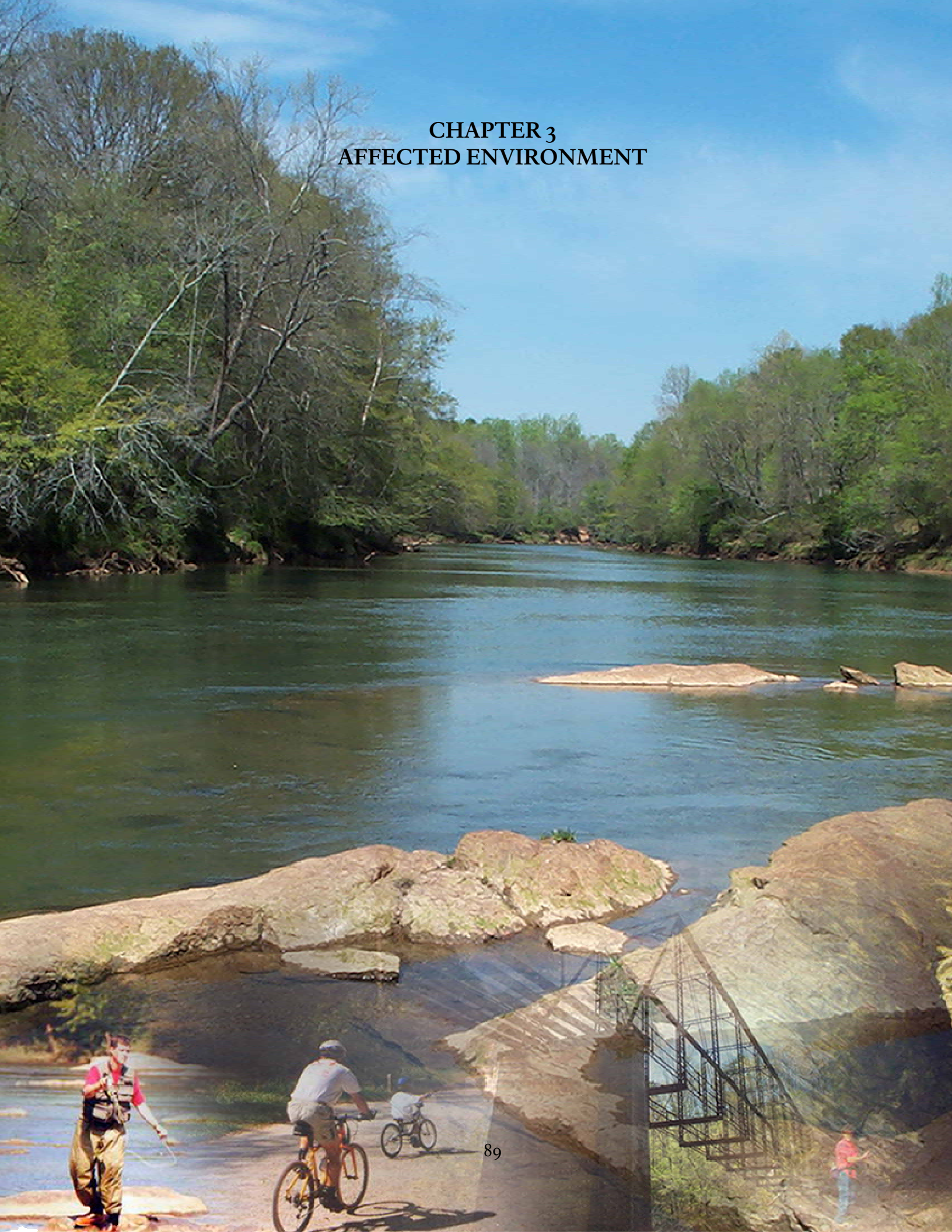
CHAPTER 3
AFFECTED ENVIRONMENT



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NATURAL RESOURCES

This section describes the characteristics of the existing natural environment that could be affected by the proposed action alternatives and the no action alternative (continue current management). In compliance with the guidelines contained in the National Environmental Policy Act and Section 1502.15 of the regulations for implementing that act developed by the Council on Environmental Quality (1978), the description of the affected environment focuses on only those environmental aspects potentially subject to the effects resulting from the proposed park access and development policies. As discussed in the "Purpose and Need for the Plan" section, the National Park Service has identified impact topics that may be affected by the proposed actions or the no action alternative (continue current management). This section establishes the basis for Chapter 4, Environmental Consequences, which addresses the effects that the alternatives may have on the impact topics within the affected environment.

WATER RESOURCES

The Chattahoochee River and its tributaries are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 1.

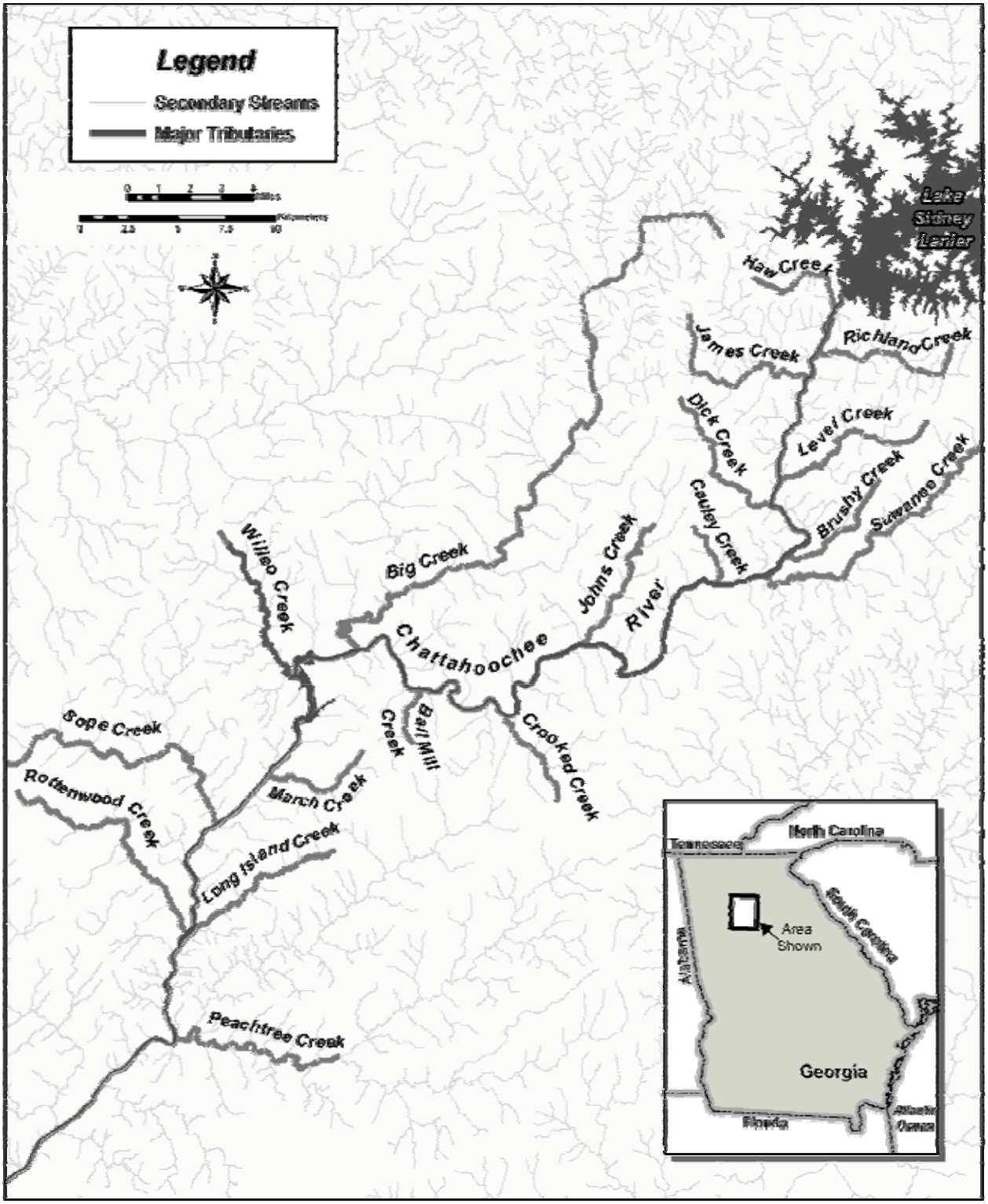
The river is the primary natural feature within the park. Within the park boundaries, the Chattahoochee River flows 48 miles from Buford Dam near Sugar Hill to the confluence with Peachtree Creek in Atlanta. Land uses within the watershed include urban, suburban residential, agricultural, and forested areas.

Surface Water Hydrology and Watershed Characteristics

The surface water hydrology of the Chattahoochee River is largely determined by the geological setting and processes that have formed the watershed, as well as hydrologic flow regulation by Buford Dam and its reservoir, which has altered the Chattahoochee River both physically and chemically. The river within the park is located within the Piedmont Province, Southern Piedmont Section, Upland Georgia Subsection, flowing along the Brevard Fault in a northeast to southwest direction within the Gainesville Ridges District. This district is characterized by "a series of northeast-trending, low, linear, parallel ridges separated by narrow valleys" (Clark and Zisa 1976). The ridge formations and Brevard Fault result from forces associated with continental drift. Faulting produced the "Palisades" cliffs, located in the extreme southern end of the park. The Palisades were the original basis for designating the park as a National Recreation Area.

This geological setting produces a relatively long and narrow watershed, surrounded within the vicinity of the park by rapidly developing urban and suburban areas. These features channel a large amount of nonpoint runoff into the river in this narrow watershed during storm events, which affect park characteristics, especially water quality (refer to the "Water Quality" subsection for additional information).

The portion of the Chattahoochee River watershed encompassed by the park, extending from river mile 348.3 at Buford Dam to river mile 300.5 at Peachtree Creek, drains 416 square miles below Buford Dam. The major tributaries and watersheds associated with the park are shown on Figure 10 in sequence from north to south and listed in alphabetical order in Table 9 (NPS 2000c). The majority of these tributaries flow through urban or suburban areas subject to excessive amounts of nonpoint runoff. Numerous minor tributaries and groundwater springs also drain to the Chattahoochee River within the park.



Water Features

Chattahoochee River National Recreation Area

U.S. Department of the Interior - National Park Service

Figure 10

Table 9. Named Creeks within Chattahoochee River National Recreation Area (with Watershed Area in Square Miles for Dominant Water Bodies)

Arrowhead Creek
Bagley Creek
Ball Mill Creek (3.5)
Bennett Creek
Bentley Creek
Big Creek (also known as Vickery Creek) (103)
Bishop Creek
Brushy Creek
Camp Creek
Cauley Creek
Caney Creek
Cheatam Creek
Cobb Creek
Crooked Creek (9.2)
Daves Creek
Dick Creek (8.8)
Foe Killer Creek
Fox Creek
Gunby Creek
Harris Creek
Haw Creek (3.8)
Heards Creek
Hog Waller Creek (also known as Hog Wallow Creek)
Ivy Creek
James Creek (10.6)
Johns Creek (13.1)
Kelly Mill Branch
Level Creek
Little Ivy Creek
Long Indian Creek
Long Island Creek (19.6)
March Creek (5.3)
Mill Creek
Mulberry Creek
Nancy Creek
Nannyberry Creek
Owl Creek
Peachtree Creek (131)
Poorhouse Creek
Richland Creek (15.2)

Table 9. Named Creeks within Chattahoochee River National Recreation Area (with Watershed Area in Square Miles for Dominant Water Bodies) (continued)

Rottenwood Creek (6.4)
Sawmill Branch
Seven Branch Creek
Sewell Mill Creek
Sibley Creek (also known as Terrel Mill Branch)
Seven Branch
Sope Creek (35.4)
Suwanee Creek (51.2)
Terrel Mill Branch (see Sibley Creek)
Vickery Creek (see Big Creek)
Willeo Creek (19.8)

Source: NPS 2000c
* Creeks bordered at least in part by Chattahoochee River National Recreation Area parcels are bolded.

Buford Dam: The flow of the river is dominated by controlled releases from Buford Dam, which was constructed in 1957 forming Lake Lanier upstream of the park. Buford Dam is managed by the Mobile District, United States Army Corps of Engineers. Flow is also affected significantly by storm events, which contribute large amounts of water to the river via overland flow and major tributaries. Average daily mean flow rates from 1994 to 2004 have been approximately 1,700 cubic feet per second (USGS 2006a). The Georgia Environmental Protection Division has established a minimum flow of 750 cubic feet per second in the Chattahoochee River at the confluence of Peachtree Creek to provide for the protection of water quality, aquatic habitat, aquatic life, and recreation.

Releases provide electrical power during peak demand periods. These surges create rapid and large changes in water levels and velocities downstream of Buford Dam. Higher flows created during peak release periods create rapid and large (up to eight feet below the dam and at Settles Bridge) variations in water levels and current velocities immediately downstream of Buford dam (USACE 1985). The surges have resulted in significant erosion of the riverbanks for as far as 20 miles downstream, significant widening of the river, and increased numbers of trees falling into the river (NPS 2000c).

Key facts summarizing the flow regime in the river are as follows:

- Drier years are characterized by lower than average streamflows.
- Wetter years produce high flows that are two to three times higher than high flows in dry years.
- Flow periods follow seasonal patterns, with higher flows in July and lower flows usually in autumn.
- Between 1994 and 2004, the average minimum and maximum discharges from Buford Dam were 644 cubic feet per second and 10,422 cubic feet per second, respectively (USGS 2006a).
- The average annual mean discharge at the USGS Norcross gauging station (approximately in the center of the park) from 1903 to 2003 is 2,240 cubic feet per second (USGS 2006a).
- The average annual mean discharge at the USGS Buford Dam gauging station from 1988 to 2003 was 1,820 cubic feet per second (USGS 2006a)

- The Buford Dam outlet has a maximum capacity of 11,600 cubic feet per second (USACE 2006).
- The two largest tributaries within the park are Big Creek (mean daily discharge of 111 cubic feet per second) and Suwanee Creek (mean daily discharge of 69 cubic feet per second). The five highest peak flows for these two creeks measured between 1985 and 2004 range from 3,140 to 5,820 cubic feet per second for Big Creek and from 2,900 to 4,350 cubic feet per second for Suwanee Creek (USGS 2006a).

Morgan Falls Dam: Morgan Falls Dam, located at river mile 312.6, was constructed from 1902 to 1904, and created Bull Sluice Lake, the only lake located within the park boundary (Figure 10). Bull Sluice Lake is bordered by cliffs over 200 feet high rising on the east side of the lake opposite Gold Branch. This shallow lake has rapidly filled with sediment, due to the large amount of suspended solids entering the river from nonpoint runoff, and is being invaded by cattail marshes that form extensive wetlands.

The Morgan Falls Hydroelectric Project is licensed to Georgia Power under the authority of the Federal Energy Regulatory Commission and is operated under an agreement with the Atlanta Regional Commission referred to as the "Statement of Policy." The Statement of Policy is considered a short-term policy in providing water for withdrawals along the river until a long-term arrangement is developed or until the expiration of the current license in 2009 (Georgia Power 2004a).

According to Georgia Power (2004a): "The policy establishes, among others, the following key elements:

- Georgia Power shall attempt to release water from the project for governmental and industrial uses during the term of the policy, and [Atlanta Regional Commission] has the responsibility of coordinating the allocation of such water to the utilities withdrawing water along the river.
- Georgia Power shall endeavor to provide a minimum release, during off peak power periods, of up to 1,164 cubic feet per second from the project, as required on a weekly basis by [Atlanta Regional Commission], within limitations imposed in the policy.
- Atlanta Regional Commission] agrees to develop and coordinate the implementation of a water management system, in cooperation with the various utilities, the [U.S. Army Corps of Engineers], [Georgia Environmental Protection Division], and Georgia Power."

In order to continue operating and maintaining an existing hydroelectric project, licenses must be renewed periodically. The relicensing process addresses power generation, natural resources, recreation, and aesthetics at hydroelectric projects. The current license for the Morgan Falls Hydroelectric Project expires February 28, 2009. Georgia Power began the relicensing process in 2003 and must submit a relicensing application to the Federal Energy Regulatory Commission by February 28, 2007. Georgia Power proposes to continue operating the Morgan Falls Project in a manner consistent with the existing Statement of Policy (Georgia Power 2004b).

In accordance with the Commission's integrated licensing process and following the Commission's National Environmental Policy Act scoping process, a Proposed Study Plan was issued by Georgia Power on June 25, 2004 and later issued a Revised Study Plan on October 26, 2004. The Revised Study Plan outlines the framework for eight individual studies that characterize baseline resource conditions within the Morgan Falls Hydroelectric Project boundary, including:

- Geology and Soils
- Water Resources

- Fish and Aquatic Resources
- Wildlife and Botanical Resources
- Wetlands, Riparian, and Littoral Habitat
- Rare, Threatened, and Endangered Species
- Recreation and Land Use
- Cultural Resources (Georgia Power 2004b).

Information contained within these study reports is referenced in the pertinent subsections of this general management plan.

As part of the licensing process, the Federal Energy Regulatory Commission must consult with the National Park Service in order to seek a balance between the project's operations and the park's resource protection interest. Since 2004, the National Park Service has been engaged in the relicensing process with the Federal Energy Regulatory Commission, Georgia Power (the license applicant) and other stakeholders including the Atlanta Regional Commission; the State of Georgia; local municipalities; other Federal, state, and local entities; the Upper Chattahoochee Riverkeeper; American Rivers; and several other non-governmental organizations. An important purpose of the relicensing process is to study the potential impacts of the Morgan Falls Hydroelectric Project on park resources. Particular issues of concern to the park include:

- Shoreline erosion related to dam operations
- Sedimentation in Bull Sluice Lake and tributaries such as Big Creek
- Dredging as a potential alternative
- Sediment contamination in Bull Sluice Reservoir
- Impacts to threatened and endangered species
- Effects on recreation
- Impacts on shoal bass habitat below Morgan Falls and in tributaries to Bull Sluice Lake (NPS 2006b).

Water Supply and Allocation

The Atlanta region relies on surface water for 98 percent of its water usage due to limited regional groundwater resources. The Chattahoochee River Basin supplies 80% of the water for metropolitan Atlanta and is one of the smallest rivers in the country serving a major metropolitan area (MNGWPD 2006).

Approximately 178 million gallons per day are withdrawn from Lake Lanier for municipal use. Within the park boundary, a total of approximately 415 million gallons per day are withdrawn from the Chattahoochee River by four municipalities (Cobb County-Marietta Water Authority, DeKalb County Water System, City of Atlanta, and Atlanta-Fulton County Water Resources Commission). The projected baseline water use for the Chattahoochee River Basin for the year 2030 ranges from 522 to 600 million gallons per day (MNGWPD 2003b). Approximately 71 million gallons per day of treated water is returned to the river within the park boundary by seven wastewater treatment plants within three counties (Georgia Power 2004a). An additional 344 million gallons per day of treated water is returned to the river below Peachtree Creek (Georgia Power 2004a).

Severe droughts in 1980-1982, 1985-1989, and 1988-2000 (USGS 2000) brought the water supply issue to the forefront in the Atlanta region. The growing need for water resources prompted a change in the release patterns of water from Lake Lanier in 1988. In order to "enhance water supply availability," the United States Army Corps of Engineers reallocated approximately 20 percent of the release from hydropower production to water supply (NPS 2000c). In addition, legal actions between Georgia, Florida, and Alabama led to the development of the Alabama-Coosa-Tallapoosa / Apalachicola-Chattahoochee-Flint River comprehensive study in 1991 to address the water supply issue. The objectives of this study were to: (1) make water use demand estimates though 2050; (2) estimate the ability of supplies to meet demands; and (3) develop water supply management alternatives. A draft National Environmental Policy Act programmatic environmental impact statement was also prepared and released by the United States Army Corps of Engineers, Mobile District in conjunction with the comprehensive study (USACE 1998). This document addressed the issues associated with implementing a range of low, moderate, or high flow conditions that could potentially result under a given water allocation formula. In 1997, Alabama, Georgia and Florida approved an Interstate Compact for the Apalachicola-Chattahoochee-Flint River, the objective of which was to provide an equitable basis for sharing of water supplies between the users. However, after numerous extensions of negotiation deadlines, the Apalachicola-Chattahoochee-Flint River Compact expired in 2003 without an extension, and negotiations on a water agreement ceased (GADNR 2003a). Subsequent to 2003, litigation between Georgia, Alabama, Florida, the United States Corps of Engineers, and Southeastern federal power customers continued with appeals from various involved parties as of September 2005 (Metro Atlanta Chamber of Commerce, 2005). Extended negotiations are expected.

The park is located within the 16-county Metropolitan North Georgia Water Planning District (District), which was established by the Georgia legislature in 2001 to address the need for comprehensive water resources management in the metropolitan area. The District is a planning entity dedicated to developing comprehensive regional and watershed-specific plans for stormwater management, wastewater management, and water supply and conservation. The District adopted three plans in September 2003 (amended February 2006): the *District-wide Watershed Management Plan*, *Long-term Wastewater Management Plan*, and *Water Supply and Water Conservation Management Plan*. The plans are aimed to protect water quality and public water supplies in and downstream of the Metropolitan Atlanta region, protect recreational values of the waters in and downstream of the region, and minimize potential adverse impacts of development on waters in and downstream of the region. In addition, basin advisory councils were established for the 6 watersheds contained within the District, including the Chattahoochee River Basin (MNGWPD 2006).

In addition to the District's management efforts, the state has developed management objectives for water resources throughout the state, including the Chattahoochee River. The 2004 Comprehensive State-wide Water Management Planning Act mandates the development of a state-wide water plan that supports a far-reaching vision for water resource management. The Water Council is a coordinating committee created by the Comprehensive Statewide Water Management Planning Act. The Water Council's purpose is to:

- Ensure coordination, cooperation and communication among state agencies and their water-related efforts in the development of a comprehensive statewide water management plan;
- Provide input to the Environmental Protection Division of the Georgia Department of Natural Resources concerning development of the plan;
- Review, modify if necessary, and approve the final draft of the proposed plan; and
- Recommend such proposed plan for consideration by the General Assembly (GADNR 2006d).

The Comprehensive State-wide Water Management Planning Act does not define the mechanisms by which the state is to achieve its vision for water management. For this reason the Environmental Protection Division, using products from the efforts of the 2001 Joint Water Study Committee and with oversight of the Water Council, prioritized four major water management objectives to guide the research and planning strategies for the initial plan development:

1. Minimize withdrawals of water by increasing conservation, reuse, and efficiency;
2. Maximize returns to the basin through managing interbasin transfers and uses of on-site sewage disposal systems, and land application of treated wastewater where water quantity is limited;
3. Meet instream and off stream demands for water through surface storage, aquifer management and reducing water demands; and
4. Protect water quality by reducing discharges of pollutants to streams and runoff from land, so as not to exceed the assimilative capacity of the streams (GADNR 2006d).

The Georgia Environmental Protection Division is developing the first Statewide Comprehensive Water Plan to be provided to the Georgia Water Council in 2007 (GADNR 2006d). This initial statewide plan will focus on policy framework and an array of tools necessary for developing the region-specific management strategies to be developed for subsequent editions of the statewide plan. The process used to develop the state-wide plan provides for meaningful participation, coordination, and cooperation among interested and affected stakeholders and citizens as well as all levels of governmental and other entities managing or utilizing water (GADNR 2006d).

