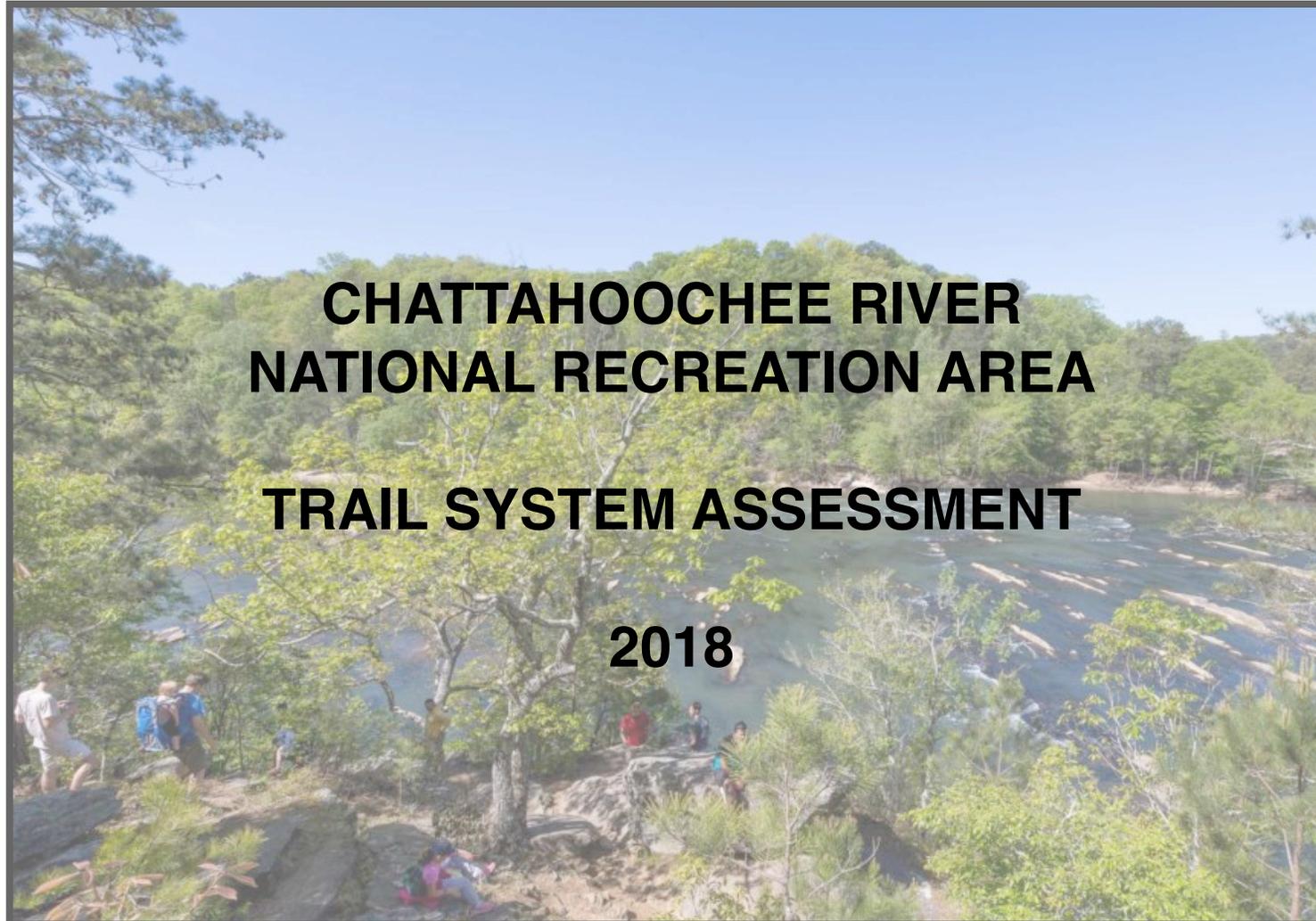


**DEVELOPED FOR:**

**CHATTAHOOCHEE RIVER NATIONAL RECREATION AREA  
MR. WILLIAM COX, SUPERINTENDENT  
1978 ISLAND FORD PKWY, SANDY SPRINGS, GA 30350**



**LORD  
AECK  
SARGENT**



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# TABLE OF CONTENTS

## EXECUTIVE SUMMARY

### OVERALL ASSESSMENT

**PROJECT COMPONENTS.....1**

**EXISTING PLAN DIRECTION.....3**

**SUSTAINABILITY APPROACH.....11**

**CRNRA CONTEXT.....13**

**SYSTEM-LEVEL OVERVIEW.....15**

### PARK UNIT ASSESSMENTS

**BOWMANS ISLAND.....17**

**ORRS FERRY.....27**

**SETTLES BRIDGE.....31**

**McGINNISS FERRY.....39**

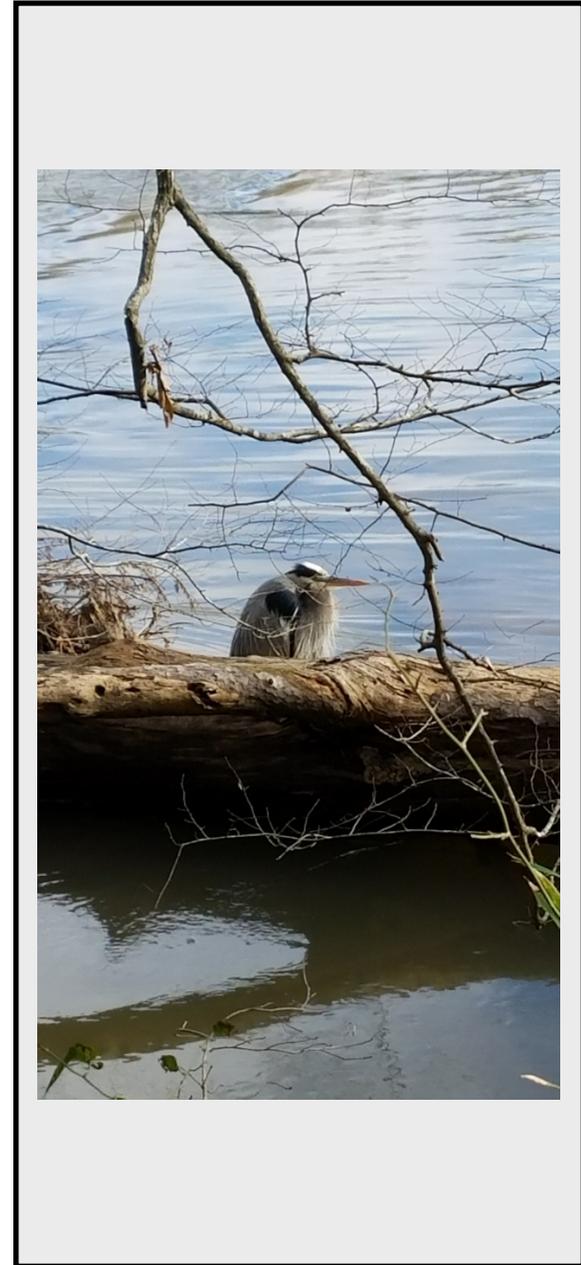
**SUWANEE CREEK.....45**

**RODGERS BRIDGE.....49**

**ABBOTTS BRIDGE.....53**

**MEDLOCK BRIDGE.....61**

**JONES BRIDGE.....69**





**HOLCOMB BRIDGE.....77**

**ISLAND FORD.....83**

**VICKERY CREEK.....93**

**GOLD BRANCH.....103**

**JOHNSON FERRY.....113**

**SOPE CREEK/COCHRAN SHOALS.....123**

**POWERS ISLAND.....133**

**PALISADES EAST.....143**

**PALISADES WEST/PACES MILL.....153**

**APPENDIX A: RECOMMENDED TRAIL SPECIFICATIONS**

**APPENDIX B: PUBLIC MEETING COMMENTS**

**APPENDIX C: STEWARDSHIP ENGAGEMENT BEST PRACTICES**

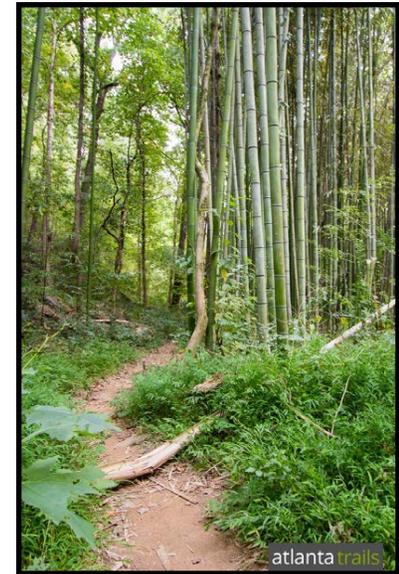
**APPENDIX D: TRAIL CLOSURE BEST PRACTICES**

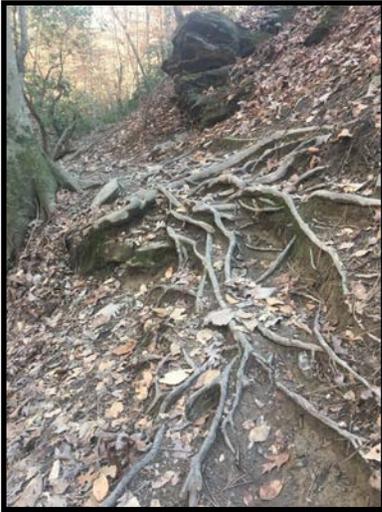
# EXECUTIVE SUMMARY

The Chattahoochee River National Recreation Area (CRNRA) Trail Assessment was conducted in 2018, as a response to direction set forth in the National Park Service (NPS) Unit's General Management Plan (GMP) and Foundation Documentation where it was stated that a key issue of degrading resource conditions "due to high levels of use that is stressing or deteriorating hiking and biking trails and leading to social trails and erosion." This key issue identifies a need to: "inventory, assess, plan, and implement efforts aimed at improving resource conditions in the park... a trail management plan for the park could inform needed cyclic projects for trail maintenance, as well as provide a means by which communities could partner on aligning trail connections and supporting maintenance of the trail system." The CRNRA trail assessment inventoried the location and condition of all trails and structures within the Bowmans Island, Orrs Ferry, Settles Bridge, McGinniss Ferry, Suwanee Creek, Rodgers Bridge, Abbots Bridge, Medlock Bridge, Jones Bridge, Holcomb Bridge, Island Ford, Vickery Creek, Gold Branch, Johnson Ferry, Sope Creek/Cochran Shoals, Powers Island, and Palisades/Paces Mill parks. The assessment activities also included extensive outreach to National Park Service staff, collaborating partners, and the general public concerning the perceived condition, concerns, and desires around the park-wide trail system. The results of these activities are included in the attached document along with recommendations for prioritized trail system improvements.

The CRNRA trail system is in a declining condition because the recreation corridors were largely adopted from 1) existing historic corridors such as roads, timber extraction routes, and utility lines and 2) informal user-created routes. These types of trails lack durability (physical sustainability), rarely manage stormwater flows effectively and often cross seasonally wet areas, leading to eroding or muddy conditions. The informal nature of the user-created routes to interesting features, especially in a high-use, urban trail system, has encouraged a repetition of this behavior and resulted in challenging navigation, lower quality trail experiences, and a general sense that something is "lacking" in the trail system (social sustainability), which is often expressed as a perceived conflict. A historic lack of capacity in resources, skills, and effort by NPS and partners (managerial sustainability) has resulted in the physical and social sustainability issues increasing in number and scope over time.

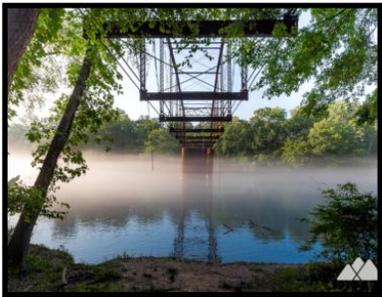
Visitation to the CRNRA-managed lands has mirrored the rapidly increasing population throughout the Chattahoochee River corridor and more broadly in the Atlanta metropolitan area. A non-traditional NPS property, with multiple, stand-alone, porous boundary parks spread across almost 50 river miles,





numerous counties and municipalities, and accessible via dozens of major roads, CRNRA's trail system will never be effectively managed solely by Park Service staff. Even demonstrating a management presence in the individual park units is an overwhelming challenge, given the geographic and traffic constraints present throughout the CRNRA corridor.

The CRNRA trail system is nearing a critical juncture due to the declining condition of the trails coupled with the increasing visitation pressure. The Vickery Creek, Sope Creek/Cochran Shoals, and Palisades park units are the biggest "flash points" in the system, being the most heavily visited parks, having the largest trail systems, and indicating the greatest physical, social, and managerial challenges. A baseline assessment is not able to address the myriad issues present in these units. Attempts to maintain these park's trails in their current locations will not result in long-term sustainability and detailed redevelopment management plans should be created to guide the prioritized improvements to these trail systems. The new trail systems and corresponding landscape restoration needed to properly close the unsustainable trails and recreate a more normal watershed hydrology will be quite costly (rough estimation of \$4 million) relative to the capital that has been historically invested in the trails.



Outside those three units, the trail assessment has conservatively recommended 7.62 miles of trail for closure, the addition of 10.92 miles of new trail, and heavy maintenance of 15.67 trail miles. This, in itself is a considerable undertaking in time and resources, but is vital to mitigate the issues present before they reach a critical condition. Population and visitation in these park units, generally further from the Atlanta core, is increasing rapidly and stewardship of the trail system can still be proactive at this time. In strictly capital estimates, the trail systems in these units need an approximately \$750,000 infusion.

A sustainable future for the CRNRA trail system is possible, but will require 1) management partnerships with municipal and county parks departments, 2) a large capital funding stream to implement improvements, and perhaps most importantly 3) a robust trail stewardship program with many partners that maintains the trail system to provide high quality experiences on durable trails and lead outreach, education, and training efforts with park visitors, service organizations, and the broader Atlanta community.

The challenge for CRNRA is that there is not a replicable model for this process. There are park co-management examples where an agency such as the US Army Corps of Engineers manages the water resource and a local entity manages the land-based park and trail facilities. There are support groups that generate large amounts of capital to fund trail improvement projects on behalf on the land managing entity. And high capacity trail stewardship groups exist that undertake most of the trail operations and maintenance activities for a park. However, there is not a single park system that combines all of these progressive management practices. CRNRA and its partners have the challenge and opportunity to create a visionary model for urban park management.

# OVERALL ASSESSMENT

## PROJECT COMPONENTS & TIMEFRAME

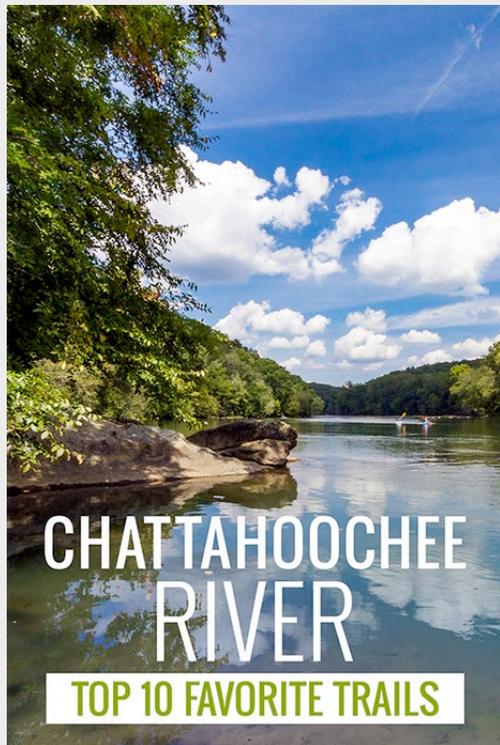
The trail assessment process involved staff walking each mile of trail within the Chattahoochee River National Recreation Area (CRNRA) during the month of January, 2018. While visitation would be low at this time of the year, the lack of leaves and a high water table condition would allow the field team to better determine problematic trail conditions and the source of those problems.

During this field reconnaissance, typical and problematic trail conditions, as well as all built structures (i.e. signs, bridges, steps, culverts, puncheon, benches, etc.) were catalogued with coordinates and photographs. Trail inventory notes were downloaded on a daily basis in narrative and database formats for future use by the National Park Service and its partners. This accompanying report distills that information in general terms for the entire system of park Units and provides more detailed information about the conditions in each Unit.

The project team met with NPS officials on multiple occasions throughout the process to seek background information that was not apparent through the inventory/reconnaissance process and gather preliminary feedback on the team's findings.

Two public presentations were conducted. The first presentation was conducted in January, 2018 with NPS Staff and partners and introduced the project components, process, and the potential utility of the gathered information to those parties in planning for and implementing positive changes to the CRNRA trail system. The second set of presentations, conducted at the Chattahoochee River Environmental Education Center (CREEC) and Atlanta REI in mid-April, 2018 provided participants with initial findings, conducted focus group small meetings, and introduced an on-line, geo-focused, public comment tool (Social PinPoint and survey) that would be utilized for cataloguing feedback on a variety of trail and recreation-related issues at each individual Unit. The feedback was monitored by the team on a daily basis for appropriateness of content and to answer questions that were posed by commenters. The public feedback process was continued for approximately six weeks and the comments were catalogued and considered for inclusion into this report.





PROJECT ELEMENT	TIMEFRAME	DELIVERABLE
Field Reconnaissance, Trail, and Structure Inventory	January 5-18, 2018	Database for NPS use, summary in report
CRNRA Staff Meetings	January 9 & 11, April 10, June, 26	Staff notes included in development of recommendations
Public Presentation 1	January 12, 2018	Copy of presentation included in report Appendix
Initial Findings Compiled	January 18 through April 6, 2018	Findings included in report
Public Presentation 2	April 12 & 14, 2018	None
Public Comment Period (Social PinPoint and survey)	April 16, 2018 through June 1, 2018	Catalogued in report with full comments included in report Appendix
Report Draft Submitted to CRNRA Staff for Review	August 6, 2018	Trail Assessment Report (Draft)
Trail Education Workshop	September 15 & 16, 2018	Best practices trail project to guide future work
Final Report Submitted to CRNRA	October, 2018	Trail Assessment Report (Final)

## EXISTING PLAN DIRECTION



### GMP DIRECTION

The Chattahoochee River National Recreation Area General Management Plan/Environmental Impact Statement (September 2009; CHAT GMP) is the guiding managerial document for the CRNRA. The CHAT GMP presents six alternative proposed management schemas for the park, including a “no action” alternative that would have made no changes from the existing management regime. The CHAT GMP and proposed alternatives were developed with consideration for:

- management and environmental needs;
- the current and desired condition for the Park and its resources; and
- the input of public individuals and communities.

The CHAT GMP does not present any overall “trail direction” per se, but the trail system is a driving factor throughout the GMP as it provides access and activities for users and because of the trail system’s potential

impact on sensitive environmental and cultural resources. The impacts of the trail system in each of the alternatives was considered in the following contexts:

- The impacts of unauthorized trails from surrounding properties on environmental quality, due to the tendency of unauthorized trails to disturb native vegetation and contribute to erosion;
- How the trail system enhances visitor enjoyment of the open spaces provided by the Park; and
- How the historic trails support the preservation of archaeological and cultural resources.

The trail system and its impacts were a key decision point in the selection of the preferred alternative (Alternative F) and management regime for the Park. The key points of consideration related to the trail system were how surrounding development has the potential to impact Park resources due to increased use and unauthorized trails. Increased use and

unauthorized trails could affect cultural resources, sensitive riparian areas, river water quality, and visitor experience. The selected alternative (Alternative F) calls for increased management of the trail system over pre-2009 levels (an increase in both activity and budget) to help manage these potential issues.

In the CHAT GMP, there is a discussion of the Park's carrying capacity, as it affects the overall management direction and activities. The trail system is an important consideration for the Park's carrying capacity. Trails have two major considerations for determining carrying capacity:

- Unauthorized trails are an issue that directly affects carrying capacity. The GMP states unauthorized trails should not exceed 5% of the total trail length in the park and that there should be two trail intersections within 100 feet of a designated trail. Monitoring should be in place to maintain these standards and the Park should manage unauthorized trails through user education, clearly delineated official trails, trail

system enforcement, limitation of activities that lead to unauthorized trails, and determination if unauthorized trails should be added to the trail system.

- Count of unauthorized trails is in an indicator for potential damage to cultural resources. According to the GMP, there should be no more than two unauthorized trails leading to a cultural site and that strategies to reduce access (such as physical barriers) should be employed to reduce the number of unauthorized trails.

Each of the proposed Alternatives in the GMP had the park broken into use "Zones". Alternatives E and F, the selected alternative, had an expanded number of zones compared to other alternatives. These expanded zones were developed as a result of public input. The zones define the acceptable activities and facilities (including trails) that are allowed in each. The Zones and their activities and facilities are reproduced from the GMP in the following table and map.

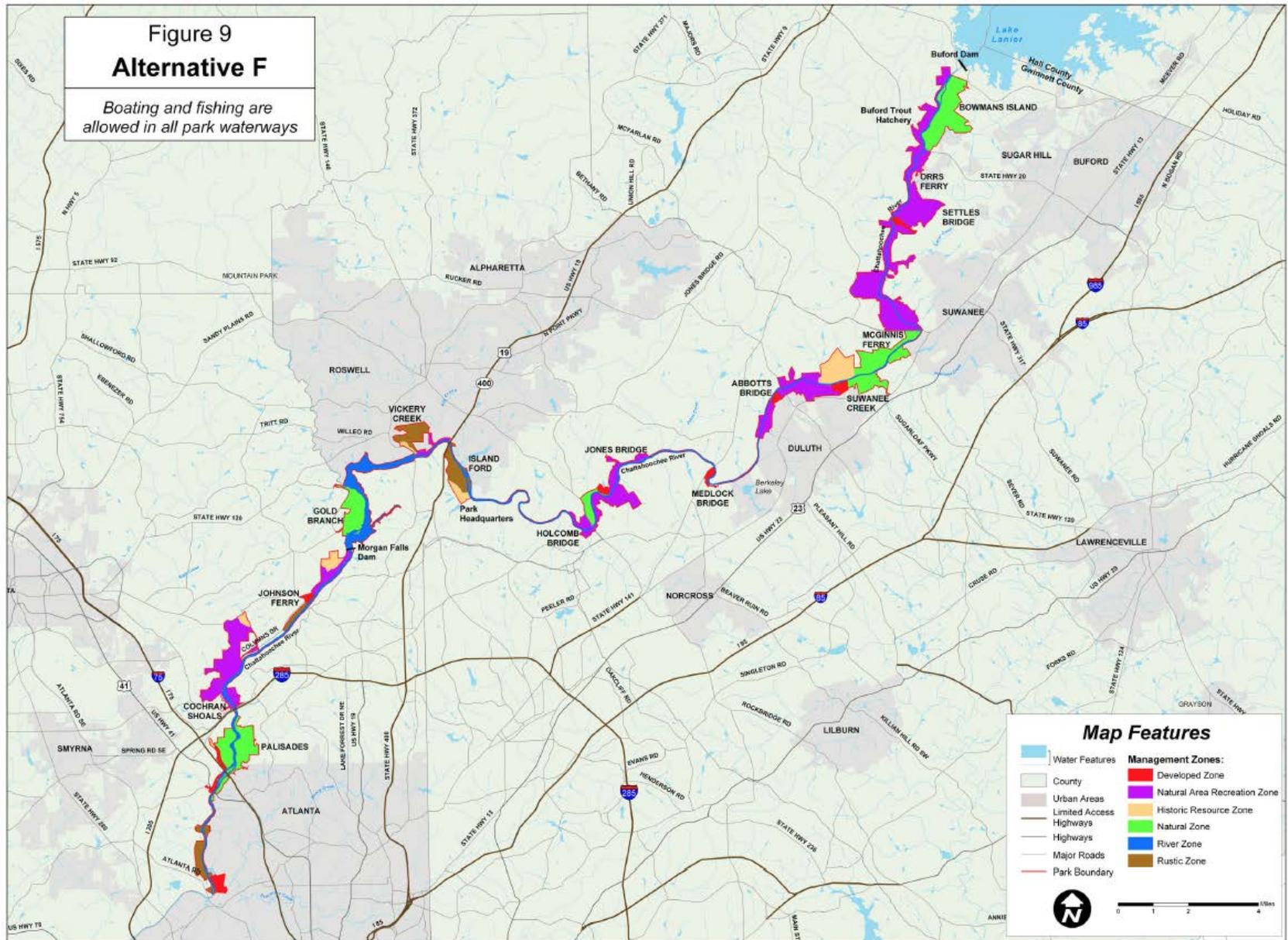


**Table 3. Management Prescriptions – Alternatives E & F**

CATEGORY	NATURAL AREA RECREATION ZONE	NATURAL ZONE (FORMERLY URBAN PRIMITIVE)	DEVELOPED ZONE	RIVER ZONE	HISTORIC RESOURCE ZONE	RUSTIC ZONE
<b>Types of Activities</b>						
Day hiking	Yes	Yes	Yes	N/A	Yes	Yes
Off-road Bicycling	Yes, on designated trails only	No	Yes, on designated trails only	N/A	No	Yes, on designated trails only
Picnicking	Yes	Yes, no facilities	Yes	Yes, no facilities	Yes	Yes, no facilities
Fishing	Yes	Yes	Yes	Yes	Yes	Yes
Equestrian	Yes, existing trails only	No	Yes	N/A	No	No
Scientific research	Yes	Yes	Yes	Yes	Yes	Yes
Canoeing, rafting, kayaking	Yes	Yes	Yes	Yes	Yes	Yes
Habitat restoration	Yes	Yes	Yes	Yes	Yes	Yes
Motorized Vessels (No PWCs allowed)	N/A	N/A	N/A	Yes	N/A	N/A
<b>Types of Facilities</b>						
Trails	Yes, unpaved trails only	Yes, primitive trails only	Yes	N/A	Yes	Yes, primitive trails only
River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)	Yes	Yes, existing only, no new river access facilities	Yes	Yes	Yes, existing only, no new river access facilities	Yes, step-downs, boardwalks, docks, viewing platforms only
Visitor & Admin. Facilities	Yes, limited in size & impact	Yes, existing only, no new visitor/admin. Facilities	Yes	N/A	Yes, appropriate within cultural context	No
Parking areas	Yes	Yes, existing only, no new parking areas	Yes	N/A	Yes, appropriate within cultural context	Yes, existing only – no new parking
Picnic areas	Yes	Yes, existing only, no new picnic areas	Yes	N/A	Yes, appropriate within cultural context	No
Restrooms	Yes	Yes, existing only, no new restrooms	Yes	N/A	Yes, appropriate within cultural context	Yes, existing only – no new restrooms
Roads	Yes, limited access roads	Yes, existing only, no new roads	Yes	N/A	Yes, appropriate within cultural context	Yes, existing only – no new roads
<b>Types of Facilities</b>						
Bridges	Yes, non-motorized vehicles & pedestrians	Yes, foot bridge only	Yes	Yes, existing vehicular bridges and bridges supportive of non-motorized use –	Yes, appropriate within cultural context	Yes, bridges supportive of non-motorized use – appropriate
Kiosks	Yes	Yes	Yes	Yes	Yes, appropriate within cultural context	Yes

**Figure 9  
Alternative F**

*Boating and fishing are allowed in all park waterways*



EXISTING PLAN DIRECTION



The GMP calls for the development of an Integrated Trail System Study (p. 270), conducted in a cooperative effort with the State of Georgia and local governments to help plan linear corridors through the region (p. 271). According to the GMP the study and accompanying plan will “integrate local environmental requirements such as the Metropolitan River Protection Act, appropriate buffers, and floodplain, wetland, and sensitive resource avoidance. Existing trails in the park will be mapped and a database will be created using Geographic Information Systems and Global Positioning Systems. Recommendations for linkages to other planned regional trail corridors will be made. Opportunities for public input will be provided” (p. 271).

#### **FOUNDATION DOCUMENT**

A “Foundation Document” is created by every unit in the National Park Service to provide basic guidance for planning and management decisions. It includes information on the park’s purpose, significance, fundamental resources and values, interpretive themes,

administrative commitments, data needs, planning issues, plans to be developed, and studies and data needed for park planning. The CRNRA’s Foundation Document references the trail system in several ways:

- The CRNRA is a heavily-used recreation resource for land- and water-based recreation. This is facilitated by trails and trail connectivity to local communities.
- The lack of recreation research and planning has resulted in unauthorized social trails and a lack of trails in the northern park units.
- Increasing population and demand are leading to crowding, vegetation trampling, unauthorized trails, trash, adverse wildlife impacts, and visitor conflict.
- A trail management plan is needed to address the threats caused by visitation including soil compaction, erosion, trampling, and wildlife impacts.

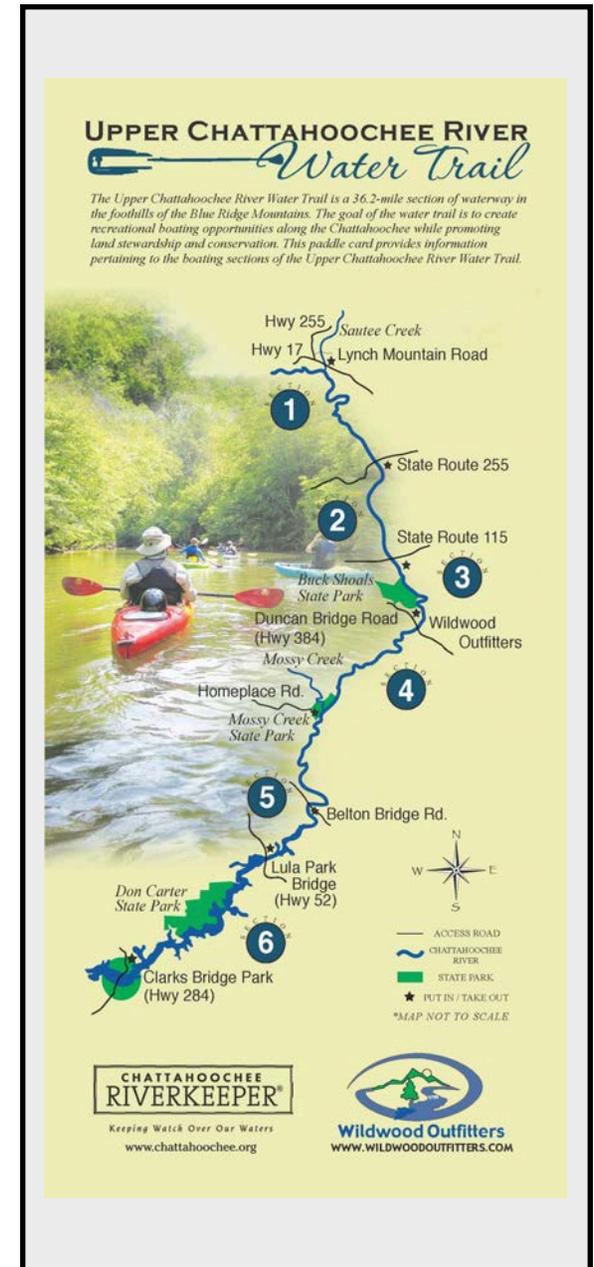
- There is an untapped opportunity to market the river corridor’s designation as a national water trail.
- Declining Resource Conditions is identified in the document as a “key issue.” The declining condition is due to high levels of use that is stressing or deteriorating hiking and biking trails and leading to social trails and erosion. This key issue identifies a need to: “inventory, assess, plan, and implement efforts aimed at improving resource conditions in the park. For example, a trail management plan for the park could inform needed cyclic projects for trail maintenance, as well as provide a means by which communities could partner on aligning trail connections and supporting maintenance of the trail system” (p. 27). The trail plan is identified as “high priority.”
- The park notes that SORBA is responsible for trail maintenance at Sope Creek, but there is no formal agreement in place. The park would like to create a formal agreement through IMBA.

### ORGANIC ACT DIRECTION

The Organic Act of 1916 authorizes the CRNRA at 16 U.S. Code Subchapter XCIII - CHATTAHOOCHEE RIVER NATIONAL RECREATION AREA; (available online at: <https://www.law.cornell.edu/uscode/text/16/chapter-1/subchapter-XCIII.>)

Information from the Act, relevant to this trail assessment include:

- The authorization limits the size of the CRNRA to 10,000 acres (not including the river corridor) plus a 2,000 foot “interest area” on either side of the river for the entire length of the river within the boundary of the park.
- The authorization states that: “Secretary shall take into consideration applicable Federal, State, and local recreation plans and resource use and development plans, including, but not limited to, the Atlanta Regional Commission Chattahoochee Corridor Study, dated July 1972”, suggesting that all local plans within the interest area should

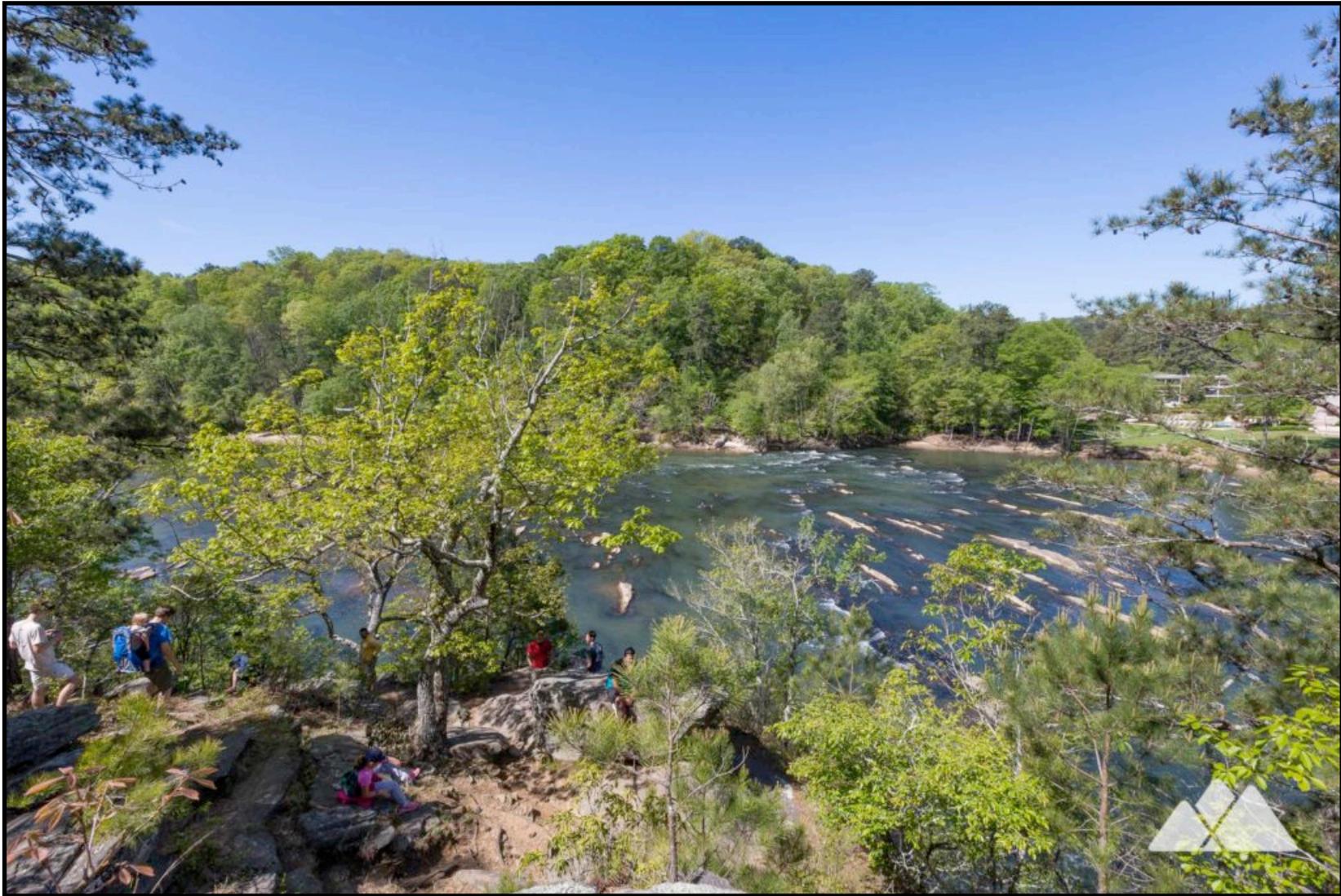


EXISTING PLAN DIRECTION



be considered in park planning efforts.

- The Secretary may enter into cooperative agreements with the State of Georgia, political subdivisions of the State, and other entities to ensure standardized acquisition, planning, design, construction, and operation of the recreation area. Suggesting that the park may have the authority to engage state governments, local governments and interest groups to assist in planning and administration of the park.



EXISTING PLAN DIRECTION

# SUSTAINABILITY APPROACH

Over the previous 75 years trail sustainability has focused mainly on the durability of the trail tread, or the physical sustainability. This framework has utility and best practices that have been developed in the construction and maintenance of natural surface trails have served land managing agencies well when utilized. However, trails are a facility, just like a road, building, boat launch, or restroom. Facilities must be kept up to an operational standard by their owners (Operations and Maintenance) and in a condition that can be optimally efficient for customers. To create a sustainable trail facility, the conditions must also be analyzed from standpoints of managerial and social sustainability.

## PHYSICAL SUSTAINABILITY

Physical sustainability of a trail relates most closely to its position on the landscape and the subsequent ability to manage water and limit sediment movements via surface water based erosion and deposition. Trails with steep or fall-aligned (running perpendicular to topographic lines) gradients create difficulties in managing water off the trail tread. On poorly aligned steep and/or fall-aligned trails the potential for unmanaged water volume and velocity along the trail's tread leads to erosion of the tread, cupping and decreased utility for trail users. These conditions often amplify over time as cupping and incision compound water management. Simultaneously, users are likely to spread out seeking better footing compounding erosion issues with trail widening.

At the other end of the trail gradient spectrum, trails with very low gradients, especially in flatter topography, allow for water- or user-entrained sediment to deposit. These areas are often located immediately down trail from steep and poorly aligned segments. Without topographic slope to drain water off trails in these landscape positions, the trail tread does not dry and deposited sediment becomes muddy, exacerbating the wet conditions. As trail users encounter these conditions, they often diverge laterally to the seemingly driest location at or beyond the edge of the trail. Over time, this trail use pattern combines with the lack of positive drainage results in wider, muddier trails.





Trail gradient also plays a role in resisting user-based forces. Trails that are too steep to withstand the physical stresses imparted upon the trail tread by users exacerbate trail degradation caused by a lack of water management.

### **SOCIAL SUSTAINABILITY**

Social trail sustainability relates how visitors to the forest interact with the trails and each other. From use patterns and access to navigability and conflicts, the factors that influence the quality of a visitor's experience and the expectations that they bring to subsequent visits play a significant role in environmental stewardship, regulatory compliance, and the stability of the trail system. Where trail conditions, diverse, high quality experiences, or sufficient access are problematic in a system of highly used trails, the public will often attempt to satisfy their own needs. Determining what social deficiencies exist in a trail system is not an easy process, as diverse interests are often present across a complex system of trails, users and access. However, continuing an open dialogue, fostering trust and collaboration, and clearly discussing forest and visitor goals is foundational to the process of meeting and shaping public desires while preserving mandated forest goals and operations.

### **MANAGERIAL SUSTAINABILITY**

Managerial sustainability relates to the capacity of Park Staff, working with the public and partners, to manage the trail system hosted on the public lands. From personnel and funding, to stewardship and organization, and public safety, incident response and risk management, management of recreation systems is a hands-on process. It is rare that trail systems are wholly managed by agency staff, yet agency staff are not often trained in collaborative management or public outreach. Conversely, trail user groups often don't consider long-term planning, operational organization, outreach, promotion or fundraising as part of their ongoing stewardship needed to meet their desires for an improved trail system. As such, development of capacity and partnership around these facets of trail management is often the linchpin to success and long-term trail sustainability.

## CRNRA CONTEXT

The Chattahoochee River National Recreation Area is a relatively recently established National Park Service set of lands, and therefore much “younger” than most sites within the National Park System. It also has many significant differences from many of holdings of this agency, including:

- **Multiple, often small and isolated parcels-** Generally NPS units have a single, uninterrupted parcel of land to manage. In most cases, these lands have a limited number of access points at which visitor interface with NPS staff is required at the time of payment. On natural lands holdings (rather than many historic or cultural sites), acreages are typically very large, with many thousands of acres falling under a single management protocol. Access may be challenging because of the size, but that access and management is all internal to the Unit. CRNRA is currently comprised of 18-20 individual, mostly isolated Units spread along over 40 miles of the Chattahoochee River. Many of the units are less than 300 acres in size. Physically having a staff management presence is infeasible, and thus visitor interface issues are minimal and regulatory compliance problems easily develop.
- **Adopted land in a rapidly developing urban area-** Outside of historic and cultural sites, most NPS Units are relatively far away from large residential populations. Visiting populations may be significant, the pressures exerted by the visitation is at the entrance gates and internal facilities, rather than closing in toward the Park boundaries from outside. At CRNRA, the pressures exerted on the boundaries of each Unit are growing on an annual basis as the greater Atlanta Metropolitan area continues to grow. “Ownership” (not legal, but in terms of de facto management) is already exerted by many neighboring residential communities. With growth pressures and the need to provide recreational assets, many of the municipalities in which the Units are located would like to help direct the development of facilities that may or may not be consistent with NPS management goals.
- **Original recreation focus on the Chattahoochee River-** Most National Parks are focused on the preservation of the existing natural resources present within the Park boundaries, a significant part of that mission focused on the interpretation of those resources through passive and programmed recreation. At CRNRA, the mission of protecting floodplain, riparian, and adjacent lands was to protect water quality and





provide a natural recreation corridor along the river. Facility development and programming have been focused on the aquatic resource. Adding management capacity, from interpretation to law enforcement to maintenance operations to manage recreation on the land resource, has not kept up with the demands placed on these resources by the public.

- **Lack of dedicated trail staff-** Most natural lands-based National Parks have dedicated, full-time trail professionals on staff that are supplemented by trained trail crews. These staff members handle the vast majority of trail planning, construction, maintenance, and operations. While volunteer and/or youth crews may be present at times, these extra resources are not essential to the base operations of managing trails. At CRNRA this capacity does not exist. Currently a single staff member, who has other responsibilities than solely trail management, is wholly dependent on volunteers for most of the Unit’s operational capacity. Special projects are then accomplished by borrowing staff resources from other departments.
- **CRNRA lands are not a traditional “destination”-** Most visitors to National Parks have made a significant investment of time and resources in choosing that destination. They have made the choice, in part, because of the special nature of the Park, and with NPS staff interface upon entrance they have received direction regarding regulations, destinations, and facilities. The act of traveling to that destination, along with the personal interaction, leads to a vested interest by most in heeding advice and utilizing facilities in an appropriate manner. Some of the larger compliance challenges faced by many NPS Units come from non-English speaking visitors who don’t comprehend the ubiquitous signage present at visitor interface facilities. That stated, these visitors have still expended significant resources to reach this destination. The CRNRA lands also have this problem, but without the resource expenditure required. While the Units are certainly destinations, they more closely resemble a local municipal park, except they are forested, border a large river, and offer recreational opportunities not typically present in urban parks. In this way the CRNRA Units are strong destinations that are accessible to a much broader population demographic who may not have a context for or a compelled interest in recreation that leaves no trace, strict regulatory compliance, or respect for natural resources.

## SYSTEM LEVEL OVERVIEW

With upwards of 80 miles of official, signed trails through the CRNRA Units, the system is not small. While a number of Units have no official trails, every parcel has socially developed routes that indicate regular usage and exploration of the NPS lands. The lack of formality of the majority of the trails through the CRNRA indicates that the development of official trails was a largely ad-hoc process, with socially utilized routes adopted into the formal trail system.

From physical, social, and managerial foci, the CRNRA trail system is far from sustainable. This is largely a result of the particular context of this NPS Unit described above. The lack of planning for sustainability or quality experiences is the root cause of the problems. This has resulted in a number of issues that are present throughout the trail system that will need to be mitigated in order to increase the sustainability factors and reduce natural resource impacts, including:

- **Adopted historic roads and industrial corridors as trails-** These linear routes, while providing simple access, are rarely durable for recreational use as they were never planned for such. These corridors were created on the lay-of-the-land for efficiency. Because of their locations next to stream valleys, they are ubiquitous across the CRNRA landscapes. These corridors almost always have either erosion or muddiness issues that cannot be mitigated. The corridors do not provide an intimate natural experience and often detract from the quality of the surroundings. Unfortunately these corridors form the major component of the overall mileage in the trail system.
- **Socially developed, walked-in routes-** Accessing the Chattahoochee or connecting from one old road bed/trail to another, the other main component of the CRNRA trail system are minimally developed routes that were walked in over time. On flat grounds, these routes compact to become the lowest surface elevation in the vicinity and hold water or muddiness longer than adjacent terrain. This is a problem on its own, but trail users react to this situation by choosing a new, often parallel route that is drier. This additional trampled vegetation widens the trail corridor, compacts in the same manner, and increases the wetness/muddiness issue. On slopes, these routes are often aligned on or near the fall line. As the steepest route down the hill, there is no feasible way to manage runoff





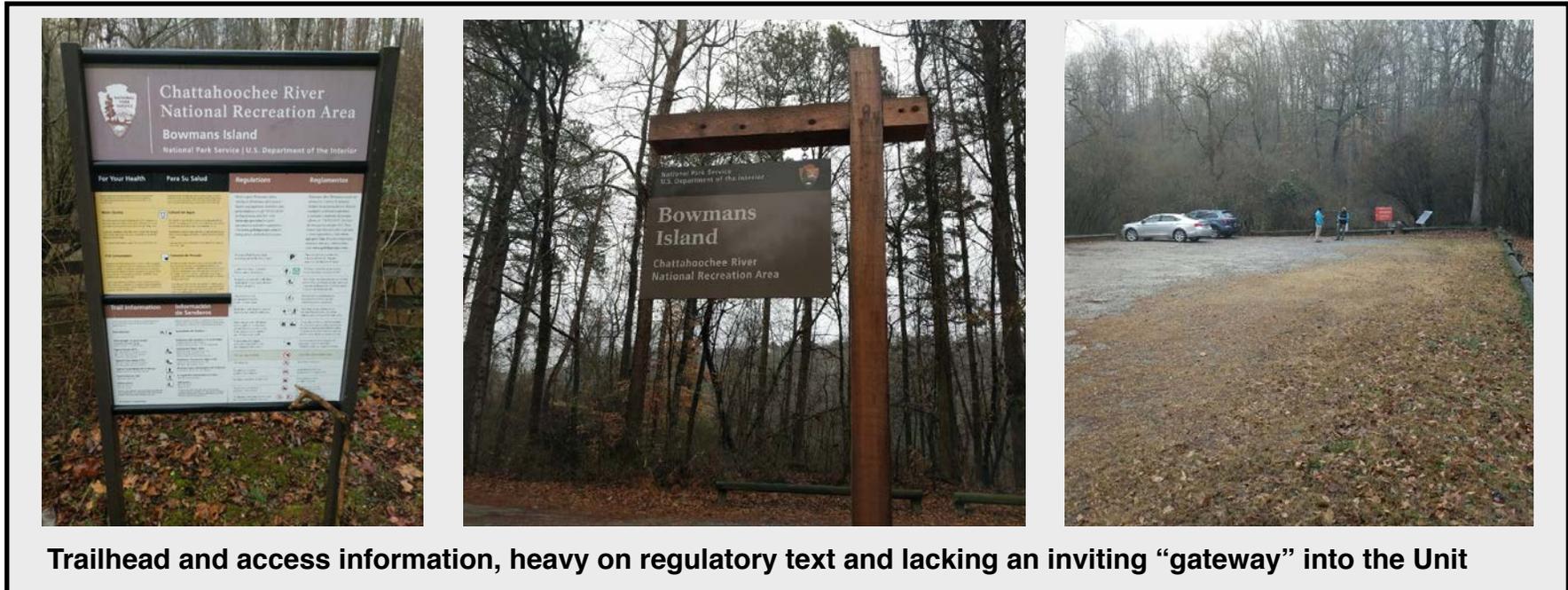
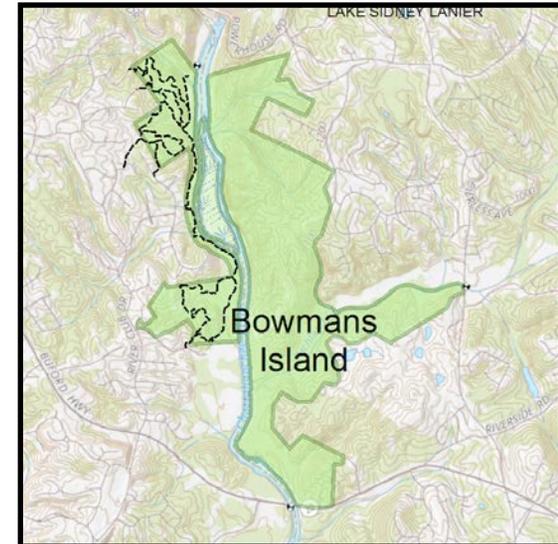
from these trails and they erode quickly. When walked in roughly on the contour, these trails tend to “creep” down the hill as roots are exposed and hikers step downhill to avoid a potentially slippery off-camber step on the roots.

- **Lack of maintenance best practices-** Very little maintenance capacity is present throughout the trail system. Outside of spanning wet issues with bridges or building steps into steep, eroding hillsides, most other maintenance attempts have proven ineffective. Water bars are not an effective water management structure, and most across the system have been installed below grade without the ability to move water off the trail. Social trail closure and erosion mitigation techniques mainly consist of piling woody debris, which does little to solve the issue or redevelop natural watershed hydrology.
- **Lack of trail stewardship and funding-** For the most part there is a lack of stewardship capacity to assist Park Service staff in the operations and maintenance of the trail system. As staffing levels are unlikely to change, a concerted effort to build volunteer and other external stewardship capacity is the most vital need in redeveloping and managing the CRNRA trail system toward a more sustainable future. The numbers of active stewards, their skillsets, and independence all have to be vastly increased to achieve lasting management success. Additionally, funding is lacking at this time to take on any of the more challenging trail redevelopment tasks outlined later in the report. Professional trail contractors can readily handle much of the construction and closure/restoration work that is required, but the scope of the issues present will require a sizable endowment.

These issues seem daunting on the scale of the entire park system. However, creating a plan to address problems in an orderly, prioritized fashion, building the capital and stewardship resources to accelerate the process, and engaging thousands of additional regional residents in the process could make success a reality over the next decade. When complete, the additional benefits derived from a more engaged base of visitors will create the right type of “ownership” by the public of the the resources that they can jointly protect and preserve for future generations.

# BOWMANS ISLAND

<b>Land Unit Location</b>	Northernmost Unit, just downstream of Buford Dam
<b>County</b>	Forsythe (West), Gwinnett (East)
<b>Municipality</b>	Buford (West), Sugar Hill (East)
<b>Acres</b>	812
<b>Trail Mileage</b>	~ 5.5
<b>Trailheads/Access</b>	2- NPS North on Buford Dam Road, NPS South on Trout Place Road

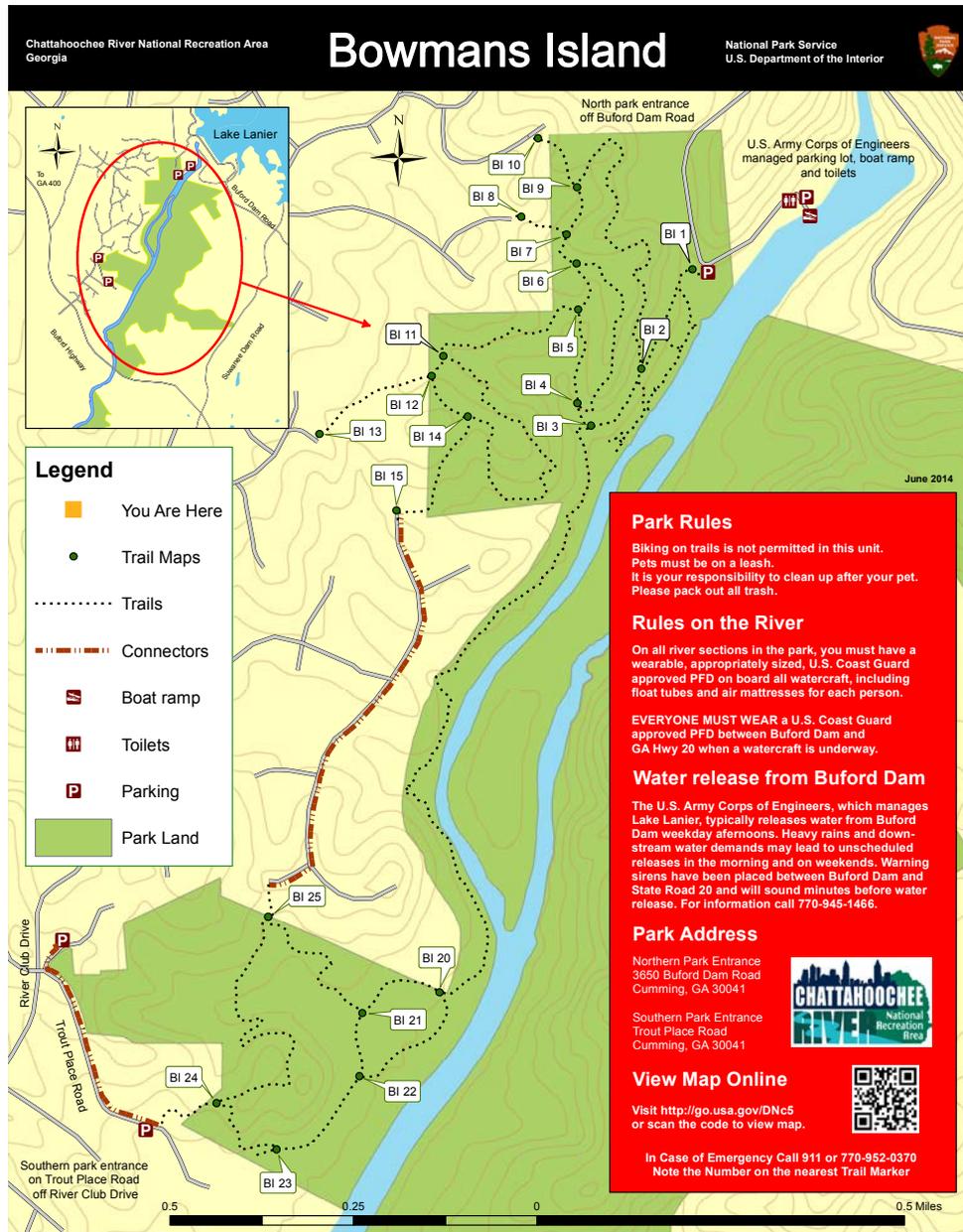


Trailhead and access information, heavy on regulatory text and lacking an inviting “gateway” into the Unit

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	East of Chattahoochee River	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>
Natural Zone	West of Chattahoochee River	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking, no facilities</li> <li>• Fishing</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.; existing only)</li> <li>• Visitor and Admin Facilities (existing only)</li> <li>• Parking Areas (existing only)</li> <li>• Picnic Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (foot bridges only)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



This land unit is a significant mix of riverside bench/floodplain terrace and rolling uplands (40-60' vertical). Much of the upland forest is mature, while the floodplain is heavily covered in non-native understory. The non-river border of these lands is almost exclusively backyards of residential developments on the west side and larger privately owned parcels on the larger east side. Soils are mostly a mix of clay and sand, with occasional exposed bedrock and stones.

