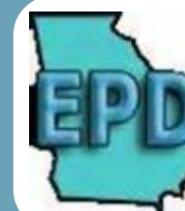


Georgia Environmental Protection Division

Best Practices: Greenspace and Flood Protection Guidebook



2014



Georgia Department of Natural Resources
Environmental Protection Division
Watershed Protection Branch
Nonpoint Source Program
Floodplain Management Unit

BEST PRACTICES: *Greenspace and Flood Protection Guidebook*

Cover Photos (upper left to lower right): City of Atlanta Old Fourth Ward Park (top), Altamaha River courtesy of Explore Georgia, City of Suwanee Greenway, City of Gainesville Rock Creek Greenway, Augusta-Richmond County Phinzy Swamp courtesy of Explore Georgia, Columbus-Muscogee County RiverWalk courtesy of Cameron Brooks.



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Objective: The objective of the Best Practices Greenspace and Flood Protection Guidebook is to provide guidance and outreach material to increase awareness of the connection between flood resilience and greenspace protection. Additionally, the guidebook should encourage innovative projects to allow communities to capture benefits from flood resilience planning beyond flood control and management.

Methodology: AMEC met with EPD to develop a list of stakeholders largely consisting of community leaders, floodplain administrators, etc. The compiled best practices were created based on the stakeholder interviews and case studies in Georgia, intended to inspire creative and multi-faceted local programs.

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The Georgia Environmental Protection Division’s Best Practices: Greenspace and Flood Protection Guidebook was produced in coordination with Tom Shillock, Glen Behrend, and Thomas Tkacs of the Georgia EPD. Authors of this guidebook include Kim Shorter, Tela Noreikas, Lee Walton, Paige Hatley, David Stroud, Ron Huffman, Lewis Hodges, Elizabeth Cole, and Demi Patch of AMEC Environment and Infrastructure.

This document produced with funding from the Federal Emergency Management Agency (FEMA), Grant EMA-2013-GR-5472

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BEST PRACTICES: *Introduction*

Background

The Georgia Environmental Protection Division (EPD) has developed this Guidebook to increase awareness of the linkages between flood resilience and greenspace protection. Designed for local elected officials, floodplain managers, recreational directors, land trusts, and other stakeholders, this Guidebook emphasizes innovative projects across Georgia where communities have captured multiple benefits from projects that increase their flood resilience. The objective is this Guidebook and supplemental training materials will inspire communities to look for linkages among existing programs and think creatively about ways to better preserve their floodplains.

Permanently preserving a floodplain as greenspace can provide a number of benefits: improve floodplain connectivity, provide flood storage that can lessen future flood impacts, reduce flood insurance rates for eligible properties, reduce nonpoint source pollution, provide compatible recreational opportunities, provide wildlife habitat, preserve stream baseflow during drought times, educate the community on the importance of floodplain management, and even raise surrounding property values. Of equal benefit, greenspace acquisition may reduce flood damage claims in a more cost effective manner than some other flood hazard mitigation options.

Organization

This Guidebook describes Best Practices related to greenspace and floodplain protection. The list of specific sub-topics is shown in the table of contents. Generally, the organization of the Best Practices flows from conceptual planning to property acquisition to development of functional facilities and concludes with ongoing maintenance. A strong emphasis is placed on Case Studies within this Guidebook, as it is often easier to replicate a program that has been successfully implemented by another local government. At the end of this Guidebook is a consolidated list of website references that identify sources for additional detail beyond the limits of this format.

Bottom Line

Most communities in Georgia want to increase greenspace and recreational opportunities. Most communities in Georgia also want to protect their communities and residents from harm and property loss associated with flooding. Permanently protecting floodplain areas and capitalizing on compatible greenspace uses can meet both goals.

Collaboration is an ongoing theme throughout this Guidebook. Combining the expertise and funding available through greenspace managers, floodplain managers, and other stakeholders can yield projects like the impressive examples outlined in this Guidebook.

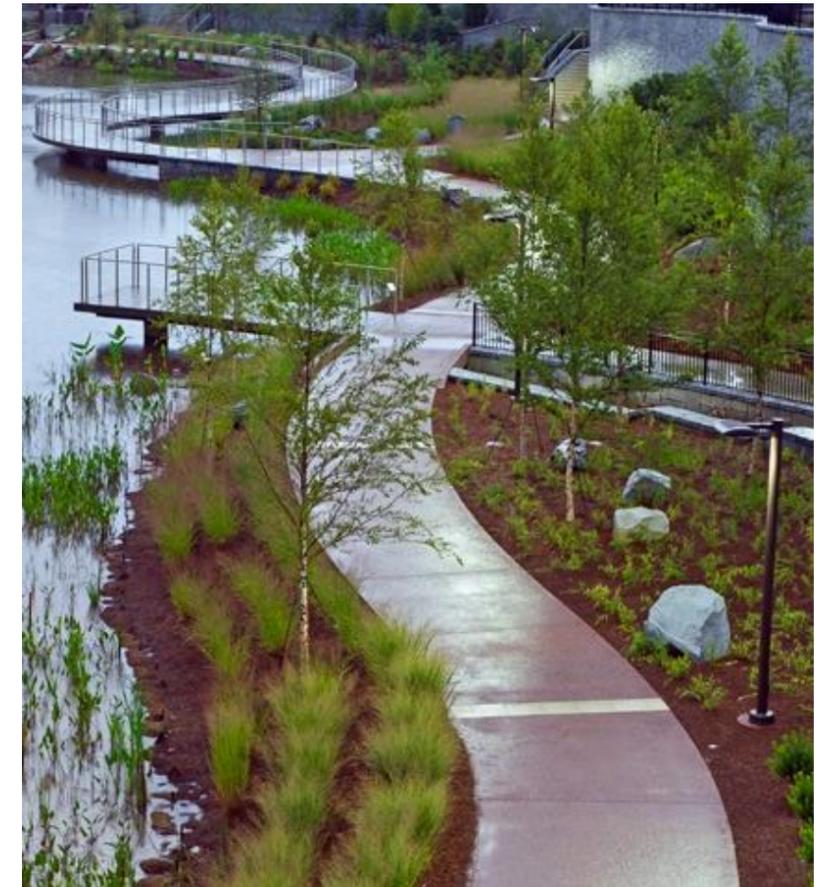


Figure iii-1: City of Atlanta’s Old Fourth Ward Park surrounds a retention pond constructed to alleviate urban flooding. The park has fostered redevelopment and hosts community events.

1 BEST PRACTICES: *Planning for Greenspace Acquisition*

Develop a Greenspace Plan.

