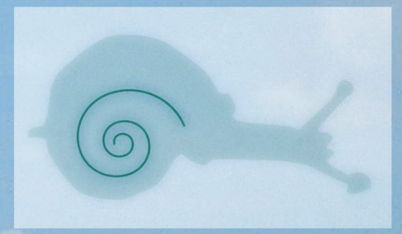

Critical Line Buffer Ordinances: Guidance For Coastal Communities

Water Quality Improvement and Community Enhancement Series

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Critical Line Buffer Ordinances: Guidance for Coastal Communities

Water Quality Improvement and Community Enhancement Series

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LIST OF ACRONYMS

CLBO: Critical Line Buffer Ordinance

CWP: The Center for Watershed Protection

GIS: Geographic Information Systems

IRB: Institutional Review Board

NOAA: National Oceanographic and Atmospheric Administration

NPS: Nonpoint source pollution

SC DHEC-OCRM: South Carolina Department of Health and Environmental Control Office of Coastal Resource Management

SCCCL: South Carolina Coastal Conservation League

SC DNR: South Carolina Department of Natural Resources

US ACE: United States Army Corps of Engineers

US EPA: United States Environmental Protection Agency

USES: Urbanization and Southeastern Estuarine Systems Project

US FWS: United States Fish and Wildlife Service

WBO: Wetland Buffer Ordinance

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EXECUTIVE SUMMARY

In coastal areas, localities are consistently faced with important decisions that will affect the short- and long-term quality of life in their communities. What to promote? Where to plan? When to preserve? How to prosper? Why protect? Residents often ask these questions and wonder how they can, or if they should be, involved with these debates. Coastal community citizens are seeking quality growth that balances economic development, human health, conservation, and environmental protection. The sustainable management of resources is one set of practices to address the changes spurred by growth while maintaining quality lifestyles for residents.

The population in coastal South Carolina is expanding at a rapid rate, and natural, cultural, and economic resources draw newcomers and keep long-term residents. Individuals are attracted to the South Carolina Lowcountry for its many appealing traits, including recreational opportunities (e.g. fishing, birding, boating) and the quality of the area resources. Water is key to these recreational activities and is vital for the health of coastal communities. Promoting good water quality, environmental health, and community involvement are the goals of this Water Quality Improvement and Community Enhancement Series. "Critical Line Buffer Ordinances: Guidance for Coastal Municipalities", a manual in the series, provides specific mechanisms to address these goals.

Significant scientific research, such as the Urbanization and Southeastern Estuarine Systems (USES) project conducted in the South Carolina Lowcountry, has provided many results about the current state of water quality (and its impact on flora and fauna). These scientific results have provided recommendations that promote consistent protection of coastal water quality for human health. Several of these recommendations point to the use of wetland buffer ordinances (WBOs) to protect and improve water quality.

One type of WBO is particularly useful for coastal communities to consider: critical line buffer ordinance (CLBO). This manual is a detailed guidance document examining the experiences of two South Carolina Lowcountry municipalities (the Town of Mount Pleasant and the City of Charleston) that have successfully enacted CLBOs. Generalizations drawn from the case studies presented in this manual provide a step-by-step model for CLBO creation, enactment, and implementation. Inherent in the manual approach is the recognition that cultural, environmental, and political variability exists from one community to another. Community case analysis provides lessons learned for localities to enhance their protection of water quality and the involvement of stakeholders. Our approach captures stakeholder sentiment about the process and the level of success about the use of CLBOs.

This manual provides practical insight for communities that are seeking to devise strategies for the protection or improvement of water quality. The use of CLBOs is one way that local residents, especially those in the eight coastal South Carolina counties, can directly participate in processes that not only improve water quality, but also enhance their community.

1.0 INTRODUCTION

"…I don't want to destroy the earth…I want us to have water.
I want my kids to have water and my grandchildren to have water." —*Real Estate Broker*

"…in Charleston, you know, you're here for not only a lot of other good quality of life things, but you're here for the water. So we need to protect our water." —*Town of Mount Pleasant Staff Member*

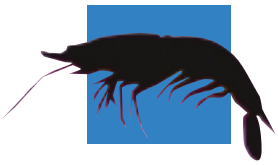
"…water quality affects all of us." —*Town of Mount Pleasant Council Member*

1.1 Manual Purpose

Recent scientific research conducted in the **South Carolina Lowcountry** has provided many results and recommendations supporting the use of **wetland buffer ordinances (WBOs).** For example, the **Urbanization** and Southeastern **Estuarine Systems** (USES) project, which began in 1990, was designed to (1) assess the impacts of urban development practices on small, high salinity **estuaries** in the southeastern United States, and (2) develop tools to aid in environmental management decision-making and planning in the **coastal zone** of South Carolina (2005). Two of the most important recommendations based on USES results were that South Carolina coastal communities should (1) maintain natural **buffers** between developed areas and waterways, and (2) create buffer strips around areas of **impervious surfaces** where vegetation had been removed (2005). Research findings such as these, along with the demonstrated benefits of existing WBOs, clearly evidenced the need for creation and implementation of municipal wetland buffer ordinances. Moreover, the Office of Ocean and Coastal Resource Management within the South Carolina Department of Health and Environmental Control (SC DHEC-OCRM) encourages the development and implementation of wetland **buffer ordinances** (also known as **vegetative and riparian buffers**).

Lowcountry Landscape (Photo by: Hitchcock)

Urban Municipal Buffer
(Photo by: Zimmerman)



The purpose of this manual is to provide guidance for **critical line buffer ordinance (CLBO)** development and implementation based on two successful cases from the South Carolina Lowcountry: the City of Charleston, SC, and the Town of Mount Pleasant, SC. This guidance targets, but is not limited to, municipalities along the South Carolina coast, including those in the eight coastal counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties (Fig. 1-1). Overall, CLBOs are designed to protect coastal **water quality**. Generalizations drawn from the case studies presented in this manual help provide a step-by-step model for CLBO creation, enactment, and implementation, while recognizing that cultural, environmental, and political variability exists from one community to another, given the nature of the community contemplating an ordinance and its surrounding environment. While this manual serves as a guidance tool, it also captures the comments, opinions, and sentiments from a variety of **stakeholders** throughout the ordinance creation process in the two case study communities. Examination of the Charleston and Mount Pleasant cases from political, socio-cultural, economic, and other perspectives provides communities with guidance on addressing this variability and lessons for effective CLBO implementation.

"…the Lowcountry…has barrier islands that you don't see in other parts of the country and…marshland…we have to protect it for the future."

—City of Charleston Council Member

"…the unique thing about our…community is the fact that you got so much [critical area]…it just affects a large segment of the population…"

—Land Owner Organization Representative

1.2 The Lowcountry Landscape

The attraction of new residents to coastal South Carolina can be attributed to its mild climate, fascinating history, diverse culture, and abundant natural resources, among other qualities. Population growth in the South Carolina Lowcountry, along with the associated development of land, has been particularly pronounced in recent decades. For example, the total population of Berkeley, Charleston, and Dorchester Counties has doubled between 1960 and 1990 (United States Census Bureau, 1990), and the number of total Charleston County residents increased by five percent between 1990 and 2000 (United States Census Bureau, 2000). While population growth fuels the local economy and bolsters the reputation of the Lowcountry as an appealing place to be and to live, the associated development simultaneously threatens some of the same natural resources that initially attracted new residents.

Few dispute that water is one of our most precious natural resources. The beaches, **marshes**, rivers, and creeks that are identifiable with the South Carolina Lowcountry also provide an economic engine for the tourism, recreation, shipping, and commercial fishing industries. The continued growth and development of the Lowcountry, however, has the potential to impact the Lowcountry landscape in two ways: (1) the addition of roads, driveways, parking lots, and rooftops increases the overall area of impervious surfaces and decreases the area of vegetated buffers adjacent to **wetlands**, and (2) higher human population density may lead to increased pollution sources. The combination of increased impervious surfaces, decreased vegetated buffers, and more pollutant sources creates the perfect scenario for increased **nonpoint source (NPS) pollution**. The addition of impervious surfaces detracts from the opportunity for **stormwater** to infiltrate naturally into the soil. Stormwater then bypasses any natural treatment opportunities and is routed directly into a creek, river, lake, or ocean through drains, culverts, underground pipe networks, and outfalls. Similarly, decreased vegetated buffer area minimizes the opportunity for stormwater treatment before entering a water body. Nonpoint pollution sources are typically difficult to identify and, therefore, difficult to regulate. Stormwater and nonpoint source pollution can drastically impact water quality, but the public is often unaware or not understanding of the potential contribution that their daily activities may have on this type of **pollution**. An effective way to protect water quality is through stormwater management and pollution prevention. In general, water quality protection involves restoring and maintaining the chemical, physical, and biological integrity of water resources.

FIGURE 1-1

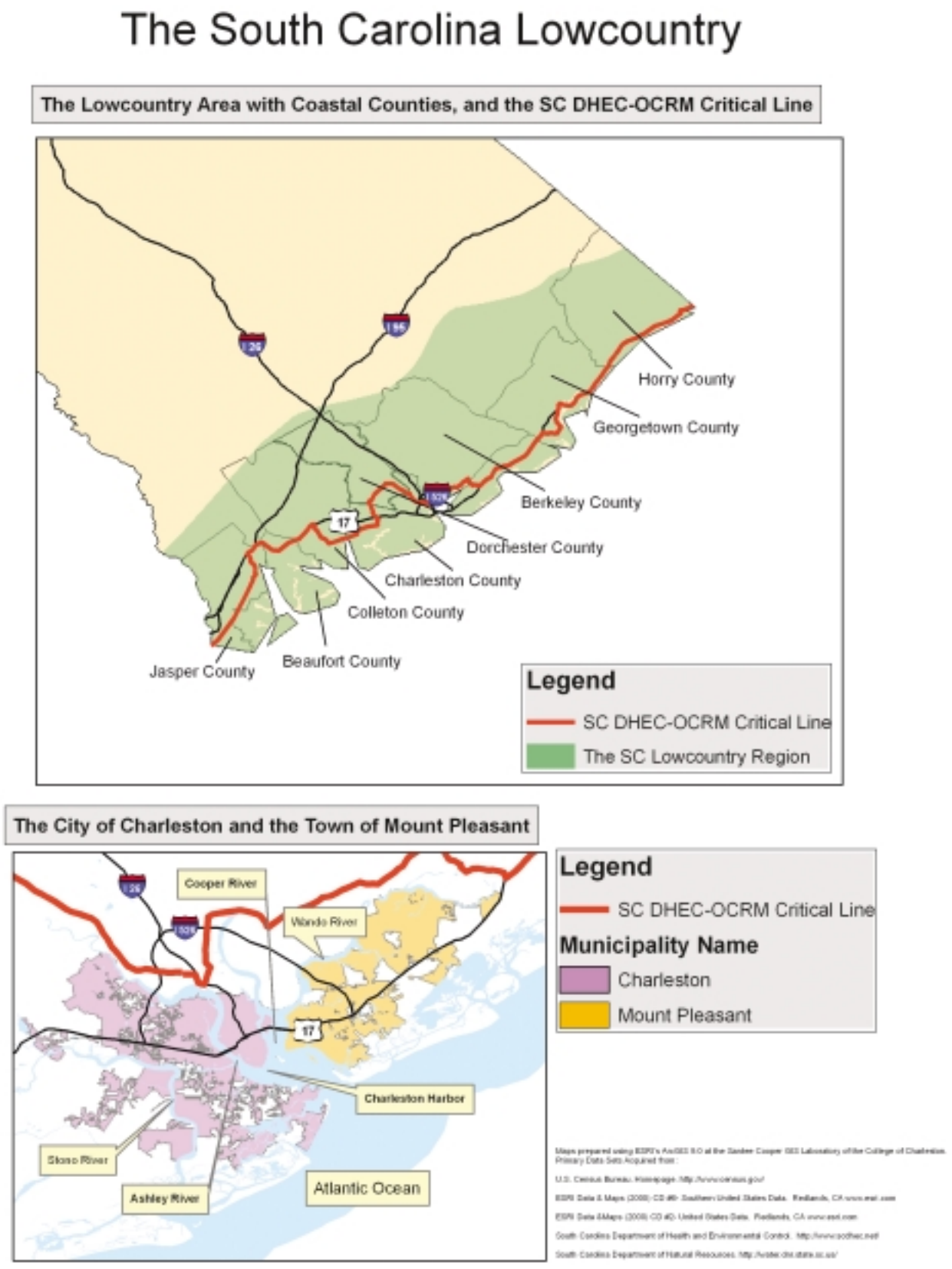


Figure: 1-1. Map of South Carolina Coastal Counties and Critical Line (as of December, 2004).

Numerous studies have demonstrated that NPS pollution can be significantly reduced through the implementation of wetland and vegetative buffers. Vegetative buffers act as filters, removing pollutants from rainfall before it enters waterways. Buffer ordinances enforce zones of vegetation between potentially polluting areas and adjacent marshes, rivers and creeks. In addition to protection of local water quality, buffer zones offer a host of other benefits for land owners, which are discussed later in this text. Both the City of Charleston and the Town of Mount Pleasant, South Carolina have made efforts to reduce NPS pollution to protect water quality by creating and implementing buffer ordinances.

This manual provides step-by-step guidance, valuable lessons, and pertinent information for municipalities and other community structures that are interested in enacting their own water quality protections. The manual uses two case studies to provide policy makers and other stakeholders with an overview of buffer regulations, as well as the tools to implement their own municipal ordinances. A comprehensive list of useful resources is also catalogued in Appendix A.

1.3 Defining a Wetland

Multiple definitions of wetlands exist, and there is not one specific single, definitive science- or management-based definition of a wetland. Some scientific definitions focus on the flora supported by wetland systems, while others focus more on **hydrology** and the degree of saturation of a wetland.

The United States Fish and Wildlife Service (US FWS) definition of wetlands is widely accepted because it addresses both the saturation and flora of a typical wetland system:

> Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water…Wetlands must have one or more of the following three attributes (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al., 1979).

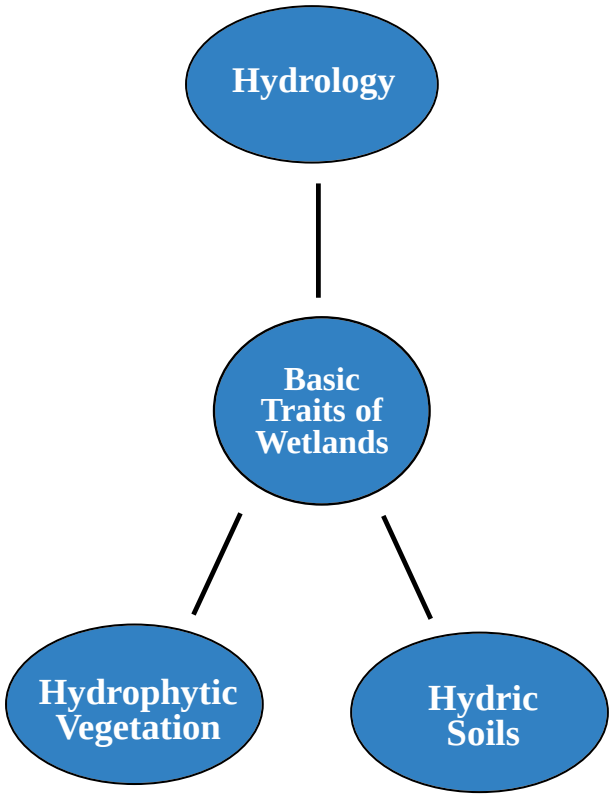
Many entities, such as the United States Environmental Protection Agency (US EPA) (2005), SC DHEC-OCRM (2005a), and the City of Charleston utilize variations of the US FWS 1979 definition of wetlands.

Regardless of type or appearance, all wetlands share the traits of existing hydrology, **hydrophytic vegetation**, and **hydric soils** (see Figure 1-2). Wetlands can be freshwater, brackish water, or saltwater systems. Marshes, swamps, bogs, pocosins, and Carolina Bays are all types of wetland systems found in South Carolina. The specific type of wetland system is often defined by its vegetation, its hydrologic features, and its location within the landscape.

> "…the wetland areas are really…resources that add value…and are to be protected and nurtured and highlighted…"
>
> —*Attorney*

> "…one of the biggest successes that [SC] DHEC-OCRM has had is the protection of those critical areas. People do not violate critical areas."
>
> —*Engineer*

Figure: 1-2. Basic Traits Of All Wetlands



Generally, wetlands occupy the natural transitional zone between upland and aquatic systems. Wetland structure, including vegetation, soils, and hydrology, determines the functionality of a wetland system. Unimpaired and properly-functioning wetlands are among the most ecologically rich ecosystems in the world. Wetlands provide many important services (Table 1-1), including removal of pollutants from water and containment of floodwaters (SC DHEC-OCRM, 2005b).

