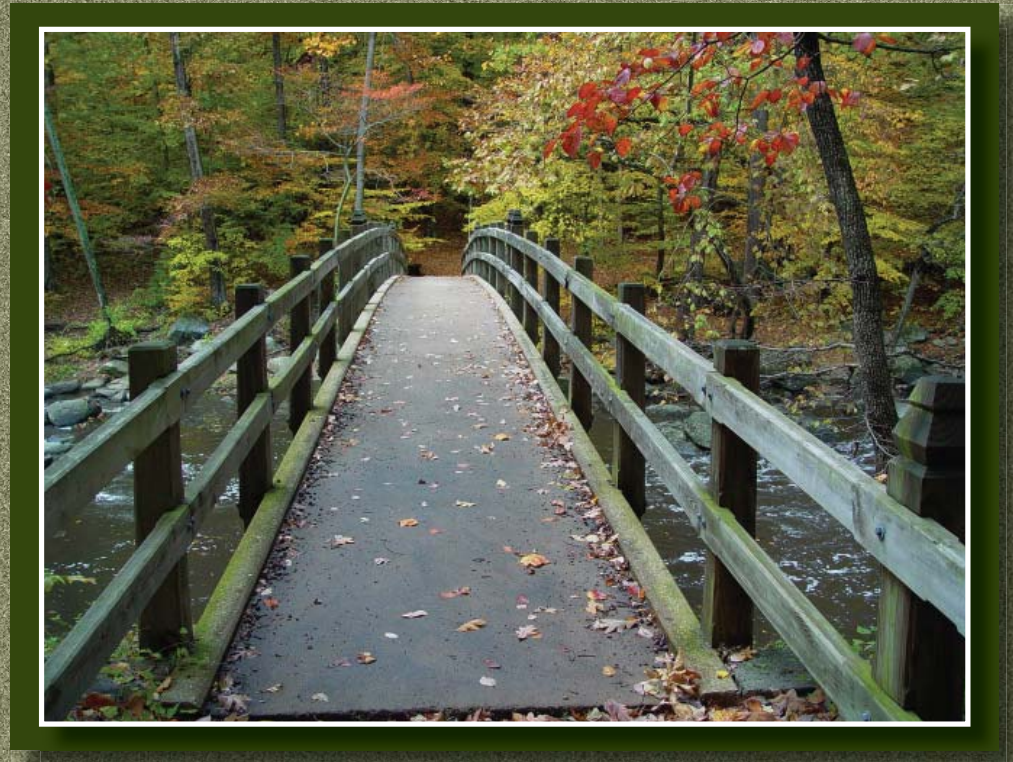




## Rock Creek Park and the Rock Creek and Potomac Parkway



### **How to Comment on This Plan:**

Comments on the *Final General Management Plan / Environmental Impact Statement, Rock Creek Park and the Rock Creek and Potomac Parkway* are welcome and will be accepted for 60 days following publication of notification in the *Federal Register*. You can submit your comments via mail or electronically.

Send written comments to:

National Park Service, Rock Creek Park  
Superintendent  
3545 Williamsburg Lane NW  
Washington, D.C. 20008-1207

You may comment via e-mail by sending comments to: [rocr\\_superintendent@nps.gov](mailto:rocr_superintendent@nps.gov)

Complete, electronic versions of the *Final General Management Plan / Environmental Impact Statement, Rock Creek Park and the Rock Creek and Potomac Parkway* and its 26-page summary can be reviewed and downloaded as PDF-format files from links at the National Park Service's Rock Creek Park Internet site at:

<http://www.nps.gov/rocr/pphtml/documents.html>

There also is a link at this location through which you can provide comments electronically.

Regardless of how you comment, please include your name and street address with your message. Please submit electronic comments as a text file, avoiding the use of special characters or any form of encryption.

It is National Park Service practice to make comments, including names and addresses of respondents, available for public review. Individual respondents may request that we withhold their address from the record, which we will honor to the extent allowable by law. However, we will not consider anonymous comments. We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

**Final**  
**General Management Plan**  
**Environmental Impact Statement**

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**Rock Creek Park and the  
Rock Creek and Potomac Parkway**

Washington, D.C.

Four alternatives were identified for the management of Rock Creek Park and the Rock Creek and Potomac Parkway.

Alternative A: Improved Management of Established Park Uses, is the NPS' preferred alternative. It would improve visitor safety, better control traffic volumes and speeds through the park, enhance interpretation and education opportunities, and improve the use of park resources, especially cultural resources. It would retain the current scope of visitor uses.

Alternative B: Continue Current Management/No Action, would continue the current management approach into the future.

Alternative C: Nonmotorized Recreation Emphasis, would permanently eliminate automobile traffic along three segments of Beach Drive, and better control traffic volumes and speeds elsewhere. Management of resources other than traffic would be the same as in Alternative A.

Alternative D: Mid-Weekday Recreation Enhancement, would eliminate automobile traffic along three segments of Beach Drive from 9:30 A.M. to 3:30 P.M. each weekday. Management of resources other than traffic would be the same as in Alternative A. This would be the environmentally preferred alternative.

Alternatives A, C, and D would improve management of the resources of the park and parkway relative to Alternative B. Impact topics that would experience major improvements would include native wildlife, historic structures and cultural landscapes, and visitor safety. Major adverse effects on the existing pattern of park use of automobile travel along the length of Beach Drive would occur with Alternative C.

Alternative A, the NPS' preferred alternative, would not impair park resources or values. As a result, it would not result in a violation of the Organic Act.

For more information concerning this plan, contact:

Adrienne Coleman, Superintendent  
3545 Williamsburg Lane NW  
Washington, D.C. 20008-1207  
202-895-6000



## EXECUTIVE SUMMARY

### OVERVIEW

This general management plan and environmental impact statement is the basic guidance document for managing Rock Creek Park and the Rock Creek and Potomac Parkway. The purposes of this plan are to specify resource conditions and visitor experiences to be achieved in the park and parkway, and to provide the foundation for decision-making and preparation of more specific resource plans regarding the management of the park and parkway.

This document consists of two volumes.

Volume 1 is the general management plan and environmental impact statement. It describes the purpose and need for general management planning; identifies the alternatives for managing the park and parkway; summarizes the existing natural resources, cultural resources, and visitor and community values that could be affected by the management plan; and evaluates the effects of each of the alternatives on these resources and values.

Volume 2 provides the public comments and National Park Service (NPS) responses regarding the draft environmental impact statement that were received from the public between the publication of a notice of availability on March 14, 2003 and closure of the comment period on July 15, 2003.

The final general management plan will be the first comprehensive plan prepared for Rock Creek Park and the Rock Creek and Potomac Parkway by the National Park Service. When completed, it will represent the shared vision of the National Park Service and the public on how the park and parkway will be used and managed in future years. This plan represents the results of a planning process that began in 1996. This plan complies with applicable NPS planning guidance, including *Management Policies 2001* (NPS 2000a) and *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a).

The area covered by this plan includes the 1,754 acres administered by the National Park Service in the Rock Creek valley from the Maryland state line south to the National Zoo, the 2-mile-long Rock Creek and Potomac Parkway from the National Zoo to Virginia Avenue, lands along selected tributaries of Rock Creek, and roadways that are associated with these areas.

A pivotal management issue to be resolved by this plan involves the use of park roads. This issue includes determining the level of nonrecreational traffic in Rock Creek Park and the degree to which park values would be affected by such use. The other two key management issues include the currently limited ability to provide orientation, interpretation, and education services to visitors in the park, and the problems that park administrative and operation activities encounter at their present locations in historic structures.

These key management issues are summarized in three questions, called decision points. The decision points helped define the management alternatives that are described and evaluated in this final general management plan. The decision points ask

how should traffic be managed in Rock Creek Park and on the Rock Creek and Potomac Parkway?

what are the most appropriate levels of service and locations for visitor interpretation and education in the park?

what are the most appropriate locations to support administration and operations functions with respect to minimizing resource disturbance?

Current management practices include closing portions of Beach Drive and other park roads to motorized vehicles on weekends and holidays. These closures provide outstanding recreation opportunities that are unmatched in the District of Columbia, and are very popular with park visitors. Therefore, all of the alternatives for future management of the park will continue the practice of weekend and holiday road closures.

As with all NPS units, management of the park and parkway is guided by numerous congressional acts, executive orders, and NPS policies. In addition to the approaches contained in the alternatives in this final general management plan, the National Park Service strives to implement all of these legislative, executive, and policy requirements in the park and parkway. The section “Servicewide Policies and Mandates” identifies the optimum conditions that the National Park Service will work to attain regardless of the alternative that is selected, and the types of actions the National Park Service will take to achieve those optimum conditions.

Specific resources and values, called impact topics, were used to focus the planning process and the assessment of the alternatives’ consequences. Four criteria were used to determine the impact topics. They included resources cited in the establishing legislation for the park or the parkway, resources critical to maintaining the significance and character of the park, resources recognized as important by laws or regulations, and resources of concern to the public, as expressed during scoping. Impact topics were organized into the following three categories:

natural resources, including air quality, Rock Creek and its tributaries, wetlands and floodplains, deciduous forests, protected and rare species, and other native wildlife

cultural resources, including archeological resources, historic structures, and cultural landscapes

visitor and community values, including traditional park character and visitor experience, public health and safety, regional and local transportation, and community character

Four alternatives were developed to provide different approaches for addressing the decision points. To design the four alternatives, the National Park Service first conducted public scoping, and then screened a larger number of alternatives, refining them based on public input. Following the general definition of the alternatives, the National Park Service identified management prescriptions that could be applicable to implementing the alternatives.

The management prescriptions identify how various parts of the park and parkway would be managed. Each prescription is defined in this general management plan based on desired visitor experiences and resource conditions, and the kinds of activities or facilities within the prescription that would achieve the targeted conditions. The management prescriptions were then mapped to specific areas of the park to define the details of the four alternatives.

Twelve management prescriptions define all of the target visitor experiences and resource conditions that could occur under the four alternatives for Rock Creek Park and the Rock Creek and Potomac Parkway. Each alternative is a combination of several management prescriptions. None

of the alternatives would use all of the prescriptions, and the locations where some of the prescriptions would be applied vary among alternatives.

Consistent with the high level of concern expressed in scoping about the use of roadways, seven of the prescriptions apply to roads. The others emphasize desired conditions and visitor experiences for forests, cultural resources, recreation areas, visitor facilities, and administration and operations areas.

## **DESCRIPTIONS OF ALTERNATIVES**

Four alternatives were identified for the management of Rock Creek Park and the Rock Creek and Potomac Parkway. The key features of the alternatives include the following.

**Alternative A: Improved Management of Established Park Uses.** Alternative A is the NPS' preferred alternative. It would improve visitor safety, better control traffic volumes and speeds through the park, enhance interpretation and education opportunities, and improve the use of park resources, especially cultural resources. It generally would retain the current scope of visitor uses.

Alternative A would improve traffic management within the park and parkway. The existing park roadway system would be retained and nonrecreational through-traffic would be accommodated. However, to improve visitor safety and the quality of the visitor's experience, traffic-calming devices such as speed tables would be installed on Beach Drive to reduce volumes and speeds compared to those that would occur if current management were continued (Alternative B). Alternative A also would include the following actions.

- Upgrade some trails, rehabilitate deteriorating segments, and construct up to 1.75 miles of new trail.

- Rehabilitate the Peirce Mill complex to focus on the history of milling and land use in the area. This would expand on the already in progress rehabilitation of the Peirce Barn, which serves as a visitor contact point with exhibits on the history of the Peirce estate and milling in the Rock Creek valley.

- Move the park administrative offices out of the Peirce-Klinge Mansion at Linnaean Hill to commercial office space outside the park, or to other office space, potentially including a new office facility constructed within the park. The park maintenance yard was evaluated as a representative site for this action.

- Rehabilitate the Linnaean Hill complex for adaptive use compatible with park values.

- Move the U.S. Park Police substation out of the Lodge House on Beach Drive at Joyce Road to commercial space outside the park, or to other space, potentially including a new park police substation constructed within the park. A site near the existing U.S. Park Police H-3 stables was evaluated as a representative site for this action.

- Convert the Lodge House to a visitor contact station to provide park orientation, information, and interpretation.

- Rehabilitate and expand the nature center and upgrade the planetarium to improve effectiveness of public programs.

**Alternative B: Continue Current Management/No Action.** Alternative B would continue the current management pattern into the future. It represents the "no action alternative" required by

the Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act and *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a).

Under Alternative B, Rock Creek Park and the Rock Creek and Potomac Parkway would be maintained as they have evolved thus far. There would not be any major changes in resources management, visitor programs, or facilities beyond regular maintenance. The current park road system would be retained and existing traffic management would continue.

**Alternative C: Nonmotorized Recreation Emphasis.** Alternative C would address comments by members of the public who want to promote nonmotorized recreation. Alternative C would eliminate traffic in much of the northern part of the park by closing three sections of Beach Drive to automobiles. These would be the same three segments that currently are closed on weekends. It also would implement traffic-reducing and traffic-calming measures on roads in the southern portion of the park and on the parkway. The Alternative C management proposals for resources other than traffic would be the same as those listed above for Alternative A.

The intent of closing the road along portions of the Rock Creek valley floor would be to manage this area as a quiet refuge from urban automobile traffic and to promote nonmotorized recreation throughout the week. This section of the park would become a destination for nonmotorized activities, rather than a through drive. Alternative C also would convert the road into a paved trail through the Rock Creek valley and connecting to the Potomac River, as envisioned in regional bicycle plans.

**Alternative D: Mid-Weekday Recreation Enhancement.** Alternative D is the environmentally preferred alternative. Alternative D was developed in response to a letter sent to the National Park Service by the Mayor of the District of Columbia. The mayor suggested “implementing weekday vehicular traffic restrictions on sections of upper Beach Drive in non-rush-hour periods.”

On weekdays, Alternative D would close three segments of Beach Drive in the northern portion of the park to motorized vehicles for a 6-hour period, from 9:30 A.M. to 3:30 P.M. These would be the same segments that currently are closed on weekends. For the other 18 hours of each weekday, including both rush-hour periods, traffic management would be similar to Alternative B, although traffic-calming measures like those in Alternative A would be used to reduce volumes and speeds. Alternative D would manage resources other than traffic in the same manner as presented above for Alternative A.

Alternative D was intended as a compromise between traffic and nonmotorized recreation. During rush-hour periods, the alternative would attempt to facilitate traffic flows and minimize the diversion of rush-hour traffic from the park into nearby neighborhoods. Between rush-hour periods on weekdays, it would promote nonmotorized recreation and provide a quiet refuge from the surrounding urban area.

## **ENVIRONMENTAL CONSEQUENCES**

The environmental impact statement portion of this plan describes the affected environment of the park and parkway in terms of 12 impact topics. The environmental consequences section describes the effects of each alternative on each impact topic.



Determining environmental consequences first included identifying the regulations and policies that were applicable to the impact topic, and then defining the methods that were used to conduct the analysis. This included defining relative terms such as “minor” or “major” effects for the impact topic and establishing timeframes for long-term and short-term effects. The analysis was then performed both for the park and parkway and in a more regional context to determine cumulative impacts. Most analyses involved comparing conditions that would occur with changes in management (Alternatives A, C, and D, commonly called the “action alternatives”) to conditions that would occur if current management practices continued (Alternative B, the “no action alternative”).

The analysis of environmental consequences found that all four alternatives would have fairly similar effects on air quality, the water quality and hydrology of Rock Creek and its tributaries, wetlands and floodplains, deciduous forests, and protected and rare species. These findings would be expected, based both on the NPS’ mandate to protect these resource and the development of the alternatives from decision points that focus on traffic management, visitor interpretation and education, and effective administration and operations.

Some differences to natural resources would occur. However, except for roadkill reductions that would occur with all of the action alternatives, none of the differences to natural resources among the alternatives would be major.

In the area of traditional park character and visitor experience, the improved education and interpretation facilities included in Alternatives A, C, and D would provide greater opportunities for the public to learn about and experience the park’s natural and cultural resources, compared to Alternative B. The action alternatives would also enhance the efficiency of park administration and improve police services.

The traffic management measures of all three action alternatives would produce major improvements in visitor safety. Most of the improvements would be associated with the implementation of engineered traffic-calming devices, such as speed tables on Beach Drive, which would reduce vehicle speeds and the associated frequency and severity of accidents.

The greatest benefits on nonmotorized recreation would be associated with Alternative C. However, Alternative C would eliminate the current practice of automobile travel along the length of Beach Drive, including the gorge area. This would result in a major adverse effect on the existing pattern of park use and visitor experience.

Historic park roads are considered a cultural resource. By closing them to motorized traffic, Alternative C would modify some of the design features that define their significance.

Cultural resources would be the only impact topic where one or more of the alternatives could cause irreversible and irretrievable losses of resources. Under the three action alternatives, the disturbance of sites in association with new construction could result in some irreversible and irretrievable loss of archeological or historic resources.

For Alternatives A, C, and D, the effects on traditional park character and visitor experience, regional and local transportation during rush hours, and community characteristics that are associated with traffic levels were evaluated based on improvements or declines in levels of service relative to Alternative B in the year 2020.

Alternatives A and D would produce 2020 rush-hour conditions similar (no differences in levels of service) to those in Alternative B. This result was expected, because the focus of Alternative A is on reducing traffic speeds in the park and Alternative D is designed to minimize effects both on rush-hour traffic and neighborhoods.

Within the park, improvements in levels of service from Alternative C would be noticeable to major. Effects would include the elimination of automobile traffic on most of Beach Drive north of Broad Branch Road with Alternative C. This alternative would produce noticeable (change of one level of service) improvements in traffic along most of the Rock Creek and Potomac Parkway.

Eight road segments outside the park would have benefits on traffic and community character under Alternative C associated with improved levels of service, while nine road segments would have decreased levels of service with associated adverse effects on traffic and community character. There would not be a disproportionate routing of traffic to disadvantaged areas or ethnic neighborhoods.

During the middle part of workdays, Alternatives C and D would have similar effects, diverting traffic that would use park roads under Alternative B onto nearby city streets. However, nearby streets and intersections would be operating well below their capacities during the mid-day period, even in the year 2020. While the diverted mid-day traffic would be perceptible on some city streets, it would not cause any changes in levels of service or in traffic-related community character.

With regard to the first decision point, Alternatives A, C, and D would substantially reduce automobile traffic speeds and/or volumes in the park compared to Alternative B.

Alternative A would accomplish this by implementing traffic-calming measures while maintaining the roads as part of the city's transportation system on weekdays.

Alternative C would permanently remove some segments of Beach Drive from the city's motorized vehicle network, and would implement traffic-reducing and traffic-calming measures in other areas.

Alternative D would implement traffic-calming measures, and would also close sections of Beach Drive to motorized traffic during the middle part of each weekday.

Regarding the second decision point, the levels of service for visitor interpretation and education would be equally improved under the identical measures of Alternatives A, C, and D. This would be accomplished by moving administrative and operations functions out of historic buildings and by rehabilitating these and other historic and educational structures. For the third decision point, Alternatives A, C, and D would provide the same levels of improvements compared to Alternative B by moving administration and operations functions into modern facilities.

Alternative D is the environmentally preferred alternative for managing Rock Creek Park and the Rock Creek and Potomac Parkway. Alternative D would best satisfy the six national environmental goals at a relatively high level.

Alternatives A, C, and D would not result in impairment of any natural or cultural resources in Rock Creek Park and the Rock Creek and Potomac Parkway.

Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

# CONTENTS

## Purpose of and Need for Action

Purpose of the General Management Plan	1
Need for the General Management Plan	4
Park History and Use Relative to Management Planning	5
Geographic Area Covered by the General Management Plan	10
Planning Direction or Guidance	11
Park Mission	11
Mission Goals	13
Special Mandates and Administrative Commitments	14
Servicewide Mandates and Policies	14
Planning Opportunities and Issues	29
Decision Points	29
Alternatives or Actions Eliminated from Further Study	32
Impact Topics - Resources and Values at Stake in the Planning Process	38
Impact Topics Dismissed from Further Consideration	43
Connected, Cumulative, and Similar Actions	45

## Alternatives

Management Prescriptions	51
Forest Zone	52
Desired Visitor Experience	52
Desired Resource Conditions	56
Appropriate Kinds of Activities or Facilities	56
Cultural Resource Zone	56
Desired Visitor Experience	57
Desired Resource Conditions	57
Appropriate Kinds of Activities or Facilities	57
Valley Floor Automobile Access Zone	57
Desired Visitor Experience	57
Desired Resource Conditions	58
Appropriate Kinds of Activities or Facilities	58
Valley Floor Controlled Automobile Access Zone	58
Desired Visitor Experience	58
Desired Resource Conditions	58
Appropriate Kinds of Activities or Facilities	58
Valley Floor Nonmotorized Recreation Zone	59
Desired Visitor Experience	59
Desired Resource Conditions	59
Appropriate Kinds of Activities or Facilities	59
Valley Floor Mid-Weekday Recreation Zone	59
Desired Visitor Experience	59
Desired Resource Conditions	60
Appropriate Kinds of Activities or Facilities	60
Rock Creek and Potomac Parkway Zone	60
Desired Visitor Experience	60
Desired Resource Conditions	60
Appropriate Kinds of Activities or Facilities	61
Park Road Zone	61
Desired Visitor Experience	61
Desired Resource Conditions	61
Appropriate Kinds of Activities or Facilities	61

Visitor Facility Zone	62
Desired Visitor Experience	62
Desired Resource Conditions	62
Appropriate Kinds of Activities or Facilities	62
Urban Recreation Zone	62
Desired Visitor Experience	62
Desired Resource Conditions	63
Appropriate Kinds of Activities or Facilities	63
Administration/Operations Zone	63
Desired Visitor Experience	63
Desired Resource Conditions	63
Appropriate Kinds of Activities or Facilities	64
Urban Transit Zone (Non-NPS Roads)	64
Desired Visitor Experience	64
Desired Resource Conditions	64
Appropriate Kinds of Activities or Facilities	64
Formulation of Alternatives	65
Public Input and the Development of Alternatives A, B, and C	65
Formulation of Alternative D	66
Formulation of the NPS' Final Preferred Alternative	67
Mitigation	68
The Preferred Alternative	69
The Environmentally Preferred Alternative	71
Alternative A: Improved Management of Established Park Uses	73
Concept	73
Management Prescriptions	74
Forest Zone	74
Cultural Resource Zone	77
Valley Floor Controlled Automobile Access Zone	78
Rock Creek and Potomac Parkway Zone	79
Park Road Zone	80
Visitor Facility Zone	80
Urban Recreation Zone	81
Administration/Operations Zone	81
Urban Transit Zone	84
Summary of Trail Improvements	84
Costs	86
Alternative B: Continue Current Management/No Action	89
Concept	89
Management Prescriptions	89
Forest Zone	89
Cultural Resource Zone	89
Valley Floor Automobile Access Zone	90
Rock Creek and Potomac Parkway Zone	90
Park Road Zone	90
Visitor Facility Zone	93
Urban Recreation Zone	93
Administration/Operations Zone	93
Urban Transit Zone	94
Costs	94

Alternative C: Nonmotorized Recreation Emphasis	95
Concept	95
Management Prescriptions	96
Forest Zone	96
Cultural Resource Zone	96
Valley Floor Nonmotorized Recreation Zone	99
Valley Floor Controlled Automobile Access Zone	99
Rock Creek and Potomac Parkway Zone	101
Park Road Zone	102
Visitor Facility Zone	102
Urban Recreation Zone	102
Administration/Operations Zone	103
Urban Transit Zone	103
Summary of Trail Improvements	103
Costs	103
Alternative D: Mid-Weekday Recreation Enhancement	105
Concept	105
Management Prescriptions	109
Forest Zone	109
Cultural Resource Zone	109
Valley Floor Controlled Automobile Access Zone	110
Valley Floor Mid-Weekday Recreation Zone	111
Rock Creek and Potomac Parkway Zone	111
Park Road Zone	112
Visitor Facility Zone	112
Urban Recreation Zone	112
Administration/Operations Zone	113
Urban Transit Zone	113
Summary of Trail Improvements	113
Costs	113
Summary of Alternatives	115

## **Affected Environment**

Natural Resources	131
Air Quality	131
Regional Compliance with Air Quality Standards	131
Carbon Monoxide Monitoring Results in 2001 and 2002	132
Year 1996 Air Quality Evaluation for Rock Creek Park	133
Rock Creek and Its Tributaries	134
Watershed Overview	134
Sewers and Outfalls	135
Water Quality Standards	136
Rock Creek Water Quality	136
Wetlands and Floodplains	140
Wetlands	141
Floodplains	141
Deciduous Forests	142
Protected and Rare Species	144
Federal- and State-Listed Amphipods	144
Other State-Listed Species	145
Other Native Wildlife	146
Terrestrial Wildlife	146
Aquatic Wildlife	148

- Non-Native Terrestrial Animals 148
- Roadkill 149
- Cultural Resources 154
  - Archeological Resources 154
  - Historic Resources and Cultural Landscapes 155
- Visitor and Community Values 159
  - Traditional Park Character and Visitor Experience 159
    - Recreation Opportunities 159
    - Visitor Profile 161
    - Visitation Trends and Visitor Services 162
  - Noise 163
  - Access 163
- Public Health and Safety 164
  - Traffic Safety 164
  - Crime 170
  - Evacuation of the City during a Major Emergency 170
- Regional and Local Transportation 171
  - Regional Traffic Flows 171
  - Local Traffic Flows 172
  - Mass Transportation 178
  - Nonmotorized Transportation Flows 178
- Community Characteristics 179
  - Metropolitan Washington, D.C. 180
  - Surrounding Neighborhoods and Zip Code Tabulation Areas 180

**Environmental Consequences**

- Environmental Impacts of Alternative A: Improved Management of Established Park Uses 185
  - Impacts on Air Quality 185
    - Regulations and Policy 185
    - Methodology 185
    - Analysis 190
    - Cumulative Impacts 190
    - Conclusions 192
  - Impacts on Rock Creek and Its Tributaries 192
    - Regulations and Policy 192
    - Methodology 192
    - Analysis 193
    - Cumulative Impacts 195
    - Conclusions 196
  - Impacts on Wetlands and Floodplains 197
    - Regulations and Policy 197
    - Methodology 197
    - Analysis 198
    - Cumulative Impacts 199
    - Conclusions 199
  - Impacts on Deciduous Forests 199
    - Regulations and Policy 199
    - Methodology 200
    - Analysis 201
    - Cumulative Impacts 203
    - Conclusions 203
  - Impacts on Protected and Rare Species 203
    - Regulations and Policy 203
    - Methodology 204
    - Analysis 204

Cumulative Impacts	205
Conclusions	205
Impacts on Other Native Wildlife	205
Regulations and Policy	205
Methodology	206
Analysis	206
Cumulative Impacts	208
Conclusions	209
Impacts on Archeological Resources	210
Regulations and Policy	210
Methodology	210
Analysis	210
Cumulative Impacts	211
Conclusions	212
Impacts on Historic Structures and Cultural Landscapes	212
Regulations and Policy	212
Methodology	212
Analysis	212
Cumulative Impacts	213
Conclusions	213
Impacts on Traditional Park Character and Visitor Experience	213
Regulations and Policy	213
Methodology	213
Analysis of Effects on Continuation and Quality of Traditional Park Uses	215
Analysis of Effects on Visitor Recreational Opportunities	217
Analysis of Effects on Access for Visitors with Impaired Mobility	219
Cumulative Impacts	219
Conclusions	219
Impacts on Public Health and Safety	220
Regulations and Policy	220
Methodology	220
Analysis of Effects on Safety along Roadways	220
Analysis of Effects on Personal Safety	224
Analysis of Effects on Emergency Evacuations	225
Cumulative Impacts	225
Conclusions	225
Impacts on Regional and Local Transportation	225
Regulations And Policy	225
Methodology	225
Analysis	228
Cumulative Impacts	231
Conclusions	231
Impacts on Community Character	232
Regulations and Policy	232
Methodology	232
Analysis	233
Cumulative Impacts	233
Conclusions	234
Sustainability and Long-Term Management	234
The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	234
Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented	234
Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented	235
Environmental Impacts of Alternative B: Continue Current Management/No Action	236



Impacts on Air Quality	236
Analysis	236
Cumulative Impacts	236
Conclusions	236
Impacts on Rock Creek and Its Tributaries	237
Analysis	237
Cumulative Impacts	237
Conclusions	237
Impacts on Wetlands and Floodplains	237
Analysis	237
Cumulative Impacts	238
Conclusions	238
Impacts on Deciduous Forests	238
Analysis	238
Cumulative Impacts	238
Conclusions	238
Impacts on Protected and Rare Species	239
Analysis	239
Cumulative Impacts	239
Conclusions	239
Impacts on Other Native Wildlife	239
Analysis	239
Cumulative Impacts	240
Conclusions	240
Impacts on Archeological Resources	240
Analysis	240
Cumulative Impacts	241
Conclusions	241
Impacts on Historic Structures and Cultural Landscapes	241
Analysis	241
Cumulative Impacts	241
Conclusions	241
Impacts on Traditional Park Character and Visitor Experience	241
Analysis of Effects on Continuation and Quality of Traditional Park Uses	241
Analysis of Effects on Visitor Recreational Opportunities	242
Analysis of Effects on Access for Visitors with Impaired Mobility	243
Cumulative Impacts	243
Conclusions	243
Impacts on Public Health and Safety	244
Analysis of Effects on Safety along Roadways	244
Analysis of Effects on Personal Safety	244
Analysis of Effects on Emergency Evacuations	244
Cumulative Impacts	244
Conclusions	244
Impacts on Regional and Local Transportation	244
Analysis	245
Cumulative Impacts	245
Conclusions	246
Impacts on Community Character	246
Analysis	246
Cumulative Impacts	246
Conclusions	246
Sustainability and Long-Term Management	246
The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	246

Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented 247

Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented 247

Environmental Impacts of Alternative C: Nonmotorized Recreation Emphasis 248

Impacts on Air Quality 248

Analysis 248

Cumulative Impacts 248

Conclusions 249

Impacts on Rock Creek and Its Tributaries 249

Impacts on Wetlands and Floodplains 249

Impacts on Deciduous Forests 249

Impacts on Protected and Rare Species 249

Impacts on Other Native Wildlife 250

Impacts on Archeological Resources 250

Impacts on Historic Structures and Cultural Landscapes 250

Analysis 250

Cumulative Impacts 250

Conclusions 250

Impacts on Traditional Park Character and Visitor Experience 251

Analysis of Effects on Continuation and Quality of Traditional Park Uses 251

Analysis of Effects on Visitor Recreational Opportunities 252

Analysis of Effects on Access for Visitors with Impaired Mobility 253

Cumulative Impacts 254

Conclusions 254

Impacts on Public Health and Safety 254

Analysis of Effects on Safety along Roadways 254

Analysis of Effects on Personal Safety 257

Analysis of Effects on Emergency Evacuations 257

Cumulative Impacts 257

Conclusions 257

Impacts on Regional and Local Transportation 257

Analysis 257

Cumulative Impacts 271

Conclusions 272

Impacts on Community Character 272

Analysis 272

Cumulative Impacts 275

Conclusions 276

Sustainability and Long-Term Management 276

The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity 276

Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented 276

Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented 276

Environmental Impacts of Alternative D: Mid-Weekday Recreation Enhancement 278

Impacts on Air Quality 278

Analysis 278

Cumulative Impacts 278

Conclusions 279

Impacts on Rock Creek and Its Tributaries 279

Impacts on Wetlands and Floodplains 279

Impacts on Deciduous Forests 279

Impacts on Protected and Rare Species 279

Impacts on Other Native Wildlife 280

Impacts on Archeological Resources	280
Impacts on Historic Structures and Cultural Landscapes	280
Impacts on Traditional Park Character and Visitor Experience	280
Analysis of Effects on Continuation and Quality of Traditional Park Uses	280
Analysis of Effects on Visitor Recreational Opportunities	282
Analysis of Effects on Access for Visitors with Impaired Mobility	283
Cumulative Impacts	283
Conclusions	284
Impacts on Public Health and Safety	284
Analysis of Effects on Safety along Roadways	284
Analysis of Effects on Personal Safety	286
Analysis of Effects on Emergency Evacuations	286
Cumulative Impacts	286
Conclusions	286
Impacts on Regional and Local Transportation	286
Analysis	286
Cumulative Impacts	289
Conclusions	290
Impacts on Community Character	290
Analysis	290
Cumulative Impacts	290
Conclusions	290
Sustainability and Long-Term Management	291
The Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	291
Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented	291
Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented	291

### **Consultation and Coordination**

History of Public Involvement	293
List of Preparers	296
Planning Team	296
Rock Creek Park	296
Denver Service Center (DSC)	296
National Capital Regional Office	296
U.S. Park Police	297
Consultants	297
Parsons	297
Rock Creek Park	297
Robert Peccia & Associates, Inc.	297
List of Recipients	297

## **Bibliography, Index, and Appendixes**

Bibliography	303
Index of Key Words	318
Appendix A: Legislation	330
Appendix B: Laws and Executive Orders	334
Appendix C: Relationship of the General Management Plan to Other Planning Efforts	337
Appendix D: Letter from the Mayor of the District of Columbia Requesting Another Alternative	344
Appendix E: Federal and State-Listed Special-Concern Species	346
Appendix F: National Register of Historic Places Properties	371
Appendix G: Comparison of Impacts of Alternatives on Traffic, Based on Modeling	372
Appendix H: Summary of Traffic Modeling Methodology	377

## **TABLES**

1: Criteria Used to Establish Each Impact Topic	39
2: Summary of Management Prescriptions	53
3: Advantages of the Action Alternatives	70
4: Management Prescription Zoning under Each Alternative	74
5: Estimated Costs of Implementing the Alternatives	87
6: Summary of Key Differences among the Alternatives	117
7: Summary of Impacts of the Alternatives	121
8: Carbon Monoxide National Ambient Air Quality Standards and Values for Washington, D.C., 2001 – 2002	133
9: Recorded Roadkills in and adjacent to Rock Creek Park and the Rock Creek and Potomac Parkway, 1991 through 2000	149
10: Roadkills Recorded on Beach Drive in 2000	150
11: Roadkills Recorded on the Rock Creek and Potomac Parkway in 2000	150
12: Locations of Recorded Roadkills for Four Species, 1991 through 2000	151
13: Summary of Traffic Accidents in Rock Creek Park and the Rock Creek and Potomac Parkway, 1993 through 1995 and 2001 through 2003	165
14: Summary of Traffic Accidents on Beach Drive Segments North of Broad Branch Road, 2001 to 2003	168
15: Accident Rates for the Rock Creek and Potomac Parkway, Beach Drive, and Washington, D.C.	170
16: Personal Crime Totals for Police Districts 2, 3, and 4 in Washington, D.C., 1999-2003	171
17: Average Mid-Day and Daily Traffic Volumes for Neighborhood Roads North of Rock Creek Park in 2003	178
18: General Characteristics of the Populations of Washington, D.C. surrounding Rock Creek Park by Zip Code Tabulation Area	182
19: General Characteristics of the Populations of Maryland Communities near Rock Creek Park by Zip Code Tabulation Area	184
20: Air Quality Impact Evaluation Based on Estimated Maximum-Hour Carbon Monoxide (CO) Concentrations in 2020	191
21: Relative Advantages of the Alternatives with Regard to Visitor Recreational Opportunities on Weekdays	218
22: Level-of-Service Characteristics of Urban and Suburban Arterials	227
23: Average Daily Traffic under Alternative C Compared to Average Daily Traffic under Alternative B in the Year 2020	258

- 24: Beach Drive and Rock Creek and Potomac Parkway Segments Experiencing Noticeable or Greater Changes in Traffic Levels of Service between Alternative C and Alternative B 263
- 25: Other Road Segments Experiencing Noticeable or Greater Changes in Traffic Levels between Alternative C and Alternative B 265
- 26: Zip Code Tabulation Areas Experiencing Noticeable or Greater Changes in Community Characteristics Associated with Traffic between Alternative C and Alternative B 274
- 27: Maximum Hourly Volume of Traffic that Would Be Diverted by Alternative D Road Closures by Road Segment in the Year 2020 287
- 28: Traffic Impact Summary for Alternative D in the Year 2020 288

## **FIGURES**

- Region 6
- Existing Conditions 7
- Rock Creek Watershed 17
- Alternative A 75
- Alternative B 91
- Alternative C 97
- Alternative D 107
- Sewerlines and Outfalls 137
- Average Weekday Traffic Volumes 173
- Alternative A and B Year 2020 Average Weekday Volumes 187
- alternative C Year 2020 Average Weekday Traffic Volumes 259
- Alternative C Year 2020 a.m. Peak-hour Volume Changes with Respect to Alternative B 267
- Alternative C Year 2020 p.m. Peak-hour Volume Changes with Respect to Alternative B 269

Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

## **PURPOSE OF AND NEED FOR ACTION**

*This section defines the purposes of the general management plan for Rock Creek Park and the Rock Creek and Potomac Parkway, and why the general management plan is needed. It includes planning direction and guidance, and identifies the issues (decision points and impact topics) that were considered.*

### **PURPOSE OF THE GENERAL MANAGEMENT PLAN**

Rock Creek Park and the Rock Creek and Potomac Parkway are heavily used by the public. This use places demands on park personnel and facilities to protect resources and maintain a suitable visitor experience. Use and associated demands are expected to increase in the future. A coordinated, integrated plan is required to guide park management in a direction that best meets the multiple demands being placed on the area.

This plan is the basic document for managing Rock Creek Park and the Rock Creek and Potomac Parkway. The purposes of this general management plan are to

- specify resource conditions and visitor experiences to be achieved in Rock Creek Park and the Rock Creek and Potomac Parkway

- provide the basic foundation for decision-making regarding the management of the park and parkway

This general management plan identifies goals that the National Park Service (NPS) is trying to achieve in the management of the park and parkway and outlines possible approaches to meet those goals. However, if an initial approach is not successful in accomplishing all or part of the goals presented in this plan, the National Park Service will use adaptive management and try other approaches to attempt to achieve the goals. It should be understood that this plan provides a long-range vision, and that more detailed implementation and annual plans that tier from this plan will be used to attempt to turn the vision into reality.

The final general management plan will be the first comprehensive plan prepared for Rock Creek Park and the Rock Creek and Potomac Parkway by the National Park Service. When completed, it will represent an agreement by the National Park Service with the public on how the park and parkway will be used and managed. As such, it is intended to

- confirm the significance of the park and parkway

- establish the direction and values that should be considered in planning to achieve the purposes defined in the establishing legislation of the park and parkway

- define management prescriptions that establish the goals of the National Park Service and the public with regard to visitor experience, natural resources, and cultural resources, including the types and locations of resource management activities, visitor activities, and development that are appropriate within each management prescription

## PURPOSE AND NEED FOR ACTION

determine areas where management prescriptions should be applied to achieve the overall management goals of the park and parkway

assist NPS staff in determining whether actions proposed by the National Park Service or others are consistent with the goals embodied in the management prescription where the action would occur

serve as the basis for shorter-term management documents such as 5-year strategic plans, annual performance plans, and implementation plans

Some of the future visitor experience, natural resource, and cultural resource conditions of Rock Creek Park and the Rock Creek and Potomac Parkway are specified in law and policy. Others must be determined through planning. The alternatives in this final general management plan address the resource and experience conditions that are not mandated by law and policy.

The National Park Service views public comment as an integral part in establishing the desired resource and experience conditions that will guide the management of the park and parkway. Measures taken by the National Park Service to include the public as a partner in general management planning for the park and parkway include

soliciting public participation in the planning process and incorporating suggestions from the public into the park management alternatives

performing public scoping to identify important impact topics and evaluating the effects of the alternatives to those impact topics in the draft environmental impact statement

inviting the public to comment on the draft general management plan and environmental impact statement

using that input in the preparation of this final general management plan and environmental impact statement

This document consists of two volumes.

Volume 1 is the general management plan and environmental impact statement. It describes the purpose and need for general management planning; identifies the alternatives for managing the park and parkway; summarizes the existing natural resources, cultural resources, and visitor and community values that could be affected by the management plan; and evaluates the effects of each of the alternatives on these resources and values.

Volume 2 provides the public comments and NPS responses regarding the draft environmental impact statement that were received from the public between the publication of a notice of availability on March 14, 2003 and closure of the comment period on July 15, 2003.

The general management plan does not propose specific actions or describe how particular programs or projects should be ranked or implemented. Those decisions will be addressed during the more detailed planning associated with strategic plans, annual performance plans, and implementation plans. All of those plans will derive from the goals, future conditions, and appropriate types of activities established in the general management plan. As part of that decision-making process,



project-specific National Environmental Policy Act documents with opportunities for public review and comment, if appropriate to the project, would be prepared prior to the implementation of any actions included in this general management plan.

NPS planning guidelines recognize that circumstances can change and that general management plans sometimes need to be modified. Therefore, a general management plan amendment could be prepared at any time after the general management plan has been approved and put into effect. Such an action would involve National Environmental Policy Act compliance, including preparation of an environmental assessment or environmental impact statement and opportunities for public review and comment.

## **NEED FOR THE GENERAL MANAGEMENT PLAN**

A general management plan is needed for Rock Creek Park and the Rock Creek and Potomac Parkway because there is no modern document to guide their management. The only previous broad management plan for Rock Creek Park was written in 1918 (Olmsted Brothers 1918). The Olmsted brothers' plan was prepared prior to the park coming under NPS jurisdiction in 1933 and before lands around the park were heavily developed. The Rock Creek and Potomac Parkway, which opened in 1936, has never had a plan to guide management.

The first sentence of the Olmsted brothers plan stated that "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" (Olmsted Brothers 1918). The Olmsted plan for Rock Creek Park was adopted in 1919 and has remained an important management document ever since (Black 2003).

Without any planning update over the subsequent 85 years, decisions for both the park and parkway have been made in a piecemeal fashion. This general management plan, which provides broad direction for the future of the park and parkway, is needed to assist park managers in making purposeful decisions based on a deliberate vision of the park and parkway.

General management planning is needed to

- clarify the minimum levels of resource protection and public use that must be achieved for the park and parkway, based on the park- and parkway-specific purpose and significance, plus the body of laws and policies directing park management

- determine the best mix of resource protection and visitor experiences beyond what is prescribed by law and policy based on the

- mission of the park and parkway
- range of public expectations and concerns
- resources occurring within the park
- long-term economic costs

- establish the degree to which the park should be managed to

- preserve and enhance its natural and cultural resources
- provide recreation
- control nonrecreational traffic

A general management plan also is needed to meet the requirements of the National Parks and Recreation Act of 1978 and NPS policy, which mandate an up-to-date general management plan for each unit of the national park system.

## **PARK HISTORY AND USE RELATIVE TO MANAGEMENT PLANNING**

Rock Creek Park is located in the northern portion of Washington, D.C. (Region map). It consists primarily of an undeveloped, wooded valley, with some associated tributaries and uplands. The major landscape feature is Rock Creek, a perennially flowing stream that bisects the length of the park before joining the Potomac River south of the park. The park is completely surrounded by the heavily urbanized metropolitan Washington, D.C. area (Existing Conditions map).

The central issue for general management planning in Rock Creek Park is how to meet the often conflicting purposes of protecting the scenic, natural, and cultural resources of the park, while concurrently providing for appropriate public use of these resources. This issue is complicated by the location of Rock Creek Park within a major metropolitan area. As a result of its location, the park has many users, some of whom hold widely varying opinions about its optimal use. Another challenge of this urban location involves encouraging use by all segments of the public.

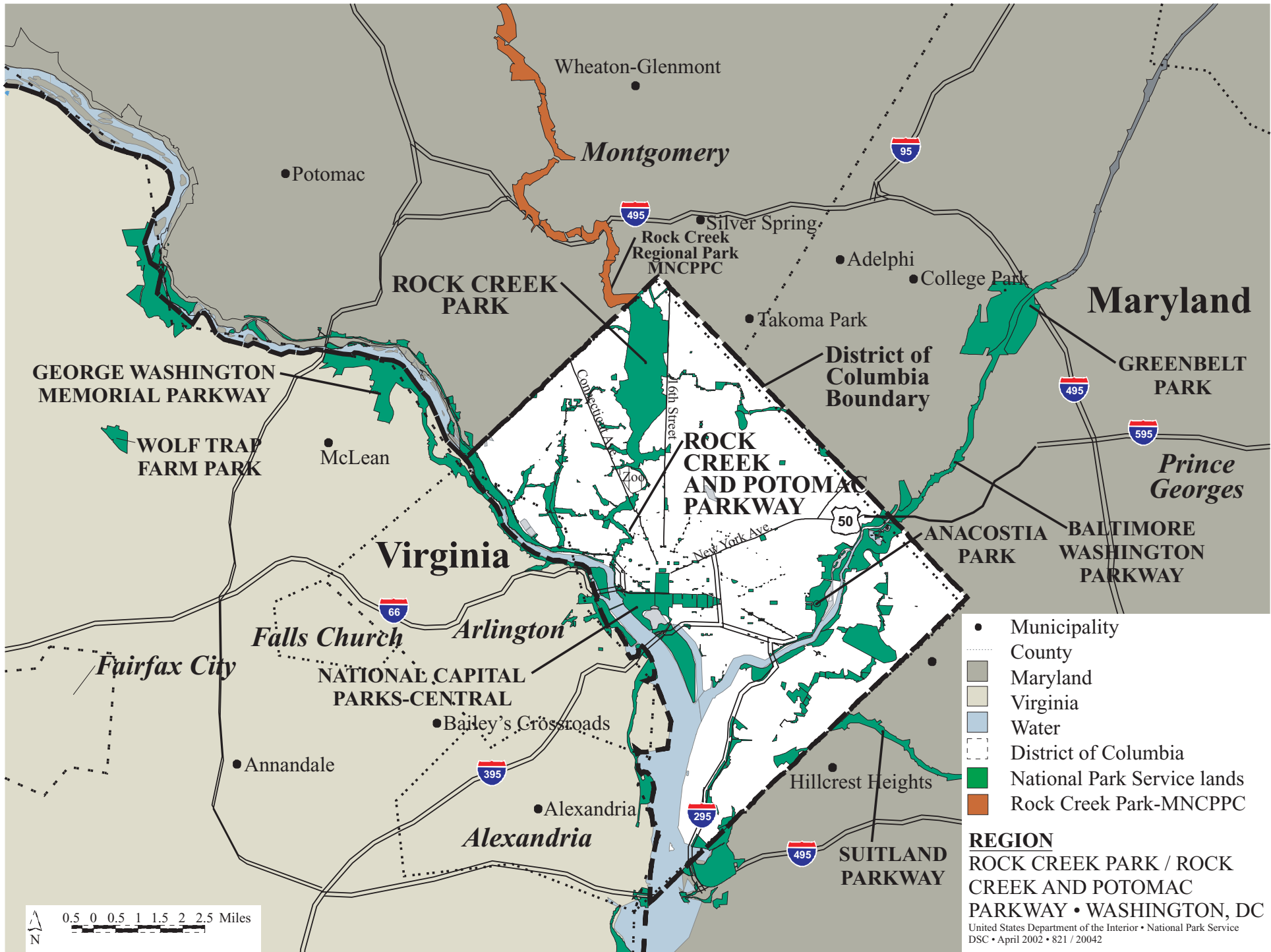
Rock Creek Park was founded in 1890 as one of the first federal parks. Its establishing legislation, provided in appendix A, cites the area's natural beauty and high public value. When the park was established, it was on the edge of the growing city and was already a favorite area for rural retreat. In the establishing legislation, Rock Creek Park was "dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people of the United States." The park would "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."

Rock Creek Park was set aside as an asset in anticipation of its envelopment by Washington, D.C. and its suburbs. As the area became more urbanized, the park's value has been recognized not only for the recreation opportunities it provides, but also for the protection it affords to remnant native wildlife populations and their habitats, and to historic structures and cultural landscapes.

Initially, Rock Creek Park was managed by the U.S. Army Corps of Engineers (NPS 1985b). It subsequently was transferred to the Office of Public Buildings and Parks (NPS, Cox 2004a). During this time, many of the developed areas of the park were established, including its road system and the golf course (NPS 1985b).

Beach Drive, which bisects the length of the park from the Maryland state line to the Rock Creek and Potomac Parkway, was originally designed as an internal park travel road to provide recreational access to the valley. In the 1918 master plan for the park, the Olmsted brothers warned against bringing the "noise and tangle" of city traffic into the heart of the park. At the same time, they recognized a need to accommodate urban traffic across the park.

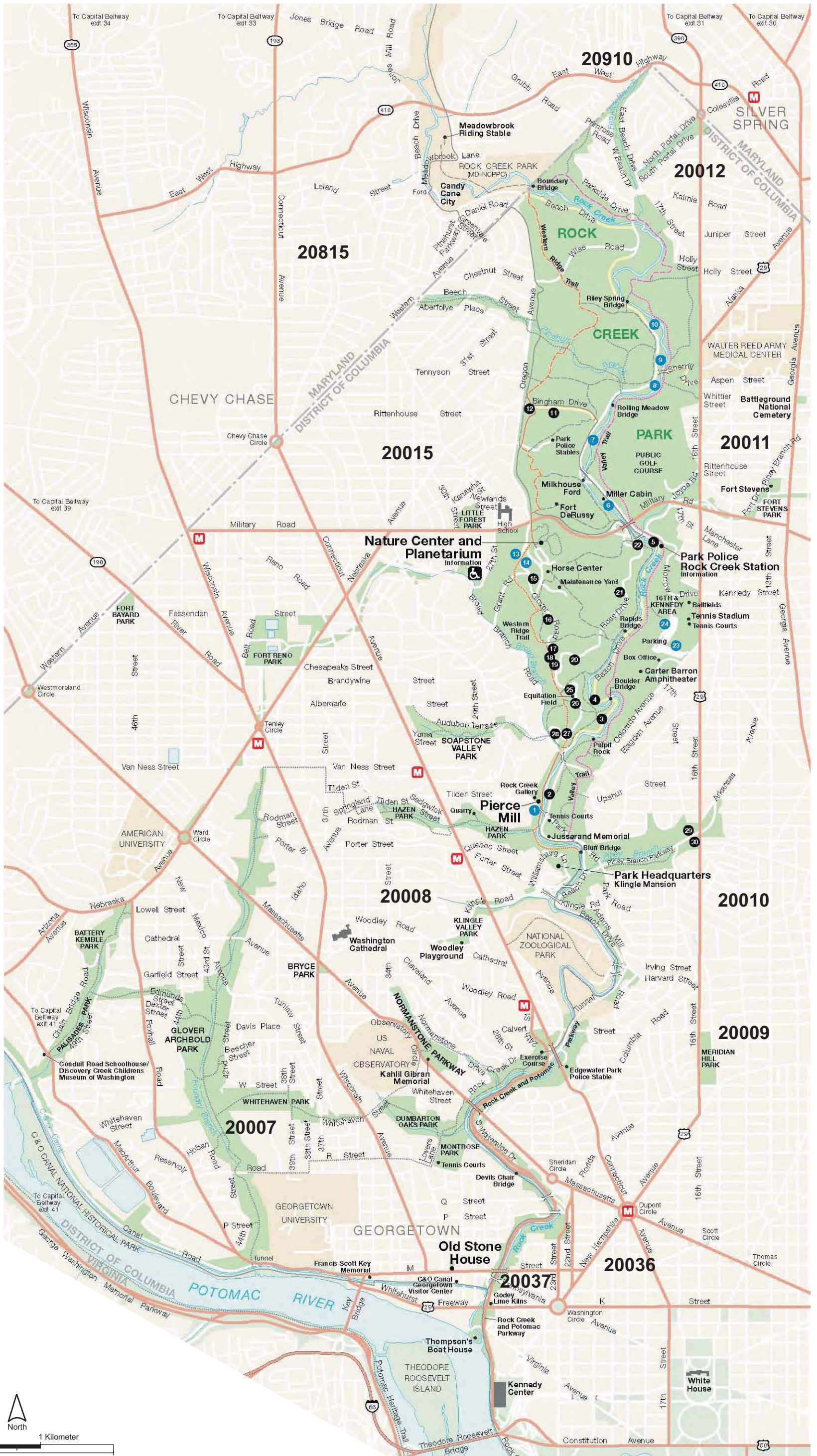
In 1916, Congress passed the Organic Act, which created the National Park Service. Through this act, Congress established the NPS' mission to "preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations."



- Municipality
- County
- Maryland
- Virginia
- Water
- District of Columbia
- National Park Service lands
- Rock Creek Park-MNCPPC

**REGION**  
 ROCK CREEK PARK / ROCK  
 CREEK AND POTOMAC  
 PARKWAY • WASHINGTON, DC  
 United States Department of the Interior • National Park Service  
 DSC • April 2002 • 821 / 20042

0.5 0 0.5 1 1.5 2 2.5 Miles



**EXISTING CONDITIONS**

Continue Current Management/No Action  
**ROCK CREEK PARK/ROCK CREEK AND  
 POTOMAC PARKWAY • WASHINGTON, DC**  
 United States Department of Interior • National Park Service  
 DCS • January 2005 • 821/20035

- Foot trail
- Horse and foot trail
- Bike and foot trail
- West Ridge Trail
- Valley Trail
- Weekend/holiday road closure
- Rock Creek Park
- Other NPS property
- 2011 Zip Code Tabulation Area
- 1 Picnic area (no permit needed)
- 2 Picnic area (permit needed)
- M Metro Station
- Handicap Access



In 1933, administration of the park was transferred to the National Park Service (NPS 1985b). Since then, the National Park Service has managed the park in accordance with the Organic Act. Thus, any management actions in Rock Creek Park must recognize that preserving the natural and cultural resources and values of the park is paramount, and that any visitor activities associated with “enjoyment, education, and inspiration” can occur only to the extent that they do not impair the natural and cultural resources and values for future generations.

The Rock Creek and Potomac Parkway was established by the Public Buildings Act of March 4, 1913. According to Section 22 of that legislation, which is provided in appendix A, the parkway was authorized “for the purpose of preventing pollution and obstruction of Rock Creek.” It also was intended as a travel corridor “connecting Potomac Park with the Zoological Park and Rock Creek Park.”

There are differences in the legislative purposes of the park and parkway. However, both were intended to blend recreation with the preservation of natural scenery and environmental quality.

Since the parkway opened in 1936, it has served as a scenic roadway in the city. Since 1937, the National Park Service has been managing traffic on weekdays by making the parkway one-way inbound during the morning rush hour and one-way outbound during the afternoon rush hour. Traffic management techniques implemented by the National Park Service within Rock Creek Park have included replacing fords with bridges and providing turning lanes at intersections.

The opening of the Zoo Tunnel in 1966 removed a major impediment to traffic. The tunnel was to be part of a larger project that would relieve traffic congestion in the area of the National Zoo. However, the other project components were never funded or built. The inadvertent result of the Zoo Tunnel was to make the corridor consisting of Beach Drive and the Rock Creek and Potomac Parkway into an attractive route for traveling by automobile between the city center and the residential areas of northwest Washington, D.C. and Montgomery County, Maryland. As discussed in detail in the “Affected Environment” section, weekday traffic averages 6,600 vehicles per day on Beach Drive north of Broad Branch Road, and 25,000 vehicles per day in the vicinity of the National Zoo. The busiest portion of the Rock Creek and Potomac Parkway typically supports 55,000 vehicle trips per day. More than 95 percent of the vehicles entering the park during commuting hours pass through without stopping (Robert Peccia & Associates 1997).

As the population of Washington, D.C. has increased, so has the demand for recreational opportunities. As described in the “Affected Environment” section, Rock Creek Park currently supports more than 2 million recreation visits per year.

Since the 1970s, the National Park Service has been closing sections of Beach Drive and some other park roads to motorized traffic during weekends and holidays to better accommodate recreational uses in the park. These closures have been very popular with the recreating public.

The most controversial management issue to be resolved by this general management plan involves the use of park roads for nonrecreational travel on weekdays. Specifically, this issue includes management of traffic in Rock Creek Park and the degree to which park values would be affected by nonrecreational automobile use. During scoping, many members of the public indicated that the recreational and environmental values of the park are compromised by what they perceive as heavy, high-speed automobile traffic, particularly on Beach Drive. They would like to reduce and control nonrecreational traffic to enhance park recreational values and visitor safety. Some called for extensive road closures in favor of bicycling and other more recreational and less

polluting forms of travel through the park. Others said that the current mix of recreational and nonrecreational use of the park and parkway, including urban traffic, is appropriate and enhances the quality of life in the city and surrounding region.

Another key management issue, which has been expressed both by the National Park Service and members of the public, is the current limited ability to provide adequate orientation, interpretation, and education services to visitors in the park. In addition, park services have outgrown the historic structures in which they are located. These include administrative and operational activities at headquarters in the Peirce-Klingling Mansion at Linnaean Hill and the U.S. Park Police District 3 substation in the Lodge House. Continuing the current arrangement would lead to increased inefficiencies and could affect the historical integrity of these buildings.

These key management issues of Rock Creek Park can be summarized in three questions.

How should traffic be managed in Rock Creek Park and on the Rock Creek and Potomac Parkway?

What are the most appropriate levels of service and locations for visitor interpretation and education in the park?

What are the most appropriate locations to support administration and operations functions with respect to minimizing resource disturbance?

The potential solutions to these questions are reflected in the four management alternatives analyzed in this final general management plan and environmental impact statement. The alternatives also address the adequacy and appropriateness of park services and facilities, and the challenges posed by managing a large, undeveloped area in the center of a major city.

## **GEOGRAPHIC AREA COVERED BY THE GENERAL MANAGEMENT PLAN**

Rock Creek Park, as an administrative unit of the national park system, is composed of 99 separate areas, known as reservations, located in the northern part of Washington, D.C. However, not all of those reservations are included in this general management plan. The area covered by this general management plan includes

the 1,754 acres administered by the National Park Service in the Rock Creek valley from the Maryland state line south to the National Zoo

the Rock Creek and Potomac Parkway from the National Zoo to Virginia Avenue

selected tributaries to Rock Creek and associated roadways, including Pinehurst Parkway, Melvin Hazen Park, Klingling Valley, Soapstone Valley Park, Normanstone Parkway, Portal Parkway, and Beach Parkway

Areas that are not included in this general management plan include the following:

The Rock Creek Tennis Stadium and adjoining playing fields. Management direction for this area was established in the *Final Environmental Impact Statement, Tennis Stadium, Rock Creek Park* (NPS 1995b).



The Carter Barron Amphitheater complex.

The similarly named Rock Creek Regional Park in Maryland, which is administered by the Maryland-National Capital Park and Planning Commission (MNCPPC).

A number of historical and recreational reservations administered by the staff of Rock Creek Park but not within the park proper. Such sites include the Civil War defenses of Washington, D.C. other than Fort DeRussy (for example, Fort Reno and Fort Stevens), Dumbarton Oaks Park, the Old Stone House, Meridian Hill Park, Montrose Park, and Glover Archbold Park. These sites have specific management and design needs because of their special historic value and/or because their public uses are different from those of Rock Creek Park. In many cases, other planning efforts already are underway. For example, cultural landscape reports recently were completed for Dumbarton Oaks Park and Montrose Park, and the management plan for the Fort Circle Parks was issued in September 2003 (NPS 2003b).

The geographic area covered by the general management plan should not be confused with the geographic area covered in the environmental impact statement. For cultural resources and most natural resources, impact evaluations primarily were considered within the boundaries of the park and parkway. However, even for these impact topics, the evaluation of cumulative impacts considered effects in a regional context. For impact topics such as air quality, regional and local transportation, and community character, a regional approach was taken, with analysis areas that extended outside the park and even into the adjoining state of Maryland. The area included in each analysis is stated in the “Methodology” section of each analysis.

## **PLANNING DIRECTION OR GUIDANCE**

*This section defines the basis for any actions taken at Rock Creek Park and the Rock Creek and Potomac Parkway. Guidance and direction include the purpose and significance of the park and parkway, the goals of the National Park Service for the park and parkway, any park- and parkway-specific mandates and administrative commitments, and servicewide mandates and commitments that the National Park Service applies to all units under its administration.*

### **Park Mission**

*This section describes the legislatively established missions of Rock Creek Park and the Rock Creek and Potomac Parkway. It defines why the park and parkway were created and why they are special. These are the fundamental criteria against which the appropriateness of all plan recommendations, operational decisions, and actions are tested.*

**Park and Parkway Purposes.** The 1890 legislation establishing Rock Creek Park is provided in appendix A.

It states that the area is to be “perpetually dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people of the United States.”

It specifies that the park is to “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.”

## PURPOSE AND NEED FOR ACTION

It directs park managers to provide for public recreation, specifically to “lay out and prepare roadways and bridle paths, to be used for driving and for horseback riding, respectively, and footways for pedestrians.”

Portions of tributaries to Rock Creek, such as Soapstone Valley and Hazen Park, have been added to the park management unit over the years as separate reservations. The legislative language for tributary additions typically states that they are to preserve the flow of water in Rock Creek, prevent pollution of Rock Creek and the Potomac River, and preserve forests and natural scenery in and around Washington, D.C.

Rock Creek Park is linked to the Potomac River and the monumental core of Washington, D.C. by the Rock Creek and Potomac Parkway. Congress established the parkway in 1913 for “the purpose of preventing pollution and obstruction of Rock Creek and of connecting Potomac Park with the Zoological Park and Rock Creek Park.” The parkway corridor is managed contiguously with Rock Creek Park.

The following purpose statements are based on and represent the NPS’ interpretation of the above legislative mandates and NPS policies. These purpose statements are the most fundamental criteria against which the appropriateness of all plan recommendations, operational decisions, and actions are to be tested.

Rock Creek Park exists to

- preserve and perpetuate for this and future generations the ecological resources of the Rock Creek valley within the park in as natural a condition as possible, the archeological and historic resources in the park, and the scenic beauty of the park

- provide opportunities for the public to experience, understand, and appreciate the park in a manner appropriate to the preservation of its natural and cultural resources

- provide opportunities for recreation appropriate to the park’s natural and cultural resources

The Rock Creek and Potomac Parkway exists to

- connect Rock Creek Park and the National Zoological Park (National Zoo) to Potomac Park with a scenic road

- prevent pollution and obstruction of Rock Creek

Park areas that contain tributaries to Rock Creek exist to

- preserve the flow of water in Rock Creek

- prevent the pollution of Rock Creek and the Potomac River

- preserve forests and natural scenery in and around Washington, D.C.

**Park and Parkway Significance.** Park significance statements capture the essence of the park’s importance to the nation’s natural and cultural heritage. Understanding park significance helps

managers to make decisions that preserve the resources and values necessary to the park's purposes. The following significance statements recognize the important features of the park and parkway.

Rock Creek Park is one of the oldest and largest naturally managed urban parks in the United States.

The park and parkway contains approximately 2,100 acres of valuable plant and wildlife habitat, providing protection for a variety of native species within a heavily urbanized area.

Rock Creek Park encompasses a rugged stream valley of exceptional scenic beauty with forested, natural landscapes and intimate natural details, in contrast to the surrounding cityscape of Washington, D.C.

Rock Creek Park's forests and open spaces help define the character of the nation's capital.

Rock Creek valley was important in the early history of the region and in the development of the nation's capital, and the park's cultural resource are among the few tangible remains of the area's past.

Rock Creek Park is an oasis for urban dwellers, offering respite from the bustle of the city.

The Rock Creek and Potomac Parkway is the first federally constructed parkway and one of the best examples of early parkway design.

The Rock Creek and Potomac Parkway provides a scenic gateway to the city's monumental core.

Rock Creek Park is a historic designed landscape incorporating early 20th century picturesque and rustic features designed to enhance the visitors' experience of the naturalistic park scenery.

Located in the heart of a densely populated cosmopolitan area, Rock Creek Park serves as an ambassador for the national park idea, providing outstanding opportunities for education, interpretation, and recreation to foster stewardship of natural and cultural resources.

## **Mission Goals**

*This section defines in broad terms the ideals that the National Park Service is striving to attain, as they are applicable to Rock Creek Park and the Rock Creek and Potomac Parkway.*

Park mission goals articulate the broad ideals and vision that the National Park Service is trying to achieve at Rock Creek Park. The goals for the park are directly linked to the NPS servicewide mission goals contained in the *National Park Service Strategic Plan* (NPS 2000b). They are written as desired outcomes in keeping with the Government Performance and Results Act. Mission goals for Rock Creek Park are as follows:

## PURPOSE AND NEED FOR ACTION

The natural and cultural resources and associated values of Rock Creek Park are protected, preserved, and maintained in good condition and managed within their broader ecosystem or cultural context (Service Mission Goal Ia).

Visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities (Service Mission Goal IIa).

Park visitors and the general public understand and appreciate the preservation of the park and its resources for this and future generations (Service Mission Goal IIb).

Natural and cultural resources are conserved through formal partnership programs (Service Mission Goal IIIa).

Through partnerships with other federal, state, and local agencies and non-profit organizations, Rock Creek Park contributes to a nationwide system of parks, open spaces, rivers, and trails and provides educational, recreational, and conservation benefits for the American people (Service Mission Goal IIIb).

The National Park Service uses current management practices, systems, and technologies to accomplish its mission at Rock Creek Park (Service Mission Goal IVa).

The National Park Service increases its managerial capabilities through initiatives and support from other agencies, organizations, and individuals (Service Mission Goal IVb).

### **Special Mandates and Administrative Commitments**

Special mandates and administrative commitments refer to park-specific requirements. These formal agreements often are established concurrently with the creation of a park. Rock Creek Park and the Rock Creek and Potomac Parkway do not have any special mandates that would affect this general management plan and future planning activities.

### **Service-wide Mandates and Policies**

*This section identifies what must be done at Rock Creek Park and the Rock Creek and Potomac Parkway to comply with federal laws and with the policies of the National Park Service. These are measures that the National Park Service must strive to meet, regardless of the alternative selected for the long-term management of the park and parkway.*

As with all NPS units, management of the park and parkway is guided by numerous congressional acts and executive orders, in addition to the establishing legislation. Many of the laws and executive orders that guide park management, with their legal citations, are identified in appendix B. Some of these laws and executive orders are applicable primarily to units of the national park system. These include the 1916 Organic Act creating the National Park Service, the General Authorities Act of 1970, and the act of March 27, 1978 relating to the management of the national park system. Others have broader application, such as the Endangered Species Act, the National Historic Preservation Act, and Executive Order 11990 addressing the protection of wetlands.

The National Park Service also has established policies for all units under its stewardship. These are identified and explained in the NPS guidance manual entitled *Management Policies 2001* (NPS 2000a).

Some of the conditions prescribed by servicewide mandates and policies are summarized below. These servicewide legal mandates and policies can all be categorized as

- natural resource management requirements
- cultural resource management requirements
- visitor experience and park use requirements
- special use management requirements

The alternatives considered in this document incorporate and comply with the provisions of these mandates and policies. In addition to the approaches specified in this general management plan, the National Park Service will strive to implement all of the servicewide mandates and policies at Rock Creek Park. The general management plan is not needed to state, for instance, that it is appropriate to protect endangered species, control invasive species, improve water quality, protect archeological sites, preserve historic structures, provide access for citizens with disabilities, and conserve artifacts.

**Natural Resource Management Requirements.** Categories included in natural resource management requirements are air quality, water resources, geologic resources, native species, and wildfire.

*Air Quality* – Current laws and policies require that the following conditions be achieved in the park.

Optimum Conditions	Sources
Air quality in the park and parkway meets National Ambient Air Quality Standards (NAAQS) for specified pollutants.	Clean Air Act <i>Management Policies 2001</i>
Park activities do not contribute to deterioration in air quality.	Clean Air Act <i>Management Policies 2001</i>
The National Park Service perpetuates the best possible air quality in Rock Creek Park and assumes an aggressive role in promoting and pursuing measures to protect air quality related values from the adverse impacts of air pollution. This includes minimizing air quality pollution emissions associated with park operations and visitor use activities, and aggressively participating in the development and implementation of federal, state, and local air pollution control plans and regulations that will remedy existing, and prevent future, impacts on park resources and values from human caused air pollution.	<i>Management Policies 2001</i>

The National Park Service has little control over air quality within the metropolitan Washington, D.C. regional airshed, which encompasses the park. However, the National Park Service recog-

nizes that incremental reductions in pollutant emissions will help improve air quality both locally and regionally. Therefore, the National Park Service commits to continued cooperation with local, state, and regional agencies and the Environmental Protection Agency to develop and implement air pollution control approaches that will remedy existing, and prevent future, impacts on resources and values from human-caused air pollution. The National Park Service will take the following kinds of actions to meet legal and policy requirements related to air quality in Rock Creek Park and the Rock Creek and Potomac Parkway.

Conduct air quality monitoring in conjunction with regional air quality agencies. This could include enhanced monitoring of localized air quality, either by establishing long-term monitoring stations in the Rock Creek valley or by conducting sampling during pollution high-risk periods.

Participate in regional air pollution control plans and regulations.

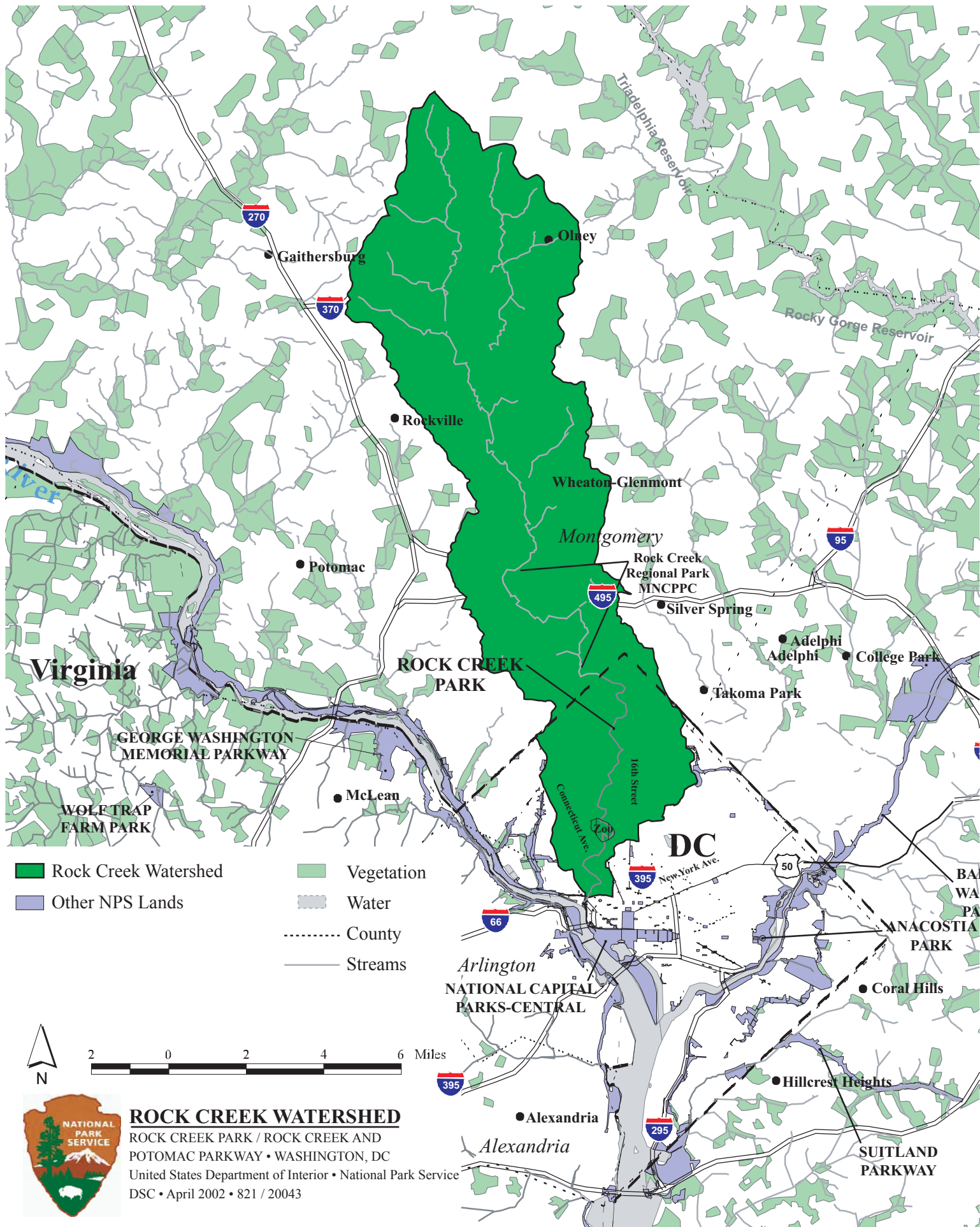
Review permit applications for major new air pollution sources that could affect the park.

Conduct park operations in compliance with federal, state, and local air quality regulations.

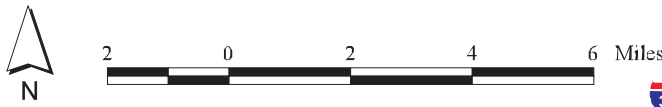
*Water Resources* – Current laws and policies require that the following condition be achieved in the park.

Optimum Conditions	Source
Rock Creek and its tributaries within the park and parkway are free flowing.	Rock Creek Park and Rock Creek and Potomac Parkway enabling legislation
Surface waters and groundwater are protected or restored such that water quality as a minimum meets all applicable Washington, D.C. water quality standards.	Clean Water Act Executive Order 11514 <i>Management Policies 2001</i>
NPS and NPS-permitted programs and facilities are maintained and operated to avoid pollution of surface waters and groundwater.	Clean Water Act Executive Order 12088 <i>Management Policies 2001</i>
Natural floodplain values are preserved or restored.	Executive Order 11988 Rivers and Harbors Act Clean Water Act <i>Management Policies 2001</i>
The natural and beneficial values of wetlands are preserved and enhanced.	Executive Order 11990 Rivers and Harbors Act Clean Water Act <i>Management Policies 2001</i>

Rock Creek is the central feature of Rock Creek Park. As shown in the Rock Creek Watershed map, Rock Creek Park is located within the lower watershed. The park comprises only a small portion of the watershed and, therefore, has limited opportunities to control actions that produce substantial changes in overall water quality. Activities occurring elsewhere in the watershed out-



- Rock Creek Watershed
- Vegetation
- Other NPS Lands
- Water
- County
- Streams



**ROCK CREEK WATERSHED**  
 ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY • WASHINGTON, DC  
 United States Department of Interior • National Park Service  
 DSC • April 2002 • 821 / 20043

side the boundaries of the park have a greater influence on water quality in the park than activities inside the park.

The basin drains approximately 77 square miles and includes urban, suburban, residential, agricultural, and parkland areas. About 70 percent of the watershed is developed, and much of the developed area contains impervious surfaces. As a result, the park is increasingly subjected to flooding caused by rapid runoff, abnormal stream bed scouring in some places and sedimentation in others, bank erosion, organic and chemical pollution, and accumulation of litter and other solid waste. Park waters do not meet quality standards for human contact, thus limiting water-oriented recreation.

The Rock Creek drainage lies within the 64,000-square-mile watershed for the Chesapeake Bay, which is the largest estuary in the United States and one of the most productive in the world. As with air quality, the National Park Service must cooperate with regional agencies to improve water quality within the Rock Creek drainage and the entire Chesapeake Bay watershed. Approximately 1,650 area governments are involved in the Chesapeake Bay restoration effort. The U.S. Environmental Protection Agency is the lead agency for the federal government and has been directing and conducting restoration efforts since the signing of the historic Chesapeake Bay Agreement of 1983 (NPS 2003e).

In July 1994, federal officials from 25 agencies and departments, including the National Park Service, signed the Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay. This agreement outlined cooperative federal efforts with specific goals and commitments by federal agencies on federal lands throughout the watershed. In November 1998, the National Park Service and 21 other federal agencies signed an updated agreement, the Federal Agencies' Chesapeake Ecosystem Unified Plan, which contains 50 specific goals and commitments by federal agencies (NPS 2003e).

On November 7, 2000 the President signed the Estuaries and Clean Waters Act of 2000, which included Title II B, Chesapeake Bay Restoration. This act amends Section 117 of the Federal Water Pollution Control Act (known as the Clean Water Act). It includes explicit mandates that federal agencies that own or operate facilities within the Chesapeake Bay watershed shall

participate in regional and sub-watershed planning and restoration programs

ensure that the property, and actions taken by the agency with respect to the property, comply with the Chesapeake Bay Agreement, the Federal Agencies Chesapeake Ecosystem Unified Plan, and any subsequent agreements and plans (NPS 2003e)

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to water resources.

Improve coordination with other agencies to ensure proper monitoring, inspection, and repair of sanitary sewers in and around the park to reduce the impacts on park water and land. Work toward the NPS' long-term goal of eliminating contaminant releases from all sanitary and storm sewers in the park. Work with other agencies in the watershed to trace and eliminate illegal discharges into the storm sewer networks that drain into Rock Creek. Coordinating agencies include, but are not limited to, the

District of Columbia Water and Sewer Authority



District of Columbia Department of Health, Water Quality Division  
 Montgomery County Department of Public Works and Transportation  
 Washington Suburban Sanitary Commission  
 Maryland-National Capital Park and Planning Commission  
 U.S. Environmental Protection Agency

Support the investigation and mitigation of artificially accelerated streambank erosion and stream bed incision and their effects on natural riparian areas. This could include implementing erosion control measures, such as establishing new streambank vegetation in eroded areas and riprap placement.

Apply best management practices to all pollution-generating activities and facilities in the park, such as operation of stables (both by a concessioner and the National Park Service), maintenance and storage facilities, the golf course, and parking areas.

Minimize the use of pesticides, fertilizers, and other chemicals and manage them in conformance with NPS policy and federal regulations.

Promote greater public understanding of water resource issues in the park and encourage public support for and participation in improvements in the Rock Creek watershed.

Promote greater public understanding of water resource issues in the park and encourage public support for and participation in improvements in the Rock Creek, Potomac River, and Chesapeake Bay watersheds.

Support initiatives by the U.S. Environmental Protection Agency, State of Maryland, the District of Columbia, and local governments, including Montgomery County, that monitor, reduce, or eliminate the pollution in urban, non-point-source runoff that affect Rock Creek or its tributary streams. These could include implementation of best management practices in communities within the watershed, improved methods or enforcement of erosion control, assistance to watershed agencies for dry weather outfall surveys, and public outreach to gain cooperation of watershed residents in reducing their contributions to pollution from fertilizers, pesticides, pets, and vehicles.

Support strategies and initiatives of the District of Columbia and Montgomery County to reduce storm flow volumes into Rock Creek and its tributaries. Examples could include installing surface or underground storm water detention and storage ponds, and using permeable materials for parking lots and road surfaces.

*Geologic Resources* – Current laws and policies require that the following condition be achieved in the park for geologic resources, which include soils.

Optimum Conditions	Source
Natural soil resources and processes function in as natural a condition as possible, except where special management considerations are allowable under policy. Areas of special management considerations are determined through management zoning decisions in this general management plan.	Rock Creek Park enabling legislation <i>Management Policies 2001</i>

Optimum Conditions	Source
Soils classified by the U.S. Department of Agriculture, Natural Resources Conservation Service as prime or unique farmland soils are retained.	Council on Environmental Quality (1980) memorandum on prime and unique farmlands

Soil resources in some portions of the park are adversely affected by accelerated erosion, compaction, and deposition caused by human activities. The National Park Service will take the following kinds of actions to comply with legal and policy requirements related to geologic resources.

Survey areas of the park with soil resource problems and take actions appropriate to the management zone to prevent further erosion, compaction, or deposition and to restore original contours, as practical.

Avoid disturbance of prime farmland soils. These include Chillum silt loam on 0 to 8 percent slopes and Glenelg Loam on 0 to 8 percent slopes.

Participate in interagency efforts to reduce erosion from accelerated runoff and streamflows in conformance with “Water Resources,” above.

Apply effective best management practices to problem soil erosion and compaction areas in a manner that stops or minimizes erosion, restores soil productivity, and re-establishes or sustains a self-perpetuating vegetative cover.

*Native Species* – Current laws and policies require that the following conditions be achieved in the park.

Optimum Conditions	Source
Federal- and state-listed threatened or endangered species and their habitats are protected and sustained.	Endangered Species Act and equivalent state protective legislation <i>Management Policies 2001</i>
Populations of native plant and animal species function in as natural a condition as possible except where special management considerations are warranted. Areas of special management considerations are determined through management zoning decisions in this general management plan.	Rock Creek Park enabling legislation <i>Management Policies 2001</i>
Native species populations that have been severely reduced in or extirpated from the park are restored where feasible and sustainable.	Rock Creek Park enabling legislation <i>Management Policies 2001</i>
Invasive species are reduced in numbers and area, or are eliminated from the natural areas of the park.	<i>Management Policies 2001</i>

Rock Creek Park represents one of the oldest and largest protected areas of natural vegetation in the region. Despite its small size, the capability of the park to sustain native species is valuable.

The National Park Service will take the following kinds of actions to comply with legal and policy requirements related to native species.

Implement measures to protect the federally endangered Hays spring amphipod and the rare Kenk's groundwater amphipod and their habitats (NPS 1997a). These actions include, but are not limited to

- protecting springs and seeps known to contain these species from disturbance

- protecting the watersheds immediately upgradient from such springs and seeps from earth moving, pollution, or changes in groundwater supply or hydrology

- developing a management plan for the continued protection of the amphipods, including an assessment of recharge areas for amphipod sites and a monitoring strategy

- informing the public about the presence and value of groundwater amphipods in the park without disclosing site-specific information that could increase the risks from illegal collection or disturbance

Initiate and maintain measures to protect plant and animal species listed as rare (both currently and in the future) by Maryland or Virginia. These measures include, but are not limited to

- protecting the habitats known to contain these species from disturbances such as pollution, changes in hydrology, visitor uses, mowing or maintenance activities, and earth moving or trail construction

- developing a management plan for the continued protection of these rare species on park lands, including regular monitoring of populations, assessing current or potential threats, implementing mitigation approved for their protection, and continuing limitations on providing information regarding their locations

Inventory the plants and animals in the park. Use the inventory as a baseline against which to regularly monitor the distribution and condition of selected species, including indicators of ecosystem condition and diversity, rare or protected species, and invasive non-native species. Modify management plans to be more effective, based on monitoring results.

Monitor native species that are capable of creating resource problems, such as overgrazing associated with over-population of white-tailed deer. If unacceptable levels of habitat degradation are indicated, implement humane measures to control the animal population.

Support research that contributes to management knowledge of native species.

Implement measures to restore native species and natural habitats. In particular, protect and restore natural aquatic and floodplain habitats in the park where they can be sustained, including freshwater springs and ephemeral wetlands.

PURPOSE AND NEED FOR ACTION

Review park fishing regulations and revise fish management as appropriate to support native fish populations.

Continue to participate in regional ecosystem-level undertakings to restore native species, such as the Chesapeake Bay Program effort to restore migratory fish to Rock Creek. Facilitate implementation of the Woodrow Wilson Bridge mitigation project, which will remove or mitigate nine man-made obstructions to fish migration in Rock Creek, including the Peirce Mill dam, fords, and sewerline crossings.

Manage vegetation in accordance with *Management Policies 2001* (NPS 2000a). In natural zones, manage vegetation exclusively for native plant species. In other management zones, use native species to the maximum extent possible. Where non-native species are justified within cultural resource zones, limit these plantings to non-aggressive species.

Control or eliminate invasive plants and animals, exotic diseases, and pest species where there is a reasonable expectation of success and sustainability. Base control efforts on the potential threat to

legally protected or uncommon native species and habitats

visitor health or safety

scenic and aesthetic quality

common native species and habitats

Provide interpretive and educational programs on preservation of native species for visitors and for residents neighboring the park boundary. Subjects could include low-impact landscaping, control of domestic animals, and avoidance of boundary encroachments, and could be presented through such forums as workshops and newsletters.

*Fire Management* – Current laws and policies require that the following conditions be achieved in the park.

Optimum Conditions	Source
Park fire management programs are designed to meet park resource management objectives while ensuring that firefighter and public safety are not compromised.	<i>Management Policies 2001</i>
A fire management plan is prepared and implemented for Rock Creek.	<i>Management Policies 2001</i>

Consistent with *Management Policies 2001* (NPS 2000a), a fire management plan has been prepared for Rock Creek Park (NPS 1991, revised 1995). The plan will respond specifically to the park’s natural and cultural resource objectives; provide for safety considerations for park visitors, employees, neighbors, and developed facilities; and address potential impacts on public and private property adjacent to the park. It also will address the need for adequate funding and staffing to support the fire management program.

An environmental assessment developed in support of the plan will tier from this general management plan and environmental impact statement and will consider effects on air quality, water quality, health and safety, and natural and cultural resource management objectives. Preparation of the plan and environmental assessment will include collaboration with interest groups, nearby communities, and governments at the federal, state and district, regional, and local levels. The deciduous forests of Rock Creek Park are relatively moist, and fires do not play a major role in maintaining the native vegetation. An average of only two woodland fires occur in the park each year, with most burning involving less than an acre. Most fires are human-caused, rather than from natural ignition sources. Wildfires in the park usually are not intense and consume only fallen leaves and duff. Barriers such as streams, mowed fields, roads, and trails usually limit the spread of fires.

Large wildfires in the park, if they were to occur, could pose a threat to residences and commercial development adjoining the park and would produce unacceptable levels of smoke pollution. To prevent these types of fires, the National Park Service will take the following kinds of actions to comply with fire management legal and policy requirements.

Suppress all wildfires as quickly as possible.

Maintain a cooperative agreement with the Washington, D.C. fire department for wildfire suppression in the park.

Management fires, or prescribed burns, would be used sparingly if at all and only on a case-by-case basis.

**Cultural Resource Management Requirements.** Categories included in cultural resource management requirements are archeological resources, historic structures and cultural landscapes, and collections.

*Archeological Resources* – Current laws and policies require that the following conditions be achieved in the park.

Optimum Conditions	Source
Archeological sites are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act Executive Order 11593 Archeological and Historic Preservation Act
Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable.	Archeological Resources Protection Act <i>Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation</i> (1992)
In those cases where disturbance or deterioration is unavoidable, the site may be professionally documented and salvaged.	Programmatic Memorandum of Agreement among the National Park Service, Advisory Council on Historic Preservation, and National Council of State Historic Preservation Officers (1995) <i>Management Policies 2001</i>

PURPOSE AND NEED FOR ACTION

The archeological sites in the park have not been systematically surveyed or inventoried. Precise information about the location, characteristics, significance, and condition of the majority of archeological resources in the park is lacking, and impacts are difficult to measure. The National Park Service will take the following kinds of actions to meet legal and policy requirements related to archeological sites.

Survey and inventory archeological resources and document their significance.

Treat all archeological resources as eligible for listing in the National Register of Historic Places pending the opinion of the District of Columbia State Historic Preservation Officer and a formal determination by the Keeper of the National Register as to their significance.

Protect all archeological resources determined eligible for listing or listed on the National Register of Historic Places. If disturbance to such resources is unavoidable, conduct formal consultation with the Advisory Council on Historic Preservation and District of Columbia State Historic Preservation Officer in accordance with the National Historic Preservation Act.

*Historic Structures and Cultural Landscapes* – Current laws and policies require that the following conditions be achieved in the park for historic properties, such as buildings, structures, roads, trails, and cultural landscapes.

Optimum Conditions	Source
Historic structures and cultural landscapes are inventoried and their significance and integrity are evaluated under National Register criteria.	National Historic Preservation Act Executive Order 11593 Archeological and Historic Preservation Act
The qualities of historic properties that contribute to their actual listing or their eligibility for listing in the National Register of Historic Places are protected in accordance with the Secretary of the Interior’s standards, unless it is determined through a formal process that disturbance or natural deterioration is unavoidable.	The Secretary of the Interior’s Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings The Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes Programmatic Memorandum of Agreement among the National Park Service, Advisory Council on Historic Preservation, and National Council of State Historic Preservation Officers (1995) <i>Management Policies 2001</i>

Many of the historic structures and cultural landscapes in Rock Creek Park exhibit deterioration that has resulted from a lack of systematic preservation. The National Park Service will take the following kinds of actions to meet legal and policy requirements related to historic properties.

Complete a survey, inventory, and evaluation of historic properties under National Register criteria.

Analyze the design elements, such as materials, colors, shape, massing, scale, architectural details, and site details, of historic structures and cultural landscapes in the park and parkway. These could include such features as bridges, trails, roads and intersections, curbing, signs, picnic tables, and parkway embayments. Use this information to guide rehabilitation and maintenance of sites and structures and to ensure that future park structures are compatible with the historic character in design and materials.

Submit the inventory and evaluation results to the District of Columbia State Historic Preservation Officer and the Keeper of the National Register with recommendations for eligibility to the National Register.

Determine the appropriate level of treatment for each historic property formally determined to be eligible for listing or actually listed in the National Register, subject to the Secretary of the Interior’s (1995a) standards.

Implement and maintain the appropriate level of preservation for such properties.

*Collections* – Current laws and policies require that the following conditions be achieved in Rock Creek Park.

Optimum Conditions	Source
All museum objects and manuscripts are identified and inventoried, and their significance is determined and documented.	National Historic Preservation Act American Indian Religious Freedom Act
The qualities that contribute to the significance of collections are protected in accordance with established standards.	Archeological and Historic Preservation Act Archeological Resources Protection Act Native American Graves Protection and Repatriation Act <i>Management Policies 2001</i>

The Rock Creek Park museum collections are at risk. Improper storage and lack of adequate security and fire protection at facilities where the collections are housed threaten their safety and integrity. Portions of the archeological and historical collections are not yet cataloged and need to be consolidated in one location. The National Park Service will take the following kinds of actions to meet legal and policy requirements related to collections.

Inventory and catalog all of the park’s museum collection in accordance with standards outlined in the *Manual for Museums* (NPS, Lewis 1976).

Develop and implement a collection management program according to NPS standards to guide protection, conservation, and use of museum objects.

**Visitor Experience and Park Use Requirements.** This category, which derives in part from the Organic Act, includes providing an enjoyable experience relating to the park’s scenic, natural,

PURPOSE AND NEED FOR ACTION

and historic resources “in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” It also includes measures to ensure visitor health and safety.

Current laws and policies require that the following conditions be achieved in Rock Creek Park.

Optimum Conditions	Source
A safe and healthful environment is provided for visitors and employees. Management actions strive to protect human life and provide for injury-free visits.	<i>Management Policies 2001</i>
Park visitors assume a substantial degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments.	<i>Management Policies 2001</i>
Effective law enforcement occurs as part of a cooperative community effort. The park encourages and assists park neighbors in the development of cooperative crime prevention and detection programs.	<i>Management Policies 2001</i>
Park roads are well constructed, sensitive to natural and cultural resources, and enhance the visitor experience. Park roads are not intended to provide fast and convenient transportation; rather, they enhance the quality of a visit, while providing for safe travel, with few or no impacts on natural and cultural resources.	<i>Management Policies 2001</i>
The National Park Service works with governments and private organizations and individuals to minimize impacts of traffic on park resources and values.	<i>Management Policies 2001</i>
Visitors understand and appreciate park values and resources and have the information necessary to adapt to the park environments. Visitors have opportunities to enjoy the park in ways that leave park resources unimpaired for future generations.	NPS Organic Act Rock Creek Park enabling legislation <i>Management Policies 2001</i>
Park recreational uses are promoted and regulated. Basic visitor needs are met in keeping with the park purposes.	NPS Organic Act Rock Creek Park enabling legislation Title 36 of the Code of Federal Regulations <i>Management Policies 2001</i>
To the extent feasible, facilities, programs, and services in the park are accessible to and usable by all people, including those with disabilities.	Americans with Disabilities Act Architectural Barriers Act Rehabilitation Act <i>Management Policies 2001</i>



Because of the location of Rock Creek Park within a major metropolitan area, a high degree of cooperation with other governments and organizations is necessary to achieve the optimum conditions identified above. For example, the U.S. Park Police routinely coordinate with law enforcement agencies in Washington, D.C. and other nearby jurisdictions with regard to traffic management and to help ensure a safe environment for park visitors.