From ACE and NPS parking lots on the northeast side, approximately 5.5 miles of trail provide river access and provides looping opportunities and connects to a few neighborhood/homes. On the southeastern end, roadside parking access along residential street next to fish hatchery. Trail loops here provide neighborhood access and river access for river trips and fishing.

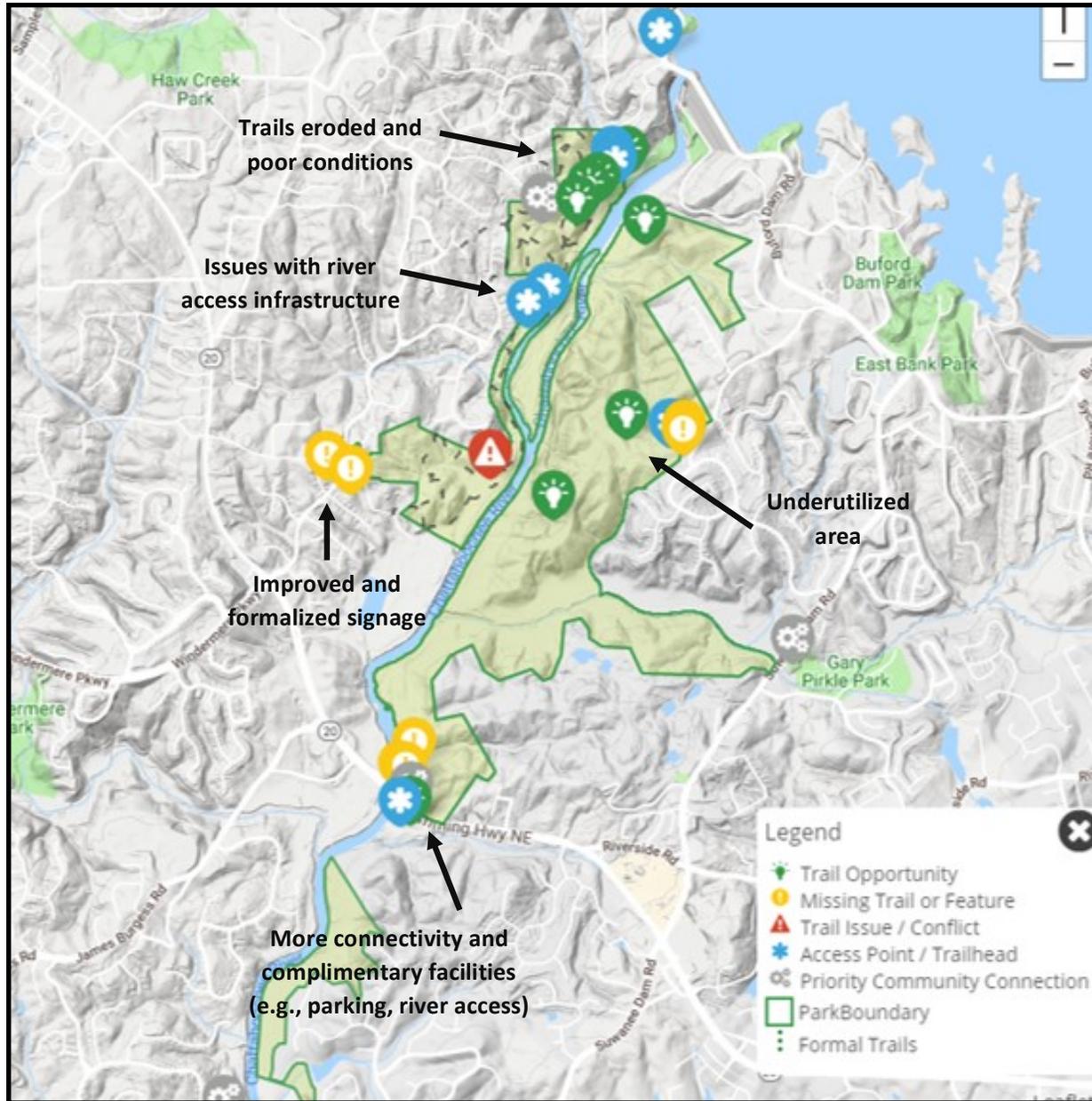
On the undeveloped east side of the Unit, access to the river is provided from a paved parking area on HWY 20 via socially developed routes. Moving northward, the trails fade, especially at a large side drainage which is a major impediment to travel

# PHYSICAL SUSTAINABILITY

- Northern trails- Routes mostly adopted from historic open corridors/roads. Many of these are fall-aligned and beginning to erode. Many socially created routes to access the river and to access points, formalized with NPS signage, in adjacent neighborhoods. There is redundancy in the routes, which do not form a cohesive system.
- Central trails- A single trail linking the northern and southern trails exists, mostly adjacent to the river. A number of side channels are downcutting rapidly due to adjacent development and stormwater runoff, challenging the foundations of several trail bridges. Similarly, streambank erosion is considerable in some locations, stretching upslope and through the established trail.
- Southern trails- Predominantly co-located on old roads on the river floodplain, which have been graveled with railroad ballast (2-3” stone) to provide a non-muddy surface. Considerable evidence of vehicular traffic, likely associated with the emergency management system and fish hatchery.
- Eastern terrain- Considerable elevation exists with some prominent rock outcrops. Socially developed fishing access trails are plentiful, especially near Highway 20, most of which are eroding upslope and through the narrow trail.



# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Existing trails are eroded and vegetation management is poor.
- River access is poor and dangerous.
- Connectivity to surrounding communities needs improvement.
- Signage and trail maintenance is poor.

### Opportunities:

- Opportunities for trail and facility expansion east of the river.
- Connectivity to surrounding communities and other area trails.

## Visitor Use Estimation/Capacity Study

- No known capacity issues.
- Visitor use estimation needs coordination with USACE and adjacent parking areas.

# SOCIAL SUSTAINABILITY

- Many signs of neighborhood access and use by dogwalkers, along with heavy fishing/river access in both the north and south sub units. Equestrian use is present, but seems very limited.
- System navigation on upland trails is not intuitive due to the adoption of old corridors, combined with formal and informal routes to neighboring homes and the river. The lack of formality in the trail development creates a “sense of entitlement” for visitors to create their own trail networks and access paths, and generally treat the Unit like an unmanaged open space.
- Some trail segments provide a high quality forest immersion experiences, but large amounts of trash near the river detract from the backcountry setting of the Unit.
- A lack of sufficient parking at the southern end, adjacent to the fish hatchery, creates issues with vehicles parking on both sides of the road, ingress/egress challenges, and a sense of an unmanaged open space.



**Numerous social routes leading to neighboring homes and to riverside fishing locations**

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- Little managerial effort along trails with a very limited number of tread improvements (water management structures).
- Significant amounts of trail “improvements” being undertaken in close proximity to personal residences and formal, signed neighborhood access points, many of which are signed with “No Parking” signs in the vicinity of the trail.
- Two of the bridges along trail 5 are getting close to failure due to eroding stream channel banks. A third bridge has a deadfall impact and remnant log on it.
- This area is largely unmanaged for hiking experiences. Trails are fisherman-created and follow existing old roads and the riverside bench. Significant amounts of trash in the woods.
- Little signage throughout the system to guide the recreational experience, except for trail junction maps and red Emergency Marker locations at quarter-mile intervals along both river banks.
- Other than stormwater-related impacts at bridge crossings and along the river, trail degradation is not substantial, allowing the opportunity for closure and redevelopment without significant regrading and stabilization.



**Trail widening from users avoiding constructed steps and foundation erosion at numerous bridges**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Bowmans has the largest land area in the park and opportunities for solitude not offered in the southern reaches.
- There are ample opportunities for a primitive trail system on either side of the river for visitors seeking a natural experience that they would get in places like Tennessee and NC without having to travel too far from suburban Atlanta.
- NPS staff looking to balance future development, with insights such as “it’s important that this area maintain its rural nature as its one of the few places in metro Atlanta to not be developed” to “the area could offer a location for a more formally developed trail system that highlights the ‘larger’ terrain and potentially a mountain bike trail system on the east side of the River.”



**Utilization of old, entrenched road beds as trails introduces challenging drainage issues and erosion**

# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

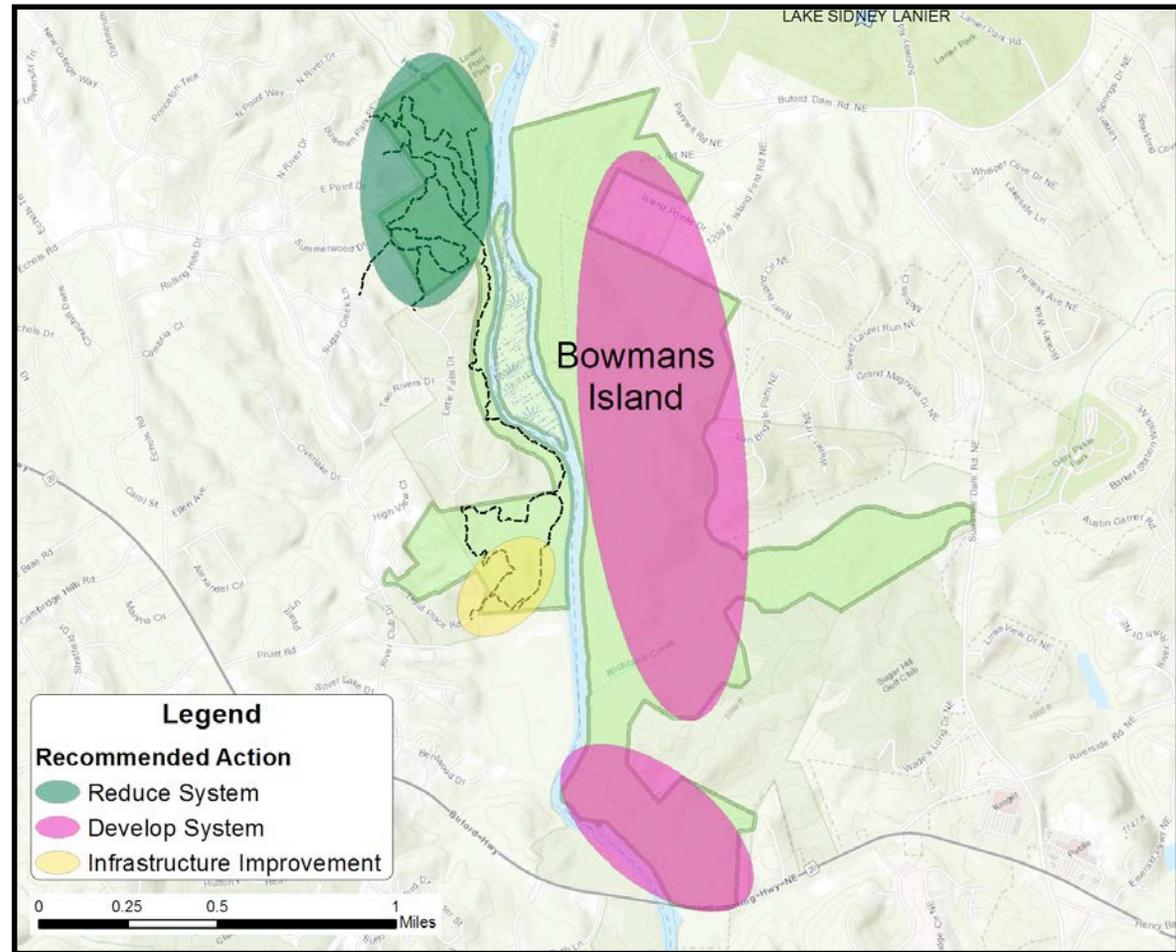
- Assess bridges for relocation.
- Construct water management structures (rolling grade dips) on trails to be kept in the system to slow the erosion issues that are developing.

## Medium Priority (Years 2 - 5)

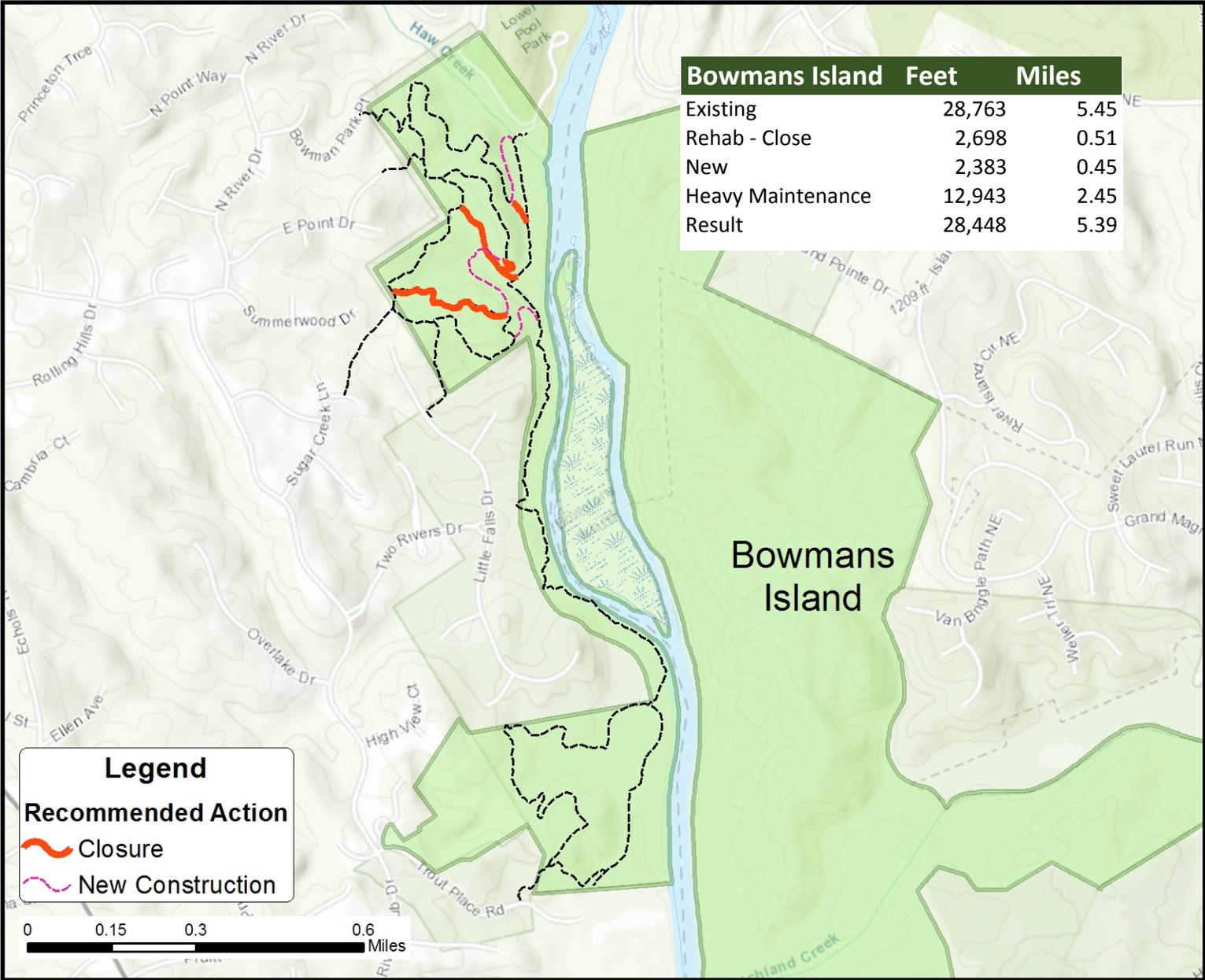
- Consider a hardening and realigned riverside trail on the west side that can form the core of the trail system, including structures that access major pools and fishing locations.
- Close unsustainable trails and provide improved, contour-aligned routes that provide longer loop opportunities.
- Formalize access issues and trail management/specification protocols with adjacent residential communities.
- Improve southern access and parking

## Lower Priority (Years 5 - 10)

- Develop a multi-loop trail network on the east side of the Unit, integrated with trails on Bowmans West and Highway 20, and including a hardened river access trail.



# POTENTIAL TRAIL SYSTEM

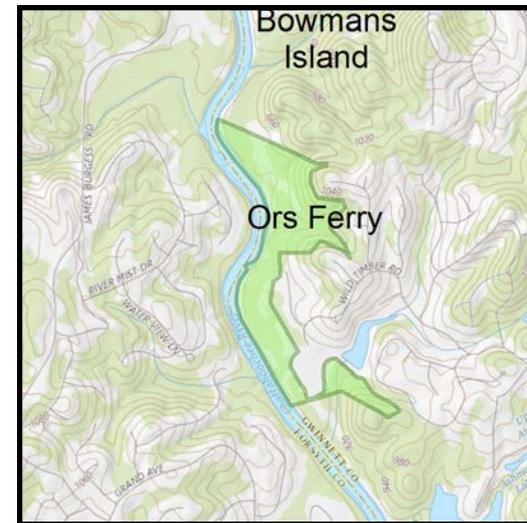


BOWMANS ISLAND



# ORRS FERRY

<b>Land Unit Location</b>	Downstream of Bowmans, River left
<b>County</b>	Gwinnett
<b>Municipality</b>	Sugar Hill
<b>Acres</b>	68
<b>Trail Mileage</b>	0
<b>Trailheads/Access</b>	0- Wild Timber HOA blocks formal access



## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

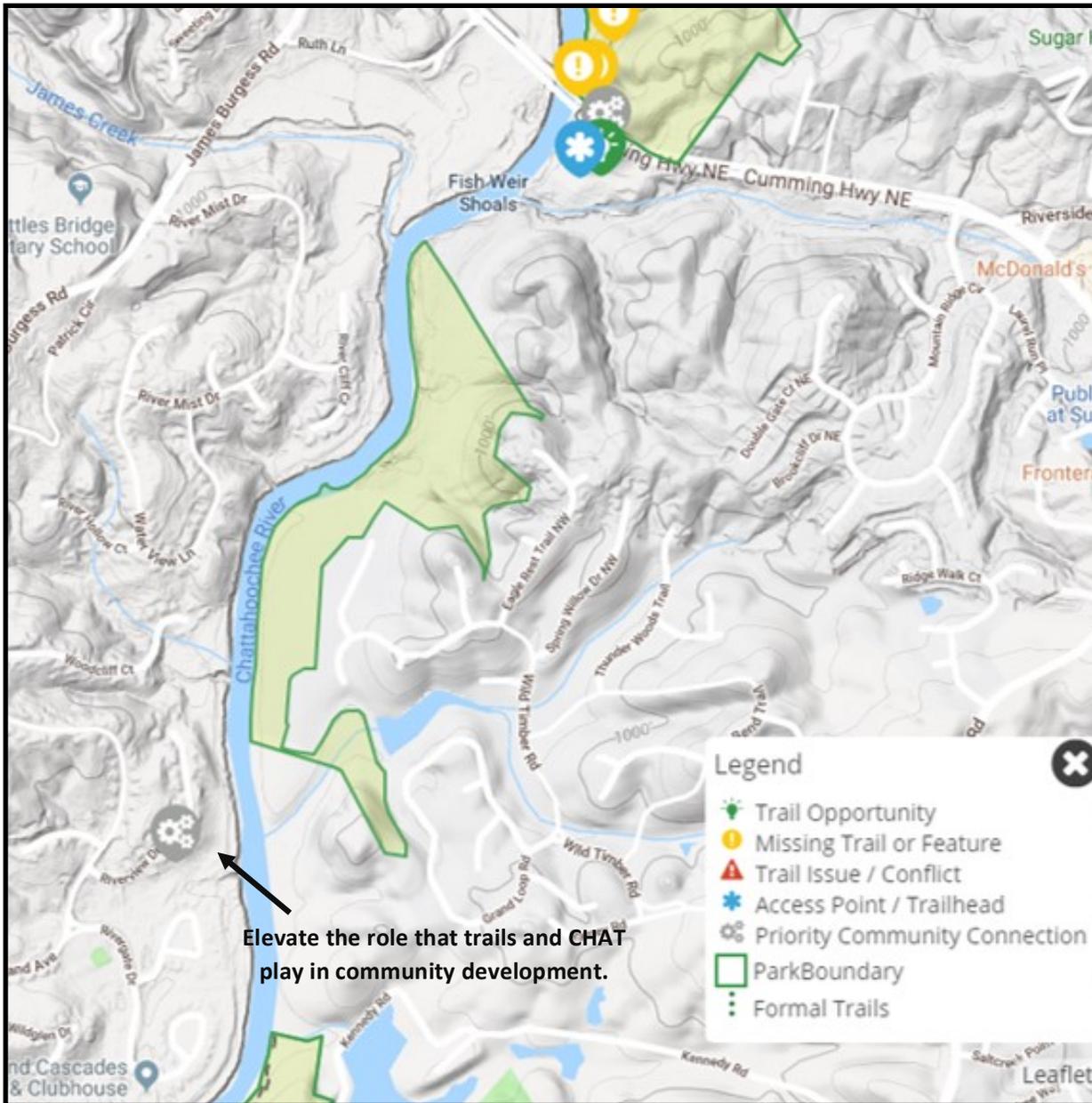
Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	Entire Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>

## GENERAL DESCRIPTION

Orrs Ferry is a 67-acre parcel of NPS land located between the Chattahoochee River and the Wild Timbers development. Access is limited but can be made by parking at the community park and tennis courts, and entering the park through a gated fence. Located wholly on a flat floodplain bench, there are numerous deeply eroded side drainages scoured when the river rises and a sewer line corridor roughly parallels river and NPS boundary.

There are no formal trails. However, social trails exist along the flat floodplain bench from adjacent private properties' backyards. Use appears to be limited but includes youth exploration, river users and neighborhood dog walkers. Motorized use (ATV and Golf Cart) appears to occur rather frequently in portions of this unit; identification of the offending users is easy due to the direct routing of this use from neighboring properties.

# SOCIAL SUSTAINABILITY ASSESSMENT



## Public Comments (Social Pinpoint)

### Opportunities:

- Elevate the role that CRNRA plays in community development in this area

### Visitor Use Estimation/Capacity Study

- No findings

# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

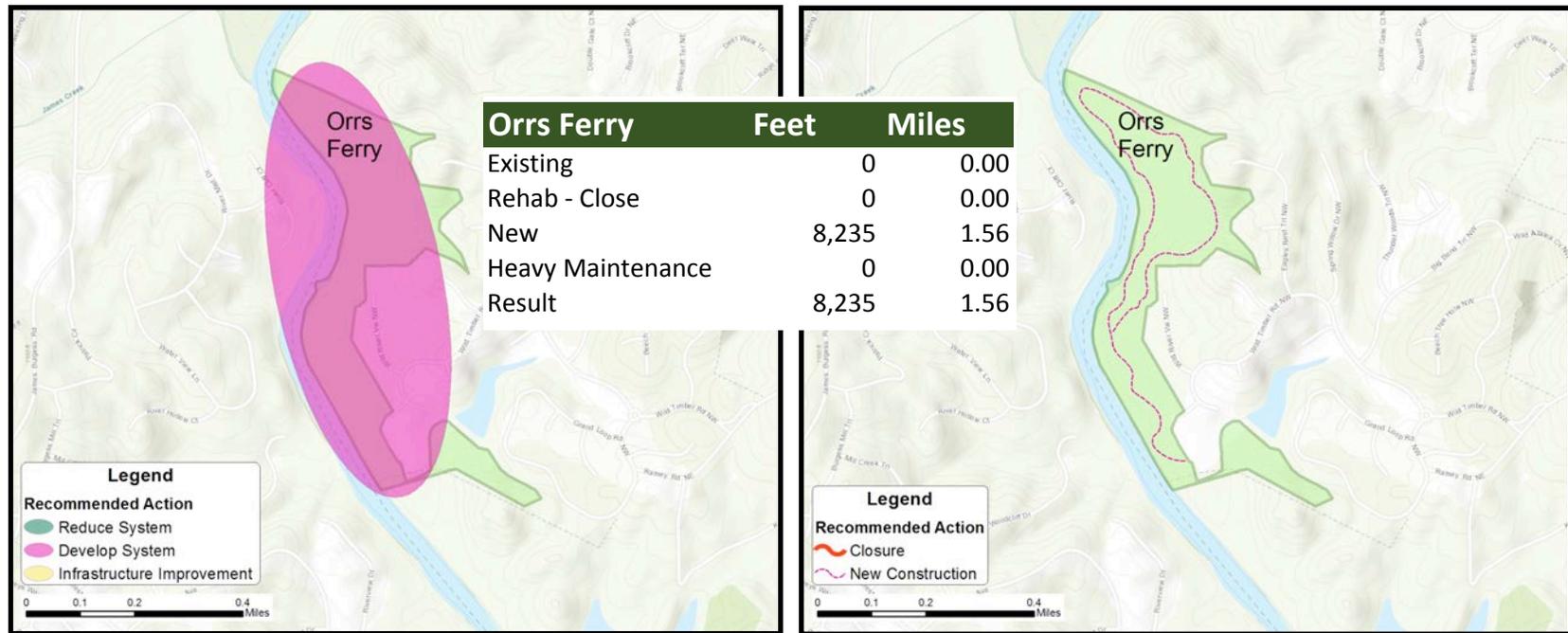
- It is recommended that the NPS presence be re-established with updated signage, formalized access and development of a short formal trail system that will provide for sustainable use by pedestrian users.

## Medium Priority (Years 2-5)

- create a management agreement for basic maintenance (i.e. annual assessment and corridor management) with the neighboring subdivision.

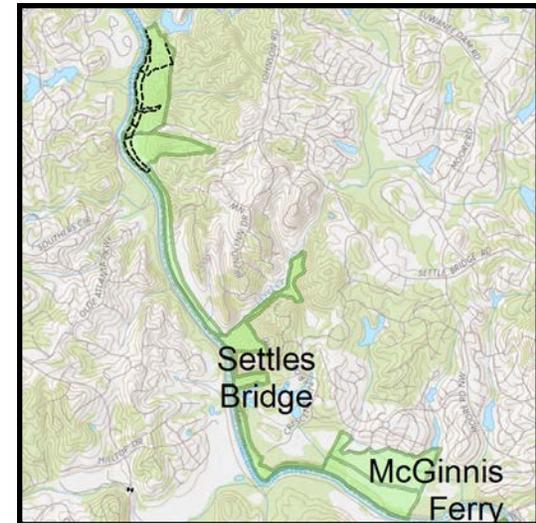
## Lower Priority (Years 5-10)

- Examine potential to interface with the HOA's existing trail system to form a loop and potentially continued trail connectivity to the southern portion of Bowman's Island East with a hardened riverside trail and fishing access points.



# SETTLES BRIDGE

<b>Land Unit Location</b>	North of McGinnis Ferry Road, River left
<b>County</b>	Gwinnett
<b>Municipality</b>	Suwanee
<b>Acres</b>	348
<b>Trail Mileage</b>	2.7
<b>Trailheads/Access</b>	Gwinnett County road



**NPS trailhead entrance signage with newer, three-panel interpretive display and no parking location**

# ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

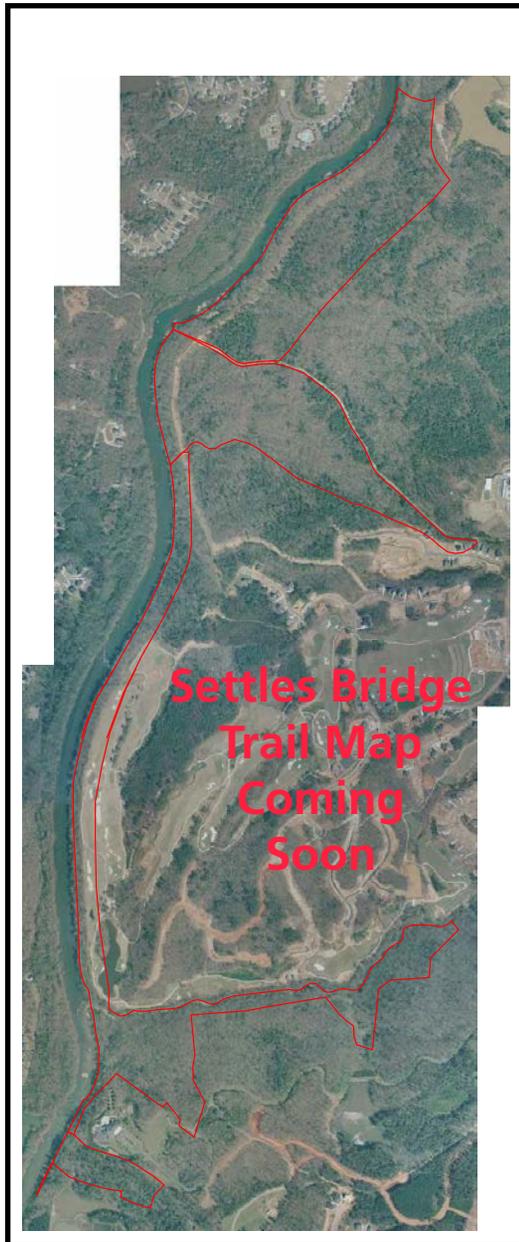
Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	Entire unit, except for Developed Zone	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>
Developed Zone	Portion of unit east of, and extending from, the main unit acreage	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>



**A number of memorials or project description signs exist in various states of repair**



# GENERAL DESCRIPTION



This 350-acre NPS set of lands flanks the eastern side of the Chattahoochee River. Despite the acreage, the land base is extremely limited, including mainly riverside floodplain terrace and a few tributary adjacent parcels. The northern portion of this unit contains 2.7 miles of formal trail that interface with the neighboring county's Settles Bridge park. No additional formal trail exists along the central and southern NPS lands in this unit.

**Visitor access information, outside of warnings, is limited and graffiti mars the historic structure**



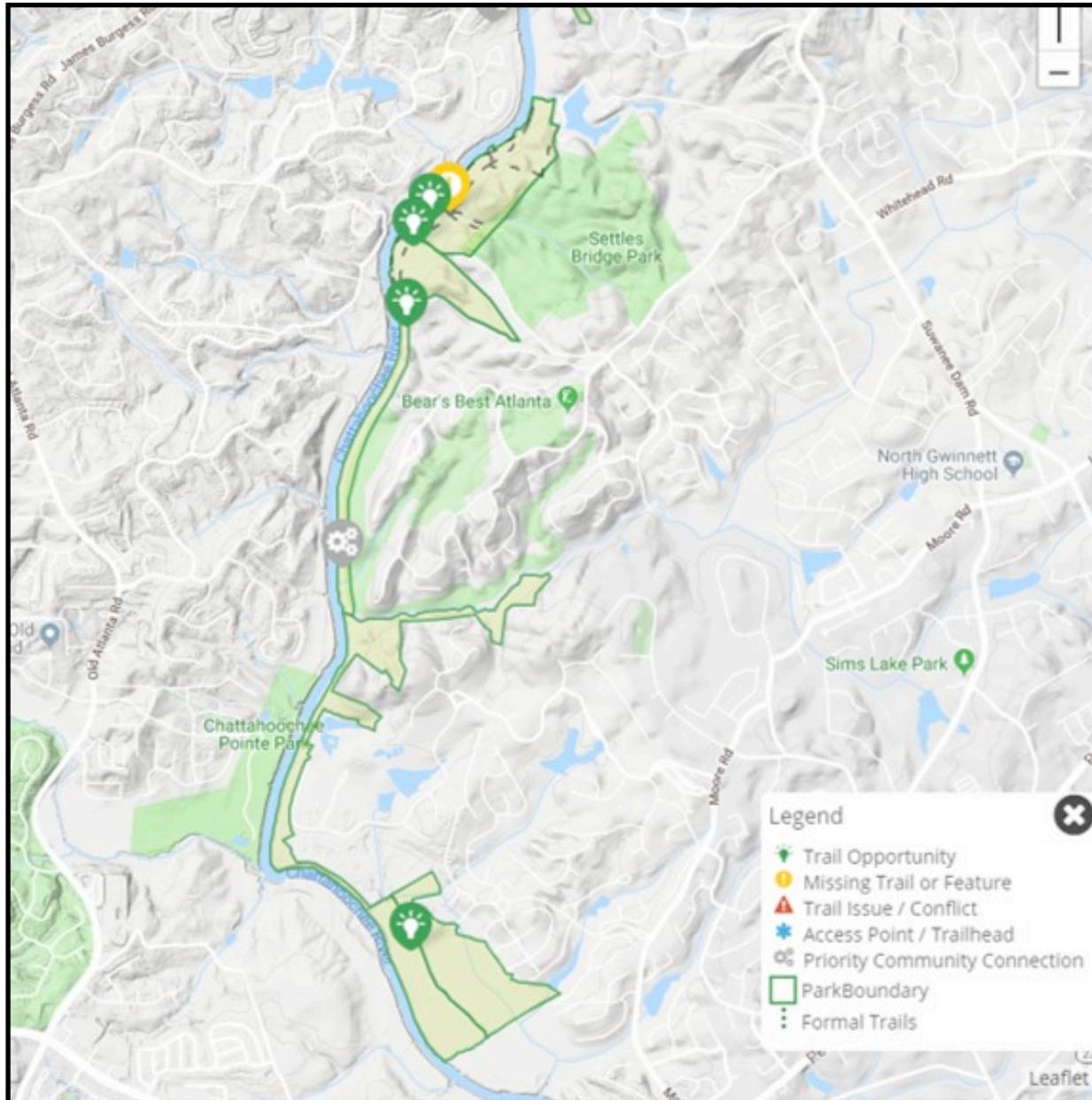
# PHYSICAL SUSTAINABILITY

- Urban natural park located between the Chattahoochee and Settles Bridge Park (Gwinnett County Park).
- Flat floodplains along the river abruptly end at steep slopes climbing up towards Settles Bridge Park.
- Deeply incised side drainages cut through the park and create accessibility problems.
- Steep slopes from floodplain down to the river contain numerous, badly eroded social trails.



**Informally developed trails are located in erosion-prone landscape locations and are actively widening**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Access and trails are unmarked and management is unclear.
- Connectivity is incomplete.

### Opportunities:

- Opportunities for complimentary uses and infrastructure including bird watching, camping, bathrooms, and trash cans.
- Opportunities to formalize existing trails, provide more wayfinding information, and connect trails to surrounding communities and trail networks.

## Visitor Use Estimation/Capacity Study

- No known capacity issues.

## SOCIAL SUSTAINABILITY

- Moderately used by fishermen and hikers.
- Unmaintained single-track trails parallel the river and have badly eroded river access social trails. Passage is difficult in places due to steep side drainages without bridges.
- Unit is adjacent to Settles Bridge County Park, but is not well connected or integrated; trails lead up to Settles Bridge Park in two places.
- A developed boat ramp is inviting to boaters, with a strong visual draw in the historic decaying bridge.

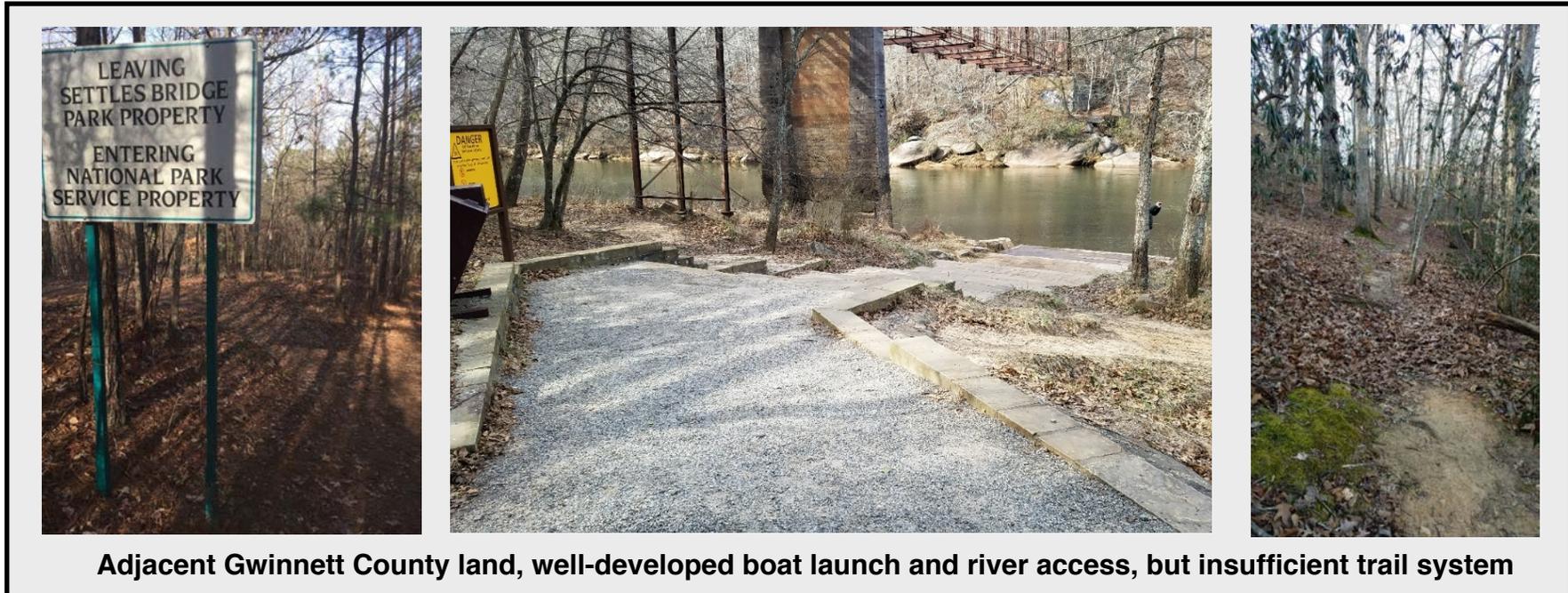


**Signage maintenance, active bank erosion to fishing locations, and narrow socially developed routes**

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- This area is well-maintained for use as a boat launch but not for land-based recreation.
- Single-track riverside trails were walked in and are largely unmaintained.
- Other routes travel through utility corridors and old roads and are unattractive but easy to follow.
- Signage is lacking away from the trailhead.



# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

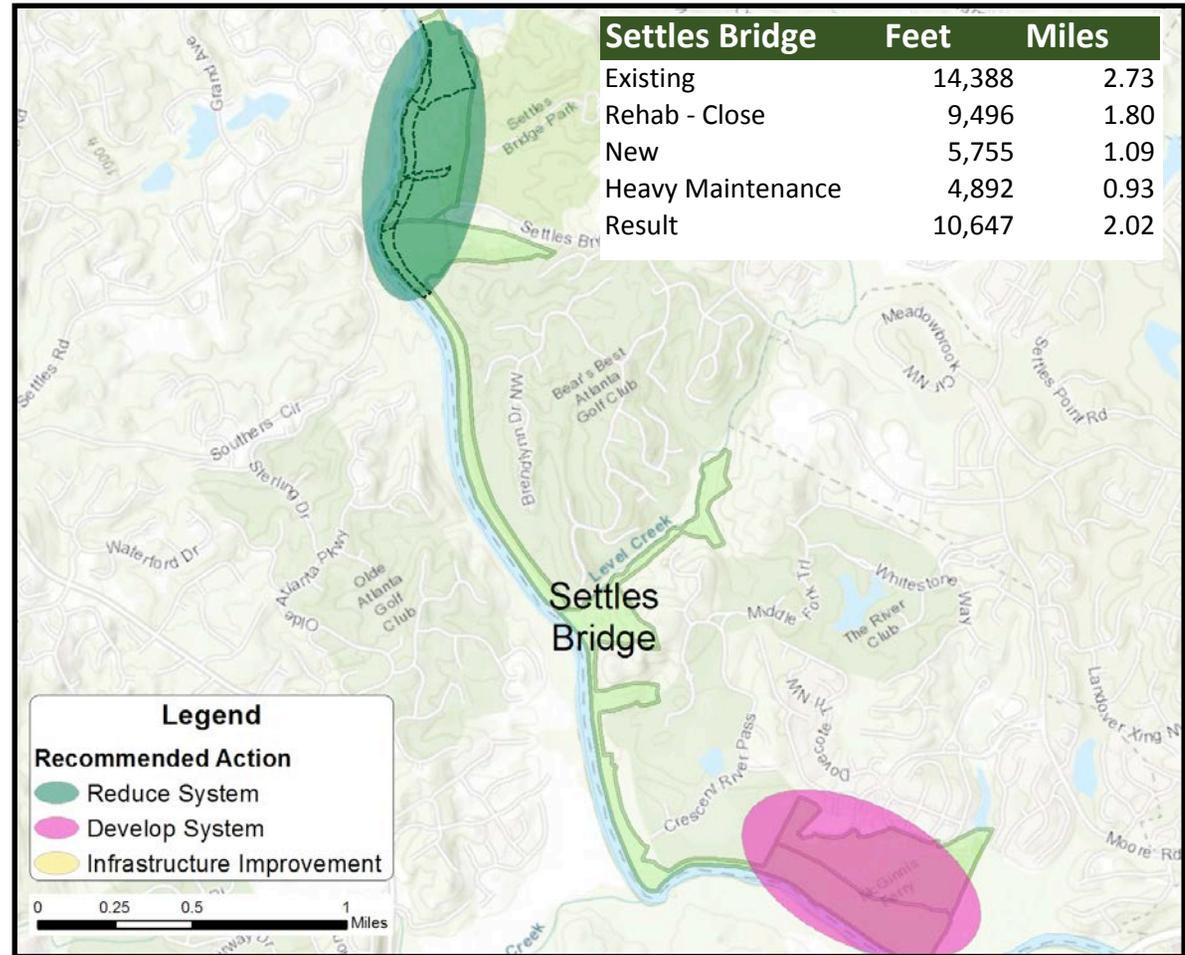
- None

## Medium Priority (Years 2-5)

- It is recommended that the formal trail system is redeveloped on the northern end of these lands to reduce the mileage, while preserving access, connectivity to Settles Bridge County Park, and improving the navigability of the trail system.
- Enter into co-management agreement for the trails and river access with Gwinnett County.

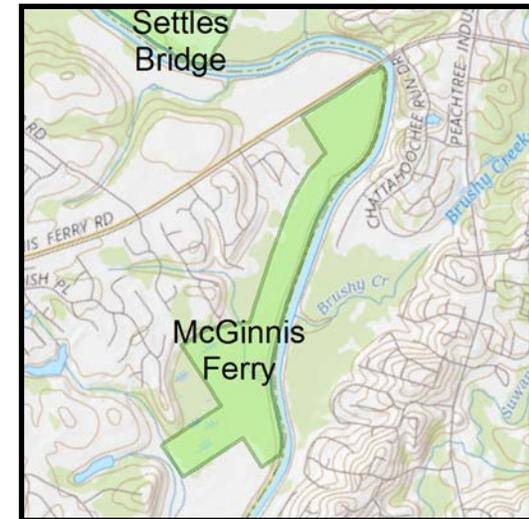
## Lower Priority (Years 5-10)

- At the extreme southern end of this unit, it is recommended to develop a looping set of trails.
- Should a hardened surface trail be developed along the river by neighboring communities, the limited land base in the central region of the Settles Bridge Unit (and nearby McGinnis Ferry) could provide strategic connectivity.



# McGINNISS FERRY

<b>Land Unit Location</b>	South of McGinniss Ferry Road, river right
<b>County</b>	Fulton
<b>Municipality</b>	John's Creek, Alpharetta
<b>Acres</b>	168
<b>Trail Mileage</b>	0
<b>Trailheads/Access</b>	Infrastructure in development



**Trailhead infrastructure in development during the assessment period**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	East of Chattahoochee River	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>
Natural Zone	West of Chattahoochee River	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking, no facilities</li> <li>• Fishing</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.; existing only)</li> <li>• Visitor and Admin Facilities (existing only)</li> <li>• Parking Areas (existing only)</li> <li>• Picnic Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (foot bridges only)</li> <li>• Kiosks</li> </ul>

### GENERAL DESCRIPTION

Nice natural setting between McGinnis Ferry Road, the Chattahoochee, and some neighborhoods. Close to the road is an old eastern white pine stand. Closer to the river there are beautiful old large hardwoods. Area is mostly very flat and may be very wet at times. There is some topography just above the river which seems to be the most suitable location for trail construction but will have social trails to the river.

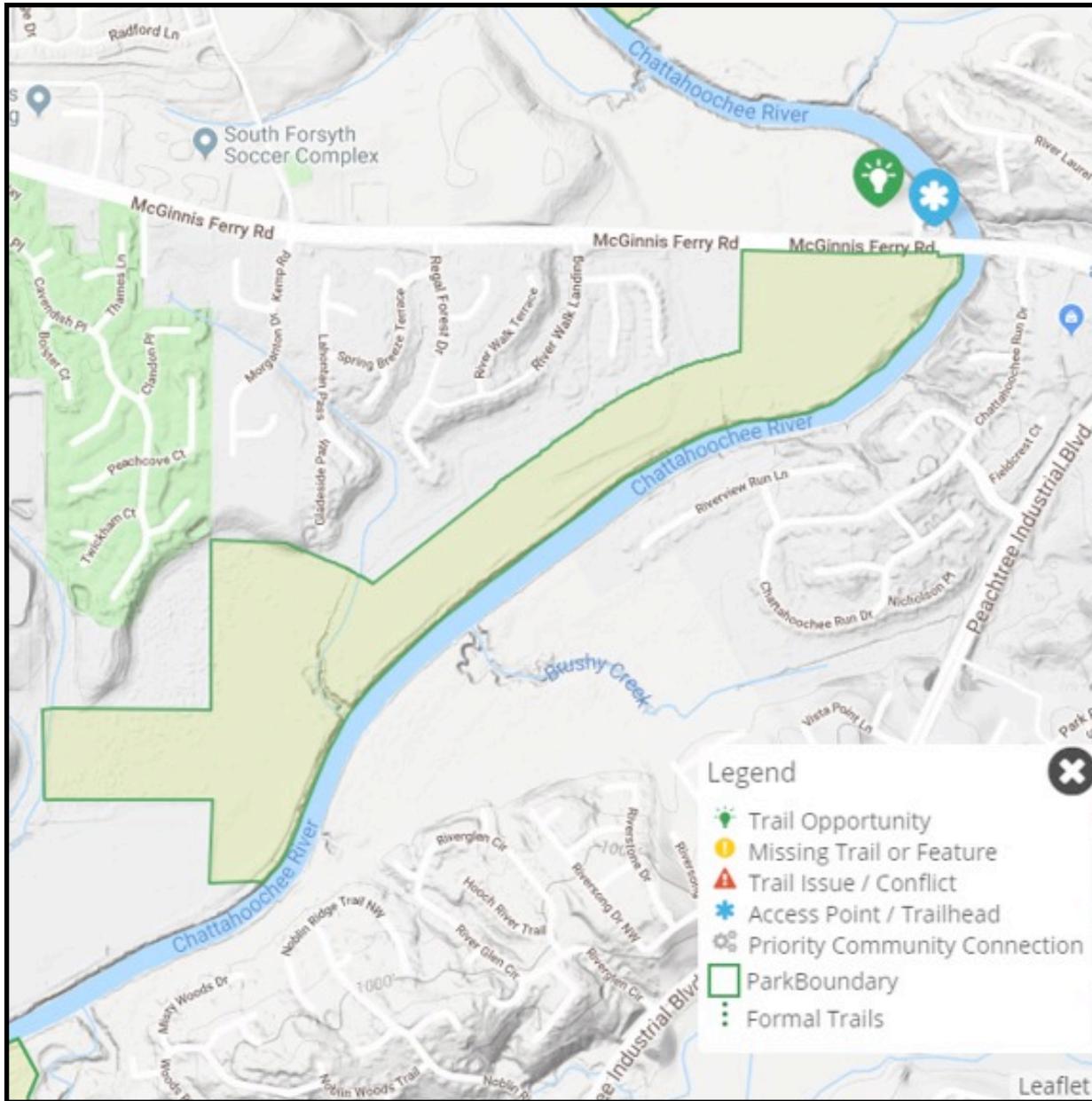
## PHYSICAL & SOCIAL SUSTAINABILITY

- Area is mostly very flat and may be very wet at times. There is some topography just above the river which seems to be the most suitable location for trail construction but will have social trails to the river.
- While there is not a developed trail system or river access, there is a parking and trailhead area that has been recently developed. It is not clear if there are additional intentions to develop the Unit.



**No official trails exist, but there are multiple socially developed routes in challenging landscape locations**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- None

### Opportunities:

- Opportunities for communication to and monitoring of river users.

## Visitor Use Estimation/Capacity Study

- None

## MANAGERIAL SUSTAINABILITY

- This Unit does not seem to have a management regime. There is no trail infrastructure in this area; there are no constructed treads or signage.
- The only signs of management are felled trees preventing vehicular access through old boundary clearings.
- The advanced age of trash in the woods indicates a lack of historic or ongoing cleanup efforts.
- Without a directed management regime, but with a paved parking location, this Unit is staged for informal social development and illicit use.



**Additional locations of informal access throughout Unit**

# RECOMMENDATIONS & PRIORITIZATION

## High Priority: Year 1

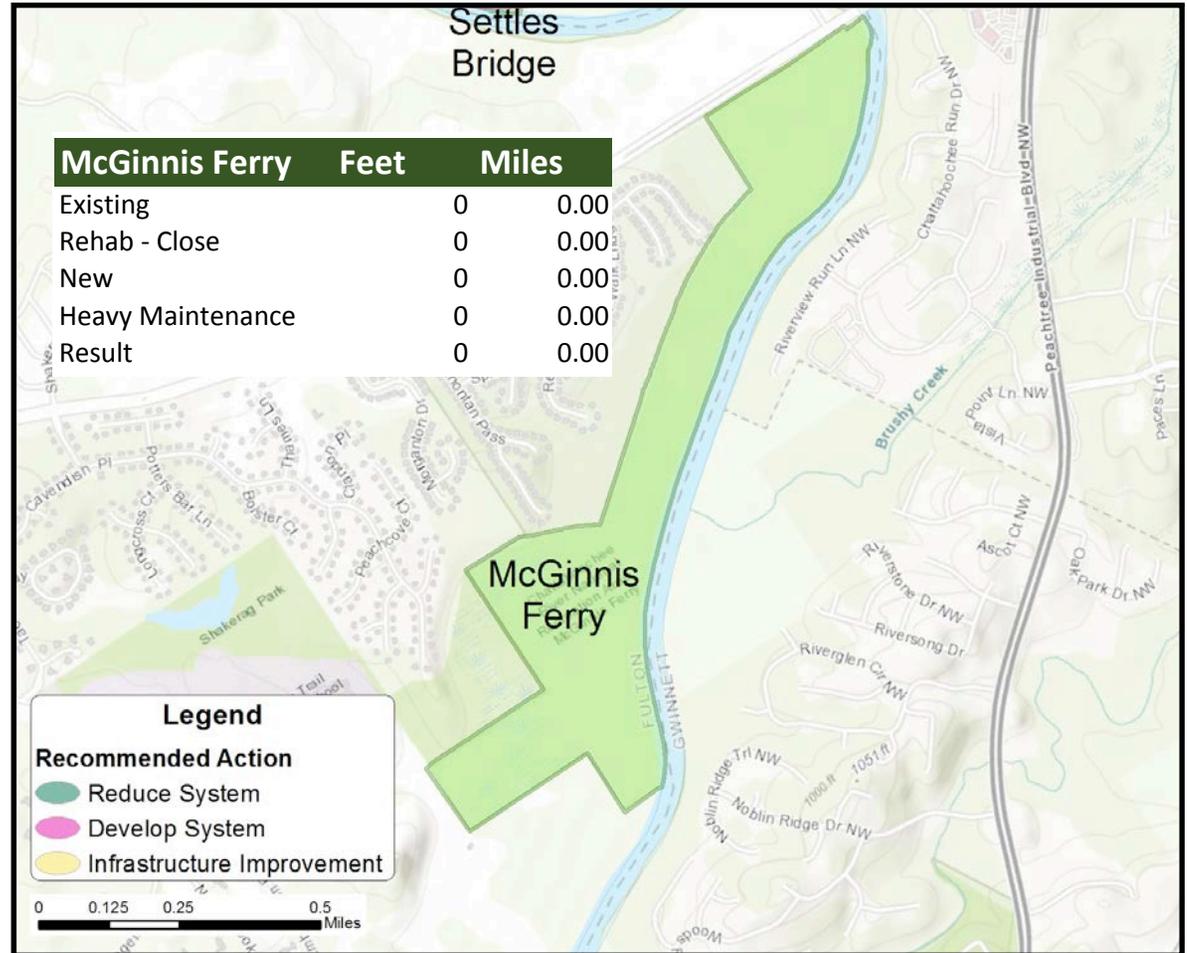
- No trail priorities, but establishing a management presence related to the river-based activities will help to create a more active regime of management for future endeavors.