The National Park Service is striving to more thoroughly understand the dynamics of water flow requirements on its resources. The park has collaborated with the U.S. Geologic Survey to determine the effects of flow regulations on aquatic habitat and biota. In 2004, a project was initiated by the two agencies to study to obtain cross-sectional measurements and instream flow data for the Chattahoochee River. In addition, the park and U. S. Geological Survey have jointly funded a project to develop a quantitative "decision model" for evaluating the effects of river regulation on native fish. The effects of flow requirements on the suitability of trout habitat have also been studied by Nestler et. al. 1986 and the U.S. Army Corps of Engineers (USACE 1998). In addition, the effects of flow requirements on recreation were studied by the park in 2000. A survey of 23 individuals concluded that a flow of 1000 to 1200 cfs is preferential for powerboat fishing and wade- and tube-fishing, while a range of 1000 cfs to 6000 cfs was preferred for non-motorized boating (shell rowing, kayaking, canoeing, and rafting) (CH2M Hill 2000). The need for additional flow studies is summarized in Chapter 5.

Water Quality

The purpose of this section is to provide a summary of existing baseline data available as of March 2006. The water quality conditions of the park reported in this general management plan represent a snapshot in time, as it is recognized that the river and its tributaries are dynamic systems with changing influences.

Water quality in the Chattahoochee River and its tributaries within the park is protected under law by Georgia's water use classifications and standards (GADNR 2005d). These regulations include standards for fecal coliform bacteria, dissolved oxygen, pH and temperature for waters used for drinking water, recreation, and fishing. Generalized visual water quality criteria also apply within the park. The Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03, Water Quality Standards (amended November 2005), established standards for toxic materials, including metals and other inorganic compounds, toxic priority pollutants, pesticides and herbicides.

Waters of the Chattahoochee River and its tributaries within the park are designated as suitable for "drinking water supplies, recreation, and fishing." However, reaches of the Chattahoochee River and many tributary streams in the park do not meet these designated uses, primarily due to exceedance of fecal coliform standards (Table 10). Section 305(b) of the Clean Water Act requires each state to submit a biennial report that identifies waters in the state that do not meet their designated uses. Section 303(d) of the Clean Water Act requires states to list their waters not supporting their designated uses; that is, not meeting water quality standards for those uses. This list is referred to as the 303(d) list and includes an assessment of the water quality conditions, the extent and causes of documented violations, and the actions being taken to correct the water quality problems. Table 10 presents a summary of waterbodies within the park that are proposed for listing on the draft 2006 303(d) list due to non-compliance with fecal coliform, fish consumption guidance, and impacted biota standards (Methier 2006). These water quality issues are discussed in further detail in the subsequent sections.

Table 10. Streams in the Park That Partially Support or Do Not Support Their Designated Uses

Stream	Use Classification	Criterion Violated	Evaluated Causes
Chattahoochee River from Johns Creek to Morgan Falls Dam	Recreation / Drinking Water	Fecal Coliform, pH	Urban Runoff
Chattahoochee River from Morgan Falls Dam to Peachtree Creek	Recreation / Drinking Water	Fecal Coliform, Fish Consumption	Urban Runoff
Ball Mill Creek	Fishing	Fecal Coliform	Urban Runoff
Big Creek	Drinking Water / Fishing	Fecal Coliform	Urban Runoff
Bishop Creek	Fishing	Fecal Coliform	Urban Runoff
Camp Creek	Fishing	Fecal Coliform	Urban Runoff
Crooked Creek	Fishing	Fecal Coliform	Urban Runoff
Foe Killer Creek	Fishing	Fecal Coliform	Urban Runoff
Hog Waller Creek	Fishing	Fecal Coliform	Urban Runoff
James Creek	Fishing	Fecal Coliform	Urban Runoff, Nonpoint Sources
Johns Creek	Fishing	Fecal Coliform	Urban Runoff
Kelly Mill Branch	Fishing	Fecal Coliform	Urban Runoff
Level Creek	Fishing	Fecal Coliform	Urban Runoff
Long Island Creek	Fishing	Fecal Coliform, Biota Impacted	Urban Runoff
March Creek	Fishing	Fecal Coliform	Urban Runoff
Nancy Creek	Fishing	Fecal Coliform, Biota Impacted	Urban Runoff
Peachtree Creek	Fishing	Fecal Coliform	Urban Runoff, Combined Sewer Overflow
Richland Creek	Fishing	Fecal Coliform	Urban Runoff
Rottenwood Creek	Fishing	Fecal Coliform	Urban Runoff
Sewell Mill Creek	Fishing	Fecal Coliform	Urban Runoff

Table 10. Streams in the Park That Partially Support or Do Not Support Their Designated Uses (continued)

Stream	Use Classification	Criterion Violated	Evaluated Causes
Sope Creek	Fishing	Fecal Coliform	Urban Runoff
Suwanee Creek	Fishing	Fecal Coliform	Urban Runoff
Willeo Creek	Fishing	Fecal Coliform	Urban Runoff

Source: Methier 2006

Each water body that does not meet the water quality criteria required by its respective designated uses, the state must develop a total maximum daily load for the pollutant of concern to ensure that applicable water quality standards can be attained and maintained. Total maximum daily load is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards. This is the sum of point source loads and nonpoint source loads, plus a margin of safety. The objective is to allocate allowable loads among different pollution sources so that appropriate control actions can be taken to achieve water quality standards. Tools used to meet total maximum daily load requirements include best management practices, regulations, land acquisition, infrastructure investment, and pollutant trading. A total maximum daily load evaluation has been completed for stream segments within the park for both fecal coliform (GADNR 2003b) and PCBs in fish tissue (GADNR 2003c).

The following is a summary of potential sources of pollution within the park including nonpoint source runoff, wastewater releases, and accidental spills.

Nonpoint Source Runoff: Stormwater runoff from impervious and exposed surfaces in urban and suburban areas contains suspended solids, trace metals, organic compounds, and various pathogens. Impervious surfaces include roads, parking lots, and rooftops. Increased runoff also causes increased flooding, streambed scouring, sedimentation, bank erosion, and accumulation of litter and other solid waste. Data contained within the Gwinnett County Watershed Protection Plan (2000) indicate that the percentage of impervious surface within Chattahoochee Basin watersheds in Gwinnett County range from 11% in the Level Creek watershed to 38% in the Crooked Creek watershed.

It is estimated that stormwater runoff from urban areas and nonpoint sources is a contributing factor to 99 percent of the designated use violations in streams within the Metropolitan North Georgia Water Planning District (MNGWPD 2003c). Urban runoff is also the predominant evaluated cause for violations of designated uses for streams within the park (Table 10).

Cleared construction sites are a primary source of suspended solids. Under the National Pollutant Discharge Elimination System construction stormwater permit system, the Georgia Environmental Protection Division regulates discharges of stormwater from construction sites greater than 1 acre. Also, in 2003 the Georgia General Assembly passed House Bill 285 which requires all people involved in land development, design, review, permitting, construction, monitoring, or inspections to attend certification courses in erosion and sedimentation control (Georgia General Assembly 2003).

As discussed in the "Community Characteristics" subsection, the Atlanta area is one of the most rapidly growing areas in the country. As a result, nonpoint pollution has increased greatly over the last 20 years. If not controlled, problems associated with nonpoint pollution are expected to continue to get worse. The county governments that surround the park have instituted a series of watershed studies designed to assess water quality problems and develop solutions in the form of best management practices that will allow each county to meet its total maximum daily load restrictions. In addition, the Metropolitan North Georgia Water Planning District has also produced a *District-Wide Watershed Management Plan* (2003c) which provides strategies and recommendations for effective

watershed management and the control of stormwater runoff. It also includes the specific tasks and milestones for implementing these recommendations, as well as guidance on funding watershed and stormwater management efforts at the local level.

Six model ordinances are included in the District's approach to protect water quality and address stormwater impacts. The ordinances include:

- Ordinance for Post-Development Stormwater Management for New Development and Redevelopment
- Floodplain Management / Flood Damage Prevention Ordinance
- Illicit Discharge and Illegal Connection Ordinance
- Conservation Subdivision / Open Space Development Ordinance
- Litter Control Ordinance
- Stream Buffer Protection Ordinance.

All cities and counties within the District are required to adopt either the model stormwater ordinances or ordinances at least as effective. A survey of local governments was conducted in October 2005 to determine how many jurisdictions have adopted the ordinances. Within or near park boundaries, all six ordinances had been adopted by unincorporated Cobb, Forsyth, and Gwinnett Counties, as well as the Cities of Cumming, Buford, Duluth, Alpharetta, and Roswell. The City of Atlanta has adopted all ordinances with the exception of the Conservation Subdivision / Open Space Development Ordinance, and unincorporated Fulton County has adopted three of the six ordinances (MNGWPD 2005).

Wastewater and Releases: An inventory of wastewater treatment facilities within the portion of the Chattahoochee River Basin represented by the Metropolitan North Georgia Water Planning District was compiled in 2002. A total of 93 permitted municipal and industrial wastewater facilities were identified with a collective discharge of approximately 405 million gallons per day (MNGWPD 2003a). Within the park boundaries, approximately 71 million gallons per day of treated water is returned to the river by seven municipal wastewater treatment plants within three counties (Georgia Power 2004a). It is anticipated that an additional 345 million gallons per day of wastewater treatment capacity will be needed for the area represented by the Metropolitan North Georgia Water Planning District by the year 2030. This will be achieved by constructing new facilities, expanding existing facilities, and phasing out smaller facilities. Plans for accommodating additional treatment capacity are detailed in the *Long-term WastewaterManagement Plan* (MNGWPD 2003a).

According to the Metropolitan North Georgia Water Planning District, most wastewater treatment plants consistently perform well, producing better quality effluent than required by their discharge permit. Many plants in the District have among the most stringent requirements in the country. Problems at wastewater treatment plants or in streams due to wastewater management are reportedly localized, documented, tracked, and addressed. In addition, the Georgia Environmental Protection Division has recently taken a zero tolerance policy toward violations in some areas, causing increased attention to preventing and resolving discharge issues (MNGWPD 2003a).

While the quality of wastewater discharged to the river has improved due to improved treatment plant technologies, sanitary sewer overflows and combined sewer overflows remain a problem within the Metropolitan Atlanta area. In 2001, Georgia Environmental Protection Division records indicated that approximately 82 million gallons of raw or partially treated sewage were spilled into the Chattahoochee River and its tributaries within the park. In 2001, two-thirds (67%) of these sewage

spills occurred in Peachtree Creek and its tributaries. Since 2001, the annual average amount of reported sewer spills has been much lower, ranging between 1.3 and 4.1 million gallons per year. The park has also maintained a list of sewer spills that are not included on the state's reported list (Harvey 2006a). The National Park Service is coordinating with the Georgia Environmental Protection Division on improving the recordation of spills. In addition, the National Park Service recently mapped the extensive network of sewer pipelines that are located within the park and the watershed surrounding the park (NPS 2001c). Many pipelines go through the park under easement agreements with local governments. Some lines, especially older lines that cross small- or medium-size tributaries, have experienced leaks and breaks due to action by flowing water and abrasion of sediments. For instance, Long Island Creek is proposed for listing on the draft 2006 303(d) list for impacted biota which may be partially attributed to a leaking sewer line (Methier 2006).

The City of Atlanta is undertaking a program to address sanitary and combined sewer overflows. In 2002, the Department of Watershed Management was formed in conjunction with the Clean Water Atlanta initiative to administer all water-related services and functions for the City of Atlanta. The primary goals of the program are compliance with two consent decrees. The First Amended Consent Decree addresses improvements in the City's sanitary sewer system and requires the elimination of sanitary sewer overflows. Under this Consent Decree, the City is repairing, replacing or rehabilitating all 2,200 miles of sewer throughout the City and implementing long-term prevention and maintenance strategies under "Operation Clean Sewer." Compliance with this Consent Decree is required by 2014. Compliance with a second Consent Decree, the Combined Sewer Overflow Consent Decree, must be in place by November 2007. The City has submitted and received regulatory authorization to implement the refined Combined Sewer Overflow Remediation Plan, which will enable the City to achieve the highest water quality at the lowest cost within the shortest time frame (Clean Water Atlanta 2006a and 2006b).

Land Application Systems: Land application of treated wastewater consists of distribution of effluent by spray application over fairly large vegetated areas. Spray application is generally preceded by primary and some secondary treatment processes on centrally collected wastewater to remove solids and some organic materials. Application to vegetated areas, in turn, completes the removal of nutrients and dissolved organics through natural physical, chemical, and biological treatment pathways. As with effluent discharged to septic system drain fields, some portion of the effluent sprayed onto the large vegetated areas used for land application may migrate into streams through stream/groundwater interactions. Application rates are calculated and these systems are designed to meet site specific conditions in order to prevent runoff to surface water bodies.

Land application sites are regulated by the state through a Land Application System Permit and/or a National Pollutant Discharge and Elimination Permit. Several municipal, industrial, and private permitted land application systems are located in the four county area encompassing the park. The permitted capacities of these systems range from 0.0075 million gallons per day to 5 million gallons per day, with most systems permitted for less than 1 million gallons per day (Steele 2006). Land application systems in the vicinity of the park with permitted capacities greater than 1 million gallons per day include Cauley Creek Water Reclamation Facility (5 million gallons per day) and Fowler and James Creek Water Reclamation Facility (1.25 million gallons per day). The Cauley Creek facility is a dual permitted facility in which a portion of the permitted capacity is land applied (an annual average daily volume of 1 million gallons per day) and the remainder of the permitted flow is discharged to Cauley Creek under a National Pollutant Discharge and Elimination Permit (Fulton County Department of Public Works 2005).

Septic Systems: Septic systems have been proven to be an environmentally sound method for onsite wastewater treatment when properly designed, sited, constructed, and maintained. When they are

not, they can become a source of ground and surface water contamination, as well as a public health hazard.

Septic systems in Georgia are governed by O.C.G.A. § 290-5-26, "On-Site Sewage Management Systems," administered by the Department of Human Resources. The Department has written the "Manual for On-Site Sewage Management Systems that details requirements for design, siting, and construction of septic systems. These regulations establish the minimum requirements that are enforced by County Boards of Health. Other local regulating agencies may also establish requirements, typically setting minimum lot sizes where septic systems will be allowed. Local wastewater utilities are involved only to the extent that if public sewer is available, septic systems are not permitted (MNGWPD 2003a).

There are an estimated 550,000 septic systems in the Metropolitan North Georgia Water Planning District, 37% of which are more than 20 years old (MNGWPD 2005). Highly developed counties, such as Fulton, have less than 10% of housing units using septic systems. Gwinnett and Forsyth Counties have between 40% and 90% of housing units using septic systems (MNGWPD 2003a).

Of special concern are those septic systems located in critical areas, or those areas where risks to public health and/or the environment are higher due to septic tank failure. The criteria for defining critical areas for septic tanks include:

- Locations in close proximity to water features, such as streams, rivers, lakes, and groundwater.
- Locations within watersheds of streams with impaired uses.
- Locations having unsuitable soil or rock.
- Locations within small water supply watersheds.
- Areas of concentrations of failing septic tanks.
- Other problem areas.
- Locations where consumptive use is an issue (MNGWPD 2003a).

These criteria result in the majority of the park falling under the definition of critical areas.

The system of regulating septic systems does not provide for their management. What little management of septic systems exists is through a variety of local ordinances and the overview of the Department of Human Resources Manual. Therefore, the Metropolitan North Georgia Water Planning District proposed recommended actions for all septic systems in the District, including improved siting, design and construction requirements, and improved maintenance requirements, such as mandatory pump-out intervals (MNGWPD 2003a).

Spills of other materials: The Georgia Oil or Hazardous Material Spills or Releases Act (O.C.G.A. 12-14-1 et seq.) requires that the Georgia Department of Natural Resources Emergency Operations Center be immediately notified of a reportable spill. A spill is reportable if it is a spill of a hazardous substance above the reportable quantity listed in 40 CFR 302.4 or a spill of a petroleum product which reaches the waters of the state (including the Chattahoochee River, tributaries, storm sewers, and drainage ditches) and causes a sheen. A database of reported spills is maintained by the Georgia Department of Natural Resources.

Accidental spills of fuel and numerous other chemicals have occurred on bridges crossing over the Chattahoochee River or other nearby roads within the park. Local or state emergency response teams handle the cleanup of these spills. The park tracks the types and quantities of materials released to the

river in a database that is updated periodically with information obtained from the Georgia Department of Natural Resources database (Harvey 2006a).

Water Quality Parameters

The Georgia Department of Environmental Protection compiles monthly water quality data at municipal water intakes on the Chattahoochee River. The DeKalb County Department of Public Works water intake, located at river mile 325.3, and the Cobb County-Marietta Water Authority intake, located at river mile 310.5, are located within the park boundary. Table 11 summarizes data for 14 parameters collected at these intakes from 2003 to 2004 (Georgia Power 2006a). Water quality sampling is also being conducted in the Morgan Falls impoundment by Georgia Power as a component of the re-licensing process. These data are summarized in Georgia Power's *Water Resources Report* (2006a).

Table 11. Summary of Water Quality Data at Two Locations on the Chattahoochee River within the Park Boundary, 2003-2004

	DeKalb County Department of Public Works Intake (River Mile 325.3)				Cobb County-Marietta Water Authority Intake (River Mile 310.5)			
	N[1]	Mean	Min	Max	N	Mean	Min	Max
Temperature (ºC)	41	11.03	5.96	17.49	41	13.28	5.91	21.61
Conductivity (µmhos/cm)	41	53.5	40	64	41	71.9	54	99
pH (standard units)	41	6.05	4.90	6.96	41	6.42	5.21	7.80
Alkalinity (mg/L)	11	13.6	10	20	11	18.6	12	45
Hardness (mg/L CaCO3)	25	15.5	10	26	25	22.1	14	50
Total Organic Carbon (mg/L)	25	2.51	1.4	4.2	25	2.72	1.7	4.8
Total phosphorous (mg/L)	12	0.0258	0.020	0.040	19	0.4263	0.020	0.090
Nitrate-Nitrite (mg/L)	25	0.299	0.09	0.49	25	0.635	0.28	1.20
Ammonia (mg/L)	13	0.062	0.03	0.15	15	0.062	0.03	0.12
Total suspended solids (mg/L)	24	18.6	1.7	86.0	25	26.6	1.3	120.0
Turbidity (NTU)	25	8.73	1.5	30.0	25	13.98	2.9	36.0
Biological Oxygen Demand (mg/L)	--	--	--	--	2	2.1	2.1	2.1
Fecal coliform bacteria (MPN colonies/100 mL)	24	615	20	9000	26	428	20	5000
E. coli (MPN colonies/100 mL)	27	393	10	6131	26	540	10	8664

[1] Sample N and reported values are only for those samples for which measurement exceeded detection limit.
N = number of samples
Min = minimum
Max = maximum
mg/L = milligrams per liter
mhos/cm = siemens per centimeter
NTU = nephelometric turbidity units
MPN = most probable number
NA = not applicable
Source: Georgia Power (2006a)

A Water Quality Monitoring Plan was developed as part of the *District-wide Watershed Management Plan* produced by the Metropolitan North Georgia Water Planning District (MNGWPD 2003c). The purposes of the monitoring plan are:

- To consolidate as many of the current monitoring requirements as possible into a larger, comprehensive program that could provide consistency in methodology and effort across the District;

- To help identify water quality impairments and improvements;
- To evaluate the effectiveness of the *District-wide Watershed Management Plan* as it is implemented; and
- To help local governments meet their existing regulatory monitoring requirements.

Database development and management is also a key component of the *Water Quality Monitoring Plan*. This comprehensive database that integrates local, federal, and interjurisdictional water quality data will be a useful tool for park managers.

The following is a summary of available water quality data and areas of concern associated with the Chattahoochee River and tributaries within the park.

Fecal Coliform Bacteria: Fecal coliform bacteria are utilized as indicators of fecal pollution and in assessing water quality for support of primary and secondary contact recreational activities. They also can indicate the presence of other harmful microorganisms, including those that can cause typhoid fever, hepatitis, gastroenteritis, dysentery and ear infections. All aerobic organisms, including the free-living, non-enteric bacterial community, use oxygen.

The State of Georgia has issued standards for fecal coliform (GADNR 2005d). In waters with a water use classification of "fishing" or "drinking water supplies", during the months of May through October, fecal coliform is not to exceed a geometric mean of 200 colonies per 100 milliliters (mL) of water based on at least four samples collected from a given sampling site over a 30-day period at intervals not less than 24 hours. Should water quality and sanitary studies show that fecal coliform levels from non-human sources occasionally exceed 200 colonies per 100 mL of water, then the allowable geometric mean fecal coliform shall not exceed 300 colonies per 100 mL of water in lakes and reservoirs and 500 colonies per 100 mL of water in free flowing freshwater streams. For the months of November through April, fecal coliform is not to exceed a geometric mean of 1,000 colonies per 100 mL of water and not to exceed a maximum of 4,000 colonies per 100 mL for any sample. In waters with a water use classification of "recreation", the year-round fecal coliform standard is the same as that outlined above for May through October in waters with a classification of "fishing" and "drinking water supply."

Sources of fecal coliform include nonpoint runoff, sewer line overflows, spills of raw sewage from sewer line breaks, and sewer line and septic system leaks. The park is surrounded by an extensive network of sewage lines, with several located inside the park. Domestic animals (cows, horses, dogs) and wildlife (duck, geese) also cause direct bacterial contamination of the river and tributaries. Failure to meet the fecal coliform standard is the most commonly listed cause of non-support of designated uses in the park and the Atlanta region. As a result, a total maximum daily load assessment was developed for fecal coliform for seventy-nine stream segments in the Chattahoochee River Basin in February 2003 by the Georgia Environmental Protection Division (GADNR 2003c).

In 1999, the U.S. Geological Survey in cooperation with the National Park Service began a two-year study designed to evaluate microbial contamination in streams in and near the park. This was accomplished by summarizing existing fecal coliform data and by data collection at several sites along the river. The following results were obtained from this study:

- The geometric-mean of fecal-coliform bacteria concentrations commonly exceeded Georgia Environmental Protection Division standards in samples collected from the Chattahoochee River near Paces Ferry Road, especially during May to October 1999 when water-contact recreation activities are expected to occur.

- The percentage of samples exceeding bacteria standards increased from the upstream monitoring site at Settles Bridge to the downstream monitoring site at Paces Ferry Road.
- The lowest fecal-coliform bacteria concentrations occurred in the Chattahoochee River and tributaries during low-flow conditions; whereas, the highest fecal-coliform bacteria concentrations occurred during storm-flow conditions.
- During low-flow and storm-flow conditions, fecal-coliform bacteria concentrations in tributary streams were generally higher than concentrations in the Chattahoochee River.
- During diurnal sampling, indicator-bacteria concentrations were lowest during the late afternoon, following the period of most intense sunlight and highest during the night (Gregory and Frick 2001).