Regulations governing visitor use and behavior in units of the national park system are contained in Title 36 of the United States *Code of Federal Regulations*. These regulations have force of law and include a variety of use limitations, such as limits on commercial activities. The following two regulations are especially pertinent to planning for Rock Creek Park because of issues raised by the public during scoping.

Bicycles are prohibited except on roads, parking areas, and designated routes (36 *Code of Federal Regulations* 4.30).

Pets must be crated, caged, restrained on a leash (6 feet long or less), or otherwise physically confined at all times (36 *Code of Federal Regulations* 2.15).

As a result of these regulations, as discussed under the heading “Alternatives or Actions Eliminated from Further Study,” suggestions from the public to allow bicycling off currently permitted roads and trails and to allow pets to run unleashed in the park were not included in any of the alternatives.

The National Park Service will take the following kinds of actions to meet legal and policy requirements related to visitor experience and park use.

Provide opportunities for visitors to understand, appreciate, and enjoy the park.

Ensure that all park programs and facilities are accessible to the extent feasible.

Continue to enforce the regulations in 36 *Code of Federal Regulations*.

These laws, regulations, and policies leave room for judgment regarding the best mix of types and levels of visitor use activities, programs, and facilities. The alternatives evaluated in this final general management plan represent four approaches to visitor experience and park use.

**Special Use Management Requirements.** Special uses refer to the use of park and parkway lands for non-park purposes. Current laws and policies require that the following conditions be achieved in the park and parkway with regard to the management of special uses.

Optimum Conditions	Source
Park resources or public enjoyment of the park are not denigrated by nonconforming uses.	Telecommunications Act 16 United States Code 5
Only telecommunication structures that do not jeopardize the park’s mission and resources may be permitted within the park.	16 United States Code 79 23 United States Code 317
No new nonconforming use or rights-of-way are permitted through the park without specific statutory authority and approval by the director of the National	36 <i>Code of Federal Regulations</i> 14 <i>Management Policies 2001</i>

Optimum Conditions	Source
Park Service or his representative and only if there is no practicable alternative to such use of NPS lands.	<i>Reference Manual #53, Special Park Uses. Appendix 5: Rights-of-Way – Rights of Way for Telecommunications Facilities (NPS 2000c)</i>

Rock Creek Park has ongoing special use concerns associated with the presence of sanitary and storm sewerlines within the park, including the antiquated, combined sanitary and storm water sewers that discharge raw sewage into Piney Branch and Rock Creek in association with storm events. The water resource section describes the types of actions that the National Park Service will take to meet legal and policy requirements related to sewers.

A more recent special use management issue at Rock Creek Park involves locating telecommunications infrastructure inside the park. The Telecommunications Act of 1996 directs all federal agencies to assist in achieving a seamless telecommunications system throughout the nation by accommodating requests from telecommunication companies for the use of property, rights-of-way, and easements to the extent allowable under the agency's mission. However, the National Park Service is legally obligated to issue right-of-way permits only for those requests for which there is no feasible and prudent alternative and will not result in a derogation of the resources, values, and purposes for which the park was established (*RM-53 Special Park Uses, Rights-of-Way, Wireless Telecommunications Facilities*, Appendix 6, Exhibit 6, page A6-51).

**Actions Outside the Park.** Rock Creek Park and the Rock Creek and Potomac Parkway include only part of the natural resources, cultural sites, and scenic vistas of the Rock Creek valley. As a result, actions by others in the watershed can affect park resources and visitor experiences. Similarly, NPS activities may have impacts outside the park's boundaries. Therefore, servicewide mandates and policies recognize the need for the superintendent and other park staff to be involved with actions outside the park. This includes working with the city, other public agencies, and landowners to address park integrity concerns and deal with issues relating to the protection and enhancement of resources, even when the resources are outside the park.

Optimum Conditions	Source
Resources outside the park are managed in such a way that the park will be safeguarded.	NPS Organic Act Redwood Amendment to the General Authorities Act <i>Management Policies 2001</i>
The National Park Service works cooperatively with others to anticipate, avoid, and resolve potential conflicts and address mutual interests.	

Examples of this type of participation were described in the "Air Quality" and "Water Resources" sections. Other actions could include, but would not be limited to, the following:

- Supporting the establishment of land use agreements and easements to ensure green space.

- Monitoring the park boundaries and working with the city and landowners to ensure that private developments do not encroach on the park or have visual impact.

Working with the city to control stray and feral pets that can prey on native wildlife or be hit by cars, and to educate citizens on the importance of animal control.

Planning projects so that noise and visual effects within the park are minimized and perceptions of solitude are enhanced.

Providing alternate transportation modes so that visitors can arrive at the park by means other than privately owned, motorized vehicles.

## **PLANNING OPPORTUNITIES AND ISSUES**

*The previous section summarized major legal and policy requirements for Rock Creek Park. This section identifies the decisions that need to be made through the general management planning process and summarizes the resources and other values that may be affected (impact topics).*

### **Decision Points**

*This section identifies the major resource condition and visitor experience issues that need to be addressed in the general management plan.*

A variety of issues and concerns were identified by the public, park staff, and other agencies during scoping for this general management plan. Comments were solicited at public meetings, through planning newsletters, and on the park web site and telephone hotline. Additional information on issues identification is provided in the “Consultation and Coordination” section.

Some of the comments were outside the scope of this general management plan. Some concerns identified during scoping are already prescribed by law, regulation, or policy, or would be in violation of such requirements. These types of issues were discussed in the preceding section entitled “Servicewide Mandates and Policies.” Because they are mandatory requirements, these matters are not subject to decision in this general management plan.

Other issues identified during scoping were at an operational or developmental level of detail. Such issues are most appropriately associated with the park’s 5-year strategic plan or annual implementation plans. Those plans will be based on the resource conditions and visitor experiences to be achieved in Rock Creek Park that are established in the final general management plan. Some of the concepts behind operational or developmental issues were incorporated into the alternatives considered in the environmental impact statement on this final general management plan.

Scoping demonstrated that there is much that the public likes about the park. Indeed, one of the most common comments during scoping was that the park is fine just the way it is today. In particular, people want the traditional character of the park to continue, although many also expressed concern about the effects of traffic on the recreational experience. Another concern is that continued use of some of the park’s historic resources as administration offices may affect their historic integrity. It has been proposed that these structures may be more appropriate for interpretive or educational activities, and that administrative functions could be performed more efficiently from modern office facilities.

Based on public comments and agency concerns, three major resource condition and visitor experience issues, called “decision points,” were identified. This final general management plan focuses on addressing these decision points, which are identified below.

**How Should Traffic Be Managed in Rock Creek Park and on the Rock Creek and Potomac Parkway.** The most controversial issue to be resolved by this plan involves establishing the appropriate level of through-traffic in Rock Creek Park and on the Rock Creek and Potomac Parkway. Some people feel that park values are compromised by what they perceive as heavy, high-speed traffic, and that nonmotorized recreation should be promoted by closing parts of Beach Drive and other park roads to automobiles. Others believe that the current mix of recreational and nonrecreational traffic is appropriate and that automobile access through the park enhances the quality of life in the region.

The Rock Creek and Potomac Parkway was established as a scenic travel corridor for the city. In contrast, Beach Drive primarily was an internal park road that provided recreational access to the valley. When the Zoo Tunnel opened to relieve traffic congestion in the area of the National Zoo in 1966, it inadvertently made the corridor consisting of Beach Drive and the Rock Creek and Potomac Parkway into an attractive route for traveling by automobile between the city center and the residential areas of northwest Washington, D.C. and Montgomery County, Maryland. As a result, weekday traffic on Beach Drive averages 6,600 vehicles per day north of Broad Branch Road, and 25,000 vehicles per day in the vicinity of the National Zoo. The busiest portion of the Rock Creek and Potomac Parkway typically supports 55,000 vehicle trips per day. More than 95 percent of the vehicles entering the park during commuting hours pass through without stopping (Robert Peccia & Associates 1997).

Traffic models predict that the volume of regional traffic will increase substantially by the year 2020. Projections indicate that without additional management, traffic on portions of Beach Drive could more than double by 2020 (Robert Peccia & Associates 1997). This traffic growth would further compromise the suitability of park roads for recreational uses.

Another traffic-related issue on Beach Drive involves the effort to provide a continuous, regional recreation trail system that is free of automobile traffic. Paved trails and roads in Rock Creek Park and along the parkway connect with the Rock Creek Trail and the Capital Crescent Trail both to the north and south and to the C and O Canal Tow Path to the south. However, the paved recreation trail system through Rock Creek valley is not continuous. Recreationists must use portions of Beach Drive in the upper valley between the Maryland boundary and Bingham Drive and in the gorge section between Joyce Road and Broad Branch Road.

Both of these road sections are constricted, winding, and have narrow or no shoulders. During the weekend, both sections are closed to automobiles, except for the short section between West Beach Drive and Wise Road. During the week, they carry heavy automobile traffic.

A 1980 study by the National Park Service recommended constructing a separate paved trail through the upper valley and gorge sections of Beach Drive (NPS 1980). A recommendation to provide a paved trail in these areas was included in *Paved Recreation Trails of the National Capital Region* (NPS 1990c), but this recommendation could be satisfied only by building a separate trail or by closing Beach Drive and using it as a recreation trail.

During the current planning effort, NPS landscape architects, resource specialists, and a civil engineer reconnoitered these sections. They also consulted with representatives of the U.S. Fish and

Wildlife Service and the District of Columbia State Historic Preservation Officer about potential effects on endangered species and properties listed in the National Register of Historic Places. The team concluded that there are no acceptable routes along these sections to construct a separate, paved trail. Impediments include potential damage to endangered species habitat, wetlands, properties listed in the National Register of Historic Places, and other environmental obstacles that would be extremely difficult and expensive to mitigate. They concluded that the only way to provide a continuous recreational trail through the valley would be to permanently close sections of Beach Drive to automobiles.

The following statement in regard to through-traffic routes in national parks is included in Section 9.2.1.2.1 of *Management Policies 2001* (NPS 2000a).

Where a determination is made that existing through-traffic routes have adverse impacts on park resources and values, the Service will work with the appropriate government authorities to minimize the impacts, or to have the traffic flow re-routed over an alternative route. Where feasible and practicable, roads that are no longer needed will be closed or removed, and the area restored to a natural condition.

During scoping, there was strong disagreement among the public about whether some sections of Beach Drive should be permanently closed and about the degree to which through-traffic should be controlled in the park and on the parkway. To address these views, four approaches for managing through-traffic are analyzed in this final general management plan and environmental impact statement.

**What are the Most Appropriate Levels of Service and Locations for Visitor Interpretation and Education in the Park?** This final general management plan and environmental impact statement analyzes two alternatives regarding the appropriate levels of service and locations for visitor interpretation and education. Factors that led to the development of these alternatives include the following:

It currently is difficult to reach the thousands of visitors who recreate each week in the Rock Creek valley, especially those who are unfamiliar with the park and its broader purposes. Visitors to Rock Creek Park often do not receive any initial orientation to the park, what it has to offer, or how to safely and appropriately experience park resources. As a result, many visitors do not even know that they are in a national park.

Interpretive programming in the park has evolved without the benefit of an interpretive plan. This has resulted in a hodgepodge of stories and facts that may not help the public understand the significance of the park and its resources. Many opportunities for reaching the public in the park are unrealized.

Over the past two decades, recreational visitation to Rock Creek Park has almost doubled while the park's visitor services have been severely reduced because of funding limitations. This has resulted in a substantial decline in visitation to the main interpretive sites in the park, which consist of the Rock Creek Nature Center and Planetarium and Peirce Mill.

Some facilities are in need of attention. Some exhibits need updating, and some of the sites are open only on a limited schedule because of a lack of personnel.

In spite of current limitations, Rock Creek Park has a long tradition of providing a wide range of visitor interpretive and educational services. Its location in the nation's capital makes the park particularly well suited to provide a large, diverse population with resource interpretation and educational opportunities and to serve as an ambassador for the national park idea.

It is important within this final general management plan to establish the desired resource condition and visitor experience for interpretation and education with regard both to location and levels of service. Two approaches for responding to this issue were included in this document.

**What Are the Most Appropriate Locations to Support Administration and Operations Functions with Respect to Minimizing Resource Disturbance?** The following have been identified with regard to the use of the existing infrastructure to support administration and operations of the park.

Some administrative and operations functions are housed in historic structures. Examples include the location of the park headquarters in the Peirce-Klingbein Mansion and the U.S. Park Police station in the Lodge House on Beach Drive. These uses may not effectively protect the historic resources of the park or efficiently serve administrative and operational needs. They also preclude the ability to use these historic resources for educational or interpretive purposes.

Spaces available for office, work, and storage activities are insufficient.

Aging buildings have been repeatedly adapted beyond their original capacities to accommodate growing functions and required personnel.

Facility expansion is necessary for administration and operations functions in the park to keep pace with increasing visitor use and resource protection demands.

Two alternatives for supporting administration and operations functions are analyzed in this final general management plan and environmental impact statement. This document also analyzes two options for the U.S. Park Police station.

### **Alternatives or Actions Eliminated from Further Study**

*Several actions suggested by the public are not incorporated into this final general management plan. This section identifies those actions and provides rationales of why they were not included.*

As described in the "Consultation and Coordination" section, the identification of issues and development of alternatives evolved through a series of meetings and other opportunities for public input. However, not all of the actions suggested by the public were included in the draft general management plan.

As the National Park Service learned more about public concerns, the draft alternatives were modified to more effectively address the public's comments. This evolution resulted in the elimination from further consideration of some possible management actions that were proposed early in the process. Other actions raised by the public were not considered because they

were not feasible

are already prescribed by law, regulation, or policy

would be in violation of laws, regulations, or policies

This section briefly describes each of these actions and the basis for excluding them from this final general management plan.

In the comments on the draft general management plan and environmental impact statement, the public provided nearly 500 suggestions on how to improve management of the park and parkway.

Some were incorporated into the final versions of the action alternatives that are evaluated in the final environmental impact statement.

Most are more appropriate for the shorter-term management documents that will tier from this final general management plan, such as 5-year strategic plans, annual performance plans, and implementation plans. The National Park Service has compiled a complete list of these suggestions that it will consult in preparing each of these documents.

A few of the suggestions were eliminated from further study. Brief descriptions of these actions and the basis for eliminating them from consideration have been added to this section.

**Other Traffic-Related Actions.** Throughout the planning process, the public commented on the management of park roads more than any other topic. Many of their suggestions were incorporated into the four alternatives that are analyzed in this final general management plan. However, many other suggestions on how to manage traffic were not addressed in any of the alternatives. The most common suggestions, and the reasons they were not included, are described below.

*Suggestion:* The National Park Service should charge a fee for entering the park or levy a toll for using Beach Drive or the Rock Creek and Potomac Parkway to discourage non-recreational automobile traffic.

*Response:* Both of these approaches would be impractical because of logistical problems associated with the more than 20 road entrances to Rock Creek Park. Charging an entrance fee or a toll high enough to discourage nonrecreational automobile traffic could also discourage recreational use, which would be contrary to the purpose of the park.

*Suggestion:* Close Beach Drive to all private automobiles and use the road as a mass transit route for city buses.

*Response:* This option would duplicate mass transit services already available in the area via Metrobus and the Metro Rail Red and Green lines and would require reengineering of Beach Drive and other park roads to accommodate buses.

*Suggestion:* End the current weekend and holiday closures of Beach Drive and allow unrestricted use by automobiles at all times.

*Response:* Early in the planning process ending the current pattern of closures was identified as a possible management approach. However, initial scoping showed strong support

for continuing weekend and holiday closures. Therefore, this was not included in any of the management alternatives.

*Suggestion:* Extend the twice-daily lane reversals (one-way traffic) on the Rock Creek and Potomac Parkway to include Beach Drive. Variants on this idea included

- closing one lane of Beach Drive to automobiles and using it for bicycles
- reversing the one-way flow against the general flow of commuter traffic

*Response:* These measures were considered unsafe and technically impractical.

*Suggestion:* Close Beach Drive to motorized traffic overnight, from the end of the evening rush hour to the start of the next morning rush hour.

*Response.* Visitors are not allowed in the park after dark except in a vehicle. Therefore, this approach would effectively close large segments of the park after dark and would preclude visitor use.

*Suggestion:* Allow motorized traffic on portions of Beach Drive only during weekday rush hours. Close these segments to motorized traffic twice daily, during the middle of the workday and overnight. Vary the time of weekday closures seasonally or based on time of sunrise and sunset.

*Response:* This approach had multiple disadvantages that led to its exclusion.

- It would double the burden for barrier placement and removal on the U.S. Park Police, compared to any other alternative.

- It would restrict the access throughout the park that visitors with limited mobility currently have during weekday evenings and would eliminate driving for pleasure except during rush hours.

- Variable opening and closing times would be confusing and difficult to implement.

- Like the preceding suggestion, it would effectively close large segments of the park after dark.

*Suggestion:* During the summer, close segments of Beach Drive to motorized traffic on weekdays after rush hour to promote nonmotorized recreation during the long evenings.

*Response:* The National Park Service analyzed sunset during the summer, including the effect of daylight savings time. The analysis showed that during the longest evenings of the year, at the end of June and beginning of July, the sun sets at 8:37 P.M. Rush hour through Rock Creek Park ends about 7:00 P.M. This would provide recreationists with little more than an hour and a half to enter the park after rush hour, reach their destinations, and exit from the park to avoid being stranded in the unlit park after the dark. By the end of August, there would be only 40 minutes between the end of rush hour and sunset. This action would also have most of the detriments of the preceding suggestion. Therefore, it was not incorporated into any of the alternatives.

*Suggestion:* Close Beach Drive segments during different mid-day time periods than those proposed in Alternative D.



*Suggestion:* Implement Beach Drive closures only during the summer and leave it open throughout the winter when fewer people participate in outdoor recreation activities.

*Response:* The NPS' preferred alternative was modified between the draft and final versions of this general management plan to increase the level of flexibility in implementing traffic management actions.

*Suggestion:* Modify Alternative D – Mid-Weekday Recreational Enhancement to include mid-day closure only of the Beach Drive segment from Joyce Road to Broad Branch Road.

*Response:* This action, designated D-1, was investigated thoroughly following the receipt of public comments on the draft general management plan. For example, the 2004 traffic study (Parsons 2004) focused on the effects of implementing mid-day closures only on this segment of Beach Drive. However, this alternative was deemed to be premature until the traffic management approaches in Alternative A of this final general management plan have been implemented and tested for effectiveness in meeting traffic management goals.

In summary, many variations for traffic management and road closure were considered based on scoping comments. The range of traffic management alternatives addressed in this final general management plan was selected because they are technically feasible, are most responsive to public concerns, and are consistent with NPS policies and authorities.

**Remove Community Gardens, the Rock Creek Horse Center, and the Rock Creek Park Golf Course.** Public comments during early scoping indicated that some people wanted to see the park managed more as a natural preserve, with a substantial reduction in developed areas within the park. Therefore, in newsletter 3 (NPS 1997c), the National Park Service responded to this general direction with preliminary alternative scenarios 3 and 4. Both of these scenarios included removal of community garden sites in the park and eliminated the Rock Creek Horse Center as a public facility. Preliminary alternative scenario 4 also included removal of the Rock Creek Park Golf Course.

Once these provisions were incorporated into preliminary alternative scenarios, few people supported removal of these established uses. Public response to newsletter 3 overwhelmingly supported continuing these facilities as appropriate to the recreational purposes of the park.

The National Park Service agrees that these facilities and activities are recreational uses in the park. The golf course and the boarding stables are established concession operations under the provisions of 36 *Code of Federal Regulations*.

There is no apparent substantive public desire to discontinue these established uses. Therefore, elimination of these facilities was dropped from further consideration in the range of alternatives evaluated in detail in the general management plan.

**Increase the Number of Community Gardens in the Park.** Few comments were received during scoping or in response to the draft general management plan on the need to expand community gardens. Moreover, throughout each year, few if any members of the public communicate to

park staff members a perceived need for additional community gardens. Therefore, expansion in the size or number of community gardens was not included in any of the alternatives.

**Construct a Continuous Paved Recreation Trail in the Rock Creek Valley.** As described previously in the section entitled “Decision Points,” the planning team for this general management plan considered the installation of a separate, paved recreation trail parallel to Beach Drive through the entire length of the Rock Creek valley in the park. Such a trail was proposed a quarter century ago in a bicycle trail study for the park (NPS 1980). A recommendation to provide a paved trail through the Rock Creek Valley was included in *Paved Recreation Trails of the National Capital Region* (NPS 1990c), but this recommendation could be satisfied by building a separate trail or by closing Beach Drive and using it as a recreation trail.

Early in the general management planning effort, a more detailed field investigation was conducted of the areas of Beach Drive that do not have a paved, parallel trail. NPS investigators included landscape architects, resource specialists, and a civil engineer. Site investigations also were made by representatives of the U.S. Fish and Wildlife Service and the District of Columbia State Historic Preservation Officer.

The investigation determined that there are multiple, severe impediments to trail construction in the area between Joyce Road and Broad Branch Road. Among these are the steep topography and narrow width of the valley bottom, which would require the cutting of numerous mature trees and extensive earthwork cut-and-fill activities. These actions would have substantial adverse effects on many of the aesthetic components of the valley bottom that currently contribute to its attractiveness. Based on this concern in conjunction with constraints associated with cultural resources, environmental resources, permitting, and funding, construction of a continuous paved recreation trail in the Rock Creek valley was eliminated from consideration as a component of any of the alternatives in this general management plan.

**Construct Additional Facilities for Organized Sports.** Preliminary alternative scenario 2 in newsletter 3 (NPS 1997c) included developing facilities for organized sports at Military Field and, potentially, at other sites in the park. While there is considerable demand for sports facilities in the District, few members of the public who commented on the preliminary alternatives supported constructing additional sports facilities in Rock Creek Park. Many people opposed such a move as inappropriate to the purposes of the park as a natural landscape.

The Brightwood area of Rock Creek Park is currently dedicated to fields supporting organized sports. Sport facilities also are provided elsewhere in the region, including NPS sites such as Fort Reno, West Potomac Park, and Anacostia Park.

Based on these considerations, the National Park Service determined that additional facilities for organized sports are neither desired nor needed at Rock Creek Park. Construction of such facilities was eliminated from further consideration in this final general management plan.

**Address Management of Canoeing and Kayaking on Rock Creek.** The National Park Service received a number of comments on the draft general management plan from private citizens expressing concern because the document did not include the management of recreational use of canoes and kayaks on Rock Creek through Rock Creek Park. Similar concerns were expressed by American Whitewater, a national non-profit organization that represents river recreationists.

Boating on Rock Creek, primarily including canoeing and kayaking, is a traditional visitor activity that has been documented for at least 35 years. At one time, float permits were required, but the permit restriction was lifted in 1986. Since then, several thousand canoe and kayak trips have occurred on Rock Creek through the park. The creek is generally runnable in the immediate hours after a thundershower or for 1 to 3 days after an extended rainstorm (American Whitewater 2003).

There is an administrative record demonstrating that superintendents of Rock Creek Park have explicitly allowed boating on Rock Creek through the park for more than a quarter century. In planning meetings for this general management plan, the current superintendent, Adrienne Coleman, reaffirmed that canoeing and kayaking are, and will continue to be, allowed within the park.

During the general management planning process, no suggestions were made to alter the current management approach to whitewater recreation. Therefore, this activity would continue regardless of the management alternative that was selected. To establish this intent, canoeing and kayaking were added to the lists of appropriate activities for all of the management prescriptions that could be applied to zones that include Rock Creek.

**Construct a New U.S. Park Police Substation at Brightwood.** It was proposed that a new District 3 substation for the U.S. Park Police be constructed in the Brightwood area of the park near the Tennis Stadium. However, as stated in the section “Geographic Area Covered by the General Management Plan,” management of the Brightwood area was established in the *Final Environmental Impact Statement, Tennis Stadium, Rock Creek Park* (NPS 1995b) and is beyond the scope of this general management plan.

The Brightwood area is to remain unchanged because of the decisions made in the Tennis Stadium plan. While the Brightwood site is attractive for a U.S. Park Police substation from an access and engineering perspective, constructing the District 3 substation there would be perceived as adversely affecting the neighbors’ quality of life and would probably be strongly opposed by much of the public.

**Improve and/or Increase Interpretive Programming.** In public comments on the draft general management plan, the National Park Service received many suggestions on ways to improve or increase interpretive programming. Some of these comments included suggestions for improving the use of existing facilities, while others identified new approaches such as using the Edgewater area as a base of interpretive programming for the lower park.

All of the action alternatives in this general management plan include a commitment to improve and increase interpretive programming. This includes adding six new staff positions to improve visitor contact, education, and interpretation.

Prior to implementing any major changes in programming, the National Park Service will update the park’s interpretive plan, which will tier from this general management plan. In preparing the update, the National Park Service will consider all of the suggestions from the public related to interpretive programming that were received as comments on the draft general management plan.

**Allow Bicycling off Currently Permitted Roads and Trails.** Bicycles are restricted to roads, parking areas, and designated paved trails in the park. This management approach is specified in

the Rock Creek Park Compendium, section 1.5 (a)(2), and is consistent with Title 36 of the U.S. Code of Federal Regulations, Sections 1.5 and 4.30 (36 *Code of Federal Regulations* 1.5 and 4.30).

During public scoping meetings, a few members of the public recommended that mountain biking be allowed on unpaved hiking and bridle trails in Rock Creek Park. This was eliminated from consideration by the National Park Service because such use is

contrary to park and NPS management policies

inconsistent with protecting the park's natural, cultural, and aesthetic values and resources

a potential threat to the safety of visitors who use the trails for established purposes such as hiking and horseback riding

**Allow Pets to Run Unleashed in the Park.** NPS policy, federal regulations (36 *Code of Federal Regulations* 2.15), and park regulations (Rock Creek Park Compendium section 2.15) require all pets to be restrained on a leash or otherwise physically confined in national parks. The National Park Service reviewed requests for allowing running-at-large dogs within Rock Creek Park, but rejected this as inappropriate for the following reasons:

The activity would be in conflict with NPS policy and regulations.

Unrestrained pets constitute a threat to park resources, particularly the native wildlife species that are recognized as important by the park's establishing legislation.

Unrestrained pets could cause personal injury or annoyance to other visitors and conflicts with appropriate visitor uses and experiences.

**Include Closures for Special Events in Alternatives.** NPS policy, federal regulations, and park regulations provide the authority to implement selected closures for special events such as Rock Creek Park Day, Earth Day, and Bike Day. Roads and other facilities also can be closed for maintenance needs, even during rush hours. This authority will remain in effect, regardless of the management actions included in this general management plan. Therefore, there was no need to incorporate special closures into any of the alternatives.

### **Impact Topics - Resources and Values at Stake in the Planning Process**

*This section identifies the resources and values (impact topics) that were considered in the planning process. It also identifies the criteria used to establish the relevance of each impact topic to long-term planning for the park and parkway.*

Specific resources and values, called impact topics, were used to focus the planning process and the assessment of potential consequences of the alternatives. The following four criteria were used to determine major resources and values for Rock Creek Park.

*Resources cited in the establishing legislation for the park or the parkway.* The establishing legislation for the park and parkway is provided in appendix A. Summaries of rele-

vant elements of the legislation are provided in the sections entitled “Park History and Use Relative to Management Planning” and “Park Mission.”

*Resources critical to maintaining the significance and character of the park.* The significance statements in the “Park Mission” section describe the defining features of Rock Creek Park and the Rock Creek and Potomac Parkway that were used to establish the resources that are critical to maintaining their significance and character.

*Resources recognized as important by laws or regulations.* A list of many of the important congressional acts and executive orders that guide the management of all NPS facilities, including this park, is provided in appendix B. A summary of some of the relevant elements of these acts and orders is provided in the section entitled “Servicewide Mandates and Policies.”

*Values of concern to the public during scoping for the general management plan.* The National Park Service conducted an extensive public information and scoping program to acquire input from the public and from other agencies. This helped the National Park Service develop alternatives and identify resources and values that are of high interest in the park.

Table 1 shows the criteria that helped establish each impact topic as a resource or value at stake in the planning process. Brief descriptions of each impact topic relative to these criteria are provided below. More detailed descriptions of each impact topic and the effects of each of the management alternatives are described in the “Environmental Analysis” section.

**TABLE 1: CRITERIA USED TO ESTABLISH EACH IMPACT TOPIC**

<b>Impact Topic</b>	<b>Cited in Establishing Legislation</b>	<b>Critical to Park Significance and Character</b>	<b>Recognized by Laws or Regulations</b>	<b>Cited During Scoping</b>
Air quality			✓	✓
Rock Creek and its tributaries	✓	✓	✓	✓
Wetlands and floodplains			✓	✓
Deciduous forests	✓	✓	✓	✓
Protected and rare species			✓	✓
Other native wildlife	✓	✓	✓	✓
Cultural resources		✓	✓	✓
Traditional park character and visitor experience	✓	✓		✓
Public health and safety			✓	✓
Local and regional transportation				✓
Community character				✓

**Natural Resources.** A major reason for establishing Rock Creek Park as a national park was to protect its natural resources and its abundant natural scenery. Natural resources in Rock Creek Park are particularly valuable because the park is located within a large metropolitan area and they are remnant vestiges of the region’s natural heritage.

*Air Quality* – Compliance with air quality standards is mandated by the Clean Air Act. In addition, during scoping members of the public expressed concerns over threats to air quality from heavy automobile traffic in the park. Poor air quality has the potential to adversely affect biological resources, cultural resources, and visitor health and experience.

*Rock Creek and Its Tributaries* – The establishing congressional acts for Rock Creek Park, the Rock Creek and Potomac Parkway, and tributary additions to the park specify that Rock Creek and its tributaries are essential resources to be protected. In addition, there are many federal laws and executive orders that protect the nation’s waters.

As the park’s name suggests, Rock Creek is fundamental to the park’s character. The undeveloped creek and its tributaries represent a unique natural resource in the Washington, D.C. metropolitan area. While surrounding urbanization adversely affects water quality and quantity, the creek and its tributaries continue to be inhabited by a variety of native fish and other aquatic species. The importance of Rock Creek as a central scenic and recreational attraction in the park was reaffirmed by numerous scoping comments.

*Wetlands and Floodplains* – Wetlands and floodplains were included in the discussion of water resources in the “Servicewide Mandates and Policies” section. Wetlands and floodplains are regulated by legislation and executive orders because of their value as biological resources and their contributions to flood control.

In the park, wetlands are located along the Rock Creek valley floor and at seeps along the lower slopes of the valley walls and along tributaries. Some of the floodplains along Rock Creek and major tributaries support riparian vegetation. Both of these sensitive areas have unusually large numbers of plant and animal species and contribute more to the biological diversity of the park than their small sizes would suggest.

*Deciduous Forests* – The establishing legislation for Rock Creek Park identifies “timber . . . in [its] natural condition” as an essential resource of the park. The National Park Service interprets this in an ecological context to mean not individual trees but the interrelated plants and animals that make up the forest biotic community. Forest stands are also an essential component of the scenic quality of the park that is mentioned in the establishing legislation.

The statements of park and parkway significance include several references to the forest’s contribution to the park’s character. The forest is an essential component of the landscape and scenic qualities of the park, buffers the park from the surrounding urbanization, and provides protected habitat for wildlife and plant species. During scoping, many comments were received about the value of the forests and the need to maintain them.

*Protected and Rare Species* – The protection of rare species and their habitats is mandated by the Endangered Species Act and *Management Policies 2001* (NPS 2000a). Rock Creek Park provides habitat for at least one federally endangered animal, at least one rare animal, and approximately 40 native plant species that are protected by Maryland and Virginia laws. (The District of Columbia does not have laws addressing native plant species protection.)

*Other Native Wildlife* – The 1916 legislation establishing the National Park Service directs the service to conserve wildlife in all national parks and to provide for public enjoyment of the same while leaving them unimpaired for future generations. Similarly, the legislation for Rock Creek

Park states that the park will “provide for the preservation from injury or spoliation of all . . . animals . . . within said park, and their retention in their natural condition.”

In Rock Creek Park, native animals represent an important resource that captures the public’s attention. During scoping, many people commented on the value of seeing wildlife in the park, especially in contrast to the surrounding urban environment. White-tailed deer, the largest and most conspicuous mammal, was most frequently mentioned. Recreational birding also was identified as an important park activity during scoping.

The breeding bird census area is a 65-acre tract of forested land in the park with exceptional scientific value related to native species. Monitoring of breeding birds has occurred since 1948. The continuous record of bird populations is an important information resource for park management and also serves as an indicator of environmental health for a much larger region.

**Cultural Resources.** The park’s cultural resources are recognized as exceptional because they illustrate significant aspects of the historic development of the park area from prehistoric times to the present. Historic features such as the Rock Creek and Potomac Parkway, the Boulder Bridge, Fort DeRussy, historic park roads, and the Peirce Mill complex help define the significance and character of the park and are protected by multiple legislative, executive, and NPS actions. These and other cultural features were cited in scoping as contributing to the appealing ambiance of the park.

**Visitor and Community Values.** In reviewing the range of comments received during scoping, the following topics appear to capture the values expressed by the public.

*Traditional Park Character and Visitor Experience* – The park and parkway significance statements presented near the beginning of this general management plan reflect the importance of the overall visitor experience in defining the park’s character. Frequent scoping comments were associated with protecting the park’s and parkway’s naturalness, not only for the ecological resources, but for its restorative value to people as a place of natural beauty and decompression from the nearby urban setting. Scenery, opportunities to learn about the natural world, natural quiet, and the ability to hear natural sounds were often highlighted. Despite contention about other management approaches, there was near unanimity that the natural character should be preserved and protected from disturbance from additional development.

People also emphasized the traditional, familiar character of the park and parkway’s recreational features and their desire to see this character maintained. While many said that park roads and trails need repair and improved maintenance, the public appeared to be mostly satisfied with the range of recreational opportunities offered by the park. Other comments emphasized

the value of the park as a gathering place for family and friends

the importance of shared experiences such as walking, picnicking, golfing, horseback riding, gardening, attending concerts, and participating in other activities that have come to be associated with the park

individual and physically challenging recreation such as biking, jogging, in-line skating, and hiking

the historic design of structures as a contributing factor to the aesthetic character of the park and the parkway

*Public Health and Safety* – Public health and safety is an important component of the National Environmental Policy Act, where two of the six criteria, listed in Section 101(b) involve ensuring safe, healthful surroundings and avoiding risk to health or safety. The complete text of these criteria is presented later in this general management plan under the heading “The Environmentally Preferred Alternative.”

Section 1508.27 of the Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act identifies several topics that must be included in any impact evaluation. One of these, listed in Section 1508.27(b)2, is “the degree to which the proposed action affects public health and safety.”

During scoping, most of the public health and safety concerns focused on traffic safety, particularly including accidents between automobiles and people participating in nonmotorized recreation activities. As a result, the draft general management plan included consideration of health and safety in the analysis of local and regional transportation. In comments on the draft general management plan, concerns about assaults and evacuation of the city during emergencies emerged as health and safety issues. As a result, public health and safety was expanded to include these additional components and was identified as a separate impact topic.

*Local and Regional Transportation* – Local and regional transportation was identified as an impact topic primarily because of scoping.

Some members of the public identified the value of park roads, the parkway, and paved trails as a transportation corridor. The Washington, D.C. metropolitan area has a serious traffic congestion problem, and scoping comments pointed out that park roads and paved trails are part of the regional transportation system. Other people stressed that any actions to change automobile use within the park or on the parkway would affect traffic patterns on surrounding city streets. They value the parkway and park roads because of their contribution to moving automobiles through the city.

Other people value the park roads and paved trails corridor for the opportunity to promote non-motorized and less polluting alternatives, especially bicycle use, to single-occupancy automobiles. These people want to see a reduction in automobile traffic in the park and parkway not only to improve chances for automobile-free recreation, but also as part of a larger effort to reduce dependency on personal automobile use in the region.

*Community Character* – Community character was identified as an impact topic primarily because of scoping. Many of those who commented during scoping described the park and parkway as a major asset to the quality of life in the metropolitan area. The scenic and recreational amenities are much appreciated. Many said that proximity and access to the park and parkway were important factors in their choice of neighborhoods. A number of people who identified themselves as park neighbors also stressed that their neighborhoods could be affected by changes in park or parkway management, particularly in regard to transportation management.



## **Impact Topics Dismissed from Further Consideration**

*This section describes why some impact topics that commonly are considered during the planning process were not relevant to the development of a the general management plan.*

Thirteen impact topics that must be considered in any environmental impact statement prepared by the National Park Service are identified in *Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001a). Based on the criteria summarized in Table 1, most of those topics are included in the impact topics evaluated for Rock Creek Park and the Rock Creek and Potomac Parkway.

In some cases, the mandatory impact topics were considered within other impact topics. For example, “socially or economically disadvantaged populations” (environmental justice) was considered under “Regional and Local Transportation.” “Urban quality and design of the built environment” was included under the heading “Historic Structures and Cultural Landscapes.”

Several of the mandatory impact topics were not relevant to management of the park and parkway. These topics, and justifications for not considering them further, are provided below.

**Possible Conflicts between the Proposal and Land Use Plans, Policies, or Controls.** Rock Creek Park and the Rock Creek and Potomac Parkway are long-time components of the Washington, D.C. physical and planning landscapes. Land use plans, policies, or controls for political entities throughout the area incorporate the presence of the park and parkway within the exiting planning framework. Although some neighboring entities may prefer that management of park roads and the parkway would not change, these entities do not have jurisdiction over park and parkway management and the existing conditions are not written into their plans, policies, or controls. Therefore, no conflicts with land use plans, policies, or controls would occur from implementation of any of the management alternatives.

**Energy Requirements and Conservation Potential.** Management actions considered in this general management plan could reduce the numbers of automobiles traveling on park roads and the parkway. However, the existing traffic would be diverted to other roads in the area and little change in area-wide traffic volumes, and associated energy requirements, would occur.

Traffic studies conducted for the National Park Service in 2004 showed that some of the traffic routes that involve Beach Drive are more time-consuming (and, therefore, fuel consuming), even during the rush hours, than traffic routes between the same points that avoid Beach Drive (Parsons 2004). Therefore, management actions that diverted automobile traffic from Beach Drive could slightly reduce the consumption of petroleum fuels. However, this could be offset by the slight increase in congestion during rush hours on other roads that would result from the diverted traffic. The effects of these conditions would be indistinguishable from normal consumption levels of petroleum fuels on area roads. The effects on energy requirements and conservation potential, when considered singly or in combination, would be negligible.

Some management actions could create a more “bicycle-friendly” environment in part of the city. However, there is no evidence that this condition would cause substantial numbers of citizens who currently travel in motorized vehicles to adopt bicycle use on a regular basis, and effects on energy requirements and conservation potential would be negligible.

Under any alternative, the National Park Service would continue to implement its policies of reducing costs, eliminating waste, and conserving resources by using energy-efficient and cost-effective technologies (NPS 2000a). This would include incorporating energy efficiency in design and materials into the construction and rehabilitation of park buildings. The National Park Service will continue to look for energy-saving opportunities in all aspects of park operations and to encourage the use of energy-efficient transportation modes.

**Natural or Depletable Resource Requirements and Conservation Potential.** Natural or depletable resources address the quality, recycling, and/or conservation of petroleum products and other natural resources. The use and conservation of petroleum products was discussed above under energy requirements and conservation potential.

The action alternatives would include construction to rehabilitate existing historic structures, and could involve new construction for the relocation of the park administrative offices and/or the Park Police District 3 substation. However, the volumes of construction materials required for these actions would be indistinguishable from the volumes of these materials used annually in the Washington, D.C. area and would have a negligible effect.

In addition to incorporating energy efficiency in design and materials into the construction and rehabilitation of buildings, the National Park Service commits to use low-impact development (LID) to minimize areas of impervious surfaces in the watershed for non-historic buildings that are constructed or remodeled. The National Park Service will work with the Government of the District of Columbia, Department of Health, to implement these and other resource conserving measures.

The National Park Service has an aggressive waste reduction and recycling program that would continue under any of the alternatives. Consistent with *Management Policies 2001* (NPS 2000a), the National Park Service would continue to look for in-house opportunities and work with partners to reduce waste and enhance the recycling and conservation of natural resources in day-to-day operations throughout the park.

**Prime and Unique Agricultural Lands.** Guidelines from the Council on Environmental Quality (1980) require federal agencies to assess the effects of their actions on soils classified by the Natural Resources Conservation Service (NRCS) as prime or unique farmlands. A letter from the Natural Resources Conservation Service state soil scientist for Maryland provided the following information (Natural Resources Conservation Service 1998):

There are no soils classified as unique within Rock Creek Park.

Two soil mapping units classified as prime farmland soils are within park boundaries.

Chillum silt loam on 0 to 8 percent slopes makes up much of the soil in the Rock Creek and Pinehurst Branch floodplains in the northern end of the park, is found along the tributary parallel to Joyce Road, and is located in isolated lenses in the floodplain of Rock Creek along the parkway.

Glenelg Loam on 0 to 8 percent slopes is located on seven isolated ridge tops around the park.

Neither of the prime farmland soil types within the park would be disturbed by management prescriptions proposed in any of the alternatives. They would continue to be generally protected within the park, and there would be no new impact on the regional production of food, forage, or fiber crops from any of the alternatives under consideration. Therefore, prime and unique farmland soils were dropped from further consideration as an impact topic.

**Ecologically Critical Areas, Wild and Scenic Rivers, or Other Unique Natural Resources.** Rock Creek Park includes a breeding bird census area, a 65-acre tract that has been surveyed regularly since 1948. This long-running study is an important contribution to the nationwide breeding bird census run by the National Audubon Society. The park also provides an island of wildlife habitat within an urban zone and serves as an important resting spot for migrating birds. Impacts on all of these resources are considered under the heading “Other Native Wildlife.” However, none of the lands covered by this general management plan have been designated as ecologically critical areas, wild and scenic rivers, or other unique natural resources. Therefore, this impact topic was not evaluated for management alternatives.

**Sacred Sites.** There are no Native American sacred sites within the area covered by this general management plan. Therefore, this is not a relevant impact topic for Rock Creek Park and the Rock Creek and Potomac Parkway.

**Indian Trust Resources.** Indian trust resources are owned by American Indians but held in trust by the United States. Requirements are included in the Secretary of the Interior’s Secretarial Order No. 3175, “Departmental Responsibilities for Indian Trust Resources” and Secretarial Order No. 3206, “American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and the Endangered Species Act.” Indian trust resources do not occur within or near Rock Creek Park or the Rock Creek and Potomac Parkway.

### **Connected, Cumulative, and Similar Actions**

*This section identifies actions that are direct or indirect consequence of the alternatives. It also identifies actions that could have an additive impact on environmental resources, regardless of who takes the actions or whether they occurred in the past, are current, or will occur in the reasonably foreseeable future.*

**Cooperating Agencies.** This final general management plan and environmental impact statement does not have any cooperating agency involvement, as defined in the Council on Environmental Quality’s (1978) “Regulations for Implementing Procedural Provisions of the National Environmental Policy Act.” However, numerous agencies were consulted in the preparation of this document, as is described in the “Consultation and Coordination” section.

**Connected and Similar Actions.** Connected and similar actions for this final general management plan refer to other planning projects in the vicinity. Appendix C describes the relationship of the general management plan to other planning in the area of Rock Creek Park and the Rock Creek and Potomac Parkway. It includes other NPS planning efforts, and planning currently in force or underway by entities other than the National Park Service.

*Rock Creek Park Plans* – Once the Rock Creek Park general management plan has been completed, several more specific plans will be prepared to implement the general management plan. These could include, but would not be limited to

PURPOSE AND NEED FOR ACTION

a traffic calming implementation plan

a trail plan

siting studies for park administrative offices and the U.S. Park Police District 3 substation

an update of the current interpretive plan

an update to the existing natural resources management plan (NPS 1996a)

The natural resources management plan could include an invasive species control plan, erosion reduction plan, and plans to address particularly difficult issues, such as deer management. It also would include a bird management plan that would establish habitat protection and improvement objectives and practices for important bird areas. Some of these could include, but would not be limited to, the areas around the maintenance yard, stables, Rock Creek Nature Center and Planetarium, picnic groves 17 and 18, and the west ridge of the park in general.

For the fire management plan and any other plan that could result in construction, including the trail plan and facility siting studies that could lead to construction, the National Park Service would prepare accompanying National Environmental Policy Act compliance documentation. In most cases, this would consist of an environmental assessment that would tier from the general management plan's environmental impact statement. However, if major impacts were anticipated, a separate environmental impact statement would be prepared.

*Coordination with Friends and Partners* – Over the years, Rock Creek Park has developed cooperative relationships with numerous organizations, currently including those listed below. Some of these relationships are formalized through contracts or memoranda of understanding but most are based on common goals. The park and these organizations will continue to work together in areas of mutual interest. Some actions will involve implementing the measures included in this general management plan, but many will go beyond its scope to address natural, cultural, and recreation resources on an area- or region-wide basis.

Alice Ferguson Foundation  
American University  
Blues Alley Foundation  
Citizens Associations (30) surrounding Rock  
Creek Park  
Committee of 100  
Community Gardens  
Council of Governments  
D.C. Chamber of Commerce (Heritage  
Tourism Office)  
Discovery Creek Children's Museum  
District of Columbia, Maryland and Virginia  
Public Schools  
Francis Scott Key Foundation  
Friends of Chevy Chase Circle  
Friends of Ft. Bayard  
Friends of Meridian Hill  
Friends of Montrose/Dumbarton

Friends of Peirce Mill  
Friends of Rose Park  
Garden Conservancy  
George Washington University  
Georgetown Business Improvement District  
Georgetown Garden Club  
Georgetown University  
Georgetown Waterfront Commission  
Harvard University-Dumbarton  
Oaks Garden  
Howard University  
Junior League  
National Park Foundation  
People's Alliance for Rock Creek Park  
Potomac Appalachian Trail Club  
Rock Creek Golf Course  
Rock Creek Horse Center  
Rowing and Boating groups

State Of Maryland  
Thompson's Boat Center  
Washington Area Bicycle Association

Washington Tennis Foundation  
Wilson Bridge Commission

**Cumulative Actions.** Cumulative actions are actions by the National Park Service or others that may have additive impacts on one or more of the resources of Rock Creek Park or the Rock Creek and Potomac Parkway. Evaluation of cumulative actions must consider past, current, or reasonably foreseeable future actions. The actions described below were included in the cumulative impact analyses in the "Environmental Consequences" section of this general management plan and environmental impact statement.

*Past Urbanization of the Washington, D.C. Area* – The Washington, D.C. metropolitan area completely surrounds Rock Creek Park, so that the park in effect is an island of natural resources within an urban zone. In the area around the park, forests and fields have been replaced by street-scapes; creeks have been routed into storm sewers, some of which receive untreated sewage in association with storm events; and archeological and historic sites were lost during construction of the city. These past actions are included to determine the effects of park management within the larger regional setting.

*Continuing Urbanization of the Rock Creek Watershed* – Continuing urbanization of the Rock Creek watershed will affect several of the resources of Rock Creek Park, regardless of management actions taken by the National Park Service within the park. Watershed development will be particularly important in the consideration of effects on Rock Creek, its floodplains, and aquatic life.

*Altered Transportation Patterns* – In addressing the cumulative effects of altering transportation patterns through the park, the National Park Service considered incremental park changes added to regional programs, policies, and objectives.

Management actions in the past continue to affect traffic in the area. For example, the management of the parkway to be one-way inbound during the morning rush hour and one-way outbound during the afternoon rush hour began in 1937. Opening of the zoo tunnel in 1966 to relieve traffic congestion in the area of the National Zoo inadvertently made the corridor consisting of Beach Drive and the Rock Creek and Potomac Parkway into an attractive route for traveling by automobile between the city center and the residential areas of northwest Washington, D.C. and Montgomery County, Maryland.

Transportation projects are occurring continuously throughout Washington, D.C. and Montgomery County as transportation departments strive to improve roadway and traffic conditions. These were considered on the whole as an activity that would be ongoing throughout the duration of the general management plan's implementation rather than as individual actions.

Area transportation plans provided indications of reasonably foreseeable actions. Several important transportation plans that were included in the analysis of alternatives include the following:

The Metropolitan Washington Council of Governments' (1998a) *Making the Vision a Reality . . . Together* outlines regional transportation policies, objectives, and strategies for the metropolitan area. The policies support an intermodal transportation system that includes rail, bus, ride sharing, bicycle, and pedestrian improvements that reduce reliance on the single-occupant automobile.

The *Transportation Plan for the District of Columbia* (District of Columbia 1997b) promotes development of a transportation system that intercepts automobile traffic at the edges of the city and reduces dependence on single-occupancy vehicles. The plan also advocates the development of bicycle paths along Beach Drive and the Rock Creek and Potomac Parkway.

Similar bicycle paths are called for in the *National Capital Region Bicycle Plan* (Metropolitan Washington Council of Governments 1995).

The District of Columbia Department of Transportation released a draft version of the *District of Columbia Bicycle Plan* in August 2004 (District of Columbia 2004f). In the document, the Department of Transportation defines plans to improve existing District of Columbia and NPS trails within Rock Creek Park and better link the bikeway system in the District of Columbia.

The Metropolitan Washington Council of Governments' (2001) Transportation Planning Board published *Priorities 2000: Metropolitan Washington Greenways*. This document establishes a regional greenway plan for the metropolitan Washington, D.C. area.

*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. Fort DeRussy is within the park boundaries.

Many management actions prescribed in the Fort Circle Parks plan are similar to and can be coordinated with practices at Rock Creek Park. These include controlling invasive plant species, surveying and monitoring park boundaries to prevent encroachments, eliminating illegal dumping, managing storm water, controlling erosion, and monitoring adjacent land use and zoning to protect park resources.

A new, 23-mile-long trail will be designated to 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. The NPS planning effort for the trail will include Rock Creek Park staff and will involve extensive consultation with District of Columbia, other government, and private organizations.

*Potomac Heritage National Scenic Trail* – The Potomac Heritage National Scenic Trail, currently in the development process, will be a braided trail system involving multiple paths rather than a single corridor. Similar to the Fort Circle Parks trail, it will intersect with linear recreation features in Rock Creek Park. This connectivity will enhance opportunities for nonmotorized recreation throughout the area.

*Chesapeake Bay Program* – The Chesapeake Bay Program is a cooperative effort by approximately 1,650 area governments at the federal, state, regional, and local levels to restore and protect the Chesapeake Bay. The program began with the signing of the Chesapeake Bay Agreement in 1983. 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. In joining the program, the National Park Service agreed to contribute to the restoration, interpretation, and conservation of the many valuable resources of Chesapeake Bay.

Subsequently, the National Park Service signed the 1994 Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay and the 1998 Federal Agencies' Chesapeake Ecosystem Unified Plan, which contains 50 specific goals and commitments by federal agencies. The Estuaries and Clean Waters Act of 2000, which includes Title II: the Chesapeake Bay Restoration Act of 2000, establishes that federal properties, and actions taken by agencies with respect to those properties, including management actions by the National Park Service in Rock Creek Park and Rock Creek and Potomac Parkway, will comply with the Chesapeake Bay Agreement, the above-listed federal agencies agreement and plan, and any subsequent agreements and plans. NPS participation is coordinated through the NPS' Chesapeake Bay Program Office.

Information on the Chesapeake Bay Program is available on the Internet at <http://www.chesapeakebay.net/>. The activities of the Chesapeake Bay Program are included as cumulative actions that are considered in the impact analysis.

*Other Coordination with Agencies* – The National Park Service routinely coordinates with numerous agencies at the federal, regional, district and state, and local levels under a variety of formal and informal arrangements. Some of these interactions were identified under “Servicewide Mandates and Policies.” This type of coordination is the only practical means to meet mutual goals in the complex urban setting where the park is located and will continue to shape decisions on park management throughout the implementation of this general management plan.

*Fish Passage Improvements in Rock Creek* – A replacement for the Woodrow Wilson Bridge, which crosses the Potomac River approximately 7 miles downstream from the mouth of Rock Creek, currently is being constructed. Mitigation for this project includes the installation of improvements in Rock Creek and its tributaries to remove barriers to fish migration. These improvements will allow fish to migrate from the mouth of the creek upstream to Needwood Lake in Montgomery County, Maryland (Madaras 2001).

Modifications are being made at eight sites in Rock Creek. Construction should be completed in 2005 (NPS, Cox 2004a).

The mitigation includes a fish bypass structure to allow fish to swim past the 8-foot-high Peirce Mill dam. This Denil fishway is located between the dam abutment and Beach Drive. Its sloped channel with baffles at regular intervals slows the velocity of the water and creates resting pools to conserve the energy of migrating fish. Its slope and length were designed based on the swimming ability of the migratory fish in Rock Creek (blueback herring, alewife, and American eel). The angle and velocity of the flow leaving the bypass will assist fish in finding the passage. According to the Chesapeake Bay Program website (<http://www.chesapeakebay.net/>), Denil fishways are probably the most common design used in the Chesapeake Bay watershed.

Milkhouse Ford was reconstructed so that it remains passable by automobiles, and all of its historic structures above the waterline were retained. The old concrete of the ford was removed and replaced with concrete of similar color and texture that was configured to provide a flow depth and velocity that allow the passage of fish. The abandoned sewerline on the upstream lip of the ford was removed.

## PURPOSE AND NEED FOR ACTION

Two abandoned roadway fords in Rock Creek within the National Zoological Park have been removed. In addition, an abandoned sewerline upstream from the Boulder Bridge was removed (NPS, Cox 2004a).

Passage over four active sewerlines will be provided by installing natural-appearing pool and weir structures. Engineers examined the existing “boulder field” area of Rock Creek, which is a natural fish passage. Within this stretch, they measured flow velocities, flow depths, and sizes of openings. They then developed designs for the area immediately downstream of each sewerline that mimic the boulder field concept and provide fish with a stair-step effect. These features have been installed below a sewerline just upstream from Boulder Bridge and two sewerlines in the vicinity of Sherrill Drive and are currently being installed below the sewerline upstream from Milkhouse Ford (NPS, Cox 2004a).

*Rock Creek Park Telecommunications Facilities* – In 2003, Rock Creek Park completed an environmental assessment (NPS 2003d) evaluating the two cellular towers located within the park. The preferred alternative in the document and signed finding of no significant impact was to continue allowing the cellular towers within the park subject to renewal of the permit, and to implement additional mitigation (NPS 2003c).

*Broad Branch Road Improvement Project* – The District of Columbia’s Department of Transportation is in the design planning stages of a project to improve Broad Branch Road. Initially, the project called for realignment of the road, increases in elevation, removal of trees, and widening the roadway 2 feet (Advisory Neighborhood Commission 3F 2000). However, in response to citizens’ concerns about the original design, additional environmental elements are now being considered, which may include a proposed parallel bike path. The National Park Service is providing advisory services in the current design process. The project is expected to begin in 2005 and will proceed regardless of roadway management actions taken the National Park Service in the nearby Rock Creek Park (Kahlid 2004).



Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

## **ALTERNATIVES**

*This section first describes each management prescription developed for Rock Creek Park and the Rock Creek and Potomac Parkway. It then describes how the alternatives were formulated and provides descriptions of each alternative, using zoning to apply management concepts to park resources.*

A description of how the alternatives were created based on scoping is provided in the section entitled “Formulation of Alternatives.” Following their general definition, the development of the alternatives was a two-step process.

The National Park Service identified management prescriptions that potentially were applicable to the park and parkway. Each management prescription was defined by desired visitor experiences and resource conditions. This helped establish the kinds of activities or facilities within each prescription that would achieve those targeted conditions.

The management prescriptions were then mapped to specific areas of the park to create the four alternatives evaluated in this final general management plan.

Each alternative is a combination of several management prescriptions. None of the alternatives uses all of the prescriptions, and the locations where the prescriptions would be applied vary among alternatives.

Each of the alternatives is presented as a concept that contains the goals of the alternative, followed by the management prescriptions that would be used to implement those goals. All of the alternatives also include an adaptive management component. This means that if the actions outlined in an alternative are not completely successful in meeting the stated goals, the National Park Service will identify and implement other approaches until the goals are achieved.

## **MANAGEMENT PRESCRIPTIONS**

*This section defines all of the management prescriptions that could be applied to Rock Creek Park and the Rock Creek and Potomac Parkway under any of the alternatives. The management prescriptions define the desired resource conditions and visitor experiences, including the appropriate kinds and levels of management, use, and development.*

A management prescription is an approach for administering or treating the resources or uses of a specified area that is based on desired outcomes. Management prescriptions include target goals or objectives for one or more resources and/or visitor experiences that are present within the prescription area.

At some NPS units, a single management prescription will be applied to an entire park. However, all of the alternatives for Rock Creek Park and the Rock Creek and Potomac Parkway consist of multiple zones with different management prescriptions. Together, all of the management prescriptions within an alternative meet all of the goals for the park and parkway.

Different physical, biological, and social conditions are emphasized in each zone. The factors that define each management prescription are the

desired natural and cultural resource conditions

desired visitor experience

These factors then indicate the types of activities or facilities that are appropriate within the zone.

Regardless of the target visitor experience or resource condition, all of the management prescriptions conform to all of the park-specific purpose, significance, and mission goals, and the servicewide mandates and policies, that were described earlier in this final general management plan. For example an archeological site will be protected, regardless of whether it occurs in the forest zone, cultural resource zone, or valley floor automobile access zone. However, the *use* of that site for interpretive or educational purposes could vary, depending on the management prescription to which its vicinity was assigned.

The 12 management prescriptions identified as potentially applicable are described below and summarized in table 2. Consistent with the high level of concern expressed in scoping about the use of roadways, seven of the prescriptions apply to roads. The others emphasize desired conditions and visitor experiences for forests, cultural resources, recreation areas, visitor facilities, and administration and operations areas.

## **FOREST ZONE**

Largely undisturbed forests characterize this zone which, in some places, includes the valley bottom and Rock Creek channel. Forests in the valley, on the slopes, and on ridge tops provide opportunities for solitude, birding and other nature study, and wilderness-like scenery. This is the only zone where a visitor expects a low to moderate number of encounters with other park visitors.

Impacts on natural resources from human activities are avoided or largely mitigated. Cultural resources are managed compatibly with the natural environment.

Unpaved trails provide for hiking, horseback riding, and jogging. A few paved trails provide for nonmotorized recreation activities such as bicycling and in-line skating. Following substantial rainfall events, canoeing and kayaking occur on Rock Creek.

### **Desired Visitor Experience**

In the interior of this zone, visitors are immersed in a natural landscape. The zone provides opportunities for exploration and contemplation of the forest, and respite from the sounds and views of the city.

**TABLE 2: SUMMARY OF MANAGEMENT PRESCRIPTIONS**

<b>Management Prescription</b>	<b>Description</b>	<b>Visitor Experience and Resource Condition</b>	<b>Appropriate Activities and Facilities</b>
Forest Zone	Natural landscape of forests on the valley slopes and ridge tops	Provides opportunities for exploration and contemplation of the forest Low to moderate encounter frequency with other visitors Mostly undisrupted natural processes	Activities: hiking, birding and other nature study, and canoeing and kayaking Facilities: mostly undeveloped, other than trails
Cultural Resource Zone	Contains the key cultural resources related to the significance and purposes of the park	Provides a sense of history High encounter frequency with other visitors and park personnel Protects the integrity and ambiance of cultural features Documents and interprets resources Manages natural resources compatibly with cultural resource	Activities and facilities are compatible with cultural resource protection Activities: education and interpretation, adaptive uses Facilities: cultural resources, which could be adaptively used
Valley Floor Automobile Access Zone	Roadways and mowed areas along the Rock Creek and Piney Branch valley floors Provides scenic views of the creek and forested valley	Provides motorized and nonmotorized access to the valley and informal recreational areas Moderate to very high encounter frequency with other visitors Heavy urban traffic on weekdays during rush hours On weekends and holidays, motorized traffic is excluded in three sections and nonmotorized recreation occurs Landscape is largely forested, but shoulders and grassy bays are maintained by mowing	Activities: motorized and nonmotorized travel, nonrecreational traffic through or across the valley, and informal recreation such as picnicking, birding and other nature study, canoeing and kayaking, bicycling, and hiking Facilities: rustic picnic areas, paved trails, roadways, and traffic control devices
Valley Floor Controlled Automobile Access Zone	Similar to Valley Floor Automobile Access Zone but with reduced traffic volumes and speeds	Same as Valley Floor Automobile Access Zone	Same as Valley Floor Automobile Access Zone

**TABLE 2: SUMMARY OF MANAGEMENT PRESCRIPTIONS (Continued)**

<b>Management Prescription</b>	<b>Description</b>	<b>Visitor Experience and Resource Condition</b>	<b>Appropriate Activities and Facilities</b>
Valley Floor Nonmotorized Recreation Zone	<p>Excludes motorized traffic</p> <p>Includes Beach Drive and adjacent mowed areas</p> <p>Provides scenic views of the creek and forested valley</p>	<p>Visitors enjoy natural sights, sounds, and smells, uninterrupted by motor vehicle traffic</p> <p>Relaxed and unhurried experience</p> <p>Moderate to very high encounter frequency with other visitors</p> <p>Landscape is largely forested, but shoulders and grassy bays are maintained by mowing</p>	<p>Activities: nonmotorized recreation such as walking, bicycling, in-line skating, birding and other nature study, canoeing and kayaking, and picnicking</p> <p>Facilities: paved trails or former road bed, rustic picnic areas, and interpretive waysides</p>
Valley Floor Mid-Weekday Recreation Zone	<p>Excludes motorized traffic on weekdays between 9:30 A.M. and 3:30 P.M.</p> <p>At all other times, is similar to the Valley Floor Controlled Automobile Access Zone</p>	<p>During mid-weekday closures, same as the Valley Floor Nonmotorized Recreation Zone</p> <p>At all other times, same as the Valley Floor Controlled Automobile Access Zone</p>	<p>Same as Valley Floor Automobile Access Zone</p>
Rock Creek and Potomac Parkway Zone	<p>Highly developed parkway that provides a scenic driving experience</p> <p>Mix of grassy fields and woodlands with limited city views</p>	<p>Aesthetically pleasing landscape provides a sense of decompression and relaxation</p> <p>High to very high encounter frequency with other visitors</p> <p>Heavy traffic is accepted</p> <p>Natural and historic features are maintained, including parkway design</p>	<p>Activities: motorized and nonmotorized recreation such as driving, walking, bicycling, canoeing and kayaking, and in-line skating</p> <p>Facilities: roadways and paved trails</p>
Park Road Zone	<p>Park roads, including associated shoulders, pullouts, parking areas, paved trails, historic bridges, and scenic viewpoints</p>	<p>Provides motorized and nonmotorized park access</p> <p>High to very high encounter frequency with other visitors</p> <p>Unhurried drive or bicycle ride, despite heavy urban traffic at times</p> <p>Surrounding landscape is forested, but shoulders are maintained by mowing</p>	<p>Activities: motorized and nonmotorized travel, nonrecreational traffic across the park</p> <p>Facilities: roadways, paved trails, and traffic control devices</p>

**TABLE 2: SUMMARY OF MANAGEMENT PRESCRIPTIONS (Continued)**

<b>Management Prescription</b>	<b>Description</b>	<b>Visitor Experience and Resource Condition</b>	<b>Appropriate Activities and Facilities</b>
Visitor Facility Zone	Developed zone defined by facilities for information, interpretation, education, and other visitor services	<p>Receive introduction to park’s natural and cultural history</p> <p>Obtain information on recreation opportunities</p> <p>High encounter frequency with other visitors and park personnel</p> <p>Substantial maintenance and intervention to accommodate concentrated visitor use</p>	<p>Activities: information, interpretation, education, and other visitor services</p> <p>Facilities: buildings and waysides to support information and interpretive activities; historic structures could be adaptively used</p>
Urban Recreation Zone	<p>Developed recreation facilities such as picnic areas, community gardens, stables, sport fields, and golf course</p> <p>Background setting is rustic and park-like</p>	<p>Developed facilities for recreation</p> <p>High levels of intervention and maintenance to support concentrated visitor use</p> <p>Very high encounter frequency with other visitors</p>	<p>Activities: gardening, picnicking, tennis, performances, golf, horseback riding, and informal sports</p> <p>Facilities: developed recreation features and structures</p>
Administration/Operations Zone	Includes structures and grounds used for park administration and operations	<p>Most visitors are unaware of the facilities</p> <p>When necessary, visitors are able to locate facilities easily and find them user friendly</p> <p>Best management practices protect resources, prevent pollution, and reduce noise and visual impacts</p>	<p>Activities: park administration and operation, birding and other nature study,</p> <p>Facilities: offices and maintenance yards; historic structures could be adaptively used</p>
Urban Transit Zone	Includes non-NPS roads within the park and parkway boundaries that provide access across the park and connections with the urban street grid	<p>Visitors experience the sights and sounds of urban traffic</p> <p>Very high encounter frequency with other visitors</p>	<p>Activities: urban transportation; where possible, links the park to local trails for nonmotorized recreation</p> <p>Facilities: roadways and traffic control devices</p>

Paved trails within the zone support active recreation and also provide opportunities for visitors in wheelchairs or with young children in strollers to experience a natural setting. On paved trails in the forest zone, the chance of a visitor encountering someone else are moderate to high on busy weekends. Away from paved trails, the encounter rate is low to moderate.

### **Desired Resource Conditions**

Natural processes function in this zone with relatively little interference except for restorative actions to protect or promote native biota, mitigate pollution, and control erosion. Natural and cultural resources within the zone are documented and understood through nondisruptive research. Archeological, historic, and ethnographic resources are managed compatibly with the natural environment, while recognizing that some disturbance to the forest currently occurs and will continue to occur in these areas.

Some open spaces are maintained within the Forest Zone using processes such as mowing and brush cutting. These include, but are not limited to, picnic groves and meadows like Military Field. Long-standing vegetation management practices involving thinning or limbing-up of trees are used along the stream banks to maintain glimpses of the water and occasional views up or down the creek. Some historic clearings may be restored within the Forest Zone, potentially including the vista at Pulpit Rock, specific views of the boulder dam at Peirce Mill, and the historic entry drive at Linnaean Hill. However, areas of modified vegetation are limited in size, have a well-defined purpose, and could be reversed by ending the management practice and allowing natural vegetation succession to occur.

### **Appropriate Kinds of Activities or Facilities**

A strong emphasis is placed on natural and rustic scenic and aesthetic quality. Structures or activities that would disrupt such a setting are not permitted.

This zone is mostly undeveloped. Park facilities are limited to bridle paths, foot trails, limited paved recreation trails, and a few picnic sites to assist visitors in enjoying the forest. Nondisruptive environmental and cultural research and monitoring, consistent with the park purpose, are permitted.

## **CULTURAL RESOURCE ZONE**

The cultural resource zone contains lands that are managed primarily for the preservation, protection, and interpretation of their cultural resource values. Typically, these lands include key cultural resources related to the significance and purposes of the park and parkway.

Not all lands that contain valuable cultural resources would be assigned to the cultural resource zone. For example, the park's entire circulation network of historic roads and trails contributes to the listing of the Rock Creek Historic District in the National Register of Historic Places. However, these roads also fulfill transportation functions that justify a different management prescription. Similarly, a historic building that houses administrative offices would be assigned an administrative rather than a cultural resource management prescription.

### **Desired Visitor Experience**

Visitors are offered the opportunity to learn about and contemplate the prehistoric and historic resources in the park and obtain a sense of past human occupation and use of the park area. The resource management objectives for each facility are based on site-specific visitor activities and encounter rates. Visitors expect a high number of encounters with other park visitors, and with NPS personnel.

### **Desired Resource Conditions**

Archeological and historic sites, buildings, structures, circulation networks, features, and landscapes are protected and preserved. Cultural resources in the zone are documented and interpreted.

Cultural landscapes in this zone generally are managed to reflect their historic design. Nonnative plant species are used sparingly, and only in a manner that is consistent with their historic use (see *Management Policies 2001*, NPS 2000a).

Natural resources are managed compatibly with cultural resource preservation procedures and programs. Natural processes are maintained wherever possible.

### **Appropriate Kinds of Activities or Facilities**

Activities are limited to those compatible with maintaining the integrity of the featured cultural resources. Historic buildings or structures could be adaptively used for various park purposes subject to NPS policies for protection, preservation, and utilization of cultural resources.

## **VALLEY FLOOR AUTOMOBILE ACCESS ZONE**

This zone lies along the Rock Creek and Piney Branch valley floors. It includes the roadways and adjacent mowed areas that are maintained for recreation and aesthetics and, in some places, includes the Rock Creek channel. The zone features scenic views of the creek and the forested valley. Grassy areas and rustic facilities are maintained for picnicking and other informal recreation.

On weekdays, the zone is managed for pleasure driving and for urban traffic, which at times is very heavy. On weekends and holidays, motorized traffic is excluded from three sections of this zone, and it provides nonmotorized recreation such as walking, bicycling, birding and other nature study, and in-line skating. Following substantial rainfall events, canoeing and kayaking occur on Rock Creek.

### **Desired Visitor Experience**

Visitors have convenient access to the valley and to informal recreational areas along Rock Creek and Piney Branch. Visitors enjoy being in a picturesque landscape of fields and forests. Informal recreation in the corridor contributes to social interaction. The frequency of visitor encounters with other visitors is moderate to very high, although secluded spots on the creek offer a chance for solitude.



### **Desired Resource Conditions**

The landscape beside the road and creek is modified from natural conditions. Shoulders and established grassy bays along Beach Drive are maintained by mowing. Forested areas within this zone are managed in a natural condition, similar to that in the Forest Zone. Wetlands and seeps are kept in a natural condition. Historic bridges and picnic facilities are maintained for heavy daily use.

### **Appropriate Kinds of Activities or Facilities**

During weekdays, motorized and nonmotorized travel are accommodated. This includes nonrecreational traffic through and across the valley, which results in heavy traffic, particularly during rush hours. Traffic control devices, such as signal lights, are used judiciously to control volumes and speeds with as little detraction from the rustic setting as practical. Speed limits and other traffic regulations are enforced. During weekends and holidays, three sections of roadways are closed to motorized traffic.

Informal recreation such as picnicking, casual ball games, and contemplation are supported, for both individuals and groups. Facilities include rustic-style picnic tables, grills, and shelters; parking and staging areas; comfort stations; and interpretive waysides and information boards.

## **VALLEY FLOOR CONTROLLED AUTOMOBILE ACCESS ZONE**

The configuration of and desired experiences and resource conditions in this zone are similar to the Valley Floor Automobile Access Zone described above. However, different kinds of activities and facilities are used to control the level of traffic in the park. The management goals are to slow traffic to posted speed limits and to reduce the volume of nonrecreational traffic in the valley.

### **Desired Visitor Experience**

The desired visitor experience is the same as the Valley Floor Automobile Access Zone.

### **Desired Resource Conditions**

The desired resource conditions are the same as the Valley Floor Automobile Access Zone.

### **Appropriate Kinds of Activities or Facilities**

Motorized and nonmotorized travel are accommodated, similar to the Valley Floor Automobile Access Zone. However, nonrecreational traffic through or across the valley is more rigorously controlled. Traffic-calming measures are used judiciously to control volumes and speeds with as little detraction from the rustic setting as practical. Speed limits and other traffic regulations are enforced. Even with controls, traffic is heavy at times.

Other activities and facilities are similar to those described in the Valley Floor Automobile Access Zone.

## **VALLEY FLOOR NONMOTORIZED RECREATION ZONE**

Motorized traffic is excluded from this zone, which includes former roads, adjacent mowed areas, and parts of the Rock Creek channel. The zone features scenic views of the creek and the forested valley. Grassy areas and rustic facilities support picnicking and other informal recreation. The zone provides nonmotorized recreation such as walking, bicycling, birding and other nature study, canoeing and kayaking, and in-line skating.

### **Desired Visitor Experience**

The zone provides visitors with opportunities to enjoy the natural sights, sounds, and smells of the creek valley, uninterrupted by motor vehicle traffic. Visitors enjoy being in a scenic landscape of fields and forests in contrast to the surrounding city. The experience is relaxed and unhurried. Informal recreation in the corridor contributes to social interaction. The frequency of visitor encounters with other visitors is moderate to very high, although secluded spots on the creek offer a chance for solitude.

### **Desired Resource Conditions**

Shoulders and some established grassy bays along Beach Drive are maintained by mowing for aesthetics and informal recreation. Some currently mowed areas are allowed to succeed to meadow and forest. Forested areas within this zone are managed in a natural condition, similar to that in the Forest Zone. Wetlands and seeps are kept in a natural condition. Historic bridges and picnic facilities are maintained.

### **Appropriate Kinds of Activities or Facilities**

This zone supports a variety of informal, nonmotorized recreational uses along the creek. Activities range from passive recreation and repose to the physically challenging. Activities include bicycling, walking, picnicking, canoeing and kayaking, birding and other nature study, in-line skating, and jogging. The road corridor remains along the existing alignment of Beach Drive. Facilities include rustic picnic tables, grills, and interpretive waysides and information boards.

## **VALLEY FLOOR MID-WEEKDAY RECREATION ZONE**

On weekdays between 9:30 A.M. and 3:30 P.M., this zone is managed in a manner similar to the Valley Floor Nonmotorized Recreation Zone. At all other times, its management is identical to that of the Valley Floor Controlled Automobile Access Zone.

### **Desired Visitor Experience**

Except during mid-weekday hours, the desired visitor experience is the same as the Valley Floor Automobile Access Zone. During mid-weekdays, the desired visitor experience is like that in the Valley Floor Nonmotorized Recreation Zone and includes unhurried enjoyment of the natural sights, sounds, and smells of the creek valley, uninterrupted by motor vehicle traffic.

### **Desired Resource Conditions**

The desired resource conditions are the same as the Valley Floor Automobile Access Zone.

### **Appropriate Kinds of Activities or Facilities**

Except during mid-weekday hours, activities are identical to those of the Valley Floor Controlled Automobile Access Zone. This includes the use of traffic-calming measures to control volumes and speeds. However, traffic is heavy even when controls are in place, particularly during rush hours. During mid-weekdays, activities are limited to nonmotorized uses, similar to those described for the Valley Floor Nonmotorized Recreation Zone. Facilities are similar to those described in the Valley Floor Automobile Access Zone.

## **ROCK CREEK AND POTOMAC PARKWAY ZONE**

The developed parkway zone connects the National Zoo, Rock Creek Park, and the monumental core of the city with a scenic driving experience. It consists of the parkway, non-forested areas of the right-of-way, parts of the Rock Creek channel, and the paved recreation trail.

This zone provides a scenic corridor through a park-like setting consisting of a mix of forests and fields with limited views of the surrounding city. Landscapes are managed in a sustainable fashion, and the defining features of the historic parkway are preserved.

### **Desired Visitor Experience**

Visitors drive along a well-maintained paved road, or they bicycle, walk, or skate on a paved recreational trail. Following substantial rainfall events, canoeing and kayaking occur on Rock Creek. Views include the creek, overhead bridges, the artistically designed roadway, planting of trees and shrubs, and forest edges.

The experience is linear and sequential in character and is transitional between the adjacent urban landscape, particularly at the southern end of the parkway, and the more natural landscape of Rock Creek Park to the north. Visitors entering the parkway from city streets have a sense of decompression and relaxation. The Godey Lime Kilns offer visitors an opportunity to view a historic industrial ruin. The visitor encounter rate with other visitors in the zone is very high at times, and heavy traffic is accepted.

### **Desired Resource Conditions**

The landscape is substantially modified compared to natural conditions. Native plant materials are used to create an aesthetically pleasing landscape in keeping with the historic parkway design.

Nonnative, noninvasive plant species are used sparingly in this zone within the standards of NPS policies. Historic parkway design features are maintained, as are the ruins of Godey Lime Kilns.

### **Appropriate Kinds of Activities or Facilities**

Visitor activities include driving, bicycling, walking, jogging, canoeing and kayaking, and in-line skating. Landscape management is relatively intensive, including such activities as mowing and trimming, tree planting or removal, and invasive plant control. Existing levels of development are maintained. Some intersections or other points are rehabilitated for visitor safety or aesthetics, but the redesign avoids increasing the capacity of the roadway or encouraging increased speeds. Speed limits and other traffic regulations are enforced.

### **PARK ROAD ZONE**

The Park Road Zone includes all paved roads, other than Beach Drive and the Rock Creek and Potomac Parkway, that are owned and maintained by the National Park Service and are open to automobile use by the public. The zone is a narrow corridor that includes the road surface, shoulders, and associated pullouts, parking areas, and paved trails. These corridors provide scenic driving, as well as pedestrian and bicyclist access, to park recreational and interpretive facilities.

### **Desired Visitor Experience**

The primary visitor experience goal for this zone is an unhurried drive or bicycle ride through a scenic, aesthetically pleasing natural landscape. The roadways and paved trails within this zone are used by visitors for traveling in the park, enjoying scenic vistas, and accessing interpretive and recreational facilities and other zones. The visitor experience generally depends on a motorized vehicle or bicycle, and involves traveling on a well-maintained, paved surface designed to complement the forest setting.

The frequency of visitor encounters with other visitors on park roads is high to very high. The latter condition occurs most often during weekday rush hours, when many of the roads in this zone are used by commuters to travel across or through the park. Although such nonrecreational use is viewed as a secondary purpose for park roads, it is accepted so long as traffic volumes do not pose an undue threat to visitor safety, cause resource damage, or create excessive traffic congestion in the park.

### **Desired Resource Conditions**

On park roads that have been identified as cultural resources, a strong emphasis is placed on the aesthetic quality of the roadways, including their ability to harmonize with the surrounding forest and retain the historic, rustic design of early park facilities. Within the goal of maintaining the historic appearance and function of the roads, some modern traffic signage and traffic control devices are accepted for visitor safety, and curbing and drainage structures may be rehabilitated to improve storm water control.

### **Appropriate Kinds of Activities or Facilities**

All roads, recreational trails, and associated facilities in this zone are managed to complement the natural setting and historic road design. The design and capacity of the roads are not adjusted to meet nonrecreational traffic volumes. Rather, traffic-calming measures are used to reduce nonrecreational traffic volumes and congestion if they become a problem. Sidewalks or paved trails are provided adjacent to the road in some corridors to improve pedestrian and bicycle access from ad-

acent streets and neighborhoods. Temporary closures are appropriate after snow storms to allow winter recreational opportunities such as sledding and skiing.

### **VISITOR FACILITY ZONE**

This is a developed zone that is defined by facilities for information, interpretation, education, and other visitor services. High maintenance and intervention are required to accommodate concentrated visitor use. In some cases, the zone includes historic structures that have been adapted for visitor services.

#### **Desired Visitor Experience**

Visitors in this zone are introduced to the natural and cultural history of the park and are provided with information on recreation opportunities. They participate in variety of activities related to environmental and cultural history. Access is easy and convenient. Social interaction is common, and the encounter rate with other visitors and park staff is very high.

#### **Desired Resource Conditions**

The developed areas in this zone receive a high degree of maintenance and intervention to accommodate concentrated visitor use. Historic buildings and grounds that have been adaptively used for visitor services are maintained in keeping with NPS policies and the Secretary of the Interior's (1995a and 1995b) standards for the protection of cultural resource values. Natural and cultural resources are integrated into educational and interpretive programs where appropriate. Nonnative plant species are used sparingly in this zone within NPS policies.

#### **Appropriate Kinds of Activities or Facilities**

This zone includes facilities where the predominant use involves providing information and interpretive services. Facilities include exhibits and other media, auditorium, book sales, and other aids for promoting visitor understanding of the park and its resources. Consistent with NPS policies for preservation and use of cultural resources, historic structures could be adaptively used for visitor services.

### **URBAN RECREATION ZONE**

The urban recreation zone includes facilities and grounds associated with reserve picnic areas, community gardens, horseback riding facilities, sport fields, the golf course, entertainment areas, and other active recreation that is consistent with traditional uses of the park. Although the natural environment is substantially modified within the zone, the background is rustic and park-like.

High levels of intervention and maintenance are required to support concentrated visitor use. Noise and visual impacts are mitigated to avoid disturbances to other visitors and park neighbors.

#### **Desired Visitor Experience**

The visitor experience in this zone is strongly associated with the presence of developed facilities. Social interactions are supported, and the visitor encounter rate with other visitors is very high.

Visitors participate in active recreation and entertainment events within a background provided by the rustic setting.

### **Desired Resource Conditions**

Vegetation within the zone is managed to support the designated recreational activities for each site. Native vegetation is preferred, although nonnative species are used within this zone in keeping with *Management Policies 2001* (NPS 2000a). Facilities within the zone are buffered to avoid noise and visual impacts to other visitors and neighbors. Storm water leaving the zone meets District storm water codes and does not contribute to the pollution of Rock Creek or its tributaries.

### **Appropriate Kinds of Activities or Facilities**

Activities in this zone include group picnicking, tennis, performances, golf, horseback riding, and informal sports. Facilities include the structures and land modifications that support these activities, with associated infrastructure such as parking areas and public toilets.

## **ADMINISTRATION/OPERATIONS ZONE**

This zone is defined by structures and grounds used for park administration and operations, such as offices, maintenance shops, storage areas, holding cells, horse patrol stables, and laboratories. This zone typically is highly modified and intensively maintained. However, areas within this zone that include multiple vegetation stages, such as grasses, brush, and trees, are attractive to wildlife and are used for nature study, particularly birding.

### **Desired Visitor Experience**

Most visitors are unaware of the facilities in this zone during their visit, and the encounter rate among visitors is low. Visitors involved with nature study or who have special needs, such as permits or first aid, are able to locate facilities easily and find them to be user friendly. Facilities in the zone provide a safe and aesthetic work environment for park staff.

### **Desired Resource Conditions**

The zone is limited to existing developed or disturbed sites in the park. Facilities in this zone result in sustainable development through the application of best management practices. The spatial extent of structures and stored materials in the zone is minimized.

While the natural environment is highly modified within the zone, the practice of maintaining vegetation in multiple stages has produced high-quality wildlife habitat. In particular, some areas such as the maintenance yard and stables attract large numbers of migrating birds. While this condition developed inadvertently, this zone is managed to maintain this condition.

Pollutants or other disturbances are contained or mitigated and do not affect adjoining areas. In particular, storm water leaving the zone meets District storm water codes and does not contribute pollution to Rock Creek or its tributaries. Sites in this zone are buffered to avoid noise and visual impacts on visitors and neighbors.

Consistent with NPS policies for preservation and use of cultural resources, historic structures could be adaptively used for administration. Other cultural resources within the zone are documented and salvaged if necessary. Nonnative plants are used sparingly, if at all.

### **Appropriate Kinds of Activities or Facilities**

Facilities support park administration and operational needs. They may include office space; police facilities such as holding cells, laboratories, and stables; storage facilities for fuel, salt, sand, stone, and equipment; vehicle maintenance areas; shops for carpentry and plumbing; staff conference sites; and employee parking.

### **URBAN TRANSIT ZONE (NON-NPS ROADS)**

This zone includes roads that are owned and maintained by the District of Columbia that are within the boundaries of the park and parkway. Examples include Military Road, Broad Branch Road, Porter Street/Klingle Road, Calvert Street, Connecticut Avenue, Massachusetts Avenue, Q Street, P Street, M Street, Pennsylvania Avenue, and the Whitehurst Freeway/K Street. These roads provide access across the park and parkway and connections with the urban street grid.

The zone encompasses nonconforming (nonpark) uses. In most cases, the right-of-way within the zone is under the jurisdiction of the District of Columbia.

The National Park Service works with District and other agencies to maintain the zone as compatibly as possible with park values. This includes emphasizing scenic views, the historic character of road structures, and linkages between the park and local trails.

### **Desired Visitor Experience**

The presence of bridges and cross roads reminds visitors that they are still within the city while in Rock Creek valley. Within this zone, visitors experience the sights and sounds of urban traffic, although measures are taken to minimize noise to the extent practical. The frequency of encounters among visitors within the zone is very high.

### **Desired Resource Conditions**

Storm water runoff from the zone meets District standards before it enters Rock Creek. Bridges and roads crossing the park are compatible in design and management with the rustic and historic scene. Scenic views of the park from roads and bridges in the zone are protected and contribute positively to the character of the city.

### **Appropriate Kinds of Activities or Facilities**

This zone primarily supports urban transportation rather than the purposes of the park. The National Park Service cooperates with other agencies to link the park to local trails for nonmotorized recreation within these corridors where practical.

## FORMULATION OF ALTERNATIVES

*This section describes how, in concert with public input, the National Park Service developed the four alternatives that are presented in this final general management plan.*

### **PUBLIC INPUT AND THE DEVELOPMENT OF ALTERNATIVES A, B, AND C**

Many aspects of the desired future condition of Rock Creek Park and the Rock Creek and Potomac Parkway are defined in the establishing legislation, park purpose and significance statements, and servicewide mandates and policies that were described earlier. Within these boundaries, the National Park Service solicited input from the public regarding the long-term goals for the park, and measures that could be implemented to achieve those goals.

The public was first invited to suggest ideas for the future of the park and parkway during scoping at the beginning of the general management planning project in June 1996 (see “Consultation and Coordination”). About 800 people responded. A large majority favored closing some of or all park roads and providing increased protection of the environment.

Based on early public comments, and within the framework established by legislation and mandates, the planning team developed four “preliminary alternative scenarios” that attempted to reflect the range of ideas proposed by the public. These approaches, which are described below, were published for public review and comment in newsletter 3 in June 1997 (NPS 1997c).

*Preliminary Alternative Scenario 1:* The National Park Service would maintain the current management direction.

*Preliminary Alternative Scenario 2:* Current management would be adjusted to reduce costs, emphasize group recreational opportunities, and control traffic on existing roads.

*Preliminary Alternative Scenario 3:* Leisurely driving, walking, cycling, and other recreation would be emphasized by permanently closing a short section of Beach Drive north of Broad Branch Road and restricting traffic elsewhere. The scenario also called for removal of boarding stables and community gardens from the park to reduce environmental disturbance and provide more equitable public access.

*Preliminary Alternative Scenario 4:* The “urban wilderness” scenario called for restoring the golf course and Military Field to forest. The scenario also called for removal of boarding stables and the community gardens and permanently closing four sections of Beach Drive to automobiles.

About 1,000 people responded to newsletter 3. Public comments overwhelmingly favored retaining the kinds of experiences and opportunities currently provided by the park and parkway. Removal of established recreational facilities, including community gardens, horse stables, and the golf course, was almost universally opposed. Respondents generally supported improving interpretation and education opportunities in the park. Public comments on the traffic management approaches proposed in newsletter 3 fell into three general responses, including



maintaining the current traffic pattern

reducing current traffic volumes and speeds in the park on the existing road system

closing selected park roads and improving control of traffic on open segments

The great majority of respondents in the third category indicated that they were not satisfied with either preliminary alternative scenarios 3 or 4. Instead, they supported extending the current weekend road closures to full time. Consequently, the National Park Service included this position as part of Alternative C in this final general management plan.

A summary of comments was provided in newsletter 4 (NPS 1998c). Based on these comments and NPS management concerns, the National Park Service developed the three decision points described earlier in the section entitled "Decision Points." Other actions that were suggested by the public, and the justifications for not incorporating them into any of the alternatives, are described in the section "Alternatives or Actions Eliminated from Further Study."

Based on the public comments and decision points, the four preliminary alternative scenarios were modified into three of the alternatives that are evaluated in this final general management plan. The alternatives are as follows:

*Alternative A: Improved Management of Established Park Uses.* Alternative A would modify current management to improve visitor safety, better control traffic volumes and speeds through the park, enhance interpretation and education opportunities, and improve the protection of park resources. It generally would retain the current scope of visitor uses.

*Alternative B: Continue Current Management/No Action.* Alternative B would continue the current management pattern into the future. It represents the "no action alternative" required by the Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act (NEPA).

*Alternative C: Nonmotorized Recreation Emphasis.* Alternative C is based on comments by members of the public who favor promotion of nonmotorized recreation. Alternative C would eliminate automobile through-traffic in northern portions of the park and control through-traffic in the southern portion of the park and on the parkway. Non-traffic-management proposals for Alternative C would be the same as in Alternative A.

## **FORMULATION OF ALTERNATIVE D**

In January 2001, the National Park Service received a letter from Mr. Anthony A. Williams, the Mayor of the District of Columbia. The letter encouraged the National Park Service to consider another alternative, which would implement "weekday vehicular traffic restrictions on sections of upper Beach Drive in non-rush-hour periods." The goals stated in the letter would include "reducing automobile traffic in the most sensitive portions of Rock Creek Park, while minimizing any impact on surrounding neighborhoods and commuters." A copy of the letter is provided in appendix D. The alternative developed to address this letter is as follows:

*Alternative D: Mid-Weekday Recreation Enhancement.* On weekdays, Alternative D would close three segments of Beach Drive to motorized traffic between 9:30 A.M. and 3:30 P.M. This would not change cross-park traffic patterns, but would provide a nonmotorized setting for recreation through much of the northern portion of the park during non-rush-hour periods. It would also maintain driving for pleasure along the length of Beach Drive as an allowed activity during such popular times as weekday summer evenings. This alternative would include all of Alternative A's non-traffic-management actions, as well as most of the traffic-calming measures of that alternative.

These four alternatives embody the range of what the public and the National Park Service want to see accomplished with regard to visitor experience, natural resource conditions, and cultural resource conditions. They are based on outcomes, or actual conditions on the ground, as expressed by the management prescriptions.

The configurations for future park conditions and management within each alternative were developed by placing the management prescriptions described previously on the map. None of the alternatives contains all of the management prescriptions. Instead, each consists only of those prescriptions that achieve the goals for the park under that alternative.

In some cases, all four alternatives apply the same management prescription to the same area. For example, Fort DeRussy and the Godey Lime Kilns are within the Cultural Resource Zone in all four alternatives. This occurs because this appears to be the most appropriate way to manage these facilities, regardless of the alternative selected for the park.

## **FORMULATION OF THE NPS' FINAL PREFERRED ALTERNATIVE**

The draft general management plan and environmental impact statement was released to the public for comment in April 2003. After reviewing all comments received on the plan, the NPS used its standard process, called Choosing by Advantages, to formulate the preferred alternative for the final general management plan. Through this process, the NPS determined the best features among all of the alternatives evaluated in the draft general management plan. The decision on the preferred alternative was sent to the director of the National Park Service and the assistant Secretary of the Interior for their approval.

The preferred alternative in this final general management plan is Alternative A, which includes minor modifications from the draft version of this alternative. Changes to Alternative A between the draft and final versions of the general management plan include

- eliminating high-occupancy vehicle (HOV) requirements during rush hours on Beach Drive

- providing an increased emphasis on flexibility and the use of an adaptive management approach, including implementing actions on a trial and/or seasonal basis, to identify and apply the most effective techniques for reducing traffic volumes and speeds on Beach Drive

- implementing measures to encourage some of the automobile traffic on Beach Drive to voluntarily use Ross Drive

## MITIGATION

Mitigation is a key concept in resource management planning. It provides a means for accommodating visitor interactions and park operations with natural and cultural resources and their tolerances for disturbances.

Mitigation and best management practices are regularly used to ensure that the park's natural and cultural resources are protected and preserved for future visitors without impairment. In the legislation that created the National Park Service, Congress charged it with managing lands under its stewardship "in such manner and by such means as will leave them unimpaired for the enjoyment of future generations"(NPS Organic Act, 16 *United States Code* 1). As a result, the National Park Service routinely evaluates and implements mitigation whenever conditions occur that could adversely affect the sustainability of park resources.