1.4 Why Protect Wetlands and Other Critical Areas?

"…you're dealing with a lot of wetlands issues…you got a lot of different issues in South Carolina, I mean Charleston area especially…you want to protect the wetlands..."

—Homebuilders Association Representative

"…it just makes common sense. If the guy's changing the oil in his car…or putting gas in his lawnmower, or the fertilizer he puts on the grass, [it will] get out there if you don't have something to stop it."

—Real Estate Broker

A Buffer Located on Spring Island, SC
(Photo by: Hitchcock)

Wetlands play a crucial role in the overall health of a watershed. "Wetlands are sometimes described as 'the kidneys of the landscape' because they function as the downstream receivers of water and waste from both natural and human sources" (Mitsch and Gosselink, 2000). These "critical areas" also provide vital wildlife habitat, nursery grounds for many species of fish and birds, and flood control during major storms. Table 1 summarizes many of the functional benefits of wetlands. Because of their economic and environmental importance, coastal wetlands in the United States are protected by Federal, State, and in many cases, local law.

The concept of the "critical line" is commonly associated with coastal wetland regulations in South Carolina. The critical line is determined by SC DHEC-OCRM and delineates the boundaries of coastal wetland systems, which comprise one of multiple "critical areas." State and Federal permits must be acquired for any alteration of any critical area (SC DHEC-OCRM, 2005b). Critical lines should be updated approximately every three years by county or other local municipal government to accommodate changes in the topography by erosion or other events (Reynolds, 2005). While freshwater wetlands in the coastal zone currently are not included in the critical area, SC DHEC-OCRM also makes efforts to minimize impacts to these important systems.

Table: 1-1. The Benefits Of Wetlands (Adapted from SC DHEC-OCRM, 2005b and Kusler and Opheim, 1996)

WETLAND BENEFITS
Flood conveyance
Wave barriers
Flood storage and slowing
Sediment control
Pollution control
Fish and wildlife habitat
Recreation
Water supply
Erosion control
Aquifer recharge
Aesthetics
Education and research

1.5 What is a Wetland Buffer?

"…an established buffer…it looks better, it works great from the public point of view and it's performing the function it needs to do…when it's done well it works well for everyone…the water quality, the public realm, and the property values…"

—Environmental Nonprofit Staff Member

"…they certainly do protect the estuary from…pollutants, but a lot of people use the buffer…to visually block development from when you're on the water."

—Engineer

Wetland buffers vary greatly in their width, composition, appearance, and use. For example, a riparian buffer can buffer either freshwater or saltwater, depending on whether the buffer is placed along an inland river or stream, as in municipalities in the state of Rhode Island, or along a tidal wetland (estuary), as in the City of Charleston, South Carolina. Other types of freshwater buffers affect only waters that are not connected to coastal waters through watersheds, such as those in the states of North Carolina, New Jersey, and Maryland. In general, a critical line buffer, as implemented in coastal South Carolina, is a corridor of vegetation that lies landward of the wetland critical line on a person's property.

Critical Line Buffer
(Photo by: Zimmerman)

Despite their differences, the purpose of all wetland buffer zones is the same—to minimize the potentially harmful effects of development or agriculture on adjacent waterways. Other amenities often include the provision of wildlife habitat and aesthetically-pleasing scenery.

Unlike those of wetlands, definitions of wetland buffers are rather straightforward and are quite consistent from one definition to another. Below are two definitions that similarly describe the basic form and purpose of wetland buffers:

> …Shoreline or riparian buffers are corridors of native vegetation along rivers, streams, and tidal wetlands that protect waterways by providing a transition zone between upland development and adjoining surface waters (SC DHEC-OCRM, 2002b).
>
> A vegetated area, including trees, shrubs and herbaceous vegetation, which exists or is established to protect a stream system, lake, reservoir or coastal estuarine area. Alteration of this natural area is strictly limited (Center for Watershed Protection, 2005).

Various factors determine how effective a given wetland buffer will be at reducing nonpoint source pollution and providing other buffer benefits. These factors include:

- **SIZE/WIDTH** of the buffer
- **TYPE** of vegetation and soil present
- **SLOPE** of the buffer
- **DESIGN** or use of zones in the buffer
- **LEVEL** of management of the buffer (SC DHEC-OCRM, 2002b)

1.6 Why Wetland Buffers?

"…the state has said that we have this critical line and we don't want to build, you know, beyond the line…why would we want to buffer that? The line, it seems to me, indicates that…that's the point where we stop…buffering of the critical line…wastes land area that could otherwise be developed more efficiently…"

—Realtors Association Representative

"I am an advocate of buffers, but…they need to be properly sized to address the concern [versus speculation]…"

—Engineer

Vegetative buffers are one of the most effective and cost-efficient ways to protect wetlands and other water bodies (SC DHEC-OCRM, 2002a). When properly constructed and/or maintained, vegetated wetland buffers can provide land owners with a host of environmental and economic benefits. In addition to improving local and downstream water quality by reducing NPS pollution, wetland buffers can benefit a land owner or developer in many ways (Table 1-2), such as reducing erosion, reducing heating of waterways, creating privacy, reducing flooding and flood damage, preserving natural habitat, and saving money for homeowners through reduced maintenance costs (SC DHEC-OCRM, 2002a).

A critical component to implementing a successful buffer ordinance is educating the public about buffer benefits. With thoughtful outreach and educational efforts, land owners and developers may realize how wetland buffers actually add to the value of a home rather than detract from it.

The Beauty of a Buffer (Photo by: Zimmerman)

Native Species in Buffers Attract Wildlife (Photo by: Zimmerman)

Table: 1-2. The Benefits Of Buffers

BUFFER BENEFITS
• Minimizes stormwater pollution
• Reduces erosion
• Reduces heating of waterways
• Creates privacy
• Reduces flooding and flood damage
• Preserves natural habitat
• Saves money for homeowner through reduced maintenance costs

1.7 An Overview of Wetland Buffer Ordinances

> "[the ordinance is] pretty easy to follow, it's pretty easy to understand, and…there's a good purpose behind it. The majority of the people are…pretty understanding of why it's there."
> *—Town of Mount Pleasant Staff Member*

> "…so many people have made…their living as shrimpers, fishermen, and we all enjoy the fruits of that, and if we don't have a good buffer ordinance that could certainly affect the quality of the seafood that we have here…"
> *—City of Charleston Council Member*

WBOs have been implemented in localities all over the nation, such as in Rhode Island, New York, Maryland, and Florida. These ordinances vary considerably according to the goals and desires of their respective communities. Ordinance details, such as minimum buffer width and provisions for ordinance flexibility, must be determined through thorough public debate so that the ordinances are politically feasible and publicly accepted.

In the southeastern region, several municipalities have implemented requirements for various types of buffers including critical line buffers, freshwater wetland buffers, and riparian (river) buffers. South Carolina buffer ordinances include those in Beaufort County, Georgetown County, Pickens County, the city of North Charleston in Charleston County, the City of Charleston in Charleston County, and the Town of Mount Pleasant in Charleston County. A more elaborate list is located in Appendix C.

The US EPA suggests the following outline as a model organizational structure for an aquatic buffer ordinance (http://www.epa.gov/owow/nps/ordinance/mol1.htm):

Section 1:	Background
Section 2:	Intent
Section 3:	Definitions
Section 4:	Applications
Section 5:	Plan Requirements
Section 6:	Design Standards for Forest Buffers
Section 7:	Buffer Management and Maintenance
Section 8:	Enforcement Procedures
Section 9:	Waivers/Variances
Section 10:	Conflict with other Regulations
	References

Critical line buffers augment state protection of critical areas, which are designated and monitored by SC DHEC-OCRM. Although buffer ordinances vary, the primary purpose of each is to protect the quality of waterways that are impacted by nearby development or agriculture. Many homes and commercial districts are placed along critical areas, and vegetated buffers can help prevent nonpoint source pollution created by these developments. Growth and development are inevitable, particularly in areas that offer great quality of life, but the effects of growth can be successfully mitigated with measures such as WBOs and, specifically for the coast, CLBOs.

In the next section, we discuss in detail the experiences of CLBO development and implementation in the City of Charleston, SC, and the Town of Mount Pleasant, SC to provide useful information, tips, and lessons for other municipalities that are considering implementing these types of ordinances.

Buffers Maintain Water Quality (Photo by: Hitchcock)

2.0 CRITICAL LINE BUFFER ORDINANCE CASE STUDIES

2.1 Case Study Data and Methodology

The purpose of this manual is to help policy makers and resource managers anticipate and address challenges that they may face in implementing critical line buffer ordinances (CLBOs). The content of the manual is derived primarily from case studies of the Town of Mount Pleasant and City of Charleston's CLBOs, including personal interviews with stakeholders involved in the passage of these ordinances. Additionally, the manual presents contextual information on water quality, buffers, and buffer ordinances collected from peer-reviewed journals, official websites and databases, and outreach materials published by universities, government agencies, and collaborative research institutions.

This section of the manual presents case study findings as well as the results of content analysis (Berg, 2004) of interviews with 24 local stakeholders, including representatives of the private sector, the nonprofit sector, and the governmental sector, who were involved with ordinance development or who have worked extensively with the CLBOs.

To identify interviewees, the researchers initially consulted one stakeholder who was involved with the complete evolution of each CLBO. During these interviews, the researchers identified further interview subjects through snowball sampling (Berg, 2004) by asking interviewees "Can you name others (planners, legislators, developers, citizens, nonprofit groups, etc.) who we should interview about critical line buffer ordinances?" Interviews were conducted in-person with the exception of one interview via telephone conference call. Interviews were semi-standardized, using an interview instrument developed by the research team and approved by the College of Charleston's Institutional Review Board (IRB) (IRB05-002).

The interview instrument included five categories of questions: personal background, role in/perspective of ordinance creation, knowledge of ordinance, evaluation of ordinance, and perceptions of ordinance outreach. Interviewees could respond to interview questions with respect to either or both municipal ordinances. The following is a breakdown of how interviewees in each of the three sectors (private, nonprofit, and governmental) addressed interview questions: Government sector (Out of 13, two discuss both Mount Pleasant and City of Charleston; four discuss Mount Pleasant only; seven discuss City of Charleston only); Nonprofit sector (All eight discuss both Mount Pleasant and City of Charleston); and Private sector (Eight of nine discuss both Mount Pleasant and City of Charleston; one of the nine discusses Mount Pleasant only).

The researchers utilized manifest and latent content analysis (Berg, 2004) to identify common themes in respondents' answers. Qualitative data was supplemented with quantitative data collected when respondents were asked to rate their answers on a scale. Results in this section are reported with respect to each of the three sectors represented in the interviewee pool and are summarized in Tables 2-2 through 2-6. Some interviewees were included in multiple sectors based on their past work experience, their current positions, and how they framed their perspectives—12 public sector respondents, nine private sector respondents, and eight nonprofit sector respondents were identified, with seven interviewees overlapping sectors.

2.2 The Town Of Mount Pleasant, South Carolina Case Study

The Town of Mount Pleasant is situated between several beaches and the downtown Charleston area. Mount Pleasant's total population is 47, 609 residents, and the majority of those residents are white, in their late-thirties, own their homes, and live in family households (United States Census Bureau, 2000).

The town has a part-time mayor with a full-time elected council (eight members), one of the three structural options as mandated by the State of South Carolina Legislature. The town council that considered the ordinance was elected in 2000, and the planning department had placed emphasis on smart growth and low impact development techniques in accordance with the town's 1998-1999 Comprehensive Plan (required by the South Carolina Legislature) and in response to citizen reaction to the area's rapid development. The town continues to be challenged by great pressure for development but has implemented growth moratoriums and building permit allocation programs with the intentions of limiting growth.

Figure 2-1 overviews the primary events that led to passage of Mount Pleasant's CLBO and offers preparatory notes for manual readers. Several aspects of this table warrant mention—in particular, key to ordinance passage was the help of the Town Planner in facilitating stakeholder involvement, and the participation of those stakeholders in drafting the document. With the participation of stakeholders, planning staff, and the Planning Committee, the town altered the ordinance to address concerns and foster compromise. The Town of Mount Pleasant passed its CLBO in early 2000.

Figure 2-1

(A) Town Conducts Ongoing Public Outreach Promoting Wetland Buffer Use.	Research for baseline knowledge to inform and encourage involvment from the community.
(B) Town Discusses Buffer Ordinance as Part of 1998-1999 Comprehensive Plan Passage.	Relate Comprehensive Plan goals with purpose of buffer ordinance. Focus on water quality.
(C) Town Planner Coordinates and Facilitates Several Meetings of Stakeholder Committee [including Coastal Conservation League (local nonprofit), SC DHEC-OCRM, Realtors, and Developers] to Research and Discuss Water Quality Concerns and Draft Ordinance.	Consider amount of owned homes, community participation, and factors affecting suburban quality of life. Be prepared to compromise. Keep diverse groups continually involved.
(D) Town's Planning Commission Considers First Draft on August 18, 1999. Commission Provides Comments on Ordinance Draft.	Evaluate suburban landscape and land uses. Anticipate multiple drafts to address all community and legislative comments.
(E) Town Planner Alters Ordinance.	
(F) Town Council's Planning Committee Reviews and Comments on Second Draft.	
(G) Town Planner Alters Ordinance.	Carefully consider ordinance flexibility and enforcement.
(H) Full Town Council Considers Third Draft December 14, 1999; After Three Readings, Ordinance Ratified January 11, 2000.	Expect the entire process to take longer than a typical ordinance timeframe (approximately six months).

Sequence of Events Leading to Passage of the Critical Line Buffer Ordinance in the Town of Mount Pleasant.

2.3 The City of Charleston, South Carolina Case Study

The City of Charleston includes historic peninsular Charleston, the West Ashley community, and annexed portions of James Island, Daniel Island, Johns Island, and Wadmalaw Island, among others. The peninsular area is considered developed to its full capacity, but it is constantly evolving, and zoning may be adapted in the future to accommodate growth. West Ashley, especially in certain annexed portions, is experiencing further development. The City of Charleston's total population is 96,650 residents, and the majority of those residents are white, in their early-thirties (though statistics are very close between ages twenty and fifty-four), homeowners (although slightly less than half rent), and living in family households (although a close percentage live alone) (United States Census Bureau, 2000).

The political structure of the City is a full-time mayor and full-time elected council (12 members). Figure 2-2 provides an overview for the primary events that led to passage of the Charleston Critical Line Buffer Ordinance and offers preparatory notes for manual readers. As with the Town of Mount Pleasant, the Planning and Zoning staff of the City was vital in facilitating passage of the ordinance. Additionally, City Council members were integral to development and passage of the ordinance, and the use of a diverse stakeholder committee was important for soliciting community input.

A View from Mount Pleasant (Photo by: Zimmerman)

A View from Charleston (Photo by: Zimmerman)

Figure 2-2

(A) City's Department of Design, Development and Preservation Discusses Conceptual Line Buffer Ordinance Among Zoning Division Staff.

Research for baseline knowledge to inform and encourage involvment from the community. Focus on water quality.

(B) Council Member Proposes Ordinance as Amendment to Existing Zoning Ordinance at September 2000 City Council Meeting.

Do not expect high levels of interest from most municipal legislators.

(C) City Zoning Division Presents Ordinance Draft to City Planning Commission. Public Comments are Heard. Planning Commission Defers Draft.

Problems may arise regarding university land, municipal golf courses, historic property, and other land uses.

(D) Zoning Division Conducts Research on Buffer Ordinances and Alters Ordinance Draft With OCRM Assistance.

Use only scientific data that is comprehensive and unbiased. Utilize local ordinances as models first.

(E) City Zoning Division Presents Second Ordinance Draft to City Planning Commission. Public Comments are Heard. Planning Commission Defers Draft Again.

Do not discount any opinions, or trust will be lost.

Consider amount of rented homes, community participation, and factors affecting urban quality of life.

(F) Zoning Planner Coordinates and Facilitates Several Meetings of Stakeholder Committee [including Coastal Conservation League (local nonprofit), SC DHEC-OCRM, Realtors, and Developers] to Research and Discuss Water Quality Concerns and Redraft Ordinance.

This process ensures stakeholder participation and helps balance ordinance components.

(G) City Zoning Division Presents Third Ordinance Draft to City Planning Commission. Public Comments are Heard. Planning Commission Recommends Approval.

(H) Full City Council Considered Ordinance; After Three Readings, Ordinance Ratified February of 2001.

Expect the entire process to take longer than a typical ordinance timeframe (approximately six months).

Sequence of Events Leading to Passage of the Critical Line Buffer Ordinance in the City of Charleston.