## Medium Priority: Years (2-5)

- Development of trails on this parcel could be considered to provide community connectivity and a secondary recreational activity on the Unit.

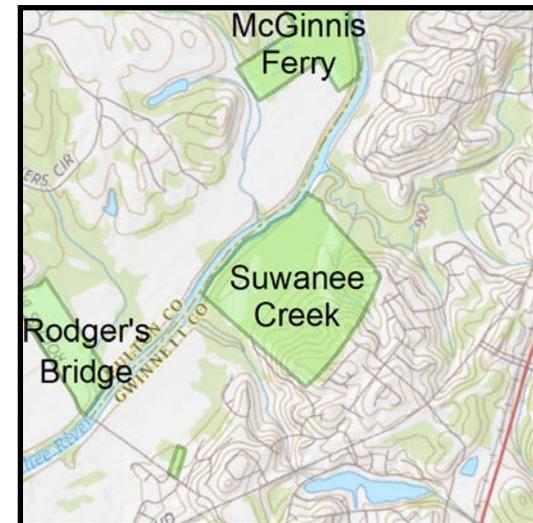
## Lower Priority

- The flat terrain and extensive riverside length make this Unit (along with nearby Settles Bridge) a strategic connecting parcel for any hardened surface, longer distance trail through the region.



# SUWANEE CREEK

<b>Land Unit Location</b>	North of Peachtree Industrial Blvd
<b>County</b>	Gwinnett
<b>Municipality</b>	Suwanee
<b>Acres</b>	145
<b>Trail Mileage</b>	1.5
<b>Trailheads/Access</b>	Access from within Suwanee Creek HOA



**Standard NPS trailhead signage panel on historic road corridor downslope from Suwanee Creek HOA**

# ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Developed Zone	Entire Unit	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>

## GENERAL DESCRIPTION

This 143-acre Unit contains no existing trails. It is located between the Chattahoochee and several, dense, upscale, suburban neighborhoods. This land unit is essentially inaccessible to the public, outside of the neighborhoods, due to parking constraints; there are many NO PARKING signs near the most logical access point located in the neighborhood. There are numerous sewage lines and manhole covers.



**HOA and resident-developed access-related infrastructure including no parking signs, gates, and OHV bridge**

## SUSTAINABILITY ASSESSMENT

The unit has moderate to high quality natural assets. Topographic variability presents opportunities for sustainable trail construction, but the majority of socially developed trails have been walked in on old sewage line corridors. Of the socially developed routes that do exist on non-flat topography, a significant percentage are steep, fall-aligned, and have erosion issues.

Consequently, this area is lightly used. There are some social trails (with switchbacks!) and a sewage line (not on the map) used for neighborhood access. There are two tree stands visible from the trail just off NPS land, and evidence that hunters drive four wheelers on trail 1/3 for access.



**Socially developed routes to the river and deer stand adjacent to NPS property**

# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

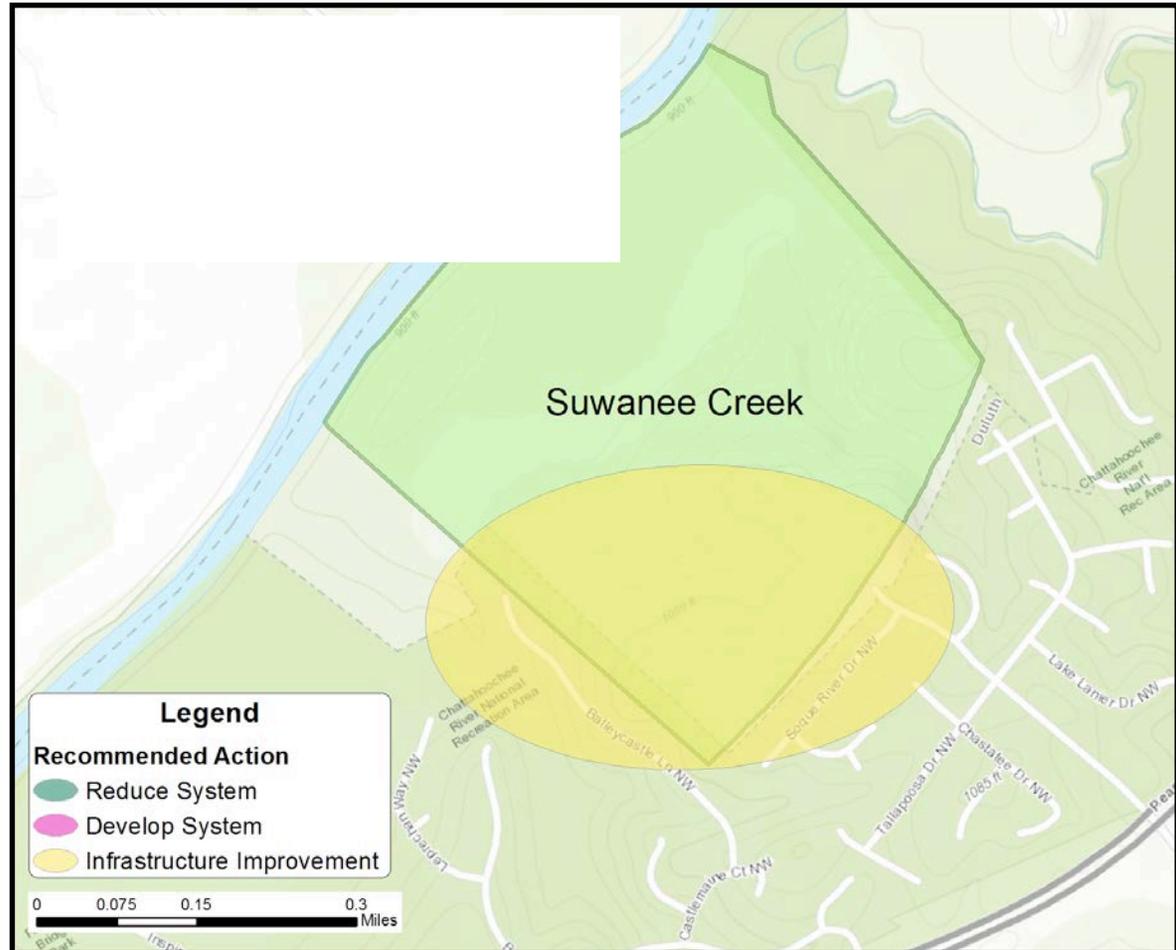
- None

## Medium Priority (Years 2-5)

- Improved infrastructure, especially related to access to the Unit and water, as well as a formal trail system would increase opportunities for the public to interact with National Park Service lands.

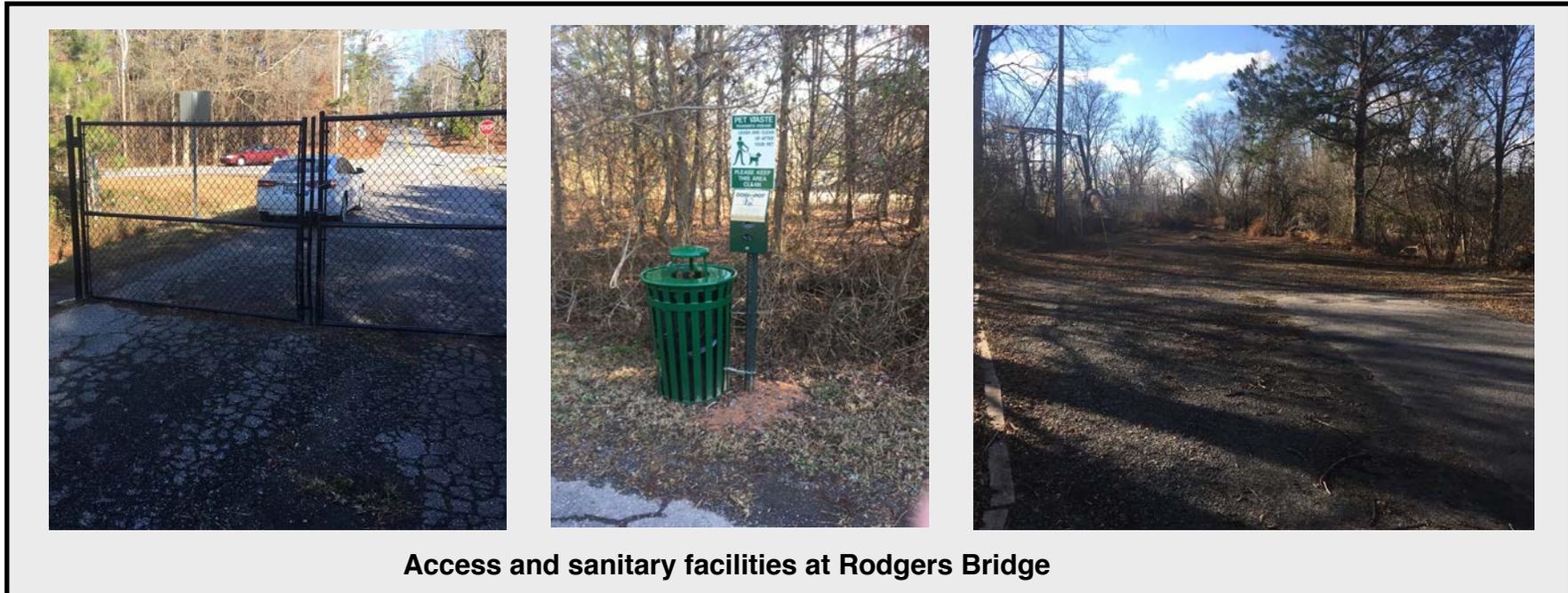
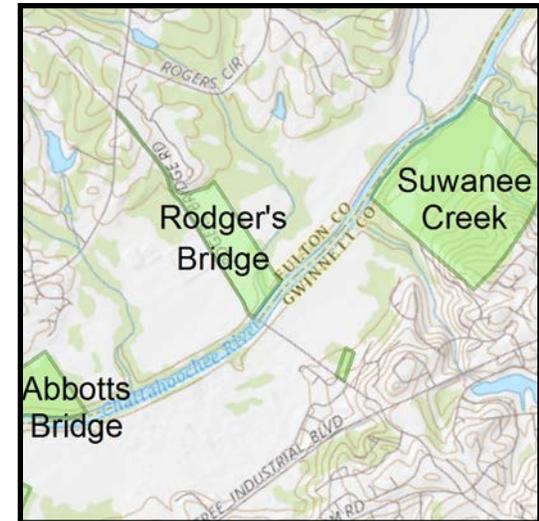
## Lower Priority (Years 5-10)

- Future development of a hardened, linear trail on this parcel, provided access outside the Unit can be developed, would provide a strategic link. These “orphaned” NPS parcels could also be evaluated for river user access for picnic spots or camping locations with developed trail systems.



# RODGERS BRIDGE

<b>Land Unit Location</b>	East of Rodgers Bridge Rd.
<b>County</b>	Fulton
<b>Municipality</b>	John's Creek
<b>Acres</b>	42
<b>Trail Mileage</b>	0
<b>Trailheads/Access</b>	1- small lot on Bell Road



**Access and sanitary facilities at Rodgers Bridge**

# ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Historic Resource Zone	Entire Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Trails</li> <li>• River Access Facilities (existing only)</li> <li>• Visitor and Admin Facilities (appropriate within cultural context)</li> <li>• Parking Areas (appropriate within cultural context)</li> <li>• Picnic Areas (appropriate within cultural context)</li> <li>• Restrooms (appropriate within cultural context)</li> <li>• Roads (appropriate within cultural context)</li> <li>• Bridges (appropriate within cultural context)</li> <li>• Kiosks (appropriate within cultural context)</li> </ul>

## GENERAL DESCRIPTION

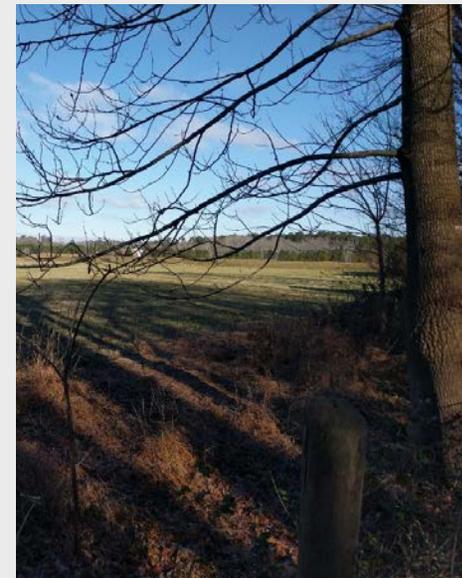


Rodgers Bridge is a 42-acre Unit that stretches from Bell Rd. in the north to the Chattahoochee River along Rodgers Bridge Rd. It currently has limited parking at Bell Rd., and a single paved trail leading directly to the historic bridge superstructure over the river. The park serves local communities as a dog park and immersive semi-natural setting.

**Rodgers Bridge structure and uninterpreted sign regarding active science activities**

# SUSTAINABILITY ASSESSMENT

Visitor created trails access the river banks, and form loops in adjacent fields. Downstream (Cauley Creek) there is a large field that provides for off-leash activities. County and regional planning activities indicate that a bridge revitalization for use by pedestrians and cyclists is underway.



**Socially developed routes and “dog park” field**

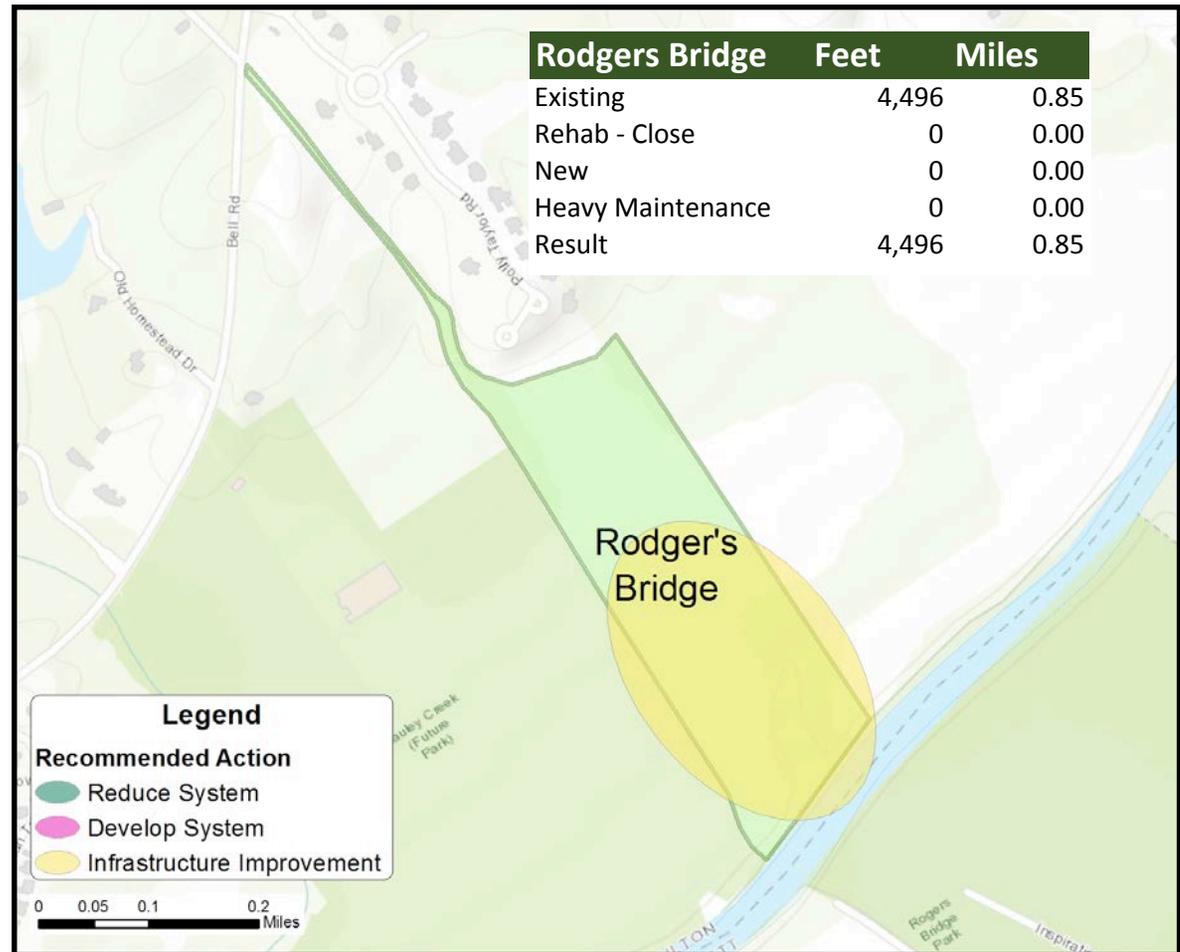
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

- No trail priorities, but more active management of river-based uses and concessionaires was requested through public comment.

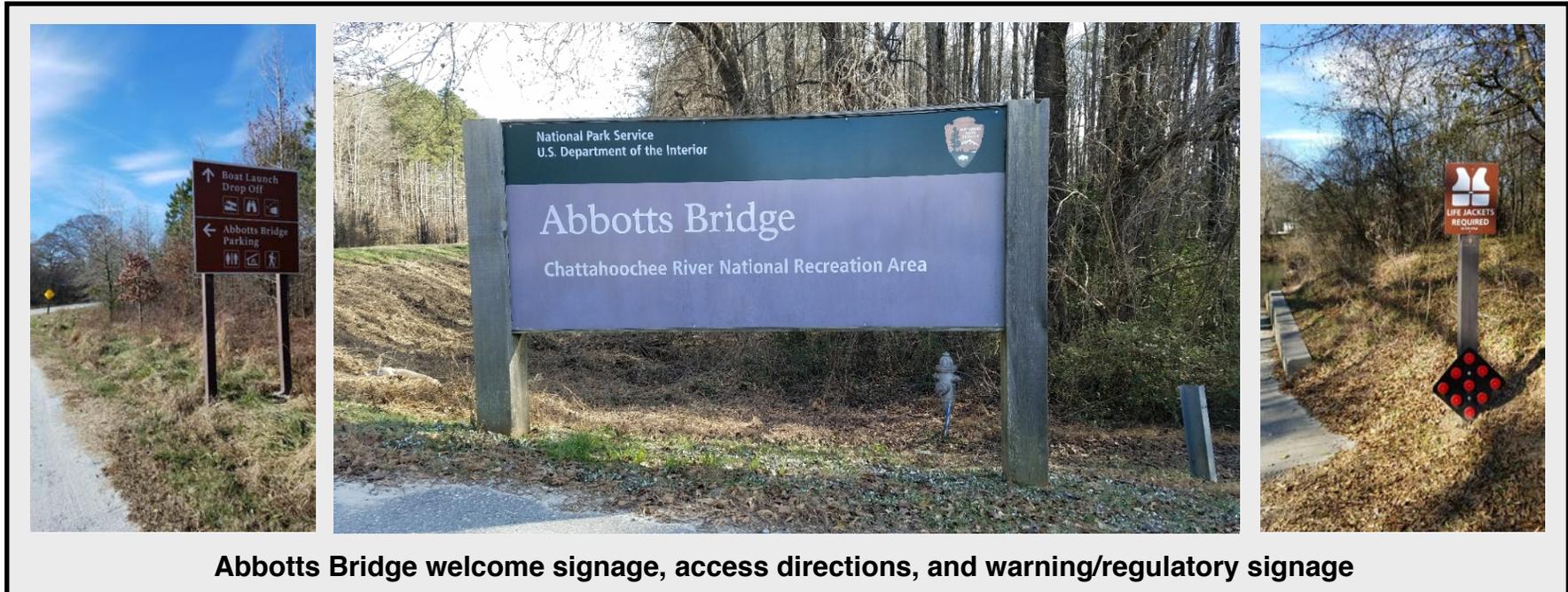
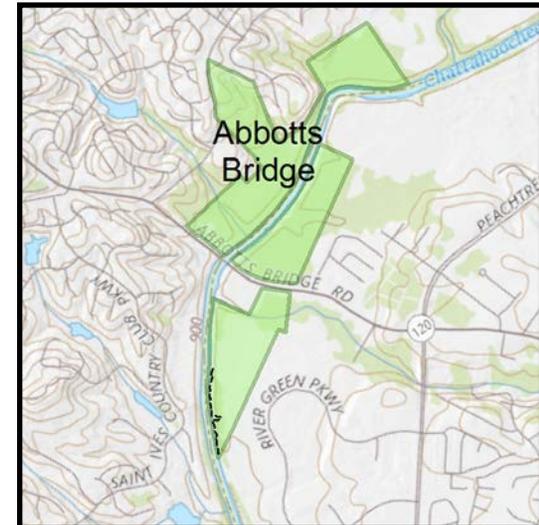
## Medium Priority (Years 2-5)

- Formalization of this as NPS-managed lands, engagement with greenway development to ensure alignment of management goals with this development.



# ABBOTTS BRIDGE

<b>Land Unit Location</b>	Abbotts Bridge Road, both sides of river
<b>County</b>	Fulton (west), Gwinnett (east)
<b>Municipality</b>	Duluth, John's Creek
<b>Acres</b>	218
<b>Trail Mileage</b>	0.4
<b>Trailheads/Access</b>	1- south of Abbotts Bridge Road

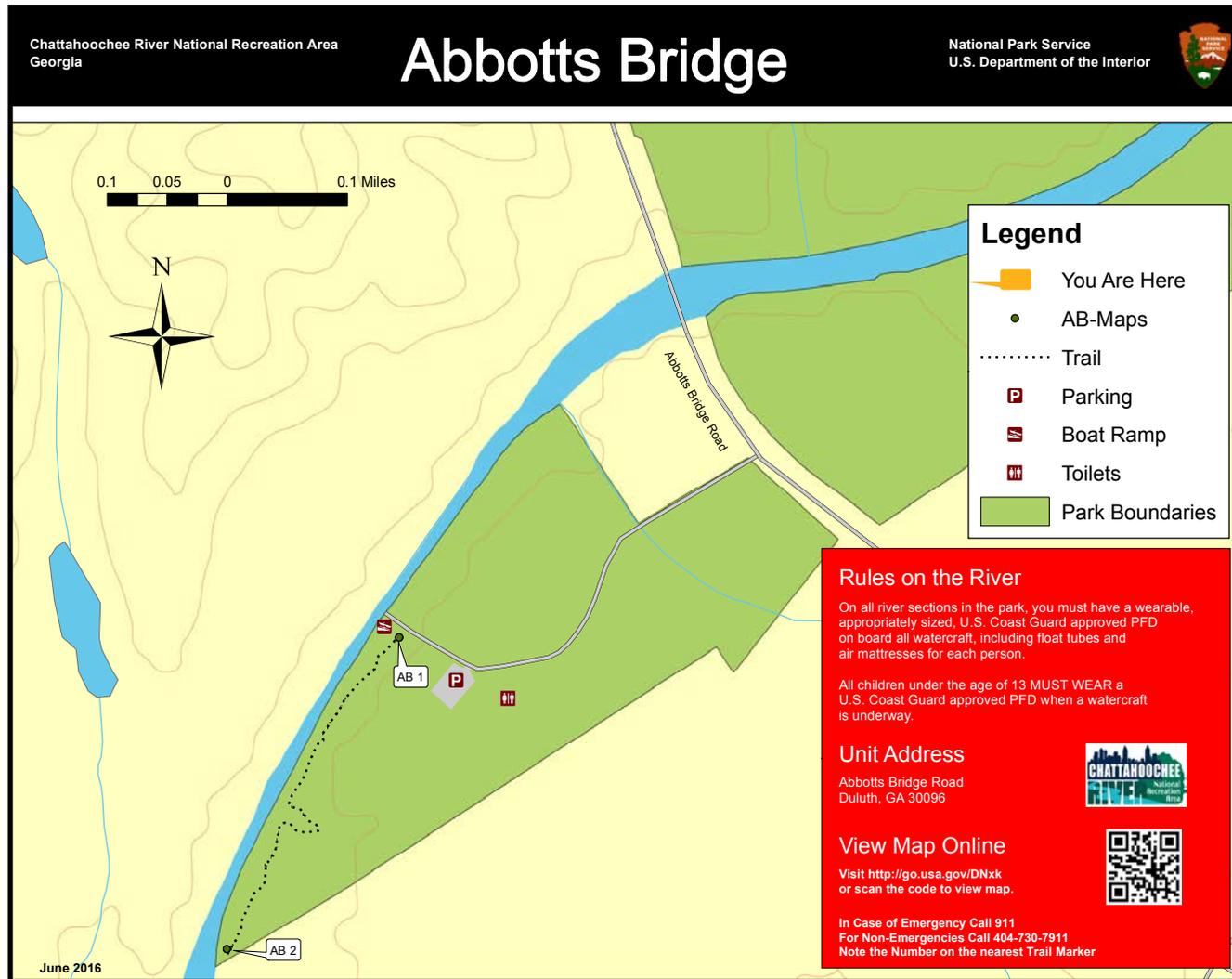


**Abbotts Bridge welcome signage, access directions, and warning/regulatory signage**

# ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	East and West of Chattahoochee River on the northern end of the Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>
Developed Zone	East of Chattahoochee River on the southern end of the Unit	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>

# GENERAL DESCRIPTION



Regulatory and warning signs regarding river use



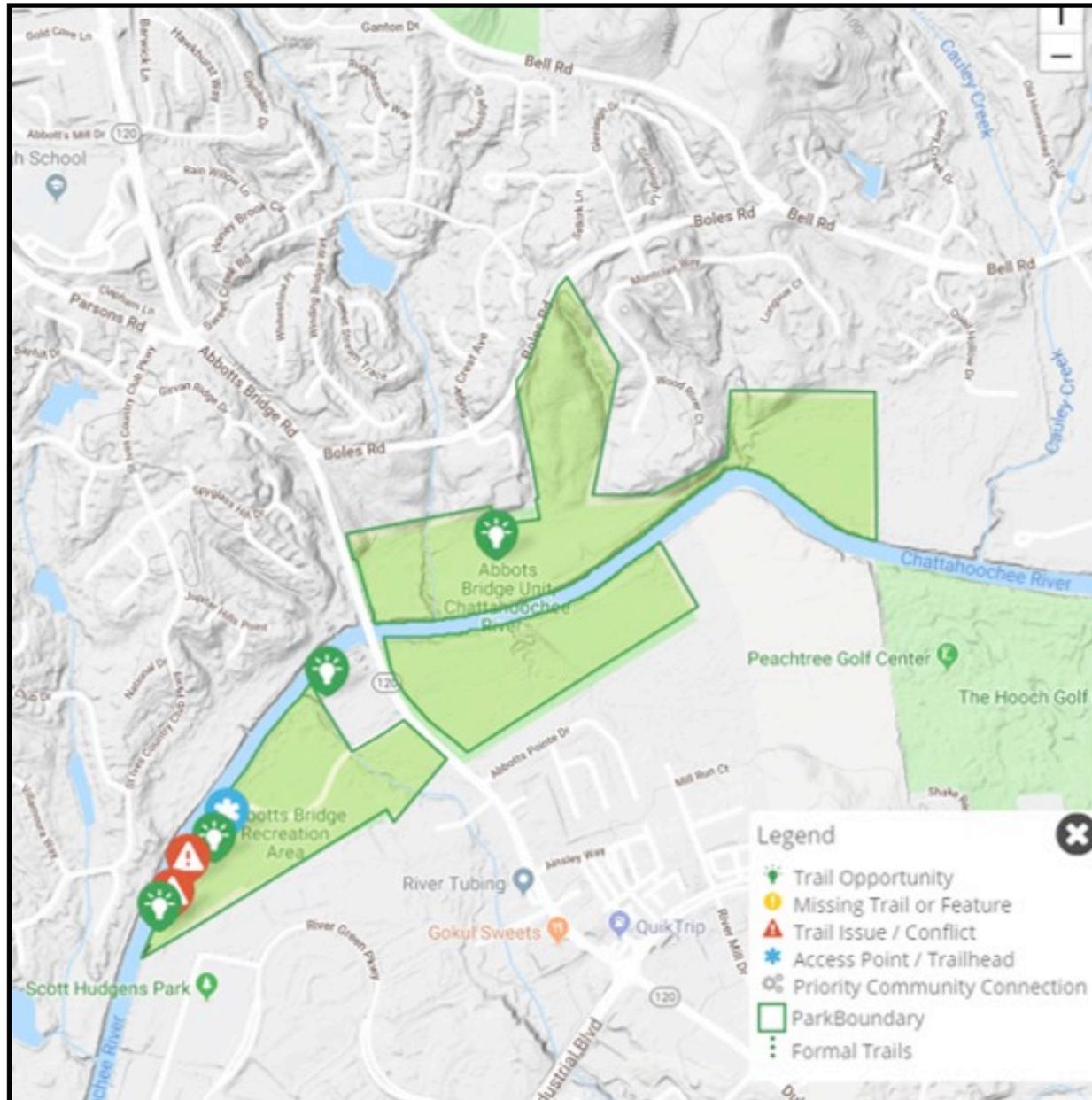
Abbotts Bridge is a 218-acre Unit with access to the southeast portion of the property from Abbotts Bridge Road. Site facilities include a boat launch, restroom facilities, pavilion, parking area, and short riverside hiking trail. East of the boat ramp on the southern portion of the Unit is undeveloped, as are the portions of the north of Abbotts Bridge Road.

# PHYSICAL SUSTAINABILITY

- Early successional, flat, wooded floodplain just above the Chattahoochee, the southern portion of the Unit is overgrown with invasive plants along with some very old large oak trees.
- Northeast portion of the Unit has some potential for quality recreational trail development and community connectivity.
- Some large grassy fields provide a city park feel.
- Single formal trail is minimally developed, less than a half-mile in length, and dead ends at the southern boundary of the Unit
- Steep unstable slopes from the floodplain to the river have multiple, eroded, informal river access trails.
- Several large natural areas on the northern portion of the Unit contain no formal trails.



# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Trails are unmaintained.
- Issues of trash, depreciative behavior, and crowding are being caused by river users

### Opportunities:

- Opportunities for enhanced monitoring and management of river users, particularly tubers.
- Enhancement of river use facilities and additional trails.

## Visitor Use Estimation/Capacity Study

- No known capacity issues exist at this site.
- This is a commercial river shuttle use site, which are counted as private vehicles in visitor use estimates.

## SOCIAL SUSTAINABILITY

- Park Unit is used predominantly as a boat launch.
- Trail is unmaintained and under-utilized, with numerous socially developed river access routes.
- Overgrown vegetation is discouraging off-trail travel, though faint informal trails do exist.



## MANAGERIAL SUSTAINABILITY

- Nicely maintained boat ramp and parking area includes a large pavilion and bathroom with flush toilets.
- Significant trailhead/boat ramp signage is present.
- Significant trash issues reported through public comments, along with other frustrations with river user behavior (i.e. public intoxication and potential intoxicated driving).
- There is one map at the beginning and end of the short out and back trail.



**Garbage receptacles and single, formal trail adjacent to river access road**

# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

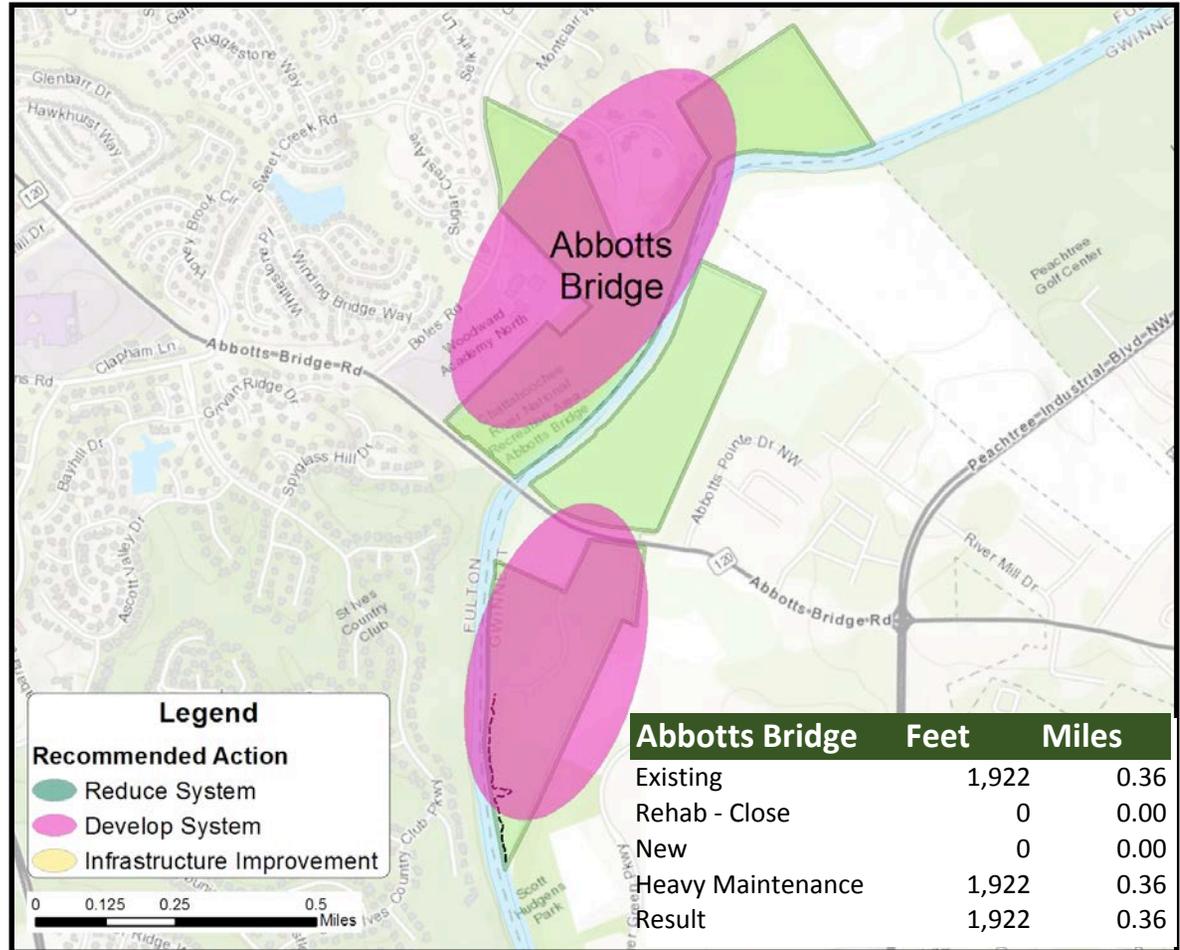
- Clear encroaching vegetation and improve tread on existing trail.

## Medium Priority (Years 2-5)

- None

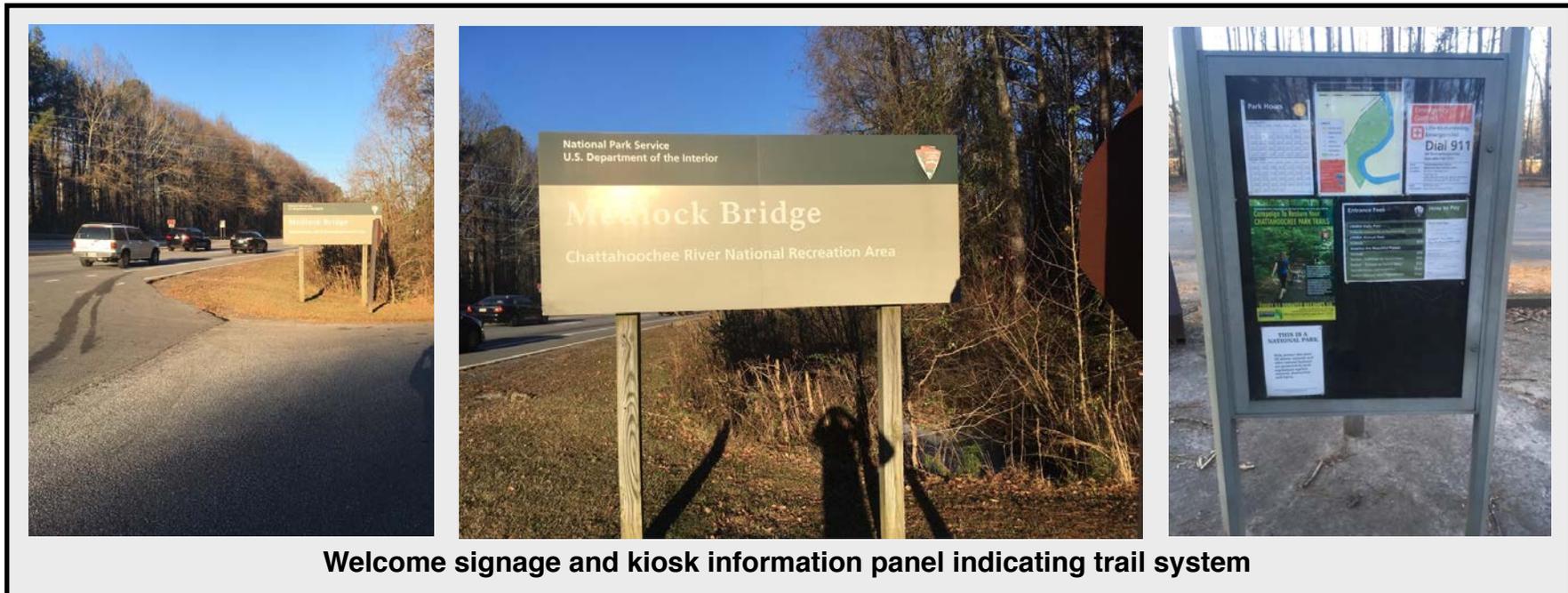
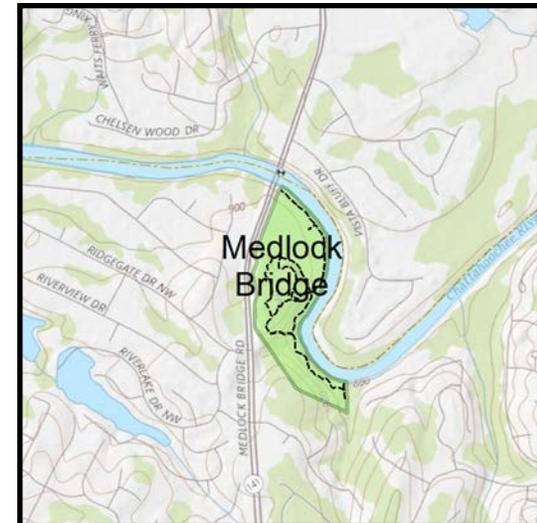
## Lower Priority (Years 5-10)

- Develop formalized trail systems on southern and northeastern portions of the Unit to provide alternative recreational activities and a stronger peer influence toward ongoing negative behaviors.



# MEDLOCK BRIDGE

<b>Land Unit Location</b>	Medlock Bridge Road, River Left
<b>County</b>	Gwinnett
<b>Municipality</b>	Peachtree Corners
<b>Acres</b>	43
<b>Trail Mileage</b>	1.4
<b>Trailheads/Access</b>	1- access from Medlock Bridge Road



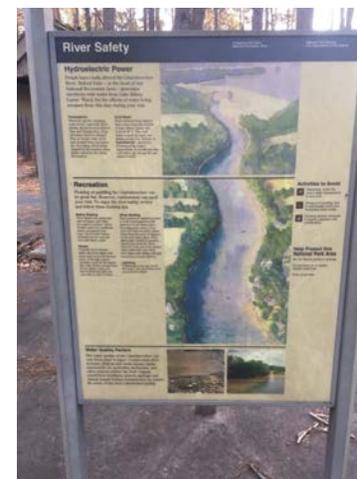
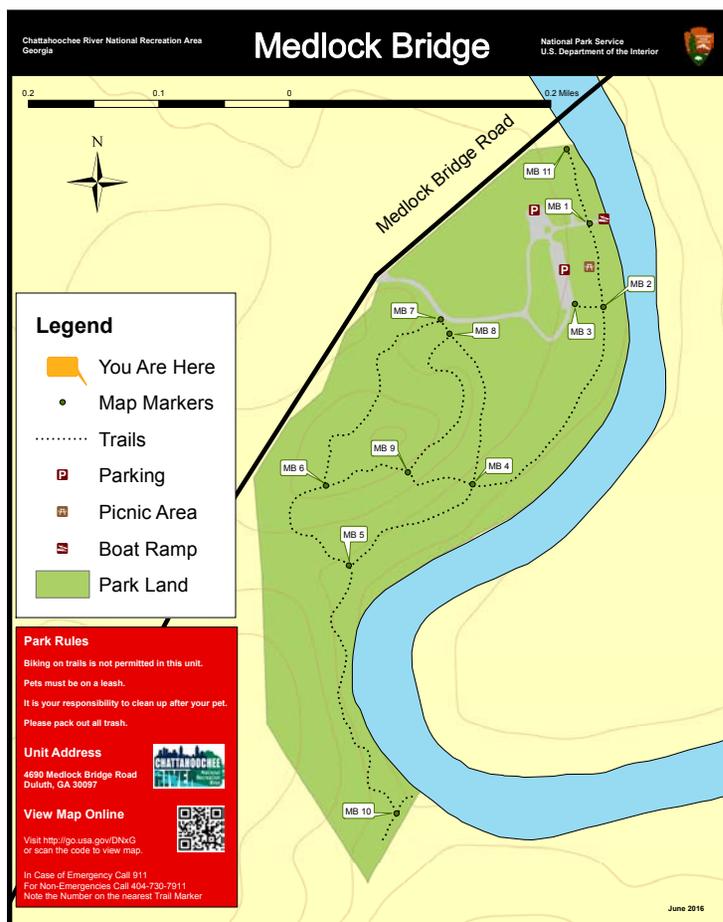
Welcome signage and kiosk information panel indicating trail system

# ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Developed Zone	Entire Unit	<ul style="list-style-type: none"> <li>All Activities</li> </ul>	<ul style="list-style-type: none"> <li>All Facilities</li> </ul>

## GENERAL DESCRIPTION

Medlock Bridge is a 42-acre Unit in an urban setting, located between Highway 141/Medlock Bridge Road, a neighborhood, and the Chattahoochee River. This parcel has a developed picnic area, river access point, and 1.4 miles of official trail. An old road bed on the flat floodplain bench adjacent to the Chattahoochee River contains the majority of the trail mileage, and provides for river access for fishing, boating and exploration by picnickers. Some topographic variation yields steep, direct ascent trails to hilltops.



Garbage receptacles and river interpretation sign panel

## PHYSICAL SUSTAINABILITY

- The existing, short system of trails lends itself to picnickers/walkers and fisherman, but limited for those who may want a recreational experience lasting more than 30 minutes.
- Informal trails leading to adjacent neighborhoods suggest moderate levels of use from nearby residents.
- The concave nature of the walked-in trails on the floodplain will hold water/mud longer than the surrounding terrain and create erosion issues where topographic slope is encountered. This situation is seen in the many eroded informal trails from the riverside formal trail down to the river.
- A small upland hill has a triad of trails on it that provide limited recreational value for exploration. These trails are aligned poorly (steep, fall-aligned) and access the local high point of the land and adjacent rock outcrops.



# SOCIAL SUSTAINABILITY

## Public Comments (Social Pinpoint)

### Issues:

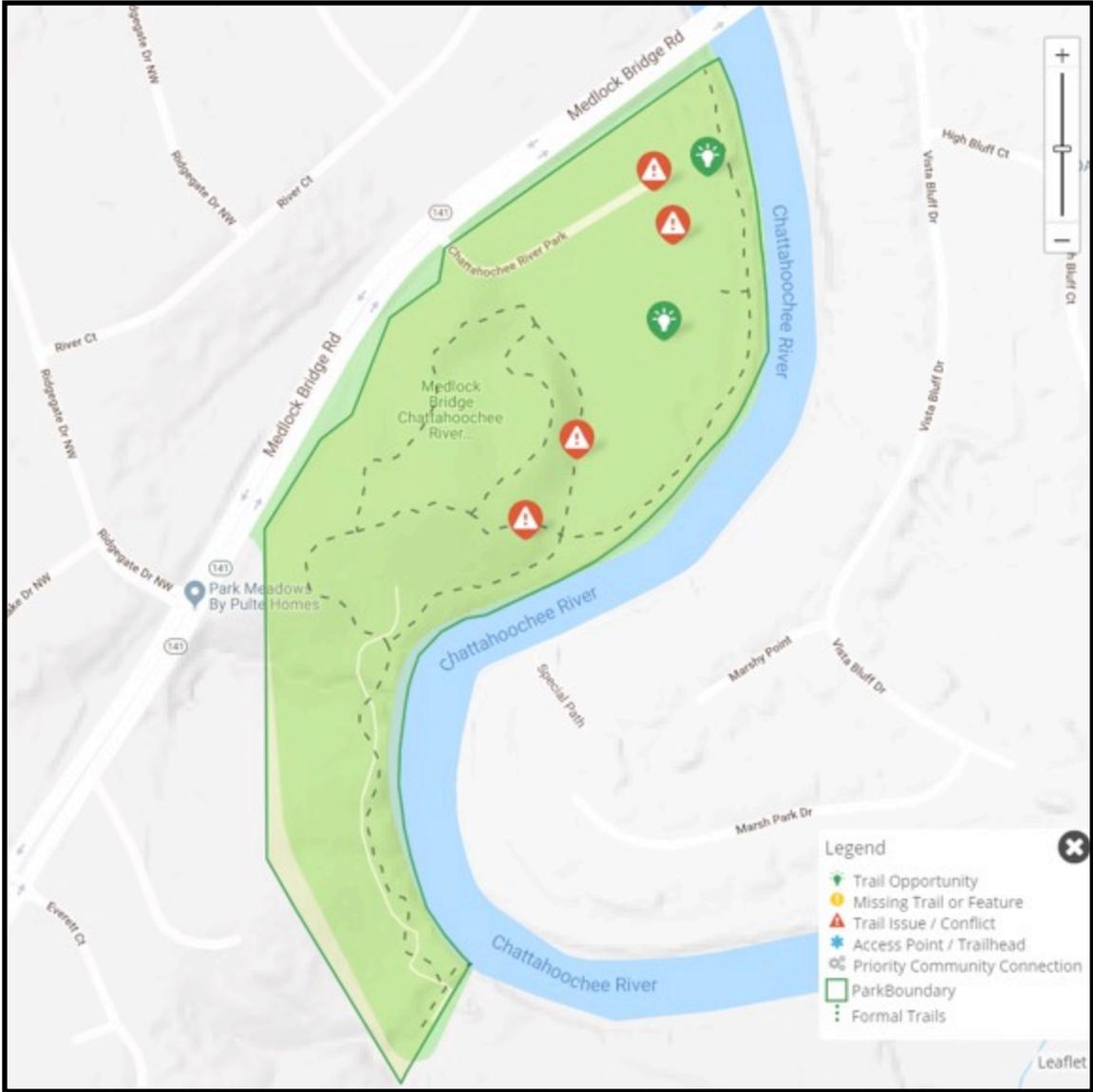
- Existing trails are eroded and vegetation management is poor.
- River access is poor and dangerous.
- Connectivity to surrounding communities needs improvement.
- Signage and trail maintenance is poor.

### Opportunities:

- Opportunities for trail and facility expansion east of the river.
- Connectivity to surrounding communities and other area trails.

## Visitor Use Estimation/Capacity Study

- No known capacity issues.
- Visitor use estimation needs coordination with USACE and adjacent parking areas.



## SOCIAL SUSTAINABILITY

- Well maintained facilities, such as the developed boat ramp is inviting to boaters and picnicking visitors.
- Trail signs are present but many could use minor repairs, namely reprinting faded maps.
- There is some evidence of social trail remediation and a need for similar work in the future, especially for river access/fisherman trails.
- There seem to be multiple deeply incised old trails which have been closed and no longer support traffic.
- Overall, the trail corridor is well maintained but tread maintenance is minimal, especially in steep sections.



**Roadside regulatory information and numerous steep, eroding social routes to river**

# MANAGERIAL SUSTAINABILITY

- Well-maintained river access and picnic facilities.
- A number of structures are present on the trails that are nearing the end of their lifecycle and/or are being undermined by erosion or rotted through sediment deposition. A lack of water management on the trails is the cause of these issues and, if not addressed, will result in the failure of these features. As these are built structures, they hold considerably more liability exposure than do the nearby trails.
- Filling existing incised and abandoned trails with woody debris may marginally slow the erosion in these channels, but maintaining an adjacent trail at the same grade and relationship to the topography will only result in the incision process repeating itself and the subsequent need to fill an additional incision. This action does not constitute trail maintenance. As the woody debris decomposes, it encourages mud formation, potential damming that may turn water back onto the trail, and enhanced snake habitat adjacent to the formal trail.