Mitigation was included throughout the formulation of the alternatives included in this general management plan. A few examples include considering different options for the park's administrative offices, identifying approaches to reduce roadkill of terrestrial wildlife, and incorporating best management practices to reduce non-point discharges of animal wastes from stable areas.

## THE PREFERRED ALTERNATIVE

*The preferred alternative is the alternative that the National Park Service believes would best accomplish its goals for managing Rock Creek Park and the Rock Creek and Potomac Parkway. Selection of the preferred alternative is based on consideration of economic, environmental, technical, and other factors.*

All the alternatives would preserve the important historic, cultural, and natural resources in Rock Creek Park and along the Rock Creek and Potomac Parkway for future generations. As funds allowed under each alternative, activities would continue in keeping with NPS policies and federal laws and regulations. These would include such actions as surveying native species and archeological sites, controlling invasive species, restoring habitats, and improving water quality.

The largest differences among the alternatives are associated with the three decision points, including managing traffic, providing visitor information and interpretive services, and meeting administration and operational needs. Within these broad categories are such differences as the most appropriate use of some cultural resources, and the ability to reduce risk to wildlife from collisions with vehicles (roadkill).

The most difficult decision to be made in the general management planning process is the management of traffic on the park road system. Park roads are recognized historic resources and the primary means for most visitors to experience the park. They also are used as part of the city's traffic network. Displacement of motorized traffic from park roads, particularly during rush hours, could increase traffic on arterials and neighborhood roads outside the park. It could also encourage the use of mass transit, and/or promote commuting by bicycle or on foot.

The councils of the District of Columbia and Montgomery County have passed formal resolutions emphasizing the importance of Beach Drive and the Rock Creek and Potomac Parkway to the local and regional transportation system. The councils have urged that these corridors remain open with no new restrictions to motor vehicles because of their concerns for potential adverse effects on the heavily burdened regional street grid. This position is supported by the Maryland Department of Transportation, the District of Columbia Department of Public Works, several neighborhood organizations, and many individuals who commented during scoping.

This traffic management approach is included in Alternative B: Continue Current Management/No Action.

Alternative A: Improved Management of Established Park Uses and Alternative D: Mid-Weekday Recreation Enhancement also would comply with the intent of these resolutions. While both of these alternatives would include traffic-calming measures and improved enforcement of speed limits, both would keep park roads and the parkway open without restrictions (such as requiring at least two people per vehicle) during rush hours. (The mid-day closures of Alternative D would not affect rush-hour traffic.)

Traffic modeling indicates that regardless of park management actions, commuter traffic will increase throughout the region. By the year 2020 with Alternative B, commuter traffic along some portions of Beach Drive would routinely include near-gridlock conditions, with average travel

speeds only a third of free-flow speeds, vehicular backups, and long delays. This situation in Rock Creek valley would increase risks to visitors and disrupt their appreciation of the park.

In addition to providing inadequate traffic management, Alternative B presents several other environmental and park management concerns.

Increasing pedestrian and bicycling use would not be served by maintaining the paved recreational trail system in its existing, inadequate condition.

The park would continue to have inadequate capability to provide environmental education to students and basic orientation and interpretation services to other visitors.

Future administration and operational efficiency would be impaired by the inadequate, existing support facilities.

Continued use of the Peirce-Klinge Mansion and the Lodge House for expanding administrative purposes could further affect these historic structures.

Consequently, the National Park Service does not consider Alternative B to be satisfactory.

Each action alternative is environmentally acceptable and, as shown in table 3, each has advantages. The National Park Service has identified Alternative A as the preferred alternative in this final general management plan based on its ability to best balance the recreational, environmental, and traffic considerations for the short- and long-term future of the park.

**TABLE 3: ADVANTAGES OF THE ACTION ALTERNATIVES**

Advantage	Alternative A	Alternative C	Alternative D
Reduces rush-hour motorized traffic volumes in the park	✓	✓	
Reduces non-rush-hour motorized traffic volumes in the park	✓	✓	✓
Slows the speed of traffic through the park	✓	✓	✓
Improves conditions for nonmotorized recreation	✓	✓	✓
Promotes recreational activities such as bicycling and walking in the park and region	✓	✓	✓
Supports regional efforts to discourage single-occupancy-vehicle use and promote high-occupancy-vehicle use during peak-traffic hours		✓	
Continues the tradition of motor travel on the park road system, which would help preserve the historic integrity of the park design	✓		✓
Improves the protection of the park's natural and cultural resources	✓	✓	✓
Enhances the enjoyment of natural sounds and setting		✓	✓
Increases the safety of cyclists and pedestrians	✓	✓	✓
Improves opportunities for recreation	✓	✓	✓

## **THE ENVIRONMENTALLY PREFERRED ALTERNATIVE**

The environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act. Section 101 states that “It is the continuing responsibility of the Federal Government to

- (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life’s amenities; and
- (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.”

Alternative D is the environmentally preferred alternative for managing Rock Creek Park and the Rock Creek and Potomac Parkway. Alternative D would best satisfy the six national environmental goals at a relatively high level. Features of this alternative would include

closing portions of Beach Drive on weekdays for 6 hours between the morning and evening rush hours and all day on Saturdays, Sundays, and holidays

ensuring continuation of traditional recreational experiences

ensuring that all visitor facilities, including all park roads, remain accessible by automobile for at least part of each work day

better utilizing the park’s cultural resources by improving existing facilities and moving some park administrative functions out of historic buildings so that they can be converted to visitor uses

improving the protection of the park’s natural resources by rerouting poorly designed sections of trail and restoring the abandoned sections

identifying and implementing measures to reduce wildlife mortality along roadways.

These actions would satisfy the six goals of Section 101 as follows:

## ALTERNATIVES

Road closure during weekdays and all day Saturday and Sunday would allow the safe use of the roadway for nonmotorized recreation such as bicycling, skating, skateboarding, and walking, which would satisfy goals 2 and 3.

Ensuring automobile accessibility to all facilities, including all park roads, for a portion of each work day would satisfy goals 3, 4, and 5.

Moving some park administrative functions out of historic structures and converting the structures to visitor uses would make them more accessible to the public while upgrading the park functions that were moved. This would meet the requirements of goals 3, 4, 5, and 6.

Natural resource protection would be improved by upgrading foot and horse trails where adverse effects on resources such as soils is occurring and working to reduce wildlife roadkill. This would meet the requirements of goals 1, 2, 3, 4, and 6.

Alternative A, like Alternative D, would satisfy all six goals. However, it would not provide as wide a range of beneficial uses or the level of safety for those uses as Alternative D (goals 2, 3, and 5). Because Alternative A would close segments of Beach Drive only on weekends and holidays, pedestrians and bicyclists using the Beach Drive corridor during the week would have a higher level of difficulty and risk because of traffic. However, the traffic calming devices would lower motorized vehicle speeds to make joint recreational use safer. Like Alternative D, Alternative A would provide for accessibility of all facilities by automobile, move park functions out of historic structures and convert them to visitor uses, upgrade foot and horse trails, and work to reduce wildlife roadkill.

Alternative B, the no action alternative, would not achieve the national goals as completely as the action alternatives. With the no action alternative, beneficial effects would not be realized and existing adverse conditions would not be remedied. Protection of cultural and natural resources, articulated under goals 1, 2, and 4, would be at a lower level than would occur with any of the action alternatives. Alternative B would not provide as wide a range of beneficial uses on a daily basis (goal 3), would not support as wide a variety of individual choices (goal 4), and would not achieve as full a balance between population and resource use (goal 5) as the action alternatives.

Alternative C, the nonmotorized recreation emphasis alternative, would be similar to Alternative D in most respects for goals 1, 2, 4, 5, and 6. However, permanently closing the road in the northern section of the park would be contrary to goal 3 of attaining the widest range of beneficial uses. This alternative would end automobile travel along the length of Beach Drive, which is a popular activity within the park. While it would improve safety within the closed areas for nonmotorized recreation, it would narrow the range of ways that visitors could access and enjoy Rock Creek Park.

## **ALTERNATIVE A: IMPROVED MANAGEMENT OF ESTABLISHED PARK USES**

*This section describes Alternative A, including the concept that defines the alternative, where the management prescriptions that would be included in this alternative would be applied, and the approximate costs.*

### **CONCEPT**

Alternative A is the NPS' preferred alternative. The goals of Alternative A would be to

- preserve traditional visitor experiences and activities
- enhance natural, cultural, and scenic values in the park
- assert control over nonrecreational use of park roads to improve the safety and quality of the experience for visitors participating in nonmotorized recreation
- optimize the use of structures for purposes such as interpretation, visitor contact, and park administration

The existing park roadway system would be retained and nonrecreational through-traffic would be accommodated. However, to improve visitor safety and the quality of the visitor's experience, traffic would be managed to reduce volumes and speeds compared to conditions that would occur if current management were continued (Alternative B).

This approach would be consistent with the 1918 master plan for the park, in which the Olmsted brothers warned against bringing the "noise and tangle" of city traffic into the heart of the park while recognizing a need to accommodate urban traffic across the park. It also would avoid diverting traffic from Beach Drive onto neighborhood streets in the surrounding communities.

Weekend and holiday road-segment closures to motorized vehicles would continue to promote recreational activities on the road surfaces in the valley, such as walking, in-line skating, and bicycling. Throughout weekdays, recreational uses of Beach Drive would continue to share the road with automobile traffic, but at reduced traffic volumes and speeds.

Better use of the park's cultural resources would be made in Alternative A. This would include moving some park functions out of historic buildings and converting those structures to visitor contact, education, and interpretation. Improvements to existing facilities would also be made. Park administrative and police functions that currently occur in historic buildings would be moved to nearby commercial space outside the park, or to new facilities constructed within already-developed areas of the park.

Alternative A would improve the protection of the park's natural resources. For example, poorly designed sections of foot and horse trails would be rerouted, and the abandoned trail sections would be restored to natural conditions. During these activities, each trail site would be evaluated to determine effects on safety and on cultural and natural resource values. Improvements would be designed to maximize the former while protecting the latter. To improve protection of terrestrial wildlife, the National Park Service would identify the most frequent locations of roadkill and would implement measures, possibly including traffic controls or protected crossways (culverts), to reduce mortality to wildlife from collisions with vehicles.



Measures that could be taken to achieve the Alternative A goals are embodied in the management prescriptions for Alternative A. These are summarized in table 4 and shown on the Alternative A map.

**TABLE 4: MANAGEMENT PRESCRIPTION ZONING UNDER EACH ALTERNATIVE**

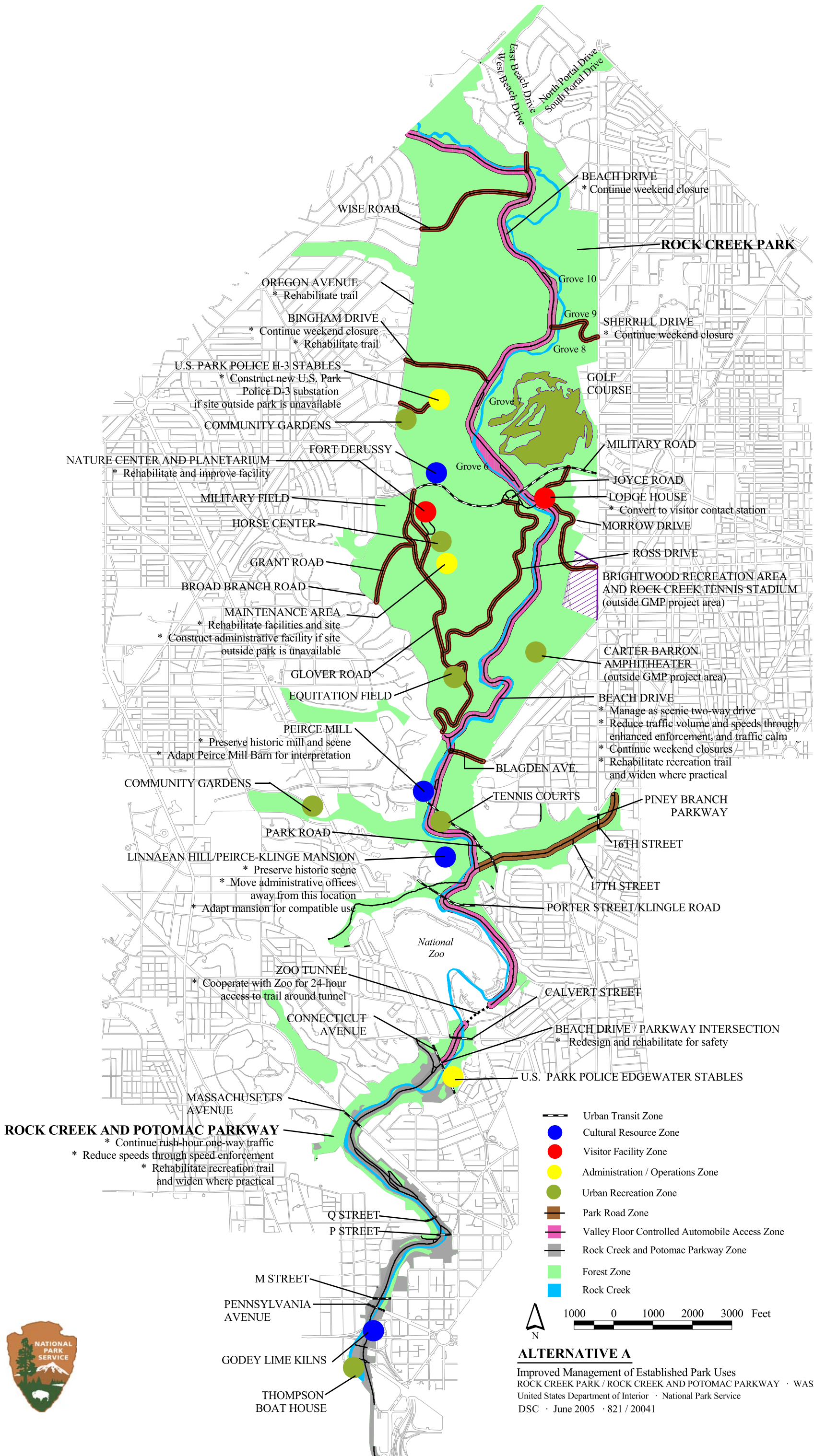
Management Prescription	Acres/Percent of Total Park Area			
	Alternative A: Improved Management	Alternative B: Continue Past Management	Alternative C: Nonmotorized Emphasis	Alternative D: Mid-Weekday Recreation
Forest Zone	2,331 acres/ 79 percent	2,331 acres/ 79 percent	2,331 acres/ 79 percent	2,331 acres/ 79 percent
Cultural Resource Zone	6 acres/ 0.2 percent	2 acres/ <0.1 percent	6 acres/ 0.2 percent	6 acres/ 0.2 percent
Valley Floor Automobile Access Zone	--	184 acres/ 6 percent	--	--
Valley Floor Controlled Automobile Access Zone	184 acres/ 6 percent	--	134 acres/ 5 percent	134 acres/ 5 percent
Valley Floor Nonmotorized Recreation Zone	--	--	50 acres/ 2 percent	--
Valley Floor Mid-Weekday Recreation Zone	--	--	--	50 acres/ 2 percent
Rock Creek and Potomac Parkway Zone	161 acres/ 5 percent	161 acres/ 5 percent	161 acres/ 5 percent	161 acres/ 5 percent
Park Road Zone	74 acres/ 2 percent	74 acres/ 2 percent	74 acres/ 2 percent	74 acres/ 2 percent
Visitor Facility Zone	1 acre/ <0.1 percent	3 acres/ 0.1 percent	1 acre/ <0.1 percent	1 acre/ <0.1 percent
Urban Recreation Zone (includes Brightwood area)	200 acres/ 7 percent	200 acres/ 7 percent	200 acres/ 7 percent	200 acres/ 7 percent
Administration/Operations Zone	5 acres/ 0.1 percent	7 acres/ 0.2 percent	5 acres/ 0.1 percent	5 acres/ 0.1 percent
Urban Transit Zone	8 acres/ 0.2 percent	8 acres/ 0.2 percent	8 acres/ 0.2 percent	8 acres/ 0.2 percent

## MANAGEMENT PRESCRIPTIONS

Management prescription zoning under Alternative A is shown in the Alternative A map. The management prescriptions were described previously in this final general management plan.

### Forest Zone

The Forest Zone would be applied to 79 percent of the park (2,331 acres). There would be no major change in the management of forested areas of the park from current management practices.



**ALTERNATIVE A**

Improved Management of Established Park Uses  
 ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY · WASHINGTON, DC  
 United States Department of Interior · National Park Service  
 DSC · June 2005 · 821 / 20041



Existing horse and foot trails would be maintained. The trail system would be evaluated, initially by reviewing previous studies (NPS 1980, 1990c, and 1993) and then by conducting field studies and preparing a trail plan. Poorly designed trail sections would be rerouted and abandoned trail sections would be restored to natural conditions. An estimated 2 miles of paved trail parallel to Oregon Avenue would be rehabilitated under Alternative A to improve the trail surface. As discussed previously, bicycles would not be allowed off of roads, parking areas, and designated paved trails.

Military Field and other, smaller meadows in the park would be managed as part of the Forest Zone to promote the diversity of native plants and habitats and to preserve the scenic variety in the park. However, rather than allowing these areas to revert to forest, they would be mowed periodically to maintain them as meadows with early successional native plants and open space for nonorganized recreation. Treatment of the meadow areas would be designed to ensure protection of archeological resources. This management approach is consistent with current management of park meadows.

### **Cultural Resource Zone**

Alternative A would increase the area of the park managed primarily for protection of park historic resources to about 6 acres (0.2 percent of the park). The types of actions that could be implemented at some of the historic sites in the park are identified below.

**Peirce Mill Complex.** The Peirce Mill complex would be the primary location for interpreting the history of milling and historic land use in the Rock Creek area. This would expand on the already completed rehabilitation of the Peirce Barn, which serves as a visitor contact point with exhibits on the history of the Peirce estate and milling in the Rock Creek valley. Visitor understanding and appreciation of the mill complex would be emphasized.

The mill would be managed consistent with the recommendations of the draft historic structures report for this facility (Friends of Peirce Mill and Quinn Evans, Architects 2000). Peirce Mill would provide a historically accurate representation of a typical mill complex in the region. This would include restoring the milling machinery to a fully operable condition. However, because the mill race was relocated away from the site many years ago, it will not be possible to restore operation of the mill using water power. The landscape of the complex would be rehabilitated to retain the historic character while allowing continued use.

**Linnaean Hill Building Complex.** The Linnaean Hill building complex and its associated designed historic landscape would be rehabilitated. Park administrative offices currently housed in the Peirce-Klingle Mansion would be relocated to a another facility, as described in the Administration/Operations Zone, below.

The exterior of the historic buildings would be accorded appropriate preservation treatment to protect their documented resource values.

The building interiors would be adaptively used for activities compatible with park resource values and the maintenance of the historic structures.

The landscape of the complex would be rehabilitated to retain the historic character while accommodating continued park use.

**Other Cultural Features.** Other cultural features, including but not limited to Fort DeRussy, the Godey Lime Kiln, and the Miller cabin, would be maintained according to accepted NPS practices. Interpretive enhancements would be guided by future interpretive plans.

### **Valley Floor Controlled Automobile Access Zone**

The Valley Floor Controlled Automobile Access Zone (184 acres, 6 percent of the park) would continue to be managed to preserve the valley's characteristic mix of forest, grassy openings, and floodplain terraces interspersed with rustic facilities. Types of actions that could be taken within this zone include the following.

**Beach Drive.** The tradition of automobile travel along the length of Beach Drive would be maintained. However, the goal in this zone would be to manage the road primarily as a scenic drive, rather than as a nonrecreational travel route, by reducing traffic volumes and speeds. The following types of measures could be implemented to reduce traffic speeds on Beach Drive.

Improve speed limit enforcement. This would include the goal of adding two new, full-time staff positions for traffic enforcement.

Implement traffic-calming measures to slow vehicle speeds. Such measures might include rumble strips, speed humps and speed tables, and intersection modifications such as all-way stops, traffic circles, reduced turning radii, and raised intersections. The intent would be to influence some drivers who currently choose routes through the park for their expedience rather than the aesthetic experience to voluntarily select non-park routes.

Encourage some of the drivers who normally would travel through the park without stopping to use the scenic Ross Drive route rather than Beach Drive. This might be accomplished through a combination of signage, lowered speed limits on Beach Drive relative to Ross Drive, and use on Beach Drive of the engineered traffic-calming features mentioned above.

Reduced speeds on Beach Drive could encourage increased use of Ross Drive between Joyce Road and Broad Branch Road by nonrecreational traffic. This could result in fewer automobiles in the gorge area during non-rush-hour periods, which would enhance recreational use.

Alternative A will stress the use of adaptive management to achieve the goal of controlling traffic volumes and speeds on Beach Drive. If an initial approach is not successful, the National Park Service will try other approaches until the goal is achieved.

The initial implementation plan for traffic management on Beach Drive will be released with this document. It will provide specifics on traffic calming devices, changes in speed limits, time periods for implementation, signage and public awareness strategies, and evaluation thresholds for determining success or the need to develop and implement alternate approaches. Although the intent of the plan will be to improve traffic management along the entire length of Beach Drive and throughout the park and parkway, the initial implementation plan will especially target the segment of Beach Drive between Joyce Road and Broad Branch Road.

Alternative A will allow experimentation to identify and implement the most effective approach. For example, traffic-calming measures could be installed singly or in combination, and the speed

limit on Beach Drive could be reduced from the current 25 miles per hour. Alternative A would maintain the current pattern of two-way traffic. It would not include any high-occupancy requirements for vehicles.

Current weekend and holiday closures would continue for sections of Beach Drive (as well as Sherrill and Bingham Drives, which are in the Park Road Zone). The goal would be to provide opportunities for nonmotorized recreation in the corridor without traffic interference on weekends, when demand for nonmotorized recreation is highest. Ross Drive would remain open as an alternate route for motorists.

**Paved Recreational Trail.** An estimated 5.3 miles of trail in the Valley Floor Controlled Automobile Access Zone would be upgraded under Alternative A. The existing paved recreational trail sections paralleling Beach Drive would be rehabilitated for visitor safety. This could include realigning some sections.

**Reduction of Roadkill.** The intent of Alternative A of reducing the volume and speed of traffic on Beach Drive would result in some reduction in roadkill. Alternative A also would improve NPS monitoring of the frequencies and locations of animals killed or injured by collisions with vehicles. The mapping of roadkill sites would indicate locations where methods to reduce road mortality would be most effective. This alternative would then include the implement of techniques, either singly or in combination, to reduce roadkill. These may include public education about vehicle hazards to wildlife; warning signs, road striping, and speed humps or speed tables to reduce speeds and enhance driver alertness; and strategically placed underpasses (culverts) for small animals such as reptiles and amphibians.

**Improved Orientation Information.** The National Park Service would implement actions to better inform visitors that they were entering a national park and provide improved orientation information. These could include

- installing orientation signs at all road and trail entry points that notified the visitor of their entry into Rock Creek Park and that provided a map showing the visitor's current location, major roads and trails, visitor contact sites, and other sites of potential interest

- low-power radio transmissions to provide park information to drivers, including sites of interest, visitor contact stations, and traffic restrictions on park roads

### **Rock Creek and Potomac Parkway Zone**

The parkway corridor, which covers 161 acres (5 percent of the park), would continue to be managed for a landscape mix of fields and forest. This would provide both a pleasant aesthetic experience, and visual and sound buffers.

The paved recreational trail paralleling the parkway would be improved and realigned in segments. The goal would be to provide a safe pathway separated from the roadway. An estimated 2 miles of trails would be upgraded within the Rock Creek and Potomac Parkway Zone.

Rush-hour lane reversals (one-way traffic) would continue on the parkway. Traffic modeling indicates that discontinuing the practice would lead to increased traffic on Beach Drive. An automated system for accomplishing lane reversals may be implemented.

The intersection of the parkway with Beach Drive near Connecticut Avenue would be improved to increase safety for pedestrians, cyclists, and motorists. The intersection redesign would not increase traffic capacity or encourage increased speeds through the intersection. Improvements may require reconfiguration of existing roads.

Speed limit enforcement on the parkway would be strengthened as described above for the Valley Floor Controlled Automobile Access Zone. Actions to reduce wildlife roadkill also would be the same as those described for the Valley Floor Controlled Automobile Access Zone.

### **Park Road Zone**

Other park roads (74 acres, 2 percent of the park) would continue to be managed to provide vehicular routes into and through the park. However, park roads would not be widened to increase capacity for nonrecreational traffic. The management emphasis in Alternative A would be on improving linkages between the park and the surrounding neighborhoods.

Improvements could include rehabilitating or constructing recreational trails adjacent to roads to minimize pedestrian and vehicular conflicts, and incorporating better directional and information signs for visitor orientation. About 0.5 miles of trail along Bingham Drive would be upgraded within the Park Road Zone. Approximately 0.75 miles of trail would be added along Piney Branch Parkway to enhance access to Rock Creek Park by foot and bicycle. Up to a mile of other new trail also may be provided. A feasibility study would be conducted to determine the optimal locations for new pedestrian trails.

Bingham Drive and Sherrill Drive would continue to be closed on weekends and holidays for nonmotorized recreation. Following snow storms, several roads in this zone could be closed to provide winter recreation opportunities such as sledding and skiing. These could include, but may not be limited to, Glover Road, Ross Drive, Bingham Drive, Sherrill Drive, and Morrow Drive.

Speed limit enforcement on park roads would be strengthened as described above for the Valley Floor Controlled Automobile Access Zone. Actions to reduce wildlife roadkill and improve visitor orientation also would be the same as those described for the Valley Floor Controlled Automobile Access Zone.

### **Visitor Facility Zone**

Alternative A would improve park information, interpretation, and education services. Under this alternative, the Visitor Facility Zone would occupy about 1 acre (less than 0.1 percent of the park). Potential actions that could be implemented to improve visitor services include converting the Lodge House to a visitor contact station and upgrading the Rock Creek Nature Center and Planetarium.

**Lodge House.** The Lodge House is an attractive, rustic building in a scenic setting in Rock Creek valley just south of the intersection of Beach Drive and Military Road. Under Alternative A, this building would be converted from a U.S. Park Police District 3 substation to a visitor contact station to provide park orientation, information, and interpretation.

Visitors could obtain general park information, park brochures and other publications, directions, event schedules, and permits at the building.

The building would be staffed by an interpretive ranger during high visitation periods. The site also would provide information and orientation when staff were not present.

U.S. Park Police officers would be stationed at the Lodge House to provide a police presence and visibility at this popular location in the park.

The exterior of the structure would be rehabilitated to preserve its documented cultural resource values. Its interior would be converted for visitor contact. Landscaping in front of the building would be rehabilitated to better reflect its rustic and historic character and to better serve visitors. However, the area occupied by the building, its parking lot, and its landscaping, would not be expanded beyond the current area.

**Rock Creek Nature Center and Planetarium.** The nature center area would continue to serve as the park's primary facility for environmental education and natural history interpretation. The building would first be evaluated for inclusion in the National Register of Historic Places, and then rehabilitated and/or expanded to improve the effectiveness of programs for the public. Improvements may include additional classroom space, a covered group shelter for bad weather, and staff offices. The planetarium would be upgraded, including increased seating capacity. Rehabilitation of the building would be aesthetically compatible with the natural setting. Expansion of the structure would be within the existing grounds of the center.

### **Urban Recreation Zone**

Most facilities and activities in the Urban Recreation Zone (200 acres, 7 percent of the park) would be retained at their current levels. These include the community gardens off Oregon Avenue and at Melvin Hazen Park, the Rock Creek Horse Center and equitation field, the Rock Creek Golf Course, the clay tennis courts near Peirce Mill, and reserve picnic areas. The Brightwood Recreation Area and Rock Creek Tennis Stadium, which are outside the area covered by this general management plan, would continue to be managed as specified in the *Final Environmental Impact Statement, Tennis Stadium, Rock Creek Park, Washington, D.C.* (NPS 1995b). The 4,000-seat Carter Barron Amphitheater, where Phase I rehabilitation recently was completed, is not included in this general management plan.

### **Administration/Operations Zone**

Alternative A would address the problems associated with the current location of park administrative offices in the Peirce-Klinge Mansion and District 3 U.S. Park Police operations at the Lodge House. Possible actions for remedying these conditions are described below. In addition, Alternative A would improve the use of the park maintenance area and implement measures to prevent water pollution from runoff at Edgewater.

The area within the Administration/Operations Zone would vary, based on the site selected for the park administrative offices. However, with the configuration shown in the Alternative A map, this zone would occupy approximately 5 acres (0.1 percent of the park).

**Park Administration Offices.** Park administrative offices currently are located in the Peirce-Klinge Mansion. Disadvantages of this arrangement include the following:



The existing buildings are not large enough to accommodate a centralized administrative facility. Substantial alterations to the historic structure would be required to meet future needs of the administrative staff and provide compliance with the Americans with Disabilities Act.

The current use precludes the ability to employ this historic resource for interpretation and education of the public.

Under Alternative A, administrative functions would be relocated to another facility. The goal would be to provide adequate, safe, energy-efficient, and cost-effective office and work space in a manner that minimizes impacts on natural and cultural resources. All park administrative staff would be consolidated into a central office, which would create a more efficient, cohesive working environment.

Section 9.1 of *Management Policies 2001* (NPS 2000a) states that

the Service will not develop, or re-develop, a facility within a park until a determination has been made that . . . it would not be practicable for the facility to be developed, or the service provided, outside the park.

Consistent with this policy, the preferred approach would be to lease or purchase office space outside but near the park. This option is made feasible by the location of the park in the Washington, D.C. metropolitan area, which offers a substantial amount of nearby commercial office space.

If locating administrative functions in commercial space outside the park was judged to be not feasible and new construction in the park was considered, a study with accompanying National Environmental Policy Act documentation tiering from this general management plan and environmental impact statement would be conducted to determine the most appropriate approach or location to house administrative services. This study would include a complete range of alternatives, such as continuing use of the Peirce-Klingbe Mansion (the no action alternative), reconsidering commercial space, constructing a new administrative office within park boundaries, and co-locating park administration with other, existing NPS facilities outside Rock Creek Park.

For a preliminary identification of impacts, this document evaluates the park maintenance area as a representative location for a new park administrative office. However, *this is only a candidate site and this general management plan does not include a commitment to use or favor this location*. Use of this location could require further environmental evaluation under the National Environmental Policy Act.

If administrative office space was constructed within a developed area of the park, the existing non-historic buildings and parking areas at that site might be remodeled or replaced to minimize disturbances of resources, such as loss of wildlife habitat. For any in-park construction involving remodeling or replacement of non-historic buildings, the National Park Service would

include modifications to provide access for employees and visitors with impaired mobility in conformance with the Americans with Disabilities Act

use low-impact development, such as the installation of green roofs, creation of rain gardens, and use of vegetated swales, to minimize areas of impervious surfaces

**U.S. Park Police Substation.** The U.S. Park Police substation for District 3 in the Lodge House currently is overcrowded. There is no opportunity for expanding the existing building because of site limitations and the historic character of the building. Alternative A would move the District 3 substation out of the Lodge House and into a new facility that would be designed to meet police functional needs and improve operational efficiency.

The preferred approach would be to relocate these functions into commercial facilities outside the park in keeping with Section 9.1 of *Management Policies 2001* (NPS 2000a). The National Park Service would work with the General Services Administration to contract for a long-term lease or other arrangement with a private firm that would construct or adapt a facility to U.S. Park Police specifications. However, this option would depend on the availability of adequate commercial properties at the time of implementation. The outside-the-park site would have to be within a reasonable response distance from Rock Creek Park and other sites protected by the District 3 staff. The U.S. Park Police would determine acceptable areas of northwest Washington for accessing the park and other sites, and a determination would be made on whether suitable properties were available at an acceptable price.

A siting study with accompanying National Environmental Policy Act documentation would be prepared if suitable commercial space for the Park Police District 3 substation could not be found outside the park and new construction in the park was considered. Siting studies for the park administration offices and District 3 substation could be conducted separately or jointly. If separate studies were prepared, each impact analysis would consider cumulative effects of both actions.

The range of alternatives could include no action, reconsideration of commercial space, constructing a new District 3 substation within park boundaries, or co-locating the District 3 substation with other, existing Park Police facilities outside Rock Creek Park. To allow for a preliminary identification of impacts, this document evaluates the U.S. Park Police H-3 area on the west side of Rock Creek Park between Bingham Drive and Military Road as a representative in-park location for the District 3 substation. However, *this is only a candidate site and this general management plan does not include a commitment to use or favor this location*. Use of this location could require further environmental evaluation under the National Environmental Policy Act.

All new construction or remodeling would provide access in conformance with the Americans with Disabilities Act and would use low-impact development techniques to minimize areas of impervious surfaces. If the District 3 substation was placed at the H-3 area or any other site with stables, designs would include best management practices to reduce the potential for bacteria-laden wastes to enter the surface water system.

For any approach, the existing stables at H-3 and nearby community gardens would remain.

**Park Maintenance Area.** Alternative A could involve constructing a new building to house park administrative offices at the maintenance area. Such new development would occur only if suitable commercial office space could not be secured outside the park and a siting study with accompanying National Environmental Policy Act compliance determined that the maintenance area was the optimal location for this facility.

New or remodeling construction at the maintenance area for park administration offices would not result in any increase in impervious area at this site compared to existing facilities (buildings and parking lots). This might be accomplished by removing existing single-story buildings and

replacing them with multi-story structures or reducing the size of the parking lot and developing a shuttle service to nearby Metro stations.

Regardless of whether administrative offices were constructed at the site, the maintenance area would be rehabilitated to correct problems with equipment and materials storage, parking, and staff office space. The site would be reorganized and improved within the existing developed area. Best management practices would be implemented to reduce the risk of environmental contamination from operations and to correct drainage problems at the site.

The National Park Service recognizes that the mixed areas of grass, shrubs, and trees at the maintenance area provide high-value wildlife habitat, particularly for migrating birds. Alternative A would include a commitment to

protect the wildlife habitat by avoiding disturbances to vegetated areas during the implementation of the actions described above

maintain the existing habitat by continuing the vegetation management practices that have produced the multiple successional stages

seek opportunities to improve the habitat, possibly in partnership with education, other government, and/or volunteer organizations

**Edgewater.** The U.S. Park Police regional stables and training arena at Edgewater would remain unchanged in its current facilities. However, best management practices would be implemented to reduce the potential for bacteria runoff from the site.

### **Urban Transit Zone**

Existing rights-of-way in the park for non-NPS roads would be classified under the Urban Transit Zone (8 acres, 0.2 percent of the park). The National Park Service would continue to work with the District government to provide linkages to the surrounding city and to protect the historic character of road structures and scenic views in this zone. Actions in this zone might also include the improved visitor orientation measures described for the Valley Floor Controlled Automobile Access Zone.

### **Summary of Trail Improvements**

In the public comments on the draft general management plan, the National Park Service received numerous recommendations that trails in the park be improved. Alternative A includes a substantial commitment to improving existing trails and providing a limited amount of new trail. However, because the proposed upgrades to the park's trail system were identified within each management prescription, the overall trail improvement program was not obvious. Therefore, this section summarizes the types of changes to the trail system that would occur with Alternative A and provides information on how they would be implemented.

The National Park Service has not yet conducted detailed trails studies. Therefore, Alternative A activities related to trails would first include systematically assessing trail conditions, establishing routes, and preparing preliminary concept designs. Because this type of information has yet to be developed, it should be recognized that the following description only indicates the general intent

for trail improvements with regard to locations and lengths and that changes will occur as supporting data are developed. For general management planning purposes, Alternative A changes to the trail system would include the following:

Throughout the park, poorly designed trail segments, such as areas with severe drainage, stability, or soil erosion problems, would be rerouted. The abandoned segments would be restored to natural conditions. Estimates for the lengths and locations of trail that would be rerouted have not been developed but could total a couple of miles. Because this action would improve protection of the park's natural and cultural resources, it would have a high priority.

An estimated 2 miles of paved trail parallel to Oregon Avenue would be rehabilitated to improve the trail surface.

An estimated 5.3 miles of existing paved recreation trail along Beach Drive would be upgraded to improve visitor safety. This could include realigning some sections.

The paved recreation trail paralleling the Rock Creek and Potomac Parkway would be improved and realigned in segments. The goal would be to provide a safe pathway separated from the roadway. An estimated 2 miles of trail would be upgraded.

About 0.5 miles of trail along Bingham Drive would be upgraded.

Approximately 0.75 miles of new trail would be constructed along Piney Branch Parkway to enhance access to Rock Creek Park from the east by foot and bicycle.

Up to a mile of new trail may be provided along park roads other than those mentioned above.

To implement the trail program, the National Park Service would prepare a trail plan that would tier from this general management plan. The assessment, routing, and conceptual design elements of this plan would allow the National Park Service to determine optimal trail alignments that would minimize impacts of trails and avoid conflicts among visitors. This would include exploring feasible options for improving park access for visitors participating in nonmotorized recreation so they can access the park safely without competing with automobiles. The study would outline the trail design and construction standards to be used and would include maps and costs for trail alternatives. As part of this process, the National Park Service would provide National Environmental Policy Act documentation, which would include opportunities for agency and public review and comment.

Protection of park resources would be a key element in designing and implementing the trail improvement program. Considerations would include

correcting existing problems, such as soil erosion, sediment loading of streams, and wetland intrusions

avoiding new disturbances of natural resources such as wetlands, habitats for endangered and other special-concern species, and important components of the deciduous forest, such as mature trees

maintaining the historic character, such as appearances and width, in culturally sensitive areas

## **COSTS**

Cost estimates for implementing Alternative A, including one-time capital costs and annual costs for operations and maintenance, are presented in table 5. Capital costs would total about \$14.8 million.

About 63 percent of the capital costs (\$9.4 million) would be used to rehabilitate and improve the Rock Creek Nature Center and Planetarium, convert the Lodge House to a visitor contact station, and restore the historic Peirce Mill area.

Approximately \$2.1 million of the capital costs (14 percent) would be required to bring existing park features up to existing NPS policy and regulatory requirements.

Another \$2.3 million in capital costs (16 percent) would fund proposed trail improvements.

About \$1.1 million (7 percent) would pay for safety improvements at the intersection of the parkway and Beach Drive, and for traffic-calming devices on Beach Drive.

Annual costs would be \$8.2 million, about \$880,000 more than the annual costs for Alternative B.

The largest part of the new costs (48 percent) would be used to lease commercial space outside the park for the new District 3 substation.

Thirty-five percent of the increased operations costs would fund eight new full-time-equivalent staff positions, including two staff positions for speed and other traffic enforcement and six positions to improve visitor contact, education, and interpretation, primarily at the Lodge House, Peirce Mill complex, and Rock Creek Nature Center and Planetarium.

Seventeen percent would be used to lease administrative space for park headquarters outside the park.

**TABLE 5: ESTIMATED COSTS OF IMPLEMENTING THE ALTERNATIVES <sup>a/</sup>**

	Alternative A		Alternative B		Alternative C		Alternative D	
	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs
Current annual funds allocated for park and parkway operations	\$6,200,000	--	6,200,000	--	6,200,000	--	6,200,000	--
Funding to meet NPS policy and regulatory requirements								
Natural resource management	\$388,000	--	\$388,000	--	\$388,000	--	\$388,000	--
Cultural resource management	\$222,000	--	\$222,000	--	\$222,000	--	\$222,000	--
Visitor services	\$388,000	--	\$388,000	--	\$388,000	--	\$388,000	--
Special use management	\$55,000	--	\$55,000	--	\$55,000	--	\$55,000	--
Partnership/cooperative activities	\$111,000	--	\$111,000	--	\$111,000	--	\$111,000	--
Bring existing facilities up to standards								
Peirce-Klingling Mansion	--	\$1,043,000	--	\$1,043,000	--	\$1,043,000	--	\$1,043,000
Maintenance area	--	\$754,000	--	\$754,000	--	\$754,000	--	\$754,000
Miller cabin	--	\$33,000	--	\$33,000	--	\$33,000	--	\$33,000
H-3 U.S. Park Police stables	--	\$233,000	--	\$233,000	--	\$233,000	--	\$233,000
Subtotal	\$7,364,000	\$2,063,000	\$7,364,000	\$2,063,000	\$7,364,000	\$2,063,000	\$7,364,000	\$2,063,000
Proposed facility changes								
Rehabilitate and improve Rock Creek Nature Center and Planetarium	--	\$5,990,000	--	--	--	\$5,990,000	--	\$5,990,000
Convert Lodge House to visitor contact station	--	\$1,442,000	--	--	--	\$1,442,000	--	\$1,442,000
Restore historic Peirce Mill area	--	\$1,919,000	--	--	--	\$1,919,000	--	\$1,919,000
Proposal trail improvements	--	\$2,341,000	--	--	--	\$2,341,000	--	\$2,341,000
Road system changes								
Install six permanent vehicle gates	--	--	--	--	--	\$60,000	--	\$60,000
Construct/install traffic-calming devices on Beach Drive	--	\$244,000	--	--	--	\$244,000	--	\$244,000
Redesign/reconstruct intersection of parkway and Beach Drive	--	\$838,000	--	--	--	\$838,000	--	\$838,000

**TABLE 5: ESTIMATED COSTS OF IMPLEMENTING THE ALTERNATIVES (Continued)**

	Alternative A		Alternative B		Alternative C		Alternative D	
	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs	Annual Costs	Capital Costs
Additional annual operational costs								
Lease headquarters office space <sup>b/</sup>	\$150,000	--	--	--	\$150,000	--	\$150,000	--
Maintain paved trails	\$1,000	--	--	--	\$1,000	--	\$1,000	--
Maintain traffic-calming devices	\$1,000	--	--	--	\$1,000	--	\$1,000	--
Improve enforcement of speed limits (and HOV requirements for Alternative C only) (two full-time staff equivalents at GS-7 rate)	\$78,000	--	--	--	\$78,000	--	\$78,000	--
Mid-day closures of Beach Drive	--	--	--	--	--	--	\$33,000	--
Staff Lodge House, Peirce Mill complex, and nature center (six full-time staff equivalents at GS-7 rate)	\$227,000	--	--	--	\$227,000	--	\$227,000	--
Lease new District 3 substation space <sup>c/</sup>	\$423,000	--	--	--	\$423,000	--	\$423,000	--
Subtotal	\$880,000	\$12,707,000			\$880,000	\$12,767,000	\$913,000	\$12,767,000
Total	\$8,244,000	\$14,837,000	\$7,364,000	\$2,063,000	\$8,244,000	\$14,897,000	\$8,277,000	\$14,897,000

a/ All costs are in year 2004 dollars.

b/ Costs include 4,500 square feet of office space at a cost of \$33 per square foot per year.

c/ Costs include 10,000 square feet of office space at a cost of \$33 per square foot per year, plus 45 vehicle parking spaces (for cruisers, emergency vehicles, and visitor parking) at \$2,000 annually per vehicle space.

## **ALTERNATIVE B: CONTINUE CURRENT MANAGEMENT/NO ACTION**

*This section describes Alternative B, including the concept that defines the alternative, where the management prescriptions that would be included in this alternative would be applied, and the approximate costs.*

### **CONCEPT**

The goals of Alternative B would be to

- preserve traditional visitor experiences and activities
- maintain the park's natural, cultural, and scenic values in conformance with the provisions outlined in "Servicewide Mandates and Policies"

Rock Creek Park and the Rock Creek and Potomac Parkway would be maintained as they have evolved thus far. There would not be any major changes in resources management, visitor programs, or facilities beyond regular maintenance. The current park road system would be retained and existing management would continue.

Measures achieve the Alternative B goals are embodied in the management prescriptions presented below. These are shown on the Alternative B map and summarized in table 4.

### **MANAGEMENT PRESCRIPTIONS**

Management prescription zoning is shown in the Alternative B map. The management prescriptions were described previously.

#### **Forest Zone**

As in all alternatives, the Forest Zone would be applied to 79 percent of the park (2,331 acres). There would be no major change in the management of forested areas of the park from current management practices. Existing horse and foot trails would be retained and deteriorated segments would be rehabilitated to the extent practical. During these activities, each trail site would be evaluated to determine effects on safety and on cultural and natural resource values. Improvements would be designed to maximize the former while protecting the latter.

Bicycles would continue to be limited to roads, parking areas, and designated paved trails. Military Field and other meadows would be managed in a manner similar to that described in Alternative A, including protection of archeological resources.

#### **Cultural Resource Zone**

Under Alternative B, about 2 acres (less than 0.1 percent of the park) would continue to be managed primarily for cultural resource protection. Resources such as Fort DeRussy and the Godey Lime Kilns would be maintained in their current condition. Historic structures and resources at the Peirce-Klingel Mansion would continue to be maintained, but the sites would be within the Administration/Operations Zone. The Peirce Mill complex would be in the Visitor Facility Zone.



### **Valley Floor Automobile Access Zone**

The Rock Creek valley would continue to accommodate through-traffic along the length of the park and parkway. The Valley Floor Automobile Access Zone (184 acres, 6 percent of the park) would be managed to preserve the valley's characteristic mix of forest, grassy openings, and floodplain terraces interspersed with rustic facilities. Management actions that could be taken within this zone include the following.

**Beach Drive.** The tradition of automobile travel along the length of Beach Drive would be maintained. Two-way traffic would continue during the week along the length of the road for non-commercial vehicles without limits on the number of vehicle occupants.

Segments of Beach Drive would continue to be closed to traffic on weekends and holidays. These include Broad Branch Road to Joyce Road, picnic grove 10 to Wise Road, and West Beach Drive to the Maryland border. Weekend closures of Sherrill and Bingham Drives, which are in the Park Road Zone, also would continue. Piney Branch Parkway would be open to two-way traffic at all times.

**Paved Recreational Trail.** The existing paved recreational trail paralleling Beach Drive would be retained along the current alignment. The paved trail would be maintained, including repairs and re-paving, but major changes in location, width, or alignment would not be undertaken.

### **Rock Creek and Potomac Parkway Zone**

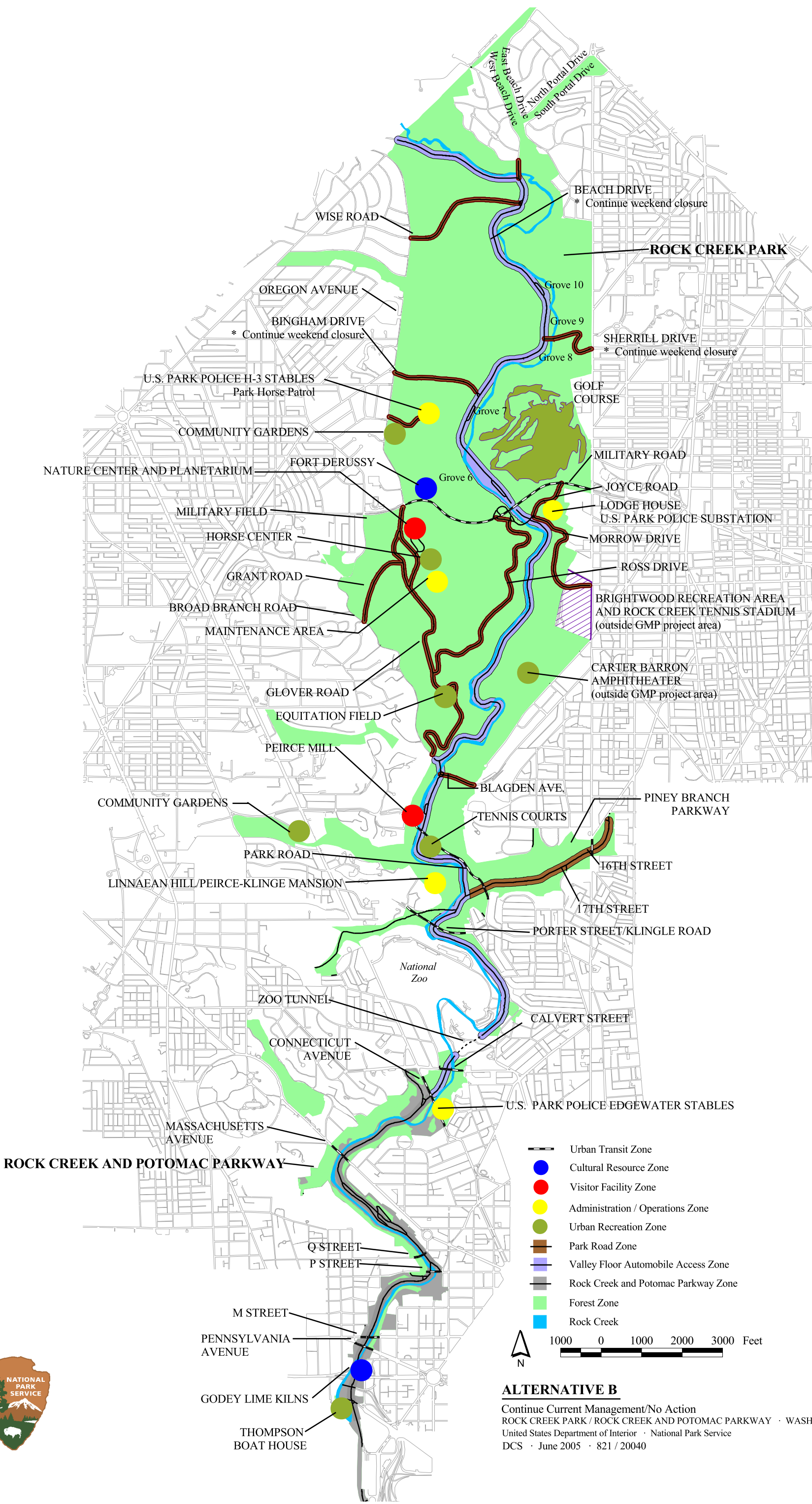
The parkway corridor, which covers 161 acres (5 percent of the park) would continue to be managed for a mix of open fields and forest. This would provide both a pleasant aesthetic experience, and visual and sound buffers. The paved trail paralleling the parkway would be maintained, including repairs and re-paving, but major changes in location, width, or alignment would not be undertaken.

Parkway traffic would be managed as at present. Rush-hour lane reversals (one-way traffic) would continue on the parkway.

### **Park Road Zone**

Other park roads (74 acres, 2 percent of the park) would continue to be managed in their current alignments and widths to provide vehicular routes into and through the park. The existing infrastructure would be maintained, potentially with improvements such as better directional and information signs for visitor orientation.

Bingham Drive and Sherrill Drive would continue to be closed on weekends and holidays for nonmotorized recreation. Following snow storms, several roads in this zone could be closed to provide winter recreational opportunities such as sledding and skiing. These could include, but may not be limited to, Glover Road, Ross Drive, Bingham Drive, Sherrill Drive, and Morrow Drive.



**ALTERNATIVE B**  
 Continue Current Management/No Action  
 ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY · WASHINGTON, DC  
 United States Department of Interior · National Park Service  
 DCS · June 2005 · 821 / 20040



### **Visitor Facility Zone**

Alternative B would continue to use the existing facilities for park introduction and information services. Under this alternative, the Visitor Facility Zone would occupy about 3 acres (0.1 percent of the park).

**Rock Creek Nature Center and Planetarium.** The nature center area would be maintained in its current configuration. The facility would continue to serve as the park's primary location for environmental education for school groups as well as an information, orientation, and interpretation center for other visitors.

**Peirce Mill Complex.** The Peirce Mill complex would continue to be managed primarily for visitor information and orientation, resources interpretation, and recreation.

The mill would be managed consistent with the recommendations of the draft historic structure report (Friends of Peirce Mill and Quinn Evans, Architects 2000). Peirce Mill would provide a historically accurate representation of a typical mill complex in the region. This would include working with the Friends of Peirce Mill to restore the milling machinery to a fully operable condition. However, because the mill race was relocated away from the site many years ago, it will not be possible to restore operation of the mill using water power.

The landscape of the complex would be rehabilitated to retain the historic character while allowing continued use.

Park interpretive staff in the mill would continue to provide park-wide information and orientation as well as generalized interpretation of milling.

The Peirce Barn would continue to be used as a visitor contact point with exhibits on the history of the Peirce estate and milling in the Rock Creek valley.

### **Urban Recreation Zone**

Most facilities and activities in the Urban Recreation Zone (200 acres, 7 percent of the park) would be retained at their current levels. These include the community gardens off Oregon Avenue and at Melvin Hazen Park, the Rock Creek Horse Center and equitation field, the Rock Creek Golf Course, the clay tennis courts near Peirce Mill, and the reserve picnic areas. The Brightwood Recreation Area and Rock Creek Tennis Stadium, which are outside the area covered by this general management plan, would continue to be managed as specified in the *Final Environmental Impact Statement, Tennis Stadium, Rock Creek Park, Washington, D.C.* (NPS 1995b). The Carter Barron Amphitheater would be repaired and rehabilitated.

### **Administration/Operations Zone**

Park administration and operations would continue in their present locations. This zone would occupy approximately 7 acres (0.2 percent of the park).

**Peirce-Klinge Mansion at Linnaean Hill.** The park administrative offices would continue to occupy the Peirce-Klinge Mansion at the Linnaean Hill site. The current level of preservation

would be maintained, and only minor interior modifications would be made in the future to avoid further affecting the historic character of the building. Future staff increases would need to be accommodated elsewhere in the park in existing facilities.

**Park Maintenance Area.** Maintenance shops, equipment and materials storage, parking, and maintenance staff office space would continue to be located at the maintenance area. Administrative staff offices that could not be accommodated at Peirce-Klingbe Mansion might also be located here. Consistent with the water resources requirements in the “Servicewide Mandates and Policies” section, best management practices would be implemented to reduce the risk of environmental contamination from operations and to correct drainage problems at the site.

**Lodge House.** The Lodge House would continue to serve as the U.S. Park Police District 3 sub-station. All current police functions, including office spaces, holding cell, parking, and motorcycle and bicycle storage, would remain in the existing building.

**H-3 Stables.** U.S. Park Police horse stables would be maintained at the site off Oregon Avenue. The community gardens near this site also would continue to be used by the public.

**Edgewater.** The U.S. Park Police regional stables and training arena at Edgewater would remain unchanged in its current facilities. Best management practices would be implemented to reduce the potential for bacteria runoff from the site.

### **Urban Transit Zone**

Existing rights-of-way in the park for non-NPS roads would be managed under the Urban Transit Zone (8 acres, 0.2 percent of the park). The National Park Service would continue to work with the District government to provide linkages to the surrounding city and to protect the historic character of road structures and scenic views in this zone.

### **COSTS**

Cost estimates for implementing Alternative B, including both one-time capital costs and annual costs for operations and maintenance, are presented in table 5. Capital costs would total approximately \$2.1 million. This money would be required to bring existing park features up to standards.

Annual costs would be \$7.4 million. This would include the \$6.3 million currently spent annually for park and parkway operations, plus additional funding of \$1.1 million to bring existing park operations up to existing NPS policy and regulatory requirements.

## ALTERNATIVE C: NONMOTORIZED RECREATION EMPHASIS

*This section describes Alternative C, including the concept that defines the alternative, where the management prescriptions that would be included in this alternative would be applied, and the approximate costs.*

### CONCEPT

The goals of Alternative C would be to

- manage northern portions of the park as an exclusion zone from urban automobile traffic and promote nonmotorized recreation throughout the week

- assert more control over nonrecreational use of park roads and improve visitor safety

- preserve most traditional visitor experiences and activities

- enhance natural, cultural, and scenic values in the park

- optimize the use of structures for purposes such as interpretation, visitor contact, and park administration

In this alternative, a portion of the northern part of the Rock Creek valley floor would be closed to automobile traffic at all times. The Alternative C map illustrates one possible closure configuration, which would close three segments of Beach Drive between the Maryland state line and Broad Branch Road. This configuration is the basis for the following Alternative C description and was evaluated. However, the actual closure configuration would be selected at a later time, and may be adjusted.

The objectives of closing the road along portions of the Rock Creek valley floor would be to manage this area as a quiet refuge from urban automobile traffic, promote nonmotorized recreation throughout the week, and enhance natural resource protection. This section of the park would become a destination for nonmotorized activities. Alternative C also would create a paved route available throughout the week with little interference from automobile traffic through the Rock Creek valley and connecting to the Potomac River, as envisioned in regional bicycle plans (NPS 1990c; Metropolitan Washington Council of Governments 1995).

The current weekend and holiday closures of Sherrill Drive and Bingham Drive would be continued to promote recreational bicycling and other nonmotorized recreation in the park.

South of Broad Branch Road, including the Rock Creek and Potomac Parkway, the valley would support through-traffic for automobile travel and controlled urban transit. However, within the park, traffic would be managed to reduce levels compared to levels that would occur if current management practices were continued (Alternative B). The intent would be to improve visitor safety, the quality of the recreational visitor's experience, and resource protection.

Most traditional recreational experiences currently associated with Rock Creek Park would continue. In addition, all visitor facilities would remain accessible. However, access by automobile during weekdays would be not be permitted in areas of new road closures.

Better use of the park's cultural resources would be made in Alternative C. This could include moving some park functions out of historic buildings and converting those structures to visitor contact, education, and interpretation. Improvements to existing facilities would also be made.

Alternative C would improve the protection of the park's natural resources. For example, poorly designed sections of foot and horse trails would be rerouted and abandoned trail sections would be restored to natural conditions. During these activities, each trail site would be evaluated to determine effects on safety and on cultural and natural resource values. Improvements would be designed to maximize the former while protecting the latter. To improve protection of terrestrial wildlife, the National Park Service would identify the most frequent locations of roadkill and would implement measures to reduce mortality to wildlife from collisions with vehicles. Visitor orientation would be improved through such activities as installing additional signage.

Measures that could be taken to achieve the Alternative C goals and concept are embodied in the management prescriptions presented below. These are shown on the Alternative C map and summarized in table 4.

## **MANAGEMENT PRESCRIPTIONS**

Management prescription zoning is shown in the Alternative C map. The management prescriptions were described previously.

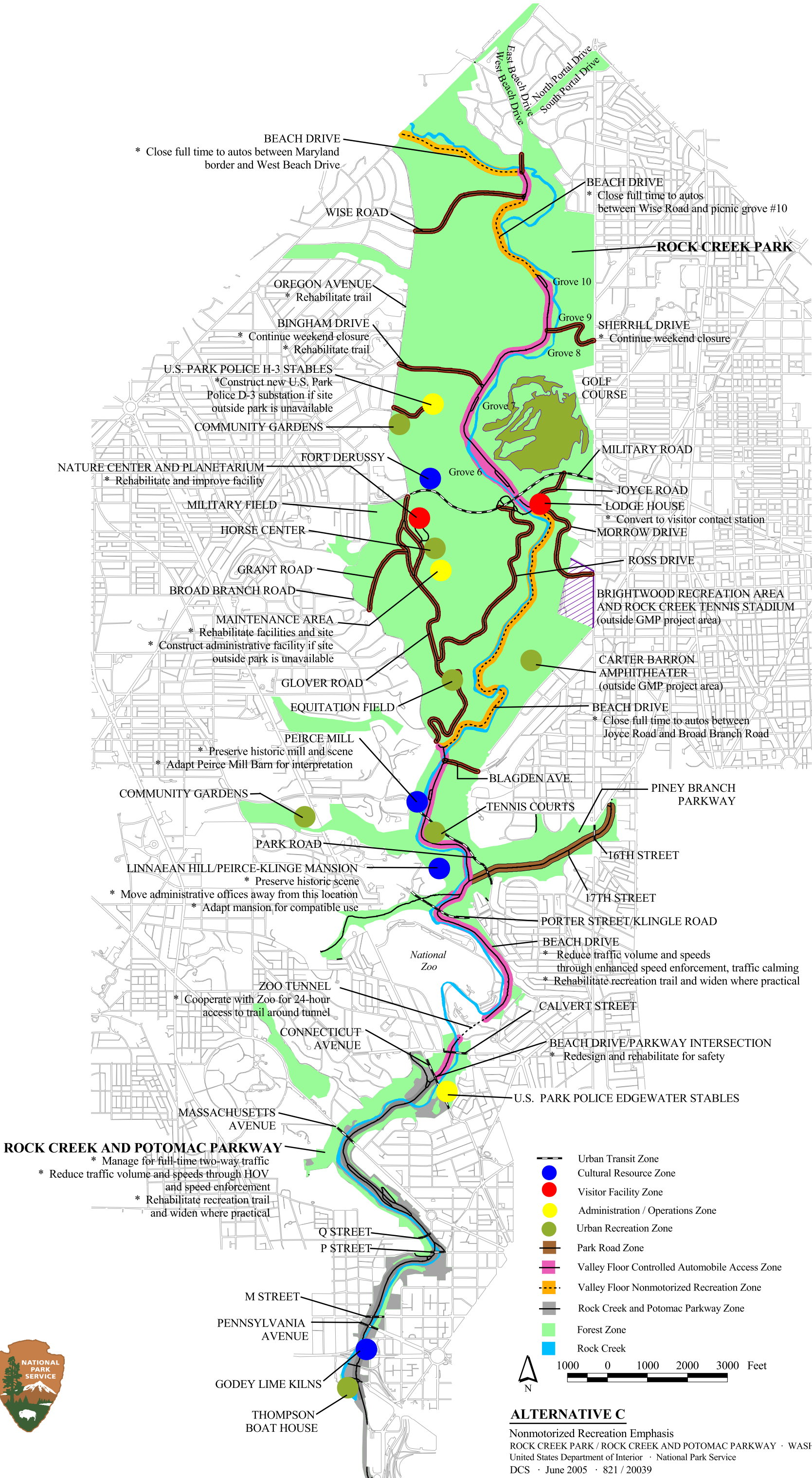
### **Forest Zone**

Under Alternative C, the Forest Zone would be applied to 79 percent of the park (2,331 acres). This zone's features and management would be similar to those described for Alternative A. An estimated 2.5 miles of paved trail would be rehabilitated under Alternative C. Military Field and other meadows would be managed in a manner similar to that described in Alternative A, including protection of archeological resources.

### **Cultural Resource Zone**

Alternative C would increase the area of the park primarily managed for protection of historic resources to about 6 acres (0.2 percent of the park). The types of actions that could be implemented at the various historic sites in the park would be identical to those described in Alternative A and could include the following:

The mill would be managed consistent with the recommendations of the historic structure report to provide a historically accurate representation of a typical mill complex in the region. This would expand on the already completed rehabilitation of the Peirce Barn, which serves as a visitor contact point with exhibits on the history of the Peirce estate and milling in the Rock Creek valley.



BEACH DRIVE  
\* Close full time to autos between Maryland border and West Beach Drive

BEACH DRIVE  
\* Close full time to autos between Wise Road and picnic grove #10

**ROCK CREEK PARK**

OREGON AVENUE  
\* Rehabilitate trail

BINGHAM DRIVE  
\* Continue weekend closure  
\* Rehabilitate trail

SHERRILL DRIVE  
\* Continue weekend closure

U.S. PARK POLICE H-3 STABLES  
\* Construct new U.S. Park Police D-3 substation if site outside park is unavailable

COMMUNITY GARDENS

GOLF COURSE

NATURE CENTER AND PLANETARIUM  
\* Rehabilitate and improve facility

FORT DERUSSY

MILITARY ROAD

MILITARY FIELD

JOYCE ROAD

HORSE CENTER

LODGE HOUSE

\* Convert to visitor contact station

GRANT ROAD

MORROW DRIVE

BROAD BRANCH ROAD

ROSS DRIVE

MAINTENANCE AREA  
\* Rehabilitate facilities and site  
\* Construct administrative facility if site outside park is unavailable

BRIGHTWOOD RECREATION AREA AND ROCK CREEK TENNIS STADIUM (outside GMP project area)

GLOVER ROAD

CARTER BARRON AMPHITHEATER (outside GMP project area)

EQUITATION FIELD

BEACH DRIVE  
\* Close full time to autos between Joyce Road and Broad Branch Road

PEIRCE MILL  
\* Preserve historic mill and scene  
\* Adapt Peirce Mill Barn for interpretation

BLAGDEN AVE

COMMUNITY GARDENS

TENNIS COURTS

PINEY BRANCH PARKWAY

PARK ROAD

16TH STREET

LINNAEAN HILL/PEIRCE-KLINGE MANSION  
\* Preserve historic scene  
\* Move administrative offices away from this location  
\* Adapt mansion for compatible use

17TH STREET

PORTER STREET/KLINGLE ROAD

National Zoo

BEACH DRIVE  
\* Reduce traffic volume and speeds through enhanced speed enforcement, traffic calming  
\* Rehabilitate recreation trail and widen where practical

ZOO TUNNEL  
\* Cooperate with Zoo for 24-hour access to trail around tunnel

CALVERT STREET

CONNECTICUT AVENUE

BEACH DRIVE/PARKWAY INTERSECTION  
\* Redesign and rehabilitate for safety

MASSACHUSETTS AVENUE

U.S. PARK POLICE EDGEWATER STABLES

**ROCK CREEK AND POTOMAC PARKWAY**

\* Manage for full-time two-way traffic  
\* Reduce traffic volume and speeds through HOV and speed enforcement  
\* Rehabilitate recreation trail and widen where practical

Q STREET

P STREET

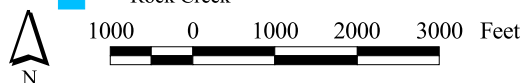
M STREET

PENNSYLVANIA AVENUE

GODEY LIME KILNS

THOMPSON BOAT HOUSE

- Urban Transit Zone
- Cultural Resource Zone
- Visitor Facility Zone
- Administration / Operations Zone
- Urban Recreation Zone
- Park Road Zone
- Valley Floor Controlled Automobile Access Zone
- Valley Floor Nonmotorized Recreation Zone
- Rock Creek and Potomac Parkway Zone
- Forest Zone
- Rock Creek







The park administrative offices would be moved out of the Peirce-Klingel Mansion at the Linnaean Hill building complex and adaptive use of the buildings would be provided.

The landscapes of the Peirce Mill complex and the Linnaean Hill complex would be rehabilitated to retain their historic characters while allowing continued park use.

Other cultural features, including but not limited to Fort DeRussy, the Godey Lime Kiln, and the Miller cabin, would be maintained according to accepted NPS practices. Interpretive enhancements would be guided by future interpretive plans.

### **Valley Floor Nonmotorized Recreation Zone**

The Valley Floor Nonmotorized Recreation Zone would be applied to 2 percent of the park (50 acres). The portions of Beach Drive within this zone would be closed to motorized vehicles at all times. Lands within this zone would be managed as a corridor providing a variety of nonmotorized recreation throughout the week, such as walking, bicycling, in-line skating, and quiet contemplation. Sections of Beach Drive within this zone would extend from

the Maryland State line to West Beach Drive

Wise Road to picnic grove 10

Joyce Road to Broad Branch Road

A paved surface would be maintained on the sections of Beach Drive in this zone to support wheeled recreation. The width of pavement may be reduced to minimize impervious surfaces and maintenance costs. However, at least a 16-foot-wide paved surface would be maintained. The closed sections would be gated to allow for maintenance and emergency vehicle access.

Picnic groves 3 and 4 are close to the Boulder Bridge within the southernmost Beach Drive segment that would be closed. Visitors would continue to be allowed to drive automobiles slowly to these picnic groves, just as driving to these sites on weekends and holidays when the road is closed currently is allowed.

There is a broad, level, unpaved horse trail on the west side of Rock Creek that can be accessed from the roadside parking area near the Rapids Bridge. This trail segment, which would be within the southernmost closed section of Beach Drive, is unique in that it provides impaired mobility visitors with the opportunity to enjoy an unpaved trail experience. Alternative C would continue to allow visitors to drive slowly from Joyce Road to the Rapids Bridge parking area to gain access to this trail segment.

### **Valley Floor Controlled Automobile Access Zone**

The Valley Floor Controlled Automobile Access Zone (134 acres, 5 percent of the park) would continue to be managed to preserve the valley's characteristic mix of forest, grassy openings, and floodplain terraces interspersed with rustic facilities. Types of actions that could be taken within this zone include the following.

**Beach Drive.** In the northern portions of the park, sections of Beach Drive from West Beach Drive to Wise Road and from picnic grove 10 to Joyce Road would be open to automobile traffic. They would be managed to provide access to the recreational opportunities of the park and would accommodate cross-park traffic.

Picnic groves 6 through 10 would be between the northern and middle closed segments of Beach Drive. (Locations of these picnic groves are shown on the Existing Conditions map.) These picnic groves would continue to be accessible by visitors entering the park via Military Road, Bingham Drive, or Sherrill Drive.

Beach Drive south of Broad Branch Road would be managed for improved control of through-traffic volumes and speeds. The National Park Service would work with surrounding jurisdictions to reduce the volume of nonrecreational traffic through the park and to help mitigate traffic impacts on adjoining neighborhoods.

The following measures may be included as ways to reduce traffic speeds and the volume of non-recreational traffic on Beach Drive.

Impose high-occupancy vehicle restrictions during rush hours on segments of Beach Drive that would not interfere with cross-park traffic. High-occupancy vehicle restrictions are consistent with regional transportation policies aimed at reducing reliance on single-occupant vehicles, reducing traffic congestion, improving air quality, and encouraging responsible commuting.

Strengthen speed limit enforcement on Beach Drive.

Implement traffic-calming measures to slow vehicle speeds. Such measures might include rumble strips, speed humps and speed tables, and intersection modifications such as all-way stops, traffic circles, reduced turning radii, and raised intersections.

Adjustments over time may be required to determine the best methods of controlling nonrecreational traffic volume and vehicle speeds. To support modeling and environmental assessment in the “Environmental Consequences” section, the following conditions were used as a reasonable scenario to characterize management of traffic on Beach Drive south of Broad Branch Road under Alternative C.

Traffic-calming measures and improved enforcement would hold traffic speeds to the posted speed limit (25 miles per hour).

Two-way traffic would be maintained.

High-occupancy vehicle would be implemented directionally, in the southbound lane during morning rush hours and in the northbound lane in the evening.

High-occupancy vehicle would be implemented from Porter Street / Klinge Road south to the parkway intersection near Connecticut Avenue. This would reduce through-traffic volume south of Broad Branch Road, while allowing for cross-park traffic between Broad Branch Road and Porter Street / Klinge Road.

**Paved Recreational Trail.** An estimated 5.3 miles of trail within the Valley Floor Controlled Automobile Access Zone would be rehabilitated for visitor safety. This could include improving and realigning some sections of the existing recreational paralleling Beach Drive south of Broad Branch Road.

The continuous alignment connecting the sections of Beach Drive that was closed to automobiles and segments of the paved recreation trail down the valley would be designated as an official bicycle route.

**Reduction of Roadkill.** Within this zone, the National Park Service would improve monitoring of the frequencies and locations of animals killed or injured by collisions with vehicles. The mapping of roadkill sites would indicate locations where methods to reduce road mortality would be most effective. Techniques that could be implemented to reduce roadkill under Alternative C, either singly or in combination, may include public education about vehicle hazards to wildlife; warning signs, road striping, and speed humps and speed tables to reduce speeds and enhance driver alertness; and strategically placed underpasses (culverts) for small animals such as reptiles and amphibians.

**Improved Orientation Information.** Actions to provide improved visitor orientation would be similar to those described for Alternative A. Signage of a scale and height appropriate to pedestrians and bicyclists may be provided at each end of and at other locations along the closed segments of Beach Drive.

### **Rock Creek and Potomac Parkway Zone**

Rock Creek and Potomac Parkway Zone, which covers 161 acres (5 percent of the park) would continue to be managed for a landscape mix of fields and forest. This would provide both a pleasant aesthetic experience, and visual and sound buffers.

The paved recreational trail paralleling the parkway would be improved and realigned in segments. The goal would be to provide a safe pathway separated from the roadway. An estimated 2 miles of trails would be upgraded within the Rock Creek and Potomac Parkway Zone.

The measures that would be used to manage the parkway would include the following:

Rush-hour lane reversals would be ended and two-way traffic would be allowed at all times.

Traffic volume would be moderated by implementing high-occupancy vehicle restrictions during rush hours, southbound in the morning and northbound in the evening. This action would be taken in concert with high-occupancy vehicle restrictions on Beach Drive south of Broad Branch Road.

The intersection of the parkway with Beach Drive near Connecticut Avenue would be improved to increase safety for pedestrians, cyclists, and motorists. The intersection redesign would not increase traffic capacity or encourage increased speeds through the intersection. Improvements may require reconfiguration of existing roads, potentially including closure of Cathedral Avenue access.

Speed limit enforcement on the parkway would be strengthened as described above for the Valley Floor Controlled Automobile Access Zone. Actions to reduce wildlife roadkill also would be the same as those described for the Valley Floor Controlled Automobile Access Zone.

### **Park Road Zone**

The Park Road Zone would include 74 acres (2 percent of the park). The park road system would be managed to provide access to park resources and to improve linkages between the park and the surrounding neighborhoods. Park roads would not be widened to increase capacity for nonrecreational traffic.

Improvements could include rehabilitating or constructing recreational trails adjacent to roads to minimize pedestrian and vehicular conflicts and incorporating better directional and informational signs for visitor orientation. About 0.5 miles of trail along Bingham Drive would be upgraded within the Park Road Zone. Approximately 0.75 miles of trail would be added along Piney Branch Parkway to enhance access to Rock Creek Park by foot and bicycle. Up to a mile of new trail also may be provided. A feasibility study would be conducted to determine the optimal locations for new pedestrian trails.

Bingham Drive and Sherrill Drive would continue to be closed on weekends and holidays for nonmotorized recreation. Following snow storms, several roads in this zone could be closed to provide winter recreational opportunities such as sledding and skiing. These could include, but may not be limited to, Glover Road, Ross Drive, Bingham Drive, Sherrill Drive, and Morrow Drive.

Speed limit enforcement on park roads would be strengthened as described above for the Valley Floor Controlled Automobile Access Zone. Actions to reduce wildlife roadkill and improve visitor orientation also would be the same as those described for the Valley Floor Controlled Automobile Access Zone.

### **Visitor Facility Zone**

Alternative C would improve park interpretive, educational, and information services. Under this alternative, the Visitor Facility Zone would occupy about 1 acre (less than 0.1 percent of the park). Potential actions that could be implemented to improve visitor services would be identical to those described for Alternative A and could include

- converting the Lodge House to a visitor contact station
- upgrading the Rock Creek Nature Center and Planetarium

### **Urban Recreation Zone**

Most facilities and activities in the Urban Recreation Zone (200 acres, 7 percent of the park) would be retained at their current levels. These include the community gardens off Oregon Avenue and at Melvin Hazen Park, the Rock Creek Horse Center and equitation field, the Rock Creek Golf Course, the clay tennis courts near Peirce Mill, and the reserve picnic areas. The Brightwood Recreation Area and Rock Creek Tennis Stadium, which are outside the area covered by this general management plan, would continue to be managed as specified in the *Final Environmental*

*Impact Statement, Tennis Stadium, Rock Creek Park, Washington, D.C.* (NPS 1995b). The Carter Barron Amphitheater would be repaired and rehabilitated.

### **Administration/Operations Zone**

Alternative C would address the problems associated with park administrative facilities in a manner similar to that described in Alternative A. This could include

- relocating the park's administrative offices to commercial space outside the park or to a new facility located at, for evaluation purposes, the park maintenance area

- relocating the District 3 U.S. Park Police substation to commercial space outside the park, or to a new facility located at, for evaluation purposes, the H-3 site

- improving the use of the park maintenance area

- implementing best management practices at Edgewater to reduce the potential for bacteria-laden wastes from manure to enter the surface water system

The area within the Administration/Operations Zone would occupy approximately 5 acres (0.1 percent of the park). The measures that were described in Alternative A to protect and enhance the park's natural and cultural resources also would be applied in Alternative C.

### **Urban Transit Zone**

Existing rights-of-way in the park for non-NPS roads would be classified under the Urban Transit Zone (8 acres, 0.2 percent of the park). The National Park Service would continue to work with the District government to provide linkages to the surrounding city and to protect the historic character of road structures and scenic views in this zone. Actions in this zone might also include the improved visitor orientation measures described for the Valley Floor Controlled Automobile Access Zone.

### **Summary of Trail Improvements**

Alternative C would include the same trail improvements, including preparation of a trail plan with accompanying National Environmental Policy Act documentation, that were described for Alternative A. However, it would differ from Alternative A by incorporating the three closed segments of Beach Drive into trail planning activities.

### **COSTS**

Cost estimates for implementing Alternative C, including one-time capital costs and annual costs for operations and maintenance, are presented in table 5. Capital costs would total approximately \$14.9 million.

- About 63 percent of the capital costs (\$9.4 million) would be used to rehabilitate and improve the Rock Creek Nature Center and Planetarium, convert the Lodge House to a visitor contact station, and restore the historic Peirce Mill area.

## ALTERNATIVES

Approximately \$2.1 million of the capital costs (14 percent) would be required to bring existing park features up to existing NPS policy and regulatory requirements.

Another \$2.3 million in capital costs (16 percent) would fund proposed trail improvements.

About \$1.1 million (7 percent) would pay for safety improvements at the intersection of the parkway and Beach Drive, and for traffic-calming devices on Beach Drive.

An estimated \$60,000 would be required to install permanent gates at six locations on Beach Drive to implement the road closures.

Annual costs would be \$8.2 million, about \$880,000 more than the annual costs for Alternative B.

The largest part of the new costs (48 percent) would be used to lease commercial space outside the park for the new District 3 substation.

Thirty-five percent of the increased operations costs would fund eight new full-time-equivalent staff positions, including two staff positions for high-occupancy, speed, and other traffic enforcement, and six positions to improve visitor contact, education, and interpretation, primarily at the Lodge House, Peirce Mill complex, and Rock Creek Nature Center and Planetarium.

Seventeen percent would be used to lease administrative space for park headquarters outside the park.

## ALTERNATIVE D: MID-WEEKDAY RECREATION ENHANCEMENT

*This section describes Alternative D, including the concept that defines the alternative, where the management prescriptions that would be included in this alternative would be applied, and the approximate costs.*

### CONCEPT

As stated in the January 2001 letter sent from the Mayor of the District of Columbia to the National Park Service (see appendix D), the traffic management goals of Alternative D would be to “reduc[e] automobile traffic in the most sensitive portions of Rock Creek Park, while minimizing any impact on surrounding neighborhoods and commuters.” This would be accomplished by “implementing weekday vehicular traffic restrictions on sections of upper Beach Drive in non-rush-hour periods.” In addition, goals of this alternative would include

preserving traditional visitor experiences and activities

enhancing natural, cultural, and scenic values in the park

asserting control over nonrecreational use of park roads and improving visitor safety and quality of the experience for visitors participating in nonmotorized recreation

optimizing the use of structures for purposes such as interpretation, visitor contact, and park administration

In accordance with the mayor’s request, the concept for Alternative D would involve closing selected park road segments to motorized vehicles on weekdays between the morning and evening rush hours. These closures would enhance recreation opportunities for pedestrians and cyclists. Because mid-weekday motorized traffic typically is light, few drivers would alter their use patterns and little traffic would be forced into surrounding neighborhoods.

Weekend and holiday closures under Alternative D would be the same as Alternative B, Continue Current Management/No Action. The road closure actions of Alternative D that are described below would be applied on weekdays.

The Alternative D map illustrates one possible closure configuration, which would close three segments of Beach Drive between the Maryland state line and Broad Branch Road. This configuration was evaluated in the environmental impact statement. However, the actual closure configuration may be adjusted. As shown in the map, Alternative D would close three segments of Beach Drive to motorized traffic during the middle part of weekdays, as follows:

The Maryland border to West Beach Drive

Wise Road to picnic grove 10

Joyce Road to Broad Branch Road

These are the same three segments that currently are closed to motor vehicles on weekends.



Alternative D would not include the weekday closure of Sherrill Drive or Bingham Drive, but would continue their closure on weekends. Keeping these roads open would minimize weekday effects on cross-park traffic.

Consistent with current management practices, Alternative D would not include any requirements for high vehicle occupancy in any part of the park or parkway. This alternative also would continue current rush-hour lane reversals (one-way traffic) on the Rock Creek and Potomac Parkway.

On weekdays, the road segments would be closed to motorized vehicles at 9:30 A.M. They would be re-opened at 3:30 P.M. to accommodate evening commuter traffic. This approach conforms with the mayor's request to consider "weekday vehicular traffic restrictions . . . in non-rush-hour periods."

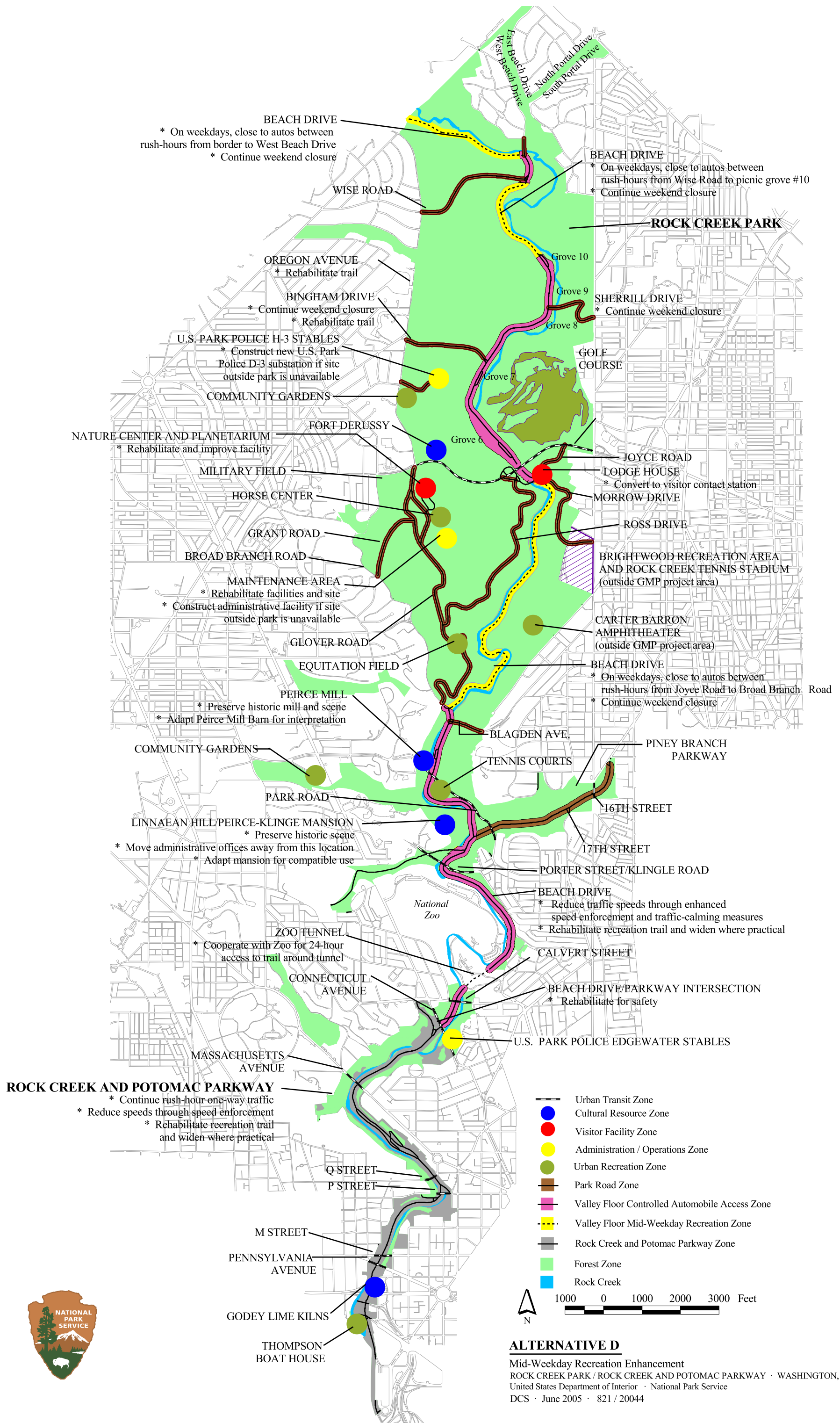
During development of Alternative D, other possible strategies for closing Beach Drive during non-rush-hour periods were considered. Descriptions of these approaches and reasons why they were not incorporated into this or any other alternative are included in the "Other Traffic-Related Actions" discussion of the "Alternatives or Actions Eliminated from Further Study" section.

During weekdays from 3:30 P.M. to 9:30 A.M., the valley would support through-traffic, including commuter traffic. However, many of the traffic management measures described for Alternative A would be implemented to reduce speeds compared to speeds that would occur if current management practices were continued (Alternative B). The intent would be to improve visitor safety, the quality of the visitor's experience, and resource protection.

For these 18 hours each weekday, Alternative D would maintain driving for pleasure along the length of Beach Drive as an allowed activity. In the establishing legislation, the park managers were directed to provide "roadways . . . to be used for driving." Commuters could continue to enjoy the slower pace and scenery afforded by their morning and evening drive through the park. In addition, visitors with limited mobility would continue to have vehicular access throughout the park during popular periods such as weekday evenings.

For 6 hours during the middle of each weekday, Alternative D would create a paved trail through the Rock Creek valley and connecting to the Potomac River, as envisioned in regional bicycle plans (NPS 1990c; Metropolitan Washington Council of Governments 1995). During this time, the Rock Creek valley floor north of Broad Branch Road would be managed as a quiet refuge from urban automobile traffic. Nonmotorized recreation would be encouraged, and the increased safety may lead to increases in bicycle and pedestrian use within the park.

All traditional recreational experiences currently associated with Rock Creek Park would continue. In addition, all visitor facilities would remain accessible by automobile. However, access by automobile during the middle part of each weekday would be not be permitted in areas of new road closures.



BEACH DRIVE  
 \* On weekdays, close to autos between rush-hours from border to West Beach Drive  
 \* Continue weekend closure

BEACH DRIVE  
 \* On weekdays, close to autos between rush-hours from Wise Road to picnic grove #10  
 \* Continue weekend closure

OREGON AVENUE  
 \* Rehabilitate trail

BINGHAM DRIVE  
 \* Continue weekend closure  
 \* Rehabilitate trail

U.S. PARK POLICE H-3 STABLES  
 \* Construct new U.S. Park Police D-3 substation if site outside park is unavailable

COMMUNITY GARDENS

NATURE CENTER AND PLANETARIUM  
 \* Rehabilitate and improve facility

MILITARY FIELD

HORSE CENTER

GRANT ROAD

BROAD BRANCH ROAD

MAINTENANCE AREA  
 \* Rehabilitate facilities and site  
 \* Construct administrative facility if site outside park is unavailable

GLOVER ROAD

EQUITATION FIELD

PEIRCE MILL

\* Preserve historic mill and scene  
 \* Adapt Peirce Mill Barn for interpretation

COMMUNITY GARDENS

PARK ROAD

LINNAEAN HILL/PEIRCE-KLINGE MANSION  
 \* Preserve historic scene  
 \* Move administrative offices away from this location  
 \* Adapt mansion for compatible use

ZOO TUNNEL

\* Cooperate with Zoo for 24-hour access to trail around tunnel

CONNECTICUT AVENUE

MASSACHUSETTS AVENUE

**ROCK CREEK AND POTOMAC PARKWAY**

\* Continue rush-hour one-way traffic  
 \* Reduce speeds through speed enforcement  
 \* Rehabilitate recreation trail and widen where practical

Q STREET

P STREET

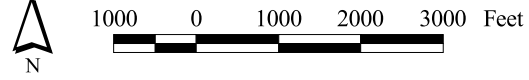
M STREET

PENNSYLVANIA AVENUE

GODEY LIME KILNS

THOMPSON BOAT HOUSE

- Urban Transit Zone
- Cultural Resource Zone
- Visitor Facility Zone
- Administration / Operations Zone
- Urban Recreation Zone
- Park Road Zone
- Valley Floor Controlled Automobile Access Zone
- Valley Floor Mid-Weekday Recreation Zone
- Rock Creek and Potomac Parkway Zone
- Forest Zone
- Rock Creek



**ALTERNATIVE D**  
 Mid-Weekday Recreation Enhancement  
 ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY · WASHINGTON, DC  
 United States Department of Interior · National Park Service  
 DCS · June 2005 · 821 / 20044





Compared to Alternative B, Continue Current Management/No Action, Alternative D would make better use of the park's cultural resources, implementing the same measures proposed for Alternative A. This would include moving some park functions out of historic buildings and converting those structures to visitor contact, education, and interpretation. Improvements to existing facilities also would be made.

Alternative D would improve the protection of the park's natural resources. For example, poorly designed sections of foot and horse trails would be rerouted and abandoned trail sections would be restored to natural conditions. During these activities, each trail site would be evaluated to determine effects on safety and on cultural and natural resource values. Improvements would be designed to maximize the former while protecting the latter. To improve protection of wildlife, the National Park Service would identify the most frequent locations of roadkill and would implement measures to reduce mortality to wildlife from collisions with vehicles. Visitor orientation would be improved through such activities as installing additional signage.

Measures that could be taken to achieve the Alternative D goals and concept are embodied in the management prescriptions presented below. These are shown on the Alternative D map and summarized in table 4.

## **MANAGEMENT PRESCRIPTIONS**

Management prescription zoning is shown in the Alternative D map. The management prescriptions were described previously.

### **Forest Zone**

Under Alternative D the Forest Zone would be applied to 79 percent of the park (2,331 acres). This zone's features and management would be similar to those described for Alternative A. An estimated 2.5 miles of paved trail would be rehabilitated under Alternative D. Military Field and other meadows would be managed in a manner similar to that described in Alternative A, including protection of archeological resources.

### **Cultural Resource Zone**

Alternative D would increase the area of the park primarily managed for protection of historic resources to about 6 acres (0.2 percent of the park). The types of actions that could be implemented at the various historic sites in the park would be identical to those described in Alternative A and could include the following. The mill would be managed consistent with the recommendations of the historic structure report to provide a historically accurate representation of a typical mill complex in the region. This would expand on the already completed rehabilitation of the Peirce Barn, which serves as a visitor contact point with exhibits on the history of the Peirce estate and milling in the Rock Creek valley.

The park administrative offices would be moved out of the Peirce-Klinge Mansion at the Linnaean Hill building complex and adaptive use of the buildings would be provided.

The landscapes of the Peirce Mill complex and the Linnaean Hill complex would be rehabilitated to retain their historic characters while allowing continued park use.

Other cultural features, including but not limited to Fort DeRussy, the Godey Lime Kiln, and the Miller cabin, would be maintained according to accepted NPS practices. Interpretive enhancements would be guided by future interpretive plans.

### **Valley Floor Controlled Automobile Access Zone**

The Valley Floor Controlled Automobile Access Zone (134 acres, 5 percent of the park) would continue to be managed to preserve the valley's characteristic mix of forest, grassy openings, and floodplain terraces interspersed with rustic facilities. Types of actions that could be taken within this zone include the following.

**Beach Drive.** In the northern portions of the park, sections of Beach Drive from West Beach Drive to Wise Road and from picnic grove 10 to Joyce Road would remain open to automobile traffic at all times. They would be managed to provide access to the recreational opportunities of the park and would accommodate cross-park traffic.

Except during weekend and mid-weekday closure periods, the tradition of automobile travel along the length of Beach Drive would be maintained. Whenever Beach Drive was open to motorized vehicles, it would be managed for improved control of through-traffic volumes and speeds. The National Park Service would work with surrounding jurisdictions to reduce the volume of nonrecreational traffic through the park and to help mitigate traffic impacts on adjoining neighborhoods.

Alternative D would incorporate the same types of traffic management actions that were described for Alternative A. These could include

- improved speed limit enforcement on Beach Drive

- traffic-calming measures, such as speed tables, and intersection modifications such as all-way stops, traffic circles, reduced turning radii, and raised intersections, to slow vehicle speeds

Adjustments over time may be required to determine the best methods of controlling nonrecreational traffic volume and vehicle speeds. To support modeling and environmental assessment in the "Environmental Consequences" section, the following conditions were used as a reasonable scenario to characterize management of traffic on Beach Drive south of Broad Branch Road under Alternative D.

