                                 | --                                  | S3                                |
| Turquoise bluet          | <i>Enallagma divagans</i>       | --                                 | --                                  | S3S4                              |
| Atlantic bluet           | <i>Enallagma doubledayi</i>     | --                                 | --                                  | SH                                |
| Burgundy bluet           | <i>Enallagma dubium</i>         | --                                 | --                                  | S1                                |
| Big bluet                | <i>Enallagma durum</i>          | --                                 | --                                  | S3                                |
| Marsh bluet              | <i>Enallagma ebrium</i>         | --                                 | --                                  | SH                                |
| Hagen's bluet            | <i>Enallagma hageni</i>         | --                                 | --                                  | S3S4                              |
| Pale bluet               | <i>Enallagma pallidum</i>       | --                                 | --                                  | SH                                |
| Golden bluet             | <i>Enallagma sulcatum</i>       | --                                 | --                                  | SU                                |
| Slender bluet            | <i>Enallagma traviatum</i>      | --                                 | --                                  | S3                                |
| Vesper bluet             | <i>Enallagma vesperum</i>       | --                                 | --                                  | S3                                |
| Blackwater bluet         | <i>Enallagma weewa</i>          | --                                 | --                                  | S1                                |
| Beaverpond baskettail    | <i>Epitheca canis</i>           | --                                 | --                                  | S3                                |
| Stripe-winged baskettail | <i>Epitheca costalis</i>        | --                                 | --                                  | S1                                |
| Mantled baskettail       | <i>Epitheca semiaquea</i>       | --                                 | --                                  | SH                                |
| Robust baskettail        | <i>Epitheca spinosa</i>         | --                                 | --                                  | S1S2                              |
| Eastern ringtail         | <i>Erpetogomphus designatus</i> | --                                 | --                                  | S2                                |
| Little blue dragonlet    | <i>Erythrodiplax minuscula</i>  | --                                 | --                                  | S1                                |
| Taper-tailed darner      | <i>Gomphaeschna antilope</i>    | --                                 | --                                  | S2                                |
| Harlequin darner         | <i>Gomphaeschna furcillata</i>  | --                                 | --                                  | S3                                |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| <b>Common Name</b>       | <b>Scientific Name</b>        | <b>Federal Status<sup>b</sup></b> | <b>Maryland Status<sup>b</sup></b> | <b>Maryland Rank<sup>b</sup></b> |
|--------------------------|-------------------------------|-----------------------------------|------------------------------------|----------------------------------|
| Spine-crowned clubtail   | <i>Gomphus abbreviatus</i>    | --                                | --                                 | SH                               |
| Midland clubtail         | <i>Gomphus fraternus</i>      | --                                | --                                 | S2                               |
| Splendid clubtail        | <i>Gomphus lineatifrons</i>   | --                                | --                                 | SH                               |
| Piedmont clubtail        | <i>Gomphus parvidens</i>      | --                                | --                                 | SH                               |
| Rapids clubtail          | <i>Gomphus quadricolor</i>    | --                                | --                                 | S1                               |
| Sable clubtail           | <i>Gomphus rogersi</i>        | --                                | E                                  | S1                               |
| Cobra clubtail           | <i>Gomphus vastus</i>         | --                                | --                                 | S3                               |
| Skillet clubtail         | <i>Gomphus ventricosus</i>    | --                                | --                                 | SH                               |
| Green-faced clubtail     | <i>Gomphus viridifrons</i>    | --                                | --                                 | S1                               |
| Selys' sunfly            | <i>Helocordulia selysii</i>   | --                                | --                                 | S2                               |
| Uhler's sundragon        | <i>Helocordulia uhleri</i>    | --                                | --                                 | S3                               |
| American rubyspot        | <i>Hetaerina americana</i>    | --                                | --                                 | S3S4                             |
| Smoky rubyspot           | <i>Hetaerina titia</i>        | --                                | --                                 | SH                               |
| Lilypad forktail         | <i>Ischnura kellicotti</i>    | --                                | --                                 | S3S4                             |
| Northern pygmy clubtail  | <i>Lanthus parvulus</i>       | --                                | --                                 | S1                               |
| Southern pygmy clubtail  | <i>Lanthus vernalis</i>       | --                                | --                                 | S1                               |
| Spotted spreadwing       | <i>Lestes congener</i>        | --                                | --                                 | S3                               |
| Emerald spreadwing       | <i>Lestes dryas</i>           | --                                | --                                 | SH                               |
| Amber-winged spreadwing  | <i>Lestes eurinus</i>         | --                                | --                                 | S3                               |
| Sweetflag spreadwing     | <i>Lestes forcipatus</i>      | --                                | --                                 | S3                               |
| Lyre-tipped spreadwing   | <i>Lestes unguiculatus</i>    | --                                | --                                 | SH                               |
| Crimson-ringed whiteface | <i>Leucorrhinia glacialis</i> | --                                | --                                 | S1                               |
| Hudsonian whiteface      | <i>Leucorrhinia hudsonica</i> | --                                | --                                 | S1                               |
| Dot-tailed whiteface     | <i>Leucorrhinia intacta</i>   | --                                | --                                 | S3                               |
| Golden-winged skimmer    | <i>Libellula auripennis</i>   | --                                | --                                 | S3                               |
| Bar-winged skimmer       | <i>Libellula axilena</i>      | --                                | --                                 | S3                               |
| White corporal           | <i>Libellula exusta</i>       | --                                | --                                 | S1                               |
| Yellow-sided skimmer     | <i>Libellula flavida</i>      | --                                | --                                 | S2                               |
| Chalk-fronted skimmer    | <i>Libellula julia</i>        | --                                | --                                 | S2                               |

TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)

| Common Name             | Scientific Name                      | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-------------------------|--------------------------------------|-----------------------------|------------------------------|----------------------------|
| Four-spotted skimmer    | <i>Libellula quadrimaculata</i>      | --                          | --                           | SA?                        |
| Allegheny river cruiser | <i>Macromia alleghaniensis</i>       | --                          | --                           | S2                         |
| Georgia river cruiser   | <i>Macromia illinoensis georgina</i> | --                          | --                           | S3S4                       |
| Royal river cruiser     | <i>Macromia taeniolata</i>           | --                          | --                           | S3                         |
| Elfin skimmer           | <i>Nannothemis bella</i>             | --                          | --                           | S1                         |
| Cyrano darner           | <i>Nasiaeschna pentacantha</i>       | --                          | --                           | S3                         |
| Sphagnum sprite         | <i>Nehalennia gracilis</i>           | --                          | --                           | S2                         |
| Southern sprite         | <i>Nehalennia integricollis</i>      | --                          | --                           | S1S2                       |
| Sedge sprite            | <i>Nehalennia irene</i>              | --                          | --                           | S3                         |
| Umber shadowdragon      | <i>Neurocordulia obsoleta</i>        | --                          | --                           | S3                         |
| Cinnamon shadowdragon   | <i>Neurocordulia virginensis</i>     | --                          | --                           | S1                         |
| Stygian shadowdragon    | <i>Neurocordulia yamaskanensis</i>   | --                          | --                           | S2                         |
| Allegheny snaketail     | <i>Ophiogomphus incurvatus</i>       | --                          | --                           | S2                         |
| Rusty snaketail         | <i>Ophiogomphus rupinsulensis</i>    | --                          | --                           | S2                         |
| Common sanddragon       | <i>Progomphus obscurus</i>           | --                          | --                           | S3                         |
| Ski-tailed emerald      | <i>Somatochlora elongata</i>         | --                          | --                           | S1                         |
| Fine-lined emerald      | <i>Somatochlora filosa</i>           | --                          | --                           | S2                         |
| Mocha emerald           | <i>Somatochlora linearis</i>         | --                          | --                           | S3S4                       |
| Treetop emerald         | <i>Somatochlora provocans</i>        | --                          | --                           | S1                         |
| Clamp-tipped emerald    | <i>Somatochlora tenebrosa</i>        | --                          | --                           | S3S4                       |
| Least clubtail          | <i>Stylogomphus albistylus</i>       | --                          | --                           | S3S4                       |
| Riverine clubtail       | <i>Stylurus amnicola</i>             | --                          | --                           | SH                         |
| Laura's clubtail        | <i>Stylurus laurae</i>               | --                          | --                           | S2                         |
| Elusive clubtail        | <i>Stylurus notatus</i>              | --                          | --                           | SU                         |
| Russet-tipped clubtail  | <i>Stylurus plagiatus</i>            | --                          | --                           | S3                         |
| Zebra clubtail          | <i>Stylurus scudderi</i>             | --                          | --                           | S1                         |
| Arrow clubtail          | <i>Stylurus spiniceps</i>            | --                          | --                           | S3                         |
| Blue-faced meadowhawk   | <i>Sympetrum ambiguum</i>            | --                          | --                           | S3S4                       |
| Jane's meadowhawk       | <i>Sympetrum janeae</i>              | --                          | --                           | SU                         |
| White-faced meadowhawk  | <i>Sympetrum obtrusum</i>            | --                          | --                           | S3                         |
| Band-winged meadowhawk  | <i>Sympetrum semicinctum</i>         | --                          | --                           | S3                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| Common Name             | Scientific Name                  | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-------------------------|----------------------------------|-----------------------------|------------------------------|----------------------------|
| Gray petaltail          | <i>Tachopteryx thoreyi</i>       | --                          | --                           | S2                         |
|                         | <i>Trichoptera</i>               |                             |                              |                            |
| A scalaris trichopteran | <i>Hydropsyche brunneipennis</i> | --                          | --                           | S3                         |
|                         | FISHES                           |                             |                              |                            |
| Mud sunfish             | <i>Acantharchus pomotis</i>      | --                          | I?                           | S2                         |
| Shortnose sturgeon      | <i>Acipenser brevirostrum</i>    | LE                          | E                            | S1                         |
| Atlantic sturgeon       | <i>Acipenser oxyrinchus</i>      | --                          | --                           | S1                         |
| White catfish           | <i>Ameiurus catus</i>            | --                          | --                           | SU                         |
| Bowfin                  | <i>Amia calva</i>                | --                          | --                           | S1?                        |
| Longnose sucker         | <i>Catostomus catostomus</i>     | --                          | X                            | SH                         |
| Flier                   | <i>Centrarchus macropterus</i>   | --                          | T                            | S1S2                       |
| Redside dace            | <i>Clinostomus elongatus</i>     | --                          | --                           | SX                         |
| Mottled sculpin         | <i>Cottus bairdi</i>             | --                          | --                           | S3S4                       |
| Slimy sculpin           | <i>Cottus cognatus</i>           | --                          | --                           | SRF                        |
| Checkered sculpin       | <i>Cottus sp 7</i>               | --                          | --                           | S1S2                       |
| Blackbanded sunfish     | <i>Enneacanthus chaetodon</i>    | --                          | T                            | S1                         |
| Bluespotted sunfish     | <i>Enneacanthus gloriosus</i>    | --                          | --                           | S3S4                       |
| Banded sunfish          | <i>Enneacanthus obesus</i>       | --                          | --                           | S2                         |
| Swamp darter            | <i>Etheostoma fusiforme</i>      | --                          | I                            | S2                         |
| Johnny darter           | <i>Etheostoma nigrum</i>         | --                          | --                           | S3                         |
| Maryland darter         | <i>Etheostoma sellare</i>        | LE                          | E                            | SH                         |
| Glassy darter           | <i>Etheostoma vitreum</i>        | --                          | T                            | S1S2                       |
| Spotfin killifish       | <i>Fundulus luciae</i>           | --                          | --                           | S2?                        |
| American brook lamprey  | <i>Lampetra appendix</i>         | --                          | T                            | S1S2                       |
| Longnose gar            | <i>Lepisosteus osseus</i>        | --                          | --                           | S2?                        |
| Warmouth                | <i>Lepomis gulosus</i>           | --                          | --                           | S3?                        |
| Striped shiner          | <i>Luxilus chrysocephalus</i>    | --                          | I                            | S1S2                       |
| Pearl dace              | <i>Margariscus margarita</i>     | --                          | T                            | S1S2                       |
| Comely shiner           | <i>Notropis amoenus</i>          | --                          | T                            | S2                         |
| Bridle shiner           | <i>Notropis bifrenatus</i>       | --                          | E                            | SH                         |
| Ironcolor shiner        | <i>Notropis chalybaeus</i>       | --                          | E                            | S1                         |

TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)