In conjunction with this study, *Escherichia coli* (*E. coli*) ribosomal fingerprints (ribotypings) were identified in an attempt to distinguish sources of fecal coliform bacteria. This technique involves matching of genetic fingerprints of E. coli in water samples to strains of E. coli from fecal material samples in the watershed. Results indicated that the majority of E. coli ribotype patterns identified in this study were unshared, and the need for a larger scale environmental sampling effort was identified (Hartel *et al.* 2004).

Because of historically high levels of indicator bacteria in the Chattahoochee River, the concept of a bacteria alert network was proposed as a means to inform people when bacteria levels in the river exceed U.S. Environmental Protection Agency criteria (*E. coli* counts above 235 colonies per 100 mL of water). Thus, a program of bacteria monitoring called BacteriALERT was initiated on the Chattahoochee River within the park in the fall of 2000. BacteriALERT is a partnership between State and Federal agencies and non-government organizations. This partnership includes the Georgia Environmental Protection Division, the National Park Service, and the U.S. Geological Survey and non-governmental organizations such as the Upper Chattahoochee RiverKeeper, Georgia Conservancy, and Trust for Public Lands.

The main objective of this network is to obtain total coliform and *E. coli* bacteria counts. However, since *E. coli* bacteria counts cannot be instantly determined, turbidity values are used to predict *E. coli* counts, and water samples are collected occasionally. Results are posted on a publicly-accessible web site within 24 hours of data collection. A second objective is the statistical analysis and interpretation of these data under a wide range of seasonal, weather, and river conditions. Information is posted on the Internet at http://ga2.er.usgs.gov/bacteria. Samples are collected daily at two park locations: Medlock Bridge and Paces Ferry Bridge. Table 12 summarizes data collected from these two stations from fiscal year 2000 to 2005.

Table 12. Summary of BacteriALERT Program *E. coli* Data Reported from Two Locations on the Chattahoochee River within the Park

Sample Location:	Medlock Bridge					Paces Ferry				
Fiscal Year	2001	2002	2003	2004	2005	2001	2002	2003	2004	2005
Total number of samples	205	355	218	126	127	208	355	218	126	127
Number of samples exceeding EPA criterion (235 colonies/100 mL of water)	29	47	49	18	32	71	80	94	34	56
Percentage of samples out of compliance	14.1	13.2	22.5	14.3	25.2	34.1	22.5	43.1	27.0	44.1

EPA = Environmental Protection Agency
mL = milliliter
Source: U.S. Geological Survey, unpublished data

Water Temperature: Cold-water conditions in the mainstem Chattahoochee River, historically a warm-water stream, commenced in the 1957-58 timeframe with the completion of Buford Dam and the filling of Lake Lanier (Hess 1980). Releases from the deep, cold region of Lake Lanier referred to as the hypolimnion provide a thermal regime in the river suitable for introducing trout. Trout did not occur historically in the river. The Georgia Department of Natural Resources began managing the Buford Dam tailwater as a put-and-take trout fishery in 1960 with the introduction of invasive rainbow trout and brown trout (Gilbert and Reinert, 1978; Hess, 1980 in Georgia Power 2004a).

Temperatures in the river are largely controlled by releases from Buford Dam. During March through September, release of cold hypolimnetic water from Lake Lanier for power generation cools the river at the upper end of the park. During December and January, the release of warmer vertically mixed water to the river causes a mid-winter warming effect, reversing the pattern expected in a free flowing river. Water temperature can also be impacted by urban runoff, the loss of riparian trees, wastewater discharges, and residence time in Bull Sluice Lake reservoir (NPS 2000c).

The Chattahoochee River is designated as a secondary trout stream from Buford Dam to the intersection with the Interstate 285 West Bridge (GADNR 2005d). According to the Rules and Regulations for Water Quality Control (GADNR 2005d) a secondary trout stream is a stream showing no evidence of natural trout reproduction, but capable of supporting trout throughout the year. The rules also state that secondary trout waters shall not have temperature elevations exceeding 2°F above natural stream temperatures. The Georgia Wildlife Resources Division and Environmental Protection Division have recognized that water temperatures in the Chattahoochee River downstream of Morgan Falls Dam have caused acute, and perhaps chronic, trout mortality since the late 1980s. Because water conditions suitable for trout survival (water temperature) are man-made, not natural, the Wildlife Resources Division and Environmental Protection Division are working concurrently to develop tailwater-specific water temperature criteria designed to protect the trout fishery in the Chattahoochee River from Buford Dam to Peachtree Creek. Water temperature data will be collected from 2004 through 2006 (Martin 2006).

A second issue driving the need for development of new water temperature criteria is the documented reproduction of brown and rainbow trout below Buford Dam, which has prompted discussion to change the designation of the Chattahoochee River upstream of Morgan Falls Dam to a primary trout stream. If redesignated as a primary trout stream, more stringent water quality and temperature standards would be applicable.

In addition, lethal high temperature events that have occurred below Morgan Falls Dam since 1989 have also prompted the need for additional data collection. In support of the relicensing of Morgan Falls Dam, Georgia Power conducted a temperature study to characterize the effects of the Morgan Falls impoundment on summer water temperatures within the impoundment and immediately downstream. The results of this study are documented in Georgia Power's Water Resources Report (2006a). One conclusion drawn from this study is that stormwater runoff from the watershed upstream of the Morgan Falls impoundment is the predominant factor producing warm-water events potentially harmful to trout in the river downstream of the impoundment, rather than warm water from shallow flats within the impoundment (Georgia Power 2006a).

Dissolved Oxygen: Dissolved oxygen is a measure of the amount of oxygen contained in a quantity of water, which is often expressed as the milligrams of oxygen contained in one liter of water (mg/L). The amount of oxygen that can be dissolved in water is temperature dependant (cold water can contain more oxygen than warm water). Dissolved oxygen concentrations are an important indicator of water quality and a water body's ability to support aquatic life.

Low dissolved oxygen levels (less than 3 mg/L) occur in the river because water discharges from Buford Dam are taken from the lowest levels of the reservoir, the hypolimnion. In the hypolimnion, water temperatures are low, but due to high rates of decomposition and bacterial activity, the biological oxygen demand is high, resulting in low amounts of dissolved oxygen. Most fish cannot survive in these low oxygen conditions, and avoid these anoxic (low oxygen) sections of the river closest to the dam. Dissolved oxygen levels quickly increase with distance from the dam, as the water is re-aerated by flowing downstream. However, in 2005, the Georgia Department of Natural Resources measured oxygen levels below the standard for secondary trout streams as far downriver as Settles Bridge, which is 5.4 miles from Buford Dam (Couch 2006).

The daily average dissolved oxygen standard for a secondary trout stream is 6.0 mg/L, and the minimum standard at any time is 5.0 mg/L (GADNR 2005d). Historically, water released from Buford Dam had low levels of dissolved oxygen, especially during late summer releases (September through October) from the deeper levels of the lake. Downstream re-aeration in shoals and vertical mixing in pools raised dissolved oxygen levels in 90% of the river within the park above the average 6.0 mg/L level desirable for trout streams (Couch 2006). In response to the problem of low dissolved oxygen in the Lake Lanier tailwater, the United States Army Corps of Engineers rehabilitated their existing turbines with auto venting turbines. During the fall seasons of 2000-2004, The United States Army Corps of Engineers made special low flow releases to enhance dissolved oxygen. Dissolved oxygen levels in the tailwater are being evaluated to determine the effects of this rehabilitation.

In the past, point-sources of wastewater from treatment plants introduced large quantities of oxygen-demanding organic material to the river. With improved treatment systems, however, these sources have been greatly reduced. In the 1960s and 1970s, dissolved oxygen levels generally ranged from 4 to 5 mg/L, and readings of 0 mg/L were not uncommon (NPS 2000c). Low dissolved oxygen in the river due to point source wastewater discharges have decreased significantly since the 1970s.

A study by Georgia Environmental Protection Division showed that between 1986 and 1995, dissolved oxygen levels at the three water intakes on the river within the park were all at greater than 80 percent saturation, exhibiting little annual variation (NPS 2000c). Dissolved oxygen levels in the tributaries of the Chattahoochee River between 1993 and 1995 were also acceptable, based on a study by Georgia Environmental Protection Division (NPS 2000c). In addition, continuous dissolved oxygen monitoring data collected by Georgia Power from 2003-2004 near the Morgan Falls impoundment indicate that applicable dissolved oxygen criteria are being met in this reach of the river (Georgia Power 2006a).

Metals: Low dissolved oxygen levels in the lowest layer (hypolimnion) of Lake Lanier create conditions where metals, such as iron, magnesium, and sulfides can be dissolved and passed downstream into the Chattahoochee River. The dissolved metals give the river a distinctive coloration in the fall when these anoxic conditions are common. These metals have also been associated with fish stress and trout mortality at the Buford Trout Hatchery. As the sulfides are released from the dam, they give the river a characteristically unpleasant odor, which has led to complaints from park neighbors in this reach of the river.

Erosion/Sedimentation: Runoff during storms carries sediment from construction sites and impervious surfaces such as roads, parking lots, driveways and rooftops into the Chattahoochee River and tributaries. This raises the levels of suspended solids in the water, increasing the turbidity levels. Elevated turbidity and sediment levels are common in streams and the Chattahoochee River in the park, especially after storm events. Suspended sediments have an adverse impact on aquatic life directly by clogging fish gills and filling in or coating benthic habitat in pools and riffles. Elevated turbidity also increases stream temperatures and lowers dissolved oxygen levels. Sediment particles

may also carry pesticides, herbicides, metals, and grease and oil into receiving streams and the river, and contaminated sediments accumulate behind dams and collect in reservoirs. Legislation and planning efforts that address erosion and sedimentation are summarized in the "non-point source runoff" subsection.

Estimates of total suspended solids loading rates for four creeks in the Chattahoochee River Basin are presented in the Gwinnett County Watershed Protection Plan (2000). Loading rates ranged from 1,396 pounds/acre/year for Suwanne Creek to 2,438 pounds/acre/year for Crooked Creek. Three of the four creeks with available data exceeded the 1,600 pounds/acre/year watershed guideline established by the County for protection of the aquatic environment. Additional study results indicate that 55% of the total drainage area of Crooked Creek would require a best management practices retrofit to meet the 1,600 pounds/acre/year criterion. A 35% and 20% retrofit were estimated for Level and Richland Creeks, respectively.

Substantial sand and silt deposition has occurred in the Morgan Falls Dam impoundment as a result of erosion and sedimentation caused by runoff from agricultural lands, scouring of the river banks below Buford Dam from peak power releases, and land clearing and disturbance and associated runoff from impervious surfaces in rapidly urbanizing areas of metropolitan Atlanta (Georgia Power 2004a). In conjunction with the relicensing of Morgan Falls Dam, Georgia Power is conducting a study to characterize existing erosion and sedimentation within the Morgan Falls project area and to develop information for analyzing the potential effects of continued project operation on geology and soils. The results of this study are summarized in Georgia Power's *Geology and Soils Study Report* (2006b). The specific objectives of the study are to:

- Characterize the distribution, sources, and rate of sediment deposition within the Morgan Falls impoundment based on field reconnaissance and review and analysis of existing topographic/hydrographic survey and sediment characterization information.
- Evaluate whether sedimentation has reached or is approaching equilibrium in the project impoundment.
- Evaluate the impact of future sedimentation on usable storage capacity of the Morgan Falls impoundment and re-regulation of Buford Dam flows.
- Characterize surface sediment quality in the project area based on review of existing sediment data for the Chattahoochee River and Morgan Falls impoundment.
- Evaluate the feasibility and estimated costs of dredging, transporting, and disposing of sediment (Georgia Power 2004b).

Results of sediment quality monitoring from 1992 to 1995 in the Apalachicola–Chattahoochee–Flint River Basin were published by the United States Geological Survey in 1998 (Frick et al., 1998). The conclusions obtained from this study serve as a general overview of sediment quality within the basin. The study results indicated that the largest enrichments of trace elements and the highest concentrations of organic compounds in bed sediments are in the urban and suburban watersheds draining portions of Metropolitan Atlanta and in main-stem and reservoir settings on the Chattahoochee River downstream from Atlanta. Concentrations of mercury, cadmium, lead, and zinc in bed sediments of these urban and suburban watersheds increased in direct proportion to the amount of industrial land and transportation corridors in these watersheds. Sediment core samples collected from six reservoirs in the basin indicated the presence of organochlorine insecticides, particularly DDT and chlordane, and PCBs in sediments deposited as recently as 1994. It was determined that much of the current pollutant load of trace elements and organic compounds is from

stormwater runoff from impervious surfaces in urban and suburban areas and local and regional industrial emissions.

Accumulation of Chemicals in Fish: Sampling of fish in the Chattahoochee River was first conducted in 1995 by the Georgia Environmental Protection Division for 43 parameters, including pesticides, herbicides, polychlorinated biphenyls, and organic substances. Of the 43 parameters, levels of mercury, polychlorinated biphenyls (PCBs), and chlordane above those recommended by the U.S. Environmental Protection Agency and State of Georgia for fish consumption have been measured in fish from some locations within the park (NPS 2000c). As a result, the Environmental Protection Division recommended a set of fish consumption guidelines specifically for mercury, polychlorinated biphenyls, and chlordane in the Chattahoochee River from Buford Dam to Morgan Falls Dam, and a separate set of recommendations for the river below Morgan Falls Dam (NPS 2000c). These guidelines are revised annually based on ongoing sampling results.

Subsequent fish tissue data document a decline in chlordane levels, and chlordane was removed as a causative contaminate from the fish consumption guidance in 1999 (GADNR 2004). A summary of fish species occurring within the park included in the 2006 fish consumption guidance is provided in Table 13. The majority of tested fish species, including rainbow trout and brown trout, have no restrictions. Of the species with consumption restrictions, the contaminants of concern are mercury and polychlorinated biphenyls.

Table 13. 2006 Fish Consumption Guidelines for Segments of the Chattahoochee River within the Park

Species	Location	Recommendation	Contaminant of Concern
Largemouth Bass	Buford Dam to Morgan Falls Dam	1 meal/week	Mercury
Common Carp	Buford Dam to Morgan Falls Dam	No restrictions	--
Brown Trout	Buford Dam to Morgan Falls Dam	No restrictions	--
Rainbow Trout	Buford Dam to Morgan Falls Dam	No restrictions	--
Yellow Perch	Buford Dam to Morgan Falls Dam	No restrictions	--
Common Carp	Morgan Falls Dam to Peachtree Creek	1 meal/month	PCBs
Jumprock Sucker	Morgan Falls Dam to Peachtree Creek	1 meal/week	Mercury
Largemouth Bass	Morgan Falls Dam to Peachtree Creek	No restrictions	--
Brown Trout	Morgan Falls Dam to Peachtree Creek	No restrictions	--
Rainbow Trout	Morgan Falls Dam to Peachtree Creek	No restrictions	--
Bluegill Sunfish	Morgan Falls Dam to Peachtree Creek	No restrictions	--
Striped Bass	Morgan Falls Dam to Interstate 285	1 meal/month	PCBs, Mercury

Notes: PCBs = Polychlorinated biphenyls
Meal size ranges from 4 to 8 ounces.
One population of striped bass migrates annually between Morgan Falls Dam and West Point Lake. Sampled population reflects this stretch of the river.
Source: GADNR 2006b

Mercury is a naturally occurring metal that does not break down as it cycles between land, water, and air. The source of mercury in Georgia's fish is currently unknown; however, it may be attributed to the

mercury content of soils and rocks, from municipal and industrial sources, atmospheric deposition, or from fossil fuel use (GADNR 2006b). The majority of mercury present in fish tissues is found in its bioavailable form, methylmercury, which is converted from inorganic mercury by sulfur reducing bacteria, commonly found in reservoirs and wetlands where low oxygen levels are common. Methylmercury is more toxic to living things than inorganic mercury, and becomes concentrated in animal tissues as it moves up the food chain through a process known as bioaccumulation. This can result in concentrations in fish tissues that are unsafe for human consumption.

Polychlorinated biphenyls were banned in 1976; however they do not break down easily and are persistent in aquatic sediments. In the past, polychlorinated biphenyls were used as coolants and lubricants in transformers, capacitors, and other electrical equipment because of their insulator properties.

In the park, the U.S. Environmental Protection Agency has made special reference to polychlorinated biphenyls because of the potential for carcinogenic and other types of health effects, recommending a level of not more than 100 parts per billion in fish and stating that the need for a health advisory is "clear, particularly for children and pregnant and nursing mothers" (NPS 2000c). The agency has recommended further research and testing of sport and native fish and sediments, and investigations of landfills as possible sources of polychlorinated biphenyls.

Currently, the Georgia Environmental Protection Division has placed a 12-mile segment of the Chattahoochee River between Morgan Falls Dam and Peachtree Creek on the draft 2006 303(d) list as only partially supporting its designated use as recreation and drinking water, due to violations of appropriate fish consumption guidelines. A total maximum daily load assessment was developed for polychlorinated biphenyls in fish tissues for seven segments of the Chattahoochee River, including Morgan Falls to Peachtree Creek, in January 2003 by the Georgia Environmental Protection Division (GADNR 2003b).

Sand and Gravel Mining: Sand and gravel mining occurs on private property along the riverbank in the vicinity of McGinnis Ferry Road and Abbotts Bridge Road. Historically, about six dredge operators mined sand and gravel in the riverbed under U.S. Army Corps of Engineer permits. Most of the mined material is used for road construction in the Atlanta area. Because dredging is normally associated with adverse impacts on benthic invertebrates, fish, and water quality, the Georgia Department of Natural Resources conducted field studies to estimate the nature of the potential effects of sand mining on the Chattahoochee River (Martin and Hess 1986). These studies concluded that:

- Abundance and diversity of fish increased at the majority of dredged sites, possibly due to increased habitat diversity and availability created by the dredging.
- Higher numbers of trout in some areas (Rogers Bridge) may have been misrepresented because dredging occurred in areas stocked regularly by the state.
- Removal of sand is generally beneficial to aquatic life, but removal of gravel and debris is detrimental to aquatic life, because these materials provide habitat for aquatic invertebrates.
- Dredging causes temporary localized increases in turbidity.
- Dredging results in deeper, wider channels with different fish assemblages, primarily related to slower current velocities.

The study recommended that dredging be limited to sand and that it not allow removal of trees, gravel, or cobble, which are beneficial to fish and invertebrates. This approach would mitigate the heavy sediment loads and erosion associated with surface water runoff resulting from other activities.

The net effect of dredging in this instance, therefore, is to partially restore natural conditions by removing the unnaturally high amounts of sediment from the river bottom.

Sand and gravel mining in the park is regulated by the United States Army Corps of Engineers under Section 404 of the Clean Water Act; the Metropolitan River Protection Act allows sand and gravel mining as long as the operations do not disturb the riverbank. The National Park Service issues a special use permit for these operations. The National Park Service also has the authority to place conditions on Clean Water Act, Section 404 permits issued by The United States Army Corps of Engineers and can veto these permits if a project appears to be inappropriate. This allows the National Park Service to control aspects of mining operations that might adversely impact water quality and aquatic life in the park (NPS 2000c).

AQUATIC RESOURCES

The existing conditions of aquatic resources in the park are summarized in terms of fish, benthic macroinvertebrates, amphibians, reptiles, bivalve mollusks, and invasive species. Habitats include the main stem of the Chattahoochee River, wetlands located in the floodplain of the park, and tributaries located within park boundaries. This section includes the following information regarding aquatic resources:

- A summary of the factors controlling diversity and abundance of aquatic resources.
- A description of biological indicators that have been used to characterize aquatic resources.
- A summary of the most recent fish inventories conducted to date.
- A description of cold-water fisheries.
- A summary of the effects of temperature on fisheries.
- Descriptions of the major characteristics of benthic macroinvertebrates, amphibians, reptiles and bivalve mollusks that occur in the park.
- A description of the types of invasive aquatic species that occur in the park.

The information presented in this section is based on interviews with local specialists and agency representatives, a literature review conducted by the National Park Service (NPS 2000c), survey results from the National Park Service Southeast Coast Inventory and Monitoring Program, and available literature.

Factors Controlling Diversity and Abundance of Aquatic Resources

The diversity and abundance of aquatic resources in the park can be used to define the ecological health of the river and tributaries in the park. The primary factors affecting the types, abundance and diversity of aquatic life in the park include the following:

- **Nonpoint runoff from developed areas within the watershed**: During storm events, nonpoint runoff from impervious surfaces in highly urbanized watersheds generates stormwater (refer to "Water Quality" subsection). The impervious surfaces include roads, parking lots, roof tops, and active construction sites. These releases cause large, short-term surges in water levels and flows, and high levels of total suspended solids. The large surges in flow cause increased erosion and sedimentation of benthic habitats, vertical riverbank erosion, widening of the river channel, and changing floodplain dimensions.
- **Regular, timed releases of water from Buford Dam**: Congress has authorized releases from Buford Dam for hydropower, flood control, and downstream navigation. In the spring,

releases are also intended for fish spawning in downstream reservoirs (Martin 2006). River levels can change up to eight feet within the park within a short period of time as a result of these releases (NPS 2005b). The effects of these variable flows on aquatic life in the river are superimposed on the effects of flows produced by stormwater runoff from nonpoint sources.

- **Releases of cold water from the hypolimnion of Lake Lanier**: These releases have created conditions that are suitable for the development of a cold water fishery below Buford Dam to Peachtree Creek. A warm water fishery exists below the Morgan Falls Dam. In addition, releases of water from the hypolimnion of Lake Lanier have created the potential for low oxygen conditions to develop below the dam, with associated potential effects on aquatic life (refer to the "Water Resources" subsection).
- **Effects of Morgan Falls Dam**: Morgan Falls Dam is a modified run-of-the-river hydropower generation low-head dam located at river mile 312.5. Although this is a modified run-of-the-river facility, the temperature regime of the river below Morgan Falls Dam is warmer than above the reservoir. This difference has affected the types, abundance, and diversity of aquatic life below the dam.

Biological Indicators

Fish and benthic macroinvertebrates are routinely used as indicators of biological health of aquatic systems. Biological health of an aquatic system is typically expressed as "biotic integrity", which is defined as the "the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region (Karr and Dudley 1981)." Biotic integrity is estimated using indices based on field data on the types, abundance and diversity of fish and benthic macroinvertebrates, combined with information on substrate type, hydrological conditions, and overall habitat features. Indices have been developed for both fish and benthic macroinvertebrates.

Two indices based on fish population data are used by the Georgia Department of Natural Resources, Wildlife Resources Division to assess the biological (biotic) integrity of streams in Georgia. These include the Index of Biotic Integrity and the Index of Well-Being. Both indices have been modified for use in the southeastern United States, since they were originally developed in the Midwest (GADNR 2005a).

The Index of Biotic Integrity was developed by Karr (1981) to assess the health of aquatic communities based on the functional and compositional attributes of the fish population. This index employs a set of 13 metrics to calculate a number that corresponds to a relative scale of biotic integrity. The Index of Well-Being was developed by Gammon (1976) to measure the health of aquatic communities based on the structural attributes of the fish population. This is a composite index that combines two parameters of fish diversity and two parameters of fish abundance in approximately equal measures to produce a single value reflective of the diversity and abundance of the fish community.