**Trail maintenance structures treatment and erosion encroaching on bridge foundation**

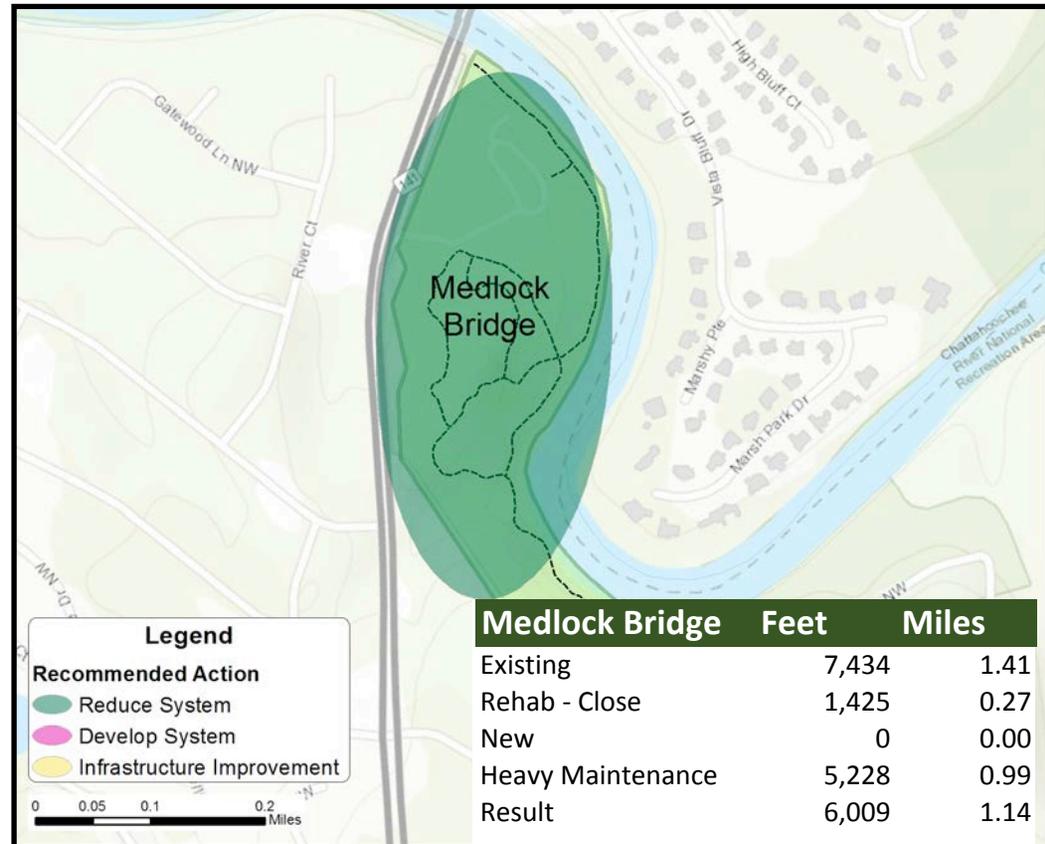
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

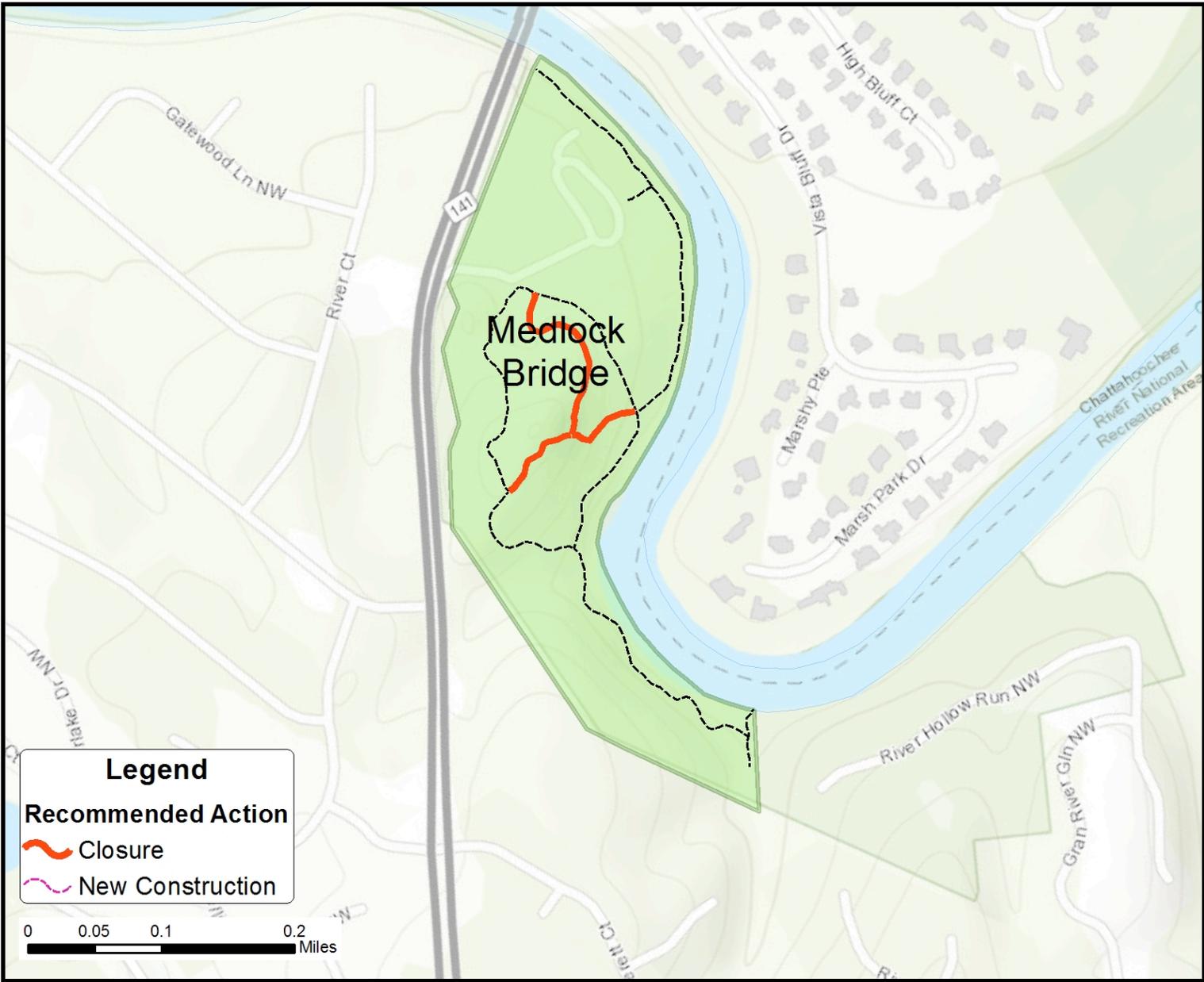
- Examine creating access to the river and parking lot to reduce social trail impact.
- Reprint faded wayfinding maps.

## Medium Priority (Years 2-5)

- Reduction of the trail system on the hill. Removal of fall aligned trails will reduce maintenance needs and eliminate acute erosion issues; these closures should be completed by a full restoration process to ensure closure and inhibit re-opening by users. Monitoring of closure should be conducted, and if use persists NPS could consider redeveloping a sustainable alignment that traverses the landscape and provides access to the rock outcroppings.

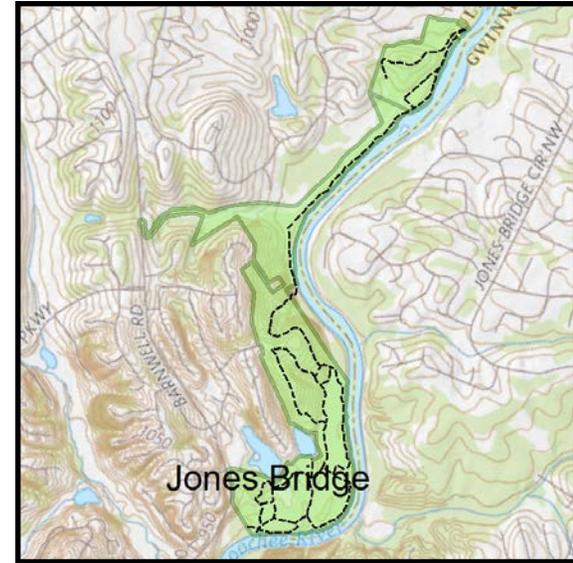


# POTENTIAL TRAIL SYSTEM



# JONES BRIDGE

<b>Land Unit Location</b>	Barnwell Road, River Right
<b>County</b>	Fulton
<b>Municipality</b>	John's Creek
<b>Acres</b>	194
<b>Trail Mileage</b>	~ 5 miles
<b>Trailheads/Access</b>	2- CREEC (south), Park Access Road (north)

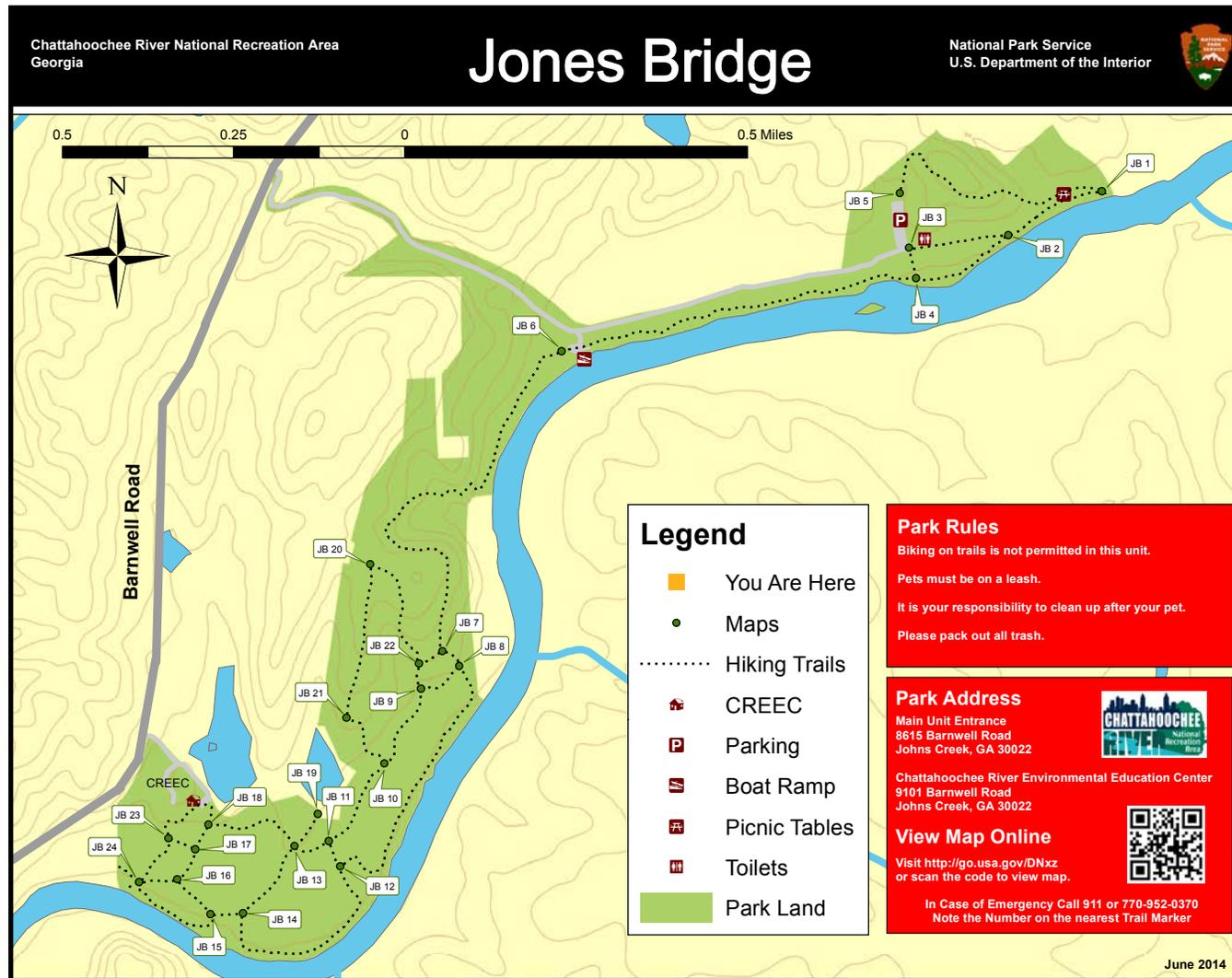


**Entrance signage at relatively non-discernible trailhead locations**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	West of Chattahoochee River	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>
Natural Zone	West of Chattahoochee River at the South end of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking, no facilities</li> <li>• Fishing</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.; existing only)</li> <li>• Visitor and Admin Facilities (existing only)</li> <li>• Parking Areas (existing only)</li> <li>• Picnic Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (foot bridges only)</li> <li>• Kiosks</li> </ul>
Developed Zone	West of Chattahoochee River between the previous Zones	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>

# GENERAL DESCRIPTION



The Jones Bridge Unit is a 194-acre parcel with facilities that include the Chattahoochee River Environmental Education Center (CREEC), an historic bridge superstructure, river and boating access, and a long riverside trail. The CREEC contains a maze of circuitous, formalized social trails on the flat bench above the river. Upper Jones Bridge hosts the formal river access, sanitary facilities, and a small set of trail loops.

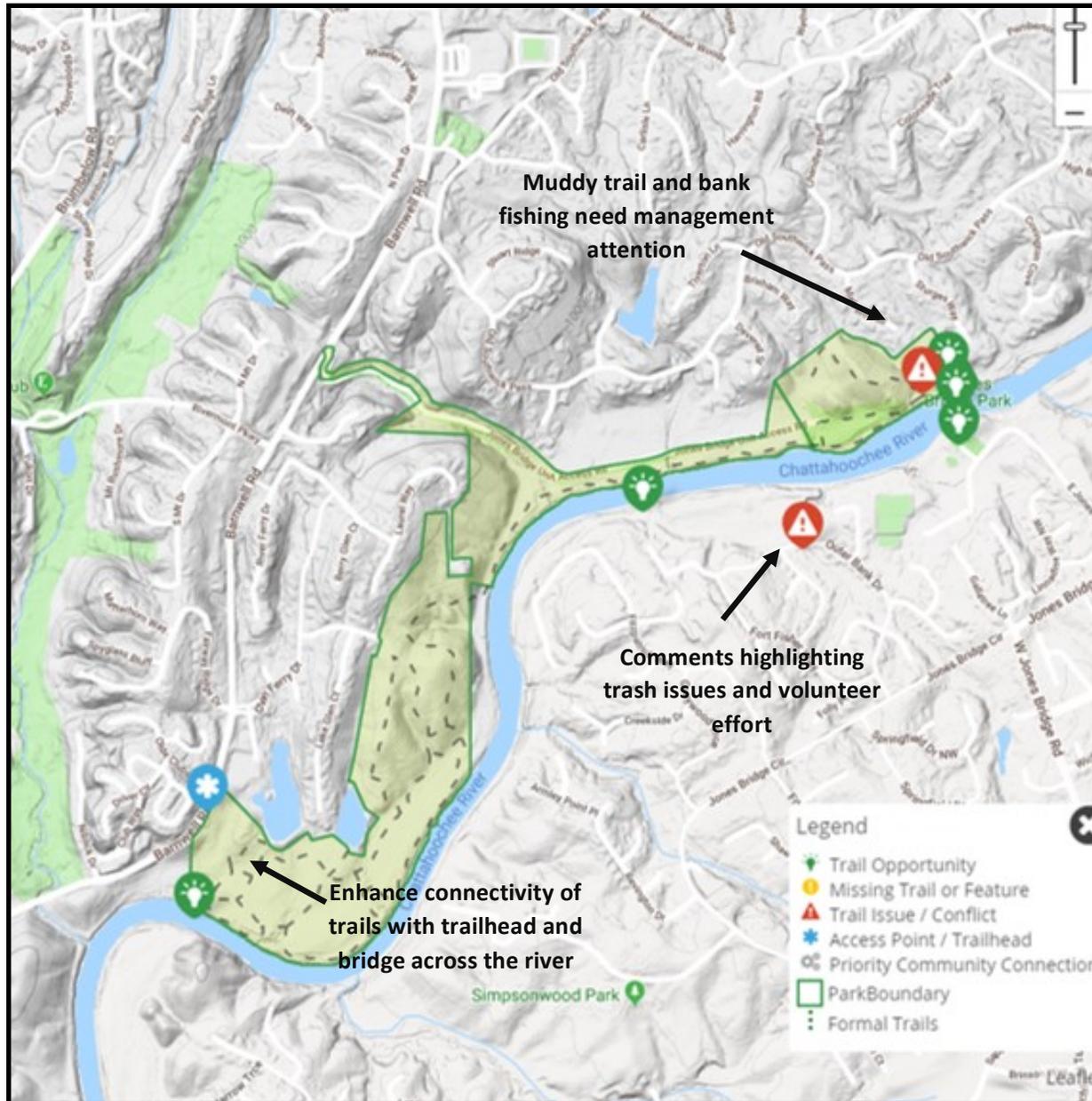
# PHYSICAL SUSTAINABILITY

- Quiet natural setting located between neighborhoods and the river.
- Long flat areas along the river at both ends of the tract and a connecting hilly section in between yield a nice variety of trails.
- Old sewer lines run through the tract, but it is otherwise fairly natural.
- Trails are a mix of historic open corridors, minimally developed trails, and socially developed river access routes.
- Many trails suffer from “tread creep” due to their informal development, while others carry water and induce erosion due to their location on flat terrain or fall-aligned on gentle slopes. In both cases, trails continue to widen, causing additional trampling, root exposure, and natural resource impacts.



**Historic open corridors and socially developed trails undergoing a widening due to lack of construction**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Trash near Jones Bridge Park and along the river.
- Trails are muddy and social trails are proliferating.

### Opportunities:

- Opportunities for more active management including trash removal, trail work, and communications; evidence of support for volunteer efforts.
- Enhance the connectivity of the trails with connections to regional parks, transportation routes, and public access points.
- Diverse user base.

## Visitor Use Estimation/Capacity Study

- No known capacity issues exist at this site.
- Attendees to CREEC programs and events are not accurately reflected in visitor use estimates.

## SOCIAL SUSTAINABILITY

- This tract is well used by hikers, dog walkers, and trail runners, with many off-leash dogs and opportunities for wildlife viewing and/or dog conflicts.
- There are also opportunities for land-based river access and a boat ramp.
- Due to the length, acreage, and trail assemblage, there are opportunities for a reasonably long run/hike with some elevation change where trails stray from the river.
- The Jones Bridge (north end) portion is open to the public, but the CREEC (south end) portion has some accessibility problems and is only available to those with private access or endurance. Many off-leash dogs were present during the assessment.
- Some signage is in a state of disrepair.



**Trails socially developed on flat areas when there is substantial topography in this Unit**

## MANAGERIAL SUSTAINABILITY

- Most of the trails in the area seem to be formalized social trails with no tread construction or maintenance.
- A few have serious trail degradation problems (erosion, creep, and widening).
- Trail corridors are maintained and clear of encroaching vegetation.
- Ample trail signs and maps have been installed but a significant portion have been vandalized.
- Well maintained trailheads, and several nice bridges and structures. However, a large number of these structures do not seem necessary if proper trail planning and location was undertaken. In some crossing or lowland locations, care has not been taken to create a structure or raise it/control drainage to mitigate water or sedimentation impacts. In total, the structure number, complexity, and inspection/maintenance load is far too large for the size of the park and length of the trail system.



**Structure maintenance challenges (i.e. sediment deposition, eroding streambanks and social access routes)**

# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

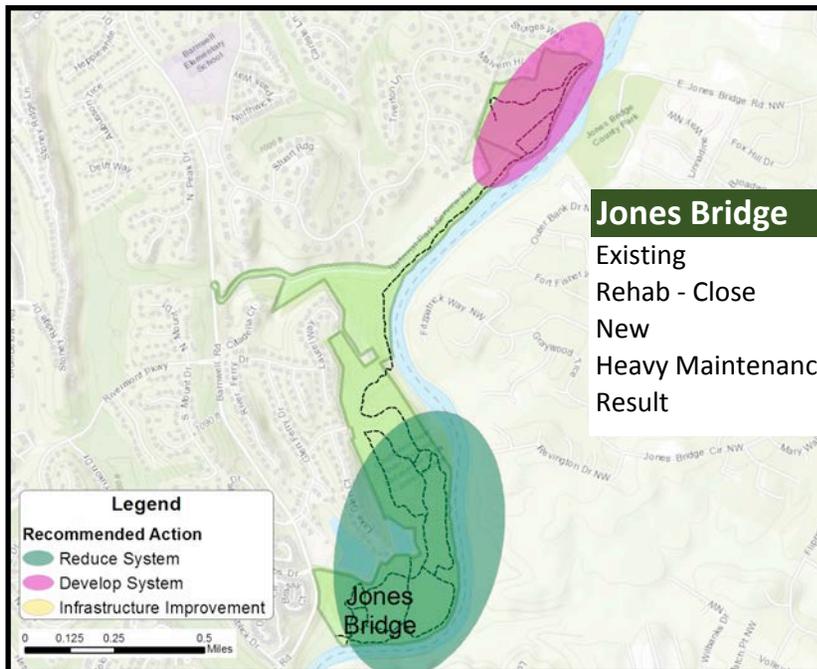
- Close and reroute degrading direct ascent trails.
- Repair damaged trail signs.

## Medium Priority (Years 2-5)

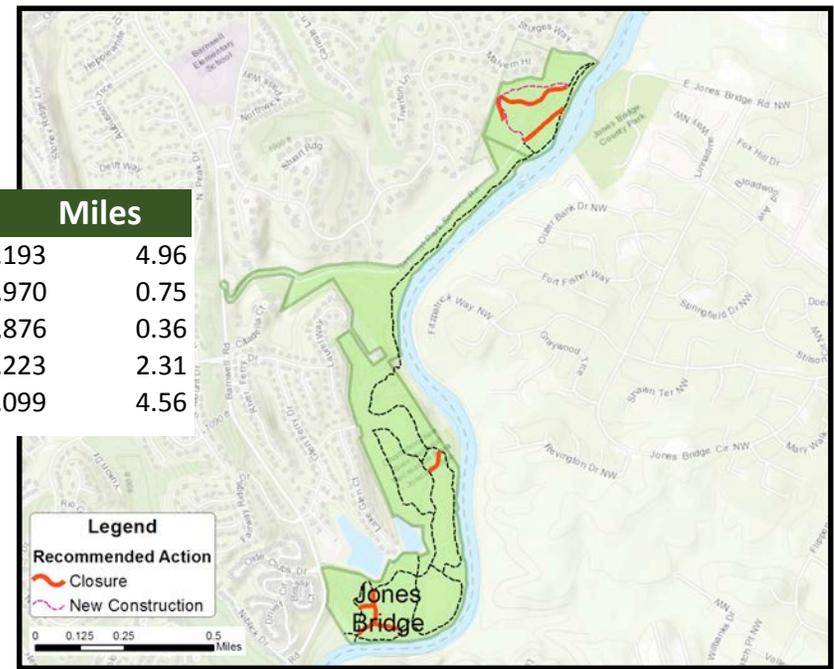
- Identify extraneous, formalized social trails for closure and restoration based on sustainability, scenery and preservation of longer loops.
- More formally redevelop existing trails through rolling contour alignment and full bench cut construction, taking advantage of topography to reduce the need and/or span of bridges and structures.
- Provide public parking and access at the CREEC end.

## Lower Priority (Years 5-10)

- None

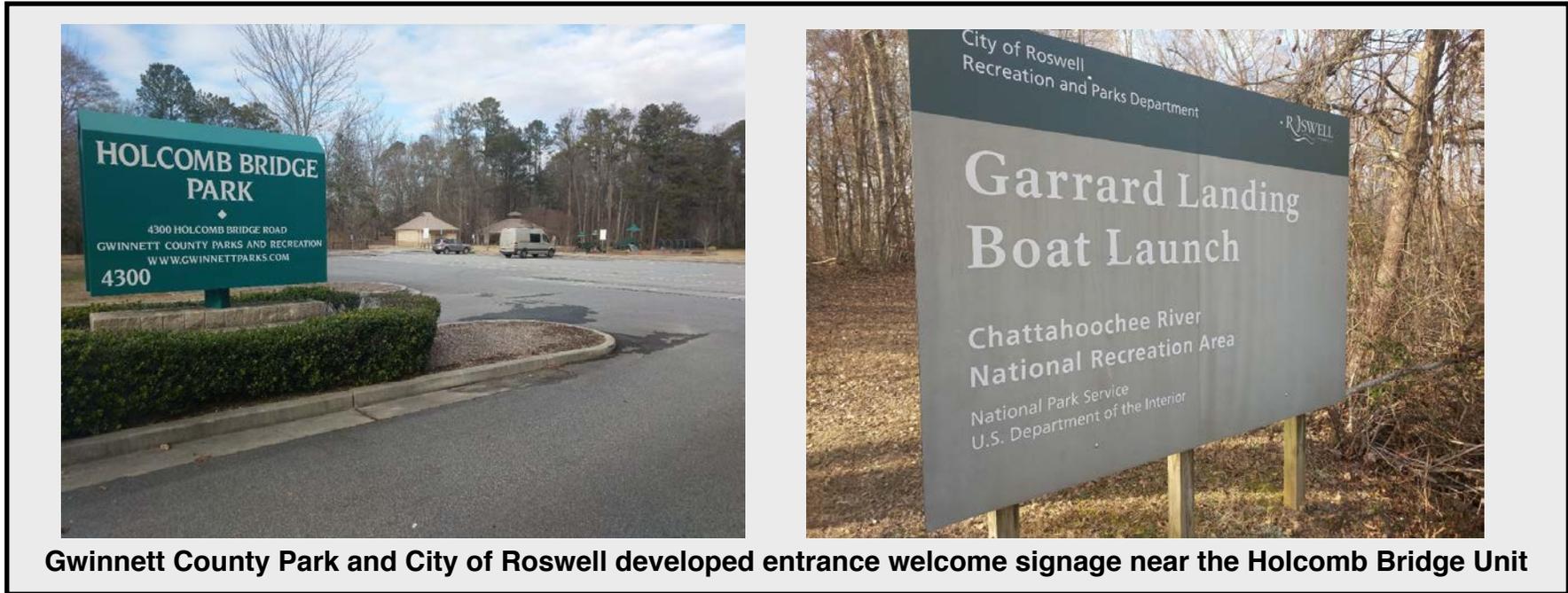
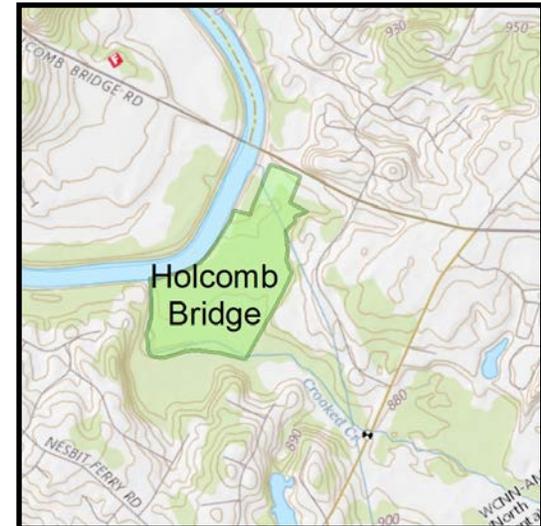


Jones Bridge	Feet	Miles
Existing	26,193	4.96
Rehab - Close	3,970	0.75
New	1,876	0.36
Heavy Maintenance	12,223	2.31
<b>Result</b>	<b>24,099</b>	<b>4.56</b>



# HOLCOMB BRIDGE

<b>Land Unit Location</b>	South of Holcomb Bridge Rd., river left
<b>County</b>	Fulton, Gwinnett
<b>Municipality</b>	Peachtree Corners, Dunwoody
<b>Acres</b>	38
<b>Trail Mileage</b>	0
<b>Trailheads/Access</b>	1- access from Holcomb Bridge Road



**Gwinnett County Park and City of Roswell developed entrance welcome signage near the Holcomb Bridge Unit**

# ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	East of Chattahoochee River	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>



**Adjacent Jones Creek Environmental Campus and attendant playground, pavilion and sanitary facilities**

## GENERAL DESCRIPTION



This 37-acre NPS Unit is isolated along the river behind an apartment complex. Access is limited, however local partners expressed interest in trail development on this small lowland parcel. Development could improve community connectivity through the area, including to neighboring parks maintained by Gwinnett county's Holcomb Bridge park, and Garrard Landing across the river.

**Existing parking and river access infrastructure in a developed setting**



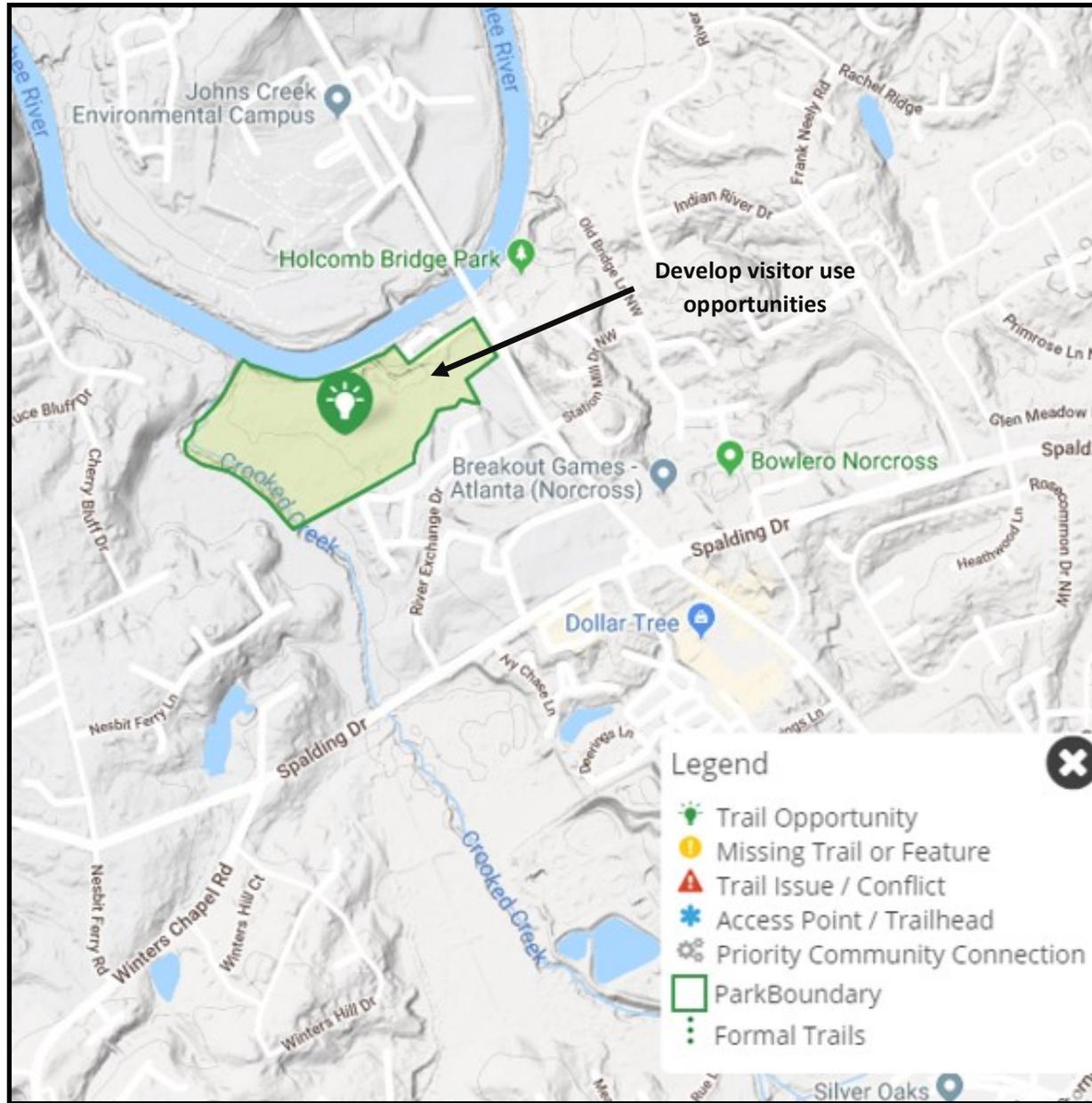
# SUSTAINABILITY ASSESSMENT

- The two developed parks (city and county) are frontcountry style with restrooms, playgrounds and significant parking infrastructure.
- Land in all three is predominately upper floodplain bench with little topographic variation.
- NPS lands are undeveloped and access is constrained by the adjacent roadway, apartment complexes and the power substation.
- Trails are largely surfaced or paved, and will require longer-term, larger capital investments in maintenance.
- The proximity to John's Creek Environmental Campus offers partnership possibilities on multiple fronts, from trail surfacing experimentation to environmental restoration to public education regarding responsible use of park lands.



**Urban park setting with higher cost, wider paved and aggregate surface trail types**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Absence of visitor use facilities.

### Opportunities:

- A small boat launch.

## Visitor Use Estimation/Capacity Study

- None

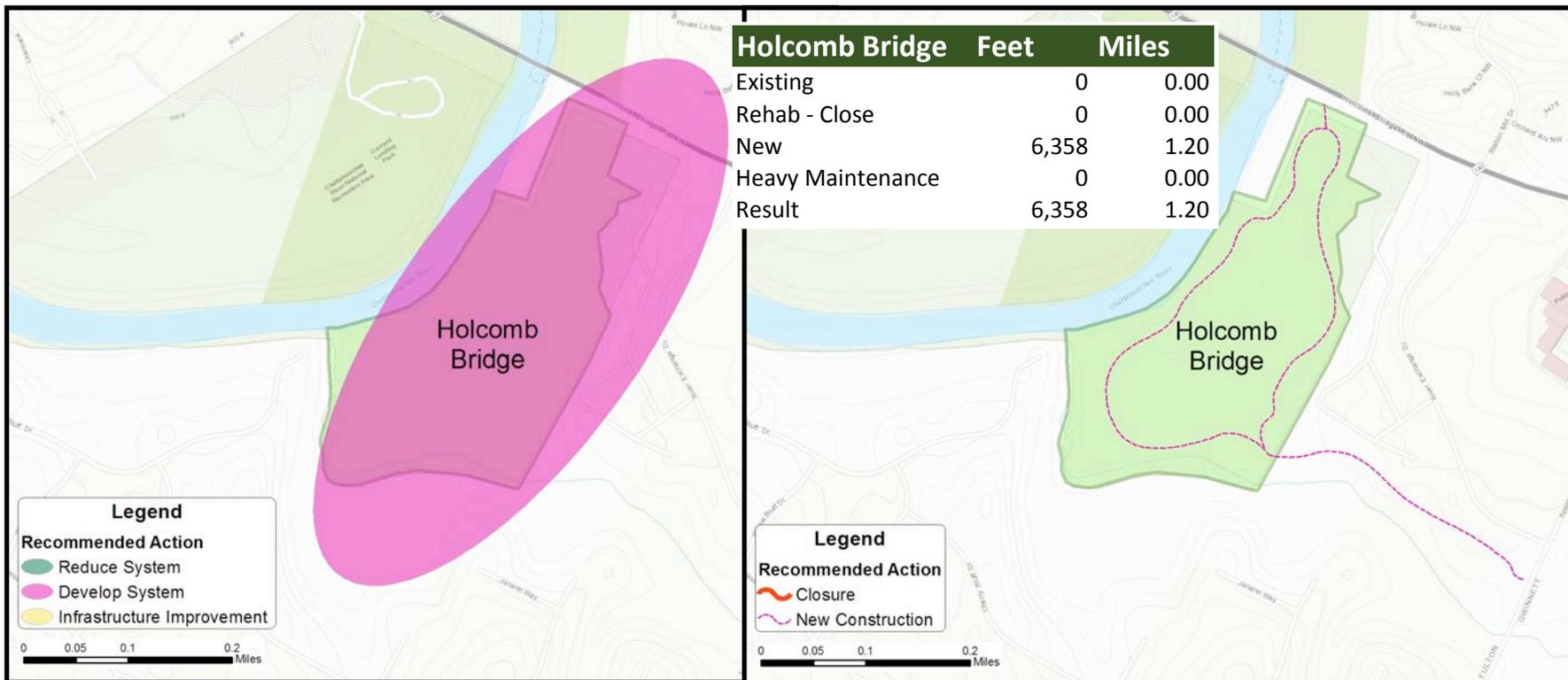
# RECOMMENDATIONS, PRIORITIZATION, & POTENTIAL TRAIL SYSTEM

## High Priority (Year 1)

- Graveling of trails and access by city parks staff in Gators or UTVs is present on the Fulton side. Gravel application is failing in several areas along the boat ramp access trail and should be augmented before considerable erosion results. During this surface hardening, limited grading should be completed to bolster runoff protection.

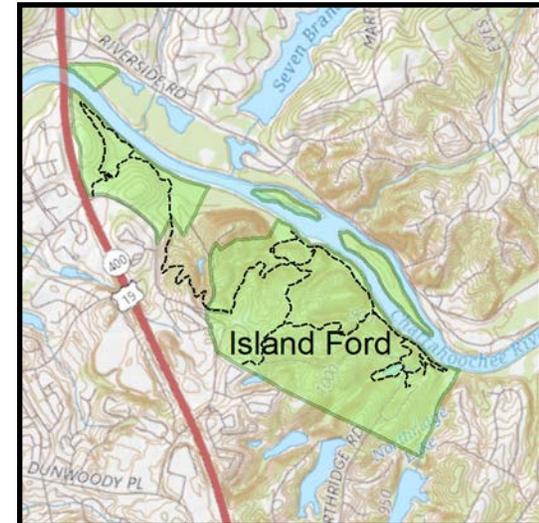
## Medium Priority (Years 2-5)

- Limited development is feasible given the topography on the Gwinnett side, parcel size and wetland nature of this parcel. Trail system development will require careful alignment coupled with tread hardening and elevated (i.e boardwalk) construction. However, a loop could be configured to provide a meaningful experience for local residents as well as thru-parcel connectivity.
- Partnership development development for the co-management of this property with opportunities for training by and for NPS and Johns Creek Environmental Campus.



# ISLAND FORD

<b>Land Unit Location</b>	East of HWY 19/400, river right
<b>County</b>	DeKalb
<b>Municipality</b>	Sandy Springs
<b>Acres</b>	319
<b>Trail Mileage</b>	5.2
<b>Trailheads/Access</b>	3- both accessed from Island Ford Pkwy.

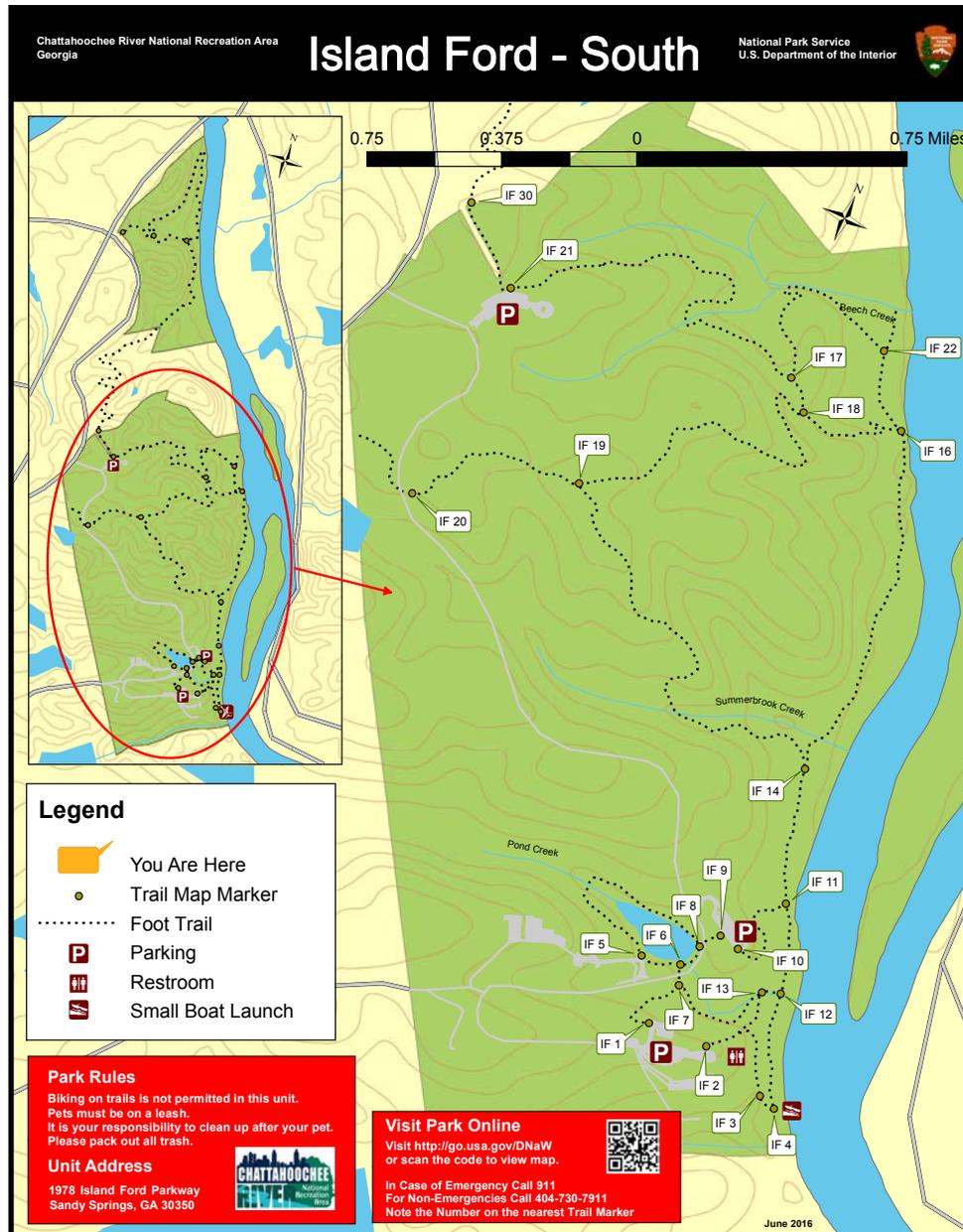


**Parking, kiosk and garbage/recycling receptacles at the Island Ford Unit**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Historic Resource Zone	Southern end of Unit, including Park Headquarters	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Trails</li> <li>• River Access Facilities (existing only)</li> <li>• Visitor and Admin Facilities (appropriate within cultural context)</li> <li>• Parking Areas (appropriate within cultural context)</li> <li>• Picnic Areas (appropriate within cultural context)</li> <li>• Restrooms (appropriate within cultural context)</li> <li>• Roads (appropriate within cultural context)</li> <li>• Bridges (appropriate within cultural context)</li> <li>• Kiosks (appropriate within cultural context)</li> </ul>
Rustic Zone	Northern end of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Canoeing, rafting, kayaking</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails Only</li> <li>• River Access Facilities (step-downs, boardwalks, docks, viewing platforms only)</li> <li>• Parking Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (supportive of non-motorized use)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



This large, 319-acre Unit houses the CRNRA headquarters, a small boat launch, interpretive trail, and network of natural surface trails. As the headquarters unit, this parcel has naturally seen much greater and formalized development of its brick and mortar and attendant facilities. Multiple parking areas provide access to a network of trails near the headquarters building and a single trailhead closer to the entrance road provides access to longer trail loops in the north end of the Unit.

The Island Ford Unit is tucked away in an urban/suburban setting that provides the feeling of a larger park, but with easy access to many regional residents.

**Interesting features present in the Island Ford South Unit include dog-accessible drinking fountain and cave-like overhangs near the river**



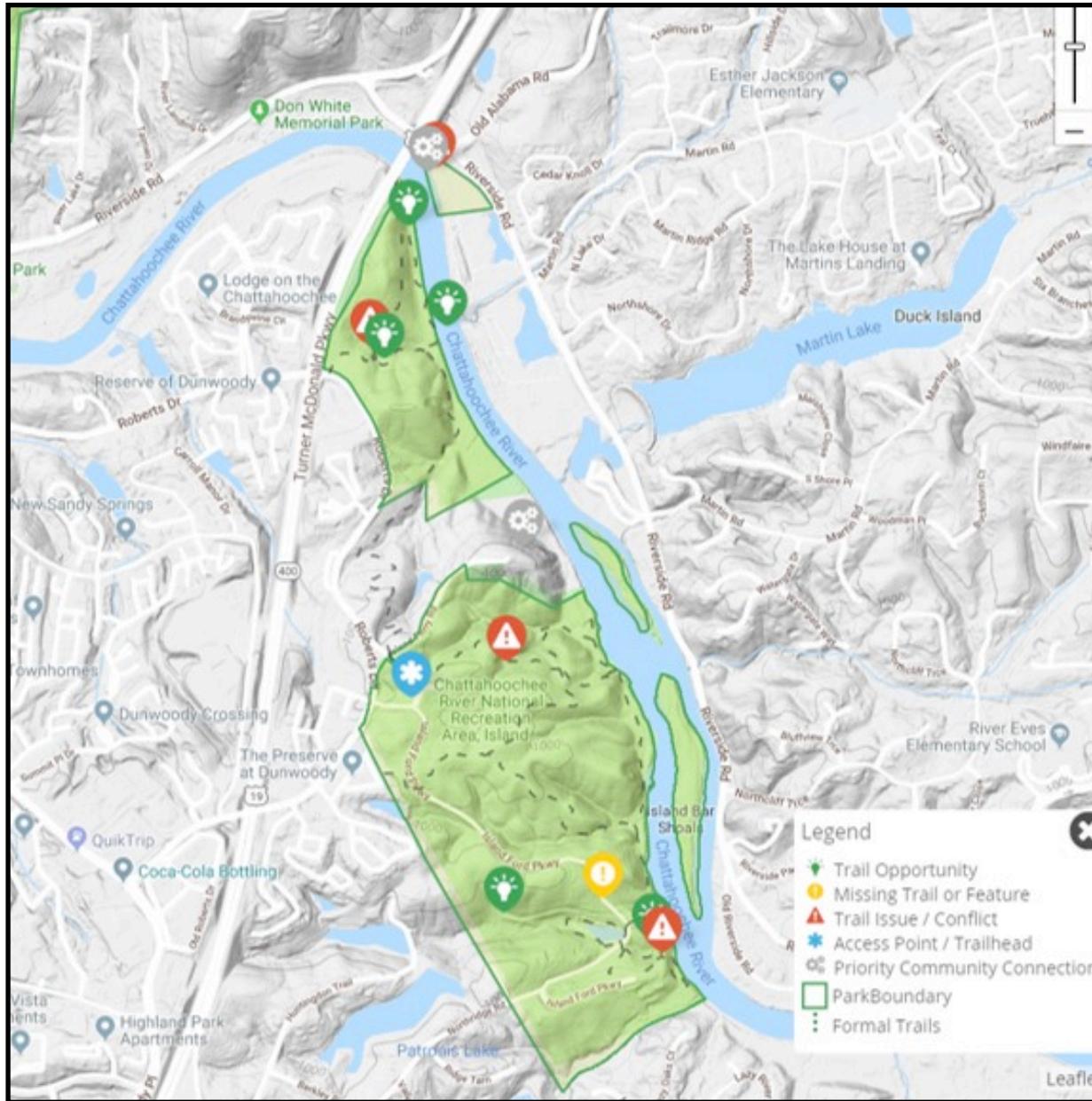
# PHYSICAL SUSTAINABILITY

- Narrow floodplain bench with an adjacent approximately 200' elevation rise to the upper portions of the Unit. Many trails follow old roads, suffer from severe tread incision, and are in need of relocation relatively soon.
- Mitigation of a few of these significant erosion problems have been attempted through trail relocations and closure. However, the quality of the design and construction in the relocation efforts is relatively low. For instance, relocation design is too short and steep, switchbacks are not properly separated, and tread construction is half-bench in nature and insufficient in width to handle visitor volumes. Trail closure consists only of massive woody debris placement in old trail/road incisions, accomplishing little in returning the area to a naturally functioning hydrology.
- Trails near the headquarters have been stepped, hardened, and culverted in an attempt to control water-based erosion, but runoff flows have rarely been diverted from the trail. This results in undue runoff stress to these expensive structures, and in a number of locations, a lack of maintenance or runoff control has resulted in magnified erosion issues.
- Notable trail design and construction sustainability improvement in trail connecting from the Island Ford North parcel to the Island Ford South/main headquarters parcel. This trail can become the model for future improvements to the existing trail system.



**Entrenched and eroding nature of many existing trails has led to some half-bench trail reconstruction**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Absence of or required maintenance for trail features like signs, bridges, stairs.

### Opportunities:

- Improve signage for and information about area access and opportunities.
- Connect trails to neighboring parks and paths.
- Opportunities for more trails.

## Visitor Use Estimation/Capacity Study

- Parking management along the entrance drive is ineffective.
- Neighboring residential access is not represented in visitor use estimates.

## SOCIAL SUSTAINABILITY

- High use land unit containing park headquarters receives significant attention to its trail system.
- Riverside trail is popular among fisherman with many river access social trails, most of which are actively eroding.
- Formalized neighborhood access trail, along with attractive rock formations, caves, and river frontage/island attract many visitors.
- Trail loops do not take advantage of acreage to provide meaningful loop experiences. Smaller loops relying solely on historic corridors are degrading the quality and length of potential recreation experiences on this Unit and creating unnecessary navigation challenges.
- Trail relocations seem to have been envisioned solely to exacerbate erosion issues without significant planning or attention in relation to user experiences and/or destinations. As a result, considerable short cutting of switchbacks is occurring.

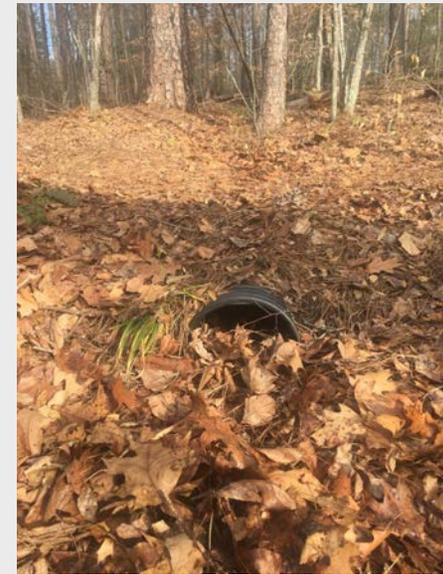


**Social use patterns of trail widening where ruts occur and shortcutting of switchbacks causing additional impact**

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- Trails are relatively formalized, where constructed, and the corridors are clear of encroaching vegetation.
- Structure development is abundant, relatively capital-intensive, and often without regard to modifying existing drainage patterns that caused the need (i.e. erosion and trail incision) for the attention in the first place. Many of these structures, including bridges, puncheons, culverts, and steps do not indicate signs of regular maintenance or annual inspection, and the results are decreasing the life cycle of these expensive facilities.
- Where trails are relatively contour-aligned, they regularly do not “roll” to naturally manage runoff, have been constructed without a positive cross slope to enhance sheet flow, and were not adequately compacted during construction which has caused “cupping”. All of these deviations from trail construction best practices have left purpose-constructed trails that have the “look” of a sustainable trail, but are missing enough crucial elements that the trails continue to erode. This has resulted in the perceive need to add more structures, such as wooden water bars, which are not functioning and/or being avoided by pedestrian users



**Trail structures are prevalent and require attention relative to sediment deposition, erosion, annual inspection**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Probably the best maintained trail system outside of the fitness trail at the park.
- Heavy trail usage and fishermen access throughout the year.
- Infrastructure issues and erosion issues outside of the trail that parallels the riverbank behind the visitor center.



**Maintenance/reconstruction activities have not always solved the social use patterns, mitigated erosion, or provided a durable trail product**

# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

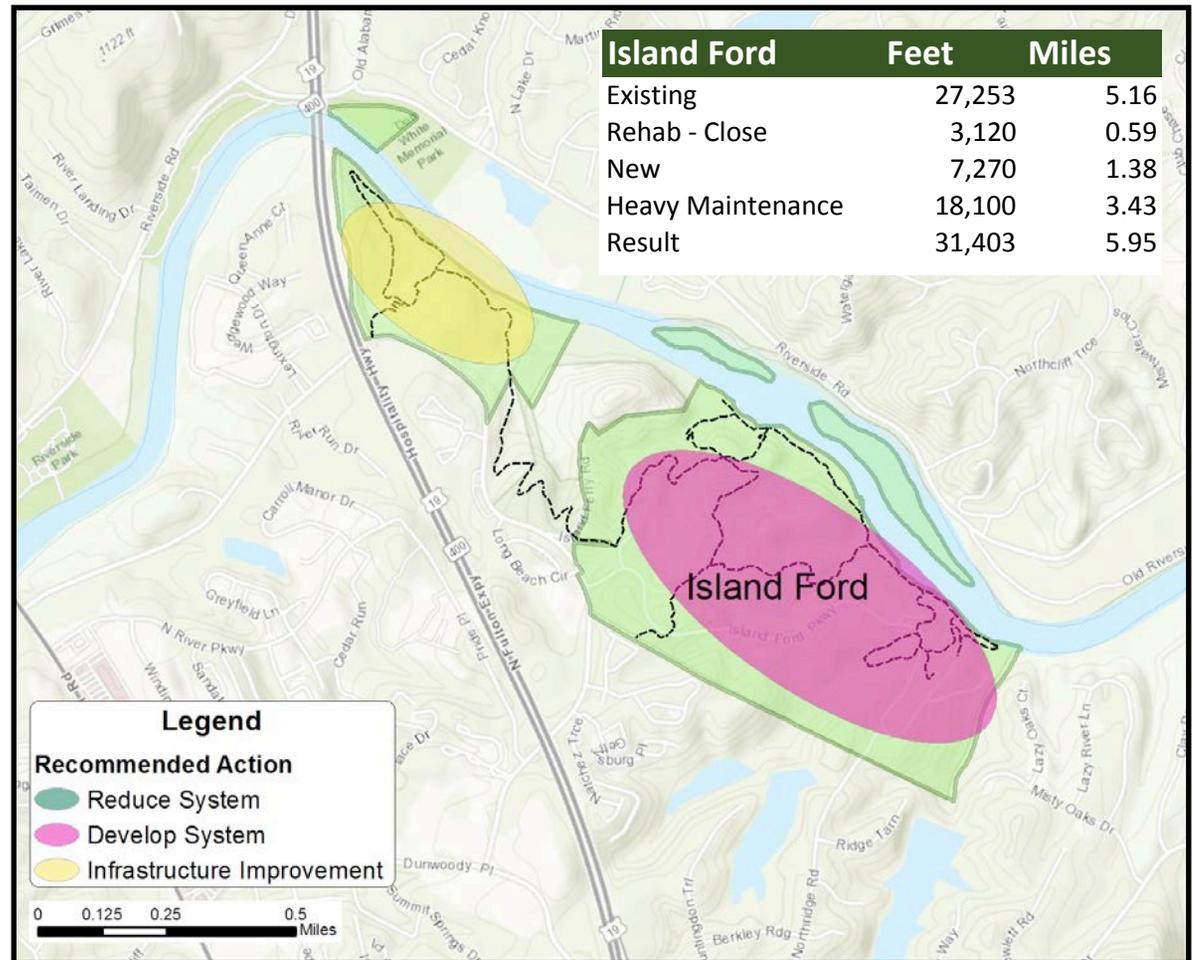
- Improve the quality of the recent trail relocation work with enhanced full bench construction and retrofit construction of rolling contour.
- Clean out culverts and make attempts at paved surfaces to divert runoff from step structures.