2.4 Overview and Comparison of the Two Case Study Ordinances

Table 2-1 compares the key elements of the two case study buffer ordinances. Of note in both ordinances are clear buffer delineations, designation of activities that are allowed and those that are not, inclusion of buffer widths, provisions for view corridors, a clear statement of exemptions, and goals of improving water quality (versus other possible goals that are benefits of wetlands vegetative buffer use).

For more information on the Town's ordinance, visit www.townofmountpleasant.com or contact the Planning and Development Department. For more information about the City's buffer ordinance, visit www.ci.charleston.sc.us or contact the City Department of Design, Development, and Preservation. Be sure to review the ordinances in their entirety, as they may be amended, updated, and edited. Complete contact information is in Appendix A.

Table 2-1. Comparison of Case Study Ordinances

	TOWN OF MOUNT PLEASANT, SOUTH CAROLINA	CITY OF CHARLESTON, SOUTH CAROLINA
Buffer Width (A)	♣ Average equal to minimum of 15 feet in access areas between land uses	♣ Minimum 25 feet for single-family and two-family residential, and conservation zones with 10 feet of building setback
Buffer Width (B)	♣ Average equal to 35 feet, with a minimum of 20 feet in areas closer to critical waterways	♣ Minimum 40 feet for commercial, industrial, office, or multi-family zones with 10 feet of building setback
Prohibited Activities	♣ Planting grassed, manicured lawns; disturbing natural vegetation; removal of historic trees 24 inches in diameter; removal of grasses, shrubs, and other smaller vegetation	♣ Planting of turf, seed-grown, manicured grass lawns, and non-native grasses; pruning of shrubs shorter than 3 feet
Permissible Activities	♣ Pruning and trimming of grasses, shrubs, and other smaller vegetation; pervious pedestrian path trails; pedestrian or vehicular accessways leading to water-dependent structures; approved utility line penetrations; swales	♣ Planting of native species; removal of trees less than 8 inches in diameter; placement of water-dependent structures; pervious pedestrian path trails; minimum utility line penetrations; OCRM-approved vegetative swales and stormwater drainage outfalls
View Corridors	♣ Cannot exceed 33 percent of total buffer length	♣ May thin some trees as long as a site plan is provided and the trees are not protected (8 inches in diameter)
Site Plans	♣ Buffer must be clearly delineated on all development plans and plats submitted for approval	♣ Buffer must be clearly delineated on all development plans and plats submitted for approval
Exemptions	♣ Lots of record, final plats, valid approved preliminary plats, and valid approved sketch plans adopted prior to January 11, 2000	♣ New developments that demonstrate buffer-equivalent alternative for stormwater runoff; platted single-family lots that existed before September 12, 2000; any plans or plats in review prior to September 12, 2000; properties located within the historic city district on the peninsular area; certain exemptions for university and golf course properties
Goals	♣ "to improve water quality…"	♣ "to protect water quality"

2.5 Stakeholder Interview Findings

To assess stakeholder perspectives on ordinance implementation in the two case study municipalities, various members of the private, nonprofit, and government sectors were interviewed. Interviewees represented the following professions:

- **Private professions:** development, engineering, law, real estate brokerage, real estate appraisal, surveying, landscape architecture
- **Nonprofit affiliations:** Charleston Metro Chamber of Commerce Developers Council; Charleston Trident Association of Realtors; Charleston Trident Homebuilders Association; South Carolina Association of Realtors; South Carolina Coastal Conservation League; South Carolina Landowners Association; South Carolina Tourism Council
- **Government offices:** City of Charleston Department of Design, Development and Preservation; Charleston City Council; SC DHEC-OCRM; Town of Mount Pleasant Council; Town of Mount Pleasant Planning Department; Town of Mount Pleasant Waterworks Commission

The respondents divulged opinions on community climate, creation of the CLBOs, implementation of the ordinances, evaluation of the ordinances, as well as experiences with any ordinance outreach that may have occurred. The trends in their responses are summarized in the following sections, with corresponding tables.

2.5.1 Community Climate

Respondents were asked how much impact community members have on local political issues, what types of community political participation exist, how much political participation there actually is by community members, and who the most influential people (types of people, groups of people, or specific individuals) are within the community. The respondents were also asked to reflect on the level of the community's general scientific and environmental knowledge, on whether or not this knowledge is important to the general community, and if there are general concerns about water quality within the community. The majority responses are summarized in Table 2-2.

> "…in many cases, you take a hundred people into a…city council, and you get their attention…they do listen to community… sometimes they listen to the loudest voice, unfortunately…"
>
> *—Real Estate Broker*

> "…it is clear to me that there is a very active group of people…in the Mount Pleasant area, in local government, and ….they've become more involved…at other levels…."
>
> *—Realtors Association Representative*

Table 2-2. Case Study Community Climate: Summary of Predominant Responses

	PRIVATE SECTOR	NONPROFIT SECTOR	GOVERNMENT SECTOR	COMMON TRENDS
Citizen Impact on Local Policy	Great Amount	Great Amount	Great Amount	Depends on which citizens are involved and what issue is discussed.
Types of Political Participation	Public Meetings and Neighborhood Associations	Public Meetings and Grassroots Organizing	Public Meetings, Neighborhood Associations, Individual Homeowners, and Interest Groups.	Public meetings are the common answer. These include council meetings, commission and board meetings, and other public hearings. Homeowners are frequently mentioned, either in associations or individually.
Amount of Political Participation	Moderate Amount	Moderate Amount	Moderate to Great Amount	Depends on the issue being discussed.
Influential Community Members	(1) Environmental Groups [South Carolina Coastal Conservation League]; (2) Business Groups; (3) Historic Preservation Groups; (4) Government Agencies; (5) City of Charleston Mayor Riley	(1) Environmental Groups [South Carolina Coastal Conservation League]; (2) City of Charleston Mayor Riley	(1) Citizen and Neighborhood Groups; (2) South Carolina Coastal Conservation League; (3) Historic Preservation Groups; (4) City of Charleston Mayor Riley	South Carolina Coastal Conservation League and City of Charleston Mayor Riley dominate all three sectors.
Amount of Scientific / Environmental Knowledge	Limited Amount	Limited Amount	Limited to Moderate Amount	Citizens believe they are knowledgeable, but do not actually have correct information
Importance of Scientific / Environmental Knowledge	Very Important	Moderately to Very Important	Moderately to Very Important	All sectors agree that the community generally values learning about science and environmental issues.
Concerns About Water Quality	Moderate Amount	Moderate Amount	Moderate Amount	Citizens do not have enough knowledge about water, but water quality is an important subject to understand on the coast.

2.5.2 *Ordinance Creation*

Respondents were questioned on the role they played during creation and passage of each municipality's ordinance, and on their perspectives of the process. Interview questions assessed identities of primary ordinance opponents and proponents, resource use in ordinance development, and impediments and successes related to ordinance creation. The majority responses are summarized in Table 2-3.

Table 2-3. Case Study Ordinance Creation: Summary of Predominant Responses

	PRIVATE SECTOR	NONPROFIT SECTOR	GOVERNMENT SECTOR	COMMON TRENDS
Typical Role(s) of Interviewee	(1) Attendance and providing comments at public meetings; (2) Offering comments on drafts	(1) Attendance and providing comments at public meetings; (2) Sending representatives to attend meetings and report back to group; (3) Offering comments on drafts	(1) Vocal support of the ordinance in general and at public meetings; (2) Facilitating diverse stakeholder groups to draft ordinance; (3) Drafting and researching for the ordinance; (4) Proposing, sponsoring, and voting in favor of the ordinance	Many different members of the community took the time to attend meetings and comment on drafts of the ordinances.
Impediments to Ordinance Creation	(1) OCRM influence; (2) Interpretation of research; (3) Determining buffer width; (4) Determining exemptions; (5) Distrust from the private sector of government and environmental groups	(1) OCRM influence; (2) Interpretation of research; (3) Determining buffer width; (4) Determining exemptions; (5) Determining activities permitted in the buffer	(1) Lengthy research process; (2) Determining exemptions; (3) Determining buffer width; (4) Determining activities permitted in the buffer; (5) Determining the start date of the ordinance; (6) gaining public and council interest	There is distrust between sectors, particularly on interpretation of scientific research. Also, buffer widths, exemptions, and activities permitted in the buffers merit great consideration.
Successes with Ordinance Creation	Protection of water quality	(1) Protection of water quality; (2) Most opposition appreciated allowances and did not object outright	(1) Protection of water quality; (2) Most opposition appreciated allowances and did not object outright	Stakeholders from various sectors of the community understand the value of protecting water quality. Flexibility is appreciated from typical opposing stakeholders.
Stakeholders in Support of Ordinance	OCRM and South Carolina Coastal Conservation League	OCRM and South Carolina Coastal Conservation League	(1) OCRM; (2) South Carolina Coastal Conservation League; (3) Citizens interested in conserving wetlands; (4) Mayor Riley and City Council; (5) Municipal staff	Government agencies and environmental groups demonstrated the most support for the ordinances in the case studies.
Stakeholders in Opposition to Ordinance	Developers, engineers, and property owners living on the water	Developers, engineers, property owners living on the water, and property rights advocates	Developers, engineers, and some citizens	Certain developers, engineers, and property owners demonstrated the least support for the ordinances in the case studies.

2.5.3 Ordinance Implementation

Respondents were asked various questions regarding specific components of the CLBOs. Respondents who "know the ordinance well" provided correct information for the majority of the questions asked. Correct answers are interpreted as an impressive amount of baseline knowledge of the ordinance or the ability to cite specific numbers. Respondents who "know the ordinance somewhat" provided answers with uncertainty or stated that they would have to check the ordinance, but still managed to provide a moderate amount of baseline knowledge or cite specific numbers. Respondents who "do not know the ordinance" openly stated that they could not provide answers, did not answer any questions correctly, or could not answer at all without reading directly from the ordinance. For the government sector, respondents generally answered interview questions in reference to their own municipality's ordinance rather than both. The majority responses are summarized in Table 2-4.

Table 2-4. Case Study Ordinance Implementation: Summary of Predominant Responses

	PRIVATE SECTOR	NONPROFIT SECTOR	GOVERNMENT SECTOR	COMMON TRENDS
Knows Ordinance Well	Four of nine respondents (Engineers, Surveyors, Landscape Architects)	Two of eight respondents (associated with environmental and business groups)	Charleston—five of nine respondents Mount Pleasant—three of six respondents	Respondents who know the current ordinances well are: (1) Private sector professionals that would be required to read the ordinance often; (2) Individuals who participated in planning meetings or offered comments at the time of creation; (3) Planners and council members heavily involved with crafting the ordinance.
Knows Ordinance Somewhat	Five of nine respondents (Developers, Realtors, Attorneys)	One of eight respondents (associated with private property rights group)	Charleston—two of nine respondents Mount Pleasant—one of six respondents	Respondents who know the current ordinances somewhat are: (1) Professionals who understand the concept of a buffer but do not work with the ordinance on a daily basis; (2) Municipal staff that do not deal directly with the ordinance
Does Not Know the Ordinance	None	Five of eight respondents (associated with real estate and development groups)	Charleston—two of nine respondents Mount Pleasant—two of six respondents	Respondents who do not know the current ordinance components are: (1) Individuals who did not participate in the creation process; (2) Council members who do not deal with the ordinance after ratification.

2.5.4 Ordinance Evaluation

Respondents were asked to evaluate the CLBOs since their implementation. Interview questions assess whether or not there are enough resources to properly enforce the ordinance, whether or not trends exist with enforcement, which community factors encourage the success of buffer ordinances, how stringent a CLBO should be, whether there are unique aspects of the ordinances, and whether there are similar aspects to the ordinances that other municipalities can model. Answers are summarized in Table 2-5.

Table 2-5. Case Study Ordinance Evaluation: Summary of Predominant Responses

	PRIVATE SECTOR	NONPROFIT SECTOR	GOVERNMENT SECTOR	COMMON TRENDS
Resources for Enforcement	(1) Need to monitor homeowners more; (2) Currently not enough staff, funds, or time; (3) Need a better monitoring system (aerial photography compared over years, GIS maps) instead of relying on citizen reports of violations	(1) Need to monitor homeowners more; (2) Currently not enough staff, funds, or time	(1) Need a better monitoring system; (2) Need more funding for better monitoring system; (3) Need to renew local legislator commitment (4) Need more staff to photograph, document, monitor, and map buffers (5) Need more teeth in building inspection codes if buffer violation is noticed	The sectors identified the need for more efficient homeowner violation monitoring, as well as more staff, funding, and equipment for detailed monitoring systems.
Trends in Enforcement	(1) Not many violations; (2) Municipal uncertainty about allowances in buffers; (3) Most violations by homeowners	(1) Homeowners are primary violators; (2) Increased awareness of critical areas; (3) Increased realization of positive effects buffers can have on water quality, aesthetics, and property values	(1) Homeowners are primary violators; (2) Private sector is now aware of ordinance and works with it; (3) Municipal uncertainty about managing violations (depending on each situation: fine, replant, or other)	Homeowners are identified in all sectors as the primary violators of buffer ordinances. The ordinance is generally understood and complied with by the private sector.
Aspects Encouraging Success	(1) Push from environmental groups, government agencies, and local legislators; (2) Utilization of diverse group of stakeholders; (3) Community's stance on quality of life	(1) Push from environmental groups, government agencies, and local legislators; (2) Utilization of diverse group of stakeholders; (3) Community's stance on quality of life; (4) Knowledge level of community	(1) Knowledge and participation levels of community; (2) Influence (different from "push) of environmental groups, government agencies, and local legislators; (3) Planning-oriented and supportive political climate	Whether environmental groups, government agencies, or local legislators "push" the ordinances, they are identified as successful. Involving diverse groups and informing the community are also important.
Stringency of Ordinances	Currently strict enough; Must have flexible components and compromise to balance water quality with development needs	Not enough balance between stakeholders (if the public wants buffers in place, property owners should be compensated OR more compromise and flexibility than currently in place)	Buffer ordinances in general need to be stringent because of importance of water quality, but need to be able to adequately enforce the ordinance	Must balance stringency between protecting water quality, allowing development flexibility, and adequately enforcing the ordinance.
Unique Aspects of Ordinance	(1) Unique tidal currents of South Carolina; (2) Value of salt water marsh; (3) Importance of critical line; (4) Activities permitted in buffers; (5) Alternative provisions instead of a buffer; (6) Belief that nonpoint source pollution problem is not solved when historic neighborhoods are exempt	(1) Unique tidal currents of South Carolina; (2) Importance of critical line; (3) Belief that nonpoint source pollution problem is not solved when historic neighborhoods are exempt; (4) Belief that critical line is the solution and a buffer is unnecessary; (5) Every landscape is different and must be accounted for	(1) Historic area exemptions; (2) Assistance from local OCRM; (3) Abundance of salt water in the area; (4) Abundance of undeveloped land to protect in the Mount Pleasant area; (5) Participation of diverse group of stakeholders	Unique aspects that all sectors could agree upon are the value and abundance of marsh and critical areas, as well as the elements of flexibility and certain exemptions provided in order to accommodate landscapes and land uses.
Components of Ordinance Useful for Similar Municipalities	(1) Each municipality's ordinance in entirety is a good model with one for suburbs and one for urban areas; (2) Concern for critical areas, nonpoint source pollution, and aesthetics; (3) Alternative provisions instead of a buffer; (4) Compromise between stakeholders when creating ordinance	(1) Learn from the case study enforcement problems; (2) the scientific research can be utilized by other communities	(1) Each municipality's ordinance in entirety is a good model with one for suburbs and one for urban areas; (2) The scientific research can be utilized by other communities; (3) List of native species can be copied by coastal southeastern municipalities	Though not all sectors agree, the predominant responses are that each case study is a good model for a suburban or urban area, and that other communities can utilize the scientific data.

2.5.5 Ordinance Outreach and Education Experiences

Respondents were asked if they knew of outreach efforts for the CLBOs and whether or not that outreach has been successful. They were also asked to provide recommendations on improving ordinance outreach and to describe what groups or individuals in the community would ideally be involved with implementation and outreach efforts. Responses are summarized in Table 2-6.

