Shoreline Protection and Restoration

A Northwest Florida Homeowner's Guide

Waterfront property owners have special opportunities to protect and enhance the aquatic environment. For property that fronts a bay, stream, lake, or even a stormwater conveyance, one of the most effective steps is to maintain a buffer zone of natural vegetation along the shoreline. Natural buffer zones stabilize shorelines and provide valuable and increasingly rare waterfront fish and wildlife habitat. Marsh vegetation, for example, supports shellfish, juvenile fish, and waterfowl, and adjacent upland plants provide habitat for birds and small mammals. Natural upland and wetland vegetation protects water quality by trapping sediments and taking up nutrients and other pollutants. It also prevents erosion and stabilizes the shoreline by absorbing wave energy, trapping sediments, slowing stormwater runoff, and moderating the effects of storms and floods. Additionally, a natural shoreline helps maintain the distinctive appearance and atmosphere of the Florida Panhandle.

A decision to maintain or restore natural vegetation on a waterfront or elsewhere is not an all or nothing proposition. Environmental and aesthetic benefits can coexist with access and use as long as natural vegetation is maintained over a substantial area. While even relatively narrow buffer zones provide benefits, a general rule is that water quality, habitat, and shoreline protection benefits increase with added width. It is recommended that an average buffer of about 30 feet or more be maintained along the shoreline. Natural vegetation widths of 50 or more feet are recommended where possible to provide optimal protection.

Where natural waterfront vegetation still exists, efforts should be made to protect it. The natural shape and habitat of the shoreline are the result of many years of adaptation to the physical and biological environment. In most residential areas, however, the natural shoreline has already been fundamentally altered. In such places, individual residents can help to restore natural vegetation and functions.

This brochure provides guidance on how to protect and restore a natural Florida waterfront for shoreline protection, aesthetic enhancement, fish and wildlife habitat, and water quality protection. You are invited to explore the following topics:

- Protecting the Shoreline
- Restoring a Natural Waterfront
- Legal Requirements
- Where to Go for Help and Services

Protecting the Shoreline

In deciding how to protect a shoreline, consider some of the major causes of erosion:

- Storm tides and waves alter the shoreline profile and cause periodic erosion, which may be followed by a natural recovery.

- Chronic, long-term erosion is caused by a lack of sediment transport from upstream or along the coast. Dams and waterfront armoring may be responsible.

- Seawalls reflect wave energy and can increase erosion at the toe of the wall and on adjacent property. The resulting sediment suspension also reduces water clarity.

- The location of a site along the water, the distance wind-blown waves are able to travel and grow before reaching the shoreline, and the slope of the site all affect wave energy and sediment stability.

- Frequent boat wakes increase erosion forces.

- Removal of natural vegetation destabilizes the shoreline and makes it more susceptible to erosion.

Avoid armoring or "hardening" the shoreline if at all possible. Seawalls, riprap, groins, and other structures replace the natural shoreline and destroy important intertidal habitat. In the process, erosion and loss of adjacent property are often accelerated due to the alteration of the sand transport process along the shoreline. For preemptive protection and minor erosion problems, enhancement of shoreline vegetation alone may suffice and should be attempted before proceeding to structural solutions. In addition to preserving intertidal habitat, protecting the shoreline with a natural buffer zone is quite inexpensive compared to a structural approach.

In cases where ongoing erosion threatens substantial fixed structures, some action to protect the shoreline may be necessary. There are alternatives to conventional shoreline armoring, however, that can both protect an eroding waterfront and maintain and/or improve natural habitats. For information on environmentally friendly shoreline protection, contact the Ecosystem Restoration Section or the Submerged Lands and Environmental Resources Program of the Florida Department of Environmental Protection (DEP).

Whether or not your shoreline is protected by a structure, maintaining a buffer zone of natural vegetation is an effective way of protecting water quality, coastal habitat, and shoreline stability. The following section provides details about ways to protect and restore a waterfront buffer zone.

Restoring a Natural Waterfront

An essential element in a restored waterfront is an approximation of a natural shoreline plant community. Northwest Florida shorelines are characterized by zones of distinct plant communities based on adaptability to water salinity, soil saturation, salt spray, and wind and wave energy. Plant types also vary depending on elevation, slope, soil type, sunlight, rainfall, and other conditions. The resulting complex of plant communities provides a structure that is defined by and adapted to the dynamic shoreline environment.

