

Florida Fish and Wildlife Conservation Commission

Living Shorelines Training for Marine Contractors



Partners



Florida Fish and Wildlife Conservation Commission

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Course Description: A training course for marine contractors to learn to install living shorelines for property owners, either alone or in addition to an existing seawall or other structure. Living Shorelines are softer, greener alternatives to stabilize shorelines from erosion, sea level rise, and other damage. They protect, restore, or enhance natural shoreline habitat and maintain coastal processes through the strategic placement of plants, oyster shell, and other structural organic materials. Demand for these structures is increasing, and this course offers a mechanism to increase the supply of contractors who can fill this need.

Course Objectives: At the end of the course, participants will be able to:

- Communicate to property owners about the benefits and relative costs of shoreline stabilization options.
- Confidently perform a site assessment, evaluate design options, and navigate the permitting process.
- Implement a living shoreline project with vegetation and/or breakwater materials.
- Follow up and provide homeowners with maintenance information.

Method of Course Presentation: This course will be presented using PowerPoint presentations, handouts, videos, group exercises, guided online exploration, discussions, and optional field trips. Additional resources will be provided on a flash drive for each participant.

Method of Evaluation of Course Participants: At the end of the course, participants will be tested to ensure their familiarity with the selling points, feasibility, implementation, and maintenance of living shorelines.



Module	Topic	Process	Description	Time
Introduction		Pre-test	Assessment of living shorelines knowledge before training	25 min
	What is a living shoreline	Slide presentation	Definition and examples of a Living Shoreline in comparison to other forms of shoreline stabilization.	20 min
Selling Points	Benefits of living shorelines	Slide presentation	Discussion of reduction of wave energy and property loss, resiliency to storms, ecosystem services, habitat provision, increased fishing opportunities, water quality improvement, pollutant filtration, water access by property owner, and aesthetic benefit.	25 min
	Relative costs of shoreline stabilization options	Handouts, discussion	Cost-benefit analysis among wood, vinyl, and concrete bulkheads, riprap, oyster shell, coir logs, marsh grasses and mangroves, and sand nourishment.	25 min
	Client questions/concerns	Group exercise	Ways to respond to client questions about high energy shorelines, implementation cost, maintenance efforts, timelines, and other concerns.	20 min
Feasibility	Site assessment	Checklist, Field trip	How to conduct analysis of site factors such as shoreline type, wind fetch and direction, erosion source and extent, energy intensity, tidal range, bank height and slope, freshwater runoff, sediment composition, and existing vegetation.	25 min + 1.5 hr
	Online tools for determining feasibility	Guided Exploration	How to use online tools such as a Living Shorelines Suitability Model, NOAA's Digital Coast, Google Earth, Sea Level Rise Scenarios, and USGS Coastal Change Hazards Portal.	25 min
	Site design options	Slide presentation, Handout	Descriptions and examples of "green" to "gray" options: vegetation only, vegetation with edging (coir logs or sills), nourishment, oyster shell breakwater, hybrid options, and revetments.	25 min
	Planning site design exercise	Group exercise	Use a decision tree to plan a site design based on different criteria.	25 min
	Types of permits needed	Handouts	Description and criteria for U.S. Army Corps of Engineers permits, Florida Department of Environmental Protection permits, and local government permits.	25 min
	Permitting exercise	Group exercise	Determine which type(s) of permits are necessary in different scenarios and what information is necessary to apply.	25 min
Implementation	Planting implementation	Video demo, Diagrams, Field trip	Details on how to implement a vegetation-based living shoreline: elevation, layout, suitable species, spacing, and other factors.	25 min + 45 min
	Breakwater implementation	Video demo, Diagrams, Field trip	Details on how to implement a breakwater of oyster shell or other material: elevation, layout, cultch material, and other factors.	25 min + 45 min
	Materials and equipment	Handouts, Props	Information about where and how to get materials locally and what types of equipment are necessary.	25 min
Maintenance	Evaluating and maintaining project success	Handout, Field trip	Instructions for helping property owners maintain their living shoreline investment: establish buffers, limit fertilizer and chemical use, remove exotic vegetation, replant as necessary, observe, follow laws, etc.	25 min + 1.5 hr
	Maintenance as business opportunity	Handout, Discussion	Consideration of additional services such as mangrove trimming, replanting, or other maintenance activities.	20 min
Wrap-up	Final considerations	Handouts, Discussion	Case studies, timeline to complete a project, review of course materials.	25 min
		Post-test	Assessment of living shorelines knowledge after training.	25 min
		Course Evaluation	Participants evaluate course content, materials, and instructors.	15 min
			Total time: Classroom Instruction time for CEUs:	12 hr 6 hr

What is a living shoreline?

- "A shoreline management practice that provides erosion control benefits; protects, restores, or enhances natural shoreline habitat; and maintains coastal processes through the strategic placement of plants, stone, sand fill, and other structural organic materials (e.g. biologs, oyster reefs, etc)." – [National Oceanic and Atmospheric Administration](#)



Introductory Materials

- Contractor's perspective video: <https://vimeo.com/359532562>
- PBS video: <https://www.youtube.com/watch?v=DwSrTICsG2I>
- Website: <http://floridalivingshorelines.com/>
- Resource Catalog:
[http://masgc.org/assets/uploads/documents/FL Living Shorelines Singles.pdf](http://masgc.org/assets/uploads/documents/FL_Living_Shorelines_Singles.pdf)

Module 1: Selling Points

1. Benefits of living shorelines
2. Relative costs of shoreline stabilization options
3. Client questions/concerns

Module Objectives

- Identify and describe the benefits of living shorelines.
- Compare relative costs and longevity among different types of shoreline stabilization.
- Respond to difficult client questions and concerns about different types of shoreline stabilization.



Photo: NOAA



Why attempt to stabilize shorelines?

- “Do Nothing” approach is no longer working and you cannot retreat
- Need to control shoreline erosion
- Need to protect coastal properties and habitats
- Need to reduce the wave energy from boat wakes and storm surge
- BUT, past practices (bulkheads, seawalls) no longer work and are increasing erosion



Failing seawall in northwest Florida, www.FloridaLivingShorelines.com

Speaking points:

- As contractors, you fill the role of problem solver of coastal erosion for your clients. When coastal erosion is at the point where you can no longer “do nothing.” Some sort of action needs to happen to protect a home, business, or cultural resource.
- As a contractor, you need to control the erosion—often by reducing wave energy from boat wakes or storm surge.
- However, often times, the traditional bulkheads or seawalls fail due to increasing erosion.
 - The vertical face of bulkheads reflects wave energy, resulting in erosion along the toe of the structure (*U.S. Army Corps of Engineers 1981, Bozek and Burdick 2005, National Research Council 2007*).
 - Shoreline hardening from structures like bulkheads can cause adverse coastal habitat impacts, including the loss of shallow intertidal bottom substrate from scour, loss of fringing marshes, decline of intertidal or shallow water habitats like submerged aquatic vegetation (SAV), and a decrease in benthic abundance and diversity (*Douglass and Pickel 1999, OSTP 2015, Patrick et al. 2014, Seitz et al. 2006*).
 - Treated wood bulkheads may also contain chemicals that can leach into the coastal environment (*Weis and Proctor 1998*).
 - And as a contractor, you will need to provide a solution.

https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf

Why consider living shorelines?



A Living Shoreline constructed in Panama City, Florida using plants and oyster shell, www.FloridaLivingShorelines.com

- Want to allow for natural processes and mimic natural shorelines
- Want to maintain coastal habitats
- Want to enhance clients' recreational opportunities & fishing
- Want to provide a cost-effective alternative to hardened shorelines

Speaking points:

- Living shorelines serve as an alternate to traditional erosion control practices and often have more benefits to existing ecosystem services, wildlife, humans, and wallets.
- Encouraging clients to consider living shorelines could allow for:
 - Natural processes, such as sediment transport, to still occur.
 - Coastal habitats for fishes, birds, vegetation, plankton, shellfishes, and more to be maintained.
 - Enhancing recreational and aesthetic opportunities for your clients. They could maintain or develop kayak launches, fishing opportunities, wildlife viewing, and overall—the main reason they live on the coastline—that view.
 - In addition, often times, living shorelines are more cost-effective to install and maintain than traditional erosion-control practices.

The benefits of living shorelines can be categorized as...

- Structure
- Ecological
- Aesthetic
- Resilience
- Maintenance

Speaking points:

- Living shorelines have a variety of benefits that can easily be categorized into five main categories, including:
 - Structural benefits
 - Ecological benefits
 - Aesthetic benefits
 - Resilient benefits and
 - Maintenance benefits.

Structure

Benefits	Traditional Erosion Control	Living Shorelines
Reduces immediate shoreline erosion	+	+
Reduces/ prevents future shoreline erosion	+	+
Maintains ecosystem processes including providing sediment to coastal habitats	-	+
Protects, restores, and enhances wildlife habitats	-	+
Improves water quality (settling sediments, filters pollutants)	-	+
Decreases nutrient runoff	-	+
Maintains water access to public/ homeowners	-	+
Natural aesthetic	-	+
Absorbs wave energy and storm surge	-	+
Becomes more stable over time	-	+
Can adapt to sea level rise	-	+

Speaking points:

- This table provides a visualization comparison between traditional erosion control practices and living shorelines.
- Highlighted in orange are our “structural benefits.”

Ecological

Benefits	Traditional Erosion Control	Living Shorelines
Reduces immediate shoreline erosion	+	+
Reduces/ prevents future shoreline erosion	+	+
Maintains ecosystem processes including providing sediment to coastal habitats	-	+
Protects, restores, and enhances wildlife habitats	-	+
Improves water quality (settling sediments, filters pollutants)	-	+
Decreases nutrient runoff	-	+
Maintains water access to public/ homeowners	-	+
Natural aesthetic	-	+
Absorbs wave energy and storm surge	-	+
Becomes more stable over time	-	+
Can adapt to sea level rise	-	+

Speaking points:

- This table provides a visualization comparison between traditional erosion control practices and living shorelines.
- Highlighted in orange are our “ecological benefits.”
- I have already mentioned a few of these benefits; also, living shorelines:
 - Improve water quality

Let's compare traditional erosion control to living shorelines...

Benefits	Traditional Erosion Control	Living Shorelines
Reduces immediate shoreline erosion	+	+
Reduces/ prevents future shoreline erosion	+	+
Maintains ecosystem processes including providing sediment to coastal habitats	-	+
Protects, restores, and enhances wildlife habitats	-	+
Improves water quality (settling sediments, filters pollutants)	-	+
Decreases nutrient runoff	-	+
Maintains water access to public/ homeowners	-	+
Natural aesthetic	-	+
Absorbs wave energy and storm surge	-	+
Becomes more stable over time	-	+
Can adapt to sea level rise	-	+

Speaking points:

- This table provides a visualization comparison between traditional erosion control practices and living shorelines.
- Highlighted in orange are our “aesthetic benefits.”

Let's compare traditional erosion control to living shorelines...

Benefits	Traditional Erosion Control	Living Shorelines
Reduces immediate shoreline erosion	+	+
Reduces/ prevents future shoreline erosion	+	+
Maintains ecosystem processes including providing sediment to coastal habitats	-	+
Protects, restores, and enhances wildlife habitats	-	+
Improves water quality (settling sediments, filters pollutants)	-	+
Decreases nutrient runoff	-	+
Maintains water access to public/ homeowners	-	+
Natural aesthetic	-	+
Absorbs wave energy and storm surge	-	+
Becomes more stable over time	-	+
Can adapt to sea level rise	-	+

Speaking points:

- This table provides a visualization comparison between traditional erosion-control practices and living shorelines.
- Highlighted in orange are our “resilience benefits.”
- I have already mentioned a few of these benefits, but I wanted to draw your attention to a few others:
 - Absorbs wave energy and storm surge
 - Becomes more stable over time
 - Can adapt to sea level rise

Let's compare traditional erosion control to living shorelines...

Benefits	Traditional Erosion Control	Living Shorelines
Reduces immediate shoreline erosion	+	+
Reduces/ prevents future shoreline erosion	+	+
Maintains ecosystem processes including providing sediment to coastal habitats	-	+
Protects, restores, and enhances wildlife habitats	-	+
Improves water quality (settling sediments, filters pollutants)	-	+
Decreases nutrient runoff	-	+
Maintains water access to public/ homeowners	-	+
Natural aesthetic	-	+
Absorbs wave energy and storm surge	-	+
Becomes more stable over time	-	+
Can adapt to sea level rise	-	+

Speaking points:

- This table provides a visualization comparison between traditional erosion control practices and living shorelines.
- Highlighted in orange are our “maintenance benefits.”
- I have already mentioned a few of these benefits, but I wanted to draw your attention to a few others:
 - Becomes more stable over time
 - Can adapt to sea level rise
- One challenge that living shoreline development has had is the permitting process. At this time, it is easier to permit the traditional erosion control techniques—the only reason being that is what has been done for so long. We will review this further in the permitting portion of the course.

Finding the balance of “green” and “gray”

- Softer technique
 - Ideal for small waves, small fetch, gentle slope, sheltered coast
- Gray technique
 - Ideal for large waves, large fetch, steep slope, open coast
- Consider the level of risk for continued erosion

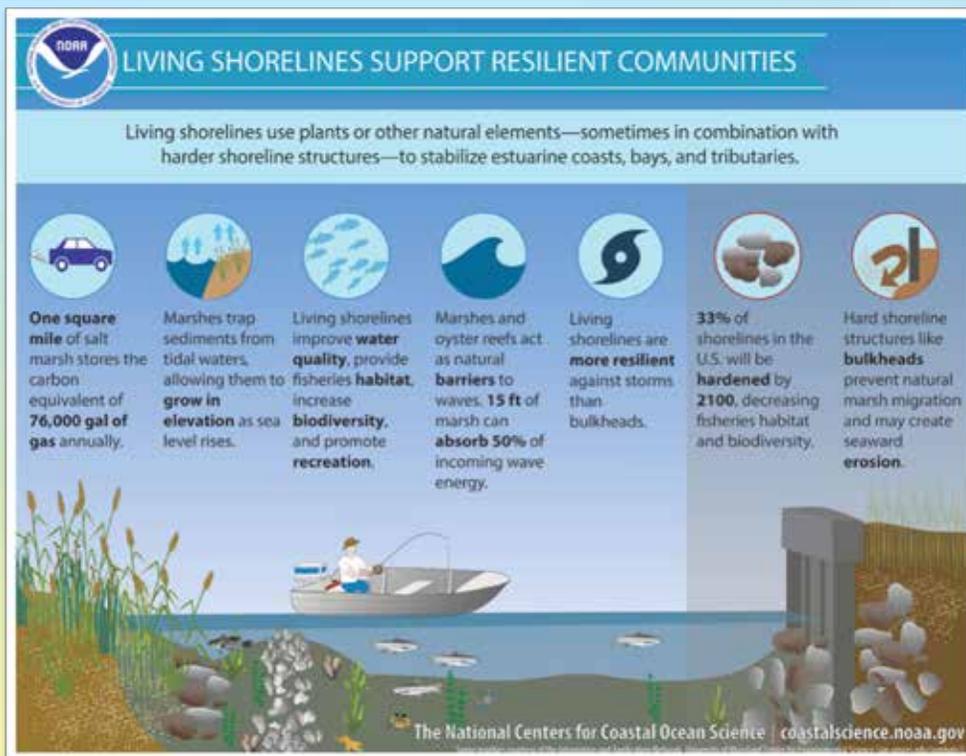


Speaking points:

- It is important to evaluate the level of risk for continued erosion with the level of protection that is acceptable at a particular site.
- Decision-makers should keep in mind that no shoreline stabilization technique (hardened or a living shoreline) is guaranteed to prevent the loss of infrastructure during the most severe storms. In theory, a living shoreline can be more resilient than a bulkhead in storms with high storm surge, because storms can roll over the living shoreline inundating the land and then leave the shoreline minimally impacted. In contrast, the wave energy from the channel-ward side and retreating water can undermine bulkhead and seawall structures that are not high enough to prevent inundation and provide storm surge protection.
- This emphasizes the point that each site will be different and all will require individual site assessments—which will be reviewed later in the course. Not all sites will allow for you to be completely green—there may need a hardened structure of some sort, but there will always be an opportunity to incorporate some “green” component.
- A great resource—which you have in your packets—is something called “The SAGE brochure.” This brochure highlights the different levels of green/soft/living shorelines as well as shorelines that need some hardened structure. The highlights include:
 - What environment that structure type is suitable for
 - Material options
 - Benefits
 - Disadvantages

It also indicates price ranges for initial construction costs as well as the operations and maintenance costs. It is available online to print and distribute to your staff and even clients.

https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf



Speaking points:

- This graphic again highlights why living shorelines would be a great addition to the services that you are able to provide your clients. (All below is copied from: https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf)
- CIRCLE 1: An acre of salt marsh has been calculated to have a value from \$981 to \$6,471 (Barbier et al. 2011). The ecosystem benefits of living shorelines are also projected to increase over time as the living components of the shoreline establish themselves, compared to a hard shoreline that will need to be replaced (Seitz et al. 2006).
- CIRCLE 2: Salt marshes—a main component of many living shorelines designs—are known to trap sediment and organic matter and may also increase surface elevation through production of below-ground biomass, which is incorporated into the sediment (Morris et al. 2002, Cahoon et al. 2004, Currin et al. 2008, Currin et al. 2010).
- CIRCLE 3: When shoreline functions are considered at a system level, the cumulative ecosystem effects of hardened shorelines can be seen. Armoring of a few small sections of shoreline may have only local adverse impacts, but as more and larger areas of shoreline become armored, changes can occur to the coastal ecosystem and services they provide (National Research Council 2007). For example, developed shorelines negatively affect benthic infauna (organisms burrowed in the sediment, like clams and worms) in subtidal habitat adjacent to the shoreline stabilization. Where impermeable bulkheads are stabilizing a shoreline, benthic infauna in the subtidal habitat adjacent to the shoreline are negatively impacted. This could be due to a loss of nutrients from marsh materials that deposit-feeding infauna would consume. Reduced 12 infauna densities adjacent to bulkheads can lead to diminished predator densities and less productivity in the shoreline system (Seitz et al. 2006).