| Common Name                 | Scientific Name                     | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-----------------------------|-------------------------------------|-----------------------------|------------------------------|----------------------------|
| Stonecat                    | <i>Noturus flavus</i>               | --                          | E                            | S1                         |
| Cheat minnow                | <i>Pararhinichthys bowersi</i>      | --                          | X                            | SX                         |
| Logperch                    | <i>Percina caprodes</i>             | --                          | T                            | S1S2                       |
| Stripeback darter           | <i>Percina notogramma</i>           | --                          | E                            | S1                         |
| Shield darter               | <i>Percina peltata</i>              | --                          | --                           | S3                         |
| Trout-perch                 | <i>Percopsis omiscomaycus</i>       | --                          | X                            | SX                         |
| Brook trout                 | <i>Salvelinus fontinalis</i>        | --                          | --                           | S3S4                       |
| AMPHIBIANS                  |                                     |                             |                              |                            |
| Jefferson salamander        | <i>Ambystoma jeffersonianum</i>     | --                          | --                           | S3                         |
| Eastern tiger salamander    | <i>Ambystoma tigrinum</i>           | --                          | E                            | S2                         |
| Green salamander            | <i>Aneides aeneus</i>               | --                          | E                            | S2                         |
| Hellbender                  | <i>Cryptobranchus alleganiensis</i> | --                          | E                            | S1                         |
| Eastern narrow-mouthed toad | <i>Gastrophryne carolinensis</i>    | --                          | E                            | S1S2                       |
| Barking treefrog            | <i>Hyla gratiosa</i>                | --                          | E                            | S1                         |
| Mudpuppy                    | <i>Necturus maculosus</i>           | --                          | X                            | S1                         |
| Wehrle's salamander         | <i>Plethodon wehrlei</i>            | --                          | I                            | S2                         |
| Mountain chorus frog        | <i>Pseudacris brachyphona</i>       | --                          | T                            | S2                         |
| Carpenter frog              | <i>Rana virgatipes</i>              | --                          | I                            | S2                         |
| Greater siren               | <i>Siren lacertian</i>              | --                          | --                           | SRF                        |
| REPTILES                    |                                     |                             |                              |                            |
| Eastern spiny softshell     | <i>Apalone spinifera</i>            | --                          | I                            | S1                         |
| Atlantic loggerhead turtle  | <i>Caretta caretta</i>              | LT                          | T                            | S1B                        |
| Eastern scarlet snake       | <i>Cemophora coccinea</i>           | --                          | --                           | S3                         |
| Atlantic green turtle       | <i>Chelonia mydas</i>               | LT                          | T                            | S1N                        |
| Bog turtle                  | <i>Clemmys muhlenbergii</i>         | LT                          | T                            | S2                         |
| Timber rattlesnake          | <i>Crotalus horridus</i>            | --                          | --                           | S3                         |
| Atlantic leatherback turtle | <i>Dermochelys coriacea</i>         | LE                          | E                            | S1                         |
| Atlantic hawksbill turtle   | <i>Eretmochelys imbricata</i>       | LE                          | E                            | SRN                        |
| Northern coal skink         | <i>Eumeces anthracinus</i>          | --                          | E                            | SU                         |
| Rainbow snake               | <i>Farancia erytrogramma</i>        | --                          | E                            | S1                         |
| Map turtle                  | <i>Graptemys geographica</i>        | --                          | E*                           | S1                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| Common Name                    | Scientific Name                   | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|--------------------------------|-----------------------------------|-----------------------------|------------------------------|----------------------------|
| Atlantic ridley turtle         | <i>Lepidochelys kempii</i>        | LE                          | E                            | S1N                        |
| Redbelly water snake           | <i>Nerodia erythrogaster</i>      | --                          | --                           | S2S3                       |
| Northern pine snake            | <i>Pituophis melanoleucus</i>     | --                          | --                           | SH                         |
| Mountain earth snake           | <i>Virginia valeriae pulchra</i>  | --                          | E                            | S2                         |
| BIRDS                          |                                   |                             |                              |                            |
| Northern goshawk               | <i>Accipiter gentilis</i>         | --                          | E*                           | S1B                        |
| Sharp-shinned hawk             | <i>Accipiter striatus</i>         | --                          | --                           | S1S2B                      |
| Spotted sandpiper              | <i>Actitis macularia</i>          | --                          | --                           | S3S4B                      |
| Northern saw-whet owl          | <i>Aegolius acadicus</i>          | --                          | --                           | S1B                        |
| Bachman's sparrow              | <i>Aimophila aestivalis</i>       | --                          | X                            | SHB                        |
| Saltmarsh sharp-tailed sparrow | <i>Ammodramus caudacutus</i>      | --                          | --                           | S3B                        |
| Henslow's sparrow              | <i>Ammodramus henslowii</i>       | --                          | T                            | S1S2B                      |
| Blue-winged teal               | <i>Anas discors</i>               | --                          | --                           | S2B                        |
| Gadwall                        | <i>Anas strepera</i>              | --                          | --                           | S2B                        |
| Short-eared owl                | <i>Asio flammeus</i>              | --                          | E                            | S1B                        |
| Long-eared owl                 | <i>Asio otus</i>                  | --                          | --                           | SHB                        |
| Upland sandpiper               | <i>Bartramia longicauda</i>       | --                          | E                            | S1B                        |
| American bittern               | <i>Botaurus lentiginosus</i>      | --                          | I                            | S1S2B                      |
| Ivory-billed woodpecker        | <i>Campephilus principalis</i>    | LE                          | X                            | SX                         |
| Labrador duck                  | <i>Camptorhynchus labradorius</i> | --                          | --                           | SX                         |
| Whip-poor-will                 | <i>Caprimulgus vociferus</i>      | --                          | --                           | S3S4B                      |
| Purple finch                   | <i>Carpodacus purpureus</i>       | --                          | --                           | S3B                        |
| Hermit thrush                  | <i>Catharus guttatus</i>          | --                          | --                           | S3S4B                      |
| Swainson's thrush              | <i>Catharus ustulatus</i>         | --                          | --                           | SXB                        |
| Piping plover                  | <i>Charadrius melodus</i>         | LT                          | E                            | S1B                        |
| Wilson's plover                | <i>Charadrius wilsonia</i>        | --                          | E                            | S1B                        |
| Lark sparrow                   | <i>Chondestes grammacus</i>       | --                          | X                            | SXB                        |
| Common nighthawk               | <i>Chordeiles minor</i>           | --                          | --                           | S3S4B                      |
| Northern harrier               | <i>Circus cyaneus</i>             | --                          | --                           | S2B                        |
| Sedge wren                     | <i>Cistothorus platensis</i>      | --                          | E                            | S1B                        |



TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)

| Common Name                 | Scientific Name                       | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-----------------------------|---------------------------------------|-----------------------------|------------------------------|----------------------------|
| Olive-sided flycatcher      | <i>Contopus cooperi</i>               |                             | E                            | SHB                        |
| Carolina parakeet           | <i>Conuropsis carolinensis</i>        | --                          | --                           | SX                         |
| Common raven                | <i>Corvus corax</i>                   | --                          | --                           | S2                         |
| Black-throated blue warbler | <i>Dendroica caerulescens</i>         | --                          | --                           | S3S4B                      |
| Cerulean warbler            | <i>Dendroica cerulea</i>              | --                          | --                           | S3S4B                      |
| Blackburnian warbler        | <i>Dendroica fusca</i>                | --                          | T                            | S1S2B                      |
| Magnolia warbler            | <i>Dendroica magnolia</i>             | --                          | --                           | S3S4B                      |
| Passenger pigeon            | <i>Ectopistes migratorius</i>         | --                          | --                           | SX                         |
| Little blue heron           | <i>Egretta caerulea</i>               | --                          | --                           | S3B                        |
| Tricolored heron            | <i>Egretta tricolor</i>               | --                          | --                           | S3B                        |
| Alder flycatcher            | <i>Empidonax alnorum</i>              | --                          | I                            | S2B                        |
| Least flycatcher            | <i>Empidonax minimus</i>              | --                          | --                           | S3S4B                      |
| American peregrine falcon   | <i>Falco peregrinus anatum</i>        | --                          | I                            | S2                         |
| Common moorhen              | <i>Gallinula chloropus</i>            | --                          | I                            | S2B                        |
| American oystercatcher      | <i>Haematopus palliatus</i>           | --                          | --                           | S3B                        |
| Bald eagle                  | <i>Haliaeetus leucocephalus</i>       | LT                          | T                            | S2S3B                      |
| Least bittern               | <i>Ixobrychus exilis</i>              | --                          | I                            | S2S3B                      |
| Dark-eyed junco             | <i>Junco hyemalis</i>                 | --                          | --                           | S2B                        |
| Loggerhead shrike           | <i>Lanius ludovicianus</i>            | --                          | E                            | S1B                        |
| Laughing gull               | <i>Larus atricilla</i>                | --                          | --                           | S1B                        |
| Black rail                  | <i>Laterallus jamaicensis</i>         | --                          | I                            | S2S3B                      |
| Swainson's warbler          | <i>Limothlypis swainsonii</i>         | --                          | E                            | S1B                        |
| Hooded merganser            | <i>Lophodytes cucullatus</i>          | --                          | --                           | S1B                        |
| Coastal plain swamp sparrow | <i>Melospiza georgiana nigrescens</i> | --                          | I                            | S2B                        |
| Eskimo curlew               | <i>Numenius borealis</i>              | LE                          | X                            | SXN                        |
| Yellow-crowned night-heron  | <i>Nyctanassa violacea</i>            | --                          | --                           | S2B                        |
| Mourning warbler            | <i>Oporornis philadelphia</i>         | --                          | E                            | S1B                        |
| Savannah sparrow            | <i>Passerculus sandwichensis</i>      | --                          | --                           | S3S4B                      |
| Brown pelican               | <i>Pelecanus occidentalis</i>         | --                          | --                           | S1B                        |
| Double-crested cormorant    | <i>Phalacrocorax auritus</i>          | --                          | --                           | S1B                        |
| Red-cockaded woodpecker     | <i>Picoides borealis</i>              | LE                          | X                            | SHB                        |
| Pied-billed grebe           | <i>Podilymbus podiceps</i>            | --                          | --                           | S2B                        |
| Vesper sparrow              | <i>Pooecetes gramineus</i>            | --                          | --                           | S3S4B                      |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND<sup>a/</sup> (CONTINUED)**

| Common Name                  | Scientific Name                 | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|------------------------------|---------------------------------|-----------------------------|------------------------------|----------------------------|
| Sora                         | <i>Porzana carolina</i>         | --                          | --                           | S1B                        |
| King rail                    | <i>Rallus elegans</i>           | --                          | --                           | S3S4B                      |
| Golden-crowned kinglet       | <i>Regulus satrapa</i>          | --                          | --                           | S2B                        |
| Bank swallow                 | <i>Riparia riparia</i>          | --                          | --                           | S3S4B                      |
| Black skimmer                | <i>Rynchops niger</i>           | --                          | E                            | S1B                        |
| Northern waterthrush         | <i>Seiurus noveboracensis</i>   | --                          | --                           | S2S3B                      |
| Red-breasted nuthatch        | <i>Sitta canadensis</i>         | --                          | --                           | S1B                        |
| Yellow-bellied sapsucker     | <i>Sphyrapicus varius</i>       | --                          | --                           | SHB                        |
| Dickcissel                   | <i>Spiza americana</i>          | --                          | --                           | S2B                        |
| Least tern                   | <i>Sterna antillarum</i>        | --                          | T                            | S2B                        |
| Roseate tern                 | <i>Sterna dougallii</i>         | LE                          | X                            | SHB                        |
| Royal tern                   | <i>Sterna maxima</i>            | --                          | E                            | S1B                        |
| Gull-billed tern             | <i>Sterna nilotica</i>          | --                          | E                            | S1B                        |
| Sandwich tern                | <i>Sterna sandvicensis</i>      | --                          | --                           | S1B                        |
| Bewick's wren                | <i>Thryomanes bewickii</i>      | --                          | E                            | S1B                        |
| Winter wren                  | <i>Troglodytes troglodytes</i>  | --                          | --                           | S2B                        |
| Greater prairie-chicken      | <i>Tympanuchus cupido</i>       | --                          | X                            | SX                         |
| Common barn-owl              | <i>Tyto alba</i>                | --                          | --                           | S3                         |
| Golden-winged warbler        | <i>Vermivora chrysoptera</i>    | --                          | --                           | S3B                        |
| Nashville warbler            | <i>Vermivora ruficapilla</i>    | --                          | I                            | S1S2B                      |
| Canada warbler               | <i>Wilsonia canadensis</i>      | --                          | --                           | S3B                        |
| MAMMALS                      |                                 |                             |                              |                            |
| Sei whale                    | <i>Balaenoptera borealis</i>    | LE                          | E                            | SZN                        |
| Blue whale                   | <i>Balaenoptera musculus</i>    | LE                          | E                            | SZN                        |
| Fin whale                    | <i>Balaenoptera physalus</i>    | LE                          | E                            | SZN                        |
| American bison               | <i>Bos bison</i>                | --                          | --                           | SX                         |
| Gray wolf                    | <i>Canis lupus</i>              | LE                          | X                            | SX                         |
| American elk                 | <i>Cervus elaphus</i>           | --                          | X                            | SX                         |
| Southeastern star-nosed mole | <i>Condylura cristata parva</i> | --                          | --                           | SU                         |
| Rafinesque's big-eared bat   | <i>Corynorhinus rafinesquii</i> | --                          | --                           | SP                         |

**TABLE E.4: STATE-LISTED ANIMAL SPECIES IN MARYLAND <sup>a/</sup> (CONTINUED)**

| Common Name                 | Scientific Name                            | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-----------------------------|--|-----------------------------|------------------------------|----------------------------|
| North American porcupine    | <i>Erethizon dorsatum</i>                  | --                          | I                            | S1S2                       |
| Northern right whale        | <i>Eubalaena glacialis</i>                 | LE                          | E                            | SZN                        |
| Snowshoe hare               | <i>Lepus americanus</i>                    | --                          | X                            | SH                         |
| Bobcat                      | <i>Lynx rufus</i>                          | --                          | I                            | S3                         |
| American marten             | <i>Martes americana</i>                    | --                          | X                            | SX                         |
| Humpback whale              | <i>Megaptera noveangliae</i>               | LE                          | E                            | SZN                        |
| Southern rock vole          | <i>Microtus chrotorrhinus carolinensis</i> | --                          | E                            | S1                         |
| Least weasel                | <i>Mustela nivalis</i>                     | --                          | I                            | S2S3                       |
| Eastern small-footed myotis | <i>Myotis leibii</i>                       | --                          | I                            | S1B                        |
| Indiana bat                 | <i>Myotis sodalis</i>                      | LE                          | E                            | S1                         |
| Allegheny woodrat           | <i>Neotoma magister</i>                    | --                          | E                            | S1                         |
| Sperm whale                 | <i>Physeter catodon</i>                    | --                          | E                            | SZN                        |
| Eastern cougar              | <i>Puma concolor couguar</i>               | --                          | X                            | SH                         |
| Eastern harvest mouse       | <i>Reithrodontomys humulis</i>             | --                          | X                            | SH                         |
| Delmarva fox squirrel       | <i>Sciurus niger cinereus</i>              | LE                          | E                            | S1                         |
| Long-tailed shrew           | <i>Sorex dispar</i>                        | --                          | I                            | S2                         |
| Smoky shrew                 | <i>Sorex fumeus</i>                        | --                          | I                            | S1S3                       |
| Southern pygmy shrew        | <i>Sorex hoyi winnemana</i>                | --                          | --                           | S2                         |
| Southeastern shrew          | <i>Sorex longirostris</i>                  | --                          | --                           | S3S4                       |
| Southern water shrew        | <i>Sorex palustris punctulatus</i>         | --                          | E                            | S1                         |
| Eastern spotted skunk       | <i>Spilogale putorius</i>                  | --                          | --                           | S1                         |
| New England cottontail      | <i>Sylvilagus transitionalis</i>           | --                          | I                            | S1                         |
| Southern bog lemming        | <i>Synaptomys cooperi</i>                  | --                          | --                           | S3                         |
| Black bear                  | <i>Ursus americanus</i>                    | --                          | --                           | S3S4                       |

a/ Information from Maryland Department of Natural Resources, Maryland Heritage & Biodiversity Conservation Programs web site, <http://dnrweb.dnr.state.md.us/download/rteanimals.pdf>, current as of November 2004. Table shows species throughout Maryland; species listed are not necessarily specific to the Rock Creek Park region.

b/ Status and rank definitions:

S1 = Highly State rare. Critically imperiled in Maryland because of extreme rarity (typically 5 or fewer estimated occurrences or very few remaining individuals or acres in the State) or because of some factor(s) making it especially vulnerable to extirpation.

S2 = State rare. Imperiled in Maryland because of rarity (typically 6 to 20 estimated occurrences or few remaining individuals or acres in the State) or because of some factor(s) making it vulnerable to becoming extirpated. Species with this rank are actively tracked by the Heritage & Biodiversity Conservation Programs.