> "I don't think we've done a good job of educating people."
> *—Town of Mount Pleasant Council Member*

Table 2-6. Case Study Ordinance Outreach and Education: Summary of Predominant Responses

	PRIVATE SECTOR	NONPROFIT SECTOR	GOVERNMENT SECTOR	COMMON TRENDS
How Successful Were Outreach Efforts?	Not very successful to the general public, but relatively effective to private sector	Not successful, and needs to be directed to general public versus private sector	Charleston—most respondents were involved in outreach, describing it as successful but needs to continue Mount Pleasant—no one definitively remembered significant outreach, describing the effort as unsuccessful	Need to improve and continue outreach, particularly to homeowners
Recommendations for Successful Outreach	All three sectors should be involved in outreach efforts, and open dialogue should exist among sectors. Methods suggested are: (1) executive summary online; (2) brochures; (3) bulk mailings; (4) television; (5) mailings attached to bills; (6) recognizable symbols [on drains, etc.]; (7) newspaper; (8) public workshops and meetings; (9) inclusion in school curriculum	All three sectors should be involved in outreach efforts, with primary responsibility on government sector. Private sector is underutilized, and that should be remedied. Methods suggested are: (1) executive summary online; (2) brochures; (3) bulk mailings; (4) television; (5) inclusion in school curriculum; (6) simplifying the education scope of buffers to focus on promoting water quality	All three sectors should be involved in outreach efforts. Methods suggested are: (1) newspaper; (2) assistance from homeowner associations; (3) improved technology to map landscapes and determine appropriate buffers; (4) web sites that link from municipal web pages to explain the science of buffers; (5) creating model buffers; (6) public workshops	All three sectors need to be involved for successful outreach. Common methods include: (1) using web sites to post executive summary of ordinance and scientific data; (2) brochures distributed at several venues; (3) newspaper coverage of issues; (4) facilitating public workshops
Types of People Ideally Involved With Implementation and Outreach	Property owners and citizens growing up near water, or who rely upon water [fishermen], as well as representatives from all three sectors.	Property owners and representatives from all three sectors.	Retirees, homeowner associations and neighborhood groups, graduate students, and representatives from all three sectors.	Representatives from all three sectors and homeowners are the same groups named across the board.

"…a lot of times there's disinformation. People only tell one side of the story. And they tell it loud and often." —*Attorney*

"…I think that other folks could take our ordinance, look at it, and…incorporate that into their…standards, or even improve it…they can use that as a guideline, and then mold it to fit their community…make it better to fit their own."

—*City of Charleston Staff Member*

"There are enough resources to…implement it. There's not enough to enforce it."

—*Engineer*

"…you want to protect your natural resources, but you also don't want to infringe on people's property rights..."

—*Landscape Architect*

"…I wouldn't personally recommend, you know, going about trying to…teach people the science, but what I would do is…have an education program that teaches them…the practical parts of…being a good steward of our water resources. Things like: don't dump your grass clippings…on the curb, you know? Don't drain your radiator on your driveway, you know, things like that."

—*Realtors Association Representative*

3.0 PRIMARY CRITICAL LINE BUFFER ORDINANCE LESSONS

The case studies narrated in Section 2.0 of this manual provide a keen insight into the development of two specific Lowcountry CLBOs. Additionally, analysis of the 24 stakeholder interviews conducted in the case studies provides overarching lessons and themes for other municipalities considering implementation of similar ordinances. Section 3.0 summarizes these lessons and themes in "checklist" form, and offers supplemental recommendations on ordinance development and implementation. Although the following guidance is based primarily on the results of interviews conducted for production of this manual, we anticipate that the lessons presented in this section will be extremely useful to a great variety of communities and municipalities.

CHECKLIST OF CONSIDERATIONS FOR EFFECTIVE ENACTMENT AND IMPLEMENTATION OF CRITICAL LINE BUFFER ORDINANCES (CLBOS):

- ❑ **1.** Involve community stakeholders from the beginning.
- ❑ 2. Opposition to ordinances is likely to come from the development community. Pay special attention to this community.
- ❑ 3. Compromise among stakeholders is key.
- ❑ 4. Be clear about scientific information used to justify buffer ordinances.
- ❑ 5. Be consistent with stakeholder outreach.
- ❑ 6. Include flexibility in ordinance stipulations.
- ❑ 7. Enforcement and monitoring resources are crucial for the success of the ordinance.
- ❑ 8. To avoid CLBO violations, homeowners should be the focus of educational campaigns.
- ❑ 9. Outreach and education on critical line buffers should take varied formats.
- ❑ 10. Promoting water quality is the most agreeable and least controversial goal of buffer ordinances.

"…meaningful input has to be done in a timely fashion where…there's adequate opportunity to…make your points…[and] to react to them…"
—Attorney

1. Involve community stakeholders from the beginning.

"…that's why our input on these ordinances was critical, because…if you say you got to have a…thirty-five foot setback, or a fifty-foot setback, it really doesn't matter what the number is. Whatever the number is, I promise you, it's an arbitrary number…Because it's all different. It depends on the topography, it depends on the elevation, it depends on the nature of the wetland or the marshes of which the runoff may be going…"

—Land Owners Association Representative

Issue: Community constituents such as neighborhood and homeowner association members, local legislators, and interest group members have a great deal of influence. If these individuals or groups become involved in an issue or process, the results can be powerful. Case study interview respondents, particularly developers and interest group members, asserted that official ordinance notification to the community came late or was underscored, therefore detracting from private sector and interest group acceptance and understanding of the ordinances. Many respondents reflected that only the most involved citizens understood the rationale for buffers, and that media coverage and greater community involvement in the early stages of ordinance creation would have streamlined the process.

Resolution: Notify stakeholders, particularly private sector stakeholders, early and often to involve them in the process and incorporate their input. Utilize the media as often as possible, going above and beyond basic public notice requirements. Begin outreach on the importance of buffers early in the ordinance creation process.

A Flourishing Buffer
(Photo by: Hitchcock)

2. Opposition to ordinances is likely to come from the development community. Pay special attention to this community.

"…if for any reason it's ruled that [buffer ordinances] takes [property] away, [property owners] just should be compensated, that's all…if this buffer is for the good of the people in the waterways so that they can have a nice view, who benefits from that? The people on the waterway, and that's the public, and maybe the public should be paying for that buffer."

—Realtors Association Representative

Issue: Professionals directly affected by buffer ordinances (such as developers, engineers, and realtors) and members of interest groups promoting property rights were generally opposed to the case study ordinances. Most were more opposed to specific ordinance elements than the broader idea of mandating buffer use. Therefore, it is wise to involve these groups early in the process and throughout ordinance evolution. During interviews, respondents from the above groups felt ignored, and stressed that they would have liked to be more involved with ordinance development and outreach. In particular, real estate brokers stated that municipal staff should utilize the private sector as a vehicle for outreach, for example as a distributor of brochures on buffers.

Resolution: Involve the development community throughout the ordinance process, particularly to incorporate their suggestions on flexibility in the ordinance. Case study interview respondents typically stated that they were appeased by the inclusion of certain alternatives and exemptions in the ordinances. Examples include: variable buffer width requirements based on land area; allowance of buffer alternatives that are equally effective at curbing runoff (such as drainage ponds and swales); and methods of compensating land owners and developers for meeting buffer requirements.

"…[the planners try] to develop relationships with developers so that you get good development…it's not opposed to development, but we are opposed to bad development…we are really trying to orient developers towards doing better things…we're open to them if it's good. And creative."

—City of Charleston Staff Member

3. Compromise among stakeholders is key.

"…you have to balance conservation with property rights, and you have to do conservation that, in my opinion, is founded on real science as opposed to speculation…"

—Engineer

Issue: Balance and compromise among all stakeholders is critical, and all community stakeholders must be involved. Every interview respondent mentioned the need for opposing sides to meet in the middle, and all mentioned the distrust that sides have of one another. Some interviewees analogized compromise to opposite poles needing to bend, and some analogized failure of compromise to pendulums swinging too far in one direction. Others mentioned bargaining skills and the expectation that compromise will always result "somewhere in the middle." Not a single respondent asserted that their views were the correct ones, and all recognized the need to compromise and to be honest.

Resolution: Not only does community involvement and compromise open the discussion to differing perspectives, but it also helps the community become better satisfied with the end result. Balance, compromise, and the opportunity for involvement contribute to greater knowledge of specific issues/ordinances as well as local governmental processes. Additionally, balance, compromise, and community involvement nurture trust and respect among stakeholder groups. Be open about research sources, use media to widely advertise all public meetings, invite all stakeholders, and offer flexibility and alternative solutions.

"Our concern, from the realtor side, is that we always like to be a part of the stakeholder group, just let us participate. Many times there is this…polarization, you know, the environmentalists over here and those bad developers and those realtors…over there… Well, that's not the way to do it. I mean, you've got to work it out and meet somewhere in the middle."

—Real Estate Broker

✔ 4. Be clear about scientific information used to justify buffer ordinances.

"…most of the environmental…propaganda that we have…is based on lies. So most people are misled by what we read in the newspaper…junk science reigns"

—Developer

Issue: The source and presentation of scientific data used in discussing buffer ordinances is important. Many respondents in the private sector and in development interest groups believe that government and environmentalists selectively choose which science is salient and that they misinterpret or misrepresent the research when relaying it to the public.

Resolution: Stakeholders should be provided with a reference list of all sources used in WBO discussions, as well as instructions on accessing those sources. In this way, all stakeholders can read and interpret the research on their own and have an open and informed discussion without suspicion of the opposing side. This action reinforces trust between stakeholders and government or other groups that may support wetland buffers.

"…people are beginning to go back now and say 'was this real science? Or did somebody have an agenda that they are trying to promote?'… "

—Developer

✔ 5. Be consistent with stakeholder outreach.

> "…Mount Pleasant definitely said…'well, we're going to implement an education program just to educate homeowners about it, you know, it's going to be on their stamp, they're going to get a pamphlet about it, that's going to be on their plat…'"
>
> *—Environmental Nonprofit Staff Member*

Issue: Outreach is pivotal if a municipality approves a buffer ordinance. Communication with the general public and especially the private sector during ordinance development and after the ordinance passes is critical to stakeholder understanding. A municipality should neither stop nor curb communication and outreach on a buffer ordinance after that ordinance takes effect. Interview respondents identified buffer violations primarily as a mistake by uninformed homeowners, or a failure of ordinance outreach, rather than blatant disregard for the ordinance.

Resolution: Respondents mentioned that outreach must be adapted, updated, and performed often. Government sector respondents asserted that workshops and public displays were successful but must be performed on a regular basis to effectively educate homeowners on local buffer ordinances and their benefits. Many private sector respondents either did not know about or did not recall outreach on case study ordinances. Continuous outreach on buffers broadens understanding and helps potential violators keep the ordinance in mind. Real estate brokers' offers to become involved with outreach can be extremely helpful and should be capitalized on by governments, because new homeowners need reminders to check plats, determine buffer boundaries, and maintain buffers.

> "…[outreach should consist] of workshop types…seminars that are available and discussion that…actually could generate results…[during which] the ordinance is available and…we talk about…what can be changed, what's working, what's not working, what's hurting our clients, what's helping…what we've seen needs to be done more…that sort of thing."
>
> *—Landscape Architect*

✔ 6. Include flexibility in ordinance stipulations.

"…these rules ought to have enough flexibility to where…a land owner or a developer has some options and not just put into a box where you got to do it this way or you can't do it at all."

—Attorney

Issue: Ordinance components should be flexible enough to meet many stakeholder needs and to appropriately match the municipality's landscape. Many private sector respondents believe that set minimum widths in buffer ordinances are arbitrary, inappropriate, and ineffective, and that widths should be based on individual land use and landscape. Many developers also contend that the use of swales, ditches, and drainage ponds are effective and should be incorporated as options in buffer ordinances.

Resolution: Much of the buffer research promotes minimum buffer widths to filter a set amount of pollutants, but stakeholders must understand the information and be provided with flexibility on buffer width. If alternatives or exemptions are appropriate for the community and acceptable to improve water quality, then they certainly should be a part of the discussion. Additional components of typical buffer ordinances may simply be unfeasible or unacceptable to certain communities, and public officials should embrace this.

"…I think most of our developers say they don't mind…planting buffers and things like that to protect it, just so there's some flexibility in dealing with the issues of when you develop the property."

—Realtors Association Representative

7. Enforcement and monitoring resources are crucial for the success of the ordinance.

"…they're definitely short of people…to continue to enforce new regulations on top of regulations that already exist, they don't have the…people to do it. Neither one of the municipalities."

—Engineer

Issue: Respondents from all sectors emphasized that enforcement of buffer ordinances is difficult and that the inability to enforce the ordinance is counteractive to promoting buffers. Most respondents mentioned that there are not enough resources to properly enforce the CLBO, and some respondents reflected that it reinforces a notion that government adds regulations but cannot secure the resources with which to enforce them.

Resolution: Enforcement and resources should not be lacking, though all governments face budget issues. A municipality needs a proper method of monitoring critical areas, for example, using Geographic Information Systems (GIS) to map and compare annual aerial photography of the landscape, or assigning an enforcement officer to periodically check critical area property. Relying on citizens to report their neighbors may be somewhat effective, but has its drawbacks and should not be the sole means of identifying violations. Proper enforcement is time-consuming, and extra staff is ideal, but a basic ability to photograph buffer areas and compare photos over time is a great start.

"…every time we identify a problem…we think that…the solution is more rules and we never really quite get down to enforcing the rules that we have in place. We just make up more rules to solve the problem, and…I honestly don't think there's a great deal of enforcement."

—Realtors Association Representative

8. To avoid CLBO violations, homeowners should be the focus of educational campaigns.

"It's not the developer. The developer does it right, sells the lot, and then the lot owner goes in with his chainsaw and cuts things down, and plants grass down to the edge of the marsh, [and] he just claims 'well, I didn't know any better.'"

—Attorney

Issue: According to all three sectors interviewed, homeowners are the culprits of most CLBO violations. Interviewees attribute this to limited general scientific knowledge and the fact that some professionals and government staff work with the ordinance daily while the general citizenry does not. These violations and the lack of knowledge associated with them are not a result of malicious intent or apathy; all three sectors agree that science and environmental knowledge are moderately to very important to community members but that this knowledge is largely absent from the community.

Resolution: Substantial and thoughtful outreach to the general citizenry is imperative and should occur throughout ordinance creation, implementation, and enforcement. Specific outreach opportunities include outreach to neighborhood associations (and even including the ordinance in the neighborhood's covenants), showing new homeowners their plats with the buffer delineated, and using private sector offices as places to distribute brochures.

"…probably the people that aren't [aware of the ordinance] are more individual property owners…that aren't part of the development process…this isn't something they do all the time."

—City of Charleston Staff Member

9. Outreach and education on critical line buffers should take varied formats.

"…I think there's got to be some forum somewhere to get that information out. Is it the municipalities' responsibility? Absolutely. And do they use the realtors to get that information out? They could."

—Real Estate Broker

Issue: The public is generally not informed about water quality, wetlands and other coastal resources, buffers, buffer ordinances, and land use issues. The interview respondents agreed that there is limited to no knowledge of these issues among most citizens.

Resolution: Though each sector had varying ideas on the best methods for making buffer ordinance information more accessible, the outreach suggestions that all three sectors shared are: (1) producing a web site that has a condensed or summarized version of the ordinance and explains why the municipality chose to put a buffer ordinance in place; (2) developing a brochure that is available at government offices, private sector offices, and public areas that outlines the buffer ordinance and buffer information; and (3) conducting public meetings and workshops on buffers and buffer ordinances.

"Put it online. You could have an executive summary of it [the ordinance] so…you don't have to read the…whole document, but you could just get an executive summary for laypeople, just so you could have a general understanding."

—Real Estate Broker

10. Promoting water quality is the most agreeable and least controversial goal of buffer ordinances.

"…and that's what setbacks are really all about, it trying to protect that fragile border …of marshland around our Lowcountry property."

—Attorney

Issue: Because of so many varied interests among stakeholders, planners and other municipal staff have a difficult time determining a community's goals with respect to buffers—Are aesthetics important? Is wildlife habitat important? Is sprawl an issue? Some goals seem to reflect narrow interests and views, and the development community interviewees in particular feel that government typically sides with environmentalists. Of all the questions and concerns that stakeholders sift through, there is one common concern for all members of a community, including the private sector—improving or maintaining water quality.

Resolution: Regardless of an interview respondent's background, perspective, profession, or level of involvement with the ordinances, all respondents recognized the importance of preserving water quality and the need for buffers of some type in the critical area. The debate between sectors in our case studies is focused more on ordinance details, not on the need for buffers. Most respondents recognized the importance of keeping water clean for posterity and demonstrated an understanding that their enjoyment of coastal resources depends largely on the health of those resources.

"…providing buffers along… critical areas [and] salt water wetlands…traps pollutants, and so…prevents nonpoint source pollution from getting to the estuaries. So in that regard, buffers are a good thing."