Communities who have successfully acquired floodplain land for greenspace typically have a Greenspace Plan that documents the overall goals of the programs, their priority areas, and the types of uses that will be considered. This Plan is a long-term vision for the community and not to be confused with a site-specific master plan for a particular park or trail. The Greenspace Plan does not have to be long or formal but should create a shared vision. Considerations for a Greenspace Plan may include:

- 1 Develop Long-Term Goals and Strategies.** Leveraging partnerships (Best Practice #2) is more effective when each partner shares a common vision for the future. As an example, the Oconee Land Trust worked with Athens-Clarke County and the Georgia Land Trust Service Center to acquire over 500 acres of land. If there is a plan for land acquisition, then a partner such as a land trust can more easily help to implement the vision.
- 2 Focus on Floodplains.** Floodplain land is relatively inexpensive and serves an important function in a community. Floodplains are typically a good starting point for a greenspace acquisition program. Cobb County started their program by focusing on floodplains for Noonday Creek, Noses Creek, and Sweetwater Creek. Now the County is adding trails to several of these floodplain areas.
- 3 Accept Donations.** Some communities expand their greenspace network by accepting ownership of floodplain areas from developers during the development process. This increases publicly available greenspace and removes the property tax burden on the developer. This process must be carefully coordinated with the Finance and Tax Assessors departments.
- 4 Look for Interconnection Opportunities.** Floodplains are natural “connectors” that can form a linear network and bring together communities that are not connected by traditional transportation networks. For example, DeKalb County has used floodplains as a way to connect multiple county parks along Shoal Creek.
- 5 Be Opportunistic.** Even with a Greenspace Plan, it is important to be flexible and take advantage of opportunities that present themselves. For example, Augusta-Richmond County takes advantage of hazard declarations to acquire repetitive loss homes with a long-term strategy of connecting these properties together. Cobb County’s program was initially focused on Noonday Creek but expanded to include Sweetwater Creek following the donation of a large tract of land.
- 6 Put a Trail on It.** We are becoming a more health conscious society and people are naturally drawn to water. Initiatives that provide linear trails for walking and biking have grown in popularity across Georgia with examples including the Columbus Chattahoochee RiverWalk, the PATH Foundation trails, and the Atlanta BeltLine.



Figure 1-1: Augusta-Richmond County's Jessye Norman Amphitheater along the Savannah River.



Figure 1-2: The Atlanta BeltLine Plan.



Figure 1-3: Atlanta BeltLine trail along Tanyard Creek.

Case Study: Augusta-Richmond County

Augusta-Richmond County Community Greenspace Program. The Augusta-Richmond County program was established in 2000 and set the target to permanently preserve 20,000 acres of floodplains out of the overall goal of 33,269 acres of permanent greenspace preservation.

The heavy emphasis on floodplain preservation and use for trails and other passive recreation amenities complements local flood hazard mitigation efforts. The Greenspace Program was subsequently incorporated into the Augusta-Richmond County Comprehensive Plan.

Case Study: Atlanta BeltLine

Atlanta BeltLine Inc.'s Vision for Atlanta. The Atlanta BeltLine utilizes an existing 22-mile historic rail corridor that encircles the city of Atlanta as its foundation. The concept started in 1999 as a masters thesis and has grown into the master plan shown in Figure 1-2. This Plan envisions a network of public parks, multi-use trails and transit. The Atlanta BeltLine is the most comprehensive transportation and economic development effort ever undertaken in the city of Atlanta and among the largest, most wide-ranging urban redevelopment programs currently underway in the United States.

2 BEST PRACTICES: *Leverage Partnerships*

Leverage partnerships to expand opportunities.

- 1 Identify internal coordination opportunities.** A number of different departments and agencies in a local government touch floodplain management and greenspace protection. It can be easy to get engrossed with daily tasks and miss opportunities to collaborate. Collaboration often leads to more successful projects. Consider how interactions between the efforts of Planning & Development, Parks & Recreation, Public Works/Engineering, Stormwater, Transportation, Water Management, Floodplain Management, and Emergency Management may yield greater results. Cobb County's trail system, as an example, included participation from Cobb County Water System, Transportation, and Parks and Recreation, as well as others.
- 2 Work with neighboring jurisdictions:** Streams, and therefore floodplains, extend across community boundaries. When neighboring jurisdictions work together, it is possible to interconnect communities and provide continuous floodplain protection. The Big Creek Greenway trail that extends through parts of Forsyth County, Alpharetta and Roswell is a great example of this coordination. This project is a Case Study for Best Practice 6.
- 3 Consider working with Land Trusts.** Land trusts are nonprofit organizations that typically work with property owners to protect ecologically sensitive areas, like floodplains. Depending on the specific circumstance, a land trust may contribute acquisition assistance, technical expertise, or both. There are 50 land trusts that operate in specific areas within Georgia, of which 9 are classified as Accredited Land Trusts. Land trusts often secure conservation easements that restrict the type and/or amount of development. Athens-Clarke County is coordinating with the Athens Land Trust on a 500-acre greenspace that includes streams, wetlands, and floodplain areas. Land trusts bring technical expertise and can be especially useful when the land does not need to be owned by the local government to accomplish the community's greenspace goals.
- 4 Partner with community groups.** Community-focused groups such as non-profit organizations and Homeowners Associations can assist with property acquisition, funding, and maintenance activities. Community groups often have access to different grant and foundation funding than local governments. Community groups may participate in litter pickup events, support invasive species vegetation removal, and trail maintenance. The Adopt-A-Park concept could be used for minor trail and greenspace maintenance activities.



Figure 2-1: Southfork Conservancy volunteers working along South Fork Peachtree Creek in DeKalb County.



Figure 2-2: The Starfish Community Garden in Savannah.

Case Study: Southfork Conservancy

The Southfork Conservancy partnered with the Atlanta Botanical Garden, Trees Atlanta, and the Piedmont Park Conservancy to participate in the Peachtree Creek Confluence Restoration project. Partially funded by the National Fish and Wildlife Foundation, this project will result in the removal of invasive species and the restoration of three acres of land bordering the headwaters of Peachtree Creek. Native species plants will be used to replace kudzu, privet, and other non-native invasive plants along 0.22 miles of the South Fork.

Case Study: City of Savannah

The City of Savannah approved a community gardens program in 2012 using City-owned property within the floodplain. The City recognized the recreational and educational opportunities provided by the gardens. The City partners with interested groups to develop these community gardens. A contract between the City and the community garden group defines the acceptable maintenance parameters in part to ensure the floodplain area remains protected.



3 BEST PRACTICES: *Land Use and Development Codes*

Amend local codes to encourage permanent greenspace preservation.