## Medium Priority (Years 2-5)

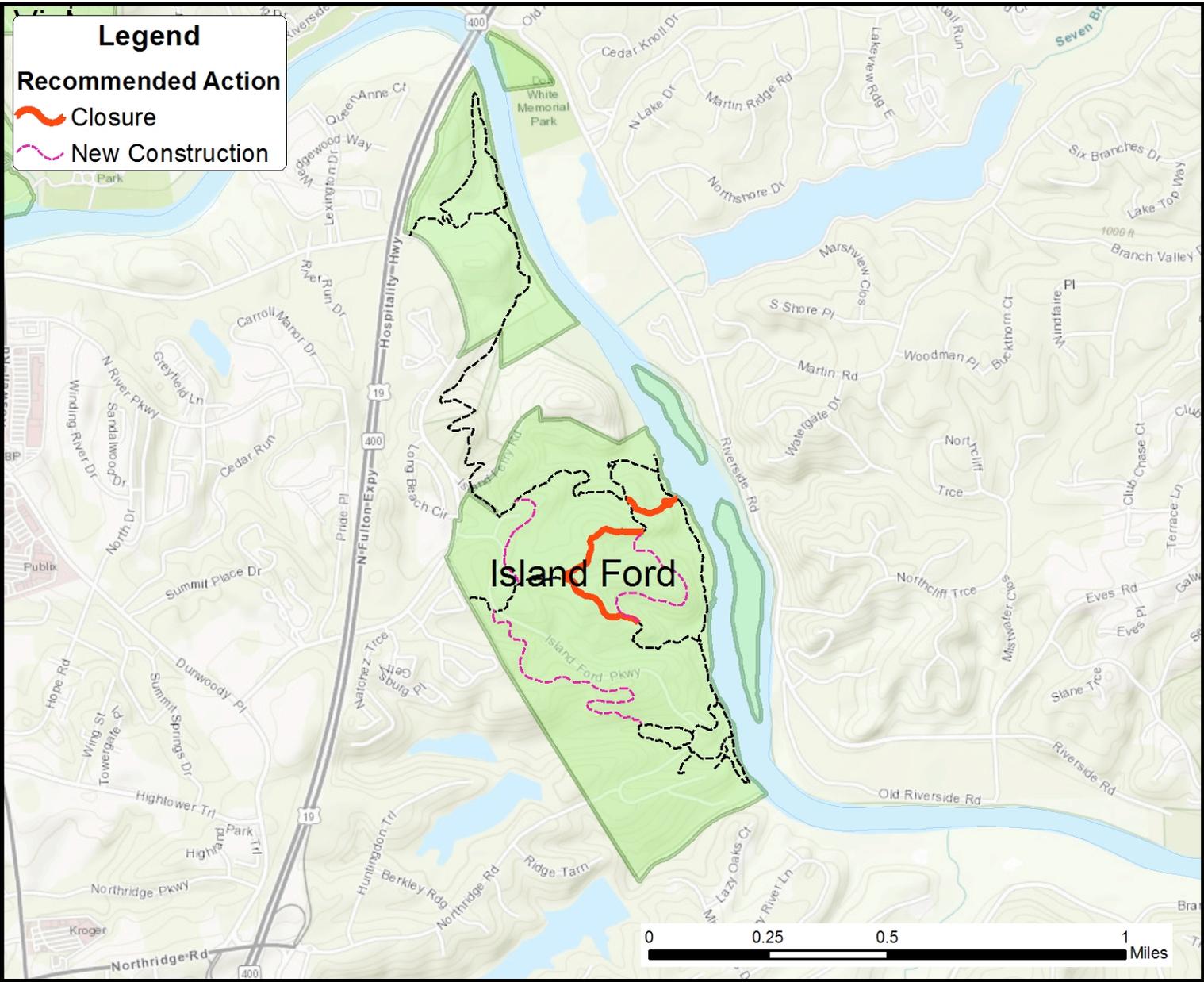
- Continue relocation and restoration efforts throughout the trail system to provide longer, more sustainable hiking opportunities.
- Develop formal access point on separated parcel that provides parking.

## Lower Priority (Years 5-10)

- None

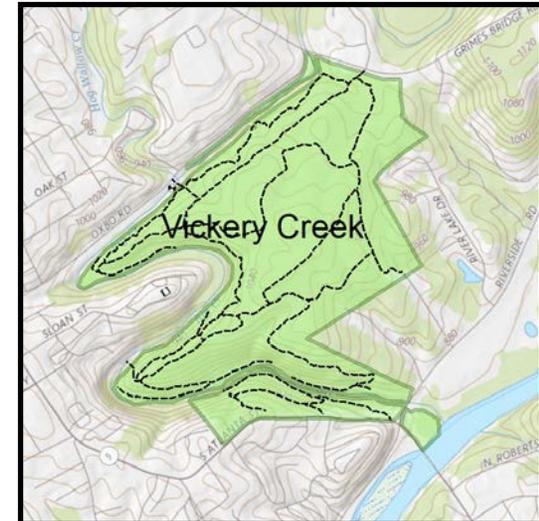


# POTENTIAL TRAIL SYSTEM



# VICKERY CREEK

<b>Land Unit Location</b>	East of S. Atlanta St., river right
<b>County</b>	Fulton
<b>Municipality</b>	Roswell
<b>Acres</b>	269
<b>Trail Mileage</b>	~8
<b>Trailheads/Access</b>	3- Memorial Park, Riverside Rd., Oxbo Rd.

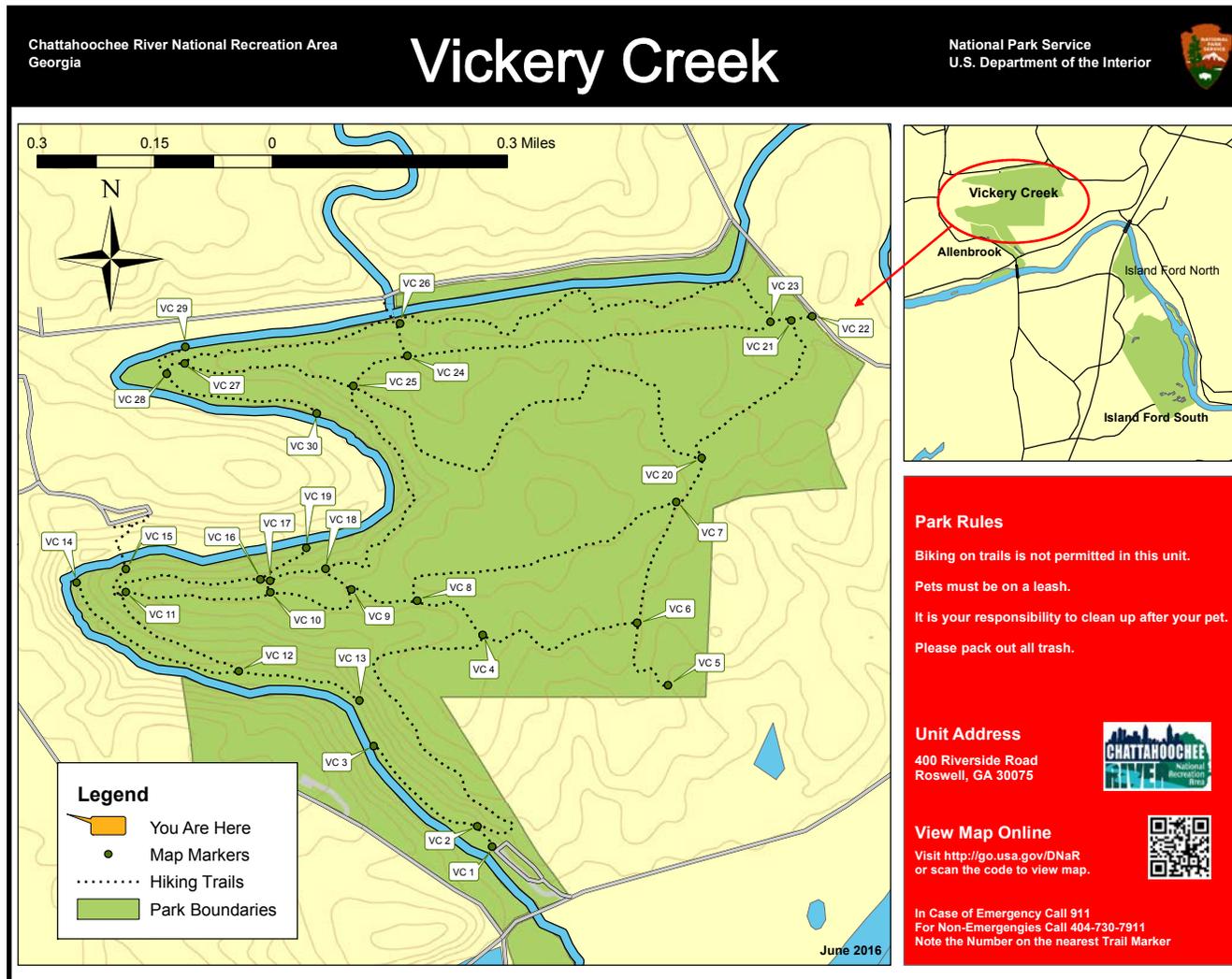


**Access points into the Vickery Creek Unit**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Historic Resource Zone	Southern end of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Trails</li> <li>• River Access Facilities (existing only)</li> <li>• Visitor and Admin Facilities (appropriate within cultural context)</li> <li>• Parking Areas (appropriate within cultural context)</li> <li>• Picnic Areas (appropriate within cultural context)</li> <li>• Restrooms (appropriate within cultural context)</li> <li>• Roads (appropriate within cultural context)</li> <li>• Bridges (appropriate within cultural context)</li> <li>• Kiosks (appropriate within cultural context)</li> </ul>
Rustic Zone	Northern end of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Canoeing, rafting, kayaking</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails Only</li> <li>• River Access Facilities (step-downs, boardwalks, docks, viewing platforms only)</li> <li>• Parking Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (supportive of non-motorized use)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



**Historic nature of the Vickery Creek/Roswell area**



Vickery Creek is a 270-acre Unit nestled between the community of Roswell and the Chattahoochee River, just north of GA-9. This unit sees very high use from neighboring communities across a nearly 8-mile trail system. The system provides access to several interesting cultural and natural features along the Creek/tributary, and provides access to a rock climbing crag on the southern portion of the unit.

# PHYSICAL SUSTAINABILITY

- Unit straddles Vickery Creek, containing rolling terrain across its central area and steep slopes along the creek with approximately 300' elevation change. This topographic diversity, along with the cultural history and urban setting, creates the potential for high and diverse use and a high quality quality trail system.
- Many trails have been adopted from historic road beds or by user created routes being adopted and formalized.
- Significant trail erosion pervasive, as many of the trails suffer from poor alignment (excessive grades, fall-aligned) and lack of substantial design and construction. These trails are failing to protect cultural and natural resources and provide user experiences that are poorly matched to the user base. The continuing erosion is resulting in trails that are becoming inaccessible to large numbers of visitors, as well as the development of dozens of social routes and/or trail widening to avoid the degrading conditions.
- The current condition of the trail system cannot be managed in-place. As a result, the redevelopment of this unit's recreational base will require a full-scale environmental restoration and active user management for years in order to create a sustainable, manageable trail system.



**Extreme erosion and trail widening at many steep trails near or accessing Vickery Creek**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Trail maintenance and signage is needed.
- Connectivity to other parks and routes is needed

### Opportunities:

- Opportunities for regional connectivity, including to the Riverwalk and Roswell Park.
- Opportunities to safely cross or bypass transportation infrastructure barriers.

## Visitor Use Estimation/Capacity Study

- No known capacity issues.
- Neighboring residential access is not represented in visitor use estimates.

## SOCIAL SUSTAINABILITY

- A very highly visited Unit due to location adjacent to historic downtown Roswell and residential areas.
- Historic mill ruins, covered bridge and dam provide cultural interest and scenic photography opportunities. Hikers, dog walkers, trail runners, and climbers utilize the extensive spider-web trail network with many short segments and opportunities for several long loops, rock outcrops, and a large ledge near Allenbrook.
- Visitors accessing the Unit from a city parking area (across the creek on the north side) are utilizing a large pipe as a bridge with the potential of a 5-foot or greater fall into the creek.
- Social trails are abundant, leading to every rock outcrop, down steep slopes to the creek, and as newly trampled routes around badly eroding trails. The trail degradation and social routes harm overall navigability and utility of the system suffers as a result.



**Use patterns, combined with unsustainable nature of trails are creating additional impacts**

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- Most trails adopted historic roads, skid trails, and socially developed routes with little thought to a system that provides high quality experiences or sustainably access destinations and park access locations.
- Little tread maintenance evident, with few drainage features, extensive unmitigated soil loss, and trail widening. Trail corridors are well maintained throughout the Unit.
- Where structures have been developed to mitigate degraded trail conditions, runoff flowing from the trail has not been managed, undermining the structures.
- A few lackluster attempts at trail closure are routinely ignored, as corridor restoration/closure activities were not undertaken.
- The dam is leaking through its earthen embankment, which could become a significant hazard.



**Maintenance structures have been ineffectual over the long term, as water management improvements have not been completed- sediment deposition/muddiness occurs or stormwater undermines structures**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- The area receives high usage throughout the year.
- The dam which offers water recreation to visitors during the summer months that is half in the park and half City of Roswell.
- Trail signage is confusing and there are multiple access points outside the park to neighborhoods.
- Plans are underway to relocate the steep, eroding route on the NPS side of the covered bridge, and there is a realization among staff that the trail problems in Vickery are rampant and serious.



With ineffectual past trail/social management actions, new structures/plans indicate a “heavier handed” approach

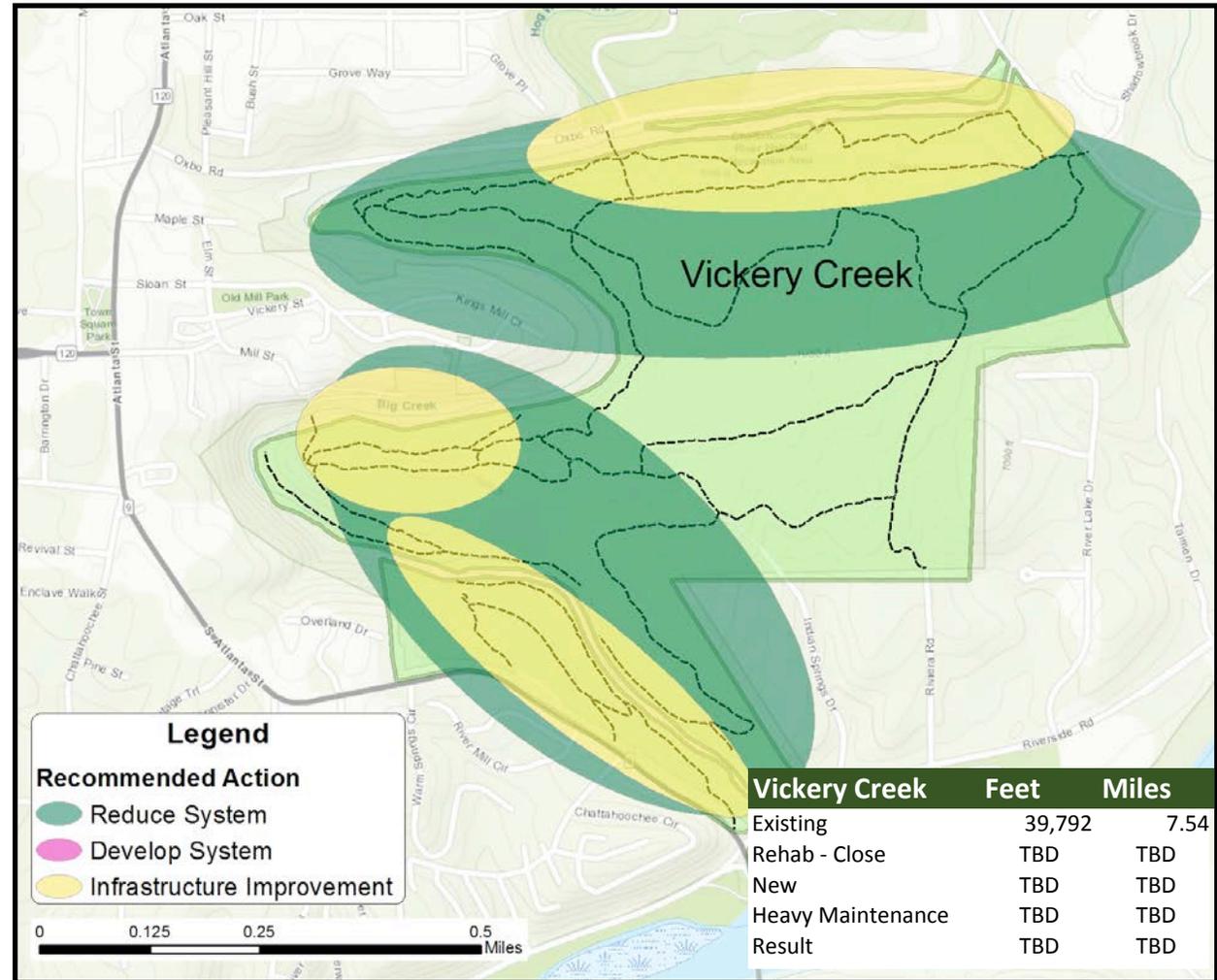
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

- Conduct a detailed trail redevelopment study that identifies the best trails based upon sustainability, setting, and loop opportunities and creates a prioritized trail closure and environmental restoration program. Trail system should be redeveloped to provide meaningful experiences, loops and river access while minimizing risk to users, cultural and natural resources on this landscape. Balancing strong desires for access and extremely high use levels on this land base for a diverse set of users will provide challenge, and necessitate compromise to achieve.

## Medium Priority (Years 2-5)

- Undertake the trail redevelopment implementation process and improve the sustainability of remaining trails through drainage features and tread hardening.
- Bolster partnership with the City of Roswell to improve access and manage the redeveloped trail system in the Unit.



Chattahoochee River National Recreation Area  
Georgia

## Vickery Creek

National Park Service  
U.S. Department of the Interior

**TO BE DEVELOPED  
THROUGH A DETAILED  
FIELD INVESTIGATION AND  
ADDITIONAL OUTREACH  
AND COLLABORATION  
WITH PROJECT PARTNERS**

**Legend**  
- You Are Here  
- Map Markers  
- Hiking Trails  
- Park Boundaries

0.3 0.15 0 0.3 Miles

N

VC 29 VC 28 VC 23 VC 22 VC 21 VC 20 VC 19 VC 18 VC 17 VC 16 VC 15 VC 14 VC 13 VC 12 VC 11 VC 10 VC 9 VC 8 VC 7 VC 6 VC 5 VC 4 VC 3 VC 2 VC 1

Allenbrook Island Ford North Island Ford South

**Park Rules**  
Biking on trails is not permitted in this unit.  
Pets must be on a leash.  
It is your responsibility to clean up after your pet.  
Please pack out all trash.

**Unit Address**  
400 Riverside Road  
Roswell, GA 30075

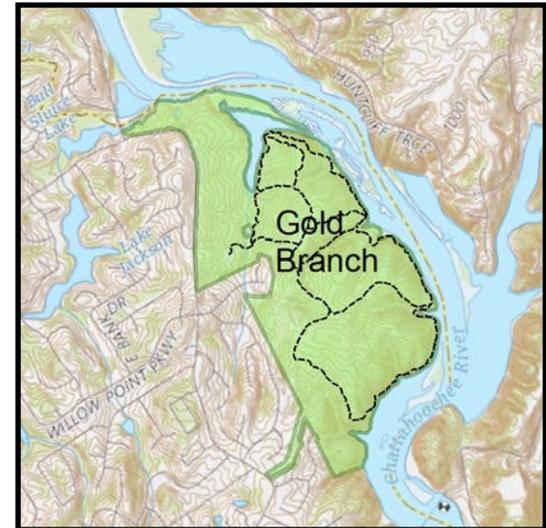
**View Map Online**  
Visit <http://go.usa.gov/DNaR>  
or scan the code to view map.

In Case of Emergency Call 911  
For Non-Emergencies Call 404-730-7911  
Note the Number on the nearest Trail Marker

June 2016

# GOLD BRANCH

<b>Land Unit Location</b>	Lower Roswell Road, River right
<b>County</b>	Cobb
<b>Municipality</b>	East Cobb, Sandy Springs
<b>Acres</b>	363
<b>Trail Mileage</b>	~5.0
<b>Trailheads/Access</b>	1, off Lower Roswell Road

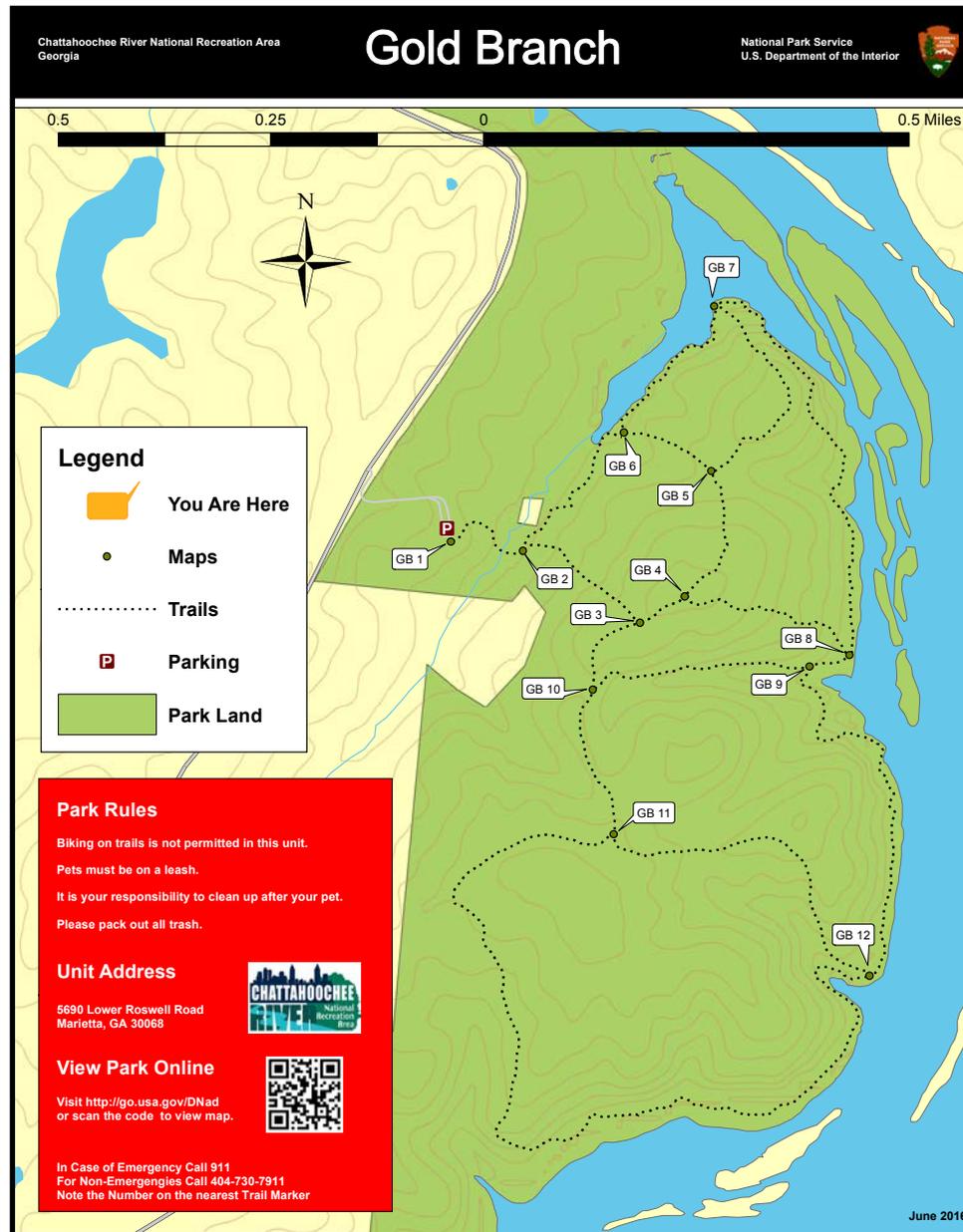


**Welcome and regulatory and garbage/recycling receptacles at the trail entrance point of Gold Branch Unit**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Zone	Entire Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking, no facilities</li> <li>• Fishing</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.; existing only)</li> <li>• Visitor and Admin Facilities (existing only)</li> <li>• Parking Areas (existing only)</li> <li>• Picnic Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (foot bridges only)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



Gold Branch is a 363-acre Unit located on a wide portion of the Chattahoochee with multiple islands. Outside of the paved trailhead and the trail system, the park has few developed facilities. The size of the park and lack of adjacent residential neighborhoods provides a backcountry-style setting.

# PHYSICAL SUSTAINABILITY

- Nice rolling terrain with 250' of elevation change that is conducive to high quality hiking/running trails.
- Many trails use old road corridors in the upland locations. These routes are generally fall-aligned, incised up to 12 inches below the surrounding terrain, carrying runoff, and actively eroding. At this stage there is no reasonable way to manage water off these routes.
- Stream- and river-adjacent trails are narrower with minimal construction. This has resulted in tread “creep” down the hillside, significant root exposure, and unstable trail conditions.
- Very steep, fall-aligned trails exist throughout the Unit, which have widened up to 8' on some segments as visitors move to the edges of the trampled tread to find stability. As with all fall-aligned trails, there is no feasible option to move runoff away from the trail to encourage a narrower, more stable travel pattern. Water bars work against the natural behaviors of flowing water and trail users would very likely avoid them and reestablish a wide tread.



**Tread migration, entrenchment, root exposure are typical signs of insufficiently developed, walked-in trails**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Trail maintenance is needed, including removal of rebar for safety.
- Mountain bike use in prohibited areas sometimes resulting in conflict.
- Safety issues associated with crossing of Willeo Road.

### Opportunities:

- Improve trail maintenance, redevelop existing poorly aligned trails, and improve signage.
- Compliment trails and relatively concentrated use with resource protection.

## Visitor Use Estimation/Capacity Study

- Conflict between pedestrians and cyclists has occurred.
- Parking fills to capacity on peak use days.
- Neighboring residential access is not represented in visitor use estimates.

## SOCIAL SUSTAINABILITY

- The Unit is highly utilized by dog walkers, some of which do not manage the dog waste by carrying it out or utilizing bags. There is also considerable vegetation trampling and erosion at the northeastern shoreline that seems primarily caused by swimming/fetching dog activity. This scenic area has a strong draw for visitors.
- The trail system is also heavily utilized by runners and dedicated hikers, with longer loops and the backcountry feeling of the park providing a high quality experience. The quality of this experience also draws unintended uses, such as mountain biking and organized group runs. These uses have reportedly resulted in some conflicts with other visitors.
- The lack of formality in the construction of the trail system seems to create a low sense of compliance with on-trail use and regulatory compliance.
- While there are not a large number of trails, navigation is still challenging due to the high number of intersections and the lack of cohesively designed trail experiences.



# MANAGERIAL SUSTAINABILITY

## Assessment Team

- Several rebar pins are exposed where logs or steps have rotted away. Quality puncheon is constructed over the lowland area near the trailhead. The formality of this structure should set the standard for the remainder of the trails throughout the Unit.
- Most of the corridor is open and signs of recent work to clear blowdowns is present.
- There is a distinct lack of attention to tread work and management of water on the entire system. Where rutting has occurred or unconstructed trails have widened, these issues have been treated with the piling of large amounts of woody debris. This action does not ameliorate the problem, will create additional muddiness and damming over time, and has the potential of creating significant snake habitat directly adjacent to the active trail tread.
- Some sections of trail along the river indicate quality rock armor work to improve the utility/ease of access on the trail. It could use much more and some corridor widening.



**Structures of different age/quality are present, but lack of water management may reduce the life cycle of newer structures**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Another unit with a spaghetti bowl of trails, which leads to a lot of confusion among visitors.
- Trail mileage should be reduced to at least half of the existing trails and maintained as a primary trail system that accesses a nice wooded area and the Bull Sluice lake where visitors swim, fish and hike.



**Some attempts at trail maintenance have been well-intentioned but not completely functional**

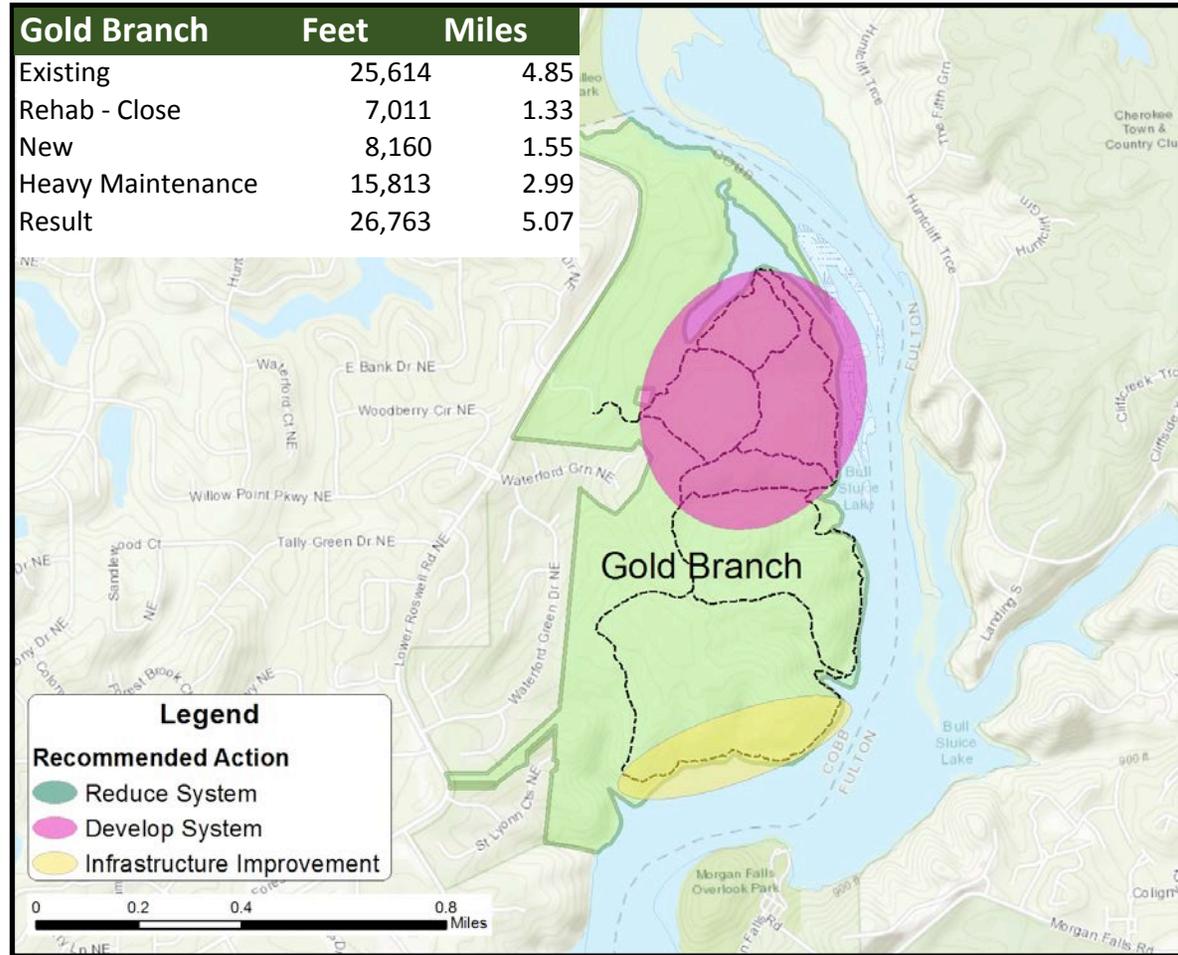
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

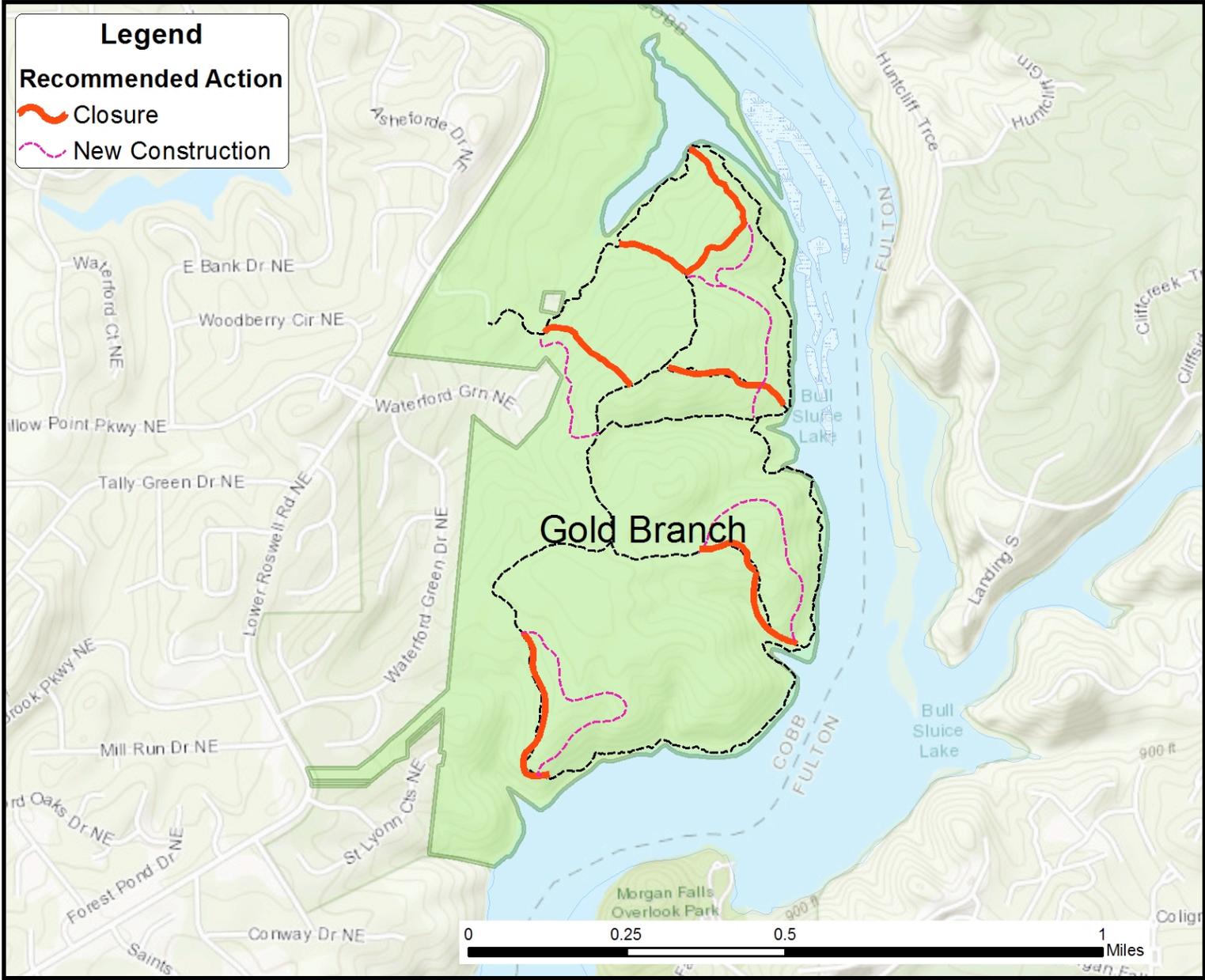
- Remove rebar hazards.
- Remove debris placement along trail 3 and 10 is not well done. It poses a threat of becoming attractive snake habitat. A reasonable fix to the widening of this trail (tread creep) is formal redevelopment of the tread to a smooth 36-40" wide tread within the existing trail bed.

## Medium Priority (Years 2-5)

- Formalize the remainder of the streamside trails through full bench, rolling contour construction and the installation of grade dips along streamside trails to better manage water.
- Install viewing/gathering structure and harden water access routes at trampled streamside site on the north end of the trail system.
- Undertake redevelopment (relocation and full closure) of the trail system to reduce junctions, lengthen loops, and enhance the positive nature of the backcountry-style experience

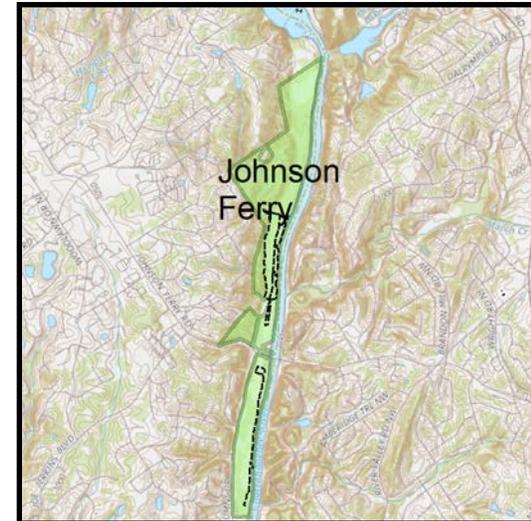


# POTENTIAL TRAIL SYSTEM



# JOHNSON FERRY

<b>Land Unit Location</b>	Johnson Ferry Road, river right
<b>County</b>	Cobb
<b>Municipality</b>	Marietta
<b>Acres</b>	310
<b>Trail Mileage</b>	~ 10
<b>Trailheads/Access</b>	2- Columns Dr., south and north

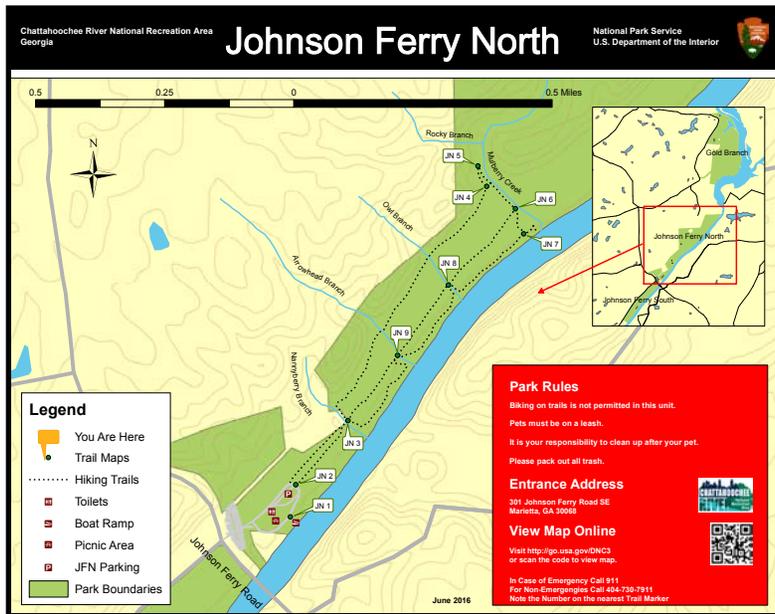


**Welcome entrance sign and parking at Johnson Ferry North**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	Majority of Unit, excluding the northern end	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>
Historic Resource Zone	Northern end of Unit, to the north and east of Natural Area Recreation Zone	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Trails</li> <li>• River Access Facilities (existing only)</li> <li>• Visitor and Admin Facilities (appropriate within cultural context)</li> <li>• Parking Areas (appropriate within cultural context)</li> <li>• Picnic Areas (appropriate within cultural context)</li> <li>• Restrooms (appropriate within cultural context)</li> <li>• Roads (appropriate within cultural context)</li> <li>• Bridges (appropriate within cultural context)</li> <li>• Kiosks (appropriate within cultural context)</li> </ul>
Rustic Zone	Southern end Of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Canoeing, rafting, kayaking</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails Only</li> <li>• River Access Facilities (step-downs, boardwalks, docks, viewing platforms only)</li> <li>• Parking Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (supportive of non-motorized use)</li> <li>• Kiosks</li> </ul>
Developed Zone	North of Rustic Zone, in the “hook” of land	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>

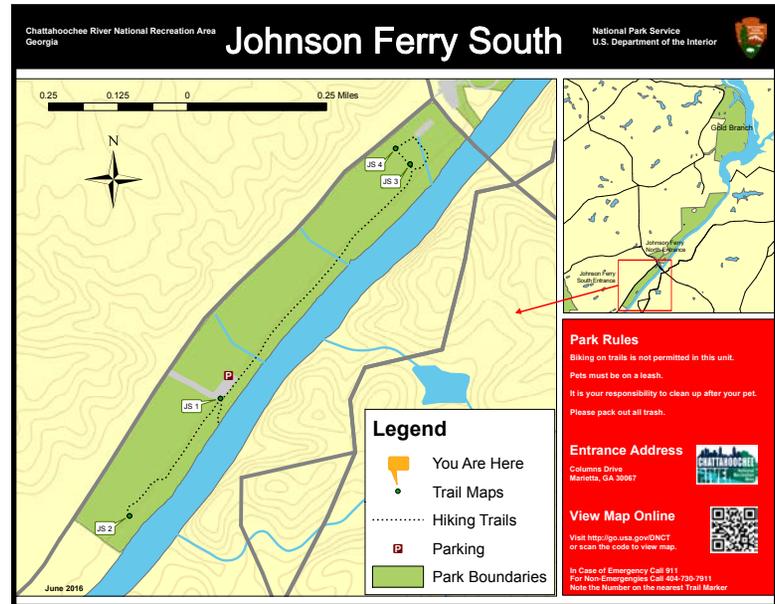
# GENERAL DESCRIPTION



This 310-acre, long linear park hosts a Nantahala Outdoor Center boat livery, river access, sanitary facilities, and a medium sized paved parking area on the North Unit and a river access, large gravel lot and covered picnic area on the South Unit. Both Units have large grass fields near the visitor interface facilities.

The northernmost portion of the North Unit is adjacent to a county park that includes a neighborhood-based trailhead that with capacity for a few vehicles.

The trails are very informal, mostly utilizing open industrial corridors and historic road beds.

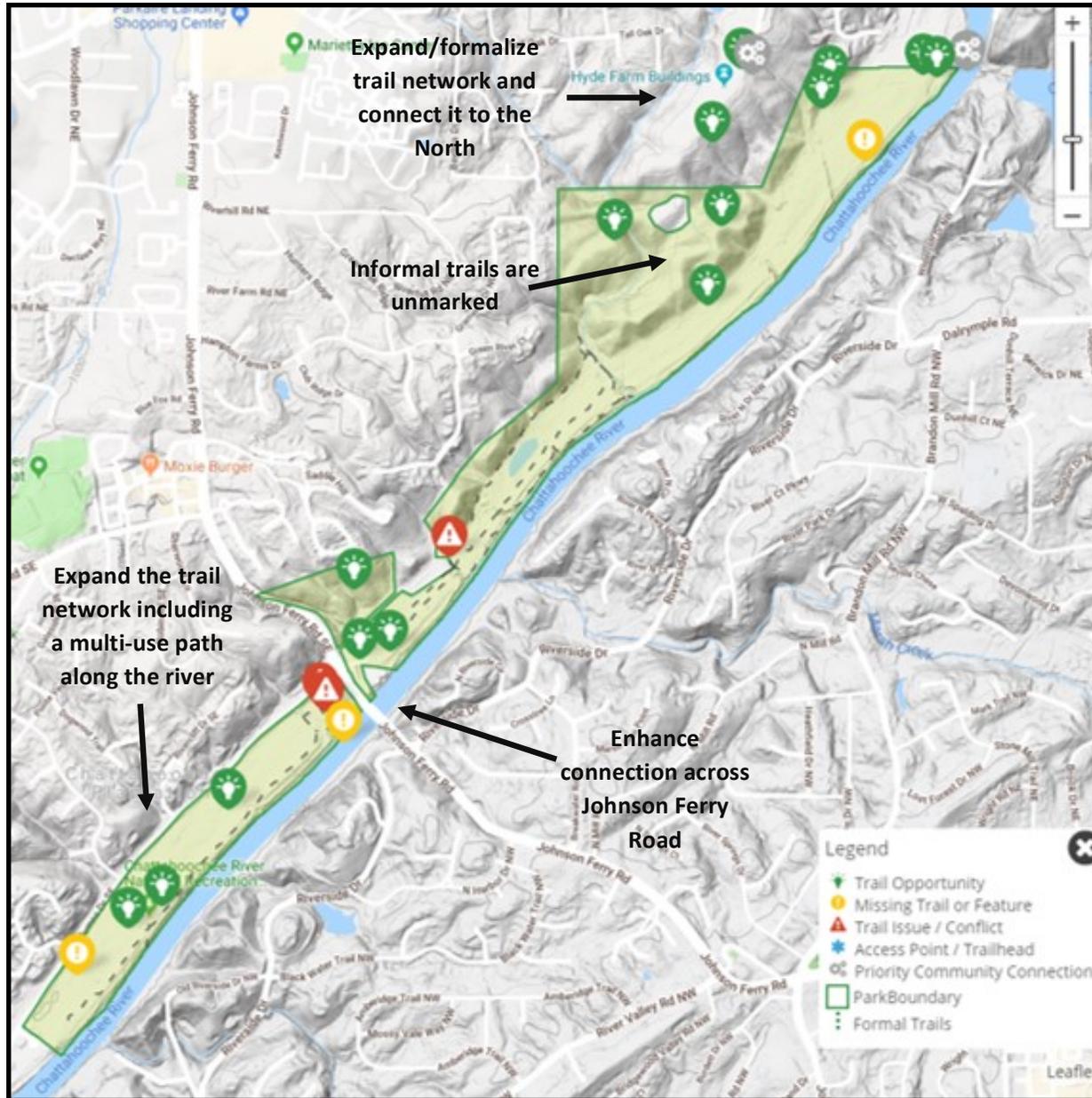


# PHYSICAL SUSTAINABILITY

- Trails in the South Section are on NPS property that consists almost exclusively of floodplain bench, crosses wetlands that are often submerged, and is overgrown in many locations.
- Portions of the inland trail in the North Unit utilize the toe of the slope. When combined with open industrial corridors that accommodate vehicular/maintenance access or an historic road, loop hikes can be created. Portions of the gas line corridor have gravel placement and corridors to accommodate vehicular and maintenance access.
- Trail crossings of the side channel in the middle of the North Unit are natural wet fords which are deep during high water. This has led to the social development of multiple crossings utilizing large sewer pipes.
- A number of smaller side channels have experienced significant erosion and have undergone some measure of stabilization restoration.



# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Connectivity across Johnson Ferry Road and other transportation-related barriers is an issue.
- Critical comments expressed about flooded and inaccessible trails, as well as vehicle traffic-related safety and conflict concerns.

### Opportunities:

- Many opportunities for connectivity within the unit and to neighboring parks and facilities.
- Encouragement to expand the trail network into undeveloped areas, although some encourage preservation of undeveloped land.
- Formalize and provide signage for existing undesigned trails.
- Expand the variety of day-use facilities and parking.

## Visitor Use Estimation/Capacity Study

- No known capacity issues.
- Neighboring residential access is not represented in visitor use estimates.

## SOCIAL SUSTAINABILITY

- The quality of the trail experiences in both North and South Units is very low. Utility corridor routes provide a non-natural experience and are often very wet. The lack of developed crossings that have led to the use of sewer pipes as bridges is an unnecessary hazard. There are also multiple socially created crossings of this side channel, causing additional bank sloughing and erosion.
- The informal trail on the South Unit dead ends in a residential neighborhood.
- The narrow inland and river trails provide a more valuable user experience, but are still minimally developed, have numerous social trail spurs, and their “cupped” nature leads to muddy conditions that will exacerbate over time.
- Map information is limited to some trail junctions and there is no signage at trailhead to delineate potential trail experiences.
- For such a limited trail system, navigation is somewhat difficult due to the social trail networks, parallel routes, and lack of managed stream crossings.



# MANAGERIAL SUSTAINABILITY

## Assessment Team

- Corridor is maintained on the North Unit, but this may be a function of sewer maintenance activities rather than trail management. Outside of the industrial corridor, the South Unit trail corridor is overgrown and the tread is often submerged.
- Little to no water management structures exist within the tread.
- One improved crossing of a side channel, created as a Boy Scout project.



**Linear, industrial nature of trails inhibits water management, except for very small projects**

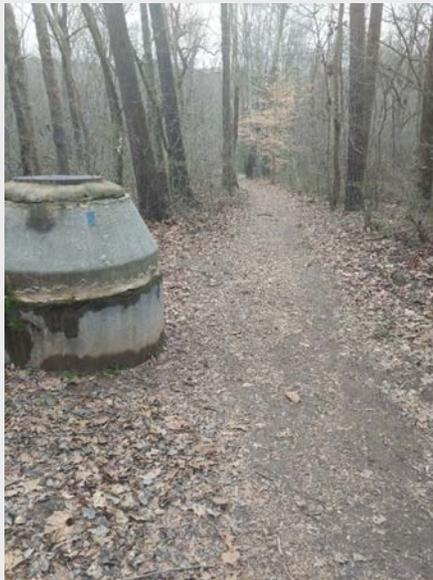
## NPS Operations & Management

### North Unit

- Primarily used as a river access point but does contain some trail users. Some park here and access the fitness trail via columns drive outside the park. Others can park in the unpaved parking area and access a small trail that parallels the river. There is a sign there designated the trail as a wildlife viewing area but doesn't really specify what sorts of wildlife are present or what a visitor will be seeing. This also connects to the Hyde Farm and potential exists for a bigger trail to link the two areas.

### South Unit

- Seldom used unit that only offers a small field and picnic pavilion. Other trail access to the north has been flooded due to water management issues. Potential for a primitive trail along the river.



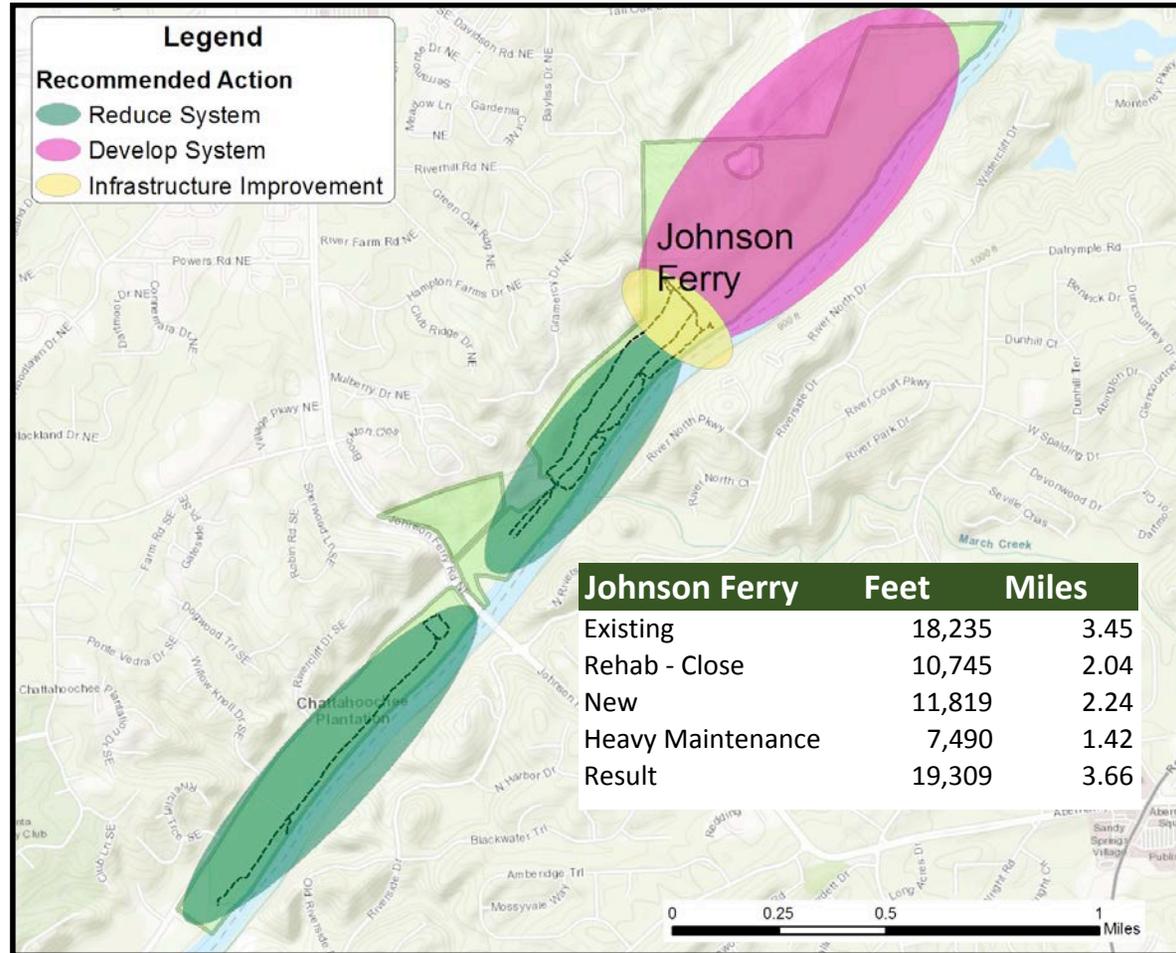
Trail use conditions suffer from lack of management and choice of “trail” corridors

# RECOMMENDATIONS & PRIORITIZATION

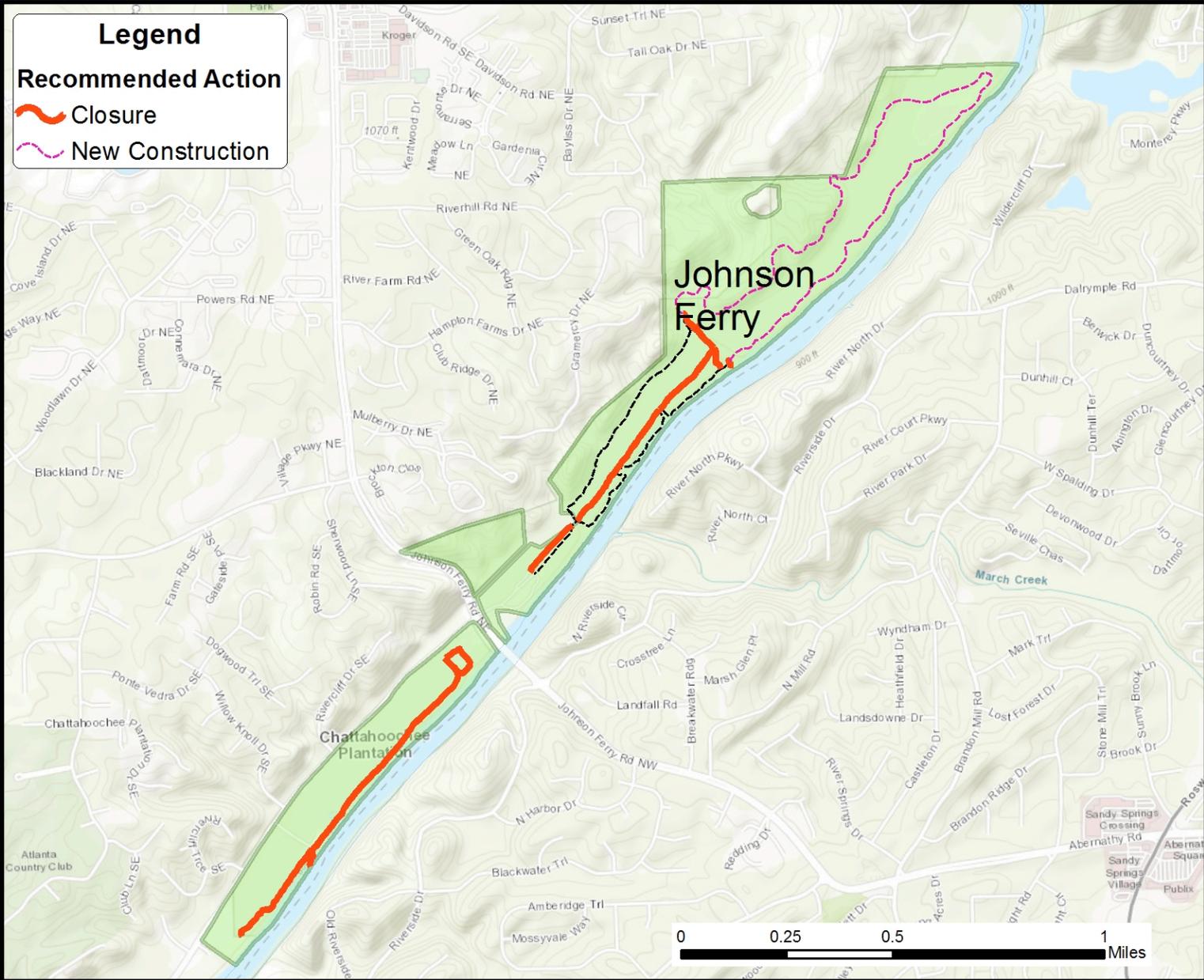
Drop the utility corridor from maps. Clean up social trails/trail spaghetti at north end of south section to better connect users to trail 25 and 17 across the creek.