Together, these two fish indices provide a direct and quantitative assessment of the biotic integrity of an aquatic community based on an overall evaluation of its fish population (GADNR 2005a). The index scores for several tributaries within the park surveyed in 2003 are summarized in Table 14 (GADNR 2005b). Index of Biotic Integrity scores ranged from poor to very poor, while the Index of Well-Being scores ranged from good to fair.

Table 14. Index of Biotic Integrity and Index of Well-Being Scores for Tributary Streams in the Park

Location	Index of Biotic Integrity Score	Index of Well-Being Score	Notes
Ivy Creek near SR 324 (Gwinnett County)	26 – Poor	6.2 - Fair	The total number of fish collected was very low given the size of the stream. Overall habitat assessment scores were very low. Sand and silt was noted to have eliminated all riffles. Instream habitat was scarce, banks were poorly vegetated and unstable, and the riparian zone along one bank was occupied by an apartment building.
Long Island Creek near Jett Park Road (Fulton County)	22 – Very Poor	7.8 - Good	An overall low number of fish were collected as well as low numbers of insect eating fish and benthic specialists. A high percentage of fish had external anomalies, which are often indicative of poor water quality. A leaking sewer pipe was noted. Poor habitat scores were assigned.
Nancy Creek near Wesley Road (Fulton County)	24 – Very Poor	6.8 - Fair	The total number of fish collected was very low given the size of the watershed and included only one benthic invertivore species, one sucker species, and one intolerant species. There was a very low percentage of insect eating minnows and an unhealthy predominance of sunfish. Stream banks were poorly vegetated and unstable.
Suwanee Creek near Woodward Mill Road (Gwinnett County)	20 – Very Poor	6.5 - Fair	Although 15 native fish species were observed, the total number of fish was very low and included no insect-eating minnows or sensitive species and a very low percentage of benthic specialists. A high percentage of fish had external anomalies, which are often indicative of poor water quality. Poor habitat scores were assigned.

Notes:

An Index of Biotic Integrity score of 60 indicates a perfect index score (best conditions), while scores of 24 or less are considered very poor.
An Index of Well-Being score of 8.1 is considered excellent for a drainage basin less than 15 square miles (Ivy Creek, Long Island Creek, and Suwanee Creek), while a score of 9.6 is considered excellent for a drainage basin greater than 15 square miles (Nancy Creek).

Source: GADNR 2005a, GADNR 2005b, and GADNR 2005c

Additional biotic integrity studies have been conducted within the park by DeVivo et al. (1997). Eight of the thirteen commonly used metrics were included in a preliminary Index of Biotic Integrity (IBI) specific to the Chattahoochee River Basin. Streams were also compared along a gradient of urbanization and were found to be inversely related to human population density. Streams in the most urbanized watersheds ranked between 'very poor' and 'fair' and the two predominantly forested watersheds scored the highest ranking of 'good'. Shallow, low energy shoreline habitats, which have been found to be the prime habitat for most fish species, are greatly reduced under the highly variable flow conditions. Several other studies of both fish and benthic macroinvertebrates have also been conducted within the boundaries of the park in support of watershed assessments conducted by Cobb, Gwinnett, Fulton and Forsyth Counties (e.g., Parsons 2001a; NPS 2000c).

Cross comparison and evaluation of the results indicate that nonpoint runoff, sedimentation, and modifications of flow regimes and available benthic habitat in area streams have combined to produce

relatively low-diversity and low-quality populations compared to reference sites. Also, the differences in scores represent responses to different environmental stressors, as fish respond differently from benthic macroinvertebrates to the same stressor.

Other studies have concluded that variability in daily high and low flow discharge in the Chattahoochee River has been a major factor in contributing to low habitat diversity and availability of benthic invertebrate food sources, which in turn results in lower fish population diversity (NPS 2000c). In summary, the effects of stormwater on flow and levels of total suspended solids in the river are superimposed on the effects of regulated flow releases. Together, these two factors have a major effect on fish and benthic macroinvertebrates in the park.

Fish Inventories

An inventory of fish species occurring within the park was conducted in 2005 by Auburn University for the National Park Service Southeast Coast Inventory and Monitoring Program. Results of this study are not yet final; however, preliminary field survey and historical data suggest that at least 70 species of fish potentially occur in the tributaries and main channel of the Chattahoochee River within the park (DeVivo 2006). A complete species list will be published by the Inventory and Monitoring Program upon data certification. A listing of fish species of concern is included in the "Rare, Threatened, or Endangered Species" subsection.

Cold Water Fisheries

A trout fishery was established in the Chattahoochee River downstream of Buford Dam in the early 1960s, prior to the establishment of the park, through stocking and has been supported by the Georgia Department of Natural Resources, Wildlife Resources Division's trout stocking program. This resulted in the classification of the Chattahoochee River, within the park, as a secondary trout stream, where there is no evidence of natural trout reproduction and trout are supported throughout the year. The river, within the park boundary is divided into two fisheries management sections. The river from Buford Dam downstream to the headwaters of Bull Sluice Reservoir is the Lanier Tailwater Section, and from Morgan Falls Dam downstream to the Interstate 285 West Bridge is the Morgan Falls Tailwater Section.

Since the 1960s, the Georgia Department of Natural Resources has managed the Lanier Tailwater Section of the river as a put-and-take trout fishery, and, in 1976, the Department constructed and began operating Buford Trout Hatchery, located approximately one and one-half miles downstream of Buford Dam. Catchable-size trout, nine inches long or larger, were stocked with the expectation that anglers would catch and keep these fish. Brook, brown, and rainbow trout have been stocked within the Lanier Tailwater Section. In the 1990s, brook trout stocking was discontinued by the Georgia Department of Natural Resources due to poor survival and angler return. Brown and rainbow trout stocking continued through 2005, when brown trout stocking was discontinued to facilitate an evaluation of the wild brown trout population. Since then, only rainbow trout have been stocked. Annual stocking numbers have ranged as high as 280,000, but have been between 150,000 and 160,000 since 2004.

Brown trout reproduction has been documented in the Lanier Tailwater Section each year since 1998 (GADNR 2006a). In 2004, it was estimated that 38% of brown trout occurring in this section of the park are river spawned (GADNR 2006a). The Georgia Department of Natural Resources ceased stocking brown trout in 2005 to assess brown trout reproduction and recruitment and its ability to sustain a fishery. The Department will continue to stock 159,000 rainbow trout, but brown trout will not be stocked in the Lanier Tailwater Section pending the results of the study. However, brown trout will continue to be stocked in the Morgan Falls Tailwater Section.

The Morgan Falls Tailwater Section was originally managed as a put-grow-and-take fishery. Fingerling brown trout (less than 6 inches long) were stocked with the expectation that they would grow and be harvested when they reached a size that anglers felt was acceptable. From the early 1980s through the 1990s, 50,000 to 150,000 fingerling trout were stocked annually into the Morgan Fall Tailwater Section. Since the late 1980s, excessive water temperatures have been a cause for acute, and perhaps chronic, trout mortality in this section of the river. This is largely due to an increased amount of impervious surfaces within the watershed that have produced large volumes of heated run-off that ultimately enters the river. In the early 2000s, the Department of Natural Resources discontinued fingerling stockings and began managing a portion of the Morgan Falls Tailwater Section from the mouth of Sope Creek downstream to Paces Mill for "Delayed Harvest" fishing. Within the delayed harvest section, approximately 50,000 catchable rainbow and brown trout are stocked from November 1 through May 14 each year, and anglers may fish for, but not harvest, trout during this period. From May 15 through October 31, anglers may harvest trout from the delayed harvest section. Harvest is legal year round in the remainder of the Morgan Falls Tailwater Section.

A three-year study of buffer protection for north Georgia trout streams was prepared by the University of Georgia Institute of Ecology, for the Georgia Department of Natural Resources, Environmental Protection Division (Meyer et al. 2005). A buffer is the undisturbed natural area on either side of a stream. Disturbing the natural buffer by removing trees and groundcover can cause water temperatures to rise and sediment loads to increase. As a result of amendments to the Georgia Erosion and Sedimentation Act in the year 2000, the requirement for trout stream buffers was reduced from 100 feet in width to 50 feet in width. Meyer et al. (2005) compared the potential effectiveness of 50-foot versus 100-foot buffers in providing healthy conditions for trout. The study concluded that most trout streams on public land have buffers at least 100 feet wide; however, the majority of Georgia's trout streams are located on private land where the buffers are often narrower and may not be as effective in providing healthy conditions for trout. Mathematical equations were used to predict the consequences of removing or reducing buffer protection on trout populations. Those predictions suggest that young trout populations are significantly reduced when forested buffer width is reduced from 100 feet to 50 feet. Calculations derived from models indicated that, on average, in a stream where the forested riparian buffers were reduced from 100 ft to 50 ft along the length of the stream, significant thermal alteration would occur and the biomass of young trout would be reduced by over 80% as a consequence of this and increased amounts of fine sediments (Meyer et al. 2005).

An additional Georgia Department of Natural Resources, Environmental Protection Division study was conducted by DeMeo *et al.* (2005) to assess the effectiveness of the trout stream buffer program. This assessment examined the policy implications resulting from the 2000 amendments to the Georgia Erosion and Sedimentation Act relating primarily to trout streams in five areas: (1) implementation by local issuing authorities, (2) effectiveness of the buffer variance process, (3) occurrence of piping springs and small streams, (4) proper use of the forestry exemption, and (5) incidence of enforcement actions. In conducting this assessment, issues related to the availability and reliability of data and information on erosion and sedimentation control became apparent and ultimately hindered the assessment. In addition, the assessment was hampered by changing requirements as relevant laws were subsequently amended (DeMeo *et al.* 2005).

Physical Habitat Simulation (PHABSIM) studies by Nestler et al. (1984) concluded that the preferences of trout of all life stages for combinations of depth, velocity, and cover were all very similar within the park. In general, trout habitat below Buford Dam varies between optimum and near-optimum at lower flows (550-1050 cubic feet per second) to a minimum value at higher discharges (approaching 10,000 cubic feet per second). Fish habitat is optimal much of the day for several hours under typical conditions (NPS 2000c).

Trout feeding habitats in the park are not like those in a free-running river. In a naturally flowing river, sources of food, especially benthic macroinvertebrates, largely originate from within the river. Lower water temperatures, high levels of turbidity and sediment deposits, shifting sand substrates, changing water levels, and changing water velocities make benthic macroinvertebrates relatively unavailable as food for trout in the park for long portions of the year (NPS 2000c). Trout feeding habits vary with location in the river. For example, very large trout occur immediately beneath Buford dam, as these fish feed heavily on threadfin shad and yellow perch that are released from the lake between December and April. High mortality of shad and perch in the lake due to cold winter temperatures produces a large food supply for these trout immediately beneath the dam (Scalley 2001). In areas farther downstream, trout feed on benthic macroinvertebrates during the same time of year. From June through August, trout in the river prefer to feed on terrestrial invertebrates. The shift to benthic macroinvertebrates occurs in September.

Temperature and the Chattahoochee River Fishery

The Georgia Wildlife Resources Division and Environmental Protection Division have recognized that water temperatures in the Chattahoochee River downstream of Morgan Falls Dam have caused acute, and perhaps chronic, trout mortality since the late 1980s. Because water conditions suitable for trout survival (water temperature) are man-made, not natural, Wildlife Resources Division and the Environmental Protection Division are working concurrently to develop tailwater-specific water temperature criteria designed to protect the trout fishery in the Chattahoochee River from Buford Dam to Peachtree Creek (see "Water Temperature" subsection).

Bull Sluice Lake and the stretch of the Chattahoochee River in the park below Morgan Falls Dam also support warm-water fish species such as shoal bass. Shoal bass are native to the Chattahoochee and the extensive shoal habitat downstream of Morgan Falls Dam likely sustained a healthy population prior to construction of Buford Dam in 1958. A small population of shoal bass still exists in this section. The Georgia Department of Natural Resources, in coordination with the National Park Service, began a shoal bass stocking program in 2003. Shoal bass fingerlings were stocked in 2003, 2004 and 2005, and survival and growth of these fish will be monitored over a five year timeframe to assess the success of these stockings (GADNR 2006a). In addition, striped bass are also found in the park between Morgan Falls Dam and Peachtree Creek. This species migrates into the park from West Point Lake located downstream, where a stocking program has been resumed by the Georgia Department of Natural Resources (GADNR 2006a).

Benthic Macroinvertebrates

An analysis of benthic macroinvertebrate data collected in the park between 1998 and 2005 by Pfitzer and Scalley was conducted by the University of Georgia (Eggert 2005). Macroinvertebrate samples were collected from Bowmans Island, Settles Bridge, Jones Bridge, Island Ford, Morgan Falls, and Cochran Shoals. The results are presented in the form of biotic indices, which are based on the pollution tolerance of benthic organisms. Pollution sensitive species will generally be found in lower numbers in degraded conditions, while pollution tolerant species are abundant. Based on biotic indices, water quality in the park ranged from good (Morgan Falls and Cochran Shoals) to fairly poor (Bowmans Island). The low biotic indices at Bowmans Island are possibly a result of low substrate quality resulting from highly variable discharges from Buford Dam. An analysis of seasonal data trends did not indicate any significant changes in water quality or habitat quality for benthic macroinvertebrates over time (Eggert 2005).

Several watershed assessments of tributaries within the park have included benthic macroinvertebrate surveys, including a study of North Fulton County covering Johns Creek and Cauley Creek (Parsons 2001a) and a study of Gwinnett County covering Crooked, Level, Richland and Suwanee Creeks

(CH2M Hill 1998). These studies show that sedimentation and scouring from storm events have reduced the density and diversity of benthic populations in the majority of streams sampled. Numerous older studies of benthic macroinvertebrates in the tributaries of the park include studies by Georgia Environmental Protection Division (GADNR 1966, 1973), the Georgia Water Control Board (NPS 2000c), and the Georgia Wildlife Resources Division (Hess et al. 1981).

Amphibians and Reptiles

Many amphibians (frogs, salamanders) and reptiles (snakes, turtles) occur within the Chattahoochee River and its tributaries. Some species are locally very abundant in springs, seeps, and other terrestrial/water interfaces such as backwater pools, sloughs, and the mouths of tributary streams where they enter the mainstem of the river (NPS 2000c). The National Park Service Southeast Coast Inventory and Monitoring Network has prepared a list of reptiles and amphibians that are known to occur within the park, which is included in Appendix C (NPS 2004a). A listing of amphibian and reptile species of concern is also included in the "Rare, Threatened, or Endangered Species" subsection.

In 2005, a study was conducted to determine the prevalence of a recently identified chytridiomycete fungus (*Batrachochytridium dendrobatidis*) at Chattahoochee River National Recreation Area. This fungus has been implicated in amphibian disease and associated worldwide population declines. Even though all tested frogs appeared healthy, five of the twenty adults (25%) tested positive for the fungus (Gibbons 2006). There are no known population declines associated with the fungus among amphibians in the Southeast, but this level of background infection warrants management concerns.

Bivalve Mollusks

Mussels are an important part of the aquatic ecosystem, providing food for wildlife. Mussels are also used as bioindicators because they are long lived (some live for up to 100 years) and relatively sessile. Because they have specific substrate requirements, siltation and sedimentation due to land disturbing activities in the watershed often result in the elimination of species. As filter feeders, they also bio-accumulate toxins in the water, making them sensitive to changes in local aquatic environment. Bivalve mollusks that have been reported in the park include clams and mussels.

A freshwater mussel status survey was conducted within the park in 2003 by O'Brien and Brim Box (2003). Eighteen locations within the park, including the Chattahoochee River mainstem, six tributaries, and Bull Sluice Lake, were investigated for the presence of freshwater mussels. One highly weathered valve of the sculptured pigtoe was found in the Chattahoochee River approximately 6 river miles downstream of Morgan Falls Dam, and aquatic snails (*Pleuroceridae*) were found at only one location. The invasive Asian clam (C*orbicula fulminea*) were documented in the main stem of the river at Island Ford, Big Creek (a major tributary), and four mainstem sites downstream of Morgan Falls dam (O'Brien and Brim Box, 2003). Eight mussel species were documented in the mainstem Upper Chattahoochee River from the late 1950's to the late 1960's, thus the 2003 study documents a decline in diversity.

Recent field surveys by park staff at the Johnson Ferry wetlands have found a previously undocumented native bivalve species belonging to the fingernail clam group (*Spheriidae*) (Harvey 2006b). Fingernail clams, also called pea clams, are common throughout North America, often found in a variety of aquatic habitats ranging from streams to standing water.

Three state and/or federally listed mussel species, the Gulf moccasinshell (*Medionidus penicillatus)*, sculptured pigtoe (*Quincuncina infucata*), and shinyrayed pocketbook (*Lampsilis subangulata*), are reported to occur in the four county area surrounding and including the park (GADNR 2006c, USFWS 2006). However, no live species were documented within the park during the 2003 survey.

Many mussels have recently been listed as federally endangered because of loss of suitable habitat caused by increased siltation and dredging, reservoirs, introductions of nonindigenous species, and pollution. Contributing factors for their absence include naturally occurring poor habitat (as a result of local geology), drought, and hydrologic changes. The absence of mussels within the Chattahoochee River may be due to a combination of habitat alterations that have occurred over the past 160 years, including reservoir construction causing bank erosion, streambed scour, species changes, sedimentation, hydrology, water quality changes, and ecological barriers (O'Brien and Brim Box, 2003).

Aquatic Plants

A recent survey of the diversity of aquatic macrophytes was conducted by the National Park Service in the Chattahoochee River, its tributaries, and wetlands (Hay and Parker 2004). Aquatic plants play a central role in aquatic ecosystems by stabilizing sediments and providing food and shelter for waterfowl, fishes, and invertebrates. This study provides important baseline information on the presence or absence and relative abundance of aquatic plant species in the park.

Fifteen sites were surveyed between October 2002 and October 2003. The results are listed in Appendix C. A total of 41 aquatic plant species were identified, including both submersed and emergent species. In addition, a state protected species, loose watermilfoil (*Myriophyllum* cf. *laxum*), was identified by a non-flowering specimen. The potential presence of this threatened species is of management concern and should be verified by future surveys.

Invasive Aquatic Species

The Asian swamp eel, an invasive species, has been reported in the Chattahoochee River, apparently the result of an aquarium release (NPS 2000c). The presence of an eel-like fish was first noticed in 1991 in the ponds of the Chattahoochee River Nature Center. Subsequent assessments in 1996 have concluded that the eel may have eliminated native sunfish populations in the ponds (NPS 2000c). The potential expansion of the range of this species is currently being assessed in a study by the University of Georgia, and funded by the National Park Service.

The red shiner (*Cyprinella lutrensis*), an opportunistic species native to areas west of the Mississippi River, also occurs in the park (NPS 2000c). Red shiners have expanded their range to tributaries of the Chattahoochee River within the park, including Rottenwood Creek. They compete with native minnow populations and possibly displace native shiners by hybridization.

The invasive Asian clam (C*orbicula fulminea*) occurs in several areas of the park, including Island Ford, Big Creek, and four mainstem sites downstream of Morgan Falls Dam (O'Brien and Brim Box, 2003). The Asian clam has been reported as a major pest throughout the United States due to its high rates of infestation, displacement of native species, and alteration of substrate quality. It has also been known to clog water lines and distribution systems.

Four invasive aquatic plants were identified by Hay and Parker (2004): Brazilian waterweed (*Egeria densa*), wartremoving herb (*Murdannia keisak*), parrotfeather watermilfoil (*Myriophyllum aquaticum*), and alligatorweed (*Alternanthera philoxeroides*). Six invasive aquatic plant species were also documented during wetland surveys conducted by Georgia Power (2005a). In general, these species spread easily and grow quickly, in thick stands, which are capable of outcompeting native aquatic species. Furthermore, treatment of these species is difficult due to their ability to spread by fragmentation. Of these, Brazilian waterweed and alligatorweed are of the biggest concern. They are both listed in the Georgia Aquatic Plant Control Act, making illegal their possession, collection, transport, cultivation, or importation (Georgia House of Representatives 1996).

WETLANDS AND FLOODPLAINS

Wetlands and floodplains are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 2. The specific concerns related to this impact topic are discussed in Chapter 4. The Clean Water Act of 1977 and Executive Orders 11990 and 11988 identify wetlands and floodplains as national natural assets. These orders direct federal agencies to avoid the occupation, adverse modification, or degradation of wetlands and floodplains.

Wetlands serve a variety of important habitat, hydrologic, and water quality functions. They act as natural water purifiers, filtering sediment and absorbing pollutants in surface waters. Vegetation provides erosion control and helps prevent the downstream movement of sediment. Wetlands help maintain flow regimes and provide flood control by storing excess water during rain events, reducing downstream flood damage. They also provide unique habitat for many fish, wildlife, and plant species, including many threatened and endangered species. Wetlands also offer recreational opportunities (NPS 1998c). Wetlands in the park are provided the special protection and conservation inherent in the National Park Service mission, which requires the park to play an active role in wetlands management, restoration, and public awareness (NPS 1998c).

Approximately 152 acres comprising 39 different types of wetlands are found throughout the park (United States Fish and Wildlife Service 2001). National Wetland Inventory maps delineating these areas are available at the park headquarters. Table 15 provides a summary of the number of acres and relative percentages of each major wetland type that occur in the park.

Table 15. Summary of Acreages and Percentages of Each National Wetland Inventory Wetland Type That Occurs in the Park

National Wetland Inventory Type	Acres of Each National Wetland Inventory Type	Percent of Total Acres
Palustrine Forested	21.5	14.2 percent
Palustrine Scrub/Shrub	10.3	6.8 percent
Palustrine Unconsolidated Bottom or Shore	7.8	5.2 percent
Palustrine Emergent	6.2	4.1 percent
Lacustrine	33.4	22.0 percent
Riverine	72.7	47.9 percent
Total:	151.9	100.0 percent

Source: United States Fish and Wildlife Service 2001

Although not commonly perceived by the public as a "typical wetland," riverine wetlands are included in the National Wetland Inventory system. As stated by the United States Fish and Wildlife Service, "The Riverine System includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water. Upland islands or palustrine wetlands may occur in the channel, but they are not part of the Riverine System" (U.S. Fish and Wildlife Service 2001). Riverine wetlands provide valuable aquatic habitats for fish and invertebrates and are a source of primary production (aquatic vascular plants). They account for approximately 48 percent (72.7 acres) of National Wetland Inventory wetlands in the park.

Lacustrine wetlands (non-flowing open water areas partially occupied by wetland vegetation) make up approximately 22 percent (33.4 acres) of the wetlands within the park. Lacustrine wetlands are defined as "wetlands and deepwater habitats with all of the following characteristics: (1) situated in a

topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage, and (3) total area exceeds 20 acres." These areas include unconsolidated bottoms and areas populated by beds of rooted aquatic vegetation. Examples include the wetlands fringing the small pond in the Sope Creek area and the beaver pond in Cochran Shoals next to the running trail. These wetlands provide valuable wildlife habitat, help control flooding, mitigate pollutants from nonpoint surface runoff, and have high rates of primary production.