- 1 Adopt an effective conservation subdivision ordinance.** Conservation subdivision standards may be amended into a zoning ordinance as an overlay zoning district or integrated into local subdivision/development regulations. Figure 3-1 illustrates a “conventional subdivision” where portions of building lots (not structures) are located in the floodplain. In Figure 3-2, the “conservation subdivision” design maintains the same density but places homes on smaller lots and outside of the floodplain. The resulting configuration leaves undivided greenspace intact. See the Newton County case study at the right, as well as the *Resources* page for more information. Provisions in effective ordinances include the following “incentives”:
 - Allow conservation subdivisions “by right” in residential zoning districts and provide flexibility in development standards (e.g. minimum lot size, building setbacks, etc.) to reduce costs and processing time that would be required if an applicant had to rezone the property and/or request a variance.
 - Allow the developer to choose the method for calculating the maximum allowed density: either a) multiply the minimum lot size in the underlying zoning district by the size of the parcel, not counting areas considered “unbuildable” (including the floodplain) or b) submit a yield plan as though the site is to be developed as a conventional subdivision. One method may result in a few more lots than the other.
 - Consider density bonus provisions, such as a maximum 10% increase in exchange for creation of contiguous (not fragmented) greenspace, the addition of trails, or an increase in riparian buffer widths.
- 2 Amend standards to require a permanent easement for designated open space.** Many communities have open space requirements but do not couple these with permanent easement requirements. Consider requiring permanent easements for Planned Unit Developments (PUDs) which require minimum open space protection. Consistent with a conservation subdivision approach, permanent easements should be required for “primary conservation areas” such as the floodplain, stream buffers, and wetlands to ensure these remain undisturbed. Similar easement requirements should be applied to conventional residential subdivisions.
- 3 Evaluate the feasibility of a Transfer of Development Right (TDR) ordinance.** A TDR ordinance allows the transfer of development rights of one parcel to another, thereby shifting density from areas designated for protection (such as floodplain and other sensitive natural areas) to areas more suitable for development. TDR programs are used in areas where there is significant development pressure and no alternate mechanism to exceed density levels. If a rezoning or variance is easier to obtain, a TDR program will likely not be used by a developer. See *Resources* page for more information.

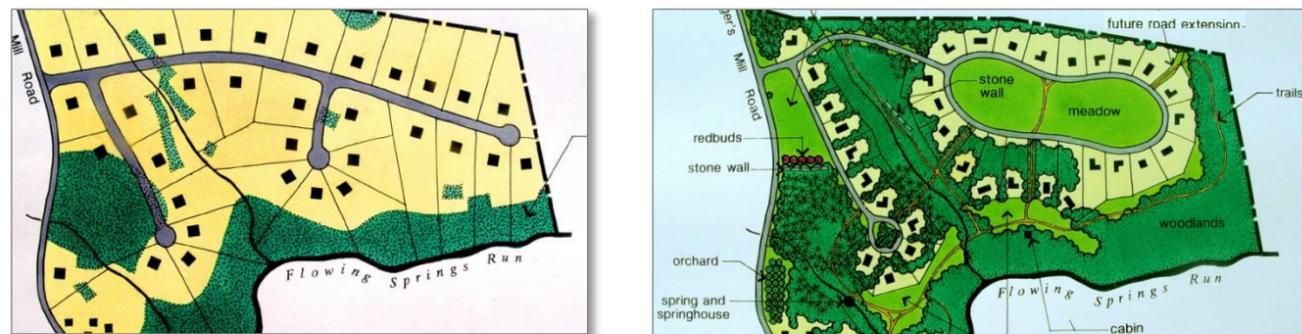


Figure 3-1: Conventional Development (L) vs. Conservation Design (R). A “conservation subdivision” groups homes on smaller lots than otherwise allowed by the property’s zoning in order to maximize and permanently protect greenspace on the project site. *Credit: LandChoices and Randall Arendt*



Figure 3-2: Chattahoochee Hills (formerly Chattahoochee Hill Country) is the first Georgia Community to preserve greenspace through a TDR program.

Case Study: Newton County

Newton County, Georgia created the Open Space Conservation Residential Overlay District to allow “conservation subdivision” development in residential zoning districts. The overlay requires 1/3 of the project site to be conserved as open space, which is defined as minimally disturbed natural areas “designed and located for the convenient access and enjoyment of all residents of the subdivision.” The floodplain is required to be conserved, and no portion of any building lot shall contain land classified as 100-year floodplain. The common open space may be:

1. Dedicated to the County;
2. Owned and maintained by a homeowner’s association (HOA)*;
3. Owned and maintained by a private, non-profit conservation organization*;
4. Owned and maintained by the residents of the subdivision (not a HOA)*.

* Requires a conservation easement to protect the property in perpetuity, and a maintenance agreement that is acceptable to the County.

The County’s zoning ordinance includes a sample conservation easement as a resource for applicants.

4 BEST PRACTICES: *Maximize Community Rating System Benefits*

Maximize CRS points for floodplain protection.

1 FEMA’s National Flood Insurance Program’s (NFIP) Community Rating System (CRS) Program is a voluntary program where communities can be rewarded for doing more than simply regulating construction of new buildings to the minimum state or national standards. Communities have an opportunity to lower flood insurance premiums for residents and businesses through the 19 CRS mitigation activities. Many of the credits awarded by the CRS are specific to a community’s floodplain programs and/or for protecting a community’s natural floodplain functions. In 2013, significant changes were made to the CRS credits that provide greater incentives to preserve and protect its floodplain.

2 The following example shows the impact adjustment calculation that is the undeveloped portion of a community’s floodplain divided by the developed portion of its floodplain.

Activity 420 - **Open Space Preservation (OSP)**. Credits are awarded for the percentage of the Special Flood Hazard Area (SFHA) that is preserved as open space.

$$\text{Benefit (\%)} = \frac{\text{Area designated as undeveloped Open Space}}{\text{Area of the SFHA within the Community}}$$

For example, if a community’s SFHA is 598 acres in size and it has 154 undeveloped acres within the SFHA, the impact adjustment and resulting benefit would be calculated as follows:

$$\frac{154 \text{ acres of undeveloped SFHA}}{598 \text{ acres in the SFHA}} = 26\% \text{ of the 1,450 points available}$$

Calculate the Credit Points = 377 points under OSP

The 377 points earned by a community for preserving 26% of its floodplain (SFHA) as open space is equal to 75% of one CRS Classification and could result in a 5% reduction in cost of flood insurance, as shown in Table 4.1.

Did You Know?

Only 46 communities in Georgia participated in the CRS program as of May 2014. The number of communities by class are listed below:

CRS 9	9 communities
CRS 8	18 communities
CRS 7	11 communities
CRS 6	7 communities
CRS 5	1 community

The City of Griffin has the lowest CRS rating in the state with a rating of 5.

Source: FEMA CRS website

Table 4-1: Possible Insurance Premium Discounts Based on CRS Class

Rate Class	SFHA* Discount	Non-SFHA** Discount	Credit Points Required
1	45%	10%	4,500 +
2	40%	10%	4,000 – 4,499
3	35%	10%	3,500 – 3,999
4	30%	10%	3,000 – 3,499
5	25%	10%	2,500 – 2,999
6	20%	10%	2,000 – 2,499
7	15%	5%	1,500 – 1,999
8	10%	5%	1,000 – 1,499
9	5%	5%	500 - 999
10	0%	0%	0 – 499

* Special Flood Hazard Area

** Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage. The Preferred Risk Policy does not receive premium rate credits under the CRS because it already has a lower premium than other policies. Although they are in SFHAs, Zones AR and A99 are limited to a 5% discount. Premium reductions are subject to change.