- CIRCLE 4: Living shorelines can be successfully used on sheltered coasts to dampen wave energy and reduce erosion (Swann 2008). Even narrow marshes—a frequent component of living shoreline designs—have been shown to slow waves and reduce shoreline erosion (Currin et al. 2015). Specifically, *Spartina* spp. salt marshes have been shown to dissipate wave energy by 50 percent within the first 2.5 meters (Knutson et al. 1982).
- CIRCLE 5: On sheltered coasts along the North Carolina outer banks, marshes (with and without sills) outperformed bulkheads during Category 1 Hurricane Irene in 2011. Those marsh and sill designs accreted sediment, while 75 percent of regional bulkheads surveyed were damaged (Gittman et al. 2014). During severe storms, bulkheads can fail. For example, along the South Carolina coast near Charleston, 58 percent of bulkheads were destroyed during Hurricane Hugo in 1989 (Thieler and Young 1991).

Longevity

- Average seawall longevity:
 - Seawall will “hold the line” for a finite amount of time
- Living shoreline longevity
 - Living shorelines can build land and “advance the line” for a potentially indefinite amount of time



Photos: The Joe Rains Living Shoreline in Cedar Key, Dr. Mark Clark, UF/IFAS Soil and Water Sciences Department

SEAWALL: Industry estimates states the average longevity is 20 years (or less) for a poorly built or maintained seawall whereas the best-case scenario is 30-50 years for a properly built or maintained seawall, which is not that long considering the average length of a home loan is 30 years.

LIVING SHORELINE: Application of living shorelines relatively new but...In theory, a properly designed living shoreline will not need to be replaced, only maintained – for example, replacing plants that may die in the early years, restacking oyster bags after large storms.

The bottom line is that there is no reason that we need to expect that a well-designed living shoreline would ever need to be replaced, whereas we know that every seawall will eventually need to be replaced.

References: <https://gibson-marine.com/2012/01/25/how-to-know-when-your-seawall-needs-repair-or-replacement/>
<https://www.seawallsunlimited.com/kind-seawall-maintenance-might-need/>
<https://everlastseawalls.com/florida-seawalls-faq/>
<https://go2coastal.com/seawalls/>

Highlights and Examples: Natural Shoreline

- Living shorelines can provide an aesthetic beauty to properties



Photo: NOAA



This example highlights one of the largest selling points of living shorelines: the aesthetic beauty that they offer. In this example, the rock breakwaters contain more gaps to allow for water movement and wildlife passage and there is more space between the vegetation and the rock, creating an area of open water. This type of shoreline will be extremely attractive to birds, fish, and other wildlife but it will also provide the landowner with significant protection against wave energy as the breakwaters will cause the waves to break just offshore from the vegetation.

Highlights and Examples: Existing Sea Wall

- Living shorelines can be added to existing sea walls to create a redeemed sea wall or hybrid living shorelines



Palm Beach County Environmental Resource Management

A redeemed seawall is an existing sea wall w/ plants added while a hybrid seawall is a new sea wall w/ plants added

These “redeemed” or “hybrid” seawalls are considered living shorelines because they now have a ‘green’ living component, as opposed to a completely ‘grey’ structure. This may be a good option in an area that is already hardened and the seawall is not failing or cannot be removed. In addition, this can provide a way for homeowners to gain property protection, ecological benefits, and wildlife habitat even if they live in a moderate or high-energy area. Habitat enhancement in front of a seawall will protect the wall by helping to prevent scour at the toe and this will help extend the life of the wall. Hybrid seawalls could create additional business for you, as this could be a service that you offer past clients where you installed a seawall. These clients may be considering ways to be more environmentally friendly or interested in ways to beautify their shoreline. Any enhancement of habitat along a seawall is going to be at least somewhat beneficial for the environment and the wall, so do not discount this option for people who have existing seawalls.

There are trade-offs of this “hybrid” or “redeemed” seawall approach. In many cases, the living components will not have room to adapt up-slope with sea level rise and may eventually be squeezed out by the seawall. Hybrid options also provide limited connectivity between land and sea for many animals, and water will still run directly off the seawall without being slowed down and filtered the way a ‘greener’ living shoreline would.

Highlights and Examples: Failing Sea Wall

- A failing sea wall can be replaced with a living shoreline



Photo: Rosalyn Kilcollins

Here is an example of removal and regrading of a failing seawall. A living shoreline can be a great option for a homeowner with a failing seawall because it will be cheaper than replacing the seawall. The photos show an example of this approach. The opportunity to regrade the shoreline gives you the ability to restore the entire shoreline plant community from upland to high marsh to low marsh. Many projects also incorporate a rock or shell sill or breakwater at the toe to enhance energy protection. The breakwaters in this example feature gaps in between the elements to allow for wildlife passage and tidal flushing. One trade-off is that the sloping living shoreline will require more space than a vertical structure. The owner must be willing to have the living shoreline occupy more of their property, or the project may require placing fill material out into the water.

Project details: Indian Creek Park. East Bay in Eastpoint, FL

Cost Comparison

Category	Installation	Lifespan	Cost (\$/ft) ^a			
			Atlantic and Gulf Coasts		Florida	
			Installation	Maintenance	Installation	Maintenance
Green	Planting	Indefinite	\$45-\$225	10%	\$15-\$45	10%
	Oyster bags	Indefinite	\$45-\$90	10%	\$30-\$40	10%
	Living shoreline	Indefinite	\$120-\$700	10-20%	\$75-\$500	10-20%
Hard	Revetment/rip rap	20+ years	\$500-\$1500	50-100%	\$465-\$1400	50-100%
	Breakwater	20+ years	\$200-\$1000	50-100%	\$200-\$900	20-100%
	Bulkhead	20+ years	\$265-\$1022	50-100%	\$240-\$800	50-100%
	Retaining wall	20+ years	\$1000-\$3370	50-100%	\$1200-\$2775	50-100%

Table x. Range of costs to construct and maintain common shore-parallel erosion control installations. Compiled by Randall W. Parkinson (Atlantic and Gulf Coast) and Tom Ries (Florida). Version control 180820.

Focusing on the Florida costs: Planting only & LS w/plants do require initial maintenance efforts (replants to ensure coalesce); over time the maintenance reduces, but an average of 10% of the initial costs should be anticipated.

Oyster bags should be inspected soon as after installation to make sure that they did not move, with some replacement of bags anticipated.

The greyer options we initially required very little in maintenance, but over time (year 2 on) there are repairs necessary to address cracking and settling issues, which equate to the figures shown.

According to Coastal Systems International “Depending on the local construction market and bulkhead design requirements, repairs may cost \$100-\$400 per linear foot of wall. Retaining wall replacement depending upon height, anchoring and associated drainage components, may cost \$500-\$1,000 per linear foot.”

Client Concerns

- Concern
 - “Will it work?”
- Recommendation
 - Living shorelines cost less than a standard seawall and research shows they may hold up better in storms



You might already be wondering if this will really work... our human nature leads us to trust in infrastructure like walls more so than natural elements like plants and oysters. Your clients, and maybe even you right now, will have lots of questions about how living shorelines hold up to storm conditions and other events that may confront their shorelines. How do we know that this approach will work?

There are some great examples of living shorelines actually outperforming walls. A paper published in 2014 documented a case study of two shorelines in North Carolina that received a direct hit from a Category 1 hurricane. The two shorelines in the images were only 500m away from each other and therefore encountered the same conditions during the storm. As you can see, the living shoreline weathered the storm with minimal impacts, while the bulkhead suffered catastrophic damage.

An additional resource to check out and share with clients really describes this in more detail:
<https://www.scientificamerican.com/article/rebuilt-wetlands-can-protect-shorelines-better-than-walls/>

Client Concerns

- Concern
 - “Will it work?”
- Recommendation
 - Even large-scale living shorelines projects are resilient to major hurricanes.



Photos: Taylor “Chips” Kirschenfeld, Escambia County Senior Scientist and Department Director, Natural Resources Management Department

This slide shows before and after images of a large-scale living shoreline project called Project Greenshores in Pensacola, FL. The project involved offshore breakwaters that created a huge gain in marsh habitat behind the structures. There were improvements in seagrass habitat, fish and bird use, and many other measures of success. These photos were taken in 2002 (top left) and 2017 (bottom)... if you are familiar with the history of Florida, then you will recall that a major hurricane, Hurricane Ivan, struck Pensacola in 2004, just 2 years after this project was installed (top right).

Client Concerns

- Concern
 - “What about maintenance?”
- Recommendation
 - Seawalls need little maintenance at first, but eventually need expensive repairs or replacement.
 - Living shorelines may need inexpensive maintenance (e.g. plants replanted) in the first few months, but over time become self-sustaining and need little to no upkeep.



Photos: Savanna Barry, UF/IFAS

What about maintenance?

Seawall = compounding costs

→ Guaranteed to eventually need expensive maintenance and eventual repair/replacement (and this will increase with SLR)

Living Shoreline = compounding gains

→ Over time, living shorelines become self-sustaining

Client Concerns

- Concern
 - “Will we lose our view?”
- Recommendation
 - There are a variety of low lying plants and structures that can be used to maintain view shed.
 - Mangroves are important to Florida ecology, they can be used in living shorelines and trimmed according to DEP protocols



Photo: Florida Living Shorelines, Palm Beach County Dept of Environmental Resources

If homeowners are concerned about mangroves affecting their view, you can remind them of the ability to trim mangroves and maintain them at a height of 6 feet under existing Florida law. If the homeowner is still concerned, you can add provisions about mangrove trimming and maintenance in the initial permit so there would not be any extra steps for the client.

Client Concerns Exercise

For each of the following scenarios, develop a positive response that demonstrates your knowledge of shoreline protection options that will address their concerns while being environmentally beneficial.

- Customer has a high energy shoreline that is eroding due to boat wake.
- Customer is concerned about the costs of solutions.
- Customer is concerned about the amount of effort that they will have to maintain after installation.
- Customer dislikes the length of time that they will have to wait for the solution to be installed and resilient.

Module 2: Feasibility

- 1. Site assessment**
- 2. Site design**
- 3. Permitting**

Module Objectives

- List and describe how to conduct physical analysis and desktop analysis of site factors.
- Differentiate among types of shoreline stabilization options and know when each is appropriate.
- Plan design based on site analysis and application of appropriate methods.
- Understand criteria for different types of permits and what information is necessary to apply.

Site Considerations

- Slope, orientation, topography, bathymetry, sediment characteristics, prevailing currents, waves, and fetch
- Wave Energy Assessment
 - ship waves verses boat wakes
- Space available
 - upland or filling of waterway
- Adjacent hardened structures
- Seawalls weaken over time; living shorelines strengthen over time

Everyone of these items must be assessed and considered as part of the design process, the information gathered will drive the design for your particular site location.

All living shoreline options require some initial and post maintenance, they are not like hardened structures, which are the strongest the day they are installed; living shorelines need some time for the plants to coalesce, but if properly maintained, they become strong over time and provide the residency desired.

Technical Definitions

- Slope Bank angle from upland into water = uniform & steepness
- Orientation Shoreline facing direction related to wave energy
- Topography Map of the natural and artificial features of the shoreline
- Bathymetry Underwater depth profile
- Sediment Characteristics of solid material that settles in the water
- Currents Rate of movement in the water (speed and direction)
- Wave Types Wind driven verses boat/ship wakes
- Fetch Distance over water that wind blows in a single direction

Slope: Minimum or 4;1 slope recommended, 10:1 is preferred

Orientation: Affects the design options – uniform direction or is the bank angulating

Bathymetry: Steep banks require designs that are anchored to keep them in place

Sediment: Sand/rock is best to hold structures in place; soft sediments require stabilization features (fabric, mattress, etc.)

Prevailing Currents: Strong tidal or stream currents must be considered to keep material in place

Waves: Wind driven waves are different than boat which are different from ship waves, plus are the boats powering up/down in this area...all affect the design options

Fetch: Large fetch equates to higher energies, consider prevailing wind directions and seasonality when designing energy dissipation options

Facets and Factors

- Shoreline length
- Fetch
- Orientation
- Sediment quality
- Sediment transport
- Salinity
- Existing vegetation
- Presence of SAV
- Invasive species
- Scarping
- Shoreline history
- Presence of oysters
- Sunlight/tree shade (roots)
- Shoreline access
- Adjacent property
- Stormwater outfalls
- Upland erosion influences
- Hidden structures
- Marine/terrestrial wildlife
- Slope of intertidal/upland

4

When evaluating a site for LS design, there are many things to consider that may impact the overall success of the project. Some variables like shallow water or SAV may make logistics or permitting difficult, or certain things like adjacent structures may impact the long-term health of the project by reflecting additional wave energy into a project area. A thorough evaluation or adequate knowledge about the resources present is necessary to properly design a project. Site evaluations may also assist in selection of vegetation. It's usually appropriate to use what is close by, as long as it is not invasive.

Site Assessment Worksheet

- Guide during initial site visit
- Identify whether LS is feasible
- Document existing conditions for LS layout and for permitting
- Streamlines site assessment process
- Facilitates planning process



Photo: Annie Roddenberry, Marine Discovery Center

Shoreline Site Assessment

Address

Time

Date

Contact Person

Phone No

SITE CONDITIONS

Notes from Desktop Analysis:

Erosion: None Light Moderate Severe

Source of erosion (Upland runoff, storm events or major disturbances, undercutting, wave/wind induced)

Existing shoreline structures and shoreline type (e.g. seawall, bulkhead, rubble, vegetation, pipes, dock, kayak access, etc.)

Wind exposure (approximate distance and direction that shoreline faces)

Prevailing winds at time of assessment

Energy intensity Low Medium High

Nearshore (1 m off shoreline) water depth

Tidal fluctuation

Tide at time of assessment

Boating activity

- None or paddlecraft only
- Minimal (occasional small, motorized watercraft)
- Moderate (regular traffic, small and large motorized watercraft)
- Heavy (regular traffic including yachts, commercial vessels, tugs, barges)

Proximity to navigational channel

Safety considerations

UPLAND FACTORS

Existing bank height and slope

Sources of freshwater runoff/outfall

Sediment (e.g. sandy, peat, clay, organics, etc)

ECOLOGICAL FACTORS

Oysters present? Yes / No Attached to:

Submerged aquatic vegetation? Yes / No

Shorebird usage? Feeding Nesting Loafing Other

Existing vegetation—native and exotic, upland and wetland:

Water quality/salinity

Nearby sources of freshwater

Approximate wetland acres to be affected

Desktop Resources

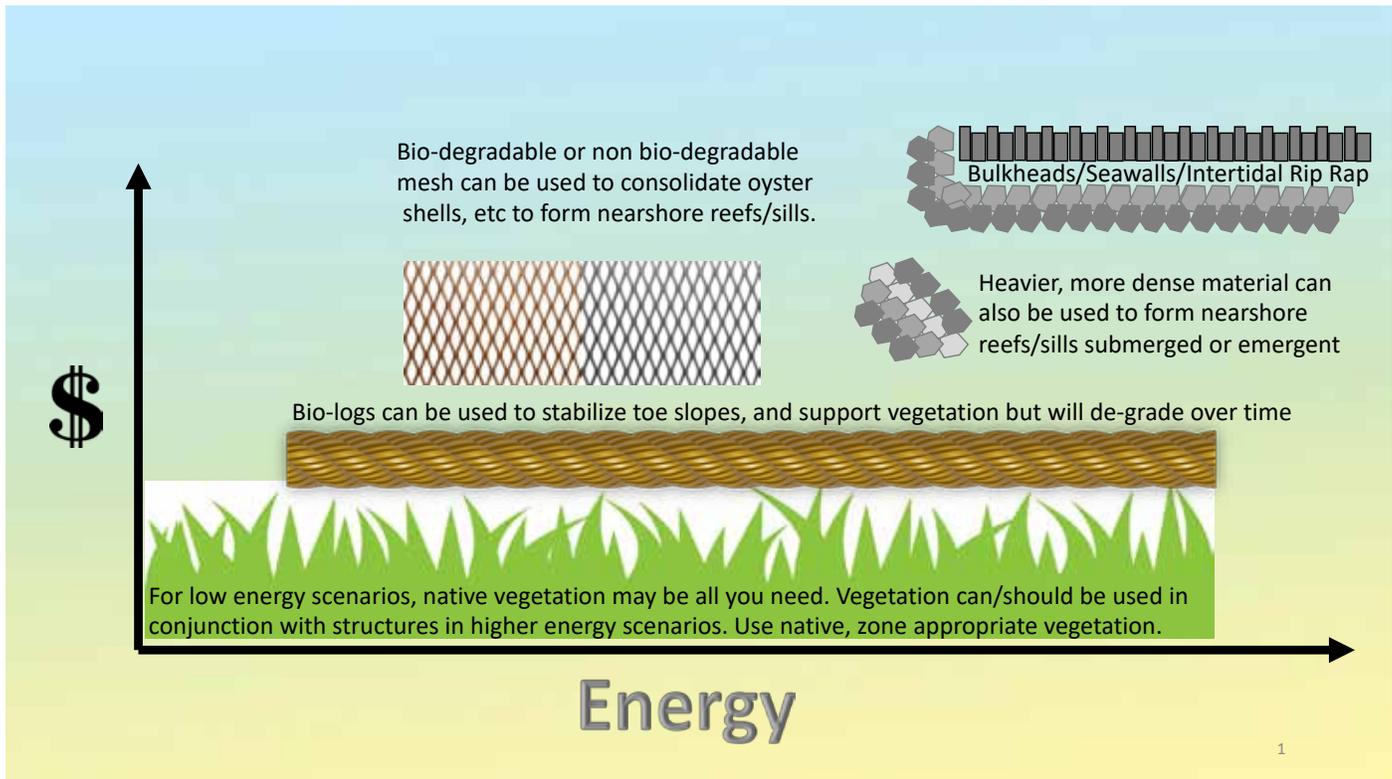
Resource	Link
Aerial Photography	Google Earth, Historic imagery, etc.
National Wetland Inventory (NWI) Maps	https://www.fws.gov/wetlands/data/mapper.html
NOAA's Environmental Sensitivity Index (ESI)	https://response.restoration.noaa.gov/esi_download
National Natural Resources Conservation Service	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/dma
USF Water Atlas	http://www.wateratlas.usf.edu/
Coastal Hazards Index	https://marine.usgs.gov/coastalchangehazardsportal/
Tides	https://tidesandcurrents.noaa.gov/tide_predictions.html

There are a number of resources available to assess a site; many of these readily available and all are great sources of valuable information.