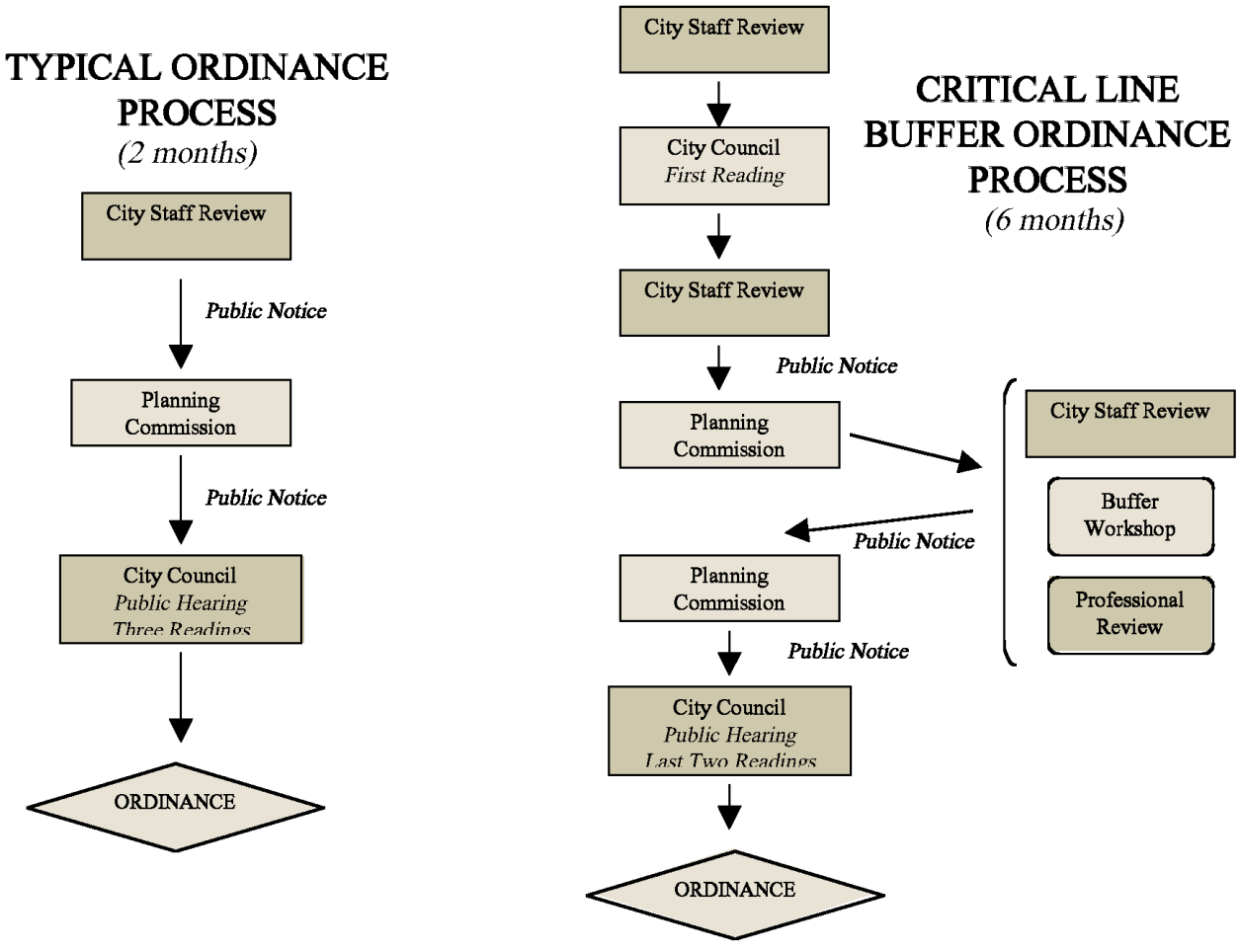
—Engineer

4.0 STEP-BY-STEP GUIDANCE FOR THE CREATION OF MUNICIPAL CRITICAL LINE BUFFER ORDINANCES (CLBOs)

The following step-by-step guidance is based on the CLBO case studies presented in Section 2.0 of this manual. Because municipalities vary considerably in their structures, legislative procedures, etc., this guidance is intended only as a framework for ordinance creation. Municipalities will likely need to adapt the contents of this section to their respective circumstances.

The case studies in Section 2.0 illustrate the great variation that can occur in development of CLBOs. For example, in the creation of the Town of Mount Pleasant CLBO (Section 2.2), the Town Planner created the draft ordinance with consultation from the Town Planning Commission. Next, the town council planning committee reviewed and commented on the ordinance draft, and, after a series of reviews and modifications, the full town council considered the ordinance. In the creation of the City of Charleston CLBO (Section 2.3), a city council member initially proposed the ordinance. The City Zoning Division then created and presented the draft ordinance to the City Planning Commission, where after several iterations, the full city council considered and eventually ratified the ordinance. Figure 4-1 compares the developmental process of a typical ordinance with that of a CLBO.

Figure 4-1. Comparison of Typical Ordinance Process and Critical Line Buffer Ordinance Process (Source: Amanda Herring, Zoning Planner, Department of Design, Development, and Preservation, City of Charleston).



The following is a 12-step CLBO development and implementation guide, derived from the case studies presented in this manual. The guide includes recommendations and considerations pertinent to CLBO development, as well as real-life examples from the case studies in Section 2.0. Figure 4-2 (below) provides a diagram of the 12-step CLBO development and implementation process.

Step 1: Municipal planning/zoning staff initiates discussion on drafting CLBO…

Recommendation: Initial brainstorming and fact-finding sessions should prepare staff through organizing information and exploring existing CLBO models. Utilize local outreach and extension specialists who may be familiar with existing CLBO models.

Example: The Town of Mount Pleasant utilized information from SC DHEC-OCRM, University of Georgia, the Center for Watershed Protection, and Beaufort County's existing ordinance, among other sources. The City of Charleston learned from the Town of Mount Pleasant, using both the Town and Beaufort County's ordinances as models. The City also used research from SC DHEC-OCRM, University of Georgia, and the Center for Watershed Protection, among other sources.

Step 2: New ordinance should be proposed as either part of Comprehensive Plan creation/modification or as an amendment to an existing zoning ordinance…

Recommendation: Expect to coordinate Comprehensive Plan goals with goals of CLBO. Focus on water quality and community enhancement.

Example: The Town of Mount Pleasant debated the purposes of the Comprehensive Plan and the related CLBO. Staff ultimately decided to focus on improving water quality, rather than on protecting wildlife habitat and preserving aesthetics, because of the setting of the coastal community and because of citizens' vocal support of quality of life. Feasibility of goals was important in this decision-making process—wildlife habitat protection was not an end goal for the community because of existing development patterns and the fact that there is no space for a buffer large enough to attract and support large marsh wildlife. Through the overarching goal of water quality, protection of habitat for smaller wildlife can exist as a sub-goal.

Step 3: Proposed CLBO is created with guidance from stakeholder committee meetings (Step 4 below) and a review of scientific research and existing CLBO models (Step 5 below).

Consideration: The creation of the CLBO will most likely be an iterative process, specifically through Steps 3-9. Specific ordinance requirements, including buffer widths, structural setbacks, tree diameter criteria, allowable species, and approved buffer modifications and enhancements will be developed during this process. Deciding on these specifications will require input from stakeholders and an assessment of available information.

Step 4: Municipal planner coordinates and facilitates stakeholder committee meetings, which include regulatory agencies (e.g. SC DHEC-OCRM), realtors, developers, not-for-profit organizations (e.g. Coastal Conservation League, SC Sea Grant Extension), and others to research and discuss water quality concerns and to draft the ordinance…

Recommendation: Be prepared to compromise with stakeholders. Keep a diverse group continually involved. Do not discount any opinions, or trust will be questioned or lost. This part of the process helps to ensure fair stakeholder participation and to balance the ordinance. Utilize local outreach and extension specialists to assist in convening the appropriate stakeholders.

Example: Both case study municipalities created diverse stakeholder committees to discuss the CLBOs during their development. Participating stakeholders drafted language and provided feedback throughout ordinance creation. The stakeholder committees supplemented the public comment periods during Planning Commission meetings for each submitted draft. Further, the stakeholder committees were composed of representatives from environmental nonprofits, the development community, and the general citizenry.

Step 5: Municipal planning commission explores scientific research on buffer ordinances with regulatory agency assistance (e.g. SC DHEC-OCRM)…

Recommendation: Ensure that scientific data is comprehensive and unbiased. Utilize nearby ordinances as models first. Consult local outreach and extension specialists who may be familiar with scientific knowledge on buffers and CLBOs.

Example: The development community members interviewed for the case studies felt that most of the data presented by municipal staff came from OCRM and environmental groups, and therefore that buffer ordinances are based on "junk science." They also felt that even if quality data is used, government staff and environmental advocates interpret the science differently, conveying false information to the general public. Though the basis for this assertion is incorrect (municipal staff utilized academic sources, research from collaborative think tanks, and other reliable data studies), the

theme is significant—in order to encourage open and truthful discussion, data must be reliable and provided to stakeholders for their own review.

Step 6: Municipal planning staff presents ordinance draft to municipal council planning commission…

Consideration: Anticipate iterative work on several drafts to incorporate and address all community and legislative input.

Example: The municipalities composed several drafts to address various concerns. For the City of Charleston, concern arose over whether the Citadel (a local military school) would have to implement the CLBO and the potential complications that would ensue. Concerns about municipal golf courses and existing development were also pinpointed and addressed. In these instances, discussion among several stakeholders and reworking of many drafts became necessary.

Example: To determine the appropriate buffer widths for the case study municipalities, planners examined the land use and zoning of the local coastal areas affected by the proposed CLBO. Utilizing studies that examine runoff filtration per foot of buffer, and then matching those studies to land use and community input, municipalities determined different widths for each area. For Mount Pleasant, areas home to more environmentally sensitive zones or areas that contained less development were protected with wider buffer widths. Areas that already contained a fair amount of development required less buffer width. The intent was to protect water quality near fragile and less developed land and "sacrifice" already developed areas. For the City of Charleston, the urban setting called for a different approach, and officials chose to exempt certain existing land uses (ports, institutions of higher learning, etc.) while buffering those areas still under development and with greater impervious surface area.

Step 7: An opportunity for public comment on the draft ordinance is provided…

Recommendation: Notice the public on the public comment period via local newspaper and posting on municipal web sites. Make hard copies available upon request and electronic versions available on the web site. Ensure that instructions for providing comments are clear. Utilize local outreach and extension specialists to facilitate the comment period.

Example: When interviewed, members of interest groups representing the development community often remarked that the public notice is only done because of Federal requirement, and that reading elaborate ordinances is time-consuming. Well-advertised public comment periods that exceed federal standards will help foster trust between groups, and offering easily accessible copies of the drafts is important. The same interview respondents above mentioned that paying to receive a copy of an approved ordinance is often a hurdle, and online executive summaries would be useful. Apply the same theory to the public comment opportunities during ordinance drafting.

Example: Case study interviewees, particularly those in the development community, indicated distrust towards government staff and "environmentalists." These respondents did not believe their opinions were valued during public comment periods, particularly their requests for ordinance flexibility.

Step 8: Municipal planning commission reviews and comments on draft ordinance…

Step 9: If necessary, planning staff reworks, modifies, or alters draft ordinance based on comments by council and public…if necessary, return to Step 6…

Step 10: Full city council considers ordinance; ordinance revised if necessary; after three readings ordinance ratified…

Consideration: Expect the entire process to take longer than a typical ordinance timeframe (~ 6 months).

Example: For both of the case study municipalities, planners emphasized that much of the extra time was needed to take various stakeholder concerns into account and for the planners to collect adequate research and buffer ordinance information. The process is therefore more elaborate and difficult than that of a typical ordinance, but the result is a better product that is representative of the municipality. The planners interviewed were comfortable that the end result met the needs of stakeholders.

Step 11: Implement the CLBO…

Recommendation: Utilize local outreach and extension specialists to facilitate implementation of the ordinance in the field.

Example: Planners interviewed in the case studies emphasized that implementation was complicated. Reviewing plats to ensure that designs included an identified, approved buffer was necessary until the process became ingrained in the development community's procedures. Outreach materials were created and distributed at government offices and public events to alert the homeowners in the community.

Step 12: Perform CLBO evaluations and assessments…

Recommendation: An evaluation of the ordinance in terms of (1) protected acres of critical area, (2) buffered lengths of

wetland boundaries, (3) number of property owners implementing buffers, and (4) measures of water quality improvement can be useful in measuring the successes of the CLBO.

Example: Both case study municipalities had planners that would like to revisit the ordinance. Planners were uncertain that the current ordinance language is appropriate and interpreted correctly, that the areas buffered are adequate, and that outreach efforts were adequate. Development community interviewees noted that they would like to determine whether or not the buffers are actually protecting water quality and whether buffers are more effective than other stormwater management techniques at achieving this.

Overall recommendation: Public education and outreach should be conducted throughout the ordinance development and implementation process. Be sure to include outreach to homeowner associations and the private sector. Also, consult local outreach and extension specialists as needed.

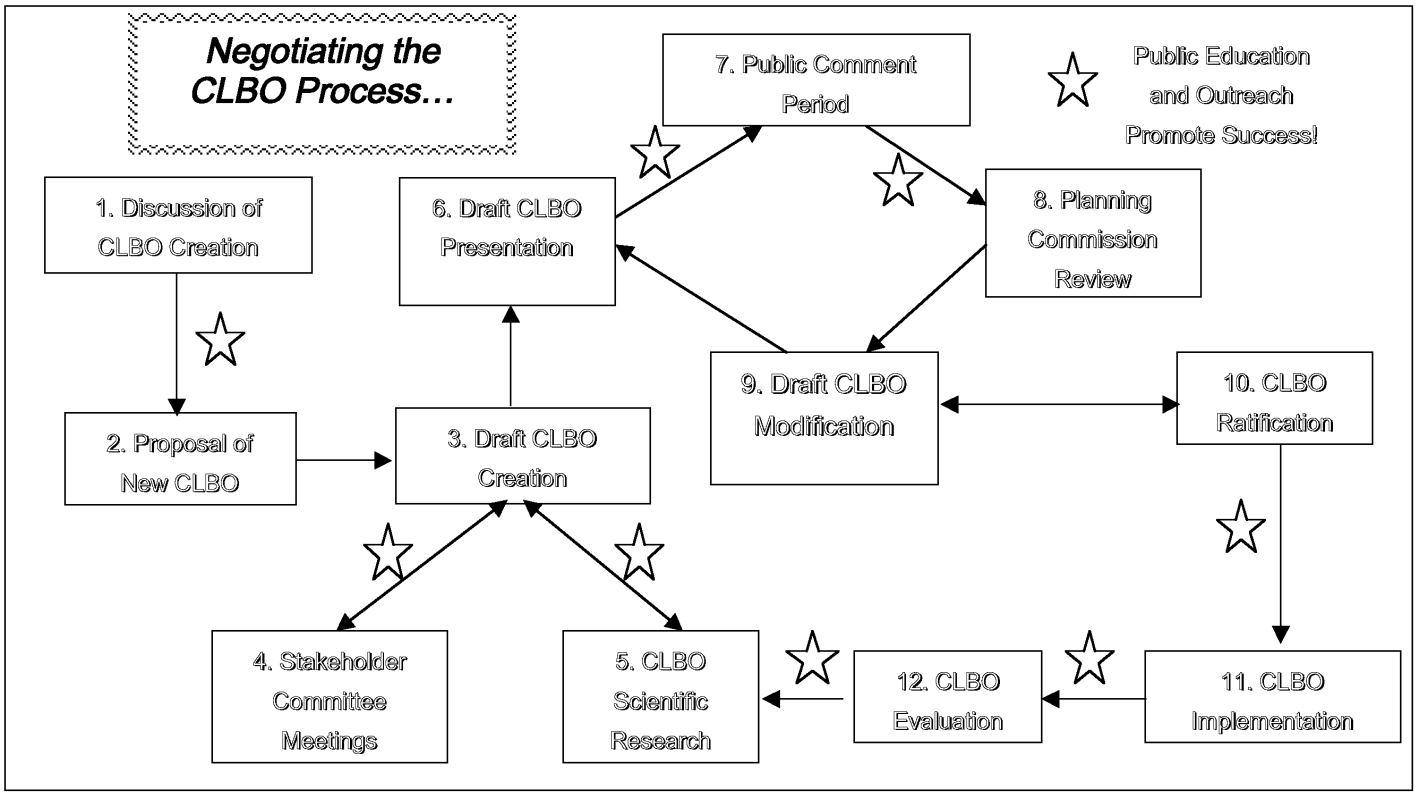


Figure 4-2. Diagram Demonstrating the 12-step Process in the Creation and Implementation of a Critical Line Buffer Ordinance (CLBO). Each box in the diagram corresponds to steps and associated recommendations or considerations given below. The stars represent components of the process during which public education and outreach can be beneficial.