Case Study: DeKalb County

DeKalb County participates in the CRS program and residents are eligible for 15% discount on the typical cost of flood insurance due to measures taken by the County. County floodplain ordinances prevent development within the floodway which protects property and helps to mitigate flooding activities. Approximately 55% of the community’s floodplain is located within the floodway and therefore is protected and suitable for credit within the CRS. DeKalb County received 700 points for floodway protection as well as credits for activities.

Case Study: City of Griffin

The City of Griffin was the first in the state to achieve a class 5 rating within the CRS program. The community first entered the program at a class 7 rating by documenting plans, ordinances, and other elements already in place. This required no additional funding! The City then began to seek out more opportunities to increase their class within the CRS program.

Outreach projects, additional maintenance documentation, stream cleanup events, and drainage system inspections resulted in the City of Griffin being the first community in Georgia to achieve the class 5 rating and bragging rights!

5 BEST PRACTICES: *Combine Funding Sources*

Innovative funding expands floodplain preservation.

Local Governments have a number of funding alternatives that can be employed to acquire greenspace and floodplain areas. Communities achieve the greatest success when blending some of the traditional funding sources outlined below:

- 1 General Fund or General Revenues.** Several communities use General Funds or revenues to fund acquisition. Cobb County Water System sets aside approximately 0.5% of water and sewer revenues to fund floodplain acquisition to protect water quality and keep development out of the floodplain. The City of Alpharetta also uses General Funds to acquire land as opportunities arise.
- 2 Stormwater Utilities.** Communities with stormwater utilities (SWU) such as Clayton County Water Authority use their stormwater revenues to leverage grants for stream restoration projects that restore floodplain functionality.
- 3 Special Purpose Local Options Sales Tax (SPLOST).** A SPLOST is a voter-approved sales tax levied by a community to fund public facilities, which can include land acquisition. The revenues cannot be used toward operating expenses or most maintenance projects. Augusta-Richmond County has used SPLOST funds in combination with grants to acquire floodprone areas.
- 4 Municipal Bonds.** There are two main types of municipal bonds (general obligation and revenue, described in the right margin) that can be used to acquire floodplain land for greenspace. DeKalb County used voter-approved general obligation bonds in 2001 and 2006, totaling \$248 million, to acquire land for parks, some of which also protected floodplains.
- 5 Grants.** A number of federal, state, and private grants are available to support land acquisition, floodplain mitigation, and recreation projects appropriate for floodplain properties. A sample list of grants and sources are outlined to the right. The City of Alpharetta combined EPD 319(h) grants with FEMA Pre-Disaster Mitigation Funds to construct a wet detention pond project along Foe Killer Creek.
- 6 Supplemental Environmental Projects (SEPs).** SEPs are, in essence, environmentally beneficial projects that are outside of a community's permitted or legal authority and that are completed as part of a negotiated settlement for an enforcement action. For example, the City of Atlanta acquired streamside properties throughout metro Atlanta along tributaries of the Chattahoochee and South Rivers as part of a September 1998 settlement. EPD is open to considering floodplain purchase as part of a negotiated SEP.



Figure 5-1: Clayton County Water Authority's East Jesters Creek Stream Restoration Project in Morrow, GA funded with 319(h) grant and SWU fees.



Figure 5-2: DeKalb County's Constitution Lakes funded by bonds.

Municipal Bonds

General Obligation Bonds are backed by the full faith, credit, and taxing power of the municipality. Typically, these are voter approved and can cover a wide variety of projects including land acquisition, parks, and mitigation.

Revenue Bonds are supported by revenues from a specific project, such as a toll bridge, or fees for service like water and stormwater. They finance income-producing projects and are secured by a specified revenue source.

Common Grant Sources

Hazard Mitigation Assistance (HMA) Unified Guidance. Consolidates the common requirements for all HMA programs – including the **Flood Mitigation Assistance (FMA) Program**, the **Hazard Mitigation Grant Program (HMGP)** and the **Pre-Disaster Mitigation (PDM) Program**. It is the principle source of information concerning HMA grant requirements.

EPD 319(h) Grants. Fund projects in support of Georgia's Nonpoint Source Management Program.

Community Development Block Grants (CDBG). Fund projects that substantially benefit low and moderate income persons and can include trails or land acquisition.

Public uses are compatible with floodplains with proper planning and design.

- 1 **Recreational Fields.** When considering whether a site can handle the impacts of a recreational field use, the site should be investigated to determine which activities are best suited for the area. There are a number of characteristics to consider; size of site, subsurface conditions, width of the floodplain corridor and potential impacts that would result from development.
- 2 **Trails.** Trails are one of the most common recreational uses within floodplains and are used for a variety of activities including walking, jogging and biking. Generally, multi-use trails are paved to improve accessibility, prevent erosion, increase longevity and minimize maintenance needs. When designing multi-use trails in the floodplain, the slope, width, paving material and subsurface conditions all need to be taken into consideration.
- 3 **Water Access.** Water recreation includes a variety of activities, each having their own set of design considerations. The water's characteristics will determine the appropriate use and location of any particular water recreation use. Water access points, including boat ramps, docks and launches require a wide variety of permits.
- 4 **Buildings.** The inclusion of buildings for public use in floodplain greenspaces should be very limited. Community centers, recreation centers and similar substantial buildings should never be located in a floodplain. Pavilions, restrooms and small buildings should be located outside of flood areas if possible, but may be located within a floodplain (not a floodway) if required permitting studies are completed and the local jurisdictional authorizes determine this to be a compatible use.

Table 6-1: Compatible Recreation Uses

	Use	Upland	Floodplain	Floodway
Recreation and Trails	Ball fields	✓		
	Golf Course	✓	✓*	
	Multi-Purpose Field	✓	✓	✓*
	Volleyball Court	✓	✓*	
	Multi-Use Trail (Paved)	✓	✓*	✓*
	Nature Trail (Unpaved)	✓	✓	✓*
	Equestrian Trail	✓		
	Mountain Biking Trails	✓		
	Bridges, Boardwalks, Decks	✓	✓*	✓*
	Picnic Area, Playgrounds	✓	✓*	
Swimming Pool	✓			
Water Recreation	Fishing Areas		✓	✓
	Canoe/Kayak/Tubing Access Points		✓	✓
	Whitewater Trails		✓	✓
	Touring Water Trails		✓	✓
	Swimming/Wading Area		✓	✓
	Tubing Area		✓	✓
Buildings	Restrooms, Small Buildings	✓	✓*	
	Pavilion, Amphitheater, Outdoor Classroom	✓	✓*	
	Education Center, Nature Center	✓		

* Consider design and maintenance impacts of these uses in the floodplain or floodway. Designs must be mindful of periodic water inundation. Upland areas are more appropriate for these uses. FEMA no-rise certifications and other permits are likely required.