Historic aerials are worth their weight in gold, especially if you have a succession of images, as one can note the changes in the shoreline over time.

In addition, NWI & NRCS are great sources to assess the wetland types and soil types for an area.

Finally, there are some new sites that can be accessed that provide ranking information on the potential suitability of living shorelines for your particular area of interest (LSSM & NOAA's ERI maps). But nothing substitutes a thorough site investigation; it is imperative to understand the site current conditions; each site is unique and the best way for a successful living shoreline solution to work is by assessing it first-hand.



This graph illustrates how wave energy increases the extent of stabilization measures and cost associated with projects. In NW Florida, we utilize *Spartina alterniflora* as our main intertidal grass, which has a fairly specific tolerance to wave energy. If one can determine that a shoreline experiences an energy climate that exceeds that threshold, typically done by observation and/or online evaluation, then it is appropriate to consider installing coir logs or a reef structure.

Feasibility: Types of Shoreline Stabilization Options

- Planted Shoreline
- Planted Shoreline with Temporary Protection (FibreLog or similar product)
- Planted Shoreline with Geoweb
- Planted Shoreline with Protective Sill (oysters, rock, timber, etc.)
- Breakwater Structures



There are a myriad of design solutions that may work for your site, but these can be generally cataloged as noted.

Plants Only

- Easiest and most cost effective option
- Regrade eroded slope and use native plants
- Cause of erosion must be addressed prior to planting



Planted Shoreline - the easiest and least cost expensive option is just regrading the eroded slope and planting with native vegetation, which worked at this site in Sarasota Bay; however, if there was an eroded bank, the cause of the erosion **must** be addressed (e.g. minimum wake zone enacted or wave energy protection installed) before just installing plants along the shoreline.

This site in Sarasota Bay (Bayfront Park) was just planted, along with an educational signage, and withstood Hurricane Irma (Cat 2) without any impacts, because of the existing rock at the water's edge.

Scenario 1: Vegetation Only

Waterbody:	Bayou Texar
Fetch:	1 mile
Orientation:	Faces South
Intertidal Slope:	Shallow
Upland Slope:	Shallow
Boat Traffic:	Mild-Moderate
Sediment:	Sandy
Scarping:	Several inches
Water Depth:	18-36 inches
SAV:	None

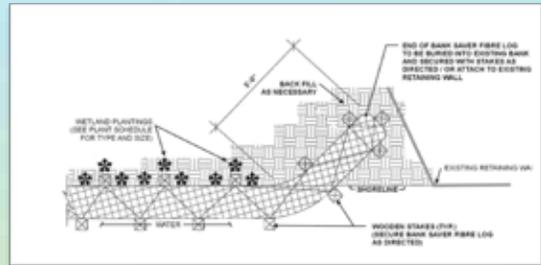


This project was completed in the “earlier” days of living shoreline work before oyster reefs were regularly used. The practitioners at the time used a small amount of sand fill along with installing the two labeled intertidal grass species. The property owner was encouraged to leave a buffer along the shoreline to allow the plants to establish. This particular stretch of shoreline was relatively sheltered, had a very shallow bottom slope and upland slope which was also ideal, and there was no shoreline hardening on adjacent shorelines.

This project was installed in 2001, and the most recent photograph shown is in 2008.

Plants with FibreCoir® Logs

- Works in areas with minimal wave energy
- Coir logs provide temporary protection for juvenile plants
- Need initial monitoring and minimal maintenance to ensure plants are growing



T. Ries, ESA



In areas with minimal wave energy; plantings with temporary protection, in the form of fiber-logs can provide temporary protection while the plants are growing/maturing; these work best in freshwater applications and can provide energy dissipation for up to 18 months, which should allow the plants the time necessary to coalesce. These applications do need initial monitoring and likely some maintenance to ensure that the plants are growing and expanding as anticipated!

Scenario 2: Vegetation + Coir (biolog)

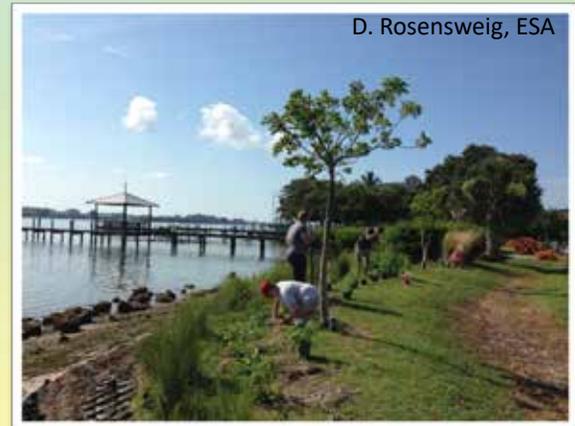
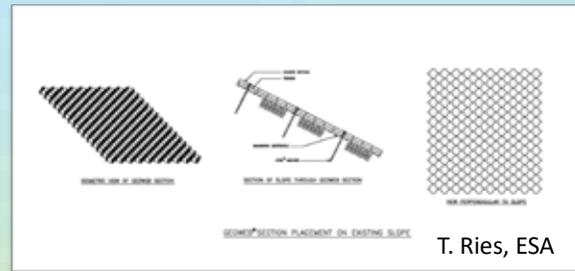
Waterbody: ICW
Fetch: 1-3 Miles
Orientation: Faces South
Intertidal Slope: Shallow
Upland Slope: Shallow
Boat Traffic: Mild-Moderate
Sediment: Sandy
Scarping: Several inches
Water Depth: 6-24 inches
SAV: None
Installed 2013



This stretch of intracoastal waterway in Navarre can experience fairly strong energy from storm waves if the wind comes from the east or west, because there is plenty of fetch for the wind to pick up speed. The shoreline is very sandy and it moves a lot from season to season (based on property owner observations). However, winter low tides expose the nearshore area for days at a time which made oyster reefs a less ideal option. Coir fiber logs were used to establish a vegetated intertidal zone to help absorb some of the energy during storms. They were buried using stakes and anchors and although at first they have some buoyancy in the water, they are heavy once waterlogged and become buried by sediment in a short period of time. Installed in 2013.

Plantings in Geoweb®

- Plastic accordion like material
- Helps to stabilize steep banks and can be used in living shoreline projects
- Material can be filled with sediments and planted

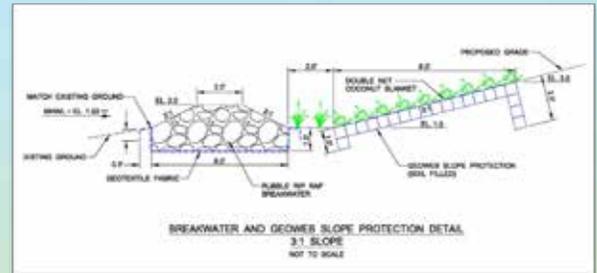


Geoweb® is a trademark name for a plastic accordion like material, typically 6” tall which can be expanded and anchored in place. These resultant cells can be filled with small rock or sediment and this matrix helps stabilize the ground. These can be used for vehicular wet crossings or planted with native vegetation for shoreline stabilization needs.

Geoweb® has been employed for decades to stabilize trails and dirt roads for wet crossings; we also have employed this material to construct overflow weirs (instead of concrete) and in the past 10 years these have been used to stabilize banks, which are steeper than a 5:1 slope, for LS applications. This material can be fill with sediments and then planted with herbaceous plants which helps to hold the soil and plants in place under the appropriate conditions. The photo is of a site in Manatee Co. along Sarasota Bay and has helped stabilize the bank.

Protective Sill

- Protective sills provide protection from strong boat wakes
- The rock protection breaks up boat wakes before they hit the shoreline
- Regrading and planting native plants behind the protective sill create a living shoreline



Protective sills are the most common design type; this site at Stewart Middle School along the Hillsborough River in Tampa, was heavily eroded (4'-5' escarpment). Since there is not a slow speed/no wake zone; the design required protection from boat wakes. Design included a small (2' wide X 1' high) line of rock protection. There were 3 different shoreline treatments (behind this sill) along this 2000'+ shoreline depending upon the adjacent infrastructure and existing bank slopes. The design graphic depicts the 3:1 slope which was also further stabilized with coconut fiber blankets and then planted with *Paspalum* sod. The other two treatments included Geoweb, either laid flat or terraced to address the 2:1 slope due to limited space because of the existing adjacent infrastructure.

Plants with Protective Sill



1 year post restoration



3 years post restoration

One year post restoration at Stewart Middle School (SMS) - left image and 3 years - right image, note that the rock sill is almost invisible (even though it runs the entire length of the (2,000') of the shoreline. This has been in the ground for over 10 years (2019) and in despite continual boat traffic (wakes), it has been stable and there is NO erosion along this bank!

Plants with Breakwater

- Off shore break waters work well in high energy situations
- Require open spaces between the breakwater elements and the shoreline
- Staggered elements can be used to provide continuous protection without blocking access to the shoreline



T. Ries, ESA



High energy situations can also be protected with offshore break water features. These structures can be constructed out of rock, oyster domes, or other structures. These features require open spaces between the breakwater elements to allow water to flush and access for wildlife. In some in very high energy fields these may require staggered placement to still provide a continuous line of protection. Bottom image: Apollo Beach with 9 miles of open water fetch and also has ship wakes to contend with; the shoreline behind these structures is now beginning to grow marsh plants and some mangroves. Top photo: breakwater in front of removed sea wall section to protect against boat wakes at Ulele Springs (Hillsborough R. Tampa)

Scenario 3: Veg + Breakwater

Waterbody:	Bayou Texar
Fetch:	1-2 miles
Orientation:	Faces South
Intertidal Slope:	Shallow
Upland Slope:	Moderate-Steep
Boat Traffic:	Mild-Moderate
Sediment:	Sandy
Scarping:	Several inches
Water Depth:	6-24 inches
SAV:	None



This is another area of Bayou Texar with a steeper bottom slope, and upland slope than the previous Bayou Texar property. Also boat wake energy and fetch are more significant factors at this site. A funny side story is that three projects were installed side by side along this stretch of bayou and we worked from east to west. The property owner in the middle didn't like the way the reefs looked when they were installed so they opted for vegetation only. After two years, the property owner which decided not to install reefs called with one week left before the expiration of their permit to install the reefs based on performance of the grasses that were established behind the oyster reef structures on the adjacent properties.

A NFWF 5-star urban restoration grant was utilized to install living shorelines at 10 different properties on this waterbody. This particular stretch of shoreline has 3 adjacent property owners which own approximately 400 linear feet which had some areas of erosion and others that were relatively stable. We encouraged the property owners to maintain a wider vegetative buffer at the shoreline, which is beneficial.

Scenario 4: Veg + Oyster Breakwater

Waterbody:	ICW
Fetch:	1-3 miles
Orientation:	Faces South
Intertidal Slope:	Shallow
Upland Slope:	Shallow
Boat Traffic:	Moderate-Heavy
Sediment:	Sandy
Scarping:	6-18 inches
Water Depth:	6-24 inches
SAV:	Present



This project experiences boat wake energy from large charter fishing boats which produce strong, successive waves. Also the fetch is a factor during certain winds. The adjacent property is stabilized with a bulk head and seawall. Although the water is shallow, and there was some SAV nearby (not directly within the area, but it did require the reefs to be placed closer than the maximum allowable distance). Also, there was an easement on this property and a traditional bulkhead/backfill project was not permissible. With limited options and an eroding waterfront, this property owner urged us to incorporate a design which gave him as much protection as possible. For the first time, we decided to alternate the curve of the reefs to allow for channel gaps that would limit wave energy from directly impacting the shoreline. Alternating the curve can help when the shoreline itself is curved or when extra protection is needed while still maintaining channel gaps.

Oyster reefs and plants were installed in 2012, and the post picture is 2013.

Seawall Enhancement Projects

- Sea wall enhancement projects can be utilized when sea walls are already in place or if there are infrastructure conflicts
- Elements such as rip-rap, mangroves, or other shoreline plants can provide wave dissipation and habitat values
- These features also extend the life of the sea wall



T. Ries, ESA

Seawalls will always exist, due to proximity of infrastructure. In those cases seawall enhancement projects are a short-term (~30 yr.) solutions; there are numerous design options, from just rip-rap at the toe of the wall to prevent scour to rip-rap with sediments tubes embedded, which appear to provide the most potential benefit as these designs that provide substrate for plant growth, especially mangroves, like these pictured at Ulele Springs in Tampa. These structures provide wave dissipation, habitat values and extend the life of the vertical wall; BUT these are NOT LS and in all cases LS options should be explored first! Both of these images depict 4 years post growth of 1-gal mangroves plantings; these are now 7' tall (2019) and the mangroves are providing ecological functions while dissipating wave energy and extending the life of the seawall.

Is a Living Shoreline right for you?

Do you own waterfront property along a river, tidal creek, or bay?

Yes



No



A living shoreline will not be the best approach to protecting your property, but native species can enhance your yard and provide habitat for pollinators.

Have you noticed your shoreline gradually eroding? Erosion can be caused by boat wakes, rough waves, and large storm events.

Yes



No



It is not necessary for you to create a living shoreline or hard armor your shoreline. However, you can always spruce up your property with Florida native plants.

Wave energy can have a big impact on your shoreline, and helps to determine what kind of living shoreline is suitable for your property. What wave energy does your shoreline experience?

- **High energy** sites usually require a “hybrid living shoreline” approach with man-made hard armoring technique such as a revetment, bulkhead, or seawall and plants at the toe to add habitat, provide filtration, and increase biodiversity in front of your property while protecting it.
- **Medium energy** environments can combine softer man made hard armoring techniques such as sills and breakwaters, with natural elements like vegetation to create a living shoreline that both protects your property and provides habitat and filtration for the ecosystem.
- Since **low energy** shorelines don’t experience as many waves as medium and high energy shorelines it is safe to use softer techniques to protect your shoreline. Edging the shoreline with natural materials and planting native shoreline species will provide a buffer and break up small waves.

Look around your property at low tide, do you see any oysters growing on rocks, pilings, or on an oyster bar?

Yes



No



If you do not have oysters around your property refrain from using oyster shell based elements. Instead use hard armoring techniques such as rip rap or concrete rubble if needed.

By adding hard elements to your living shoreline such as oyster bags or reef balls you are helping to create habitat for oysters while protecting your property.

To learn more please visit:

[Florida Living Shorelines.com](https://www.floralivingshorelines.com)

Planning Site Design Exercise

For each of the following scenarios, determine which type of site design is most appropriate.

Scenario 1: Aerial View



Site description: The site is approximate 50 ft long with 950 SF of barren soil. The land is eroded from runoff with an approximate 2 feet elevation difference.

Scenario 1: Ground Level View



Site Conditions:

- Address: Jenkins Park Creek
- Notes from Desktop Analysis: Tidal creek to Gulf
- Source of erosion: Upland Erosion from foot traffic of fisherman
- Existing shoreline structures and shoreline type: N/A
- Wind exposure: Minimal wind influence
- Prevailing winds at time of assessment: Calm winds
- Energy intensity: Low
- Nearshore (1 m off shoreline) water depth: Approximately 1 ft.
- Tidal fluctuation: 1 – 1.5 feet
- Tide at time of assessment: Winter tide
- Boating activity: Minimal (occasional small, motorized watercraft)
- Proximity to navigational channel: N/A

Scenario 1: Ground Level View



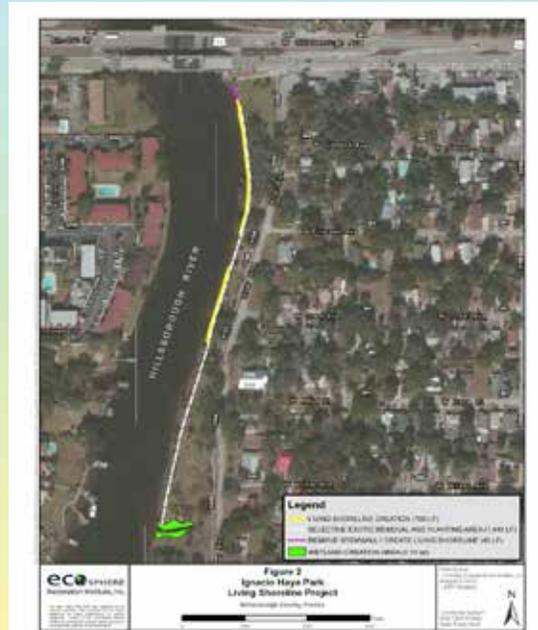
Upland Factors:

- Existing bank height and slope: 1.5 ft per 10 ft; 26 ft from eroded upland ledge to water's edge, drops 4 ft
- Sources of freshwater runoff/outfall: Upland rainfall runoff
- Sediment: Barren sandy

Ecological Factors:

- Oysters present? No
- SAV? No
- Shorebird usage? N/A
- Existing vegetation: Native and exotic, upland and wetland; monoculture of black needle rush; few black mangroves; palm tree
- Water quality/salinity: Good WQ, brackish
- Nearby sources of freshwater: Upland runoff to creek
- Approximate wetland acres to be affected: N/A

Scenario 2: Project Location and Aerial View



The site is approximately 1,800 feet long with numerous eroded sections, most with 1-2' escarpment. The land is eroded due to boat wakes.