S3 = Watch List. Rare to uncommon with the number of occurrences typically in the range of 21 to 100 in Maryland. It may have fewer occurrences but with a large number of individuals in some populations, and it may be susceptible to large-scale disturbances. Species with this rank are not actively tracked by the Heritage & Biodiversity Conservation Programs.

S3.1A = "Watch List" species that is actively tracked by the Heritage & Biodiversity Conservation Programs because of its global rarity and, therefore, the global significance of Maryland occurrences.

S4 = Apparently secure in Maryland with typically more than 100 occurrences in the State or may have fewer occurrences if they contain large numbers of individuals. It is apparently secure under present conditions, although it may be restricted to only a portion of the State.

S5 = Demonstrably secure in Maryland under present conditions.

SA = Accidental or a vagrant in Maryland.

SH = Historically known from Maryland, but not verified for an extended period (usually 20 or more years), with the expectation that it may be rediscovered.

SP = Potentially occurring in Maryland or likely to have occurred in Maryland (but without persuasive documentation).

## BIBLIOGRAPHY, INDEX, AND APPENDICES

SR = Reported from Maryland, but without persuasive documentation that would provide a basis for either accepting or rejecting the report (e.g., no voucher specimen exists).

SU = Possibly rare in Maryland, but of uncertain status for reasons including lack of historical records, low search effort, cryptic nature of the species, or concerns that the species may not be native to the State. Uncertainty spans a range of 4 or 5 ranks as defined above.

SX = Believed to be extirpated in Maryland with virtually no chance of rediscovery.

SZ = The species would not substantially benefit from protection efforts at a given location in Maryland because of its transitory nature.

S? = The species has not yet been ranked.

\_B = This species is a migrant and the rank refers only to the breeding status of the species. Such a migrant may have a different rarity rank for non-breeding populations.

\_N = A qualifier at the end of a rank. This species is a migrant and the subrank refers only to the nonbreeding status of the species in Maryland. This species may have a different subrank for breeding populations.

Federal status - This is the status of a species as determined by the U.S. Fish and Wildlife Service's Office of Endangered Species, in accordance with the Endangered Species Act. Definitions for the following categories have been modified from 50 CFR 17.

LE = Taxa listed as endangered; in danger of extinction throughout all or a significant portion of their range.

LT = Taxa listed as threatened; likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

PE = Taxa proposed to be listed as endangered.

PT = Taxa proposed to be listed as threatened.

C = Candidate taxa for listing for which the Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened.

\* = A qualifier denoting taxa which may be possibly extinct (although persuasive documentation of extinction has not been made).

Maryland status - This is the status of a species as determined by the Maryland Department of Natural Resources, in accordance with the Nongame and Endangered Species Conservation Act. Definitions for the following categories have been taken from Code of Maryland Regulations (COMAR) 08.03.08.

E = Endangered; a species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.

I = In Need of Conservation; an animal species whose population is limited or declining in the State such that it may become threatened in the foreseeable future if current trends or conditions persist.

T = Threatened; a species of flora or fauna which appears likely, within the foreseeable future, to become endangered in the State.

X = Endangered Extirpated; a species that was once a viable component of the flora or fauna of the State, but for which no naturally occurring populations are known to exist in the State.

\* = A qualifier denoting the species is listed in a limited geographic area only.

-- indicates no special status

TABLE E.5: STATE-LISTED PLANT SPECIES IN MONTGOMERY COUNTY, MARYLAND<sup>a</sup>

| Common Name             | Scientific Name                | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-------------------------|--------------------------------|-----------------------------|------------------------------|----------------------------|
| Auricled gerardia       | <i>Agalinis auriculata</i>     | --                          | E                            | S1                         |
| Fascicled gerardia      | <i>Agalinis fasciculata</i>    | --                          | E                            | S1                         |
| Blunt-leaved gerardia   | <i>Agalinis obtusifolia</i>    | --                          | E                            | S1                         |
| Thread-leaved gerardia  | <i>Agalinis setacea</i>        | --                          | E                            | S1                         |
| Running juneberry       | <i>Amelanchier stolonifera</i> | --                          | T                            | S2                         |
| Scarlet ammannia        | <i>Ammannia coccinea</i>       | --                          | --                           | SU                         |
| Single-headed pussytoes | <i>Antennaria solitaria</i>    | --                          | T                            | S2                         |
| Clasping-leaved dogbane | <i>Apocynum sibiricum</i>      | --                          | X                            | SH                         |
| Hairy rockcress         | <i>Arabis hirsute</i>          | --                          | --                           | SU                         |
| Missouri rockcress      | <i>Arabis missouriensis</i>    | --                          | E                            | S1                         |
| Curtiss' three-awn      | <i>Aristida curtissii</i>      | --                          | --                           | SU                         |
| Woolly three-awn        | <i>Aristida lanosa</i>         | --                          | E                            | S1                         |
| Lake cress              | <i>Armoracia lacustris</i>     | --                          | E                            | S1                         |
| Leopard's bane          | <i>Arnica acaulis</i>          | --                          | E                            | S1                         |
| Red milkweed            | <i>Asclepias rubra</i>         | --                          | E                            | S1                         |
| Lobed spleenwort        | <i>Asplenium pinnatifidum</i>  | --                          | E                            | S1                         |
| Serpentine aster        | <i>Aster depauperatus</i>      | --                          | E                            | S1                         |
| Drummond aster          | <i>Aster drummondii</i>        | --                          | --                           | S1                         |
| Rough-leaved aster      | <i>Aster radula</i>            | --                          | E                            | S1                         |
| Canada milkvetch        | <i>Astragalus canadensis</i>   | --                          | E                            | S1                         |
| Bent milkvetch          | <i>Astragalus distortus</i>    | --                          | T                            | S2                         |
| Mosquito fern           | <i>Azolla caroliniana</i>      | --                          | --                           | SU                         |
| Wild false indigo       | <i>Baptisia australis</i>      | --                          | T                            | S2                         |
| Small grape-fern        | <i>Botrychium simplex</i>      | --                          | X                            | SH                         |
| Side-oats grama         | <i>Bouteloua curtipendula</i>  | --                          | --                           | S2                         |
| Broad-glumed brome      | <i>Bromus latiglumis</i>       | --                          | E                            | S1                         |
| Nottoway's brome        | <i>Bromus nottowayanus</i>     | --                          | X                            | SH                         |
| Blue-hearts             | <i>Buchnera americana</i>      | --                          | X                            | SH                         |
| Great Indian-plantain   | <i>Cacalia muehlenbergii</i>   | --                          | X                            | SH                         |

**TABLE E.5: STATE-LISTED PLANT SPECIES IN MONTGOMERY COUNTY, MD (CONT')<sup>a</sup>**

| Common Name           | Scientific Name                | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-----------------------|--------------------------------|-----------------------------|------------------------------|----------------------------|
| Low bindweed          | <i>Calystegia spithamea</i>    | --                          | --                           | S2                         |
| Cuckooflower          | <i>Cardamine pratensis</i>     | --                          | --                           | S1                         |
| Buxbaum's sedge       | <i>Carex buxbaumii</i>         | --                          | T                            | S2                         |
| Carey's sedge         | <i>Carex careyana</i>          | --                          | E                            | S1                         |
| Davis' sedge          | <i>Carex davisii</i>           | --                          | E                            | S1                         |
| Cypress-knee sedge    | <i>Carex decomposita</i>       | --                          | X                            | S1                         |
| Hitchcock's sedge     | <i>Carex hitchcockiana</i>     | --                          | E                            | S1                         |
| Hop-like sedge        | <i>Carex lupuliformis</i>      | --                          | --                           | S1?                        |
| Mead's sedge          | <i>Carex meadii</i>            | --                          | E                            | S1                         |
| Woolly sedge          | <i>Carex pellita</i>           | --                          | --                           | S2?                        |
| A sedge               | <i>Carex planispicata</i>      | --                          | --                           | S1S2                       |
| Necklace sedge        | <i>Carex projecta</i>          | --                          | --                           | S2                         |
| Short's sedge         | <i>Carex shortiana</i>         | --                          | E                            | S2                         |
| Burr-reed sedge       | <i>Carex sparganioides</i>     | --                          | --                           | S1S2                       |
| Slender sedge         | <i>Carex tenera</i>            | --                          | X                            | SH                         |
| Rigid sedge           | <i>Carex tetanica</i>          | --                          | X                            | SH                         |
| Big shellbark hickory | <i>Carya laciniata</i>         | --                          | E                            | S1                         |
| American chestnut     | <i>Castanea dentata</i>        | --                          | --                           | S2S3                       |
| Sugarberry            | <i>Celtis laevigata</i>        | --                          | --                           | SU                         |
| Prickly hornwort      | <i>Ceratophyllum echinatum</i> | --                          | E                            | S1                         |
| Hairy spurge          | <i>Chamaesyce vermiculata</i>  | --                          | --                           | SH                         |
| Wister's coralroot    | <i>Corallorhiza wisteriana</i> | --                          | E                            | S1                         |
| Tall tickseed         | <i>Coreopsis tripteris</i>     | --                          | E                            | S1                         |
| Hazel dodder          | <i>Cuscuta coryli</i>          | --                          | X                            | SH                         |
| Smartweed dodder      | <i>Cuscuta polygonorum</i>     | --                          | E                            | S1                         |
| Reflexed cyperus      | <i>Cyperus refractus</i>       | --                          | --                           | S2?                        |
| Rough cyperus         | <i>Cyperus retrofractus</i>    | --                          | --                           | S2                         |
| Trailing tick-trefoil | <i>Desmodium humifusum</i>     | --                          | X                            | SH                         |

TABLE E.5: STATE-LISTED PLANT SPECIES IN MONTGOMERY COUNTY, MD (CONT')<sup>a</sup>

| Common Name                     | Scientific Name                | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|---------------------------------|--------------------------------|-----------------------------|------------------------------|----------------------------|
| Rigid tick-trefoil              | <i>Desmodium rigidum</i>       | --                          | E                            | S1                         |
| Twin oats                       | <i>Diarrhena americana</i>     | --                          | E                            | S1                         |
| Glade fern                      | <i>Diplazium pycnocarpon</i>   | --                          | T                            | S2                         |
| Leatherwood                     | <i>Dirca palustris</i>         | --                          | T                            | S2                         |
| Upright burhead                 | <i>Echinodorus cordifolius</i> | --                          | E                            | S1                         |
| Ten-angled pipewort             | <i>Eriocaulon decangulare</i>  | --                          | --                           | S2                         |
| White trout lily                | <i>Erythronium albidum</i>     | --                          | T                            | S2                         |
| Spotted Joe-pye-weed            | <i>Eupatorium maculatum</i>    | --                          | X                            | SU                         |
| Blunt-leaved spurge             | <i>Euphorbia obtusata</i>      | --                          | E                            | S1                         |
| Fringe-tip closed gentian       | <i>Gentiana andrewsii</i>      | --                          | T                            | S2                         |
| Striped gentian                 | <i>Gentiana villosa</i>        | --                          | E                            | S1                         |
| Yellow avens                    | <i>Geum aleppicum</i>          | --                          | E                            | S1                         |
| Tesselated rattlesnake-plantain | <i>Goodyera tessellata</i>     | --                          | X                            | SH                         |
| Sweet-scented indian-plantain   | <i>Hasteola suaveolens</i>     | --                          | E                            | S1                         |
| Mcdowell's sunflower            | <i>Helianthus occidentalis</i> | --                          | T                            | S1                         |
| Slender-leaved bluets           | <i>Houstonia tenuifolia</i>    | --                          | --                           | S1                         |
| Deciduous holly                 | <i>Ilex decidua</i>            | --                          | --                           | S2                         |
| Bloodleaf                       | <i>Iresine rhizomatosa</i>     | --                          | E                            | S1                         |
| Crested iris                    | <i>Iris cristata</i>           | --                          | E                            | S1                         |
| Small whorled pogonia           | <i>Isotria medeoloides</i>     | LT                          | X                            | SH                         |
| Butternut                       | <i>Juglans cinerea</i>         | --                          | --                           | S2S3                       |
| Long's rush                     | <i>Juncus longii</i>           | --                          | E                            | S1                         |
| Potato dandelion                | <i>Krigia dandelion</i>        | --                          | E                            | S1                         |
| Hairy lettuce                   | <i>Lactuca hirsuta</i>         | --                          | X                            | SH                         |
| Vetchling                       | <i>Lathyrus palustris</i>      | --                          | X                            | S1                         |
| Florida yellow flax             | <i>Linum floridanum</i>        | --                          | X                            | SH                         |
| Small-flowered hemicarpha       | <i>Lipocarpha micrantha</i>    | --                          | E                            | S1                         |
| American gromwell               | <i>Lithospermum latifolium</i> | --                          | E                            | S1                         |

**TABLE E.5: STATE-LISTED PLANT SPECIES IN MONTGOMERY COUNTY, MD (CONT')<sup>a</sup>**

| Common Name                 | Scientific Name                                   | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|-----------------------------|---|-----------------------------|------------------------------|----------------------------|
| Carolina clubmoss           | <i>Lycopodiella caroliniana</i>                   | --                          | X                            | S1                         |
| Climbing fern               | <i>Lygodium palmatum</i>                          | --                          | T                            | S2                         |
| Lowland loosestrife         | <i>Lysimachia hybrida</i>                         | --                          | T                            | S2                         |
| Winged loosestrife          | <i>Lythrum alatum</i>                             | --                          | E                            | S1                         |
| Climbing milkweed           | <i>Matelea obliqua</i>                            | --                          | E                            | S1                         |
| Ostrich fern                | <i>Matteuccia struthiopteris</i>                  | --                          | --                           | S2                         |
| Erect water-hysop           | <i>Mecardonia acuminata</i>                       | --                          | E                            | S1                         |
| Broad-leaved bunchflower    | <i>Melanthium latifolium</i>                      | --                          | E                            | S1                         |
| Narrow melicgrass           | <i>Melica mutica</i>                              | --                          | T                            | S1                         |
| Long-awned hairgrass        | <i>Muhlenbergia capillaris</i>                    | --                          | E                            | S1                         |
| Thread-like naiad           | <i>Najas gracillima</i>                           | --                          | X                            | SU                         |
| American lotus              | <i>Nelumbo lutea</i>                              | --                          | --                           | S2                         |
| Virginia false-gromwell     | <i>Onosmodium virginianum</i>                     | --                          | E                            | S1                         |
| One-sided pyrola            | <i>Orthilia secunda</i>                           | --                          | X                            | SH                         |
| Bristling panicgrass        | <i>Panicum aciculare</i>                          | --                          | --                           | SU                         |
| Wiry witch-grass            | <i>Panicum flexile</i>                            | --                          | E                            | S1                         |
| Lax-flowered witchgrass     | <i>Panicum laxiflorum</i>                         | --                          | --                           | SU                         |
| Few-flowered panicgrass     | <i>Panicum oligosanthes</i>                       | --                          | --                           | S2S3                       |
| Tall swamp panicgrass       | <i>Panicum scabriusculum</i>                      | --                          | E                            | S1                         |
| Yellow nailwort             | <i>Paronychia virginica</i> var. <i>virginica</i> | --                          | E                            | S1                         |
| Floating paspalum           | <i>Paspalum fluitans</i>                          | --                          | E                            | S1                         |
| Smooth cliffbrake           | <i>Pellaea glabella</i>                           | --                          | E                            | S1                         |
| Coville's phacelia          | <i>Phacelia covillei</i>                          | --                          | E                            | S1                         |
| Smooth phlox                | <i>Phlox glaberrima</i>                           | --                          | E                            | S1                         |
| Downy phlox                 | <i>Phlox pilosa</i>                               | --                          | E                            | S1                         |
| Pale green orchid           | <i>Platanthera flava</i>                          | --                          | --                           | S2                         |
| Purple fringeless orchid    | <i>Platanthera permoena</i>                       | --                          | T                            | S1                         |
| Small purple fringed orchid | <i>Platanthera psychodes</i>                      | --                          | X                            | SU                         |