Case Study: City of Savannah

Fernwood/Parkwood Walking trail is a newly paved walking trail that is a product of the City's Floodways to Greenways Program. Floodways to Greenways is a new way to address drainage issues through combining stormwater infrastructure with community amenities. Savannah's Water Resources Bureau has planned events throughout the year to introduce the ecological benefits of the new trail.

Case Study: City of Roswell

The Big Creek Greenway trail is part of the City of Roswell's Wetlands Demonstration Project and consists of just over two miles of concrete sidewalk and boardwalks. The multi-user trail is heavily used by walkers, runners, dog walkers, bikers, etc. and now connects multiple communities. Three water quality features were designed to address upland stormwater runoff and protect Big Creek and the adjacent wetlands.



Figure 6-1: Flooding on the Big Creek Greenway, 2009. (www.bigcreekgreenway.com)

7 BEST PRACTICES: *Permit Requirements For Floodplain Uses*

Recognize permit requirements for floodplain uses. Permits will be required for any development located within the floodplain, and for some maintenance activities as well. Permits and regulatory approval can be a lengthy process and adequate lead time should be provided to secure needed permits. Meeting with the local issuing authority and relevant review agencies at the early planning stages of a project is recommended. The table below lists the more commonly needed permits, a brief description, and estimated lead times.

Table 7-1: Regulatory Permits and Review Agencies

Permit/ Regulatory Approval	Reviewing Agency/ Time Required
Section 106 Clearance: Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of projects they carry out, approve, or fund on historic resources. Section 106 is also required if a project receives federal clearance funding or requires a federal permit, license, or other approval; such as a Section 404 permit (described below).	State Historical Preservation Officer (SHPO): If the SHPO finds that no historic properties are present or affected, documentation is provided to the permit applicant and, barring any objection, proceeds with its undertaking in 30 days. Depending on the specifics of the project, a Federal Agency may take the lead in permitting. If a resource is listed on the National Register, then Section 106 process must be implemented.
NEPA : The National Environmental Policy Act applies to federalized projects that do not individually or cumulatively have a significant effect on the environment. Projects receiving federal funds or that require a federal permit, license or other approval would need to assess environmental impacts under NEPA that may result in a CE.	Federal Highway Administration, Georgia Department of Transportation: Where NEPA applies and an applicant is pursuing a CE determination, it is important to review the latest implementing NEPA regulations for the appropriate agency to confirm what their CE categories may be and any other guidance. Depending on the activity that triggers NEPA, multiple determinations may be needed. Each Federal Agency (Federal Highway Administration, US Corps of Engineers, etc.) has their own procedures for CE's.
No Rise Certification: Any project in a floodway, such as bridges or trails in the floodplain, must be reviewed to determine if the project will increase flood heights.	FEMA: An engineering analysis must be conducted and the project certified before a permit can be issued. It is important to work with the floodplain administrator prior to planning any work in the floodplain.
Stream Buffer Variance: In all communities there are state, regional, and local stream buffer requirement. Any encroachment in the stream buffer requires a variance. Projects within the floodplain often require multiple stream buffer variances.	Local Government, EPD, others: Many communities have specific buffers that exceed the state's. The state protects a 25-foot stream buffer on intermittent and permanent streams and a 50-foot stream buffer on those classified as trout streams. Within 60 days of receipt of a complete buffer variance application, the Division will either provide written comments to the applicant or propose to issue a variance. Special or regional buffers may exist, such as the Metropolitan River Protection Act's 2,000-foot stream buffer on either side of the Chattahoochee within a designated metropolitan area. These buffer variances are reviewed by the local issuing authority and the Atlanta Regional Commission (ARC).
Local Construction/ Building Permits: Building codes are designed to ensure safe building techniques; protecting communities from safety risks and ensuring the public safety, health and general welfare. Building permits may be needed for restroom facilities and other support facilities that cannot be placed outside of the floodplain.	Local Government : Most plan reviews are performed by local governments within 14 business days. Plans are reviewed for compliance with current and applicable codes that include, but are not limited to Georgia's Construction Codes, Building Energy Codes, Georgia Accessibility Codes, and the International Building Code.
Erosion and Sedimentation Control (E&SC): The Erosion and Sediment Control Program protects water resources by reducing the amount of erosion from development sites. Any land disturbing activity which disturbs one acre or greater or within 200 feet of a perennial stream must have an approved Erosion & Sediment Control Plan.	Local Government : Most jurisdictions are local issuing authorities (LIA) and can approve developments. A few communities relying on EPD to review their local development sites. The E&SC rules include construction inspection requirements as well. Any land disturbance will require a local land disturbance permit.
National Pollutant Discharge Elimination System (NPDES): Georgia requires most land disturbing activities one acre or greater to obtain coverage under a General NPDES construction permit.	EPD: In addition to a Notice of Intent (NOI) requesting coverage under the NPDES permit, a copy of an approved E&SC, and fees of \$40/disturbed acre for LIAs and \$80/disturbed acre for non LIAs are submitted to EPD.
Section 404: Regulates discharge or fill material into waters of the US. Projects with stream or wetland impacts may require a Section 404 permit and mitigation. This may include piers for boat docks or boardwalk trails in waters of the US.	Army Corps of Engineers: An individual Section 404 permit is required for impacts to waters of the US. Most greenspace projects will have only minimal adverse effects, a general permit may be suitable.
Endangered Species Act (ESA): If a project area contain endangered species or habitat for an endangered species, an ESA permit will likely be required. If there is an adopted Habitat Conservation Plan, additional development requirements may apply.	US Fish and Wildlife Services (FWS): Technical studies and extensive coordination are required; ESA is an intensive permit process. Allow at least 90 days to process permit applications. Additional information on locating endangered species, permitting, and application processes can be found on the <i>References</i> page.

8 BEST PRACTICES: *Design and Phasing for Recreation*

Carefully approach the design and construction of recreation projects within the floodplain. The design and construction of public amenities within floodplains involves the detailed design of elements suitable for a specific site, management of construction activities and an understanding of the facilities long-term maintenance needs.

1 Design and construct public amenities and open space improvements that maintain and enhance the functions of the existing floodplain.

- Subsurface investigations should be implemented to determine the feasibility of different types of recreation facilities development. Conditions change within floodplains and construction details of trails and other amenities within the same area may require multiple details to address subsurface conditions.
- Prepare a site inventory that includes the location of the existing floodplain and floodway limits, regulatory buffers of water bodies, wetlands, environmental habitat and features.
- Design and construct amenities that maintain and enhance the functions of the existing floodplain.
- Plan and design trails along greenways in floodplains to create linear connected parks, and include interpretive/educational signage with information about the function and importance of floodplains as part of community outreach.
- Recognize that standard construction details may not be appropriate within the floodplain due to repetitive water undulation, soil types, and moisture variations.