Palustrine forested wetlands make up approximately 14 percent (21.5 acres) of the total acreage of wetlands in the park. These wetlands are dominated by mature hardwood trees that inhabit the floodplains of the Chattahoochee River, tributary streams, and associated sloughs. These areas experience variable degrees of flooding, but are flooded frequently enough to qualify as wetlands. Typical forested wetlands occur in floodplain areas at Bowmans Island, Island Ford, and Palisades. These wetlands provide important habitat for wildlife, protect the water quality of the river by stabilizing the stream and river banks, help control flooding, and produce plant material that helps support the adjacent aquatic ecosystem.

The remaining wetlands in the park include palustrine unconsolidated bottom or shore (approximately 5 percent; 7.8 acres), palustrine emergent (approximately 4 percent; 6.2 acres), and palustrine scrub/shrub (approximately 7 percent; 10.3 acres) (USFWS 2001). Numerous emergent and scrub/shrub wetlands occur throughout the park, generally associated with beaver pond complexes. For example, an extensive wetland complex associated with a large beaver pond at the southern end of the Cochran Shoals area includes palustrine emergent, lacustrine, and scrub/shrub wetland on the floodplain next to the river. A series of elevated boardwalk trails provides visitors an opportunity to observe these wetlands. These habitats provide excellent habitat for wildlife and are known to be excellent birding areas. In addition, they help control flooding, remove pollutants present in surface water runoff, recharge groundwater, and have high rates of primary production.

In support of the relicensing of Morgan Falls Dam, Georgia Power conducted a wetlands, littoral, and riparian habitat survey in 2005 for the purposes of describing floodplain, wetlands, riparian habitats, and littoral habitats in the vicinity of Morgan Falls Dam; listing plant and animal species that use representative habitat; identifying invasive species; and mapping wetlands habitat. The results of this study are documented in Georgia Power's *Wetlands, Littoral, and Riparian Habitat Study Report* (2005a). The study area included the Island Ford, Vickery Creek, and Gold Branch areas of the park. Three major types of wetland habitat were observed including riverine systems, open-water lacustrine systems, and palustrine wetlands. At least 35 species of aquatic macrophytes were documented, and 6 invasive aquatic plant species were also documented, including Brazilian waterweed, alligator weed, and parrot feather watermilfoil. It was determined that approximately 78 different species of resident and migratory birds use the diverse wetland habitats, including wading birds, waterfowl, shorebirds, and a wide variety of song birds. Common mammals in wetland and riparian habitats in the park include beaver, muskrat, and river otter. Common reptiles and amphibians associated with wetland and riparian habitats in the park include frogs, toads, salamanders, turtles, and snakes (Georgia Power 2005a).

An overview study of wetlands within the park concluded that the actual extent of wetlands in the park was probably larger than that depicted in the United States Fish and Wildlife Service National Wetland Inventory maps. In addition, some wetlands were not mapped by the National Wetland Inventory program. The study concluded that a detailed mapping of wetlands in the park should be conducted to provide a more accurate inventory (Garrow & Associates 1990). In addition, wetlands in some areas of the park have been partially drained due to past practices. The hydrology in these areas

could be restored by plugging ditches or making other hydrological modifications. This would improve the functions and values of these wetlands significantly.

Floodplains and associated wetlands play a critical role in maintaining riverine systems by providing flood and erosion control, maintaining water quality, and providing important wildlife habitat. Due to the basic geologic characteristics of the area, the floodplains along the Chattahoochee River and its tributaries are relatively narrow, reducing the margin of flood protection. The frequency and height of floodplain overflows have increased in the park as a result of urbanization and associated increases in impervious surfaces in the watershed.

Despite these limitations, the Georgia RiverCare 2000 assessment assigned a "significant" rating to the floodplain of the Chattahoochee River within the park (Miller et al. 1998). This rating is largely based on the extent of wetlands within each floodplain and the implied ability of wetlands to control flooding and protect water quality. A floodplain area containing from 0.5 to 2 percent wetlands was assigned a "significant" rating. This rating applies only to the mainstem of the Chattahoochee River and does not take into account floodplain values of the numerous tributaries present within the park, which provide additional values.

The Federal Emergency Management Agency delineated floodplains in the park in 1998; the resulting maps are available at the park headquarters. The water resources management plan (NPS 2000c) provides maps comparing the 100-year floodplain lines from this delineation to existing park boundaries. The United States Army Corps of Engineers has also prepared reports that provide maps and information for the 100-year floodplain in the park along the Chattahoochee River and Rottenwood Creek (USACE 1973, USACE 1974).

TERRESTRIAL ECOLOGICAL RESOURCES

The park lies within the Piedmont physiographic province and contains a wide variety of terrestrial habitat types, including fields, ravines, floodplains, hills, and cliffs. The park is aligned along a northeast/southwest gradient where a variety of coastal plain and Appalachian species overlap within the Piedmont province. As a result, the park has some of the most diverse vegetation in the country. A compilation of flora studies conducted within the park indicates at least 982 plant species are present including algae, bryophytes (mosses), ferns, gymnosperms (pines and cedars), monocots (sedges, rushes, grasses, orchids, etc.), and dicots (willows, maples, oaks, hollies, asters, etc. (NPS 2004b).

One of the primary natural features of the park is the interaction of the river with the associated floodplains and terrestrial habitats. These features combine to make a linear corridor of habitats arranged in a mosaic of natural beauty and high ecological value. Because many of the terrestrial habitats are relatively mature, second growth forests, they greatly augment the natural values of the park. The Palisades area includes unusual cliffs that were the basis of the original designation of the park as a nationally significant resource. The cliffs of the Palisades and associated bluffs are populated by near-original hardwood forests, a unique natural resource. These areas were too steep and escaped logging in the early 1900s (Wharton 1978). Other areas of the park also support near-original plant communities that are unique resources as well.

The present landscape and vegetation in the park is a mixture of fields, natural stands of second growth trees, some near-original stands of forest, and planted trees. The present forest is defined as a "modified second growth deciduous hardwood and hardwood-pine mixtures" (Wharton 1978). Residential development and other sources have introduced several invasive species, including privet, English Ivy, kudzu, Japanese honeysuckle, mimosa, princess tree, and periwinkle. Chestnut blight and pine beetle have affected native trees (NPS 2000c). Despite these issues, the Georgia RiverCare 2000 Assessment assigned a rating of "outstanding" for forest resources within the park (Miller et al. 1998).

A rating of "significant" was assigned for river segments with 50 to 75 percent forested cover. This was the only standard used to rate forest resources.

The park provides habitat for a wide variety of wildlife, including birds, mammals, reptiles, and amphibians. The oak-hickory climax forest is the most widespread terrestrial habitat type in the park, but it is characterized by a lower overall diversity of species; wildlife diversity is greater in the mesic bluff and bottomland habitats (Wharton 1998). These habitats are present in the park, but are less common.

As many as 189 bird species, including neotropical migrant songbirds, raptors, waterfowl, and shorebirds use diverse wetland and upland habitats in the park. A listing of bird species observed in the park is reported in Georgia Power's Wildlife and Botanical Resources Study Report (2005b). The list is based on sightings by three Atlanta area birders who have explored the Chattahoochee River within the park, species sighted during nearly three decades of annual breeding bird surveys conducted along two routes in north-central Georgia for the United States Geological Survey breeding bird survey (Sauer et al., 2005), and species sighted during field reconnaissance conducted in the vicinity of Morgan Falls in May 2005. Of particular note are the diversity of ducks and sandpipers that use the Chattahoochee River during seasonal migrations, the variety of birds of prey (hawks, kites, eagles, falcons) that use the area, the use of the Morgan Falls impoundment by sandhill crane (Grus canadensis), and the reported sighting of the federally threatened bald eagle (Haliaeetus leucocephalus) and federally endangered whooping crane (Grus americana) in the park (Georgia Power 2005b; NPS 2006c).

The park has not completed an avian inventory; however, it is one of several parks in the National Park Service Southeast Coast Inventory and Monitoring Network for which a study plan has been developed to inventory natural resources. In addition, a Draft Avian Conservation Implementation Plan was compiled by the U.S. Fish and Wildlife service in cooperation with the resource management staff at the park to serve as guidance to identify, document, and undertake bird conservation activities in the park and with neighboring communities, organizations, and adjacent landowners. This plan identifies goals, strategies, partnerships, and specific projects that would allow the park to participate in existing bird conservation planning and implementation efforts associated with the North American Bird Conservation Initiative (USFWS 2004).

Common species of mammals in the park include deer, raccoons, opossums, bats, squirrels, eastern cottontail rabbits, short-tailed shrew, pine vole, deer mouse, and chipmunk. The presence of coyotes has also been reported in the park. A field inventory of small mammals in the park was completed in fiscal year 2004 by the University of North Carolina at Wilmington for the National Park Service Southeast Coast Inventory and Monitoring Program. In addition, a summer bat survey was conducted in the park in 2004 by the U.S. Department of Agriculture Forest Service and Clemson University for the Inventory and Monitoring Program. Species lists will be published and available from the park upon data certification (NPS 2006d).

A complete list of reptiles and amphibians that are known to occur in the park or are presumed to be present, based on available habitat information, was compiled by the National Park Service Southeast Coast Inventory and Monitoring Program and is included in Appendix C (NPS 2004a). A total of 23 amphibian species and 40 reptile species are documented in the park including snakes, lizards, turtles, frogs, and salamanders.

The park is important to wildlife in part because it connects the Piedmont and Mountain physiographic provinces. As such, the park serves as a migratory route and a means of range extension for many forms of wildlife. For example, some species more common in mountainous area have moved south along the river corridor and into the park (NPS 1989, Wharton 1998). As the population

of Atlanta continues to grow, the park will become increasingly important as a refuge for native wildlife in the area and along the river corridor, as these areas will be protected and managed by the National Park Service.

RARE, THREATENED, OR ENDANGERED SPECIES

Rare, threatened, or endangered species are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 2. The specific concerns related to this impact topic are discussed in Chapter 4.

The Chattahoochee River Corridor, including the park, is a biologically significant resource that harbors a variety of protected and rare species of plants and animals. The National Park Service is required under the Endangered Species Act to ensure that federally listed species and their habitats are protected on lands within the agency's jurisdiction. In addition, park policy and management actions include maintaining state- and heritage program-listed species as part of the park's natural heritage.

As such, the U.S. Fish and Wildlife Service and the Natural Heritage Program of the Georgia Department of Natural Resources, Wildlife Resources Division were contacted to obtain information concerning occurrence of protected and rare species within the park and the surrounding area. In addition, the National Park Service Southeast Coast Inventory and Monitoring Program also maintains lists of state- and federally-listed species that are known to be present in the park or to have historically occurred in the park as documented in the "NPSpecies" database as of August 2004 (NPS 2005c). The NPSpecies database is subject to revision following the completion of ongoing biological inventories, database quality assurance procedures, and any updates to federal and state listing status (NPS 2005c).

The U.S. Fish and Wildlife Service and the National Park Service Southeast Coast Inventory and Monitoring Program provided lists of protected species that occur or could occur in the four-county area surrounding the park (Table 13; Appendix F). As shown in Table 16, a total of ten federally-listed bird, mammal, fish , and invertebrate species and seven federally-listed plant species were identified as actually or potentially occurring in the four-county area surrounding the park. General habitat requirements are summarized by species in Table 16. This list includes federally-listed threatened and endangered species as wells as candidate species recognized by the U.S. Fish and Wildlife Service. In addition, park staff observed the federally endangered whooping crane in the park in March 2006 (NPS 2006c).

The Georgia Department of Natural Resources, Natural Heritage Program and the National Park Service identified several state-listed species known to occur within the park or within 3 miles of the park, including: 4 species of birds, 1 species of mammal, 6 species of fish, 4 species of invertebrates, and 15 species of plants (Table 17; Appendix F). Other protected or watch list species historically reported to potentially occur in the vicinity of the park include: peregrine falcon, greater sandhill crane, jack-in-the-pulpit, Boott's sedge, dark green sedge, pink ladyslipper, yellow ladyslipper, Shuttleworth's ginger, goldenseal, Canada lily, bunchflower, loose watermilfoil, Stone Mountain mint, Biltmore's carrion-flower, goldenrod, and mountain camellia. Many or most of these species could occur in the park, although detailed, site-specific surveys would be required to confirm their existence. These surveys would be conducted as part of site-specific environmental assessments conducted by the National Park Service in conjunction with proposed actions such as construction of roads, parking areas, trails, or buildings. These environmental assessments would be tiered to this general management plan and environmental impact statement as projects are developed by the National Park Service.

Table 16. List of Federally Protected Species that Potentially Occur in the Four-County Area Surrounding the Park or within the Park as Reported by the United States Fish and Wildlife Service and the National Park Service Southeast Coast Inventory and Monitoring Program

Common Name	Scientific Name	Federal Status	Habitats
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	T	Inland waterways and estuarine areas in Georgia
Red Cockaded Woodpecker [1]	*Picoides borealis*	E	Nest in mature pine with low understory vegetation (<1.5meters); forage in pine and pine hardwood stands ≥ 30 years of age, preferable > 10 inch diameter at breast height
Whooping Crane [2]	*Grus americana*	E	Migratory
Wood Stork [1]	*Mycteria americana*	E	Primarily feed in fresh and brackish wetlands and nest in cypress or other wooded swamps
Mammals			
Gray Bat [1]	*Myotis grisescens*	E	Colonies restricted to caves or cave-like habitats; forage primarily over water along rivers or lake shores
Fish			
Amber Darter	*Percina antesella*	E	Gentle riffle areas over sand and gravel substrate that becomes vegetated (primarily with Podostemum) during summer; last taken in Etowah River in 1980; historic population in Shoal Creek probably extirpated by construction of Allatoona Reservoir in 1950
Cherokee Darter	*Etheostoma scotti*	T	Shallow water (0.1-0.5 meters) in small to medium warm water creeks (1-15 meters wide) with predominantly rocky bottoms; usually in sections with reduced current, typically runs above and below riffles and at ecotones of riffles and backwaters
Etowah Darter	*Etheostoma etowahae*	E	Shallow riffle habitat, with large gravel, cobble, and small boulder substrates. Usually found in medium and large cool water creeks or small rivers (15-30 m wide) with moderate or high gradients and rocky bottoms.
Invertebrates			
Gulf Moccasinshell Mussel	*Medionidus penicillatus*	E	Medium to large rivers with slight or moderate current over sand and gravel substrates; may be associated with muddy and sand substrates around tree roots
Shiny-rayed pocketbook mussel	*Lampsilis subangulata*	E	Medium creeks to the mainstems of rivers with slow to moderate currents over sandy substrates and associated with rock or clay

Table 16. List of Federally Protected Species that Potentially Occur in the Four-County Area Surrounding the Park or within the Park as Reported by the United States Fish and Wildlife Service and the National Park Service Southeast Coast Inventory and Monitoring Program (continued)

Common Name	Scientific Name	Federal Status	Habitats
Plants			
Black-Spored Quillwort	*Isoetes melanospora*	E	Shallow pools on granite outcrops, where water collects after a rain; Pools are less than one foot deep and rock rimmed
Georgia Aster	*Aster georgianus*	C	Post oak savannah/prairie communities. Most remaining populations survive adjacent to roads, utility rights of way, and other openings.
Georgia Rockcress [1]	*Arabis georgiana*	C	Shallow soil accumulations on rocky bluffs, ecotones of gently sloping rock outcrops, and in sandy loam along eroding riverbanks. It is occasionally found in adjacent mesic woods, but it will not persist in heavily shaded conditions.
Little Amphianthus (also known as Pool Sprite and Snorkelwort)	*Amphianthus pusillus*	T	Shallow pools on granite outcrops, where water collects after a rain. Pools are less than one foot deep and rock rimmed
Michaux's Sumac	*Rhus michauxii*	E	Sandy or rocky open woods, usually on ridges with a disturbance history (periodic fire, prior agricultural use, maintained right-of-ways); the known population of this species in Cobb County has been extirpated(last seen in county in 1900)
Smooth Purple Coneflower [1]	*Echinacea laevigata*	E	Meadows and open woodlands on basic or circumneutral soils; often with eastern redcedar (*Juniperus virginiana*) and button snakeroot (*Eryngium yuccifolium*)
White Fringeless Orchid (also known as Monkey-face Orchid)	*Platanthera integrilabia*	C	Red maple-blackgum swamps; also on sandy damp stream margins; or on seepy, rocky, thinly vegetated slopes

Source: U.S. Fish and Wildlife Service 2006; National Park Service 2005c; National Park Service 2006c

1 Species reported by the National Park Service Southeast Coast Inventory and Monitoring Program as being "Present in the Park" or "Historic" based on inclusion in the NPSpecies database as of August 26, 2004. These data are subject to revision following the completion of ongoing biological inventories, database quality assurance procedures, and any updates to Federal listing status.

2 The whooping crane was documented in the park by park staff on March 2, 2006.

FEDERAL STATUS

E Listed as endangered. The most critically imperiled species. A species that may become extinct or disappear from a significant part of its range if not immediately protected.

T Listed as threatened. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

C Candidate species. Candidate species are plants and animals for which the U.S. Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Table 17: List of State Protected Species Known to Occur within the Park or within 3 Miles of the Park as Reported by the Georgia Natural Heritage Program and the National Park Service Southeast Coast Inventory and Monitoring Program

Common Name	Scientific Name	Global Rank, State Rank, Federal Status, and State Status [1]	Preferred Habitat
Birds			
Bald Eagle [2]	*Haliaeetus leucocephalus*	G4, S2, (PS:LT,PDL), E	Edges of lakes & large rivers; seacoasts
Red Cockaded Woodpecker [2]	*Picoides borealis*	G3, S2, LE, E	Open pine woods; pine savannas
Swallow-tailed Kite [2]	*Elanoides forficatus*	G5, S2, ---, R	River swamps; marshes
Wood Stork [2]	*Mycteria americana*	G4, S2, PS:LE, E	Cypress/gum ponds; marshes; river swamps; bays
Mammals			
Gray Bat [2]	*Myotis grisescens*	G3, S1, LE, E	Caves with flowing water
Fish			
Alabama Shad [2]	*Alosa alabamae*	G3, S1, C, U	Saltwater; coastal rivers in moderate current
Apalachicola redhorse	*Moxostoma sp. 1*	G3, S?, ---, ---	Habitat data is not available
Bluestripe Shiner	*Cyprinella callitaenia*	G2G3, S2, --, T	Flowing areas in large creeks and medium-sized rivers over rocky substrates
Frecklebelly Madtom [2]	*Noturus munitus*	G3, S1, ---, E	Shoals and riffles of moderate to large streams and rivers
Highscale Shiner	*Notropis hypsilepis*	G3, S3, ---, T	Flowing areas of large to small streams over sand or bedrock substrates
Shoal Bass	*Micropterus caracterae*	G3, S3, ---, ---	Shoals and riffles of large streams to rivers
Invertebrates			
Brother Spike (Mussel)	*Elliptio fraterna*	G1, S1, ---,---	Sandy substrates of river channels with swift current
Delicate Spike	*Elliptio arcata*	G3G4, S3, ---, ---	Large rivers and creeks with some current in sand and sand and limestone rock substrates

Table 17. List of State Protected Species Known to Occur within the Park or within 3 Miles of the Park as Reported by the Georgia Natural Heritage Program and the National Park Service Southeast Coast Inventory and Monitoring Program (continued)

Common Name	Scientific Name	Global Rank, State Rank, Federal Status, and State Status [1]	Preferred Habitat
Invertebrates (continued)			
Sculptured Pigtoe (Mussel)	*Quincuncina infucata*	G4, S3, ---, ---	Main channels of rivers and large streams with moderate current in sand and limestone rock substrates
Shiny-rayed Pocketbook (Mussel)	*Lampsillis subangulata*	G2, S2, LE, E	Sandy/rocky medium-sized rivers & creeks
Plants			
American Ginseng	*Panax quinquefolius*	G3G4, S3, ---, ---	Mesic hardwood forests, cove hardwood forests
Bay Starvine	*Schizandra glabra*	G3, S2, ---, T	Rich woods on stream terraces and lower slopes
Broadleaf Bunchflower	*Melanthium latifolium*	G5, S2?, --- , ---	Mesic deciduous hardwood forests
Dwarf Sumac	*Rhus michauxii*	G2, S1, LE, E	Open forests over ultramafic rock
Flatrock Onion [2]	*Allium speculae*	G2, S2, ---, T	Granite outcrops (limited to Lithonia Gneiss types)
Florida Anise Tree [2]	*Illicium floridana*	G5, S1, ---, E	Steepheads, floodplain forests
Georgia Aster	*Aster georgianus*	G2G3, S2, C, ---	Upland oak-hickory-pine forests and openings; sometimes with *Echinacea laevigata* (smooth purple coneflower) or over amphibolite
Georgia Rockcress [2]	*Arabis georgiana*	G1, S1, C, T	Rocky or sandy river bluffs and banks, in circumneutral soil
Goldenseal	*Hydrastis canadensis*	G4, S2, ---, E	Rich woods in circumneutral soil
Indian Olive	*Nestronia umbellula*	G4, S2, ---, T	Mixed with dwarf shrubby heaths in oak-hickory-pine woods; often in transition areas between flatwoods and uplands
Mountain Witch-alder	*Fothergilla major*	G3, S1, --- , ---	Rocky (sandstone, granite) woods; bouldery stream margins
Ozark Bunchflower	*Melanthium woodii*	G5, S2, ---, R	Mesic hardwood forests over basic soils
Piedmont Barren Strawberry	*Waldsteinia lobata*	G2, S2, ---, T	Stream terraces and adjacent gneiss outcrops; rocky, acidic woods along streams with mountain laurel (*Kalmia latifolia*); rarely in drier, upland oak-hickory-pine woods
Smooth Purple Coneflower [2]	*Echinacea laevigata*	G2, S2, LE, E	Upland forests over amphibolite
Plants (continued)			
Sweet Pinesap	*Monotropsis odorata*	G3, S1, --- , ---	Upland forests

Table 17. List of State Protected Species Known to Occur within the Park or within 3 Miles of the Park as Reported by the Georgia Natural Heritage Program and the National Park Service Southeast Coast Inventory and Monitoring Program (continued)

Common Name	Scientific Name	Global Rank, State Rank, Federal Status, and State Status [1]	Preferred Habitat

Source: Georgia Natural Heritage Program, Georgia Department of Natural Resources, Wildlife Resources Division (GADNR 2006c) and National Park Service 2005c

[1] Listed in order left to right by state global rank, state rank, federal status, and state status. Line (---) indicates no status has been assigned to that species. The following is an explanation of these rankings:

STATE [GLOBAL] RANK

S1[G1]: Critically imperiled in state [globally] because of extreme rarity (5 or fewer occurrences).
S2[G2]: Imperiled in state [globally] because of rarity (6 to 20 occurrences).
S3[G3]: Rare or uncommon in state [rare and local throughout range or in a special habitat or narrowly endemic] (on the order of 21 to 100 occurrences).
S4[G4]: Apparently secure in state [globally] (of no immediate conservation concern).
S5[G5]: Demonstrably secure in state [globally].
?: Denotes questionable rank; best guess given whenever possible (e.g. S3?).

FEDERAL STATUS (U.S. Fish and Wildlife Service)

LE: Listed as endangered. The most critically imperiled species. A species that may become extinct or disappear from a significant part of its range if not immediately protected.
LT: Listed as threatened. The next most critical level of threatened species. A species that may become endangered if not protected.
PS: Partial status. Status in only a portion of the species' range.
PDL: Proposed for delisting.
C: Candidate species presently under status review for federal listing for which adequate information exists on biological vulnerability and threats to list the taxa as endangered or threatened.