TABLE E.5: STATE-LISTED PLANT SPECIES IN MONTGOMERY COUNTY, MD (CONT')<sup>a</sup>

| Common Name               | Scientific Name                    | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|---------------------------|------------------------------------|-----------------------------|------------------------------|----------------------------|
| Racemed milkwort          | <i>Polygala polygama</i>           | --                          | T                            | S1                         |
| Seneca snakeroot          | <i>Polygala senega</i>             | --                          | T                            | S2                         |
| Leafy pondweed            | <i>Potamogeton foliosus</i>        | --                          | E                            | S1                         |
| Spiral pondweed           | <i>Potamogeton spirillus</i>       | --                          | --                           | S1                         |
| Flatstem pondweed         | <i>Potamogeton zosteriformis</i>   | --                          | E                            | S1                         |
| Tall cinquefoil           | <i>Potentilla arguta</i>           | --                          | --                           | SU                         |
| Eastern dwarf cherry      | <i>Prunus pumila</i>               | --                          | --                           | SU                         |
| Basil mountain-mint       | <i>Pycnanthemum clinopodioides</i> | --                          | --                           | S1S2                       |
| Torrey's mountain-mint    | <i>Pycnanthemum torrei</i>         | --                          | E                            | S1                         |
| Whorled mountain-mint     | <i>Pycnanthemum verticillatum</i>  | --                          | E                            | S1                         |
| Virginia mountain-mint    | <i>Pycnanthemum virginianum</i>    | --                          | --                           | S2                         |
| Greenish-flowered pyrola  | <i>Pyrola virens</i>               | --                          | X                            | SH                         |
| Mossy-cup oak             | <i>Quercus macrocarpa</i>          | --                          | --                           | S1                         |
| Shumard's oak             | <i>Quercus shumardii</i>           | --                          | T                            | S2                         |
| Water-plantain spearwort  | <i>Ranunculus ambigens</i>         | --                          | X                            | SH                         |
| Yellow water-crowfoot     | <i>Ranunculus flabellaris</i>      | --                          | E                            | S1                         |
| Hairy wild-petunia        | <i>Ruellia humilis</i>             | --                          | E                            | S1                         |
| Pursh's ruellia           | <i>Ruellia purshiana</i>           | --                          | E                            | S1                         |
| Rustling wild-petunia     | <i>Ruellia strepens</i>            | --                          | E                            | S1                         |
| Tall dock                 | <i>Rumex altissimus</i>            | --                          | E                            | S1                         |
| Engelmann's arrowhead     | <i>Sagittaria engelmanniana</i>    | --                          | T                            | S2                         |
| Long-beaked arrowhead     | <i>Sagittaria longirostra</i>      | --                          | --                           | SU                         |
| Sessile-fruited arrowhead | <i>Sagittaria rigida</i>           | --                          | E                            | S1                         |
| Sandbar willow            | <i>Salix exigua</i>                | --                          | E                            | S1                         |
| Dwarf prairie willow      | <i>Salix tristis</i>               | --                          | --                           | S1                         |
| Canada burnet             | <i>Sanguisorba Canadensis</i>      | --                          | T                            | S2                         |
| Smith's clubrush          | <i>Scirpus smithii</i>             | --                          | X                            | SU                         |
| Bashful bulrush           | <i>Scirpus verecundus</i>          | --                          | --                           | S2S3                       |

**TABLE E.5: STATE-LISTED PLANT SPECIES IN MONTGOMERY COUNTY, MD (CONT')<sup>a</sup>**

| Common Name                        | Scientific Name                     | Federal Status <sup>b</sup> | Maryland Status <sup>b</sup> | Maryland Rank <sup>b</sup> |
|------------------------------------|-------------------------------------|-----------------------------|------------------------------|----------------------------|
| Reticulated nutrush                | <i>Scleria reticularis</i>          | --                          | --                           | S2                         |
| Common skullcap                    | <i>Scutellaria galericulata</i>     | --                          | --                           | S1                         |
| Leonard's skullcap                 | <i>Scutellaria leonardii</i>        | --                          | T                            | S2                         |
| Veined skullcap                    | <i>Scutellaria nervosa</i>          | --                          | E                            | S1                         |
| Rock skullcap                      | <i>Scutellaria saxatilis</i>        | --                          | E                            | S1                         |
| Virginia mallow                    | <i>Sida hermaphrodita</i>           | --                          | E                            | S1                         |
| Snowy campion                      | <i>Silene nivea</i>                 | --                          | E                            | S1                         |
| Star-flowered false Solomon's seal | <i>Smilacina stellata</i>           | --                          | E                            | S1                         |
| Halberd-leaved greenbrier          | <i>Smilax pseudochina</i>           | --                          | T                            | S2                         |
| Hard-leaved goldenrod              | <i>Solidago rigida</i>              | --                          | X                            | SH                         |
| Rock goldenrod                     | <i>Solidago rupestris</i>           | --                          | X                            | S1                         |
| Riverbank goldenrod                | <i>Solidago spathulata</i>          | --                          | T                            | S1                         |
| Showy goldenrod                    | <i>Solidago speciosa</i>            | --                          | T                            | S2                         |
| Buttonweed                         | <i>Spermacoce glabra</i>            | --                          | E                            | S1                         |
| Swamp-oats                         | <i>Sphenopholis pensylvanica</i>    | --                          | T                            | S1S2                       |
| Wide-leaved ladys' tresses         | <i>Spiranthes lucida</i>            | --                          | E                            | S1                         |
| Yellow nodding ladys' tresses      | <i>Spiranthes ochroleuca</i>        | --                          | E                            | S1                         |
| Long-leaved rushgrass              | <i>Sporobolus asper</i>             | --                          | --                           | S1                         |
| Rough rushgrass                    | <i>Sporobolus clandestinus</i>      | --                          | T                            | S2                         |
| Rough hedge-nettle                 | <i>Stachys aspera</i>               | --                          | E                            | S1                         |
| Nuttall's hedge-nettle             | <i>Stachys cordata</i>              | --                          | --                           | S1                         |
| Featherbells                       | <i>Stenanthium gramineum</i>        | --                          | T                            | S1                         |
| Fameflower                         | <i>Talinum teretifolium</i>         | --                          | T                            | S1                         |
| Bog fern                           | <i>Thelypteris simulata</i>         | --                          | T                            | S2                         |
| Climbing dogbane                   | <i>Trachelospermum difforme</i>     | --                          | E                            | S1                         |
| Narrow-leaved bluecurls            | <i>Trichostema setaceum</i>         | --                          | --                           | S1                         |
| Buffalo clover                     | <i>Trifolium reflexum</i>           | --                          | X                            | SH                         |
| Narrow-leaved horse-gentian        | <i>Triosteum angustifolium</i>      | --                          | E                            | S1                         |
| Nodding pogonia                    | <i>Triphora trianthophora</i>       | --                          | X                            | S1                         |
| Valerian                           | <i>Valeriana pauciflora</i>         | --                          | E                            | S1                         |
| Goose-foot cornsalad               | <i>Valerianella chenopodiifolia</i> | --                          | E                            | S1                         |
| Tall cornsalad                     | <i>Valerianella umbilicata</i>      | --                          | X                            | SH                         |
| Marsh speedwell                    | <i>Veronica scutellata</i>          | --                          | E                            | S1                         |
| Sand grape                         | <i>Vitis rupestris</i>              | --                          | --                           | S1                         |
| Northern prickly-ash               | <i>Zanthoxylum americanum</i>       | --                          | E                            | S1                         |

a/ Information from Maryland Department of Natural Resources, Maryland Heritage & Biodiversity Conservation Programs web site, <http://www.dnr.state.md.us/wildlife/rte/rte04mont.pdf>, current as of November 2004. Table shows species throughout Montgomery County, Maryland; species listed are not necessarily specific to the Rock Creek Park region.

b/Rankings and statuses are identical to those in Table E.4.

## APPENDIX F: NATIONAL REGISTER OF HISTORIC PLACES PROPERTIES

Historic properties within Rock Creek Park and the Rock Creek and Potomac Parkway that are listed in the National Register of Historic Places include the

Peirce-Klinge Mansion (Linnaean Hill)

Peirce Mill

Peirce Springhouse and Peirce Mill Barn

Godey Lime Kilns

Boulder Bridge and Ross Drive Bridge

Fort DeRussy, which is listed as a contributing feature to “Civil War Fort Sites” National Register nomination

In addition to the listing of individual properties, the area of Rock Creek Park covered by this general management plan was listed in the National Register of Historic Places as Rock Creek Park Historic District (No. 91001524) on October 23, 1991. The historic district boundaries encompass Public Reservation 339 established as Rock Creek Park on September 27, 1890. The historic district included 31 resources classified as contributing to its significance. These resources are listed in table F.1.

**TABLE F.1: RESOURCES THAT CONTRIBUTE TO THE  
SIGNIFICANCE OF THE ROCK CREEK HISTORIC DISTRICT**

|   |   |   |
|---|---|---|
| 1) Peirce-Klinge Mansion                              | 12) Visitor Center/Park Police Substation (Lodge House) | 22) Morrow Drive Bridge   |
| 2) Peirce-Klinge House                                | 13) Jules J. Jusserand Memorial                         | 23) Rapids Footbridge   |
| 3 and 4) Peirce-Klinge Utility House and Potting Shed | 14) Fort DeRussy Earthworks                             | 24) Rolling Meadow Bridge                                       |
| 5) Peirce-Klinge Stable/Garage                        | 15) Ross Drive Bridge                                   | 25) Riley Spring Bridge   |
| 6) Peirce Mill  | 16) Grant Road Bridge                                   | 26) Boundary Bridge   |
| 7) Peirce Mill Bridge                                 | 17) Boulder Bridge                                      | 27) Bluffs Bridge   |
| 8) Peirce Mill Dam                                    | 18) Pinehurst Bridge                                    | 28) Circulation Network-Historic Roads and Trails <sup>a/</sup> |
| 9) Peirce Mill Barn                                   | 19) Sixteenth Street Bridge                             | 29) Rock Creek Golf Course                                      |
| 10) Peirce Springhouse                                | 20) Old Military Road Bridge-Joyce Road Bridge          | 30) Outdoor Fireplaces (6)                                      |
| 11) Joaquin Miller cabin                              | 21) Milkhouse Ford and Cross Valley Road Structures     | 31) Culverts and Retaining Walls                                |

<sup>a/</sup> Includes Beach Drive, Peirce Mill Road, Piney Branch Parkway, Grant Road, Sherrill Drive, Wise Road, Bingham Drive, Joyce Road, Ridge (Glover) Road, Ross Drive, Morrow Drive, and portions of several other roads.

## **APPENDIX G: COMPARISON OF IMPACTS OF ALTERNATIVES ON TRAFFIC, BASED ON MODELING**

This appendix consists of three tables that were developed using the traffic modeling method described in Appendix H.

Table G.1 – Year 2020 Average Weekday Traffic Volumes.