Scenario 2: Ground Level View



Site Conditions:

- Address: Eastern bank of the Hillsborough River (tidal section) at the juncture of Hillsborough Ave (SR 580) in Tampa, Florida
- Notes from Desktop Analysis:
- Source of erosion: Boat wakes
- Existing shoreline structures and shoreline type: Natural shoreline with some rock rubble with an eroded escarpment feature 12-18" in height
- Wind exposure: Low, 1^o boat wakes; not low-profile bridge
- Prevailing winds at time of assessment: Light
- Energy intensity: Low, except for boat wakes which can be as many as 200-300 on weekend days
- Nearshore (1 m off shoreline) water depth: 12'-18" depending upon the tidal stage
- Tidal fluctuation: 1 foot
- Tide at time of assessment: Mid to low
- Boating activity: Minimal during week days
- Proximity to navigational channel: No marked channel in this section of the river; most boats come within 30-40 feet of this shoreline + there is a hardened shoreline on the west bank which also reflects boat wakes

Upland Factors:

- Existing bank height and slope: Eroded bank with an ~10 to 1 slope above the escarpment
- Sources of freshwater runoff/outfall: Limited runoff except for the 3 pipe outfalls along the river, which are also badly eroded at the outfall pipes
- Sediment: Sandy soils with a thin layer of organics and grass cover

Ecological Factors:

- Oysters present? No
- SAV? No
- Shorebird usage? Limited wading birds noted
- Existing vegetation: Grass at the eroded section, but native and some nuisance marsh vegetation in sections of the river bank
- Water quality/salinity: Good, low salinities 0-10ppt
- Nearby sources of freshwater: None
- Approximate wetland acres to be affected: 1,000 linear feet of shoreline

Scenario 3: Aerial View #1



Site description: The site is approximately 800 feet long with severely eroded shoreline due to vast open water fetch conditions, most of this site has a 6-8' escarpment. The land is eroded due to wind driven waves as well as ship wakes.

Scenario 3: Aerial View #2



Scenario 3: Ground Level View



Site Conditions:

- Address: Apollo Bach Nature Preserve, western facing shoreline, Apollo Beach, Florida
- Notes from Desktop Analysis:
- Source of erosion: Wind driven waves over large (~9 miles) of fetch, plus some ship wakes
- Existing shoreline structures and shoreline type: Originally fill material dredged from the bay in the early 1970s
- Wind exposure: Very high
- Prevailing winds at time of assessment: Western generally
- Energy intensity: Very high
- Nearshore (1 m off shoreline) water depth: At low tide = 3' deep
- Tidal fluctuation: 18-24"
- Tide at time of assessment: Low tide
- Boating activity: Moderate
- Proximity to navigational channel: ~2,600 feet from the shipping channel

Upland Factors:

- Existing bank height and slope: 8-10' of eroded bank (escarpment) with a flat top (very gentle) slope above
- Sources of freshwater runoff/outfall: Limited; most of the site runoff flows to the east
- Sediment: Sandy material

Ecological Factors:

- Oysters present? None here
- SAV? Limited shoal grass within 10 feet of the shoreline at high tide
- Shorebird usage? Limited, mostly wading bird activity noted
- Existing vegetation: None, all eroded away, with grass on top of the bank
- Water quality/salinity: Good water quality, salinities range form 18-26 ppt
- Nearby sources of freshwater: Limited
- Approximate wetland acres to be affected: 800 linear feet



Permitting Living Shorelines in Florida

A moving target

- Major caveat - permitting information on living shorelines is ever-evolving
- Permitting staff are your friends
 - Pre-application meetings will clarify requirements given:
 - Your specific project context
 - Recent changes to rules
 - New permit forms, checklists, etc.
- UF/IFAS Extension Agents and other contacts here to help
- Provide as much detail as possible up-front to avoid RAI
- Understand the guidelines the permitting staff are looking for
 - Native plants, correct size gaps, elevations for sill/breakwater elements, proper materials, existing habitats in vicinity

Photo: Mark Clark, UF/IFAS



A pre-application meeting is highly encouraged. These will save you time in the long run, especially for more complex projects or if you are new to the process.

RAI = Request for additional information

State Permitting

<http://edis.ifas.ufl.edu/sg155>

- Needed for (almost) all:
 - State submerged lands authorization - FREE
- Environmental Resource Permit types – ascending order by complexity:
 - Exempt –
 - Self-certified – FREE but not recommended
 - Staff verified - \$100
 - General – varies, \$250+
 - Individual – varies, \$250+
- FDEP – legally required to respond within 30 days of submittal of a complete application
 - RAI or
 - Permit issued



- Because almost all living shoreline projects will occur on sovereign submerged lands (that is, any area waterward of the mean high water line, MHWL), you will require a submerged state lands authorization (SLA). The SLA allows you to perform work on public land. This comes bundled along with any of the permits, including the verification of exemption. The only time you would need to apply separately for a submerged state lands authorization would be if you proceed with an exempt project without getting the verification of exemption (not recommended).
- For the actual construction of the project, you have several permitting types depending on the size and scope of the project.
 1. Exemption: The next slide shows the criteria that a project would need to meet in order to qualify as an “exempt” project. The exemption was created for small scale projects that would have minimal impacts to state lands and neighboring properties. You can construct an exempt project without any additional paperwork for the state permit other than the SLA (see above) if you are certain that your project meets all the specifications. However, for only \$100 you can have DEP staff examine your project and provide a “Verification of Exemption” which ensures that you and the homeowner are within the guidelines and will not incur any fees or penalties.
 2. General: A general permit may apply for certain things such as oyster habitat enhancement. This is another form of streamlined permitting that only applies if the project meets certain criteria. A pre-application meeting with DEP staff is the best way to determine if there are any general permits that apply to your client’s situation. Usually, if you are applying as a habitat restoration or enhancement project, the permit fee will be \$250.00. However, if you are bringing in large amounts of fill or building any other structures for the client, your actual fee may be higher.
 3. Individual: this type of permit is known as the “full blown” permit and is the type of permit you will need to get if your project exceeds any of the thresholds of linear feet, height,

materials, etc. that are outlined in the exemption and the general permits. These permits sometimes have extra layers of information required, such as sediment analyses and MHWL surveys, but may not always carry these requirements especially if recent surveys or other means of estimating the MHTL are available. As for general permits, if you are applying as a habitat restoration or enhancement project, the permit fee will be \$250.00. However, if you are bringing in large amounts of fill or building any other structures for the client, your actual fee may be higher. There could also be other costs related to the survey or a public lands easement if a large area will be affected by fill.

- Timeline – FDEP will respond within 30 days of receiving the complete application. They will either issue the permit or an “RAI” – request for additional information. To avoid an RAI, be sure to include all the required elements such as a detailed site description, plan and cross section view drawings of the present condition and the proposed condition, tax ID number, etc. The links to the EDIS documents shown on the slides give much more detail on exactly what permits would apply to each situation, as well as step-by-step instructions for filling out many sections of the permit application documents.

State Living Shoreline Exemption Guidelines (Updated June 2018)

62-330.051(12)(e), Restoration of an eroding shoreline with native wetland vegetative enhancement plantings, provided:

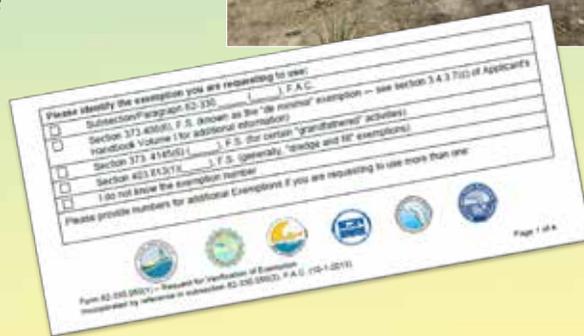
1. The length of shoreline is 500 linear feet or less;
2. Plantings are native wetland plants appropriate for the site obtained from commercially-grown stock;
3. Plantings extend no farther than 10 feet waterward of the approximate mean high water line (MHWL) or ordinary high water line (OHWL);
4. All invasive and exotic vegetative species along the shoreline is removed in conjunction with the planting to the extent practicable;
5. Biodegradable natural fiber logs or mats that are secured in place, such as with the use of wooden stakes, may be used if necessary to support the vegetative plantings; and
6. No fill is placed other than that needed to support the vegetative plantings, except that a breakwater is authorized to be installed concurrent with the planting if permanent wave attenuation is required to maintain the shoreline vegetation, provided:
 - a. The waterward toe of the breakwater extends no more than 10 feet waterward of the approximate MHWL or OHWL, with a top height of no more than the mean or ordinary high water elevation;
 - b. The breakwater is composed predominantly of natural oyster shell cultch (clean and fossilized oyster shell) or other stable, non-degradable materials such as oyster reef, reef balls, boulders, clean concrete rubble, riprap, rock sills, or triangular concrete forms. Oyster shell cultch, if used, shall be enclosed in mesh bags having openings of no more than three inches, or securely fixed to matting prior to placement in the water. Oyster bags and mats must be anchored to prevent movement of shell from the project area;
 - c. The breakwater shall not be placed over, or within three feet (in any direction) of any submerged grassbed or existing emergent marsh vegetation;
 - d. The breakwater shall be placed in units so that there is at least one opening measuring at least five feet in width located every 75 linear feet along the breakwater, with a minimum of one opening, to allow the flow of water and the passage of fish and aquatic wildlife;
 - e. All equipment used during construction shall be operated from, and be stored in uplands; and
 - f. All work is conducted in compliance with subsection 62-330.050(9), F.A.C.

The slide outlines the requirements that a living shoreline project must meet in order to qualify for the state of Florida permit exemption. Bear in mind that these are the guidelines as of June 2018, and could be subject to change. Always check the latest version of the Florida Administrative Code section 62-330.051(12)(e) for the newest guidance. DEP regulatory staff in your region can also be of assistance.

State Permitting

- Joint Permit Application
 - State Programmatic General Permit (SPGP)
 - Red/green analysis by FDEP/WMD staff
 - Eliminates need to submit separate permit to USACE **BUT....**

Photo: Mark Clark, UF/IFAS



The State of Florida has an agreement with the federal government (US Army Corps of Engineers) that allows state regulatory staff to “green light” certain kinds of projects. A “green light” status from DEP means that a project would receive both federal and state permits under one streamlined process. There is a specific mention of living shorelines in this joint agreement but as of late 2019, there are effectively no living shoreline projects that could qualify for a “green light” under the current rules. We will get to that in a minute (and remember, *this could change*).

State Programmatic General Permit (SPGP V) State of Florida

Published Dec. 3, 2018 / Expiration date: 12/31/2018



[PRINT](#) | [E-MAIL](#)

PUBLIC NOTICE

STATE PROGRAMMATIC GENERAL PERMIT (SPGP V) STATE OF FLORIDA

MODIFICATION EFFECTIVE DECEMBER 31, 2018

PRIOR INSTRUMENT (SPGP V) REVISED AND RENAMED (SPGP V-R1)

The U.S. Army Corps of Engineers (Corps) hereby modifies the Department of Army Permit titled State Programmatic General Permit (SPGP V) State of Florida. The modifications incorporated into a revised State Programmatic General Permit (SPGP V-R1) State of Florida. SPGP V-R1 is effective December 31, 2018.

The Department of Army State Programmatic General Permit V (SPGP V) authorizes various activities if the applicant obtains a verification and performs the work in accordance with the terms and conditions of the SPGP V. The Florida Department of Environmental Protection, the St. Johns River Water Management District, Hillsborough County, and the Southwest Florida Water Management District are able to issue a verification, concurrently with their other authorization(s), provides the verification that an applicant's proposed work is authorized pursuant to SPGP V and that a separate application to the U.S. Army Corps of Engineers (Corps) is not required.

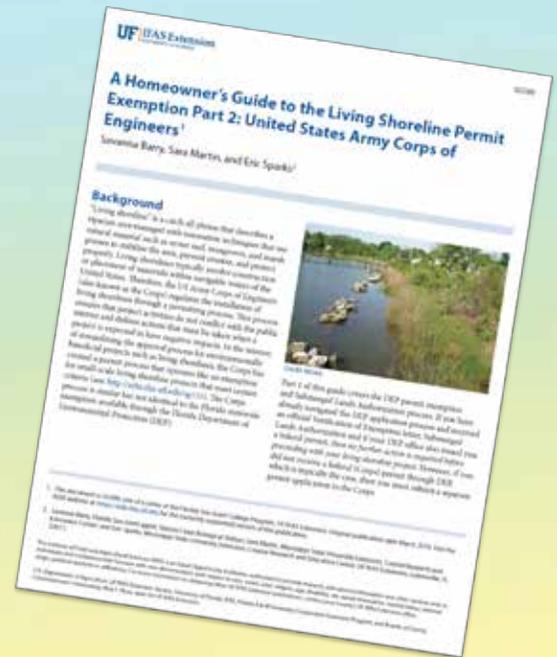
<https://www.saj.usace.army.mil/Missions/Regulatory/Public-Notices/Article/1703359/state-programmatic-general-permit-spgp-v-state-of-florida/>

The federal-state agreement that allows the red/green analysis by state permitting staff is called the State Programmatic General Permit and we are on version V, revision 1 of this agreement between Florida and the USACE. Therefore, this agreement is called the SPGP V-R1.

Federal Permitting

Permit types – ascending order:

- General Permit - SPGP V-R1 green light from state
- Letter of Permission
- Nationwide Permit
 - NWP 13 – bank stabilization
 - 500 feet along the bank
 - 1 cubic yard fill per running foot
 - New language says to consider alternatives
 - NWP 27 – habitat restoration, enhancement, or establishment
 - NWP 54 – living shorelines (preferred)
 - 30 feet or less channel-ward of mean low water in tidal waters
 - 500 feet or less along the bank
 - <https://www.nao.usace.army.mil/Portals/31/docs/regulatory/nationwidepermits/Nationwide%20Permit%2054.pdf>
- Standard Individual Permit
- No fee for USACE permits, but also no statutory time limit for Corps staff to respond (though 60 days is a typical goal)



<http://edis.ifas.ufl.edu/sg189>

Just as in state permitting, there are multiple levels of permits that could apply to a project, mostly depending on the size, scope, and potential “impact” of the project on navigable waters of the US. Most of the information required for state permitting can be directly repurposed and re-organized to meet the requirements for federal permitting. The same elements are needed, site description, plan and cross section drawings of the present condition and the proposed condition, etc. Unless you get a green light from the state permitting entity (which is unlikely at this time for reasons we will cover in a moment), you will need to apply for a separate federal permit.

You have several permitting types depending on the size and scope of the project. The permit application is the standard ENG-4345 form available from the Jacksonville District and a pre-application meeting with your regulatory staff can help you anticipate what type of permit might be the appropriate one for each situation.

1. Letter of permission – this is a type of permitting mechanism that allows the project to move ahead without a public notice period and at the discretion of the regulatory staff.
2. Nationwide permit – these are permits similar to general permits from the state. There are several types of nationwide permits that cover common activities. As long as the project sticks to the parameters within each nationwide description, a permit can be granted fairly quickly and easily. If at all possible, it is best to attempt to qualify for a nationwide. At this time, there are three types of nationwide permits commonly used for living shorelines.
 - NWP 13 – bank stabilization
 - NWP 27 – habitat restoration, enhancement, or establishment
 - NWP 54 – living shorelines (preferred option)
3. Standard Individual Permit – this is the federal version of the “full-blown” permit and includes additional mandatory elements over and above the nationwide permits such as a public notice, public comment period, and analysis by other federal agencies such as EPA, USFWS, and NOAA.

SPGP V-R1 – Effective Dec 31, 2018 – Jul 26, 2021

Work Authorized:

A. Activities. The Projects authorized by this SPGP V-R1 are those activities that qualify for and authorized by the specific State of Florida Exemptions and General Permits cited below as adopted by reference in Chapter 62-330, Florida Administrative Code (F.A.C.).

1. Shoreline Stabilization.

a. 62-330.051(12)(a), F.A.C. Synopsis: Seawalls or riprap in artificially created waterways, including backfilling.

b. 62-330.051(12)(b), F.A.C. Synopsis: Restoration of seawall or riprap at its previous location or upland of, or within 18 inches waterward of, its previous location.

c. 62-330.051(12)(c), F.A.C. Synopsis: Construction of private vertical seawalls or riprap between and adjoining existing seawalls or riprap at both ends.

d. 62-330.431, F.A.C. Synopsis: Installation of riprap.

e. 62-330.051(12)(d), F.A.C. Synopsis: Installation of batter or king piles used exclusively to stabilize and repair seawalls and that do not impede navigation.

f. 62-330.051(12)(e), F.A.C. Synopsis: Living Shorelines (restoration of an eroding shoreline with native wetland vegetative enhancement plantings). ← MUST FOLLOW STATE GUIDELINES AND...

This is the section of the SPGP V-R1 that specifically mentions living shorelines. Paragraph “f.” says that the project must follow all state guidelines (see slide 4) as well as the guidelines on the next three slides.

SPGP V-R1 – Effective Dec 31, 2018 – Jul 26, 2021

d. Living shorelines can only be constructed in unvegetated, nearshore waters along shorelines to create tidal marshes or mangrove habitat for the purpose of shoreline erosion control or aquatic habitat enhancement. Native plants can be placed along the shoreline or between the shoreline and the living shoreline structure (Reference: JAXBO PDC A7.4.).

e. Living shoreline structures and permanent wave attenuation structures can only be constructed out of the following materials: oyster breakwaters, clean limestone boulders or stone (sometimes contained in metal baskets or cages), small mangrove islands, biologs, coir, rock sills, and pre-fabricated structures made of concrete and rebar that are designed in a manner so that they do not trap sea turtles, smalltooth sawfish, or sturgeon (Reference: JAXBO PDC A7.5.).