Monitor trees around the wooden bridge/puncheon structures to prevent damage from dead fall.

Remove trail segments 4/5 from map and connect main trail to Johnson Ferry North parking lot and trails system, possibly via sidewalk under bridge.

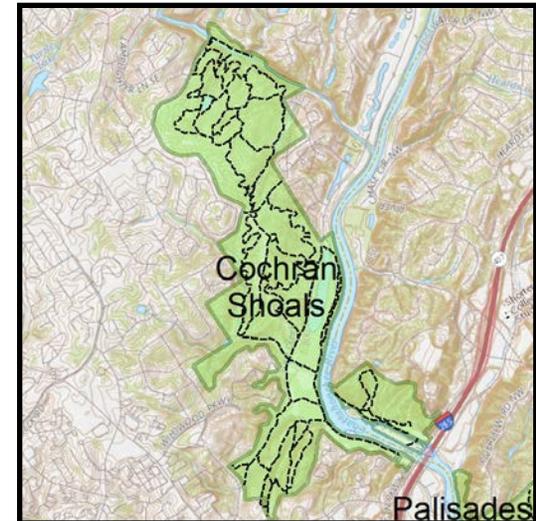


# POTENTIAL TRAIL SYSTEM



# SOPE CREEK/COCHRAN SHOALS

<b>Land Unit Location</b>	South of Johnson Ferry Rd., river right
<b>County</b>	Cobb
<b>Municipality</b>	Sandy Springs
<b>Acres</b>	873
<b>Trail Mileage</b>	~ 18
<b>Trailheads/Access</b>	2- Paper Mill Dr. SE, Columns Dr.

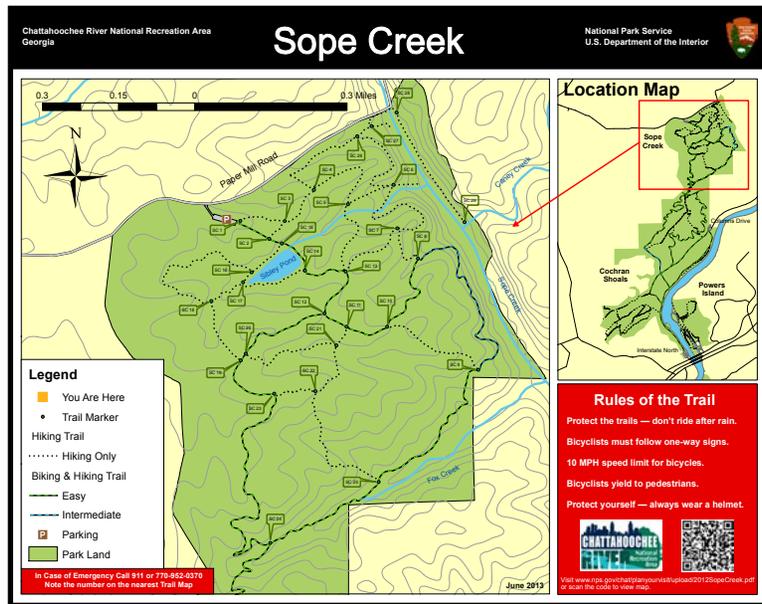


Full trailhead condition typical of Sope Creek

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	Majority of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>
Historic Resource Zone	Northern tip of Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Trails</li> <li>• River Access Facilities (existing only)</li> <li>• Visitor and Admin Facilities (appropriate within cultural context)</li> <li>• Parking Areas (appropriate within cultural context)</li> <li>• Picnic Areas (appropriate within cultural context)</li> <li>• Restrooms (appropriate within cultural context)</li> <li>• Roads (appropriate within cultural context)</li> <li>• Bridges (appropriate within cultural context)</li> <li>• Kiosks (appropriate within cultural context)</li> </ul>

# GENERAL DESCRIPTION



The Sope Creek/Cochran Shoals Unit is a 974-acre (including the connected, adjacent East and West Palisades, Powers Island, and Paces Mill acreage) parcel that is the most highly visited unit within CRNRA. While adjacent to many residential neighborhoods, the rolling terrain above the Chattahoochee floodplain and size of this Unit provides the feeling of being in a larger park.

An urban park setting with numerous highly developed facilities and historic/cultural significance, this is also the only Unit in the CRNRA that currently allows mountain bike use on some of the trails.



Historic interpretive panels providing information near the Sope Creek Trailhead



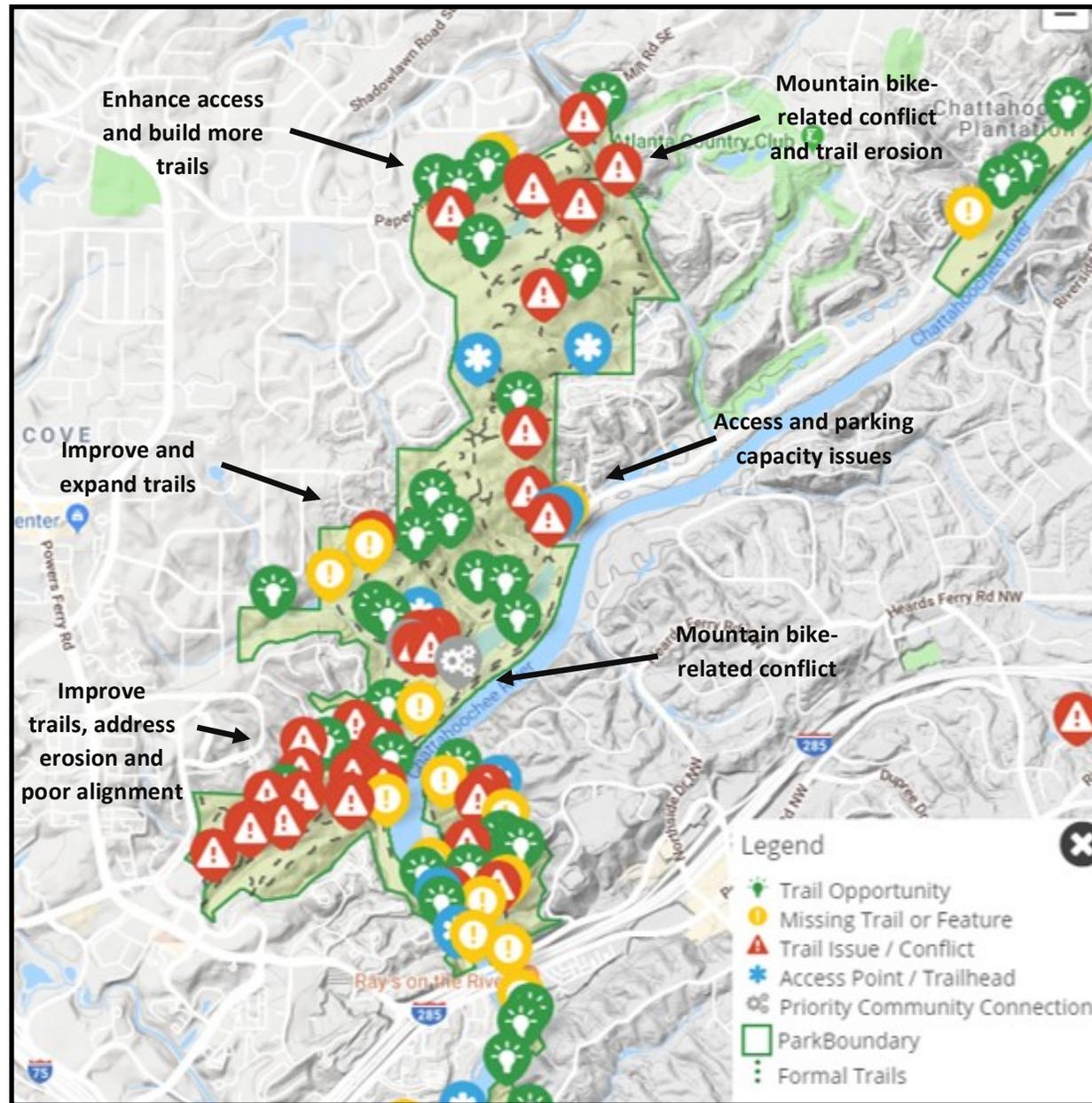
# PHYSICAL SUSTAINABILITY

- The heavily developed, surfaced, wide trail originating from the Columns Drive trailhead is punctuated by large bridges and handles very high visitor loads. An additional natural surface trail on the southwest portion of the unit suffers from poor alignments and minimal construction, coupled with often moist soils and proximity to wetlands.
- The upland hiking trails are largely adopted from historic open corridors through the rolling terrain. With challenging clay-based soils, predominantly fall-line alignments, and heavy usage without effective maintenance, poor conditions abound. Significant erosion is present on trails located on sloping topography and muddiness and widening tread where trails are located on flat terrain.
- Similar conditions exist on the trails open to mountain bikes, except that more of the trail mileage is contour-oriented and therefore does not suffer the same extent of erosion or muddiness. However, poor sight-lines and high speed differentials between pedestrians and mountain bikers contributes to discord among user communities.
- Some trail relocations have been completed to mitigate these issues, with the most success apparent on the mountain bike-accessible trails.



**Poor trail alignment- fall-aligned or flat-aligned- have caused significant issues across this high use system**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Conflict directed toward dog walkers and mountain bikers, particularly in reference to illegal, unsafe, and environmental damaging activities.
- Overuse, in terms of both numbers of recreational users and area developed for recreational use.
- Trails are eroded, unsafe, unsigned, and poorly maintained.

### Opportunities:

- Enhance and extend the trail network, providing additional opportunities for mountain bike and hiking exclusive facilities.
- Expand day-use and access facilities to support the trail network.
- Enhance connectivity with neighboring development and paths.

### Visitor Use Estimation/Capacity Study

- Conflict between pedestrians and mountain bikers occurs throughout the unit.
- Parking demand is in excess of supply during high-use times.
- Neighboring residential access is not represented in visitor use estimates.

## SOCIAL SUSTAINABILITY

- The level and diversity of visitation has resulted in conflicts throughout the Unit. Regulatory compliance regarding pet waste management and mountain bike use during wet trail conditions are ignored by what seem to be a relatively small number of visitors, but with the scale of visitation, these non-compliance incidents are enough to cause a constant undertone of us vs. them between some use groups.
- Social trails abound, especially where trail conditions are degraded, adjacent to trailhead areas, and originating from adjacent neighborhoods.
- Navigation is challenging in the Sope Creek area due to the small length of loops when combined with the large number of trail junctions with the mountain bike-accessible trail. While these many use-regulated junctions have necessitated the development of “No Bike” gates, the same gates play a role in 1) exacerbating perceptions of conflict between bikers and pedestrians, and 2) lowering the quality of the natural experience.
- Parking capacity is not high enough for the visitation, resulting in overflow down Columns Drive. This crowding and interaction between pedestrians, cyclists, and vehicles sets up visitors for a subpar start to their recreational experience, bothers neighbors, and creates hazards to the frequent exercise users of Columns Drive.



**Multiple use conflicts are perceived between different users of the area trail system**

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- The vast majority of trail management in this Unit seems to have focused on attempting to close social trails. In many instances this has been attempted by piling woody debris in the socially developed corridor. In some others, closure has involved sign placement without any attempt to close the open corridor. Neither treatment has been particularly effective.
- Some water management structures, mainly water bars (sometimes stacked two or three high), have been installed on the hiking trails. However, most function as check dams rather than moving water off the trail because functional drains have not been developed and/or the structure alignment is incorrect. The result is, in high surface runoff situations, water cascading over the structures after being dammed and exacerbating the trail erosion.
- More regular and effective maintenance has taken place on the mountain bike-accessible trails, but alignments, location, and rolling contour are not enough to fully remove water from the trail in an expeditious manner. That stated, the drier, more stable condition of these trails likely “invites” more pedestrians to these trails during wet conditions and worsens the conflict issues.



**Trail management attempts are sporadic, ineffectual (large boardwalk excepted) and focused mostly on reducing social trail creation**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Sope Creek has a spaghetti bowl of maintained and social trails. There is added confusion as there are designated mountain bike trails that share use with hikers. This has led to significant user conflict and actual physical fights between user groups in the past. The trail system could also be simplified to reduce confusion.
- Significant issues with surrounding communities building social trails to access the park and from the parking area to the Sope Creek ruins. With formally developed trails, visitor traffic could be better funneled into the park with reduced impact on vegetation and erosion.
- The jogging trail/fitness trail is the busiest trail system in the park. The trail receives heavy usage throughout the year with joggers, dog walkers and bike riders. Trail should be maintained as primary trail with heavy emphasis on access and maintaining infrastructure. Some flooding issues due to poor drainage and beaver activity needs to be addressed in the short term.
- There are various trails that access the jogging trail, some are planned by the park and others are social trails. Most are poorly designed and have significant water issues with run off.
- With some planning, the trail could be linked to Paces through the Palisades Unit to provide a long distance trail that jumps between units through CCID property in Cobb County



**Lack of water management - leading to rutting and entrenchment- degrade trails and experiences**

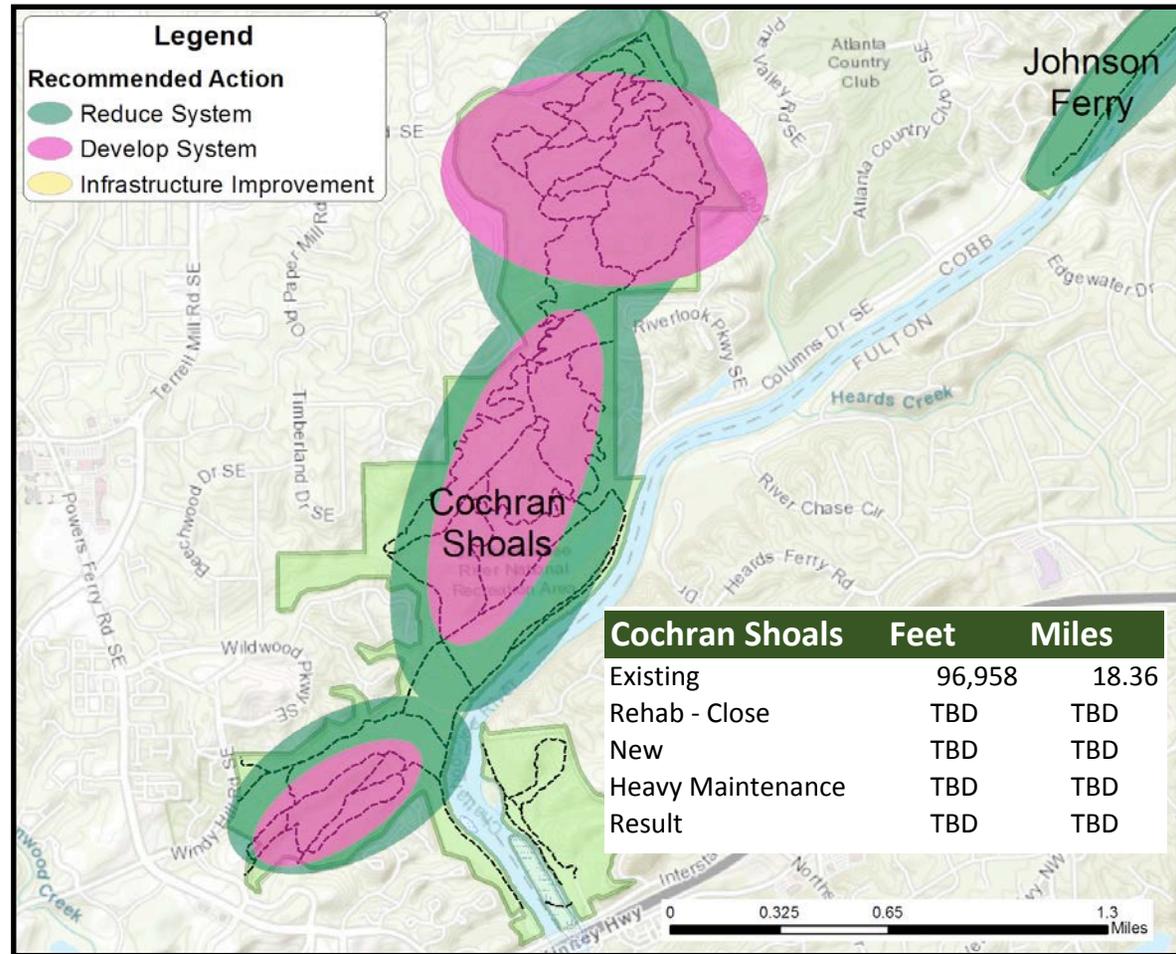
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

- Need for a more robust field-based design for redevelopment to address acute- and broad-scale issues highlighted in this assessment. Trail system should be redeveloped to provide meaningful experiences, loops and river access while minimizing risk to users, cultural and natural resources on this landscape. Balancing strong desires for access and extremely high use levels on this land base for multiple user types will provide challenge, and necessitate compromise to achieve.

## Medium Priority (Years 2-5)

- Implement a phased trail redevelopment and environmental restoration process, coupled with public education and peer-to-peer assistance in changing visitor behaviors and attitudes.
- Bolster partnership with mountain bike community and develop similar partnership to play a primary maintenance role on the hiking-only trails.
- Develop increased parking infrastructure at Columns Drive.



# POTENTIAL TRAIL SYSTEM

Chattahoochee River National Recreation Area  
Georgia
**Cochran Shoals Columns Drive**
National Park Service  
U.S. Department of the Interior

TO BE DEVELOPED  
THROUGH A DETAILED  
FIELD INVESTIGATION AND  
ADDITIONAL OUTREACH  
AND COLLABORATION  
WITH PROJECT PARTNERS

**Legend**

- You Are Here
- Trail Map
- Hiking Trail
- ..... Hiking Only
- Biking & Hiking Trail
- Easy
- Intermediate
- Parking
- Restrooms
- Park Land

In Case of Emergency Call 911 or 770-352-0370  
Note the number on the nearest Trail Map

June 2013

**Location Map**

Rules of the Trail

Protect the trails — don't ride after rain.

Bicyclists must follow one-way signs.

10 MPH speed limit for bicycles.

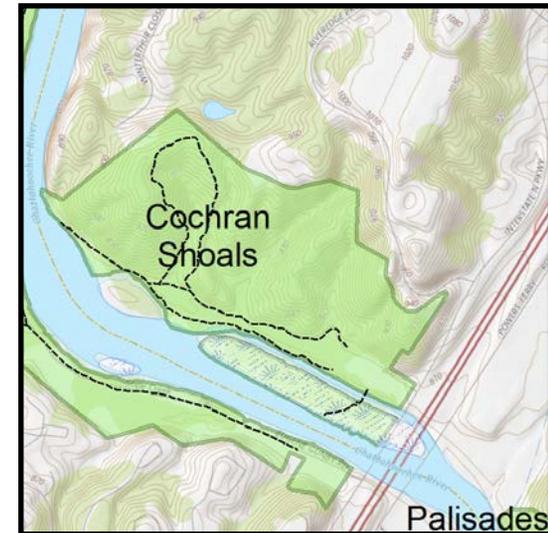
Bicyclists yield to pedestrians.

Protect yourself — always wear a helmet.

Visit <http://go.usa.gov/2swn> or scan the code to view map.

# POWERS ISLAND

<b>Land Unit Location</b>	Interstate North Pkwy, river left
<b>County</b>	Cobb
<b>Municipality</b>	Sandy Springs
<b>Acres</b>	85
<b>Trail Mileage</b>	~ 18
<b>Trailheads/Access</b>	1- Interstate North Pkwy.

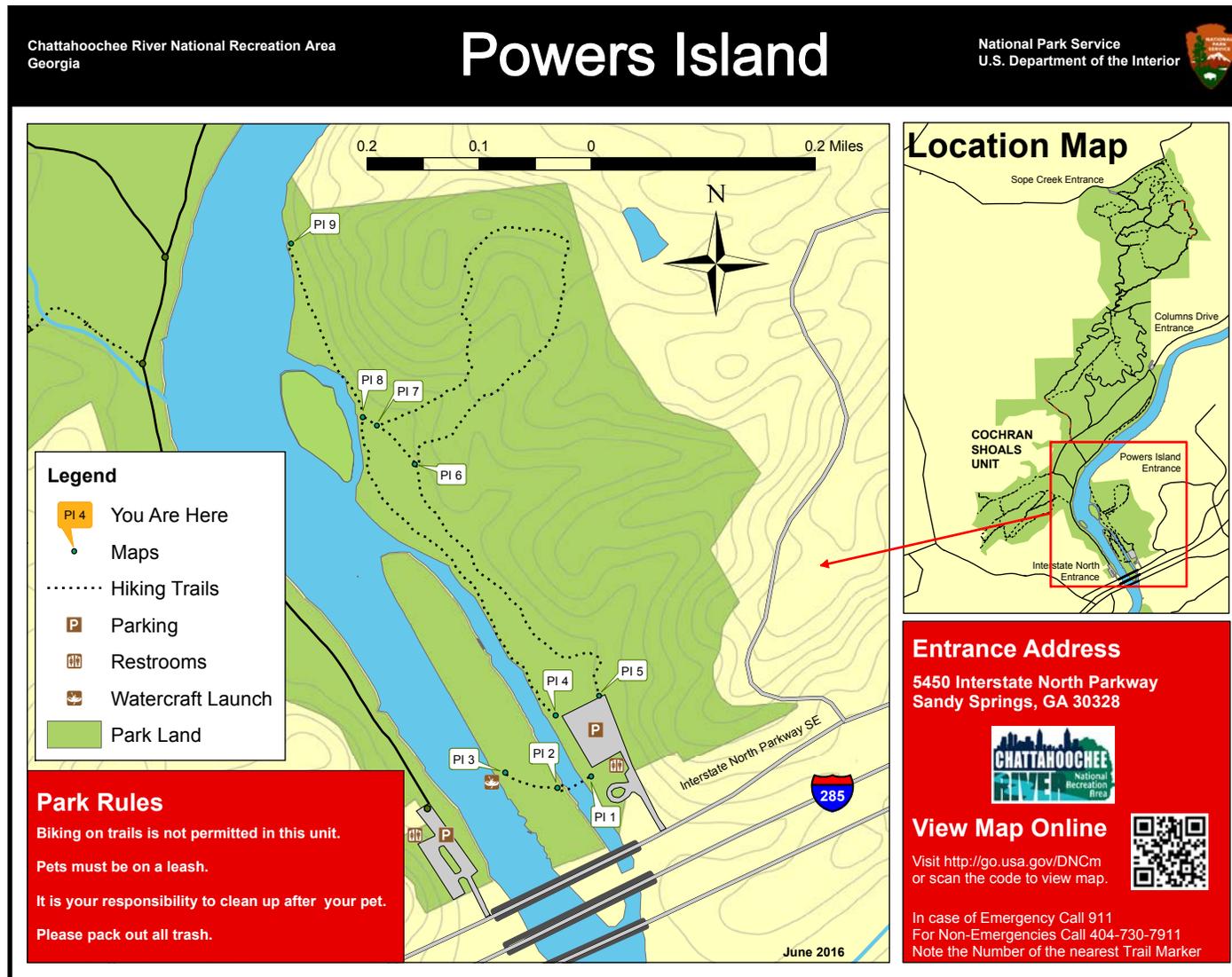


**Entrance facilities, NOC rental center and large steel bridge over side channel to island**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Natural Area Recreation Zone	Entire Unit	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Off-Road Bicycling on designated trails only</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Equestrian on existing trails only</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Unpaved Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.)</li> <li>• Visitor and Admin Facilities, limited in size and impact</li> <li>• Parking Areas</li> <li>• Picnic Areas</li> <li>• Restrooms</li> <li>• Roads (limited access only)</li> <li>• Bridges (for non-motorized vehicles and pedestrians)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



Powers Island is part of the 974-acre complex of Park Units on the southern end of the CRNRA. It hosts a Nantahala Outdoor Center boat livery, developed river access, sanitary facilities, a large paved parking lot, and a small trail system. Off the floodplain, the terrain climbs steeply with a number of rock outcrops to mature hardwood forests. An adjacent office park and residential neighborhood are to the east.

# PHYSICAL SUSTAINABILITY

- The primary trail in the Unit parallels the river on an historic road bed on the upper portion of the floodplain. The old road bed has sufficient cross slope and well-draining alluvial soils to avoid a muddy condition.
- A route has been walked in adjacent to the water's edge. It is cupped and holds water/mud during wet conditions, and crosses a number of small drainages (culverted on the trail slightly upslope) that are significantly incised. The crossings have been spanned with bridges, some of which are experiencing bank erosion very near their footings.
- An informally developed trail climbs steeply from the floodplain to the highest elevations on the property and then back down steeply to the floodplain. This trail is aligned close to the fall line with some trail gradients nearing 30%. It is cupped due to the walked-in nature and is actively eroding. Some relatively ineffective water management has been attempted on the southern leg of this loop with non-standard metal water and/or concrete bars that are becoming a hazard.



**Narrow, informally developed trail with many very steep segments on the hillside that are actively eroding**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Address environmental issues including invasive vegetation, informal trails, and parking lot runoff.

### Opportunities:

- Extend, formalize, and connect the trail network.
- Improve trailhead kiosks and signage.

## Visitor Use Estimation/Capacity Study

- Experience quality on the river may be degraded from the volume and “party-like” atmosphere of visitor use.
- Parking capacity and overflow issues exist during peak visitation.
- Neighboring residential access is not represented in visitor use estimates.

## SOCIAL SUSTAINABILITY

- A few socially created river access routes exist along the water's edge trail and to the neighboring properties to the east.
- A strange sign is located at the northern terminus of the Unit, informing visitors that they are leaving the National Forest and entering private property.
- While primarily a river access Unit, the forested portion of the property does not seem to experience a great deal of use, especially when compared to the other parks in this complex. The trail system could be formalized and expanded to provide an approximately 1.5-mile hiking loop opportunity in this area and connect officially to the neighborhoods to the east.



Trail continues beyond unit boundaries where it has been “closed” to public use

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- A number of small bridges on the water's edge trail are experiencing stream bank erosion issues that endanger the bridge footings.
- Culverted crossings of these same drainages have not been recently cleared and are partially blocked by accumulated vegetation.
- Maintenance efforts on the southern leg of the upland loop do not seem like they were completed by Park staff/volunteers, given the metal and concrete materials utilized in creating the non-functioning water bars.



**Older bridges indicate signs of deck maintenance but foundations are threatened by bank erosion**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Small trail leading north along the river, which is seldom used as the area is primarily a river access point.
- There is an opportunity for a secondary or primitive trail so users can access the area that is not as busy as across the river.



**Culverts require annual inspection and cleaning and have been exposed by stormwater flows**

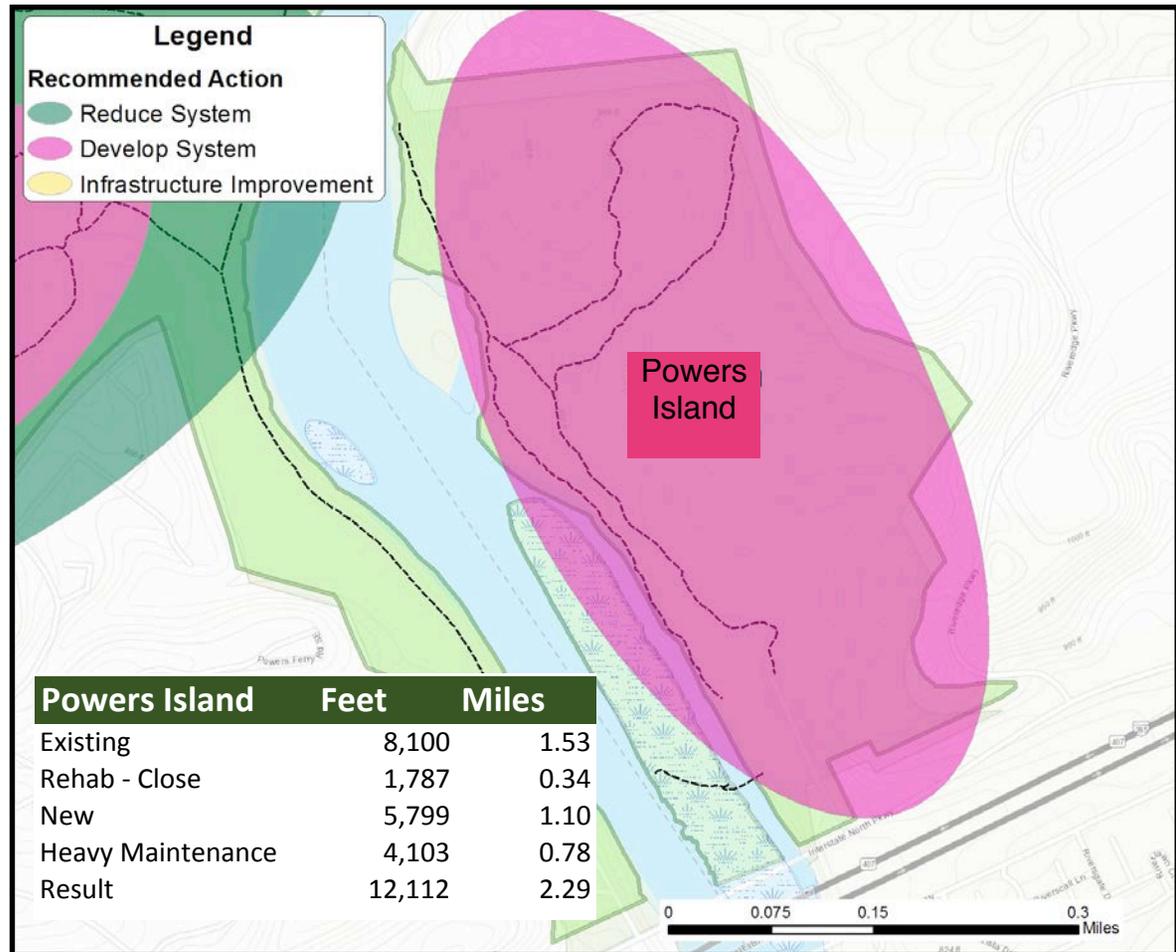
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

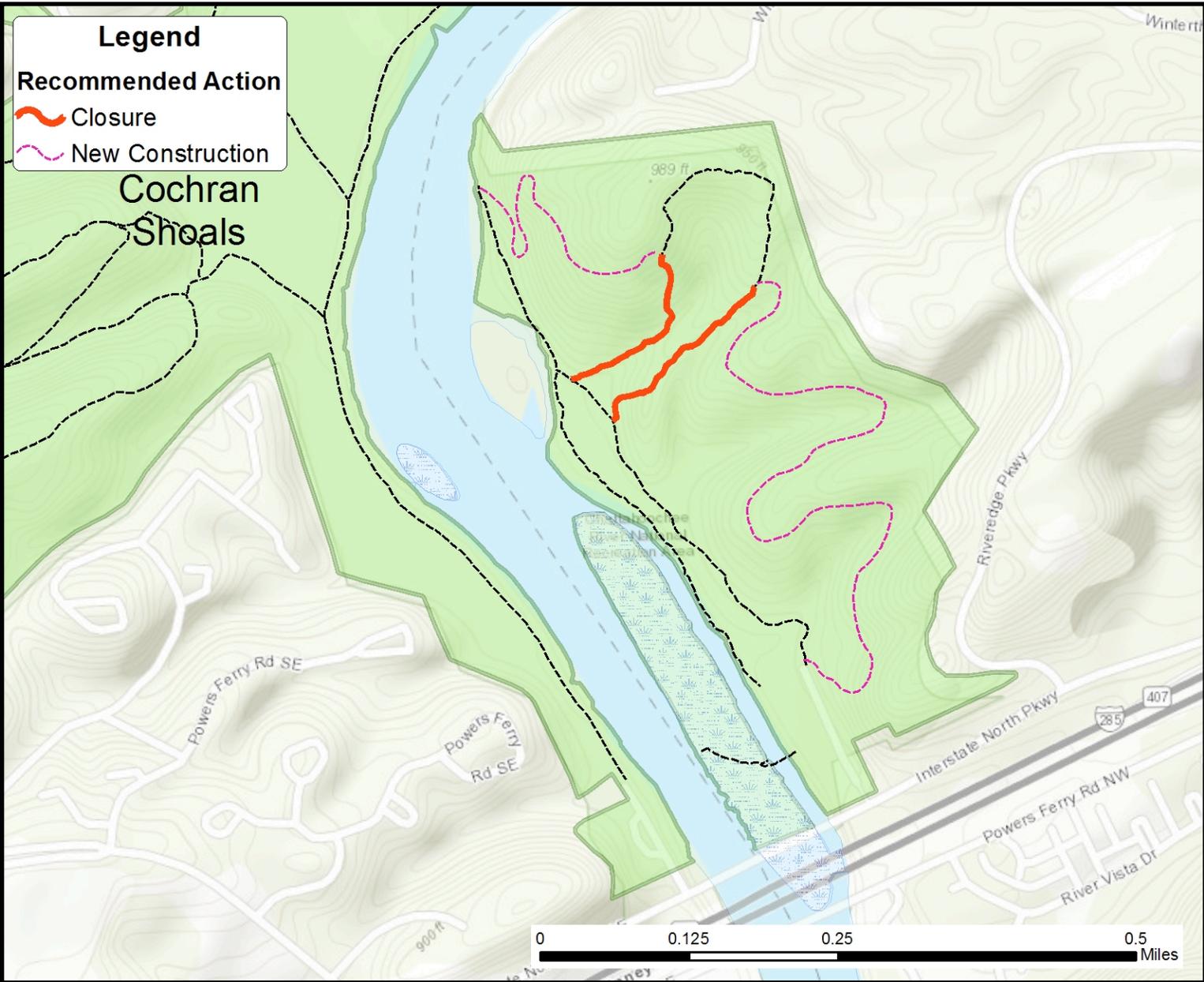
- Inspect bridge footings and reset if necessary.
- Remove ineffective maintenance structures on southern leg of upland trail.

## Medium Priority (Years 2-5)

- Develop a trail loop through the rock outcrops near the northern terminus of the floodplain route that climbs to the upper elevations of the property, connects formally to the surrounding neighborhood and office park, and descends back to the paved trailhead parking area. Fully close and restore the existing loop.

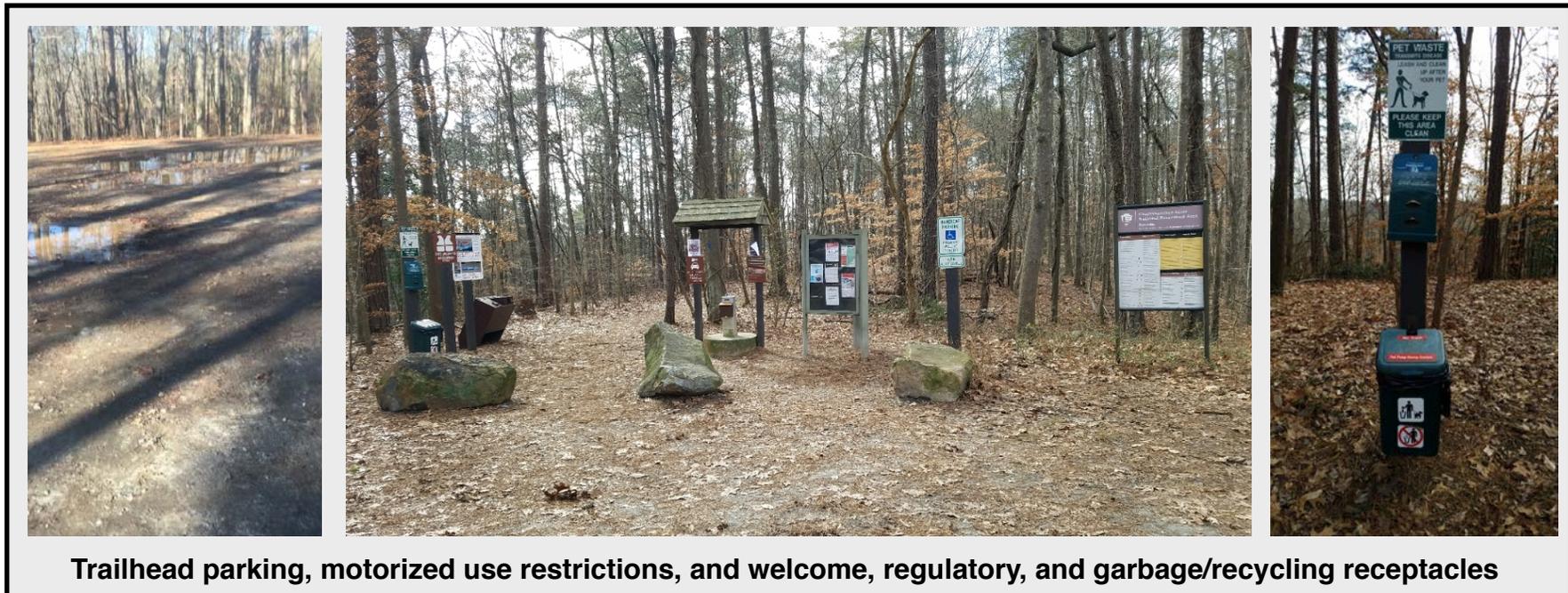
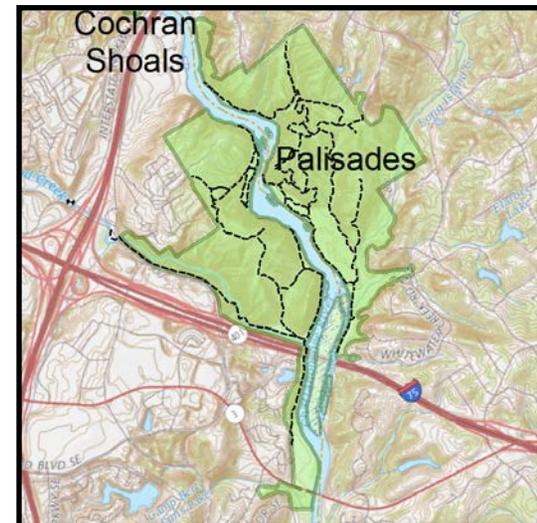


# POTENTIAL TRAIL SYSTEM



# PALISADES EAST

<b>Land Unit Location</b>	East of I 285/75 Junction, river left
<b>County</b>	Fulton
<b>Municipality</b>	CCID (West), Sandy Springs, Atlanta (East)
<b>Acres</b>	386
<b>Trail Mileage</b>	10.5
<b>Trailheads/Access</b>	2- Whitewater Creek Rd NW, Indian Trail Rd.



**Trailhead parking, motorized use restrictions, and welcome, regulatory, and garbage/recycling receptacles**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Developed Zone	West of the river near the main Palisades Unit West of the river on the south end of the unit, near Paces Mill	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>
Natural Zone	Main section of the unit on both sides of the river	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking, no facilities</li> <li>• Fishing</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.; existing only)</li> <li>• Visitor and Admin Facilities (existing only)</li> <li>• Parking Areas (existing only)</li> <li>• Picnic Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (foot bridges only)</li> <li>• Kiosks</li> </ul>
Rustic Zone	East and west of the river on the south end of the unit, near Paces Mill	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Canoeing, rafting, kayaking</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails Only</li> <li>• River Access Facilities (step-downs, boardwalks, docks, viewing platforms only)</li> <li>• Parking Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (supportive of non-motorized use)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



East Palisades Unit is large parcel comprised of low floodplain near the Whitewater Creek Trailhead, extensive rock bluffs to the north and rolling, mature hardwood forest over the central and eastern portions of the property and the Indian Trailhead.

With little facility development and trailheads that are somewhat harder to access than the other nearby Units, this parcel caters more to trail users than those looking to access the river. Highlighting the topography is a rock climbing area and developed overlook platform with upriver views of a number of shoals.

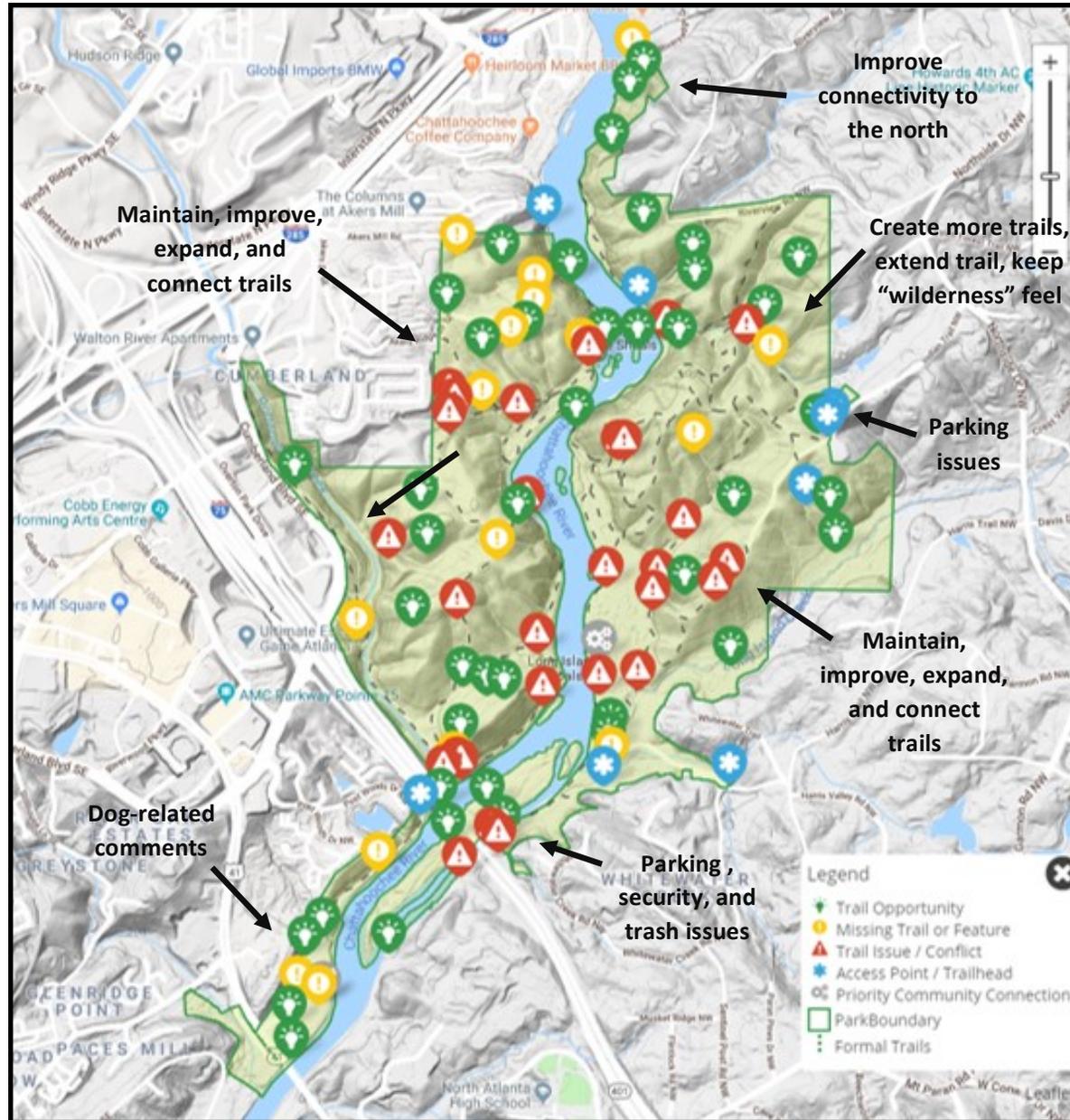
# PHYSICAL SUSTAINABILITY

- The trail system is comprised of a mix of historic road beds and minimally developed (walked-in) routes. Almost none of the nearly 10 miles of trail within this Unit could be classified as sustainable.
- With many historic roads in the area, it seems most of them were adopted as part of the formal trail system. These roads are generally incised a few inches to a few feet and in some cases have eroded down to bedrock. Water management is not practical on most of these roads due to the amount of earth moving that would be necessary to open drains on these 10-15' wide corridors.
- The socially developed routes, especially those on the hillsides are degrading rapidly. The tread is creeping, exposing many roots, creating unstable trail tread, and in some instances endangered the stability/health of large trees adjacent to the trails.
- Floodplain routes are cupped, creating muddy conditions and/or funneling runoff toward side drainages where it can undermine wooden crossing structures.



**Tread widening and severe root exposure caused by insufficient trail development on sidehill locations**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Erosion, muddiness, excessive grade, and overgrown vegetation along trails needs management.
- I-75 bridge area parking capacity and waste disposal issues.
- Parking capacity issues at a number of trail access locations.
- Conflict directed toward mountain bikers and dog walkers.

### Opportunities:

- Enhance trail network connectivity with Powers Island, Cochran Shoals, and other neighboring areas.
- Expand trail network, including more mountain bike trails.
- Develop day-use and supporting facilities, particularly in the southern region and including dog- and security-related facilities and bathrooms.
- Consider installing a bridge across the river.

### Visitor Use Estimation/Capacity Study

- Concern for the quality of river experiences due to volume and behavior of river users, including tubers.
- Parking demand is in excess of supply during high-use times.

## SOCIAL SUSTAINABILITY

- Parking access is challenged at all trailhead locations. Parking is not formalized at the I-75 crossing of the park but widely utilized. The Whitewater Creek Road NW Trailhead area is relatively small with approximately 25-vehicle occupancy. The Indian Road Trailhead is accessed by a narrow unpaved road with many potholes. Parking at this location is random due to the dirt lot and it is obviously overtaxed, with socially developed parking spots formed between trees on the periphery and the dirt road. The Unit is also accessed from a gated road on Riverview Dr. NW, though a sign explicitly states that parking is illegal.
- The trail system is only navigable with a relatively keen sense of direction and constant reference to the trail junction maps. Even then, numerous visitors were confused and asked others for directions or walked unintentional loops.
- Eroding social routes are abundant along the river and from the main bluff down to the river. It seems that many of these routes have been adopted into the trail system over time, with the increased travel exacerbating the poor trail conditions.
- The rock climbing area and river overlook are strong destination points that are unfortunately accessed by poorly aligned trails, again exacerbating the trail conditions and the quality of accessing these experiences.



# MANAGERIAL SUSTAINABILITY

## Assessment Team

- Numerous wooden bridges and puncheons were developed throughout the Unit, all seemingly near the same time, and are nearing the end of their life cycle. Replacing these structures could entail substantial expense and time.
- Other unmanaged water/mud crossings exist that have not been improved, but trail users have attempted to keep dry by laying logs over channels or piling woody debris into “corduroy”, an ineffective technique that may have been copied from other floodplain maintenance techniques present in the Unit.
- Water management is not present or has been ineffective throughout the trail system, with most wooden structures turning into check dams and worsen the trail tread erosion by encouraging runoff to cascade over the wooden feature.
- Social trail closure attempts seem sporadic, minimal, and ineffective.

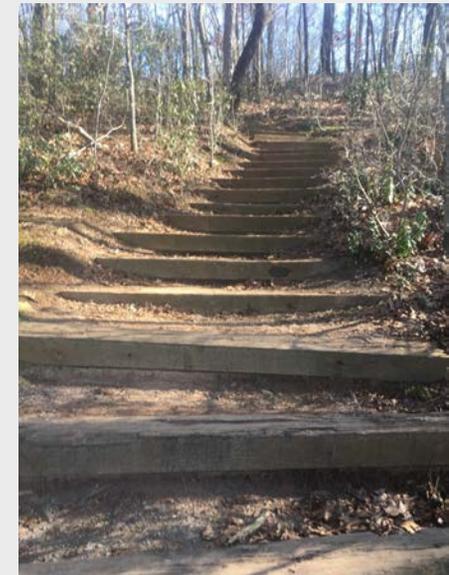


**Structures are generally old and reaching, somewhat ineffectual, and reaching the end of its life cycle**

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Whitewater Creek Trailhead is perhaps the most overused area of the park with infrastructure (road, parking, trails) being worn to death with significant impacts on the quality of the visitor experience. The trails are very popular with day hikers, joggers and dog walkers who use the parking area to access a beach that they let their dogs swim in. Alternative access to the area needs to be considered, including from Paces Mill via a pedestrian bridge in the vicinity of long island shoals. That trail system could also access West Palisades area at Akers Mill.
- Indian Trail: is also overused but not nearly as bad as Whitewater Creek. Indian trail parking sits on a ridge overlooking the river. The road to the trail is dirt but could be improved to provide a better visitor access point to the area, especially if the park follows through with closing Whitewater Creek.
- The trail system at East Palisades is a spaghetti bowl with heavy usage. Trail infrastructure such as bridges and culverts are in varying states of decay. A prioritized trail system with primary trails and secondary primitive trails would be beneficial. The trails are also not well designed and have significant hydrology issues with run off and slope (some trails go straight up and down an incline)



**Some structures were developed with forethought, others without water management and showing undercutting and other signs signs of deterioration**

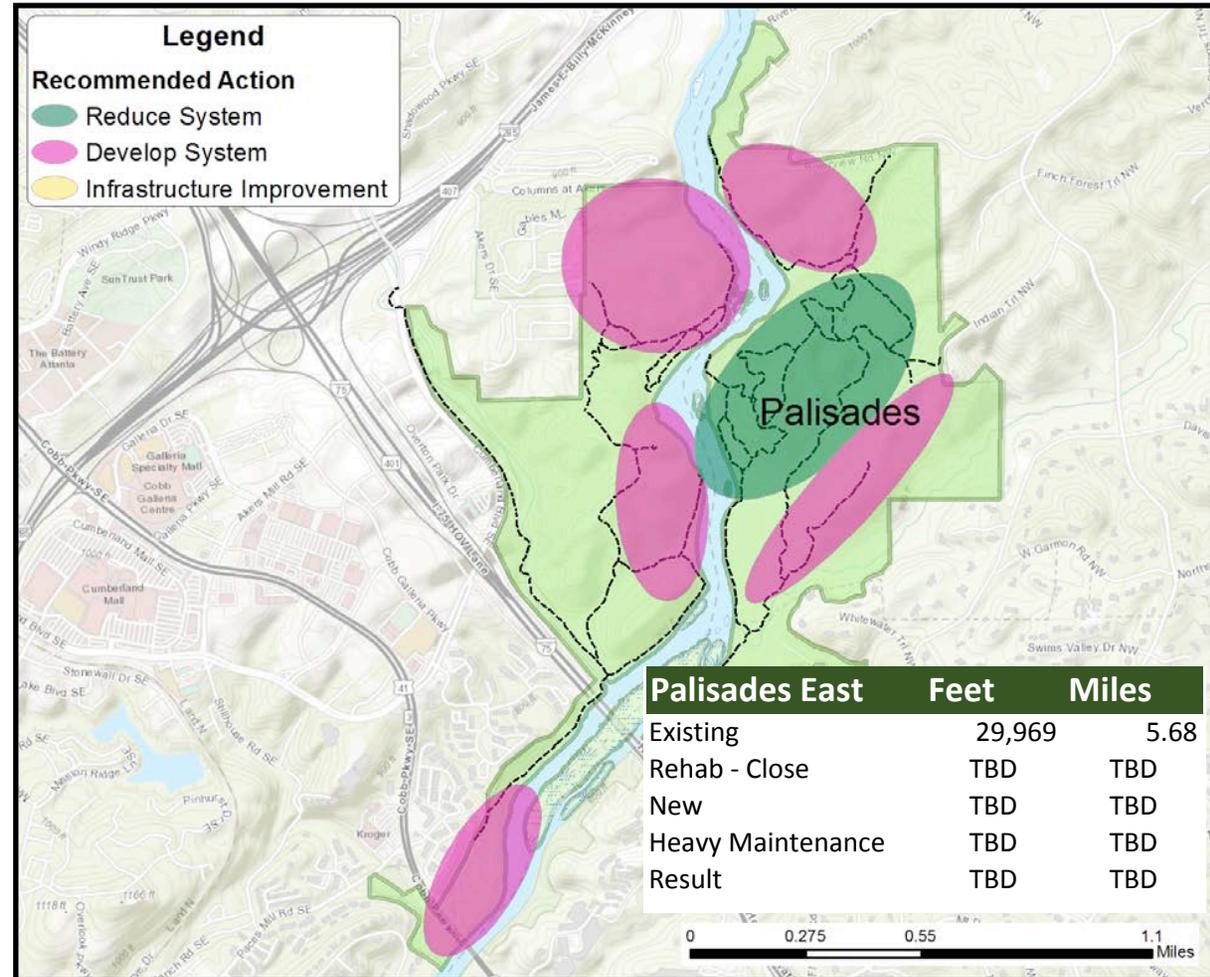
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

- Need for a more robust field-based design for redevelopment to address acute- and broad-scale issues highlighted in this assessment. Trail system should be redeveloped to provide meaningful experiences, loops and river access while minimizing risk to users, cultural and natural resources on this landscape. Balancing strong desires for access and extremely high use levels on this land base for multiple user types will provide challenge, and necessitate compromise to achieve.