Table G.2 – Year 2020 A.M./P.M. Peak-Hour Traffic Volumes

Table G.3 – Level of Service Analysis

**TABLE G--1**  
**MATRIX 1: YEAR 2020 PREDICTED AVERAGE WEEKDAY TRAFFIC VOLUMES**

| ROADWAY LINK RESULTS  |                   |                    |          |                       |                       |                       |        |                    |
|-----------------------|-------------------|--------------------|----------|-----------------------|-----------------------|-----------------------|--------|--------------------|
| Roadway               | From              | To                 | 1990 ADT | 2001 ADT <sup>b</sup> | 2004 ADT <sup>c</sup> | 2020 ADT              |        |                    |
|                       |                   |                    |          |                       |                       | Alt A, B, D<br>Volume | Alt C  |                    |
|                       |                   |                    |          |                       |                       |                       | Volume | % Chg <sup>a</sup> |
| Beach Drive           | Wyndale           | W Beach            | 5,400    | --                    | --                    | 13800 <sup>d</sup>    | 0      | -100.0%            |
| Beach Drive           | Wise              | Sherrill           | 8,000    | --                    | --                    | 16900 <sup>d</sup>    | 0      | -100.0%            |
| Beach Drive           | Bingham           | Joyce              | 8,700    | --                    | --                    | 12,600                | 300    | -97.6%             |
| Beach Drive           | Joyce             | Broad Branch       | 9,000    | 12,500                | 6,600                 | 11700 <sup>d</sup>    | 0      | -100.0%            |
| Beach Drive           | Blagden           | Tilden / Park      | 18,000   | 15,200                | 17,000                | 26,700                | 20,000 | -25.1%             |
| Beach Drive           | Porter            | Zoo                | 24,000   | 25,100                | --                    | 33,800                | 27,900 | -17.5%             |
| Beach Drive           | Zoo               | 24th / Cathedral   | 24,700   | --                    | --                    | 36,000                | 30,800 | -14.4%             |
| RCPW SB               | 24th / Cathedral  | Waterside NB on    | 21,700   | --                    | --                    | 31,200                | 27,500 | -11.9%             |
| RCPW NB               | 24th / Cathedral  | Waterside NB on    | 21,700   | --                    | --                    | 33,400                | 28,900 | -13.5%             |
| RCPW SB               | Waterside ramps   | P ramps            | 27,500   | --                    | --                    | 37,400                | 34,900 | -6.7%              |
| RCPW NB               | Waterside ramps   | P ramps            | 27,500   | --                    | --                    | 40,500                | 36,700 | -9.4%              |
| RCPW SB               | K / Whitehurst    | Virginia           | 26,200   | --                    | --                    | 35,700                | 35,100 | -1.7%              |
| RCPW NB               | K / Whitehurst    | Virginia           | 26,200   | --                    | --                    | 39,500                | 36,000 | -8.9%              |
| RCPW SB               | Virginia          | Teddy Roosevelt Br | 20,000   | --                    | --                    | 26,200                | 27,800 | 6.1%               |
| RCPW NB               | Virginia          | Teddy Roosevelt Br | 20,000   | --                    | --                    | 28,900                | 28,300 | -2.1%              |
| 16th Street           | DC line           | S Portal           | 30,000   | 35,500                | --                    | 46,600                | 47,400 | 1.7%               |
| 16th Street           | Alaska            | Sherrill           | 36,000   | --                    | --                    | 56,600                | 62,100 | 9.7%               |
| 16th Street           | Missouri          | Kennedy            | 30,000   | 31,400                | 34,000                | 48,200                | 49,700 | 3.1%               |
| 16th Street           | Kennedy           | Colorado           | 28,000   | 30,200                | 34,000                | 45,000                | 46,700 | 3.8%               |
| 16th Street           | Park              | Irving             | 30,400   | --                    | --                    | 44,900                | 45,700 | 1.8%               |
| 16th Street           | Euclid            | Florida            | 32,200   | 28,000                | --                    | 41,100                | 42,400 | 3.2%               |
| Alaska Avenue         | Georgia           | Morningside        | 6,800    | 7,200                 | --                    | 10,900                | 11,600 | 6.4%               |
| Georgia Avenue        | Alaska            | Fern               | 29,000   | 31,900                | --                    | 38,400                | 39,800 | 3.6%               |
| Georgia Avenue        | Dahlia            | Aspen              | 28,000   | 24,000                | --                    | 37,200                | 38,400 | 3.2%               |
| Georgia Avenue        | Missouri          | Kennedy            | 22,000   | 20,000                | --                    | 32,300                | 34,800 | 7.7%               |
| Georgia Avenue        | Arkansas          | Upshur             | 20,000   | 18,000                | --                    | 33,300                | 31,800 | -4.5%              |
| Oregon Avenue         | Western           | Wise / Chesnut     | 1,700    | 1,700                 | --                    | 1,900                 | 1,900  | 0.0%               |
| Oregon Avenue         | Chesnut           | Nebraska           | 8,500    | 9,800                 | --                    | 10,700                | 11,600 | 8.4%               |
| Oregon Avenue         | Moreland          | Military           | 3,500    | 3,300                 | 4,800                 | 4,700                 | 4,800  | 2.1%               |
| Glover Road           | Military          | Grant              | 2,500    | --                    | 500                   | 3,800                 | 3,600  | -5.3%              |
| Grant Road            | Glover            | Broad Branch       | 2,100    | --                    | --                    | 3,000                 | 2,800  | -6.7%              |
| Glover Road           | Ross              | Broad Branch       | 500      | --                    | 800                   | 1,300                 | 1,100  | -15.4%             |
| Ross Drive            | Glover            | Joyce              | 200      | --                    | 340                   | 600                   | 300    | -50.0%             |
| Broad Branch Road     | Western           | McKinley           | 1,200    | --                    | --                    | 2,700                 | 3,800  | 40.7%              |
| Broad Branch Road     | 32nd St           | 27th St            | 2,000    | 2,000                 | --                    | 3,100                 | 3,500  | 12.9%              |
| Broad Branch Road     | Grant             | Brandywine         | 6,800    | 6,800                 | 7,500                 | 9,000                 | 9,200  | 2.2%               |
| Connecticut Avenue    | DC line           | McKinley           | 36,200   | 38,000                | --                    | 45,300                | 46,100 | 1.8%               |
| Connecticut Avenue    | Nebraska          | 36th               | 38,000   | --                    | --                    | 47,500                | 47,400 | -0.2%              |
| Connecticut Avenue    | Macomb            | Cathedral          | 37,000   | 38,000                | --                    | 48,800                | 47,300 | -3.1%              |
| Connecticut Avenue    | Columbia          | Florida            | 41,200   | 39,300                | --                    | 52,700                | 55,800 | 5.9%               |
| Connecticut Avenue    | 18th St           | Dupont Circle      | 27,600   | --                    | --                    | 32,600                | 34,000 | 4.3%               |
| Wisconsin Avenue      | Albemarle         | Nebraska           | 30,800   | 35,000                | --                    | 39,500                | 41,300 | 4.6%               |
| Wisconsin Avenue      | Porter            | Newark             | 30,200   | 30,000                | --                    | 37,600                | 39,400 | 4.8%               |
| Wisconsin Avenue      | Calvert           | Reservoir          | 29,000   | 32,000                | --                    | 34,200                | 34,800 | 1.8%               |
| Wisconsin Avenue      | O St              | P St               | 24,000   | --                    | --                    | 31,000                | 31,400 | 1.3%               |
| Massachusetts Avenue  | DC line           | 49th St            | 25,000   | 24,900                | --                    | 30,400                | 31,400 | 3.3%               |
| Massachusetts Avenue  | Macomb            | Idaho              | 33,400   | 18,000                | --                    | 37,600                | 38,200 | 1.6%               |
| Massachusetts Avenue  | Garfield          | 34th St            | 46,000   | 30,900                | --                    | 51,800                | 53,000 | 2.3%               |
| Massachusetts Avenue  | 24th St           | Sheridan Circle    | 25,000   | --                    | --                    | 30,600                | 31,300 | 2.3%               |
| Massachusetts Avenue  | Sheridan Circle   | Florida            | 29,500   | 24,700                | --                    | 35,400                | 36,100 | 2.0%               |
| Massachusetts Avenue  | 17th St           | 18th St            | 22,000   | 26,200                | --                    | 26,500                | 27,000 | 1.9%               |
| Nebraska Avenue       | Oregon            | Utah               | 5,800    | 8,700                 | --                    | 7,700                 | 9,200  | 19.5%              |
| Nebraska Avenue       | Nevada            | Military           | 22,300   | 19,000                | --                    | 26,600                | 27,400 | 3.0%               |
| Nebraska Avenue       | Reno              | Albemarle          | 19,000   | 23,100                | --                    | 22,900                | 23,800 | 3.9%               |
| Nebraska Avenue       | Van Ness          | Massachusetts      | 21,000   | 20,600                | --                    | 25,100                | 25,500 | 1.6%               |
| Military Road         | Nebraska          | 32nd St            | 20,600   | 20,000                | --                    | 25,300                | 25,800 | 2.0%               |
| Military Road         | Oregon            | Beach              | 34,000   | 30,900                | 36,000                | 40,700                | 40,800 | 0.2%               |
| Military Road         | 16th St           | 14th St            | 28,400   | 29,900                | --                    | 36,300                | 37,900 | 4.4%               |
| West Beach            | Beach             | Portal             | 11,500   | 15,000                | --                    | 17,100                | 11,300 | -33.9%             |
| Wise Road             | Oregon            | Beach              | 10,200   | 3,600                 | --                    | 14,100                | 15,200 | 7.8%               |
| Sherrill Drive        | Beach             | 16th St            | 2,400    | --                    | --                    | 7,700                 | 1,600  | -79.2%             |
| Bingham Drive         | Oregon            | Beach              | 1,000    | 1,100                 | --                    | 1,800                 | 1,900  | 5.6%               |
| Joyce Road            | Morrow            | 16th St            | 900      | --                    | 1,100                 | 1,500                 | 0      | -100.0%            |
| Morrow                | Joyce             | Carter-Barron      | 1,600    | 2,200                 | 2,400                 | 3,400                 | 1,000  | -70.6%             |
| Kennedy               | 14th St           | 13th St            | 6,400    | 7,500                 | --                    | 9,800                 | 7,700  | -21.4%             |
| Blagden Avenue        | Beach             | Upshur             | 7,100    | 8,300                 | 7,700                 | 12,900                | 13,800 | 7.0%               |
| Blagden Avenue        | Upshur            | Decatur            | 5,000    | 5,800                 | 5,100                 | 9,400                 | 11,200 | 19.1%              |
| Piney Branch Pkwy     | Beach             | 16th St            | 10,100   | 11,400                | --                    | 13,300                | 14,000 | 5.3%               |
| Tilden Street         | Linnean           | Beach              | 9,000    | 10,300                | --                    | 11,800                | 12,900 | 9.3%               |
| Park Road             | Beach             | Piney Branch       | 8,900    | 11,400                | --                    | 12,100                | 12,900 | 6.6%               |
| Porter Street         | Connecticut       | Kling              | 16,000   | 12,300                | --                    | 18,700                | 19,100 | 2.1%               |
| Adams Mill Road       | Park              | Irving             | 9,900    | 9,600                 | --                    | 11,500                | 11,800 | 2.6%               |
| Harvard Street        | Adams Mill        | 16th St            | 5,000    | 6,500                 | --                    | 6,700                 | 7,200  | 7.5%               |
| Zoo Main Rd           | Connecticut       | Zoo                | 2,000    | --                    | --                    | 2,400                 | 2,400  | 0.0%               |
| Cathedral Avenue      | Calvert           | Beach / 24th       | 9,000    | --                    | --                    | 11,100                | 6,300  | -43.2%             |
| 24th / Calvert access | 24th / Calvert    | Beach              | 19,800   | --                    | --                    | 29,800                | 26,400 | -11.4%             |
| M Street              | 30th St           | Pennsylvania       | 44,000   | --                    | --                    | 54,900                | 54,800 | -0.2%              |
| M Street              | New Hampshire     | 22nd St            | 21,600   | 21,400                | --                    | 24,300                | 24,800 | 2.1%               |
| New Hampshire Avenue  | 19th St           | 20th St            | 10,000   | 8,400                 | --                    | 14,900                | 16,000 | 7.4%               |
| New Hampshire Avenue  | 21st St           | M St               | 10,200   | 10,500                | --                    | 12,400                | 14,000 | 12.9%              |
| New Hampshire Avenue  | Washington Circle | Virginia           | 6,000    | 6,000                 | --                    | 7,900                 | 8,800  | 11.4%              |
| Pennsylvania Avenue   | M St              | L St               | 30,000   | 34,000                | --                    | 38,200                | 37,800 | -1.0%              |
| Pennsylvania Avenue   | K St              | I St               | 23,000   | 23,200                | --                    | 29,900                | 29,800 | -0.3%              |
| Virginia Avenue       | New Hampshire     | 23rd St            | 14,000   | 12,800                | --                    | 16,000                | 14,000 | -12.5%             |
| Constitution Avenue   | 23rd St           | Henry Bacon        | 34,000   | 30,000                | --                    | 42,900                | 45,000 | 4.9%               |

a/ Note: % Change shown represents the difference between the selected alternative and Alternative B (Continued Current Management) in the year 2020-

b/ Note: 2001 Traffic Volume numbers were obtained from District Department of Transportation maps available at <http://ddot--dc--gov/ddot/cwp/view,a,1250,q,580996.asp>.  
 -- indicates a road segment that did not have 2001 data

c/Data were obtained from the June 2004 Traffic Study for Rock Creek Park, Washington  
 d/ For this road segment, Average Daily Traffic volumes would be about 30-36% lower Alternatives A and B volumes because of mid-day closures

