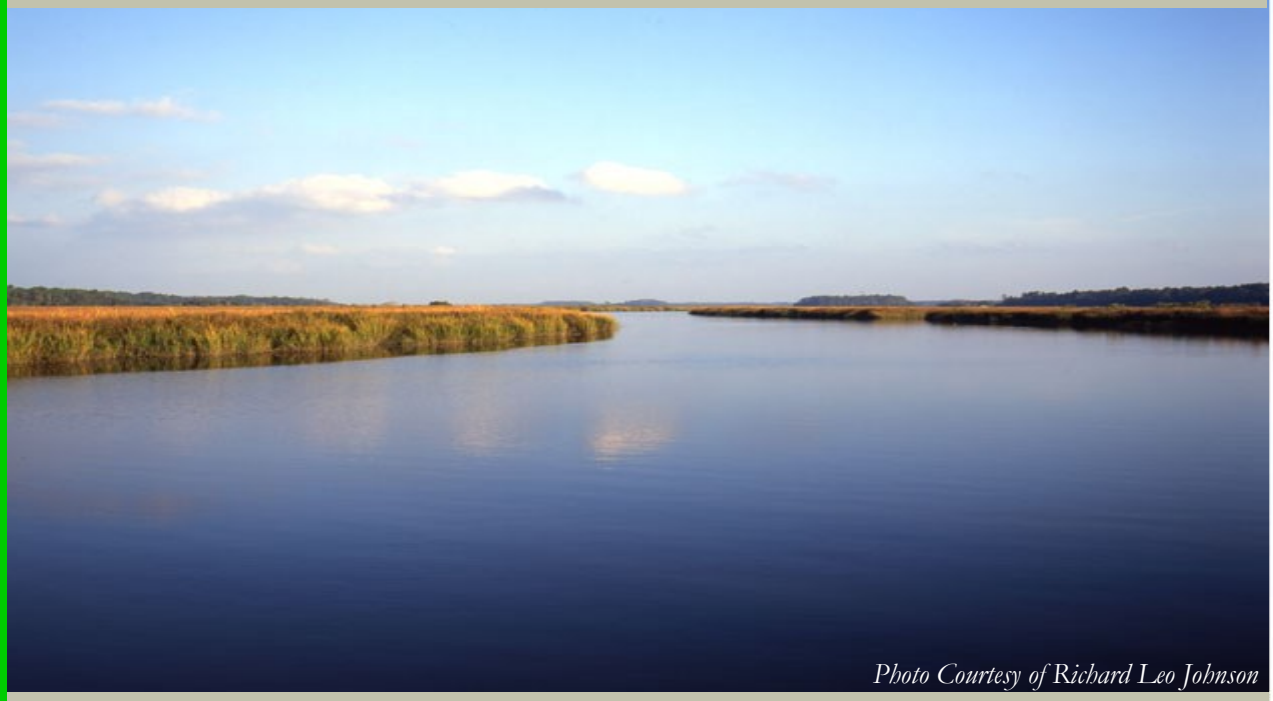
GREEN GROWTH GUIDELINES

EDITION II 2014



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GREEN INFRASTRUCTURE

SITE PLANNING & DESIGN

STORMWATER MANAGEMENT

STREAMBANK & SHORELINE STABILIZATION

RECREATIONAL DEVELOPMENT & MANAGEMENT

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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GEORGIA
Coastal Management Program

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MAREX
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In 2006, the first edition of the Green Growth Guidelines was developed as a part of Georgia's Nonpoint Source Management Program. Over time, G3 has become a "living document", and therefore has been updated and expanded to include additional strategies that aim to prevent, reduce, or alleviate nonpoint source pollution in the coastal region of the State. The second edition of G3 was completed in Spring 2014.

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Introduction

Georgia's coast is valued as a coveted national treasure—with its historic cities and distinctive smaller communities enhanced by natural beauty. The coastal region is set apart by its unique geographic landscape, defined by scenic rivers, creeks, forested wetlands, and the largest expanse of tidal marshlands in the southeastern United States. The beauty of Georgia's coast can be mainly attributed to its abundant natural resources—diverse and interconnected—these ecosystems are highly functional components of the landscape and, collectively, are some of the most biologically productive ecosystems on Earth.

The Coastal Georgia region encompasses six coastal counties and five inland counties, covering a land area of over 5,000 square miles [US Census]. It is home to five National Wildlife Refuge Areas, three State Parks, a State Wildlife Management Area, a National Seashore, and a National Marine Sanctuary—not to mention the nearly 100 miles of public beaches and waterways. The Georgia barrier islands are unparalleled in the continental United States as undisturbed islands in their natural state. All of Georgia's ocean beaches are on the seaward faces of barrier islands, which are separated from the mainland by a four to six mile-wide band of salt marsh, tidal creeks and estuaries. About half of the region's land area is comprised of tidal and freshwater wetlands. The Altamaha, Ogeechee, St. Mary's, Satilla and Savannah rivers are major waterways that meander through the coastal Georgia region and empty into the Atlantic Ocean. [Coastal RDC, 2010]

Ecological resources within the region offer endless social opportunities—as well as drive the local economy. These resources improve the overall quality of life, creating a highly desirable place to live, work and visit.