STATE STATUS

E: Listed as endangered. A species that is in danger of extinction throughout all or part of its range
T : Listed as threatened. A species that is likely to become an endangered species in the foreseeable future throughout all or parts of its range.
R: Listed as rare. A species that may not be endangered or threatened but that should be protected because of its scarcity.
U: Listed as unusual (and thus deserving of special consideration). Plants subject to commercial exploitation would have this status.

[2] Species reported as occurring within the park by the National Park Service Southeast Coast Inventory and Monitoring Program as being "Present in the Park" or "Historic" based on inclusion in the NPSpecies database as of August 26, 2004. These data are subject to revision following the completion of ongoing biological inventories, database quality assurance procedures, and any updates to State Listing status.

The Wildlife Resources Division of the Georgia Department of Natural Resources is in the process of completing the first comprehensive revision of Georgia's protected plant and animal lists since 1992. These lists specify what species are protected under Georgia's Wildflower Preservation Act and Georgia's Endangered Wildlife Act, and are increasingly used to help prioritize funding for conservation and research on rare species. The listing status of each species will be based upon the best available scientific data from Wildlife Resources Division biologists, other experts, and members of the general public. The Board of Natural Resources will make the final decision on which species will be added to or deleted from the lists. Wildlife Resources Divisions began accepting nominations and supporting data for proposed changes to the state protected species list in February 2006.

The presence of protected species was also used as an indicator for the Georgia River Care 2000 River Assessment. An "outstanding" botanical rating was assigned to the Level Creek area of the park and a "significant" rating was given to the portion of the park above Level Creek. An outstanding rating indicates an area has "at least one listed species or three special concern plants; at least one high quality natural community (intact and recoverable) with little disturbance, some logging, or some grazing); high diversity; and moderate richness" (Miller et al. 1998). A "significant" rating requires that a "segment contain at least one special-concern plant; at least one moderate-quality significant natural community (considerable disturbance, but intact and recoverable); only moderate diversity; and low to moderate richness" (Miller et al. 1998).

PRIME AND UNIQUE FARMLANDS

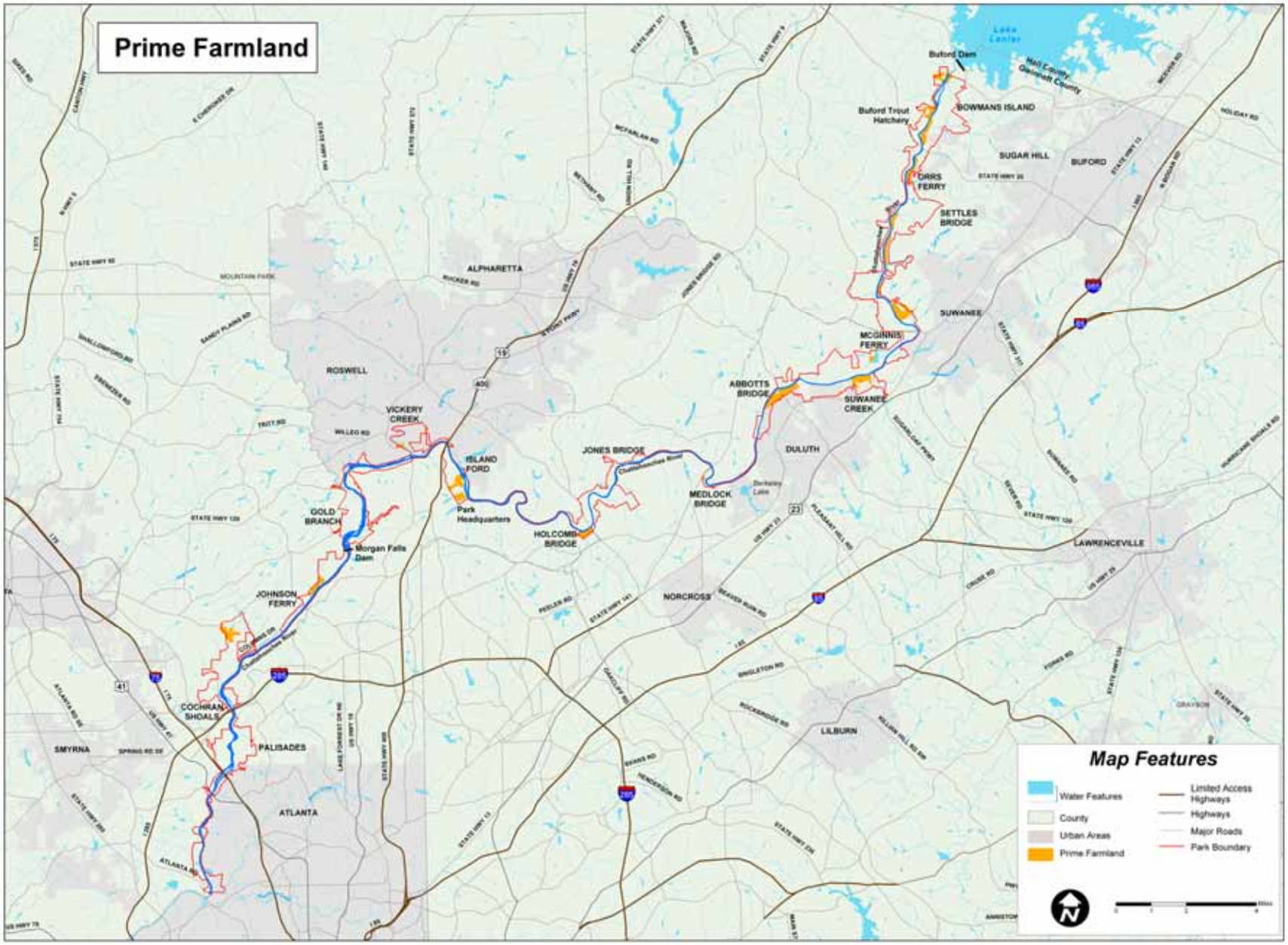
Prime and unique farmlands are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 2. The specific concerns related to this impact topic are discussed in Chapter 4.

An August 11, 1980, memorandum from the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on farmland soils classified by the Natural Resource Conservation Service as prime or unique. Prime farmland soil has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oil seed crops and is available for these uses (i.e., it is not urban or developed land nor is it under water). Unique farmland soil is used for the production of high-value food crops, such as fruits, vegetables, and nuts. Prime and unique farmlands have the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops.

A number of the soil types in the park have been classified as prime farmlands, as mapped in Figure 11. No unique farmland has been identified within park boundaries. Site-specific assessments of the impacts of proposed park projects on prime farmlands, using Natural Resource Conservation Service methods, would be required in the future. This involves assigning an impact score to the project to estimate the degree of impact on prime farmlands. These assessments would be conducted as part of environmental assessments tiered to this general management plan and environmental impact statement.

The U.S. Department of Agriculture's Natural Resource Conservation Service has prepared soil surveys for the counties surrounding the park: Cobb County (1973, with a 1996 update); Forsyth County (1960); Fulton County (1958, with a 1982 supplement); and Gwinnett County (1967). Upland soils in the park belong principally to the Madison-Louisa-Pacolet association and the Wickham-Altavista-Red Bay association. These soils are located on steep slopes and are highly erodable, shallow, and rocky. Bottomland soils in the park belong primarily to the Congaree-Chewacla-Wehadkee association and the Cartecay-Toccoa association, and are located on nearly level areas along the Chattahoochee River and some of its tributaries. These soils are often highly erodable, and

Figure 11


Prime Farmland
Buford Dam
Lake Lanier
Hall County
Gwinnett County
Buford Trout Hatchery
BOWMANS ISLAND
SUGAR HILL
BUFORD
DARRS FERRY
SETTLES BRIDGE
ALPHARETTA
SUWANEE
McGINNIS FERRY
ROSWELL
ABBOTTS BRIDGE
SUWANEE CREEK
VICKERY CREEK
ISLAND FORD
JONES BRIDGE
DULUTH
MEDLOCK BRIDGE
GOLD BRANCH
Park Headquarters
HOLCOMB BRIDGE
Morgan Falls Dam
LAWRENCEVILLE
JOHNSON FERRY
NORCROSS
COCHRAN SHOALS
PALISADES
SMYRNA
ATLANTA
LILBURN
Map Features
Water Features
County
Urban Areas
Prime Farmland
Limited Access Highways
Highways
Major Roads
Park Boundary

uncontrolled exposure of such soils has resulted in accelerated erosion and attendant sediment and siltation in the Chattahoochee River (NPS 1989; NPS 2000c).

CULTURAL RESOURCES

Cultural resources are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 2. The specific concerns related to this impact topic are discussed in Chapter 4. Baseline data for cultural resources issues were obtained from the Georgia State Historic Preservation Officer in Atlanta, the Georgia State Site Files at the University of Georgia, Athens, and the files of Mr. David Ek, former Chief of Science and Resource Management at the park. Data collection occurred between October 2000 and March 2001. A comprehensive archeological survey of the park has not been conducted to date. As described in the "Servicewide Mandates and Policies" section, an archeological inventory of the park is required by law. In addition, individual surveys are 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.

The park area appears to have been occupied for at least 10,000 years. The earliest known occupation of the park dates to the Early Archaic Period, between 8000 and 6000 BC. The cultural chronology of the region prior to the arrival of Europeans is divided into several periods: Paleoindian (9500 to 8000 BC), Archaic (8000 to 1000 BC), Woodland (1000 BC to 1000 AD), and Mississippian and Late Prehistoric (1000 AD to European contact). The Paleoindian, Archaic, Woodland and Mississippian Periods are each further divided into early, middle and late periods. Broadly speaking, the Paleoindian Period refers to the occupation of the first people to arrive in North America during the last Ice Age, and is characterized by distinctive projectile points used in part for hunting the large mammals, or megafauna, that roamed the continent prior to the end of the Pleistocene. The Archaic Period refers to an era of gathering and hunting following the end of the last Ice Age. The presence of ground-stone tools indicates increased food processing habits. The Woodland Period saw increased sedentism, especially in riverine environments, and the introduction of ceramic vessels. The Mississippian Period is characterized by complex societies and sites with elaborate earthworks.

O'Grady and Poe (1980) concluded that the park was most extensively occupied during the Woodland Period. This was based on an extensive archaeological survey they conducted identifying 70 sites. Numerous surveys have been conducted on or near the park since that time, identifying sites dating from the Archaic through Late Mississippian Periods. Woodland sites remain the most numerous of those prehistoric sites that can be assigned a temporal affiliation.

Prior to nineteenth century manipulation of the Chattahoochee River for industrial purposes, the river corridor was a fertile region dedicated to agricultural production (Brown 1980). Early European settlers in the region brought with them agricultural tools and a variety of crops that broadened the agricultural base of both European and Native American populations. With increased interaction with whites, native tribes adopted and used some aspects of non-native cultures. Family farming, along with raising mixed livestock, became the primary activity in the river corridor (Brown 1980).

The Chattahoochee River area became a battleground during the Battle of Atlanta in 1864 after Confederate defenses were turned at Kennesaw Mountain and Cheatam's Hill in June. Confederate lines reformed northwest of the river from Smyrna to Nickajack Creek. The Union Army attacked this line on July 4. The Confederate Army was forced back towards the Chattahoochee River, and retreated across it to stage the last defense of Atlanta by July 17. Atlanta fell to the Union Army on September 2, 1864. Known Civil War features in the park include picket depressions and trenches. Examples include log and earthwork forts associated with Sherman's River Crossings, which Sherman used to flank Johnston's Line (Brown and Smith 1997).

Agriculture remained a steady occupation of white settlers in the river corridor throughout the nineteenth century, reaching its peak between 1910 and 1920, when 87 percent of the Piedmont had been cultivated (Brown 1980). The shift from mixed farming to intensive cotton cultivation in the 1850s and the long-term failure to implement soil conservation practices began to take their toll. Contributing to the rapid decline of fertility in the region was the practice of hydraulic mining of gold in the headwaters of the Chattahoochee, which resulted in extensive deforestation of the upper river corridor (Brown 1980). By 1935, most of the rich topsoil in the Chattahoochee River floodplain was eroded and deposited in stream bottoms.

The decline in soil fertility forced small farmers to change occupations, and many Southern rural families migrated to the North after Reconstruction in search of jobs in the cities. Others adopted an entrepreneurial approach and turned their attention to developing the industrial potential of the Chattahoochee River. Mills and distilleries had been present along the river corridor since the 1830s but, for a number of reasons (including destruction of many mills during the Civil War), industry did not become the major enterprise in the region until agriculture became unviable. Mill villages replaced farmsteads, and rapid growth of commerce and industry along the Chattahoochee River began to alter the river landscape.

By the turn of the twentieth century, however, industrialists were discovering the increased efficiency and output of steam-generated and electrical power for manufacturing. Expansion of the railroads in the latter half of the nineteenth century also had given the region greater access to national markets, reducing the reliance on locally manufactured goods. The importance of the Chattahoochee River for industrial manufacturing was thus diminished, and other uses drinking water supply and hydroelectric power generation gained importance (Brown 1980).

Historically accustomed to relying on public or private wells for drinking water, the people of Atlanta found themselves without a reliable source of drinking water in the face of rapid expansion of urban area and population. Construction of the pumping station at the junction of Peachtree Creek and the Chattahoochee River in 1892, as part of what would later become the Atlanta Water Works, temporarily solved the problem of water by pumping water directly from the river.

Morgan Falls Dam, constructed in 1902, was the largest hydroelectric installation in the Southeast, measuring 900 feet in length by 60 feet in height. In the 1920s, improvements to Morgan Falls Dam resulted in the creation of large reservoirs along the Chattahoochee River corridor and provided a storage area for water pumped from the river during periods of high water.

In 1957, the U.S. Army Corps of Engineers erected Buford Dam with the goals of providing flood control and stream flow regulation, assisting in navigation, providing a constant source of water, and producing electrical power. Located on the Chattahoochee River about 35 miles northeast of Atlanta, Buford Dam collects runoff water from a wide area of north Georgia into a large reservoir, Lake Sidney Lanier. Lake Lanier extends 44 miles up the Chattahoochee River and covers more than 58,000 acres of former farmland and forests.

On August 15, 1978, the United States Congress passed an act authorizing the establishment of the Chattahoochee River National Recreation Area (16 United States Code 460ii). The boundaries of the park were subsequently modified in Amendments to the Chattahoochee River National Recreation Area Act in September 1984 and August 1998. Most recently, in June 1999, Congress enacted a bill to improve protection and management of the park.

ARCHEOLOGICAL RESOURCES

A number of studies provide significant data concerning the park's archeological resources as well as the status of archeological research and previous archeological work in the park. These studies include:

- *An Archaeological Reconnaissance of the Chattahoochee River Corridor between Buford Dam and Georgia 20 Highway Bridge (*Hamilton 1974*).*
- *Cultural Resource Inventory Chattahoochee River National Recreation Area Final Report (*O'Grady and Poe 1980*).*
- *Cultural Resources Survey of the Proposed Lake Sidney Lanier Reregulation Dam and Lake Area, Forsyth and Gwinnett Counties, Georgia (*Gresham 1987*).*
- *Phase I Cultural Resource Survey of 286 acres west of the Chattahoochee River in Forsyth County, Georgia (*Markham and Holland 1996*).*
- *Cultural Resources Survey, Proposed Trail System, Chattahoochee River National Recreation Area, Forsyth County, Georgia (*Webb and Burns 1997*).*
- *Cultural Resources Survey, Proposed New Trail System, Island Ford Unit, Chattahoochee River National Recreation Area, Fulton County, Georgia. (*Gantt and DeRosa 2000*).*

Other surveys conducted in or near the park include Moore (1986), Hamby and Reed (1995), Brown et al. (1999), and Webb and Quirk (2000). Surveys completed within the boundaries of the park include: Magennis and Williams (1978), Bowen (1981), Braley (1987), Rogers and Braley (1991), Ledbetter et al. (1991), Braley et al. (1992), Gardner and Reynolds (1993), Webb and Gantt (1995, 1996a, 1996b), Webb and Duncan (1997), Gantt (1997), and Webb et al. (1998).

Additional references to archeological surveys are included in the park's *Historic Resource Study* (NPS 2005a), the *Cultural Resources Overview and Predictive Model for the Chattahoochee River National Recreation Area* (Parsons 2001b), and the "Outline of Prehistory and History, Southeastern North America and the Caribbean" (NPS 2006e). Copies of these reports, as well as relevant maps and archival materials regarding specific resources within the park, are stored at park headquarters in Fulton County, Georgia.

Review of the site files maintained by the University of Georgia, Athens, conducted in the fall of 2000 indicated that approximately 200 archeological sites have been previously recorded within the boundaries of the park. Of these, 32 lie within Cobb County, 46 in Forsyth County, 26 in Fulton County, and 93 in Gwinnett County. Artifact scatters dominate the sites recorded within the park and include ceramic scatters, lithic scatters, historic artifact scatters, and scatters encountered in association with rock shelters, open habitations, or villages. Fourteen of the sites include rock shelters, two are quarries, five are fish weirs/rock dams located within the river, one contains a probable mound, and one includes earthworks. Native American habitation sites include open habitations, camps, and villages in addition to the rock shelters. Historic sites with structural components include a bridge, three mills (one with a race), a cotton gin, a dam, a fence, a still, and nine structural foundations.

Locational data provided in earlier survey reports do not always match the locational data archived within the GIS database maintained by the Georgia State Site Files at the University of Georgia, Athens. Rectification of the survey data sets with those maintained by the Georgia State Site Files would be included as a task to be completed as part of the park wide resource stewardship strategy planning document preparation in the future.

Three of the archeological sites are currently submerged and 13 have been destroyed; the majority of the remaining sites have been extensively (57 sites), moderately (53 sites), or minimally (38 sites) disturbed by erosion, agriculture, vandalism, or development. The condition of 36 of the sites is not recorded in the site files.

There is a high probability that unknown prehistoric and historic archeological resources occur in the park. However, the archeological sites in the park have not been systematically surveyed or inventoried, and precise information about the location, characteristics, and significance of the majority of known archeological resources in the park is incomplete.

National Park Service policy at the park is to work with the Georgia State Historic Preservation Officer to nominate all archeological resources within the park that appear to meet the National Register of Historic Places criteria. A review of the National Register and the site files maintained by the University of Georgia, Athens and information from the *Historic Resource Study, Chattahoochee River National Recreational Area* (NPS 2005a), indicates that two archeological sites recorded within the park have been determined eligible for listing on the National Register of Historic Places. Nineteen archeological sites have been recommended eligible for listing, and 72 have been recommended not eligible for listing. One site is a national landmark, and two have been subjected to Historic American Engineering Record documentation. The 104 remaining sites within the boundaries of the park have not been evaluated in terms of their eligibility for listing on the National Register of Historic Places.

HISTORIC BUILDINGS, STRUCTURES, LANDSCAPES, AND OBJECTS

Two studies have documented the park's historic development and resources: Historic Resource Study: Chattahoochee River National Recreation Area and the Chattahoochee River Corridor (Brown 1980), and Historic Resource Study: Chattahoochee River National Recreation Area (NPS 2005a).

Other studies that provide information regarding the historical development of Atlanta and north-central Georgia include:

> "Outline of Prehistory and History, Southeastern North America and the Caribbean" (NPS 2006e); and "Georgia Before Oglethorpe: A Resource Guide to Georgia's Early Colonial Period 1521- 1733" (Worth 2003).

A review of several sources, including the historic structures and buildings files maintained by the Georgia State Historic Preservation Officer in Atlanta, the park's List of Classified Structures, the Chattahoochee River Historic Resource Study, and the Cultural Resources Overview and Predictive Model, indicates that 31 historic structures or buildings have been recorded within the riverway corridor. Eighteen of these historic structures are listed on the park's List of Classified Structures.

A number of the park's structures were evaluated under National Register of Historic Places criteria.[1] Historic structures associated with early settlement and agricultural development in and near the park that were found to be eligible for the National Register include the Hyde Farm, Scribner Cemetery, Jones Bridge, and Settles Bridge. In 1992 the National Park Service acquired 40 acres of riverfront property within the Hyde Farm Complex. The remaining 95 acres of this complex remain a priority acquisition for the National Park Service. The Hyde Farm Complex property of 135 acres, includes the circa 1840 residence, a corn crib (circa 1850), the barn (circa 1910), machine shed/garage (circa 1945), two sheds (circa 1900), and a chicken house (circa 1950). The complex is significant as a fine example of both antebellum and postbellum farmsteads in the upper Georgia Piedmont.

[1] The National Park Service has determined that these properties are eligible for the National Register, but the Georgia State Historic Preservation Officer may not yet have concurred with the National Park Service determinations.

The George A. Power House (also referred to as Power Cabin) (a circa 1845 property) is also in this same area. This property is representative of small farmsteads in the river corridor before and after the Civil War. The Trust for Public Land deeded this 2.5 acre property, including the Power House, in 1999 to the Cobb Landmarks and Historical Society. At the same time, the Trust for Public Land granted a conservation and Façade Easement to the National Park Service to ensure its permanent protection. The Trust for Public Land also granted life-long tenancy to the current resident. Power House was listed on the National Register of Historic Places in 2001. The Hyde Farm Complex could potentially be considered as a cultural landscape; however an assessment would have to be conducted after the National Park Service acquires ownership.

The following historic structures and sites have also been evaluated for the National Register and were found eligible. The Scribner Cemetery (circa 1880) is a small family cemetery associated with an area homestead. The two bridges (Settles Bridge, circa 1880 and Jones Bridge, circa 1904) were installed after roads had been built in the area, helping to replace the role of ferries in transporting agricultural products from farm to market. Settles Bridge occurs on both the State Historic Preservation Officer and National Park Service lists (both as a historic structure and an archeological site).

There are three historic steel-truss bridges that cross the Chattahoochee River in the park but no longer carry vehicular traffic: Settles Bridge, Jones Bridge, and Rogers Bridge. The ownership of these bridges is under evaluation, as portions of the bridges may be located on both sides of the river, and have ownership interests from different counties or individuals. A fourth steel-truss bridge, the Paces Ferry Road bridge, is owned by Cobb and Fulton Counties. There are also several 20th century concrete and/or steel bridges that cross the river and at least three of these are eligible for the National Register: Roswell Road (U.S. 19), U.S. 41, and the Cumming Highway (GA 20) bridge. The historic value of these bridges is under evaluation by the National Park Service (NPS 2006h).