- Traffic-calming measures and improved enforcement would hold traffic speeds to the posted speed limit (25 miles per hour).

- Two-way traffic would be maintained.

**Paved Recreational Trail.** An estimated 5.3 miles of trail within the Valley Floor Controlled Automobile Access Zone would be rehabilitated for visitor safety. This could include improving and realigning some sections of the existing recreational trail paralleling Beach Drive south of Broad Branch Road.

**Reduction of Roadkill.** Within this zone, the National Park Service would improve monitoring of the frequencies and locations of animals killed or injured by collisions with vehicles. The map-

ping of roadkill sites would indicate locations where methods to reduce road mortality would be most effective. Techniques that could be implemented to reduce roadkill under Alternative D, either singly or in combination, may include public education about vehicle hazards to wildlife; warning signs, road striping, and speed humps and speed tables to reduce speeds and enhance driver alertness; and strategically placed underpasses (culverts) for small animals such as reptiles and amphibians.

**Improved Orientation Information.** Actions to provide improved visitor orientation would be similar to those described for Alternative A. Additional signage of a scale and height appropriate to pedestrians and bicyclists may be provided along Beach Drive, similar to Alternative C.

### **Valley Floor Mid-Weekday Recreation Zone**

The Valley Floor Mid-Weekday Recreation Zone would be applied to 2 percent of the park (50 acres). On weekdays, the portions of Beach Drive within this zone would be closed to motorized vehicles from 9:30 A.M. to 3:30 P.M. During this period, lands within this zone would be managed as a corridor providing nonmotorized recreation, such as walking, bicycling, in-line skating, and quiet contemplation. At all other times, its management would be identical to that of the Valley Floor Controlled Automobile Access Zone.

Picnic groves 6 through 10 would be between the northern and middle closed segments of Beach Drive. (Locations of these picnic groves are shown on the Existing Conditions map.) These picnic groves would continue to be accessible during the mid-day closure period by visitors entering the park via Military Road, Bingham Drive, or Sherrill Drive.

Developed park facilities within this zone include picnic groves 3 and 4, which are close to the Boulder Bridge. Visitors would continue to be allowed to drive automobiles slowly to these picnic groves, just as driving to these sites on weekends and holidays when the road is closed currently is allowed. As described in Alternative C, visitors also would be allowed to drive slowly to the roadside parking area near the Rapids Bridge, which provides access to a nearby horse trail that gives visitors with impaired mobility the opportunity to enjoy an unpaved trail experience.

### **Rock Creek and Potomac Parkway Zone**

Rock Creek and Potomac Parkway Zone, which covers 161 acres (5 percent of the park) would continue to be managed for a landscape mix of fields and forest. This would provide both a pleasant aesthetic experience, and visual and sound buffers.

The recreational trail paralleling the parkway would be improved and realigned in segments. The goal would be to provide a safe pathway separated from the roadway. An estimated 2 miles of trails would be upgraded within the Rock Creek and Potomac Parkway Zone.

Rush-hour lane reversals (one-way traffic) would continue on the parkway.

The intersection of the parkway with Beach Drive near Connecticut Avenue would be improved to increase safety for pedestrians, cyclists, and motorists. The intersection redesign would not increase traffic capacity or encourage increased speeds through the intersection. Improvements may require reconfiguration of existing roads, potentially including closure of Cathedral Avenue access.

Speed limit enforcement on the parkway would be strengthened as described above for the Valley Floor Controlled Automobile Access Zone. Actions to reduce wildlife roadkill also would be the same as those described for the Valley Floor Controlled Automobile Access Zone.

### **Park Road Zone**

Other park roads (74 acres, 2 percent of the park) would continue to be managed to provide vehicular routes into and through the park. However, park roads would not be widened to increase capacity for nonrecreational traffic. The management emphasis would be on improving linkages between the park and the surrounding neighborhoods, and ensuring that park road management would provide for cross-park traffic.

Improvements could include rehabilitating or constructing recreational trails adjacent to roads to minimize pedestrian and vehicular conflicts and incorporating better directional and information signs for visitor orientation. About 0.5 miles of trail along Bingham Drive would be upgraded within the Park Road Zone. Approximately 0.75 miles of trail would be added along Piney Branch Parkway to enhance access to Rock Creek Park by foot and bicycle. Up to a mile of new trail also may be provided. A feasibility study would be conducted to determine the optimal locations for new pedestrian trails.

Bingham Drive and Sherrill Drive would continue to be closed on weekends and holidays for nonmotorized recreation. However, they would remain open throughout weekdays and would not be subject to the mid-weekday closures that would characterize roads in the Valley Floor Mid-Weekday Recreation Zone.

Following snow storms, several roads in this zone could be closed to provide winter recreational opportunities such as sledding and skiing. These could include, but may not be limited to, Glover Road, Ross Drive, Bingham Drive, Sherrill Drive, and Morrow Drive.

Speed limit enforcement on park roads would be strengthened as described above for the Valley Floor Controlled Automobile Access Zone. Actions to reduce wildlife roadkill and improve visitor orientation also would be the same as those described for the Valley Floor Controlled Automobile Access Zone.

### **Visitor Facility Zone**

Alternative D would improve park interpretive, educational, and information services. Under this alternative, the Visitor Facility Zone would occupy about 1 acre (less than 0.1 percent of the park). Potential actions that could be implemented to improve visitor services would be identical to those described for Alternative A and could include

- converting the Lodge House to a visitor contact station

- upgrading the Rock Creek Nature Center and Planetarium

### **Urban Recreation Zone**

Most facilities and activities in the Urban Recreation Zone (200 acres, 7 percent of the park) would be retained at their current levels. These include the community gardens off Oregon Ave-

nue and at Melvin Hazen Park, the Rock Creek Horse Center and equitation field, the Rock Creek Golf Course, the clay tennis courts near Peirce Mill, and the reserve picnic areas. The Brightwood Recreation Area and Rock Creek Tennis Stadium, which are outside the area covered by this general management plan, would continue to be managed as specified in the *Final Environmental Impact Statement, Tennis Stadium, Rock Creek Park, Washington, D.C.* (NPS 1995). The Carter Barron Amphitheater would be repaired and rehabilitated.

### **Administration/Operations Zone**

Alternative D would address the problems associated with park administrative facilities in a manner similar to that described in Alternative A. This could include

- relocating the park's administrative offices to commercial space outside the park, or to a new facility located at, for evaluation purposes, the park maintenance area

- relocating the District 3 U.S. Park Police substation to commercial space outside the park, or to a new facility located at, for evaluation purposes, the H-3 site

- improving the use of the park maintenance area

- implementing best management practices at Edgewater to reduce the potential for bacteria-laden wastes from manure to enter the surface water system

The area within the Administration/Operations Zone would occupy approximately 5 acres (0.1 percent of the park). The measures that were described in Alternative A to protect and enhance the park's natural and cultural resources also would be applied in Alternative D.

### **Urban Transit Zone**

Existing rights-of-way in the park for non-NPS roads would be classified under the Urban Transit Zone (8 acres, 0.2 percent of the park). The National Park Service would continue to work with the District government to provide linkages to the surrounding city and to protect the historic character of road structures and scenic views in this zone. Actions in this zone might also include the improved visitor orientation measures described for the Valley Floor Controlled Automobile Access Zone.

### **Summary of Trail Improvements**

Alternative D would include the same trail improvements, including preparation of a trail plan with accompanying National Environmental Policy Act documentation, that were described for Alternative A.

### **COSTS**

Cost estimates for implementing Alternative D, including both one-time capital costs and annual costs for operations and maintenance, are presented in table 5. Capital costs would total approximately \$14.9 million.



## ALTERNATIVES

About 63 percent of the capital costs (\$9.4 million) would be used to rehabilitate and improve the Rock Creek Nature Center and Planetarium, convert the Lodge House to a visitor contact station, and restore the historic Peirce Mill area.

Approximately \$2.1 million of the capital costs (14 percent) would be required to bring existing park features up to existing NPS policy and regulatory requirements.

Another \$2.3 million in capital costs (16 percent) would fund proposed trail improvements.

About \$1.1 million (7 percent) would pay for safety improvements at the intersection of the parkway and Beach Drive, and for traffic-calming devices on Beach Drive.

An estimated \$60,000 would be required to install gates at six locations on Beach Drive to implement the mid-day road closures.

Annual costs would be almost \$8.3 million, about \$913,000 more than the annual costs for Alternative B.

The largest part of the new costs (46 percent) would be used to lease commercial space outside the park for the new District 3 substation.

Approximately 34 percent of the increased operations costs would fund eight new full-time-equivalent staff positions, including two staff positions for speed and other traffic enforcement, and six positions to improve visitor contact, education, and interpretation, primarily at the Lodge House, Peirce Mill complex, and Rock Creek Nature Center and Planetarium.

Sixteen percent would be used to lease administrative space for park headquarters outside the park.

Mid-day closures of the three segments of Beach Drive would cost about \$33,000 (4 percent of the cost difference from Alternative B) annually to implement.

## **SUMMARY OF ALTERNATIVES**

All of the action alternatives meet the overall objective of the National Park Service of preserving unimpaired the natural and cultural resources and values of Rock Creek Park and the Rock Creek and Potomac Parkway for future generations. In addition, all three action alternatives satisfy all of the purposes of the general management plan that were defined at the beginning of this document. The alternative of continue current management/no action does not fulfill any of these goals.

Table 4 summarized the area within each management prescription under each alternative. As shown in the table, five of the zones would be the same size in all of the alternatives. These include the Forest Zone, Rock Creek and Potomac Parkway Zone, Park Road Zone, Urban Recreation Zone, and Urban Transit Zone.

Table 6 summarizes the key differences among the alternatives. In all areas, Alternative B, the no action alternative, would continue current management practices. Differences of the other three alternatives with current management practices are highlighted below.

Alternative A would continue weekday automobile travel throughout the park, but would implement measures to reduce vehicle speeds and traffic volumes, which would enhance nonmotorized recreation activities.

Alternative C would permanently close selected segments of Beach Drive north of Broad Branch Road to automobiles and would promote nonmotorized recreation in this area. Other park roads would be managed to encourage slower speeds and reduce the number of nonrecreational vehicles.

On the Rock Creek and Potomac Parkway, Alternative C would end lane reversals and allow two-way traffic at all times. This alternative would implement high-occupancy vehicle restrictions during rush hours in the primary travel direction of the traffic.

During the middle part of each weekday, Alternative D would close portions of Beach Drive north of Broad Branch Road to motorized vehicles. It would continue automobile travel throughout the park at all other times on weekdays. Traffic-calming measures would reduce speeds and volumes.

Recreation trails would be upgraded under Alternatives A, C, and D.

Alternatives A, C, and D would increase the use of park historic resources for interpretive and educational purposes. This would include using Peirce Mill to provide a historically accurate representation of a typical mill complex in the region. These alternatives also would move the park administrative offices out of the Peirce-Klinge Mansion at the Linnaean Hill building complex and provide adaptive use of the buildings.

Alternatives A, C, and D would improve park introduction and information services by such measures as converting the Lodge House to a visitor contact station and upgrading the Rock Creek Nature Center and Planetarium. Improved signage at park entrances and popular use areas would enhance visitor orientation.

## ALTERNATIVES

Alternatives A, C, and D would address the problems of insufficient space within historic buildings for park administration offices and the District 3 U.S. Park Police substation by moving these functions to other locations. For both functions, the preferred approach would be to use commercial space outside the park. If commercial space could not be secured, these functions would be relocated to sites within the park, such as the maintenance yard and/or H-3 area, only after completing a siting study. These alternatives also would improve the use of the park maintenance area. All of these actions would be designed and implemented to protect wildlife habitat.

Table 7 summarizes the impacts of the alternatives. Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.

**TABLE 6: SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES**

<b>Park Feature</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Traffic Management				
Beach Drive	<p>Include in the Valley Floor Controlled Automobile Access Zone.</p> <p>Continue weekend closures of sections of this road.</p> <p>Allow automobile travel along the length of Beach Drive on weekdays, but at reduced speeds.</p>	<p>Include in the Valley Floor Automobile Access Zone.</p> <p>Continue weekend closures of sections of this road.</p> <p>Allow automobile travel along the length of Beach Drive on weekdays using current management techniques.</p>	<p>Include northern portions in the Valley Floor Nonmotorized Recreation Zone. Permanently close this zone to motorized vehicles and manage for nonmotorized recreation.</p> <p>Include the remainder in the Valley Floor Controlled Automobile Access Zone. Allow automobile travel, but encourage slower speeds and fewer nonrecreational vehicles.</p>	<p>Include northern portions in the Valley Floor Mid-Weekday Recreation Zone.</p> <p>Between rush hours on weekdays, close this zone to motorized vehicles and manage for nonmotorized recreation.</p> <p>Except during mid-weekday closures, allow automobile travel along the length of Beach Drive on weekdays, but encourage slower speeds.</p> <p>Continue weekend closures of sections of this road.</p>
Rock Creek and Potomac Parkway	<p>Continue rush-hour lane reversals.</p> <p>Upgrade the recreational trail.</p> <p>Improve the intersection of the parkway with Beach Drive near Connecticut Avenue.</p>	<p>Continue current traffic management policies.</p> <p>Provide maintenance as needed.</p>	<p>End lane reversals and allow two-way traffic at all times.</p> <p>Implement HOV restrictions in the primary direction of travel during rush hours.</p> <p>Upgrade the recreational trail.</p> <p>Improve the intersection of the parkway with Beach Drive near Connecticut Avenue.</p>	<p>Same as Alternative A.</p>

**TABLE 6: SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES (Continued)**

<b>Park Feature</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Other park roads	Rehabilitate or construct recreational trails adjacent to roads.	Continue current management practices.	Same as Alternative A.	Same as Alternative A.
Recreational trails	Upgrade about 10 miles of trails and construct up to 1.75 miles of new trails.	Maintain trails and provide rehabilitation of deteriorated trail segments.	Same as Alternative A.	Same as Alternative A.
Interpretation and Education				
Peirce Mill complex	<p>Include in the Cultural Resource Zone.</p> <p>Rehabilitate the mill to focus on history of milling and land use in the Rock Creek area. Rehabilitate the landscape of the complex to retain the historic character.</p>	<p>Include in the Visitor Facility Zone.</p> <p>Rehabilitate the mill to focus on history of milling and land use in the Rock Creek area.</p>	Same as Alternative A.	Same as Alternative A.
Peirce-Klinge Mansion and the Linnaean Hill building complex	<p>Include in the Cultural Resource Zone.</p> <p>Rehabilitate the buildings for adaptive use compatible with park resource values.</p>	<p>Include in the Administration/Operations Zone.</p> <p>Continue to use for park administrative offices.</p>	Same as Alternative A.	Same as Alternative A.
Lodge House	<p>Move the U.S. Park Police District 3 substation out of the structure.</p> <p>Include in the Visitor Facility Zone.</p> <p>Convert to a visitor contact station to provide park orientation, information, and interpretation.</p>	<p>Include in the Administration/Operations Zone.</p> <p>Continue to use for U.S. Park Police District 3 substation.</p>	Same as Alternative A.	Same as Alternative A.

**TABLE 6: SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES (Continued)**

<b>Park Feature</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Rock Creek Nature Center and Planetarium	Rehabilitate the nature center and expand to improve effectiveness of public programs.  Upgrade the planetarium.	Maintain current configuration.	Same as Alternative A.	Same as Alternative A.
Administration and Operations				
Administrative offices	Move out of the Peirce-Klingling Mansion. Relocate preferably to commercial office space outside the park, or to new or remodeled space constructed in the park, such as at the maintenance yard.	Continue to use current space in the Peirce-Klingling Mansion.	Same as Alternative A.	Same as Alternative A.
U.S. Park Police District 3 substation	Move out of the Lodge House. Relocate preferably to commercial space outside the park or to new space constructed in the park, such as at the H-3 area.	Continue to use current space in the Lodge House.	Same as Alternative A.	Same as Alternative A.
H-3 area	Construct a new park police substation only if selected by a siting study conducted if suitable commercial space cannot be obtained outside the park.	Continue current uses.	Same as Alternative A.	Same as Alternative A.

**TABLE 6: SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES (Continued)**

<b>Park Feature</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Maintenance yard	Rehabilitate the area.  Construct new office facilities only if selected by a siting study conducted if suitable commercial space cannot be obtained outside the park.	Continue current uses.  Relocate some administrative staff to existing facilities at this site.	Same as Alternative A.	Same as Alternative A.
Approximate cost <sup>a/</sup>				
Capital cost (one time)	\$14,837,000	\$2,130,000	\$14,897,000	\$14,897,000
Annual operating cost	\$8,244,000	\$7,364,000	\$8,244,000	\$8,277,000

a/ Details regarding costs are provided in Table 5.

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Air quality	<p>Little effect on air quality because traffic patterns would not change from Alternative B and traffic would remain in the airshed.</p> <p>Carbon monoxide levels would be below National Ambient Air Quality Standard.</p> <p>The airshed’s ozone status would not be affected.</p> <p>Best management practices would ensure that effects from construction would be negligible.</p> <p>No impairment of air quality resources.</p>	<p>Carbon monoxide levels would increase compared to current conditions because of traffic increases. However, carbon monoxide levels would remain well below the National Ambient Air Quality Standard.</p> <p>No impairment of air quality resources.</p>	<p>Effects would be the same as Alternative A. Although Alternative C would reroute traffic that would use Beach Drive under Alternative A or B, no traffic would be diverted to outside the airshed.</p>	<p>Effects would be the same as Alternative A. Although Alternative D would reroute traffic that would use Beach Drive during the mid-day period under Alternative A or B, no traffic would be diverted to outside the airshed.</p>



**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Rock Creek and its tributaries	<p>Application of best management practices to park areas known to be contributing pollutants would produce beneficial, long-term, measurable effects on water quality.</p> <p>Construction at several sites would produce negligible, adverse, short-term effects on water quality and hydrology.</p> <p>Better education of the public could help reduce upstream pollutant loadings and storm water flows.</p> <p>Replacement of poorly designed trail segments with erosion problems would have a measurable, long-term, beneficial effect on water quality.</p>	<p>The application of best management practices to park areas known to be contributing pollutants would produce beneficial, long-term, measurable effects on water quality.</p> <p>Continued interagency measures to maintain and improve sanitary and combined sewer systems would produce beneficial, long-term, major effects on water quality. Coordination could also produce beneficial, long-term, major reductions in streambed alterations such as scour and sedimentation.</p>	<p>Diversion of traffic to roads outside the park would redistribute vehicle-related pollutants that wash into Rock Creek during storms but the change in pollutant loading in the watershed would be negligible.</p> <p>Other effects would be the same as Alternative A.</p>	<p>Diversion of traffic to roads outside the park during mid-day periods would redistribute vehicle-related pollutants that wash into Rock Creek during storms but the change in pollutant loading in the watershed would be negligible.</p> <p>Other effects would be the same as Alternative A.</p>

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

Impact Topic	Alternative A: Improved Management of Established Park Uses	Alternative B: Continue Current Management/No Action	Alternative C: Nonmotorized Recreation Emphasis	Alternative D: Mid-Weekday Recreation Enhancement
Rock Creek and its tributaries (continued)	<p>Improved park-wide management of soils, vegetation, and water under an updated natural resources management plan would have a measurable, long-term, beneficial effect on water quality and hydrology.</p> <p>Continued interagency measures to maintain and improve sanitary and combined sewer systems would produce beneficial, long-term, major effects on water quality. Coordination could also produce beneficial, long-term, major reductions in streambed alterations such as scour and sedimentation.</p> <p>No impairment of water quality or hydrology resources.</p>	<p>No impairment of water quality or hydrology resources.</p>		
Wetlands and floodplains	<p>No temporary or permanent adverse effects would occur on wetlands. Better education of the public on the need to control upstream storm water runoff could benefit wetlands.</p> <p>Minor, temporary, adverse effects on floodplains would result from rehabilitation at the Peirce Mill complex and construction of improvements on some trails along Rock Creek. Effects would be controlled using best management practices.</p> <p>No impairment of wetland or floodplain resources.</p>	<p>No effects would occur. Wetlands and floodplains would continue to be protected in conformance with Executive Orders 11990 and 11988, respectively.</p> <p>No impairment of wetland or floodplain resources.</p>	<p>Effects would be the same as Alternative A.</p>	<p>Effects would be the same as Alternative A.</p>

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
(Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Deciduous forests	<p>Current management practices would continue to protect the deciduous forest.</p> <p>Conversion of about a half acre of forested land to new paved trail area would be a long-term, minor, adverse effect on the deciduous forest.</p> <p>Disturbance of up to 5.8 acres of forest for a trail construction zone would be a minor, short-term, adverse effect.</p> <p>Rerouting trails currently on steep slopes, erosion-prone areas, riparian zones, or rare biotic communities would be a major, long-term, beneficial effect.</p> <p>No impairment of deciduous forest resources.</p>	<p>Current management practices would continue to protect deciduous forests.</p> <p>Erosion problems along heavily used or improperly designed trails would continue and probably worsen.</p> <p>No impairment of deciduous forest resources.</p>	Effects would be the same as Alternative A.	Effects would be the same as Alternative A.
Protected and rare species	<p>Long-term protection of endangered amphipods could be enhanced by implementing more active protection.</p> <p>Improved education and interpretation may increase the public’s appreciation for these species and lead to better protection outside the park.</p> <p>No impairment of protected or rare species.</p>	<p>The National Park Service would continue to protect rare species and their supporting habitats.</p> <p>No impairment of protected or rare species.</p>	Effects would be the same as Alternative A.	Effects would be the same as Alternative A.

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Other native wildlife	<p>Current management practices would continue to protect native wildlife.</p> <p>Minor, short-term, adverse effects from trail improvements and realignments would be controlled using best management practices.</p> <p>Reduced traffic speeds and volumes would reduce wildlife roadkill, a beneficial effect. For most species, the effect would be negligible. Effects on the box turtle would be moderate. Effects on the gray fox would be major.</p> <p>Better education of the public on the adverse effects of moving box turtles or removing them from the park would provide a moderate, long-term, beneficial effect on box turtles.</p> <p>No impairment of native wildlife resources.</p>	<p>Current management practices would continue to protect native wildlife in the park.</p> <p>No impairment of native wildlife resources.</p>	<p>Closure of portions of Beach Drive to motorized traffic would further reduce the number of terrestrial wildlife roadkills compared to Alternative B. For most species, the effect would be negligible. Effects on the box turtle would be moderate. Effects on the gray fox would be major.</p> <p>Other effects would be the same as Alternative A.</p>	<p>Closure of portions of Beach Drive to motorized traffic during mid-weekdays would reduce the number of terrestrial wildlife roadkills, especially for species that are active during the day. For most species, the effect would be negligible. Effects on the box turtle would be moderate. Effects on the gray fox would be major.</p> <p>Other effects would be the same as Alternative A.</p>

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Archeological resources	<p>No significant adverse effect would occur because the National Park Service would relocate any facilities that would disturb sites that potentially were eligible for listing in the National Register of Historic Places.</p> <p>Increased monitoring and improved visitor education would reduce the potential for non-construction-related significant adverse effects.</p> <p>The disturbance of sites could result in some irretrievable and irreversible loss of archeological resources.</p> <p>No impairment of archeological resources.</p>	<p>Current incremental degradation of sites and features would continue.</p> <p>No impairment of archeological resources.</p>	Effects would be the same as Alternative A.	Effects would be the same as Alternative A.
Historic structures and cultural landscapes	<p>A significant beneficial impact would occur to the Peirce-Klingel Mansion and Lodge House, which would be rehabilitated to preserve their architecturally significant features and would be used in accordance with park resource values.</p> <p>A significant beneficial impact would occur to historic trails where improvements or rehabilitation would enhance their integrity and preservation.</p>	<p>Historic structures and cultural landscapes would be protected, preserved, and interpreted in a manner consistent with NPS policies.</p> <p>No impairment of historic structures and cultural landscapes.</p>	Effects would be the same as Alternative A.	Effects would be the same as Alternative A.

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

Impact Topic	Alternative A: Improved Management of Established Park Uses	Alternative B: Continue Current Management/No Action	Alternative C: Nonmotorized Recreation Emphasis	Alternative D: Mid-Weekday Recreation Enhancement
Historic structures and cultural landscapes (continued)	<p>Rehabilitation of the significant cultural landscape features and attributes of the Linnaean Hill and Peirce Mill areas would enhance park preservation and visitor understanding of park’s historic settings.</p> <p>The disturbance of sites during new construction could result in some irretrievable and irreversible loss of resources.</p> <p>No impairment of historic structures and cultural landscapes.</p>			
Traditional park character and visitor experience	<p>The traditional character and appearance of the park would not change.</p> <p>Reduced noise because of reduced traffic speeds and volumes would have negligible to minor, long-term, beneficial impacts.</p> <p>Improvements to trails would have a moderate, long-term, beneficial impact.</p> <p>Rehabilitation of historic buildings and landscapes would a moderate, long-term, beneficial impact.</p> <p>Improved education and interpretation facilities and staffing levels would enhance opportunities to learn about and experience the park’s natural and cultural resources, a moderate, long-term, beneficial impact.</p>	<p>The traditional character and appearance of the park would not change.</p> <p>Park visitors would be adversely affected by escalating nonrecreational traffic in the park and on the parkway.</p> <p>Eroding trail segments could lead to unsightly and potentially unsafe conditions.</p> <p>Education and interpretation would continue to be limited by inaccurate, worn, and dated facilities and exhibits and insufficient staff levels.</p>	<p>The elimination of the visitor experience of automobile travel along the length of the park, including the gorge area, would be a major adverse impact.</p> <p>A moderate, long-term, beneficial effect would result from the improved ability for park visitors to participate in nonmotorized recreation along Beach Drive throughout the week.</p> <p>Reduced noise on the closed segments of Beach Drive would have minor to moderate, long-term, beneficial impacts.</p>	<p>The traditional character and appearance of the park would not change.</p> <p>The mid-day closures of Beach Drive segments would have a minor, adverse effect on automobile travel along the length of the park.</p> <p>A moderate, long-term, beneficial effect would result from the improved ability for park visitors to participate in nonmotorized recreation along Beach Drive during workday mid-day periods.</p>

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
(Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Traditional park character and visitor experience (continued)	<p>Improved working conditions would result in a moderate, long-term, beneficial effect on park operations, but the intensity of the beneficial impact perceived by the public probably would be minor.</p> <p>Moderate, long-term, beneficial effect on recreational opportunities would occur because of slower traffic and improved education and interpretation opportunities.</p> <p>Improved access to many facilities throughout the park to individuals with impaired mobility would be a moderate, long-term, beneficial impact.</p>	<p>Inadequate administration and operations facilities could have a deleterious effect on visitors experience and safety.</p> <p>A large number of visitors would continue to participate in a wide spectrum of recreation opportunities, but recreation quality and opportunities for interpretation and education would continue to decline.</p> <p>Individuals with impaired mobility would continue to encounter access impediments in park buildings and on trails.</p>	<p>Effects from trail improvements, rehabilitation of historic buildings and landscapes, improved education and interpretation facilities and staffing, and improved working conditions would be the same as Alternative A.</p> <p>While the quality of recreation experiences would improve, there would be decreases in park use and the spectrum of opportunities.</p> <p>Improved access for people with impaired mobility would be a moderate, long-term, beneficial impact. Changes in access on the closed segments of Beach Drive would have moderate impacts but each person’s perception would determine if they were beneficial or adverse.</p>	<p>Reduced noise on the closed segments of Beach Drive would have minor to moderate, long-term, beneficial impacts during the mid-day.</p> <p>Effects from trail improvements, rehabilitation of historic buildings and landscapes, improved education and interpretation facilities and staffing, and improved working conditions would be the same as Alternative A.</p> <p>Daily installation and removal of traffic barriers would have a negligible to minor adverse effect on park operations.</p> <p>Moderate, long-term, beneficial effect on recreational opportunities would occur because of improved quality, the greatest spectrum, and improved education and interpretation opportunities.</p> <p>Effects on people with impaired mobility would be like Alternative C.</p>

**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

Impact Topic	Alternative A: Improved Management of Established Park Uses	Alternative B: Continue Current Management/No Action	Alternative C: Nonmotorized Recreation Emphasis	Alternative D: Mid-Weekday Recreation Enhancement
Public health and safety	Long-term, major, beneficial effects on public health and safety would occur, primarily because of the effectiveness of traffic-calming measures in reducing the number and severity of traffic accidents. Effects on crimes against persons and the effectiveness of emergency evacuations would be negligible.	Public health and safety would decline over time. Already high traffic volumes that would continue to increase throughout the park and on the parkway would represent the greatest threats to public health and safety.	Permanent closures of three segments of Beach Drive would have a long-term, negligible to minor, beneficial effect on safety. Other effects of this alternative would be the same as Alternative A.	Mid-day closures of three segments of Beach Drive would have a long-term, negligible to minor, beneficial effect on safety. Other effects of this alternative would be the same as Alternative A.
Regional and local transportation	<p>During rush-hour periods, effects on traffic speeds and volumes would be negligible compared to Alternative B.</p> <p>Outside the rush-hour periods, traffic-calming measures and reduced speed limits would slow the speed of traffic. They also would reduce traffic volumes because some drivers who were not planning other recreation in the park would voluntarily use Ross Drive or non-park routes. The effects on levels of service would be negligible compared to Alternative B. However, the reduced motorized traffic volumes and speeds would reduce conflicts between automobile use and nonmotorized travel in the Rock Creek valley.</p>	<p>Congestion would continue to increase with increased traffic in the park and throughout the area.</p> <p>Continued conflicts would occur between recreational and nonrecreational users of park roads.</p>	<p>Nonrecreational traffic would be eliminated or substantially reduced in the park. Nonmotorized travel would be enhanced.</p> <p>Levels of service would improve on most segments of the parkway.</p> <p>Traffic volumes in the neighborhoods to the north of the park could increase in the short term until drivers learned alternate patterns. There would not be any long-term changes in levels of service in these neighborhoods.</p>	<p>Outside of mid-weekday closure periods, transportation conditions would be like those of Alternative A.</p> <p>During mid-weekday closures, nonrecreational traffic would be eliminated or substantially reduced in the park. Nonmotorized travel would be enhanced.</p> <p>During weekday Beach Drive closures, effects on traffic volumes in nearby neighborhoods would be the same as those described for Alternative C.</p>



**TABLE 7: SUMMARY OF IMPACTS OF THE ALTERNATIVES (Continued)**  
 (Detailed information on the impacts evaluation is provided in the “Environmental Consequences” section.)

<b>Impact Topic</b>	<b>Alternative A: Improved Management of Established Park Uses</b>	<b>Alternative B: Continue Current Management/No Action</b>	<b>Alternative C: Nonmotorized Recreation Emphasis</b>	<b>Alternative D: Mid-Weekday Recreation Enhancement</b>
Regional and local transportation (continued)	Throughout the day, improvements to recreation trails would enhance nonmotorized transportation in the park. During non-rush-hour periods, reduced automobile traffic speeds and volumes may increase nonmotorized travel on Beach Drive, particularly bicycle travel.		Changes in levels of service on city streets outside the park would be mixed, with some improvements and some decreases. Changes would be negligible to considerable.	
Community character	<p>Negligible effects, relative to Alternative B, on community character and the quality of life of area residents or the economic health of businesses.</p> <p>Trail improvements and traffic control would improve nonmotorized recreation, benefiting citizens who use the park and park vicinity for these purposes.</p> <p>Environmental justice: No disproportionate routing of traffic to disadvantaged areas or ethnic neighborhoods would occur.</p>	Changes in community character from park management activities would be minor compared to changes from social and economic conditions outside the park.	<p>Eight segments would experience noticeably improved community characteristics associated with lower traffic levels during one or both of the peak hours on weekdays. Nine road segments would experience a noticeable to considerable decline.</p> <p>Moderate beneficial effects would occur on regional opportunities for nonmotorized recreation.</p> <p>Environmental justice: No disproportionate routing of traffic to disadvantaged areas or ethnic neighborhoods would occur.</p>	<p>Except during mid-day closures on weekdays, effects would be the same as Alternative B.</p> <p>During the middle portion of weekdays, moderate beneficial effects would occur on regional opportunities for nonmotorized recreation.</p> <p>Environmental justice: No disproportionate routing of traffic to disadvantaged areas or ethnic neighborhoods would occur.</p>

Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

## **AFFECTED ENVIRONMENT**

*This section describes the physical resources of Rock Creek Park and the Rock Creek and Potomac Parkway, including both natural and cultural resources. It also describes visitor and community conditions, such as visitor profile, visitation trends, automobile traffic and other transportation within and near the park, and the characteristics of the communities around the park and parkway.*

### **NATURAL RESOURCES**

#### **AIR QUALITY**

##### **Regional Compliance with Air Quality Standards**

Air quality is included as an impact topic based on the criteria presented in the “Impact Topics - Resources and Values at Stake in the Planning Process” section. The specific concerns related to this impact topic are summarized as part of the “Environmental Consequences” discussion.

National Ambient Air Quality Standards (NAAQS) were established in the 1970 Clean Air Act amendments. The standards are concentrations of contaminants in the air that will protect public health and prevent degradation or harm to the environment.

To measure compliance with the National Ambient Air Quality Standards, the District of Columbia operates an ambient air monitoring network. The Air Quality Division of the District of Columbia, Department of Health is the responsible agency for monitoring and enforcing the applicable standards. A complete table of the National Ambient Air Quality Standards is available on the Internet site of the District of Columbia, Air Quality Division at <http://dchealth.dc.gov/index.asp>. The web site also contains monitoring data, and a printed ambient air monitoring data report can be obtained.

The Metropolitan Washington Council of Governments is a partner in the program and analyzes the air quality data. The Metropolitan Washington Council of Governments provides an area air quality index and notifies the public of the region’s air quality status. Up-to-date information on the index can be obtained by calling 202-962-3299. In addition, this organization has information available about its environmental programs and publications at <http://www.mwcog.org/>.

Most air pollutants in the District of Columbia region are from vehicle emissions. Since the Clean Air Act was amended in 1990, the metropolitan Washington area has made significant strides in improving air quality, mostly by reducing the volumes of contaminants in automobile emissions (District of Columbia 2004c).

The region currently meets five of the six National Ambient Air Quality Standards. The area remains out of compliance only with the standard for ground-level ozone (Metropolitan Washington Council of Governments 2004).

In 2003, the U.S. Environmental Protection Agency began phasing in a more stringent standard for measuring ground-level ozone. The new standard involves measurements collected over an 8-hour period, instead of the 1-hour period previously used. When the U.S. Environmental Protection Agency announced its guidance for the new standard, the region was found to be moderately out of compliance for ozone (Day 2004).

In early 2004, the Metropolitan Washington Air Quality Committee approved a regional State Implementation Plan for submission to the U.S. Environmental Protection Agency. The State Implementation Plan focuses on improving air quality in the Washington region to meet the National Ambient Air Quality Standard for ozone. The plan consists of

- two rate-of-progress demonstrations, for the periods 1999-2002 and 2002-2005
- an attainment demonstration for 2005

The State Implementation Plan shows that progress is being made on improving air quality in the Washington non-attainment area. There were no 1-hour exceedences for ozone during 2004 (Day 2004). Despite these improvements, the entire Washington, D.C. metropolitan area, including Rock Creek Park and the adjacent counties in Virginia and Maryland, is still classified as being in non-attainment with the ozone standard by the U.S. Environmental Protection Agency.

The park and parkway are within a class II air quality area. As described above, the air quality is generally good with the exception of ozone. Ozone cannot be measured as a tailpipe emission. Instead, it is a secondary pollutant that is formed in the atmosphere by the combination of volatile organic hydrocarbons and nitrogen oxides with sunlight as a catalyst. Ozone exceedences generally occur in the summer and are region-wide, rather than localized. The occurrence of high levels of ozone is almost always associated with hot stagnant air masses over the region in combination with strong sunlight. Carbon monoxide is a tailpipe emission, and local monitoring can indicate problem areas. The region became an attainment area for carbon monoxide in 1988 and data indicate that the long-term trend for carbon monoxide is downward (Day 2004). The reduction in carbon monoxide concentrations has been attributed to the use of oxygenated fuels and the gradual replacement of older, more polluting motor vehicles with newer, more fuel-efficient models. Washington, D.C. and the surrounding region now implement a maintenance plan to prevent violations of the carbon monoxide standard.

### **Carbon Monoxide Monitoring Results in 2001 and 2002**

The District of Columbia, Department of Health, Air Quality Division operates an ambient air monitoring network consisting of six permanent air monitoring stations. Two of these stations monitor for carbon monoxide. Air quality experts from the District of Columbia, Department of Health and U.S. Environmental Protection Agency have agreed that for regulatory purposes, the data from these two sites provide an adequate representation of carbon monoxide concentrations for the District. The carbon monoxide monitoring stations are located at the

Verizon Telephone building at 21st and K Street, N.W., which is 3.2 miles from the headquarters of Rock Creek Park at the Peirce-Klingbe Mansion

River Terrace Elementary School at 34th and Dix Streets, N.E., which is 6.1 miles from the headquarters of Rock Creek Park

Data from these monitoring sites are reported as 1-hour averages. As shown in table 8, the 1-hour standard for carbon monoxide is 35 parts per million. One-hour values are averaged over 8-hour periods to determine compliance with the 8-hour standard for carbon monoxide of 9 parts per million.

Data from throughout 2001 and 2002 indicated that carbon monoxide concentrations in the District of Columbia are well within the 1-hour and 8-hour standards for carbon monoxide. The combined data from both monitoring sites show only 20 1-hour readings over the 2-year period that exceeded 5 parts per million (compared to the standard of 35 parts per million). The highest concentration of carbon monoxide detected in the 2-year period was 7.6 parts per million. This sample was collected in the 9:00 A.M. hour on October 16, 2002 from the Verizon Telephone building site (District of Columbia 2004a and 2004b).

**TABLE 8: CARBON MONOXIDE NATIONAL AMBIENT AIR QUALITY STANDARDS AND VALUES FOR WASHINGTON, D.C., 2001 – 2002**

<b>Standard or Parameter</b>	<b>Value</b>
1-hour National Ambient Air Quality Standard for carbon monoxide	35 parts per million
8-hour National Ambient Air Quality Standard for carbon monoxide	9 parts per million
Total number of 1-hour readings from either monitoring station exceeding 5.0 parts per million over 2-year period	20
Maximum carbon monoxide level measured in 2001 and 2002	7.6 parts per million

### **Year 1996 Air Quality Evaluation for Rock Creek Park**

The National Park Service conducted a short-term air pollution monitoring study in the park and along the parkway from December 7 to 20, 1996 (Robert Peccia and Associates *et al.* 1997). The goal was to assess carbon monoxide concentrations at three locations during peak morning and afternoon rush hours. Winter sampling was performed, because winter is the worst season for high carbon monoxide emissions. This occurs because vehicles emit more carbon monoxide during cold weather, especially during the cold-startup period, and temperature inversions can trap carbon monoxide emissions close to the ground.

Monitoring sites were located at the intersection of 16th Street and Colorado Avenue near Military Road; at the intersection of the Rock Creek and Potomac Parkway and Calvert Street; and at the golf course, away from roads. The golf course location was chosen in an effort to establish background (unaffected by local traffic) levels.

Considerable variations were seen in the data as a result of wind direction, precipitation, and atmospheric mixing. On three occasions, wind direction caused the “background” golf course concentrations to be higher than the other, heavily traveled sites.

The study did not indicate that there were any “valley effects” that would tend to concentrate pollutants within the narrow valley bottom. Elevated concentrations of carbon monoxide were detected at all of the sampling locations and, in general, showed agreement with measurements taken during the same period at other local air monitoring stations around the Washington, D.C. metropolitan area. The sampling results suggested that some of the carbon monoxide detected in the park drifts in from the city.

The highest concentration of carbon monoxide was 3.38 parts per million, measured over a 3-hour period at the intersection of 16th Street and Colorado Avenue. This and all other measured concentrations from the park and parkway were well below both the 1-hour (35 parts per million) and 8-hour (9 parts per million) National Ambient Air Quality Standards for carbon monoxide. Based on these limited sampling results, the carbon monoxide levels in the park and along the parkway met the National Ambient Air Quality Standards for carbon monoxide.

## **ROCK CREEK AND ITS TRIBUTARIES**

Rock Creek and its tributaries are included as an impact topic based on the criteria presented in the “Impact Topics – Resources and Values at Stake in the Planning Process” section. The specific concerns related to this impact topic are summarized as part of the “Environmental Consequences” discussion.

### **Watershed Overview**

The Rock Creek Watershed map was included previously in the “Servicewide Mandates and Policies” section. Rock Creek flows generally south for 33 miles from its headwaters near Laytonsville, Maryland, to its confluence with the Potomac River at Georgetown. Land uses within the 77-square-mile Rock Creek watershed include urban, suburban, residential, agricultural, and parkland.

An estimated 500,000 people reside in the watershed. Approximately 70 percent of the watershed, mostly upstream from Rock Creek Park, is developed. Much of the developed area consists of impervious surfaces, such as buildings, roads, and driveways. Problems within the park that have been produced by upstream development include increased flooding from rapid runoff, abnormal stream bed scouring in some places and sedimentation in others, bank erosion, organic and chemical pollution, and accumulation of litter and other solid waste.

Rock Creek is the primary water feature in the park, and within the area it has two major tributaries.

Broad Branch enters from the northwest, just opposite the intersection of Blagden Avenue and Beach Drive.

Piney Branch enters Rock Creek from the northeast at Piney Branch Parkway, approximately a half mile south of Broad Branch.

Sixteen smaller tributaries enter the creek in Rock Creek Park, primarily from the west. Most Rock Creek tributaries to the east were canalized, covered, and converted into storm drains during the early development of Washington, D.C. (Banta 1993). There also are numerous minor tributaries and many groundwater springs that drain to Rock Creek within the park.

## Sewers and Outfalls

As shown in the Sewerlines and Outfalls map, numerous municipal storm sewers converge in the Rock Creek valley and discharge surface water from city streets and lots directly into park waters. The pollutants that surface waters transport from roadways and parking lots are a major source of contamination of Rock Creek and its tributaries during and after precipitation events.

The Sewerlines and Outfalls map also shows that numerous municipal sanitary sewers are located within the park, including pipelines that run under road beds and under the creek channel. Sanitary sewers carry raw sewage, and can pollute park waters when leaks develop. In upper Rock Creek, high bacterial concentrations are suspected to originate from sanitary sewer leaks, and from failed septic systems in the Maryland portion of the watershed.

A serious source of pollution exists in the southeastern portion of the park where there is an antiquated system of combined sanitary and storm sewers (see the Sewerlines and Outfalls map). Under normal conditions, the flow in these combined sewers is routed to the Blue Plains Wastewater Treatment Plant. However, during storms when rainfall exceeds 0.3 inches per hour, these sewers overflow and discharge untreated sewage directly into Piney Branch and Rock Creek. There are 29 combined sanitary/storm sewer overflow structures on Rock Creek (URS Greiner Woodward Clyde 1999). Together, they contribute 49 million gallons of combined storm water and sewage to the creek in an average year (District of Columbia 2003).

The District of Columbia Water and Sewer Authority estimated that 60 to 70 storm-related sewer overflow events occur each year (*Engineering News-Record* 2001). 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 2004e). 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 2002b and 2004e; Siddique 2004).

Also within the Rock Creek drainage, the Separate Luzon Valley project, which provides separation of combined sewers north of the park and city, was completed in 2002. Separation of combined sewer outfalls 031, 037, 053, and 058 was initiated in 2004. Monitoring at combined sewer outfalls 033, 036, 047, and 057 is ongoing (District of Columbia 2002b and 2004e; Siddique 2004).

## **Water Quality Standards**

For the purposes of water quality standards, the surface waters of the District of Columbia are classified based both on their current uses and the future uses to which the waters could be restored. Each designation category has applicable water quality standards that are the principal water quality management objectives for the park. The District works to support the designations and meet the applicable standards by granting permits and reviewing permit applications and environmental impact statements. The standards and classification of the District's waters are published in the District of Columbia Register, Title 21, Chapter 11.

The District of Columbia Water Resources Management Division has designated Rock Creek and its tributaries for restoration to meet all five beneficial use classes. The classes and the status of surface waters have been documented in District of Columbia 305(b) reports that are prepared every other year; the most recent was produced in 2002. For Rock Creek, the 2002 report (District of Columbia 2002a) indicates the following progress in achieving standards for each specified class.

Class A is for primary contact recreation. These standards are not being met in Rock Creek and its tributaries.

Class B is for secondary contact recreation and aesthetic enjoyment. These standards are generally not being met in Rock Creek and its tributaries except for one reach in the northern portion of the park in which the Class B designation is being partially supported.

Class C is for propagation of fish, shellfish, and wildlife. The water quality in Rock Creek and its tributaries partially supports the Class C designation.

Class D is for protection of human health related to consumption of fish and shellfish. The Class D standards are not being supported below the Peirce Mill dam. The creek above the dam was not assessed for support of the Class D standards, because the dam continues to be a barrier to the migration of fish. Installation of a bypass as part of the mitigation program for the Woodrow Wilson Bridge is planned to occur in 2005 (NPS, Cox 2004a).

Class E is for navigation. The Class E designation is supported in Rock Creek.

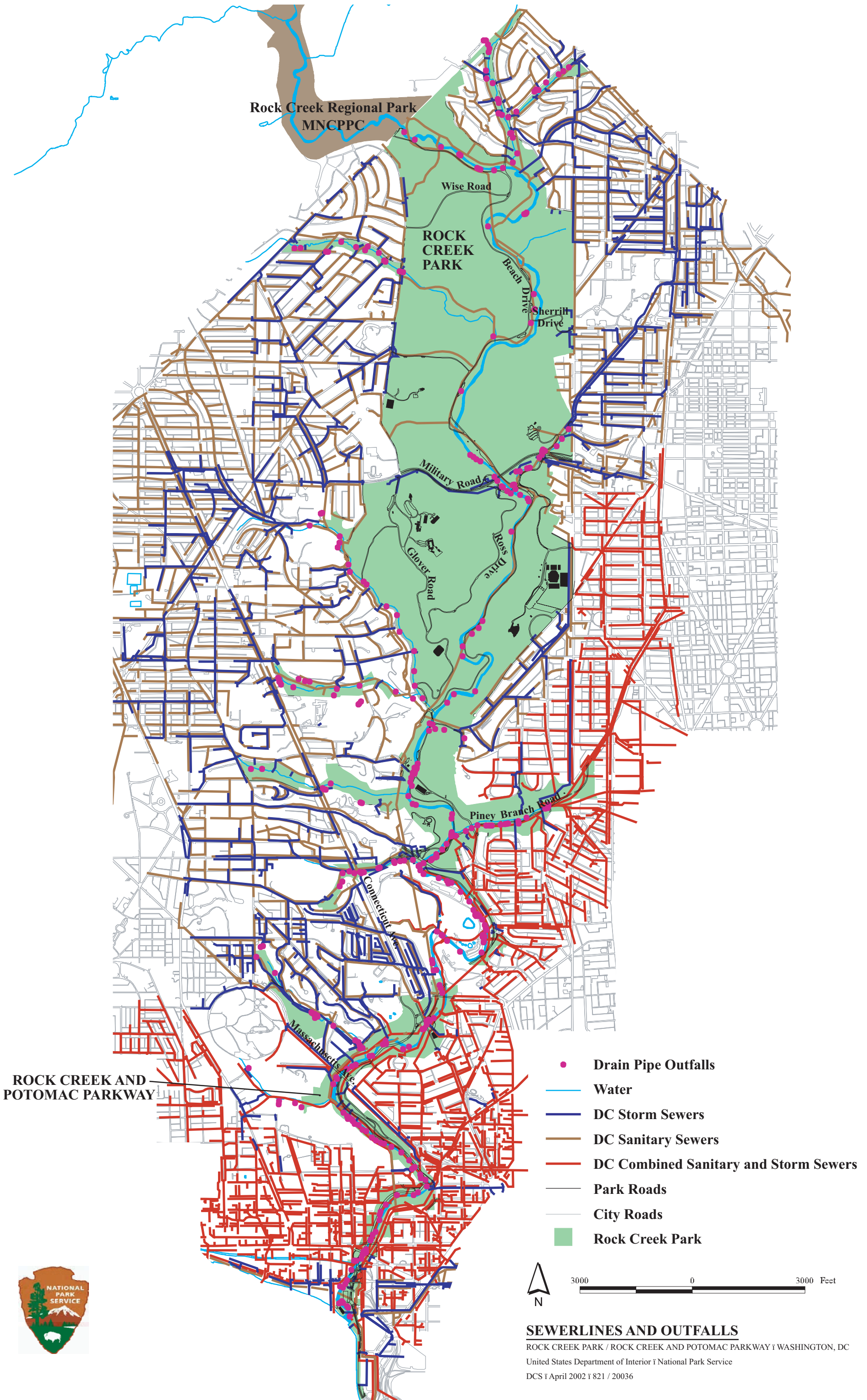
Rock Creek and its tributaries also have been designated "Special Waters of the District of Columbia" for their scenic and aesthetic importance. It is intended that the water quality of such designated waters be maintained and not allowed to degrade.

## **Rock Creek Water Quality**

Point and non-point sources of water pollutants in Rock Creek were identified by Anderson *et al.* (2002) and the District of Columbia Department of Health (District of Columbia 2002a). The types of contaminants entering Rock Creek surface waters include the following:

Sediment is transported from unvegetated soils, such as construction sites and agricultural fields.

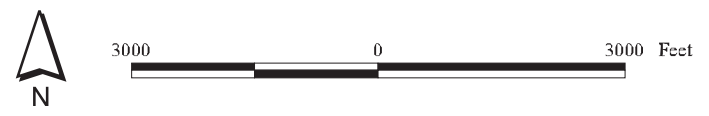




ROCK CREEK AND POTOMAC PARKWAY



- Drain Pipe Outfalls
- Water
- DC Storm Sewers
- DC Sanitary Sewers
- DC Combined Sanitary and Storm Sewers
- Park Roads
- City Roads
- Rock Creek Park



**SEWERLINES AND OUTFALLS**  
 ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY / WASHINGTON, DC  
 United States Department of Interior / National Park Service  
 DCS / April 2002 / 821 / 20036



Storm water runoff from transportation corridors and parking lots within the watershed carries sediments, oil and grease, and metals, such as cadmium, iron, lead, and zinc.

Runoff from lawns, stables, and leaking sewerlines are sources of nutrients, including nitrogen and phosphorus, and contributes to high coliform bacteria counts.

Pollution has adversely affected the ability of Rock Creek Park and its tributaries to support aquatic life. Banta (1993) determined that 58 percent of the tributaries of Rock Creek were classified as severely impaired for habitat quality and biological water quality using U.S. Environmental Protection Agency biological assessment standards, and that the remaining 42 percent of the creek's tributaries were moderately impaired. The 2002 District of Columbia 305(b) report (District of Columbia 2002a) indicated that the lower and upper reaches of Rock Creek continue to be partially supporting of its aquatic life.

The report entitled *Baseline Water Quality Data/Inventory and Analysis – Rock Creek Park* (NPS 1994) reported that criteria for nitrite, pH, dissolved oxygen, copper, zinc, total and fecal coliform bacteria, and turbidity were exceeded multiple times throughout the study area. The criteria included drinking water standards and U.S. Environmental Protection Agency freshwater acute toxicity standards. The report concluded that surface water quality in the park was typical of that encountered in streams in metropolitan areas.

A study entitled *Best Management Practices for Water Quality, Rock Creek Park* (URS Greiner Woodward Clyde 1999) identified several facilities as actual or potential sources of water pollution in Rock Creek Park. These include the maintenance yard, public stables, H-3 Park Police stables, Edgewater Park Police stables, golf course, roads, and parking lots. For each of these areas, the report provided best management practices to remediate or prevent pollution. The National Park Service has been implementing the recommended best management practices and will continue to do so, regardless of the alternative selected from this final general management plan.

Water quality assessment reports were prepared by the District of Columbia for the U.S. Environmental Protection Agency and U.S. Congress pursuant to Section 305(b) of the Clean Water Act (District of Columbia 1996a, 1998, 2000a, 2000b, and 2002a). The 1996 report documented violations of fecal coliform bacteria and pH standards. The 2002 edition indicated that dissolved oxygen and fecal coliform violations also were occurring. These indicate that nutrient enrichment and leakage from unidentified sewerlines and combined sewer outfall discharges are a continuing problem.

A report by the U.S. Geological Survey entitled *Water Quality, Sediment Quality, and Stream-Channel Classification of Rock Creek, Washington D.C., 1999-2000* documented the presence of pesticides in surface waters of Rock Creek. Bottom sediments contained a variety of contaminants, including heavy metals, polycyclic aromatic hydrocarbons (PAHs), pesticides, phthalates, and polychlorinated biphenyls (PCBs) (Anderson *et al.* 2002).

Water quality conditions in Rock Creek appear to have stabilized. A review of the District of Columbia 305(b) reports from 1998, 2000, and 2002 and the NPS' (1994) *Baseline Water Quality Data/Inventory and Analysis – Rock Creek Park* indicates that over the past decade the water quality in Rock Creek generally has exhibited little change. A contributing factor has been the efforts of government agencies in the District of Columbia and Maryland in controlling pollutant discharges and storm water runoff. This particularly includes requiring new development and

selected established sites to implement best management practices to control storm water runoff. In addition, there has been a decrease in upstream agriculture, and natural vegetation has been allowed to revegetate abandoned farmlands. This land use change reduces sediment, pesticides, and fertilizers entering the waterway.

Individuals, companies, and communities throughout the watershed continue to implement measures to control point and non-point source pollution in the Rock Creek drainage. For example, comments on the draft general management plan indicated concern about the potential for wastes to enter Rock Creek from a stable located adjacent to Rock Creek just north of the Maryland line. Follow-up found that the stables have implemented numerous actions to ensure that animal and other wastes are not entering Rock Creek. These include the installation of a manure management system with a bioretention facility to treat stable runoff.

Historically, the *Rock Creek Watershed Conservation Study* (CH2M Hill 1979) led to improvements to Rock Creek and its tributaries outside and within the park. Many of the actions developed in response to this report continue to be important contributors to improvements in the watershed's water quality.

Park resources management staff members monitor sanitary sewers and facilitate their repair to correct leaks.

The District of Columbia has been given assistance in tracing illegal pollutant discharges connected to storm drains.

Combined sanitary/storm sewer outlets have been identified for retrofitting to reduce discharges.

Dry-weather outfall surveys have led to the cleaning of blocked combined sanitary/storm sewers to halt continual overflowing.

The District of Columbia Water and Sewer Authority continues to monitor and investigate for illegal connections to storm sewers, retrofit combined sewer outlets to reduce discharges, and clean blocked combined sewer outfalls (Siddique 2004).

Because the majority of the Rock Creek watershed lies outside Rock Creek Park and the jurisdiction of the National Park Service, park personnel must work with other federal, local, state, district, and regional agencies and organizations to implement steps that would improve existing water quality in the park. The Chesapeake Bay Program is the most comprehensive interagency effort to improve water resource values in the region. A description of this program and the NPS' participation was described previously under the heading "Servicewide Mandates and Policies."

## **WETLANDS AND FLOODPLAINS**

Wetlands and floodplains are included as an impact topic based on the criteria presented in the "Impact Topics - Resources and Values at Stake in the Planning Process" section. The specific concerns related to this impact topic are summarized as part of the "Environmental Consequences" discussion.

The Clean Water Act and Executive Orders 11990 and 11988 identify wetlands and floodplains as national natural assets. They direct all federal agencies to avoid the occupation, adverse modification, or degradation of wetlands and floodplains.

### **Wetlands**

Four temporarily flooded, forested wetlands (National Wetland Inventory designation of palustrine forested 1 (PFO1)) are found along Rock Creek in the northern portion of the park (U.S. Fish and Wildlife Service 2004). Rock Creek is identified as an open water, tidally influenced riverine system (National Wetland Inventory designation of R1OWV) (U.S. Fish and Wildlife Service 1999).

An additional wetland inventory was performed in 1997 (District of Columbia 1997a). Its results differ from the National Wetland Inventory only by defining the northernmost forest wetland as being about twice the size of the wetland identified by the National Wetland Inventory.

The National Wetland Inventory-designated forested wetlands are located within the primary floodplain of Rock Creek where the creek is underlain by Codorus silt loam (Soil Conservation Service 1976). These wetlands are typically covered by sycamore-green ash forest. Other wetlands, not identified by the National Wetland Inventory, are in the narrow alluvial deposits of the Pinehurst Branch, Fenwick Branch, and Joyce Branch drainages.

Vernal pools, also not identified on the National Wetland Inventory, are widely scattered wetland features in the park. These are small, temporary puddles or ponds that appear during wet periods and are dry at other times. If they persist for 4 months or more, particularly in the spring, these limited habitats can be breeding places for frogs, toads, and salamanders. The number of vernal pools in the park today may be reduced from the pre-urbanization era because of past draining or filling activities, stream bed scouring from increased runoff that has resulted from development in the watershed upstream from the park, and lowered water tables from incising of the stream channel or urban groundwater use.

The U.S. Geological Survey Northeast Amphibian Research and Monitoring Initiative has been surveying vernal pools and streams in Rock Creek Park since 2001 as part of a northeast region amphibian monitoring program. In a park-wide inventory conducted in 2004, a total of eight vernal pools were located (Jung 2004). Wood frogs and spotted salamander egg masses were identified in the vernal pools surveyed.

Other important wetland-related features in the park include groundwater springs and seeps. These small, wet areas are fed by relatively dependable flows of pollutant-free water. Several of these wetlands support endemic, aquatic animal species such as amphipods and other macroscopic invertebrates. Researchers from the U.S. Geological Survey Northeast Amphibian Research and Monitoring Initiative identified 35 springs and seeps in the park (Jung 2004).

### **Floodplains**

Floodplains in the park were mapped as part of the *Rock Creek Watershed Conservation Study* (CH2M Hill 1979). Flood levels in the park have been substantially affected by urbanization and associated increases in impervious surfaces in the Rock Creek watershed. Stream flows in the

main stem of Rock Creek during storm events are estimated to be more than double the predevelopment discharge (CH2M Hill 1979).

Four major park buildings are in the 100-year floodplain. Peirce Mill and the Miller cabin are completely within the 100-year floodplain. Portions of the Lodge House and the Edgewater Stables building are on the fringe of the floodplain, but would not be subject to high velocities or deep water during flooding (CH2M 1979). Normally, the National Park Service would avoid the occupancy of floodplains within the park. However, except for the Edgewater Stables, these buildings are historic structures that contribute to the significance of the Rock Creek Historic District, and their location is integral to their significance. As a result, *Director's Order #77-2: Floodplain Management* does not apply to these sites (NPS 2003a).

Sections of Beach Drive and the Rock Creek and Potomac Parkway are within the 100-year floodplain, as are a number of picnic groves and associated parking areas, picnic shelters, and restrooms. Under Section V.B. of the NPS floodplain management procedures, historic structures, such as the roads, and facilities that require little physical development and do not involve overnight occupation, such as picnic facilities, daytime parking facilities, and trails, specifically are excepted from floodplain management procedures (NPS 2003b).

A network of storm sewer, sanitary sewer, and combined sanitary/storm sewer lines underlies the park (see the Sewerlines and Outfalls map). Some of these pipelines are within the 100-year floodplain. The storm sewers discharge into drainages that may lead to riparian wetlands, and the combined sanitary/storm sewers experience overflows that may discharge raw sewage into floodplains and wetlands whenever rainfall exceeds 0.3 inches per hour. As mentioned previously under "Rock Creek and its Tributaries," the District of Columbia Water and Sewer Authority submitted a plan for managing such overflow events and currently is awaiting approval from the U.S. Environmental Protection Agency (District of Columbia 2002b and 2004e).

## **DECIDUOUS FORESTS**

Deciduous forests are included as an impact topic based on the criteria presented in the "Impact Topics - Resources and Values at Stake in the Planning Process" section. The specific concerns related to this impact topic are summarized as part of the "Environmental Consequences" discussion.

The establishing legislation for the park identifies "timber" as an essential resource to the park. The National Park Service interprets this in an ecological context to mean not individual trees, but the interrelated plant and animal populations that form the forest community. The ecosystem processes provided by forests are a part of this essential resource. In addition, forest stands are an integral component of the scenic quality of the park cited in the establishing legislation. Therefore, regardless of the management alternative selected from this general management plan, the National Park Service will maintain the forests consistent with its charge in the 1916 Organic Act to preserve unimpaired the natural resources and values of the park for this and future generations.

Approximately 80 percent (1,662 acres) of the park land area is covered with second growth forest, much of which is more than 100 years old. Activities prior to the park's establishment in 1890, such as timber cutting, farming, and Civil War clearing, removed virtually all of the original forest. A few large oaks still living in the park are estimated to be more than 280 years

old and may be remnants of virgin growth. Today's forests are primarily a mixture of deciduous species typical of the eastern deciduous forest in the later stages of succession.

Rock Creek Park runs along the topographic break separating the Piedmont Plateau and the Atlantic Coastal Plain provinces. The vegetation reflects affinities to both of these provinces. The following five forest associations have been identified and mapped in Rock Creek Park using the National Vegetation Classification System developed by The Nature Conservancy (1998).

The beech-white oak/mayapple forest association occurs on moist to somewhat drier slopes. It is the most common of all associations found in the park. Two variants include the mixed oak/beechnut variant and the beech-tulip poplar variant.

The tulip poplar forest association is uncommon and occurs on moist, mid-slope to low-slope sites that were cleared in the past. The sites are dominated by tulip poplar.

The chestnut oak-black oak/huckleberry forest association is uncommon and occurs on ridge tops, convex upper slopes, and south-facing slopes on rocky, well-drained soils.

The sycamore-green ash forest association is uncommon and occurs along stream banks, floodplains, and other low-lying areas subject to temporary or irregular flooding.

The Virginia pine-oak forest association is rare because it is an early to mid-successional forest that is being replaced by hardwood forests. Remnants of this association occur on dry soils of hilltops in limited areas where forest succession has not yet replaced it.

Small natural areas such as the park and parkway have been shown to be very important contributors to regional biodiversity (Falkner and Stohlgren 1997). Rock Creek Park serves as a major reservoir of native flora for the region and is important in protecting the natural heritage of this area.

An inventory of park vegetation, conducted by park and volunteer staff between 1986 and 1994, documented 656 species of vascular plants in Rock Creek Park between the National Zoo and the Maryland boundary (NPS 1995a). Approximately 150 plant species that had been found in the park during a 1919 vegetation inventory were not found during the 1986 – 1994 inventory (NPS, Cox 2004a). Among the more notable species that appear to have disappeared from the park are the swamp shadbush (*Amelanchier canadensis*), shooting star (*Dodecatheon meadia*), dwarf chinkapin oak (*Quercus prinoides*), Allegheny chinkapin (*Castanea pumila*), and a wild rose species (*Rosa setigera*). The reasons for their absence in the second inventory are unknown.

The recent inventory of park vegetation also determined that 238 of the plant species were introduced species, not native to the area. Of this number, 42 species have been judged to be invasive exotic plants that, unless controlled, are likely to spread and adversely affect native plant populations. Control of these invasive exotic plants is a serious problem in the park. A program now underway is selectively applying approved herbicides to invasive species in a limited portion of the park. However, control efforts are not able to keep pace with the rate of invasive plant introduction and spread. Management of invasive species will be a continuous need in the park and operational plans will be updated as control strategies and funding evolve.

Soil properties are integral components of determining the species diversity, productivity, and regenerative potential of the deciduous forest system. Therefore, soil characteristics important to these processes are included in this impact topic characterization.

The park's soil resources are adversely affected by accelerated erosion, compaction, and deposition caused by human activities inside and outside the park boundaries. Some areas that receive heavy visitor use are subject to soil compaction, removal of vegetation cover, and erosion. This is particularly evident along streambanks, at picnic groves and other popular recreation areas, and along heavily used or improperly designed and maintained trails. Accelerated erosion caused by increased runoff from the upstream watershed is occurring along the Rock Creek channel in the northern portion of the park. Associated deposition of some of the eroded soils is occurring in the floodplains in the central and southern portions of the park and parkway. The National Park Service will implement measures to protect soils from erosion, compaction, and deposition caused by human activities and to restore areas of soils degradation, as required in *Management Policies 2001* (NPS 2000a).

Woodland fires in the park were described in the section entitled "Servicewide Mandates and Policies." An average of two fires occur in the park each year. All wildfires are suppressed promptly by the District of Columbia Fire Department or park firefighters.

## **PROTECTED AND RARE SPECIES**

Protected and rare species are included as an impact topic based on the criteria presented in the "Impact Topics - Resources and Values at Stake in the Planning Process" section. The specific concerns related to this impact topic are summarized as part of the "Environmental Consequences" discussion.

The National Park Service is required under the Endangered Species Act to ensure that federally listed species and their designated critical habitats are protected on lands within the agency's jurisdiction. Only one federally listed species, the endangered Hays spring amphipod (*Stygobromus hayi*), is known to inhabit the park.

Lists of the rare and protected species that are documented as occurring in Rock Creek Park are provided in appendix E. Complete lists of federally listed species and the species identified as protected or rare by the states of Maryland and Virginia can be found on the Internet. Internet addresses for the lists are presented in the "Bibliography" of this general management plan under the following citations:

U.S. Fish and Wildlife Service 2004

Maryland Department of Natural Resources 2003a and 2003b

Virginia Department of Conservation and Recreation, Division of Natural Heritage 2004

### **Federal- and State-Listed Amphipods**

The Hays spring amphipod was discovered in Rock Creek Park in 1998. Earlier, another rare species, Kenk's amphipod, also known as the Rock Creek groundwater amphipod, (*Stygobromus kenki*), was identified in park springs (NPS 1997a). Kenk's amphipod is not currently listed under



the Endangered Species Act, but it is under consideration by the U.S. Fish and Wildlife Service for future listing. In addition, three other *Stygobromus* species of amphipods that are listed by the state of Maryland as rare or uncommon have been located in or near the park (Maryland Department of Natural Resources 2003b).

Groundwater amphipods are sensitive to environmental pollution, making the present concentration of these species an extremely rare occurrence in the Piedmont region. The relative abundance of rare amphipods in the park has been attributed to the long-term protection of groundwater quality afforded by the park.

The Hays spring amphipod ranges from one-half to one inch long. It is colorless, eyeless, and has adaptive hairs for sensing currents and food. They have life spans of 8 years or more and a low reproductive rate. *Stygobromus* amphipods spend the majority of their lives in groundwater below the surface, feeding on detritus. Amphipods are subject to a number of predators when they are at surface springs, such as stonefly larvae and salamanders, but probably have few if any predators below the surface.

Researchers from the U.S. Geological Survey Northeast Amphibian Research and Monitoring Initiative identified 35 springs and seeps in the park (Jung 2004). All of these potentially provide habitat for groundwater amphipods.

Threats to groundwater amphipods include alterations of groundwater flows, groundwater pollution, loss of detritus as a food source, and disturbance of spring sites. Common pollution problems for amphipods are nitrates in fertilizers (which can result in groundwater oxygen depletion), pesticides, and petroleum leaking from underground storage tanks.

#### **OTHER STATE-LISTED SPECIES**

Washington, D.C. does not currently provide special protection status for rare plant or animal species. As shown in appendix E, the District of Columbia (NPS, Cox 2004a) and the adjoining states of Maryland and Virginia (Maryland Department of Natural Resources 2003a and 2003b; Virginia Department of Conservation and Recreation, Division of Natural Heritage 2004) identify

five plant species that are documented as occurring in Rock Creek Park as “highly state rare – critically imperiled” (E, S1, or S2)

twelve plant species that are documented as occurring in Rock Creek Park as “watch list – rare or uncommon” (S3, SU)

Although three of these species are trees, most are non-woody, herbaceous species that typically occur in a single population within the park.

Several animal species with known occurrences in Rock Creek Park are listed as rare or uncommon by Maryland (Maryland Department of Natural Resources 2003b). They include the Appalachian spring snail, gray petaltail dragonfly, and five bird species. The birds are discussed in the next section, “Other Native Wildlife.” Wetlands, including freshwater springs and outflow channels, provide habitat for the invertebrate species.

The National Park Service is not under any legal obligation to protect these plant or animal species. However, NPS policy and management actions include maintaining these uncommon native species as part of the park's natural heritage (NPS 2000a).

## **OTHER NATIVE WILDLIFE**

### **Terrestrial Wildlife**

Native wildlife species are included as an impact topic based on the criteria presented in the "Impact Topics - Resources and Values at Stake in the Planning Process" section. The specific concerns related to this impact topic are summarized as part of the "Environmental Consequences" discussion.

*Mammals* - The woodlands in Rock Creek Park provide suitable habitat for a variety of wildlife mammal species, despite their location within the city limits of the District of Columbia. Approximately 30 species of mammals have been inventoried in the park. Species of particular interest because of their size or their public attention include the raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), and white-tailed deer (*Odocoileus virginianus*).

White-tailed deer have been recorded for many years, but since the late 1980s their numbers have substantially increased in the park. The deer population is monitored to avoid adverse impacts on park resources, particularly vegetation.

Aerial infrared photography taken in March 1997 indicated a population of 87 deer, and a repeat survey in March 1998 estimated the number had increased to 155. Nighttime spotlight counts for deer were conducted to estimate autumn deer populations in the park from 2000 to 2003. The 2000, 2001, and 2002 results ranged from 162 to 166 deer, but year 2003 data indicated an estimated population of 270 deer. Deer populations are capable of increasing very quickly, and the increases in 1998 and 2003 are consistent with a rapidly expanding deer population (NPS, Cox 2004a). The National Park Service will be preparing an environmental assessment or environmental impact statement on the impacts of managing the park's deer population.

*Birds* - Approximately 180 species of breeding or migrating birds have been documented in Rock Creek Park (MacKiernan 2003). Most are migrants or seasonal visitors. Rock Creek Park is recognized by the National Audubon Society and the American Bird Conservancy as an Important Birding Area for its exceptional diversity of bird species during migration (Maryland/District of Columbia Audubon 2004).

From 10 years of migratory bird censuses conducted by the Audubon Naturalist Society, 33 of 34 warblers found in the northeastern United States have been detected in Rock Creek Park. As a group, warblers are of concern because their numbers have been dropping, with sharp declines for some species, throughout the past two decades. Warblers seen in the park include the cerulean warbler, which has been proposed for listing as endangered or threatened by the U.S. Fish and Wildlife Service. Bicknell's thrush, another species that has been proposed for listing, also has been detected in spring migratory censuses (Cooper 2003).

A number of Maryland state-designated threatened, endangered, or other concern species have been documented in Rock Creek Park during migration. These include the olive-sided flycatcher (Maryland endangered), Blackburnian warbler (Maryland threatened), mourning warbler (Maryland endangered), and the Nashville warbler (Maryland species of concern) (Cooper 2003). The yellow-crowned night-heron, considered rare by the state of Maryland, is also known to occur in the park. However, the only bird species that is listed as threatened or endangered by the U.S. Fish and Wildlife Service that potentially occurs in the park is the bald eagle (see appendix E, table E.1).

The breeding bird census area is an important bird-related resource within Rock Creek Park. The 65-acre census area is roughly triangular in shape. The north edge generally extends along the Whitehorse Trail while the west and east sides begin at the public stables and Joyce Road, respectively, and meet at picnic grove 21.

Data on breeding birds have been collected in the spring from the census area in most years since 1948. The longevity of the site in an area of relatively undisturbed natural vegetation provides a baseline of relative abundance against which later data can be compared to determine if changes in bird populations are occurring. Information from this long-running study is an important contribution to the nationwide breeding bird census run by the National Audubon Society (NPS, Cox 2004a). Typically, 22 to 24 species nest in the breeding bird census area in Rock Creek Park (unpublished data from the Rock Creek Park breeding bird census, 1997 through 1999).

A number of sites that provide good viewing of birds have been identified in Rock Creek Park. These include, but are not limited to, the areas around the nature center, stables, maintenance yard, picnic groves 17 and 18, and, in general, the western ridge of the park. The maintenance yard area, where the Audubon Naturalist Society conducts their migration censuses, is an especially notable area for large congregations of migrating birds (MacKiernan 2003). The Maryland Ornithological Society (2004), which maintains a web page of birding areas in the District of Columbia, also mentions less visited, but still productive areas, including “the area around Peirce Mill, Melvin Hazen Park, and the stream valley along Broad Branch west of the ridge.” Rock Creek Park recognizes the importance of these bird habitats within the park and is committed to ensuring their conservation and enhancement, regardless of the alternative selected in the final general management plan.

*Reptiles and Amphibians* - The variety and numbers of amphibians and reptiles found in the park are markedly reduced compared to inventories from the early and middle parts of the 20th century. Of species historically recorded for Rock Creek Park, only 9 of 17 amphibians and 11 of 24 reptiles have been recorded in recent years. The amphibian observations are consistent with the recent world-wide decline in amphibian numbers and diversity.

Some amphibians such as the gray treefrog (*Hyla versicolor*) and chorus frog (*Pseudacris triseriata*) have disappeared altogether from Rock Creek Park.

Others amphibians, such as the spring peeper (*Hyla crucifer*), wood frog (*Rana sylvatica*), and spotted salamander (*Ambystoma maculatum*) can be found in modest numbers in wetland areas.

Red-backed salamanders (*Plethodon cinereus*), which do not depend on wetlands, are relatively common in moist uplands where they inhabit moist niches under logs and leaf litter.

The U.S. Geological Survey Northeast Amphibian Research and Monitoring Initiative has been monitoring stream salamanders in Rock Creek Park since 2001 (Jung 2004). Some of the species identified include the northern dusky salamander, northern two-lined salamander, and northern red salamander.

Factors responsible for the declines that have been noted in reptile diversity in Rock Creek Park are unknown. Relatively protected and abundant moist upland sites provide habitat for small snakes, such as the northern ringneck snake (*Diadophis punctatus*), which is common. Eastern box turtles (*Terrapene carolina*) and larger snakes such as the black rat snake (*Elaphe obsoleta*) are much less common.

### **Aquatic Wildlife**

Surveys by the District of Columbia have found approximately 35 species of fish in Rock Creek.

Resident native species include five shiners (*Notropis* spp.), two bullheads (*Ictalurus* spp.), and three sunfish (*Lepomis* spp.). Blacknose dace (*Rhinichthys atratulus*) are relatively common and can be found in the main stream and many tributaries.

Other resident species are introduced, including carp (*Cyprinus carpio*), bluegill (*Lepomis macrochirus*), and largemouth bass (*Micropterus salmoides*).

At least two native species, the blueback herring (*Alosa aestivalis*) and the alewife (*Alosa pseudoharengus*), migrate from salt water up Rock Creek to spawn each spring (anadromous). An abandoned sewerline and an abandoned gauging station near Q Street that interrupted their migrations were removed from Rock Creek in 2001 (Madaras 2001). The removal of eight other barriers in Rock Creek and the installation of a fish bypass at the Peirce Mill dam as part of the Woodrow Wilson Bridge mitigation are expected to allow these species to migrate from the mouth of the creek upstream to Needwood Lake in Montgomery County, Maryland (Madaras 2001). These activities are expected to be completed in 2005.

The American eel (*Anguilla rostrata*) is the only species found locally that lives in either fresh or brackish water. Eels migrate to the Sargasso Sea to spawn (catadromous). The removal of barriers in Rock Creek as part of the Woodrow Wilson Bridge mitigation is expected to enhance the habitat for this species.

The urban pollution and storm water runoff problems that were described previously in the section entitled "Rock Creek and Its Tributaries" have adversely affected fish numbers and diversity in the park. Generally, the 16 tributaries of Rock Creek are more severely affected than the main channel. In a 1993 study by NPS staff, no fish were found in nearly half of the tributaries, and only one had more than a single species present. Flooding and scouring during storms, pollution from runoff, and periodic low flows are likely contributing factors.

### **Non-Native Terrestrial Animals**

Several non-native species of wildlife that occur in Rock Creek Park are adversely affecting the park's natural resources.

Free-roaming domestic cats (*Felis catus*) are particularly found near the park borders. Mitchell and Beck (1992) demonstrated that cats in such settings prey on local populations of songbirds, squirrels, and other small mammals and may reduce their numbers.

Starlings (*Sturnus vulgaris*) compete with some cavity-nesting birds for nest sites.

The gypsy moth (*Lymantria dispar*) has been present in the park for many years and, at times, has become sufficiently abundant to require aerial spraying to prevent forest defoliation and related impacts.

The effects of these and other exotic animals on native species are not fully known. They could be substantial, considering the small size of the natural areas of Rock Creek Park and the park's location within an urban setting. However, except for treatments of insect pests, no control efforts are presently contemplated for these species.

### Roadkill

Collisions with vehicles kill or injure terrestrial and semi-aquatic animals on roads in Rock Creek Park, along the Rock Creek and Potomac Parkway, and on adjoining city streets. From 1980 to 2000, the park staff kept informal counts of carcasses along roads and streets within and adjacent to the park and parkway. The data included species, date, and location where each carcass was found. The counts were non-systematic and were collected incidental to other activities. Because of the informal nature of the data collection and the frequent removal of roadkill carcasses by scavengers such as crows and raccoons, the park roadkill counts probably were lower than actual animal deaths. Larger, more conspicuous animals, particularly mammals, tend to be more represented in the count, as opposed to smaller animals such as songbirds, amphibians, and reptiles that are more easily overlooked or scavenged.

For the 10 years between 1991 and 2000, park staff recorded 1,223 roadkilled carcasses. Table 9 summarizes these data by class and by selected species.

**TABLE 9: RECORDED ROADKILLS IN AND ADJACENT TO ROCK CREEK PARK AND THE ROCK CREEK AND POTOMAC PARKWAY, 1991 THROUGH 2000**

Type	Number	Percent of Total Roadkills Recorded
Total recorded roadkills, 1991 through 2000	1,223	100
Mammals	1,088	89
Squirrel	455	37
Raccoon	303	25
Deer	135	11
Opossum	96	8
Other	96	8
Gray fox	3	0.25
Birds	90	7
Reptiles	45	4
Box turtle	22	2
Black rat snake	15	1

Between 25 and 33 percent of the annual recorded roadkill in the park and vicinity occurred on Beach Drive. For example, in the year 2000, 104 carcasses were recorded, including 28 from Beach Drive. Table 10 shows all roadkilled species recorded from Beach Drive in 2000 and sub-totals for sections of the road under different traffic management strategies.

**TABLE 10: ROADKILLS RECORDED ON BEACH DRIVE IN 2000**

<b>Species</b>	<b>Total for Beach Drive</b>	<b>South of Broad Branch Road</b>	<b>Sections Closed to Traffic on Weekends and Holidays</b>	<b>Sections Open to Traffic North of Broad Branch</b>
Raccoon	8	5	3	0
Squirrel	7	3	3	1
Deer	4	1	0	3
Water snake	2	0	1	1
Unidentified bird	2	2	0	0
Red-eyed vireo	1	0	0	1
Snapping turtle	1	0	1	0
Box turtle	1	0	0	1
Opossum	1	1	0	0
Domestic cat	1	0	1	0
Total	28 (100%)	12 (43%)	9 (32%)	7 (25%)
Percent of road length	100%	13%	46%	41%
Average annual road-kill per mile	28/5.8 = 4.8	12/0.70 = 17.1	9/2.7 = 3.3	7/2.4 = 2.9

As shown in the table, the highest incidence of roadkill on Beach Drive occurred south of Broad Branch Road. The roadkill rate on this stretch was five times higher than on more northern portions of Beach Drive, indicating that this area might be an appropriate site for the installation of mitigating measures such as traffic controls or protected wildlife crossings such as culverts.

As shown in table 11, 16 animal carcasses were recorded from the 2-mile-long Rock Creek and Potomac Parkway in the year 2000. This produces an average annual roadkill of eight animals per mile. Contributing factors to this relatively high value probably include the higher traffic speeds on the parkway and a heavier traffic level than on most park roads.

**TABLE 11: ROADKILLS RECORDED ON THE ROCK CREEK AND POTOMAC PARKWAY IN 2000**

<b>Species</b>	<b>Number</b>
Squirrel	5
Raccoon	5
Mallard duck	2
Unidentified bird	2
Crow	1
Deer	1
Total	16

The importance of roadkill to populations of wildlife is difficult to determine. Squirrels, raccoons, and deer sustain the heaviest toll from vehicle collisions. However, these species are common in the region and have high reproduction potentials. Their populations do not appear to be substantially influenced by roadkill. For less common species with more limited reproduction potential,

roadkill could be a contributing factor to population reductions or local extirpation (Foreman and Alexander 1998).

Based on casual, undocumented sightings, four species of wildlife may have declined in the park over the past decade or more. These species are the opossum, gray fox, eastern box turtle, and black rat snake. Concern has been expressed that roadkill could be a contributing factor. Recorded roadkill numbers and locations for these species between 1991 and 2000 are shown in table 12. For all four species, approximately a third of the roadkills were recorded *outside* the park and parkway.

**TABLE 12: LOCATIONS OF RECORDED ROADKILLS FOR FOUR SPECIES, 1991 THROUGH 2000**

Location	Opossum	Grey Fox	Box Turtle	Black Rat Snake
Park roads				
Rock Creek and Potomac Parkway	18	1		
Beach Drive south of Broad Branch Road	14	1		1
Beach Drive north of Broad Branch Road	8		2	3
Wise Road	4		1	1
Glover Road	3		3	2
Ross Drive	1		1	
Bingham Drive			4	
Joyce Road				1
Nature center/maintenance area	1		1	1
Other park roads	7			
Adjacent non-park roads				
Military Road (though park and nearby)	17	1	2	
Oregon Avenue	14		8	5
Broad Branch Road	4			1
Other non-park roads	5			
Total roadkills recorded 1991-2000	96	3	22	15

**Opossum.** The number of roadkilled opossum carcasses recorded in and around Rock Creek Park and the parkway declined over the 10-year period of data analysis. Numbers dropped from a high of 16 animals in 1992 to one specimen in 2000.

Although the reason for the decrease is unknown, it is unlikely that roadkill caused a population decline. Opossums are common in the region and much of the United States. They have a high reproduction potential (2 litters per year with 5 to 13 young per litter) and are highly adapted to living in close proximity to humans, even in densely developed metropolitan areas (Hossler *et al.* 1994; Pennsylvania Game Commission 2001). The decline in roadkill in Rock Creek Park probably reflects population reductions caused by another factor such as a disease outbreak. It is unlikely that roadkill would seriously threaten or cause the extirpation of opossums in the park.

**Gray Fox.** Between 1991 and 2000, three gray foxes were found dead on roads in and around the park, including one each in 1991, 1994, and 1999. Gray foxes are relatively common in the eastern United States. They have been described as habitat generalists that prefer wooded areas with dense cover for daytime dens and mixed fields and forests for nighttime hunting (Greenburg and Pelton 1994).

A study in Tennessee found that gray foxes had overlapping home ranges of about 1,000 acres, and that a 5,000-acre area supported 12 adult and young foxes (Greenburg and Pelton 1994). New Mexico studies showed that gray foxes were tolerant of low to moderate residential development, but avoided high-density development (Harrison 1993 and 1997). At 1,700 acres, Rock Creek Park may provide sufficient habitat for only a few individuals. Additional habitat on adjoining lands would be necessary to support a larger, more sustainable gray fox population.

Gray foxes, such as young animals dispersing from the den, will travel distances of 50 miles or more (Trippensee 1953). The Rock Creek corridor probably served as a travel route between foxes in the park and populations in woodlands to the north. However, as more of the forested areas in the upper drainage have been developed, the interactions of animals in the park with those in other areas probably were reduced. This would include the recruitment of foxes into the park population.

Gray foxes are very susceptible to canine diseases such as distemper and hepatitis (Nicholson and Hill 1984). The potential for these diseases to be introduced into the gray fox population from the large number of dogs using the park is high.

Gray fox populations in and around the park are probably small and are likely stressed by habitat destruction, habitat fragmentation, low recruitment, and periodic disease outbreaks. Roadkills, even infrequent ones, could contribute to an overall reduction of a resident population or even local extirpation.

**Box Turtle.** There is no clear trend in recorded roadkills of box turtles in and around the park and parkway. Between 1991 and 2000, 22 box turtle roadkills were recorded, for an average rate between two and three turtles per year.

Prime habitat for box turtles includes wooded uplands and bottomlands. In the wild, box turtles are known to live at least 40 years and there are claims of some turtles living more than 100 years. They do not reach sexual maturity until 4 or 5 years of age. The average clutch size is only four or five eggs, although a female may lay several clutches per year. The female does not protect the nest or hatchlings, and mortality of hatchlings is high, primarily because of predation (Dawson 1999).

Populations of box turtles have declined throughout their range in the eastern United States because of a variety of human-induced factors. Roadkill is believed to be a contributing factor to the declining numbers, along with habitat loss and fragmentation, commercial and personal collecting, predation by animals such as dogs and raccoons that are associated with human development, and disease (Hutchinson 2000; Mitchel 2000). Because box turtles are long-lived and have a low reproduction potential, losses of individuals can have long-lasting effects on local populations.

A study in the 1950s of mixed forests and agricultural lands in Maryland reported turtle densities at 10 per acre (Hall *et al.* 2000). Other studies in Missouri summarized by Dawson (1999) indicated a lower density, identifying home range size as varying from about 5 acres to about 13 acres and stating that “the home ranges of several individuals will often overlap.”

There is little information on box turtle populations in Rock Creek Park. The riparian wetlands along Rock Creek and its tributaries provide excellent habitat, and sightings of box turtles by park visitors and park staff are relatively common. However, studies of box turtle numbers or densities have never been conducted. Removing box turtles from the park for any purpose, including use as



pets, is illegal, but anecdotal evidence suggests that such illegal collecting occurs at a rate far greater than the annual roadkill rate of two or three box turtles. However, the additive effect of roadkill may be a contributing factor in an apparent decline in box turtles in and near the park.

**Black Rat Snake.** There is no clear trend in the pattern of roadkills of black rat snakes in Rock Creek Park between 1991 and 2000. Fifteen roadkills were recorded, including five on Oregon Avenue outside the park.

Black rat snakes are fairly common in the region. They are active during daylight hours and hibernate during the winter months. They prefer dense cover along forest edges, meadows, and hedgerows and tend to avoid open areas such as closely mowed roadsides, road surfaces, and open fields. Black rat snakes use the interior of forests and often enter structures for periodic refuges (Durner 1991; Durner and Gates 1993).

Habitat for the black rat snake has declined in the Washington D.C. metropolitan area over the decades as land has been converted from woodlots and agriculture to high-density development. Within Rock Creek Park, black rat snake populations also may have declined because of continued maturation of forest, as opposed to the mix of woodlands and meadows that existed historically. Roadkill may be a contributing factor affecting local populations, but the degree of effect is unknown.

## CULTURAL RESOURCES

### ARCHEOLOGICAL RESOURCES

Several studies provide information on Rock Creek Park's archeological resources, previous archeological work in the park, and the status of archeological research. These studies include

*Ancient Washington: American Indian Cultures of the Potomac Valley* (Humphrey and Chambers 1985)

*Archeological Survey Report: An Archeological Investigation of Thirty-One Erosion Control and Bank Stabilization Sites along Rock Creek and Its Tributaries, Rock Creek Park and Rock Creek and Potomac Parkway* (NPS, Inashima 1985a)

*National Capital Area Archeological Overview and Survey Plan for the Systemwide Archeological Inventory Program, National Park Service, National Capital Area* (NPS, Little 1995c)

*Rediscovering Archeological Resources at Rock Creek Park* (Moran 1997)

Some of the prehistoric and historic objects recovered from Rock Creek Park have been cataloged and are kept in storage at the NPS' Museum Resource Center in Landover, Maryland.

There are at least 10 archeological sites in the Rock Creek valley with known prehistoric occupations. Three are quartzite quarries, three are soapstone quarries, three are short-term campsites, and one is a cremation burial. The latter was excavated prior to construction of a pier for one of the Whitehurst Freeway ramps.

Historic archeological sites in the park are largely associated with historic agricultural and industrial uses during the 18th and 19th centuries, Civil War-era operations, and development of the park under the administration of the U.S. Army Corps of Engineers (1890 to 1933) and the National Park Service (1933 to present).

There is a high probability that there are additional undisturbed prehistoric and historic archeological resources in Rock Creek Park. Archeological sites in the park have not been systematically surveyed or inventoried, and precise information about locations, characteristics, and the significance of the majority of known archeological resources in the park is incomplete. Because the condition of archeological resources, especially those underground, is generally unknown, the impacts of development projects on archeological sites in the park are uncertain.

As described in the "Servicewide Mandates and Policies" section, an archeological identification and evaluation study of the park is required by law. A 4-year study to meet this requirement began in 2004. Year two is currently underway (NPS, Cox 2004a). In addition, individual surveys will be needed prior to the initiation of ground-disturbing activities. Areas identified as having a high potential for archeological resources must be treated with special sensitivity.

NPS policy at Rock Creek Park is to work with the District of Columbia State Historic Preservation Officer to nominate all archeological and historical resources within the park and parkway that appear to meet the National Register of Historic Places criteria. Although Rock Creek Park is

listed in the National Register of Historic Places, its archeological resources have yet to be individually listed. As a result of the 4-year archeological study that currently is underway, new National Register of Historic Places listings for archeological resources might be generated. Currently, 23 archeological sites associated with the earliest occupation of the region and one site associated with an early 19th century industrial complex (Blagden Mill) have been investigated.

## **HISTORIC RESOURCES AND CULTURAL LANDSCAPES**

Several NPS documentary studies provide an understanding of the historic development of the Rock Creek Park area and the Rock Creek and Potomac Parkway. These include

*Rock Creek Park: An Administrative History* (NPS, Mackintosh 1985b)

*Historic Resource Study: Rock Creek and Potomac Parkway, George Washington Memorial Parkway, Suitland Parkway, Baltimore-Washington Parkway* (NPS, Krakow 1990a)

*Historic Resource Study: Rock Creek Park, District of Columbia* (NPS, Bushong 1990b)

*Rock Creek and Potomac Parkway* (Historic American Buildings Survey, HABS No. D.C.-697, 1991-2) (NPS, Davis 1992)

*Linnaean Hill Cultural Landscape Inventory* (NPS, Wheelock *et al.* 1998b)

*Peirce Mill Cultural Landscape Inventory* (NPS Wheelock *et al.* 1998d)

Europeans began to acquire private rights to land in the Rock Creek valley during the 17th century. However, the Rock Creek valley remained largely untouched by settlement until a trading post was established in 1703 at what was then the navigable mouth of Rock Creek.

Commercial and industrial use of Rock Creek increased steadily in the early decades of the 19th century. The gradient of the streambed and the water flow were sufficient to support a number of mills above and below the District line. The milling industry flourished along the creek in the first half of the 19th century, growing in direct proportion to the development of Georgetown and Washington City. More than a half-dozen water mills operated along its course within the District.

Today only the Peirce Mill stands on the creek near Tilden Street as a reminder of this once-common building type. Peirce Mill functioned as an integral part of a diversified farm complex. After 1890, stone grinding became obsolete and few water-powered flour millers operated in the eastern United States. However, Peirce Mill continued grinding corn, rye, and wheat into flour and meal until 1897 when its main shaft broke.

The Peirce family erected two substantial enclaves of buildings, several of which remain today. They represent the only examples of 19th century structures erected in the park prior to its establishment. The original Peirce family dwelling and its immediate dependencies were located about a quarter mile west of Peirce Mill, just south of present-day Tilden Street. The Peirce estate eventually numbered 11 buildings, many of which were built of solid granite. The Peirce-Klingling Mansion, which houses the park headquarters, was the core of the second major complex of buildings erected by the Peirce family in what would become Rock Creek Park.