By 2030, over 800,000 people are expected to reside in the coastal region, an increase of 51 percent over the 2000 population [Georgia Coast 2030: Population Projections for the 10-County Coastal Region, 2006]. Most of the this growth is driven by a lower cost of living within the region, the attractiveness of the ecological resources the region offers to residents, businesses, and visitors, and the direct access to these resources. This population growth has stimulated economic prosperity in the region by producing jobs and increasing tax revenues at a pace greater than the national average; but it has also driven the development of Georgia's coast at an accelerated pace. As a result, natural lands will continue to be converted to developed areas, often at the expense of critical natural resources and ultimately the environmental, economic, and social health of our communities.

As coastal communities experience the effects of "sprawl", people are increasingly concerned about the impacts of rapid growth. For this reason, there is growing interest by the general population, developers, public officials, regulators, and environmentalists in more balanced approaches to land development. In response, the state of Georgia has supported the creation of the *Green Growth Guidelines, a Sustainable Development Strategy for Coastal Georgia.*

Coastal ecosystems provide flood and hurricane protection, food, commerce, and vital habitat for animal and plant communities. Additionally, these areas are readily accessible and offer a myriad of recreational opportunities. The use of Coastal Georgia's natural resources for recreational activities is logically dependent on the sustained health of these resources. Development without measures for protection and conservation can result in environmental impacts that are often irreversible and can result in the diminishment or loss of the very resources we are dependent upon. Development can result in poor water quality conditions caused by erosion and sedimentation, excess nutrients, pathogens, and toxic chemicals. Additionally, development can alter or even destruct vital marine and terrestrial wildlife habitats.

Outdoor recreation is an integral part of the culture of Georgia's coast. In addition to being a highly desirable place to live and work, the coast is a popular destination for tourists as well. The coast of Georgia is spectacular in its natural beauty, offering a variety of habitats: ocean, beaches, dunes, maritime forests, salt marshes, and many rivers with their own freshwater marshes and swamps [Mallory Pearce, 2012].

A sustainable environment is closely linked to the economic vitality of the coast. Property values and ecotourism-related revenue increases with proximity and accessibility to natural resources such as beaches, rivers and creeks, marshlands, and hammocks. Outdoor recreation accounts for $23.3 billion dollars annually to the local economy and supports over 16,000 local jobs [Georgia Statewide Comprehensive Outdoor Recreation Plan 2014-2016].

Preserving natural resources in the midst of population growth is imperative for coastal Georgia. Urbanization and its potential impact on a watershed are well known. While demand seems boundless, vital water resources are limited in supply. Consequently, there is a high potential for environmental impacts including:

- Degraded water quality from fertilizers, pesticides, and herbicides
- Increased impervious surfaces and stormwater runoff
- Loss of greenspace and buffers used as wildlife habitat
- Increased land erosion and sedimentation of tidal streams and creeks

- Decreased flood and hurricane protection
- Contaminated fisheries and beaches from metals, motor oil, and gasoline
- Contaminated recreation areas and drinking water from harmful bacteria caused by faulty septic systems
- Downstream channel scour and bank erosion caused by more severe peak storm flows
- Reduced shallow aquifer recharge due to stormwater conveyance bypassing the ground

Development practices that insist on locating buildings and infrastructure in close proximity to coastal beaches and wetlands pose a fundamental challenge to coastal development. Wind, water, waves, and the lack of natural buffers continually erode beaches and wetlands, and our best technical efforts to turn back these forces of nature on the intensive margin of the human-nature interface may not be ecologically sustainable. For example, creation of impervious surfaces, such as driveways and parking lots, affects the natural flow of stormwater. Instead of being absorbed into the soil naturally, in paved areas stormwater flows directly into ditches, streams, and wetlands. This runoff often includes pollutants, such as petroleum products from motor vehicles, particulates from brake-linings, fertilizers, and pesticides. According to the EPA List of Impaired Waterways, the following pollutants are mainly responsible for degraded water quality conditions in coastal Georgia:

- Toxic Pathogens
- Excess Sediments
- Fertilizers and Pesticides
- Heavy Metals
- Petroleum Hydrocarbons
- Solvents, Antifreeze, and other Harmful Chemicals
- Debris and Litter

Water pollution can potentially threaten the health of aquatic organisms and ultimately, humans using these areas. Coastal estuaries and wetlands provide spawning grounds, nurseries, shelter, and food for many species of birds, mammals, amphibians, reptiles and insects. Most recreationally and commercially important fishes, crustaceans, and shellfish spend at least part, if not all, of their lives in Georgia's estuaries and marshes. Good water conditions are vital to the health and sustainability of these important aquatic species. In addition to aquatic habitat degradation, terrestrial habitats—especially maritime forests—are often destructed for recreational uses. Wildlife depends on large, contiguous, natural areas for food, shelter, and reproduction. Habitat destruction and fragmentation is closely linked to declined species richness and biodiversity. Habitat loss is expected to persist and most likely increase in relation to continued coastal development.