(1) Reef balls or similar structures are authorized if they are (a) not open on the bottom, (b) open on the bottom and have a top opening of at least 4 ft, or (c) pre-fabricated reef discs stacked on a pile.

(2) Oyster reef materials shall be placed and constructed in a manner that ensures that materials will remain stable and that prevents movement of materials to surrounding areas (e.g., oysters will be contained in bags or attached to mats and loose cultch must be surrounded by contained bagged oysters or another stabilizing feature) (Reference: JAXBO PDC A7.2.).

(3) Oyster reef materials shall be placed in designated locations only (i.e., the materials shall not be indiscriminately dumped or allowed to spread outside of the reef structure) (Reference: JAXBO PDC A7.3.).

(4) Wave attenuation structures must have 5 ft gaps at least every 75 ft in length as measured parallel to the shoreline and at the sea floor, to allow for tidal flushing and species movement (Reference: JAXBO PDC A7.6.).

(5) Other materials are not authorized by this SPGP V-R1 (Reference: JAXBO PDC A7.5.).

f. For living shorelines, only native plant species can be planted (Reference: JAXBO PDC A7.1.).

The SPGP V-R1 gives guidance regarding specific materials

SPGP V-R1 – Effective Dec 31, 2018 – Jul 26, 2021

1. Red: The following Projects are not authorized by this SPGP V-R1:

a. JAXBO Checklists not submitted or are inaccurate or incomplete....

d. A Project that is:

(1) Located in Federal right-of-ways or easements.

(2) Located between the shoreline and federally authorized **navigation channels** or within 300 feet of the design edge, whichever is less, or within such channels, including but not limited to: the Intracoastal Waterways, channels and turning basins of a port or inlet, and wideners (where the width of the channel is widened, for example, when the channel changes direction)

(3) Located within or crossing a **flood control channel/canal** or the levees, dikes, dams, or other water retaining structures of a federally authorized project (either federally or locally maintained) or within those channels.

...

If seagrass or corals are found within the project footprint, the Project is not authorized under SPGP V-R1... and a whole host of other exclusions based on certain boundaries of localities, special management areas, or threatened and endangered species critical habitats. See:

<https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll7/id/8784>

The SPGP V-R1 gives guidance regarding placement of project elements within certain boundaries – distances from navigational channels and certain habitat types

SPGP V-R1 – Effective Dec 31, 2018 – Jul 26, 2021

Red: The following projects are not authorized by this SPGP V-R1:

- a. Construction and/or repairs to groins, jetties, breakwaters and beach nourishment/renourishment (Reference: JAXBO PDC A1.5.).
- b. Installation of a seawall or riprap to remove/fill an upland cut area (e.g., boat slip, boat ramp, boat basins).
- c. Living Shorelines (62-330.051(12)(e), F.A.C.), if the work extends waterward past the adjacent shorelines (this provision is to preclude changes in down drift currents).

One of the most important provisions of the SPGP V-R1 is paragraph “c.” highlighted above. The State of Florida staff interpret this statement to mean that if a project has any elements that extend past neighbors’ property lines then they cannot greenlight the project. This precludes the green light designation for almost all living shorelines at this time. There are a few situations where a green light might be possible. For example, maybe a shoreline that was sandwiched in between two seawalls and the property eroded landward of the seawalls, and the homeowner wants to build a living shoreline where the most waterward element is even with the neighboring seawall. That would be one example of a possible green light. But until the SPGP is revised again, paragraph “c.” above effectively makes all living shorelines “red”, and therefore in need of a separate permit application to USACE.

Nationwide 54 – used for most FL projects as of 8/19

Structures and work in navigable waters of the United States and discharges of dredged or fill material into waters of the United States for the construction and maintenance of living shorelines to stabilize banks and shores in coastal waters, which includes the Great Lakes, along shores with small fetch and gentle slopes that are subject to low- to mid-energy waves.

A living shoreline has a footprint that is made up mostly of native material. It incorporates vegetation or other living, natural “soft” elements alone or in combination with some type of harder shoreline structure (e.g., oyster or mussel reefs or rock sills) for added protection and stability. Living shorelines should maintain the natural continuity of the land-water interface, and retain or enhance shoreline ecological processes.

Living shorelines must have a substantial biological component, either tidal or lacustrine fringe wetlands or oyster or mussel reef structures.

The guidelines on this and the next slide show the criteria for obtaining a Nationwide 54 for living shorelines

Nationwide 54 – con't

The following conditions must be met:

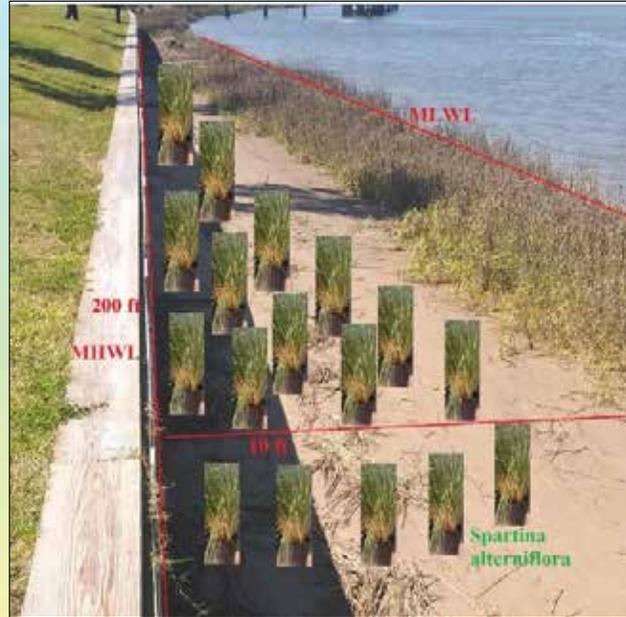
- (a) The structures and fill area, including sand fills, sills, breakwaters, or reefs, cannot extend into the waterbody more than 30 feet from the mean low water line in tidal waters unless waived by the district engineer;
- (b) The activity is no more than 500 feet in length along the bank unless waived by the district engineer;
- (c) Coir logs, coir mats, stone, native oyster shell, native wood debris, and other structural materials must be adequately anchored, of sufficient weight, or installed in a manner that prevents relocation in most wave action or water flow conditions, except for extremely severe storms;
- (d) For living shorelines consisting of tidal or lacustrine fringe wetlands, native plants appropriate for current site conditions, including salinity, must be used if the site is planted by the permittee;
- (e) Discharges of dredged or fill material into waters of the United States, and oyster or mussel reef structures in navigable waters, must be the minimum necessary for the establishment and maintenance of the living shoreline;
- (f) If sills, breakwaters, or other structures must be constructed to protect fringe wetlands for the living shoreline, those structures must be the minimum size necessary to protect those fringe wetlands;
- (g) The activity must be designed, constructed, and maintained so that it has no more than minimal adverse effects on water movement between the waterbody and the shore and the movement of aquatic organisms between the waterbody and the shore; and
- (h) The living shoreline must be properly maintained, which may require periodic repair of sills, breakwaters, or reefs, or replacing sand fills after severe storms or erosion events. Vegetation may be replanted to maintain the living shoreline. This NWP authorizes those maintenance and repair activities, including any minor deviations necessary to address changing environmental conditions.

Permitting Exercise

For each of the following scenarios, determine which permits are required and why, and identify any caveats.

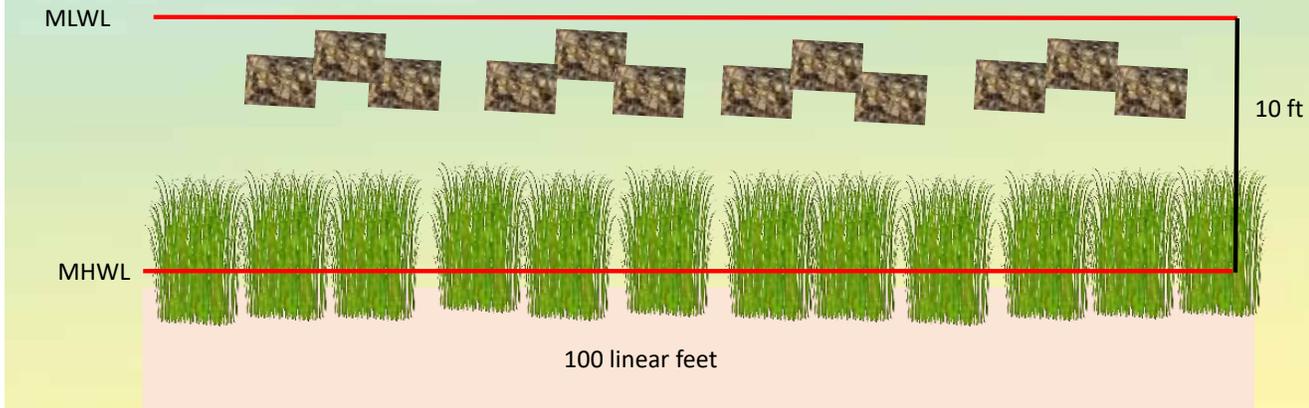
The Florida Department of Environmental Protection strongly recommends contacting the Department prior to submission of applications, etc. to ensure that you have the correct authorizations for your project.

Scenario #1: Profile View



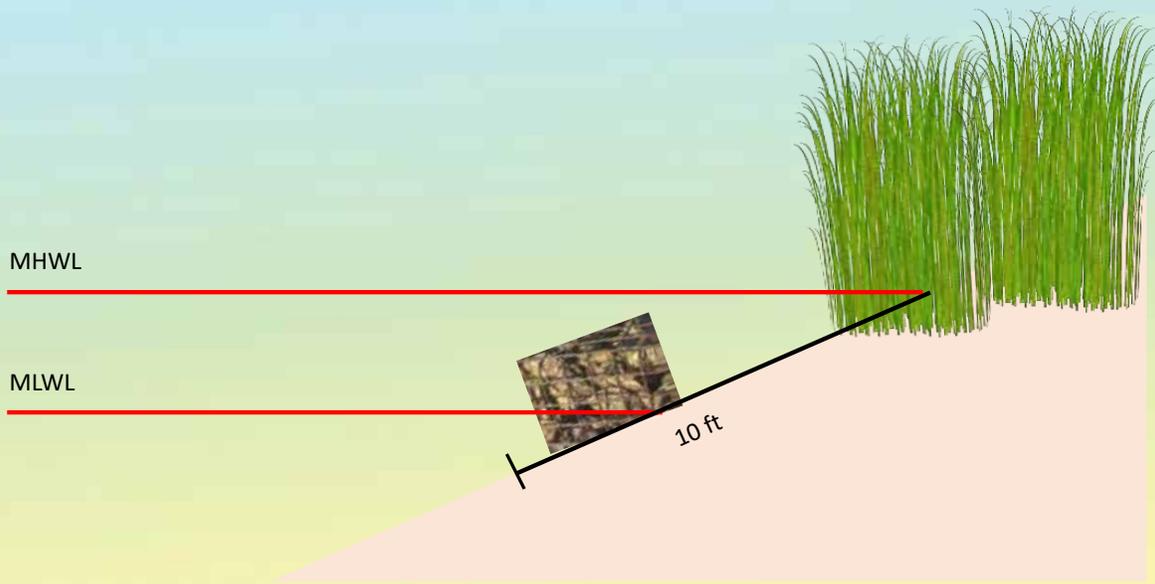
- Located within Fort George River
 - Within an aquatic preserve and outstanding Florida waterbody
 - On State Lands
- Land adjacent are public lands.
- Project will be ~200 linear feet.
- Living shoreline project that includes:
 - Planting
- The living shoreline will start with plantings only and will be placed above the mean high water line and within less than 10 ft of the mean high high water line.

Scenario #2: Plan View

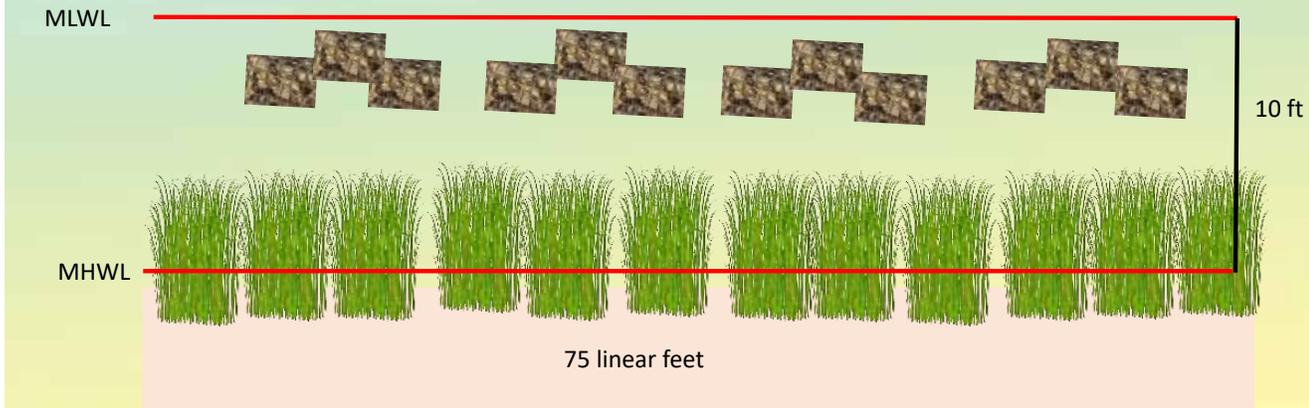


- Located within Pellicer Creek
 - Within an aquatic preserve and outstanding Florida waterbody
 - On State Lands
- Land adjacent to the project is owned by the private residence.
- Project will be ~100 linear feet. Living shoreline project that includes:
 - Planting
 - Oyster bags/gabions
- The living shoreline will start with some upland planting and then oyster gabions will be placed no more than 10 ft waterward of the mean high water line.
- There will be a minimum of 5 ft gaps between the oyster gabions to ensure no entanglement issues.

Scenario #2: Profile View

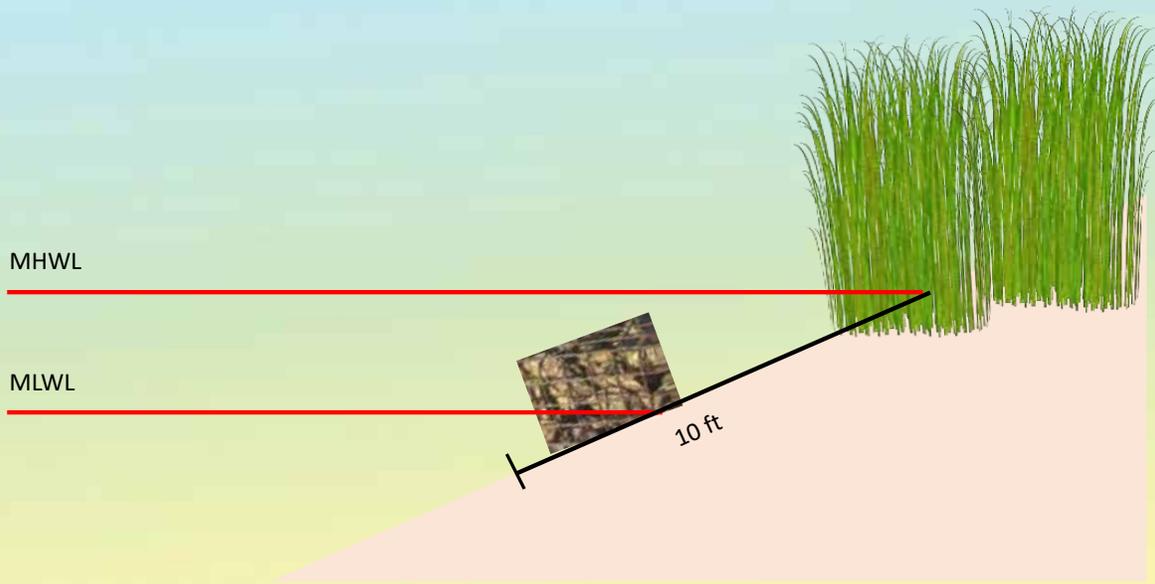


Scenario #3: Plan View

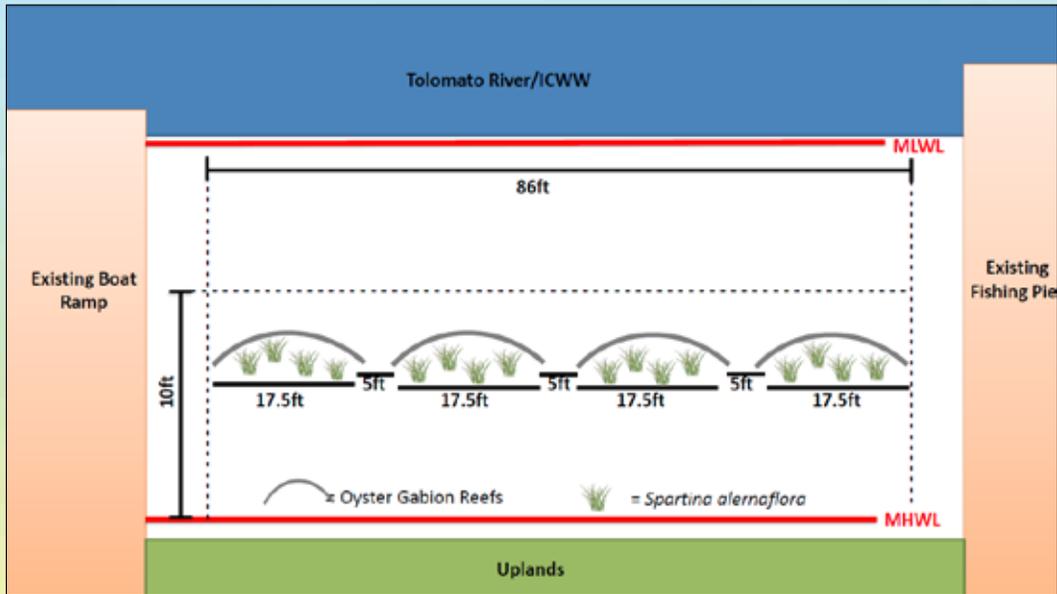


- Located within the City of St. Augustine.
 - Verified with FDEP that the submerged lands are not considered state lands.
- Land adjacent to the project is owned by the private residence.
- Project will be ~75 linear feet.
- Living shoreline project that includes:
 - Planting
 - Oyster bags/gabions
- The living shoreline will start with some upland planting and then oyster gabions will be placed no more than 10 ft waterward of the mean high water line.
- There will be a minimum of 5 ft gaps between the oyster gabions to ensure no entanglement issues.