Joshua Peirce became a prosperous nurseryman and landscape gardener who specialized in the cultivation of camellias and other exotic plants. His arboretum at Linnaean Hill provided botanical specimens for the grounds of the White House, U.S. Capitol, and many of the national capital's other federal reservations. The expansive landscape surrounding his mansion also included fruit trees and ornamental plants. Today, the Peirce structures stand as rare examples of early 19th century vernacular stone construction in the District of Columbia.

The mills and estates in the Rock Creek valley were served by a network of roads. The courses of five of these pre-Civil War roads exist roughly today in the form of

Tilden Street and Park Road (formerly Peirce's Mill Road)

Klinge Road (formerly Joshua Peirce's Road, laid out in 1831)

Broad Branch Road (surveyed and built in 1839)

Blagden's Mill Road (1847), a road trace on the landscape and a portion of Colorado Avenue

Milkhouse Ford Road, now Rock Creek Ford Road

Most of these early, narrow, unpaved roads were privately built, but they later evolved into public thoroughfares and were eventually acquired by the local government. Further road development was stimulated by the Civil War.

In 1862, army engineers constructed Fort DeRussy as part of a circle of fortifications around the city. They also established Military Road to connect the defenses of the city. Located northeast of the intersection of Military Road and Oregon Avenue, Fort DeRussy was strategically placed to provide formidable resistance to enemy advancement down the valley. The fort saw action during the only Confederate assault on the city in July 1864. Although the fort's structures were removed after the war, Fort DeRussy remains the most pronounced Civil War earthworks site in the national capital area.

Operation of the Godey Lime Kilns began in 1864. The manufacture and sale of lime at this site continued until 1907. The kilns represent an important aspect of the thriving late 19th century commercial activities in Georgetown. The kilns were partially restored by the National Park Service in 1967.

Urban development in the area surrounding the valley began with a building boom in the 1880s. By the late 1880s, tracts north of the old Washington city limits and near the future park had been subdivided into suburban lots, with development potential reaching to the banks of Rock Creek.

The rapid pace of suburban development threatened to destroy the rural character and natural scenery of the Rock Creek valley. In response, a bill establishing Rock Creek Park (Public Reservation 339) was approved by both houses of Congress and signed into law (26 Stat. 492) by President Benjamin Harrison on September 27, 1890. A copy of this legislation is provided in appendix A.

The first park improvements included a road system. The new park drive along the creek, named for Capt. Lansing Beach, incorporated existing road segments and a dirt road created by the construction of a sewerline below Piney Branch in 1896. Walking trails and bridle paths also provided public access.

Boulder Bridge was constructed in 1902. It has become a quintessential symbol of the rustic character and picturesque design of the first park structures. It is Washington's finest example of rustic bridge architecture, and one of the earliest Melan reinforced concrete arch structures of its type built in the District.

In 1901-02, a Senate Park Commission comprehensive plan for the nation's capital included a proposal for a regional park system that extended beyond the boundaries of the District to include such scenic areas as Great Falls. One aspect of their proposal was the development of a parkway, in the wording of the 1913 legislation establishing the Rock Creek and Potomac Parkway, "for the purpose of preventing pollution and obstruction of Rock Creek and of connecting Potomac Park with the Zoological Park and Rock Creek Park."

On June 2, 1912, the reconstructed Joaquin Miller cabin (named for the California author of *Song of the Sierras*) was dedicated at a site just off Beach Drive, approximately a half-mile north of Military Road. The cabin, which had been disassembled and moved from its location across from Meridian Hill Park by the California State Association, soon became an "adopted" historic attraction in the park and a meeting point for picnic groups, hikers, and equestrian riders. Placement of the Miller cabin in the landscape was part of the picturesque improvement of the early 20th century Rock Creek Park, which was also evident in the design of Boulder Bridge, the dam at Peirce Mill, and the rustic stone improvements to Milkhouse Ford.

To accommodate the growing popularity of golf, two nine-hole golf courses were opened in 1923 and 1926 in the east side of the park north of Military Road at the site of a former arboretum, which had been removed in 1920. A remodeled farmhouse served as a clubhouse.

During the 1930s, numerous physical improvements in Rock Creek Park were made by the National Park Service and Depression-era work relief laborers. The National Park Service made an effort to blend new construction with the picturesque park landscape, designing new structures in a rustic style popularly known today as "parkitecture."

In 1935-36, the stone-lodge-style Lodge House was constructed as a U.S. Park Police substation near the intersection of Military Road and Beach Drive. The National Park Service continued to preserve historic buildings, including the Peirce-Klingling Mansion, the other structures at the Linnaean Hill complex, and the Peirce Mill with its adjacent springhouse and barn.

The 1930s marked the beginning of Rock Creek Park's use as a commuter route. The completion of a motor drive from the park's north end to East-West Highway in Maryland in 1932 and the opening of the Rock Creek and Potomac Parkway in 1936 created a continuous automobile route from Maryland to central Washington, D.C. However, it was not until 1966 that a truly continuous automobile route was created with completion of the zoo tunnel. Previously, evening zoo closure and flooding of fords hampered full use.

**Historic National Register Properties.** Historic properties within the park and parkway that are listed in the National Register of Historic Places include the

Peirce-Klingling Mansion

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 the “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 appendix F.

In 1997-98, the National Park Service, in consultation with the District of Columbia State Historic Preservation Officer, completed a comprehensive survey of structures in Rock Creek Park and the Rock Creek and Potomac Parkway that are eligible for listing in the National Register of Historic Places. The Rock Creek and Potomac Parkway was found to be eligible for listing, and the National Park Service coordinated with the District of Columbia State Historic Preservation Officer to finalize a nomination. A National Register nomination for the parkway has been sent to the Keeper of the National Register for review (NPS, Cox 2004a).

**Cultural Landscapes.** Cultural landscapes reflect the relationship between what is natural and what is man-made. According to *The Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Secretary of the Interior 1995b), a cultural landscape is “a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.”

A cultural landscape inventory documents the qualities and attributes of a cultural landscape that make it significant and worthy of preservation. The goal of the National Park Service is to locate and evaluate cultural landscapes and provide information on their location, historical development, characteristics and features, and management to assist park managers in planning, programming, and recording treatment and management decisions.

In 1997, the National Park Service initiated a cultural landscape inventory of the area covered by this general management plan. As part of the cultural landscape inventory process, inventories for two component landscapes, Peirce Mill and Linnaean Hill, were completed. Field work and research for the remainder of Rock Creek Park and Rock Creek and Potomac Parkway has been completed, but has not been entered into the NPS Cultural Landscape Inventory database.

## **VISITOR AND COMMUNITY VALUES**

### **TRADITIONAL PARK CHARACTER AND VISITOR EXPERIENCE**

Rock Creek Park was intended in the establishing legislation to be a “pleasure ground.” Visitors come for the scenery and the other sensory experiences that accompany a forested creek valley. They enjoy such features as the changing seasonal colors; life cycles and scents of the forest; sounds of water, wind, and small animals, including birds; and the quiet. The open spaces offer more active recreation and the sounds of people at play.

### **Recreation Opportunities**

**Nonmotorized Recreation.** Rock Creek Park provides a visual respite from the urban surroundings. The park offers a variety of views, from rugged expanses of mature, second-growth forest with little recent human disturbance to landscapes from the rural past. The engineered bridges are reminders of the monumental city to the south.

Rock Creek Park offers visitors a variety of recreation options, including

- paved multi-use trails and weekend closures of Beach Drive for jogging, bicycling, in-line skating, and other nonmotorized uses

- an extensive system of hiking and horseback riding trails

- Rock Creek Horse Center for public horseback riding and horse boarding (concession operated)

- an 18-hole public golf course (concession operated)

- tennis courts, including 21 soft-surface courts and 10 hard-surface courts (concession operated)

- picnic areas, including 20 unrestricted picnic areas and 10 picnic areas requiring a permit

- sports fields suitable for soccer, football, volleyball, field hockey, lacrosse, and rugby

- canoeing and kayaking on Rock Creek

- interpretive programs and other visitor contact at the Rock Creek Nature Center and Planetarium, Peirce Mill complex, and Old Stone House

- the Carter Barron Amphitheater, which is a 4,000-seat outdoor theater offering summer musical and theatrical performances

- two community gardens with a total of about 200 garden plots

One of the favorite ways to experience Rock Creek Park is from Beach Drive. This roadway, which is within the narrow creek valley for much of the length of the park, is a popular site for such activities as walking, in-line skating, and bicycling. During weekends and holidays when

three segments of Beach Drive are closed to automobile traffic, thousands of people recreate along its length.

During weekdays, participation in nonmotorized recreation activities along Beach Drive is limited. Based on comments received on the draft general management plan and environmental impact statement, many potential users perceive this area as “hazardous” and either choose to recreate in other areas of the park or avoid the park altogether.

**Motorized Recreation.** A popular visitor experience on weekdays is motorized travel on Beach Drive and other park roads. Commuters and others use Beach Drive as a pleasant way to traverse the city in a north/south direction, even if they do not leave their cars for more direct contact with the outdoors. Based on traffic studied conducted in 2004, approximately 2.5 to 3 million visitors per year drive on Beach Drive on the segments north of Broad Branch Road and Joyce Road. South of Blagden Avenue, more than 7.5 million drivers travel on Beach Drive annually (Parsons 2004). More than 9 million drivers per year take Beach Drive south of Klinge Road (District of Columbia 2001a and 2001b).

The travel time analyses in the 2004 traffic study showed that some of the automobile travel through the park on Beach Drive on weekdays is not time effective. For some routes involving Beach Drive, the driver could have selected another route, most of which were outside the park, that would have reduced the trip duration (Parsons 2004). This suggests that some of the drivers who use Beach Drive do so for the aesthetic quality of the experience.

Other park roads are less heavily traveled. Based on average daily traffic volumes from the District of Columbia Department of Transportation (District of Columbia 2001a and 2001b) and the 2004 traffic study (Parsons 2004), use includes an estimated

1.3 million vehicles per year on Wise Road

285,000 vehicles per year on Bingham Drive

125,000 vehicles per year on Ross Drive north of the intersection with Glover Road and 290,000 vehicles per year south of this intersection

Wise Road and Bingham Drive can provide cross-park connections, but selection of these routes may also be based on the quality of the experience of driving through the park. Many routes are more efficient than the north/south trending Glover Road and Ross Drive, so motorized vehicle use on these roads primarily relates to enjoyment of the drive.

The Rock Creek and Potomac Parkway is a heavily used municipal thoroughfare that, in the vicinity of Massachusetts Avenue, carries average traffic of 55,000 vehicles per day or about 20 million vehicle trips per year (District of Columbia 2001a and 2001b). Because many national parks experience large differences in seasonal use, the NPS' Public Use Statistics Office assists park planners by providing recreation-related seasonal traffic factors as well as average daily traffic factors. On the Rock Creek and Potomac Parkway, these factors are virtually identical, indicating that throughout the year, travelers on the parkway are seeking an efficient travel route and are little affected by season or weather.



## Visitor Profile

Visitors to Rock Creek Park are primarily local residents of the Washington, D.C. metropolitan area. However, because it is a national park, it also is visited by people from all over the country and the world who are visiting the area. The park's recreational visitors come from a wide variety of demographic backgrounds representing many ethnic, racial, and economic groups reflective of the adjacent neighborhoods and society at large. A survey of Rock Creek Park visitors by the University of Idaho in 1999 characterized visitors and their experiences. Many of the values exceed 100 percent because, for example, visitors may have driven to the edge of the park and then walked in and identified both modes as how they arrived.

The majority of visitors during the survey were white (74 percent). Blacks or African Americans comprised 24 percent of those surveyed. Asians made up 3 percent; Hispanics or Latinos 2 percent; and American Indian/Alaska Natives and Native Hawaiian/Pacific Islander groups were each 1 percent or less (Littlejohn 1999).

Visitors from the United States predominantly were from Washington, D.C. (64 percent), Maryland (18 percent), and Virginia (7 percent). Not enough international visitors were surveyed to provide information that was reliable (Littlejohn 1999). However, comments of the draft general management plan were received from visitors from Canada, England, Israel, Japan, and Singapore.

Most visitors to interpretive centers, concessioner-operated sites, and picnic areas drive to the park in private automobiles. Many users of trails and the closed segments of Beach Drive arrive on foot, bicycle, or in-line skates. Park-wide, 58 percent of visitors said they arrived by private vehicle, 32 percent walked, 14 percent biked, 2 percent took public transportation, 1 percent arrived on in-line skates, 1 percent used a rental car, 1 percent came on a school bus, and 5 percent used other forms of transportation (Littlejohn 1999).

Visitors come to the park for a wide variety of reasons. In the University of Idaho survey (Littlejohn 1999), respondents mentioned participating in the following activities:

walking/hiking/jogging:	44 percent
bicycling:	18 percent
walking the dog:	17 percent
communing with or studying nature:	13 percent
picnicking and family reunions:	11 percent
golfing:	10 percent
in-line skating:	6 percent
tennis:	4 percent
studying history:	3 percent
creating art:	3 percent
horseback riding:	1 percent
other activities:	16 percent

The most common reasons given for visiting the park were exercise (61 percent), escaping the city environment (47 percent), time with family and/or friends (37 percent), and solitude (30 percent) (Littlejohn 1999).

Rock Creek Park is a popular site in the Washington metropolitan area for birding (birdwatching). Birding is a growing recreational activity that more than doubled in popularity from 1983 to 2001 (Cordell and Herbert 2002). Some of the preferred areas for birding in Rock Creek Park include the areas around the nature center, stables, maintenance yard, picnic areas 17 and 18, and, in general, the western ridge of the park. Birders visit the park mostly in the spring and fall during bird migration and during the summer bird breeding season. Rare bird sightings can bring larger than normal numbers of birders to the park.

The length of a visitor's stay depends on the purpose of the visit. A jogger may only stay an hour while a picnicker may stay all day. Overall, the majority of visitors (59 percent) stay 2 hours or less (Littlejohn 1999). Many visitors come to Rock Creek Park on a regular basis, and 52 percent of those surveyed visited weekly (Littlejohn 1999).

Most visitors do not participate in the park's education or interpretive programs. Visitor contacts at the three interpretive sites (the Rock Creek Nature Center and Planetarium, Peirce Barn, and Old Stone House) totaled 82,000 in 2002 and 75,000 in 2003. Visitor contacts at formal interpretive programs totaled 33,000 in 2002 and 14,000 in 2003. Fewer than 20,000 visitors in either year participated in other activities, such as the Junior Ranger Program, slide shows, and special events (NPS, Cox 2004a).

### **Visitation Trends and Visitor Services**

In the 1980s, recreational visitation to Rock Creek Park almost doubled, and then stabilized throughout the 1990s. In 1980 there were 1,060,000 recreational visitors. By 1989, this number had risen to 2,050,000 recreational visitors. Since then, based on traffic counts, visitation has been relatively stable (NPS, Street 2004d).

At the same time, the park's visitor services have been severely reduced, resulting in a substantial decline in visitation to the park's interpretive centers. Visitor services such as publications and wayside exhibits also are inadequate. The result is that many visitors to Rock Creek Park never know they are in a national park. Most never have contact with park rangers or receive any basic orientation.

Recreational visits to Rock Creek Park occur fairly evenly over the warmer months of spring, summer, and early fall, and drop slightly in the late fall and winter. This pattern has been recorded at a number of sites throughout the park, where from 2001 to 2003, an average of 26 percent of annual visits occurred during spring, 28 percent occurred during summer, 27 percent occurred during fall, and 19 percent occur during winter (NPS, Street 2004). These findings are supported by data from traffic counting devices along Morrow Drive and Beach Drive (NPS, Street 2004) and the University of Idaho Visitor Survey (Littlejohn 1999).

Nonrecreational visits, including those from commuters, are distributed evenly throughout the year, with an average of 25 percent of total visits occurring each season. This is particularly true on the Rock Creek and Potomac Parkway, where traffic counts show little variation from month to month (NPS, Street 2004). During scoping, many commenters identified themselves as commuters (by both automobile and bicycle) and emphasized that they consider their commute through the park to be recreational because it is an enjoyable ride through a scenic landscape and provides mental decompression from the workday.

## Noise

In early December 1996, noise levels were measured at 21 sites in and around Rock Creek Park and the Rock Creek and Potomac Parkway (Robert Peccia and Associates *et al.* 1997). Results included the following:

Peak traffic noise levels within the park and parkway ranged from a low of 57 decibels (dB) equivalent sound level ( $L_{eq}$ ) at the 4th hole of the golf course to 79 dB  $L_{eq}$  on the jogging trail south of Calvert, about 10 feet from the Rock Creek and Potomac Parkway.

Peak and off-peak noise levels were quite similar. Readings between these two periods varied by 4 dB or less at all 17 sites at which both peak and off-peak measurements were made.

Peak noise levels at seven sites met or exceeded the Federal Highway Administration's noise abatement criterion of 67 dB  $L_{eq}$ . All of these sites were within 100 feet of Beach Drive or the Rock Creek and Potomac Parkway and four of the seven were within 25 feet of the roads. Noise levels at four of these sites also met or exceeded the noise abatement criterion during off-peak periods.

Generally, the study found the following:

Picnic areas along Beach Drive north of Military Road are not adversely affected by traffic noise.

South of Military Road, traffic noise exceeds Federal Highway Administration standards at picnic areas that are within 60 feet of Beach Drive.

Visitor facilities within 110 feet to 125 feet of the Rock Creek and Potomac Parkway typically experience noise levels above the Federal Highway Administration standard.

The noise standard is frequently exceeded along segments of recreation trails within 100 feet of Beach Drive and the parkway.

Noise samples near residences along Oregon Avenue, 16th Street, and Broad Branch Road, at Kalorama Circle and at the National Zoo were all within the Federal Highway Administration standard.

## Access

Rock Creek Park provides access to all visitors, in accordance with governing laws, regulations, and policies (see the “Servicewide Mandates and Policies” section). Mobility-impaired visitors can currently access all facilities within the park by automobile. From the University of Idaho Visitor Survey (Littlejohn 1999), 72 percent of those surveyed rated the quality of handicapped accessibility as “Good” or “Very Good.”

None of the road segments currently closed on weekends limit access to park facilities. Picnic groves 3 and 4 are within the southernmost closed road segment, but visitors are allowed to access them by driving very slowly along the road segments (NPS, Cox 2004a).

Perceptions regarding access were provided in comments on the draft general management plan. On weekends when the three segments of Beach Drive are closed to automobiles, some mobility-impaired visitors feel their access to those particular road stretches is eliminated. Others expressed appreciation at the ability to move slowly with a walker or wheelchair on the road’s broad, smooth, level surface without worrying about traffic and to be able to experience the sights, sounds, smells, and touch of roadside features that were inaccessible to them from a car.

## PUBLIC HEALTH AND SAFETY

### Traffic Safety

An analysis of accidents occurring on park roads and the Rock Creek and Potomac Parkway between January 1, 1993 and December 31, 1995 was included in the *Transportation Study, Rock Creek Park, Washington, D.C.* (Robert Peccia & Associates 1997). More recent traffic accident data (January 1, 2001 to December 31, 2003) for Rock Creek Park and the Rock Creek and Potomac Parkway were provided by the U.S. Park Police (NPS, Pettiford 2004c). This section is based on information from these source.

**Accidents by Type and Location.** Table 13 summarizes traffic accident data by outcome (fatal, survivable injury, or property damage only) and collision type for three areas (Beach Drive, other park roads, and the Rock Creek and Potomac Parkway) for the 1993-1995 and 2001-2003 periods. The table also includes a comparison between the two data sets. Table 13 indicated the following:

Property-damage-only accidents consistently accounted for approximately three-quarters of all accidents, regardless of location or time period. Fatal accidents (four in 1993-1995 and three in 2001-2003) represented 0.3 percent of all accidents in both time periods. The remaining accidents resulted in survivable injuries.

During both time periods, the highest number of collisions between motorized vehicles and pedestrians or bicyclists occurred on Beach Drive. However, the number of these collisions on Beach Drive dropped more than 75 percent, from 13 in 1993-1995 to 3 in 2001-2003. Similar drops occurred along other park roads and the parkway so that throughout the area, this class of accidents dropped from 2.4 percent of all accidents in 1993-1995 to 0.6 percent in 2001-2003.

**TABLE 13: SUMMARY OF TRAFFIC ACCIDENTS IN ROCK CREEK PARK AND THE ROCK CREEK AND POTOMAC PARKWAY, 1993 THROUGH 1995 AND 2001 THROUGH 2003<sup>a</sup>**

Accident Type	Beach Drive			Other Park Roads			Rock Creek and Potomac Parkway			Total		
	1993-1995	2001-2003	Percent change	1993-1995	2001-2003	Percent change	1993-1995	2001-2003	Percent change	1993-1995	2001-2003	Percent change
Total accidents	294 (25%)	247 (26.2%)	-16.0	224 (19.1%)	45 (4.8%)	-79.9	657 (55.9%)	651 (69.0%)	-0.9	1,175 (100%)	943 (100%)	-19.7
Fatal accidents	1 (0.3%)	0 (0%)	-100.0	1 (0.4%)	1 (2.2%)	0	2 (0.3%)	2 (0.3%)	0	4 (0.3%)	3 (0.3%)	-25.0
Injury accidents	75 (25.5%)	60 (24.3%)	-20.0	45 (20.1%)	11 (24.4%)	-75.6	155 (23.6%)	140 (21.5%)	-9.7	275 (23.4%)	211 (22.4%)	-23.3
Property damage only	218 (74.2%)	187 (75.7%)	-14.2	178 (79.5%)	33 (73.3%)	-81.5	500 (76.1%)	509 (78.2%)	+1.8	896 (76.3%)	729 (77.3%)	-18.6
Collision with motor vehicle or fixed object	273 (92.9%)	237 (96.0%)	-13.2	210 (93.8%)	45 (100%)	-78.6	621 (94.5%)	635 (97.5%)	+2.3	1,104 (94.0%)	917 (97.2%)	-16.9
Collision involved pedestrian or bicyclist	13 (4.4%)	3 (1.2%)	-76.9	4 (1.8%)	0 (0%)	-100.0	11 (1.7%)	3 (0.4%)	-72.7	28 (2.4%)	6 (0.6%)	-78.6
Non-collision accidents	8 (2.7%)	7 (2.8%)	-12.5	10 (4.5%)	0 (0%)	-100.0	25 (3.8%)	13 (2.0%)	-48.0	43 (3.6%)	20 (2.1%)	-53.5

a/Data are from Robert Peccia & Associates 1997 and NPS, Pettiford 2004c.

In the earlier period, 94 percent of accidents involved a collision of an automobile with another motor vehicle or a fixed object. This value increased to more than 97 percent during the latter period.

During both periods, accidents on Beach Drive represented about a quarter of all accidents in the park and on the parkway. Accidents on other park roads dropped from about 20 percent in 1993-1995 to less than 5 percent of all accidents in 2001-2003.

The total number of accidents on the parkway dropped by about 1 percent between 1993-1995 and 2001-2003. However, the proportion of all park and parkway accidents that occurred on the parkway increased from 56 percent to 69 percent.

The total number of accidents on the park and parkway dropped by almost 20 percent, from 1,175 accidents in 1993-1995 to 943 accidents in 2001-2003. This included a 25 percent decrease in fatal accidents, a 23 percent decrease in injury accidents, and a 19 percent decrease in accidents that resulted in property damage only.

The decreases were most notable on other park roads, where injury and property accidents both declined by more than 75 percent.

The least change occurred on the parkway, where injury accidents decreased by 10 percent and property-damage accidents increased by 2 percent.

The U.S. Park Police office in Rock Creek Park was contacted to identify what caused the 20 percent decrease in accidents in the 8 years between the two data sets. The consensus was that the decrease in accidents reflected the incremental benefits of many actions, including those listed below, that had occurred over the period (NPS, Davis 2004b).

Several engineered actions have been implemented to improve safety. Some of these include raised reflectors along the center of the Rock Creek and Potomac Parkway, stop signs at the intersection of Beach Drive and Piney Branch, and improved signage to manage rush-hour lane reversals on the Rock Creek and Potomac Parkway.

Region-wide traffic enforcement actions have improved driving habits. For example, the U.S. Park Police participate in the "Click It or Ticket" campaign to encourage seatbelt use that could have contributed in the decreases in fatal and injury accidents that were greater than the decrease in property-damage-only accidents. Other efforts have included the "Smooth Operator" program that intensively targets all forms of aggressive driving and a campaign to ticket drivers who run red lights.

An important contributor probably has been increased traffic volumes that have forced motorists to reduce vehicle speed along the parkway and, particularly, in the park. As a result, drivers get into fewer situations that could lead to accidents, and have time to react successfully even when those situations occur.

Robert Peccia & Associates (1997) stated that the frequency and severity of accidents in the 1993-1995 period were relatively low for an urban area. However, they attributed the relatively low number of serious accidents in the park at least in part to a perceived risk to personal safety, which caused some potential visitors to avoid using the park during periods of high traffic speeds and/or heavy volumes.

Robert Peccia & Associates (1997) attributed the greatest traffic safety problems in the park and along the parkway to excessive vehicle speeds and aggressive driving tendencies. They found that conflicts between automobiles and recreational visitors were common, even when accidents were avoided.

**Temporal Distribution of Accidents.** If traffic conditions were identical throughout the week, each day would have about 14 percent of the traffic accidents. However, the analysis of the 943 accidents for the 2001-2003 period shows that accidents were most common on Fridays (17.1 percent) and Saturdays (16.4 percent) and least common on Mondays (11.0 percent) and Sundays (11.8 percent). For the Rock Creek and Potomac Parkway, accidents were slightly more common on Saturdays than on any other day, possibly because drivers could travel at higher speeds in the lighter weekend traffic.

In the 2001-2003 period, the three geographic areas showed different accident patterns based on time of day.

For the Rock Creek and Potomac Parkway, the 6 hours between midnight and 6:00 A.M. each had fewer than 2 percent of the total accidents. The rush hours between 6:00 A.M. and 9:00 A.M. each had fewer than 4 percent of accidents. Accident numbers generally increased throughout the remainder of the morning and early afternoon, peaking at more than 9 percent of the daily total between 3:00 P.M. and 4:00 P.M., and then declining through the afternoon rush hour and evening.

For Beach Drive, the 13 hours between 10:00 P.M. until 11:00 A.M. each had fewer than 3 percent of the total accidents. From 11:00 A.M. until 8:00 P.M., most hours accounted for about 8 percent of daily accidents, with the peak of 10.5 percent occurring between 3:00 P.M. and 4:00 P.M.

Other park roads had a more even distribution of traffic accidents. The highest rates of 5 percent to 7 percent of daily traffic accidents each hour occurred between noon and 6:00 P.M. Almost all other hours accounted for 2 to 4 percent of daily accidents.

**Beach Drive and Ross Drive.** The locations of the 247 accidents that were recorded on Beach Drive during the 2001-2003 period were mapped. Of these, only 16 (6.7 percent) occurred on the segments between the Maryland border and the intersection with Broad Branch Road that currently are closed on weekends. Table 14 shows the distribution of accidents in these segments, plus accident data for Ross Drive, which could be used as an alternate north-south route through the park.

**TABLE 14: SUMMARY OF TRAFFIC ACCIDENTS ON BEACH DRIVE SEGMENTS  
NORTH OF BROAD BRANCH ROAD, 2001 TO 2003 <sup>a/</sup>**

Accident Type	Broad Branch to Joyce Road	Picnic Grove 10 to Wise Road	West Beach Drive to Mary- land border	Ross Drive	Total
Total accidents	6	6	4	0	16
Fatal accidents	0	0	0	0	0
Injury accidents	1	3	0	0	4
Property damage only	5	3	4	0	12
Collision with motor vehicle or other object	3	4	3	0	10
Collision involved pedestrian or bicyclist	0	0	0	0	0
Non-collision accidents	1	1	0	0	2

a/ Data are from NPS, Pettiford 2004c.

Concern was expressed during scoping and in comments on the draft environmental impact statement that many accidents occur along the narrow portion of Beach Drive where there is no trail and where pedestrians and cyclists enter the traffic flow. However, for the 2001-2003 period, only six accidents, including one with injuries, occurred in the three-quarter-mile stretch extending from the intersection with Broad Branch Road north to Joyce Road. None of these accidents involved a pedestrian or bicyclist. Factors that could contribute to the low incidence of traffic accidents along this stretch include its closure to motorized traffic on weekends and holidays and the extra caution taken by motorists who recognize the gorge area as potentially dangerous.

The portion of Beach Drive between the Wise Road intersection and picnic grove 10, which also is closed on weekends, had a similarly low number of accidents. However, this area appears to have had an unusually high ratio of injury accidents for the years 2001-2003 of 50 percent, compared to less than 25 percent throughout the remainder of the park and parkway (see table 13). During the 1993-1995 period, an even higher 60 percent of accidents on this road segment resulted in injuries. These findings over both periods suggest that public safety could benefit from an investigation to determine the causes of the high injury ratio in this road segment and the implementation of corrective measures.

The segment of Beach Drive from West Beach Drive to the Maryland border was the site of four accidents in the 2001-2003 period. These accidents resulted in property damage only, and none involved pedestrians or bicyclists.

As shown in table 14, no traffic accidents were recorded on Ross Drive during the 2001-2003 period. However, this road is very lightly traveled, and the 340 vehicles that use it on a daily basis represent only about 5 percent of the traffic levels on the parallel segment of Beach Drive.

**Fatalities.** Three traffic fatalities in the 2001-2003 period occurred in the park or along the parkway (table 13). This was one fewer (25 percent decrease) than the 1993-1995 period. None of the 2001-2003 fatalities involved a bicyclist or pedestrian and none occurred on Beach Drive.

Two of the fatalities occurred along the Rock Creek and Potomac Parkway.



One involved a driver traveling the wrong way on the ramp from P Street to the southbound parkway near midnight.

The other was an afternoon rush-hour rear-end accident in the intersection of the parkway and Beach Drive.

The third fatality occurred on the Piney Branch Parkway between Beach Drive and 17th Street. A driver traveling too fast for conditions on a rainy afternoon lost control and hit a tree head-on.

**Traffic Accidents involving Pedestrians and Bicyclists.** As shown in table 13, there were six traffic accidents involving motorized vehicles and pedestrians or bicyclists during the 2001-2003 period. This represented a decrease of more than 75 percent from the 28 traffic accidents involving motorized vehicles and pedestrians or bicyclists that occurred during the 1993-1995 period. Three of these accidents occurred on Beach Drive and three occurred along the Rock Creek and Potomac Parkway. Because of the low accident numbers, it was not possible to establish patterns relating to locations or causative factors.

**Accident Rates.** The accident rate for a road segment is calculated as the number of accidents per 100 million vehicle-miles traveled. Accident rates also can be determined for fatal and injury accidents.

Robert Peccia & Associates (1997) calculated accident, injury, and fatality rates for the park and parkway for the 3-year period, 1993-1995. The results are presented in table 15. The area evaluated for the Rock Creek and Potomac Parkway extended from Calvert Street to Ohio Drive. The Beach Drive analysis extended from the Maryland line to the intersection with the parkway south of the National Zoo.

A similar analysis was not conducted for the 2001-2003 data. However, park and parkway rates would be expected to be about 20 to 25 percent lower, based on the lower accident rates shown in table 13.

For comparison, table 15 also includes

average accident and injury rates in Washington, D.C. for 1993 through 1995 (calculated from District of Columbia 1995)

average fatality rates for Washington, D.C. and average accident, injury, and fatality rates nationwide in 2002 (National Highway Traffic Safety Administration 2002; Bureau of Transportation Statistics 2003)

The parkway had an overall accident rate that was about 20 percent higher than that occurring throughout Washington, D.C. and more than 2.4 times higher than the national accident rate. The fatality rate also was about 20 percent higher than the Washington, D.C. rate, but only 6 percent higher than the national rate. The parkway's injury rate also was higher, by 25 percent, than the national average, but was 13 percent lower than the injury rate for Washington, D.C.

The accident rate on Beach Drive exceeded the national rate by a factor of 1.8, but was about 10 percent lower than the accident rate of Washington, D.C. Probably because of the relatively slow speed limit on Beach Drive (25 miles per hour), the injury and fatality rates on this road equaled or were lower than the national rates.

**TABLE 15: ACCIDENT RATES FOR THE ROCK CREEK AND POTOMAC PARKWAY, BEACH DRIVE, AND WASHINGTON, D.C.**

<b>Location</b>	<b>Accident Rate (per 100 million vehicle-miles traveled)</b>	<b>Injury Rate (per 100 million vehicle-miles traveled)</b>	<b>Fatality Rate (per 100 million vehicle-miles traveled)</b>
Rock Creek and Potomac Parkway <sup>a/</sup>	540	127	1.6
Beach Drive <sup>a/</sup>	387	99	1.3
Washington, D.C. area	425 <sup>b/</sup>	147 <sup>b/</sup>	1.3 <sup>c/</sup>
Nationwide <sup>c/</sup>	221	102	1.5

a/ Data from Robert Peccia & Associates 1997.

b/ Data from District of Columbia 1995.

c/ Data from National Highway Safety Transportation Administration 2002; Bureau of Transportation Statistics 2003.

### **Crime**

A number of commenters on the draft general management plan mentioned feeling unsafe sometimes in the park, and some stated that safety concerns were a factor influencing their decisions on when and where to recreate. With regard to the management of Beach Drive, some commenters on the draft plan felt that it is unsafe to recreate along a busy road because no one could hear a cry for help over the traffic. Others felt that having lots of people in cars in the vicinity would help prevent personal crimes, such as assault.

Table 16 includes statistics for crimes against persons for the period 1999-2003 for the three police districts that include the park. The 2nd District is west of Beach Drive and the Rock Creek and Potomac Parkway. The 3rd and 4th Districts are east of Beach Drive and the parkway, with the 3rd District on the north. Although these districts include NPS properties, crimes occurring in the park are not reported separately.

Numbers of offenses within the 2nd District are substantially lower than numbers in the 3rd and 4th Districts. The only notable trends for these 5 years are a decrease in homicides for the 3rd District and a decrease in aggravated assaults in the 4th District. However, 10-year trends show substantial decreases in homicides and aggravated assaults for both the 3rd and 4th Districts (District of Columbia 2004d, 2004g, 2004h, 2004i, and 2004j).

### **Evacuation of the City during a Major Emergency**

Concerns about evacuating portions or all of Washington, D.C. during an emergency situation were raised by the public following the terrorist attacks of September 11, 2001. Comments focused on the possibility of using Beach Drive as an evacuation route to reach areas to the north.

Beach Drive is not formally designated as an emergency evacuation route. The National Park Service does not take any actions such as closing Beach Drive or any other park roads during emergency situations.

**TABLE 16: PERSONAL CRIME TOTALS FOR  
POLICE DISTRICTS 2, 3, AND 4 IN WASHINGTON, D.C., 1999-2003**

<b>Crime Type</b>	<b>Year</b>	<b>2nd District Total</b>	<b>3rd District Total</b>	<b>4th District Total</b>
Homicide	1999	3	31	39
	2000	3	30	40
	2001	0	30	29
	2002	3	17	41
	2003	2	16	31
Sexual Assault	1999	14	33	39
	2000	16	37	53
	2001	19	28	24
	2002	22	37	43
	2003	8	22	50
Aggravated Assault	1999	143	633	806
	2000	157	596	831
	2001	159	721	773
	2002	168	721	798
	2003	139	559	776

**REGIONAL AND LOCAL TRANSPORTATION**

A detailed description of traffic conditions in the vicinity of the Rock Creek Park and the Rock Creek and Potomac Parkway was included in *Transportation Study, Rock Creek Park, Washington, D.C.* (Robert Peccia & Associates 1997). That study was prepared to support this general management plan and used year 1990 data, which were the most current available. A similarly comprehensive traffic study has not been performed since then.

Information in this section is based on the Robert Peccia & Associates (1997) report, average daily traffic counts for 2001 provided by the District of Columbia, Department of Transportation (District of Columbia 2001a and 2001b), and a traffic analysis of the southern portion of Beach Drive and surrounding roads that was conducted in June 2004 (Parsons 2004). The most recent information available for each road segment was used in this analysis. Levels of service have not been recalculated since the work by Robert Peccia & Associates (1997) and their data are included in this evaluation.

**Regional Traffic Flows**

Traffic congestion in the Washington, D.C. metropolitan area is the third worst in the nation (Shaver 2003). The roads in the vicinity of Rock Creek Park are an important component of the urban road network of Washington, D.C.

Principal arterial routes radiate out from the center of the District and include Massachusetts, Wisconsin, Connecticut, Nebraska, Georgia, and Virginia Avenues as well as 16th Street. Many of the arterial streets extend into Maryland and are primary commuter and delivery routes into the District.

Military Road, the Whitehurst Freeway, and Porter, Harvard, Calvert, and M Streets traverse the park and provide for cross-town traffic.

The Average Weekday Traffic Volumes map presents traffic counts on major roads in the vicinity of Rock Creek Park from 1990, 2001, and 2004. The most recent data are reported for each road segment.

As shown on the map, the major arterials each had an average daily traffic (ADT) count of 20,000 to 40,000 vehicles.

On weekdays, the peak-hour morning count and peak-hour evening count were nearly identical (difference of 10 percent or less) for almost every major roadway.

On almost all of these roads, the peak-hour morning count and peak-hour evening count each accounted for approximately 8 percent to 9 percent of the ADT.

During the morning and evening commuting periods, traffic levels on these arterial roadways typically meet or exceed their capacities. Table G.1 in appendix G shows the average daily traffic volumes for the major roadways in the area (the most recent data from 1990, 2001, or 2004 are provided). The roadways usually can accommodate these high traffic volumes through aggressive traffic management measures such as reversing lanes during commuting periods.

Some morning and evening traffic counts in the mapped area have increased while others have decreased between 1990 and 2004. (Table G.2 in appendix G shows 1990 and 2004 peak hour volume data where available.) However, the patterns described above are still occurring.

In Maryland, Maryland 410 (East-West Highway) intersects Beach Drive and is the closest state road to the affected area. The average daily traffic for Maryland 410 near Beach Drive is 31,600 vehicles per day. The average daily traffic on Beach Drive at the state line (one mile south of Maryland 410) is approximately 5,400 (Simpson 2003).

Excellent public transportation opportunities occur in the area. The Washington Area Metropolitan Transit Authority provides Metro Bus service throughout the area. The Metro Rail's red line runs to the west of the park and the green line runs to the east of the park. Several Metro Rail stops are within 1 mile of the central portion of the park.

Recent counts of vehicular and passenger volumes show that throughout the metropolitan Washington area, single-occupancy vehicle use increased slightly from 1999 to 2002 (from 40 percent to 41 percent of all 5 A.M. to 10 A.M. inbound trips), while multiple-occupancy vehicle use decreased slightly (from 23 percent to 20 percent) (Metropolitan Washington Council of Governments 2003a). At the same time, transit trips increased from 36 percent to 38 percent, offsetting the decrease in multiple-occupancy vehicles.

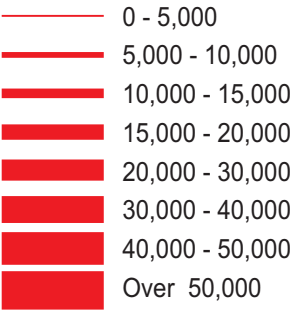
### **Local Traffic Flows**

The Rock Creek and Potomac Parkway and Beach Drive are the principal roads within Rock Creek Park.



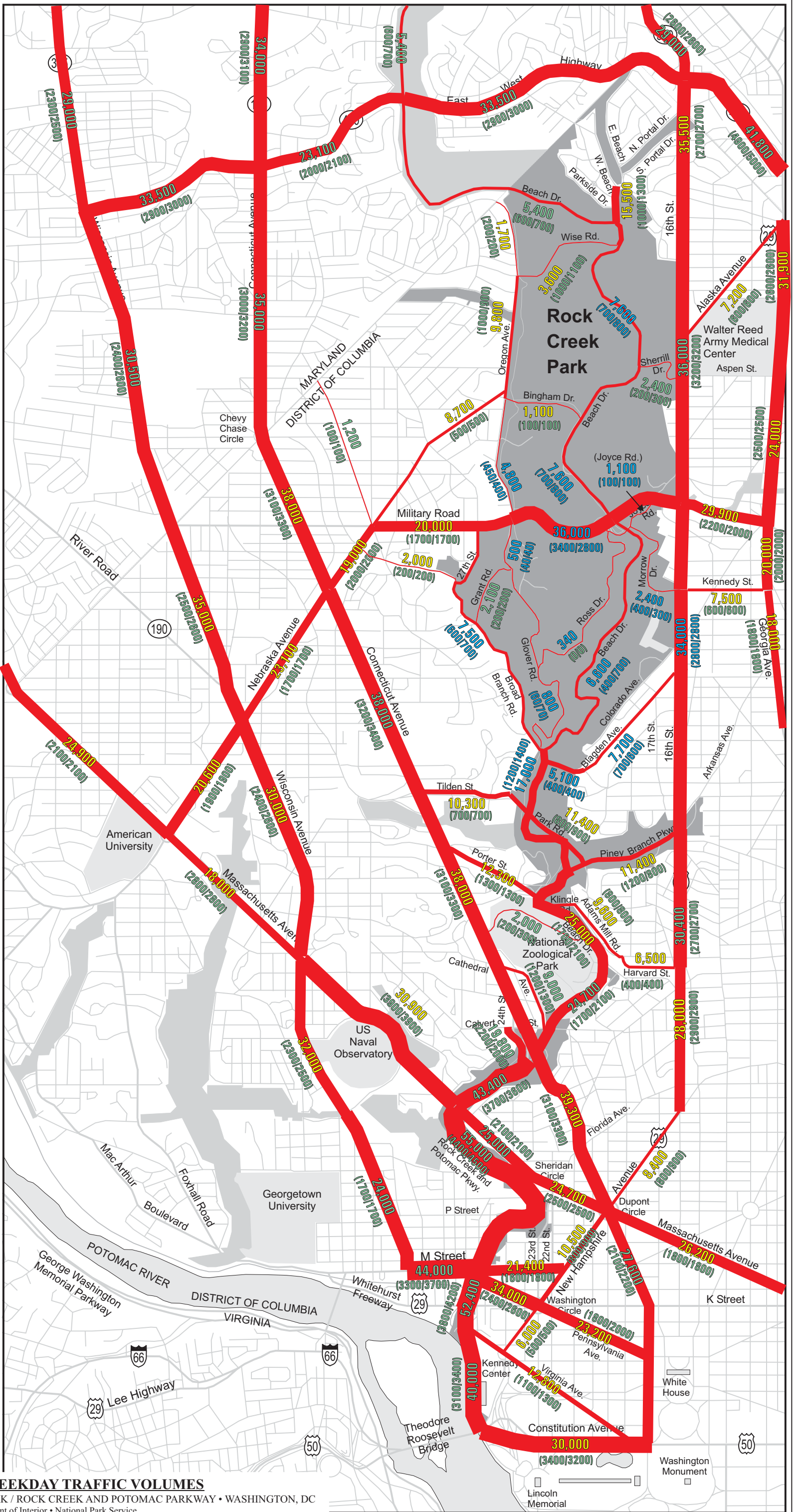
Map Scale: 1" = 0.5 Miles

Rock Creek Park



**900 = Average daily traffic volume (ADT)**  
**(100/100) = (AM Peak Hour/PM Peak Hour)**

**20,000** 1990 data  
**20,000** 2001 data  
**20,000** 2004 data





The Rock Creek and Potomac Parkway extends approximately 2.5 miles from the Theodore Roosevelt Bridge in the core of the District north to Calvert Street. The parkway is a four-lane, paved, limited-access facility with a posted speed limit of 35 miles per hour.

As shown on the Average Weekday Traffic Volumes map, this roadway carried more traffic than any other in the vicinity, with average daily traffic counts of 40,000 to 55,000 vehicles.

Traffic patterns were very similar to those described above for other arterials, with similar morning and evening traffic volumes and peak-hour counts during the morning and evening each accounting for approximately 8 percent to 9 percent of the average daily traffic.

It is assumed that, as with the other arterials, traffic has increased since 1990 on the Rock Creek and Potomac Parkway. However, accurate estimates of current traffic levels on this roadway are not available.

From Calvert Street, Beach Drive extends approximately 6.5 miles north to the Maryland state line. Beach Drive is a two-lane, paved road with a posted speed limit of 25 miles per hour. Traffic exhibited the following characteristics:

Overall, there was slightly more evening traffic than morning traffic. At all sites shown on the map, peak-hour evening traffic represented 5 percent to 13 percent of the average daily traffic, while morning peak-hour traffic accounted for 5 percent to 17 percent of the daily total.

Between Wise Road and Blagden Avenue, average daily traffic counts were 8,000 to 9,000 vehicles in 1990. More recent data were not available for this portion of the road.

Beach Drive between Joyce Road and Broad Branch Road has an average daily traffic volume on weekdays of about 6,600 vehicles. The highest 1-hour volume occurs during the afternoon rush hour and includes about 670 vehicles. During the 5-hour mid-day period on a weekday from 10:00 A.M. to 3:00 P.M., approximately 1,660 vehicle trips occur, for an average of about 330 vehicle trips per hour (Parsons 2004).

From Blagden Avenue south to the Rock Creek and Potomac Parkway, counts ranged from 18,000 to 24,700 vehicles per day in 1990; 12,500 to 25,100 in 2001; and 6,600 to 17,000 (from Blagden Avenue south to Tilden Road/Park Road only) in 2004. These data show a small decrease in traffic volumes over time for this section of Beach Road.

Twenty-four entry routes provide access to Rock Creek Park (see Existing Conditions map). Although the park is closed at dark, park roads and entry points remain open.

Major entry points north of Military Road include Beach Drive at the Maryland state line, West Beach Drive, and Wise Road.

South of Military Road, major entry points include Joyce Road, Morrow Drive, Broad Branch Road, Blagden Avenue, Park Road, Tilden Street, and Piney Branch Parkway.

Visitors can also enter the park from 16th Street NW, the Kennedy Street area, and from the National Zoological Park.

Commuting has the greatest effect on traffic flows through Rock Creek Park. Traffic volumes show little seasonal variation (NPS, Street 2004d) and the highest traffic levels correspond to the peak morning and evening commuting times. To accommodate these peaks in commuter traffic, all lanes of the Rock Creek and Potomac Parkway are designated as one-way southbound during the morning commute period (6:30 to 9:00 A.M.) and one-way northbound during the evening commute (3:30 to 6:00 P.M.) (NPS, Cox 2004a).

To provide recreational opportunities for pedestrians, bicyclists, and in-line skaters, the park closes portions of Beach Drive to motorized vehicle traffic during the day on weekends and holidays. During these times, Beach Drive is closed from Broad Branch Road to Joyce Road, picnic grove 10 to Wise Road, and West Beach Drive to the Maryland state line. Bingham Drive and Sherrill Drive also are closed.

During the week when all park roads are open to automobile traffic, interactions are common between automobiles and visitors on foot or using bicycles. These particularly occur in areas where a trail does not parallel Beach Drive, because those are places where pedestrians and bicyclists often enter the traffic flow.

To understand automobile traffic patterns, the National Park Service commissioned a license plate survey in 1996 (Robert Peccia & Associates 1997). The results indicated the following:

During weekday rush hours, more than 99 percent of all vehicles using the Rock Creek and Potomac Parkway and more than 95 percent of vehicles entering Rock Creek Park pass through without stopping.

Commuting patterns through Rock Creek Park do not simply flow north and south. Instead, many rush-hour drivers use segments of park roads to traverse the park and reenter the city street grid.

Only 3 percent of the vehicles that enter the park at the Maryland state line exit onto the parkway.

In the morning, the greatest number of vehicles that exit onto the parkway enter the park at Broad Branch Road (17 percent), Blagden Avenue (20 percent), and Piney Branch Parkway (34 percent).

In the evening, the patterns are very similar. Only 1 percent of the vehicles that enter from the parkway exit the park at the Maryland state line. The majority of vehicles exit onto Broad Branch Road (18 percent), Blagden Avenue (19 percent), and Piney Branch Parkway (33 percent).

The study also determined vehicle occupancy in August 1996. During commuting periods, the average vehicle occupancy on park roads ranged from a low of 1.09 people per vehicle on Morrow Drive to a high of 1.38 people per vehicle on Tilden Street. On nearby streets in the District,



the results ranged from 1.22 people per vehicle on Oregon Avenue to 1.34 people per vehicle on 16th Street. These averages indicate that much of the rush-hour use is by vehicles with a single occupant (Robert Peccia & Associates 1997).

More recently, vehicle occupancies were measured by the Metropolitan Washington Council of Governments in the final draft version of the *2002 Metro Employment Core Cordon Count of Vehicular and Passenger Volumes* (2003a). For the Rock Creek and Potomac Parkway just south of P Street N.W., the 5-hour inbound average vehicle occupancy was 1.18. Nearby major roads in northwest Washington ranged from 1.16 to 1.24 occupants per vehicle. These updated vehicle occupancy statistics indicate that the majority of rush-hour use is still by single-occupancy vehicles.

Higher traffic volumes during peak hours cause delays at certain intersections during the commuting periods (Robert Peccia & Associates 1997).

In the morning, the following intersections failed or functioned very poorly: Beach Drive and Blagden Avenue, Beach Drive and Piney Branch Parkway, Beach Drive and Tilden Street/Park Road, and 16th Street and Kennedy Drive/Morrow Road.

In the evening, failures or poor operations occurred at Beach Drive and Joyce Road, Beach Drive and Porter Road, and Beach Drive and Tilden Street/Park Road.

Most vehicles travel at or above the posted speed limit through the park. Spot speed checks revealed that the average speed was 15 miles per hour over the posted speed limit. Commuters in Rock Creek Park also tend to have more aggressive driving habits than do visitors unfamiliar with the park. A detailed speed analysis can be found in *Transportation Study, Rock Creek Park, Washington, D.C.* (Robert Peccia & Associates 1997).

Residents in neighborhoods to the north of the park perceive that with the current management of weekend closures, there is substantial cut-through traffic in their neighborhoods once drivers realize that Beach Drive is closed (Mikulski 2003). They are concerned that the same would happen if permanent or mid-day weekday road closures on Beach Drive occurred. Observations included in comments on the draft general management plan were that the non-local traffic in their neighborhoods on weekends consists of drivers who are not familiar with the area or the weekend closures and intended to enter Rock Creek Park via Beach Drive. When they find Beach Drive is closed, they turn onto the nearby neighborhood streets in an attempt to get back to a local arterial.

The Maryland-National Capital Park and Planning Commission responded to residents' concerns by conducting a limited traffic count study in summer 2003 for three roads (Beach Drive north of the park, Daniel Road., and Pinehurst Parkway) in Montgomery County, Maryland, just to the north of the park (Maryland-National Capital Park and Planning Commission, Hawthorne 2004). Results are summarized in table 17.

The traffic counts demonstrated that weekend traffic is higher for the neighborhood roads than during the week. Some of this is related to neighborhood residents running errands or conducting other local activities on weekends. However, Richard Hawthorne, the Chief of Transportation Planning for the Maryland-National Capital Park and Planning Commission, believes that it also is attributable to the weekend closure of Beach Drive in Rock Creek Park. Mid-day weekday volumes for Beach Drive measured in this count may indicate the maximum number of vehicles that could potentially travel through these neighborhoods if Beach Drive were closed during the mid-day period on weekdays.

**TABLE 17: AVERAGE MID-DAY AND DAILY TRAFFIC VOLUMES FOR NEIGHBORHOOD ROADS NORTH OF ROCK CREEK PARK IN 2003 <sup>a/</sup>**

Road Segment	Weekday		Saturday	
	Average Daily Traffic	9:00 A.M. – 3:00 P.M. Volumes	Average Daily Traffic	9:00 A.M. – 3:00 P.M. Volumes
Beach Drive (north of Rock Creek Park)	5,700	1,500	650	275
Pinehurst Parkway	970	320	960	460
Daniel Road	1,980	670	2,180	930

a/ Data are from Maryland-National Capital Park and Planning Commission, Hawthorne 2004.

### Mass Transportation

There are 14 Metrorail stations within a mile of the park and parkway (see the Existing Conditions map) and numerous bus stops. The Washington Metropolitan Area Transit Authority provides bus and rail service in the region, which includes the District of Columbia, two counties in Maryland, and three counties in Virginia. Average weekday ridership in fiscal year 2004 was 650,000, a sizable portion of the 3.2 million residents in the service area (Washington Metropolitan Area Transit Authority 2004a and 2004b). Transportation trends show that transit use increased, while automobile transportation decreased in the last 10 years (Metropolitan Washington Council of Governments 2003a).

Transit buses and commercial vehicles are not permitted on park roads or the parkway. The number of visitors entering the park and parkway by foot or bicycle from the mass transit network is unknown, but is believed to be relatively small.

### Nonmotorized Transportation Flows

Nonmotorized transportation in this document includes walking, bicycling, and other means of personal transport for the purpose of getting from one location to another. This contrasts with nonmotorized recreation, defined here as walking or riding for pleasure, fitness, or some other recreational purpose.

Bicycles are used by 1.16 percent of the population for all District of Columbia-based work trips, a higher percentage than most major cities in the United States (District of Columbia 2004f). Studies prepared for the National Capital Region Transportation Planning Board (NCRTPB) of the Metropolitan Washington Council of Governments (MWCOC) reported that cyclists represent a wide range of ages, and more than half have an annual income of \$75,000 or greater (Bairstow 1995a and 1995b).

There are several hundred miles of paved trails and designated bicycle routes in the region. The report entitled *Priorities 2000 Metropolitan Washington Greenway* (Metropolitan Washington Council of Governments 2001) highlights Rock Creek Park as an existing greenway and designates Fort Circle Greenway and the Metropolitan Branch Trail as regional priority projects that would connect directly to Rock Creek Park. Other major trails that currently connect to the paved trails through Rock Creek Park and the parkway include the Rock Creek Trail (in Rock Creek

Regional Park, Maryland), the Capital Crescent Trail, the Mount Vernon Trail, and the C and O Canal Trail.

A 1990s survey (Sacks 1994) found that 67 percent of all users on the paved recreation trails in Rock Creek Park and along the parkway during weekday peak hours were engaged in transportation rather than strictly recreation. Average distance traveled by such users was 5.3 miles. Typical nonmotorized transportation participants in the park and parkway lived within 2 miles of the paved trail system and were going to destinations within 1 mile of the trail.

Bicycling is the most popular form of nonmotorized transportation along the park and parkway, accounting for 54 percent to 86 percent of average weekday nonmotorized transit during a 1-day August 1996 survey (Robert Peccia & Associates 1997). Surveys (Bairstow 1995a and 1995b) of morning peak-hour bicyclists along the Rock Creek and Potomac Parkway trail determined the following characteristics:

Eighty-five percent of the trail users were going to destinations in the District and 16 percent were headed through the park to locations in Arlington, Virginia.

Bicyclists averaged 9.9 miles per trip on paved trails.

Sixty-eight percent of cyclists preferred off-street trails while 20 percent preferred bike lanes on streets or sharing streets with automobiles.

Bad weather was the greatest deterrent to cycling (72 percent). The threat to safety from traffic was the second most frequently mentioned deterrent (35 percent).

The same survey of bicyclists on radial routes into the city documented that paved trails have a 5-fold or greater increased bicycle use compared to designated street routes or low-traffic roads (Bairstow 1995a and 1995b). This survey, combined with 1993 counts, indicated about 60 bicycles per hour during the evening peak period on the Rock Creek and Potomac Parkway paved trail at P Street. The studies considered 12 to 80 bikes per hour to be in the high range for the region.

A 1-day, 8-hour sample of nonmotorized transportation in the park and parkway was collected on Thursday, August 22, 1996 (Robert Peccia & Associates 1997). Similarly to the NCRTPB survey (Bairstow 1995a and 1995b), the Peccia survey found preferential use of trails, with an average weekday hourly volume of 34 users per hour on the bike/foot trail south of the Beach Road/Broad Branch Road intersection and 14 users per hour on Beach Drive north of this intersection. Beach Drive in the vicinity of Joyce Road averaged 22 users per hour, and 112 users per hour were recorded on the bike/foot path along the Rock Creek and Potomac Parkway south of P Street.

Little information is available on pedestrian nonmotorized transportation. However, the 2000 Census reports that 11.8 percent of the District of Columbia's population walked to work. Results from zip code tabulation areas close to or within the downtown area indicate that up to 50 percent of commuters walk to work (U.S. Census Bureau 2000).

## **COMMUNITY CHARACTERISTICS**

Community characteristics are included as an impact topic based on the criteria presented in the "Impact Topics - Resources and Values at Stake in the Planning Process" section.

## **Metropolitan Washington, D.C.**

The Washington, D.C. metropolitan area is generally illustrated in the Region map shown at the beginning of this general management plan. More than 4 million people reside in the U.S. Census Bureau's Washington metropolitan statistical area, including about 570,000 people who live within the boundaries of the District (U.S. Census Bureau 2000). The remainder of the statistical area consists of five Maryland counties, six Virginia counties, and four Virginia cities (District of Columbia 1996c).

Washington, D.C.'s population is approximately 60 percent African American, 31 percent white, and 9 percent other races. Approximately 8 percent of Washington, D.C.'s citizens also identify themselves as Latino. Compared to statistics from the 50 states, the District's per capita income is 33 percent higher than the national average (U.S. Census Bureau 2000).

Generalizations cannot be made about ethnic composition of the nearby areas in Maryland and Virginia. For example, populations in some of these communities are 90 percent or more white, while the Takoma Park area (zip code tabulation area 20912) just north of the Maryland state line is 36 percent black, 43 percent white, and 22 percent other races, with 21 percent of the residents identifying a Latino heritage.

## **Surrounding Neighborhoods and Zip Code Tabulation Areas**

The Existing Conditions map shows the locations of the U.S. Census Bureau zip code tabulation areas for Washington, D.C. in the vicinity of the park. It also shows the zip code tabulation areas for the Maryland cities of Chevy Chase, Silver Springs, and Takoma Park that are just north of Rock Creek Park.

Table 18 provides statistics from the 2000 census for areas around the park, organized by zip code tabulation area. Zip code tabulation areas are generalized area representations of U.S. Postal Service ZIP Code service areas that are aggregations of census blocks. More information on how zip code tabulation areas were designated can be found at:

<http://www.census.gov/geo/ZCTA/zcta.html>.

The neighborhoods surrounding Rock Creek Park are some of the most racially, ethnically, and economically diverse in the Washington, D.C. metropolitan area. Many residential and mixed-use areas, including Adams Morgan, DuPont Circle, and Georgetown, as well as office buildings and foreign embassies, are located near the park and parkway. During scoping, citizens living in the adjoining neighborhoods both east and west of Rock Creek Park expressed concerns about local increases in traffic that might be associated with changes in park management.

To the north of the park in Montgomery County, Maryland, are communities that are primarily residential, with commercial development extending along the major thoroughfares. These include Connecticut Avenue, Wisconsin Avenue, and 16th Street. Table 19 summarizes selected census characteristics of the people living in these communities, organized by zip code tabulation area.

In addition to Rock Creek Park, many recreational and educational opportunities exist in the area. Some of these are identified below. However, Rock Creek Park is unique because it is the only major natural area in this urban environment.

More than 40 recreation centers, 25 swimming pools, and 75 tennis courts provide active recreational opportunities in the areas neighboring the park.

More than 100 public and private schools are located in the surrounding area, along with major universities such as American University, University of the District of Columbia, George Washington University, Georgetown University, and Howard University.

Many other public parks occur in the area, including the C&O Canal National Historical Park, the sites of the Civil War Defenses of Washington, Meridian Hill Park, Dumbarton Oaks Park, Glover-Archbold Park, Montrose Park, and the National Zoological Park.

Montgomery County's Rock Creek Regional Park borders Rock Creek Park to the north. The regional park follows Rock Creek through southern Montgomery County and provides many recreational opportunities such as fishing, boating, canoeing, picnic shelters, a golf course, and trails.

**TABLE 18: GENERAL CHARACTERISTICS OF THE POPULATIONS OF WASHINGTON, D.C.  
SURROUNDING ROCK CREEK PARK BY ZIP CODE TABULATION AREA <sup>a/</sup>**

Feature	Zip Code Tabulation Area <sup>b/</sup>									Total Dis- trict
	2007	2008	2009	2010	2011	2012	2015	2036	2037	
Population	28,818	26,195	46,561	28,772	57,444	13,604	15,824	3,808	12,642	572,059
Land area (acres) <sup>c/</sup>	2,145	1,895	865	996	3,110	1,630	2,151	201	470	39,303
Population density (residents per acre)	13	14	54	29	18	8	7	19	27	15
Average household size	1.86	1.61	1.81	2.59	2.50	2.32	2.29	1.31	1.37	2.16
Median household income	\$70,815	\$66,339	\$42,106	\$33,408	\$39,757	\$59,040	\$97,091	\$51,847	\$42,487	\$40,127
Age distribution										
Under 18 years	8%	9%	14%	22%	21%	18%	19%	2%	2%	20%
18-64 years	84%	78%	80%	70%	62%	65%	59%	91%	86%	68%
65+ years	8%	13%	7%	9%	17%	18%	22%	7%	13%	12%
Racial composition										
White	87%	84%	49%	23%	8%	16%	82%	82%	75%	31%
Black or African-American	4%	5%	32%	47%	80%	75%	10%	5%	12%	60%
Other	10%	10%	19%	30%	12%	9%	8%	13%	13%	9%
Also identified Latino heritage	5%	7%	20%	32%	14%	8%	5%	7%	13%	8%
Educational attainment										
Less than high school diploma	2%	4%	20%	41%	26%	14%	7%	2%	6%	22%
High school graduate (only)	5%	5%	11%	17%	27%	15%	10%	5%	5%	21%
College, 1-3 years	10%	10%	14%	16%	25%	22%	15%	9%	13%	18%
College, 4 or more years	83%	82%	56%	26%	22%	49%	69%	84%	76%	39%

**TABLE 18: GENERAL CHARACTERISTICS OF THE POPULATIONS OF WASHINGTON, D.C. SURROUNDING ROCK CREEK PARK BY ZIP CODE TABULATION AREA (CONTINUED)**

Feature	Zip Code Tabulation Area <sup>b/</sup>									Total District
	2007	2008	2009	2010	2011	2012	2015	20036	20037	
Housing unit occupancy										
Owner occupied (percent of occupied)	48%	38%	28%	32%	54%	67%	73%	35%	31%	41%
Renter occupied (percent of occupied)	52%	62%	72%	68%	46%	33%	27%	65%	70%	60%
Vacant (percent of total units)	5%	5%	7%	9%	7%	5%	2%	7%	11%	10%
Median gross rent	\$896	\$943	\$699	\$559	\$554	\$625	\$794	\$851	\$866	618
Median value of owner-occupied units	\$497,500	\$560,200	\$290,000	\$156,300	\$139,400	\$220,600	\$399,500	\$530,300	\$380,900	\$157,200
Unemployment rate	4%	1%	4%	6%	5%	4%	1%	2%	11%	7%
Families below poverty line in 1999	4%	3%	18%	19%	10%	5%	1%	2%	5%	17%
Individuals below poverty line in 1999	14%	6%	18%	22%	14%	9%	4%	10%	23%	20%
Commuting to work										
Car, truck, or van: drove alone	47%	34%	26%	30%	49%	51%	53%	16%	13%	38%
Car, truck, or van: carpooled	9%	6%	8%	14%	15%	12%	13%	2%	3%	11%
Public transportation (including taxi)	17%	44%	38%	47%	32%	26%	21%	30%	27%	33%
Walked	17%	8%	22%	6%	2%	6%	4%	43%	51%	12%
Other means	3%	1%	4%	3%	1%	1%	2%	3%	1%	2%

a/ All data are from the 2000 U.S. Census and are available at [www.census.gov](http://www.census.gov).

b/ Zip code tabulation areas aggregate census block data to the zip code level, and may not correspond exactly with postal zip codes.

c/ Land area data were obtained from the U.S. 2000 Gazetteer, available at [www.census.gov](http://www.census.gov).

**TABLE 19: GENERAL CHARACTERISTICS OF THE POPULATIONS OF MARYLAND COMMUNITIES NEAR ROCK CREEK PARK BY ZIP CODE TABULATION AREA <sup>a/</sup>**

Feature	Zip Code Tabulation Area <sup>b/</sup>			Montgomery County, MD
	20815	20910	20912	
Population	27,916	35,588	24,498	873,341
Land area (acres) <sup>c/</sup>	3,558	2,989	1,637	317,025
Population density (residents per acre)	8	12	15	3
Average household size	2.20	2.15	2.52	2.66
Median household income	\$ 95,511	\$50,552	\$44,572	\$ 71,551
Age distribution				
18 years and older (percent)	79%	81%	76%	75%
Under 18 years	21%	19%	24%	25%
18-64 years	58%	70%	68%	63%
65+ years	21%	11%	8%	11%
Racial composition				
White	89%	52%	43%	65%
Black or African-American	3%	32%	36%	15%
Other	8%	17%	22%	20%
Also identified Latino heritage	5%	14%	21%	12%
Educational attainment				
Less than high school diploma	3%	12%	18%	10%
High school graduate (only)	7%	13%	16%	15%
College, 1-3 years	12%	20%	21%	21%
College, 4 or more years	79%	56%	45%	55%
Housing unit occupancy				
Owner occupied (percent of occupied)	66%	36%	38%	69%
Renter occupied (percent of occupied)	34%	64%	62%	31%
Vacant (percent of total units)	4%	3%	4%	3%
Median gross rent	\$1,233	\$844	\$658	\$914
Median value of owner-occupied units	\$469,400	\$208,300	\$178,800	\$221,800
Unemployment rate	1%	2%	5%	2%
Families below the poverty line in 1999	2%	4%	10%	4%
Individuals below the poverty line in 1999	3%	7%	12%	5%
Commuting to work				
Car, truck, or van: drove alone	58%	54%	52%	69%
Car, truck, or van: carpooled	9%	9%	14%	11%
Public transportation (including taxi)	18%	29%	26%	13%
Walked	4%	3%	4%	2%
Other means	1%	1%	1%	1%

a/ All data are from the 2000 U.S. Census and are available at [www.census.gov](http://www.census.gov).

b/ Zip code tabulation areas were defined specifically for aggregating census block data to the zip code level.

c/ Land area data were obtained from the U.S. 2000 Gazetteer, available at [www.census.gov](http://www.census.gov).



Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

## ENVIRONMENTAL CONSEQUENCES

*For each impact topic, this section identifies the applicable regulations and policy, describes the methods used to determine environmental effects, presents the results of the analysis, identifies cumulative impacts, and presents a conclusion.*

### ENVIRONMENTAL IMPACTS OF ALTERNATIVE A: IMPROVED MANAGEMENT OF ESTABLISHED PARK USES

#### IMPACTS ON AIR QUALITY

##### Regulations and Policy

The regulations and policies that guide NPS actions with respect to air quality are presented in the “Servicewide Mandates and Policies” section of this document.

##### Methodology

Within Rock Creek Park, vehicle tailpipe emissions are the only substantial source of air pollutants. Occasionally, dust emissions from exposed soils and smoke particulates from small wildfires contribute particulate pollutants. However, dust and smoke particulate emissions occur only sporadically, for short periods, and in such small quantities that their contributions to overall park air quality are very small. Consequently, dust and smoke emissions are not considered further in this analysis.

Tailpipe emissions from automobiles and other internal combustion engines contain particulates, hydrocarbons, and oxides of carbon, nitrogen, and sulfur. As described in the “Affected Environment” section, the Washington, D.C. region most recently achieved compliance with the National Ambient Air Quality Standard (NAAQS) for carbon monoxide (in 1988) and now implements a maintenance plan to prevent violations. Therefore, this impact evaluation focuses on changes in emissions of carbon monoxide that result from each alternative. It is assumed that if carbon monoxide concentrations are within the standard, other tailpipe emissions, which have not historically been a problem in the region, also will not exceed air quality standards.

Air quality has been improving in the region. No exceedences of carbon monoxide have occurred since 1988 and data indicate that the long-term trend for carbon monoxide is downward. This trend has been attributed to the increasing use of oxygenated fuels and the gradual replacement of older, more polluting motor vehicles with newer models (Day 2004).

It is believed that improvements will continue into the future (Day 2004). However, there is no basis for quantifying these improvements. Therefore, this evaluation assumed that emissions per vehicle in the year 2020 would be identical to those produced per vehicle in 2001 and 2002.

Most tailpipe emissions in the Washington, D.C. area come from automobile traffic. Regardless of any actions taken by the National Park Service at Rock Creek Park, local and regional traffic levels are expected to increase from those defined in the “Affected Environment” section. The magnitude of these increases is presented in the “Impacts on Regional and Local Transportation” section.

Because traffic will increase, the evaluation of impacts on air quality for each action alternative was determined through comparisons to the conditions that are modeled for the year 2020 without any change in park management (Alternative B).

Carbon monoxide concentrations in the year 2020 were estimated by assuming that increases in carbon monoxide between now and 2020 would be proportional to increases in automobile traffic volumes between now and 2020. Average daily traffic counts were used to express automobile volumes.

The most recent average traffic counts available for city streets were obtained from the District of Columbia, Department of Transportation map entitled *2001 Traffic Volumes* (District of Columbia 2001a and 2001b). For locations inside Rock Creek Park, average daily traffic counts were measured in June 2004 (Parsons 2004). These counts are shown on the Average Weekday Traffic Volumes map in the “Affected Environment” section.

Average daily traffic counts for 2020 were obtained from modeling conducted by Robert Peccia and Associates (1997). For details on the model, see the section “Impacts on Regional and Local Transportation” for Alternative A and the information in appendixes G and H. The resulting Alternative A and B Year 2020 Average Weekday Traffic Volumes map is shown on the following page. Maps applicable to other alternatives are included in subsequent sections.

The highest 1-hour carbon monoxide concentration detected during 2001 and 2002, a reading of 7.6 parts per million on October 16, 2002, was used as the baseline representation of the reasonable worst-case condition within the District and in the park and parkway area.

The traffic modeling for the year 2020 did not identify any changes in regional traffic because of management actions at Rock Creek Park. Instead, the alternatives would redistribute the same traffic volume onto different roadways. Based on the traffic modeling, this air quality analysis assumed that regional air quality also would not change among alternatives. Therefore, this analysis focused on changes among alternatives that would occur at individual intersections.

The geographic area that was included in the air quality analysis is the area shown on the Alternative A and B Year 2020 Average Weekday Traffic Volumes map. Within this area, the following locations were evaluated to determine effects on air quality.

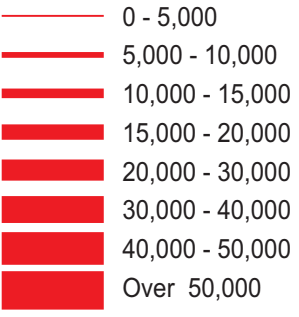
The Rock Creek and Potomac Parkway/M Street/Pennsylvania Avenue intersection, because this is the busiest intersection on the map.

The intersections of Beach Drive/Wise Road, Beach Drive/Military Road, and Beach Drive/Broad Branch Road/Blagden Avenue, because the management prescriptions vary among alternatives at these intersections.

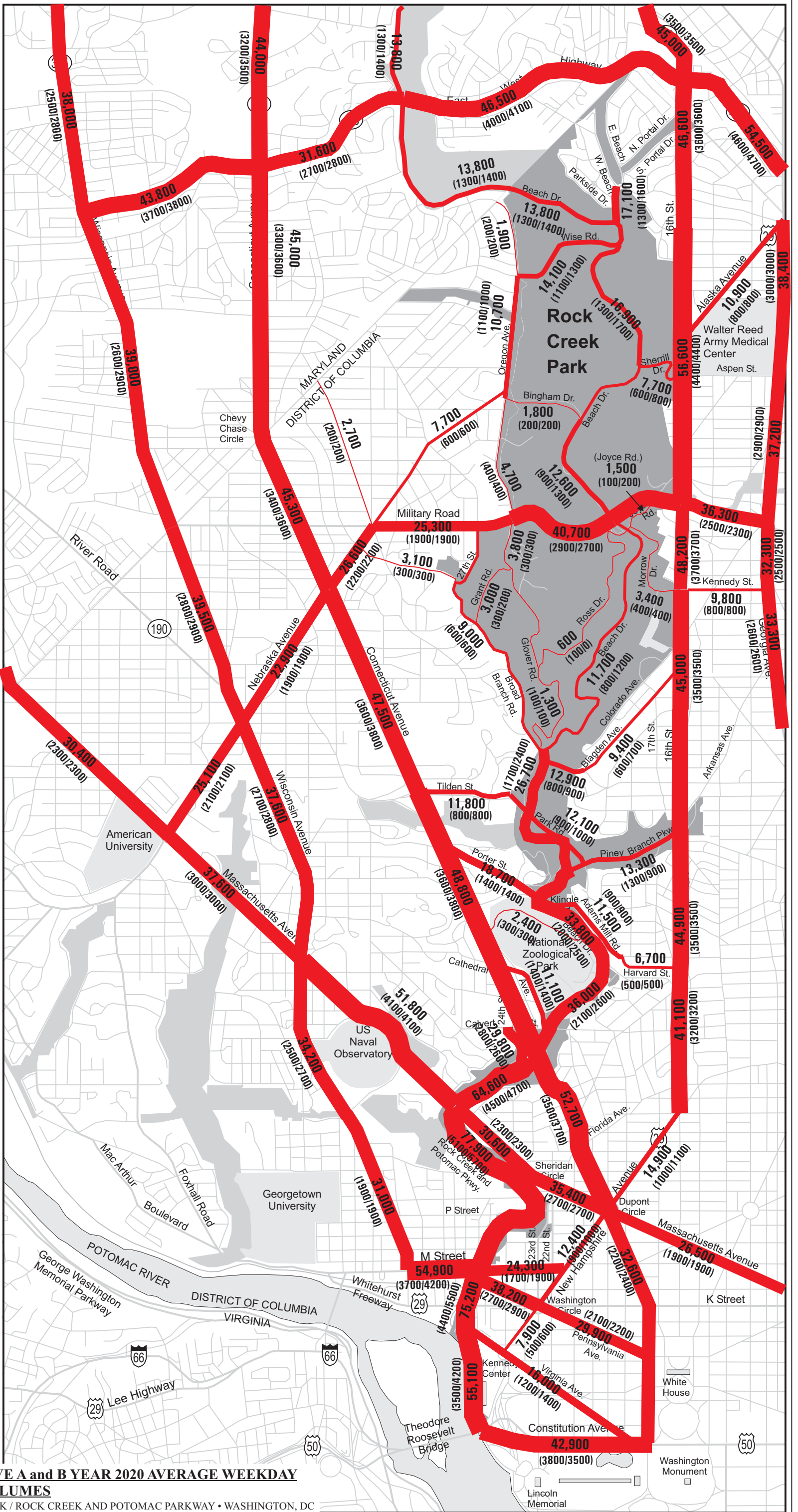


Map Scale: 1" = 0.5 Miles

Rock Creek Park



900 = ADT  
 (100/100) =  
 (AM Peak Hour/PM Peak Hour)



**ALTERNATIVE A and B YEAR 2020 AVERAGE WEEKDAY TRAFFIC VOLUMES**  
 ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY • WASHINGTON, DC  
 United States Department of Interior • National Park Service  
 DCS • January 2005 • 821 / 20049



The intersections of Wisconsin Avenue and Nebraska Avenue, Connecticut Avenue and Nebraska Avenue, and 16th Street and Military Road, because these are the locations that would receive the greatest increases in traffic if traffic management procedures were implemented in the park and along the parkway.

Each car both enters and exits an intersection. To avoid double-counting of cars, all of the average daily traffic counts around an intersection were summed, and the total was divided by two. For example, using values from the Alternative A and B Year 2020 Average Weekday Traffic Volumes map at the intersection of 16th Street and Military Road, the average daily traffic volumes were summed (total equals 181,800) and divided by two to determine that 90,900 vehicles would pass through the intersection during a normal workday.

Changes in air quality could be either beneficial (reducing carbon monoxide concentrations relative to Alternative B) or adverse (increasing carbon monoxide concentrations relative to Alternative B).

A short-term air quality impact could last over a period of several weeks or months, but would not be expected to recur after a defined period. For example, dust and construction-vehicle emissions associated with rehabilitation and expansion of the Rock Creek Nature Center and Planetarium would cause a short-term air quality impact but would end with the completion of construction. A long-term air quality impact may last for only a few hours each day, but would recur regularly, creating a pattern of changes in carbon monoxide concentrations relative to Alternative B. Changes in tailpipe emissions at an intersection because of changes in traffic management would be an example of a long-term air quality impact.

A negligible impact on air quality was defined as a change resulting from an alternative that would cause the maximum 1-hour average concentration of carbon monoxide at any intersection to change by less than 2 parts per million relative to Alternative B.

A minor impact on air quality was defined as a change resulting from an alternative that would cause the maximum 1-hour average concentration of carbon monoxide at any intersection to change by 2 to 5 parts per million relative to Alternative B.

A moderate impact on air quality was defined as a change resulting from an alternative that would cause the maximum 1-hour average concentration of carbon monoxide at any intersection to change by 5 to 8 parts per million relative to Alternative B.

A major impact on air quality was defined as a change resulting from an alternative that would cause the maximum 1-hour average concentration of carbon monoxide at any intersection to change by more than 8 parts per million relative to Alternative B. In addition, any change resulting from an alternative that would cause a change in carbon monoxide National Ambient Air Quality Standard attainment at any intersection relative to Alternative B was identified as a major impact.

Impairment of air quality would occur if there was a major adverse impact on air quality resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

As described in the “Affected Environment” section, the Washington, D.C. metropolitan area is not yet classified as an attainment area for the ground-level ozone National Ambient Air Quality Standard. However, as discussed in that section, ozone is not a tailpipe emission but is a secondary pollutant that results from region-wide interactions of air pollutants with sunlight. Ozone would not be affected by the redistribution of traffic that would occur from the Rock Creek Park management alternatives and, therefore, was not considered in this impact evaluation.

### **Analysis**

Regardless of the actions associated with Alternative A, the air quality of Rock Creek Park and the Rock Creek and Potomac Parkway would be affected more by emissions throughout the regional airshed than by tailpipe emissions from vehicles using the park and parkway.

Table 20 summarizes the effects of Alternative A on air quality in the year 2020 compared to Alternative B. The focus of Alternative A is on reducing traffic speeds throughout the park and parkway rather than changing traffic volumes. Some of the traffic that would have used Beach Drive under Alternative B may voluntarily divert under Alternative A to Ross Drive between Military Road and the Broad Branch Road/Ross Drive/Beach Drive intersection, but would reestablish the Alternative B traffic pattern outside of this area. As a result, the differences in traffic volumes between the two alternatives would be negligible, as would differences in carbon monoxide concentrations at intersections in and around the park and parkway.

Table 20 also shows the estimated concentrations of carbon monoxide at intersections in and around the park and parkway in the year 2020 with the implementation of Alternative A. As shown in the table, the worst 1-hour carbon monoxide concentration that would be associated with Alternative A (12.6 parts per million at the intersection of Beach Drive, Broad Branch Road, and Bladgen Avenue) would be well below the 1-hour National Ambient Air Quality Standard of 35 parts per million that is protective of human health and the environment.

Alternative A would include some construction in the park that would not occur with Alternative B. This would include preserving historic structures, expanding the Rock Creek Nature Center and Planetarium, and possibly constructing new buildings at the maintenance yard or the H-3 area. Best management practices and prompt revegetation would be applied in association with all construction to ensure that dust and construction-vehicle emissions associated with these activities would not be substantially greater than those that would occur with Alternative B.

### **Cumulative Impacts**

No changes would occur in air emissions from vehicles in the region because of Alternative A management actions at Rock Creek Park and the Rock Creek and Potomac Parkway. Although Alternative A would slow traffic speeds along the park and parkway, there would be little difference in motor vehicle use or distribution compared to Alternative B. As a result, Alternative A would have negligible effects on the regional air quality.

**TABLE 20: AIR QUALITY IMPACT EVALUATION BASED ON ESTIMATED  
MAXIMUM-HOUR CARBON MONOXIDE (CO) CONCENTRATIONS IN 2020**

<b>Location</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>
Rock Creek and Potomac Parkway/M Street/Pennsylvania Avenue				
Average daily traffic count (vehicles)	135,250	135,250	130,050	130,050 to 135,250
Max 1-hour carbon monoxide concentration	9.9	9.9	9.6	9.6 to 9.9
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	negligible	negligible
Beach Drive/Wise Road				
Average daily traffic count (vehicles)	24,050	24,050	13,250	13,250 to 24,050
Max 1-hour carbon monoxide concentration	11.4	11.4	6.3	6.3 to 11.4
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	moderate	negligible to minor
Beach Drive/Military Road				
Average daily traffic count (vehicles)	51,700	51,700	39,800	39,88 to 51,700
Max 1-hour carbon monoxide concentration	9.6	9.6	7.4	7.4 to 9.6
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	minor	negligible to minor
Beach Drive/Broad Branch Road/Blagden Avenue				
Average daily traffic count (vehicles)	30,800	30,800	22,050	22,050 to 30,800
Max 1-hour carbon monoxide concentration	12.6	12.6	9.1	9,1 to 12.6
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	minor	negligible to minor
Wisconsin Avenue north of Nebraska Avenue				
Average daily traffic count (vehicles)	62,550	62,550	65,000	62,550 to 65,000
Max 1-hour carbon monoxide concentration	8.7	8.7	9.1	8.7
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	negligible	negligible
Connecticut Avenue north of Nebraska Avenue				
Average daily traffic count (vehicles)	71,150	71,150	72,350	71,150 to 72,350
Max 1-hour carbon monoxide concentration	9.2	9.2	9.3	9.2
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	negligible	negligible
16th Street/Military Road intersection				
Average daily traffic count (vehicles)	90,900	90,900	95,250	90,900 to 95,250
Max 1-hour carbon monoxide concentration	10.2	10.2	10.7	10.2
Exceeds 1-hour NAAQS of 35 ppm	no	no	no	no
Change relative to Alternative B	negligible	-	negligible	negligible



Provisions of Alternative A to reduce traffic speeds in the park and on the parkway may encourage some travelers to use bicycles rather than automobiles. This change in transportation mode would result in a beneficial but negligible effect on the regional air quality.

### **Conclusions**

Alternative A would result in negligible effects on air quality compared to Alternative B. It would not result in the exceedence of the 1-hour National Ambient Air Quality Standard for carbon monoxide. It would not cause any impairment of resources or values associated with air quality.

## **IMPACTS ON ROCK CREEK AND ITS TRIBUTARIES**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to water quality and hydrology in Rock Creek and its tributaries are presented in the “Servicewide Mandates and Policies” section of this document.

### **Methodology**

The area addressed in the water quality and hydrology analysis of Rock Creek and its tributaries is described in the “Geographic Area Covered by the General Management Plan” section. This includes

- the 1,754 acres administered by the National Park Service in the Rock Creek valley from the Maryland state line south to the National Zoo

- the Rock Creek and Potomac Parkway from the National Zoo to Virginia Avenue

- selected tributaries to Rock Creek and associated roadways

All of the alternatives include implementing best management practices to improve the hydrology and quality of surface waters in the park. Therefore, the analysis for each alternative included an evaluation of the effects of the best management practices compared to current conditions. In addition, conditions that would occur under Alternatives A, C, and D were compared to conditions that would occur under Alternative B to determine differences that would result compared to continuing with current management practices at the park.

Historical and current water quality within the park was determined from existing water quality data. The effects of Alternatives A, C, and D were estimated by adding the incremental effect of the alternatives to the estimated water quality conditions with continuation of existing management practices (Alternative B).

Changes to Rock Creek and its tributaries could be either beneficial (reducing pollutant loadings or the intensity of storm water flows) or adverse (increasing pollutant loadings or the intensity of storm water flows).

A negligible effect would be a change that probably would not be detected by water quality or quantity monitoring.

A measurable effect on Rock Creek and its tributaries was defined as a change that probably would be detected by water quality or quantity monitoring, but that would not be major.

A major effect on the water quality of Rock Creek and its tributaries was defined as a change caused by an alternative that would alter the ability of the waterway to meet a water quality standard. For example,

a change that would enable Rock Creek to consistently meet fecal coliform standards, which it frequently fails, would be a major beneficial change

a change that caused Rock Creek to repeatedly exceed the standard for lead, which it has historically met (NPS 1994), would be a major adverse change

A major effect on the hydrology of Rock Creek and its tributaries would result in visually obvious changes in channel configuration, such as areas of scour or deposition.

Impairment of Rock Creek or its tributaries would occur if there was a major adverse impact on water resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

Short-term effects would be temporary changes. Increased sediment loading from construction runoff would be a short-term effect, even though the construction-related increase might last for more than a year. Long-term effects would occur for many years, such as increased runoff from the installation of a large area of impervious surface, such as a new parking lot. For storm water flows, a long-term effect would refer to a change in the hydrologic pattern, rather than changes associated with any particular storm event.

## **Analysis**

No new point-source discharges in the park are anticipated as a result of Alternative A. The contribution of pollutants from existing point source discharges would be expected to decline as the park increased its implementation of best management practices and corrective measures to reduce or eliminate discharges. The result of these activities would produce beneficial, long-term, negligible to measurable effects on water quality.

Continued cooperation of NPS staff with local, district, state, and federal environmental and sanitation agencies for monitoring and completing timely repair of sanitary and combined sanitary/storm sewers would reduce contamination of Rock Creek and its tributaries. Continued progress toward eliminating combined sanitary/storm sewers would also improve water quality. This would produce beneficial, long-term, measurable to major effects on water quality.

The application of best management practices at the three park stables, the maintenance yard and storage area, the golf course, and other existing park facilities would reduce contaminated runoff.

Specific sources of potential contamination in the park and recommendations for best management practices to minimize pollution are presented in the *Best Management Practices for Water Quality – Rock Creek Park* (URS Greiner Woodward Clyde 1999). Implementation of best management practices at these sites has begun; continuation would produce beneficial, long-term, measurable effects on water quality.

Alternative A would include preservation of historic features, expansion of the Rock Creek Nature Center and Planetarium, and relocation of the park administrative offices and the District 3 U.S. Park Police substation. The relocations preferably would be to commercial space outside of the park, but could involve construction of a new administrative facility at the maintenance yard and/or construction of a new park police substation at the H-3 area. During construction activities and throughout long-term operations, the National Park Service would employ conventional soil erosion and runoff prevention best management practices that have proved effective in minimizing both the volume and sediment loading of runoff. Anticipated effects during construction would be adverse, but would be short-term and would not last more than 2 to 3 months after construction was completed.

Without best management practices, construction activities could cause temporary increases in sedimentation and turbidity in surface water as a result of soil disturbance. However, the representative sites that are being evaluated in this general management plan are already disturbed, are well removed from streams (at least 1,200 feet), and are buffered by surrounding natural vegetation cover. When combined with best management practices, these factors should result in negligible adverse, short-term effects from construction on water quality and hydrology compared to conditions under Alternative B.

If administrative and U.S. Park Police functions were relocated within the park, such as at the maintenance yard or H-3 stable area, the National Park Service has committed to not increasing the impervious area at the site compared to existing facilities (buildings and parking lots). This might be accomplished by removing existing single-story buildings and replacing them with multi-story structures or by removing part of the parking area and developing a shuttle service to nearby Metro stations. Moreover, the National Park Service would use low-impact development, such as the installation of green roofs, creation of rain gardens, or use of vegetated swales, to minimize areas of impervious surfaces. As a result, the impervious area at these sites would remain the same or decrease slightly. These long-term, beneficial effects would be highly localized and would be of negligible intensity.

Alternative A may cause some automobile traffic to divert to other routes, particularly Ross Drive. However, all of the alternate routes, both in and outside the park, are within the Rock Creek drainage. Therefore, any changes in traffic patterns related to Alternative A would have a negligible effect on pollutant loadings in Rock Creek that result from storm water runoff from roadways in the drainage.

Trail improvement activities associated with Alternative A could involve

- upgrading almost 10 miles of trails along Oregon Avenue, Beach Drive, the Rock Creek and Potomac Parkway, and Bingham Drive

- constructing up to 1.75 miles of new trails along Piney Branch Parkway and other park roads

rerouting up to 2 miles of poorly designed trail segments, such as areas with severe drainage, stability, or soil erosion problems

Best management practices would be employed during construction to minimize soil mobilization and transport into the water system. However, because of the proximity of some trail segments to Rock Creek or its tributaries, an measurable increase in sediment loading could occur. Disturbed areas would be rapidly revegetated with native species. Therefore, this adverse effect would be short-term.

An estimated 3.6 acres of new, impervious surface, configured as a long, narrow corridor, would be created by the construction of new trails. The trail shoulders would be revegetated with native species, with an emphasis on dense vegetation, such as grasses, that slow the speed of runoff and allow the water to soak into the ground. As a result, little if any additional runoff would reach the stream channels and the intensity of the long-term, adverse effect on hydrology would be negligible.

Replacement of poorly designed trail segments would substantially reduce their current erosion problems that cause sediment loading of Rock Creek. This would be a long-term, beneficial effect that probably would be measurable but would not change the ability of the creek to meet any water quality standards.

Adaptive management is an important feature of Alternative A that can be applied to improving the water quality and hydrology of Rock Creek and its tributaries. As described under “Connected, Cumulative, and Similar Actions,” a component of this alternative will be the updating of the existing natural resources management plan. This plan would include water quality improvements focused on outcomes. Implementing actions could include planting trees and shrubs to enhance riparian zone functions and reduced mowing along roadways to maximize the soil-stabilizing effects of vegetation while preventing vegetation succession. The long-term, beneficial effect of these actions on Rock Creek and its tributaries would be measurable.

### **Cumulative Impacts**

Water quality and flows in Rock Creek and its tributaries would continue to be more heavily influenced by urban development in the upstream watershed than by activities in the park. However, the incremental effects of reducing pollutant loading inside the park through the application of best management practices, replacement of poorly designed trail sections, and other Alternative A features would measurably benefit stream water quality.

NPS programs to encourage public awareness of water quality problems could improve citizen stewardship of water resources in the region. Improvements could result from the cumulative effects of small measures taken by better-informed individual citizens on their properties. In addition, park water quality improvements could result from the increased action of citizen groups in upstream communities. Implementation and enforcement of water pollution control regulations in Maryland, especially storm water controls, would improve water quality and storm water flows in the park.

Use of best management practices in the park to reduce runoff from impervious surfaces would have a small beneficial effect in offsetting general watershed trends of increased storm water runoff. The higher runoff flows from the upstream watershed appear responsible for scouring the

streambed in some areas of the park and depositing sediment in others. Coordination with upstream jurisdictions to implement best management practices in the upstream watershed as well as in the park would result in beneficial, long-term, measurable to major reductions in streambed alterations such as scour and sedimentation.

The installation of a fish bypass at the dam at Peirce Mill and the removal of other impediments to fish migration in Rock Creek as part of the Woodrow Wilson Bridge mitigation were described in the “Connected, Cumulative, and Similar Actions” section. The Woodrow Wilson Bridge fish bypass mitigation project was initiated in 2004 and several components have been completed. This project is having short-term, measurable, adverse effects by slightly increasing sediment loading in Rock Creek, but the long-term effects on water quality and hydrology will be negligible.

Continued cooperation with local, district, state, and federal environmental and sanitation agencies for monitoring and completing timely repairs of sanitary and combined sanitary/storm sewers would reduce contamination of Rock Creek and its tributaries. Continued progress toward eliminating combined sanitary/storm sewers would also improve water quality. This would produce beneficial, long-term, major effects on water quality.