**TABLE G.2**  
**YEAR 2020 PREDICTED AM/PM PEAK HOUR TRAFFIC VOLUMES**

| ROADWAY LINK RESULTS  |                   |                    |                  |       |                   |             |                     |          |               |                    |              |                    |
|-----------------------|-------------------|--------------------|------------------|-------|-------------------|-------------|---------------------|----------|---------------|--------------------|--------------|--------------------|
| Roadway               | From              | To                 | 1990             |       | 2004 <sup>b</sup> |             | 2020                |          |               |                    |              |                    |
|                       |                   |                    | Peak Hour Volume |       | Peak Hour Volume  |             | Alternative A, B, D |          | Alternative C |                    |              |                    |
|                       |                   |                    | AM               | PM    | AM                | PM          | AM Pk Hr            | PM Pk Hr | AM Peak Hour  |                    | PM Peak Hour |                    |
|                       |                   |                    |                  |       |                   |             | Volume              | Volume   |               | % Chg <sup>a</sup> | Volume       | % Chg <sup>a</sup> |
| Beach Drive           | Wyndale           | W Beach            | 600              | 700   | --                | --          | 1,300               | 1,400    | 0             | -100.0%            | 0            | -100.0%            |
| Beach Drive           | Wise              | Sherrill           | 700              | 900   | --                | --          | 1,300               | 1,700    | 0             | -100.0%            | 0            | -100.0%            |
| Beach Drive           | Bingham           | Joyce              | 700              | 1,000 | --                | --          | 900                 | 1,300    | 100           | -88.9%             | 100          | -92.3%             |
| Beach Drive           | Joyce             | Broad Branch       | 700              | 1,000 | --                | 400 700     | 800                 | 1,200    | 0             | -100.0%            | 0            | -100.0%            |
| Beach Drive           | Blagden           | Tilden / Park      | 1,400            | 1,900 | --                | 1,200 1,400 | 1,700               | 2,400    | 1,300         | -23.5%             | 1,900        | -20.8%             |
| Beach Drive           | Porter            | Zoo                | 1,700            | 2,100 | --                | --          | 2,000               | 2,500    | 1,400         | -30.0%             | 2,000        | -20.0%             |
| Beach Drive           | Zoo               | 24th / Cathedral   | 1,700            | 2,100 | --                | --          | 2,100               | 2,600    | 1,900         | -9.5%              | 2,000        | -23.1%             |
| RCPW SB               | 24th / Cathedral  | Waterside NB on    | 3,700            | 0     | --                | --          | 4,500               | 0        | 1,800         | -60.0%             | 1,900        | N/A                |
| RCPW NB               | 24th / Cathedral  | Waterside NB on    | 0                | 3,600 | --                | --          | 0                   | 4,700    | 1,900         | N/A                | 1,900        | -59.6%             |
| RCPW SB               | Waterside ramps   | P ramps            | 4,400            | 0     | --                | --          | 5,100               | 0        | 2,200         | -56.9%             | 2,300        | N/A                |
| RCPW NB               | Waterside ramps   | P ramps            | 0                | 4,500 | --                | --          | 0                   | 5,700    | 2,300         | N/A                | 2,600        | -54.4%             |
| RCPW SB               | K / Whitehurst    | Virginia           | 3,800            | 0     | --                | --          | 4,400               | 0        | 1,400         | -68.2%             | 2,700        | N/A                |
| RCPW NB               | K / Whitehurst    | Virginia           | 0                | 4,200 | --                | --          | 0                   | 5,500    | 2,200         | N/A                | 2,500        | -54.5%             |
| RCPW SB               | Virginia          | Teddy Roosevelt Br | 3,100            | 0     | --                | --          | 3,500               | 0        | 1,600         | -54.3%             | 2,300        | N/A                |
| RCPW NB               | Virginia          | Teddy Roosevelt Br | 0                | 3,400 | --                | --          | 0                   | 4,200    | 1,800         | N/A                | 2,400        | -42.9%             |
| 16th Street           | DC line           | S Portal           | 2,700            | 2,700 | --                | --          | 3,600               | 3,600    | 3,700         | 2.8%               | 3,600        | 0.0%               |
| 16th Street           | Alaska            | Sherrill           | 3,200            | 3,200 | --                | --          | 4,400               | 4,400    | 4,500         | 2.3%               | 4,800        | 9.1%               |
| 16th Street           | Missouri          | Kennedy            | 2,700            | 2,700 | --                | 2,800 2,800 | 3,700               | 3,700    | 3,800         | 2.7%               | 3,800        | 2.7%               |
| 16th Street           | Kennedy           | Colorado           | 2,500            | 2,500 | --                | 2,800 2,800 | 3,500               | 3,500    | 3,600         | 2.9%               | 3,600        | 2.9%               |
| 16th Street           | Park              | Irving             | 2,700            | 2,700 | --                | --          | 3,500               | 3,500    | 3,500         | 0.0%               | 3,500        | 0.0%               |
| 16th Street           | Euclid            | Florida            | 2,900            | 2,900 | --                | --          | 3,200               | 3,200    | 3,500         | 9.4%               | 3,500        | 9.4%               |
| Alaska Avenue         | Georgia           | Morningside        | 600              | 600   | --                | --          | 800                 | 800      | 800           | 0.0%               | 900          | 12.5%              |
| Georgia Avenue        | Alaska            | Fern               | 2,600            | 2,600 | --                | --          | 3,000               | 3,000    | 3,100         | 3.3%               | 3,100        | 3.3%               |
| Georgia Avenue        | Dahlia            | Aspen              | 2,500            | 2,500 | --                | --          | 2,900               | 2,900    | 2,900         | 0.0%               | 3,000        | 3.4%               |
| Georgia Avenue        | Missouri          | Kennedy            | 2,000            | 2,000 | --                | --          | 2,500               | 2,500    | 2,600         | 4.0%               | 2,700        | 8.0%               |
| Georgia Avenue        | Arkansas          | Upshur             | 1,800            | 1,800 | --                | --          | 2,600               | 2,600    | 2,500         | -3.8%              | 2,400        | -7.7%              |
| Oregon Avenue         | Western           | Wise / Chesnut     | 200              | 200   | --                | --          | 200                 | 200      | 200           | 0.0%               | 200          | 0.0%               |
| Oregon Avenue         | Chesnut           | Nebraska           | 1,000            | 900   | --                | --          | 1,100               | 1,000    | 1,100         | 0.0%               | 1,000        | 0.0%               |
| Oregon Avenue         | Moreland          | Military           | 400              | 400   | --                | 450 400     | 400                 | 400      | 400           | 0.0%               | 400          | 0.0%               |
| Glover Road           | Military          | Grant              | 300              | 200   | --                | 40 40       | 300                 | 300      | 300           | 0.0%               | 300          | 0.0%               |
| Grant Road            | Glover            | Broad Branch       | 200              | 200   | --                | --          | 300                 | 200      | 200           | -33.3%             | 200          | 0.0%               |
| Glover Road           | Ross              | Broad Branch       | 100              | 0     | --                | 60 70       | 100                 | 100      | 100           | 0.0%               | 100          | 0.0%               |
| Ross Drive            | Glover            | Joyce              | 0                | 0     | --                | --          | 100                 | 0        | 0             | -100.0%            | 0            | N/A                |
| Broad Branch Road     | Western           | McKinley           | 100              | 100   | --                | --          | 200                 | 200      | 400           | 100.0%             | 300          | 50.0%              |
| Broad Branch Road     | 32nd St           | 27th St            | 200              | 200   | --                | --          | 300                 | 300      | 300           | 0.0%               | 300          | 0.0%               |
| Broad Branch Road     | Grant             | Brandywine         | 500              | 600   | --                | 600 700     | 600                 | 600      | 600           | 0.0%               | 700          | 16.7%              |
| Connecticut Avenue    | DC line           | McKinley           | 3,100            | 3,300 | --                | --          | 3,400               | 3,600    | 3,300         | -2.9%              | 3,700        | 2.8%               |
| Connecticut Avenue    | Nebraska          | 36th               | 3,200            | 3,400 | --                | --          | 3,600               | 3,800    | 3,300         | -8.3%              | 3,800        | 0.0%               |
| Connecticut Avenue    | Macomb            | Cathedral          | 3,100            | 3,300 | --                | --          | 3,600               | 3,800    | 3,200         | -11.1%             | 3,700        | -2.6%              |
| Connecticut Avenue    | Columbia          | Florida            | 3,100            | 3,300 | --                | --          | 3,500               | 3,700    | 4,100         | 17.1%              | 4,000        | 8.1%               |
| Connecticut Avenue    | 18th St           | Dupont Circle      | 2,100            | 2,200 | --                | --          | 2,200               | 2,400    | 2,600         | 18.2%              | 2,500        | 4.2%               |
| Wisconsin Avenue      | Albemarle         | Nebraska           | 2,500            | 2,600 | --                | --          | 2,800               | 2,900    | 2,900         | 3.6%               | 3,100        | 6.9%               |
| Wisconsin Avenue      | Porter            | Newark             | 2,400            | 2,600 | --                | --          | 2,700               | 2,800    | 2,900         | 7.4%               | 3,000        | 7.1%               |
| Wisconsin Avenue      | Calvert           | Reservoir          | 2,300            | 2,500 | --                | --          | 2,500               | 2,700    | 2,600         | 4.0%               | 2,900        | 7.4%               |
| Wisconsin Avenue      | O St              | P St               | 1,700            | 1,700 | --                | --          | 1,900               | 1,900    | 1,900         | 0.0%               | 1,900        | 0.0%               |
| Massachusetts Avenue  | DC line           | 49th St            | 2,100            | 2,100 | --                | --          | 2,300               | 2,300    | 2,500         | 8.7%               | 2,400        | 4.3%               |
| Massachusetts Avenue  | Macomb            | Idaho              | 2,800            | 2,800 | --                | --          | 3,000               | 3,000    | 3,000         | 0.0%               | 3,100        | 3.3%               |
| Massachusetts Avenue  | Garfield          | 34th St            | 3,900            | 3,900 | --                | --          | 4,100               | 4,100    | 4,300         | 4.9%               | 4,200        | 2.4%               |
| Massachusetts Avenue  | 24th St           | Sheridan Circle    | 2,100            | 2,100 | --                | --          | 2,300               | 2,300    | 2,400         | 4.3%               | 2,500        | 8.7%               |
| Massachusetts Avenue  | Sheridan Circle   | Florida            | 2,500            | 2,500 | --                | --          | 2,700               | 2,700    | 2,700         | 0.0%               | 2,900        | 7.4%               |
| Massachusetts Avenue  | 17th St           | 18th St            | 1,800            | 1,800 | --                | --          | 1,900               | 1,900    | 1,900         | 0.0%               | 2,000        | 5.3%               |
| Nebraska Avenue       | Oregon            | Utah               | 500              | 500   | --                | --          | 600                 | 600      | 700           | 16.7%              | 700          | 16.7%              |
| Nebraska Avenue       | Nevada            | Military           | 2,000            | 2,000 | --                | --          | 2,200               | 2,200    | 2,200         | 0.0%               | 2,200        | 0.0%               |
| Nebraska Avenue       | Reno              | Albemarle          | 1,700            | 1,700 | --                | --          | 1,900               | 1,900    | 2,000         | 5.3%               | 2,000        | 5.3%               |
| Nebraska Avenue       | Van Ness          | Massachusetts      | 1,900            | 1,900 | --                | --          | 2,100               | 2,100    | 2,100         | 0.0%               | 2,100        | 0.0%               |
| Military Road         | Nebraska          | 32nd St            | 1,700            | 1,700 | --                | --          | 1,900               | 1,900    | 1,800         | -5.3%              | 1,900        | 0.0%               |
| Military Road         | Oregon            | Beach              | 2,600            | 2,400 | --                | 3,400 2,800 | 2,900               | 2,700    | 2,700         | -6.9%              | 2,700        | 0.0%               |
| Military Road         | 16th St           | 14th St            | 2,200            | 2,000 | --                | --          | 2,500               | 2,300    | 2,500         | 0.0%               | 2,500        | 8.7%               |
| West Beach            | Beach             | Portal             | 1,000            | 1,300 | --                | --          | 1,300               | 1,600    | 900           | -30.8%             | 1,200        | -25.0%             |
| Wise Road             | Oregon            | Beach              | 1,000            | 1,100 | --                | --          | 1,100               | 1,300    | 1,100         | 0.0%               | 1,400        | 7.7%               |
| Sherrill Drive        | Beach             | 16th St            | 200              | 300   | --                | --          | 600                 | 800      | 200           | -66.7%             | 200          | -75.0%             |
| Bingham Drive         | Oregon            | Beach              | 100              | 100   | --                | --          | 200                 | 200      | 200           | 0.0%               | 200          | 0.0%               |
| Joyce Road            | Morrow            | 16th St            | 100              | 100   | --                | 100 100     | 100                 | 200      | 0             | -100.0%            | 0            | -100.0%            |
| Morrow                | Joyce             | Carter-Barron      | 200              | 200   | --                | 400 300     | 400                 | 400      | 300           | -25.0%             | 100          | -75.0%             |
| Kennedy               | 14th St           | 13th St            | 600              | 600   | --                | --          | 800                 | 800      | 700           | -12.5%             | 700          | -12.5%             |
| Blagden Avenue        | Beach             | Upshur             | 500              | 600   | --                | 400 400     | 800                 | 900      | 800           | 0.0%               | 900          | 0.0%               |
| Blagden Avenue        | Upshur            | Decatur            | 400              | 400   | --                | 700 600     | 600                 | 700      | 700           | 16.7%              | 800          | 14.3%              |
| Piney Branch Pkwy     | Beach             | 16th St            | 1,200            | 800   | --                | --          | 1,300               | 900      | 1,400         | 7.7%               | 900          | 0.0%               |
| Tilden Street         | Linnean           | Beach              | 700              | 700   | --                | --          | 800                 | 800      | 800           | 0.0%               | 900          | 12.5%              |
| Park Road             | Beach             | Piney Branch       | 800              | 900   | --                | --          | 900                 | 1,000    | 900           | 0.0%               | 1,100        | 10.0%              |
| Porter Street         | Connecticut       | Klingbe            | 1,300            | 1,300 | --                | --          | 1,400               | 1,400    | 1,400         | 0.0%               | 1,500        | 7.1%               |
| Adams Mill Road       | Park              | Irving             | 800              | 800   | --                | --          | 900                 | 900      | 700           | -22.2%             | 900          | 0.0%               |
| Harvard Street        | Adams Mill        | 16th St            | 400              | 400   | --                | --          | 500                 | 500      | 500           | 0.0%               | 500          | 0.0%               |
| Zoo Main Rd           | Connecticut       | Zoo                | 200              | 300   | --                | --          | 300                 | 300      | 200           | -33.3%             | 400          | 33.3%              |
| Cathedral Avenue      | Calvert           | Beach / 24th       | 1,200            | 1,300 | --                | --          | 1,400               | 1,400    | 1,200         | -14.3%             | 1,100        | -21.4%             |
| 24th / Calvert access | 24th / Calvert    | Beach              | 2,200            | 2,000 | --                | --          | 2,800               | 2,600    | 2,200         | -21.4%             | 2,100        | -19.2%             |
| M Street              | 30th St           | Pennsylvania       | 3,300            | 3,700 | --                | --          | 3,700               | 4,200    | 3,700         | 0.0%               | 4,100        | -2.4%              |
| M Street              | New Hampshire     | 22nd St            | 1,600            | 1,800 | --                | --          | 1,700               | 1,900    | 1,800         | 5.9%               | 2,100        | 10.5%              |
| New Hampshire Avenue  | 19th St           | 20th St            | 800              | 900   | --                | --          | 1,000               | 1,100    | 1,300         | 30.0%              | 1,400        | 27.3%              |
| New Hampshire Avenue  | 21st St           | M St               | 800              | 900   | --                | --          | 900                 | 1,000    | 600           | -33.3%             | 1,500        | 50.0%              |
| New Hampshire Avenue  | Washington Circle | Virginia           | 500              | 500   | --                | --          | 500                 | 600      | 800           | 60.0%              | 700          | 16.7%              |
| Pennsylvania Avenue   | M St              | L St               | 2,400            | 2,600 | --                | --          | 2,700               | 2,900    | 2,500         | -7.4%              | 3,000        | 3.4%               |
| Pennsylvania Avenue   | K St              | I St               | 1,800            | 2,000 | --                | --          | 2,100               | 2,200    | 2,000         | -4.8%              | 2,200        | 0.0%               |
| Virginia Avenue       | New Hampshire     | 23rd St            | 1,100            | 1,300 | --                | --          | 1,200               | 1,400    | 900           | -25.0%             | 1,000        | -28.6%             |
| Constitution Avenue   | 23rd St           | Henry Bacon        | 3,400            | 3,200 | --                | --          | 3,800               | 3,500    | 4,100         | 7.9%               | 3,500        | 0.0%               |

a/ Note: % Change shown represents the difference between the selected alternative and Alternative B (Continued Current Management) in the year 2020.

b/ 2004 data was obtained from the June 2004 Traffic Study for Rock Creek Park, Washington, D.C. 2001 District Department of Columbia data for peak hour traffic volumes has not been compiled.