2 Planning and Maintenance are involved in each phase of a project.

- Think ahead when creating community plans. Ask these and other important questions early in the process. What are the maintenance costs associated with this greenspace development? Can we leverage partnerships with homeowner associations, programs similar to "Adopt-a-Park", or other entities within communities that could assist with the potential burden of maintenance of this public greenspace?



Figure 8-1: Boardwalk Constructed for Woodstock Trails



Figure 8-2: Construction of Heritage Park in Canton, GA

Key Concepts

Variables to Consider in Design and Phasing of Greenspace:

1. Understand potential challenges and costs associated with developing amenities within floodplains.
2. Plan and design with future maintenance needs in mind.
3. Assess local recreation uses currently in place. Connecting to existing established greenspace may allow for greater access
4. Know your site. Can it handle the impacts of the intended development? Geotechnical assessments can help to determine the most appropriate construction details for an area.

Case Study: City of Canton

Heritage Park, Canton GA

1. Park property is located within the Etowah River floodway/floodplain.
2. Amenities were located to preserve existing environmental features
3. Subsurface investigations were prepared to determine proper construction detailing.
4. Construction was phased to minimize damage during flood events.
5. Facility was designed and constructed to facilitate long-term maintenance needs.

9 BEST PRACTICES: *Integrating Stormwater Management*

Link stormwater management and the floodplain.

Stormwater management practices are fundamental to floodplain management. If you manage stormwater upstream with Green Infrastructure (GI) or other Best Management Practices (BMPs), then the volume and velocity of stormwater runoff is less likely to result in harm to people and properties. However, not all stormwater management practices are appropriate within a floodplain. Here are a few best practices related to integration:

- 1 Reconnect the Stream to the Floodplain.** Eroded stream banks, shown in Figure 9-1, disconnect the stream bed from the floodplain thereby reducing natural velocity control and water quality benefits. Reconnecting the stream bed and the floodplain, as shown in Figure 9-2, creates a functional system.
- 2 Restore the Natural Functionality of the Buffer Zone.** Diverse and appropriate vegetation is important. Trees and deep rooted plants minimize erosion, help slow floodwaters, and improve the ecosystem within the stream and floodplain. Grass should never be mowed to the edge of the water.
- 3 Address Upland Stormwater.** Erosive velocities can threaten stream restoration projects and must be evaluated when considering restoration.
- 4 Regulations Apply to Stormwater Management.** Even if a project is improving the stream habitat and floodplain functionality, it still requires the applicable permits as outlined in Best Practice #7. Waters of the state should not be used for active water quality treatment, but a functional stream and floodplain will provide filtration.

Figure 9-1: Channelized Stream Cross-section

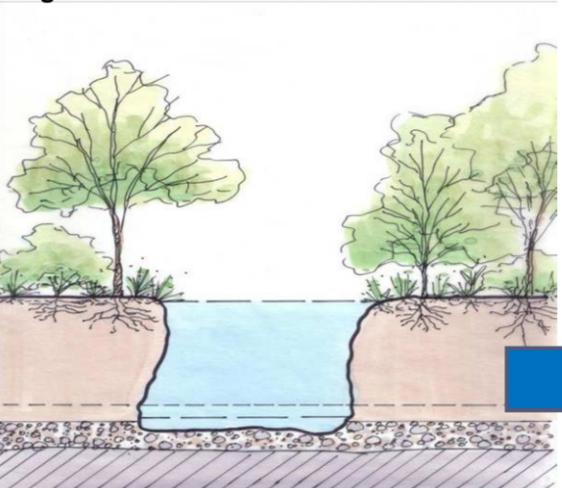


Figure 9-2: Functional Stream Cross-section

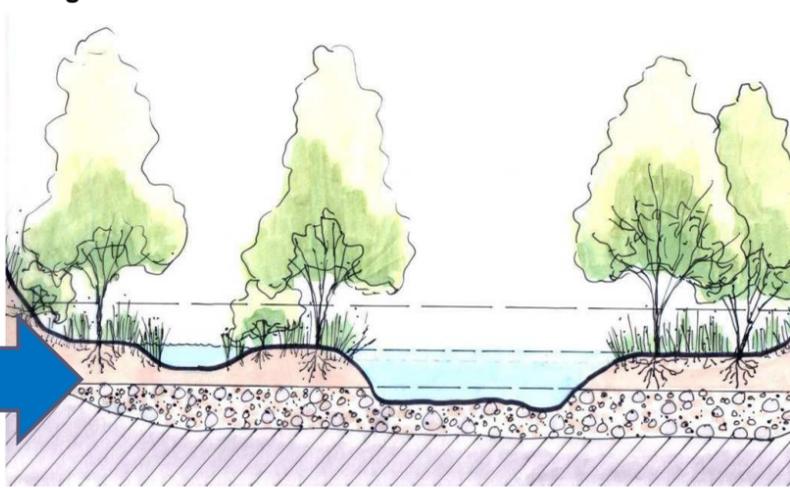


Figure 9-3: Overview of the CCWA East Jesters Creek joint project with Lake City



Figure 9-4: Section of East Jesters Creek during restoration – re-establishing connection to floodplain

Case Study: CCWA's Stream Restoration Program

Clayton County Water Authority (CCWA) initiated a stream restoration program in 2003 based on a prioritized list of stream habitat impairment and a desire to protect drinking water supplies and water quality within the county. CCWA has used a number of different funding approaches and through partnerships with neighboring jurisdictions and property owners, integrated passive recreation and education elements. One example project is the East Jesters Creek stream restoration project in Lake City.

In 2008, CCWA and the City of Lake City developed a collaborative partnership to conduct stream restoration activities along East Jesters Creek adjacent to the 26-acre Reynolds nature preserve near the Lake City Municipal Complex. The project restored 1,640 feet of East Jesters Creek to protect water quality, improve habitat, and reduce stream bank erosion.

The multi-faceted design incorporated stream restoration, wetland restoration, and stormwater improvements with the creation of a nature park complete with trails, bridges, parking areas, a pavilion, scenic overlook, and aesthetic water features. The completed project enhances water quality and restores stream and wetland while providing a place for the citizens of Clayton County to enjoy the beauty of nature and the recreation benefits of the 1.5 miles of walking trails and two park amenity areas.