REFERENCES

Berg, B.L. (2004) Qualitative Research Methods. (5th ed.) Boston: Pearson Education.

Center for Watershed Protection (CWP). (2005) Homepage. http://www.cwp.org/

Cowardin, L.M., Carter, V., Goley, F.C., & LaRoe, E.T. (1979) Classification of Wetlands and Deepwater Habitats of the United States. (FWS/OBS-79/31). Washington, DC: US Fish and Wildlife Service, 103.

Kusler, J. & Opheim, T. (1996) Our National Wetland Heritage: A Protection Guide. (2nd ed.) Washington, DC: Environmental Law Institute.

Mitsch, W.J. & Gosselink, G.J. (2000) Wetlands. New York: John Wiley & Sons.

Reynolds, W. (2005) Email to authors. January 18.

South Carolina Department of Health and Environmental Control-Office of Ocean and Coastal Resource Management. (2005a) Frequently Asked Questions. http://www.scdhec.net/ocrm/html/faq.html.

South Carolina Department of Health and Environmental Control. (2005b) Guide to Wetlands Permitting. www.scdhec.net/eqc/water/pubs/401guide.pdf.

South Carolina Department of Health and Environmental Control-Office of Coastal Resource Management (SC DHEC-OCRM). 2002a. Backyard Buffers for the South Carolina Lowcountry. Columbia, South Carolina: SC DHEC-OCRM.

South Carolina Department of Health and Environmental Control-Office of Coastal Resource Management (SC DHEC-OCRM). 2002b. Vegetated Riparian Buffers and Buffer Ordinances. Columbia, South Carolina: SC DHEC-OCRM.

Urbanization and Southeastern Estuarine Systems Project (USES). (2005) Homepage. http://www.urbanestuary.org/

US Census Bureau. (2000) http://quickfacts.census.gov/qfd/states/45000.html

US Census Bureau. (1990) http://quickfacts.census.gov/qfd/states/45000.html

US EPA. (2004) Wetland Homepage. http://www.epa.gov/owow/wetlands/

Appendix A: Wetland Buffer Resources, Documents, and Contacts

The following are general references that may be useful to those wishing to learn more about buffers. These citations are organized by type: academic sources and documents; government documents; interest group documents, online sources and documents; documents containing model ordinance language. Following the list is a chart of contacts helpful for the Lowcountry area. For sources directly cited in the manual text, see the reference page.

ACADEMIC SOURCES

Arnold, C.L, & Gibbons, C.J. (1996) Impervious surface coverage: the emergence of a key environmental indicator. Journal of the American Planning Association, 62(2), 243-259.

Bryan, E.H. (1972) Quality of stormwater drainage from urban land. Water Resources Bulletin, 8(3), 578-588.

Burke, V.J., & Gibbos, J.W. (1995) Terrestrial buffer zones and wetland conservation: a case study of freshwater turtles in a Carolina Bay. Conservation Biology, 9(6), 1365-1369.

Carpenter, S.R., Caraco, N.F., Correll, D.L., Howarth, R.W., Sharpley A.N., & Smith, V.H. (1998) Nonpoint pollution of surface waters with phosphorus as nitrogen. Ecological Applications, 8(3), 559-568.

Castelle, A. J., Johnson, A.W., & Conolly, C. (1994) Wetland and stream buffer size requirements- a review. Journal of Environmental Quality, 23, 878-882.

Corbett, C.W., Wahl, W., Porter, D.E., Edwards, D., & Moise, C. (1997) Nonpoint source runoff modeling a comparison of a forested watershed and an urban watershed on the South Carolina coast. Journal of Experimental Marine Biology and Ecology, 213, 113-149.

Desbonnet, A., Pogue, P., Lee, V., & Wolff, N. (1994) Vegetated Buffers in the Coastal Zone- A Summary Review and Bibliography. University of Rhode Island: Coastal Resource Center, Rhode Island Sea Grant.

Heimlich, R.E., Wiebe, K.D., Claassen, R., & House, R.M. (1997) Recent evolution of environmental policy: lessons from wetlands. Journal of Soil and Water Conservation, 52(3), 157-165.

Holland, A.F., Sanger, D.M., Gawle, C.P., Lerberg, S.B., Santiago, M.S., Riekerk, G.H.M., Zimmerman, L.E., & Scott, G.I. (2004) Linkages between tidal creek ecosystems and the landscape and demographic attributes of their watersheds. Journal of Experimental Marine Biology and Ecology, 298, 151-178.

Kennish, M.J. (2002) Environmental threats and environmental future of estuaries. Environmental Conservation, 29(1), 78-107.

Kramer, R.A. & Shabman, L. (1993) The Effects of agriculture and tax policy reform on the economic return to wetland drainage in the Mississippi Delta region. Land Economics, 69(3), 249-62.

Lant, C.L. & Roberts, R.S. (1990) Greenbelts in the cornbelt: riparian wetland, intrinsic, values, and market failure. Environment and Planning A, 22, 1375-1388.

Lerberg, S.B., Holland, A.F., & Sanger, D.M. (2000) Responses of tidal creek macrobenthic communities to the effects of watershed development. Estuaries, 23(6), 838-853.

Livingston, R.L. (1991) Historical relationships between research and resource management in the Apalachicola River estuary. Ecological Applications, 1(4), 361-382.

Maddock, T.A. (2001) Fragmenting regimes: how water quality regulation is changing political-economic landscapes. Geoforum, 35(2), 217-230.

Mahan, B.L., Polasky, S., & Adams, R.M. (2000) Valuing urban wetland: a property price approach. Land Economics, 76(1), 100-113.

McCutcheon, S.C., Hayes, J.C., Williams, C.A., Weisskopf, C.P., & Klaine, S.J. (1999) Evaluation of vegetative filter strips to control urban runoff into Charleston harbor. Columbia, South Carolina: Charleston Harbor Project.

Appendix A: Wetland Buffer Resources, Documents, and Contacts

- Nichols, D.S. (1983) Capacity of natural wetlands to remove nutrients from wastewater. Journal of the Water Pollution Control Federation, 55(5), 495-502.
- Roth, L. (2004). Life at the Water's Edge: A Shoreline Residence's Guide to Natural Lakeshore and Streamside Buffers for Water Quality Protection in South Carolina. Clemson, SC: Clemson Public Service, Clemson University.
- Sanger, D.M., Holland, A.F., & Scott, G.I. (1999) Tidal creek and salt marsh sediments in South Carolina coastal estuaries: I. Distribution of trace metals. Archives of Environmental Contamination and Toxicology, 37, 445-457.
- Sanger, D.M., Holland, A.F., & Scott, G.I. (1999) Tidal creek and salt marsh sediments in South Carolina coastal estuaries: II. Distribution of organic contaminants. Archives of Environmental Contamination and Toxicology, 37, 458-471.
- Semlitsch, R.D. (1998) Biological delineation of terrestrial buffer zones for pond-breeding salamanders. Conservation Biology, 12(5), 1113-1119.
- Spray, S.L. & McGlothlin, K.L. (2004) Wetlands. Lanham: Rowman & Littlefield Publishers.
- Tiner, R. W. (1999) In Search of Swampland: a Wetland Sourcebook and Field Guide. New Brunswick: Rutgers University Press.
- Weller, D.E., Jordan, T.E., & Correll, D.L. (1998) Heuristic models for material discharge from landscapes with riparian buffers. Ecological Applications, 8(4), 1156-1169.
- Wenger, S. (1995) A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Athens: Office of Public Service & Outreach, Institute of Ecology, University of Georgia.
- Wenger, S. & Fowler, L. (1999) Guidebook for Developing Local Riparian Buffer Ordinances. Athens: Office of Public Service & Outreach, Institute of Ecology, University of Georgia.
- Williams, C. A., Weisskopf, C.P., McCutcheon, S.C., Hayes, J.C., & Klaine, S.J. (1996) Evaluation of Vegetated Filter Strips to Control Nonpoint Source Pollution onto Charleston Harbor and Other Coastal Waters. Clemson, South Carolina: Clemson University, [Draft].

GOVERNMENT DOCUMENTS

- American Public Health Association (APHA). (1995) Standard methods for the examination of water and wastewater. Washington, DC: APHA.
- Herring, M. (2002) Creating and conserving critical line buffers. Charleston, SC: City of Charleston Department of Design, Development & Preservation.
- South Carolina Department of Health and Environmental Control-Office of Coastal Resource Management (SC DHEC-OCRM). (2000). CHP: The Citizen's Guide to the Charleston Harbor Project. Columbia, SC: SCDHEC-OCRM.
- United States Army Corps of Engineers (US ACE). (1991) Buffer strips for riparian management (a literature review). Waltham, MA: USACE – New England Division.
- United States Environmental Protection Agency (US EPA). (1993) Guidance specifying management measure for sources of nonpoint pollution in coastal waters. (EPA Doc # 840-B-92-002.) Washington, DC: Office of Water.

INTEREST GROUP DOCUMENTS

- National Research Council. (2000) Clean coastal waters: understanding and reducing the effects of nutrient pollution. Washington, DC: National Academy Press.
- South Carolina Coastal Conservation League. (2002) Coastal Sprawl-The Effects of Urban Design on Aquatic Ecosystems in the United States. Charleston, SC: Pew Oceans Commission.
- South Carolina Department of Health and Environmental Control-Office of Coastal Resource Management (SC DHEC-OCRM). (2002) Post Development BMP Design Aid Manual. Columbia, South Carolina: SCDHEC-OCRM.

Appendix A: Wetland Buffer Resources, Documents, and Contacts

ONLINE

- SC DHEC-OCRM. Backyard Buffers for the South Carolina Lowcountry. (2004) pdf version of manual online. http://www.scdhec.net/ocrm/pubs/backyard.pdf/
- College of Charleston Campus Sustainability. (2005) Homepage. http://www.cofc.edu/sustainability/
- CWP: The Stormwater Manager's Resource Center. (2004) Homepage. http://www.stormwatercenter.net/
- Low Impact Development Center. (2005) Homepage. http://www.lowimpactdevelopment.org/
- Municode website. (2005) Homepage. http://www.municode.com/resources/online_codes.asp/
- South Carolina Native Plant Society. (2004) Homepage. http://www.scnps.org/

MODEL ORDINANCE LANGUAGE

- Center for Watershed Protection. (2004) The Stormwater Manager's Resource Center. Buffer Model Ordinance. http://www.stormwatercenter.net/Model%20Ordinances/buffer_model_ordinance.htm
- South Carolina Department of Health and Environmental Control-Office of Ocean and Coastal Resource Management (2004) Model Vegetated Buffer Ordinance: http://www.scdhec.com/eqc/ocrm/pubs/model.pdf
- U.S. EPA. (2004) Model Ordinance Language for stream buffers. http://www.epa.gov/owow/nps/ordinance/mol1.htm/

Appendix

A: Wetland Buffer Resources, Documents, and Contacts

LOWCOUNTRY AREA CONTACTS

Entity	Contact	Office / Department	Address / Phone	Email / Web Site
Alhambra Hall Model Buffer	Dr. Diane Lauritsen (Coordinator)			ddlauritsen@comcast.net
City of Charleston	Amanda Herring (Zoning Planner)	Zoning Division / Department of Design, Development and Preservation	75 Calhoun Street Third Floor Charleston, SC 29401 (843) 724-3765	herringa@ci.charleston.sc.us www.charlestoncity.info
Town of Mount Pleasant		Planning and Development Department	Town of Mount Pleasant Municipal Complex 100 Ann Edwards Lane PO Box 745 Mount Pleasant, SC 29464 (843) 884-1229	www.townofmountpleasant.com
South Carolina Department of Health and Environmental Control (SC DHEC)	Ward Reynolds (Environmental Planner)	Office of Ocean and Coastal Resource Management (OCRM)	1362 McMillan Avenue, Suite 400 Charleston, SC 29405 (843) 744-5838 ext. 141	REYNOLWW@dhec.sc.gov www.scdhec.gov/ocrm/
South Carolina Department of Natural Resources (SC DNR)	Dr. Robert Van Dolah (Director)	Marine Resources Research Institute	P.O. Box 12559 Charleston, SC 29412 (843) 953-9819	vandolahr@mrd.dnr.state.sc.us www.dnr.state.sc.us/

Appendix

APPENDIX B: Lowcountry Native Species for Vegetative Buffer Use

The following is a list of native plants for critical line buffers, outlined in *Creating and Conserving Critical Line Buffers* and *Backyard Buffers for the South Carolina Lowcountry*, both of which have full citations in Appendix A. Several of these species are listed in the City of Charleston's CLBO as recommendations for supplemental planting.

PERENNIALS

Butterfly Weed	*Asclepias tuberosa*
Tickseed Coreopsis	*Coreopis augustifolia*
Coreopsis	*Coreopis lanceolata*
Cora Bean	*Eyrthrina herbacea*
Swamp Sunflower	*Helianthus angustifolius*
Swam Rose Mallow	*Hibiscus moshceutos*
Blue Flag Iris	*Iris virginica*
Seashore Mallow	*Kosteletzkya virginica*
Blazing Star	*Liatris spicata*
Beach Evening Primrose	*Oenothera drummondii*
Evening Primrose	*Oenothera speciosa*
Carolina Phlox	*Phlox Carolina*
Black-Eyed Susan	*Rudbeckia fulgida (hirta)*
Scarlet Sage	*Salvia coccinea*
Lyre-leaved Sage	*Salvia lyrata*
Seaside Goldenrod	*Solidago sempervirens*
Pink Verbena	*Verbena Canadensis*

SHRUBS

Beauty Berry	*Callicarpa Americana*
Button Bush	*Cephalanthus occidentalis*
Sweet Pepper Bush	*Clethra alnifolia*
Inkberry	*Ilex glabra*
Yaupon Holly	*Ilex vomitoria*
Virginia Sweetspire	*Itea virginica*
Leucothoe	*Baccharis halmifolia*
Salt Myrtle	*Leucothoe axillaries*
Wax Myrtle	*Myrica cerifera*
Wild Azalea	*Rhododendron canescens*
Dwarf Azalea	*Rhododendron atlanticum*
Shrub Palmetto	*Sabal minor*
Saw Palmetto	*Sabal repens*
Sparkleberry	*Vaccinium aboreum*
Spanish Bayonet	*Yucca aloifolia*
Bear Grass	*Yucca filamentosa*

TREES

Red Maple	*Acer rubrum*
Southern Magnolia	*Magnolia grandiflora*
Slash Pine	*Pinus elliottil*
Loblolly Pine	*Pinus taeda*
Southern Red Oak	*Quercus falcate*
Laurel Oak	*Quercus laurifolia*
Willow Oak	*Quercus phellos*
Live Oak	*Quercus virginica*
Cabbage Palmetto	*Sabel palmetto*
Bald Cypress	*Taxodium distichum*
Red buckeye	*Aesculus pavia*
Eastern Redbud	*Cercis Canadensis*
Dogwood	*Cornus florida*
Loblolly Bay	*Gordonia lasianthus*
Red Cedar	*Juniperus virginiana*
Cherry Laurel	*Prunus caroliniana*
Sassafras	*Sassafras albidum*

GRASSES

Brushy Broomsedge	*Andropogon glomeratus*
Broomsedge	*Andropogon virginicus*
Whitetop Sedge	*Dichromena latifolia*
Sweetgrass	*Muhlenbergia filipes*
Seaside Panicum	*Panicum amarum*
Switch Grass	*Panicum virgatum*
Sea Oats	*Uniola paniculata*
Cane	*Arundinaria gigantean*
Reed Grass	*Calamagrostis cinnoides*
Foxtail Grass	*Setaria ganculata*
Green Bristlegrass	*Setaria viridis*
Indian Grass	*Sorgastrum sp.*
Salt Hay	*Spartina patens*

Appendix

APPENDIX B: Lowcountry Native Species for Vegetative Buffer Use

The following plants are species native along the southeastern coastline of the United States, and have been used in urban native species garden on the College of Charleston, South Carolina campus (http://www.cofc.edu/sustainability/). The area where the garden is located is periodically saturated with rainwater, due to the nature of the downtown drainage system.