All of the known resources associated with the industrial development of the Chattahoochee River corridor within the study area lie in three distinct concentrations. These register-eligible sites associated with milling various materials include the Roswell Manufacturing Company and the Laurel/Ivy Woolen Mills, both of which are part of a greater Roswell Complex, the Marietta Paper Mill/Sope Creek Mill, and the Akers/Banner Mill ruins. The Roswell complex includes ruins of 1838 and 1854 factories and associated structures and objects dating between 1838 and 1926; an 1883 factory and associated structures and objects (1882-1976); and two stone retaining walls (the railroad grade and the Big Creek retaining wall, both near Allenbrook). The ruins of Ivy Mill (Laurel/Ivy Woolen Mills, circa 1870-1917) and the Marietta Paper Mill Ruins (Sope Creek Mill ruins, circa 1854-1902) are recorded as archeological sites by the State Historic Preservation Officer. The Sope Creek/Marietta Paper Mill ruins were listed on the National Register of Historic Places in 1973. Mill #1, the main paper mill and associated objects and structures date to circa 1854-1902, and Mill #2, the pulp-grinding mill, dates to circa 1886-1902. The Akers/Banner Mill ruins (circa 1873-1896) represent the best preserved grist mill sites in the area. These mills are considered eligible for the National Register because of their capacity to illustrate the development of water-powered industry in Georgia.

Allenbrook (circa 1840) is the only residential building associated with the Roswell Manufacturing Company within the park's Vickery Creek area. Allenbrook, located south of the Roswell Historic District (also listed on the National Register of Historic Places in 1973), is not within the boundaries of the district, but is considered eligible for listing in the register. Under the terms of a Memorandum of Understanding, the National Park Service and the Roswell Historical Society share responsibility for preservation and maintenance of this resource.

The Gold Branch/Morgan Falls rifle pits/picket posts (1864) is a National Register-eligible historic structure(s) associated with the Civil War in this area. Other rifle pits (Island Ford areas) are potentially eligible properties, pending additional research.

The Island Ford Lodge property (including the lodge, picnic shelter, retaining wall, spring box, and shelter steps) was found to be eligible for the register because this collection of structures illustrates use of the Rustic style of architecture for a country retreat along the river used by the wealthy during the early 20th century.

The Collins-Yardum House, Smokehouse, and well, also an extant example of a country home in the study area, has been recommended as eligible for listing on the National Register of Historic Places. In 2001, the State Historic Preservation Officer determined that this "unusual stone Craftsman-style bungalow house" is possibly unique in its stone architecture because of its distinctive use of both vertically and horizontally stacked stones.

The original Fort Gilmer, now known as Fort Peachtree, was built in 1814 during the War of 1812 to control the Creek Indians who had become allied with the British against the United States. The present Fort Peachtree is a replica fort built on the site of a major Creek Indian Settlement by the City of Atlanta Bureau of Water. This area was the borderline between Creek Indian lands to the south and Cherokee territories to the north. While Fort Peachtree is not listed on or eligible for the National Register, it forms an important part of the region's cultural resources.

Although they have not had a formal cultural landscape inventory to identify their important character-defining elements, the Scribner Cemetery/Farmstead, the Island Ford complex, the Collins-Yardum complex, Sope Creek Ruins, Allenbrook-Ivy Mill complex, Hyde Farm/Power House, and the Rogers Homestead are landscapes within the park that have sufficient integrity to be considered potentially significant.

TRANSPORTATION

Regional Transportation Conditions

Infrastructure. The park is located in one of the nation's largest urban areas, providing a natural refuge from urban life near the homes of millions of urbanites. The park is made up of 15 different areas, with access provided by numerous streets and roadways. Collector and local roadway facilities provide direct access to most areas.

The Atlanta region is the major transportation hub of the southeastern United States. Along with one of the busiest airports in the United States, Atlanta is served by a number of interstate highways that connect the Atlanta area to other parts of the United States (Figure 1). Interstate 285 encircles Atlanta, providing a bypass route around the congested downtown area. In addition, Georgia 400, which bisects the Chattahoochee watershed and the park, is a strategically located highway between the City of Atlanta and the northern suburbs (see Figure 2).

The transportation network in the Atlanta Regional Commission's 10-county Atlanta region consists of more than 17,000 miles of interstate, highways, and local streets. The interstate highway system contains approximately 90 miles of express lanes (high occupancy vehicle lanes) to assist commuters in traveling to downtown Atlanta during the peak traffic periods. In 2005, more than 28,000 commuters used express lanes daily; an 8% increase over 2004 volumes (ARC 2005a). In 2002, there were more than 180 miles of bicycle and pedestrian facilities in the Atlanta Region, of which 143 miles were located within Cobb, Fulton, and Gwinnett Counties (ARC 2005a).

However, Atlanta, like other large metropolitan areas, contains many roads that operate at low service levels due to inadequate capacity. It is estimated that 39 percent of freeway lane miles in the Atlanta

region experience more than two hours of delay per day, while 15% of non-freeway miles experience more than one hour of daily delay (ARC 2004). Without the implementation of proposed transportation planning and funding initiatives, it is projected that these percentages would rise to 69 percent and 40 percent, respectively, by the year 2030 (ARC 2004).

Mass Transit. According to U.S. Census data, in 2004 nearly 79 percent of residents in the 28-county Metropolitan Atlanta area drove to work alone in their vehicle, 11 percent of the workforce carpooled, while 2.4 walked, bicycled, or used some type of transportation alternative. Only 3.2 of the Atlanta workforce commuted via public transportation (ARC 2005b). However, average ridership increased between 2004 and 2005 for MARTA (4.7%), Gwinnett County Transit (46%), and Xpress (10%), while ridership decreased by nearly 39% for Cobb County Transit (ARC 2005a). In 2005, the average total daily boardings for the transit systems serving the area near the park (MARTA, Cobb County Transit, Gwinnett County Transit, and GRTA Xpress) was approximately 477,000.

The Metropolitan Atlanta Regional Transportation Authority (MARTA), the largest mass transit provider for the Atlanta area, serves Fulton and DeKalb Counties as well as a small portion of Gwinnett and Cobb Counties within the study area. MARTA has 48 miles of rail facilities and 238 rail cars in its system. In addition, 556 buses provide service on 120 routes (MARTA 2006). In 2005, there were 35,335 park and ride spaces in the Atlanta region, the majority of which are operated by MARTA, and 51% of these spaces were occupied on an average weekday (ARC 2005a).

Cobb Community Transit provides bus service within Cobb County, with connections to MARTA rail stations and direct express service to downtown Atlanta (Cobb County 2006a). Gwinnett County Transit operates six I-85 express bus routes from points in Gwinnett County to downtown Atlanta, including stops at MARTA rail stations. Five local routes service points within Gwinnett County and operate Monday through Saturday (Gwinnett County 2006). Forsyth County operates an "on-call" Dial-A-Ride program; three vans are made available to residents on an appointment basis for $1.50 to $4.50 per trip (Forsyth County 2006).

Xpress is metropolitan Atlanta's newest public transportation service, providing a connection between work and home for the region's commuters. Xpress is operated as a partnership between 11 metro counties (including the four counties encompassing the park), the City of Atlanta, and the Georgia Regional Transportation Authority, which was created by the Georgia General Assembly in 1999 and is charged with combating air pollution, traffic congestion and poorly planned development in the metropolitan Atlanta region. Xpress service began in 2004 and currently operates 15 routes. More routes will be added over the next several years, taking into account the availability of park-and-ride lots, transit connections, and customer interest. Current plans envision a network of 27 Xpress routes serving the region by the end of the decade (Xpress 2006).

Transportation Planning Initiatives. The Atlanta Regional Commission board adopted a Regional Transportation Plan for the Atlanta Region referred to as Mobility 2030 (Atlanta Regional Commission 2004). A Regional Transportation Plan is a long-range plan which includes a balanced mix of projects such as bridges, bicycle paths, sidewalks, transit services, new and upgraded roadways, safety improvements, transportation demand management initiatives and emission reduction strategies.

One component of Mobility 2030 is a short-range list of high priority projects referred to as the Transportation Improvement Program or the Fiscal Year 2005 – Fiscal Year 2010 TIP. The TIP identifies 839 transportation projects totaling $8.2 billion to be funded in the Atlanta region through 2010. Approximately 25% of the funding is designated for adding roadway capacity, 20% for transit, 18% for roadway upgrades, 17% for expansion of high occupancy vehicle lanes, 8.2 % for roadway system maintenance, and 5.8% for pedestrian and bicycle facilities (Atlanta Regional Commission

2005a). A second TIP has also been drawn from Mobility 2030 and is referred to as the Fiscal Year 2006- Fiscal Year 2011 TIP, which primarily reflects the logical progression of projects and programs defined in the previous TIP. Significant changes such as adding or removing high occupancy vehicle lanes, transit facilities or freeway widenings are only made as part of a comprehensive regional transportation plan update. The next regional transportation plan update, referred to as "Envision 6", is scheduled to be adopted in the summer of 2007.

The Atlanta Regional Commission is also the primary entity designated for identifying and prioritizing congested locations and facilities within the metropolitan area for use in the transportation planning process. The process is formally referred to as the Congestion Management Process. This process identifies appropriate strategies to reduce congestion that focus on improving efficiency and providing alternatives to single-occupant vehicles. The Congestion Management Process identification and ranking methodologies are continuously improved and information is updated periodically as necessary. The Atlanta Regional Commission also coordinates regional Intelligent Transportation Systems, which consist of the application and integration of advanced technologies, information processing, communications technologies, and advanced control strategies for the efficient and effective operation of the existing transportation system. Examples of Intelligent Transportation Systems include signal synchronization, incident management, emergency management, and transit signal priority.

In addition to regional planning, each of the counties bordering the park also participates in transportation planning. Fulton County adopted a Comprehensive Transportation Plan in 2001, Cobb County anticipates completion of a plan in 2007, and Forsyth County completed a plan in 2002 which is currently in the process of being updated. Gwinnett County will complete a Comprehensive Transportation Plan concurrently with their overall Comprehensive Plan, the 2030 Unified Plan, which is scheduled to be adopted in 2008.

Transportation Conditions in Relation to the Park

The park is comprised of segmented parcels of land located along a 48-mile corridor of the Chattahoochee River. No single roadway provides access to all of the segments. In addition, most areas of the park are located on minor collector or local roadways; therefore, arterial roadways do not provide primary access to the park. Table 18 lists the most common path to each area from the nearest freeway or arterial highway. Those that are congested during the morning and evening peak travel periods are indicated in italics.

Table 18: Main Street/Highway Access Points for the Park and Associated Areas

Area	Street / Highway Access*
Paces Mill	*I-285, I-75, Cobb Parkway*
Palisades	*I-285, Northside Drive*, *Mt. Vernon Highway, Powers Ferry Road,* Riverview Road
Cochran Shoals	*Johnson Ferry Road,* Paper Mill Road, Columns Drive
Powers Island	*I-285, Northside Drive*
Johnson Ferry	*Johnson Ferry Road*
Gold Branch	Lower Roswell Road, Timber Ridge Road

Table 18: Main Street/Highway Access Points for the Park and Associated Areas (continued)

Area	Street / Highway Access*
Vickery Creek	*Roswell Road*, Azalea Drive, Riverside Road
Island Ford	*Georgia 400,* Northridge Road, Dunwoody Place, Roberts Drive
Holcomb Bridge	*Holcomb Bridge Road*
Jones Bridge	*Holcomb Bridge Road, Jones Bridge Road, Barnwell Road*
Medlock Bridge	*Peachtree Parkway, Medlock Bridge Road*
Abbotts Bridge	*Abbotts Bridge Road*, Boles Road
Suwanee Creek	*Peachtree Industrial Boulevard*, Chattahoochee Drive (unpaved)
McGinnis Ferry	*McGinnis Ferry Road*
Settles Bridge	Suwanee Dam Road, Johnson Road (unpaved)
Orrs Ferry	No land-based facilities, river access only
Bowman's Island	*Cumming Highway/Georgia 20,* Suwanee Dam Road

**Italics* indicate congested roadways as defined by the Atlanta Regional Commission (Atlanta Regional Commission 2006a).

Transit service is provided in areas near the park, but service is currently not provided directly to the park. MARTA route 148 provides service between the Sandy Springs rail station and the Powers Ferry Landing area, near the Powers Island portion of the park. MARTA route 140 crosses the Chattahoochee River on Georgia 400 as it travels between the Mansell Road park-and-ride lot and the North Springs rail station. MARTA's North Line provides rail service in the general vicinity of the park, with rail stations at the Medical Center near Georgia 400/I-285, Dunwoody, Sandy Springs, and North Springs. Bicycles can be transported on the MARTA rail system and are allowed on MARTA buses (MARTA 2006).

Cobb Community Transit connects with the MARTA system near the park at Dunwoody rail station via route 65, which crosses the river on Johnson Ferry Road. Route 50, which leaves from the Cumberland Boulevard Transfer Station, provides service along Powers Ferry Road. Route 10B leaves from the MARTA Civic Center Station and also provides service along Powers Ferry Road. Route 10 provides service along Akers Mill Road, and leaves from the MARTA Arts Center Station. These routes service areas near the southern-most portion of the park, including Johnson Ferry, Cochran Shoals, and Palisades (Cobb County 2006a). Xpress bus service operates four routes that cross the Chattahoochee River within the park. Route 400 crosses the river on GA-400 near the Island Ford area, route 408 crosses the river on GA-141 near the Medlock Bridge area of the park, and routes 480 and 481 cross the river on Interstate 75 near the Palisades portion of the park (Xpress 2006). Currently, none of the Gwinnett County Transit routes intersect with the park.

A few bicycle/pedestrian paths currently exist near the park. Paths are located along Columns Drive from Sope Creek to Johnson Ferry Road, along Riverside Road near Island Ford, along Georgia 141 to the south of Medlock Bridge Road, along Peachtree Industrial Boulevard between Suwanee Creek and McGinnis Ferry Road, and along Buford Dam Road east of Bowmans Island. None of these bicycle/pedestrian paths provides direct access into the park (Atlanta Regional Commission 2001; Forsyth County 1996, 2001; City of Roswell n.d.).

Additional bicycle/pedestrian path projects have been proposed by local governments in the Atlanta region (see Appendix G and the "Regional, County, and Municipal Park Planning and Linkages" subsection). These have been compiled in the Atlanta Regional Commission's *Atlanta Region Bicycle*

Transportation and Pedestrian Walkways Plan (2002). In this plan there are more than 1000 miles of additional bike and pedestrian facilities proposed within Atlanta region, totaling $400 million in project costs (ARC 2005a). An update to this plan is scheduled for completion in 2007. The National Park Service is also developing an integrated trail system plan with objectives to establish trail linkages.

Park Transportation Statistics. According to traffic counts collected by the National Park Service in 2000 (NPS 2000a), vehicles entering each area with formal parking facilities range from 12,500 annually at Gold Branch to 415,000 at Cochran Shoals North. In areas where traffic was counted, nearly 1.5 million vehicles entered the park during 2000, with many of the vehicles transporting more than one person. In addition, numerous uncounted visitors enter the park each day via pedestrian and bicycle modes.

The park frequently experiences parking shortages, particularly at the southern areas that receive the highest visitation. Parking problems have been reported at Palisades, Cochran Shoals, Johnson Ferry, Gold Branch, Vickery Creek, Island Ford, and occasionally at Jones Bridge (NPS 1998b). The most severe parking shortages occur at Cochran Shoals, which contains approximately 150 parking spaces but experienced over 520,000 vehicles in 2000 (NPS 2000a). In 1995, over 1,000,000 vehicles were counted at Cochran Shoals (NPS 1995b), so an apparently considerable latent demand to use this area is hampered, at least in part, by lack of parking facilities. Park officials report that visitors sometimes wait 30 minutes or more for a parking space, or may choose to park illegally on the park access roads or on nearby public roads (NPS 1998a).

Visitation is greatest during the late spring and summer months, according to the traffic counts collected by the National Park Service. Vehicles accessing the park during this period approximately double the visitation during the winter months. Parking shortages occur more frequently during peak visitation periods than during low visitation periods (NPS 1998a). Limited parking facilities and the abundance of nearby residential neighborhoods encourage many visitors to walk or bicycle to the park. In areas adjacent to or near residential developments, such as Island Ford, McGinnis Ferry, Johnson Ferry, Vickery Creek, and Palisades, unauthorized access trails between neighborhoods and the park have been formed by frequent pedestrian and bicycle "short-cut" traffic.

Pedestrian/bicycle/vehicle conflicts are another problem reported by park officials and local residents. In park areas such as Island Ford and Jones Bridge, joggers and walkers often choose to use the edge of the 21-foot-wide winding access road instead of the trails. As they round a curve, motorists may encounter a bicycle or pedestrians walking two or three abreast on the roadway. Motorists traveling at excessive speed are also a problem in these park areas. A traffic calming study is currently under way to identify measures to slow the motorists and separate pedestrians from the vehicular traffic.

VISITOR AND COMMUNITY VALUES

Traditional Park Character and Visitor Experience

Traditional park character and visitor experience are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 2.

The enabling legislation of the park provides for the protection and preservation of the natural, scenic, recreational, and historic values of the river. The park provides access to natural river corridor for millions of people in the Atlanta area. Visitors come to the park for the scenery and the other sensory experiences that accompany the river and associated forested areas. They enjoy such features as the changing seasonal colors, scents of the forest, sounds of water and wildlife, solitude, and quiet. Some areas of the park offer more active opportunities for recreation, such as fishing, hiking, horse back riding, biking, and boating.

Scoping for the general management plan obtained information about visitor issues, experiences, and concerns for the future through a series of public meetings and a public comment period. Public input identified numerous community issues, which were sorted by type into the 13 categories illustrated below.

More comments addressed the value of recreational trails (jogging, biking, hiking, and for access to fishing) than any other issue, followed by experiences and concerns related to land use and the need for more outreach/public education about park facilities. Table 19 summarizes the detailed nature of public comments on visitor-related issues associated with management of the park.

Table 19. Summary of Issues Raised During Public Meetings

Comment Category	Nature of Comment
Outreach	Increase environmental education and outreach of park to surrounding communities.
Private Property	Conflicts between private property owners and park on acquisitions.
Transit	Improved traffic and safety, improved parking and roads, better transportation system.
Fisheries/Fishing	Improved fisheries management, to include emphasis on resource protection/long term maintenance.
Enforcement	More stringent enforcement of water quality laws, safety, legal rules in park.
Restoration	Restoration of damaged or disturbed areas of the park to be restored and enforcement of relevant regulations.
Access (River or general)	Increased access and types of visitor experiences.
Facilities	More or less varied support, recreational and educational facilities.
Ecological	Increased protection of natural park features.
Impacts	Water quality, fisheries protection, water quantity, point and nonpoint pollution, noise.
Use	Increased multiple use, but with protection of natural resources.
Boundaries	Expand park as much as possible, connectivity.
Trails	More and different types of trails.

This outreach program helped create a dialogue with park visitors on visitor and community values. There was also consistency in the nature of public concerns and the desired visitor experiences.

To further assess these values, information obtained from park visitors during the 2000-2001 public scoping was compared to the park Visitor Survey Card Data Reports of 1998, 1999, and 2000. These reports showed a reduction in overall satisfaction with conditions at the park from 85 percent to 81 percent between 1998 and 2000. Citizens commented on the severe strain on park infrastructure due to growth and development trends in the Atlanta metropolitan region. They also called for more park facilities, raised the need for more National Park Service staff to address enforcement of park regulations, and expressed concern over conditions of the river caused by forces outside the boundaries of the national park itself, i.e., “the river was brown, it was hard to enjoy our raft trip” (NPS 1998a).

Comments reflect the fact that visitation is primarily local or regional, but also express the universal popularity of the park, the use of the river as a drinking water supply, and the role of the river-based park to serve as a buffer to provide clean water. The park, in fact, provides the largest single public

greenspace in the metropolitan Atlanta region, and the river supplies 80 percent of the metropolitan Atlanta area's drinking water (MNGWPD 2006).

Recreational Opportunities

The park offers visitors a wide variety of ways to experience a range of natural and cultural resources. Scenic views and natural settings range from rugged expanses of forest with little human disturbance to landscapes from the historic and archeological past. The visual respite from rapidly developing urban and suburban surroundings draws approximately 2.5 million visitors each year.

Table 20 summarizes the current recreational amenities offered in the park. The park offers visitors a variety of recreational opportunities, including:

- An extensive system of hiking, jogging, and bicycling trails;
- River access points for activities such as fishing, motorized boating, canoeing, rafting, tubing, wading, and kayaking;
- Numerous picnic areas;
- Open spaces and natural habitat areas for scenery enjoyment and wildlife viewing/bird watching; and
- Nineteenth-century historic sites and Native American archeological sites.

One of the primary recreational values expressed by visitors was the desire to achieve a sense of solitude within natural areas of the park. This requires a low-noise environment, and an absence of unwanted sound. Sound is easily measured with instruments, but variations in human responses to sound complicate understanding of its impact. People judge the relative magnitude of sound by subjective terms such as "loudness" or "noisiness." Low-noise environments can be achieved in many parts of the park, but because the park is located in an urban/suburban metropolitan area, the amount of noise varies greatly across different areas of the park and even locally within individual areas.

Visitors seeking a recreational experience in the park are exposed to a variety of noise generators, primarily vehicular traffic on bridges, along roads, and in parking lots adjacent to park property. Hikers, boaters, or fisherman, depending on their proximity to these sources, may hear noise from vehicles or residential areas. The densely forested areas in many parts of the park, however, serve to dampen vehicular noise, providing a sense of solitude largely absent of road noise. Areas such as the Palisades, for example, are especially effective at damping noise, even though they are located close to major arterials such as I-75 and I-285.

Regional, County, and Municipal Park Planning and Linkages. Surrounding communities in Forsyth, Fulton, Gwinnett, and Cobb Counties have initiated active recreational programs to complement the more natural types of activities of the park. An inventory and assessment of park planning in adjacent counties provides a comprehensive understanding of the potential for connectivity to existing and proposed local parks, for addressing gaps in service delivery, and for identifying potential duplication of recreation services:

- The **Atlanta Regional Commission** has coordinated with the Georgia Conservancy and the Trust for Public Land to develop a regional plan that will enhance the level of coordination and cooperation among local governments and private parties that to protect greenspace. The

Table 20. Principal Recreational Amenities Summarized According to Park Unit

Park Area	Boating	Boat Launch[2]	Step-Down Launch[3]	Fishing	Hiking	Parking	Picnic Area	Rest-rooms	Other
Bowmans Island	X	X[1]		X	X	X		X[1]	Equestrian
Orrs Ferry	X			X					
Settles Bridge	X			X	X	X			
McGinnis Ferry	X				X				
Suwanee Creek	X			X	X				
Abbotts Bridge	X	X		X	X	X	X	X	
Medlock Bridge	X	X		X	X	X	X		
Jones Bridge	X	X	X	X	X	X	X	X	
Holcomb Bridge	X			X					
Island Ford	X		X	X	X	X	X	X	Ranger Station
Vickery Creek	X			X	X	X	X		
Gold Branch	X			X	X	X	X		
Johnson Ferry	X	X		X	X	X	X	X	
Cochran Shoals	X		X	X	X	X	X	X	Off-road biking
Palisades	X	X	X	X	X	X	X	X	

[1]Corps of Engineers facility

[2]Other launch sites at Chattahoochee River Park and Morgan Falls Park.

[3]Other step down launch sites at Jones Bridge Park, Garrard Landing.

Commission is also working to develop a complete inventory of existing greenspace in the region, to identify priority areas in the region for preservation, and to promote greenspace connectivity (Atlanta Regional Commission 2006b). In 2003, it was estimated that the Atlanta region contained over 50,000 acres of greenspace (Atlanta Regional Commission 2005b).