## Medium Priority (Years 2-5)

- Implement a phased trail redevelopment and environmental restoration process, coupled with public education and peer-to-peer assistance in changing visitor behaviors and attitudes.
- Bolster partnership with mountain bike community and develop similar partnership to play a primary maintenance role on the hiking-only trails.
- Develop improved access and parking infrastructure at the Indian Trailhead

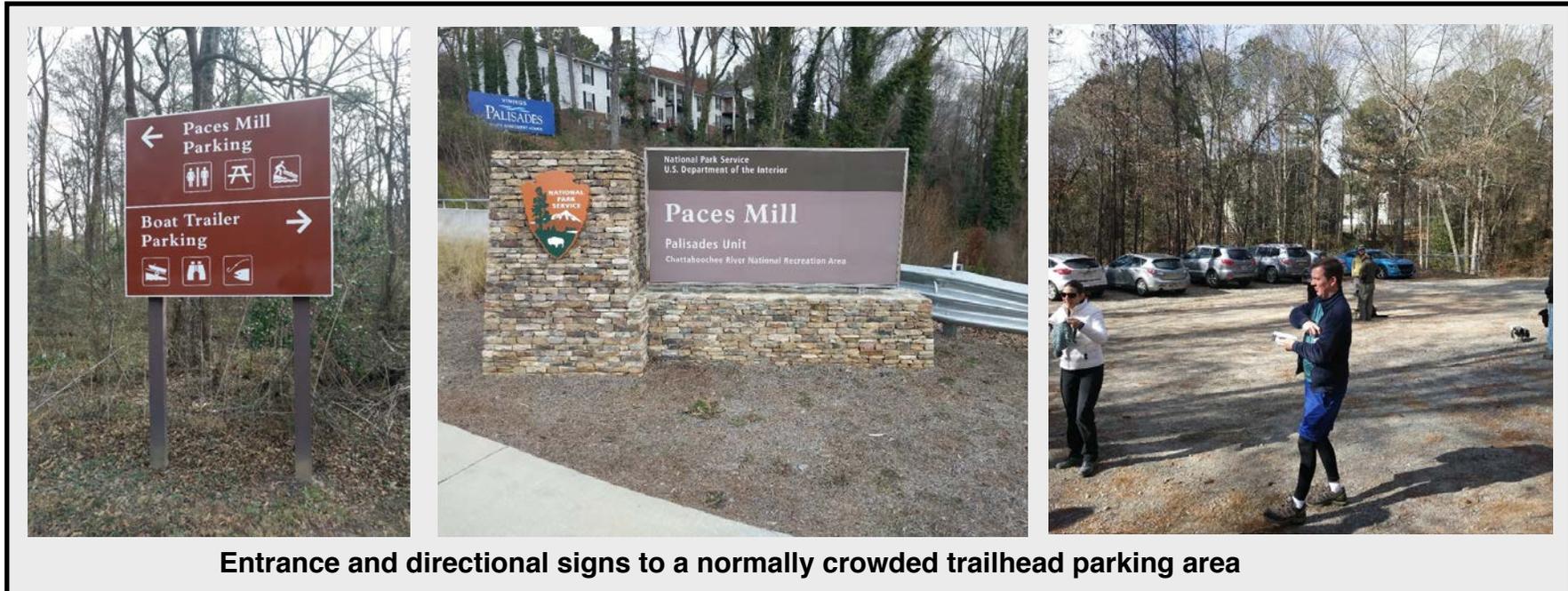
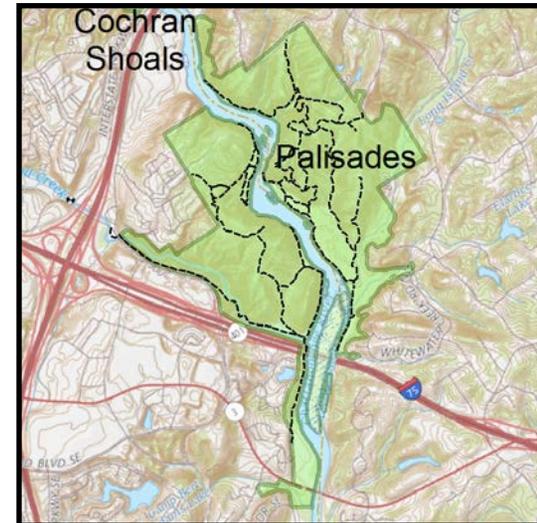


# POTENTIAL TRAIL SYSTEM



# PALISADES WEST/PACES MILL

<b>Land Unit Location</b>	East of I-75/285 junction, river right
<b>County</b>	Cobb
<b>Municipality</b>	CCID (West), Sandy Springs, Atlanta (East)
<b>Acres</b>	322
<b>Trail Mileage</b>	10.5
<b>Trailheads/Access</b>	2- Akers Ridge (north), Paces Mill (south)



**Entrance and directional signs to a normally crowded trailhead parking area**

## ZONES/ALLOWED USES (GMP, FOUNDATION, ORGANIC ACT EXCERPTS)

Zone	Area within Unit	Allowable Activities	Allowable Facilities
Developed Zone	West of the river near the main Palisades Unit West of the river on the south end of the unit, near Paces Mill	<ul style="list-style-type: none"> <li>• All Activities</li> </ul>	<ul style="list-style-type: none"> <li>• All Facilities</li> </ul>
Natural Zone	Main section of the unit on both sides of the river	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking, no facilities</li> <li>• Fishing</li> <li>• Canoeing, rafting, kayaking</li> <li>• Scientific Research</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails</li> <li>• River Access Facilities (ramps, step-downs, boardwalks, docks, etc.; existing only)</li> <li>• Visitor and Admin Facilities (existing only)</li> <li>• Parking Areas (existing only)</li> <li>• Picnic Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (foot bridges only)</li> <li>• Kiosks</li> </ul>
Rustic Zone	East and west of the river on the south end of the unit, near Paces Mill	<ul style="list-style-type: none"> <li>• Day Hiking</li> <li>• Picnicking</li> <li>• Fishing</li> <li>• Scientific Research</li> <li>• Canoeing, rafting, kayaking</li> <li>• Habitat Restoration</li> </ul>	<ul style="list-style-type: none"> <li>• Primitive Trails Only</li> <li>• River Access Facilities (step-downs, boardwalks, docks, viewing platforms only)</li> <li>• Parking Areas (existing only)</li> <li>• Restrooms (existing only)</li> <li>• Roads (existing only)</li> <li>• Bridges (supportive of non-motorized use)</li> <li>• Kiosks</li> </ul>

# GENERAL DESCRIPTION



This unit is adjacent to a heavily developed area along I-285 and I-75, Atlanta Braves Stadium, and Cobb Parkway. It contains nearly 5 miles of trail, including over a mile of the concrete-surfaced Rottenwood Creek trail on its western edge, connecting Paces Mill to Akers Mill and beyond. The unit provides river take-out and related facilities for rafting activities on the Chattahoochee River. Large parking lots accommodate this seasonal use, and provide access to Paces Mill and the West Palisades portions of CRNRA.

The northern reaches of this side of the unit can be reached via additional trailheads off of Akers Ridge Dr. NPS has developed some new trail in this area coupled with some additional parking infrastructure. These lots provide more direct access to Devils Race Shoals, a popular swimming area in the river. This area is supported with loaner life jackets, restrooms, boardwalk and a kiosk sharing regulatory and cautionary information.

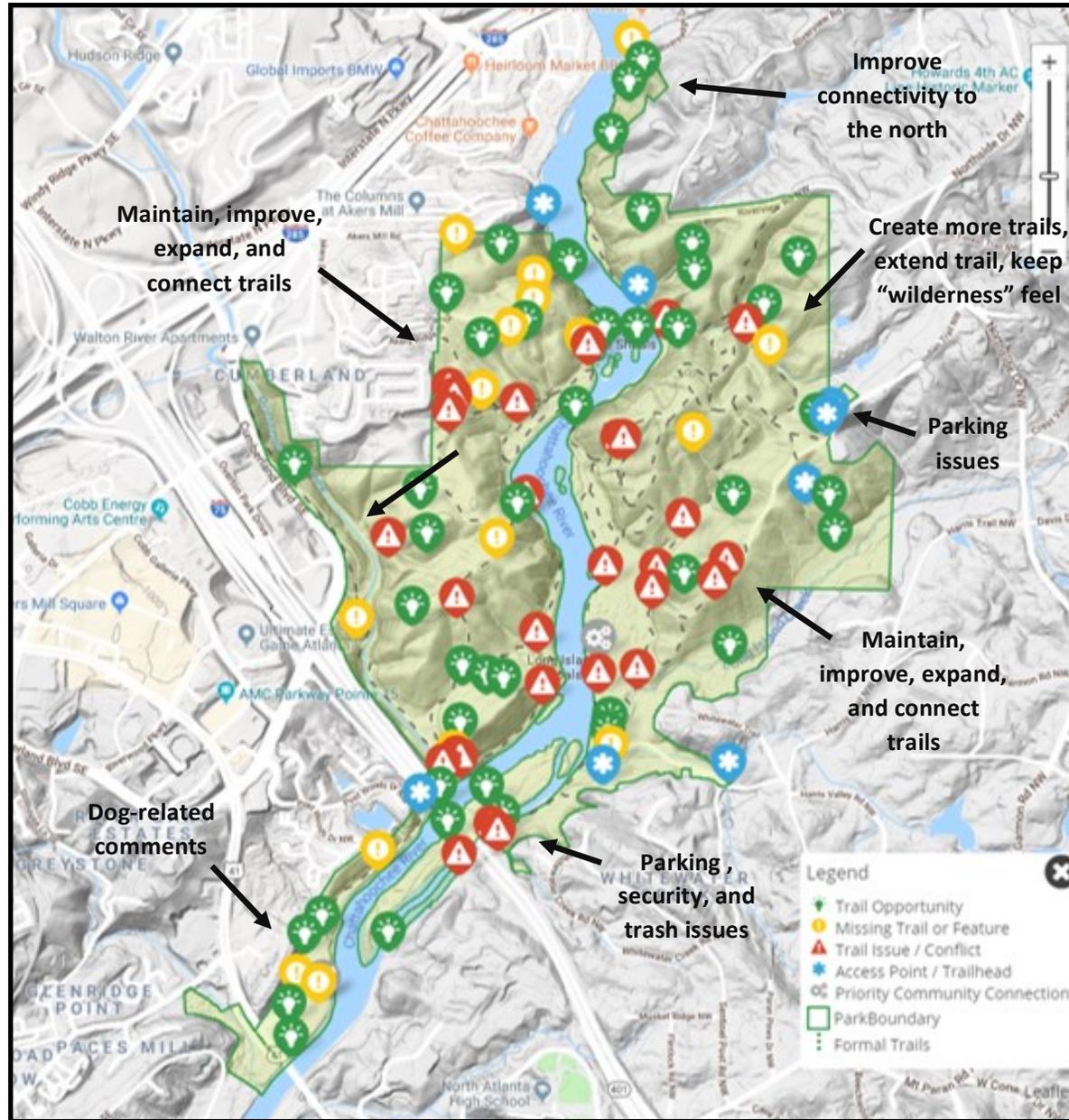
# PHYSICAL SUSTAINABILITY

- Many of the trails on this unit are maintained for full size vehicle access, with wide tread surfaced with 2”+ rock and occasional intermittent concrete.
- The natural surface trails on this unit provide river and overlook access, but don’t form meaningful loops or provide connectivity to the neighboring (non-NPS) lands to the north.
- Visitor created routes to provide this connectivity exist, but lack formal maintenance and sustainable design or construction.



**A mix of vehicle-width, incised trails, well-developed contour-aligned, and informally developed river access trails**

# SOCIAL SUSTAINABILITY



## Public Comments (Social Pinpoint)

### Issues:

- Erosion, muddiness, excessive grade, and overgrown vegetation along trails needs management.
- I-75 bridge area parking capacity and waste disposal issues.
- Parking capacity issues at a number of trail access locations.
- Conflict directed toward mountain bikers and dog walkers.

### Opportunities:

- Enhance trail network connectivity with Powers Island, Cochran Shoals, and other neighboring areas.
- Expand trail network, including more mountain bike trails.
- Develop day-use and supporting facilities, particularly in the southern region and including dog- and security-related facilities and bathrooms.
- Consider installing a bridge across the river.

### Visitor Use Estimation/Capacity Study

- Concern for the quality of river experiences due to volume and behavior of river users, including tubers.
- Parking demand is in excess of supply during high-use times.

## SOCIAL SUSTAINABILITY

- Access is provided via ample parking at downstream end of the unit. A large parking lot and adjacent river access are well developed.
- Trail conditions range from surfaced (Rottenwood Creek Trail) to gravel road based (much of the primary routes from Akers Drive trailhead) to narrow recently constructed and visitor created routes along the river's edge.
- Access from the adjacent apartments is prevalent; this community advertises access to the park as part of their amenities.
- The network of trails is incomplete, and visitors have expanded access along the river edge throughout this unit and developed additional connectivity to upland overlook locations (e.g. WP5 to WP7).
- The wide road based trails allow for side by side travel, but are punctuated by heavy gravel application and concrete surfacing where alignments are poor and degraded. Vehicle use to access the riverside facilities is present.
- The Akers Drive trailhead is somewhat hidden from public view and provides only a limited number of parking spots.



**High levels of riverside use and sometimes dangerous conditions create management concerns**

# MANAGERIAL SUSTAINABILITY

## Assessment Team

- The natural surface trails in this unit suffer from poor alignments and are primarily adopted old road beds. These wide treads capture and carry much surface water during storm events and have high maintenance needs as a result. Their water management is less than effective and is being propped up by application of gravel and concrete surfacing to shore up erosion.
- New narrow singletrack trail has been developed to connect a future parking lot to the riverside facilities (WP9 up to the end of gravel road). This trail features bench cut construction but lacks in final layout and construction of water management features. If subject to high use (appears to be primary trail connection to future parking area) it will likely fail to meet the width needs for the volume of use it will receive. Unless layout and specification shortcomings are rectified trail conditions will be dynamic and present several erosion, widening and visitor use issues in the coming seasons of use.



Various techniques and effectiveness of tread and drainage maintenance throughout unit

# MANAGERIAL SUSTAINABILITY

## NPS Operations & Management

- Trail system basically just includes the Akers Mill. A relatively new trail begins at the new parking area and has been used by visitors this summer. There is an issue here with social trails linking the park to the surrounding apartment complexes.
- The only trail at Paces is the terminus of the Rottenwood creek trail. The trail isn't signed from the lot and the sign at the trail looks like it was installed by Cobb County and not the NPS. There is ample parking for the majority of the year at Paces and this is the most logical area for a jumping off point to other nearby units with other serious visitor capacity issues . Rottenwood Creek trail is shared with portions in NPS park lands and other portions in Cobb County.
- Infrastructure along the trail is in various levels of quality, it would be nice harmonize management (and conditions) along the Rottenwood Creek trail with adjacent managers of the trail.



**Extensive and costly structures should have an annual inspection and maintenance schedule to protect initial investments**

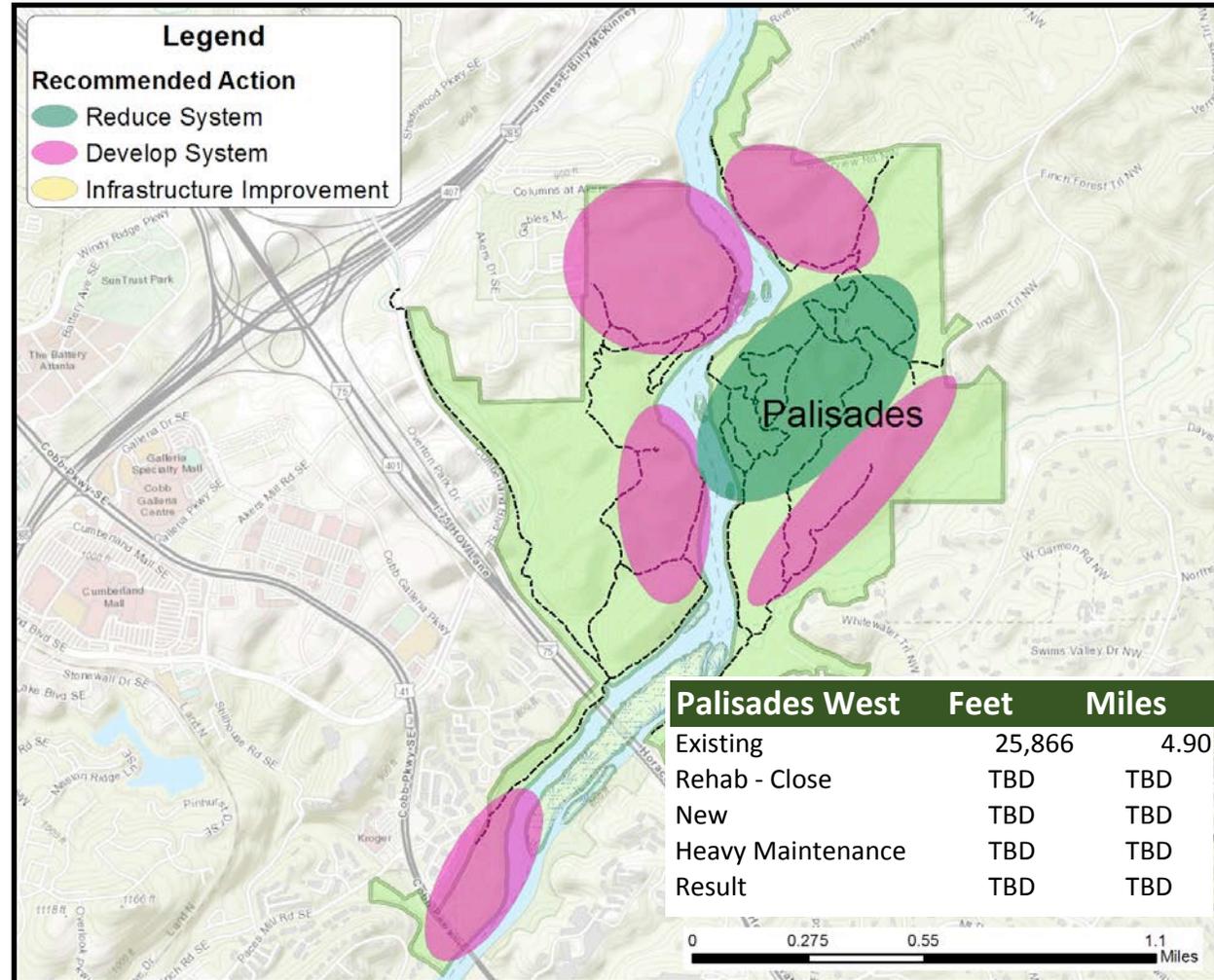
# RECOMMENDATIONS & PRIORITIZATION

## High Priority (Year 1)

- Need for a more robust field-based design for redevelopment to address acute- and broad-scale issues highlighted in this assessment. Trail system should be redeveloped to provide meaningful experiences, loops and river access while minimizing risk to users, cultural and natural resources on this landscape. Balancing strong desires for access and extremely high use levels on this land base for multiple user types will provide challenge, and necessitate compromise to achieve.

## Medium Priority (Years 2-5)

- Implement a phased trail redevelopment and environmental restoration process, coupled with public education and peer-to-peer assistance in changing visitor behaviors and attitudes.
- Develop partnership to play a primary maintenance role on the hiking-only trails.





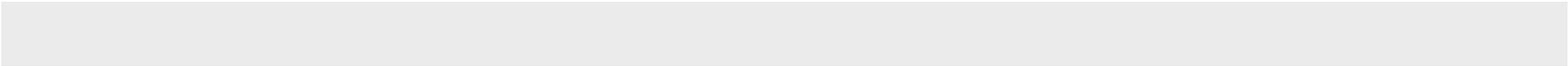
# APPENDICES

A. RECOMMENDED TRAIL SPECIFICATIONS

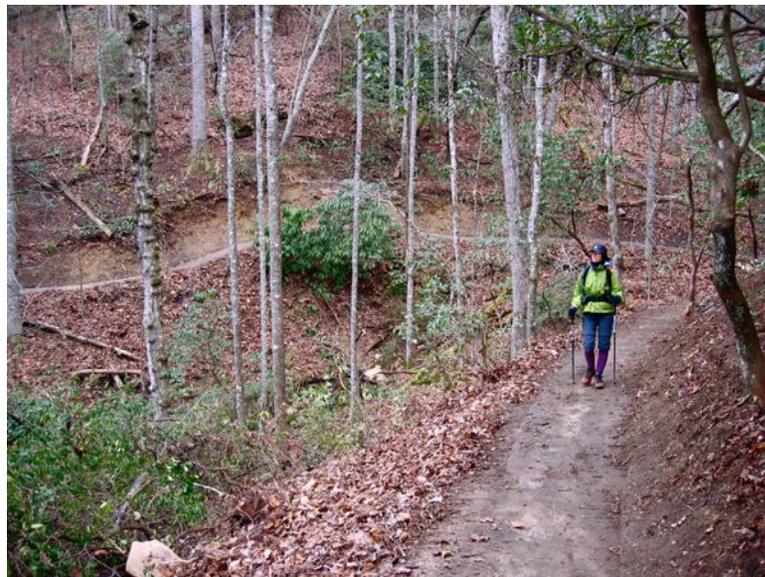
B. PUBLIC MEETING COMMENTS

C. STEWARDSHIP ENGAGEMENT BEST PRACTICES

D. TRAIL CLOSURE BEST PRACTICES



## APPENDIX A: RECOMMENDED TRAIL SPECIFICATIONS



# AGGREGATE SURFACE TRAIL

**Typical Tread Width:** 48 - 72"

**Typical Corridor Width:** 60"-96"

**Minimum Trail Corridor Height:** 10'

**Average Gradient:** 2-5%

**Maximum Sustained Grade:** 8%

**Maximum Grade:** 8%

**Cross Slope:** 1-3%

**Typical Tread Materials:** Cut and fill below grade, surfaced compacted crushed stone (3-4" lift of 1/2"-) with sub-base, as needed

**Exposure Factor:** Low, flat to 30% slopes

**Minimum Turn Radius:** 20'

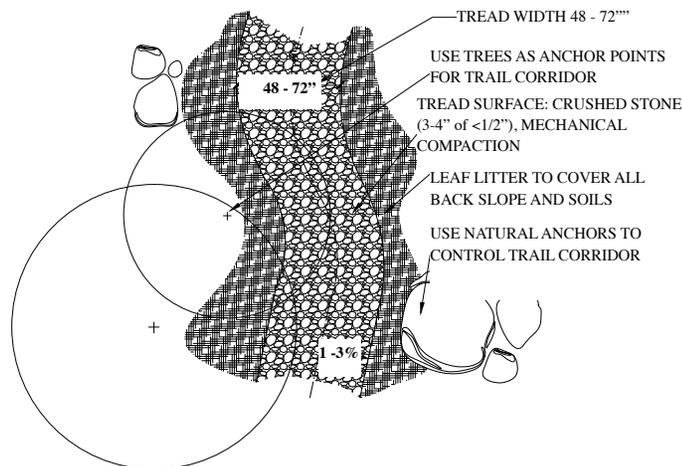
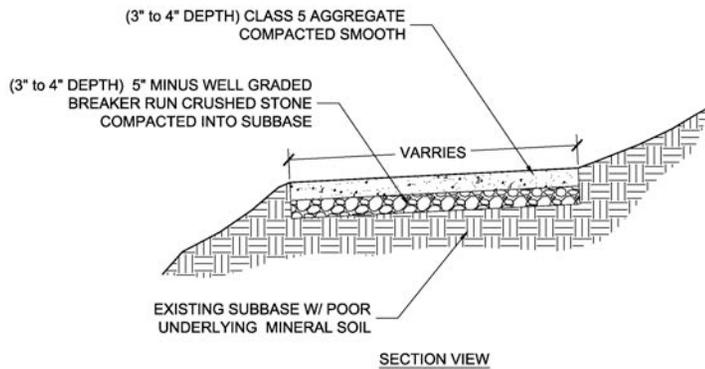
**Maximum Turnpad Grade:** 5%

**Wet Area Crossing Formality:** High, bridged crossings

**Minimum Bridge/Boardwalk Width:** 72"

**Maximum Vertical Exposure (without railing):** 12"

**Duty of Care:** High



# FRONTCOUNTRY TRAIL

**Typical Tread Width:** 36 - 48"

**Typical Corridor Width:** 48" - 60"

**Minimum Trail Corridor Height:** 8'

**Average Gradient:** < 7%

**Maximum Sustained Grade:** 10%

**Maximum Grade:** 15% or less for short distances

**Cross Slope:** 3 - 7%

**Typical Tread Materials:** Mostly natural surface (native soils) with some rock. Some loose material possible, protrusions < 3" above trail tread

**Exposure Factor:** Low to moderate, flat to 45% slopes

**Turn Radius:** 8' minimum

**Maximum Turnpad Grade:** 10%

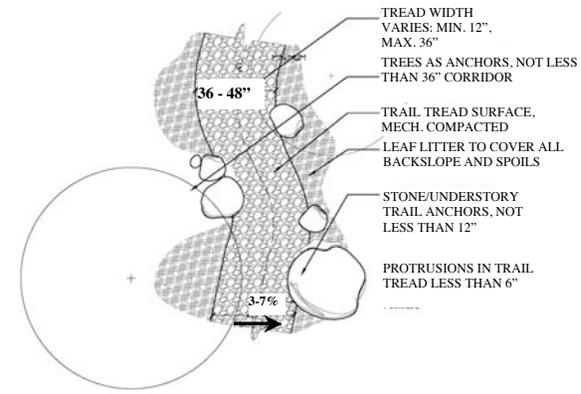
**Structure Formality:** Moderate, 48" minimum width

**Wet Area Crossing Formality:** Moderate to High, Low puncheon on tributaries and bridges with railings for stream crossings

**Duty of Care:** Moderate



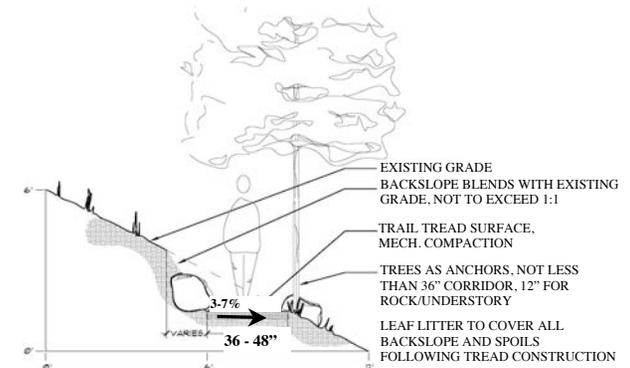
CHATTAHOOCHEE RIVER NATIONAL RECREATION AREA  
TRAIL SYSTEM ASSESSMENT



1.1

N.T.S

PLAN DETAIL: FRONTCOUNTRY TYP.



1.2

N.T.S

SECTION DETAIL: FRONTCOUNTRY TYP.

# BACKCOUNTRY TRAIL

**Typical Tread Width:** 12" - 36"

**Typical Corridor Width:** 36"-48"

**Corridor Height:** 8'

**Average Gradient:** < 10%

**Maximum Sustained Grade:** 15%

**Maximum Grade:** 30%, with armored tread

**Typical Tread Materials:** Mostly natural surface (native soils) with some rock armoring

**Sideslope Steepness:** Flat to 75%

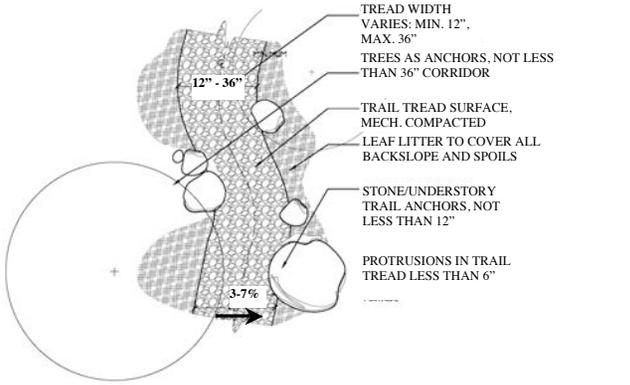
**Turn Radius:** Tight turns with possible switchbacks

**Maximum Turn Pad Grade:** 15%

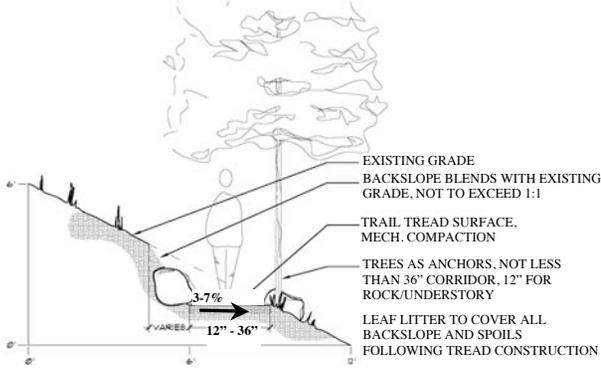
**Structure Formality:** Low formality, 36 minimum width

**Wet Area Crossing Formality:** Armored crossings at grade where possible, open bottom metal culverts over intermittent channels, bridges over perennial channels.

**Duty of Care:** Low, except for bridge inspection



**2.1** N.T.S  
**PLAN DETAIL: BACKCOUNTRY TRAIL TYP.**



**2.2** N.T.S  
**SECTION DETAIL: BACKCOUNTRY TRAIL- TYP.**



# MOUNTAIN BIKE TRAIL

**Typical Tread Width:** 36 - 48"

**Typical Corridor Width:** 48"- 60"

**Minimum Trail Corridor Height:** 8'

**Average Gradient:** < 7%

**Maximum Sustained Grade:** 10%

**Maximum Grade:** 15% for short distances, armored if needed

**Cross Slope:** 3 - 7%, insloped with drain on outside turns

**Typical Tread Materials:** Mostly natural surface with some rock. Some loose material possible, protrusions <6" above trail tread

**Sideslope Steepness:** 15 to 65% slopes

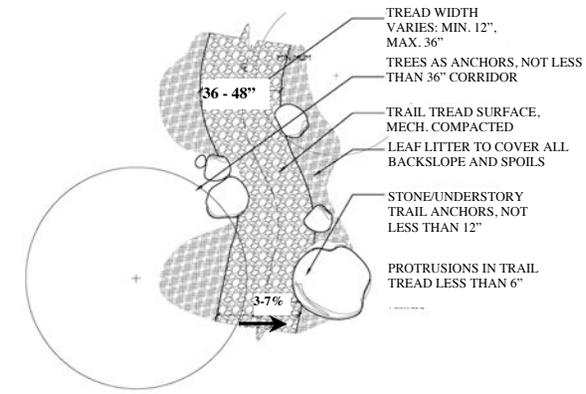
**Turn Radius:** 12' minimum

**Maximum Turnpad Grade:** 30%, insloped

**Structure Formality:** Moderate, 48" minimum width

**Wet Area Crossing Formality:** Armored crossings at grade, low puncheon over wet area

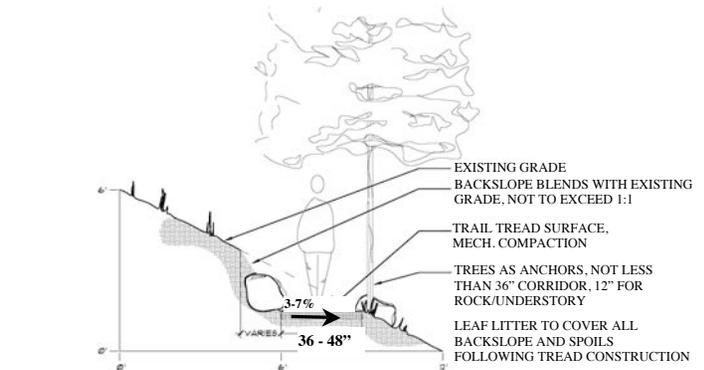
**Duty of Care:** Moderate



3.1

N.T.S

**PLAN DETAIL: BACKCOUNTRY TRAIL TYP.**



3.2

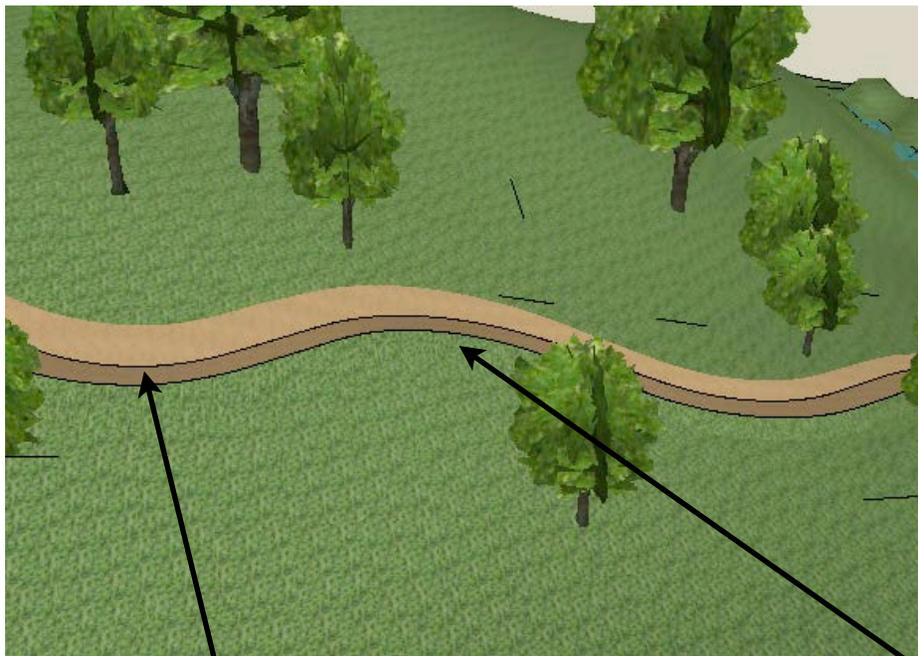
N.T.S

**SECTION DETAIL: BACKCOUNTRY TRAIL- TYP.**

# ROLLING CONTOUR TRAIL

## HIKING ROLLING CONTOUR

**Rolling Contour - Outsloped Tread with frequent grade reversals** to force water to drain off the trail, maintaining natural hydrologic flow patterns and watersheds.



Drain

## MOUNTAIN BIKING ROLLING CONTOUR

**Rolling Contour - Insloped Turn with Outsloped Grade Reversal** to keep riders on trail and reduce lateral displacement of soil.



Grade Reversal

Drain

Insloped Trail

# APPENDIX B: SOCIAL PINPOINT AND PUBLIC MEETING FEEDBACK

## CRNRA Public Meeting Notes 4-12-2018

### **Mid Meeting Q&A**

- How are you going to prioritize needs?
  - Still working that out now – the public knows more than the agency about OTG condition
- Is this Park-specific or does it include other connecting lands?
  - Park
- Is the study looking at paddlers?
  - From an access perspective
- Are you proposing new trails?
  - Probably
- Does this connect to any environmental assessment?
  - No, NEPA still has to happen – probably will change some things
- How many trail systems have you done?
  - You couldn't fling a biscuit around this country without hitting a trail system we've worked on.

### **Recreation Desires**

- What experiences do you want?
- How do you define a quality experience?
- Does the park satisfy that experience?

## Group 1

- Experience: Long, connected hiking/running experiences
  - Need better connectivity in spatially close units.
- There is crowding, but not adequate access for all.
  - E.g. fishermen can't access some good river spots because of steep banks
  - E.g. Would like more pedestrian access to the water for dog wading
- Experience: Water is the key feature and other experiences should highlight that.
- Experience: Want more volunteer opportunities
- Experience: More emphasis on trail running, because it is increasing in popularity
- Experience: Hiking in Hyde Farm area with connection to Johnson Ferry unit
- **Question: How is this plan specifically going to try to get opinions of millennials**
- Quality: Need better signage with easier to interpret signs that aren't paper. Orient signs to trails, not to north.
- Experience: More orienteering opportunities
- Quality: Safety – close areas with dangerous features (Golds Branch has rickety cables/fraying ropes that provide false sense of security)
- Quality: Distinguish between real system trails and social trails
- Park satisfaction: More often than not, local governments are stepping up to meet public needs more than national park.

## Group 2

- Quality: Improved parking
- Experience: More variety in hiking difficulty; distinctions between a “path” and a “trail” on maps
- Experience: A more mixed experience for mountain biking.
  - Quality: flat gravel that is formally open to bikes

- Quality: connected trails
- Quality: a dedicated biking facility with multiple levels of trail.
  - Suggestion: a beginner trail would be appropriate at the environmental center, because of the camp programs that occur there
- Need: a master bike plan for the entire river corridor.
- Experience: a Restaurant on the river at Azalea Park
- Quality: Creating connected corridors where you can access the park without needing to get in the car
- Quality: Interpretation of a “Total experience” of the river – Recreation, environment, history, points of interest. This could be achieved through some kind of unified data location for “best places” along the river with a n informational tool (kind of like social pinpoint)
- Experience: Bird watching.
  - Quality: Integrate birdwatching into other activities
  - Quality: Connect the trails
  - Quality: designate a “Birding Trail” to try to attract people to the are for the purposes of birding.
- Quality/Need: System to inform users about the schedules and warnings for river releases. Educational (how water works on the river) combined with alerts.
- Need: Soap in the restrooms
- Quality: designation of “urban type trails vs. solitude experiences.

### **Group 3**

- Quality: A concerted effort should be undertaken to try to drive people to Points of Interest and underused units through signage, maps, and by creating a list of “best Places”

- Quality: Routes – maps/signs should give the following information about trails: time/distance to points of interest or to finish a trail. There should be some kind of rating scale for difficulty. Maybe different colored or types of blazes by difficulty
- Experience: A zipline across the river.
- Experience: Progressive bike experiences with levels of difficulty (demand on the current trail system is too much)
- Quality: Parallel designated trails for bikers and hikers
- Experience: Interpretive talks/walks – promote underused areas, provide “reward” for visiting all units (a passport of sorts – GA State Parks has an example)
- Experience: More concessionaire access to the river (increase allowable permit level)
- Experience: Camping opportunities on river

#### **Group 4**

- Quality: Safer trails – flatter surfaces for older people
- Experience: Variety of trail difficulty including signage that ranks trails by difficulty
- Experience: Hiking with fewer visitors – solitude opportunities
- Experience: A better shuttle/portage system for boaters
- Experience: Suggested connectivity between park units – even if it’s not on park land, a route could be suggested to get to the next unit.
- Quality: Better maps/better maintained signage (getting lost is a problem and need to know official trails – suggested naming trails)
- Experience: More designated running opportunities (beyond the “fitness Trail)
- Experience: Park recommended fishing spots
- Quality: Improved Parking
- Experience: Self-guided interpretation trails.

## CRNRA Public Meeting Notes 4-14-2018

### Group 1

- Experience: More Hiking
  - Quality: More interpretation of local/regional/park history/ecology; interpretive talks by volunteers/NPS staff; weekend talks like the “owl prowl”; broad advertisement of these talks
- Overall quality: More information on what each area provides (online and signage)
  - # of parking spaces
  - Available experiences
  - Trail information
  - Directions between parks to help with continuity
- Experience: Love to feel like they get away from Atlanta
  - Quality: Parking is the biggest frustration
  - Need is mostly fulfilled by the park
  - Led walks are good for older people, because some people are “afraid of a dirt path”
- Experience: Walking
  - Quality: Long walks
  - Fulfillment: Not fulfilled by the park
  - Signage not available to let you know when you’re leaving NPS lands, if you’re supposed to be on the land you’re on or not, or if other lands/routes are available (Rogers bridge area especially)
  - Suggestion: Website where users can sort trails by use, the park publishes up to date condition information

- Need: More restrooms; stations for dog waste bags
- Full parking lots are stressful/points of conflict
- Suggest taking non-cash payments in fee areas
- Experience: Would like camping in the park area.
  - Suggest only accessible by boat
  - Primitive, but reservable
  - Tables, maybe fire pit, probably no bath facility
- Need: More mountain bike accessibility; access points for road bikes

## **Group 2**

- Some units are more “raw” than others
- Experience: Would like more “authentic” experiences
  - Met in some areas
  - Need more natural experiences
- Experience: Wildlife interaction opportunities
  - Photography opps available
  - Experience is damaged by off-leash dogs.
  - Off leash dogs also cause danger to other users
  - NPS: Enforcement is extremely hard
  - The area needs more dog park areas
  - There was a suggestion to make one unit the only one where off-leash dogs are allowed, then stricter enforcement in other areas.

- Experience: Biking “progressive” experiences
  - Need connectivity through green spaces (they’re working with Cobb Co on that now)
- Experience: Long trail running opportunities
  - Distance in the forest
  - Not met very well, because trail segment distances are not known
  - REI has an app to assist with this “hiking project” “running project”

### **Group 3**

- Experience: Wading and float fishing
  - Access is easy and the experience is well-met by the park; no crowding issues
- Person suggested that the Chat is a “gateway outdoor experience” for the locals
  - Need to maximize the opportunity through interpretation with signs about history and environment
  - Current signs are really out of date
  - Not adequate signage at Johnson Ferry wetland
- There is more mountain biking in the county than the park.
- Need to encourage a better sense of place, encourage people to move around to other park units.
- Person suggested that most people don’t even know they’re in a national park. Need big “arch” type signage
- Experience: Small group hikes – met on forest (sierra club)
- Desire: Limit group sizes in some way
- Experience: Paddling – met
- Issue: Some uses tax each other, due to bottlenecks. E.g. tubing and hiking – both constrained by parking
- Issue: visitor behavior is “appalling” sometimes

# APPENDIX C: STEWARDSHIP ENGAGEMENT BEST PRACTICES

## Benefits of Using Volunteers

Given current and projected deficit of staff numbers or with adequate resources to meet current recreation management needs, many land agencies are being “forced” to utilize external sources of assistance to maintain their lands in a manner that does not degrade natural resources and visitor experiences. Volunteers, broadly defined as non-staff resources, can fulfill land management resource voids - putting miles of trails on the ground, removing noxious weeds, cleaning up trash, interfacing with the general public, and building an engaged constituency of stakeholders invested in the success of public land management. Attaining efficiency and productivity, high performance, positive attitudes, and good morale from volunteers requires agency systems, staff time, and often additional training for staff/volunteers. When effectively organized, a collaborative team of citizens and managers is a significant force multiplier.

## Volunteer Stewardship Engagement: Overarching Goals

- Work is accomplished in a safe manner
- Volunteers have a good experience
- High quality work is accomplished with volunteers
- A sufficient quantity of work is accomplished
- The volunteer effort saves money for the agency
- The volunteer effort saves staff time for the agency
- The volunteer effort involves the community and other important constituencies
- The volunteers help support agency land management initiatives



Efficient and effective utilization of volunteers through ongoing collaboration on forest management activities hits on all the above goals. When successful, results can be measured and employed to demonstrate agency efficiencies, articulate staff/management needs for further improved results, and grow the breadth and depth of activities collaboratively taken on by agency and staff.

## Volunteer Management Development

Many public land agencies are not immediately prepared to manage volunteer projects or provide the necessary resources for project planning, design, and oversight. Systems must be developed and maintained for:

- Volunteer recruitment
- Project planning, approval, and scheduling
- Event organization and communication
- Individual and group volunteer management
- Volunteer recognition and rewards, and
- Program evaluation and improvements.



**Many hands make light work. Volunteers dig into a trail relocation project.**

Each of these volunteer management development items link directly to staff time and resources. Internal agency assessment must optimize the direct benefits of volunteer labor (through on the ground projects) and the indirect benefits of volunteer engagement (growing support network for agency) with staff time and agency costs. The agency must assess its own capacity in terms of technical (project specific), volunteer management, and a high-functioning agency-volunteer relationship. Addressing internal needs early in the process will streamline the development of meaningful projects.

## Informal Agency Stewardship Needs and Capacity Assessment (Summary Table Follows)

1. Identify agency stewardship needs through multiple processes, including internal discussions regarding annual goals, outreach and collaboration with volunteers, and strategic outlook regarding other resources that may be/are available at the time.
2. Categorize each stewardship need as ongoing, short-term, and long-term.
  - Short-term needs typically reflect a specific point source of need, such as repairing a water crossing to provide safe access across a stream or post-event clean up to pre-event conditions.

- Long-term needs reflect more general goals such as building a volunteer-led maintenance program through additional training, more efficient/effective volunteer events, etc.
- An ongoing need relates to tasks that require multiple, similar treatments over time such as litter removal or trail corridor bucking and brushing.

3. Identify needs that can realistically be fulfilled by volunteers. Volunteers are a diverse group with unique and varied skill sets. Volunteers need to be set up for success and volunteer projects should:

- a) be easily accomplished within the agreed upon time period
- b) provide tangible outcomes
- c) improve the quality of the volunteer's experience in the forest
- d) not require a specific skill set that a general group of volunteers does not have, unless the requisite training is also planned for as part of the project.



**A cache of tools awaits a volunteer crew on a trail project. Utilizing the right personnel, resources and tools for projects leads to successful projects and engaged volunteers.**

4. Identify the specific resources needed to accomplish a project. What types of tools are needed (i.e. personal protective equipment, disposable gloves for litter pick-up, proper tools for trail maintenance, environmental restoration, and tree planting)? Does the Agency have these tools? How many? Are there other sources of these tools?
5. Establish the primary contacts for the project implementation and volunteer management within the agency and volunteer groups?

## Volunteer Partner Organizations: Recruitment and Assessment

There are potential volunteers in many different places, and each may have different ideas and capacities regarding their volunteerism, and often have unique resources that they bring to the table. From visitors in the forest to national service organization and everything in between, volunteers are out there and ready to assist.

Agency-led outreach is the key to developing the relationships that result in meaningful volunteer collaborations. Staff must both understand where to look for volunteers and how to best utilize their enthusiasm, time, and resources. Waiting for volunteers to come to the agency is not a sound engagement or development strategy; volunteers will utilize their time helping elsewhere at locations where their need is articulated and coordinated, or not help at all.

Volunteer sources in your area often include:

- User Groups (Individual Mountain bikers, equestrians, hikers, or off-road enthusiasts)
- Community support groups (such as Rotary, Friends or local chapters of national organizations or established local organizations)
- College Students: Many fraternities and sororities have community service days. Also, College Outing Clubs look for opportunities that combine outdoor recreation and service.
- High School Students: Some high schools have mandatory community service and many students desire to demonstrate active volunteer service in their college admission applications.
- Girl and Boy Scouts groups of different ages.
- National Service Organizations: Americorps and the Student Conservation Association are great examples.
- Institutionalized Service: Many city, county, and state corrections departments provide well-organized, hard-working, and enthusiastic work crews that are excited to be outside.
- Local companies and Chambers of Commerce committees often look for volunteer opportunities.
- Check out [www.volunteermatch.org](http://www.volunteermatch.org) and The Corps Network at [www.corpsnetwork.org](http://www.corpsnetwork.org) to find partners.

Once a broad array of volunteers are identified, personal staff outreach will help define the potential collaborations between agency and groups, cooperation between groups, alignment with agency priorities, and potential training needs or other resource needs (i.e. funding, equipment, design, or permitting). Cross referencing the agency's internal capacity assessment table with the potential volunteer collaborations may further elucidate opportunities for projects, training, and resource needs.

Consider setting up a volunteer advisory group made up of a representative from each of the stakeholder/volunteer groups. Getting everyone together in one room a few times each year for project planning/scheduling, prioritization, and reporting often results in additional collaborative efforts help to identify efficiencies, and provides agency transparency in planning.

## Solidifying the Partnership

Clear and open communication is key to working with volunteers and maximizing their efficiency and retention. Work with the main contact(s) at the partner organization to identify:

- a. Agency contact and an individual who is the partner contact lead. Delineate the best means of communication (i.e. email, phone, meetings, etc.) between these leads and discuss how communication will flow to/from the agency and organization.
- b. Clearly define agency volunteer policies (risk management, liability waivers, code of conduct, etc.).
- c. Set mutual goals between the partner organization and the agency, using the forest stewardship needs table to clearly match the agency need with the partner.
- d. Assess communication systems (agency and partner) and determine processes and timelines for outreach and advertising, and promoting events (i.e. volunteer group designs and prints the posters, but the agency logo must be on the poster), post-event recognition to volunteers, and broader promotion of the partnership.
- e. Set up systems for tracking volunteer engagement metrics (see Volunteer Project Metrics Tracker and Annual Stewardship Report Tables), enabling the agency and the partner to measure successes over time, to better plan future projects, and to track in-kind donations to the forest that are often needed as matching funds for grants. Determine who will be the responsible party for tracking.
- f. Jointly, decide on a mechanism to recognize and reward volunteers.

With long-term relationships or ongoing projects, consider creating a project- or partnership-specific document that defines the scope of a proposed project or ongoing stewardship role with clear agendas, responsibilities, and roles. These documents help to handle volunteer and agency turnover. Potential partnership documents could include a Memorandum of Understanding (MOU, sample at end of appendix), a non-legally binding public statement of general goals and duties for a volunteer group and agency, or a jointly developed Strategic Plan that sets forth mutual goals, timelines, and success measures. These types of partnership documents can be utilized for annual project planning and year-end accounting with partner groups, creating a record of activity and transparency in the partnership.



**Promotion of agency and partner collaborations at a trailhead, advertises past successes and future projects. Communication and marketing of partnerships attracts additional participants and resources for future projects.**

## Project Resource Development

Identify training needs :

- Do all the volunteers need to be trained or can the event be accomplished with trained project leaders working with small groups of volunteers?
- What are the goals of the training and what specific knowledge or skills will be developed?
- Do Agency or Project Leaders need additional training?
- What resources can you utilize for the training?
- Do you have schedules and funding/staff/volunteers to ensure that the training can be accomplished?