Asclepias tuberose (Butterfly Weed)
Aster concolor (Eastern Silver Aster)
Aster carolinianus (Climbing Aster)
Aster cordifolius (Common Blue Wood Aster)
Baptisia australis (False Blue Indigo)
Baptisia australis (Yellow Wild Indigo)
Cercis Canadensis (Eastern Redbud)
Chelone glabra (White Turtlehead)
Coreopsis lanceolata (Lanceleaf Tickseed)
Coreopsis rosea (Rose Coreopsis)
Chrusogonum virginicum (Green and Gold)
Chasmanthium latifolium (Fish-on-a-Pole)
Equisetum hymale (Scouring Rush)
Eupatorium fistulosum (Joe-pye Weed)
Eupatorium dubium
Gaillardia pulchella (Fire-wheel)
Helianthus angustifolius (Narrowleaf or Swamp Sunflower)
Helenium flexuosum (Southern Sneezeweed)
Iris virginica
Itea virginica (Virginia Willow)
Juncus effuses (Common Rush)
Kosteletzkya virginica (Seashore Mallow)
Liatris spicata (Mountain Blazing Star)
Lobeilia cardinalis (Cardinal Flower)
Lonicera sempervirens (Coral Honeysuckle)
Macbridea caroliniana (Carolina Birds-in-a-Nest)
Monarda punctata (Spotted Horse Mint)
Muhlenbergia filipes (Sweet Grass)
Parthenium integrifolium (Wild Quinine)
Pycnanthemum incanum (Mountain Mint)
Rudbeckia fulgida
Sabatia dodecandra (Larger Marsh Pink)
Sarracenia flava (Yellow Trumpet or Biscuit Flower)
Sarracenia minor (Hooded Pitcher Plant)
Sarracenia purpurea (Frog's Breeches or Hunter's Cap)
Sarracenia rubra (Sweet Pitcher Plant)
Tradescantia rosea (Rosey Spiderwort)

Appendix

APPENDIX C: Inventory of Municipal Buffer Ordinances in the Southeastern United States

The following list is by no means comprehensive, but contains various examples of buffer ordinances and regulations currently ratified in the southeastern United States. Researching these ordinances may be helpful to other municipalities seeking examples of language, purpose, and types, as well as relating to communities similar to their own. To view more ordinances/regulations, go to the Municode.com web site (http://www.municode.com/resources/online_codes.asp).

ALABAMA

Baldwin County, AL
Wetland buffer
http://www.co.baldwin.al.us/uploads/Baldwin%20County%20Zoning%20Regulations%202004-11-16.pdf

Bay County, AL
Wetland buffer
http://library2.municode.com/gateway.dll/FL/florida/33612?f=templates&fn=default.htm&npusername=12713&nppassword=MCC&npac_credentialspresent=true&vid=default

Town of Trussville, AL
Stream buffer
http://www.alabamarivers.org/trussvilleordinance.htm

FLORIDA

Brevard County, FL
Shoreline buffer
http://library.municode.com/gateway.dll/FL/florida/8823?f=templates&fn=default.htm&npusername=10473&nppassword=MCC&npac_credentialspresent=true&vid=default

Broward County, FL
Wetland buffer used for mitigation
http://library.municode.com/gateway.dll/FL/florida/5913?f=templates&fn=default.htm&npusername=10288&nppassword=MCC&npac_credentialspresent=true&vid=default

Charlotte County, FL
Upland buffer zone
http://library.municode.com/gateway.dll/FL/florida/9091?f=templates&fn=default.htm&npusername=10526&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Key West, FL
Wetland buffer
http://library.municode.com/gateway.dll/FL/florida/806?f=templates&fn=default.htm&npusername=10053&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Tallahassee, FL
Wetland buffer
http://library2.municode.com/gateway.dll/FL/florida/42744?f=templates&fn=default.htm&npusername=19980&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Tampa, FL
Wetland buffer
http://library.municode.com/gateway.dll/FL/florida/2261?f=templates&fn=default.htm&npusername=10132&nppassword=MCC&npac_credentialspresent=true&vid=default

Flagler County, FL
Wetland buffer
http://library1.municode.com/gateway.dll/FL/florida/30996?f=templates&fn=default.htm&npusername=12218&nppassword=MCC&npac_credentialspresent=true&vid=default

St. Johns County, FL
Upland buffer
http://www.co.stjohns.fl.us/BCC/gmsvcs/Planning/Current_Planning/LandDevRegs/Art4-Pt4-01-02.pdf

Town of Palm Beach, FL
Wetland buffer during construction
http://library1.municode.com/gateway.dll/FL/florida/22511?f=templates&fn=default.htm&npusername=11397&nppassword=MCC&npac_credentialspresent=true&vid=default

GEORGIA

Cherokee County, GA
Stream buffer
http://library3.municode.com/gateway.dll/GA/georgia/9146?f=templates&fn=default.htm&npusername=12524&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Alpharetta, GA
Stream buffer
http://library3.municode.com/gateway.dll/GA/georgia/6991?f=templates&fn=default.htm&npusername=12100&nppassword=MCC&npac_credentialspresent=true&vid=default

Appendix

APPENDIX C: Inventory of Municipal Buffer Ordinances in the Southeastern United States

City of Atlanta, GA
Riparian buffer
http://library3.municode.com/gateway.dll/GA/georgia/719?f=templates&fn=default.htm&npusername=10376&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Newnan, GA
Stream buffer
http://library3.municode.com/gateway.dll/GA/georgia/4402?f=templates&fn=default.htm&npusername=11345&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Roswell, GA
Stream buffer
http://ordlink.com/codes/roswell/index.htm

City of Savannah, GA
Aquatic buffer
http://library3.municode.com/gateway.dll/GA/georgia/5424?f=templates&fn=default.htm&npusername=11556&nppassword=MCC&npac_credentialspresent=true&vid=default

Cobb County, GA
Stream buffer
http://library3.municode.com/gateway.dll/GA/georgia/1660?f=templates&fn=default.htm&npusername=10572&nppassword=MCC&npac_credentialspresent=true&vid=default

Douglas County, GA
Stream buffer
http://library3.municode.com/gateway.dll/GA/georgia/6729?f=templates&fn=default.htm&npusername=11904&nppassword=MCC&npac_credentialspresent=true&vid=default

Fulton County, GA
Riparian buffer
http://library3.municode.com/gateway.dll/GA/georgia/2919?f=templates&fn=default.htm&npusername=10816&nppassword=MCC&npac_credentialspresent=true&vid=default

NORTH CAROLINA

City of Asheville, NC
Aquatic buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/6934?f=templates&fn=default.htm&npusername=12499&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Fayetteville, NC
Aquatic buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/1862?f=templates&fn=default.htm&npusername=10733&nppassword=MCC&npac_credentialspresent=true&vid=default

City of Wilson, NC
Riparian buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/3868?f=templates&fn=default.htm&npusername=11716&nppassword=MCC&npac_credentialspresent=true&vid=default

Durham County, NC
Stream buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/7197?f=templates&fn=default.htm&npusername=12650&nppassword=MCC&npac_credentialspresent=true&vid=default

Orange County, NC
Aquatic buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/7977?f=templates&fn=default.htm&npusername=13166&nppassword=MCC&npac_credentialspresent=true&vid=default

Richmond County, NC
Aquatic buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/8866?f=templates&fn=default.htm&npusername=13396&nppassword=MCC&npac_credentialspresent=true&vid=default

Town of Chapel Hill, NC
Aquatic buffer
http://library8.municode.com/gateway.dll/NC/north%20carolina/9690?f=templates&fn=default.htm&npusername=19952&nppassword=MCC&npac_credentialspresent=true&vid=default

SOUTH CAROLINA

Beaufort County, SC
Riparian and wetland buffer
http://library10.municode.com/gateway.dll/1/153?f=templates&fn=default.htm&vid=nextpage:104000&npusername=10400&nppassword=MCC&npac_credentialspresent=true

Appendix

APPENDIX C: Inventory of Municipal Buffer Ordinances in the Southeastern United States

Charleston County, SC
Zoning ordinance
http://www.charlestoncounty.org/index2.asp?p=/departments/planning/ZLandDevReg.htm

City of Beaufort, SC
Critical area buffer
http://www.cityofbeaufort.org/depts/planning/udo/udo.pdf

City of Charleston, SC
See Appendix A Contact Chart

Georgetown County, SC
Wetland setback from line designated by DHEC- OCRM
http://www.georgetowncountysc.org/zoning/docs/ZO_A8.pdf

Pickens County, SC
Freshwater wetland buffer for golf courses
http://library4.municode.com/gateway.dll/SC/south%20carolina/5177/5178?f=templates&fn=default.htm&npusername=13400&nppassword=MCC&npac_credentialspres

Town of Hilton Head, SC
Wetland buffers
http://czo.duncanplan.com/hilton-head/main.asp

Town of Mount Pleasant, SC
See Appendix A Contact Chart

Appendix

Appendix D: Glossary

Unless noted otherwise, the definitions in this glossary were taken from The Citizens Guide to the Charleston Harbor Project, fully cited in Appendix A.

Best Management Practices: practices determined to be the most effective and feasible means of preventing or reducing pollution from point and nonpoint sources in order to protect water quality.

Buffer: strips of land between a waterway and a developed area that are left undeveloped to protect the waterway from pollution by filtering runoff water.

Buffer Ordinances: regulations that enforce zones of vegetation between potentially polluting areas and adjacent marshes, rivers and creeks.

Coastal Zone: the term 'coastal zone' means the coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder), strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches (from section 304 of the Coastal Zone Management Act).

Critical Area: the area delineated by critical lines as determined by the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management (SC DHEC-OCRM). State and Federal permits must be acquired for any alteration of any critical area.

Critical Line: determined by the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management (SC DHEC-OCRM), and it delineates the boundaries of coastal wetland systems, one of multiple critical areas.

Critical Line Buffer: a corridor of vegetation that lies landward of the wetland critical line on a person's property. Wetland buffers vary greatly in their width, composition, appearance, and use.

Critical Line Buffer Ordinance (CLBO): regulations that enforce zones of vegetation between potentially polluting areas and adjacent designated critical areas in the coastal zone.

Erosion: the group of natural processes, including weathering, dissolution, abrasion, corrosion, and transportation, by which material is worn away from the earth's surface.

Estuarine System: the interconnected network of streams, creeks, rivers, salt marshes, forests and their inhabitants that surround an estuary.

Estuary: a body of water where inflowing salt water from the ocean mixes with fresh water from streams, rivers, rainwater and runoff.

Eutrophication: excessive nutrient enrichment of water bodies, frequently the result of human activities, that causes an explosive growth or "bloom" of algae and other aquatic plants. The respiration of the additional plant life depletes the water of dissolved oxygen which can be detrimental to the plant and animal inhabitants of the water body.

Fecal Coliform Bacteria (FCB): total coliform bacteria are the group of bacteria that are commonly associated with the digestive tract of warm and cold blooded organisms including humans. A subset of the total coliform bacteria is the fecal coliform bacteria (FCB). This subset is distinguished by its ability to survive at elevated temperatures and are associated only with the fecal material of warm blooded animals.

Freshwater Buffer: strips of land that act as filters, removing pollutants from rainfall before it enters freshwater systems.

Geographic Information System (GIS): a computerized data management system created by geographers for the capture, storage, analysis and display of data, most often on maps. Different "data layers" can be placed on top of one another on maps (for instance, the distribution of docks can be placed on top of the distribution of grass shrimp) to examine and analyze relationships between the layers.

Groundwater: water that normally is located below the ground surface (Kusler and Opheim, 1986).

High Marsh: areas of marsh characterized by higher elevation, less frequent tidal flooding and plant species such as black needle rush and salt meadow cordgrass.

Appendix

Appendix D: Glossary

High Salinity Estuary: an estuary with limited fresh water input often only from rain and runoff characterized by higher salt content in the water.

Hydric Soil: a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (Kusler and Opheim, 1996).

Hydrology: the study of the properties, location and movement of inland waters both above and below ground. The hydrologic cycle is the cycle of water movement from the atmosphere to the earth and back to the atmosphere through various processes including rain, runoff, infiltration, and evaporation.

Hydrophyte: any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water; plants typically found in wetland habitats (Kusler and Opheim, 1996).

Hydrophytic Vegetation: the sum total of macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content (Kusler and Opheim, 1996).

Impervious Surface: ground cover such as roofs, driveways and roadways that does not allow water to sink into (infiltrate) the soil. Impervious surfaces increase the volume and speed of runoff after rainfall.

Infiltration: the penetration of water through the ground surface and into the soil.

Intertidal or Tidal: pertaining to the region above the low water mark of low tide and below the high water mark of high tide. This region is covered by water for a portion of every day and is above water for the remainder of every day.

Load: the quantity of a material that enters a body of water over a given time period.

Marsh: low, wet grassland without trees, periodically covered by water.

Native Species: those plant species believed to live in this area before the arrival of Europeans to North America. Provide food and shelter for an assortment of native wildlife (South Carolina Native Plant Society, 2005).

Nonpoint Source Pollution (NPS): pollution from diffuse sources that cannot be attributed to one identifiable point, such as a discharge pipe.

Permeable: capable of being penetrated or passed through.

Permits: regulatory permission to perform or allow an activity.

Phosphorous: an inorganic nutrient essential for plant growth and reproduction; excess can cause eutrophication; problems are usually associated with farmland runoff, sewage, and detergents.

Point Source Pollution: pollution from a definable source, such as an outfall pipe.

Pollution: the addition of a substance(s) to an environment in greater than natural concentrations as a result of human activity producing a net detrimental effect on the environment.

Polycyclic Aromatic Hydrocarbons (PAH): a class of chemicals which are by-products of the combustion of petroleum products that can cause lethal and sub-lethal impacts on estuarine organisms.

Retention Basin: man made ponds built in or near developments to retain storm water and runoff from the development.

Riparian: situated on the bank of a river or other body of water.

Riparian Buffer: corridors of native vegetation along rivers and streams…that protect waterways by providing a transition zone between upland development and adjoining surface waters (SC DHEC-OCRM, 2002a).

Runoff: rain water that does not penetrate the ground's surface and therefore flows off into creeks and streams, often carrying with it sediment and sediment bound contaminants.

Appendix

Appendix D: Glossary

Salt Marsh: a low-lying tract of soft wetland that is tidally flooded with salt water and is often dominated by a few plant species such as Spartina alterniflora and other grasses.

Sediment: particles which accumulate on the bottom of a waterway.

Smooth Cord Grass or Marsh Grass (Spartina alterniflora): the predominant plant species in salt marshes on the east coast.

South Carolina Lowcountry: the coastal area of the state of South Carolina characterized by lowland topography and unique history and culture.

Stakeholders: individuals or organizations with an interest or "stake" in the outcome of policies.

Stormwater: water resulting from a rain event that can typically move quickly to water bodies due to impervious surfaces; also known as "runoff."

Turbidity: the measurement of water cloudiness; it may be affected by sediment and plankton concentrations.

Urbanization: the process by which an area becomes developed for residential, commercial and industrial use.

Vegetative Buffer: strips of land that act as filters, removing pollutants from rainfall before it enters waterways.

Water Quality: the condition of water based on its physical, chemical, and biological integrity in regard to a specific designated use.

Watershed: an area of land that is drained by a river or other body of water.

Wetland: lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water…Wetlands must have one or more of the following three attributes (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowadin et al., 1979).

Wetland Buffer: strips of land that act as filters, removing pollutants from rainfall before it enters wetland.

Wetland Buffer Ordinance (WBO): regulations that enforce zones of vegetation between potentially polluting areas and adjacent designated wetlands.

Please NOTE: This is the current ordinance as of Fall 2004. Please contact the Town of Mount Pleasant Planning Department for current ordinance.

ORDINANCE NO. 99069

STATE OF SOUTH CAROLINA	AN ORDINANCE TO AMEND PARAGRAPH (J) OF SECTION 156.047 OF CHAPTER 156
COUNTY OF CHARLESTON	OF THE MOUNT PLEASANT CODE OF ORDINANCES, PROVIDING FOR A
TOWN OF MOUNT PLEASANT	CRITICAL LINE BUFFER

WHEREAS, Mount Pleasant Town Council is desirous of providing a buffer along the marsh edge of property in an effort to improve the water quality of the adjoining waterways by reducing the negative effects of fertilizers, pesticides and pet waste from stormwater runoff and preserve wildlife habitat and protect scenic vistas pursuant to recommendations and implementation strategies from the Resources element of the Town of Mount Pleasant 1998-1999 Comprehensive Plan; and

WHEREAS, the Mount Pleasant Planning Commission held a public hearing on August 18, 1999, pursuant to the applicable requirements of the Mount Pleasant Code of Ordinances pertaining to the text amendment referenced herein; and

WHEREAS, as an incident to the adoption of this Ordinance, Mount Pleasant Town Council makes the following findings of fact:

a) The land development regulations proposed herein are not in conflict with the laws or land development regulations governing property subject to any adopted development agreement and do not prevent the development set forth in the

same.

b) Substantial changes have occurred in pertinent conditions which are essential to the public health, safety and general welfare and require Town Council action in order to alleviate threats to the same.