As described in the “Affected Environment” section, the District of Columbia Water and Sewer Authority has proposed a storm water management program that includes installing a 5-million-gallon-capacity tunnel along Rock Creek to provide temporary storage of combined storm runoff and sewage. This would eliminate most of the 60 to 70 overflow events that currently occur each year. The remaining 5 to 10 overflow events that would occur annually would be associated with major storms. Elimination of most combined sewer overflow events would produce major, beneficial, long-term effects on water quality of Rock Creek and its tributaries. An alignment for placing such a tunnel “along Rock Creek” has not yet been proposed, and would require extensive coordination to ensure that park resources and values were not adversely affected.

The National Park Service would continue to provide support of, and participation in, other regional programs to improve water quality and watershed management. These include the Chesapeake Bay Program described in “Servicewide Mandates and Policies.” Collectively, these actions already have had major, beneficial, long-term effects on water quality of Rock Creek and its tributaries and continued improvements are expected.

## **Conclusions**

Compared to future conditions occurring under the alternative of no action/continue current management (Alternative B), Alternative A would produce short-term, negligible to measurable, adverse effects on water quality. These primarily would be caused by increased sedimentation associated with trail construction near streams. Short-term, adverse effects from other construction would be negligible.

Long-term effects of Alternative A on Rock Creek and its tributaries would be measurable and beneficial. Contributing factors would include increased implementation of best management practices, reduced sedimentation by replacing poorly designed trail segments that have erosion problems, and improved park-wide management of soils, vegetation, and water under an updated natural resources management plan.

Cumulatively, continued interagency measures, such as reducing point and non-point discharges, and maintaining and improving sanitary and combined sewer systems would continue to produce beneficial, long-term, major effects on water quality. Coordination would also produce beneficial, long-term, major reductions in streambed alterations such as scour and sedimentation.

The management actions of Alternative A would not result in impairment of resources or values associated with Rock Creek and its tributaries.

## **IMPACTS ON WETLANDS AND FLOODPLAINS**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to wetlands and floodplains are presented in the “Servicewide Mandates and Policies” section of this document.

### **Methodology**

The area addressed in the analysis of wetlands and floodplains is described in the “Geographic Area Covered by the General Management Plan” section.

Protection of wetlands and floodplains has been a standard practice at Rock Creek Park for many years. Protection of these resources will continue in conformance with NPS guidance documents such as

*Procedural Manual #77-1: Wetland Protection* (NPS 1998e)

*Director’s Order 77-1, Wetland Protection* (NPS 2002a)

*Director’s Order 77-2, Floodplain Management* (NPS 2003a)

*Procedural Manual #77-2: Floodplain Management* (NPS 2002b)

*Management Policies 2001* (NPS 2000a)

The protection of freshwater spring-fed wetlands and seeps and the biota found in and around them, including rare amphipods, would be an important management objective. None of the alternatives would allow any actions that potentially would cause adverse effects on these sites. Therefore, effects on these specific wetland resources were not considered further in this impact analysis.

Potential effects were assessed based on the potential for locating new construction in floodplains or near known seep locations; conducting ground disturbing activities or depositing fill material in wetlands, seeps, or floodplain zones; or changing the existing hydrologic regime of one of these locations through facility construction or operation. Indirect effects from construction, management activities, or visitor use upgradient from floodplain and wetland areas were also considered.

The analysis consisted of identifying the locations and types of wetlands, seeps, and floodplain areas from existing park maps. The locations of the proposed facilities associated with the

alternative were superimposed on the wetland and floodplain locations to determine which facilities (if any) would be located in or across one or more of these features. The potential consequences of the facility or activities anticipated at each location were then estimated.

Short-term effects were defined as temporary changes, such as the temporary placement of fill in a wetland or floodplain in association with construction that would last less than one growing season, followed by site restoration. Long-term effects would occur for many growing seasons.

Intensities of effects on wetlands were defined as follows.

A minor adverse effect on a wetland would include a change that would not require a Section 404 nationwide dredge-and-fill permit.

A major adverse effect on a wetland would include any of the following:

a change that needed an individual Section 404 dredge-and-fill permit

a change that resulted in the loss of one or more wetland functions

the permanent loss of a wetland, regardless of whether or not it was included in the National Wetland Inventory or was classified as jurisdictional by the U.S. Army Corps of Engineers

A major adverse effect on a floodplain would be an action that reduced the hydraulic capacity of the floodplain or caused the floodplain boundaries to shift outside its current 100-year boundary.

Impairment of wetlands or floodplains would occur if there was a major adverse impact on wetlands or floodplain resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

## **Analysis**

None of the proposed actions in Alternative A would have long-term, adverse effects on wetlands.

Rehabilitation of the Peirce Mill complex would occur within the 100-year floodplain. This historic structure is allowed within the 100-year floodplain according to *Procedural Manual #77-2: Floodplain Management* because location is integral to the historic structures' significance (NPS 2002b). Prior to rehabilitation, the National Park Service would perform a floodplain analysis and would include appropriate mitigation to prevent adverse, long-term impacts on the floodplain capacity or boundaries. Short-term adverse effects on the 100-year floodplain capacity could occur during construction.

Alternative A would include improving and possibly rerouting of the recreation trails along Rock Creek, portions of which are in the 100-year floodplain. Trail construction in a floodplain is acceptable under *Procedural Manual #77-2: Floodplain Management* because trails do not affect a floodplain's capacity for flood management (NPS 2002b). Short-term adverse effects on the

100-year floodplain capacity could occur during construction. All trail modifications and route alignments would be designed to avoid wetland areas.

This alternative's better education of the public on the need to control storm water runoff upstream from the park could produce a beneficial effect on the park's wetlands and floodplains relative to Alternative B. However, the size of this effect probably would be negligible.

### **Cumulative Impacts**

Alternative A would not produce any adverse, long-term impacts on wetlands, seeps, or floodplains. Therefore, it would not contribute to any cumulative adverse impacts on wetlands or floodplains in the park or in the region.

Floodplains and wetlands throughout the park would continue to be protected from direct disturbance from development. Application of best management practices would help reduce risk to floodplain and wetland resources from polluted runoff, erosion, filling activities, water diversions, and sedimentation from sources within the park. Wetlands located in the Rock Creek floodplain would continue to be threatened by sediments transported during high storm water discharges originating upstream from the park.

The removal of impediments to fish migration, including construction of a fish bypass at Peirce Mill dam, represents a new construction action in the 100-year floodplain. Some of the construction has already occurred and completion of the project is expected in 2005. These actions are being implemented as part of the mitigation program for the Woodrow Wilson Bridge. Construction activity would represent a short-term adverse effect on the 100-year floodplain capacity. However, because federal floodplain management strategies require no net loss of 100-year floodplain hydraulic capacity, the bypass structure and barrier removals will be designed so there is no long-term loss of floodplain hydraulic capacity.

Construction would temporarily increase downstream water turbidity while construction was in progress. Use of best management practices to control downstream siltation would ensure that the deposition of silt in wetlands did not occur and that silt deposition did not reduce floodplain capacity.

### **Conclusions**

Alternative A would not produce any adverse, long-term effects on wetlands or floodplains. Short-term reductions in floodplain capacities could occur during construction activities at the Peirce Mill complex and along trails. There would be no impairment of resources or values associated with wetlands and floodplains.

## **IMPACTS ON DECIDUOUS FORESTS**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to deciduous forests are presented in the "Servicewide Mandates and Policies" section of this document.



## Methodology

The area addressed in the analysis of deciduous forests is described in the “Geographic Area Covered by the General Management Plan” section. Particular emphasis is placed on lands within each alternative’s designated Forest Zone management prescription.

Protection of the deciduous forest has been a long-term management goal at Rock Creek Park. Protection has included such actions as minimizing or avoiding clearing of trees, suppressing wildfires, and controlling the presence and distribution of invasive species. Protecting the forest resource from disturbance factors will continue in conformance with NPS *Management Policies 2001* (NPS 2000a). Therefore, these types of management actions will not be considered further in this impact analysis.

The deciduous forest impact evaluation consisted of comparing conditions that would occur under Alternatives A, C, and D to those under Alternative B, which would strive to maintain current park conditions. It involved comparing the proposed locations of new and upgraded structural facilities to current forest distribution and to the susceptibility of forest areas to disturbances. Anticipated changes in the operational characteristics of future park activities were reviewed to determine whether such activities could lead to the substantial loss of portions of the forest, conversion of one plant assemblage to another type of plant composition, or reduced productivity. The assessment also examined whether facilities were proposed for forested sites that were steep or would be difficult to revegetate.

Because deciduous forests require a long time to reach maturity, the concepts of short-term versus long-term effects were defined based on plant associations rather than maturity.

Short-term effects were defined as the removal of forest vegetation, followed by restoration with native woody species representative of the various successional stages of the eastern hardwood forest. It is recognized that areas of short-term effects may not have the appearance of the mature deciduous forest for 50 to 80 years.

Long-term effects involve the removal of forest vegetation, followed by a change in vegetation. This could include conversion to another use such as a paved trail or a building site, implementation of management techniques such as mowing to maintain herbaceous vegetation, selected clearing to preserve historic views, or revegetation with exotic species.

A negligible effect would not be measurable.

A minor effect on the deciduous forest would be measurable, but would involve changes smaller than those described in the next paragraph as major.

A major effect would include any of the following. All of these effects would include the aggregate loss or gain from the same action in different locations. For example, all forest alterations associated with trail improvements and construction of new paved trails under an alternative would be considered together.

A permanent loss or gain of the upland deciduous forest resource in an area totaling 12 acres or more. This area represents approximately 0.5 percent of the forested area in the park.

A permanent loss or gain of the riparian deciduous forest resource in an area totaling 1 acre or more. This criterion recognizes the ecological importance of riparian areas and their relative scarcity.

Conversion of similar-sized upland or riparian areas to or from a vegetation type dominated by invasive or non-native species.

Any loss or creation of a rare plant community within the deciduous forest.

Any disturbance or rehabilitation of the deciduous forest on slopes greater than 30 percent.

Impairment of the deciduous forest would occur if there was a major adverse impact on deciduous forest resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

Adverse effects on the deciduous forest would involve loss of existing forest, or conversion of a native species plant assemblage to predominantly exotic or invasive plant species. Beneficial effects would include such actions as restoring unvegetated areas to deciduous woodlands, amending poor or impaired soil conditions to accommodate restoration of deciduous tree species, realigning trails away from steeply sloping areas and revegetating the former alignments, and discontinuing the artificial suppression of tree regeneration through periodic cutting or mowing.

## **Analysis**

Rock Creek Park is the only large area of deciduous forests in the Washington, D.C. metropolitan area, and the deciduous forest is a major factor in defining park character. As such, changes in the area or character of the deciduous forest are an important management factor.

The primary action under Alternative A compared to Alternative B that would affect the abundance and presence of deciduous forest would be associated with trail system improvements. A summary of these activities was included in the Alternative A description and would include

- preparing a trail plan that would determine optimal trail alignments to minimize impacts of trails and avoid conflicts among visitors; outline the trail design and construction standards to be used; include maps and costs for trail alternatives; and provide National Environmental Policy Act documentation with opportunities for agency and public review and comment

- upgrading almost 10 miles of trails along Oregon Avenue, Beach Drive, the Rock Creek and Potomac Parkway, and Bingham Drive

- constructing up to 1.75 miles of new trails along Piney Branch Parkway and other park roads

- rerouting up to 2 miles of poorly designed trail segments, such as areas with severe drainage, stability, or soil erosion problems

The upgrading of trails along park roadways would have a negligible effect on the deciduous forests of Rock Creek Park. These trails occur in previously disturbed areas where there would be little need to remove trees or otherwise alter the vegetation or character of the deciduous forest.

Similarly, constructing new trails along Piney Branch Parkway and other park roads would have a negligible effect on the park's deciduous forests. Some of the lands on which new trails would be aligned currently are maintained as grasslands within the road right-of-way, and there would be no effects on deciduous forests in these areas. The wooded areas where trail construction would occur would be on the forest margins, and careful trail design could avoid most tree removal and other activities that would alter the forest.

In areas where current trail alignments are moderately to severely eroded, in areas of rare or unusual plant or animal assemblages, or in areas where trails cross slopes of 30 percent or more, up to 2 miles of trail may be relocated to more appropriate areas. Assuming a construction corridor 24 feet wide, which would include the permanent trail alignment (typically ranging from 6 to 9 feet), tree removal and other disturbances would occur on up to 5.8 acres of the park's deciduous forest.

Following completion of trail work, the construction zone outside the permanent trail alignment (about 3.6 acres) would promptly be planted with native grasses to stabilize the soil, and would then be allowed to revegetate naturally with native woody species. Based on the impact thresholds presented above, construction activities would result in a short-term, minor, adverse effect on the park's upland deciduous forest resource.

The former alignments of the poorly designed trail segments would be revegetated in the manner described above for the construction zone. The restoration of the old trail segments would directly offset the long-term commitment of about 2.2 acres of the deciduous forest to the new trail alignments, and the net effect on the acreage of the deciduous forest committed to trails would be negligible. However, realigning the poorly designed trail segments would produce a major, long-term, beneficial effect on the deciduous forest by protecting forest resources and by helping to maintain soil productivity and prevent erosion on steep slopes.

Prior to any trail construction, the National Park Service would perform research and detailed field investigations to support final trail designs. Improvements would be designed to maximize safety and the quality of the visitor recreational experience, and to accommodate historic alignments of old roads and trails without compromising the long-term composition and reproductive capability of the surrounding forest. This would include routing trails around rare plant and animal communities and areas with slopes greater than 30 percent to avoid adverse effects on these areas.

Effects on riparian deciduous forest zones could include the following. The effect would be beneficial in the long term, but the impact intensity would depend on the aggregate acreages of all of these actions.

Within riparian zones, vegetation restoration would be implemented to correct problem areas. This would supplement the regenerating capabilities in this zone.

Existing trails in riparian zones may be relocated outside the riparian zone. After stabilization with native grasses, riparian vegetation would be reestablished along the former

alignment either naturally or with the assistance of plantings. This would be a beneficial, long-term effect.

The improved education and interpretation elements of Alternative A may increase the public's appreciation for deciduous forests. However, the impact of this beneficial, long-term effect probably would be negligible in the park because, as demonstrated by scoping, the public already recognizes the value of the deciduous forest to Rock Creek Park. The beneficial impact would increase if this appreciation were translated into action to protect other remnant woodlands in the region.

The traffic management changes in Alternative A would not affect the forest resources of Rock Creek Park and the Rock Creek and Potomac Parkway. If park administration offices and a new District 3 substation for the U.S. Park Police were constructed in the park, they would not be located in wooded and would not affect the deciduous forest.

### **Cumulative Impacts**

Ongoing urbanization of the Rock Creek watershed and other forested areas of Maryland and Virginia near Washington, D.C. will continue to eliminate deciduous forests. Park management practices associated with Alternative A would have little effect on regional, development-related decreases in deciduous forests. However, as discussed above, the improved education and interpretation elements of Alternative A could provide beneficial, long-term effects if the public's appreciation for deciduous forests obtained at Rock Creek Park were translated into action to protect other remnant forests in the region.

### **Conclusions**

Compared to Alternative B, trail construction activities would result in a short-term, minor, adverse effect on up to 5.8 acres of the park's upland deciduous forest resource. Following revegetation, long-term effects in these areas would be negligible. Major, long-term, beneficial effects may occur in both upland and riparian deciduous forest areas through rehabilitation and/or restoration of problem areas of trails. There would be no impairment of resources or values associated with deciduous forests.

## **IMPACTS ON PROTECTED AND RARE SPECIES**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to protected and rare species are presented in the "Servicewide Mandates and Policies" and "Affected Environment" sections of this document. The National Park Service is required under the Endangered Species Act to ensure that federally listed species and their designated critical habitats are protected on lands within the agency's jurisdiction. Although the National Park Service is not under any legal obligation to protect rare plants or animals identified by the adjoining states of Maryland and Virginia, NPS policy and management actions include maintaining these uncommon native species (NPS 2000a).

## **Methodology**

This analysis evaluated impacts on protected and rare species in the area described in the section entitled “Geographic Area Covered by the General Management Plan.” Species of interest were identified from the current federal list of endangered or threatened fish, wildlife, and plants and from the lists of special-interest species that are maintained by the states of Virginia and Maryland.

The analysis consisted of comparing known species location information and typically occupied habitat conditions in the park to the proposed locations of facilities associated with each alternative. Areas of potential overlap were considered indications of potential adverse effects on the special-concern species. Conditions that would occur under Alternative A, C, and D were compared to those under Alternative B, which would strive to maintain current park conditions.

Moderate effects on protected or rare plant or animal species would include any of the following:

- short-term degradation of critical habitat, followed by effective restoration

- restoration of a previously degraded habitat

- the loss of one or more individuals of a plant or animal listed as being of interest by the states of Virginia and Maryland

Any of the following would be a major adverse effect:

- the removal or long-term degradation of critical habitat for a protected or rare plant or animal species

- the loss of a rare plant community

- the loss of one or more individuals of a federally listed or candidate plant or animal

Impairment of protected or rare plant or animal resources would occur if there was a major adverse impact on protected or rare species resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

## **Analysis**

The groundwater amphipods that were described in the “Affected Environment” section, including the federally endangered Hays spring amphipod, inhabit seeps and springs in several park locations. The National Park Service is aware of these sites and may implement additional measures to protect these important habitats under Alternative A. Compared to Alternative B, long-term protection of the endangered Hays spring amphipod could be enhanced by implementing more active protection of the springs and their upgradient drainages.

Alternative A could include construction at several park locations. All of these sites have previously been disturbed and do not support any protected or rare species. Therefore, these activities would not have any effects on protected or rare species.

As described in the section on deciduous forests, prior to any trail construction, the National Park Service would perform detailed field investigations to ensure that new or upgraded trail segments would not affect any rare plant and animal communities. As a result, the effect of trails on rare or protected species would be negligible.

None of the activities that would affect the waterways within the park, including Rock Creek, would adversely affect protected or rare aquatic species because no species of concern are known to occur in the park's drainages.

The improved education and interpretation elements of Alternative A may increase the public's appreciation for protected and rare species. This could include assisting the public in gaining a better understanding of the importance of rare plants and animals, the need to prevent species extinction, and the importance of habitat in the maintenance of protected and rare species. The resulting beneficial, long-term effect probably would be negligible in the park because the National Park Service already protects rare species within park boundaries. The beneficial effect would increase if this appreciation were translated into action by members of the public to protect rare species in other locations throughout the region.

### **Cumulative Impacts**

Under Alternative A, the park's assemblage of national and regionally rare plants and animals would continue to benefit from the protection that the park affords.

Ongoing urbanization of the Rock Creek watershed and other areas of Maryland and Virginia near Washington, D.C. will continue to eliminate individuals and habitats of protected and rare species. Park management practices associated with Alternative A would have little effect on regional, development-related impacts on these species. However, as discussed above, the improved education and interpretation elements of Alternative A could provide beneficial, long-term effects if the public's appreciation for rare species obtained at Rock Creek Park were translated into action to protect these species outside the park.

### **Conclusions**

Compared to Alternative B, long-term protection of the endangered Hays spring amphipod could be enhanced by implementing more active protection of springs and their upgradient drainages. Opportunities for the public to learn about protected and rare species would be improved. There would be no impairment of resources or values associated with protected and rare species.

## **IMPACTS ON OTHER NATIVE WILDLIFE**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to native wildlife are presented in the "Servicewide Mandates and Policies" section of this document.

## **Methodology**

The effects analysis was conducted by identifying the general wildlife habitats of representative native species that would be affected by the alternative. Once identified, an evaluation was made whether the physical environmental changes associated with each alternative were likely to displace some or all members of a species present in the park, or result in the substantial loss or creation of habitat conditions needed for the continued survival and welfare of the species. The potential for attracting and supporting new wildlife species also was considered by the analysis.

This analysis evaluated effects on native wildlife species associated with the area described in the “Geographic Area Covered by the General Management Plan” section.

Long-term effects on native wildlife were considered to encompass a period of one year or more. Effects of less than this duration would be short-term.

Beneficial effects would result from the maintenance or restoration of native wildlife populations, including their habitat. Adverse effects would involve the loss of native species diversity, supporting habitat, or population numbers.

Intensity was defined as follows.

Negligible effects could cause changes (including death) to individual animals, but would not affect the viability of a wildlife population or assemblage, either locally or park-wide.

A moderate effect would result in the displacement, loss, or restoration of a wildlife population or wildlife assemblage within a localized area of the park.

A major effect would result in the displacement, loss, or restoration of a wildlife population or wildlife assemblage throughout the entire park.

Impairment of the native wildlife resource would occur if there was a major adverse impact on wildlife resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

Throughout the park, little change in the overall management approach for native wildlife would occur under any of the alternatives. The native wildlife evaluation consists of comparing conditions that would occur under Alternatives A, C, and D to those under Alternative B, which would strive to maintain current park conditions.

## **Analysis**

Native species that require deciduous forest habitats in relatively large, contiguous tracts would continue to benefit from the protection of most of the park’s land area as relatively undisturbed woodland.

Alternative A includes a commitment to identify areas with high-quality habitat for birds, including areas such as the maintenance yard where other management activities have inadvertently

created attractive vegetation assemblages. In the natural resources management plan that will tier from this general management plan, the National Park Service would develop measures to protect and enhance these areas. Although the long-term effects of this commitment would be beneficial, differences from the conditions that would occur under Alternative B would be negligible.

Trail realignments and proposed construction activities associated with Alternative A may cause the localized, short-term displacement of individuals. Minor, temporary effects on species from trail realignments would be controlled by using best management practices. There would be no removal of substantial blocks of forest, which might eliminate or substantially alter habitat conditions for species affiliated with the park.

Compared to Alternative B, actions to reduce traffic speeds in the park and on the parkway would reduce the number of wildlife individuals killed or injured by motor vehicles. Additional mitigating efforts to reduce roadkill, such as increasing public awareness, strategic traffic calming, and providing underpasses, could further reduce the frequency of wildlife mortality. This would produce long-term, beneficial effects on the park's native wildlife. For most park species, the change would be negligible, because their populations are stable or expanding. Expected effects on species that have been identified by park staff as potentially declining would be as follows.

Effects on opossums would be negligible. This prey species has a high reproductive rate to compensate for the high mortality it typically experiences from predation. Reducing deaths by the average recorded roadkill of 10 individuals per year would have little effect on populations of this species in the park.

Effects on black rat snakes would be negligible. Recorded roadkill within the park averages less than one individual per year, which would have little effect on the population, either locally or in the park as a whole.

Effects on box turtles would be moderate, long-term, and beneficial. The survival of an additional two to three box turtles per year could help ensure the long-term success of localized populations of this species, which has long-lived individuals with low reproductive potential.

Effects on gray foxes would be major, long-term, and beneficial. As described in the "Affected Environment" section, the gray fox population in the park is small and experiences multiple stress factors. Under these conditions, even infrequent roadkills could contribute to an overall reduction of the resident population or even local extirpation. Actions that reduced roadkill of gray foxes could help ensure the continued existence of this species in the park.

Alternative A would better provide the public with information that removing box turtles from the park is illegal and would provide better education on the adverse effects on box turtles of removing them from the park or even moving them within the park. Because anecdotal evidence suggests that a substantial number of box turtles are removed from the park each year for use as pets, this would provide a moderate, long-term, beneficial effect on box turtles.

For the following reasons, other actions associated with Alternative A would be unlikely to substantially affect native wildlife population abundance, diversity, or habitat abundance compared to Alternative B.



Areas along roadways already experience a high level of human presence and disturbance that degrades habitat conditions for species that are intolerant of human presence. Changes in traffic management associated with Alternative A without substantial decreases in nonmotorized use of park roads and trails would be unlikely to alter wildlife conditions sufficiently to encourage new species presence or increases in abundance.

If suitable commercial space cannot be located outside the park, new administrative or U.S. Park Police facilities could be constructed within the park, such as at the park maintenance yard and/or H-3 stable areas. Any new construction would occur within the footprint of the existing developed sections of these areas to avoid impacts on the native wildlife.

The restoration of some historic clearings could produce beneficial effects by restoring edge areas that are preferred habitat for many native wildlife species. However, these areas would be limited in size and would have negligible effects when considered on a park-wide basis.

### **Cumulative Impacts**

Both terrestrial and aquatic native wildlife species within the District of Columbia and the region would continue to benefit from habitat protection provided by natural areas in Rock Creek Park. Benefits could be enhanced through cooperative efforts with the District of Columbia Water and Sewer Authority and other agencies to reduce or eliminate pollutant discharges from currently developed areas of the drainage.

As described in the section entitled “Connected, Cumulative, and Similar Actions,” mitigation for the Woodrow Wilson Bridge is currently being constructed in Rock Creek Park, with completion expected in 2005. This will include removing or mitigating man-made obstructions to fish migration in Rock Creek, including the Peirce Mill dam, fords, and sewerline crossings. This action is expected to have a major beneficial effect for at least three native species.

The blueback herring and alewife return from saltwater to spawn in freshwater. The Woodrow Wilson Bridge mitigation actions would provide access to historical Rock Creek spawning grounds for these species.

The American eel lives primarily in freshwater but migrates to saltwater to spawn. The fish migration improvements would help restore access to its historical habitat throughout the Rock Creek drainage.

The pollution control measures described previously for Rock Creek and its tributaries also would enhance the restoration of these species upstream from the Peirce Mill dam and throughout the drainage.

Protection of wildlife habitat in the park is important. However, despite the actions taken under Alternative A, terrestrial and semi-aquatic wildlife habitat on privately owned land throughout the region would continue to be lost and fragmented because of continued high-density urban development and in-filling. This would result in declines in both numbers and diversity of native wildlife, and would be a major, long-term, adverse effect.

Species with relatively small home ranges, high reproduction rates, generalized habitat requirements, and/or a high tolerance of human activities, such as squirrels, opossums, raccoons, white-tailed deer, coyotes, and many birds, would likely persist in the region.

Wildlife species with limited mobility, low reproduction rates, specialized habitat requirements, or large home ranges, such as many amphibians and reptiles, some birds, and many predatory mammals, would continue to decline and could be locally extirpated.

Watershed development outside the park also would alter aquatic life habitat within the park and throughout the drainage. Effects on aquatic life could be either beneficial or adverse.

Development would alter the hydrology of the basin. Adverse effects on aquatic life could occur as increases in impervious areas increased the intensity of flood flows and the scouring of stream channels and banks. Conversely, runoff to storm sewers from lawn irrigation would increase creek flows during dry periods and could produce beneficial effects on aquatic life.

Short-term increases in sediment, which can suffocate aquatic life, could result from construction sites where best management practices were not employed. However, long-term sediment loadings could decrease as agricultural fields were converted to turf and impervious surfaces.

Modern sewage collection and treatment systems installed in new developments would prevent the introduction of massive nutrient loadings into Rock Creek. At the same time, non-point pollutant loadings would change. Runoff from animal wastes, agricultural pesticides, and agricultural fertilizers would decrease. Loadings of heavy metals, and oil and grease from roadways would increase, as would runoff from lawn fertilizers. Effects on aquatic life could be either beneficial or adverse, and would result both from changes in direct toxicity of pollutant loadings and indirectly from algal blooms associated with nutrient inputs.

## **Conclusions**

Alternative A would not produce substantial changes in the overall abundance, diversity, or habitat availability for native wildlife. However, long-term, beneficial effects could result within the park to box turtles (moderate) and gray foxes (major) from reductions in roadkill associated with Alternative A's traffic management provisions and from better education of visitors on the importance of not disturbing or removing box turtles. Alternative A would not result in any impairment of resources or values associated with native wildlife.

Cumulative impacts from actions outside the park would have much larger effects than those actions associated with Alternative A. Woodrow Wilson Bridge mitigation, which will restore upper watershed access for at least three species of migratory fish in Rock Creek, will produce a major, long-term, beneficial effect within the park and the entire creek system. Adverse effects on terrestrial and semi-aquatic native wildlife would occur from the loss of habitat associated with development in the watershed. Development-related effects on native aquatic life within the park could be either adverse or beneficial, based on changes in pollutant loadings and basin hydrology from development occurring upstream from the park.

## IMPACTS ON ARCHEOLOGICAL RESOURCES

### Regulations and Policy

The regulations and policies that guide NPS actions with respect to archeological resources are presented in the “Servicewide Mandates and Policies” section of this document.

### Methodology

This analysis evaluates effects on archeological resources within the area described in the “Geographic Area Covered by the General Management Plan” section. The archeological resource evaluation consists of comparing conditions that would occur under Alternatives A, C, and D to those under Alternative B, which would strive to maintain current park conditions.

The Advisory Council on Historic Preservation’s “Regulations for the Protection of Historic Properties” (36 *Code of Federal Regulations* 800) provide guidance for determining whether an archeological or historic property is eligible for inclusion in the National Register of Historic Places and provides a procedure for nominating such properties to the National Register. The regulations also define what constitutes an impact or effect on an archeological or historic property listed in or eligible for listing in the National Register of Historic Places. These definitions, described below, were used in this environmental impact statement.

An activity has an effect on a prehistoric or historic property when that activity may alter characteristics of the property that may qualify the property for inclusion in the National Register of Historic Places. Alteration to a property’s location, setting, or use may be relevant in determining effect, depending on the property’s characteristics.

An action is considered to have a significant adverse impact when the effect on the prehistoric or historic property may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.

Impairment of archeological resources would occur if there was a major adverse impact on archeological resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

Determination of effect is made jointly by the National Park Service, District of Columbia State Historic Preservation Officer, and Advisory Council on Historic Places. Properties that have been evaluated and are deemed ineligible for listing in the National Register of Historic Places following consultation may be altered without further consultation among the three parties. Properties that are listed in the National Register of Historic Places or have been determined eligible for listing require consultation among the parties to ensure that the actions proposed do not “adversely affect” (in the language of the National Historic Preservation Act) the resource.

### Analysis

As discussed in the “Affected Environment” section, there is a high probability that there are unknown prehistoric and historic archeological resources within the boundaries of the park and

parkway. Any ground-disturbing activities associated with Alternative A would have the potential to affect such sites.

Until a National Register of Historic Places evaluation for any site was completed, it would be assumed that the site is eligible for listing in the National Register of Historic Places. Therefore, until proven otherwise, disturbance to any archeological site that was discovered during an archeological survey of the proposed site prior to design or construction of any facilities under Alternative A would be considered a significant adverse effect. Because Alternative A includes construction that would not occur under Alternative B, Alternative A has a higher potential for adverse construction-related effects on archeological resources than does Alternative B.

As described in the section entitled “Servicewide Mandates and Policies,” the National Park Service is required to protect archeological resources within the park and parkway. Therefore, prior to undertaking any construction activities under Alternative A, the National Park Service would

conduct cultural resources surveys of areas to be disturbed, including trail alignments

identify all archeological resources that are discovered during the surveys

systematically evaluate each site to determine and document its significance to support its evaluation for National Register of Historic Places eligibility

determination eligibility in concert with the District of Columbia State Historic Preservation Officer and Advisory Council on Historic Places

avoid locating any proposed facilities in areas that would disturb sites that were eligible for listing in the National Register of Historic Places, or mitigate the adverse effect by conducting scientific evaluation in advance of construction

The collection of data to support the eligibility evaluation, and the determination of eligibility can be time consuming. Therefore, as a time-saving approach, the National Park Service would assume that any archeological site that is discovered is eligible for listing, and would relocate the facility to be constructed to avoid that site. This approach would substantially reduce the potential for construction-related significant adverse effects on archeological resources.

Under Alternative B, the integrity of some sites would be degraded by natural processes such as wind and water erosion, or by vandalism or inadvertent damage by visitors. Alternative A would include actions to reduce these effects, such as increased ranger monitoring and visitor education programs. These actions would reduce the potential for non-construction-related significant adverse effects compared to Alternative B.

Where sites were disturbed, data recovery and preservation efforts would partly mitigate impacts. However, the disturbance could result in some irretrievable and irreversible loss of archeological resources.

### **Cumulative Impacts**

Archeological resources in most of the Washington, D.C. area have been lost because of construction activity during the historic period. Therefore, it is important that the archeological re-

sources remaining in the park and parkway be protected as examples of the types of resources that formerly existed throughout the region.

A systematic program to identify and inventory the archeological resources in the park and parkway began in 2004 and is expected to be completed in 4 years (NPS, Cox 2004a). This program will offer an opportunity to add to the knowledge of the prehistory and history of the park and the entire vicinity. This survey is not part of any of the general management plan alternatives.

### **Conclusions**

Because it includes ground-disturbing activities, Alternative A would have a higher potential for construction-related significant adverse effects on archeological resources than Alternative B. However, the survey, identification, and avoidance measures that would be implemented prior to construction would avoid most or all of the significant adverse effects. There would be no impairment of resources or values associated with archeological resources.

## **IMPACTS ON HISTORIC STRUCTURES AND CULTURAL LANDSCAPES**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to historic structures and cultural landscapes are presented in the “Servicewide Mandates and Policies” section of this document.

### **Methodology**

The historic structures and cultural landscapes analysis used the same effects criteria and definitions as the archeological resources analysis. Please refer to the previous section for a description of the procedures that were applied.

### **Analysis**

Most historic structures in the park and parkway, such as Boulder Bridge, the Godey Lime Kilns, and the Jules J. Jusserand Memorial, would not be changed relative to Alternative B. However, under Alternative A, a significant beneficial impact would occur on

the Peirce-Klinge Mansion and Lodge House, which would be rehabilitated to preserve their architecturally significant features and be used in accordance with park resource values

historic trails in the park and parkway, where improvements or rehabilitation would enhance their integrity and preservation

Rehabilitation of the significant cultural landscape features and attributes of the Linnaean Hill and Peirce Mill areas would enhance park preservation and visitor understanding of the historic settings in the park. This would be a beneficial effect compared to Alternative B. Historic-designed roads would be preserved and maintained.

Where sites were disturbed, data recovery and preservation efforts would partly mitigate impacts. However, the disturbance could result in some irretrievable and irreversible loss of historic resources.

### **Cumulative Impacts**

Rock Creek Park and the Rock Creek and Potomac Parkway contain a variety of cultural resources that are significant to the historic development of the Rock Creek valley and Washington, D.C. area. Some of these resources are among the last remaining examples of their construction types in the region. Protection and rehabilitation of these resources by Alternative A would have a significant beneficial effect in preserving them for the future.

### **Conclusions**

Under Alternative A, the historic structures and cultural landscapes in Rock Creek Park would be afforded enhanced protection and preservation treatment. Rehabilitation of historic structures and cultural landscapes would occur. Several significant historic structures would be rehabilitated and adaptively reused in accordance with park resource values. There would be no impairment of resources or values associated with historic structures and cultural landscapes.

## **IMPACTS ON TRADITIONAL PARK CHARACTER AND VISITOR EXPERIENCE**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to park character and visitor experience are presented in the “Servicewide Mandates and Policies” section of this document.

### **Methodology**

This analysis evaluates effects on traditional park character and visitor experiences associated with the area described in the “Geographic Area Covered by the General Management Plan” section.

Public comments submitted during scoping initially were used to identify public concerns regarding park character and visitor experience. Comments from the public commonly addressed the traditional character of Rock Creek Park, including the historic appearance of facilities and landscapes, and the availability of traditional ways of enjoying the park and parkway. Access for visitors with impaired mobility was a commonly expressed concern in the comments on the draft general management plan and was added to this final general management plan analysis.

Commenters often disagreed on their perception of what constituted “traditional” use of the park. Some interpreted this as retaining established use patterns, including through traffic. Others felt that reductions in automobile traffic in the park would return it to lower use levels, which they consider more traditional.

The analysis of impacts on traditional park character and visitor experience involved comparisons of the action alternatives to Alternative B, which would strive to maintain current park conditions. Because this impact topic is based primarily on perceptions, rather than the regulatory standards

that provide a framework for most other impact topic analyses, impacts often were expressed as advantages relative to Alternative B. The action alternatives were evaluated based on three components of traditional character and visitor experience, described below.

**Continuation and Quality of Traditional Park Uses.** Comments on the draft general management plan reinforced the observation that visitors like, and would not want to change, most aspects of Rock Creek Park. They most often cited its pleasing appearance and the range of activities. Less commonly mentioned were the services that support an enjoyable experience, such as adequate directional signage and adequate administration resources. This evaluation considered all of these factors that contribute to the traditional character of the park and visitor enjoyment.

A negligible effect would not measurably change traditional park uses or the quality of the experience for most users, or the effect would not be noticeable or measurable outside normal variability.

A minor effect would be measurable, and might be noticed by some park users, but would not substantially affect visitor use or enjoyment of the park.

A moderate effect would be readily apparent and would result in a noticeable change in traditional park uses or the quality of the experience for many users.

A major effect would be recognized by most visitors as being markedly different from the existing character and experience and would substantially alter a traditional park use or the quality of the experience for most users. Major effects would include the elimination of a traditional visitor experience. The addition of a visitor experience would not be a major effect, since through the years the park has accommodated many new experiences, including the recent growth of in-line skating.

**Recreational Opportunities.** Protection of the park's and parkway's cultural and natural resources is mandated by law and would be managed much the same under all of the action alternatives. Therefore, providing for public use and enjoyment of park resources was identified as the most important factor in identifying advantages among the alternatives.

Visitor recreational opportunities associated with each alternative have been evaluated for four attributes, including

quality, which is based on the purpose of the park, as stated in the establishing legislation (appendix A) and park mission and mission goals presented in the "Planning Direction or Guidance" section of this general management plan

quantity, or the total number of people using the park

spectrum, which relates to diversity in the types of recreational opportunities

interpretive and education opportunities

The advantages associated with each alternative were identified as lowest, middle, or highest relative to the other alternatives. Alternative B: Continue Current Management/No Action was then used as a baseline for expressing the relative advantages of the action alternatives for the four attributes.

A negligible effect on traditional park character and visitor experience would not have any net difference in number of advantages relative to Alternative B.

A minor effect on traditional park character and visitor experience would have a net difference of one advantage relative to Alternative B.

A moderate effect on traditional park character and visitor experience would have a net difference of two advantages relative to Alternative B.

A major effect on traditional park character and visitor experience would have a net difference of three advantages relative to Alternative B.

Net difference in numbers of advantages could be either beneficial or adverse.

The analysis of visitor recreational opportunities did not consider short-term effects, because the concept of “traditional” character and experience implies a long-term result.

**Access for Visitors with Impaired Mobility.** Impact threshold definitions for this category were defined as follows.

A negligible effect would not measurably affect accessibility for individuals with disabilities.

A minor effect would be noticeable, but would affect only a small portion of the individuals with mobility-related disabilities who use the park.

A moderate effect would be readily apparent to many of the individuals with mobility-related disabilities who use the park.

A major effect would be readily apparent to most of the individuals with mobility-related disabilities who use the park and would substantially change their ability to access multiple features throughout the park.

Impairment to traditional park character and visitor experience would occur if there was a major adverse impact on resources or values whose conservation was (1) necessary to fulfill specific purposes identified in the establishing legislation of the park or parkway, (2) key to the natural or cultural integrity of the park and parkway or opportunities for enjoyment of these units, or (3) identified as a goal in this general management plan or other NPS planning documents.

### **Analysis of Effects on Continuation and Quality of Traditional Park Uses**

The overall character of the park would not change under Alternative A. Recognition of cultural landscape values and management for those values would help maintain the traditional appearance of the park. Development of design standards for park facilities and signs would also enhance the traditional ambiance.

The traditional appearance of Beach Drive, the Rock Creek and Potomac Parkway, and other park roads would be largely maintained. Some new traffic-calming structures such as speed humps, speed tables, and signs would be necessary to implement controls on automobile speeds under Alternative A. Visual intrusion of such facilities could be offset by removal of some existing traffic



structures such as right-turn lanes and signs. The net effect on the traditional character of the park probably would be negligible.

As described under the heading “Impacts on Regional and Local Transportation,” Alternative A would have a negligible effect on traffic volumes and speeds during the rush hours. Outside the rush hours, Alternative A is expected to cause a noticeable reduction in traffic volumes and speeds on Beach Drive. This may result in a small but measurable increase in nonmotorized recreation along Beach Drive, particularly among bicyclists who could now maintain a speed similar to that of the automobiles on the road. Changes in use by other visitor groups probably would not occur. The long-term effect along Beach Drive during non-rush-hour periods would be beneficial, but the intensity would be negligible to minor.

Noise levels in the Rock Creek valley would follow the existing pattern. However, because of this alternative’s traffic-calming measures, noise levels throughout the park and parkway, and particularly on Beach Drive, may be somewhat lower than with Alternative B. Even so, noise levels close to major roadways would probably continue to exceed Federal Highway Administration noise abatement criteria during both peak and off-peak traffic periods. During weekdays, traffic noise would remain the dominant background sound at picnic groves and along Rock Creek, and the beneficial effect relative to Alternative B would be negligible to minor.

Weekend road closures would continue current opportunities for nonmotorized recreation in the park. Alternative A would have similar weekend use levels and experiences as Alternative B, because weekend traffic management would be similar for both alternatives.

Compared to Alternative B, upgraded recreation trails, bridle trails, and foot trails throughout the park would increase visitor safety and provide a more pleasant recreational experience for most trail users. Rehabilitated trails and better directional and information signs would enhance visitor access, safety, and orientation to park areas and facilities. This would be a moderate, beneficial, long-term effect on traditional park character and visitor experience.

Rehabilitation of the cultural landscape at the Peirce Mill complex would provide visitors with a better understanding of the land-use history of the Rock Creek valley and its contribution to the development of the nation’s capital. A visitor contact station at the Lodge House would improve the park experience for recreational visitors. They would have greater opportunities to learn about and experience the park’s natural and cultural resources and to take advantage of the programs and exhibits at the park’s other interpretive centers. This would be a moderate, beneficial, long-term effect on traditional park character and visitor experience.

Improvements to the Rock Creek Nature Center and Planetarium would result in better opportunities for the public to learn about and understand the park’s natural resources and their relationship to the urban environment. The addition of six full-time staff positions for interpretation and outreach would allow the park to improve both the quality and quantity of programming. It would also greatly improve services to school and youth groups. As a result, more visitors, especially young people, would have opportunities to participate in quality, resource-based environmental education programs. This would be a moderate, beneficial, long-term effect on traditional park character and visitor experience.

The more efficient and cohesive working environment that Alternative A would provide for park staff, and the dispersed park police presence would result in better service to park visitors. Increased visitor services and activities in the park may give some visitors a perception of improved

security. Improved working conditions would result in a moderate beneficial effect on park operations, but the intensity of the beneficial impact perceived by the public probably would be minor.

### **Analysis of Effects on Visitor Recreational Opportunities**

Table 21 summarizes the advantages of Alternative A relative to Alternative B for recreational opportunity quality, quantity, spectrum, and interpretation and education. Alternative A would have a moderate, beneficial effect on recreational opportunities relative to Alternative B. It would be more advantageous than the alternative to continue current management in two attributes and would not be less advantageous in any attributes, as follows:

The quality of the visitor experience for people participating in nonmotorized recreation activities along Beach Drive would be somewhat improved compared to Alternative B, based primarily on reduced automobile speeds. Along the Rock Creek and Potomac Parkway, the quality of the experience would be enhanced for all visitors by slower speeds resulting from improved traffic enforcement. Upgraded recreation trails would improve the quality of the experience along the parkway for visitors participating in nonmotorized recreation activities.

Alternative A would match Alternative B in continuing to accommodate the greatest number of visitors. These include the many visitors who drive through the park without stopping and view their use of the park as secondary to their travel. However, traffic studies demonstrate that some travel through the park on Beach Drive is time-inefficient (Parsons 2004), suggesting that these visitors may choose this route at least partly for the quality of the aesthetic experience.

Alternative A would be similar to Alternative B with regard to the spectrum of opportunities. Management actions associated with this alternative would not limit any of the traditional recreational uses in the park. In practice, however, nonmotorized recreation on Beach Drive during rush hours would continue to be limited by the heavy automobile traffic. Better speed control during other daylight hours may encourage some nonmotorized recreational use of Beach Drive relative to Alternative B, but the change probably would not change the relative rankings of the alternatives.

Interpretation and education opportunities would experience substantial advantages under Alternative A. Increased opportunities to learn about and experience the park's natural and cultural resources would result from upgraded interpretation and education facilities in the park. Six additional staff positions for interpretation and education would substantially improve opportunities for visitor contact, programming, and outreach.

**TABLE 21: RELATIVE ADVANTAGES OF THE ALTERNATIVES  
WITH REGARD TO VISITOR RECREATIONAL OPPORTUNITIES ON WEEKDAYS**

<b>Attribute</b>	<b>Alternative B = Baseline</b>	<b>Alternative A</b>	<b>Alternative C</b>	<b>Alternative D</b>
Quality: based on purpose of the park and parkway	<p>Lowest</p> <p>Rock Creek Park: quality would be reduced on and along roadways, particularly Beach Drive, during the week because of heavy traffic volumes and associated noise and congestion.</p> <p>Rock Creek and Potomac Parkway: same effect as along roads within Rock Creek Park.</p>	<p>Middle</p> <p>Rock Creek Park: use of traffic calming measures and improved enforcement would enhance the quality of the experience by reducing traffic speeds with associated noise.</p> <p>Rock Creek and Potomac Parkway: improved traffic enforcement and upgraded recreation trails would enhance the quality of the parkway experience.</p>	<p>Highest</p> <p>Rock Creek Park: permanent closure of three segments of Beach Drive would provide an unhurried experience with the ability to enjoy natural sounds and smells and view park resources in a manner consistent with the intent of its establishing legislation.</p> <p>Rock Creek and Potomac Parkway: HOV during rush hours and an end to lane reversal would provide a more pleasurable driving experience with the ability to enjoy a scenic drive into the monumental core of the city.</p>	<p>Highest</p> <p>Rock Creek Park: Same as Alternative A during rush hours, same as Alternative C during mid-day period.</p> <p>Rock Creek and Potomac Parkway: same as Alternative A.</p>
Quantity: total number of people using the park	<p>Highest</p> <p>Highest number of visitors using the park; primarily would include motorists who travel through the park without stopping.</p>	<p>Highest</p> <p>Visitor numbers would be similar to Alternative B and primarily would include motorists who travel through the park without stopping.</p>	<p>Lowest</p> <p>Permanent road closures would result in the lowest number of people using the park, but recreation would be the primary focus of all visitors.</p>	<p>Middle</p> <p>Same as Alternative B during rush hours, same as Alternative C during mid-day period.</p>
Spectrum: diversity of recreational types	<p>Middle</p> <p>Less diversity of recreational opportunities would occur along Beach Drive because recreational users would avoid roadway area during heavy traffic periods.</p>	<p>Middle</p> <p>Similar to Alternative B, although better speed control may somewhat improve opportunities for nonmotorized recreation.</p>	<p>Lowest</p> <p>Lowest variety of recreational opportunities would be available because of limits on recreational driving the length of Beach Drive.</p>	<p>Highest</p> <p>Would provide the greatest variety of recreational opportunities. Would allow driving the length of the Beach Drive 18 hours daily; nonmotorized recreation would be emphasized on Beach Drive between rush hours.</p>
Interpretation and education opportunities	<p>Lowest</p> <p>Some exhibits would continue to be inaccurate, worn, and dated; most visitors would have little contact with interpretive and education personnel or programs.</p>	<p>Highest</p> <p>Upgraded facilities and six additional staff positions to improve visitor contact, education, and interpretation would increase opportunities to learn about and experience the park's natural and cultural resources.</p>	<p>Highest</p> <p>Same as A.</p>	<p>Highest</p> <p>Same as A.</p>

### **Analysis of Effects on Access for Visitors with Impaired Mobility**

Alternative A would have a long-term, moderate, beneficial effect by providing improved access to many facilities throughout the park to individuals with impaired mobility.

All construction involving non-historic buildings, including remodeling and new construction, would provide compliance with the Americans with Disabilities Act. For historic buildings, improvements would be made to the extent that they did not alter the historic features or character. Rehabilitation of the historic scenes at the Peirce Mill complex and the Linnaean Hill complex also would include access improvements that would not intrude on the historic character.

The trail upgrades that are included in Alternative A would include improvements that would increase accessibility to people with impaired mobility. In some areas, physical features such as topography may limit the ability to comply with width or slope parameters. However, the improvements should be readily apparent to individuals with impaired mobility and would enhance their ability to enjoy the park and parkway.

### **Cumulative Impacts**

The Maryland Office of Planning (1993) predicted that demand for bicycling, hiking, and picnicking facilities in the state would increase by 6 to 14 percent between the years 2000 and 2010. Rock Creek Park and the parkway would continue to contribute to the regional mix of recreational opportunities and would be compatible with regional recreational plans.

Despite the actions associated with Alternative A that would improve access for individuals with impaired mobility, these people would continue to be challenged on a daily basis in Washington, D.C. by street curbing, buildings that are accessible only by stairs, and doorways and restrooms that do not accommodate people in wheelchairs. Compared to the impediments that occur on a daily basis, the improvements that would result from Alternative A would have a negligible effect on access for mobility-impaired people in the city. However, Alternative A would provide substantial improvements in the ability of these people to experience the unique cultural and natural resources of Rock Creek Park and would represent an important action in allowing them to lead enjoyable, productive lives.

### **Conclusions**

Alternative A would maintain the traditional character and visitor experiences of Rock Creek Park and the Rock Creek and Potomac Parkway. Moderate, beneficial, long-term effects would be associated with upgraded trails throughout the park; improvements to visitor contact, interpretation, and education facilities and services; and improved access for visitors with impaired mobility. Improved working conditions for park administrative staff and personnel in the U.S. Park Police District 3 substation would result in a moderate beneficial effect on park operations, but the intensity of the beneficial impact perceived by the public probably would be minor. Compared to Alternative B, this alternative would have a moderate, beneficial effect on the park's recreational opportunities.

## **IMPACTS ON PUBLIC HEALTH AND SAFETY**

### **Regulations and Policy**

The regulations and policies that guide NPS actions with respect to public health and safety are included in the “Visitor Experience and Park Use Requirements” presented in the “Servicewide Mandates and Policies” section of this document.

### **Methodology**

The area addressed in the public health and safety analysis is described in the “Geographic Area Covered by the General Management Plan” section. Conditions that would occur under Alternatives A, C, and D were compared to conditions that would occur under Alternative B to determine differences that would result each action alternative compared to continuing with current management practices at the park and along the parkway. Thresholds that were used to determine impacts on public health and safety were defined as follows.

A negligible effect would not change the safety or health of park visitors, or the effects would not be measurable. Indicators such as traffic accident rates would be within historical norms.

A minor effect would be detectable and would include variations from historical norms for such factors as minor traffic accident rates. However, they would not produce an appreciable change in public health or safety.

A moderate effect would be locally apparent, and could be expressed in such factors as numbers of serious traffic accidents or crimes against persons compared to historical norms.

A major effect would be sufficiently large to be apparent in District-wide statistics for such factors as serious traffic accidents rates that result in injury or fatality or crimes against persons.

Public health and safety issues identified during scoping and addressed in the impact analysis included traffic safety, crimes against persons in the park, and emergency evacuations of the Washington, D.C. metropolitan area.

### **Analysis of Effects on Safety along Roadways**

Traffic management measures associated with Alternative A that could affect public health and safety would include

- enhanced enforcement

- use of traffic-calming measures, such as speed humps and speed tables, all-way stops, rumble strips, or raised intersections

- reconfiguration of the intersection of the parkway with Beach Drive near Connecticut Avenue to improve safety

continuation of one-way traffic on the Rock Creek and Potomac Parkway during peak periods

Most vehicles travel at or above the posted speed limit through the park. Spot speed checks showed that the average speed was 15 miles per hour above the speed limit (Robert Peccia & Associates 1997). This finding is consistent with traffic management problems occurring throughout the nation and around the world. Studies in the United States, Canada, and Europe that were reviewed by the Federal Highway Administration (1998) consistently found that about 70 percent of the vehicles on low- and moderate-speed roads exceed the posted speed limits.

Multiple studies reviewed by the Federal Highway Administration (1998) show that the incidence of crashes depends not so much on speed as on the difference in speed between an individual vehicle and the mean speed of traffic. Large differences in speed commonly occur in the park, where nonrecreational visitors using park roads to get to a destination encounter slow-traveling cyclists, pedestrians, and recreational visitors driving for pleasure. Therefore, a key traffic management component of Alternative A would be to reduce the mean speed of traffic along Beach Drive and the Rock Creek and Potomac Parkway. This would reduce the difference in speed among park users.

**Enhanced Enforcement.** The effectiveness of the improved speed enforcement measures associated with Alternative A would depend on the types of actions and how frequently and consistently they were applied. Studies reviewed by the Federal Highway Administration (1998) found the following:

The duration of speed-reducing effects of using mobile patrols could end almost immediately after the patrol activities ceased (Benekohal *et al.* 1992) or could last as long as eight weeks following intensive enforcement (Vaa 1997).

Parking a marked patrol car in a problem area was an effective method of reducing speeds (Armour 1986; Stuster 1995) and crashes (Stuster 1995). However, speeds returned to their pre-enforcement level within three days after a single episode of stationary enforcement (Hauer *et al.* 1982). Exposure of traffic to a stationary patrol vehicle over a 5-day period had the greatest effect in suppressing speeds after the enforcement period (Hauer *et al.* 1982).

Speed feedback indicators that are intended to increase awareness of excessive speeds and encourage drivers to slow down sometimes reduce speeds in the vicinity of the placement site. However, they have no effect on traffic speeds after they are removed unless they were combined with enforcement activities (Dart and Hunter 1976; Casey and Lund 1990, Perrillo 1997).

The Federal Highway Administration (1998) observed that a large proportion of the reviewed studies mentioned a public information or education program. None of them attributed a significant reduction in speed, speeding, crashes, or crash severity to any such campaign that was not closely tied to an enforcement or engineering action. However, a combined program of enforcement with public information or education can effectively reduce injury crashes (Sali 1983) and result in successful speed enforcement using such methods as speed indicators and photo radar (Hamalainen and Hassel 1990; Cameron *et al.* 1992).

The enhanced enforcement elements of Alternative A would have a minor to moderate beneficial effect on public health and safety. However, if traffic enforcement levels were reduced because of budget cuts or the need to assign U.S. Park Police staff to other duties, the beneficial effects would not be expected to continue for very long.

**Traffic-Calming Devices.** As described by the Federal Highway Administration (1998), traffic-calming techniques are street design or regulatory features that cause motorists to be more attentive to their surroundings and to drive more slowly. The National Highway Traffic Safety Administration (1999) in its *Literature Review on Vehicle Travel Speeds and Pedestrian Injuries* identifies the following advantages for traffic-calming devices.

Once implemented, they are effective without constant attention (such as enforcement).

They can be placed in areas where regular enforcement would be unaffordable.

They require little maintenance, so engineering changes can be implemented as funding is available without placing burdens on future budgets.

Fildes and Lee (1993) pointed out that traffic-calming techniques have the common objective of transferring the costs associated with excessive speed from unprotected road users (that is, death and injury of pedestrians and cyclists) to speeding drivers through such mechanisms as increased inconvenience, wear to vehicles, and longer travel time. In many roadway situations, this transfer conflicts with the goal of moving traffic more efficiently. However, there is no such dilemma in the park, which has mandates for resource preservation and public enjoyment (see the Park Mission section) but no requirement to accommodate nonrecreational traffic.

Other features identified by the National Highway Traffic Safety Administration (1999) make traffic-calming devices especially suitable for uses in the park and parkway.

These measures are most practical on moderate- and low-speed roadways. Posted speed limits on Beach Drive and the parkway are 25 miles per hour and 35 miles per hour, respectively.

Because they cause alterations to the driving environment, their success requires the public's understanding, involvement in planning, and approval. The public involvement capabilities of Rock Creek Park, such as those described in the "Consultation and Coordination" section, could be used to ensure the success of these measures.

The Federal Highway Administration (1998) reported that the most effective traffic-calming measures involve vertical shifts in the roadway, such as speed humps and speed tables. Greater reductions in vehicle speeds and crashes were achieved when combinations of measures were implemented and when traffic calming was implemented systematically over a wide area. Reductions in the incidence and severity of crashes of 50 percent or more were frequently reported. However, the Federal Highway Administration review pointed out that most traffic-calming projects also resulted in reductions in traffic volume, and that the traffic and associated crashes could be migrating to other roads.

Data reviewed by the National Highway Traffic Safety Administration (1999) included analyses of the safety and cost benefits of traffic-calming devices in Europe, Australia, the United States, and Canada (Geddes *et al.* 1996; Zein *et al.* 1997). For 85 case studies reviewed, the median

crash reduction was about 80 percent. In the 15 cases with expected numbers of crashes of five or more, the median reduction was about 70 percent. Looking at case studies where it was possible to isolate the effectiveness of individual types of traffic-calming measures, Geddes *et al.* (1996) found the following levels of crash reduction

traffic circles and chicanes:	82 percent
speed humps:	75 percent
narrowings:	74 percent
stop signs:	70 percent
multiple measures:	65 percent
pedestrian refuges:	57 percent
speed limit reductions:	30 percent

Cost-benefit analyses were performed on the Canadian projects (Geddes *et al.* 1996). On average, costs of the modifications were paid back in approximately 6 months in crash-reduction savings.

The use of traffic-calming devices in Alternative A would have a major beneficial effect on visitor safety in the park and parkway compared to Alternative B. If these measures were successful in reducing the frequency and severity of crashes by the levels indicated above, they would be highly apparent in the statistics maintained for the park and parkway with regard to the number of accidents and the ratio of injury to non-injury accidents. The changes probably would be sufficiently large to be detected in District-wide statistics. As long as the traffic-calming devices were maintained, these would be long-term effects.

**Effects on Vehicle Occupants.** As described in the “Affected Environment” section, more than 97 percent of the traffic accidents in the park and parkway in the 1993-1995 period and 99 percent of the traffic accidents during the 2001-2003 period did not involve cyclists or pedestrians (see table 13). For these types of accidents, the risk of injury to vehicle occupants depends on the change in speed upon impact. Bowie and Waltz (1994) found that the risk of moderate or greater injury was about 10 percent when the change in speed on impact was 20 miles per hour or less, was more than 50 percent at changes in speed up to 40 miles per hour, and was almost 70 percent for changes in speed greater than 50 miles per hour.

It is probable that geometric deficiencies are contributing to the accident history at the intersection of Beach Drive and the parkway near Connecticut Avenue. Based on results typically associated with the redesign of major intersections, improvements have the potential to reduce accidents related to the deficiency by 40 to 60 percent.

Two accidents where vehicle occupants died occurred during the 1993-1995 period, and three such accidents occurred in the 2001-2003 period (Robert Peccia & Associates 1997; NPS, Pettiford 2004c). Because of these low numbers compared to the 9 million vehicle trips on Beach Drive each year and 20 million annual trips on the parkway, the effect of Alternative A on the number of fatal accidents cannot be accurately calculated. However, if the Alternative A actions reduced accidents by 50 percent or more (reasonable reduction estimates, based on studies reviewed by the Federal Highway Administration (1998) and National Highway Traffic Safety Administration (1999)), a similar reduction in fatalities among vehicle occupants would be expected.



The 1993-1995 and 2001-2003 periods each resulted in more than 200 injury accidents to vehicle occupants on the park and parkway. The periods had similar injury-accident rates of about 23 percent. Based on studies reviewed by the Federal Highway Administration (1998) and National Highway Traffic Safety Administration (1999), the traffic management actions of Alternative A would reduce the number of injury accidents by 50 percent or more. Even greater reductions would be expected on Beach Drive, where lower speed limits combined with traffic calming measures would result in speeds for most vehicles of 20 miles per hour or less. In this area, the risk of moderate or greater injury would be reduced to the 10 percent level found by Bowie and Waltz (1994).

Alternative A would have a long-term, major, beneficial effect in reducing the number and severity of motor-vehicle-only accidents in the park and along the parkway. The reduced speeds produced by enhanced enforcement and traffic-calming measures would reduce both the number of accidents and the number and severity of injuries to vehicle occupants. This would reduce the ratio of accidents to number of visitors, the ratio of injury to non-injury accidents, and the frequency of fatal accidents. These changes would be highly apparent in the statistics maintained for the park and parkway and probably could be perceived in District-wide statistics.

**Effects on Pedestrians and Bicyclists.** The National Highway Traffic Safety Administration (1999) summarized information in three United States databases containing the outcome of hundreds of thousands of crashes involving pedestrians. Information in all three databases demonstrated that the pedestrian had a 98.8 percent or better chance of surviving if the pre-crash speed of the vehicle was less than 20 miles per hour. Fatalities were about 5 percent when the pre-crash speed of the vehicle was below 35 miles per hour. Speeds up to 45 miles per hour doubled or tripled the fatality rate for the pedestrian. Crashes at speeds greater than 45 mps killed more than 20 percent of the pedestrians and caused incapacitating injuries to at least 25 percent more.

As shown in table 13, 28 of the 1,175 accidents recorded in the park and along the parkway in the 1993-1995 period involved pedestrians or bicyclists. Among these, seven bicyclists or pedestrians were injured and two pedestrians were killed. During the 2001-2003 period, only six of the 943 accidents, and no fatalities, involved bicyclists or pedestrians.

By slowing traffic speeds, the traffic management measures of Alternative A would have a long-term, beneficial effect in reducing the number and severity of collisions between automobiles and pedestrians or cyclists in the park and along the parkway. However, because of the low number of this type of accidents (average of two per year) compared to the 2 million annual pedestrian and cyclist visits to the park and parkway, some year-to-year fluctuation in the number of pedestrian and cyclist accidents would be expected.

### **Analysis of Effects on Personal Safety**

Alternative A would not alter the patterns of use along park roads or the parkway compared to Alternative B. As a result, the effects of this alternative on crimes against persons would be negligible.

### **Analysis of Effects on Emergency Evacuations**

For Alternative A, there would be no change compared to Alternative B regarding management of roads during emergencies. Rock Creek Park roads could be used during emergencies for evacuation; however, segments of Beach Drive would be closed on the weekends.

### **Cumulative Impacts**

Rock Creek Park is located in large metropolitan area with a traffic accident rate that is almost double that of the national rate (see table 15 in the “Affected Environment” section). The Metropolitan Washington Council of Governments, District Department of Transportation, District of Columbia Metropolitan Police, and other local transportation agencies and organizations are continuously planning and implementing measures to improve local and regional traffic safety. The National Park Service is working cooperatively with these agencies. The 20 percent reductions in accident rates, including property-only, injury, and fatal accidents, in the park and parkway between the 1993-1995 period and 2001-2003 period (see table 13) provide evidence that these types of actions are having cumulative beneficial effects.

### **Conclusions**

By reducing the number and severity of traffic accidents in Rock Creek Park and along the Rock Creek and Potomac Parkway, the traffic calming measures of Alternative A would have a long-term, major, beneficial effect on public health and safety. This alternative would have negligible effects on crimes against persons or the effectiveness of emergency evacuations.

## **IMPACTS ON REGIONAL AND LOCAL TRANSPORTATION**

### **Regulations And Policy**

All roads proposed for management changes under Alternative A are within NPS ownership and jurisdiction. Chapter 9 of the NPS’ *Management Policies 2001* (2000a) provides guidance for management of park access and circulation systems. While there are no legal restrictions to the traffic management actions associated with any of the alternatives, their implementation in the park would require coordination with local, regional, and federal transportation agencies.

All park roads are designated as contributing resources to the Rock Creek Park Historic District listed on the National Register of Historic Places. The Rock Creek and Potomac Parkway has been determined to be eligible for nomination to the National Register of Historic Places. Any changes in the physical layout of the roads or their setting may require consultation with the District of Columbia State Historic Preservation Officer and the Advisory Council on Historic Preservation under Section 106 of the National Historic Preservation Act (see “Impacts on Archeological Resources”).

### **Methodology**

The area addressed in the regional and local transportation analysis is the area shown on the map entitled Average Weekday Traffic Volumes. The evaluation of effects on regional and local transportation consisted of comparing conditions that would occur in the year 2020 under Alter-

natives A, C, and D to those in the year 2020 under Alternative B, which would strive to maintain current park conditions.

The National Park Service wanted to be certain that the alternatives and the evaluation of effects incorporated the concerns of major transportation agencies in the vicinity. Therefore, early in the planning process, the National Park Service consulted with representatives of the

District of Columbia Department of Public Works

District of Columbia Department of Transportation

Federal Highway Administration

Maryland Department of Transportation

Maryland National Park and Planning Commission

National Zoological Park.

Washington Area Transit Authority

Washington Metropolitan Council of Governments (MWCOG) Transportation Planning Board

Potential impacts of the action alternatives were estimated using a refined traffic projection model based on the official regional model developed by the Metropolitan Washington Council of Governments. A summary of the traffic modeling technique is presented in appendix H. Information on the validation of the traffic model also is provided in this appendix.

The modeling assumed that the current widespread use of private automobiles would continue, and did not anticipate major shifts toward mass transit or other transportation modes. Regional plans that support increased intermodal travel and the use of “intelligent transportation systems” to better manage traffic flows and reduce congestion have been developed by the State of Maryland, Montgomery County, and the Washington Metropolitan Council of Governments. If these programs are successful, the results of the transportation model may be somewhat higher than actual year 2020 traffic levels. Conversely, traffic in the past two decades has grown more quickly than anticipated, and may continue to do so. Based on these both positive and negative uncertainties, the model results are considered reasonable estimates.

The modeling results for the alternatives in the year 2020 are provided in appendix G. The Alternative A and B Year 2020 Average Weekday Traffic Volumes map shows the modeling results used for the Alternative A evaluation. As appropriate, the maps for the other alternatives are provided with their respective analyses.

Where management actions associated with an alternative would result in changes in traffic volumes relative to Alternative B (the “Continue Current Management/No Action” alternative), results of the model are also presented as potential “levels of service” (LOS) along road segments. The levels of service scale was defined by the American Association of State Highway and Transportation Officials (AASHTO) (1990) and is widely used to describe traffic and driving characteristics at various intensities of traffic flow and congestion. These characteristics are described in table 22.

**TABLE 22: LEVEL-OF-SERVICE CHARACTERISTICS OF URBAN AND SUBURBAN ARTERIALS<sup>a/</sup>**

Level of Service	Descriptor	Characteristics
A	Light traffic	Average travel speed is about 90 percent of free flow speed. Stopped delay at signalized intersections is minimal.
B	Moderate traffic	Average travel speeds drop because of intersection delay and inter-vehicle conflicts, but remain at 70 percent of free flow speed. Delay is not unreasonable.
C	Substantial traffic	Stable operations. Longer queues at signals result in average travel speeds of about 50 percent of free flow speeds. Motorists experience appreciable tension.
D	Heavy traffic	Approaching unstable flow. Average travel speeds are down to 40 percent of free flow speed. Delays at intersections may become extensive.
E	Very heavy traffic	Unstable flow. Average travel speeds are 33 percent of free flow speed. Continuous backups occur on approaches to intersections.
F	Extremely heavy traffic	Forced flow; near gridlock conditions. Average travel speed is between 25 and 33 percent of free flow speed. Vehicular backups and long delays occur, particularly at signalized intersections.

a/ Source: American Association of State Highway and Transportation Officials 1990

An level of service analysis was conducted for the major routes within the study area. The analysis was developed as an interpretive tool to help define existing and future traffic conditions. The analysis compared the projected peak-hour traffic volumes for each alternative to the estimated traffic capacity of each corridor. Both the morning and afternoon peak-hour conditions were evaluated.

The capacity of each corridor was estimated based on the number of travel lanes, the number of stop or signal-controlled intersections, the presence of buses and heavy trucks in the traffic mix, and other roadside friction factors such as on-street parking and the number of access points. The following volume/capacity relationships were used to define the levels of service:

Level of service A: volume/capacity = 0 to 28 percent

Level of service B: volume/capacity = 29 to 47 percent

Level of service C: volume/capacity = 48 to 66 percent

Level of service D: volume/capacity = 67 to 79 percent

Level of service E: volume/capacity = 80 to 100 percent

Level of service F: volume/capacity = 100+ percent

The level of service categories are designed for urban and suburban driving conditions. In contrast, public expectations for recreational driving conditions on park roads are often at a very high level of service. For instance, many people would describe existing evening rush-hour traffic through the gorge section of Beach Drive between Joyce Road and Broad Branch Road as heavy

because the stream of traffic is constant, fast flowing, and demands constant attention of the driver. However, it is classified as level of service B, moderate traffic, because the flow is steady with few traffic-related delays.

The level of service analysis is only an approximation of the traffic on various segments of the road network and does not reflect the operation of specific intersections. In many cases, intersections within the study area operate at a different level of service than the adjacent corridors. Within the park, three intersections currently operate poorly. These include the intersections at Beach Drive and Park Road/Tilden Street, Beach Drive and the parkway, and Virginia Avenue and the parkway. All of these intersections are currently providing level of service E/F during the morning and evening peak-hours. These poor level of service conditions would not be correctable without expanding the intersection corridors to include additional traffic lanes, and the National Park Service does not propose to take such action in this general management plan.

Traffic impacts of the action alternatives are defined as the differences between future traffic conditions predicted without changing existing management (represented by Alternative B) and future traffic conditions if the traffic management measures included in the action alternative are implemented.

A change of one level of service (for example, level of service D to C) is characterized in this analysis as a noticeable effect.

A change of two levels of service (for example, level of service B to D) is characterized as a considerable effect.

A change of three levels of service or more (for example, level of service B to E) is characterized as a major effect.

## **Analysis**

Traffic-calming measures applied to Beach Drive between the Maryland state line and the Rock Creek and Potomac Parkway would reduce vehicle speeds through the park. The speed limit on Beach Drive could also be modified (after experimentation to determine the optimal speed limit) to reduce traffic speeds. Currently, the speed limit on Beach Drive is 25 miles per hour, but it could be reduced to 20 or 15 miles per hour under Alternative A.

During rush hours, neither the traffic-calming measures nor the adjustment of the speed limit on Beach Drive are anticipated to cause vehicles to reroute. Because congestion on Beach Drive during the rush hours often forces vehicles to travel below the speed limit, the traffic calming measures would not cause the level of inconvenience that would influence drivers to choose alternate routes. Therefore, during rush hours, traffic volumes for Alternative A would be essentially the same as those in Alternative B.

Outside the rush hours, Alternative A would reduce traffic volumes and speeds on Beach Drive. The inconvenience of the traffic calming measures probably would influence some drivers who were not planning to stop in the park and enjoy its other recreational opportunities to select other routes, including Ross Drive or non-park roads. The engineered measures also would force all drivers to control their speeds. While the reductions in traffic volumes and speeds probably would be noticeable, they would not result in a change in level of service within the park. They also

would not result in level-of-service changes outside the park, where roads during the off-peak periods have plenty of capacity available.

Proposed safety modifications to the intersection of Beach Drive and the parkway would reduce vehicle conflicts and help minimize traffic congestion and delays. The result of these combined measures would be a safer and more somewhat pleasant environment for recreationists and other visitors using either motorized or nonmotorized travel.

**Average Daily Traffic.** Alternative A average daily traffic projections for the year 2020 are shown in table G.1 in appendix G and the Alternative A and B Year 2020 Average Weekday Traffic Volumes map. Alternative A would not change rush-hour traffic volumes, so the increases in traffic volumes between current conditions and those in 2020 would not be attributable to Rock Creek Park's management strategies. Modeling shows that by the year 2020, traffic volumes would increase on all of the roads within the park and throughout the area. Traffic also would increase during the morning and evening peak-hours, and the peak periods would begin earlier and last longer than what currently occurs.

Daily traffic volumes on Beach Drive north of Sherrill Drive are projected to more than double by the year 2020. Traffic on other sections of Beach Drive would increase between 30 and 48 percent. All of the intersections along Beach Drive south of Joyce Road would operate at or near capacity during the morning and evening peak periods.

By the year 2020, traffic delays would create long lines both on Beach Drive and the side roads. The flow of traffic along Beach Drive would be quite congested. Bumper-to-bumper traffic conditions would be common on Beach Drive between the parkway and Joyce Road during all hours of the day.

Traffic congestion would be substantial at several intersections with Beach Drive. These include the intersections with the parkway, Porter Street, Piney Branch, Tilden Street/Park Road, Blagden Avenue, Broad Branch Road, and Wise Road. In some instances, the vehicle backups at one or more of these intersections would be long enough to interfere with the operation of adjacent intersections on the park road network and/or the city street grid.

Daily traffic on side roads in the park would also increase, compared to the most recent traffic counts available. Traffic on Wise Road and West Beach Drive would increase by 38 percent (to 14,100 vehicles per day) and 49 percent (to 17,100 vehicles per day) respectively by the year 2020. Piney Branch Parkway traffic would increase by 32 percent, to 13,300 vehicles per day. There would be proportionately very large increases on lightly used side roads. For instance, daily volumes on Sherrill Drive and the Ross Drive-Glover Road connection would almost triple. Volumes on other side roads would increase from 40 to 100 percent. Despite such increases, service would be at level of service C or better on most side roads.

Traffic on the Rock Creek and Potomac Parkway also would increase by the year 2020. Traffic congestion on the parkway, created by the increased volumes, would be greatest at the north end near the intersection with Beach Drive and at the south end near Virginia Avenue. Traffic congestion would also occur on several of the ramps connecting with the parkway, including the on-ramp at P Street and the off-ramp at Waterside Drive.

**Morning Rush-Hour Traffic.** Table G.3 in appendix G shows year 1990 levels of service and the levels of service that would occur with implementation of Alternative A. During the morning

peak hour, 57 percent of the modeled roadways would have very heavy (level of service D) to extremely heavy (level of service F) traffic. In contrast, fewer than 44 percent of these roadways were level of service D or worse in 1990.

During the morning rush hour, the level of service would noticeably decline on four of seven segments of Beach Drive. There would be a considerable deterioration in level of service on the northern-most stretch of Beach Drive above West Beach Drive. Traffic conditions on Beach Drive south of Blagden would be heavy to very heavy in the mornings.

On the Rock Creek and Potomac Parkway, morning traffic would range from substantial (level of service C) to very heavy (level of service E). On three of the four segments modeled, this would be a noticeable decrease in level of service.

No change in level of service would be anticipated for Ross Drive, Glover Road, Grant Road, Bingham Drive, Morrow Drive, or Joyce Road in the mornings. Traffic levels of service on all other park roads would decline noticeably by 2020. Morning traffic would increase considerably on West Beach Drive to very heavy levels.

**Evening Rush-Hour Traffic.** There pattern of declining level of service and increasing traffic on Beach Drive and the Parkway during the evening would be similar to the morning rush hour. Levels of service on Beach Drive would be noticeably reduced compared to year 1990 conditions. The worst traffic problems on Beach Drive would occur between Blagden Avenue and the parkway, reaching extremely heavy traffic conditions (level of service F).

Except on the south end where traffic would be substantial, the parkway would see heavy (level of service D) and very heavy (level of service E) conditions in the evenings. This would represent a noticeable reduction in service from year 1990 conditions.

With a few exceptions, side roads in the park would see less of a change in traffic levels. West Beach Drive would decline in level of service during the evenings from the year 1990 to a very heavy level (level of service E) or extremely heavy level of traffic (level of service F) by 2020. Traffic on Wise and Blagden would noticeably increase, and traffic on Sherrill Drive would considerably increase from light to substantial levels.

**Neighborhood Traffic.** During rush hours, traffic volumes would not change relative to Alternative B and all park roads would remain open. Therefore, there would not be any changes during these periods in the volumes of traffic that turned off Beach Drive and into the neighborhoods adjacent to Rock Creek Park compared to volumes that would occur with Alternative B.

During other periods, all park roads would remain open, and most drivers who elected to use other routes because of the traffic calming measures would make that decision before they approached the park. Therefore, there would be a negligible change compared to Alternative B in neighborhood traffic because of changes in traffic volumes on Beach Drive.

**Nonmotorized Travel.** Weekday nonmotorized travel for recreation and personal transport would increase in the park with Alternative A, primarily because this alternative would provide improved conditions for cyclists, pedestrians, in-line skaters, and others. Improvements would include rehabilitation of recreation trails in the park and improved enforcement to ensure that automobile traffic traveled at or below the speed limit (currently 25 miles per hour, but it could be reduced) on Beach Drive. The current weekend closures of sections of Beach Drive and all of

Bingham and Sherrill Drives for recreational use would continue to support weekend nonmotorized recreation.

Actions in Alternative A such as traffic calming measures and reduced speed limits would cause some drivers to use non-park roads or Ross Drive instead of Beach Drive. This would cause a measurable reduction in traffic on Beach Drive. The reductions in traffic speeds and volumes through the park could be sufficient to cause some increase in nonmotorized travel on Beach Drive on weekdays, particularly bicycle travel. However, visitors using nonmotorized transportation modes would still have to use park roads with extreme caution because of continued automobile traffic throughout the length of Beach Drive.

### **Cumulative Impacts**

Regional growth in the counties around the District of Columbia, especially to the north in Montgomery County, Maryland, is the primary reason for the projected increases in traffic volumes around the park. No matter which action is taken in Rock Creek Park or on the parkway, traffic in the region is expected to increase by at least 70 percent above 1990 levels by the year 2020 (Metropolitan Washington Council of Governments 1998b). The transportation model used by Metropolitan Washington Council of Governments incorporates expected increases in mass transportation and nonmotorized transportation. Growth-induced increases in traffic would have a detrimental impact on traffic on all of the roads in the area with or without Alternative A.

Major commuter routes in the city would be unaffected by Alternative A. Maryland Department of Transportation does not anticipate any impacts to state roads (Simpson 2003).

A project to improve Broad Branch Road is currently being designed by the District of Columbia Department of Transportation (see “Connected, Cumulative, and Similar Actions”). Once completed, an improved Broad Branch Road may attract drivers as an alternative to Beach Drive.

Alternative A would have little influence on nonmotorized travel outside the park. An individual’s decision to walk or ride a bicycle would not likely be influenced by the traffic control measures associated with Alternative A.

### **Conclusions**

During rush-hour periods, effects of Alternative A on regional and local transportation would be negligible compared to Alternative B.

During non-rush-hour periods, Alternative A would reduce traffic speeds and volumes along Beach Drive while allowing weekday vehicle access to all existing road segments and preserving the existing visitor experience of automobile travel through the park. The decreased weekday non-rush-hour traffic speeds and volumes on Beach Drive would reduce conflicts between automobile use and nonmotorized travel in the Rock Creek valley.

Because Beach Drive would remain open to mid-day traffic, changes in traffic in neighborhoods around the park would not be expected. Any shift in automobile traffic from park roads to other routes outside the park would have very little effect on city traffic conditions.



Throughout the day, the improvements to recreation trails would enhance nonmotorized transportation in the park. During non-rush-hour periods, reduced automobile traffic speeds and volumes may increase nonmotorized travel on Beach Drive, particularly bicycle travel.

## **IMPACTS ON COMMUNITY CHARACTER**

### **Regulations and Policy**

There are no applicable regulations or policies to guide NPS actions with respect to community character because the entire area of concern is outside the jurisdiction of the National Park Service.

### **Methodology**

This analysis evaluated impacts on community character in the nine Washington, D.C. and three Maryland zip code tabulation areas that were characterized in the “Affected Environment” section.

Changes in community character were assumed to be related to changes in traffic management because traffic changes are the primary element of the alternatives that would have recurring, detectable effects outside the park. As a result, traffic changes associated with each action alternative were analyzed in relation to the neighborhoods, delineated as U.S. Census Bureau zip code tabulation areas, that the changes would potentially affect. Changes were measured against the projected traffic volumes for Alternative B, the continue current management/no action alternative, for the year 2020.

In addition, the projected changes were evaluated from an environmental justice perspective. This evaluation examined whether noticeable or greater increases in traffic would disproportionately occur in neighborhoods characterized as disadvantaged or minority, based on U.S. Census Bureau zip code tabulation area data.

Traffic changes and the associated, qualitative changes in community character were described as noticeable, considerable, and major. This evaluation used the same criteria that were used to determine the effects of traffic changes on traditional park character and visitor experience. Effects were defined in terms of a change in level of service as follows:

A change of one level of service would be considered a noticeable change.

A change of two level of service would be considered a considerable change.

A change of three or more level of service would be considered a major change.

See the “Impacts on Regional and Local Transportation” section for definitions of level of service and the data related to the projected level of service changes.

The environmental justice evaluation was conducted by examining current neighborhood demographic information to determine whether patterns were present that would suggest that noticeable or greater traffic increases would occur disproportionately in economically disadvantaged or

ethnic neighborhoods. The zip code tabulation areas were superimposed on the forecast traffic volume increases for the traffic corridors that were analyzed.

### **Analysis**

As described in “Impacts on Regional and Local Transportation,” the traffic management components of Alternative A would affect traffic volumes only during non-rush-hour periods. Because of the relatively low traffic volumes during these times, the small proportion of drivers that may voluntarily choose other routes to avoid the inconvenience of the traffic calming measures on Beach Drive, and the large number of alternate routes available to these drivers, Alternative A would not result in changes to traffic volumes that were outside the range of normal variability on roads outside the park, compared to Alternative B.

Alternative A would have negligible effects, relative to Alternative B, on community character and the quality of life of area residents or the economic health of businesses. Although traffic and noise levels would continue to increase both in the park and surrounding neighborhoods, the cause would be regional population growth and not any actions by the National Park Service. Recreational opportunities and access to the park would continue to be compromised by traffic congestion in the area. No changes would occur to recreational or educational opportunities outside the park because of implementation of Alternative A.

Regional and local economic patterns would not be affected by Alternative A. Although this alternative includes almost \$15 million in capital improvements, these funds would be spent throughout the life of this general management plan and may average about \$1 million per year. This would represent a negligible contribution to the economies of the neighborhoods surrounding the park. Alternative A’s \$880,000 increase in annual park operating costs compared to Alternative B also would be undetectable in the local economy and would have a negligible effect. The eight new jobs associated with this alternative could not be discerned economically in comparison with employment opportunities available in the neighborhoods and city and would have a negligible effect on the character of the community.

### **Cumulative Impacts**

Traffic levels are anticipated to grow substantially by 2020 and increase congestion in the park and surrounding neighborhoods (Metropolitan Washington Council of Governments 1998b). For example, traffic projections indicate residents of the Brightwood neighborhood can expect a 57 percent increase in traffic on 16th Street over 30 years. Mount Pleasant residents would experience a 48 percent increase in traffic on 16th Street during the same period. Similar increases would occur on the western side of the park. Cleveland Park residents can expect a 32 percent increase in traffic on Connecticut Avenue and Barnaby Woods residents would see a 26 percent increase in traffic along Oregon Avenue north of Bingham Drive.

A project to improve Broad Branch Road is currently being designed by the District of Columbia Department of Transportation (see “Connected, Cumulative, and Similar Actions”). An improved Broad Branch Road may attract drivers as an alternative to Beach Drive. Such projects are continually occurring in the vicinity of the park and throughout the city as transportation departments strive to improve travel conditions for citizens. After each project is completed, area-wide traffic patterns will adjust to take advantage of the changes. Cumulatively, these projects

will have a greater influence on the character of the community outside the park than will the actions associated with Alternative A.

## **Conclusions**

Alternative A would have negligible effects, compared to Alternative B, on the quality of life of area residents. Traffic is expected to become more congested, but park actions would not introduce additional traffic onto the roadways surrounding the park. Opportunities for recreation and education outside the park would continue to be available. Alternative A would have negligible economic effects on the neighborhoods around the park and would not be detectable in the city's economy.

## **SUSTAINABILITY AND LONG-TERM MANAGEMENT**

### **The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity**

Actions associated with Alternative A would be consistent with a long-term management strategy for ensuring the protection of natural, archeological, and historic resources and improving park visitor experiences.

Some motorists who use park roads as a nonrecreational travel route would be inconvenienced by traffic-calming measures, and by increased travel times. However, this inconvenience would be offset by an improved weekday recreational visitor experience that would be more compatible with the park character.

The development of new administrative and interpretive facilities would support the 'PS' mission while having no adverse cumulative impacts on ecosystems or resources. Removing NPS administrative facilities from historic sites would allow for improved educational and interpretive uses at the sites and would better protect these cultural resources.

Short-term degradation of local water quality during construction projects would largely be prevented by best management practices. Any unmitigated short-term degradation would be overwhelmingly offset by long-term improvements resulting from reduced storm water contaminant discharges into Rock Creek and reduced non-point runoff from developed areas.

Short-term localized soil erosion (largely prevented by best management practices) and removal of plant communities along trail construction corridors would be offset by long-term reductions in soil erosion resulting from the repair or realignment of poorly designed or damaged trails.

### **Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented**

There would be a potential for irreversible or irretrievable commitments of archeological and historic resources under Alternative A.

None of the natural resource changes associated with Alternative A would be considered irreversible or irretrievable commitments. However, the effort required to reverse some resource

commitments and decisions, once implemented, may require substantial planning and implementation efforts.

The construction of new administrative space and the renovation of historic structures would employ methods encouraging energy conservation and recycling when possible. The energy expended during any construction project would be an irretrievable resource commitment.

Financially, Alternative A would require funding to accomplish its goals. In the long-term, some costs may be reduced as a result of more efficient use of administrative space and lowered maintenance costs.

**Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented**

None of the effects identified in this assessment of Alternative A would be considered major adverse effects. Alternative A would not result in impairment of any resources that would affect the basic purposes of Rock Creek Park and the Rock Creek and Potomac Parkway.

## **ENVIRONMENTAL IMPACTS OF ALTERNATIVE B: CONTINUE CURRENT MANAGEMENT/NO ACTION**

The regulations and policy that apply to Alternative B, and the methods used to conduct the analysis are identical to those describe for Alternative A, unless otherwise noted.

### **IMPACTS ON AIR QUALITY**

#### **Analysis**

Under Alternative B, the area of Rock Creek Park and the Rock Creek and Potomac Parkway would be affected more by emissions throughout the regional airshed than by tailpipe emissions from vehicles using the park and parkway. Table 20 summarizes the effects of Alternative B on air quality in the year 2020 based on modeling described in the "Methodology" section under Alternative A. The analysis showed the following would occur in the vicinity of Rock Creek Park if the National Park Service maintains its current management practices.

Peak-hour traffic would have increased substantially since the 2001 and 2004 traffic counts shown on the Average Weekday Traffic Volumes map in the "Affected Environment" section. At most intersections shown in Table 20, the increases between the current counts and the modeled values for 2020 are between 20 and 35 percent. However, the projected increase in average daily traffic counts is 50 percent at the intersection of Beach Drive and Wise Road at the northern end of the park and 72 percent at the intersection of Beach Drive, Broad Branch Road, and Bladgen Avenue. Despite traffic increases, the worst 1-hour carbon monoxide concentration that would be associated with Alternative B (12.6 parts per million at the intersection of Beach Drive, Broad Branch Road, and Bladgen Avenue) would be well below the 1-hour National Ambient Air Quality Standard of 35 parts per million that is protective of human health and the environment.

#### **Cumulative Impacts**

No changes would occur in emissions from vehicles in the region because of management actions at Rock Creek Park.

#### **Conclusions**

Alternative B would not result in the exceedence of the 1-hour National Ambient Air Quality Standard for carbon monoxide at any of the intersections in the vicinity of Rock Creek Park. In addition, it would not cause any impairment of resources or values associated with air quality.

## **IMPACTS ON ROCK CREEK AND ITS TRIBUTARIES**

### **Analysis**

No new point-source discharges in the park are anticipated as a result of Alternative B. The application of best management practices at the three park stables, the maintenance yard and storage area, the golf course, and other existing park facilities would reduce contaminated runoff from non-point sources. Specific sources of potential contamination in the park and recommendations for best management practices to minimize pollution are presented in the *Best Management Practices for Water Quality – Rock Creek Park* (URS Greiner Woodward Clyde 1999). Implementation of best management practices at these sites would produce beneficial, long-term measurable effects on water quality.

Up to 2 miles of park trails are poorly designed or are located on slopes greater than 30 percent. Erosion and sedimentation from these trail segments are having a measurable, adverse effect on water quality in Rock Creek. This long-term effect would continue under Alternative B.

### **Cumulative Impacts**

Cumulative impacts of Alternative B would be like those described in Alternative A. Water quality and flows in Rock Creek and its tributaries would continue to be more heavily influenced by urban development in the upstream watershed than by activities in the park. Continued interagency measures, such as reducing point and non-point discharges, and maintaining and improving sanitary and combined sewer systems would continue to produce beneficial, long-term, major effects on water quality. Coordination would also produce beneficial, long-term, major reductions in streambed alterations such as scour and sedimentation.

### **Conclusions**

Compared to current conditions, the implementation of best management practices under Alternative B would produce long-term, measurable improvements in water quality. Erosion from poorly designed trail segments or trails on steep slopes would continue to have long-term, measurable, adverse water quality effects. Regional coordination would continue to result in major beneficial effects on water quality and hydrology throughout the watershed.

The management actions of Alternative B would not result in impairment of resources or values associated with Rock Creek and its tributaries.

## **IMPACTS ON WETLANDS AND FLOODPLAINS**

### **Analysis**

None of the actions included in Alternative B would have beneficial or adverse effects on wetlands. Protection of these resources would continue in conformance with NPS guidance documents such as those listed in the “Methodology” section under Alternative A.

### **Cumulative Impacts**

Alternative B would not produce any adverse, long-term impacts on wetlands, seeps, or floodplains. Therefore, it would not contribute to any cumulative adverse impacts on wetlands or floodplains in the park or in the region.

Floodplains and wetlands throughout the park would be continue to be protected from direct disturbance from development. Application of best management practices would help reduce risk to floodplain and wetland resources from polluted runoff, erosion, filling activities, water diversions, and sedimentation from sources within the park. Wetlands located in the Rock Creek floodplain would continue to be threatened by sediments transported during high storm water discharges originating outside the park.

The removal of impediments to fish migration, including construction of a fish bypass at Peirce Mill dam, represents a new construction action in the 100-year floodplain. The effects under Alternative B would be similar to those described for Alternative A and would not result in a long-term loss of floodplain hydraulic capacity.

### **Conclusions**

Alternative B would have negligible, long-term effects on wetlands or floodplains. There would be no impairment of resources or values associated with wetlands and floodplains.

## **IMPACTS ON DECIDUOUS FORESTS**

### **Analysis**

Alternative B would have little effect of the deciduous forests of Rock Creek Park. Protection of the deciduous forest has been a long-term goal at Rock Creek Park. The continuation of current management practices such as avoiding clearing of trees, suppressing wildfires, and controlling the presence and distribution of or invasive species, would maintain the deciduous forest in a condition much like that currently seen in the park.

As described in the “Affected Environment” section, accelerated erosion currently is occurring along heavily used or improperly designed trails. Under Alternative B, this problem would continue and probably worsen.

### **Cumulative Impacts**

Ongoing urbanization of the Rock Creek watershed and other forested areas of Maryland and Virginia near Washington, D.C. will continue to eliminate deciduous forests. Park management practices associated with Alternative B would have little effect on regional, development-related decreases in deciduous forests.

### **Conclusions**

Alternative B would have little effect on most of the deciduous forest areas of Rock Creek Park. At selected sites along heavily used or improperly designed trails where accelerated erosion is

occurring, problems would continue and probably worsen. However, there would be no impairment of resources or values associated with the deciduous forest.

## **IMPACTS ON PROTECTED AND RARE SPECIES**

### **Analysis**

The groundwater amphipods that were described in the “Affected Environment” section, including the federally endangered Hays spring amphipod, inhabit several seeps and springs in the park. The National Park Service is aware of these locations and would continue measures to protect these sites in the long term from general park use.

### **Cumulative Impacts**

Under Alternative B, the park’s assemblage of national and regionally rare plants and animals would continue to benefit from the protection that the park affords. Ongoing urbanization of the Rock Creek watershed and other areas of Maryland and Virginia near Washington, D.C. will continue to eliminate individuals and habitats of protected and rare species. Park management practices associated with Alternative B would have little effect on regional, development-related effects on these species.

### **Conclusions**

Alternative B would continue to maintain protected or rare species populations currently present in the park. There would be no impairment of resources or values associated with protected and rare species.