Scenario #3: Profile View

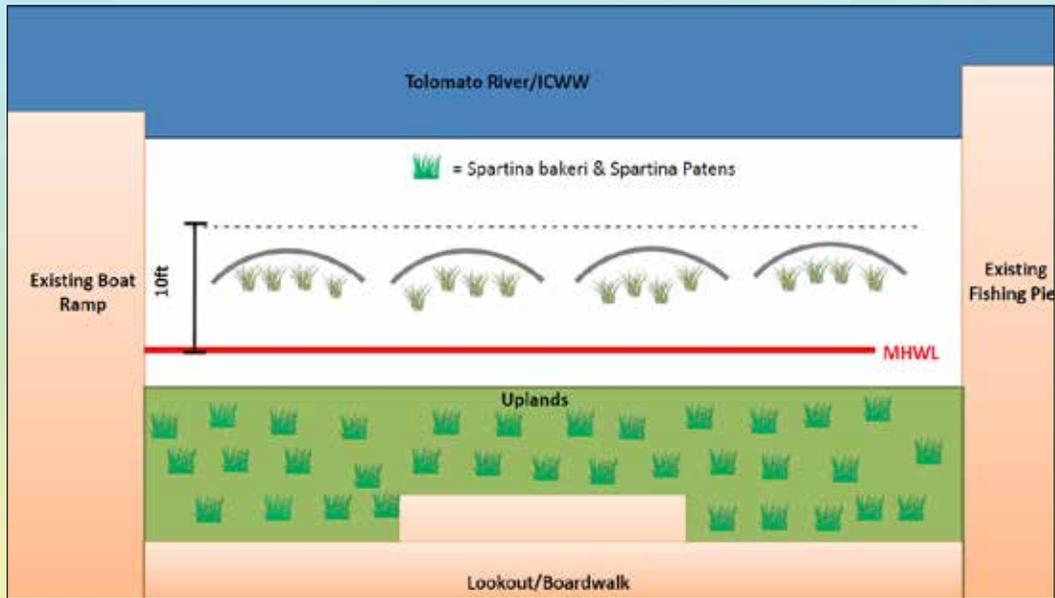


Scenario #4: Plan View #1

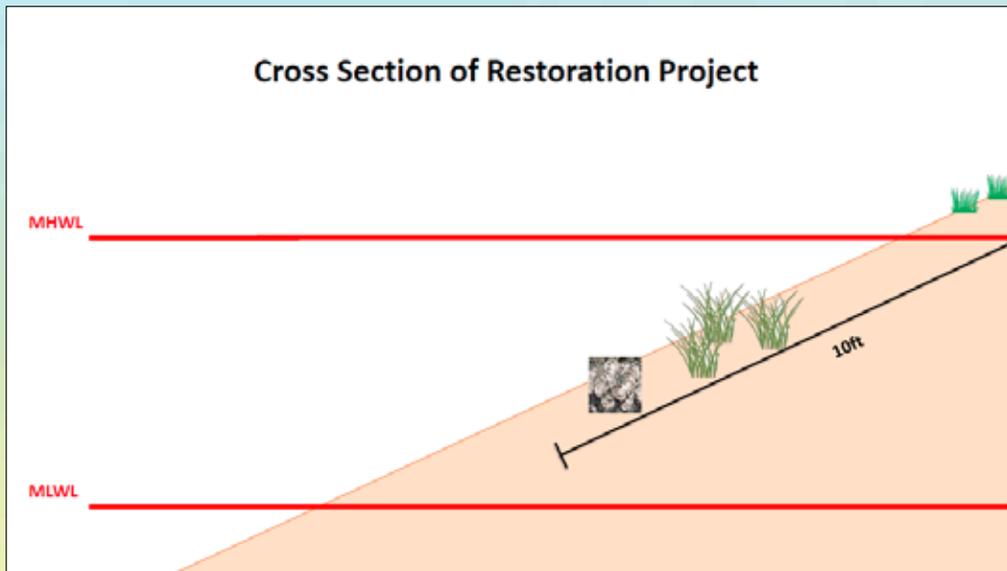


- Located within the Tolomato River / Intracoastal Waterway on state lands.
- Land adjacent to the project is owned by the City.
- Project will be ~86 ft in length.
- Living shoreline project that includes:
 - Planting
 - Oyster bags/gabions
- The living shoreline will start with some upland planting and then oyster gabions will be placed no more than 10 ft waterward of the mean high water line.
- There will be a minimum of 5 ft gaps between the oyster gabions to ensure no entanglement issues.

Scenario #4: Plan View #2



Scenario #4: Profile View

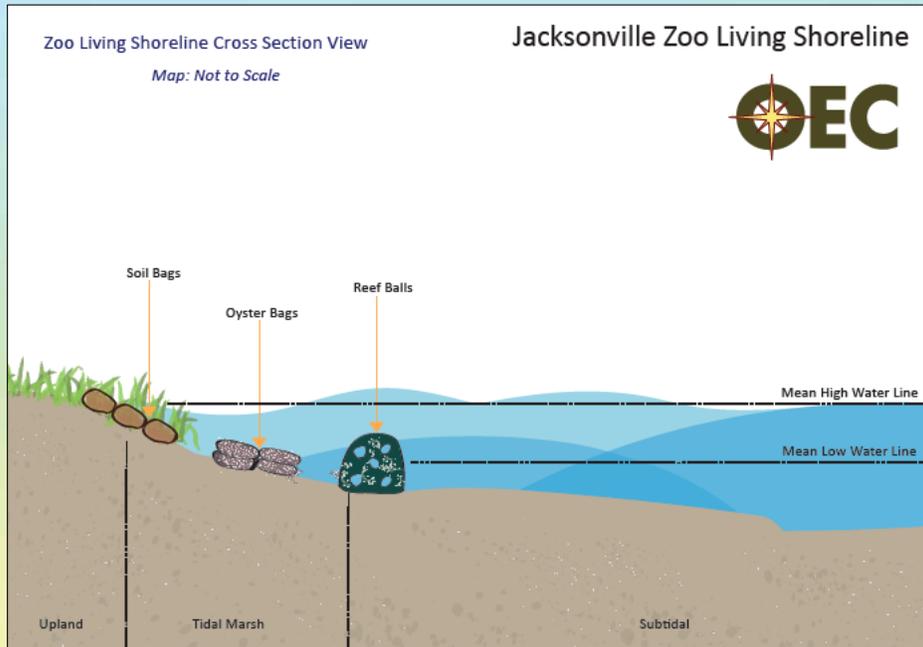


Scenario #5: Plan View



- Located within the St. Johns River
 - On State Lands
- Land adjacent is owned by the City of Jacksonville.
- Project will be ~200 linear feet Living shoreline project that includes:
 - Soil bags
 - Planting
 - Oyster bags/gabions
 - Reef balls
- The living shoreline will start with some upland planting and go out ~21 ft waterward of the mean high water line.
- There will be a minimum of 5 ft gaps between the oyster bags/gabions to ensure no entanglement issues.
- The reef balls will be placed waterward of the oyster bags/gabions.
- Due to the tidal fluctuations and potential for boats to hit the reef balls and oyster bags/gabions, signage will be placed to inform individuals to avoid the area.

Scenario #5: Profile View



Module 3: Implementation

- 1. Planting implementation**
- 2. Breakwater implementation**
- 3. Materials and equipment**

Module Objectives

- Identify details on how to implement a vegetation-based living shoreline and breakwaters of oyster shell or alternative materials.
- Understand where and how to get materials locally and what types of equipment are necessary.

Techniques

Vegetation

- PLANTING DEPTH
- Timing (season/tide)
- Condition of plants
- Zonation
- Grade
- Spacing
- Follow up

Oyster Reef Breakwater

- CONSOLIDATION
- Size (length/width/ht)
- Shape/orientation
- Distance from MHWL
- Grade
- Spacing
- Follow up

2

Any time we install oyster reefs and/or vegetation along a waterfront, we follow some basic guidelines that transfer well from project to project and apply even if a project is scaled up.

Adequate planting depth for vegetation, specifically for intertidal plants can be as important as providing an adequate wave energy climate with any attenuation device.

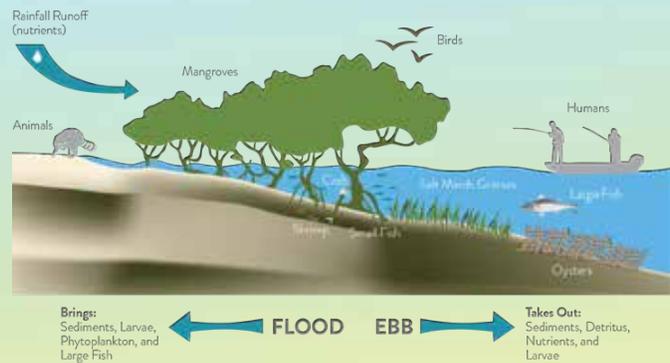
Any attenuation device should consist of consolidated, stable, or sturdy material, although high porosity (interstitial space, surface complexity, rugosity) is also ideal. Water flow-through and connectivity also important.

Implementation: Key Principles- Design Considerations

- Conditions
- Goals
- Zonation



Photo: Tampa Bay Watch



- Wildlife Passage/Gaps along bars
- Viewshed
- Nesting habitat and seasons

There are many different considerations that should be factored in when designing a living shorelines project.

Conditions of the project location such as: Is there heavy boat traffic? Is it an area of high wake? Is it directly exposed to weather and wind or is it more sheltered? What is the tidal range or how great is the fluctuation between low and high tide? How much sunlight does the area get? Full sun, partial sun, shade? What is the sediment like?

What are the goals of the project? Is it stabilization and erosion control? Habitat creation? Water quality improvement? Storm buffer? Or some combination of these?

What is your zonation going to be? Basic zonation looks like this graphic on the right.

Gaps in your living shoreline structures are usually required at set lengths to allow for wildlife passage and water flow through the tidal changes.

Transitions as shorelines stabilize. Mangroves will compete with salt marsh plants in transitional areas. Beware of the viewshed issue with homeowners or property owners do not like to have mangrove habitat blocking their waterfront view.

Beware of nesting habitat and seasons of birds, horseshoe crabs and other species is something to be aware of in the given project location.

Implementation: Key Principles- Choose Appropriate Vegetation

- Geographic Location (sun tolerance, drought tolerance, tidal tolerance)
- Zonation (low marsh, mid marsh, high marsh)
- Native Species- use only healthy, native plants with established, actively growing roots



Photo: Tampa Bay Watch

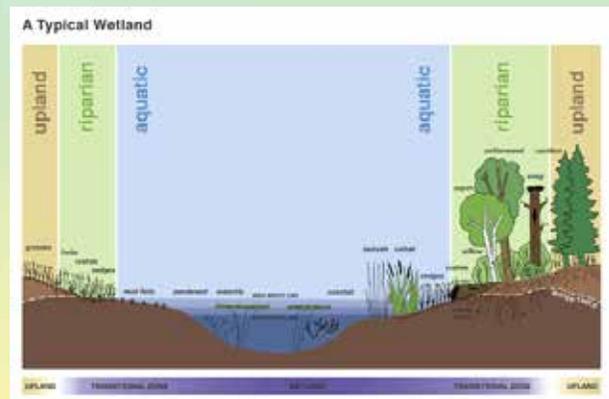


Image Credit: Environmental Specialties Group

Geographic location – use only native plants appropriate for the climate and conditions. Are the plants tolerant of full sun, partial sun, shade? Are the plants drought tolerant? Can they be exposed to salinity for a length of time? The species selected should ideally be resilient and low maintenance. It is also ideal that the selected species can be subjected to storms with occasional salt water inundation, intense sunlight, salt-laden winds and can thrive in drought and sandy, nutrient poor soils.

Again, zonation should be considered and making sure that you are planting along the entire wetland-upland profile (graphic on the right of the slide)

The low marsh tidal zone occurs along the seaward edge of the salt marsh. It is flooded daily and usually exposed during low tide (species include: black mangrove, red mangrove, smooth cordgrass, sea purselane).

The mid marsh tidal zone lies above the mean high water line between low marsh and high marsh. Plants that live here can tolerate flooding, although they prefer drier conditions. (species include: *spartina patens*, *seashore paspalum*)

The high marsh tidal zone is generally flooded only during above-average high tides. Plants that live here do not get waterlogged or suffer severe salt stress. (species include: beach sunflower, black eyed susan, firebush)

Make sure you are using healthy, native plants with established, actively growing roots to ensure planting success. Generally, it is recommended to plant in staggered rows with the plants about 1-3 feet apart, along the profile in the zone where the plants' specific moisture/salinity requirements are met

Suitable Species

- It is important to plant the correct species in the correct zones to ensure their success along the shorelines.
- Plant species will depend on the region of the living shoreline
- For a list of suitable species based on region please visit:
<http://floridalivingshorelines.com/marshplants/>



Photo: Jessy Wayles, Marine Discovery Center

In Florida, there are many species of beautiful marsh plants that can be used to add aesthetics to the property and functionality to the living shoreline. However, it is imperative that you only use species that are suitable for your region.

There are a variety of marsh grasses that work well for low marsh regions in Florida such as: smooth cord grass.

In the mid marsh, plants such as salt meadow cord grass and seashore *paspalum* grow well in all areas of Florida.

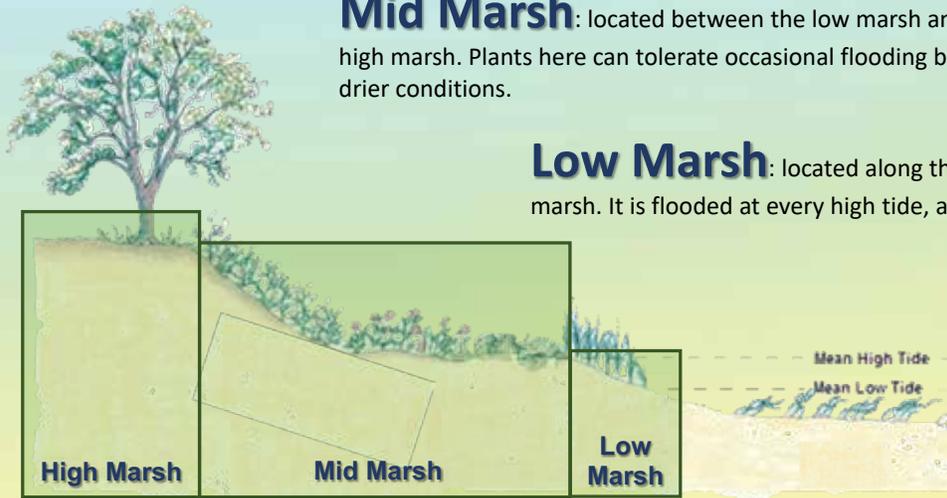
Upland plants such as seaside goldenrod, sweet bay, and fire bush can be used almost everywhere in Florida and add color to the high marsh zone of the living shoreline.

Photo: Marine Discovery Center living shoreline demonstration area. Pictured is dune daisy and loose oyster shells to reduce storm water run off.

High Marsh: located at the highest elevation of the slope, it is generally only flooded during storm surges. It does not experience water logged conditions or severe salt stress.

Mid Marsh: located between the low marsh and the high marsh. Plants here can tolerate occasional flooding but prefer drier conditions.