Where natural vegetation has been lost, appropriate species can be planted to recreate some natural appearance and function. It is important to plan carefully, however, to ensure that correct procedures are followed and that the right plants are selected for the different conditions along the waterfront. Choosing the correct species and deciding where to plant them depends on identifying the different areas—or zones—in which conditions demand specific plant characteristics.

To assist in planning, waterfront planting areas are divided here into four zones defined in relation to tide levels:

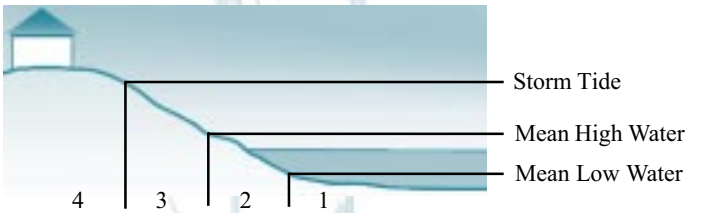
- Zone 1 is the area below mean low water and nearly always has standing water. This zone may be naturally unvegetated where there is high wave energy and/or steep slopes. In relatively protected waters, emergent wetland plants—those that are rooted on the bottom but grow above the water's surface—may thrive here and provide valuable habitat and water quality benefits. Where slopes are gentle and wave energy is limited, emergent plants can coexist with preexisting seawalls or other structures.

- Zone 2 is the intertidal zone between mean low and mean high water. It is submerged during high tide but exposed to the air at low tide. Various wetland species may be appropriate for this zone.

- Zone 3 is the area between mean high water and the normal limit of storm tides. In this area, the soil is typically exposed to the air, although it is periodically submerged during especially high tides. Soils

in this area may be periodically saturated and may have a relatively high salt content. Grasses and shrubs that are capable of withstanding varying degrees of soil saturation may do well here.

- Zone 4 is the coastal area above the normal storm tide line. While this area is often upland, the plants within it are greatly affected by coastal processes, including consistent winds and salt spray. A buffer of natural vegetation (grasses, shrubs, and trees) here is important both for preventing water pollution and protecting wetland and aquatic plants closer to the water. Incorporating a swale or other landscape feature that allows rain water to pool and infiltrate into the ground rather than run off will further help to prevent water pollution.



Consider the following factors before beginning a shoreline stabilization project:

- *Dominant Vegetation*: Observe what grows naturally in the area. Existing species are probably well adapted and native to the area and should be considered.

- *Slope*: Observe how steep the slope of the shoreline is. This helps define how wide the intertidal zone is and how large a marsh area you may be able to create. In the case of a relatively steep slope, the area suitable for planting emergent plants will be relatively narrow. Within a few feet of the shore, for example, the water may be too deep to plant. With a more gradual slope, each planting zone will be wider.

- *Fetch:* The distance waves travel before reaching the shoreline is referred to as "fetch." The longer the fetch, the greater the wave energy tends to be. If the fetch is small, as within a quiet bay or bayou, the shoreline may be suited for plants in all four zones. Where fetch is greater than one mile, however, wave energy may be too high to support emergent vegetation. On such sites, natural vegetation above mean high water may be especially important for stability.

The following tables provide suggestions for plant selection for northwest Florida waterfronts:

Shoreline Plant Suitability for Zones 1-4

Species Name	Common Name	Zone				Salinity Range*		
		1	2	3	4	Low	Medium	High
Nymphaea odorata	Fragrant water lily							
Juncus effusus	Soft rush							
Pontederia cordata	Pickerelweed							
Scirpus californicus	Giant bulrush							
Panicum hemitomon	Maidencane							
Zizaniopsis miliacea	Southern wild rice							
Zizania aquatica	Wild rice							
Crinum americanum	Swamp lily							
Iris virginica	Blue flag							
Scirpus americanus	Three square							
Sagittaria lancifolia	Lance-leaf arrowhead							
Cladium jamaicense	Sawgrass							
Spartina patens	Saltmeadow cordgrass							
Juncus roemerianus	Black needlerush							
Spartina alterniflora	Smooth cordgrass							
Paspalum distichum	Knot-grass							
Distichlis spicata	Saltgrass							
Scirpus robustus	Saltmarsh bulrush							
Sporobolus virginicus	Seashore dropseed							

**General water salinity tolerance ranges in parts per thousand (ppt): low = 0-5; medium = 6-15; high = 16-33. Note that these are general quidelines for average conditions. Actual salinity ranges often vary widely.*

Upland Shoreline Plants (all appropriate for Zone 4)

Species suitability depends on soil types and ecosystems. Consult county extension representatives and nurseries for details.