## **IMPACTS ON OTHER NATIVE WILDLIFE**

### **Analysis**

Native species that require deciduous forest habitats in relatively large, contiguous tracts would continue to benefit from the protection of most of the park’s land area as relatively undisturbed woodland.

Compared to current conditions, the number of wildlife animals killed or injured by motor vehicles in the park would increase under Alternative B as traffic volumes through the park continued to increase. Higher traffic volumes during daylight rush hours on park roads and adjacent streets would increase the risk to box turtles and black rat snakes, both of which are believed to be declining within the park.

Increased evening, nighttime, and early morning traffic, when many mammals are active, would probably result in increased gray fox deaths. The effect of this mortality on the gray fox population is unknown. However, the gray fox population in the park is small and experiences multiple stress factors. Under these conditions, even infrequent roadkills could contribute to an overall reduction of the resident population (a moderate, adverse, long-term effect) or even local extirpation (a major, adverse, long-term effect).



For native species that are not currently declining, continuing current traffic management patterns in Alternative B would be unlikely to affect on their population abundance, diversity, or habitat availability compared to present conditions. The park already experiences a high level of human presence and disturbance, and additional traffic would have little additive effect.

### **Cumulative Impacts**

Cumulative effects on native wildlife under Alternative B would be similar to those described for Alternative A. They would include:

- continued benefits from habitat protection provided by natural areas in Rock Creek Park

- improved habitat conditions from cooperative efforts with other agencies to reduce or eliminate pollutant discharges in currently developed areas of the drainage

- restoration of access to the watershed upstream from Peirce Mill dam by removing or mitigating man-made obstructions to fish migration

- continued loss and fragmentation of wildlife habitat on privately owned land throughout the region because of continued urban development and in-filling

- continued changes in hydrology and water quality because of watershed development outside the park

### **Conclusions**

Alternative B would not produce any major changes in native wildlife species abundance, diversity, or habitat availability. Increased roadkill from higher levels of traffic could produce long-term, adverse effects on species that are believed to already be declining. However, this would not result in any impairment of resources or values associated with native wildlife. As with Alternative A, cumulative impacts from actions outside the park would have much larger effects on native wildlife than those actions associated with Alternative B.

## **IMPACTS ON ARCHEOLOGICAL RESOURCES**

### **Analysis**

Information about the location, characteristics, and significance of the majority of the archeological resources of Rock Creek Park and the Rock Creek and Potomac Parkway currently is lacking. However, following completion of the 4-year archeological inventory and analysis of the park and parkway that began in 2004, park managers will have sufficient information to carry out their responsibilities for protection and interpretation in an effective and efficient manner.

Under Alternative B, the integrity of some sites would be degraded by natural processes such as wind and water erosion, or by vandalism or inadvertent damage by visitors. These processes could result in non-construction-related significant adverse effects on archeological resources.

### **Cumulative Impacts**

Cumulative impacts of Alternative B would be the same as those described for Alternative A.

### **Conclusions**

Following completion of the 4-year, park-wide archeological inventory and evaluation that currently is underway, resource managers will have the necessary information to provide effective protection of the park's and parkway's archeological resources. There would be no impairment of resources or values associated with archeological resources as a result of Alternative B.

## **IMPACTS ON HISTORIC STRUCTURES AND CULTURAL LANDSCAPES**

### **Analysis**

Under Alternative B, Rock Creek Park would continue to inventory historic resources. Measures for the preservation of significant resources would be undertaken in accordance with NPS policies and guidelines. Historic designed roads and trails would be preserved and maintained as part of the cultural landscape, as would structures such as Peirce Mill, the Godey Lime Kilns, and Fort DeRussy.

### **Cumulative Impacts**

Cumulative impacts of Alternative B would be the same as those described for Alternative A.

### **Conclusions**

Under Alternative B, cultural resource management activities would protect, preserve, and interpret the park and parkway cultural resources in a manner consistent with *Management Policies 2001* (NPS 2000a). Cultural resources would continue to be maintained as at present. There would be no impairment of resources or values associated with historic structures and cultural landscapes.

## **IMPACTS ON TRADITIONAL PARK CHARACTER AND VISITOR EXPERIENCE**

### **Analysis of Effects on Continuation and Quality of Traditional Park Uses**

The traditional character of the park would not change under Alternative B. Visitors would continue to have access to the wide variety of established recreational activities described in the "Affected Environment" section. The appearance of park historic structures and grounds would be mostly preserved (see "Impacts on Historic Structures and Cultural Landscapes"), maintaining the traditional ambiance of the park setting.

Continuing current management under Alternative B would result in park visitors being affected by increased nonrecreational traffic along park roads and the parkway. Projections for traffic volumes on Beach Drive (table G.1 in appendix G) indicate that by the year 2020, average daily traffic on Beach Drive may increase by 30 percent.

Increases in traffic, particularly during weekday rush hours, would cause increased noise, and for several hours each weekday views along park roads would be dominated by long lines of slowly moving or stopped vehicles. When traffic volume allowed, such as during the mid-day period, speeding would continue to be a problem in the park. Visitors attempting to use park roads for recreation during weekdays could feel distracted and intimidated by the large volume of traffic and congestion on park roads.

Noise levels in Rock Creek valley would continue to follow the existing pattern. Noise levels within 60 feet Beach Drive and within 125 feet of the Rock Creek and Potomac Parkway would exceed the Federal Highway Administration's noise abatement criteria during high traffic periods. Traffic noise would remain the dominant background sound at picnic groves and along Rock Creek during weekdays. On weekends when road closures were implemented, traffic noise would be eliminated or greatly reduced in the valley north of Broad Branch Road.

Weekend road closures would continue current opportunities for nonmotorized recreation in the valley. As the number of visitors participating in nonmotorized recreation increased, weekend use could grow considerably above current levels occurring on the closed segments of Beach Drive on weekends.

Without realignment of segments of the park horse and foot trails, trail erosion would be a continuing and growing problem in some areas. This would lead to unsightly and potentially unsafe conditions at some trail sites.

At the Rock Creek Nature Center and Planetarium, visitors would continue to have opportunities to learn about the park, although the exhibits and furnishings would be worn and dated. School children and their teachers would continue to participate in environmental education programs at the center within the existing facility. Visitor contacts would continue to be limited by an insufficient number of NPS personnel to provide education, interpretation, and outreach services.

Park maintenance, patrol, and resource management activities would have continuous difficulties in staying abreast of deteriorating infrastructure, inadequate administration and operations support, and increasing resource threats. This situation would have a deleterious effect on visitors' aesthetic experience and, potentially, on their safety.

### **Analysis of Effects on Visitor Recreational Opportunities**

Table 21 summarizes the advantages of Alternative B relative to the action alternatives for recreational opportunity quality, quantity, spectrum, and interpretation and education.

Alternative B is in the lowest rank with regard to the quality of the visitor experience. Throughout workdays, heavy traffic volumes and associated noise and congestion would continue to have adverse effects on nonmotorized recreation. Particularly on Beach Drive, the heavy traffic would continue to interfere with the recreational purposes of the park that were identified in its establishing legislation.

Alternative B would continue to accommodate the greatest number of visitors and was ranked highest for this attribute. These include the many visitors who drive through the park without stopping and view their use of the park as secondary to their travel. However, traffic studies demonstrate that some travel through the park on Beach

Drive is time-inefficient (Parsons 2004), suggesting that these visitors may choose this route at least partly for the quality of the aesthetic experience.

Alternative B is in the middle rank with regard to the spectrum of opportunities. Management actions associated with this alternative would not limit any of the traditional recreational uses in the park. In practice, however, nonmotorized recreation on Beach Drive during rush hours is limited by the heavy automobile traffic. During other daylight hours, the excessive speed of individual automobiles causes many people on foot or bicycle to avoid this area or not participate in nonmotorized recreation.

Alternative B is in the lowest rank for interpretation and education opportunities. Existing inadequacies led to identification of this among the three decision points that guided the development of the alternatives, and the action alternatives would result in major improvements in visitor facilities and staffing for education, interpretation, and outreach.

### **Analysis of Effects on Access for Visitors with Impaired Mobility**

No changes in access for individuals for impaired mobility would occur. Within the park they would continue to be challenged by stairs, narrow doorways, and inadequate restroom facilities in public buildings. They also would continue to have difficulty using some segments of the paved trails that are in disrepair.

### **Cumulative Impacts**

The Maryland Office of Planning (1993) predicted that demand for bicycling, hiking, and picnicking facilities in the state would increase by 6 to 14 percent between the years 2000 and 2010. Rock Creek Park and the Rock Creek and Potomac Parkway would continue to contribute to the regional mix of recreational opportunities and would be compatible with regional recreational plans.

For individuals with impaired mobility, the inability to access many of Rock Creek Park's facilities, including the public buildings, would be a continuing impediment to their ability to experience simple activities that others take for granted and that contribute to a sense of well-being.

### **Conclusions**

The traditional character and recreational enjoyment of the park would decline over time under Alternative B. Already high traffic volumes would continue to increase through the park and would cause threats to safety and a reduced quality of visitor experience. Trail erosion would be a continuing and growing problem that would lead to unsightly and potentially unsafe conditions at some trail sites. Education, interpretation, and outreach would continue to be limited by inadequate staffing levels and worn and outdated facilities. Inadequate administration and operations support could result in declines in the quality of visitors' aesthetic experience and, potentially, their safety.

## **IMPACTS ON PUBLIC HEALTH AND SAFETY**

### **Analysis of Effects on Safety along Roadways**

Alternative B would not substantially change how traffic was managed in the park and on the parkway. As a result, as discussed in “Impacts on Regional and Local Transportation,” traffic volumes would increase on park roads and the parkway. By year 2020, traffic flows and levels of service throughout the park would deteriorate to a poor condition. Speeds would likely be highly variable, which would increase accident rates along Beach Drive and the Rock Creek and Potomac Parkway.

Because Alternative B would not mitigate existing safety problems, vehicle accident numbers and rates would either continue at present levels or increase. However, the slow speeds of the overly congested traffic may reduce the *severity* of accidents that occur during peak periods.

Under Alternative B, pedestrians and bicyclists would be sharing the road with increased numbers of cars. Therefore, automobile accidents involving pedestrians or cyclists would be expected to increase.

### **Analysis of Effects on Personal Safety**

Alternative B would not alter current patterns of use along park roads or the parkway. As a result, the effects of this alternative on crimes against persons would be negligible.

### **Analysis of Effects on Emergency Evacuations**

For Alternative B, there would be no changes in management from current conditions. Rock Creek Park roads could be used during emergencies for evacuation; however, segments of Beach Drive would be closed on the weekends.

### **Cumulative Impacts**

Cumulative effects of Alternative B on public health and safety would be the same as those described for Alternative A.

### **Conclusions**

Visitors’ safety would decline over time under Alternative B. Already high traffic volumes that would continue to increase throughout the park and on the parkway would represent the greatest threat to safety.

## **IMPACTS ON REGIONAL AND LOCAL TRANSPORTATION**

The evaluation of effects on regional and local transportation for Alternative B involved comparing the conditions that would occur in the year 2020 under Alternative B to current conditions. The intent of this analysis is to provide an understanding of traffic conditions in the year 2020 if current park management practices are maintained.

## **Analysis**

The effects of Alternative B on traffic volumes would be identical to those in Alternative A. However, because Alternative B does not include Alternative A's actions to reduce speed on Beach Drive through additional enforcement or traffic-calming measures, speeds would be expected to be substantially higher under Alternative B. For a detailed analysis of traffic projections for 2020, see the Analysis section of "Impacts on Regional and Local Transportation" for Alternative A.

## **Cumulative Impacts**

The Washington Metropolitan Area Council of Governments predicts that if current patterns of growth and motor vehicle use continue, traffic in the region would increase by 70 percent between 1990 and the year 2020 (Metropolitan Washington Council of Governments 1998b). The transportation model used by Metropolitan Washington Council of Governments incorporates expected increases in mass transportation and nonmotorized transportation. The Transportation Planning Board for the council of governments has targeted increased intermodal transportation, reduced single occupancy vehicle use, and improved management of the traffic grid to avoid further problems with flows in the region.

If past trends continue and there are no major changes in transportation management, future daily traffic would increase on all arterials in northwest Washington. Most major streets in the vicinity of the park would see a 20 to 30 percent increase in volume by 2020. This would include Connecticut Avenue, Massachusetts Avenue, Wisconsin Avenue, Military Road, and Pennsylvania Avenue. The greatest relative increases are predicted east of the park on 16th Street (28 to 62 percent), Georgia Avenue (32 to 56 percent), and New Hampshire Avenue (22 to 49 percent).

Already crowded commuter routes would become even more congested by the year 2020 during rush hours. Levels of service on segments of many major arterials would noticeably decline and most would range from heavy (level of service D) to extremely heavy (level of service F) during peak traffic hours. Rush-hour levels of service would be noticeably reduced on several smaller streets around the park including Tilden, Harvard, and Kennedy Street.

The Maryland Department of Transportation does not anticipate any impacts on state roads from the implementation of Alternative B or any other management alternative for Rock Creek Park (Simpson 2003).

As described in Alternative A, transportation departments in the area will continually be implementing projects on roads near the park and throughout the city to improve travel conditions for citizens. After each project is completed, area-wide traffic patterns will adjust to take advantage of the changes.

The Rock Creek Trail, including the segment through the park and parkway, is a designated regional bikeway in the Washington metropolitan area. Maintaining existing facilities for bicyclist and pedestrians in the park and on the parkway would not change their contribution to regional efforts to promote nonmotorized transportation. Increasing automobile traffic on park roads could, to an unknown extent, discourage weekday nonmotorized travel.

## **Conclusions**

Alternative B would result in increased traffic volumes in 2020 on park roads with deteriorating levels of service on Beach Drive and the Rock Creek and Potomac Parkway. Traffic on Beach Drive south of Porter Street would reach near-gridlock levels during evening rush hours by the year 2020. Conflicts and safety problems among visitors participating in nonmotorized recreation and automobile users would likely increase on park roads.

Alternative B would continue to support existing traffic patterns through and around the park but at greater volumes.

## **IMPACTS ON COMMUNITY CHARACTER**

### **Analysis**

Continuing current management practices with Alternative B would not affect community character and the quality of life of area residents or businesses. Although traffic and noise levels would continue to increase in both the park and surrounding neighborhoods, the cause would be regional population growth and not any actions by the National Park Service. Recreational opportunities and access to the park would continue to be compromised by traffic congestion in the area.

Alternative B would not include any additional spending in the area for capital improvements, jobs, or annual operations. The economic effects of this alternative would be negligible on a local and city-wide basis.

### **Cumulative Impacts**

Cumulative impacts would be the same as those described for Alternative A. Other social and economic factors in neighborhoods near the park and throughout the Washington, D.C. metropolitan area would have a greater influence on the character of the community outside the park than would the actions associated with implementing Alternative B.

### **Conclusions**

The impacts of Alternative B on community character would be identical to those described for Alternative A.

## **SUSTAINABILITY AND LONG-TERM MANAGEMENT**

### **The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity**

Existing traffic problems, which will worsen with time, and the space constraints faced by NPS administrators are not likely to be sustainable as demand for recreation in the park grows. These conditions could jeopardize the long-term enjoyment of park resources.

**Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented**

There would be a potential for irreversible or irretrievable commitments of archeological and historic resources under Alternative B. These losses could occur because of the continuing inability to place mitigative actions within an appropriate research context, to synthesize data, and to implement a comprehensive program for historic resource preservation.

**Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented**

None of the effects identified in this assessment of Alternative B would be considered major adverse effects. Alternative B would not result in impairment of any resources that would affect the basic purposes of Rock Creek Park and the Rock Creek and Potomac Parkway.



## **ENVIRONMENTAL IMPACTS OF ALTERNATIVE C: NONMOTORIZED RECREATION EMPHASIS**

### **IMPACTS ON AIR QUALITY**

#### **Analysis**

The area of Rock Creek Park and the Rock Creek and Potomac Parkway would be affected more by emissions throughout the regional airshed than by tailpipe emissions from vehicles using the park and parkway. Table 20 summarizes the effects of Alternative C on air quality in the year 2020 compared to Alternative B. The analysis showed the following.

At three intersections in the park, Alternative C would result in minor to moderate beneficial effects on the air quality, as represented by carbon monoxide concentrations, during the representative worst-case conditions.

At intersections outside the park, the differences in carbon monoxide concentrations between Alternative C and Alternative B would be negligible, and would differ by only a few tenths of a part per million.

The worst 1-hour carbon monoxide concentration that would be associated with Alternative C (10.7 parts per million at the intersection of 16th Street and Military Road) would be well below the 1-hour National Ambient Air Quality Standard of 35 parts per million that is protective of human health and the environment.

Alternative C would include some construction that would not occur with Alternative B. This would include preserving historic structures, expanding the Rock Creek Nature Center and Planetarium, and possibly constructing new buildings at the maintenance yard and H-3 stables. Best management practices and prompt revegetation would be applied with all construction to ensure that dust and construction-vehicle emissions would not be substantially greater than those that would occur with Alternative B.

#### **Cumulative Impacts**

No changes would occur in air emissions from vehicles in the region because of Alternative C's management actions at Rock Creek Park and the Rock Creek and Potomac Parkway. Instead, Alternative C would redistribute the same traffic volume onto different roadways, compared to Alternative B. This redirection of the same volume of traffic would have negligible effects on the regional air quality.

Provisions of Alternative C to eliminate traffic on segments of Beach Drive and to create a transportation corridor separated from motorized vehicles may encourage some travelers to use bicycles rather than automobiles. This change in transportation mode would result in a beneficial but negligible effect on the regional air quality.

## **Conclusions**

Alternative C would result in negligible effects on air quality at intersections outside the park compared to Alternative B. At intersections within the park under assumed worst-case conditions, it would have a minor to moderate beneficial effect on air quality, as represented by carbon monoxide concentrations. It would not result in the exceedence of the 1-hour National Ambient Air Quality Standard for carbon monoxide. In addition, it would not cause any impairment of resources or values associated with air quality.

## **IMPACTS ON ROCK CREEK AND ITS TRIBUTARIES**

As described in the section “Impacts on Local and Regional Transportation,” automobile traffic on Beach Drive north of Broad Branch Road would be eliminated on the closed sections and would decrease by 97 percent relative to Alternative B on the segments that remained open to support east-west traffic. South of Broad Branch Road, Beach Drive traffic would decrease by 15 percent to 25 percent. Traffic decreases greater than 5 percent would occur along most of the Rock Creek and Potomac Parkway.

These decreases in park and parkway traffic would result in lower pollutant loadings (sediments, oils and grease, and metals from the road surface) draining into Rock Creek from park roads. However, all of the alternate routes, both in and outside the park, are within the Rock Creek drainage. Therefore, changes in traffic patterns related to Alternative C would redistribute rather than reduce pollutant loadings in the Rock Creek watershed. The effect on water quality in the Rock Creek drainage would be negligible.

Aside from roadway runoff, Alternative C would have the same effects as Alternative A on Rock Creek and its tributaries. This includes identical cumulative impacts and conclusions. There would be no impairment of resources or values associated with Rock Creek and its tributaries.

## **IMPACTS ON WETLANDS AND FLOODPLAINS**

Alternative C would have the same effects as Alternative A on wetlands and floodplains. This would include identical cumulative impacts and conclusions.

## **IMPACTS ON DECIDUOUS FORESTS**

Alternative C would have the same effects as Alternative A on deciduous forests. This would include identical cumulative impacts and conclusions.

## **IMPACTS ON PROTECTED AND RARE SPECIES**

Alternative C would have the same effects as Alternative A on protected and rare species. This would include identical cumulative impacts and conclusions.

## **IMPACTS ON OTHER NATIVE WILDLIFE**

Except as noted below, Alternative C would have the same effects as Alternative A on native wildlife. This would include identical cumulative impacts and conclusions. There would be no impairment of resources or values associated with native wildlife.

Permanent closure of segments of Beach Drive and other actions to reduce traffic speeds and volumes on park roads and the parkway would reduce the number of wildlife killed or injured by motor vehicles. Compared to Alternative B, this would produce long-term, beneficial effects on the park's native wildlife.

For most park species, the reductions in mortality from closing the road would be negligible. As shown in table 10, nine animals were killed in the year 2000 on sections of Beach Drive that would be permanently closed under Alternative C (the same sections that currently are closed to traffic on weekends and holidays). This value represents less than 8 percent of the average road-kill recorded in the park each year (122 animals per year, calculated from table 9). Measures to reduce traffic volumes and speeds would further reduce roadkills compared to Alternative B, but would have little effect on the populations of most park species because their populations are stable or expanding. As with Alternative A, the effects on box turtles would be moderate, long-term, and beneficial. Effects on gray foxes would be major, long-term, and beneficial.

## **IMPACTS ON ARCHEOLOGICAL RESOURCES**

Alternative C would have the same effects as Alternative A to archeological resources. This would include identical cumulative impacts and conclusions.

## **IMPACTS ON HISTORIC STRUCTURES AND CULTURAL LANDSCAPES**

### **Analysis**

Impacts on historic structures and cultural landscapes would be the same as those described for Alternative A with the following exceptions. Conversion of portions of Beach Drive to a paved recreation trail could have an effect on its historically significant design features if the paved surfaces were reduced over time. Its historic use would also change with the removal of vehicles, because the roadway was constructed for scenic driving.

### **Cumulative Impacts**

Cumulative impacts under this alternative would be the same as described for Alternative A.

### **Conclusions**

The impacts of this alternative would be similar to those described for Alternative A except that the design features of the roads converted to trails could be modestly affected and vehicles would be removed from the roadways. In addition, there would be a change in the use of Beach Drive from the historic use of scenic driving to other uses. Because the roadbed would not be greatly altered, the historic use could be returned at some future date if management goals changed. Con-

sequently, there would be no impairment of resources or values associated with historic structures and cultural landscapes.

## **IMPACTS ON TRADITIONAL PARK CHARACTER AND VISITOR EXPERIENCE**

### **Analysis of Effects on Continuation and Quality of Traditional Park Uses**

Except in the areas where Beach Drive was permanently closed, the overall character of the park would not change under Alternative C. Recognition of cultural landscape values and management for those values would help maintain the traditional appearance of the park. Development of design standards for park facilities and signs would also enhance the traditional ambiance.

The traditional appearance of the Rock Creek and Potomac Parkway, the segments of Beach Drive that remained open to motorized vehicles, and other park roads would be largely unchanged. Some new traffic-calming structures such as speed humps and speed tables, four-way-stop intersections, and signs would be necessary to implement controls on automobile speeds and volumes under Alternative C. Visual intrusion of such facilities could be offset by removal of some existing traffic structures such as right-turn lanes and signs. The net effect on the traditional character of the park probably would be negligible.

Along closed sections of Beach Drive, existing traffic control signs would be removed and in some cases replaced by control signs related to pedestrian and bicycle use. Beach Drive would remain paved in these sections, although the width of pavement could be reduced over time if warranted by recreational use.

Permanent closure of sections of Beach Drive north of Broad Branch Road would eliminate the existing visitor experience of automobile travel along the length of the park, including the gorge area. With the exception of cross-park access using the Wise Road-West Beach Drive and Bingham Drive-Sherrill Drive connections, both recreational and nonrecreational visits by automobile would cease north of Broad Branch Road. This change in the pattern of park use would be a major, adverse impact on the existing visitor experience.

Weekday visitation to the northern portion of the park would be substantially reduced. This alternative would eliminate weekday motorized visitation on the segment of Beach Drive between Broad Branch Road and Joyce Road which, under Alternative B, would total about 15,000 visits per day (11,700 vehicles per day containing 1.3 people per vehicle). Most of the reduced park use under Alternative C would be in nonrecreational visits.

The experience of automobile travel along the length of Beach Drive would be eliminated in this alternative but the other activities described in the “Affected Environment” section would remain. The experience of driving along Beach Drive north of Broad Branch Road would be replaced by enhanced opportunities for nonmotorized use of this area. A portion of the increased weekday visits would be by nonrecreational cyclists. However, substantially increased use for multiple forms of nonmotorized recreation would occur during weekdays from groups that formerly avoided the park because of fast-moving traffic on Beach Drive. These would include individuals who do not work a traditional Monday through Friday workday schedule, caregivers with small children, retired people, and school groups. A long-term, beneficial effect of moderate intensity would result from the improved ability for park visitors to participate in nonmotorized recreation along Beach Drive throughout the week.

Even with the permanent closure of segments of Beach Drive, all visitor-use facilities such as picnic grounds and trailheads would continue to be accessible via motorized vehicle. However, visitors would have to use city streets to drive around the closed sections to access other portions of the park. This could be confusing, particularly to out-of-town visitors.

Continued weekend road closures north of Broad Branch Road under Alternative C would maintain current opportunities for nonmotorized recreation in the valley. The number of weekend users would probably be similar to those occurring under Alternative B on weekends.

South of the road closures on Beach Drive, high-occupancy vehicle restrictions, speed limit enforcement, and traffic-calming measures would create a less congested driving experience compared to Alternative B. High-occupancy vehicle restrictions would inconvenience some nonrecreational visitors who did not carpool during weekday rush hours. The experience for motorists and cyclists on Beach Drive south of Broad Branch Road would be similar to what it is today (and less crowded than under Alternative B), because cars would still be present in large numbers during weekday rush hours.

Weekday noise levels in Rock Creek valley north of Broad Branch Road would change considerably under Alternative C. Traffic noise would be eliminated along much of northern portion of Beach Drive, except for substantial cross-park traffic using the Wise Road-West Beach Drive and Bingham Drive-Sherrill Drive connections. Natural sounds and the sounds of people recreating would be dominant, similar to the conditions currently occurring on weekends. The long-term, beneficial effect of reduced noise in these areas would be minor to moderate.

Noise levels in the valley south of Broad Branch Road would follow the existing pattern, where weekday noise levels within 60 feet of Beach Drive and within 125 feet of the Rock Creek and Potomac Parkway would exceed the Federal Highway Administration's noise abatement criteria during high-traffic periods.

Alternative C would have similar weekend use levels and experiences as Alternative B. This would occur because weekend traffic management would be similar for both alternatives.

Alternative C components that would be similar to Alternative A would include upgraded recreation trails, rehabilitation of the cultural landscape at the Peirce Mill complex, improvements to the Rock Creek Nature Center and Planetarium, and improved working conditions for park and U.S. Park Police staff. All of these would have moderate, long-term, beneficial effects on park character and visitor experience, although the perceived benefit by the public to improved administrative staff conditions probably would only be minor.

### **Analysis of Effects on Visitor Recreational Opportunities**

Table 21 summarizes the relative advantages of Alternative C relative to Alternative B for recreational opportunity quality, quantity, spectrum, and interpretation and education. Alternative C would have a negligible effect on recreational opportunities relative to Alternative B. It would be more advantageous than Alternative B for two attributes and less advantageous for two attributes, for no net difference in numbers of advantages relative to Alternative B.

Alternative C would be considerably more advantageous than Alternative B with regard to the quality of the experience. The permanent closure of three segments of

Beach Drive would provide an unhurried experience with the ability to enjoy natural sounds and smells and to view park resources.

Alternative C would be substantially less advantageous than Alternative B with regard to the number of visitors who use the park. Based on traffic patterns, it is estimated that total visitation to Rock Creek Park could decrease by 75 percent or more. Many of the visitors who would be displaced currently drive through the park without stopping.

Alternative C would reduce the spectrum of recreation opportunities relative to Alternative B. The lowest variety of recreational opportunities would be available because the opportunity to drive the length of Beach Drive in a motorized vehicle would be eliminated.

Interpretation and education opportunities would experience substantial advantages under Alternative C. Increased opportunities to learn about and experience the park's natural and cultural resources would result from upgraded interpretation and education facilities in the park. Six additional staff positions for interpretation and education would substantially improve opportunities for visitor contact, programming, and outreach.

### **Analysis of Effects on Access for Visitors with Impaired Mobility**

For site improvements associated with trails, buildings, and historic scenes, the same long-term, moderate, beneficial effects for individuals with impaired mobility that were described for Alternative A would occur.

The effects of permanent closures of three segments of Beach Drive on access for visitors with impaired mobility would vary, based on the individual's perception. Comments on the draft general management plan identified two very different viewpoints.

Many people stated that an adverse effect would occur on people with impaired mobility because they would no longer be able to drive through and enjoy the closed segments of Beach Drive, particularly the gorge area between Joyce Road and Broad Branch Road.

Many others perceived a beneficial effects on people with impaired mobility because they would be able to enjoy the use of the broad, level, smooth surface of Beach Drive throughout the week. They noted that their experience would be enhanced not only by the absence of cars but also by the lower numbers of other visitors, such as inattentive children who can pose a risk to people with impaired mobility. They also noted that once they reached areas such as the gorge, they could stop and enjoy the experience, which they could not do from a car.

The intensity of the Alternative C impact on individuals with impaired mobility would be moderate because changes in access from this component of Alternative C would only affect the Beach Drive area. Whether this long-term impact was beneficial or adverse would depend on each individual's viewpoint.

## **Cumulative Impacts**

The Maryland Office of Planning (1993) predicted that demand for bicycling, hiking, and picnicking facilities in the state would increase by 6 to 14 percent between the years 2000 and 2010. Rock Creek Park and the Rock Creek and Potomac Parkway would continue to contribute to the regional mix of recreational opportunities and would be compatible with regional recreational plans. Alternative C would provide a pedestrian and bicycling route through Rock Creek Park that would be relatively free from interference by automobiles and would provide an effective connection with regional pedestrian and bicycle trails.

Cumulative effects of Alternative C on access for individuals with impaired mobility would be much the same as described for Alternative A. However, depending on their viewpoint, individuals may see the permanent closure of Beach Drive as an additional restriction on their ability to access important natural and cultural resources in the area or an opportunity that increases their ability to enjoy high-value resources.

## **Conclusions**

The loss of the existing visitor experience of automobile travel along the length of the park would be a major, long-term, adverse impact of Alternative C. However, because the roadbed would not be greatly altered, this use could be returned at some future date if management goals changed.

A long-term, beneficial effect of moderate intensity would result from the improved ability for park visitors to participate in nonmotorized recreation along Beach Drive throughout the week.

Many other effects of Alternative C would be like those described for Alternative A. These would include moderate, beneficial, long-term effects associated with upgraded trails throughout the park; improvements to visitor contact, interpretation, and education facilities and services; and improved access for visitors with impaired mobility at buildings, historic scenes, and trails. Improved working conditions for park administrative staff and personnel in the U.S. Park Police District 3 substation would result in a moderate beneficial effect on park operations, but the intensity of the beneficial impact perceived by the public probably would be minor. Compared to Alternative B, this alternative would have a negligible effect on the park's recreational opportunities.

For the closed segments of Beach Drive, Alternative C would have a long-term, moderate effect on access for individuals with impaired mobility. Each person's viewpoint would determine whether this effect was adverse or beneficial.

## **IMPACTS ON PUBLIC HEALTH AND SAFETY**

### **Analysis of Effects on Safety along Roadways**

Traffic management measures associated with Alternative C that could affect public health and safety would include

- permanently closing portions of Beach Drive to vehicular traffic
- enhanced enforcement

use of traffic-calming measures, such as speed humps and speed tables, all-way stops, rumble strips, or raised intersections

reconfiguration of the intersection of the parkway with Beach Drive near Connecticut Avenue to improve safety

discontinuation of the one-way traffic restrictions on the Rock Creek and Potomac Parkway during peak periods

high-occupancy vehicle restrictions on the parkway and on Beach Drive south of Broad Branch Road during rush hours

High-occupancy vehicle restrictions might improve safety by reducing traffic volumes. However, without other controls, traffic speeds in high-occupancy vehicle zones might increase, which could increase the frequency or severity of accidents. Because of these potentially conflicting effects, the safety effects of high-occupancy vehicle restrictions were not considered extensively in this section. The effects of the other traffic management measures on safety are described below, with a summary of effects on vehicle occupants and to pedestrians and cyclists.

**Beach Drive Closures.** The segments of Beach Drive that would be permanently closed by Alternative C were the site of 16 accidents between 2001 and 2003. These represent less than two percent of the accidents that occurred in the park and on the parkway in this period. Closing these segments to motorized vehicle traffic would reduce accidents involving motorized vehicles in the area covered by this plan by approximately the same percentage.

Closing portions of Beach Drive may move accidents to other nearby areas. Traffic volumes along Wise Road, Oregon Avenue, Military Road, and 16th Street are projected to increase compared to Alternative B, and the numbers of accidents on these roads may also increase.

**Enhanced Enforcement.** The effectiveness of improved speed enforcement measures was described for Alternative A. The enhanced enforcement elements of Alternative C would have a similar minor to moderate beneficial effect on visitor safety. However, if traffic enforcement levels were reduced because of budget cuts or the need to assign U.S. Park Police staff to other duties, the beneficial effects would not be expected to continue for very long.

**Traffic Calming Measures.** The use of traffic-calming techniques to reduce speeds and enhance safety was described in the analysis of Alternative A. As with that alternative, the use of traffic-calming devices in Alternative C would have a major, beneficial effect on visitor safety in the park and parkway compared to Alternative B. As long as the traffic-calming devices were maintained, these would be long-term effects.

**Discontinue One-Way Traffic Restriction during Peak Periods.** Generally, one-way streets lead to higher speeds. One-way streets can also be more confusing for pedestrians. Both of these factors can increase the number of accidents.

There also are features of one-way streets that can reduce the number of accidents. These include reduced conflicts at intersections, more orderly traffic flow, and the creation of gaps for both pedestrians and vehicles to enter or cross the traffic stream.



The safety of one-way street systems typically has been assessed by comparing accidents before and after conversion to one-way operation, and most often has been studied for streets in central business districts. Most of these studies indicate that one-way streets are safer, by perhaps 20 to 30 percent. However, other studies have found that in locations outside of central business districts, accident rates were higher on one-way streets.

For the Rock Creek and Potomac Parkway, it is difficult to conclude whether converting this road to two-way operation during peak periods would improve safety along the corridor. A detailed analysis of accidents and volumes by time of day would be useful in determining whether accident rates are currently lower during one-way or two-way operation.

**Effects on Vehicle Occupants.** As described for Alternative A, speed is the major factor affecting the probability of injury or death in vehicle-only traffic accidents. By reducing speeds, differences in speeds, and traffic volumes on park roads and the parkway, the traffic management measures of Alternative C would have a long-term, major, beneficial effect in reducing the number and severity of motor-vehicle-only accidents. Monitoring would be needed to determine if the Alternative C closure of segments of Beach Drive and traffic-reducing measures, which would divert some traffic onto nearby city streets, was increasing the number of injury and fatal accidents outside of the park.

**Effects on Pedestrians and Cyclists.** Speed is the primary factor affecting the outcome of collisions between motorized vehicles and pedestrians or cyclists. By slowing traffic speeds and reducing traffic volumes, the traffic management measures of Alternative C would have a long-term, beneficial effect in reducing the number and severity of collisions between automobiles and pedestrians or cyclists in the park and along the parkway.

Pedestrians and cyclists would have a continuous trail throughout the park and parkway that would be separated from motor vehicles. This would probably reduce the number of accidents involving automobiles and cyclists or pedestrians compared to Alternative B. However, because of the low number of this type of accident (average of two per year throughout the park and parkway for the 2001-2003 period), some year-to-year fluctuation in the number of collisions between cars and pedestrians or cyclists would be expected.

Some accidents involving cyclists, skaters, and/or pedestrians would occur in the segments of Beach Drive that would be closed to vehicular traffic. Some of the factors that could influence the number and severity of nonmotorized vehicle accidents are identified below. Both individually and collectively, these factors would have only a negligible to minor effect on the total number and ratio of accidents in the park and on the parkway.

The weekday use of the closed segments for recreation and nonmotorized travel is expected to be about 30 percent of weekend use. However, the availability of a car-free route could increase the number of bicycle recreationists and travelers. While this would probably increase the number of cycle accidents, it probably would not change the ratio of accidents to the number of cyclists.

As with automobiles, a difference in speed can cause accidents. On weekdays, the occasional presence of stopped or slow-moving recreationists may be more likely to result in an accident with a fast-moving cyclist than would occur on a weekend when many slow-moving visitors are present and tend to limit the speed of cyclists.

Bicycle commuters may travel at higher speeds than many recreationists. Also, the absence of motorized vehicles may encourage higher speeds among some cyclists and skaters. Both of these could increase the severity of bicycling and skating injuries.

### **Analysis of Effects on Personal Safety**

Alternative C would permanently close three segments of Beach Drive to motorized vehicle use. In comments on the draft general management plan, some people felt that assaults would be reduced in these segments because cries for help could be easily heard in the quiet setting. Others felt that the absence of large numbers of people in motor vehicles in the area would lead to increases in assaults.

Alternative C is expected to have a negligible effect on crimes against persons compared to Alternative B. There currently are many secluded locations within the park where homicides, sexual assaults, or aggravated assaults could occur, but do not. Removing traffic on three segments of Beach Drive would not make the segments into magnets for violent offenders. Under any alternative, visitors should continue to use common-sense measures such as making sure others are around and reporting suspicious conditions to authorities.

### **Analysis of Effects on Emergency Evacuations**

For Alternative C, portions of Beach Drive would be permanently closed to the driving public. The narrow width of the roadway that formerly was Beach Drive (16 feet) would probably discourage most drivers from using this as an evacuation route, even if some considered driving around the gates. However, Beach Drive is not a designated evacuation route and is already gated on weekends. As a result, the effects of Alternative C on emergency evacuations would be negligible compared to Alternative B.

### **Cumulative Impacts**

Cumulative effects of Alternative C would be the same as those described for Alternative A.

### **Conclusions**

Effects of Alternative C on public health and safety would include a long-term, major, beneficial effect because of the effectiveness of traffic calming measures in reducing the numbers and severity of traffic accidents. Alternative C would have negligible effects on crimes against persons or the effectiveness of emergency evacuations.

## **IMPACTS ON REGIONAL AND LOCAL TRANSPORTATION**

### **Analysis**

**Average Daily Traffic.** Compared to Alternative B, the predicted changes in weekday average daily traffic volumes on Beach Drive, the Rock Creek and Potomac Parkway, and other roadways in the park under Alternative C are summarized in table 23 and table G.1 in appendix G. Visual representations of estimated traffic levels are shown in the Alternative C Year 2020 Average

**TABLE 23: AVERAGE DAILY TRAFFIC UNDER ALTERNATIVE C COMPARED TO AVERAGE DAILY TRAFFIC UNDER ALTERNATIVE B IN THE YEAR 2020**

<b>Road Segment</b>	<b>Alternative C</b>	<b>Alternative B</b>	<b>Change</b>	<b>Percent Change</b>
Beach Drive – Wyndale to East Beach Drive	0	13,800	-13,800	-100
Beach Drive – Wise Road to Sherrill Drive	0	16,900	-16,900	-100
Beach Drive – Bingham Drive to Joyce Road	300	12,600	-12,300	-98
Beach Drive – Joyce Road to Broad Branch Road	0	11,700	-11,700	-100
Beach Drive – Blagden Avenue to Tilden/Park Road	20,000	26,700	-6,700	-25
Beach Drive – Porter Street to Zoo	27,900	33,800	-5,900	-17
Beach Drive – Zoo to 24 <sup>th</sup> /Cathedral	30,800	36,000	-5,200	-14
Rock Creek and Potomac Parkway – 24 <sup>th</sup> /Cathedral to Waterside	56,400	64,600	-8,200	-13
Rock Creek and Potomac Parkway – Waterside to P Street	71,600	77,900	-6,300	-8
Rock Creek and Potomac Parkway – K Street/Whitehurst to Virginia	71,100	75,200	-4,100	-5
Rock Creek and Potomac Parkway – Virginia to Teddy Roosevelt Bridge	56,100	55,100	+1,000	+2
West Beach – Wise Road	11,300 and 15,200	17,100 and 14,100	-5,800 and +1,100	-34 and +8
Bingham Drive – Sherrill Drive	1,900 and 1,600	1,800 and 7,700	+100 and -6,100	+6 and -79
Joyce Road – Morrow Drive	0 and 1,000	1,500 and 3,400	-1,500 and -2,400	-100 and -71
Broad Branch Road – Blagden Avenue	9,200 and 11,200	9,000 and 9,400	+200 and +1,800	+2 and +19
Tilden Street – Park Road	12,900 and 12,900	11,800 and 12,100	+1,100 and +800	+9 and +7
Piney Branch Parkway – Porter Street	14,000 and 19,100	13,300 and 18,700	+700 and +400	+5 and +2





Weekday Traffic Volumes map and the Alternative A and B Year 2020 Average Weekday Traffic Volumes map.

Alternative C would eliminate traffic along some sections of Beach Drive, would substantially reduce automobile traffic in other sections of the park and on the parkway, and would cause mixed changes in traffic flow from park roads onto the city's commuter corridors. Permanent full-time closure of sections of northern Beach Drive would transfer from 11,700 to 16,900 vehicles per day, compared to Alternative B, from park roads to city streets.

As shown in table 23, an estimated 4,100 to 8,200 vehicles per day, compared to Alternative B, would use other portions of the city grid rather than the southern portion of Beach Drive and the parkway. These shifts in the southern park and most of the parkway would result from high-occupancy vehicle restrictions on portions of Beach Drive and the parkway during morning and evening peak periods, Beach Road closures to the north, and full-time, two-way traffic on the parkway. The only area of the park and parkway where traffic would increase would be at the southern end of the parkway, where traffic would increase by 1,000 vehicles (2 percent) per day.

Vehicles that would otherwise travel Beach Drive between the Maryland border and Broad Branch Road would have to find alternate routes. Single occupancy vehicles currently using the southern portion Beach Drive and Rock Creek and Potomac Parkway would also have to use alternate routes during high-occupancy vehicle restrictions. Some commuter vehicles carrying two or more people and currently using routes on the city street grid would likely re-route onto lower Beach Drive and the parkway.

Providing for two-way travel at all times on the parkway would allow new access to those wishing to travel against the rush-hour flow along the parkway. Since high-occupancy vehicle restrictions would only be in effect for the predominant flow of commuter traffic on Beach Drive and the parkway, there would be no impact on vehicles traveling in the opposite direction during these times.

Road closures and high-occupancy vehicle restrictions on Beach Drive would not restrict the cross flow of traffic between the east and west sides of the park on routes such as West Beach-Wise, Bingham-Sherrill, Joyce-Morrow, Broad Branch-Blagden, Tilden-Park, or Piney Branch-Porter. As shown in table 23, effects on these routes would vary, with traffic reductions of more than 70 percent on the Joyce-Morrow route and traffic increases of about 5 percent to 10 percent on most of the other routes, compared to Alternative B.

Traffic-calming measures applied to Beach Drive between Broad Branch Road and the parkway would reduce vehicle speeds. However, slower speeds are not anticipated to cause vehicles to re-route. Proposed safety modifications to the intersection of Beach Drive and the parkway near Connecticut would reduce vehicle conflicts and help minimize traffic congestion and delays.

High-occupancy vehicle restrictions and changes in parkway management would not change the volume of vehicles going to and from the National Zoological Park. Zoo visitors riding alone in a vehicle would not be allowed to use Beach Drive in the direction of rush-hour flow during the morning and evening peak-hours. However, because most visits to the zoo are part of a social activity, vehicles with the zoo as a destination would usually have more than one occupant. High-occupancy vehicle restrictions would not affect zoo visitors during the middle of the day from Monday through Friday, or at any time on weekends.

The decreases in traffic that would occur on Beach Drive, the Rock Creek and Potomac Parkway, and some cross-park roads would result in increases in traffic on other routes. In addition to those already identified on table 23, road segments where traffic would increase by 3 percent or more compared to Alternative B include the following:

<b>Road Segment</b>	<b>Percent Increase</b>
16th Street from Alaska to Florida	3 - 10
Alaska Avenue from Georgia to Morningside	6
Georgia Avenue from Alaska to Kennedy	3 - 8
Oregon Avenue from Chestnut to Nebraska	8
Broad Branch Road from Western to 27 <sup>th</sup> Street	13 - 41
Connecticut Avenue from Columbia to DuPont Circle	4 - 6
Wisconsin Avenue from Albemarle to Newark	5
Massachusetts Avenue from the state line to 49th Street	3
Nebraska Avenue from Oregon to Utah	20
Harvard Street from Adams Mill to 16th Street	8
New Hampshire Avenue from 19th Street to Virginia	7 - 13
Constitution Avenue from 23rd Street to Henry Bacon	5

Goals of Alternative C include managing northern portions of the park as an exclusion zone from urban automobile traffic to promote nonmotorized recreation throughout the week, asserting more control over nonrecreational use of park roads, and improving visitor safety. To determine the effectiveness of Alternative C in meeting these goals, average daily traffic estimates in the year 2020 were compared to traffic counts in the year 1990. This analysis determined the following:

North of Broad Branch Road, traffic would be eliminated on Beach Drive, except for 300 vehicles per day on the segment between Bingham Drive and Joyce Road.

South of Broad Branch Road, traffic on Beach Drive would increase modestly, by about 11 percent on the segment to Tilden/Park, 16 percent on the segment south to the zoo, and 25 percent from the zoo to 24th/Cathedral.

Based on these results, it is concluded that Alternative C would be very effective in reducing or excluding traffic from the northern portion of the park and limiting nonrecreational traffic on other park roads. In concert with reduced speeds that would result from the traffic restrictions and calming measures, Alternative C would also meet the objective of improving visitor safety south of the road closure area.

**Effects on Levels of Service on Beach Drive and the Rock Creek and Potomac Parkway.** Table 24 summarizes the effects of the Alternative C traffic management measures on the levels of service on Beach Drive and the Rock Creek and Potomac Parkway compared to Alternative B. The terms “noticeable,” “considerable,” and “major” were defined in the “Methodology” section that preceded the Alternative A analysis. Evaluation of the information in table 24 showed the following:

**TABLE 24: BEACH DRIVE AND ROCK CREEK AND POTOMAC PARKWAY SEGMENTS EXPERIENCING NOTICEABLE OR GREATER CHANGES IN TRAFFIC LEVELS OF SERVICE BETWEEN ALTERNATIVE C AND ALTERNATIVE B**

<b>Road Segment</b>	<b>Peak-Hour Period</b>	<b>Alternative C LOS</b>	<b>Alternative B LOS</b>	<b>Change<sup>a/</sup></b>
Traffic eliminated – Beach Drive				
Wyndale to West Beach Drive	A.M.	Closed	C	M
Wyndale to West Beach Drive	P.M.	Closed	C	M
Wise Road to Sherrill Drive	A.M.	Closed	C	M
Wise Road to Sherrill Drive	P.M.	Closed	D	M
Joyce Road to Broad Branch Road	A.M.	Closed	B	M
Joyce Road to Broad Branch Road	P.M.	Closed	C	M
Improved level of service – Beach Drive				
Bingham to Joyce Road	A.M.	A	B	N
Bingham to Joyce Road	P.M.	A	C	C
Blagden to Tilden/Park	A.M.	C	D	N
Blagden to Tilden/Park	P.M.	E	F	N
Porter Street to zoo	A.M.	C	E	C
Porter Street to zoo	P.M.	E	F	N
Improved level of service – Rock Creek and Potomac Parkway				
Zoo to 24th/Cathedral	P.M.	E	F	N
24th/Cathedral to Waterside ramps	A.M.	C	D	N
24th/Cathedral to Waterside ramps	P.M.	C	D	N
Waterside ramps to P Street ramps	A.M.	D	E	N
K Street/Whitehurst to Virginia	A.M.	B	D	C
K Street/Whitehurst to Virginia	P.M.	D	E	N
Reduced level of service				
Virginia to T. Roosevelt Bridge	P.M.	D	C	N

a/ N = noticeable. C = considerable. M = major.



The three closed segments of Beach Drive would exhibit major changes in levels of automobile traffic compared to Alternative B.

Park visitors in the vicinity of Beach Drive would observe considerable improvements in levels of automobile traffic from Porter Street to the zoo in the morning peak hour and from Bingham Drive to Joyce Road in the afternoon. Both of these stretches would have noticeable improvements in traffic levels during the other rush hour.

Noticeable improvements in traffic levels would be observed by park visitors on Beach Drive from Blagden Avenue to Tilden/Park during both the morning and afternoon rush hours.

Noticeable improvements in levels of traffic would be seen by visitors along several portions of the Rock Creek and Potomac Parkway in the morning and afternoon. In the morning, the improvement from K Street/Whitehurst to Virginia Avenue would be considerable.

A noticeable decrease in the level of service compared to Alternative B would occur from Virginia Avenue to the Theodore Roosevelt Bridge during the afternoon period.

**Morning Rush-Hour Traffic.** During the weekday morning rush hour, many road segments would have identical levels of service (LOS) in the year 2020 under Alternative C and Alternative B. Table 24, table 25 and the Alternative C Year 2020 A.M. Peak-Hour Volume Changes with Respect to Alternative B map show segments where the level of service between the two alternatives would vary by at least one step. Additional information on year 2020 peak-hour traffic volumes and levels of service for both the morning and evening are provided in tables G.2 and G.3 in appendix G.

There would be two major changes in weekday morning rush-hour traffic patterns associated with Alternative C compared to Alternative B.

Traffic on Beach Drive would be eliminated north of picnic grove 10, except for the short road segment between West Beach Drive and Wise Road.

Northbound traffic would be permitted on the Rock Creek and Potomac Parkway during morning rush hour, where it is estimated to be substantial (level of service C) to heavy (level of service D). Under Alternative B, traffic on the Rock Creek and Potomac Parkway would be one-way southbound.

Fifteen road segments would have improved levels of service during the morning rush hour with Alternative C, compared to Alternative B. Three of these would have considerable improvements (two level of service steps), including Beach Drive from Porter Street to the Zoo, the Rock Creek and Potomac Parkway southbound from K Street/Whitehurst Parkway to Virginia Avenue, and West Beach Drive from Beach Drive to Portal. The other 12 road segments would have noticeable improvements (one level of service step) compared to Alternative B. All 15 segments would have level of service D (heavy traffic) or better, compared to Alternative B, where six of the segments would experience very heavy traffic (level of service E).

**TABLE 25: OTHER ROAD SEGMENTS EXPERIENCING NOTICEABLE OR GREATER CHANGES IN TRAFFIC LEVELS BETWEEN ALTERNATIVE C AND ALTERNATIVE B**

Road Segment	Peak-Hour Period	Alternative C LOS	Alternative B LOS	Change <sup>a/</sup>
Improved level of service				
Georgia Avenue - Arkansas to Upshur	A.M.	D	E	N
Georgia Avenue - Arkansas to Upshur	P.M.	D	E	N
Oregon Avenue – Chestnut to Nebraska	A.M.	C	D	N
West Beach Drive - Beach Drive to Portal	A.M.	C	E	C
West Beach Drive - Beach Drive to Portal	P.M.	E	F	N
Kennedy -14th to 13th	A.M.	B	C	N
Kennedy -14th to 13th	P.M.	B	C	N
Adams Mill Road - Park Street to Irving	A.M.	B	C	N
Cathedral Avenue – Calvert to Beach/24th	A.M.	D	E	N
Cathedral Avenue – Calvert to Beach/24th	P.M.	D	E	N
New Hampshire Avenue –21st to M Street	A.M.	B	C	N
Pennsylvania Avenue - M Street to L Street	A.M.	D	E	N
Pennsylvania Avenue - K Street to I Street	A.M.	D	E	N
Reduced level of service				
Georgia Avenue – Missouri to Kennedy	A.M.	E	D	N
Georgia Avenue – Missouri to Kennedy	P.M.	E	D	N
Oregon Avenue - Moreland to Military Road	P.M.	B	A	N
Wisconsin Avenue – Calvert to Reservoir	A.M.	E	D	N
Blagden Avenue - Upshur to Decatur	P.M.	C	B	N
Park Road - Beach Drive to Piney Branch Parkway	P.M.	E	D	N
Military Road – 16th to 14th	A.M.	E	D	N
Military Road - 16th to 14th	P.M.	E	D	N
New Hampshire Avenue –19th to 20th	A.M.	E	C	C
New Hampshire Avenue – 19th to 20th	P.M.	E	D	N
New Hampshire Avenue - Washington Circle to Virginia	A.M.	C	B	N
M Street - New Hampshire to 22nd	P.M.	D	C	N
New Hampshire Avenue – 21st to M Street	P.M.	E	C	C

a/ N = noticeable. C = considerable. M = major.

Five road segments would have worse levels of service during the morning rush hour with Alternative C, compared to Alternative B. One of these, New Hampshire Avenue from 19th Street to 20th Street, would have a considerable decline in service (two level of service steps). The other four road segments would have noticeable decreases in service (one level of service step) compared to Alternative B. Four of the five segments would have very heavy traffic (level of service E) with Alternative C, while all five segments would be level of service D or better under Alternative B.

**Evening Rush-Hour Traffic.** During the weekday evening rush hour, most road segments would have identical levels of service in the year 2020 under Alternative C and Alternative B. Table 24,

table 25, and the Alternative C Year 2020 P.M. Peak-Hour Volume Changes with Respect to Alternative B map show segments where the level of service between the two alternatives would vary by at least one step.

There would be two major changes in weekday evening rush-hour traffic patterns associated with Alternative C compared to Alternative B.

Traffic on Beach Drive would be eliminated north of picnic grove 10, except for the short road segment between West Beach Drive and Wise Road.

Southbound traffic would be permitted on the Rock Creek and Potomac Parkway during evening rush hour, where it is estimated to be substantial (level of service C) to very heavy level of service E). Under Alternative B, traffic on the Rock Creek and Potomac Parkway would be one-way northbound.

Eleven road segments would have improved levels of service during the evening rush hour with Alternative C, compared to Alternative B. One of these, the Rock Creek and Potomac Parkway northbound from K Street/Whitehurst Parkway to Virginia Avenue, would have a considerable improvement in service (two level of service steps). Four of the segments would have very heavy traffic (level of service E), compared to eight segments with very heavy or extremely heavy traffic (level of service F) under Alternative B.

Nine road segments would have worse levels of service during the morning rush hour with Alternative C, compared to Alternative B. One of these, New Hampshire Avenue from 21st Street to M Street, would have a considerable decline in service (two level of service steps). The other eight road segments would have noticeable decreases in service (one level of service step) compared to Alternative B. Five of the nine segments would have very heavy traffic (level of service E) with Alternative C, while all nine segments would be level of service D or better under Alternative B.

**Neighborhood Traffic.** Alternative C would likely increase the volume of traffic on weekdays that would turn off Beach Drive at the northernmost closure location and enter the surrounding neighborhoods to the north of the park. Because most commuters know their preferred routes and would be aware that Beach Drive was closed, traffic entering the neighborhoods would be uncommon during the rush hours. Most would probably occur during the day between the rush hours.

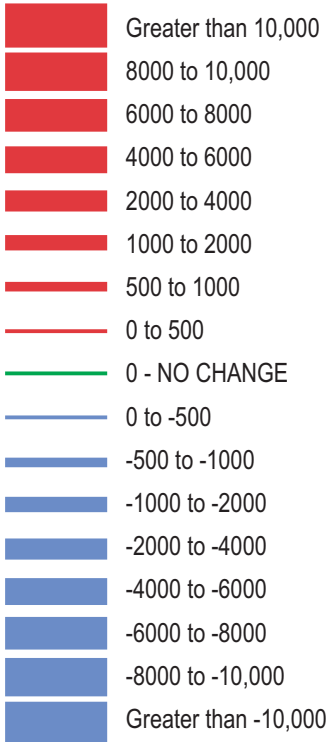
As shown in table 17, 1,500 vehicles currently travel on Beach Drive north of Rock Creek Park during the mid-day period and could potentially enter neighborhood streets north of the park. Most of these drivers would quickly learn alternate patterns to accommodate the Beach Drive closures and there would not be any long-term changes in the levels of service on these roads.

**Nonmotorized Travel.** Alternative C would improve conditions for cyclists and pedestrians in the park, particularly north of Broad Branch Road. Permanent closure of three segments of Beach Drive and improvements to existing recreation trails would provide an almost continuous automobile-free route the length of the park and parkway at all times.

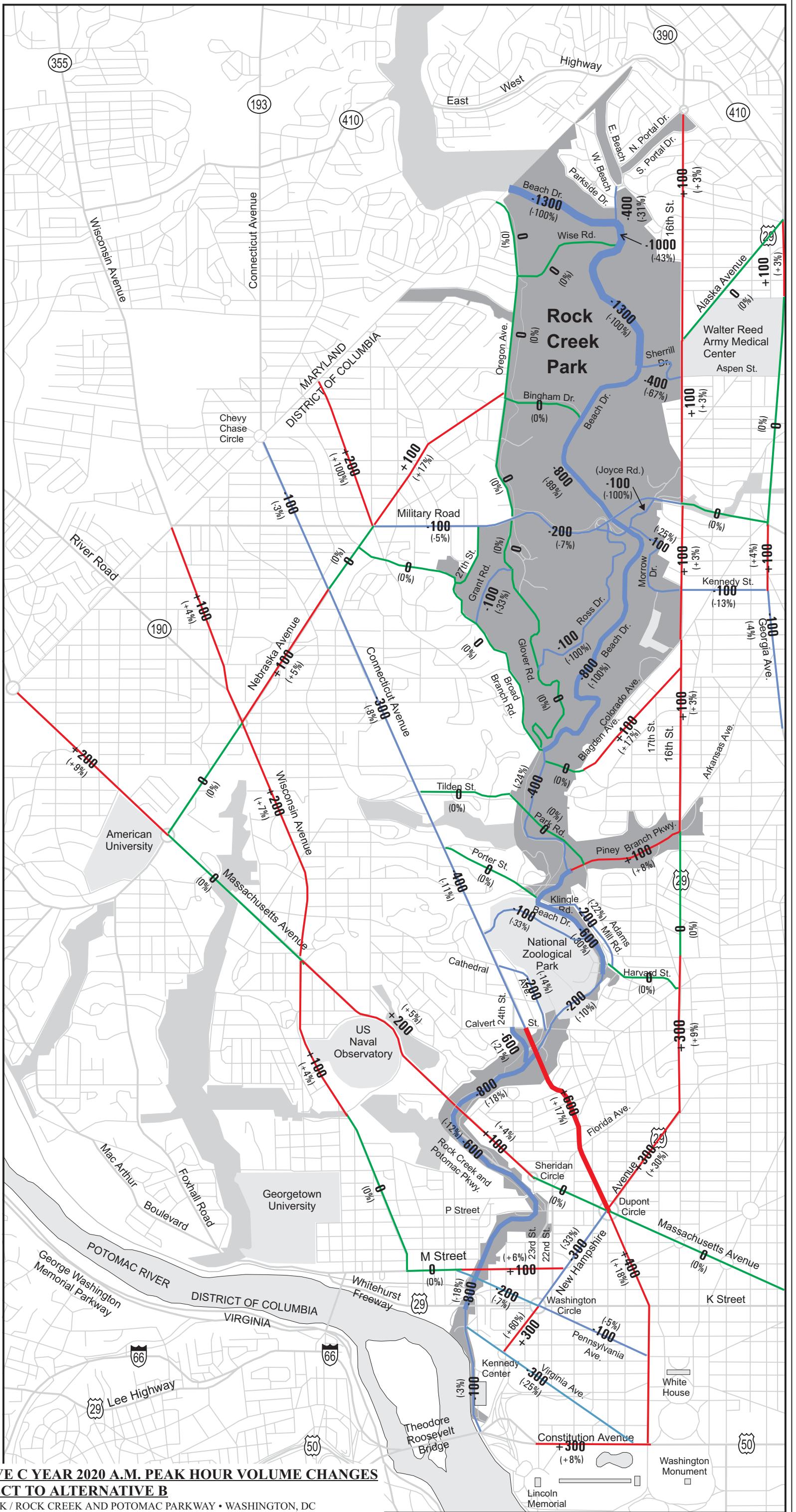


Map Scale: 1" = 0.5 Miles

Rock Creek Park



**+900 = Volume Change With Respect to Alternative B in The Year 2020.**  
**(+5%) = % Volume Change With Respect to Alternative B in The Year 2020.**



**ALTERNATIVE C YEAR 2020 A.M. PEAK HOUR VOLUME CHANGES WITH RESPECT TO ALTERNATIVE B**

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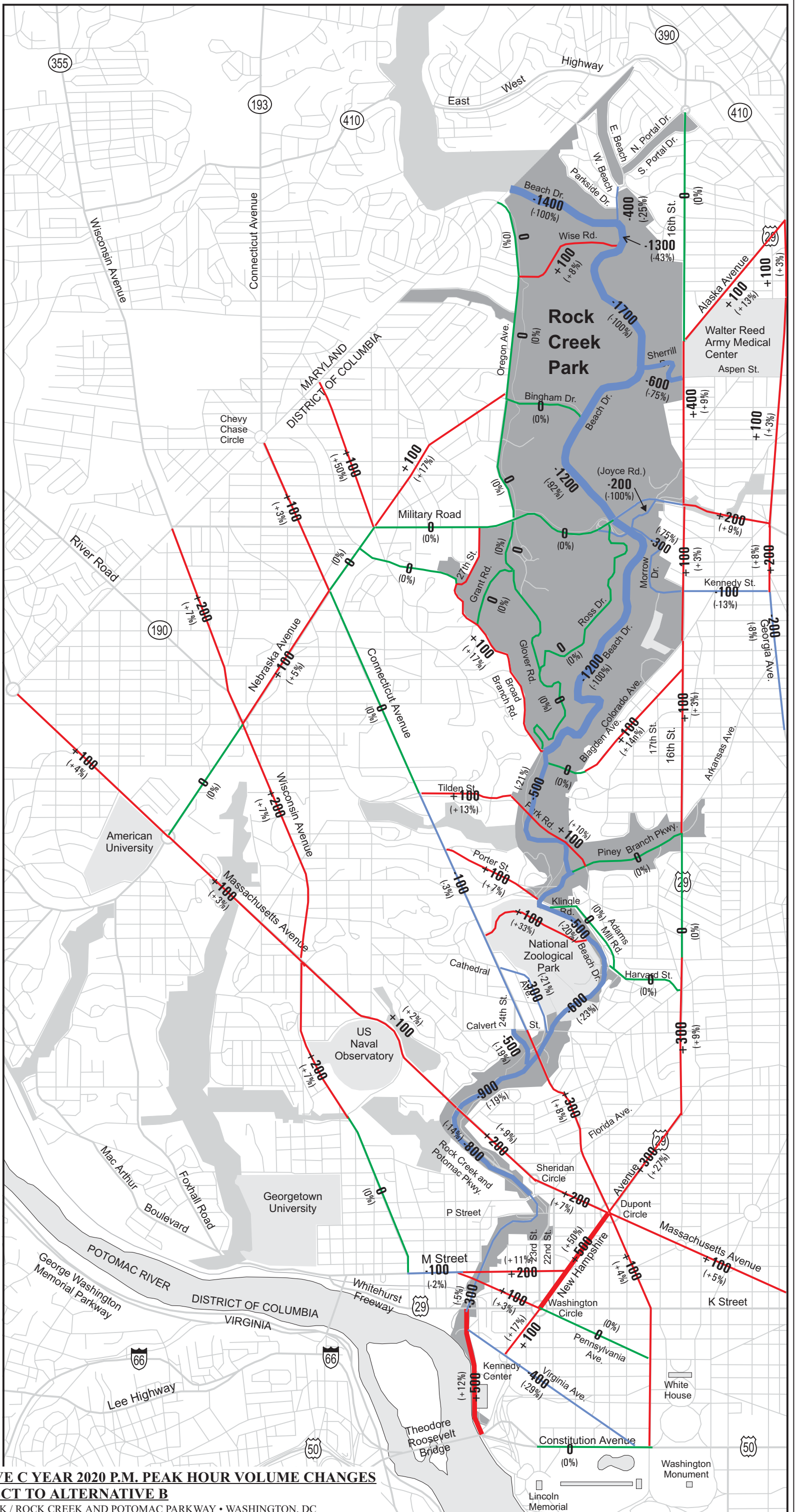
Map Scale: 1" = 0.5 Miles

Rock Creek Park



+900 = Volume Change With Respect to Alternative B in The Year 2020.

(+5%) = % Volume Change With Respect to Alternative B in The Year 2020.



**ALTERNATIVE C YEAR 2020 P.M. PEAK HOUR VOLUME CHANGES WITH RESPECT TO ALTERNATIVE B**

ROCK CREEK PARK / ROCK CREEK AND POTOMAC PARKWAY • WASHINGTON, DC  
United States Department of Interior • National Park Service  
DCS • January 2002 • 821 / 20052



Motor-vehicle-related safety problems on the closed sections of Beach Drive would be eliminated. The closed portions of Beach Drive would be available for recreational uses by park visitors, creating a corridor for such activities as bicycling, skating, walking, and jogging. The availability of this corridor would likely encourage some people to use bicycles and other nonmotorized modes for commuting and other travel, which would slightly reduce motor vehicle travel on other park roads and on other routes in the area.

Speed-related problems would be anticipated from some bicyclists and skaters. Some individuals or groups would use the corridor for high-speed travel that would endanger walkers, joggers, and other park users who travel at slower speeds. Cyclists who ran stop signs and refused to yield to pedestrians using crosswalks would also create safety hazards. These problems currently occur during the weekend road closures and probably would worsen during weekday closures when recreational use was lighter and a greater proportion of cyclists were using the corridor as a commuting route or, possibly, a training route or race track. Therefore, the two additional traffic enforcement positions that would be included in Alternative C would focus in part on controlling speeds of bicyclists in the park. As a result, the impacts would be negligible compared to Alternative B.

### **Cumulative Impacts**

As described for Alternative A, regional growth in the counties around the District of Columbia, especially to the north in Montgomery County, Maryland, is the primary reason for the projected increases in traffic volumes around the park. No matter which action is taken in Rock Creek Park or on the parkway, traffic in the region is expected to increase by at least 70 percent above 1990 levels by the year 2020 (Metropolitan Washington Council of Governments 1998b). Growth-induced increases in traffic would have a detrimental impact on traffic on all of the roads in the area with or without Alternative C.

In addition to Beach Drive and the Rock Creek and Potomac Parkway, 70 road segments around the park were modeled (Robert Peccia & Associates 1997). Of these, compared to Alternative B

26 would have average daily traffic increases of between 3 percent and 10 percent

5 would have average daily traffic increases of greater than 10 percent

4 would have average daily traffic decreases of between 3 percent and 10 percent

10 would have average daily traffic decreases of greater than 10 percent

25 would be little affected by Alternative C, with an average daily traffic increase or decrease of 3 percent or less

Maryland Department of Transportation does not anticipate any impacts on state roads because of the implementation of Alternative C (Simpson 2003).

As described for Alternative A, there will be ongoing projects throughout the area that transportation departments will implement to improve travel conditions for citizens. After each project is completed, area-wide traffic patterns will adjust to take advantage of the changes.

The greatest effect of Alternative C on nonmotorized travel in the region would be associated with providing an almost automobile-free corridor for bicyclists and pedestrians from the Mary-



land state line to the core of the city. The corridor would improve the linkage of the Rock Creek Trail with the regional system. The Rock Creek corridor would become the route of choice for some bicyclists who, under Alternative B, would have used other routes on city streets because of convenience and safety considerations.

Bicycling as a means of personal transportation, as well as a form of recreation, would likely to grow in the region with or without Alternative C. However, the presence of the automobile-traffic-free corridor may encourage more individuals to try bicycle or other nonmotorized commuting or travel.

## **Conclusions**

Alternative C would eliminate traffic on closed sections and would considerably curtail automobile traffic on open sections of Beach Drive north of Broad Branch Road. Traffic on Beach Drive south of Broad Branch Road would be noticeably to considerably reduced. Changes in traffic management on Beach Drive in combination with implementing two-way traffic on the Rock Creek and Potomac Parkway would have noticeable to considerable positive effects on most parkway levels of service. Changes in traffic volumes in the neighborhoods to the north of the park because of the closure of Beach Drive would not result in any long-term changes in levels of service. Conditions for nonmotorized travel through the park would be substantially enhanced.

Alternative C would cause mixed changes in traffic patterns on city streets. Some segments would improve noticeably while others would have noticeable declines in levels of service. Segments of three major arterials – Military Road, New Hampshire Avenue, and Wisconsin – would be negatively affected and major arterial, Pennsylvania Avenue, would be positively affected.

There would be a change in the use of Beach Drive from the historic use of scenic driving to other uses. Because the roadbed would not be greatly altered, the historic use could be returned at some future date if management goals changed.

## **IMPACTS ON COMMUNITY CHARACTER**

### **Analysis**

Traffic volume changes caused by Alternative C, and any associated changes in community character, would be minor compared to the substantially increased traffic volumes that are expected to result from continued regional population growth. For instance, Metropolitan Washington Council of Governments (1998b) forecasts as much as a 70 percent increase in traffic in the region because of population growth by 2020. Residents adjacent to the park would be affected by this regional change regardless of traffic management actions in the park.

The closure of portions of Beach Drive to automobiles and conversion of these road segments to a recreational trail in Alternative C would fill a void in the regional trail system. The trail improvements would make it easier for area residents to reach the valley, and would increase recreation opportunities such as walking, jogging, and biking through the valley. This would be a beneficial effect on all citizens who use the regional trails and paths that would be linked by the availability of a trail through the length of the Rock Creek valley.

The Alternative C Year 2020 A.M. and P.M. Peak-Hour Volume maps show the projected traffic changes for streets in the park vicinity. These projections were compared to projected traffic volumes that would occur without a change in traffic management (Alternative B).

Traffic modeling suggests that the closure of segments of Beach Drive and other traffic management restrictions in Alternative C would reinforce current commuter patterns. It is unlikely that traffic would be introduced onto streets where substantial commuter traffic does not currently exist.

Table 26 summarizes the roads outside the park and parkway where the community would experience a noticeable or greater traffic change in level of service between Alternative C and Alternative B. As shown in the table, eight road segments would experience noticeably improved community characteristics associated with lower traffic levels during one or both of the peak-hours on weekdays. These include one segment in each of the following zip code tabulation areas: 20012, 20011, 20015, 20008, and 20009; and two segments in 20037.

Nine road segments would experience a decline in traffic-related community quality characteristics because of higher traffic levels during one or both of the peak-hours on weekdays, compared to Alternative B. Three segments would be located in zip code tabulation area 20037, three in 20011, and one segment each in 20007, 20015, and 20036. The changes would be considerable on New Hampshire Avenue from 19th to 20th (zip code tabulation area 20036) during the morning peak-hour, and on New Hampshire Avenue from 21st Street to M Street (zip code tabulation area 20037) during the evening peak-hour. All other declines in community characteristics because of increased traffic would be noticeable.

An environmental justice evaluation was conducted to determine if inequitable distributions of adverse effects from declines in traffic levels of service would occur for ethnic or economically disadvantaged neighborhoods or groups. As shown in table 26, nine road segments would experience noticeable declines in community characteristics related to traffic, relative to Alternative B.

Three of the segments would be in zip code tabulation area 20011 which, among the nine zip code tabulation areas presented in table 18, could be considered ethnically or economically disadvantaged based on the following characteristics:

highest percentage of non-white population

second greatest median household size, second lowest median household income, lowest median gross rent, and lowest median value of owner-occupied units

second highest percentage of citizens not completing high school and lowest percentage of citizens with a college degree

The other six segments, including both segments that would have considerable declines in community characteristics related to traffic, would be located within zip code tabulation areas that would not be considered ethnically or economically disadvantaged. All have

predominantly white populations, ranging from 75 to 87 percent, compared to 31 percent for the District of Columbia

**TABLE 26: ZIP CODE TABULATION AREAS EXPERIENCING NOTICEABLE OR GREATER  
CHANGES IN COMMUNITY CHARACTERISTICS ASSOCIATED WITH TRAFFIC  
BETWEEN ALTERNATIVE C AND ALTERNATIVE B**

<b>Zip Code Tabulation Area</b>	<b>Road Segment</b>	<b>Peak- Hour Period</b>	<b>Alt. C LOS</b>	<b>Alt. B LOS</b>	<b>Change</b>
Improved level of service					
20009	Adams Mill Road – Park Street to Irving	A.M.	B	C	N <sup>a/</sup>
20037	New Hampshire Avenue – 21st to M	A.M.	B	C	N
20037	Pennsylvania Avenue – K to I	A.M.	C	D	N
20007	Pennsylvania Avenue – M to L	A.M.	D	E	N
20008	Cathedral Ave. – Calvert to Beach/24 <sup>th</sup>	A.M.	D	E	N
	Cathedral Ave. – Calvert to Beach/24 <sup>th</sup>	P.M.	D	E	N
20015	Oregon Avenue – Chestnut to Nebraska	A.M.	C	D	N
20011	Georgia Avenue – Arkansas to Upshur	A.M.	D	E	N
	Georgia Avenue – Arkansas to Upshur	P.M.	D	E	N
20012	Kennedy – 14th to 13 <sup>th</sup>	A.M.	B	C	N
	Kennedy – 14th to 13 <sup>th</sup>	P.M.	B	C	N
Reduced level of service					
20037	M Street – New Hampshire to 22 <sup>nd</sup>	P.M.	D	C	N
20036	New Hampshire Avenue – 19th to 20 <sup>th</sup>	A.M.	E	C	C
	New Hampshire Avenue – 19th to 20 <sup>th</sup>	P.M.	E	D	N
20037	New Hampshire Avenue – 21st to M	P.M.	E	C	C
20037	New Hampshire Avenue – Washington Circle to Virginia	A.M.	C	B	N
20007	Wisconsin Avenue – Calvert to Reservoir	A.M.	E	D	N
20015	Oregon Ave – Moreland to Military Road	P.M.	B	A	N
20011	Blagden Avenue – Upshur to Decatur	P.M.	C	B	N
20011	Georgia Avenue – Missouri to Kennedy	A.M.	E	D	N
	Georgia Avenue – Missouri to Kennedy	P.M.	E	D	N
20011	Military Road – 16th to 14 <sup>th</sup>	A.M.	E	D	N
	Military Road – 16th to 14 <sup>th</sup>	P.M.	E	D	N

a/ N = noticeable. C = considerable. M = major.

median household incomes greater than that of the District of Columbia

high education attainment levels, with college degrees ranging from 69 to 84 percent of households, compared to 39 percent for the District of Columbia

median values of owner-occupied units that are at least twice those of the District of Columbia median

The distribution of adversely affected road segments predominantly in advantaged zip code tabulation areas indicates an absence of ethnic or economic bias in the location of adverse effects.

Alternative C would have the same negligible economic effects on nearby neighborhoods and the city that were described for Alternative A.

The closure of segments of Beach Drive to automobile traffic would not adversely affect police or emergency operations in the vicinity of the park. These services would be managed throughout the week in a similar manner to that currently associated with the weekend closures of Beach Drive, Sherrill Drive, and Bingham Drive.

There would be no irretrievable or irreversible commitment of resources with this alternative. Management actions that altered community character in association with traffic could be reversed. There would be a change in the use of Beach Drive from the historic use of scenic driving to other uses. Because the roadbed would not be greatly altered, the historic use could be returned at some future date if management goals changed.

### **Cumulative Impacts**

Most of the cumulative impacts of Alternative C would be the same as those described for Alternative A. Differences are described below.

Alternative C would contribute incremental increases in traffic volume on streets and highways that would receive traffic displaced from the park. However, this incremental increase would be masked by the cumulative effects of traffic volume increases of 70 percent that are expected throughout the Washington, D.C. metropolitan area (Metropolitan Washington Council of Governments 1998b).

The high-occupancy vehicle restrictions included in Alternative C would be consistent with the goals of the *Transportation Planning Board Vision Document* (Metropolitan Washington Council of Governments 1998b) and the District's strategic transportation plan (District of Columbia 1997b) that propose reducing congestion problems in the region by reducing dependency on single occupancy vehicles.

Expanded recreational opportunities would create benefits for area residents. The closure of sections of Beach Drive would complete an important link in the regional trail system and could substantially increase regional nonmotorized recreational opportunities throughout the week. Development of the trail would be consistent with goals and improvements advocated in the Transportation Planning Board's vision document (Metropolitan Washington Council of Governments 1997 and 1998a) and the District's strategic transportation plan (District of Columbia 1997b).

## **Conclusions**

Alternative C would produce regional beneficial effects of moderate intensity for citizens who participate in nonmotorized recreation such as jogging, walking, and bicycling by filling a void in the regional trail system.

Alternative C would produce noticeable beneficial changes in the community character associated with traffic along eight road segments, and detrimental changes along nine road segments. Six of the segments that would experience detrimental effects, including both segments with considerable detrimental changes, would be in zip code tabulation areas that would be considered privileged when compared to social and economic characteristics for the population of the entire District of Columbia. As a result, Alternative C would not produce inequitable distributions of adverse effects from declines in traffic levels of service for ethnic or economically disadvantaged neighborhoods or groups.

## **SUSTAINABILITY AND LONG-TERM MANAGEMENT**

### **The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity**

Actions associated with Alternative C would be consistent with a long-term management strategy for ensuring natural, archeological, and historic resources and improving park visitor experiences.

The closure of portions of Beach Drive to automobiles, and the implementation of traffic-reducing and traffic-calming measures elsewhere in the park, would inconvenience some motorists who use park roads as a nonrecreational travel route. This inconvenience would be offset by an improved weekday visitor experience that is more compatible with the park's purpose and character.

Other relationships between local short-term uses of the environment and the maintenance and enhancement of long-term productivity would be identical to those described in Alternative A.

### **Any Irreversible or Irretrievable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented**

The irreversible or irretrievable commitments of resources under Alternative C would be identical to those described for Alternative A.

### **Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented**

Permanent closure of sections of Beach Drive north of Broad Branch Road would eliminate the current visitor experience of automobile travel along the length of the park, including the gorge area. This would be a major, adverse impact on the existing visitor experience. However, the elimination of this activity would not result in impairment of any resources that would affect the basic purposes of Rock Creek Park and the Rock Creek and Potomac Parkway.

None of the other effects identified in this assessment of Alternative C would be considered major adverse effects. Alternative C would not result in impairment of any resources that would affect the basic purposes of Rock Creek Park and the Rock Creek and Potomac Parkway.

## **ENVIRONMENTAL IMPACTS OF ALTERNATIVE D: MID-WEEKDAY RECREATION ENHANCEMENT**

### **IMPACTS ON AIR QUALITY**

#### **Analysis**

Table 20 summarizes the effects of Alternative D on air quality in the year 2020. As with the other alternatives, the area of Rock Creek Park and the Rock Creek and Potomac Parkway would be affected more by emissions throughout the regional airshed than by tailpipe emissions from vehicles using the park and parkway.

Alternative D would close three segments of Beach Drive to traffic for 6 hours during the middle part of each workday. As a result, average daily traffic counts in 2020 and their associated emissions of carbon monoxide would be between the values calculated for Alternative B, which would continue current management of Beach Drive, and Alternative C, which would permanently close the Beach Drive segments.

As shown in table 20, Alternative D would have negligible to minor beneficial effects on air quality at the intersections of Beach Drive/Military Road and Beach Drive/Broad Branch Road/Blagden Avenue. Minor beneficial effects would be expected at the Beach Drive/Wise Road intersection. During the mid-day period, Alternative D would have negligible adverse effects on air quality at intersections outside the park.

Outside of the mid-day closure period, the air quality effects of Alternative D would be the same as Alternative B. At all times, the worst 1-hour carbon monoxide concentration that would be associated with Alternative D (12.6 parts per million at the intersection of Beach Drive, Broad Branch Road, and Bladgen Avenue) would be well below the 1-hour National Ambient Air Quality Standard of 35 parts per million that is protective of human health and the environment.

Alternative D would include some construction in the park that would not occur with Alternative B. This would include preserving historic structures, expanding the Rock Creek Nature Center and Planetarium, and possibly constructing new buildings at the maintenance yard or the H-3 area. Best management practices and prompt revegetation would be applied in association with all construction to ensure that dust and construction-vehicle emissions associated with these activities would not be substantially greater than those that would occur with Alternative B.

#### **Cumulative Impacts**

No changes would occur in air emissions from vehicles in the region because of Alternative D's management actions at Rock Creek Park and the Rock Creek and Potomac Parkway. Instead, Alternative D would redistribute the same mid-day traffic volume onto different roadways, compared to Alternative B. This redirection of the same volume of traffic would have negligible effects on the regional air quality.

Provisions of Alternative D to reduce traffic speeds in the park and on the parkway, and to provide an automobile-free corridor during the mid-weekday period may encourage some travelers to use

bicycles rather than automobiles. This change in transportation mode would result in a beneficial but negligible effect on the regional air quality.

### **Conclusions**

Alternative D would result in negligible effects on air quality at intersections outside the park compared to Alternative B. At intersections within the park under reasonable worst-case conditions, it would have a negligible to minor beneficial effect on air quality, as represented by carbon monoxide concentrations. It would not result in the exceedence of the 1-hour National Ambient Air Quality Standard for carbon monoxide. In addition, it would not cause any impairment of resources or values associated with air quality.

### **IMPACTS ON ROCK CREEK AND ITS TRIBUTARIES**

Alternative D would decrease average daily traffic counts on Beach Drive, which would reduce pollutant loadings (sediments, oils and grease, and metals from the road surface) draining into Rock Creek from this park road. However, all of the alternate routes, both in and outside the park, are within the Rock Creek drainage. Therefore, changes in traffic patterns related to Alternative D would redistribute rather than reduce pollutant loadings in the Rock Creek watershed. The effect on water quality in the Rock Creek drainage would be negligible.

Aside from roadway runoff, Alternative D would have the same effects as Alternative A on Rock Creek and its tributaries. This would include identical cumulative impacts and conclusions.

### **IMPACTS ON WETLANDS AND FLOODPLAINS**

Alternative D would have the same effects as Alternative A on wetlands and floodplains. This would include identical cumulative impacts and conclusions.

### **IMPACTS ON DECIDUOUS FORESTS**

Alternative D would have the same effects as Alternative A on deciduous forests. This would include identical cumulative impacts and conclusions.

### **IMPACTS ON PROTECTED AND RARE SPECIES**

Alternative D would have the same effects as Alternative A on protected and rare species and their associated habitats. This would include identical cumulative impacts and conclusions.



## **IMPACTS ON OTHER NATIVE WILDLIFE**

Except as noted below, Alternative D would have the same effects as Alternative A on native wildlife. This would include identical cumulative impacts and conclusions. There would be no impairment of resources or values associated with native wildlife.

Mid-day closures of segments of Beach Drive during workdays, and other actions to reduce traffic speeds on park roads and the parkway, could reduce the number of wildlife killed or injured by motor vehicles. The greatest reduction would occur among groups that are active during the day, including reptiles such as box turtles and black rat snakes. Compared to Alternative B, this would produce long-term, beneficial effects on the park's native wildlife.

For all park species, the reductions in mortality from closing segments of Beach Drive would be negligible. As shown in table 9, only two box turtles and four black rat snakes were recorded as roadkill along the entire length of Beach Drive in the 10-year period from 1991 through 2000. Neither of these species was recorded as killed on the Rock Creek and Potomac Parkway during this period.

Measures to reduce traffic speeds could reduce roadkill throughout the park compared to Alternative B, but would have little effect on the populations of most park species because their populations are stable or expanding. As with Alternative A, the effects on box turtles would be moderate, long-term, and beneficial. Effects on gray foxes would be major, long-term, and beneficial.

## **IMPACTS ON ARCHEOLOGICAL RESOURCES**

Alternative D would have the same effects as Alternative A on archeological resources. This would include identical cumulative impacts and conclusions.

## **IMPACTS ON HISTORIC STRUCTURES AND CULTURAL LANDSCAPES**

Alternative D would have the same effects as Alternative A on historic structures and cultural landscapes. This would include identical cumulative impacts and conclusions.

## **IMPACTS ON TRADITIONAL PARK CHARACTER AND VISITOR EXPERIENCE**

### **Analysis of Effects on Continuation and Quality of Traditional Park Uses**

The traditional character of the park would not change under Alternative D. Recognition of cultural landscape values and management for those values would help maintain the traditional appearance of the park. As under Alternative A, the appearance of park historic structures, grounds, and roadways would be preserved or enhanced, maintaining the traditional ambiance of the park setting. Development of design standards for park facilities and signs would also enhance the traditional ambiance.

As described under "Impacts on Regional and Local Transportation," Alternative D would not have noticeable effects on rush-hour traffic volumes compared to Alternative B. However, new

traffic-control structures and traffic-calming measures would reduce the speed of traffic in the park and on the parkway.

The experience of automobile travel throughout the length of the park on workdays would be maintained under Alternative D during the evening, throughout the night, and during both rush-hour periods. This would allow continued use of the park by commuters who chose to drive park roads because they enjoyed the slower pace and scenery. The inability to access the three closed Beach Drive segments during the mid-day periods would be a minor adverse effect.

Automobile travel on northern segments of Beach Drive would cease during the mid-day closure period. Between 9:30 A.M. and 3:30 P.M. on workdays, the driving experience in the Rock Creek valley north of Broad Branch Road would be replaced by enhanced opportunities for nonmotorized use. It is expected that substantially increased use for multiple forms of nonmotorized recreation probably would occur during the mid-day period from groups that formerly avoided the park because of fast-moving traffic on Beach Drive. These could include individuals who do not work a traditional Monday through Friday workday schedule, caregivers with small children, retired people, and school groups. A long-term, beneficial effect of moderate intensity would result from the improved ability for park visitors to participate in nonmotorized recreation along Beach Drive during the mid-day period.

During the closure period, traffic noise would be eliminated along most of northern Beach Drive, except for cross-park traffic noise. Natural sounds and the sounds of people recreating would be dominant, similar to the condition that currently occurs on weekends. The beneficial effect of reduced noise in these areas would be minor to moderate. When Beach Drive was open to traffic, noise levels would follow the existing pattern, where noise levels within 60 feet of Beach Drive and within 125 feet of the parkway exceed the Federal Highway Administration's noise abatement criteria during high-traffic periods.

Visitors would continue to have access to all of the traditional activities in the park that were described in the "Affected Environment" section. Even with the mid-day closure of segments of Beach Drive, visitor-use facilities such as picnic grounds and trailheads would continue to be accessible via motorized vehicle. However, visitors would have to drive around the closed sections via city streets to access other portions of the park. This could be confusing, particularly to out-of-town visitors.

Weekday visitation to the northern portion of the park would be substantially reduced. As described under "Impacts on Regional and Local Transportation," up to 1,400 vehicles per hour that would use Beach Drive under Alternative B would have to use an alternate route under Alternative D. South of Broad Branch Road and on the Rock Creek and Potomac Parkway, use would decrease by about 10 percent during the mid-day closure period. Most of the traffic reductions in the park under Alternative D would be in nonrecreational visits.

Opening and closing Beach Drive each day would pose a labor and logistical challenge that would not occur with any of the other alternatives. The closing and opening of barriers would have to occur nearly simultaneously at six points to accommodate traffic entering both from the north and south ends of Beach Drive and from east-west roads that cross the park. However, this function could be performed by park staff rather than the U.S. Park Police and would represent a negligible to minor adverse effect on operations compared to Alternative B.

The installation of automated barriers would reduce staff labor commitments. However, enforcement activities such as patrolling “no waiting” zones would continue to make demands on officers that would not occur with any of the other alternatives.

Weekend road closures would continue current opportunities for nonmotorized recreation in the valley. Alternative D would have similar use levels as Alternative B, because weekend traffic management would be similar for both alternatives.

Alternative D components that would be similar to Alternative A would include upgraded recreation trails, rehabilitation of the cultural landscape at the Peirce Mill complex, improvements to the Rock Creek Nature Center and Planetarium, and improved working conditions for park and U.S. Park Police staff. All of these would have moderate, long-term, beneficial effects on park character and visitor experience, although the perceived benefit by the public to improved administrative staff conditions probably would only be minor.

### **Analysis of Effects on Visitor Recreational Opportunities**

Table 21 summarizes the relative advantages of Alternative D relative to Alternative B for recreational opportunity quality, quantity, spectrum, and interpretation and education. As shown in the table, Alternative D would have a moderate, beneficial effect on recreational opportunities relative to Alternative B. It would be more advantageous than the alternative to continue current management for three attributes and less advantageous for one attribute.

Alternative D would be considerably more advantageous than Alternative B with regard to the quality of the experience. The closure of three segments of Beach Drive during the middle of the day when many people recreate would provide an unhurried experience with the ability to enjoy natural sounds and smells and to view park resources in a manner consistent with to the intent of its establishing legislation.

Alternative D would be somewhat less advantageous than Alternative B with regard to the number of visitors who used the park. For 18 hours each workday, the number of park users would be the same as Alternative B. During the mid-day closures, visitors who would drive through the park under Alternative B would be displaced to other roads. Some increased use probably would occur during the mid-day period from groups that avoided the park because of fast-moving traffic on Beach Drive. These could include individuals who do not work a traditional Monday through Friday workday schedule, caregivers with small children, retired people, and school groups. However, based on numbers, there probably would be a decrease in total park visitation.

Alternative D would be the most advantageous of all alternatives in providing a broad spectrum of use of Beach Drive. The existing activity of traveling the length of Beach Drive by automobile would be available for 18 hours on each workday. During the 6-hour mid-day period, visitors could enjoy a complete range of nonmotorized recreation opportunities on the broad, level, smooth surface of Beach Drive without interference from automobiles.

Interpretation and education opportunities would experience substantial advantages under Alternative D. Increased opportunities to learn about and experience the park’s

natural and cultural resources would result from upgraded interpretation and education facilities in the park. Six additional staff positions for interpretation and education would substantially improve opportunities for visitor contact, programming, and outreach.

### **Analysis of Effects on Access for Visitors with Impaired Mobility**

For site improvements associated with trails, buildings, and historic scenes, the same long-term, moderate, beneficial effects for individuals with impaired mobility that were described for Alternative A would occur.

The effects of mid-day closures of three segments of Beach Drive on access for visitors with impaired mobility would vary, based on the individual's perception. Comments on the draft general management plan identified two very different viewpoints.

Many people stated that an adverse effect would occur on people with impaired mobility because they would no longer be able to drive through and enjoy the closed segments of Beach Drive, particularly the gorge area between Joyce Road and Broad Branch Road, during the mid-day period.

Many others perceived a beneficial effects on people with impaired mobility because they would be able to enjoy the use of the broad, level, smooth surface of Beach Drive during mid-day periods of the work week. They noted that their experience would be enhanced not only by the absence of cars but also by the lower numbers of other visitors, such as inattentive children who can pose a risk to people with impaired mobility. They also noted that once they reached areas such as the gorge, they could stop and enjoy the experience, which they could not do from a car.

The intensity of the Alternative D impact on individuals with impaired mobility would be moderate. Whether this long-term impact was beneficial or adverse would depend on each individual's viewpoint.

### **Cumulative Impacts**

The Maryland Office of Planning (1993) predicted that demand for bicycling, hiking, and picnicking facilities in the state would increase by 6 to 14 percent between the years 2000 and 2010. Rock Creek Park and the parkway would continue to contribute to the regional mix of recreational opportunities and would be compatible with regional recreational plans. During the middle part of weekdays, on weekends, and on holidays, Alternative D would provide a bicycling route through Rock Creek Park that would be relatively free from interference by automobiles and would provide an effective connection with regional pedestrian and bicycle trails.

Cumulative effects of Alternative D on access for individuals with impaired mobility would be much the same as described for Alternative A. However, depending on their viewpoint, individuals may see mid-day closures of Beach Drive as an additional restriction on their ability to access important natural and cultural resources in the area or an opportunity that increases their ability to enjoy high-value resources.

## Conclusions

The traditional character of the park would be maintained under Alternative D.

A long-term, beneficial effect of moderate intensity would result from the improved ability for park visitors to participate in nonmotorized recreation along Beach Drive during the mid-day period on weekdays. A minor, adverse effect on the existing visitor experience of automobile travel along the length of the park would result from restrictions on driving the length of Beach Drive during the mid-day period.