Training Resources:

- Professional Trailbuilders Association workshops- [www.trailbuilders.org](http://www.trailbuilders.org)
- American Trails Webinars- [www.americantrails.org](http://www.americantrails.org)
- National Trails Training Partnership online resources, available through American Trails

Project Funding Support Assessment:

- Can you clearly demonstrate the need (resource, experiential or other protection needed? Agency goal not being met?)
- Do the project provide well-defined solutions?
- Is the project feasible given the agency and volunteer resources available?
- Can you break down your project into several phases to match funding potential (i.e. grant size, matching limitations, etc.)?
- Can you clearly articulate objectives/goals (attainable, concrete, and quantifiable outcomes) with measures of success (completed project with deadline/timeline, increased volunteer engagement and skills development, leveraging agency resources)

## **Volunteer Event Planning and Implementation**

Planning is essential for volunteer projects. Trained leaders, achievable tasks, and fun will create a sense of accomplishment that will keep volunteers coming back. Planning can start as much as one year in advance of a specific project (Adapted from IMBA's *Managing Mountain Biking*):

A volunteer event needs to be enjoyable so avoid scheduling projects during the hottest months/time of day, don't work for more than four or five hours at a time. Tackle a reasonable project that can be fully completed with the volunteers and tools available. Quality of the finished work rather than the quantity.

In addition to staff time, agencies must assess their equipment and resources to determine the maximum number of volunteers who can work at one time, as well as identify holes in volunteer-provided resources.

Working with an established volunteer group is an efficient way to organize a project since many volunteer groups take ownership in recruiting and training their volunteer pools and choosing days that work within the schedule of their constituency. If the agency is organizing a general project with broad appeal, local volunteers can be found through local (news, newspapers, local calendar postings), Agency, and volunteer media sources.



**Volunteers can provide many stewardship services. Trail construction and maintenance activities are commonly undertaken. In the middle photo a volunteer spreads surfacing along a trail.**

## **Event Planning Checklist**

### *4-12 months before the event*

1. **Identify Goals and Develop a Plan:** Write your goals and create a blueprint and timeline with your partners. The projects you tackle should be matched to experience level, manpower, need, and visibility. Evaluate your previous events to improve future projects.
2. **Set Dates Early:** Avoid conflicts with holidays, school schedules, popular local events, and races. Circulate your schedule to cultivate supporters such as outdoor retailers, local businesses, bike shops, and other user groups. Feature the event dates prominently in your newsletter and on your website.
3. **Designate Point People:** Designate one or two people from the agency and participating volunteer groups. Team up to develop realistic options for different-sized groups, arrange liability waivers, and coordinate insurance and permitting.

### *Four Months to Two Weeks Before the Event*

4. **Secure Sponsorship:** Attract a variety of sponsors to provide food, supplies, funding, or other benefits. Recognize sponsors generously in promotional materials and at the event.
5. **Get the Word Out:** Create materials to advertise the year's volunteer events. Include dates, times, locations, contact information, and logos of all supporters. Ask newspapers and television stations to publicize the event in a community calendar, or in a story. In interviews, convey the "who, what, why, where, when, and how" so interested people can get involved.
6. **Pre-Register Volunteers:** RSVP-ing can help with estimating the workgroup size, but it shouldn't be required. If you decide to use pre-registration, post forms on your website. Collect contact information so you can invite volunteers to future events.
7. **Identify and Train Project Leaders:** Identify a group of suitable volunteers and agency staff to lead different aspects of the event and provide appropriate training. Project Leaders allows for a safer and more effective event where you can break the volunteers into small groups. Make sure leaders know their responsibilities and action steps if an accident occurs.

### *Two Weeks Before the Event*

8. **Match Leaders and Project to the Expected Turnout:** Adjust project specs to the available resources and participants and make sure you have the right people and resources on the right projects. Leaders should arrive early to prepare the site and answer questions.
9. **Finalize Project Preparations:** Assure the logistics have all been addressed. For trailwork, use tightly-spaced flagging where you'll be working to assure the final product matches the design. Where needed, write field notes directly on flags. Confirm that parking, gates, restrooms, and staging areas are ready and that the time and duration are agreed upon. Finalize the emergency plan including access/exit points.
10. **Coordinate Social Aspects of the Event:** Make sure lunch and beverages are ordered or prepared on time. Collect prizes and gifts. Leave time for a social event following the work.

*Day of the Event- Guiding Principals: Be prepared, Emphasize Fun, Don't Waste Time*

11. Registration, staging and safety: In a conspicuous area, get all necessary volunteer information, follow up with schedule and staging information, and when all volunteers are registered and directed, provide a Volunteer Safety Talk that includes tool safety (spacing, proper use of tools, safety gear needed, etc.) and what to do in an emergency. Let volunteers know how their work improves the management of the forest. Explain how it aids drainage, restores damage, or improves sustainability. Volunteers perform better work when they understand its purpose, and you may inspire future crew leaders.. Finally, introduce the Volunteer Leaders and break into groups.
12. Schedule Water and Food Breaks - Assess the volunteers' morale and be prepared to cut the work day short if necessary.
13. End on a positive note, touting the success of the day and the benefits provided by volunteers to the agency.

*Immediately following the event*

14. Necessary activities to accomplish after event is over include:
  - Financial close-out: gather all receipts, documentation, final registration data, etc. and update budget
  - Appreciation: send thank-you's or acknowledgement letters to sponsors and donors, volunteers, and speakers/ presenters, and promote your ongoing programs and how they can support these programs throughout the year by joining, volunteering or making donations.
  - Communication: alert the media and update agency resources. Stick to the basics of who, what, when, where, and why. Add a "how to get involved" message with direct links to agency volunteer portals or staff contacts and 3-4 photographs of the project being undertaken by volunteers and the results of the work.
15. Conduct a post-event survey to learn what people enjoyed about your event, and where you have room to improve.
16. Conduct an internal evaluation of the event, accounting for staff time and other resources, volunteer time and other resources, work completed, value of the work completed, and strategies for improving future events.

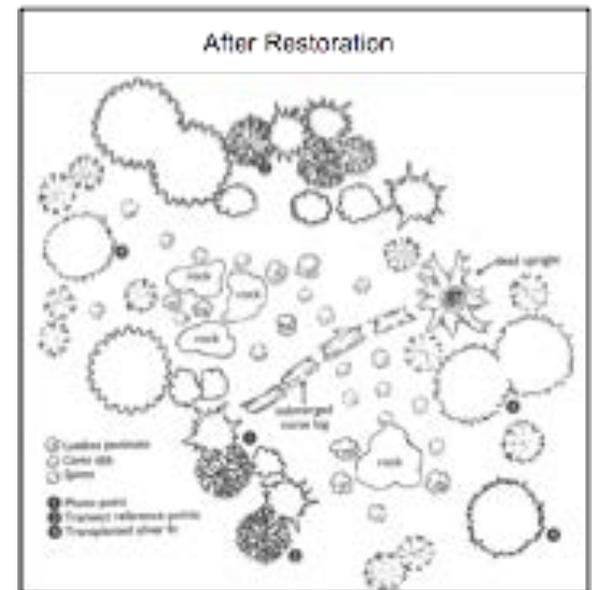
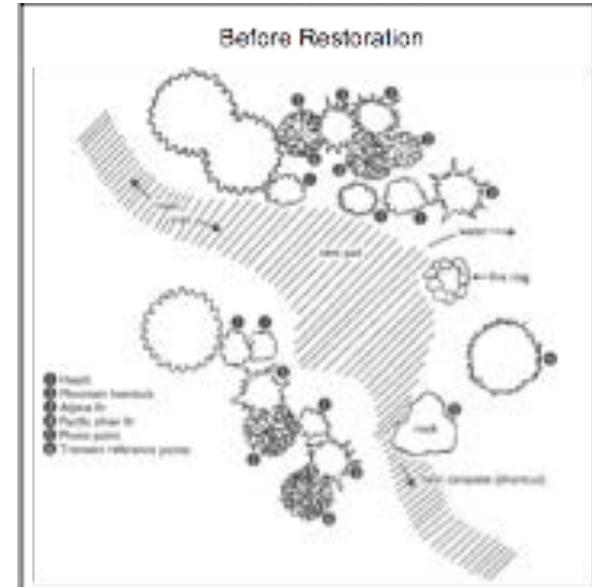
## APPENDIX D: TRAIL CLOSURE BEST PRACTICES

Undesired and informally created trails (social trails) impact the landscape and visitor experience at CRNRA. In addition to trampled vegetation and potential habitat fragmentation, fall line-aligned social trails often increase surface run off, which can lead to water-based erosion problems. As social trails receive more use and/or erode more, these routes become more pronounced and attract use, contributing to confused or lost park users. Better monitoring of social trail development and more effective closure and restoration techniques are needed to reduce natural resource impacts, mitigate habitat fragmentation, and reduce erosion.

Effective and permanent closure of undesired social trails and routes is very challenging. Trail restoration projects in locations with relatively high moisture and vegetation are initiated in a “camouflage, barricade, sign” progression prior to the actual restoration of the area hydrology and vegetation.

### Camouflage

Long-term success in closing social routes is dependent upon camouflaging the linear feature from users. Covering a linear feature with uprooted vegetation and/or woody debris does not disguise that feature and often makes the closed trail more visually evident. Initially, the creative use of cut brush and rocks to obscure the vertical corridor will be effective, but least some revegetation through transplanting, seeding, or natural regeneration is necessary for the long-term restoration success. These materials are placed within, adjacent to, and offset from the linear route to mimic a natural assemblage of materials.



## Sign

Consistent signage and messaging is the first step in reducing use on a social trail. Clear and consistent marking unauthorized routes is vital, and should be accompanied by messaging at trailhead kiosks, the visitor center, and through programming that focuses on the broader, underlying resource impacts and regeneration time needed to mitigate the damage these routes create.

## Barricade

With signage in place, physical barriers to travel may need to be introduced to reinforce the messaging that use is not authorized. Effectiveness of the barriers is related to characteristics of naturalness and subtlety. Where larger woody vegetation is present, a piece or two may be creatively used to mimic a fence. In other locations a low, unobtrusive fence may be the only option.

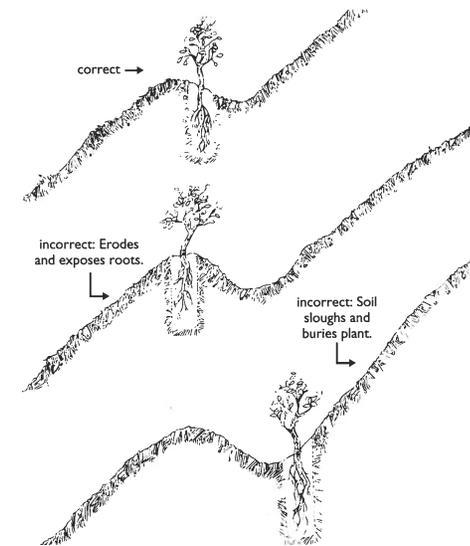
## Restore

When use of the route is stopped, restoration of natural hydrologic and vegetation patterns can be effectively initiated. If an erosion gully is present, filling that depression is necessary to restore natural hydrologic patterns. Check dams of the depth of the gully should be constructed at intervals to catch and retain sediment being transported downslope. These dams can be constructed with woody materials (large rounds from dead trees or smaller materials bound together with twine or bailing wire) or rock (large rocks or rip rap) where available.

If sufficient rock and/or woody debris is not available, coconut coir logs are effective erosion control products that allow water to flow through the check dam, but catch and hold rock, sediment, and seed materials upslope of the dam. The coir logs can also be used to reestablish vegetation by “plugging” live root specimens into the log. In more extreme cases of erosion and slope stabilization, use jute mat can be laid under the coir logs. This



Figure 4. Transplants on steep slopes must be properly placed for plant success. (IMAGE COURTESY OF THE SCA)



treatment adds additional organic matter to aid in vegetative regeneration and can also be used as a planting substrate for seed or live root seedlings.

In all cases, scarify the gully to aerate any potential native seed stock and improve permeability. Only revegetate with native plants that are already present in the vicinity of the restored trail. When establishing plants in the erosion gully, seedlings should be planted on the upslope edge of check dams.

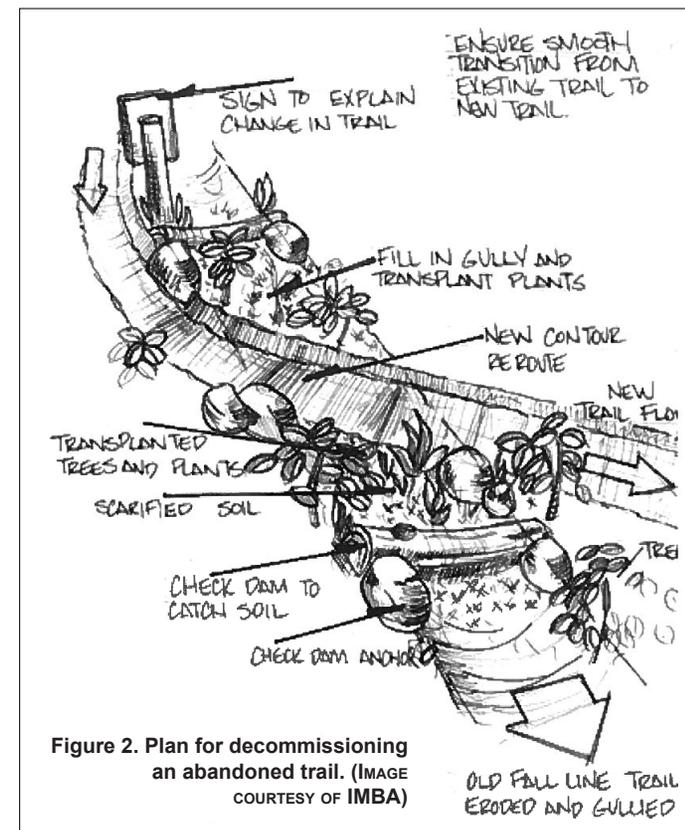
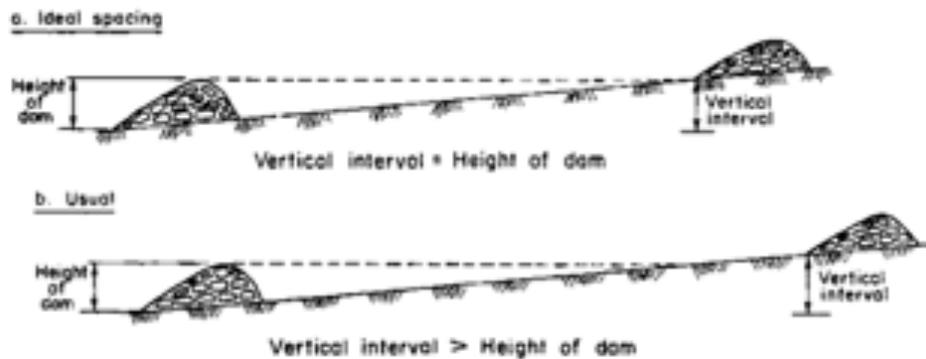


Figure 2. Plan for decommissioning an abandoned trail. (IMAGE COURTESY OF IMBA)

## **Efficacy of Indirect and Site Management Techniques in Reducing Off-Trail Behavior in a Fragile Biotic Community, Acadia National Park**

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### **ABSTRACT**

Striking a balance between resource protection and visitor experience is a perennial challenge for protected area managers. Some level of resource degradation must be tolerated to allow any recreational use at all, but even low levels of foot traffic can reduce vegetation cover, pulverize and remove organic litter, and increase the erosion potential of the underlying soils (Bradford and McIntyre 2007, Bayfield 1973, Cole 1995a, Olive and Marion 2009). In this companion paper to a 2008 article by Park et al. on efficacy and acceptability of adaptive management measures designed to discourage depreciative off-trail behaviors in a high use frontcountry setting, additive combinations of management techniques are evaluated for efficacy in a high use backcountry trail setting. Combinations including site management and information/education that address multiple motivations for off-trail behaviors are shown to be effective at reducing off-trail travel rates. However, a more-direct, obtrusive measure that relied on fewer additive components—low symbolic post-and-rope fencing—was shown to be the most effective among all treatments studied. Data were collected by a closed circuit video recording system assembled in the backcountry and powered by a deep cycle battery.

## **Resource Impact, Resource Protection**

Striking a balance between resource protection and visitor experience is a perennial challenge for protected area managers. This issue is particularly salient for those working in national parks, where visitor use measured in millions of visits per year can lead to substantial ecological and experiential impacts. Therefore, investigations of effective management approaches that prevent (or minimize) visitation-associated impacts can provide valuable information and assistance in visitor experiences and resource conditions.

For protected areas that receive high levels of visitation, the management of the effects of foot traffic and associated trampling impacts are particularly acute. Some level of resource degradation must be tolerated to allow any recreational use at all, but even low levels of foot traffic can reduce vegetation cover, pulverize and remove organic litter, and increase the erosion potential of the underlying soils (Bradford and McIntyre 2007, Bayfield 1973, Cole 1995a, Olive and Marion 2009). Repeated off-trail excursions create and proliferate informal visitor-created trails. Over time, short cuts and additional access routes are cut across vegetation and exposed soils (Johnson and Vande Kamp 1996). When visitors go off-trail or use informal trails, they can accelerate the spread of exotic invasive species into native biotic communities (Cole 1995a). Low levels of off-trail travel lead to compositional and species richness changes as fragile species are crushed underfoot (Frissell and Duncan 1965). These species (esp. ferns and other nonwoody herbs) are not resistant to impact and can be severely impacted in a single season of consistent use. Further off-trail travel slowly overwhelms more resilient species as stored resources are channeled into tissue repair. Eventually trampled areas suffer reduced biomass and vegetative cover (Cole 1995b, Sun and Liddle 1993). Continued use exposes soil by pulverizing surface organic litter into fragments and further into humus, which is easily removed by wind or

overland water flow. With reduced organic covering to cushion impacts, exposed mineral soil is made susceptible to erosion in a positive feedback cycle (Monti and Mackintosh 1979). At this stage, recovery to an “unimpacted” state can occur on a geologic timescale in some places. Localized impacts can vary in size; considered across the scale of a trail network or national park, the aggregate impact can be immense (Lawson and Manning 2002). Moreover, informal trails are quick to appear and slow to recover (Cole et al. 1997). Managers seek to limit trampling impacts by concentrating visitor traffic to networks of formal trails and designated recreation sites designed to accommodate intensive use. However, visitors frequently venture off or away from these designated trails and sites, expanding the boundaries and aggregate area of intensive trampling disturbance and creating new informal or visitor-created networks of trails and recreation sites (Leung and Marion 2000).

Accommodating more than two million visits every year since the 1960’s, Acadia National Park (ANP) is an example of these visitor impact management challenges (PUSO 2008). ANP is among the most visited national parks in the United States, and due to its comparatively small size, less than twenty thousand hectares, its density of use is exceptionally high. As a result, ANP has experienced substantial use of its popular icon areas—with associated trampling impacts—in recent years.

The Gorham Ridge Trail is one such area. Hundreds of hikers enjoy this high-use, backcountry trail each day during peak season use (personal communication to Jacobi 2007). The trailhead is vehicle accessible from the high-use park loop road, offers commanding views of coastal Maine and the ocean, and features short and comparatively easy hikes to these views. Unfortunately, a small proportion of Acadia’s visitors in past years have evidenced a functional

understanding of “Leave No Trace” principles, an international program of low impact practices and ethics adopted by ANP management (Evans 2002, Turner and LaPage 2001).

Gorham Ridge Trail hikers frequently venture off-trail once they pass the lower forest vegetation and reach the more open summit environment, characterized by exposed bedrock with thin lenses of soil and low shrubby or grassy vegetation. Trampling of the fragile subalpine vegetation and soils is a significant management concern and challenge for park staff (Turner and LaPage 2001). The thin granitic soils overlying the summit bedrock regenerates slowly given the harsh weather conditions and the bedrock’s natural resistance to erosion/soil generation processes (Davis 1966). Because of these thin soils and adverse weather, the “heath summit dwarf shrubland mosaic complex” in the area grows and regenerates slowly from foot traffic impacts and may be more vulnerable to exotic invasive incursion (Turner and LaPage 2001, Leung et. al. 2002). A century of off-trail exploration, photography, and blueberry picking has resulted in substantial, immediate, and long-lasting resource degradation (Liddle 1997, Baldwin and LaPage 2003).

Responding to these impacts, park management has erected trailhead maps and educational signage encouraging low-impact behaviors seeking to persuade hikers to remain on the formal trail or on durable rock surfaces. In addition, park managers have erected pagoda-like Bates rock cairns at regular intervals and used paint blazing in an attempt to clearly mark the designated path. However, the literature suggests that the success of these measures can be improved through adaptive management, an iterative process of flexible and “deliberately experimental” refinements to management practices (Walters 1986, Walters and Holling 1990). As successive trials of management interventions are applied in light of the insights gained from past trials, resource protection is improved. The process relies on “incremental knowledge

growth” to adequately manage dynamic natural and social systems as an ongoing series of experiments (Reid 2003). This study seeks to enrich the small corpus of research on adaptive management approaches to trail-proximate resource protection in a backcountry setting.

A companion study of this research was undertaken to examine similar concerns at a popular frontcountry site at ANP, the summit of Cadillac Mountain (Park et al. 2008). Several thousand visitors access the summit each day, spreading out from a short, paved summit loop trail onto bedrock, exposed soil and patches of vegetation. That research suggests that particular combinations of site management and information/education management approaches may be effective in enhancing the protection of the area’s biota and soil without unduly burdening the visitors’ experiences there. However, measures appropriate and effective for a frontcountry setting (as investigated by the companion piece) may not be appropriate for a backcountry setting as studied on Gorham Ridge and places like it. Another study at ANP by Cahill (2003) examined the suitability of a range of management interventions in terms of frontcountry versus backcountry settings. Cahill’s stated choice analyses found that setting had a strong effect on the acceptability of management actions arranged along a spectrum of “naturalness.” Specifically, management actions that reduced the natural aesthetic were less acceptable in backcountry settings than they were in frontcountry settings. Similarly, management interventions that increase visitor encounters between groups were more acceptable to respondents for frontcountry settings than for backcountry settings. This important finding suggests that areas of degraded environmental quality in the backcountry should not be managed in the same way as analogous impacts in the frontcountry. But which measures are effective at reducing depreciative behaviors along trails in the backcountry? Measures must first be found effective before they can be considered for their potential experiential impacts or setting suitability.

This research explores the protection effectiveness of a variety of measures drawn from management strategies and tactics suggested in the literature, though few basic research studies exist to examine the effectiveness of combinations of site management and educational messages in preventing trailside resource degradation. This information could prove invaluable in protected areas land management. The findings of this study may be useful to other land management agencies as well as larger private organizations that manage publically accessible lands.

### **Management Frameworks**

The literature describes several frameworks or strategies useful in constructing management options for limiting off-trail travel. One management framework groups impact-mitigation tactics into four broad strategies: (1) reducing use via permit requirements or restricting access; (2) increasing the supply of the resource by distributing use and making more of the area accessible; (3) reducing use impacts by altering uses, e.g., restricting type of use or behavior or educating visitors about high-impact practices; or (4) hardening the resource to better accommodate use with limited impact, e.g. installing gravel or rockwork to a trail (Manning 1999). However, not all techniques within this framework are feasible or appropriate to the aesthetics or experiences associated with a given protected area management unit.

Specific techniques derived from one of this fourfold framework’s strategies (or combination of strategies) for protecting natural and experiential resources may in several ways affect visitors’ experiences while recreating (Park et al. 2008). For example, techniques that limit use may be received unfavorably by visitors, given that such techniques generally reduce the perceived freedom of recreationists. Just as importantly, use-limiting techniques can entirely exclude some recreationists from being able to access a recreation area. Also, management techniques that are appropriate for one site may not be appropriate for another in terms of

aesthetic considerations or the recreation opportunities of the site (Cheung 1972). For example, fencing may be appropriate for reducing off-trail behaviors at frontcountry cultural and archaeological sites, but wholly aesthetically inappropriate in most backcountry settings. In addition, the management strategy used can affect perceptions of crowding (Shelby, Vaske, and Heberlein 1989). One example is the effect of alternative spatial arrangements of parking lots that concentrate or disperse equivalent numbers of visitors. Thus, it is important for managers to select techniques that are appropriate and minimally obtrusive on recreation experiences.

Another way of organizing management approaches is to locate them on a spectrum of direct to indirect actions (Gramann, Christensen, and Vander Stoep 1992; Manning 1999). Direct management actions target visitors' actions and associated outcomes (Manning 1999, Crandall 1980). Common direct management actions include fining noncompliant visitors, site management measures such as restrictive permitting schemas. At Gorham Ridge, one example of direct techniques could include use of low native stone scree walls as a visual cue of trail boundaries in exposed bedrock areas where only erosive, degraded soil (which can appear to visitors to be a thin gravel) is present to fill this role. Site alterations, posted use regulations, and other direct techniques are often effective in changing visitor behaviors but can be aesthetically intrusive or perceived to impair visitor freedom (Wohlwill and Harris 1980, Carls 1974). The aesthetic intrusion may even be tied to effectiveness. A previous study demonstrated that wooden split rail fences were less effective at keeping visitors on a trail than were less-attractive yellow nylon rope fences, even though the wooden fencing was more physically substantial (Swearingen and Johnson 1988). This tradeoff of aesthetics/perceived experience quality versus impact prevention is a common issue with site management techniques.

Indirect management actions, by contrast, seek to prevent depreciative behaviors by influencing visitor reasoning and decision-making, for example through information/education measures designed to increase awareness of the consequences of specific visitor behaviors (Gramann Christensen and Vander Stoep 1992; Gramann and Vander Stoep 1986). Previous studies have suggested that most depreciative behaviors by visitors are the result of uninformed behavior, not of malicious intent; such behaviors are thought to be effectively remedied through information/education management approaches (Eagly and Chaiken 1993, Harrison 1992, Namba and Dustin 1992). Common examples are the use of educational messages to inform and appeal to visitor ethics as a persuasive technique. For example, Roggenbuck and Berrier (1982) found that informational pamphlets had a significant effect on altering visitor dispersal at a crowded park location. Managers often prefer indirect techniques for the simple idea that they are less conspicuous in the visitor experience (Manning 1999). However, indirect techniques are sometimes perceived by managers as less effective than direct techniques, and in some cases have been empirically demonstrated to be less effective (e.g., Alessa Bennett and Kliskey 2003). This perception has been substantiated in the literature as well (Park et al. 2008).

A degree of synergy may exist between direct and indirect techniques; combinations of direct and indirect techniques may be more effective in reducing noncompliant visitor behaviors (Johnson and Swearingen 1992, Roggenbuck and Berrier 1982). A study of off-trail behavior at a hiking area in the Blue Ridge Parkway found that closing informal trails through sensitive habitat through various kinds of brushing (i.e., site management) was not effective (Johnson Bratton and Firth 1987). Brushing the informal trails (without information/education present) not only failed to close the trails, but overall impact also increased as some visitors went through the brushing (keeping the trails open) and other visitors went around the brushing, creating new impacts in the sensitive biological community there. Again, managers must take care to ensure

that an incorporation of a variety of techniques is not too burdensome or intrusive on the visitor experience. In the example of the brushing at the Blue Ridge Parkway hiking area, information/education measures may have helped visitors to understand why off-trail areas were being closed for restoration.

Regardless of any specific combination of techniques, careful thought must be given to ensuring that the measures in place address a variety of motivations for going off formal trails (Gramann and Vander Stoep 1987, Christensen and Dustin 1989, Knopf and Dustin 1992). Past research has suggested that such motivations can range from unintentional or accidental reasons (e.g., difficulty in distinguishing between formal and informal trails), through “releaser cues” (e.g., going off-trail after reaching informal trail junctions or seeing others already off-trail), to intentional/purposive off-trail behavior (e.g., traveling to a vista outcrop not routed with a formal trail) (Gramann and Vander Stoep 1987).

Research has suggested that indirect information/education approaches may be effective in changing careless or unintentional behaviors. However, direct measures are appreciably more effective at curbing intentional depreciative behaviors (Swearingen and Johnson 1994, Johnson and Swearingen 1992). For example, earlier research at Acadia’s nearby Cadillac Mountain summit found that tall wooden exclosures protecting patches of sensitive vegetation were highly effective, but appeared to suggest to visitors that all other areas of the summit (including unnaturally exposed soils and other vegetation patches) were acceptable for visitor foot traffic (Baldwin and LaPage 2002). Thus, it is important to make certain that the messages presented to visitors are explaining site management measures in place.

Additional useful means of enhancing message effectiveness lie in communication theory. Specifically, the route to persuasion construct examines how messages are evaluated by

people on the bases of content (central route to persuasion) and/or delivery (peripheral route to persuasion) (Manning 1999, 2003). Several studies have suggested that message delivery through personal contact with protected area authorities can be among the most effective means at engendering a desired visitor behavior (e.g., Fennell 2001). In an ANP context, an emphasis on delivery might involve a uniformed ranger asking visitors to remain on the paved trail. One cost-reducing approach might be to utilize official-looking logos and organization identification in an attempt to access some of the same sense of authority wielded by uniformed park employees. Similarly, a more formal or prominently placed sign by itself communicates a stronger message than a less formal one with identical wording (Baldwin and LaPage 2002). However, emphasis of the central (“substantive”) route to persuasion has been suggested to promote more lasting changes in behavior (Manning 1999). As a result, it is important to maximize messaging effectiveness through both routes to persuasion.

## **Methods**

### **Study Area**

Gorham is a popular backcountry mountain summit rising 525 feet above sea level with parking lot access along the busy and popular Ocean Drive Road. The trail’s 1 mile length receives approximately 400-600 visitors per day during the summer season. The Gorham Mountain trail is the only trail over the summit, and it is marked by Bates-style rock cairns and paint blazes to help visitors navigate and remain on-trail. Off-trail hiking, while permitted to extend visitors maximal recreation freedom, is a concern because the subalpine vegetation is relatively fragile and recovery rates are low due to the shallow dry soils in the area.

A park summit steward volunteer noted that visitors often interpret eroded, exposed patches of subalpine soil along trails and at summits in the park as legitimate foot trails. Above tree-line on the mountain, informal (visitor-created) trails occur at vistas and in other flatter

areas, with vegetation and soil loss caused by decades of intensive visitor trampling. Previous surveys by park staff have also found that the cairns used to mark the trail are under continual disturbance by visitors, adding to safety and navigation concerns. Less than 40% of cairns survive five days without alteration during the peak season (Jacobi 2003).

The objective of this study was to test the relative effectiveness of adaptive management-style combinations of educational and site management actions on reducing off-trail behavior along a high use backcountry foot trail. The efficacy of alternative treatment combinations of these actions was assessed through videography because use levels were too low to allow for the effective use of human observers. The study's observation site was selected based on availability of concealing vegetation for video equipment used to record video data, the variety of trail environs visible (and differing hypothesized motives for possible off-trail travel), and the high level of localized off-trail resource degradation. Hypothesized motives for off-trail travel include getting around other visitors, exploring, accessing vistas, and shortcutting (Park et al. 2008).

#### **Treatments**

This study tested a variety of educational messages and site management techniques in combination through an experimental, behavioral design. The practices used in the study were selected based on a review of the literature and consultations with park managers in a collaborative and adaptive management process. The overriding goal was to substantially reduce off-trail hiking. Combinations of actions were expected to have higher efficacy than single actions. Table 1 summarizes the control and experimental treatments undertaken in this study and the specific management techniques involved in each treatment.

**Control (Baseline)** – To mimic baseline existing conditions, rock cairns were placed along the trail at intervals ensuring that one was visible to hikers regardless of position and

direction of travel. Any border rocks that had been placed previously for trail management were removed. The tread of the trail itself was left unchanged in this and all subsequent treatments. There were 10 pre-existing paint blazes on the trail's bedrock surface during the control period. No educational signage was present during this treatment.

**Treatment 1 (Blazing)** – The rectangular paint blazes marking the trail were supplemented with additional similarly colored and sized temporary blazes constructed from adhesive tape (n = 13). The blazes were set at short intervals (5 – 10m) to ensure that multiple blazes were visible regardless of hiker position and direction of travel. Rock cairns were removed. Beyond the upper end of the study area, additional tape blazes (n = 6) were placed along the trail to the summit to encourage as many hikers as possible to enter the study area on the formal trail. No educational signage was present during this treatment.

**Treatment 2 (Educational Signs)** – Large educational signs were placed at each end of the trail study area (Figure 4-1). Sign text included prescriptive injunctive (i.e., what visitors *should not* do), attributional language: "Leave No Trace of your summit visit. Your footsteps damage fragile plants and animals. Please: do not leave paint-blazed trails. Do not move rocks." The message featured Leave No Trace language as a tie-in to a broader national program and to convey the intended personal outcome. The educational signs included the NPS arrowhead logo to emphasize the official authority of the message. Rock cairns were placed along the trail at intervals ensuring that one or more was visible to hikers regardless of position and direction of travel. Additional temporary blazes were placed as in treatment 1 (blazing). Additionally, approximately 10 small trailside prompter signs (Figure 4-2, inset) were placed on informal, visitor-created side trails wherever they joined the formal trail study area. Two additional

prompter signs were placed along the trail to the summit to encourage as many hikers as possible to enter the study area while on-trail.

**Treatment 3 (Coping Stones)** – Large native stones (8-24” dia.) were placed on opposite edges of the trail; these stones were spaced along the trail at 6 foot intervals to create a continuous visual trail border across the study area’s open bedrock. From the oblique viewing angle of hikers along the trail, the discontinuous coping stones more clearly delineated the boundary of the trail. Rock cairns were placed along the trail at intervals ensuring that one or more was visible to hikers regardless of position and direction of travel. No educational signage was present during this treatment.

**Treatment 4 (Scree Wall)** – Native stones were arranged as a continuous trail border throughout the study area, enough to cover the extent of the upper half of the study area. As with treatment 3 (coping stones), the rocks were large enough to create a clear visual demarcation of the trail treadway, but small enough that they were not a physical barrier. Rock cairns were placed along the trail at intervals ensuring that one or more was visible to hikers regardless of position and direction of travel. No educational signage was present during this treatment.

**Treatment 5 (Symbolic Fencing)** – Low rope fencing was installed with 0.5m wooden stakes along both sides of the upper section of the study area. As in treatment 4, the fencing was a symbolic visual cue, not a physical barrier. Rock cairns were placed along the trail at intervals ensuring that one or more was visible to hikers regardless of position and direction of travel. No educational signage was present during this treatment.

**Treatment 6 (Integrated)** – This additive treatment incorporated several of the above treatments’ measures, using the educational signage placed at both ends of the study area, the rock cairns, coping stones, and trailside prompter signs.

#### **Data Collection**

Video surveillance equipment was unobtrusively installed across the study area to evaluate the efficacy of each treatment. Three color closed-circuit weatherproof video cameras were trained on sequential segments of the study area. Each camera was oriented to provide a clear view of the trail without providing individually identifying features of the hikers. A fourth camera recorded a field of view of the lower educational signage for those treatments incorporating the sign. All cameras were wired to a digital video recorder unit and all were powered by a deep-cycle gel battery and configured through an electric timer to continuously record data during peak use hours. Field staff periodically reviewed footage to ensure system functionality, created field data backups to DVD, and replaced the battery as necessary.

The control and treatments were applied for up to four randomly selected days during a period of six weeks in July and August 2008, corresponding to peak season use levels. Video data were collected during fair weather days and peak use hours, from 9 am to 6 pm. Sample sizes for treatments and controls ranged from 686 to 1261 visitors, total headway (Table 1). Hikers were not counted as going off-trail unless they had first traveled any distance on-trail within the study area to ensure that they were making a decision to go off-trail in contravention of the treatment or control in place. Some hikers observed entering the study area in the downhill direction were likely hikers who had previously entered the study area in the uphill direction, though not all visitors share this itinerary.

At the conclusion of fieldwork, the video footage was evaluated for off-trail behaviors according to location, direction of travel, extent to which the visitor went off trail (i.e., “near off” within 6 feet of the tread or “far off”), time of day, and weather conditions (i.e., rain, wind, visibility). For treatment 2 (educational signage) additional data were collected to characterize how long each individual uphill-bound hiker spent reading the sign at the lower end of the study

area, how often cairn and border rocks were disturbed, and (where possible) the apparent reasons for hikers going off-trail.

To ensure data transcription quality, evaluators were trained in video interpretation techniques and used transparent screen overlays to clearly demarcate the different visual zones for each camera's field of view. In addition, the evaluators used slow motion review where necessary. Inter-rater reliability tests were performed among the teams of video evaluators with no significant differences found. Exceptional and ambiguous situations were flagged by the evaluators and scrutinized further as necessary.

The observation data were processed in Microsoft Excel from hourly totals of off-trail behavior to off-trail rates through a series of Visual Basic automating macros, then analyzed in SPSS for statistically significant differences among treatments and the control.

## Results

The rates for off-trail travel by treatment are shown in Table 2. Off-trail rate reductions were examined at two ranges of distance from the formal trail, less and more than 2m distance, based on literature suggesting that off-trail behavior can occur for differing motivations, resulting in differing degrees of behavior (Park et al. 2008). For example, a visitor attempting to pass a group of other visitors might tend to stay close to the formal trail. By contrast, a visitor seeking a vista may go further off-trail. Approximately 1 in 2 visitors (49.9%) went off-trail no more than 2m from the trail under control conditions. The coping stones treatment reduced off-trail rates to 48.3% of visitors, a reduction that was not significantly different than the control result ( $\chi^2 = 0.667, p = 0.414, 1 \text{ df}, n = 2438$ ). The symbolic fencing treatment provided the greatest reduction of off-trail behavior, to 11.1%, from control conditions. This reduction was

highly significant ( $\chi^2 = 323.3, p < 0.001, 1 \text{ df}, n = 1992$ ). Direction of travel was not found to have a significant effect on off-trail rates for any individual treatment.

Results for treatment efficacy were generally similar for off-trail behavior beyond 2m from the formal trail (Table 2). Blazing ( $\chi^2 = 1.029, p = 0.310, 1 \text{ df}, n = 2021$ ), as with off-trail travel within 2m of the formal trail, did not reduce off-trail travel to a rate differing from the control. The coping stones treatment did have a highly significant effect on off-trail travel rates beyond 2m from the formal trail ( $\chi^2 = 12.4, p < 0.001, 1 \text{ df}, n = 2438$ ), in contrast to travel within 2m of the formal trail. All other treatments had highly significant reductions in off-trail travel beyond 2m from the formal trail. Fencing had the greatest reduction of off-trail travel among all treatments, to 6.2% (Table 2).

Tukey's HSD and Scheffe grouping statistics were computed to understand treatment levels with similar means. Blazing and coping stones were not significantly different than control conditions in deterring off-trail travel (Table 2). The education, scree wall, and integrated treatments were shown to have similar, improved effects over control conditions. Fencing (including trailside cairns), however, was excluded from this group as the single most effective measure for reducing off-trail travel for excursions both within and beyond 2m from the formal trail.

Park et al. (2008) found that at a popular summit area in Acadia National Park, some site management measures may have a "latent effect" on off-trail behaviors, after hikers continued down the trail beyond the extent of the site management measures. Latent (or carry-over) effects were investigated across the length of the study area for treatments including a continuous site management technique (fencing or scree wall). No significant carryover effect was found for the scree wall treatment ( $\chi^2 = 2.174, p = 0.140, 1 \text{ df}, n = 719$ ), with a near off-trail percentage 4.2%

higher than the control for this section (19.6%). Similarly, no significant carryover effect was found for symbolic fencing ( $\chi^2 = 0.147, p = 0.701, 1 \text{ df}, n = 776$ ), with a near off-trail percentage only 1% lower than the control condition for this section and direction of travel (14.4%).

The number of seconds a visitor was observed to read the educational signage did not have a significant inverse effect on off-trail rates ( $\chi^2 = 56.325, p = 0.303, 36 \text{ df}, n = 518$ ) (Table 3). No clear trend was shown to exist in the relationship between time spent reading the educational signage and the percentage of visitors going off-trail (Figure 4-2). Further analysis showed that near off-trail travel reduction was significant ( $\chi^2 = 29.427, p = 0.043, 18 \text{ df}, n = 518$ ), and that far off trail travel (beyond 2m from the formal trail) was highly significant ( $\chi^2 = 35.062, p = 0.001, 36 \text{ df}, n = 518$ ). Visitors who spent the most time reading the sign were also the most likely to go off-trail subsequently. The data are inconclusive.

“Effective group” ID was procedurally generated for each visitor during the educational message treatment. The ID was assigned based on temporal groupings of people entering the study area (i.e., people hiking near others in time regardless of any social relationship or lack thereof). Visitors entering the study area within 30 seconds of earlier visitors (i.e., within visual proximity of each other) were assigned the same ID. Previous research at Acadia suggested that the presence of others off-trail nearby serves as a releaser cue for a visitor to engage in off-trail behavior. This effect was highly significant ( $\chi^2 = 562.8, p < 0.001, 412 \text{ df}, n = 518$ ) on off-trail behaviors. Since effective IDs were assigned irrespective of social units (e.g., families, groups of friends, or couples), shared IDs across visitors likely mix social units; the extent of this mixing is unknown.

## Discussion and Conclusions

### Treatment Efficacy

This research effort investigated alternative means to discouraging off-trail traffic through a series of additive experimental trials. As has been suggested by other literature, the trials incorporating more-direct measures tended to be more effective than measures relying primarily on indirect measures (i.e., information/education). One relatively unique approach taken by this research study was to examine the cumulative effects of multiple techniques applied simultaneously, e.g., combining the information/education approach with site management. If management techniques are effective ultimately because they address specific motivations for a given deprecative behavior, it follows that additive techniques targeted to multiple potential motivations should be more effective than individual techniques. These methods were effective at substantially reducing off-trail behavior. However, the most effective method relied almost exclusively upon symbolic fencing. This result suggests that, where intensive resource protection effort is required, application of multiple techniques may be unnecessarily costly where a low symbolic fence will perform even better.

Similarly, it is important to note that visually-continuous site management techniques were the most effective at reducing off-trail behavior rates. Specifically, a low continuous stone scree wall performed better than coping stones made of the same material and spaced at even intervals along the trail. While the coping stones did form a somewhat continuous demarcation of the trail border when viewed from oblique angles normally experienced while hiking, it may be important that the border is present at the very moment a visitor considers walking off-trail (or approaches a location where it is easy to wander off the formal trail unintentionally). While construction of scree walls is certainly more labor and resource intensive than that of coping stone installation, it is considerably more effective, especially in rocky environments like Acadia

ridge-top trails where it can potentially be difficult for a visitor to intuit that a given stone is, in fact, a border marker. However, it should be noted that this approach could be potentially visually obtrusive. Because intensive delineation of the trail through extended blazing did not have a strong effect on off-trail behavior rates, it is likely that confusion over what constitutes the formal trail (versus informal side trails running parallel and shortcuts) is a strong driver of off-trail behaviors.

The information/education approach did significantly reduce off-trail behavior from control levels. This approach is popular with managers because it is usually reported to be among the most acceptable of management alternatives to visitors. Gorham Ridge trail is a popular trail accommodating hundreds of visitors a day through a natural community with extremely low recovery rates. In this context, reductions in off-trail behavior may not promote resource recovery and protection. Although the educational signage in this study used multiple techniques validated in the literature for enhancing message effectiveness (attribution, prescriptive injunctive wording, peripheral route to persuasion via the perceived authority of the international Leave No Trace program and NPS logo), the reduction in off-trail behavior achieved in this manner was not sufficient on its own to protect resources. This study demonstrated that combining this information/education signage with direct site management in the form of coping stones was less effective than a continuous scree wall without the signage. Managers should not plan to rely on the effectiveness of the information/education approach at Acadia wherever trailside resources are fragile or already degraded.

Educational signage should be placed in locations that prevent visitors “bunching up” around them and blocking views to the management messages on display. Recorded video data showed that larger groups and visitors standing close to the sign occasionally obstructed it for

other, passing recreationists. Recreationists cannot be alerted to types and degrees of resource degradation if they are unable to see the sign, or can easily walk by it at a distance, as is the case with many trailhead signs and bulletin spaces.

#### **Cost Implications**

Management intensity must be balanced against cost. Acadia’s ridge trails are currently marked by historical rock cairns and blazing. Unfortunately some visitors destroy, alter, or add to these cairns, leading to ongoing maintenance costs. In this situation, continuous site management measures such as low rock scree walls or symbolic fencing may be more desirable than cairns in that they present less of an individualized “target” for depreciative behaviors, and less costly long term (Doucette and Kimball 1990). A well-designed scree wall can fade into the scenery but provide a needed prompt to stay on trail wherever necessary. Replacing the cairns with additional paint blazes (less expensive in the short term), however, is not an effective off-trail behavior deterrent, particularly in settings like Acadia where the formal trail can “disappear” in open bedrock areas and be one among several informal trail options at the far end of the bedrock face. This situation increases the difficulty in successfully remaining on the formal trail.

The companion study to this work suggested a latent effect among some site management treatments (i.e., treatments lowered off-trail behaviors beyond the extent of the actual site management) (Park et al. 2008). However, no similar relationship was found in the backcountry study area for fencing or scree walls. This study suggests that any latent effect may be situation and/or site-specific. However it should be utilized wherever possible, as it represents “free” effects beyond the installed extent of site management measures. One potential application could be utilizing obtrusive effects in sites of maximal degradation, and relying on any latent effect for proximal, marginally degraded areas.

### **Management Implications**

As a result of the insights gained from this and related studies on reducing depreciative behavior on trail systems, the authors suggest an integrated, additive management approach on reducing depreciative behavior on the backcountry trail system at Acadia National Park. Where resource degradation is most intense, e.g., near perceived vista locations along ridgeline trails similar to that of the study area, it is important to adopt a direct, site management approach. This research underscores that information/education-based approaches are not efficacious alone at reducing off-trail travel to sufficient levels. Consequently, low, symbolic fencing should be installed across junctions of the formal trail with informal trails leading to appealing shortcuts or vista sites where resource degradation is a major concern. In other locations where degradation is topographically constrained, vista side trails could be formalized and managed against further resource harm. As trail realignment is a costly measure, it should in this case be used as a last resort. Where resource degradation is still a concern but to a lesser degree than that requiring low symbolic fencing, natural material scree walls should be installed.

This research confirmed the importance of a visually continuous border along the trail to help visitors understand where the formal trail is and is not, as well as providing a gentle reminder cue at any point where the visitor could have the urge to engage in off-trail behavior. The contrast in effects between the blazing treatment and continuous border treatments suggests that continuous prompts to remain on the formal trail address the motivation to go off-trail in this high use backcountry setting. To reinforce this visual reminder at key locations including informal trail junctions, low-profile symbolic prompter signs could be installed. At locations that are actively degrading, larger educational signage could be installed to sensitize visitors to the effect of careless footsteps. When these signs are used, they can be placed close to the trail so that they are easily read in a narrow section so that visitors pass it single file.

### **Video-Based Data Collection**

The researchers would like to note the utility and effectiveness of using a video recorder-based data collection approach. By mounting digital cameras throughout the study area, field staffing needs (aside from the setup needs of each experimental treatment) were reduced to a single technician required to change out the 60 lb. battery and make periodic data backups to DVD. The resolution and placement of the cameras ensured sufficient detail for interpretation of visitor location and behavior, but protected the confidentiality of visitors participating in the study. An added benefit was the ability to recheck observational data through later review of the video footage in the few ambiguous evaluations that arose during the course of data transcription. Perhaps most importantly, though, the video surveillance approach allowed explicit, precise, and reproducible demarcations of on-trail and off-trail locations, a difficulty usually associated with studies of this nature.

A further development of this off-trail zone demarcation technique yielded the sub-zoning of near off-trail and far off-trail behavior zones, which were mapped to potentially differing reasons for going off-trail. Specifically, near off-trail behavior (within 2m of the formal trail) appeared almost always due to a visually unclear edge to the formal trail or the need to get around a large cluster of other visitors blocking the way while standing on the trail. Far off-trail behavior, by contrast, usually was due to visitors intentionally seeking alternate routes (e.g., to explore) or to seek out vistas along the trail.

### **Further Study**

This study did have some limitations and results suggest areas of inquiry for further research. This study examined additive approaches to combining multiple management techniques intended to encourage visitors to stay on the formal trail system. Each experimental trial was analyzed for the sum effect of all the techniques used in that trial. Constraints on

staffing and the length of the peak visitor use season prevented the use of a more powerful full factorial design that would allow further insight regarding the relative contributions of individual techniques within each trial. This study also assessed the efficacy of a limited subset of techniques. Additional study is suggested to further advance our understanding of the additive effects of an expanded range of management techniques for a backcountry trail setting, e.g., alternative border materials such as downed logs.

Finally, the empirical observation approach used in this study is useful as an objective measure of visitor behaviors. However, observation tells researchers little about visitor cognitive processes and motivations for undertaking the behaviors that they do. Ideally, qualitative interviews of visitors linked to their observation data would be a powerful means of understanding visitor behaviors on trail networks on a reasoning and thought process level. For example, it would be useful to know why some visitors pause to read a sign carefully and why others walk past without a second glance. Further insights of this nature help to expand our understanding of the efficacy and suitability of management actions designed to keep visitors on-trail. Finally, in evaluating the efficacy of varying management alternatives designed to encourage formal trail use, managers and researchers must also consider the site-specific aesthetic impacts of a given technique or combination of techniques. While some research has been conducted on this effect, relatively little is known about the potential combined aesthetic impacts of multiple additive management techniques. An attitudinal survey research effort could serve to expand the field in this area.

**Tables**

**Table 4-1. Summary of off-trail behavior management techniques included in each treatment.**

Treatments	Management Actions							# of Actions Included	n
	Educational Signs	Additional Paint Blazes	Cairns	Coping Stones	Scree Wall	Trailside Fencing	Prompter Signs		
Control (baseline)	No	No	Yes	No	No	No	No	1	1170
Blazing	No	Yes	No	No	No	No	No	1	847
Educational Signs	Yes	Yes	Yes	No	No	No	Yes	4	773
Coping Stones, 6 ft	No	No	Yes	Yes	No	No	No	2	1261
Low Scree Wall	No	No	Yes	No	Yes	No	No	2	686
Symbolic Fencing	No	No	Yes	No	No	Yes	No	2	818
Integrated	Yes	No	Yes	Yes	No	No	Yes	4	1192

**Table 4-2. Efficacy of measures designed to encourage visitors to remain on-trail.**

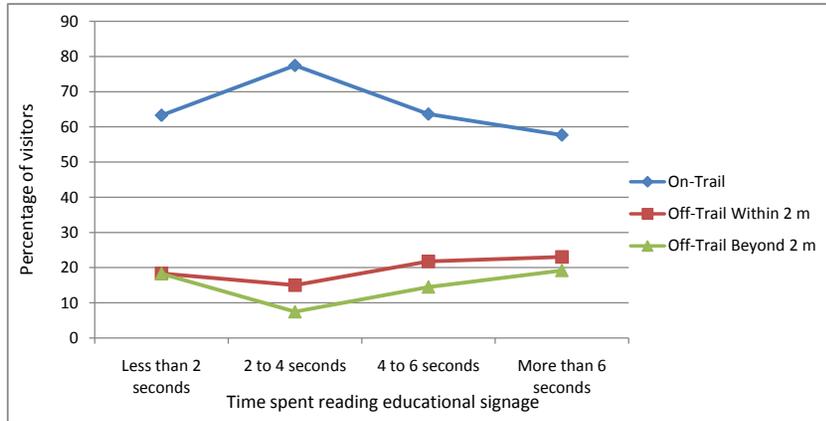
Treatment	Percentage Off-Trail Within 2 m (n) <sup>2</sup>	Percentage Off-Trail Beyond 2 m (n) <sup>2</sup>	Total n <sup>1</sup>
Control (baseline)	49.91 (586) <sup>1, a</sup>	22.91 (269) <sup>1, BA</sup>	1174
Blazing	40.50 (343) <sup>2, b</sup>	21.02 (178) <sup>1, CB</sup>	847
Educational Signs	31.56 (244) <sup>3, bc</sup>	13.71 (106) <sup>2, DC</sup>	773
Coping Stones, 6 ft	48.25 (610) <sup>1, ab</sup>	29.19 (369) <sup>3, A</sup>	1264
Low Scree Wall	21.72 (149) <sup>4, d</sup>	13.27 (91) <sup>2, ED</sup>	686
Symbolic Fencing	11.12 (91) <sup>5, e</sup>	6.23 (51) <sup>4, E</sup>	818
Integrated	24.55 (298) <sup>4, cd</sup>	11.78 (143) <sup>2, 4, ED</sup>	1214

1. Harmonic mean n = 918.49; Bonferroni-type correction applied to significance and grouping interpretation.
2. Tukey's HSD groupings as numbered and (conservative Scheffe's groupings as lettered).

**Table 4-3. Time spent reading educational signage and the effect on off-trail behavior rates.**

Signage Reading Time	On-Trail Percentage (n)	Percentage Off-Trail Within 2 m (n)	Percentage Off-Trail Beyond 2 m (n)	Total
Less than 2 seconds	63.30 (176)	18.34 (51)	18.34 (51)	278
2 to 4 seconds	77.44 (103)	15.03 (20)	7.518 (10)	133
4 to 6 seconds	63.63 (35)	21.81 (12)	14.54 (8)	55
More than 6 seconds	57.69 (30)	23.07 (12)	19.23 (10)	52
Total	66.40 (344)	18.33 (95)	15.25 (79)	518

Note: data represent only uphill travelers within the educational signage treatment.



**Figure 4-2. Time spent reading educational signage and the effect on off-trail behavior rates.**