10 BEST PRACTICES: *Maintaining Greenspaces in the Floodplain*

Plan and consistently execute proper maintenance of greenspace:

- 1 Establish an effective greenspace maintenance plan.** The maintenance plan needs to balance compliance with floodplain limitations/regulations, address public expectations for maintenance, and support the goals for the greenspace. The maintenance activities will vary greatly but may include:
 - Weed Control - Weed control along greenways will be conducted on an as needed basis. Methods will vary based on the location and proximity to water. Weed control may include periodic invasive plant species removal.
 - Tree and Shrub Maintenance – performed as needed to preserve plant health.
 - Trail Maintenance – This may include debris removal and possibly graffiti removal. Trail removal may include addressing erosion issues adjacent to the trail, although erosion issues can be avoided by following proper design techniques.
 - Mowing – Mowing in the stream buffer violates stream buffer protection requirements and damages the functionality of the floodplain. The maintenance plan should outline areas where mowing is and is not allowed.
 - Trash Collection and Pet Waste – Trash should be removed frequently. Many communities provide pet waste stations to protect water quality and maintain an enjoyable experience for greenway visitors.

Communities may consider working with Land Trusts or Community Groups to gain public support (and possibly volunteers) for the level of maintenance. It is important to establish community expectations for maintenance in advance. Educating the public on why mowing to the stream bed is not appropriate may translate best practices to their homes too.

- 2 Secure consistent budgeting, staffing and equipment for maintenance.**
 - To be effective, maintenance must be performed on a consistent basis. Neglecting regular maintenance for a period of time will result in additional costs to address deferred maintenance.
 - Annual maintenance budgets should include all costs and should anticipate future inflation impacts.
 - Factor in the potential need to rent or purchase specialized equipment for maintenance of areas that might be unique to floodplains.
- 3 Provide regular training on proper techniques for maintenance workers and for volunteers.**
 - Take advantage of opportunities for maintenance manager training through organizations like the National Recreation and Park Administration (NRPA) and Georgia Recreation and Park Administration (GRPA).
 - Training for maintenance workers is critical, whether they are local government employees, contract services, non-profit employees or volunteers.
 - Training should include both general best practices for maintenance and also site-specific training.
 - Always include safety training to ensure that everyone is prepared for use of equipment, site conditions, and emergency response in case of accident.

Case Study: Gwinnett County

To address ongoing maintenance challenges along the Yellow River Park Trail System, Gwinnett County completed a redevelopment plan. The park covers approximately 565 acres of land abutting the Yellow River.

The original Master Plan for the trail system (1) put trails in high maintenance areas and (2) didn't meet visitors' needs which resulted in maintenance challenges from informal trails.

The redevelopment plan outlined goals and considerations intended to reduce future maintenance demands including:

- Maintain the overstory canopy to minimize the colonization of non-native understory vegetation
- Remove fallen trees to avoid erosion and new informal trails
- Discourage off-trail travel through education to reduce the removal of native vegetation and avoid the spread of non-native vegetation
- Design trails with suitable grades to minimize erosion
- Discourage use of natural (non-paved) trails during and immediately following precipitation to avoid soil compaction and erosion
- Minimize stream crossings and where needed identify the most resistant crossing location
- Encourage "Leave No Trace" practices to avoid harm to wildlife
- View wildlife from a distance to avoid damage to important habitat



Figure 10-1: Yellow River Park, Gwinnett County: The Maintenance Program in place protects the stream buffer and floodplain functionality of the waterway *within in the park.* (www.gwinnettcountry.com)

BEST PRACTICES: *Resources*

1 *Planning for Greenspace Acquisition*

Georgia Community Greenspace Program Greenspace Planning Tools

<http://www1.gadnr.org/greenspace/schedule.html>

2 *Leverage Partnerships*

Land Trusts to Partner With

<http://galandcc.com/land-trusts-to-partner-with/>

3 *Land Use and Development Codes*

Conservation Subdivisions Community Choices Toolkit (Atlanta Regional Commission)

www.atlantaregional.com/local-government/implementation-assistance/best-practices

Model Conservation Subdivision/Open Space Development Ordinance (Metropolitan North Georgia Water Planning District)

www.northgeorgiawater.org/stormwater/model-ordinances

Model Conservation Subdivision Ordinance (Coastal Georgia Regional Commission)

www.crc.ga.gov/departments/planning/planning.html

Chattahoochee Hill Country, GA TDR Program

www.chatthillcountry.org/dev_rights

Milton, Georgia TDR Program

www.cityofmiltonga.us

The TDR Handbook: Designing and Implementing Transfer of Development Rights Programs (2012) by Dr. Arthur C. Nelson Ph.D. FAICP, Rick Pruetz, and Doug Woodruff

Transfer of Development Rights: Current Programs and Proposals for a Standard Implementation Program

http://georgiaplanning.org/student_reports/2007/13--TDR%20and%20Chatt%20Hill/CHC_TDR_report.pdf

4 *Maximize Community Rating System Benefits*

National Flood Insurance Program (NFIP) Community Rating System (CRS)

<http://www.fema.gov/national-flood-insurance-program-community-rating-system>

5 *Combine Funding Sources*

Hazard Mitigation Grant Program

<http://www.fema.gov/hazard-mitigation-grant-program>

Pre-Disaster Mitigation Grant Program

<http://www.fema.gov/pre-disaster-mitigation-grant-program>

Section 319(h) Georgia's Nonpoint Source Implementation Grant

<http://epd.georgia.gov/section-319h-georgias-nonpoint-source-implementation-grant>

Stormwater Utility Handbook: A Step-by-Step Guide to Establishing a Utility in Coastal Georgia

http://www.rivercenter.uga.edu/publications/pdf/coastal_stormwater_utility_2008_10_08_lo_res.pdf

SPLOST: Building for the Future

<https://www.gmanet.com/Assets/PDF/Publications/SPLOST.pdf>

Hazard Mitigation Assistance Program Digest

<http://www.fema.gov/media-library/assets/documents/95109>

6 *Compatible Recreation Uses*

Chattahoochee River Greenway Planning and Implementation Handbook

http://www1.gadnr.org/greenspace/c_index.html

7 *Permit Requirements For Floodplain Uses*

Section 106

http://georgiashpo.org/faq_section106

NEPA

<http://environment.fhwa.dot.gov/projdev/docuce.asp>

No Rise Certification

<http://www.fema.gov/floodplain-management/no-rise-certification-floodways> (requirements may be specific for your community/consult local authority)

Stream Buffer Variance

<http://rules.sos.state.ga.us/docs/391/3/7/05.pdf> (requirements may be specific for your community/consult local authority)

Erosion and Sedimentation Control

<http://gaswcc.georgia.gov/manual-erosion-and-sediment-control-georgia> (requirements may be specific for your community/consult local authority)

Section 404

<http://water.epa.gov/lawsregs/guidance/cwa/dredgdis/>

BEST PRACTICES: *Resources continued*

Endangered Species Act

<http://www.fws.gov/ENDANGERED/laws-policies/index.html>

Local Construction/Building Permits

<http://www.dca.state.ga.us/development/ConstructionCodes/index.asp>

National Pollutant Discharge Elimination System (NPDES)