Species Name	Common Name	Type
Schizachyrium spp.	Bluestem	Grass
Muhlenbergia capillaris	Muhly grass	Grass
Aristida stricta	Wiregrass	Grass
Verbena spp.	Roadside verbena	Ground cover
Asclepias spp.	Butterfly weed (milkweed)	Ground cover
Ipomoea spp.	Morning-glory	Flowering vine
Solidago spp.	Goldenrod	Flowering bush
Hypericum spp.	St. John's wort	Shrub
Vaccinium arboreum	Sparkleberry	Shrub
Serenoa repens	Saw palmetto	Shrub
Baccharis spp.	Saltbush	Shrub
Ilex vomitoria	Yaupon holly	Shrub/small tree
Illicium floridanum	Florida anise	Shrub/small tree
Myrica cerifera	Wax myrtle	Shrub/small tree
Quercus myrtifolia	Myrtle oak	Shrub/small tree
Callicarpa americana	Beautyberry	Shrub/small tree
Quercus chapmanii	Chapman's oak	Shrub/small tree
Ilex opaca	American holly	Shrub/small tree
Osmanthus americanus	Wild olive	Shrub/small tree
Cephalanthus occidentalis	Button bush	Small tree
Cornus florida	Flowering dogwood	Small tree
Quercus margaretta	Sand post oak	Small tree
Quercus incana	Bluejack oak	Small tree
Quercus geminata	Sand live oak	Small tree
Quercus marilandica	Blackjack oak	Small/medium tree
Quercus laevis	Turkey oak	Small/medium tree
Persea borbonia	Redbay	Medium tree
Prunus serotina	Black cherry	Medium tree
Diospyros virginiana	Persimmon	Medium tree
Acer rubrum	Red maple	Medium/large tree
Quercus falcata	Red oak	Medium/large tree
Pinus elliottii	Slash pine	Medium/large tree
Pinus clausa	Sand pine	Medium/large tree
Carya glabra	Pignut hickory	Medium/large tree
Quercus hemisphaerica	Laurel oak	Large tree
Quercus virginiana	Live oak	Large tree
Pinus palustris	Longleaf pine	Large tree
Magnolia grandiflora	Southern magnolia	Large tree
Juniperus silicicola	Southern red cedar	Large tree

Planting

Step 1: *Planning.* Plan the width and layout of your natural buffer zone based on slope, fetch, and existing vegetation, as well as personal needs and preferences for access, aesthetic characteristics, habitat potential, and amount of lawn desired.

Step 2: *Plant selection.* Consider the plant species listed for the different planting zones, and consult your county extension service and the other resources listed below.

Step 3: *Authorization.* To protect natural wetlands and prevent the spread of damaging invasive plants, state authorization is required for planting below the mean high tide line. Given appropriate planning and plant selection, this authorization should be obtainable without difficulty. See "Legal Requirements" for details.

Step 4: *Planting.* General guidance for planting is provided here. For more details, consult your county extension representative or other resource.

- Generally, planting is not recommended during the hottest part of the summer. Also, if species are desired in Zone 1, they may need to be planted during periods of low water typically in winter. This allows plants to become established before being submerged 100 percent of the time.

- For emergent plants, space 12 to 18 inches apart. High levels of wave energy require higher planting densities, while areas with little wave energy may be planted less densely. Plant size should also increase with the level of wave energy.

- Dig a hole deep enough so that the top of the root mass is about 3-8 inches below the top of the soil level. Plant the deepest in high wave energy areas.

- For species in Zones 1 and 2, push a shovel into the sediment, place a plant behind the shovel and move the shovel back and forth until suction has pulled the plant into the substrate.

- If water is available, apply enough to saturate the area, and allow water to soak to roots.

- For Zones 1 and 2, fertilizer is not needed (fertilizers should never be used within 50 feet of a waterbody).

- If Zones 3 and 4 are more than 50 feet from the water, fish emulsion may be used as a fertilizer. Mix the emulsion according to the directions (e.g., dilute 3 tablespoons of fish emulsion in one gallon of water). Pour a small amount of the solution into the hole, place plant, and cover with soil and water.