Many other effects of Alternative D would be like those described for Alternative A. These would include moderate, beneficial, long-term effects associated with upgraded trails throughout the park; improvements to visitor contact, interpretation, and education facilities and services; and improved access for visitors with impaired mobility at buildings, historic scenes, and trails. Improved working conditions for park administrative staff and personnel in the U.S. Park Police District 3 substation would result in a moderate beneficial effect on park operations, but the intensity of the beneficial impact perceived by the public probably would be minor. Compared to Alternative B, this alternative would have a moderate beneficial effect on the park's recreational opportunities.

For the mid-day closure segments of Beach Drive, Alternative D would have a long-term, moderate effect on access for individuals with impaired mobility. Each person's viewpoint would determine whether this effect was adverse or beneficial.

## IMPACTS ON PUBLIC HEALTH AND SAFETY

### Analysis of Effects on Safety along Roadways

Traffic management measures associated with Alternative D that could affect public health and safety would include

- enhanced enforcement

- use of traffic-calming measures, such as speed humps and speed tables, all-way stops, rumble strips, or raised intersections

- reconfiguration of the intersection of the parkway with Beach Drive near Connecticut Avenue to improve safety

- closure of segments of Beach Drive to motorized vehicles during mid-weekday periods

**Mid-Weekday Beach Drive Closures.** Mid-day closures of segments of Beach Drive would have negligible to minor effects on traffic safety. These stretches of Beach Drive were the sites of just 16 accidents between 2001 and 2003 (NPS, Pettiford 2004c), and accidents consistently occurred at a rate of five (2002 and 2003) or six (2001) per year. The same data indicate that fewer than 45 percent of all accidents on Beach Drive occur during the Alternative D closure period. The prevention of 2 or 3 accidents annually along these segments would not change any of the accident ratios occurring in the park and parkway, and may not be measurable, based on year-to-year fluctuation in the number of accidents.

Mid-workday closures of portions of Beach Drive may move accidents to other nearby areas. However, because of the low levels of traffic on roads around the park during this period, the change in number of accidents outside of the park probably would be negligible.

**Enhanced Enforcement.** The effectiveness of the improved speed enforcement measures was described for Alternative A. The enhanced enforcement elements of Alternative D would have a minor to moderate beneficial effect on visitor safety. However, if traffic enforcement levels were reduced because of budget cuts or the need to assign U.S. Park Police staff to other duties, the beneficial effects would not be expected to continue for very long.

**Traffic Calming Measures.** The use of traffic-calming techniques to reduce speeds and enhance safety was described in the analysis of Alternative A. As with that alternative, the use of traffic-calming measures in Alternative D would have a major beneficial effect on visitor safety in the park and parkway compared to Alternative B. As long as the traffic-calming devices were maintained, these would be long-term effects.

**Effects on Vehicle Occupants.** As described for Alternative A, speed is the major contributing factor to the probability of injury or death in vehicle-only traffic accidents. By reducing speeds on park roads and the parkway, the traffic management measures of Alternative D would have a long-term, major, beneficial effect in reducing the number and severity of motor-vehicle-only accidents.

**Effects on Pedestrians and Cyclists.** Speed is also the primary factor affecting the outcome of collisions between motorized vehicles and pedestrians or cyclists. By slowing traffic speeds, the traffic management measures of Alternative D would have a long-term, beneficial effect in reducing the number and severity of collisions between automobiles and pedestrians or bicyclists in the park and along the parkway.

During the mid-workday closures, pedestrians and cyclists would have a continuous trail throughout the park and parkway that would be separated from motor vehicles. This would probably reduce the number of accidents involving automobiles and pedestrians or cyclists compared to Alternative B. However, because of the low number of this type of accident (average of two per year for the 2001-2003 period), some year-to-year fluctuation in the number of collisions between cars and pedestrians or cyclists would be expected.

Alternative D would have unique safety concerns for visitors who may not be familiar with the concept of reopening Beach Drive each weekday mid-afternoon or may have lost track of time. Rush-hour traffic along narrow stretches that do not have a recreation trail and little or no shoulder may hinder the ability of these visitors to exit the park. This may be of particular concern for visitors with limited mobility and those accompanied by small children. Possible mitigation could include having park staff travel each segment before it reopened and warn recreationists using Beach Drive that the primary road use was about to change. This approach would require a commitment of time and would limit the availability of park staff for other activities. However, with the implementation of this type of mitigation, the effects on public health and safety would be negligible.

Some accidents involving cyclists, skaters, and/or pedestrians would occur in the segments of Beach Drive that would be closed to vehicular traffic during the mid-day period. Factors that could influence the number and severity of nonmotorized vehicle accidents were described in the

Alternative C analysis. For Alternative D, these factors would have a negligible to minor effect on the total number and ratio of accidents in the park and on the parkway.

### **Analysis of Effects on Personal Safety**

As described for Alternative C, the additional closures of Beach Drive segments under would have a negligible effect on the numbers of crimes against persons that would occur within Rock Creek Park.

### **Analysis of Effects on Emergency Evacuations**

For Alternative D, gates would close portions of Beach Drive to automobile traffic during work-day mid-day periods. These road segments already are gated on weekends. If an evacuation occurred during these periods, drivers could choose to drive around the gates. However, Beach Drive is not a designated evacuation route. As a result, the effects of Alternative D on emergency evacuations would be negligible compared to Alternative B.

### **Cumulative Impacts**

Cumulative effects of Alternative D would be identical to those described for Alternative A.

### **Conclusions**

Under Alternative D, there would be major improvements in visitors' safety compared to Alternative B, primarily because of the effectiveness of this alternative's traffic-calming measures. Mid-workday closures of portions of Beach Drive would have a negligible to minor effect on safety. Alternative D would have negligible effects on crimes against persons or the effectiveness of emergency evacuations.

## **IMPACTS ON REGIONAL AND LOCAL TRANSPORTATION**

### **Analysis**

**Morning and Evening Rush-Hour Traffic.** Alternative D was developed in response to a letter from the Mayor of the District of Columbia. The mayor asked the National Park Service to consider "weekday vehicular traffic restrictions on sections of upper Beach Drive in non-rush-hour periods." As a result, Alternative D was designed so that all of its management actions that would change traffic volumes or patterns would be applied only during periods outside of rush hours.

Alternative D would incorporate the same types of traffic-calming measures as Alternative A. As described in the transportation analysis for Alternative A, these measures would reduce vehicle speeds through the park but would cause relatively few vehicles to re-route.

Because of these conditions, Alternative D would have negligible traffic differences from Alternative B during weekday peak-travel periods. Alternative D would have same levels of service summarized for Alternative B in table G.2 in appendix G. The entire length of Beach Drive and all of the east-west connecting routes through the park would continue to be available to the driving public during the typical weekday commuting times.

**Weekday Non-Rush-Hour Traffic.** East-west flow of traffic through the park would not be affected by the mid-day road closures proposed in Alternative D. The traffic impacts primarily would be associated with the north-south traffic flow that, under Alternative B, would use Beach Drive and the parkway during the non-peak hours of weekdays.

Changes in the year 2020 are quantified in table 27 for the weekday, off-peak, maximum-hour, traffic volume. The values in the table were estimated using the projected 2020 average weekday traffic volume for each road segment for Alternative B and factoring it to represent the maximum off-peak hour. According to traffic count data, the maximum off-peak hour of the day occurs between 10:00 A.M. and 11:00 A.M. and accounts for approximately 8.3 percent of the weekday total traffic volume.

**TABLE 27: MAXIMUM HOURLY VOLUME OF TRAFFIC THAT WOULD BE DIVERTED BY ALTERNATIVE D ROAD CLOSURES BY ROAD SEGMENT IN THE YEAR 2020**

<b>Road Segment</b>	<b>Alternative B Maximum Hourly Volume between 9:30 A.M. and 3:30 P.M.</b>	<b>Maximum Estimated Hourly Traffic that Would Use Another Route under Alternative D</b>
Beach Drive – Maryland Line to West Beach Drive	1,150 vehicles	1,150 vehicles
Beach Drive – Wise Road to Joyce Road	1,400 vehicles	1,400 vehicles
Beach Drive – Joyce Rd. to Broad Branch Rd.	970 vehicles	970 vehicles
Beach Drive – Broad Branch Rd. to Parkway	3,000 vehicles	750 vehicles
Parkway – Beach Drive to P Street	6,500 vehicles	650 vehicles
Parkway – P Street to Constitution Avenue	6,250 vehicles	625 vehicles

On non-holiday weekdays between 9:30 A.M. and 3:30 P.M., Alternative D would eliminate all motorized traffic on the closed sections of Beach Drive in the northern part of the park. This traffic would reroute itself to other north-south corridors.

About 25 percent of the traffic that would use Beach Drive between Broad Branch Road and the north end of the parkway under Alternative B would choose another route during the closure period of Alternative D.

Closure of the north end of Beach Drive would cause as much as 10 percent of the Alternative B traffic on the Rock Creek and Potomac Parkway to choose another route.

Table 28 shows the likely selection of alternate routes by diverted traffic. The most likely corridors would include 16th Street NW, Georgia Avenue, Connecticut Avenue, Wisconsin Avenue, Broad Branch Road, and Oregon Avenue.



**TABLE 28: TRAFFIC IMPACT SUMMARY FOR ALTERNATIVE D IN THE YEAR 2020**

<b>Alternate Route</b>	<b>Maximum Non-Peak Hourly Traffic Increase</b>	<b>Estimated Traffic Impact<sup>a/</sup></b>
Connecticut Avenue north of Tilden	500 vehicles	Would result in a perceptible increase in traffic. Would increase traffic congestion at several intersections. Would not cause any intersections to fail.
Wisconsin Avenue north of Massachusetts Ave.	140 vehicles	No noticeable impact.
16th Street NW north of Blagden	560 vehicles	Would result in a perceptible increase in traffic. Would not cause any intersections to fail.
Georgia Avenue	140 vehicles	No noticeable impact.
Broad Branch Road	500 vehicles	Would result in a minor increase in traffic. Would not cause any intersections to fail. Would increase traffic related noise.
Oregon Avenue	140 vehicles	Would result in a perceptible increase in traffic.
Blagden Avenue	500 vehicles	Would result in a minor increase in traffic. Would not cause any intersections to fail. Would increase traffic related noise.
Porter Street	250 vehicles	Would result in a perceptible increase in traffic.
Piney Branch	250 vehicles	Would result in a perceptible increase in traffic.

a/ Traffic impacts were determined in comparison to the average daily traffic volumes estimated to occur in the year 2020 under Alternative B. A change with no noticeable impact would increase maximum non-peak hourly traffic by less than 0.5 percent relative to the Alternative B average daily traffic volume. A perceptible increase would result in an increase of 0.5 to 2.0 percent. A minor increase would increase the maximum non-peak hourly traffic by 2.0 to 10.0 percent. A substantial increase would be more than 10 percent.

On all of these routes, mid-day closure of Beach Drive would increase traffic volumes by fewer than 10 vehicles per minute. On the roadways where traffic increased by two or three vehicles per minute, this change probably would not be noticeable. Little effect also would occur on high-capacity streets such as Connecticut Avenue, which routinely handles more than 50 vehicles per minute during rush hours. The most obvious changes would occur on Broad Branch Road and Blagden Avenue, where the mid-day traffic volumes would more than double. However, on both of these streets, this doubling would represent only about eight vehicles per minute (four in each direction).

During weekday non-peak hours, the roads shown in table 28 and most other north-south corridors in the vicinity of the park and parkway would be operating well below their capacities. Therefore, none of the routes onto which traffic would divert would experience a change in the level of service compared to Alternative B, as defined in the "Methodology" section for "Impacts on Regional and Local Transportation."

Increased traffic outside of the park would increase noise and decrease the safety of pedestrians and cyclists using the alternate routes. However, traffic volumes would be lower than the volumes typically handled by these roads during rush-hour periods. The estimated traffic increase would not cause any of the intersections on these routes to fail.

Some localized, minor traffic effects could occur shortly before 3:30 P.M. if drivers blocked a traffic lane or pulled their vehicles to the side of the road and waited at the closure points for Beach Drive to open. This could be mitigated by creating and enforcing “no waiting” zones in areas where this activity would create a safety hazard.

Alternative D would include traffic-calming measures such as speed humps and speed tables, raised intersections, and four-way stop control at selected intersections. Some of these traffic-calming measures may create minor traffic congestion within its local vicinity. These measures would help reduce speeding along Beach Drive. They also would help to regulate the bicycle speeds during times when the road was closed to motorized vehicle traffic. As described in Alternative C, the two additional traffic enforcement positions that would be included in this alternative also would help control speeds of motorists and bicyclists throughout the park and on the parkway.

**Neighborhood Traffic.** In the short-term, Alternative D would likely increase the volume of mid-day traffic on weekdays that would turn off Beach Drive at the northernmost closure location and enter the surrounding neighborhoods to the north of the park. However, most drivers would quickly learn alternate patterns to accommodate the mid-day Beach Drive closures and there would not be any long-term changes in the levels of service on these roads.

**Nonmotorized Travel.** During mid-weekday closures, motor-vehicle-related safety problems on the closed sections of Beach Drive would be eliminated. The closed portions of Beach Drive would be available for recreational uses by park visitors, creating a corridor for such activities as bicycling, skating, walking, and jogging. The availability of this corridor would likely encourage some people to use bicycles and other nonmotorized modes for commuting and other purposes, which would slightly reduce motor vehicle travel on other park roads and on other routes in the area.

Speed-related problems would be anticipated from some bicyclists and skaters. Some individuals or groups would use the corridor for high-speed travel that would endanger walkers, joggers, and other park users who travel at slower speeds. Cyclists who ran stop signs and refused to yield to pedestrians using crosswalks would also create safety hazards. These problems currently occur during the weekend road closures and probably would worsen during weekday closures when recreational use was lighter and a greater proportion of cyclists were using the corridor as a commuting route or, possibly, a training route or race track. As described previously, this alternative’s two additional traffic enforcement positions would help control speeds of bicyclists in the park so that impacts would be negligible compared to Alternative B.

### **Cumulative Impacts**

As described for Alternative A, regional growth in the counties around the District of Columbia, especially to the north in Montgomery County, Maryland, is the primary reason for the projected increases in traffic volumes around the park. No matter which action is taken in Rock Creek Park or on the parkway, traffic in the region is expected to increase by at least 70 percent above 1990 levels by the year 2020 (Metropolitan Washington Council of Governments 1998b). Growth-induced increases in traffic would have a detrimental impact on traffic on all of the roads in the area with or without Alternative D.

Maryland Department of Transportation does not anticipate any impacts to state roads because of the implementation of Alternative D (Simpson 2003).

During the middle portion of each weekday, Alternative D would provide an almost automobile-free corridor for bicyclist and pedestrians from the Maryland state line to the core of the city. However, because it would not be automobile-free during rush hours, it would do little to encourage people who worked during traditional office hours to commute by nonmotorized modes such as bicycles.

As described for Alternative A, there will be ongoing projects throughout the area that transportation departments will implement to improve travel conditions for citizens. After each project is completed, area-wide traffic patterns will adjust to take advantage of the changes.

### **Conclusions**

Alternative D would have little effect on rush-hour traffic volumes or patterns compared to Alternative B. However, on non-holiday weekdays between 9:30 A.M. and 3:30 P.M., Alternative D would eliminate all motorized traffic on the closed sections of Beach Drive in the northern part of the park, and would reduce traffic on other park roads. This would provide an almost automobile-free corridor for bicyclist and pedestrians from the Maryland state line to the core of the city. During this non-peak period, traffic diverted from the park would be noticeable on some of the alternate routes motorists would choose, but would not adversely affect the level of service on any roads. There also would not be any changes in levels of service on roads in the neighborhoods to the north of the park.

## **IMPACTS ON COMMUNITY CHARACTER**

### **Analysis**

As described in the “Methodology” section under Alternative A, changes in community character were assumed to be related to changes in traffic management during peak-travel periods (rush-hours). Alternative D was designed so that all of its management actions that would change traffic volumes or patterns would be applied only during periods outside rush hours. Therefore, the impacts of Alternative D on community character would be identical to those described for Alternative B.

### **Cumulative Impacts**

The cumulative impacts of Alternative D on community character would be identical to those described for Alternative A.

### **Conclusions**

The impacts of Alternative D on community character would be identical to those described for Alternative A.

## **SUSTAINABILITY AND LONG-TERM MANAGEMENT**

### **The Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity**

Actions associated with Alternative D would be consistent with a long-term management strategy for ensuring natural, archeological, and historic resources and improving park visitor experiences.

The closure of portions of Beach Drive to automobiles during the middle portion of weekdays, and the implementation of traffic-calming measures elsewhere in the park, would inconvenience some motorists who use park roads during this period. This inconvenience would be offset by an improved weekday visitor experience that was more compatible with the character of the park.

Other relationships between local short-term uses of the environment and the maintenance and enhancement of long-term productivity would be identical to those described in Alternative A.

### **Any Irreversible or Irrecoverable Commitments of Resources that Would Be Involved Should the Alternative Be Implemented**

The irreversible or irretrievable commitments of resources under Alternative D would be identical to those described for Alternative A.

### **Any Adverse Impacts that Cannot Be Avoided Should the Action Be Implemented**

None of the effects identified in this assessment of Alternative D would be considered major adverse effects. Alternative D would not result in impairment of any resources that would affect the basic purposes of Rock Creek Park and the Rock Creek and Potomac Parkway.



Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

## CONSULTATION AND COORDINATION

### HISTORY OF PUBLIC INVOLVEMENT

A notice of intent to prepare a general management plan and environmental impact statement was published on July 18, 1996, in the *Federal Register* (volume 61, number 139, page 37494). At that time, a press release was distributed to local media, and newsletter 1 (NPS 1996b) was published and distributed to the park mailing list. The newsletter contained information on the function of a general management plan, draft statements of the park purpose and significance, information on the planning team and the process for planning, and methods available to the public for communicating with the team and participating in the planning effort.

A public scoping meeting was held July 24, 1996, in the auditorium at the National Zoo. About 100 people attended and 35 spoke.

Based on discussions at the scoping meeting, the planning team hosted two focus group meetings at the Rock Creek Nature Center and Planetarium. One was on September 17, 1996, with representatives of three area bicycling organizations. The second was on September 18 with representatives of seven environmental organizations. In October 1996, members of the planning team attended a presentation on the history of planning and design for Rock Creek Park hosted by the Committee of 100 for the Capital City, an organization of professional planners and designers in Washington, D.C.

During early scoping, the superintendent and park staff met with District of Columbia congressional representatives Norton and Morella, the mayor's office, and 15 advisory neighborhood commissions (ANCs) to inform them of the planning project and to discuss their concerns for the future of the park.

Newsletter 2 provided updates on public outreach activities and progress on the planning process. The newsletter was distributed in January 1997 (NPS 1997b).

Focus group meetings were held on October 22, 1996, at the Metropolitan Washington Council of Governments headquarters with representatives of regional transportation and air quality agencies. A second set of meetings was held on February 2, 1997, with air quality and transportation agencies. The purposes of the meetings were to inform the agencies of the planning effort, inquire about sources of information pertinent to planning, share public scoping comments received to date, and discuss the insights and concerns of the agencies regarding their fields of expertise and potential environmental effects.

Public comments received during early scoping tended to focus on management of traffic through the park and the idea of returning the park to more natural conditions. In response, the NPS planning team prepared a range of four "preliminary alternative scenarios," characterizing four potential management directions for the park for public comment. The scenarios ranged from continuing current management to extensive closures of roads and removal of recreation facilities to return the park to a more wilderness-like state. The scenarios were published in newsletter 3 (NPS 1997c), which also included a postage-free response form. The newsletter was distributed to about 1,500 agencies, organizations, and individuals; was placed in area libraries; and was posted on the Internet (<http://www.nps.gov/rocr/gmpnewsletter3>).

Public open house meetings were held in conjunction with newsletter 3 at the Rock Creek Nature Center and Planetarium on June 25 and June 28, 1997. About 800 people attended the open houses. Planning team members and other park staff hosted the open house meetings to talk directly with people about the planning project and to hear their ideas and concerns. Comments were recorded on response forms, flip charts, and through interviews. A court reporter was provided at the open houses.

Approximately 1,000 comments on the preliminary alternative scenarios were received during the official review period that ended August 1, 1997. The range of comments was summarized in newsletter 4 (<http://www.nps.gov/rocr/gmpnewsletter4>) published in January 1998 (NPS 1998c). Public views varied widely about the management of park roads, but there was nearly universal opposition to closing the community gardens, the public horse stables, and the golf course in the park.

After the official review period ended, additional letters, email, and post cards were received. The large majority of these supported “Alternative 2½,” a recommendation developed by a new coalition of organizations entitled People’s Alliance for Rock Creek (see Alternative C in this document).

Newsletter 5 was published in June 1998 to inform the public of a schedule extension for producing the plan (NPS 1998f). The newsletter also announced that new alternatives were being developed that did not include closing traditional recreation facilities. The recent discovery in the park of a federally endangered amphipod was also announced.

In November 1998, a letter was sent to everyone on the mailing list announcing an indefinite delay in the production of the draft general management plan and environmental impact statement. The delay was caused by a congressionally directed reorganization and downsizing of NPS planning, design, and construction programs and personnel.

In January 2001, the Mayor of the District of Columbia sent a letter to the National Park Service suggesting that a new alternative be developed to implement weekday vehicular traffic restrictions on sections of upper Beach Drive in non-rush hour periods. A copy of this letter is included in appendix D. As described in the “Formulation of Alternatives” section, this led to the development of Alternative D, Mid-Weekday Recreation Enhancement.

Work on the plan was restarted in early 2001. A notice of availability for the *Rock Creek Park and the Rock Creek and Potomac Parkway Draft General Management Plan / Environmental Impact Statement* was published in the *Federal Register* on March 14, 2003. This action informed the public that the draft general management plan and environmental impact statement were ready for public review.

Consistent with the requirements of the Council on Environmental Quality for implementing the National Environmental Policy Act (40 *Code of Federal Regulations* Part 1506), the draft environmental impact statement was available for public review for more than the minimum of 60 calendar days from publication of the notice of availability. The actual comment period during which the National Park Service accepted written comments was 123 days, and closed on July 15, 2003.



Oral comments were received during two public hearings, on May 20 and May 22, 2003. Approximately 800 people attended these meetings. The public also could provide comments in writing on paper, via e-mail, or from the NPS' Internet site. The National Park Service received more than 3,000 communications on the draft general management plan and environmental impact statement that contained more than 5,000 individual comments.

Based on public comments, the National Park Service modified the draft document to produce this *Final Rock Creek Park and the Rock Creek and Potomac Parkway General Management Plan / Environmental Impact Statement*. A companion volume entitled *Volume 2: Comments and Responses on the Draft Rock Creek Park and the Rock Creek and Potomac Parkway General Management Plan / Environmental Impact Statement* provides complete reproductions of all comment letters from agencies, organizations, and businesses plus examples of each group submittal, including postcards, form letters, and petitions. That volume also summarizes the content of the substantive public comments and describes how each substantive comment was addressed.

Following publication of notification in the *Federal Register*, the National Park Service will provide the public with a 60-day period to comment on this final general management plan and environmental impact statement. A record of decision will then be issued and implementation of the general management plan will proceed.

## **LIST OF PREPARERS**

### **PLANNING TEAM**

#### **Rock Creek Park**

Adrienne Coleman, Superintendent  
Cynthia Cox Assistant Superintendent  
Bob Ford, former Supervisory Park Ranger  
Regina Moriarty, former Chief of Interpretation and Resources Management  
Susan Salmons, former Resource Management Specialist  
Bill Shields, former Superintendent  
Steve Strach, former Cultural Resource Specialist  
Julia Washburn, former Chief of Visitor Services and Resource Protection  
Perry Wheelock, Cultural Resource Manager  
Bill Yeaman, Resource Management Specialist

#### **Denver Service Center (DSC)**

Craig Cellar, Project Manager  
James Crockett, Architect  
Betty Janes, former Project Manager  
Helen Starr Kuykendall, former DSC Landscape Architect  
Nat Kuykendall, former DSC Team Captain  
Mark Matheny, Civil Engineer  
Alice McClarty, former DSC Landscape Architect  
Jeff Reinbold, former DSC Park Planner  
Amy Schneckenburger, former DSC Project Manager  
Harlan Unrau, Historian  
Michael Wilderman, former DSC Natural Resource Specialist

#### **National Capital Regional Office**

Sally Blumenthal, Deputy Associate Regional Director  
Patrick Gregerson, Chief of Planning  
David Hammers, Transportation Specialist  
John Parsons, Associate Regional Director, Lands, Resources and Planning  
Rebecca Stevens, Historical Architect  
Tammy Stidham, Geographic Information System Specialist

**U.S. Park Police**

Lt. Joe Cox  
Sergeant Charles Orton

**CONSULTANTS**

**Parsons**

Maria Aguilar, Graphics Artist  
Pat Ditzel, Word Processor  
Michelle Johnson, Environmental Scientist  
Don Kellett, Environmental Scientist  
Greg Matthews, Geographical Information System Specialist  
Lee Monnens, Environmental Scientist  
Bruce Snyder, Project Manager  
Janet Snyder, Environmental Scientist and Editor  
Joe Springer, Transportation Planner

**Rock Creek Park**

Steve Lebel, Concessions Specialist

**Robert Peccia & Associates, Inc.**

Doug Widmayer, Transportation Planning Specialist/Project Manager

**LIST OF RECIPIENTS**

---

**PUBLIC OFFICIALS, AGENCIES, AND ORGANIZATIONS**

16 <sup>th</sup> Street Civil Association	American Hiking Society	Beach Drive Commuters Alliance
3016 Tilden Street, NW, Inc.	American Whitewater.	BFI Company
92 <sup>nd</sup> Infantry Division World War II Association	American Recreation Coalition	Bike the Sites
AAA Mid-Atlantic	American Rivers	Blair Road Garden Association
AAA Potomac	Ariba, Inc.	Booz Allen Hamilton
Accokeek Foundation	Arnold & Porter	Boston House, The
Adler & Robin Books, Inc.	Audubon Naturalist Society	Boy Scouts of America (80)
Advisory Neighborhood Commissions, Members of	Audubon Naturalist Society of Central Atlantic States	Brownstein & Zeidman, P.C. Law Offices
Advisory Neighborhood Commissions 3, 3C, 3F, 3FO4, 4A, 4C, 4G	Audubon Society of the District of Columbia	CAPRA
Advisory Neighborhood Commissioners' Assembly	Auto Free D.C.	Carter Barron Community Task Force
American Automobile Assoc		
American Discovery Trail		

Cary Ridder & Associates  
 Center for Environmental  
 Citizenship  
 Chesapeake & Potomac Re-  
 gional Alliance  
 Chesapeake Bay Foundation  
 Chesapeake Bay Program Of-  
 fice, NPS  
 Chevy Chase Advisory  
 Neighborhood Commis-  
 sion 3/4G  
 Chevy Chase Citizens Assoc.  
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 Chronicle of Higher Educa-  
 tion, The  
 City Bikes in Adams Morgan  
 City of Rockville Recreation  
 Program  
 Coalition for the Capital  
 Crescent Trail  
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 Committee for Children  
 Committee of 100, Members  
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 D.C. Dept. of Public Works  
 D.C. Dept. of Recreation  
 D.C. Dept. of Recreation Of-  
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 D.C. Natural Heritage Pro-  
 gram  
 D.C. Office of Planning  
 D.C. Office of Tourism &  
 Promotion  
 D.C. Sewer Services  
 D.C. Statehood Green Party  
 D.C. Water Resources Man-  
 agement  
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 D.C. Dept. of Public  
 Works, DELP  
 D.C. Dept. of Public  
 Works, OPP  
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 & Planning  
 D.C., State Historic  
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 Defenders of Wildlife  
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 Medi-  
 cine/Biometrics,  
 USUHS  
 Dept. of Public Works  
 & Trans./Traffic &  
 Parking Division  
 Dumbarton Oaks Mu-  
 seums & Gardens  
 E.W. Stokes Commu-  
 nity Freedom Pub-  
 lic Charter School  
 Endangered Species  
 Coalition  
 Exotic Pest Plant  
 Council  
 Federal Highway Ad-  
 ministration  
 Federation of Citizens  
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 District of Columbia  
 Fillmore Art Center  
 Fine Arts Commission  
 Flower and Nature  
 Photography  
 Forest Hills Citizens  
 Association  
 Fort Reno Garden As-  
 sociation  
 Fort Stevens Garden  
 Association  
 Francis Scott Key  
 Foundation  
 Friends of Meridian  
 Hill  
 Friends of Open Park-  
 ways  
 Friends of Peirce Mill  
 Friends of Rose Park  
 Friends of the Earth  
 Gallaudet Research In-  
 stitute  
 Gateway Coalition,  
 The  
 Gateway Georgetown  
 Condominium  
 Assoc.  
 Girl Scout Council of  
 the Nation's Capital  
 Glover Archbold Gar-  
 den Association  
 Glover Park Citizens'  
 Assoc., Inc.  
 Golf Course Specialists  
 Inc. E. Potomac Park  
 Great Falls Group, Si-  
 erra Club  
 Greater Washington  
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 Green Peace  
 Harkins Conningham  
 Hillandale Community  
 Group  
 Hillwood Museum  
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 Williams  
 Honorable Chris Van  
 Hollen  
 Honorable Eleanor  
 Holmes Norton  
 Humane Society of  
 D.C.  
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 IFPTE  
 Indigo Spokes  
 Inst. for Public Rep.,  
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 Law Ctr.  
 International Mass Re-  
 tail Association  
 Interstate Commission  
 of Potomac River  
 Basin  
 Izaak Walton League  
 of America  
 Jack Faucett Associa-  
 tion, Inc.  
 Jonathan Woodner C.,  
 Woodner Apts.  
 Kalorama Citizen's As-  
 sociation

Knollwood Army Retirement  
Residence  
League of American Bicy-  
clists  
Leather Industries of America  
Lobel, Novins & Lamont  
Mamie D. Lee Garden Asso-  
ciation  
Marigold Productions  
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Resources  
Maryland Department of  
Transportation  
Maryland Department of the  
Environment  
Maryland Native Plant Soci-  
ety  
MD Dept. of Housing &  
Comm. Dev.  
MD Dept. of the Env., Tech.  
& Reg. Serv. Admin.  
MD Dept. of Transportation  
MD Hist. Trust  
MD-National Capital Park &  
Planning Commission  
MD Office of Planning  
MD State Highway Admini-  
stration  
Meadowbrook Riding Stables  
Medlantic Healthcare Group  
Melvin Hazen Community  
Garden Association  
Metro Teleproductions  
Metro Washington Council of  
Governments  
Metroped, Inc.  
Montgomery County Chap-  
ter, MD Ornithological So-  
ciety  
Montgomery County Council  
Montgomery County Dept. of  
Park & Planning Comm.  
(NR)  
Montgomery County Dept. of  
Park & Planning  
Montgomery County Dept. of  
Permitting Services  
Montgomery County Parks-  
Eastern Area  
Montgomery County Dept. of  
Env. Protection  
Montgomery County Dept. of  
Park & Planning

Montrose & Dumbar-  
ton Oaks Parks,  
Friends of  
Mount Pleasant  
ANCID  
NAHB Research Cen-  
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NASA Goddard  
Spaceflight Center  
National 4-H Council  
National Capital Plan-  
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National Park Founda-  
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National Park Hospi-  
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National Parks Con-  
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National Trust for His-  
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National Wildlife Fed-  
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National Zoological  
Park  
Nature Conservancy,  
The  
Neotropical Bird Club  
New Columbia Audu-  
bon Society  
New Columbia Coali-  
tion, MD Native  
Plant Society  
News Channel 8  
NIH Office of Com-  
munications and  
Public Liaison  
Northwest Side Story  
NOVA Lighting Co.,  
Inc.  
Oak Hill Cemetery  
Oakcrest School  
Park View Citizens  
Association  
Parsons Transpiration  
Group, Inc.  
Pascal & Weiss  
Patricia McPherson  
Interiors  
Peabody Garden As-  
sociation  
People's Alliance for  
Rock Creek

Pham and Roodman,  
Parenting Division  
Potomac Appalachian  
Trail Club  
Potomac Peddlars  
Touring Club  
Rabbi Emeritus, Adas  
Israel Synagogue  
Rails to Trails Conser-  
vancy  
Regional and Intermo-  
dal Planning  
Rivendell Assoc.  
Robert & Quigg Attor-  
neys & Counselors  
Rock Creek Garden  
Assoc.  
Rock Creek Park Golf  
Course  
Rock Creek Somm.  
Garden Assoc.  
Rock-it! Media  
Rollingwood Citizens  
Assn.  
Rummel, Kleppter, and  
Kahl  
Sheppard Park Citizens  
Assn.  
Shoreham North, The  
Sierra Club  
Sierra Club Legal De-  
fense Fund  
Signatory Residents of  
the 1400 block of  
Taylor Street  
State Resource Strate-  
gies Committee of  
100  
StreamSage, Inc.  
Temple Shalom  
Tifereth Israel  
Tilden Gardens, Inc.  
Trail Riders of Tomor-  
row (TROT) - 50  
U.S. Naval Observa-  
tory  
U.S. Secret Service  
University of the D.C.,  
Water Resources  
Center  
US Environmental Pro-  
tection Agency

US Fish and Wildlife Service  
 USDA, Cooperative Extension (NRCS)  
 USGS, Biological Res. Div.  
 Walter Reed Army Medical Ctr.  
 Washington Area Bicycle Assoc.  
 Washington Metro. Area Transit Authority

Washington Post  
 Washington Regional Network for Livable Community  
 Washington Tennis Foundation  
 Washington Times  
 Whitehaven Garden Assoc.

Wilderness Society,  
 The  
 Woodland Normanstone Neighborhood Assoc.  
 Woodrow Wilson Bridge Center

**EMBASSIES**

Embassy of Algeria  
 Embassy of Argentine  
 Embassy of Australia  
 Embassy of Austria  
 Embassy of Bahamas  
 Embassy of Bangladesh  
 Embassy of Barbados  
 Embassy of Belgium  
 Embassy of Belize  
 Embassy of Bolivia  
 Embassy of Bruneidarussalm  
 Embassy of Burkina Fasco  
 Embassy of Canada  
 Embassy of Cape Verde  
 Embassy of Chile  
 Embassy Chile Military Mission  
 Embassy of Columbia  
 Embassy of Costa Rica  
 Embassy of Cyprus  
 Embassy of Czechoslovakia  
 Embassy of Denmark  
 Embassy of Djibouti  
 Embassy of Ecuador  
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 Embassy of France  
 Embassy of Germany  
 Embassy of Ghana  
 Embassy of Great Britain  
 Embassy of Greece  
 Embassy of Grenada  
 Embassy of Guatemala  
 Embassy of Guinea  
 Embassy of Guyana  
 Embassy of Haiti  
 Embassy of Honduras  
 Embassy of India  
 Embassy of Indonesia

Embassy of Ireland  
 Embassy of Israel  
 Embassy of Italy  
 Embassy of Japan  
 Embassy of Jordan  
 Embassy of Kenya  
 Embassy of Kuwait  
 Embassy of Latvia  
 Embassy of Lebanon  
 Embassy of Lesotho  
 Embassy of Liberia  
 Embassy of Luxembourg  
 Embassy of Madagascar  
 Embassy of Malaysia  
 Embassy of Malta  
 Embassy of The Marshall Island  
 Embassy of Mauritius  
 Embassy of Mexico  
 Embassy of Mongolia  
 Embassy of Morocco  
 Embassy of Mozambique  
 Embassy of Nepal  
 Embassy of New Zealand  
 Embassy of Nicaragua  
 Embassy of Niger  
 Embassy of Nigeria  
 Embassy of Norway  
 Embassy of Oman  
 Embassy of Pakistan  
 Embassy of Panama  
 Embassy of Papua New Guinea  
 Embassy of Paraguay  
 The Peoples Republic of China  
 Embassy of Peru

Embassy of Portugal  
 The Republic of Surinam  
 Embassy of Romania  
 Embassy of Rwanda  
 Embassy of Saudi Arabia  
 Embassy of Senegal  
 Embassy of Singapore  
 Embassy of South Africa  
 Embassy of Spain  
 Embassy of Sri Lanka  
 Embassy of Sudan  
 Embassy of Sweden  
 Embassy of Switzerland  
 Embassy of Syria  
 Embassy of Tanzania  
 The Central African Republic  
 Embassy of Dominican Republic  
 Federated States of Micronesia  
 Embassy of The Gambia  
 Islamic Republic of Mauritania  
 Embassy of Kingdom of Swaziland  
 Lao People's Dem. Republic  
 Embassy of The Netherlands  
 Peoples Republic of Mozambique  
 Embassy of The Philippines

Embassy of Republic of Benin  
 Embassy of Republic of Cameroon  
 Embassy Republic of Cape Verde  
 Embassy Republic of Hungary

Embassy of Republic of Mali  
 Embassy of Republic of Namibia  
 Embassy of Russian Federation  
 Embassy of State of Bahrain

Embassy of Togo  
 Embassy of Tunisia  
 Embassy of Turkey  
 Embassy of Uruguay  
 Embassy of Venezuela  
 Embassy of Zimbabwe

**LIBRARIES**

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 Langston Community Library

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 Martin Luther King, Jr. Memorial Library  
 Mt. Pleasant Library  
 Northeast Library  
 Petworth Library

Tenley-Friendship Library  
 Watha T. Daniel/Shaw Library  
 Woodridge Library

**SCHOOLS**

Adams Elementary School  
 American University School of Law  
 Annunciation School  
 Bancroft Elementary School  
 Banneker Senior High School  
 Barnard Elementary School  
 Bell Multicultural High School  
 Blessed Sacrament School  
 Brightwood Elementary School  
 Bruce-Monroe Elementary School  
 Capitol Hill Day School  
 Cardozo Elementary School  
 Clark Elementary School  
 Clayton Singleton, Principal  
 Cook J.F. Elementary School  
 Cooke, H.D. Elementary School  
 Coolidge Community School  
 Coolidge Elementary School  
 Deal Junior High School  
 Discovery Creek Children's Museum of Washington  
 Dunbar Elementary School  
 Eaton Elementary School  
 Edmond Burke School  
 Edmund Burke School

Ellington School of the Arts  
 Env. Awareness Group, Nat'l Cathedral School  
 Francis Junior High School  
 Gage-Eckington Elementary School  
 Garnet-Patterson Middle School  
 George Mason University, School of Public Policy  
 Georgetown Day School  
 Georgetown Univ. Law Ctr./Inst. for Public Rep.  
 Georgetown Visitation Preparation School  
 Gonzaga College High School  
 Hardy Middle School  
 Holton Arms School  
 Holy Redeemer School  
 House of Rep. Page School  
 Hurst Elementary School  
 Hyde Elementary School  
 Sr. Donna Marie Coward, RSM

Janney Elementary School  
 Key Elementary School  
 Lafayette Elementary School  
 Lewis Elementary School  
 Lincoln Junior High School  
 Lowell School  
 MacFarland Junior High School  
 Mann Elementary School  
 Maret School  
 Meyer Elementary School  
 Montgomery Elementary School  
 Murch Elementary School  
 Nannie Helen Burroughs School  
 National Cathedral School  
 National Presbyterian School  
 Nativity Catholic Academy

Nat'l. Cathedral Elem. School/Beauvoir	Sidwell Friends School	Thompson Elemen- tary School
Northwestern University	Sidwell Friends School	Truesdell Elemen- tary School
Our Lady of Victory School	Slater-Langston Elemen- tary School	Tubman Elementary School
Oyster Elementary School	St. Ann's Academy	University of the D.C.
Park View Elementary School	St. Augustine School	Walker-Jones Ele- mentary School
Parkmont School	St. Gabriel's School	Washington Ethical High School
Paul Junior High School	St. Patrick's Episcopal Day School	Washington Interna- tional School
Powell Elementary School	St. John's Collee Middle School	Washington Interna- tional School
Rabaut Junior High School	Stevens Elementary School	Washington M.M. Elementary School
Raymond Elementary School	Stoddert Elementary School	West Elementary School
Reed Community School	Takoma Community School	Whittier Elementary School
Reed L.C. Elementary School	Takoma Elementary School	Wilson W. Elemen- tary School
Roosevelt Adult Ed. Ctr.	Terrell, R.H. Junior High School	
Roosevelt Elementary School	The Field School	
Ross Elementary School	The Kingsbury Day School	
Rudolph Elementary School	The Lab School of Wash- ington	
Sacred Heart School		
School Without Walls		
Seaton Elementary School		
Sharpe Health School		
Shaw Community School		
Shaw Junior High School		
Shepherd Elementary School		
Sheridan School		

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**CITIZENS**

A complete list of citizens who received notification of the availability of this *Final Rock Creek Park/Rock Creek and Potomac Parkway General Management Plan/Environmental Impact Statement* is available on request from the superintendent, Rock Creek Park.



Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

# BIBLIOGRAPHY, INDEX, AND APPENDIXES

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Volume 1  
Final  
General Management Plan  
Environmental Impact Statement

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

**Washington, D.C.**

**INDEX OF KEY WORDS**

- Accessibility, 14, 72, 164, 215, 219
- Adams Mill Road, 265, 274
- Affected Environment, vi, xi, 9, 185, 186, 190, 196, 203, 204, 207, 210, 223, 225, 232, 236, 238, 239, 241, 251, 281
- Agreement, 1, 18, 23, 24, 48, 49, 134
- Air, iv, vii, xi, xii, xiv, xv, xvii, 11, 15, 16, 18, 23, 28, 39, 40, 100, 121, 131, 132, 133, 134, 185, 189, 190, 191, 192, 236, 248, 249, 278, 279, 293
- Air Quality, iv, vii, xi, xii, xiv, xv, xvii, 11, 15, 16, 18, 23, 28, 39, 40, 40, 100, 121, 131, 132, 132, 133, 134, 185, 186, 189, 190, 191, 192, 236, 248, 249, 278, 279, 293
- American Association of State Highway and Transportation Officials (AASHTO), 226, 227
- American University, 46, 181
- Amphibian(s), 79, 101, 111, 141, 145, 147, 148, 149, 209
- Amphipod(s), xi, 21, 124, 141, 144, 145, 197, 204, 205, 239, 294
- Approach, 3, 1, 11, 33, 34, 37, 51, 67, 69, 71, 73, 77, 78, 82, 83, 106, 116, 206, 211, 285
- Archeology, Archeological Resources, iv, xii, xiii, xiv, xv, xvi, 23, 24, 25, 77, 89, 96, 109, 126, 154, 155, 210, 211, 212, 225, 240, 241, 250, 280
- Archeological Sites, 15, 23, 24, 69, 154, 155
- Automobile, vi, vii, viii, ix, x, xi, 9, 30, 33, 40, 42, 43, 47, 48, 52, 53, 54, 57, 58, 59, 60, 61, 66, 67, 71, 72, 73, 74, 78, 79, 80, 84, 90, 95, 100, 101, 102, 103, 105, 106, 110, 111, 112, 113, 115, 117, 127, 129, 130, 131, 157, 160, 163, 166, 176, 178, 185, 186, 194, 213, 215, 217, 230, 231, 232, 243, 244, 245, 246, 249, 251, 254, 261, 262, 264, 266, 271, 272, 275, 276, 278, 281, 282, 284, 286, 290
- Beach Drive, 3, iv, v, vi, vii, viii, xvii, xviii, 5, 9, 30, 31, 32, 33, 34, 35, 36, 43, 47, 48, 49, 54, 58, 59, 61, 65, 66, 67, 69, 71, 72, 73, 78, 79, 80, 85, 86, 87, 88, 90, 95, 99, 100, 101, 103, 104, 105, 106, 110, 111, 114, 115, 117, 121, 125, 127, 128, 129, 130, 134, 142, 150, 151, 157, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 175, 176, 177, 178, 179, 186, 190, 191, 194, 201, 215, 216, 217, 218, 220, 221, 222, 223, 224, 225, 227, 228, 229, 230, 231, 232, 233, 236, 241, 242, 243, 244, 245, 246, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 261, 262, 263, 264, 265, 266, 271, 272, 273, 275, 276, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 294
- Bicycle, vi, 36, 42, 43, 47, 48, 54, 60, 61, 69, 80, 85, 94, 95, 101, 102, 106, 112, 130, 161, 163, 178, 179, 231, 232, 243, 251, 254, 256, 257, 272, 283, 289
- Bicycling, 9, 27, 37, 52, 53, 54, 57, 59, 61, 70, 72, 73, 95, 99, 111, 159, 161, 178, 179, 219, 243, 254, 257, 271, 272, 276, 283, 289, 293
- Bicyclists, 61, 72, 101, 111, 165, 166, 168, 169, 176, 179, 216, 224, 244, 245, 271, 285, 289, 290

- Bird(s), Birding, 41, 45, 46, 63, 84, 145, 146, 147, 149, 150, 159, 162, 206, 209
- Brightwood, 36, 37, 74, 81, 93, 102, 113, 233
- Broad Branch Road, viii, xvii, 9, 30, 35, 36, 50, 64, 65, 78, 90, 95, 99, 100, 101, 105, 106, 110, 115, 150, 151, 156, 160, 163, 167, 168, 175, 176, 179, 186, 190, 191, 227, 229, 231, 233, 236, 242, 249, 251, 252, 253, 255, 258, 261, 262, 263, 266, 272, 276, 278, 281, 283, 287, 288
- Bypass, 49, 136, 148, 196, 199, 238
- Calvert Street, 64, 133, 169, 175
- Canoe(ing), 37, 52, 53, 54, 57, 59, 60, 61, 159, 181
- Carbon Monoxide, xi, xvii, 121, 132, 133, 134, 185, 186, 189, 190, 191, 192, 236, 248, 249, 278, 279
- Carter Barron, 11, 81, 93, 103, 113, 159
- Chesapeake Bay, 18, 19, 22, 48, 49, 140, 196
- Chevy Chase, 46, 180
- Civil War, 11, 48, 142, 154, 156, 158, 181
- Clean Air Act, 15, 40, 131
- Clean Water Act, 16, 18, 139, 141
- Cleveland Park, 233
- Community Gardens, 35, 46, 55, 62, 65, 81, 83, 93, 94, 102, 112, 159, 294
- Comprehensive Plan, iii, 1, 157
- Congestion, 9, 30, 42, 43, 47, 61, 100, 129, 171, 218, 226, 228, 229, 233, 242, 246, 261, 275, 288, 289
- Connecticut Avenue, 64, 80, 100, 101, 111, 117, 180, 189, 191, 220, 223, 233, 245, 255, 262, 284, 287, 288
- Constitution Avenue, 262, 287
- Cost(s), Cost Estimate, x, xi, xvii, 4, 44, 65, 73, 82, 85, 86, 87, 88, 89, 94, 95, 99, 103, 104, 105, 113, 114, 120, 201, 222, 223, 233, 235
- Council of Governments, MWCOG, 46, 47, 48, 95, 106, 131, 172, 177, 178, 225, 226, 231, 233, 245, 271, 272, 275, 289, 293
- Cumulative Impact(s), vii, xii, xiii, xiv, xv, xvi, 11, 47, 185, 190, 195, 199, 203, 205, 208, 209, 211, 213, 219, 225, 231, 233, 234, 236, 237, 238, 239, 240, 241, 243, 244, 245, 246, 248, 249, 250, 254, 257, 271, 275, 278, 279, 280, 283, 286, 289, 290
- Deciduous, iv, vii, xi, xii, xiv, xv, 23, 39, 40, 85, 124, 142, 143, 144, 199, 200, 201, 202, 203, 205, 206, 238, 239, 249, 279
- Decision Point(s), iii, iv, vii, viii, 1, 30, 66, 69, 243
- Deer, 21, 41, 46, 146, 149, 150, 209
- District of Columbia (D.C.), xii, xvii, iv, vi, xvii, 1, 2, 3, 5, 9, 10, 11, 12, 13, 15, 16, 18, 19, 23, 24, 25, 27, 30, 31, 36, 40, 42, 43, 44, 46, 47, 48, 50, 64, 66, 69, 81, 82, 93, 103, 105, 113, 131, 132, 133, 134, 135, 136, 139, 140, 141, 142, 144, 145, 146, 147, 148, 153, 154, 155, 156, 157, 158, 160, 161, 164, 169, 169, 170, 171, 178, 179, 180, 181, 182, 183, 185, 186, 190, 196, 201, 203, 205, 208, 210, 211, 213, 219, 220, 225, 226, 231, 232, 233, 238, 239, 246, 271, 273, 275, 276, 286, 289, 293, 294
- Dog(s), 38, 152, 161
- Dumbarton Oaks, 11, 181

- DuPont Circle, 180, 262
- Ecosystem, 14, 18, 21, 22, 4142
- Edgewater, 37, 81, 84, 94, 103, 113, 139, 142
- Eel, 49, 148, 208
- Embassies, 180
- Endangered Species, 14, 15, 20, 21, 31, 40, 45, 85, 124, 144, 145, 146, 147, 203, 204, 205, 239, 294
- Endangered Species Act, 14, 20, 40, 45, 144, 145, 203
- Enforcement, 19, 26, 27, 69, 78, 80, 86, 88, 100, 102, 104, 110, 112, 114, 166, 195, 217, 218, 220, 221, 222, 224, 230, 245, 252, 254, 255, 271, 282, 284, 285, 289
- Environmental Impact Statement, iii, vi, 1, 2, 3, 10, 11, 23, 29, 31, 32, 33, 37, 43, 45, 46, 47, 67, 81, 82, 93, 103, 105, 113, 136, 146, 160, 168, 210, 293, 294, 295
- Environmental Justice, 43, 130, 232, 273
- Environmental Protection Agency, 16, 18, 19, 49, 132, 135, 139, 142
- Establishing Legislation, iv, 1, 5, 14, 38, 40, 65, 106, 142, 159, 189, 193, 198, 201, 204, 206, 210, 214, 215, 218, 242, 282
- Executive Order(s), 14, 16, 23, 24, 39, 40, 123, 141
- Farmland(s), 20, 44, 45, 140
- Fee, 33
- Fire, Wildfire, 15, 22, 23, 25, 46, 144, 185, 200, 238
- Fish, 22, 30, 36, 40, 49, 50, 136, 141, 144, 145, 146, 147, 148, 196, 199, 204, 208, 209, 238, 240
- Fishing, 22, 181
- Floodplain(s), iv, vii, xi, xii, xiv, xv, 16, 21, 39, 40, 44, 47, 78, 90, 99, 110, 123, 140, 141, 142, 143, 144, 197, 198, 199, 237, 238, 249, 279
- Flow(s), vi, xii, 12, 19, 31, 34, 49, 50, 70, 122, 134, 135, 141, 145, 148, 155, 168, 171, 172, 176, 178, 192, 193, 195, 209, 226, 227, 228, 229, 237, 244, 245, 255, 261, 287
- Ford(s), 9, 22, 49, 50, 156, 157, 208
- Forest(s), iv, v, vii, ix, x, xi, xii, xiv, xv, 12, 13, 23, 39, 40, 47, 52, 53, 56, 57, 58, 59, 60, 61, 65, 74, 77, 78, 79, 85, 89, 90, 96, 99, 101, 109, 110, 111, 115, 124, 141, 142, 143, 144, 149, 151, 152, 153, 159, 199, 200, 201, 202, 203, 205, 206, 207, 238, 239, 249, 279
- Forest Zone, ix, x, xi, 52, 53, 56, 58, 59, 74, 77, 89, 96, 109, 115, 200, 202
- Fort DeRussy, 11, 41, 48, 67, 78, 89, 99, 110, 156, 158, 241
- Fort Reno, 11, 36
- Fort Stevens, 11
- Fox(es), 125, 146, 149, 151, 152, 207, 209, 239, 250, 280
- Garden(s), 35, 36, 46, 82, 159, 194
- George Washington University, 46, 181
- Georgetown, 46, 134, 155, 156, 180, 181
- Georgetown University, 46, 181
- Georgia Avenue, 245, 262, 265, 274, 287, 288
- Godey Lime Kilns, 60, 67, 78, 89, 99, 110, 156, 157, 212, 241

- Golf Course, 5, 19, 35, 46, 55, 62, 65, 81, 93, 102, 113, 133, 139, 157, 159, 163, 181, 193, 237, 294
- Groundwater, 16, 21, 134, 141, 144, 145, 204, 239
- Growth, 30, 142, 159, 214, 231, 233, 245, 246, 271, 272, 289
- H-3 Area, v, 83, 87, 94, 103, 113, 116, 119, 139, 190, 194, 208, 248, 278
- Habitats, 5, 20, 21, 22, 40, 69, 77, 85, 124, 141, 144, 147, 203, 204, 205, 206, 239, 279
- Hardwood, 143, 200
- Harvard, 46, 172, 245, 262
- High-Occupancy Vehicle(s) (HOV), 67, 70, 79, 88, 100, 101, 104, 106, 115, 117, 172, 218, 252, 255, 261, 275
- Highway, 157, 163, 169, 170, 172, 216, 221, 222, 223, 224, 226, 242, 252, 281
- Hiking, Hikers, 38, 41, 52, 53, 157, 159, 161, 219, 243, 254, 283
- Historic, 3, iii, iv, vii, viii, xii, xiii, xiv, xv, xvi, xvii, 5, 10, 11, 12, 13, 15, 18, 23, 24, 25, 26, 29, 31, 32, 36, 41, 42, 43, 44, 47, 48, 49, 54, 55, 56, 57, 58, 59, 60, 61, 62, 64, 69, 70, 71, 72, 73, 77, 81, 82, 83, 84, 86, 87, 93, 94, 96, 99, 103, 109, 113, 114, 115, 116, 118, 126, 127, 128, 142, 154, 155, 157, 158, 190, 194, 198, 200, 202, 208, 210, 211, 212, 213, 219, 225, 234, 235, 241, 247, 248, 250, 253, 254, 272, 275, 276, 278, 280, 283, 284, 291
- Historic Resources, vii, xii, 12, 26, 29, 32, 57, 69, 77, 96, 109, 115, 155, 213, 234, 241, 247, 276, 291
- History, v, ix, xvi, 5, 13, 39, 53, 55, 62, 77, 81, 93, 96, 109, 118, 155, 161, 212, 216, 223, 293
- Horse, 12, 38, 41, 35, 46, 52, 55, 62, 63, 65, 72, 73, 77, 81, 8993, 94, 96, 99, 102, 109, 111, 113, 159, 161, 242, 294
- Horse Center, 35, 46, 81, 93, 102, 113, 159
- Howard University, 46, 181
- Hydrocarbons, 132, 139, 185
- Hydrology, vii, 21, 122, 123, 192, 193, 194, 195, 196, 209, 237, 240
- Impact Topics, iv, vi, ix, 1, 2, 3, 11, 29, 38, 43, 131, 134, 140, 142, 144, 146, 179
- Indicator(s), 21, 41, 220, 221
- Interpretation, 3, iii, v, vii, 10, 12, 13, 32, 37, 49, 53, 55, 56, 62, 65, 66, 70, 73, 80, 81, 82, 86, 93, 95, 96, 104, 105, 109, 114, 118, 124, 127, 128, 203, 205, 216, 217, 218, 219, 240, 241, 242, 243, 252, 253, 254, 282, 283, 284
- Jogger(s), 162, 271, 289
- Joyce Road, v, 30, 35, 36, 44, 78, 90, 99, 100, 105, 110, 147, 151, 160, 168, 175, 176, 177, 179, 227, 229, 230, 251, 253, 258, 262, 263, 264, 283, 287
- K Street, 64, 132, 258, 263, 264, 265, 266
- Kayak(ing), 37, 52, 53, 54, 57, 59, 60, 61, 159
- Kennedy Street, 176, 245
- Klingle, 10, 64, 93, 100, 156, 160
- Land, v, 18, 28, 41, 43, 48, 63, 77, 118, 124, 134, 140, 142, 153, 155, 182, 183, 184, 206, 208, 216, 239, 240
- Landowners, 28
- Leash, 27, 38
- Legislation, xvii, 5, 9, 11, 16, 19, 20, 26, 38, 39, 40, 65, 68, 142, 156, 157

- Level(s) of Service (LOS), iv, vii, viii, 10, 31, 32, 129, 130, 171, 226, 227, 228, 229, 230, 232, 245, 246, 262, 263, 264, 265, 266, 272, 273, 274, 276, 286, 288, 289, 290
- Linnaean Hill, v, 10, 56, 77, 93, 99, 109, 115, 118, 127, 155, 156, 157, 158, 212, 219
- M Street, 64, 172, 186, 191, 265, 266, 273, 274
- Management Prescription, iv, ix, x, xi, xvii, 1, 2, 37, 45, 51, 52, 53, 54, 55, 56, 67, 73, 74, 84, 89, 95, 96, 105, 109, 115, 186, 200
- Mandate(s), iv, vii, ix, 4, 11, 12, 14, 15, 18, 28, 29, 39, 40, 49, 52, 65, 89, 94, 134, 140, 144, 154, 163, 185, 192, 196, 197, 199, 203, 205, 210, 211, 212, 213, 220, 222
- Maryland, iii, xvii, 5, 9, 10, 11, 19, 21, 30, 40, 44, 46, 47, 49, 69, 90, 95, 99, 105, 132, 134, 135, 139, 140, 143, 144, 145, 146, 147, 148, 152, 154, 157, 161, 167, 168, 169, 171, 172, 175, 176, 177, 178, 179, 180, 184, 192, 195, 203, 204, 205, 219, 226, 228, 231, 232, 238, 239, 243, 245, 254, 261, 271, 272, 283, 287, 289, 290
- Maryland-National Capital Park and Planning Commission (MNCPPC), 11, 19, 177, 178
- Mass Transit, Mass Transportation, 33, 69, 178, 226, 231, 245
- Massachusetts Avenue, 64, 160, 245, 262
- Meeting(s), 29, 32, 35, 37, 38, 51, 69, 157, 262, 293, 294
- Melvin Hazen Park, 10, 81, 93, 102, 113, 147
- Meridian Hill Park, 11, 157, 181
- Method(s), vii, 19, 79, 100, 101, 110, 111, 185, 221, 235, 236, 293
- Methodology, xii, xiii, xvii, 11, 185, 192, 197, 200, 204, 206, 210, 212, 213, 220, 225, 232, 236, 237, 262, 288, 290
- Migration, 22, 49, 136, 146, 147, 162, 196, 199, 208, 238, 240
- Military Field, 36, 56, 65, 77, 89, 96, 109
- Military Road, 48, 64, 80, 83, 100, 111, 133, 151, 156, 157, 163, 172, 175, 176, 186, 189, 190, 191, 245, 248, 255, 265, 272, 274, 278
- Milkhouse Ford, 49, 50, 156, 157
- Miller Cabin, 78, 87, 99, 110, 142, 157
- Mission, ix, 4, 5, 11, 13, 14, 27, 28, 52, 39, 214, 222, 234
- Mission Goal(s), ix, 13, 14, 52, 214
- Monitoring, xi, 16, 18, 21, 28, 41, 48, 56, 79, 101, 110, 126, 131, 132, 133, 134, 135, 141, 145, 148, 193, 196, 211, 256
- Montgomery County, 9, 19, 30, 47, 49, 69, 148, 177, 180, 181, 184, 226, 231, 271, 289
- Montrose Park, 11, 181
- Motor Vehicle(s), 54, 59, 69, 105, 132, 165, 166, 168, 185, 190, 207, 239, 245, 250, 256, 257, 271, 280, 285, 289
- Motorized Vehicle, iv, vi, viii, 29, 43, 61, 72, 73, 99, 105, 106, 110, 111, 115, 117, 160, 166, 169, 176, 248, 251, 252, 253, 255, 256, 257, 281, 284, 285, 289
- Mount Pleasant, 233
- National Ambient Air Quality Standard(s) (NAAQS), 15, 121, 131, 132, 133, 134,

- 185, 189, 190, 191, 192, 236, 248, 249, 278, 279
- National Capital, xvi, 11, 19, 30, 36, 48, 154, 156, 177, 178
- National Capital Region Transportation Planning Board (NCRTPB), 178, 179
- National Environmental Policy Act (NEPA), vi, 3, 42, 45, 46, 66, 71, 82, 83, 85, 103, 113, 201
- National Historic Preservation Act, 14, 23, 24, 25, 210, 225
- National Park Service (NPS), iii, iv, vi, vi, vii, x, 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51, 55, 57, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 73, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87, 93, 94, 95, 96, 99, 100, 101, 103, 104, 105, 106, 109, 110, 113, 114, 115, 124, 126, 133, 136, 139, 140, 142, 143, 144, 145, 146, 147, 148, 154, 155, 156, 157, 158, 160, 162, 164, 165, 166, 168, 170, 176, 185, 189, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 210, 211, 212, 213, 215, 220, 223, 225, 226, 228, 232, 233, 234, 236, 237, 239, 241, 242, 246, 284, 286, 293, 294, 295
- National Register, xvii, 24, 25, 31, 56, 81, 126, 154, 157, 158, 210, 211, 225
- National Zoo, Zoological Park, iii, 9, 10, 12, 30, 47, 50, 60, 143, 157, 163, 169, 176, 181, 192, 226, 258, 261, 262, 263, 264, 293
- Native American, 25, 45
- Native Species, 13, 15, 20, 21, 22, 41, 69, 146, 148, 149, 195, 201, 203, 206, 208, 239, 240
- Natural Quiet, 41
- Natural Resources Conservation Service (NRCS), 44
- Nature Center, v, 31, 46, 80, 81, 86, 87, 88, 93, 102, 103, 104, 112, 114, 115, 119, 147, 159, 162, 189, 190, 194, 216, 242, 248, 252, 278, 282, 293, 294
- Nebraska Avenue, 189, 191, 262
- New Hampshire Avenue, 245, 262, 265, 266, 272, 273, 274
- Nitrogen (and compounds), 132, 139, 185
- Noise, xii, 5, 29, 55, 62, 63, 64, 73, 127, 128, 163, 216, 218, 233, 242, 246, 252, 281, 288
- Nonmotorized, 3, vi, vii, ix, xi, xii, xv, 30, 34, 42, 48, 52, 53, 54, 55, 57, 58, 59, 60, 64, 66, 67, 70, 72, 73, 74, 79, 80, 85, 90, 95, 99, 102, 105, 106, 111, 112, 115, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 129, 130, 159, 160, 178, 179, 208, 216, 217, 218, 229, 230, 231, 232, 242, 243, 245, 246, 248, 251, 252, 254, 256, 262, 266, 271, 272, 275, 276, 281, 282, 284, 285, 289, 290
- Normanstone Parkway, 10
- NRCS, 44
- Old Stone House, 11, 159, 162
- Olmsted Brothers, 4, 5, 73
- Oregon Avenue, 77, 81, 85, 93, 94, 102, 113, 151, 153, 156, 163, 177, 194, 201, 233, 255, 262, 265, 274, 287, 288
- Organic Act, 3, 5, 9, 14, 25, 26, 28, 68, 142
- Organized Sports, 36
- Outfall(s), xi, xviii, 19, 135, 137, 139, 140, 142
- Oxides, 132, 185

- P Street, 64, 169, 177, 179, 229, 258, 263, 287
- Park, iii, iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv, xvi, xvii, 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 90, 93, 94, 95, 96, 99, 100, 101, 102, 103, 104, 105, 106, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 189, 190, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 261, 262, 263, 264, 265, 266, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294
- Park Administration, vii, 55, 63, 64, 73, 81, 82, 83, 93, 95, 105, 116, 203
- Park Maintenance, v, 81, 82, 83, 94, 103, 113, 116, 208, 242
- Park Police, v, xvi, 10, 27, 32, 34, 37, 44, 46, 80, 81, 83, 84, 87, 94, 103, 113, 116, 118, 119, 139, 157, 164, 166, 194, 203, 208, 216, 219, 222, 252, 254, 255, 281, 282, 284, 285
- Park Road, iii, iv, v, vi, vii, viii, ix, x, xi, 9, 30, 33, 41, 42, 43, 54, 61, 65, 66, 66, 69, 70, 71, 72, 73, 74, 79, 80, 85, 89, 90, 95, 102, 105, 112, 115, 118, 118, 129, 149, 150, 151, 156, 160, 164, 165, 166, 167, 170, 175, 176, 177, 178, 194, 201, 202, 208, 215, 221, 224, 225, 227, 228, 229, 230, 231, 234, 239, 241, 242, 244, 245, 246, 249, 250, 251, 256, 258, 261, 262, 265, 271, 276, 279, 280, 281, 285, 289, 290, 291, 294
- Park Use, 3, vii, v, x, xii, xiii, xiv, xv, xvi, 15, 25, 27, 28, 66, 69, 73, 77, 99, 109, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 185, 214, 215, 220, 221, 239, 241, 251, 280, 271, 282, 289
- Parking, 19, 27, 37, 54, 58, 61, 63, 64, 77, 81, 82, 83, 84, 88, 89, 94, 99, 111, 135, 139, 142, 193, 194, 221, 227
- Parkway, 3, iii, iv, v, vi, vii, 1, 2, 4, 9, 10, 11, 12, 13, 14, 15, 16, 25, 27, 30, 31, 33, 38, 40, 41, 42, 43, 44, 47, 51, 54, 55, 56, 60, 64, 65, 66, 69, 78, 79, 80, 86, 87, 90, 94, 100, 101, 102, 104, 106, 111, 112, 114, 117, 127, 129, 131, 132, 133, 134, 143, 144, 149, 150, 151, 152, 154, 157, 158, 160, 163, 166, 167, 168, 169, 170, 175, 176, 178, 179, 180, 186, 189, 190, 192, 193, 198, 201, 204, 206, 207, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 222, 223, 224, 225, 228, 229, 230, 231, 236, 240, 241, 244, 245, 248, 249, 250, 255, 256, 261, 266, 271, 272, 273, 278, 280, 281, 283, 284, 285, 286, 287, 288, 289
- Particulates, 185
- Paved, vi, 30, 31, 36, 37, 42, 52, 53, 54, 56, 60, 61, 70, 77, 79, 85, 88, 89, 90, 95, 96, 99, 101, 106, 109, 110, 124, 159, 175, 178, 179, 200, 243, 250, 251
- Paved Trail, vi, 30, 31, 36, 37, 42, 52, 53, 54, 56, 61, 77, 85, 88, 89, 90, 96, 106, 109, 124, 178, 179, 200, 243



- Pedestrians, 12, 70, 72, 80, 101, 105, 111, 166, 168, 169, 176, 221, 222, 223, 224, 230, 244, 245, 255, 256, 266, 271, 285, 288, 289, 290
- Peirce Barn, v, 77, 93, 96, 109, 157, 162
- Peirce Mill, v, 22, 31, 41, 46, 49, 56, 77, 81, 86, 87, 88, 89, 93, 99, 102, 103, 104, 109, 113, 114, 115, 118, 123, 127, 136, 142, 147, 148, 155, 157, 158, 159, 196, 198, 199, 208, 212, 216, 219, 238, 240, 241, 252, 282
- Peirce Mill Dam, 22, 49, 56, 136, 148, 157, 196, 199, 208, 238, 240
- Peirce-Klinge, v, 10, 32, 70, 77, 81, 82, 87, 89, 93, 94, 99, 109, 115, 118, 119, 126, 132, 155, 157, 212
- Pennsylvania Avenue, 64, 186, 191, 245, 265, 272, 274
- Permit(s) Permitting, 16, 28, 36, 37, 50, 71, 63, 80, 136, 159, 198
- Pinehurst Parkway, 10, 177, 178
- Piney Branch Parkway, 80, 85, 90, 102, 112, 134, 169, 176, 177, 194, 201, 202, 229, 258, 265
- Planetarium, v, 31, 46, 80, 81, 86, 87, 93, 102, 103, 104, 112, 114, 115, 119, 159, 162, 189, 190, 194, 216, 242, 248, 252, 278, 282, 293, 294
- Policy(ies), iii, iv, vii, ix, xii, xiii, 2, 4, 12, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 33, 35, 38, 43, 44, 47, 49, 52, 57, 60, 62, 63, 64, 65, 69, 71, 82, 83, 86, 87, 89, 94, 100, 104, 114, 117, 126, 134, 140, 144, 146, 154, 163, 185, 192, 197, 199, 200, 203, 205, 210, 211, 212, 213, 220, 225, 232, 236, 241
- Population(s) xvii, 5, 9, 20, 21, 32, 41, 43, 71, 72, 142, 143, 145, 146, 147, 149, 150, 151, 152, 153, 178, 179, 180, 182, 183, 184, 206, 207, 233, 239, 240, 246, 250, 272, 273, 276, 280
- Porter Street, 64, 100, 229, 246, 258, 263, 264, 288
- Potomac Park, 2, 3, iii, iv, v, vi, viii, ix, x, xi, xvii, xviii, 1, 2, 4, 5, 9, 10, 11, 12, 13, 14, 16, 28, 30, 33, 34, 36, 39, 40, 41, 43, 45, 47, 48, 49, 51, 54, 60, 61, 65, 69, 71, 74, 79, 85, 89, 90, 95, 101, 106, 111, 115, 117, 131, 133, 142, 149, 150, 151, 154, 155, 157, 158, 160, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 175, 176, 177, 179, 186, 190, 191, 192, 194, 201, 203, 213, 215, 217, 218, 219, 221, 225, 228, 229, 230, 235, 236, 240, 242, 243, 244, 246, 247, 248, 249, 251, 252, 254, 255, 256, 257, 258, 261, 262, 263, 264, 266, 271, 272, 276, 277, 278, 280, 281, 287, 291, 294
- Potomac River, vi, 5, 12, 19, 49, 95, 106, 134
- Prime or Unique Farmland, 20, 44, 45
- Property(ies), xvii, 18, 22, 25, 28, 31, 49, 83, 144, 157, 158, 164, 165, 166, 168, 170, 195, 210, 225
- Protected Species, 21, 144, 205
- Public, 2, iii, iv, v, vi, vii, x, xii, xiii, xiv, xv, xvi, 1, 2, 3, 4, 5, 9, 10, 11, 12, 14, 19, 21, 22, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 38, 39, 40, 41, 42, 46, 61, 63, 65, 66, 67, 69, 72, 78, 79, 81, 82, 84, 85, 94, 101, 111, 119, 122, 123, 124, 125, 128, 129, 131, 139, 146, 147, 156, 158, 159, 160, 161, 164, 168, 170, 172, 181, 183, 184, 195, 199, 201, 203, 205, 207, 213, 214, 216, 217, 219, 220, 221, 222, 225, 226, 227, 243, 244, 252, 254, 257, 282, 284, 285, 286, 293, 294, 295
- Public Comments, iii, 2, 30, 35, 37, 65, 66, 84, 294, 213, 293
- Public Input, iv, x, 32, 65

Public Involvement, xvi, 222, 293

Purpose, iii, ix, 1, 2, 4, 9, 11, 12, 33, 52, 56, 61, 65, 152, 157, 162, 178, 214, 218, 276, 293

Q Street, 64, 148

Rare Species, iv, vii, xi, xii, xiv, xv, 21, 39, 40, 124, 144, 203, 204, 205, 239, 249, 279

Record of Decision, 295

Recreation, 3, iv, v, vi, vii, xi, xii, xv, 4, 5, 9, 12, 13, 18, 30, 34, 35, 36, 37, 41, 42, 46, 48, 52, 53, 54, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 66, 67, 69, 70, 72, 73, 77, 79, 80, 85, 90, 93, 95, 99, 101, 102, 105, 106, 111, 112, 113, 115, 117, 127, 128, 129, 130, 136, 144, 145, 159, 160, 163, 178, 179, 181, 198, 216, 217, 218, 230, 232, 234, 242, 243, 246, 248, 250, 251, 252, 253, 254, 256, 262, 266, 272, 276, 278, 281, 282, 284, 285, 293, 294

Recreational, xiii, xiv, xv, xvi, xvii, 5, 9, 11, 14, 26, 29, 30, 31, 33, 35, 36, 40, 41, 42, 53, 57, 59, 60, 61, 63, 65, 70, 71, 72, 73, 78, 79, 80, 90, 95, 100, 101, 102, 106, 110, 111, 112, 117, 118, 128, 129, 161, 162, 163, 167, 176, 178, 180, 181, 202, 214, 215, 216, 217, 218, 219, 221, 227, 228, 231, 233, 234, 241, 242, 243, 246, 251, 252, 253, 254, 271, 272, 275, 282, 283, 284, 289

Recreational Trail, 31, 60, 61, 70, 79, 80, 90, 101, 102, 110, 111, 112, 117, 118, 272

Regional Transportation, 39, 42, 47, 69, 100, 249, 293

Regulations, iv, vii, xii, xiii, 15, 16, 19, 22, 26, 27, 29, 33, 33, 35, 38, 39, 45, 58, 61, 69, 163, 185, 192, 195, 197, 199, 203, 205, 210, 212, 213, 220, 225, 232, 236

Research, 21, 56, 141, 145, 148, 154, 158, 202, 247

Rock Creek, 2, 3, iii, iv, v, vi, vii, viii, ix, x, xi, xii, xiv, xv, xvi, xvii, xviii, 1, 2, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 56, 57, 59, 60, 61, 63, 64, 65, 66, 69, 70, 71, 72, 74, 77, 79, 80, 81, 82, 83, 85, 86, 87, 89, 90, 93, 95, 96, 99, 101, 102, 103, 104, 105, 106, 109, 111, 112, 113, 114, 115, 117, 118, 119, 122, 123, 129, 131, 132, 133, 134, 135, 136, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 205, 208, 209, 213, 214, 215, 216, 217, 218, 219, 221, 222, 225, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 251, 252, 253, 254, 255, 256, 257, 258, 261, 262, 263, 264, 266, 271, 272, 276, 277, 278, 279, 280, 281, 282, 283, 286, 287, 289, 291, 293, 294

Rock Creek Historic District, 56, 142

Rock Creek Valley, iii, v, vi, 10, 12, 13, 16, 28, 30, 31, 36, 40, 64, 70, 77, 80, 90, 93, 95, 96, 106, 109, 129, 135, 154, 155, 156, 192, 213, 216, 231, 242, 252, 272, 281

Ross Drive, 67, 78, 79, 80, 90, 102, 112, 129, 151, 158, 160, 167, 168, 190, 194, 228, 229, 230, 231

Rush Hour, Rush-Hour, vi, vii, viii, 9, 34, 38, 43, 47, 53, 60, 61, 66, 67, 69, 70, 71, 78, 79, 90, 100, 101, 105, 106, 111, 115, 117, 129, 130, 133, 166, 167, 169, 175, 176, 177, 216, 217, 218, 227, 228, 229, 230, 231, 232, 233, 239, 242, 243, 245, 246, 252, 255, 261, 264, 265, 266, 280, 281, 285, 286, 288, 290, 294

Sacred Site(s), 45

- Safety, 3, iv, v, vii, xii, xiii, xiv, xv, xvi, 9, 22, 23, 25, 26, 38, 39, 42, 61, 66, 70, 71, 72, 73, 79, 80, 85, 86, 89, 95, 96, 101, 104, 105, 106, 109, 110, 111, 114, 128, 129, 164, 166, 167, 168, 169, 170, 179, 202, 216, 220, 222, 223, 224, 225, 229, 242, 243, 244, 246, 254, 255, 256, 257, 261, 262, 271, 272, 284, 285, 286, 288, 289
- Schedule(s), 31, 80, 251, 281, 282, 294
- Scoping, iv, v, 2, 9, 27, 29, 31, 33, 35, 38, 39, 40, 41, 42, 51, 52, 65, 69, 162, 168, 180, 203, 213, 220, 293
- Sensitive, 26, 40, 66, 86, 105, 145
- Sewer, 18, 28, 47, 122, 123, 135, 139, 140, 142, 193, 196, 197, 208, 209, 237
- Sewerline(s), xviii, 22, 28, 49, 50, 135, 137, 139, 142, 148, 156, 208
- Sherrill Drive, 50, 80, 90, 95, 100, 102, 106, 111, 112, 176, 229, 230, 231, 251, 252, 258, 263, 275
- Shuttle, 84, 194
- Silver Spring, 180
- Single-Occupancy, 42, 48, 70, 172, 177, 245, 261, 275
- Skaters, 176, 230, 256, 257, 271, 285, 289
- Skate(ing), 41, 52, 54, 57, 59, 60, 61, 72, 73, 99, 111, 159, 161, 214, 257, 271, 289
- Snake(s), 148, 149, 150, 151, 153, 207, 239, 280
- Soapstone, 10, 12, 154
- Soil(s), 19, 20, 44, 45, 72, 85, 123, 136, 141, 143, 144, 185, 194, 196, 195, 201, 202, 234
- Standards, xi, xvii, 15, 16, 18, 23, 24, 25, 40, 60, 62, 64, 71, 85, 87, 94, 131, 133, 134, 136, 139, 158, 163, 185, 193, 195, 201, 213, 215, 251, 280
- Summer, 34, 35, 67, 132, 159, 162, 177
- Takoma Park, 180
- Tennis Court, 81, 93, 102, 113, 159, 181
- Tennis Stadium, 10, 37, 81, 93, 102, 113
- Through-Traffic, v, 30, 31, 66, 73, 90, 95, 100, 106, 110
- Tilden Street, 155, 156, 176, 177, 228, 229, 258
- Traffic, 3, iii, v, vi, vii, viii, xii, xvii, xviii, 4, 5, 9, 10, 26, 27, 29, 30, 31, 33, 34, 35, 40, 42, 43, 46, 47, 48, 53, 54, 55, 57, 58, 59, 60, 61, 64, 65, 66, 67, 69, 70, 72, 73, 78, 79, 80, 86, 87, 88, 90, 95, 100, 101, 102, 104, 105, 106, 110, 111, 112, 114, 115, 117, 121, 122, 125, 127, 128, 129, 130, 131, 133, 150, 160, 162, 163, 164, 166, 167, 168, 169, 170, 171, 172, 175, 176, 177, 179, 180, 185, 186, 189, 190, 191, 192, 194, 203, 207, 208, 209, 213, 215, 216, 217, 218, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 236, 239, 240, 241, 242, 243, 244, 245, 246, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 261, 262, 264, 265, 266, 271, 272, 273, 275, 276, 278, 279, 280, 281, 282, 284, 285, 286, 287, 288, 289, 290, 291, 293, 294
- Trail(s), v, x, xi, 14, 21, 23, 24, 25, 27, 30, 36, 37, 41, 42, 46, 48, 52, 53, 55, 56, 60, 64, 71, 73, 77, 79, 80, 84, 85, 86, 87, 89, 96, 99, 101, 102, 103, 104, 109, 110, 111, 112, 113, 114, 115, 118, 122, 123, 124, 125, 126, 127, 128, 130, 142, 144, 147, 156, 159, 161, 163, 168, 176, 178, 179, 181, 194, 195, 196, 198, 199, 200, 201, 202, 203, 205, 207, 208, 211, 212, 216, 217, 218, 219, 230, 232, 234, 237, 238, 241, 242, 243, 245, 250, 252, 253, 254,

- 256, 266, 272, 275, 276, 282, 283, 284, 285
- Trailheads, 252, 281
- Transportation, iv, vii, viii, xii, xiii, xiv, xv, xvi, 11, 19, 26, 29, 42, 43, 44, 47, 48, 50, 55, 56, 64, 69, 129, 130, 131, 139, 160, 161, 164, 169, 170, 171, 172, 177, 178, 179, 183, 184, 185, 186, 192, 216, 225, 226, 231, 232, 233, 244, 245, 248, 257, 271, 272, 275, 279, 280, 281, 286, 288, 290, 293
- Tributary(ies), iii, iv, vii, xi, xii, xiv, xv, 5, 10, 12, 16, 19, 39, 40, 49, 63, 122, 123, 134, 135, 136, 139, 140, 142, 148, 152, 154, 192, 193, 195, 196, 197, 208, 237, 249, 279
- Turbidity, 139, 194, 199
- Turtle(s), 125, 148, 149, 150, 151, 152, 207, 209, 239, 250, 280
- Urban Recreation, x, xi, 55, 62, 74, 81, 93, 102, 112, 115
- Urban Transit, x, xi, 55, 64, 74, 84, 94, 95, 103, 113, 115
- Valley, i, vi, x, xi, 5, 10, 12, 13, 30, 31, 36, 40, 52, 53, 54, 57, 58, 59, 60, 73, 74, 78, 79, 80, 84, 90, 95, 99, 101, 102, 103, 106, 110, 111, 112, 113, 117, 134, 135, 147, 154, 155, 156, 159, 242, 252, 272, 282
- Valley Floor, ix, x, xi, 52, 53, 54, 57, 58, 59, 60, 74, 78, 79, 80, 84, 90, 99, 101, 102, 103, 106, 110, 111, 112, 113, 117
- Valley Park, 10
- Vegetation, 19, 20, 22, 23, 40, 56, 63, 84, 123, 140, 143, 144, 146, 147, 194, 195, 196, 200, 201, 202, 207
- Virginia, iii, 10, 21, 40, 46, 132, 143, 144, 145, 161, 171, 178, 179, 180, 192, 203, 204, 205, 228, 229, 238, 239, 258, 262, 263, 264, 265, 266, 274
- Virginia Avenue, iii, 10, 171, 192, 228, 229, 264, 266
- Visitor, 3, iii, iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv, xvi, xvii, 1, 2, 4, 9, 10, 15, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 34, 37, 38, 39, 40, 41, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 66, 67, 68, 69, 71, 72, 73, 74, 77, 79, 80, 81, 84, 85, 86, 87, 88, 89, 90, 93, 95, 96, 101, 102, 103, 104, 105, 106, 109, 110, 111, 112, 113, 114, 115, 118, 126, 127, 128, 131, 144, 159, 160, 161, 162, 163, 164, 197, 202, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 223, 231, 232, 234, 242, 243, 251, 252, 253, 254, 255, 262, 276, 280, 281, 282, 283, 284, 285, 291
- Visitor Experience, iii, iv, v, vii, ix, x, xii, xiii, xiv, xv, xvi, 1, 2, 4, 15, 25, 26, 27, 28, 29, 30, 32, 39, 41, 51, 52, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63, 64, 67, 73, 89, 95, 105, 127, 159, 160, 213, 214, 215, 216, 217, 219, 220, 231, 232, 234, 241, 242, 243, 251, 252, 254, 276, 280, 282, 284, 291
- Visitor Facility, x, xi, 55, 62, 74, 80, 89, 93, 102, 112, 118
- Visitor Interpretation, iv, vii, viii, 10, 31
- Visitor Profile, xii, 131, 161
- Visitors, iii, iv, xiii, xiv, xv, xvi, 10, 13, 14, 22, 26, 27, 29, 31, 34, 38, 52, 53, 54, 55, 56, 57, 59, 60, 61, 62, 63, 64, 68, 69, 70, 72, 73, 79, 80, 81, 82, 85, 93, 99, 100, 105, 106, 111, 127, 128, 146, 152, 159, 160, 161, 162, 163, 164, 167, 176, 177, 178, 201, 209, 211, 213, 214, 215, 216, 217, 218, 219, 220, 221, 224, 229, 231, 240, 241, 242, 243, 244, 246, 251, 252, 253, 254, 256, 257, 261, 264, 271, 281, 282, 283, 284, 285, 286, 289

- Walk(ing), 41, 48, 54, 57, 59, 60, 61, 65, 70, 72, 73, 99, 111, 156, 159, 161, 178, 179, 231, 271, 272, 276, 289
- Water, vii, xi, 12, 15, 16, 18, 19, 20, 23, 28, 40, 48, 49, 56, 61, 63, 64, 69, 77, 81, 83, 93, 94, 103, 113, 122, 123, 134, 135, 136, 139, 140, 141, 142, 148, 150, 155, 159, 192, 193, 194, 195, 196, 197, 199, 208, 211, 234, 237, 238, 240, 249, 279
- Water Quality, vii, 15, 16, 18, 23, 40, 69, 122, 123, 136, 139, 140, 192, 193, 194, 195, 196, 197, 234, 237, 240, 249, 279
- Watershed, xi, xviii, 16, 17, 18, 19, 28, 44, 47, 49, 122, 134, 135, 139, 140, 141, 144, 195, 196, 203, 205, 209, 237, 238, 239, 240, 249, 279
- West Beach Drive, 30, 90, 99, 100, 105, 110, 168, 175, 176, 229, 230, 263, 264, 265, 266, 287
- Wetland(s), iv, vii, xi, xii, xiv, xv, 14, 16, 21, 31, 39, 40, 58, 59, 85, 123, 140, 141, 142, 145, 147, 152, 197, 198, 199, 237, 238, 249, 279
- Whitehurst Freeway, 64, 154, 172
- Wilderness, 52, 65, 293
- Wildfire, Fire, 15, 22, 23, 25, 46, 144, 185, 200, 238
- Wildlife, 3, iv, xi, xiii, xiv, xv, 5, 13, 29, 31, 36, 38, 39, 40, 41, 45, 63, 68, 69, 71, 72, 73, 79, 80, 82, 84, 96, 101, 102, 109, 111, 112, 116, 125, 136, 141, 144, 145, 146, 147, 148, 150, 151, 158, 204, 205, 206, 207, 208, 209, 239, 240, 250, 280
- Wisconsin Avenue, 180, 189, 191, 245, 262, 265, 274, 287, 288
- Wise Road, 30, 90, 99, 100, 105, 110, 151, 160, 168, 175, 176, 186, 191, 229, 236, 251, 252, 255, 258, 263, 264, 266, 278, 287

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.

<p>September 27, 1890.</p> <p>District of Columbia.</p> <p>Rock Creek Park established.</p> <p>Location.</p> <p>Description.</p> <p>Dedication.</p> <p>Proviso.</p> <p>Maximum size and cost.</p> <p>Commission to be appointed.</p> <p>Duties.</p> <p>Executive officer.</p> <p>Map to be filed.</p> <p>Condemnation.</p> <p>Title.</p> <p>Compensation.</p> <p>Proviso.</p> <p>Acceptance by owners.</p> <p>Failure to agree.</p> <p>Judicial procedure.</p> <p>Application for assessment.</p> <p>Petition and map.</p> <p>Notification.</p> <p>Appraisal commission.</p> <p>Ascertainment of value.</p> <p>Payment.</p> <p>Title.</p>	<p><b>CHAP. 1001.</b>—An act authorizing the establishing of a public park in the District of Columbia.</p> <p><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 lying on both sides of Rock Creek, beginning at Klingle Ford Bridge, and running northwardly, following the course of said creek, of a 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 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 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 this act shall not exceed two thousand acres nor the total cost thereof exceed the amount of money herein appropriated.</p> <p><b>SEC. 2.</b> That the Chief of Engineers of the United States Army, the Engineer Commissioner of the District of Columbia, and three 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 aforesaid, and to have the same surveyed by the assistant to the said 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.</p> <p><b>SEC. 3.</b> That the said commission shall cause to be made an accurate map of said Rock Creek Park, showing the location, quantity, 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 District of Columbia, and from and after the date of filing said map the several tracts and parcels of land embraced in said Rock Creek Park shall be held as condemned for public uses, and the title thereof vested in the United States, subject to the payment of just compensation, to be determined by said commission, and approved by the President of the United States: <i>Provided,</i> That such compensation be accepted by the owner or owners of the several parcels of land.</p> <p>That if the said commission shall be unable by agreement with the respective owners to purchase all of the land so selected and condemned within thirty days after such condemnation, at the price approved by the President of the United States, it shall, at the expiration of such period of thirty days, make application to the supreme court of the District of Columbia, by petition, at a general or special term, for an assessment of the value of such land as it has been unable to purchase.</p> <p>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; and the said court is hereby authorized and required, upon such application, without delay, to notify the owners and occupants of the land, if known, by personal service, and if unknown, by service by publication, and to ascertain and assess the value of the land so selected and condemned, by appointing three competent and disinterested commissioners to appraise the value or values thereof, and to return the appraisement to the court; and when the value or values of such land are thus ascertained, and the President of the 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</p>
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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 aforesaid 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.



<p>Payment of assessment by installments, etc.</p>	<p>Interest. Separate Treasury fund.</p>	<p>Validity of proceedings. Court record.</p>	<p>Duplicate assessment book to be filed.</p>	<p>Evidence of recited facts. Delinquent assessments.</p>	<p>Collection.</p>	<p>Payment of compensation by Treasurer. Commission orders.</p>	<p>Proceeds in excess of cost.</p>	<p>Compensation of public officers. Compensation of civilian commissioners. Delinquent assessment sale deeds. Evidence of.</p>	<p>Judgment of sale.</p>	<p>Estoppel, etc.</p>	<p>Appropriation. For total cost, etc.</p>	<p>Provision. Half from the District revenues.</p>	<p>Reimbursed in installments. Interest. Maintenance, etc. Half from District revenues.</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>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</p>
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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.

Vol. 26, p. 412.

## 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 MWCOC 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-Klingling 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.

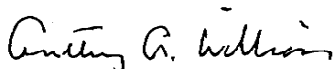
With a general management plan for Rock Creek Park currently under development, the Park Service now has an opportunity to make this park an even better resource for recreational opportunities and habitat protection. The District of Columbia government has been discussing with various citizen groups 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  
Page Two

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,



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</b> <sup>b/</sup>	<b>Virginia Status</b> <sup>b/</sup>	<b>Virginia Rank</b> <sup>b/</sup>
CRUSTACEA (AMPHIPODS, ISOPODS, & DECAPODS)				
Pizzini's amphipod	<i>Stygobromus pizzinii</i>	--	SC	S1S2
A groundwater amphipod	<i>Stygobromus sp. 15</i>	SOC	--	S1
PLANTS				
Yellow nailwort	<i>Paronychia virginica var. 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>Glypyalina 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>al</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>Pseudanopthalmus sp 15</i>	--	--	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 - Butterflies</i>			
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>Problema 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>Synanathedon 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 damer	<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)

Common Name	Scientific Name	Federal Status <sup>b</sup>	Maryland Status <sup>b</sup>	Maryland Rank <sup>b</sup>
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)**

Common Name	Scientific Name	Federal Status <sup>b</sup>	Maryland Status <sup>b</sup>	Maryland Rank <sup>b</sup>
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 allegnaniensis</i>	--	--	S2
Georgia river cruiser	<i>Macromia illinoiensis 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 virginiensis</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>Progromphus 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 plagiatu</i>	--	--	S3
Zebra clubtail	<i>Stylurus scudder</i>	--	--	S1
Arrow clubtail	<i>Stylurus spiniceps</i>	--	--	S3
Blue-faced meadowhawk	<i>Sympetrum ambigu</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 erythrogramma</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 APPENDIXES

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 laciniosa</i>	--	E	S1
American chestnut	<i>Castanea dentate</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

a/ 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		Alt C
						Volume	% Chg <sup>d</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	2,100	--	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	Kingle	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	% Chg <sup>a</sup>	PM Peak Hour	% 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	--	--	200	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	Klingling	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	1 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
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	Klinge	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 through 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 (MWCOCG) is the agency in the Washington, D.C. area that is responsible for regional planning and traffic modeling. The MWCOCG 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 MWCOCG 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.

### **MWCOCG REGIONAL TRANSPORTATION MODEL**

The MWCOCG transportation model files, network plots and supporting documentation were obtained from MWCOCG 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 MWCOCG 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 MWCOCG 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 MWCOCG 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 MWCOCG 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 MWCOCG 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 MWCOG 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 Volumes (Thousands)</b>	<b>1999 Model Volumes (Thousands)</b>	<b>% Difference Be- tween Modeled and Actual Vol- 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 Parkway southbound	Virginia	Teddy Roosevelt Br	24.1	21.8	-9%
Rock Creek and Potomac 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 Volumes (Thousands)</b>	<b>1999 Model Volumes (Thousands)</b>	<b>% Difference Be- tween Modeled and Actual Vol- 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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Superintendent  
3545 Williamsburg Lane NW  
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