<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

Federal Housing Authority

http://portal.hud.gov/hudportal/HUD?src=/federal_housing_administration

United States Army Corps of Engineers

<http://www.usace.army.mil/>

8 Design and Phasing for Recreation

Chattahoochee River Greenway Planning and Implementation Handbook

http://www1.gadnr.org/greenspace/c_index.html

9 Integrating Stormwater Management

Stream Corridor Restoration Principles, Processes, and Practices

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044574.pdf

10 Maintaining Greenspaces in the Floodplain

National Recreation and Park Administration:

<http://www.nrpa.org/education/>

Georgia Recreation and Park Administration

<http://www.grpa.org>

Gwinnett County Yellow River Park Trail System: Assessment and Redevelopment Plan

http://www.gwinnettcounty.com/static/departments/parks_rec/pdf/YellowRiverTARP_FINAL_3.pdf

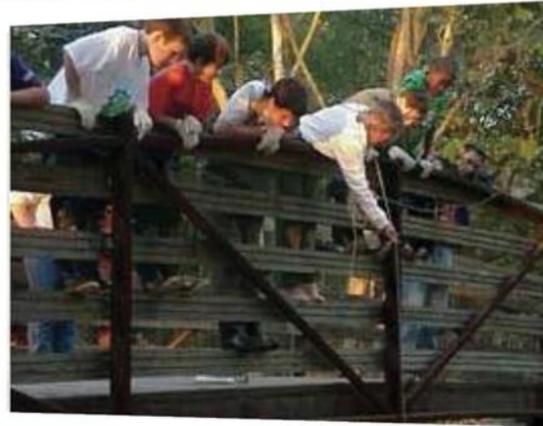
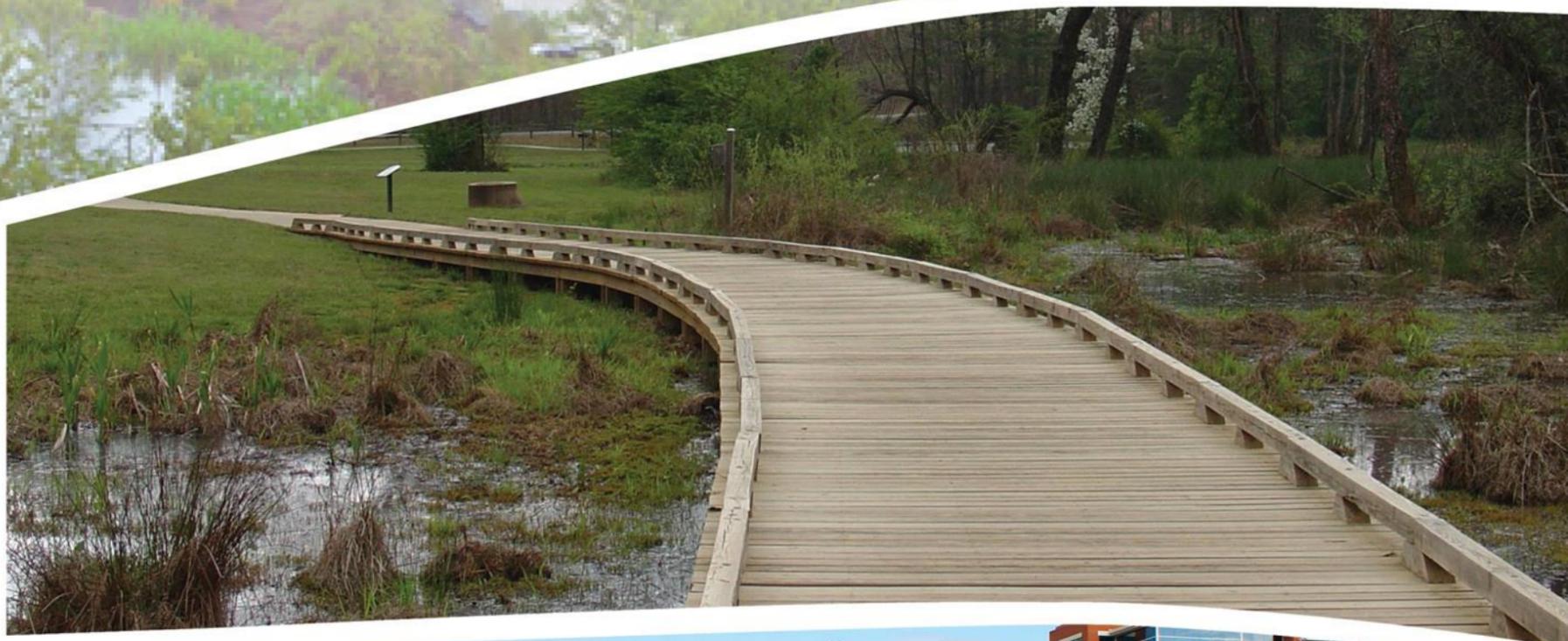
BEST PRACTICES: *Acknowledgements*

The development of this guidebook included interviews with local government and agency technical experts. Questions posed to each expert included:

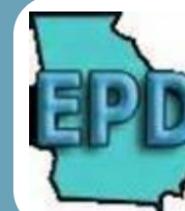
1. What is your community's best example project that highlights an intersection with floodplain management and greenspace protection?
2. What have been challenges that you have faced related to floodplain protection and/or greenspace acquisition? Have you addressed these or are there tools that could help you address these challenges?
3. Do you work on these issues across multiple departments? If so, who are the players involved (name, title, and department if available)?
4. How are floodplain and greenspace projects funded in your community?
5. Have you measured the benefit of the projects that you have completed? For example, do you know that preserving floodplains provides more value than other mitigation projects? Documentation of social/health/community/financial benefits?
6. Do you have other thoughts or input to provide?

We acknowledge the following experts that were interviewed:

Name	Title	Affiliation
Jill Bazinet	Senior Stormwater Engineer	City of Alpharetta
Seham Abdulahad	Watershed Project Manager	City of Atlanta
Susan Rutherford	Watershed Manager	City of Atlanta
Terri Turner	Development Administrator	Augusta-Richmond County
Kevin Osbey	Assistant General Manager	Clayton County Water Authority
Bill Higgins	Division Manager	Cobb County Water System
Michael Burgess	Division Chief	Columbia-Muscogee County
Brian Shoun	Floodplain Manager	DeKalb County
Brian Keel	Engineering Manager	Douglasville-Douglas County Water and Sewer Authority
Lisa Westberry	Environmental Services	Georgia Department of Transportation
Alicia Soriano	Risk Reduction Manager	Georgia Emergency Management Agency
Hans Neuhauser	Executive Director	Georgia Land Trust Service Center
Rex Schuder	Principal Community Planner	Gwinnett County Department of Community Services
George Kimberly	Executive Director	Mountain Conservation Trust of Georgia
Ernie Smith	GIS Coordinator	Newton County
Alice Champagne	Water Resources Manager	City of Roswell
Laura Walker	Environmental Administrator	City of Savannah



2014



Georgia Department of Natural Resources
Environmental Protection Division
Watershed Protection Branch
Nonpoint Source Program
Floodplain Management Unit