Low Marsh: located along the seaward edge of the salt marsh. It is flooded at every high tide, and exposed during low tide.



http://ccrm.vims.edu/wetlands/livingshoreline_intro.html

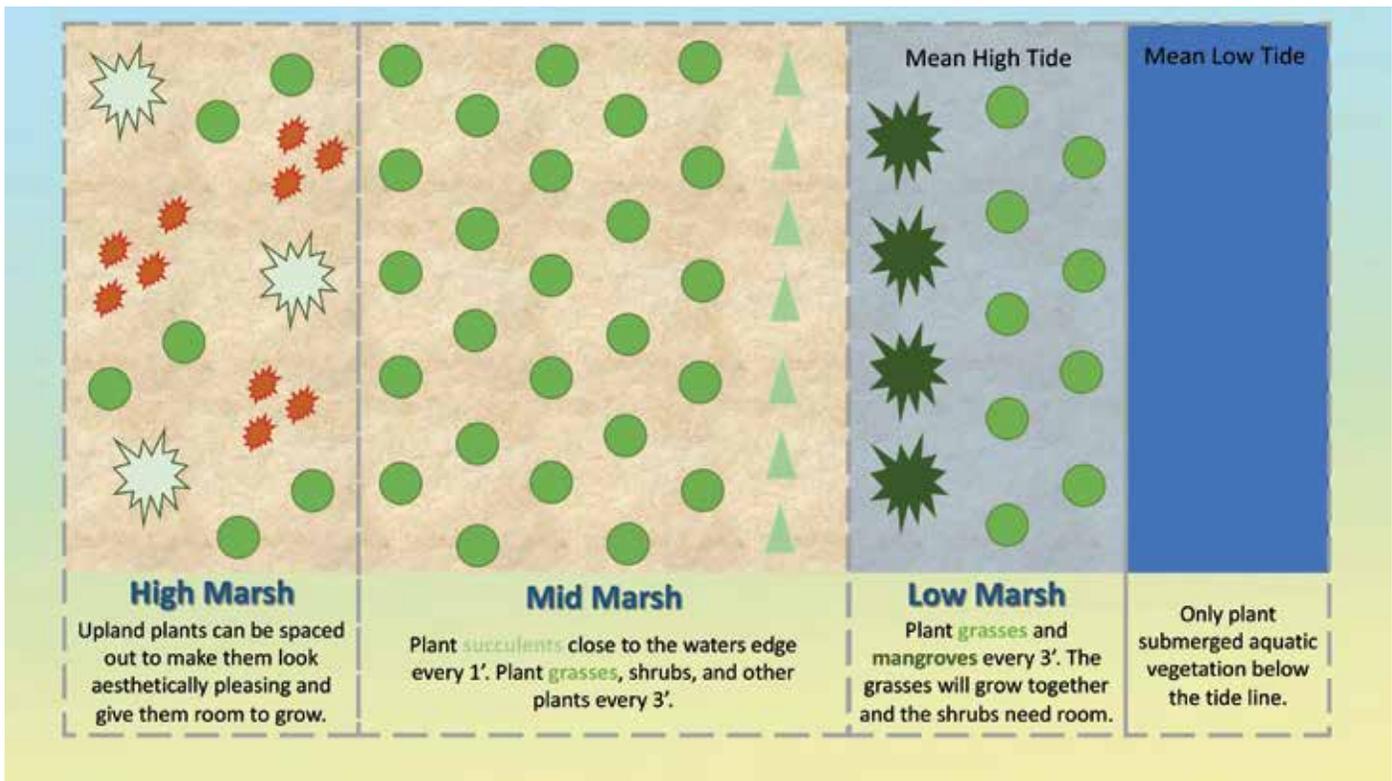
In order for shoreline plants to thrive, you must determine which elevation is best suited for the species of plants you're using. Each species should be planted at the correct elevation, and the nursery where you are purchasing the plants should be able to assist you if you're unsure.

Estuary shorelines can easily be broken up into three sections: high marsh, mid marsh, and low marsh.

In the high marsh plants only get flooded during storm surges. These plants can tolerate salt spray, but cannot tolerate being water logged for an extended amount of time. High marsh plants usually consist of beautiful flowers and shrubs, vines and grasses.

In the mid marsh plants get flooded irregularly like during king tides and storm surges. These plants can tolerate occasional flooding and being water logged for a short amount of time. Mid marsh plants usually consist of grasses, succulents, and mangroves.

In the low marsh plants are regularly covered at every high tide. These plants can tolerate being waterlogged for extended periods of time and a variety of salinities. Low marsh plants consist of a select few species of marsh grasses, and mangroves.



The spacing and lay out of your plants will depend on the species you are using and how dense the home owners wants the plants to be upon installation. The above graph is a good rule of thumb for different types of plants.

Avoid planting any marsh plants below the mean low tide line as they will quickly be lost to wave action and over-watering.

Implementation: Key Principles- Use Recycled Oyster Shell When Possible

- Importance of recycled shell
- Sources of recycled shell
- How to implement recycled shell program



Photo: Tampa Bay Watch



Photo: Tampa Bay Watch

Oyster shell is the best, most natural material used to rebuild oyster reefs but it's also in short supply. To save this ecologically important byproduct, many organizations are creating oyster shell recycling programs by partnering with local restaurants. Organizations around the state are partnering with local restaurants that are looking to recycle their shells and put the resource back in the water. Shells from the restaurants are collected or delivered to a staging area where the oyster shells must cure for a period of at least six months to ensure that disease and/or bacteria are not being introduced to the local waters. After that six month period is over, the recycled shell can be bagged and used at living shoreline projects throughout the state. Using recycled shell is a great option as it takes the resource that would otherwise be disposed of in a landfill and puts it back in the water where it is most productive and effective. Whenever possible, recycled shell should be considered as an option for living shoreline projects.

Implementation: Key Principles- Other Substrate Options



Fossilized Shell

Photo: Tampa Bay Watch



Reef Balls/Oyster Domes

Photo: Tampa Bay Watch



Depending on the project location and the goals of the project, there are many living shoreline designs that can be considered all the way from your gray or harder techniques in areas of higher vulnerability such as revetments and breakwaters to the green and softer techniques in lower energy environments such as edging and sills.

Other substrates that often used are fossilized shell, reef balls or oyster domes, native limestone rip rap. Fossilized shell has limitations in availability and size as well as being a finite resource that will eventually run out. We are very fortunate here in Florida to have a fossilized shell option as many other states doing oyster restoration (North Carolina, Chesapeake, Louisiana) do not have fossilized shell as an option.

Oyster domes or Reef Balls®, help replace oyster populations in struggling habitat areas. The Lo-Pro version are 24" in diameter, 18" tall and weigh approximately 150 lbs and are installed along seawalls and shorelines to provide habitat.

Breakwater Materials

Oyster Structure Guidelines

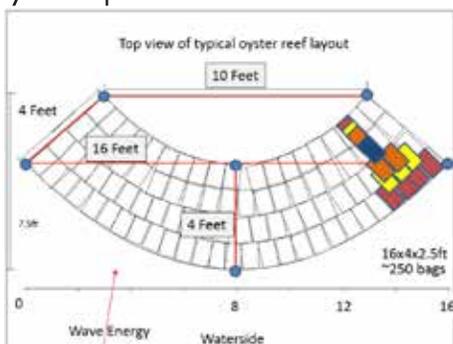
The primary function of a breakwater structure is to stop or greatly reduce the energy of waves before reaching the shoreline. The reduction in wave energy allows for shoreline stability and the establishment of emergent vegetation in the protected area between the breakwater and the shoreline.

Elevation

A recent study (Colden et al. 2017) found that there is a common mechanism underlying the persistence or degradation of reefs based on their initial height. This study shows that the reduction of initial reef height below a critical threshold will result in the reef being more likely to fail. Oyster density exhibits a nonlinear threshold response with respect to reef height. The mean threshold value in this study was 0.3 meters: Reefs with initial heights ≥ 0.3 m had higher oyster densities that generally increased over time. The elevation of oyster reef breakwaters will vary with each site depending on the tidal range.

Layout

Nationwide Permit 54, authorized by the Army Corps of Engineers in March 2017, covers the construction and maintenance of living shorelines. According to the permit, the structures and fill area used for living shorelines cannot extend into the waterbody more than 30 feet from the mean low water line in tidal waters. The activity may be no more than 500 feet in length along the bank, unless the district engineer waives this criterion depending on the activity. The activity must be designed, constructed, and maintained so that it has no more than minimal adverse effects on water movement between the waterbody and the shore and the movement of aquatic organisms between the waterbody and the shore. Sills must be designed with at least one 5 foot window/gap per property and per 100 linear feet unless waived by the district engineer.



Disclaimer: The materials included here are examples of commonly used breakwater structures used to promote oyster settlement. We do not warrant or make any representations regarding the use or the results of the use of any of the materials in terms of their correctness, accuracy, reliability, or otherwise.

Restoration Materials



Oyster shell bags are plastic mesh bags filled with fossilized and/or recycled oyster shell. Because loose shell can be more easily moved by waves before growth of new oysters can occur, loose shell is packed in aquaculture grade mesh bags before being used in oyster reef creation.



Oyster gabions are wire cages filled with recycled oyster shell. Gabions are great for shallow tidal creeks, bays, brackish rivers, and marsh lands. The gabions provide spat with a safe and healthy place to grow, while helping protect against erosion and scour.



Community Oyster Reef Enhancement (CORE) modules are lightweight, easy to produce, plastic-free structures constructed from concrete and an organic mix (wood chips and burlap) with partially embedded recycled oyster shells. Each module contains ten vertically oriented oyster shells, measures 11x14 inches, and weighs about 6-8 pounds.



The Oyster Castle® is an easily deployed, specialized manufactured concrete unit using an environmentally friendly, certified blend of material conducive to fostering oyster settlement, attachment, and growth.



Oyster reef balls can be used to decrease wave energy while enhancing fish and oyster habitat. These structures provide a surface on which oysters colonize and form small living reefs. These structures also dissipate waves, decreasing coastal erosion and providing an area in which newly planted vegetation can grow.

Materials and Equipment

- Use the following pages as an aid to locate suppliers in your region.
 - Regions based on Florida Marine Contractors Association chapters
- Types of suppliers
 - Plant nurseries (sources for marsh plants; may also provide mangroves)
 - Hardscape materials (sources for recycled oyster shell, lime rock, whole fossil shell, alternative materials)
 - Limestone Bedding Stone should meet grading requirements of FDOT Standard Specifications for Road and Bridge Construction 530-2.1.4 Bedding Stone, (FDOT Code 30)

- Source plants from the nearest biological stock available to preserve genetic diversity. Ask supplying nurseries about to their sources. Note that nurseries may grow plants sourced from multiple regions of Florida.
- Oyster bag materials and recycled shell are best sourced through Marine Discovery Center and the Shuck and Share program. MDC can provide the most up-to-date information regarding changing technologies, recommendations, and suppliers.
- Gabion structures should be fabricated for specific project needs. Uncoated steel is recommended for use to reduce plastic pollution.
- Ensure that concrete products used are bio-compatible with oysters (have pH near 8). Alternative engineered materials include:
 - Reef Balls
 - oyster castles
 - oyster rings
 - Community Oyster Reef Enhancement (CORE) modules
 - Oyster Catchers

Panhandle Materials Suppliers

Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin, and Wakulla counties

Plant Nurseries:

Aquatic Plants of Florida, Inc.
8120 Blaikie Court
Sarasota, Florida 34240
(941) 378-2700
<http://www.apofl.com>
info@apofl.com

ARCGateway Plant Nursery
1112 E. Fairfield Drive
Pensacola, Florida 32053
(850) 469-0849
Taylor Gantt – Nursery Manager

Earth Balance – Native Plant Nursery
2570 Commerce Parkway
North Port, FL 34289
(941) 426-7878
plantsales@earthbalance.com
<http://www.earthbalance.com>

Hutton Landscapes, Inc. 1326 Little
Neck Road Savannah, Georgia 31419
(912) 927-1565

S&J Tree Farm and Nursery
(primarily a provider of sand cordgrass)
7280 State Road 13 N
Jacksonville, Florida 32092
(904) 522-1786

Hardscape Materials:

ACG Materials (North Florida Rock)
(Primarily Limestone Boulders)
5160 Vermont Road
Marianna, Florida 32448
(850) 762-4315

Shuck and Share
www.shuckandshare.org
(Oyster Bags and Recycled Shell)
Marine Discovery Center
(386) 428-4828
Brevard Zoo
(321) 254 - 9453

Martin Marietta – Perry Quarry
(Primarily Limestone Boulders)
22550 Nutall Rise Road
Lamont, Florida 32336
(850) 584-6461

Reef Innovations, Inc.
(Reef Ball supplier)
1126 Central Ave
Sarasota, FL 34236
(941) 330-0501

Tampa Bay Materials Suppliers

Citrus, Hernando, Pasco, Pinellas, Hillsborough, Manatee, and Sarasota counties

Plant Nurseries:

Aquatic Plants of Florida, Inc.
8120 Blaikie Court
Sarasota, Florida 34240
(941) 378-2700
<http://www.apofl.com>
info@apofl.com

Earth Balance – Native Plant Nursery
2570 Commerce Parkway
North Port, FL 34289
(941) 426-7878
plantsales@earthbalance.com
<http://www.earthbalance.com>

Florida Natives Nursery, Inc.
4115 Native Garden Dr
Plant City, Florida 33565-2426
(813) 754-1900
Other Phone: (813) 927-8562
<http://floridanativesnursery.com/>
flnativesnursery@yahoo.com

Sandhill Native Growers, Inc.
5980 SE County Road 760
Arcadia, Florida 34266-9607
(863) 494-9737
Mobile: (863) 990-7498
<http://www.sandhillgrowers.com>
chrisholly@sandhillgrowers.com

Hardscape Materials:

Bulk Aggregate Materials
2504 Tamiami Trail, Suite 4
Nokomis, FL 34275
(941) 270-1235

Carroll's Building Materials
2001 13th Av N
St. Petersburg, FL 33713
(727) 822-3370

Shuck and Share
www.shuckandshare.org
(Oyster Bags and Recycled Shell)
Marine Discovery Center
(386) 428-4828
Brevard Zoo
(321) 254 - 9453

Reef Innovations, Inc.
(Reef Ball supplier)
1126 Central Ave
Sarasota, FL 34236
(941) 330-0501

SMR Aggregates East
5875 Quarry Drive
Sarasota, FL 34240
(941) 907-0041

Venice Hauling
4244 Persian Lane
North Port, FL 34287
(561) 502-5943
(941) 275-2940

Southwest Florida Materials Suppliers

Charlotte, Lee, Collier, and peninsular Monroe counties

Plant Nurseries:

Aquatic Plants of Florida, Inc.
8120 Blaikie Court
Sarasota, Florida 34240
(941) 378-2700
<http://www.apofl.com>
info@apofl.com

Earth Balance – Native Plant Nursery
2570 Commerce Parkway
North Port, FL 34289
(941) 426-7878
plantsales@earthbalance.com
<http://www.earthbalance.com>

Earth Tech Environmental
10600 Jolea Ave Bonita Springs,
Florida Lee County
(239) 304-0030
<http://www.eteflorida.com>
d.brown@eteflorida.com

Sandhill Native Growers, Inc.
5980 SE County Road 760
Arcadia, Florida 34266-9607
(863) 494-9737
Mobile: (863) 990-7498
<http://www.sandhillgrowers.com>
chrisholly@sandhillgrowers.com

Note: Peninsular Monroe County shorelines are entirely within Everglades National Park. The Park may have its own specifications and preferred contractors for living shorelines plantings.

Hardscape Materials:

Bulk Aggregate Materials
2504 Tamiami Trail, Suite 4
Nokomis, FL 34275
(941) 270-1235

Shuck and Share
www.shuckandshare.org
(Oyster Bags and Recycled Shell)
Marine Discovery Center
(386) 428-4828
Brevard Zoo
(321) 254 - 9453

Reef Innovations, Inc.
(Reef Ball supplier)
1126 Central Ave
Sarasota, FL 34236
(941) 330-0501

SMR Aggregates East
5875 Quarry Drive
Sarasota, FL 34240
(941) 907-0041

Star Quarries, LLC
12201 US Hwy 27 South
South Bay, FL 33493
(561) 996-7515

Venice Hauling
4244 Persian Lane
North Port, FL 34287
(561) 502-5943
(941) 275-2940

Central Florida Materials Suppliers

Volusia, Brevard, and Indian River counties

Plant Nurseries:

Aquatic Plants of Florida, Inc.
8120 Blaikie Court
Sarasota, Florida 34240
(941) 378-2700
<http://www.apofl.com>
info@apofl.com

Beeman's Nursery
3637 State Road 44, New Smyrna
Beach, FL 32168
(386) 428-8889

DIGG Gardens
7430 US Highway 1, Vero Beach, FL
(772) 360-2131

Earth Balance – Native Plant Nursery
2570 Commerce Parkway
North Port, FL 34289
(941) 426-7878
plantsales@earthbalance.com
<http://www.earthbalance.com>

Green Images Natives
1333 Taylor Creek Rd, Christmas, FL
(407) 568-1333

Lindley's Nursery
1232 Canal ST, New Smyrna Beach, FL
(386) 428-7298

Maple Street Natives
7619 Henry Ave, West Melbourne, FL
(321) 729-6857

Hardscape Materials:

Go Native Landscaping
Melbourne Beach, Florida
(321) 795-3111

Florida Oceanographic Society
(Recycled Oyster Shell)
890 NE Ocean Blvd, Stuart, FL 34996
(772) 225-0505

Shuck and Share
www.shuckandshare.org
(Oyster Bags and Recycled Shell)
Marine Discovery Center
(386) 428-4828
Brevard Zoo
(321) 254 - 9453

NatScape
7619 Henry Ave,
West Melbourne, FL
(321) 223-6147

Reef Innovations, Inc.
(Reef Ball supplier)
1126 Central Ave
Sarasota, FL 34236
(941) 330-0501

First Coast Materials Suppliers

Gulf of Mexico: Jefferson, Taylor, Dixie, Levy; Atlantic: Nassau, Duval, St. Johns, Flagler, Clay, and Putnam counties

Plant Nurseries:

Aquatic Plants of Florida, Inc.
8120 Blaikie Court
Sarasota, Florida 34240
(941) 378-2700
<http://www.apofl.com>
info@apofl.com

Beeman's Nursery
3637 S.R. 44
New Smyrna Beach, FL 32168
(386) 428-8889
beemansnursery@att.net
www.beemansnursery.com

Earth Balance – Native Plant Nursery
2570 Commerce Parkway
North Port, FL 34289
(941) 426-7878
plantsales@earthbalance.com
<http://www.earthbalance.com>

EarthWorks
12501 Beach Blvd.
Jacksonville, Florida 32246
(904) 996-0712
mail@earthworksjax.com
www.earthworksjax.com

Native and Uncommon Plants, LLC
(904) 388-9851
www.nativeanduncommonplants.com/

Native Plant Consulting
(904) 671-2880
renee@nativeplantconsulting.com
<http://www.nativeplantconsulting.com/>

Reflections of Nature
3030 S 8th Street/ A1A
Fernandina Beach, FL 32034
(904) 491-8684
loper.1993@att.net
www.rnlNursery.com