**TABLE G.3**  
**MATRIX 3: LEVEL OF SERVICE ANALYSIS\***

| ROADWAY LINK RESULTS |                  |                    |          |    |                 |    |       |    |
|----------------------|------------------|--------------------|----------|----|-----------------|----|-------|----|
| Roadway              | From             | To                 | 1990 LOS |    | 2020 LOS        |    |       |    |
|                      |                  |                    | AM       | PM | Alt A, B, and D |    | Alt C |    |
|                      |                  |                    | AM       | PM | AM              | PM | AM    | PM |
| Beach Drive          | Wyndale          | W Beach            | A        | B  | C               | C  | --    | -- |
| Beach Drive          | Wise             | Sherrill           | B        | B  | C               | D  | --    | -- |
| Beach Drive          | Bingham          | Joyce              | B        | B  | B               | C  | A     | A  |
| Beach Drive          | Joyce            | Broad Branch       | B        | B  | B               | C  | --    | -- |
| Beach Drive          | Blagden          | Tilden / Park      | C        | E  | D               | F  | C     | E  |
| Beach Drive          | Porter           | Zoo                | D        | E  | E               | F  | C     | E  |
| Beach Drive          | Zoo              | 24th / Cathedral   | D        | E  | E               | F  | E     | E  |
| RCPW SB              | 24th / Cathedral | Waterside NB on    | C        | -- | D               | -- | C     | C  |
| RCPW NB              | 24th / Cathedral | Waterside NB on    | --       | C  | --              | D  | C     | C  |
| RCPW SB              | Waterside ramps  | P ramps            | D        | -- | E               | -- | D     | D  |
| RCPW NB              | Waterside ramps  | P ramps            | --       | D  | --              | E  | D     | E  |
| RCPW SB              | K / Whitehurst   | Virginia           | C        | -- | D               | -- | B     | E  |
| RCPW NB              | K / Whitehurst   | Virginia           | --       | C  | --              | E  | D     | D  |
| RCPW SB              | Virginia         | Teddy Roosevelt Br | C        | -- | C               | -- | C     | D  |
| RCPW NB              | Virginia         | Teddy Roosevelt Br | --       | C  | --              | C  | C     | D  |
| 16th Street          | DC line          | S Portal           | D        | D  | D               | D  | D     | D  |
| 16th Street          | Alaska           | Sherrill           | E        | E  | D               | D  | D     | D  |
| 16th Street          | Missouri         | Kennedy            | D        | D  | D               | D  | D     | D  |
| 16th Street          | Kennedy          | Colorado           | C        | C  | D               | D  | D     | D  |
| 16th Street          | Park             | Irving             | D        | D  | D               | D  | D     | D  |
| 16th Street          | Euclid           | Florida            | D        | D  | D               | D  | D     | D  |
| Alaska Avenue        | Georgia          | Morningside        | B        | B  | C               | C  | C     | C  |
| Georgia Avenue       | Alaska           | Fern               | E        | E  | E               | E  | E     | E  |
| Georgia Avenue       | Dahlia           | Aspen              | D        | D  | E               | E  | E     | E  |
| Georgia Avenue       | Missouri         | Kennedy            | C        | C  | D               | D  | E     | E  |
| Georgia Avenue       | Arkansas         | Upshur             | C        | C  | E               | E  | D     | D  |
| Oregon Avenue        | Western          | Wise / Chesnut     | A        | A  | A               | A  | A     | A  |
| Oregon Avenue        | Chesnut          | Nebraska           | C        | C  | D               | C  | C     | C  |
| Oregon Avenue        | Moreland         | Military           | A        | A  | A               | A  | A     | B  |
| Glover Road          | Military         | Grant              | A        | A  | A               | A  | A     | A  |
| Grant Road           | Glover           | Broad Branch       | A        | A  | A               | A  | A     | A  |
| Glover Road          | Ross             | Broad Branch       | A        | A  | A               | A  | A     | A  |
| Ross Drive           | Glover           | Joyce              | C        | C  | C               | C  | C     | C  |
| Broad Branch Road    | Western          | McKinley           | A        | A  | A               | A  | A     | A  |
| Broad Branch Road    | 32nd St          | 27th St            | A        | A  | A               | A  | A     | A  |
| Broad Branch Road    | Grant            | Brandywine         | B        | B  | B               | B  | B     | B  |
| Connecticut Avenue   | DC line          | McKinley           | D        | D  | D               | D  | D     | D  |
| Connecticut Avenue   | Nebraska         | 36th               | D        | D  | D               | D  | D     | D  |
| Connecticut Avenue   | Macomb           | Cathedral          | E        | E  | E               | E  | E     | E  |
| Connecticut Avenue   | Columbia         | Florida            | D        | D  | D               | D  | D     | D  |
| Connecticut Avenue   | 18th St          | Dupont Circle      | C        | C  | C               | C  | C     | C  |
| Wisconsin Avenue     | Albemarle        | Nebraska           | D        | E  | E               | E  | E     | E  |
| Wisconsin Avenue     | Porter           | Newark             | D        | E  | E               | E  | E     | E  |
| Wisconsin Avenue     | Calvert          | Reservoir          | D        | D  | D               | E  | E     | E  |
| Wisconsin Avenue     | O St             | P St               | C        | C  | C               | C  | C     | C  |
| Massachusetts Avenue | DC line          | 49th St            | D        | D  | D               | D  | D     | D  |
| Massachusetts Avenue | Macomb           | Idaho              | E        | E  | E               | E  | E     | E  |
| Massachusetts Avenue | Garfield         | 34th St            | F        | F  | F               | F  | F     | F  |
| Massachusetts Avenue | 24th St          | Sheridan Circle    | D        | D  | D               | D  | D     | D  |
| Massachusetts Avenue | Sheridan Circle  | Florida            | D        | D  | E               | E  | E     | E  |
| Massachusetts Avenue | 17th St          | 18th St            | C        | C  | C               | C  | C     | C  |
| Nebraska Avenue      | Oregon           | Utah               | B        | B  | B               | B  | B     | B  |
| Nebraska Avenue      | Nevada           | Military           | D        | D  | D               | D  | D     | D  |
| Nebraska Avenue      | Reno             | Albemarle          | D        | D  | D               | D  | D     | D  |
| Nebraska Avenue      | Van Ness         | Massachusetts      | D        | D  | D               | D  | D     | D  |

**TABLE G.3**  
**MATRIX 3: LEVEL OF SERVICE ANALYSIS\***

| ROADWAY LINK RESULTS  |                   |               |          |    |                 |    |       |    |
|-----------------------|-------------------|---------------|----------|----|-----------------|----|-------|----|
| Roadway               | From              | To            | 1990 LOS |    | 2020 LOS        |    |       |    |
|                       |                   |               | AM       | PM | Alt A, B, and D |    | Alt C |    |
|                       |                   |               |          |    | AM              | PM | AM    | PM |
| Military Road         | Nebraska          | 32nd St       | C        | C  | C               | C  | C     | C  |
| Military Road         | Oregon            | Beach         | E        | D  | E               | E  | E     | E  |
| Military Road         | 16th St           | 14th St       | D        | C  | D               | D  | E     | E  |
| West Beach            | Beach             | Portal        | C        | E  | E               | F  | C     | E  |
| Wise Road             | Oregon            | Beach         | C        | D  | D               | E  | D     | E  |
| Sherrill Drive        | Beach             | 16th St       | A        | A  | B               | C  | --    | -- |
| Bingham Drive         | Oregon            | Beach         | A        | A  | A               | A  | --    | -- |
| Joyce Road            | Morrow            | 16th St       | A        | A  | A               | A  | A     | A  |
| Morrow                | Joyce             | Carter-Barron | A        | A  | A               | A  | A     | A  |
| Kennedy               | 14th St           | 13th St       | B        | B  | C               | C  | B     | B  |
| Blagden Avenue        | Beach             | Upshur        | B        | B  | C               | C  | C     | C  |
| Blagden Avenue        | Upshur            | Decatur       | A        | A  | B               | B  | B     | C  |
| Piney Branch Pkwy     | Beach             | 16th St       | D        | C  | E               | C  | E     | C  |
| Tilden Street         | Linnean           | Beach         | C        | C  | D               | D  | D     | D  |
| Park Road             | Beach             | Piney Branch  | D        | D  | D               | D  | D     | E  |
| Porter Street         | Connecticut       | Kling         | D        | D  | D               | D  | D     | D  |
| Adams Mill Road       | Park              | Irving        | C        | C  | C               | C  | B     | C  |
| Harvard Street        | Adams Mill        | 16th St       | A        | A  | B               | B  | B     | B  |
| Zoo Main Rd           | Connecticut       | Zoo           | A        | A  | A               | A  | A     | A  |
| Cathedral Avenue      | Calvert           | Beach / 24th  | D        | E  | E               | E  | D     | D  |
| 24th / Calvert access | 24th / Calvert    | Beach         | F        | F  | F               | F  | F     | F  |
| M Street              | 30th St           | Pennsylvania  | F        | F  | F               | F  | F     | F  |
| M Street              | New Hampshire     | 22nd St       | C        | C  | C               | C  | C     | D  |
| New Hampshire Avenue  | 19th St           | 20th St       | C        | C  | C               | D  | E     | E  |
| New Hampshire Avenue  | 21st St           | M St          | C        | C  | C               | C  | B     | E  |
| New Hampshire Avenue  | Washington Circle | Virginia      | B        | B  | B               | B  | C     | B  |
| Pennsylvania Avenue   | M St              | L St          | D        | E  | E               | E  | D     | E  |
| Pennsylvania Avenue   | K St              | I St          | C        | C  | D               | D  | C     | D  |
| Virginia Avenue       | New Hampshire     | 23rd St       | B        | B  | B               | B  | B     | B  |
| Constitution Avenue   | 23rd St           | Henry Bacon   | F        | F  | F               | F  | F     | F  |

This analysis provides a general indication of the level of service provided on the corridors within the study area based on volume versus capacity relationships for each roadway. Certain assumptions were made about the volume distributions and lane use during peak hour periods. For the purposes of this analysis, the following volume/capacity relationships were used: LOS A= 0-28%, LOS B= 29-47%, LOS C= 48-66%, LOS D= 67-79%, LOS E= 80-100%, LOS F= 100+%.

Adjustment factors for lane capacity includes adjustments for signalized areas, trucks, buses, access points, grades, lane width, turning vehicles, and on-street parking.



## **APPENDIX H: SUMMARY OF TRAFFIC MODELING METHODOLOGY**

### **INTRODUCTION**

The National Park Service is in the process of producing a General Management Plan (GMP) and an environmental impact statement for Rock Creek Park. During the course of the GMP process a variety of alternatives were developed and analyzed. In order to conduct a thorough analysis it was necessary to develop a traffic model for Rock Creek Park that would forecast traffic conditions within the study area. The model was used to analyze the traffic impacts of the various alternatives considered in the GMP.

The Metropolitan Washington Council of Governments (MWCOC) is the agency in the Washington, D.C. area that is responsible for regional planning and traffic modeling. The MWCOC regional transportation model was used as the basis for the Rock Creek Park transportation model used to evaluate roadway system alternatives considered in the GMP for the Park. It was necessary to modify the MWCOC regional model to improve the detail and accuracy of the model in the study area and to allow evaluation of the alternatives being considered in this project.

### **MWCOC REGIONAL TRANSPORTATION MODEL**

The MWCOC transportation model files, network plots and supporting documentation were obtained from MWCOC in September, 1996. This model utilizes the MINUTP microcomputer software package (version 93B) developed by Comsis Corporation (currently maintained by the Seiders Group). The model has been developed for several target years, including 1990, 2000, 2010 and 2020. Data on years other than even decades were not available. The MWCOC model has been developed and validated for regional studies and regional air quality analysis, not subregional or corridor studies such as the Rock Creek Park project.

The area covered by the MWCOC includes approximately 4,000 square miles and 12 principal jurisdictions within the Washington, D.C. metropolitan area. These jurisdictions include Washington, D.C. and these surrounding counties: Montgomery, Prince Georges, Charles, Anne Arundel, Howard, and Frederick in Maryland, and Arlington, Alexandria, Fairfax, Loudoun, and Prince William in Virginia.

The roadway network used in the MWCOC model contains over 9,000 links and 6,000 nodes. Existing and proposed high-occupancy vehicle lanes for the metropolitan area are included in these networks. The MWCOC model includes 293 districts and 1,478 zones within those districts. Trip generation and trip distribution calculations are performed at the district level, while mode choice and all traffic assignment calculations are performed at the zone level. Zone sizes are typically smaller in the center of the model area (i.e. - Washington, D.C.) and become larger as the zones are located farther out in the Maryland and Virginia suburban counties.

### **Growth Factors**

The current version of land use forecasts, Round 5.3 Cooperative Forecast, reflects the latest estimates of regional job and household growth as agreed upon by local planning agencies around the region. The regional growth forecasts used by MWCOC for the years 2000, 2010, and 2020 were applied to the Rock Creek Park model to predict traffic in those future years.

## **Trip Generation**

Trip generation calculations are applied at the district level. Productions and attractions are calculated for each district by the following six trip purposes: home based work (HBW), home based shop (HBS), home based other (HBO), non-home based (NHB), medium truck and heavy truck. Miscellaneous trips such as taxi, school, tourist and through trips are estimated separately based on growth factored survey-based trip tables and added later in the model run. All purposes are in vehicle trips except HBW, which is in units of person trips.

## **Trip Distribution**

The trip distribution step utilizes the standard gravity model to develop district level trip tables from productions and attractions calculated in trip generation. While most districts use a base set of friction factors to distribute trips, there are some districts with unique travel characteristics (such as airports and external districts) which utilize different sets of friction factors for trip distribution.

## **Mode Choice**

In the MWCOG model, mode choice currently allocates HBW person trips among motorized travel choices. HBW person trips from trip distribution are split from district to zone level prior to mode choice. Mode choice calculates the number of persons traveling in single occupancy vehicles (SOV) and in high-occupancy vehicles (HOV), walk-access transit, auto-access transit, HOV auto-driver and HOV auto-person trip tables. In these tables, HOV represents all persons actually using HOV lanes, while low-occupancy vehicles (LOV) represents all persons using LOV lanes. This mode choice is only performed once during the base run, and only includes HBW trips. Trips for all other purposes are not included in this mode choice procedure.

## **Traffic Assignment**

Traffic assignment involves a four iteration incremental capacity restraint procedure for loading trips to the network. The loading of each iteration is equal (25% of the trip table), and the path building algorithm weights time and distance equally. The model assigns all trips on a daily basis, assuming a peak-hour factor of 10 percent on all links for capacity calculations except the Beltway (8 percent) and a few other unique roadways such as HOV facilities. Thus, there are no peak period assignments in the MWCOG model.

## **MODIFICATIONS MADE TO MWCOG MODEL TO CREATE THE ROCK CREEK PARK MODEL**

Because the MWCOG regional model only includes the major arterial road network, it was necessary to make additions to roadway network within the study area to include all of the roads within the Park and numerous local city streets near the Park. It was also necessary to develop AM peak period, PM peak period, and OFF peak period trip tables to enable full impact analysis of the alternatives. It was also necessary to develop High-occupancy Vehicle (HOV) trip tables by trip purpose and by peak period to allow analysis of alternatives that include HOV operation during peak periods.

The model was validated using actual ground count volumes from the year 1990 that were collected by the National Park Service and D.C. Department of Public Works.

As stated above, the MWCOG model has been primarily developed and validated for regional traffic studies and air quality analysis, not subregional or corridor studies such as the Rock Creek Park project. In order to effectively evaluate impacts of project alternatives within the Rock Creek study area, significant modifications to the original MWCOG model were included in the development of the Rock Creek Park (RCP) model. Due to these changes, RCP model results cannot be directly compared to results from the MWCOG model. However, the RCP model has a significantly improved correlation between model results and existing ground counts within the project study area relative to the MWCOG original model. These RCP model volumes are then adjusted in the RCP adjustment spreadsheet.