When coastal barrier islands, hammocks, and wetlands are modified beyond a functional threshold, these areas lose the natural ability to protect the mainland against damaging floodwaters and winds associated with major storms and hurricanes. Cumulative aquatic ecosystem impacts coupled with rapid development of essential riparian buffers and the mainland itself can result in a significant safety risk, especially to residents and businesses located within flood-prone areas. In addition to flood protection, people depend on coastal waters for food and recreation. Some of the most sought after seafood—oysters, shrimp, crabs, clams, flounder, mackerel, shark, and mullet—are long-lived, often bottom-dwelling fish and filter feeders which are particularly susceptible to excess nutrients, chemicals, and bacteria. Chemical and bacterial contamination can also render beaches, rivers, and creeks unfit for swimming, skiing, fishing, and other water-contact activities.

In the interest of the public, the main goal is to protect and sustain the unique cultural, historical, biological, and aesthetic character of coastal natural resources. This presents an immediate need for strategies that achieve a balance between economic development and environmental conservation of natural resources. The main objective of the *Green Growth Guidelines* is to prevent, reduce, and manage nonpoint source pollution before it adversely affects coastal waters. Implementation of these guidelines can result in numerous environmental and economic benefits including:

- Better water quality
- Healthier wildlife habitat, especially for marine life
- Cleaner, safer conditions for recreational activities
- Enhanced visual appearance
- Reduced construction and maintenance costs
- More efficient operations
- Higher profit margins
- Increased property values
- Investment opportunities in sustainable businesses
- Community recognition and rewards for environmental stewardship

Executive Summary

It is the mission of the Georgia Coastal Management Program to balance economic development in Georgia's coastal zone with preservation of natural, environmental, historic, archeological, and recreational resources for the benefit of Georgia's present and future generations.

The Georgia Department of Natural Resources Coastal Resource Division's role in the GCMP is to provide funding and technical assistance for programs that prevent, reduce, and abate nonpoint source pollution in coastal waters. In support of this program objective, the ***Green Growth Guidelines (G^3)*** was developed to encourage alternative site planning and design techniques, construction practices, and management measures that protect the health and vitality of Georgia's coastal ecosystems.

The guidelines serve as a toolbox of innovative, yet practical, strategies that result in development projects that are profitable and environmentally sensitive - reaping the benefits of growth without overwhelming communities, taxpayers, and the environment in the process.

This guide strives to make the green growth process an appealing and more readily accepted model for the rapid development facing this region. Balancing inevitable development demands and natural resource protection are essential to achieving better water quality in the region. Adopting green planning and development for our coastal region achieves this balance. With creativity, determination, and support for these efforts, coastal Georgia can create and maintain healthy, vibrant communities that ensure economic vitality while retaining a healthy environment.

Made possible by the National Ocean and Atmospheric Administration, Environmental Protection Agency, and the State of Georgia, G3 is the product of a collaborative effort among a consortium of private and public stakeholders including the members of the development community, scientists and researchers, natural resource managers, local governments and private landowners. G3 is intended to evolve as a "living" document—to be updated and expanded as needed to address current and future growth patterns and natural resource issues. The Second Edition of G3 is comprised of five (5) chapters.

Chapter 1—Green Infrastructure: A Sustainable Development Approach

The first chapter includes (1) important Green Infrastructure terminology and concepts, (2) a list of technical and financial assistance tools and resources for local governments, developers and landowners interested in implementing GI strategies, and (3) a series of GI network maps that can be used for planning and design purposes.

Chapter 2—Designing with the Landform: Better Site Planning and Design

The second chapter contains (1) Site Selection Criteria, (2) Natural Resource Inventory—Site Fingerprinting Process, (3) Better Site Planning and Design Techniques, (4) Model design comparison demonstrating the economic and environmental benefits of green site development versus conventional development plans, and (5) Examples of green building case studies throughout the Southeast.

Chapter 3—Stormwater Management

The third chapter provides (1) Green Infrastructure and Low Impact Development-based Stormwater Management Practices, (2) Site Planning and Design checklists, (3) Practice Design Profiles from Georgia's Stormwater Management Manuals—Coastal Stormwater Supplement, and (4) Regulatory Permitting Contact Information.

Chapter 4—Streambank and Shoreline Stabilization

The fourth chapter covers (1) Streambank and Shoreline Stabilization Practices, (2) Living Shorelines Local Case Study, and (3) Regulatory Requirements and Contact Information.

Chapter 5—Recreational Facilities Development and Management

The fifth chapter includes Planning, Design, Construction, and Management Guidelines for Golf Courses, Parks, Trails, Marinas, and Community Docks.