Where to Obtain Plants

A number of commercial nurseries sell native plants that are useful in shoreline restoration. Also, guidance on plant sources and restoration methods may be obtained from a number of organizations, including the Ecosystem Restoration Section at the Northwest District Office of the Florida Department of Environmental Protection in Pensacola.

Plants used in waterfront restoration tend to have the greatest chance of success if the seed stock is native to the area. Nursery personnel should know the sources of the plants they sell. To prevent damage to natural habitats, however, avoid digging plants out of existing wetlands.

Legal Requirements

The restoration of natural vegetation communities along Florida's waterfronts is strongly encouraged. It is important, however, that inappropriate species (such as invasive exotic plants) not be introduced and that natural wetlands not be damaged by transplanting or other activities. To help ensure this, the State of Florida generally requires that written authorization be obtained prior to planting below mean high water (or ordinary high water in fresh water). This would generally include any emergent vegetation planted in Zones 1 or 2.

So long as no fill or other structure is added to submerged lands, this review and authorization can be provided at no cost by DEP's Bureau of Invasive Plant Management.

For projects that involve structure, excavation, or fill, a Wetland Resource Permit and/or Sovereign Submerged Lands Authorization is required. For information, contact the Northwest District Office of the Florida Department of Environmental Protection.

Where to Go for Help and Services

Florida Department of Environmental Protection
Ecosystem Restoration Section
160 Governmental Center
Pensacola, FL 32501
(850) 595-8300

Florida Department of Environmental Protection
Bureau of Invasive Plant Management
3915 Commonwealth Boulevard, MS 710
Tallahassee, FL 32399-3000
(850) 488-5631

Santa Rosa County Marine Extension
6051 Old Bagdad Highway
Milton, FL 32583
(850) 623-3868

Okaloosa County Extension
5479 Old Bethel Road
Crestview, FL 32536
(850) 689-5850

Walton County Extension
732 N. 9th Street, Suite B
Defuniak Springs, FL 32433
(850) 892-8172

Longleaf Pine Chapter of the Florida Native Plant Society
PO Box 9322
Pensacola, FL 32513-9322
longleaf.pine.fnps@juno.com

Northwest Florida Aquatic Preserves Office
7255 Highway 90, East
Milton, FL 32583
(850) 983-5359
nwfap@pcola.gulf.net

Florida Department of Environmental Protection
Submerged Lands and Environmental Resources
160 Governmental Center
Pensacola, FL 32501
(850) 595-8300

Okaloosa/Walton County Marine Extension
Camp Timpoochee
4750 Timpoochee Lane
Niceveille, FL 32578
(850) 897-1800

Escambia County Extension
3740 Stefani Road
Cantoment, FL 32533-7792
(850) 475-5230

Northwest Florida Water Management District
SWIM Program
81 Water Management Drive
Havana, FL 32333
(850) 539-5999

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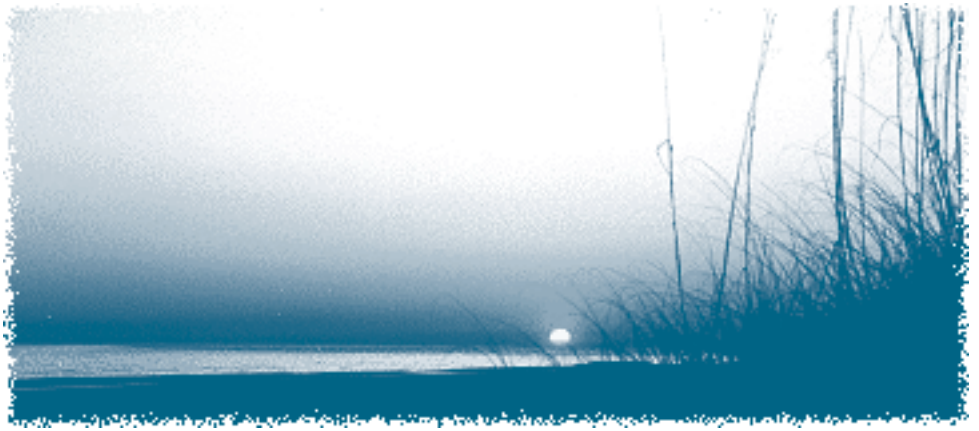

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