The following types of modifications to the MWCOG model were included in the development of the RCP model:

- additions and modifications to roadway network within the study area, including better spatial representation of Beach Drive, Rock Creek and Potomac Parkway and other roadways, new local roadways added to the network, relocation of some centroids within their zonal boundaries, addition and relocation of some centroid connectors, and speed and capacity changes along some roadway links

- development of AM peak period, PM peak period, and OFF peak period roadway networks and traffic assignment procedures, with the sum of these peak period assignment results representing an ADT assignment

- development of LOV, HOV-2, HOV-3 trip tables by trip purpose and by peak period to allow analysis of HOV-2 conditions during peak periods along Beach Drive

- use of adjustment spreadsheets for the following purposes: adjust future year model link volumes based on existing (1990) model volume to ground count error, include peak-hour spreading for future year model runs, and present output data in tabular format by roadway and by screenline for improved comparison and analysis

## **ROCK CREEK PARK TRAFFIC MODEL**

The following sections describe the RCP model, with emphasis on the modifications made to the MWCOG model.

### **Modeling Area**

The whole modeling area was retained, even though the project study area was mostly contained within the western half of Washington, D.C. Model run times were not excessively long to justify the effort to reduce the size of the model area.

### **Land Use / Trip Generation**

There was no modification to the MWCOG zone system, land use data or trip generation procedures or results. Thus, it is assumed that project alternatives do not change the number of trips made in any zone.

### **Highway Networks**

Outside the project study area, all network data remains identical to original MWCOG model area data. Numerous modifications were made to the MWCOG roadway network within the RCP study area. Generally, the project study area boundaries are the Wisconsin Avenue / Foxhall Road alignment to the west, East - West Highway (Rte 410) to the north, the George Mason / 14th Street Bridge to the south, and North Capitol Street to the east.

### **Trip Distribution**

The RCP model keeps trip tables constant for each project alternative being analyzed within any future target year. Trip distribution results from the MWCOG model were utilized for this project. It is assumed that project alternatives do not change the origin and destination of any trips; only the travel paths calculated in traffic assignment can change due to a project alternative. Therefore, the trip tables calculated in the MWCOG action model runs for each target year were used for all RCP model runs.

### **Mode Choice**

The RCP model uses the results of the MWCOG mode choice steps, which estimate LOV auto drivers, LOV auto persons, walk-access transit, auto-access transit, HOV auto-driver and HOV auto-person trip tables for the HBW trip purpose. In these mode choice steps, HOV is defined as HBW persons or drivers actually using an HOV facility included in the MWCOG model, while LOV represents all other HBW persons or vehicles. Note that the MWCOG model only calculates HBW trips which access transit facilities or utilize HOV facilities.

To estimate usage of HOV lanes along Beach Drive, the RCP model utilizes the MWCOG post-mode choice procedure. This procedure estimates LOV auto driver and LOV auto person trip tables by auto occupancy. For the RCP model, SOV, HOV-2 and HOV-3 trip tables were calculated for each trip purpose. MWCOG currently has no available data for auto occupancy by trip purpose in the Washington, D.C. region. Therefore, consultant estimates of average auto occupancy for each trip purpose were utilized based on data collected within the project study area during this study as well as data from other similar urban areas.

### **Time of Day Trip Table Calculations**

As described above, the RCP model performs a post-mode choice procedure to calculate trip tables by auto occupancy. These trip tables are then stratified by period of the day to allow analysis of project alternatives involving peak period roadway network changes. The MWCOG has no available data regarding time of day (TOD) factors for trips by trip purpose (for example, the percentage of daily HBW trips which occur during the AM peak period). Therefore, the consultant compiled available data for other similar urban areas and estimated these TOD factors for each

trip purpose in the MWCOG model. These TOD factors were used to estimate trip tables by trip purpose for the AM peak period (3 hours), the PM peak period (3 hours), and the OFF peak period (18 hours).

### **Traffic Assignment**

Following are the primary changes in the RCP model traffic assignment procedure relative to the MWCOG model:

The RCP model performs separate traffic assignments for the AM, PM and OFF peak periods, and adds the volumes of these three runs to produce ADT model volumes. These three period assignment procedures are identical except for the peak-hour percent of peak period factors as described below. In contrast, the MWCOG model performs one ADT traffic assignment.

Each RCP assignment includes a ten iteration incremental capacity restraint procedure, with each iteration loading 10% of the trip table. The MWCOG assignment procedure includes four iteration incremental capacity restraint procedure, with each iteration loading 25 percent of the trip table. It was observed that the four iteration assignment procedure used by MWCOG occasionally overloaded some minor streets within the project study area; the ten iteration procedure improved results along these minor roadways.

### **Adjustment Spreadsheet**

The 1990 (existing conditions) RCP model link volumes are significantly closer to existing ground counts within the study area than MWCOG model link volumes. However, there is still much error along many links within the study area. Therefore, a spreadsheet was developed which adjusts all future year model results by adding / subtracting this inherent error to each link being analyzed. The same link adjustments are applied to all model run results. This adjustment procedure provides much more reasonable estimates of future link volumes, as known existing year model error is removed.

### **Air Quality Analysis**

Model volumes calculated by the RCP model and adjusted with the adjustment spreadsheet are being utilized for most analytical purposes, including local or hot-spot air quality analysis. However, only selected links are included and adjusted in the adjustment spreadsheet. Regional air quality analysis, which must include all links within a specified geographic area, will use link volumes directly from the RCP model output before adjustment by adjustment spreadsheet. This unadjusted model output includes the same level of traffic diversion along all roadways due to project alternatives, so the relative impact of project alternatives on air quality can be calculated.

### **Agency Support**

In addition to model computer files, MWCOG provided network plots and supporting documentation which were utilized throughout the development of the RCP model. Additionally, the District of Columbia Department of Public Works provided current and historic traffic count maps and count data. These maps and counts were utilized throughout this project.

## **Model Limitations**

The following limitations have been identified about the RCP model:

Due to the nature of the model, it was not practical to attempt to model local roadways which carry very low traffic volumes. In order to model these low volume roadways, zones sizes would have to be greatly reduced and many more roadways would have to be included.

Neither the MWCOG model nor the RCP model provide any data relating to bicycle or pedestrian trips.

The data relating to the use of Metrorail and Metrobus is very limited and considered to be of little use in the analysis of alternatives.

The model does not provide any data on possible mode shifts that would result from a particular alternative.

## **TRAFFIC MODEL VALIDATION**

The traffic model used in the EIS traffic impact analysis was developed in 1996 using the Metropolitan Washington Council of Governments (MWCOG) regional traffic model. The model was developed by MWCOG in the early 1990's and calibrated using 1990 ground traffic count data. The MWCOG model was modified by Robert Peccia & Associates (RPA) to provide more model sensitivity in the vicinity of the Park and within the study area of the EIS. This revised model was also calibrated using 1990 traffic count data provided by the Washington D.C. Department of Public Works.

It is essential that the model used to assess the traffic impacts of the various alternatives being considered be accurate enough for this purpose. In an effort to assess the current validity of the model it was necessary to compare current traffic counts with the model results for the same year. The most current traffic counts available from the Washington D.C. Department of Public Works were for the year 1999. These actual traffic counts were compared to traffic volumes generated by the model for the year 1999.

The traffic growth projections included in the model were used to estimate 1999 traffic volumes. RPA then compared actual traffic counts at 40 locations within the vicinity of the study area with the model results. The results of this analysis are presented in table H.1.

The data in table H.1 indicates that the actual overall trends in traffic volumes in the area of Rock Creek Park have not increased as much as the model predicted. It is not unreasonable to expect a traffic model to vary somewhat from actual growth trends. The MWCOG growth trends used to project traffic were based on a variety of factors including the anticipated growth of residential and commercial developments within the region. On average the model is projecting traffic volumes that are about 5% greater than the actual ground counts. The modeled traffic volumes for individual streets ranged from 22% less than the actual volume to 23% more than the actual traffic counts. In 24 of the 40 locations examined the actual volumes were within 10% of the modeled results. In 34 of the 40 locations the actual and modeled volumes were within 15% of each other. Considering the wide variety of social and economic variables that determined the growth

within the area between 1990 and 1999, the differences in traffic volumes are not considered unusual.

It is important to note that traffic modeling provides the analyst with information that indicates the anticipated trends in traffic changes resulting from a particular alternative. The actual volume estimated on a particular street is not nearly as important as the relative change in traffic volumes produced as a result of the alternative. When examining the model results the most important information provided relates to the relative changes in traffic patterns and the magnitude of the volume changes. The model is used as a tool to identify where volumes are likely to increase or decrease as a result of the alternative and to estimate the general magnitude of those changes. There is no evidence that indicates that the model does not provide a reasonable assessment of the relative change in traffic volumes resulting from a particular alternative.

This validity analysis indicates that in general the model reflects a slightly greater traffic volume for the year 1999 than what actually occurred in that year. However, the impact analysis included in the GMP/EIS, which relies heavily on relative changes in traffic patterns, does provide a reasonably accurate assessment of the traffic impacts within the area resulting from the various alternatives. The slight difference between the modeled and actual volumes is considered acceptable considering that the analysis was intended to examine the alternatives using a “worst case scenario.” The model results provide a reasonable approximation of the traffic impacts that would occur with each alternative.

Based on a comparison of the most current traffic volume data with the traffic model, it is the opinion of Robert Peccia & Associates that the traffic model is still valid for the purposes of the analyzing the GMP alternatives. Although the traffic volumes projected by the model are slightly greater than the actual traffic volumes, it still is valid for use as a basis for determining possible traffic impacts. We believe that the modified MWCOC model and the analysis results contained in the GMP/EIS are valid and can be used for traffic planning efforts within the study area.

**TABLE H.1: TRAFFIC VALIDATION SUMMARY**

| <b>Roadway</b>                               | <b>From</b>   | <b>To</b>          | <b>1999 Actual<br/>Volumes<br/>(Thousands)</b> | <b>1999 Model<br/>Volumes<br/>(Thousands)</b> | <b>% Difference Be-<br/>tween Modeled<br/>and Actual Vol-<br/>umes</b> |
|--|---------------|--------------------|--|---|--|
| Beach Drive                                  | Joyce         | Broad Branch       | 12.5   | 9.8   | -21%   |
| Beach Drive                                  | Porter        | Zoo                | 25.0   | 26.9  | 8%   |
| Rock Creek and Potomac<br>Parkway southbound | Virginia      | Teddy Roosevelt Br | 24.1   | 21.8  | -9%  |
| Rock Creek and Potomac<br>Parkway northbound | Virginia      | Teddy Roosevelt Br | 24.1   | 22.8  | -5%  |
| 16th Street                                  | Missouri      | Kennedy            | 32.2   | 35.3  | 10%  |
| 16th Street                                  | Park          | Irving             | 33.8   | 34.5  | 2%   |
| Georgia Avenue                               | Alaska        | Fern               | 31.5   | 31.5  | 0%   |
| Georgia Avenue                               | Missouri      | Kennedy            | 22.7   | 24.9  | 10%  |
| Georgia Avenue                               | Park          | Kenyon             | 21.0   | 22.6  | 7%   |
| Oregon Avenue                                | Chestnut      | Nebraska           | 9.0  | 9.0   | 0%   |
| Connecticut Avenue                           | D.C. line     | McKinley           | 35.9   | 38.6  | 8%   |
| Connecticut Avenue                           | Macomb        | Cathedral          | 33.0   | 39.9  | 21%  |
| Reno Road / 34th Street                      | Macomb        | Woodley            | 16.7   | 17.7  | 6%   |
| Massachusetts Avenue                         | Macomb        | Idaho              | 30.5   | 34.6  | 13%  |
| Adams Mill Road                              | Park          | Irving             | 10.6   | 10.2  | -4%  |
| New Hampshire Avenue                         | 21st St       | M St               | 9.7  | 10.7  | 10%  |
| Virginia Avenue                              | New Hampshire | 23rd St            | 12.8   | 14.3  | 11%  |
| 23rd Street                                  | N St          | P St               | 20.0   | 15.6  | -22%   |
| 19th Street                                  | E St          | Pennsylvania       | 16.1   | 16.6  | 3%   |
| 18th Street                                  | E St          | Pennsylvania       | 16.9   | 17.5  | 4%   |
| Connecticut Avenue                           | 18th St       | Dupont Circle      | 30.2   | 28.8  | -5%  |
| Massachusetts Avenue                         | 17th St       | 18th St            | 26.2   | 23.2  | -12%   |
| 17th Street                                  | Massachusetts | P St               | 7.8  | 9.2   | 17%  |
| 16th Street                                  | Scott Circle  | P St               | 17.2   | 21.1  | 23%  |
| 14th Street                                  | Irving        | New Hampshire      | 21.4   | 23.1  | 8%   |
| Wisconsin Avenue                             | Newark        | Woodley            | 29.2   | 31.7  | 9%   |
| Connecticut Avenue                           | Jennifer      | Military           | 35.9   | 40.1  | 12%  |
| Nevada Avenue                                | Nebraska      | Military           | 5.8  | 6.9   | 18%  |
| Nebraska Avenue                              | Nevada        | Military           | 19.0   | 23.3  | 23%  |
| 13th Street                                  | Kennedy       | Missouri           | 18.1   | 20.5  | 13%  |
| 16th Street                                  | Kalmia        | Iris               | 39.0   | 40.1  | 3%   |



**TABLE H.1: TRAFFIC VALIDATION SUMMARY (CONTINUED)**

| <b>Roadway</b>       | <b>From</b>  | <b>To</b>  | <b>1999 Actual<br/>Volumes<br/>(Thousands)</b> | <b>1999 Model<br/>Volumes<br/>(Thousands)</b> | <b>% Difference Be-<br/>tween Modeled<br/>and Actual Vol-<br/>umes</b> |
|----------------------|--------------|------------|--|---|--|
| Utah Avenue          | 32nd St      | Western    | 2.0  | 2.0   | 1%   |
| 5th Street           | Missouri     | Kennedy    | 8.4  | 7.6   | -9%  |
| 41st Street          | Western      | Military   | 7.4  | 8.5   | 14%  |
| Western Avenue       | 41st St      | Military   | 19.7   | 22.4  | 14%  |
| Blair Road           | Piney Branch | Fern       | 14.2   | 16.4  | 15%  |
| Blair Road           | Piney Branch | Fern       | 14.2   | 16.4  | 15%  |
| 14th Street          | Pennsylvania | New York   | 33.0   | 35.5  | 8%   |
| 13th Street          | E St         | G St       | 14.5   | 14.5  | 0%   |
| North Capital Street | Irving       | Scale Gate | 36.8   | 37.4  | 2%   |
| OVERALL TOTAL=       |              |            | 838.1  | 883.6   | 5%   |





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