- The **Georgia Department of Natural Resources,** Parks, Recreation and Historic Sites Division has produced a 2003-2007 Statewide Comprehensive Outdoor Recreation Plan which identifies the adequacy of existing recreation opportunities in Georgia and determines the demand and need for additional opportunities. The plan calls for more active and passive recreational sites, rehabilitation and restoration or existing facilities, and linkages between facilities. The plan does not make specific recommendations regarding the park, however (Georgia Power 2006c).
- C**obb County** plans for the Silver Comet Trail to intersect the park. Initiated by the Path Foundation, contractors have built the Silver Comet Trail along 38 miles from Smyrna to Rockmart over the path of the abandoned Seaboard Railroad line. The multipurpose trail is designed to move bikers and joggers through the western metro region. State, federal, and local funds are being used to fund this $9.5 million project. Cobb County and local neighborhoods were approved for Transportation Efficiency Act funds to plan river area connectivity to the national park from Johnson Ferry area subdivisions. In addition, a *Chattahoochee River Trail Conceptual Plan Feasibility Study* was commissioned by the Cobb County Department of Transportation, the purpose of which was to explore the feasibility of developing a multi-use trail extending north from the intersection of the Chattahoochee River and Cobb Parkway to the boundary of Cobb and Fulton Counties (JJ&G 2004). Cobb County also anticipates park linkages with the proposed East Cobb Trails, the proposed Wildwood Trail, the programmed Interstate North Parkway Trail, and the proposed Mountain-to-River Trail (Cobb County 2006b). The park has also coordinated with Cobb County on a potential park linkage with the Akers Mill Trail as well as a linkage of Paces Mill and Cochran Shoals with the Rottenwood Creek Trail, which is currently under construction (Lutz 2006). A future trail linkage from the park to the Kennesaw Mountain National Battlefield Park is also under consideration, which would require extensive coordination with Cobb County.
- **Forsyth County** prepared a unified development code that supports park-like environments. The county is using Georgia Greenspace Program funds to purchase permanent open space. The county has also completed the Forsyth County Bicycle Transportation and Pedestrian Walkways 2025 Plan (Forsyth County n.d.) which includes plan for several multi-use paths and greenways, including an extension of the Big Creek Greenway from Alpharetta into Forsyth County.
- **Fulton County** initiated a master plan for county parks in 2001 and a Community Greenspace Program in 2000. The Greenspace Program calls for permanent protection of 20% of the county's geographic area, or approximately 68,000 acres. Local communities and stakeholders adjacent to the park have negotiated individual agreements for equestrian use of sites, trails, fishing, maintenance, and water quality monitoring.
- The **Gwinnett County** park and recreation plan calls for park and green space investments in riverfront land purchases and trails, using county funds and state Greenspace Program funds. The green space plan targets the purchase of 20 percent of the county land designated for permanent open space. A 2001 referendum approved implementation of the park plan. In May 2002, the County adopted the Open Space and Greenway Master Plan and in 2004 adopted a Comprehensive Parks and Recreation Master Plan, which addresses trail and coordinates

with the Open Space and Greenway Master Plan. In addition, the Western Gwinnett bikeway, which will stretch from Reps Miller Road in Norcross to Rogers Bridge Road in Duluth via Peachtree Industrial Boulevard, is under construction with completion scheduled for 2010 (Gwinnett Daily Post 2005). The park has also coordinated with Gwinnett County on a possible trail linkage through the Settles Bridge area (Lutz 2006).

- The **City of Atlanta** updated the master plan for parks and recreation and is participating in the Georgia Greenspace purchase plan. The City's greenway acquisition program was established under a consent decree which mandates $25 million in funding for land acquisition. Under the program, the City has acquired more than 1100 acres of land (City of Atlanta 2006) with a goal of acquiring 1900 acres by 2009 (Atlanta Development Authority 2006). In addition, provisions for growing dedicated parks and greenspace is included in the City's New Century Economic Development Plan (City of Atlanta 2005).
- The **City of Duluth** prepared and funded the Chattahoochee River greenway plan to link National Park Service property and a state park adjacent to Abbotts Bridge Park to the south.
- The **City of Roswell** updated its parks and recreation plan in 2000 which calls for connections to Island Ford and Vickery Creek. A referendum held in 2000 included funding for parkland purchases of over $22 million. The park and recreation plan Roswell's plan includes active sculling uses, expansion of the Chattahoochee Nature Center, trails, and parking facilities. In addition, the City has developed a 7-mile trail system, the Roswell Riverwalk, along the western/northern bank of the Chattahoochee River.
- The **City of Sandy Springs** is planning to develop 60 acres of land along the Chattahoochee River into the Great Park at Morgan Falls, which is designed to connect publicly and privately owned riverfront land to existing public and recreational amenities in the Morgan Falls Park area. Possible amenities include walking trails, a pavilion area, picnic areas, a canoe dock, fishing areas, permeable surface parking, and a pedestrian bridge spanning the river (Georgia Power 2006c). Park staff have coordinated with this effort.
- The **City of Suwanee** green space program was initiated in 1999. In 2001, residents voted to approve a $17 million bond referendum to fund purchase of property to be used for open space, parks, and greenways. Since 2003, the City has acquired 240 acres of open space, created three new city parks, and expanded the existing Suwanee Creek Greenway with three miles of multi-purpose trails (Atlanta Regional Commission 2005b).
- The park anticipates coordination with the newly formed (2006) **City of Johns Creek**.

Visitor Profile. Most visitors are residents of the Atlanta metropolitan area. However, because it is a national park, people from all over the country who visit the Atlanta area also visit the park. The park's recreational visitors come from a wide variety of economic backgrounds representing many groups from the adjacent neighborhoods and society at large.

The 1998 visitors survey (NPS 1998a) reported that 91 percent of park visitors are from Georgia, and 88 percent of the visitors had previously visited the park. Approximately 56 percent of respondents had visited the park at least 10 times in the past year, and 22 percent had visited the park at least 51 times during that period.

Visitors come to the park for a wide variety of reasons, including viewing scenery, walking, hiking, jogging, bicycling, wildlife viewing/bird watching, communing with or studying nature, studying history, picnicking, fishing, and water sports (NPS 2000c). 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. Many visit the park on a regular or frequent basis.

Park staff collects annual visitation statistics for the park. Visitation estimates are developed using traffic counts. Monthly public use is recorded and reported. Table 21 presents the annual visitation at the park from 2000 through 2005 (NPS 2006a).

Table 21: Annual Visitation 2000 – 2005

Year	Annual Visitors
2000	2,659,709
2001	2,751,256
2002	2,806,578
2003	2,694,541
2004	2,672,138
2005	2,511,306

Source: NPS 2006a

Visitation Trends. Park visitation more than doubled from 1991 to 1996, from 1,660,563 to 3,540,375. This increase is attributed to the growth of population in the region and the popularity of the river corridor as a recreation area, particularly for rafting and fishing. The counties that border the river had individual population growth that ranked in the top 20 nationally between 1991 and 1996 (Forsyth and Gwinnett tied for first, Cobb was 16th); north Fulton cities Roswell and Alpharetta ranked first and third, respectively, among cities. The Atlanta region was rated the fourth fastest growing metropolitan area in the United States from 1990 to 2000.

In the last few years, however, documented visitation has incrementally decreased (Table 18) despite this record-breaking population growth. The following factors may have affected visitation trends in the park in recent years:

- **Water Quality**: One explanation of the decline in visitation may be public perceptions concerning water quality. During this era of booming growth, the Chattahoochee River corridor became a desirable place to live, leading to sprawl along the river corridor. Poor development practices and weak enforcement of existing local and state regulations that protected the river buffer and tributaries from run off and nonpoint pollution in the adjacent counties produced water quality concerns in the watershed. The Chattahoochee River was listed in the top 10 most endangered American rivers in 1999. The extensive media coverage of the pollution clearly affected perceptions of the desirability of the river as a recreational resource and may have contributed to the reduced rate of visitation of the park for boating, rafting, and fishing. Subsequent to 1999, several state, regional, and local planning initiatives and ordinance have been adopted that are aimed at improving water quality in the Chattahoochee River (refer to "Water Quality" subsection).
- **Change in Visitor Experience from Water-based Uses to Land-based Uses**: The metropolitan population rose from approximately 2.5 million in 1990 to over 4.1 million in 2000. However, the number of visitors who rafted the river dropped precipitously beginning in the mid-1990s, according to National Park Service rafting vendors (NPS 2000c). This decline in the number of water-oriented users has been attributed to the declining water quality (NPS 2000c). This period, however, has seen a significant increase in biking and jogging, as documented in the annual National Park Service visitor surveys (NPS 2000c).

- **Change in Access Patterns to the Park**: Regional traffic congestion, new patterns of access to the park, and changing visitor uses in different areas of the park suggest a new visitation trend. The typical visitor experience is currently more oriented toward walking, jogging, biking, car-pooling, and using unauthorized trails. This trend suggests the need for a new method for surveying and tracking visitor use, as those that access the park as pedestrians or bicyclists are not always included in the visitor count, artificially lowering total visitors reported.

Community Characteristics

Community characteristics are included as an impact topic based on the criteria presented in "Impact Topics – Resources and Values at Stake in the Planning Process" in Chapter 3. Community characteristics include population, land use, and economics.

Population. The Atlanta metropolitan area is one of the most rapidly growing areas in the United States. According to the United States Census Bureau, the population of the 28-county Atlanta Metropolitan Statistical Area passed 4 million in 2000 and grew to over 4.7 million in 2004 (Metro Atlanta Chamber of Commerce 2006a). By 2030, the population is projected to surpass 6 million residents.

Gwinnett, Cobb, Fulton, and Forsyth counties were among the fastest growing counties in the Metropolitan Atlanta Statistical Area during the 1990s; however, growth in these counties has slowed between 2000 and 2004. According to Atlanta Chamber of Commerce statistics, the greatest percentage of population change between 2004 and 2005 was observed in counties on the periphery of the Atlanta metropolitan area, such as Dawson, Newton, and Paulding Counties. The population growth from 2000 to 2004 for the region in the vicinity of the park is summarized in Table 22 (U.S. Census Bureau 2006a).

Table 22. Population Growth in the Metropolitan Atlanta Area from 2000 to 2004

	Population		Change in Population	
County	**2000**	**2004**	**Numeric**	**Percent**
Gwinnett	588,448	700,794	112,346	19.1%
Fulton	816,006	814,438	1,568	-0.2%
Cobb	607,751	654,005	46,254	7.6%
Forsyth	98,407	131,865	33,458	34.0%
Atlanta MSA	4,054,500	4,704,300	649,800	16.0%

Source: U.S. Census Bureau (2006) and Metro Atlanta Chamber of Commerce (2006a)

Land Use

Regional Land Use. Local governments in Georgia, such as counties and incorporated municipalities, have responsibility for land use management and water quality protection. Their roles include master planning, zoning enforcement, storm water ordinance control, and water and wastewater planning. The U.S. Army Corps of Engineers, Mobile District manages the Buford Dam and Lake Lanier, located at the northern end of the park. The United States Army Corps of Engineers plays a key role in the management of the park through its control of river flow (NPS 2000c). The National Park Service increasingly participates on various commissions and boards dealing with land use issues, sprawl, smart growth, park planning, zonings by county and by cities, and regional and state studies of land use trends and their affects on local development and quality of life.

The four heavily populated counties of Cobb, Forsyth, Fulton, and Gwinnett are involved in land use planning activities that also affect the park. All four counties are required by State of Georgia Land

Planning enabling legislation to prepare comprehensive plans for management of land use, infrastructure, and the financing of implementation of those same plans. Land use planning for each county along the Chattahoochee River is also specifically protected by Metropolitan River Protection Act requirements (also discussed in the "Aesthetics/Viewsheds" subsection).

Park units abut the cities of Atlanta, Duluth, and Roswell, and are relatively close to Alpharetta, Buford, Suwanee, and Cumming. Atlanta's Standing Peachtree Creek area has a municipal water facility and historic land uses that include mill and Fort Peachtree properties. Older Atlanta neighborhoods and industrial uses are the predominant land uses along the park boundaries. Resolution of the multi-year lawsuit on wastewater and storm water disposal from the City of Atlanta has prompted plans to purchase tributary buffers along the Chattahoochee River and the river itself as a means of improving water quality. The City of Roswell and the City of Alpharetta have combined to create citywide linking green belts along the Big Creek tributaries.

Municipalities that directly connect to the park have often taken leading roles in land use planning. The City of Roswell comprehensive plan provides an award winning park and recreation plan, an Adopt-A-Stream program, and land use buffer systems beyond state minimums. The Gwinnett Cities of Buford and Suwanee have approved new funding for open space purchases to support implementation of their comprehensive planning efforts. Duluth was an early leader in the formation of groups that supported the initial development of the park.

The Atlanta Regional Commission, the Metropolitan North Georgia Water Planning District, the Georgia Department of Natural Resources, and the Georgia Regional Transportation Authority play active roles in natural resource management, environmental assessment, watershed protection, and land use planning. New land use enforcement efforts are geared towards large land use developments called Projects of Regional Impact. Guidelines for these projects have recently been approved to provide wiser choices regarding compact growth, transportation alternatives, and green space protection. The state and regional agencies continue to expand enforcement and protection responsibilities in land use development activities. In addition, various community-based organizations and stakeholders have influenced in resource management (NPS 2000c).

Park Land Use. Land use in the northern end of the park and vicinity is primarily characterized by rapid population growth and urban sprawl. Urbanization has converted approximately half of the land in the vicinity of the park from agricultural or forested uses to residential, commercial, industrial, or other more intensive uses. Development has followed the major transportation corridors (I-75, I-285, Georgia 400) and includes high-rise buildings, industrial sites, subdivisions, and highway expansions (NPS 2000c). The National Park Service has increasingly focused on these transportation corridors because of runoff and viewshed issues related to intense new developments in these key economic corridors.

The southern end of the park, including the City of Atlanta and parts of Fulton County, is the most densely developed area, and the most heavily used by visitors. The northern portion of the park still contains some open fields and forests, and Forsyth County has large pockets of rural land uses and horse farms. However, development is increasing as urbanization sprawls northward (NPS 2000c).

The park serves as a green or open-space buffer for the entire region, bringing form to the land use patterns of the region. The density of land uses tends to increase as the distance from the park increases. In general, the park covers about a ¼-mile wide core area on each side of the river. Residential neighborhoods continue outward to ½ mile, and mixed uses to 1 mile.

This approximate ¼ mile width of the park is a community characteristic that planners refer to as the "walking distance." This core area is the least developed, with notable exceptions in the southern

portion of the metro region, where industrial land uses and mill housing were developed earlier in the 20th century around Atlanta proper.

Up to ½ mile beyond the park boundaries, the neighboring area has various densities of residential development. Existing land uses are primarily single family residential except at key hubs near major traffic interchanges or intersections. These major activity centers involve a mix of non-residential and residential land uses, as on the Georgia 400 Corridor at Northridge and at locations along the I-285 perimeter highway near Cumberland Mall.

The 1-mile distance represents the approximate limits of a nexus of land use planning and conditions that can buffer the park. Stream buffers throughout the watershed are protected under local and state authority. The core park area land, the residential ring, major activity centers, and industrial, apartment, and office land uses make up the overall layering of land use patterns.

Aesthetics/Viewsheds. The Georgia Metropolitan River Protection Act of 1973 includes language that allows the National Park Service to protect park aesthetics and viewsheds in the vicinity of the park. The Atlanta Regional Commission designed the act to protect river quality and visitor experiences in the national park, and to improve development controls in the Chattahoochee River watershed. The act established a 2000-foot-wide corridor on both banks of the Chattahoochee River for the entire length of the park. In 1998, the Metropolitan River Protection Act Corridor extended 36 additional miles to the downstream limits of Fulton and Douglas Counties. The act required the Atlanta Regional Commission to adopt a plan that would result in protection of the land and water resources of the Chattahoochee River Corridor, and to develop procedures to implement the plan and the act. Local governments in the corridor have the responsibility to implement the plan.

The Metropolitan River Protection Act makes it illegal to engage in any land-disturbing activity not in compliance with or not certified under the Chattahoochee Corridor Plan. This includes restricting any land clearing activity within a 50-foot buffer of the river and prohibiting impervious surfaces within 150 feet of the river. In addition, it requires a 35-foot vegetated buffer along tributaries to the Chattahoochee River, and precludes any land or water uses within the floodplain. When enforced, these provisions help protect the viewshed along the river corridor.

Proposed developments adjacent to the national park increasingly concern area residents, park visitors, and adjacent property owners. Visitors identify aesthetics and viewsheds of the park and the river corridor as important issues. The principle reasons for park visitation are to appreciate the beauty and serenity of the natural environment. As a result, one National Park Service objective is to allow views of the park and Chattahoochee River corridor from the outside but to ensure that high rises and nearby developments are not obvious from inside the park.

No county or city governmental jurisdiction other than the Metropolitan River Protection Act provides controls or guidelines for protection of the park viewsheds. However, the Cobb Galleria Community Improvement District, which incorporates 25,000 acres of landmass in the vicinity of the Palisades and Cochran Shoals, provides an effective means of improving visitor experience at site-specific developments and for leveraging private sector voluntary support for aesthetics and viewshed protection. In a unique public-private partnership, the district negotiates for joint funding of trails, amenities, and park area improvements in exchange for height and density waivers.

Economics

The park corridor abuts some of the wealthiest areas of metropolitan Atlanta. According to 2000 census data, the median household income in the City of Roswell, for example, is estimated at over $71,000 per family, while the median income per household for the State of Georgia is just over $42,000 (U.S. Census Bureau 2006). The combined real estate value of parcels in close proximity to

the park has been estimated at approximately $15 billion (Trust for Public Land 2001), and the total amount obligated for land acquisition since the Chattahoochee River National Recreation Area was established in 1978 is $112, 840,439 (Libman 2006). Comparisons of waterfront and park-front properties to non-park parcels show significantly higher values for properties adjacent to rivers and parks. For example, properties and lease rates for New York City real estate facing Central Park, an 1800 acre green space, are as much as 40 percent higher than average rates. The economic value of the national park to the metropolitan Atlanta region has not yet been quantified.

The Atlanta region has a growing office and employment market due to geographic location and private sector planning. Atlanta is home to the headquarters of 15 Fortune 500 companies and 12 Fortune 1000 companies. In addition, Atlanta has remained competitive in business costs and was ranked the least costly large city for business in an annual KPMG study released in 2006 (Metro Atlanta Chamber of Commerce 2006b).

The four-county area containing the park had 1,231,000 employees in 1990, growing to 1,578,000 employees in 2000 and then declining slightly to 1,350,000 in 2004 (Atlanta Regional Commission 2005a). Metropolitan Atlanta as a whole employs over 2.4 million employees. In 2002, negative job growth was experienced in for the first time in decades; however, net gain of jobs was realized in 2004 and 2005. The Atlanta region will likely be impacted by mergers and acquisitions of large companies, such as Georgia-Pacific, Scientific Atlanta, and BellSouth as well as continuation of effects associated with Delta's bankruptcy. In addition Department of Defense facilities such as Fort Gilem, Fort McPherson, and the Marietta Naval Station are slated for closure as well as the General Motors and Ford manufacturing facilities. Despite these potential setbacks, it is predicted that job growth will continue with gains of more than 50,000 employees in 2007 and 2008 (Metro Atlanta Chamber of Commerce 2006b).

Although Metropolitan Atlanta's economy was not immune to the early 2000s recession, key economic indicators, such as personal income and gross metro product, indicate a near-term return to growth. Median household income in metropolitan Atlanta grew an estimated 18.4 percent from 2000 to 2004 and is 27 percent higher than the national average. The area's gross metro product growth is forecasted to increase 4 percent annually through 2008 (Metro Atlanta Chamber of Commerce 2004). Additionally, commercial construction grew in 2005 with an overall increase of almost 7% in total private construction valuation (Metro Atlanta Chamber of Commerce 2006b). Future trends in economic growth will result in continued development along the Chattahoochee River watershed and on the fragile environs of the narrow band of park habitats that wind through the north Fulton and I-75/I-285 areas of the region.

Park revenues reflect these economic trends. Fees from parking permits and related sources are estimated at $512,875 for fiscal year 2005, up from $495,465 in 2004 and $455,384 in 2003. The climbing revenues indicate a substantially increased demand on the parks, parking lots, trails, restroom facilities, interpretative activities, security, and related services. Additional economic output is generated in the park via fishing. The economic output of fishing in Chattahoochee River within the park was calculated based on a creel survey conducted in 2000-2001 by the Georgia Department of Natural Resources and on economic output data obtained from a U.S. Fish and Wildlife Service 2001 survey and published by the American Sportfishing Association. The average economic output per angler day for freshwater fishing in Georgia is $77.03. When combined with an average of 105,454 angler trips per year within the 48-mile stretch of the park yields an annual economic output of over $8,000,000 (Martin 2005).

PARK OPERATIONS

Staffing

Park staff provide the full scope of functions and activities to accomplish management objectives, performing duties that include resource protection and management, law enforcement, emergency services, public health and safety, visitor services, interpretation and education, community services, utilities, housing, and fee collection. As of 2006, there were 32 full-time employees, performing their duties in the five functional roles including:

- The **Science and Resource Management** division is responsible for all activities related to the management, preservation, and protection of the park's cultural and natural resources. Activities include research, restoration activities, species-specific management programs, archives and collections management, and historic site protection.
- The **Resource Education** division is responsible for all park activities related to providing visitors with an educational park experience. Duties include interpretation, visitor center management, and interpretive media. Volunteer activities are also managed under this division.
- The **Ranger Activities** division is responsible for law enforcement, emergency services, and public health and safety within the park.
- The **Maintenance** division is responsible for all activities related solely to prolonging the life of park assets and infrastructure through substantial repair, replacement or rehabilitation of park assets, such as buildings, roads, trails, utilities, fleet vehicles, and equipment. This work includes cyclic and routine maintenance activities, inspection, general preventative maintenance and renovation projects.
- The **Administrative** division is responsible for all park-wide management and administrative support activities, park-level planning, human resource management, information technology, park leadership, and financial management. This staff also coordinates daily internal operations at the park and works with external constituencies.

Park staff spend time working with a variety of agencies and organizations to aid the park in achieving its mission. The park actively coordinates with the Georgia Department of Natural Resources, Wildlife Resources Division, regarding fish management practices within the park boundaries. In addition, there is an ever increasing demand for park staff to address connectivity with local city and county parks, and it is anticipated that a greater emphasis will be placed on coordinating with this entities in the future.

Park Infrastructure and Facilities

The park consists of 10,000 acres of land distributed along a 48-mile, linear corridor of the Chattahoochee River between Buford Dam and Peachtree Creek. The park is comprised of 15 separate areas which are listed in Table 17. Park facilities consist of picnic areas, hiking and biking trails, river access facilities, restrooms, and parking areas. The distribution of these facilities throughout the park is also provided in Table 17. Park headquarters are located at Island Ford, which serves as the operations center for all park staff and also contains a visitor contact station.

Commercial Services

The park will be conducting a study of concessionaire options which would review the potential cost for different uses, including replacement concessions, park offices, elimination of facilities, limited new facilities, or new information and interpretative facilities.