WHEREAS, Mount Pleasant Town Council is empowered with the authority to make amendments/changes to the Mount Pleasant Code of Ordinances and believes it is in the best interest of the Town to so act with respect to the matters described herein.

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Councilmembers of the Municipality of Mount Pleasant, in Council assembled, that for the purposes stated herein, Paragraph (J) of Section 156.047 of Chapter 156 of the Mount Pleasant Code of Ordinances, shall be and is hereby amended by adding a new paragraph (2), along with subparagraphs (a) through (k), to read specifically as follows:

Chapter 156 ZONING CODE

Section 156.047 BUFFERYARDS

(J) Special bufferyards

(2) Critical Line Buffer.

(a) A vegetated buffer shall be established along areas designated as tidally influenced "critical line" by SCDHEC-OCRM. The entire buffer shall remain as an undeveloped vegetated area. The intent of this ordinance is to disallow grassed, manicured lawns within this buffer area.
(b) The natural vegetation in the buffer shall remain undisturbed.
(c) Vision corridors may be established through the critical line buffer, provided that they may not exceed 33 percent of the total buffer length. Within the vision corridor historic trees with a dbh of 24 inches or greater are never

removed while grasses, shrubs and other smaller vegetation may be appropriately pruned and trimmed, but not removed. The effect of this should be a vertical corridor cut through the buffer, allowing a view of the marsh from the yard and house.

(d) No uses shall be allowed in the critical line buffer except the following:

1) A pedestrian access foot trail of pervious material parallel to the critical line.

2) Pedestrian or vehicular accessways leading to such water dependent uses as docks, piers, bridges and boat landings. These accessways must be elevated above grade to avoid channelization. Such uses must be the minimum necessary to provide access.

3) Minimum utility line penetrations as specifically and previously approved on development plans.

4) Use of swales or other means rather than drainage pipes shall be required.

(e) The required width of the natural buffer shall be based on the location of the property. This width shall be an average equal to the following:

1) Between the Cooper River Bridge and the Ben Sawyer Bridge - 15 feet. (Minimum width of 15 feet)

2) From the Cooper River Bridge eastward up the Wando River and from the Ben Sawyer Bridge northward along the Intracoastal Waterway - 35 feet (Minimum width of 20 feet)

(f) The boundaries of the critical line buffer shall be clearly delineated and identified on all development plans and plats submitted for approval.

(g) Buffer limits shall be staked in the field in a manner approved by planning staff prior to and remaining through construction activities.

(h) The following are exceptions to these requirements:

1) lots of record and final plats;

2) valid approved preliminary plats; and

3) valid approved sketch plans adopted prior to the date of this ordinance shall be exempt for a period of two years from the date of approval of said sketch plan by the Town. Subsequent preliminary plats must accurately reflect said sketch plan; otherwise, compliance with this ordinance will be required.

(i) Violation of section 156.047 (J)(2) or failure to comply with any of the requirements hereof shall be classified as a misdemeanor punishable by a fine in the amount of up to $500 or imprisonment for not more than 30 days or both. However, no penalty shall exceed the penalty provided by state law for a similar offense. A separate offense shall be deemed committed for each tree and/or separate plant or shrub identified in this Code which is removed, and for each day that the violation occurs or continues. Any person, firm, organization, society, association, partnership, corporation, or like entity, or any agent or representative thereof who commits, participates in, or assists in

such violation may each be found guilty of a separate offense and suffer the penalties herein provided.

(j) Full restoration to a condition comparable to that which was destroyed *or* payment to the Town for the removal of all or any portion of a buffer shall be required within a specified period. If restoration is to be accomplished by the offending party, it shall include posting an acceptable financial guarantee with the Town for the full amount of restoration required until the same is completed.

(k) Failure to comply with the terms stated herein shall also be subject to enforcement in a circuit court of competent jurisdiction.

(The preceding Subparagraph (1) with (a) through (d) thereunder remains unchanged)

BE IT FURTHER ORDAINED that the new land development regulations as specified herein shall also apply to the development of property subject to any such adopted development agreement.

THIS ORDINANCE SHALL BE EFFECTIVE IMMEDIATELY UPON FINAL READING.

SIGNED, SEALED AND DELIVERED THIS 11th DAY OF January, 2000.

Please NOTE: This is the current ordinance as of Fall 2004. Please contact the City of Charleston Planning Department for current ordinance.

CITY OF CHARLESTON ZONING ORDINANCE

ARTICLE 3

SITE REGULATIONS

Part 8 Landscape Buffer Requirements

Sec. 54-347.1. Critical line buffer requirements.

Critical line buffers are naturally vegetated areas of specific widths, adjacent to all SCDHEC-OCRM critical lines. The primary purpose for critical line buffers is to protect water quality.

a. Generally:

1. Buffers which satisfy the requirements for a Type L Buffer as listed in Section 54-348, shall be located on all property within the zoning districts listed below in subsection 2.

2. Buffers shall vary in width according to the zoning of the lot as listed below:

   (a) Within the C, RR-1, SR-1 through SR-7, STR, DR-3, DR-6, DR 9 zoning districts, each buffer shall maintain a minimum width of 25 feet.

   (b) Within the DR-4, DR-12, DR-1, DR-1F, DR-2, DR-2F, RO, GO, CT, LB, GB, UC, MU-1, MU-2, GP, BP, LI, and HI, zoning districts and all properties zoned or developed under the Neighborhood District regulations, each buffer shall maintain a minimum width of 0 feet.

   (c) Within the CY zoning district, the provisions of subsection 2 (a) and (b) shall apply based on designated uses in the development plan.

3. All buildings shall be setback a minimum of ten feet from the required Critical Line buffer.

4. Buffers shall be located adjacent to the Critical Line and extend the entire length of the Critical Line.

5. The boundaries of the SCDHEC-OCRM certified Critical Line and Critical Line Buffer shall be clearly delineated and identified on all development plans and plats submitted for

approval and notes shall be placed on all development plan and plats which read as follows: "The Critical Line Buffer shown hereon is under a jurisdiction and permitting authority of the City of Charleston."

b. Exemptions. In addition to the exemptions provided in Section 54-344, the following exemptions shall apply.

1. Platted single family lots of record as of September 12, 2000.

2. Approved valid, preliminary subdivision plats as of September 12, 2000, and any project submitted to the Technical Review Committee as of September 12, 2000, shall be exempt from this ordinance.

3. Properties located within the Old City District or Old and Historic District and located on the peninsula south of Line Street extended from the Ashley River to the Cooper River or West of the Ashley River in an area bounded by the Ashley River on the east, the Highway 61 Connector and Merritt Road on the south, Albemarle Road on the west, and Folly Road/Highway 17 on the north.

4. Existing developed portions of The Citadel campus, and water-dependent maritime shipping and cargo handling facilities or terminals.

5. Golf courses shall only be exempt from tree removal restrictions of Section 54-348 in areas of the required Critical Line Buffer that fall within golf corridors when a tree or trees would obstruct play as shown on plans approved by the Technical Review Committee. Tree protection requirements of Article 3, Part 6, including requirements to protect grand trees, shall still apply.

c. Violations. The Board of Zoning Appeals--Site Design is authorized, upon a violation of the buffer regulations set forth herein, to require restoration of the buffer area using Best Management Practices to a condition deemed by the Board to be comparable to that which existed prior to the damage and/or destruction of the protected vegetation within the buffer.

(Ord. No. 2001-14, § 1, 2-27-01; Ord. No. 2002-84, § 6, 8-13-02; Ord. No. 2003-69, §§ 11, 15, 8-19-03)

Sec. 54-348. Buffer types.

Buffer Type A

Required for properties which abut Class I roads. Buffer must maintain an average depth of fifteen feet, not to go below ten feet, and contain specified vegetation selected from Appendix A. The intent of this buffer type is to provide street frontage landscaping along Class I roads.

Required minimum plantings per one hundred feet:
2 recommended trees
3 understory trees
40 ornamental shrubs

ARTICLE 5

EXEMPTIONS AND MODIFICATIONS

Part 5 Exemptions to Buffer Requirements

Sec. 54-513. Exemptions to Buffer Requirements

The requirement in Section 54-347.1 for a critical line buffer within the DR-4, DR-12, DR-1, DR-1F, DR-2, DR-2F, RO, GO, CT, LB, GB, UC, MU-1, MU-2, GP, BP, LI, and HI zoning districts, and those areas within the CY district developed for comparable uses as shown on an approved development plan, shall not be reduced except with the approval of the Board of Zoning Appeals upon a finding by the Board that an alternative design, certified by an engineer registered by the State of South Carolina, will have no greater impact on water quality than the impact that would have occurred had there been compliance with the critical line buffer requirements and all of the following conditions are met:

a) There is a stormwater management plan which addresses, to the satisfaction of the Board based upon a review of the plan by the Technical Review Committee, the design, construction, future maintenance and future monitoring of storm water runoff resulting from the development of the Lot, which has been certified by an engineer licensed by the State of South Carolina.

b) The project's engineer certifies that the adverse impact on water quality in the adjacent water body of the project is equal to, or less than, what the impact would have been with compliance with the critical line buffer requirements.

c) The Board shall consider the project's stormwater management plan, the project engineer's certification and such other information as the Board shall elect, in its sole discretion. The Board shall have the right, but not the obligation, to have such information reviewed by an independent engineer and the project applicant shall bear the reasonable cost of such review.

(Ord. No. 2001-14, § 3, 2-27-01; Ord. No. 2002-84, § 7, 8-13-02; Ord. No. 2003-69, § 3,8-19-03)

Interview Instrument:

Critical Line Wetlands Buffer Ordinance Experiences and Lessons Learned
City of Charleston and Town of Mount Pleasant
South Carolina

This consent form is for the College of Charleston, standard procedure to ensure that interview respondents are treated with the utmost respect/ethically. It's to make sure you, as the respondent, understand the purpose of the interview questions and feel as comfortable as possible, and also for you to have contact information for any questions you may have in the future. Please read the form before we start, and sign at the end of the interview if you are comfortable.

Introduction
Thank you for taking the time to meet with us today. We have several questions relating to your experience with the process of implementing critical line wetland buffer ordinances in the City of Charleston and/or Town of Mount Pleasant area. When reporting the information we collect from your responses in this interview, we will not use any identifiable information (i.e. your name will not be used).

A. Respondent Background / Community

1. Name
2. Affiliation / Profession? For how long?
3. What other types of employment have you had?
4. How long have you lived and worked as a (whatever profession) in the (Town of Mount Pleasant or City of Charleston) area?
5. How long have you lived and worked as a (whatever profession) in other regions outside of Mount Pleasant / Charleston?
6. Have you ever worked with any types of wetland buffers and ordinances for you current position and / or past jobs?
7. Are you familiar with any other wetland buffer ordinances (freshwater, riparian, critical line) in the state of South Carolina?
8. What are your general impressions of the (City of Charleston or Town of Mount Pleasant) political climate? (with regard to the buffer ordinance, your professional responsibilities, legislative structure of city / town, or anything else)
9. Do you think that community members have an impact on local political issues? If so, how much impact:
    (1) little to no impact
    (2) moderate impact
    (3) great amount of impact
10. What kind of political participation is there by community members? (town meetings, attendance at city council meetings, etc.)
    (1) little to no participation
    (2) moderate participation
    (3) great amount of participation
11. Who are the most influential persons within the community? (income level, titles, profession, location of residence)

12. What is the city / town's general approach to development?
13. What would you say is the level of the community's general scientific and environmental knowledge?
    (1) limited or no knowledge
    (2) moderate knowledge
    (3) great amount of knowledge

    Do these subjects seem to be very important, moderately important, or not really important to the community as a whole?
14. Are there concerns about water quality among the community?
    (1) little or no concern
    (2) moderate concern
    (3) great concern

B. Process of Ordinance Creation

15. What was your role (principle planner / advisor) in the process and actual passage of the municipality's critical line buffer ordinance?
16. Can you tell us about the process of developing and passing the critical line buffer ordinance?
    a. Who were the stakeholders involved? (municipal, other political, environmental, individual citizens, construction or other business, chamber of commerce, etc.)
    b. What stakeholders played major roles supporting the ordinance?
    c. What stakeholders played major roles challenging / opposing the ordinance?
    d. What level of interest / involvement did the city / town have?
    e. What level of interest / involvement did the mayor have?
    f. Were there other political figures involved / interested / opposed?
    g. What was the role of the development community and who represented this sector?
    h. What resources were utilized to develop the ordinance?
    i. How many drafts were created before the final ordinance was approved?
    j. What were the impediments / difficulties in the process?
    k. What were the successes / easy parts?
    l. What was the time frame of the process?
    m. Were components on freshwater wetlands or riparian areas considered as well?

C. Ordinance Components

17. What are the buffer width requirements and do those requirements vary based on land use and / or zoning?
18. What can and cannot be removed in a buffer? What activities or improvements are prohibited within the required buffer?
19. What can you plant in a buffer? What activities or improvements are allowed within the required buffer?
20. Are view corridors permitted, and if so, what are the requirements for creating such corridors?

21. Are there any exemptions or exceptions to the critical line buffer ordinance?

D. Implementation of the Critical Line Buffer Ordinance

22. How did the municipality start to implement the ordinance, once passed?
    a. How were citizens / developers educated about the new ordinance?
    b. What staff resources were designated? (e.g. departments created?, who is in charge of it, etc.)
23. What were the initial difficulties to implementation? How have these challenges changed over time?
24. How is the buffer ordinance enforced?
25. How do you determine where there are buffer violations and how are violations managed?

E. Evaluation of the Ordinance

26. Are there currently enough resources to properly implement the buffer ordinance? If not, what resources are needed?
27. Do you notice any trends in the enforcement of the critical line buffer ordinance? (e.g. certain demographics against / for buffers; certain areas in the Lowcountry that receive ordinances in a positive manner)
28. Are there any changes planned for the ordinance (regarding amendments, adding riparian or freshwater wetland components, adding resources, or furthering outreach efforts)?
29. What aspects of a community do you think encourage the success of critical line buffer ordinances?
    a. Political climate?
    b. Organization of political structure? (e.g. strong mayor with city council)
    c. Environmental groups / knowledge?
    d. Development?
    e. Knowledge level of community?
    f. Current water quality?
    g. Recreational use?
    h. Amount of new residents?
    i. Rate of new resident influx?
30. How stringent does an ordinance for a community like (City of Charleston or Town of Mount Pleasant) need to be? Why?
31. What aspects to implementing a critical line buffer ordinance in the (City of Charleston or Town of Mount Pleasant) are unique to the area? And what aspects can be utilized by other similar communities?

F. Education / Outreach

32. How successful has the education and outreach effort on the ordinance been since implementation?
33. What suggestions do you have to make information on buffers better accessible or easier to understand for people in the community and your profession?
34. What types of people are most likely to be involved with implementation and outreach?

G. Conclusion

35. Can you name others (planners, legislators, developers, citizens, nonprofit groups, etc.) who we should interview about wetland buffer ordinances?
36. When compiling summaries of our findings, may we use quotations that would indicate your profession (by title)?

Thank you very much for your time. If you have any questions, please contact Dr. Angela Halfacre (953.5825), Katie Zimmerman (kszimmer7@aol.com), or Megan Barkes (megancastle@hotmail.com).

INTERVIEW RESPONDENT AFFLIATIONS

Interview respondents currently represent or worked the following organizations and industries in the past. These organizations and industries are grouped by sector.

Government Sector Agencies
Berkeley-Charleston-Dorchester Council of Governments (BCD-COG)
Charleston City Council
Charleston County Planning Department
City of Charleston Department of Design, Development, and Preservation
City of Charleston Planning Commission
College of Charleston
Mount Pleasant Town Council
South Carolina Department of Health and Environmental Control (SC DHEC)-Office of Ocean and Coastal Resource Management (OCRM)
South Carolina Department of Natural Resources (SC DNR)
Town of Mount Pleasant Planning and Development Department
Town of Mount Pleasant Waterworks Commission

Nonprofit Sector Organizations
Ashley River Citizens Committee
Charleston Metro Chamber of Commerce Developers Council
Charleston Trident Homebuilders Association
Charleston Trident Realtors Association
College of Charleston Alumni Association
College of Charleston Town and Gown
Council of Coastal Futures
Riley Institute for Urban Affairs and Policy Studies Board of Directors
South Carolina Association of Realtors
South Carolina Coastal Conservation League (SCCCL)
South Carolina Homebuilders Association
South Carolina Landowners Association
South Carolina Tourism Council
Southeastern Wildlife Exposition

Private Sector Industries
Bookkeeping
Civil Engineering
Construction
Journalism
Land Development
Landscape Architecture
Law
Real Estate
Real Estate Appraisal
Scientific Research / Consulting
Stockbrokerage
Surveying