Southern Horticulture
1690 A1A South
St. Augustine, FL 32080
(904) 471-0440
<http://www.southernhorticultureflorida.com/>

Trad's Garden Center
8178 San Jose Blvd.
Jacksonville, FL 32217
(904) 733-7488
<https://tradsofjacksonville.com>

Hardscape Materials:

Shuck and Share
www.shuckandshare.org
(Oyster Bags and Recycled Shell)
Marine Discovery Center
(386) 428-4828
Brevard Zoo
(321) 254 - 9453

Reef Innovations, Inc.
(Reef Ball supplier)
1126 Central Ave
Sarasota, FL 34236
(941) 330-0501

South Florida Materials Suppliers

St. Lucie, Martin, Palm Beach, Broward, Miami-Dade, and Monroe counties

Plant Nurseries:

Aquatic Plants of Florida, Inc.
8120 Blaikie Court
Sarasota, Florida 34240
(941) 378-2700
<http://www.apofl.com>
info@apofl.com

Carl Bates Indigenous Plants
17639 64th Place North
Loxahatchee, Florida 33470
(828) 342-7764
batescabins@aol.com

Earth Balance – Native Plant Nursery
2570 Commerce Parkway
North Port, FL 34289
(941) 426-7878
plantsales@earthbalance.com
<http://www.earthbalance.com>

Indian Trails Native Nursery
6315 Park LN W
Lake Worth, Florida 33467-6606
(561) 641-9488
<http://www.IndianTrails.vpweb.com>
InjnTrails@aol.com

Martin County Farms
3449 SW Honey Ter
Palm City, Florida 34990
(561) 262-3414
martincountyfarms.com/mcf
apatchunka@avcaquatic.com

Hardscape Materials:

Florida Oceanographic Society
(Recycled Shell)
890 NE Ocean Blvd,
Stuart, FL 34996
(772) 225-0505

Shuck and Share
www.shuckandshare.org
(Oyster Bags and Recycled Shell)
Marine Discovery Center
(386) 428-4828
Brevard Zoo
(321) 254 - 9453

Reef Innovations, Inc.
(Reef Ball supplier)
1126 Central Ave
Sarasota, FL 34236
(941) 330-0501

Palm Beach Aggregates LLC
20125 Southern Blvd
Loxahatchee, FL 33470
(561) 795-6550

SDI Aggregates
15600 SW 288 St., Ste. 310
Homestead, FL 33033
(305) 670-9610

White Rock Quarries
18300 NW 122nd Ave
Hialeah, FL 33018
(305) 822-5322

Statewide Equipment Suppliers

Herc Rentals

<https://www.hercrentals.com/us.html>

Sunbelt Rentals

<https://www.sunbeltrentals.com/locations/>

United Rentals

<https://www.unitedrentals.com/locations/fl>

Supplier Professional Associations

Florida Association of Native Nurseries

<https://www.afnn.org/>

Florida Limerock & Aggregate Institute

<http://myflai.org/>

Disclaimer:

Any reference in this manual to any person, or organization, or activities, products, or services related to such person or organization, or any linkages from this manual to the web site of another party, do not constitute or imply the endorsement, recommendation, or favoring of the Florida Fish and Wildlife Conservation Commission, partner organizations, or any of its employees or contractors acting on its behalf.

Note:

Supplier regions align with coastal counties within Chapters of the Florida Marine Contractors Association and are provided as an aid. Suppliers listed may provide materials or services outside of those regions. Contact individual suppliers for confirmation.

Implementation Exercise

- Create a model of how to best implement your living shoreline project from the Site Design Exercise.
 - Scenario 1 (low energy)
 - Scenario 2 (medium energy)
 - Scenario 3 (high energy)

Module 4: Maintenance

1. Evaluating and maintaining project success
2. Maintenance as a business opportunity

Follow-up: Module Objectives

- Monitoring and maintenance services
- Providing instructions to home owners for evaluating success
- Opportunities that can provide additional income



Photo Credit: G. Raulerson, TBEP

This module will discuss:

Identification of post-installation monitoring and maintenance services that may be used as a business opportunity.

Provide instructions for property owners to evaluate and maintain the success of their living shoreline investment

- Understand local natural conditions that could be mimicked by living shorelines

- Discover standardized evaluations that provide good information about the project

Understanding how different opportunities may arise that can add value to a project

Options that also provide additional value to project as well as additional contractor income

Also includes potential for new business relationships that can add value

This follow-up work can also provide examples to show to prospective clients

Neighbors always interested in what's happening next door – potential for future projects

Photo is from GTM Research Reserve, St. Augustine

- Oyster bags deployed ca 2014
- Post monitoring conducted by GTM staff, and partners from Flagler College
 - Looked at oyster regeneration (spat settlement and oyster growth) seen
 - Noted accretion behind but also observed “scalloping” between the sets of bags
 - Has led to different designs (longer sets of overlapping bags)
 - Still allow for passage of megafauna

Project Goals

- Build from established project purpose
 - Shoreline protection
 - Habitat enhancement
 - Oysters
 - Shoreline vegetation
 - Wildlife – Fish, birds
- Think long-term for some components
- Creates maintenance needs (service opportunities)



Photo Credits: G. Raulerson, TBEP

Goals should be established during planning (pre-construction) stages

- What issues does the client was solved or repaired?
- What extras (add-ons) would your clients like to see?
 - Fish, birds, seagrass, oysters, plants
- Are there any permit reporting requirements for monitoring
- What questions do your clients have about the project
 - What questions might their neighbors and friends have that might be selling points?
- Is the client interested in wildlife use, fishing, other additional amenities that occur when a living shoreline is constructed?
 - That tells you what services might be needed
 - Fish species present, oyster growth, bird list, nearby seagrasses, newly recruiting vegetation
- There are several standardized analyses that could be conducted based on the desires of the client
- Assessments after storms – both to discuss project with homeowner and potential selling component for neighbors and others
- A picture is worth a thousand words

Monitoring

- Evaluation on a regular basis can provide home owners with peace of mind and a point of pride that their living shoreline is excelling
- Visual observation such as a quarterly set of photographs is easy to achieve
- More in-depth monitoring such as deposition or erosion of sediments, success of vegetation, growth of oysters, and fish biodiversity are important indicators but require a different skill set.



Photo Credit: M. Burke, TBEP

Creating a series of photographs over time from same location will help to document project maturation, wildlife seen, and vegetation growth

Discuss returning to sites over time to evaluate or get new photos for demonstration of projects to other potential clients

- Pictures (and video) are a great way to tell your story
- Provide information to new clients
- Get permission to conduct regular flyovers, from land, or water

Photo is of Southwest Florida biologists learning about seagrass monitoring

Partnering with environmental firms

Different areas of expertise that may add value to the project

Discuss returning to sites over time to evaluate or get new photos for demonstration of projects to other potential clients

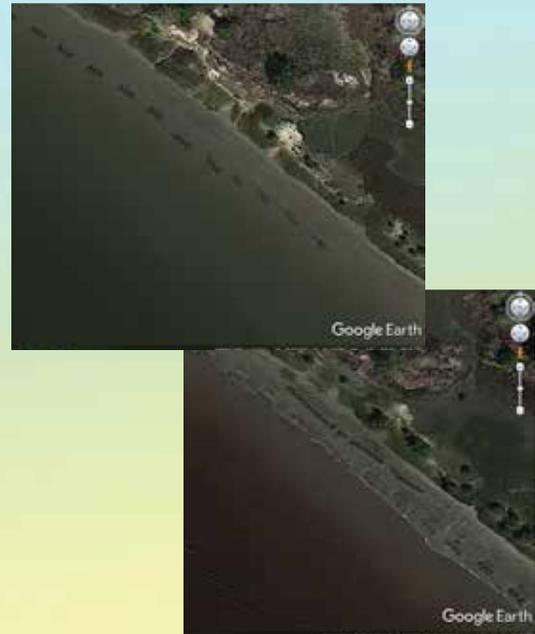
Buy-in from neighbors (potential new clients)

- Quarterly/monthly photos showing changes over time
- Aerial photos with drones

Evaluation on a regular basis

- Observe deposition and erosion (neighbors too)
 - Formal or Informal Survey
- Vegetation, oysters, seagrass (more difficult, different skill set)
- Fish, sediment (much more difficult, very different skill set)
- Sub-contracting?
- Different time scales

Google Earth Image, 2013



Google Earth Image, 2018

- Significant land-building has been seen in living shoreline projects
- There is a need to document changes over time for multiple groups:
 - Homeowner
 - Your company
 - Create lessons learned
- Partner with survey teams to assess changes
- Many of these occur fairly slowly (order of years)
 - Discuss returning to sites over time to evaluate or get new photos for demonstration of projects to other potential clients
 - Checkpoints should include
 - Regular inspections during plant establishment phase
 - Quarterly for 1st Year
 - After storms
- Google Earth as option to demonstrate long-term changes to shoreline
 - Picture is the same living shoreline project (oyster bags and Salt marsh grass planting) from the opening slide

Local Natural Conditions

- Monitoring the state of surrounding natural habitat will help to determine if the living shoreline is a success
 - Tells you what the site could or should look like
 - Utilize undisturbed areas, local resource managers, web search, or historical photos



Photo Credits: G. Raulerson, TBEP

Understanding what the surrounding natural community looks like provides insight into what natural protections are possible

For example, are there oysters, mangroves, marshes, seagrasses...? Are there nearby natural parks or relatively undisturbed shorelines that could be models?

Drive or walk around the area and/or use your favorite web-based mapping application or search engine

Contact park staff, use an internet mapping service to find shorelines that may be models for mature sites

<https://www.floridamemory.com/photographiccollection/>

During initial assessment and planning stages, think about how project will mature

What are appropriate check points to demonstrate that the project is doing well (or to identify issues)?

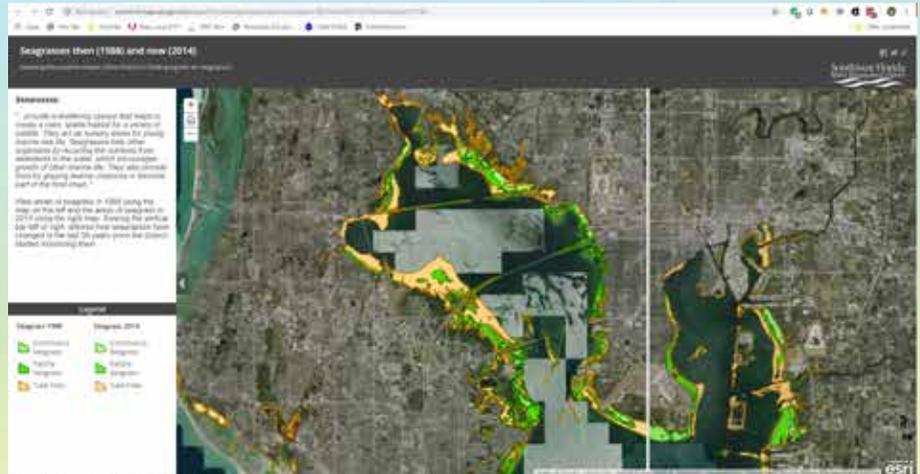
What are foreseeable issues that should be discussed?

- Exotic plants
- Lack of vegetation success
- Additional oyster material, reef modules...

Create some type of maintenance plan (eg I have one for my air conditioner, built into price of system)

Local Natural Conditions

- Web search – GoogleEarth, historical maps and photos
- Web-based maps
 - FWRI for shoreline classification ([Story Map](#)) and [web map application](#)
 - WMD [Seagrass](#) and [Land Cover](#) maps (work in progress)



Screenshot from:

<http://myfwc.maps.arcgis.com/apps/MapJournal/index.html?appid=591936d39af4410f94e8a69a0a42cf53#>

- Screenshot shows seagrasses in northern parts of Tampa Bay from 1988 and 2014
 - Should be updated sometime soon with 2018 data
- Will help understand if seagrasses should be growing along or near the owner's shoreline
- <http://swfwmd.maps.arcgis.com/apps/StorytellingSwipe/index.html?appid=90c22bc49561431bbf1eb4e2ae7f1796>
- http://www21.swfwmd.state.fl.us/maps/pages/viewer_general.html

Maintenance

- Pre-project - Identification of potential issues
 - Exotic species encroachment
 - Mangrove windowing
 - Additional materials needed
- Follow-up instructions for homeowners
 - Post storm inspections
 - Quarterly photos to show changes



Photo Credit: G. Raulerson, TBEP

Monitoring should occur so that maintenance needs are identified and addressed

It is important to establish a maintenance plan with the client prior to installing the living shoreline. Maintenance plans can help you to create and build new partnerships with additional firms if needed.

Again, revisit the goals of the project. What made the client approach you in the first place?

During initial assessment and planning stages, think about how project will mature.

What are foreseeable issues that should be discussed? Eg:

Exotic species encroachment:

If the client is interested in maintaining a 'natural Florida' feel, then exotics maintenance might be necessary, and this could be another opportunity for partnering with an environmental company

Additional materials needed:

Clients may decide they need more of a particular component, or additional plants to enhance look of shoreline – always encourage natives.

Follow up instructions:

Post storm inspections and quarterly photos provide opportunities to enhance work and build new clientele.

Create some type of maintenance plan (eg I have one for my air conditioner, built into price of system)

Maintenance

- Additional materials (practical or aesthetic)
- Vegetation or oyster enhancement
 - Mangrove windowing (Certified arborist advisable)
 - New vegetation installation
 - Soft sediments



Photo Credit: G. Raulerson, TBEP

- Clients may decide they need more of a particular component
 - For example, additional oyster bags or modules
 - Occasionally there can be issues that need to be addressed
- Additional plants to enhance look of shoreline – always encourage natives
 - Nursery list provided
- Recognize being in a sub-tropical environment
 - And mangroves marching north because of climate change
 - Mangroves will grow in most intertidal saltwater areas around Tampa Bay
 - Some counties are responsible (Hillsborough, Pinellas, and Sarasota), or state can have jurisdiction
- <https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/mangroves>

Maintenance

- Long-term maintenance plan
- Exotic species encroachment
- *FLEPPC website:*
<https://www.fleppc.org/index.cfm>



Photo Credit: G. Raulerson, TBEP

- Florida is home to hundreds of invasive plant species
- Covering thousands of acres
- Pictured: Brazilian pepper & Melaleuca in Manatee County (Crosley Mansion, ca. 2003)
- If the client is interested in maintaining a 'natural Florida' feel, then exotics maintenance MIGHT be necessary
- Another opportunity for partnering with an environmental company

Wrap-up: Monitoring & Maintenance

- Opportunities that can provide additional income
- Monitoring and maintenance services
- Evaluate and maintain the living shoreline



Photo Credit: G. Raulerson, TBEP

Photo: where, what did you do, why, and how is it doing?

- Salt Creek, St. Augustine, FL, at Yacht Club
- Area was seeing erosion
- Wanted to limit water access by kayaks and hobie cats to one area and improve natural shoreline
- Oyster bags line launch area, loose shell in rest of location(?) (<1 ac)
- St. Augustine Yacht Club, Volunteers, City of St. Augustine, GTM Reserve (Guana Tolomato Matanzas National Estuarine Research Reserve, <http://gtmnerr.org/>)
- Monitoring plan using standardized oyster monitoring protocols
- This module discussed:
 - Options for extra services that may add value to a project
 - Information regarding evaluation and maintenance of the success of their living shoreline investment
 - Potential for future projects that can create new work (e.g. neighbors)

Wrap-Up

Review

- Selling Points: Structural, Ecological, Aesthetic, Resilience, Maintenance, Cost Comparison, Confident answers to client concerns
- Feasibility: Site assessment factors, Desktop resources, Site design options from green to gray, Permits needed
- Implementation: Techniques for planting vegetation (high marsh, mid marsh, and low marsh) and installing breakwaters, Materials and equipment suppliers
- Maintenance: Evaluation of project success, Monitoring, Maintenance as a business opportunity

Selling Points

LIVING SHORELINES SUPPORT RESILIENT COMMUNITIES

Living shorelines use plants or other natural elements—sometimes in combination with harder shoreline structures—to stabilize estuarine coasts, bays, and tributaries.

- One square mile of salt marsh stores the carbon equivalent of 75,000 gal of gas annually.**
- Wetlands trap sediments from tidal waters, allowing them to grow in elevation as sea level rises.**
- Living shorelines improve water quality, provide habitat, increase biodiversity, and promote recreation.**
- Marshes and riparian wetlands act as natural barriers to waves. 18 ft of marsh can absorb 30% of incoming wave energy.**
- Living shorelines are more resilient against storms than bulkheads.**
- 23% of shorelines in the U.S. will be hardened by 2100, decreasing fisheries habitat and biodiversity.**
- Hard shoreline structures like bulkheads prevent natural marsh migration and may create seaward erosion.**

The National Centers for Coastal Ocean Science | coastalscience.noaa.gov

Category	Installation	Lifespan	Cost (\$/ft)*			
			Atlantic and Gulf Coasts		Florida	
			Installation	Maintenance	Installation	Maintenance
Green	Planting	Indefinite	\$45-\$225	10%	\$15-\$45	10%
	Oyster bags	Indefinite	\$45-\$90	10%	\$30-\$40	10%
	Living shoreline	Indefinite	\$120-\$700	10-20%	\$75-\$500	10-20%
Hard	Revetment/rip rap	20+ years	\$500-\$1500	50-100%	\$465-\$1400	50-100%
	Breakwater	20+ years	\$200-\$1000	50-100%	\$200-\$900	20-100%
	Bulkhead	20+ years	\$265-\$1022	50-100%	\$240-\$800	50-100%
	Retaining wall	20+ years	\$1000-\$3370	50-100%	\$1200-\$2775	50-100%



Gittman et al. 2014, Ocean & Coastal Management

Feasibility

Shoreline Site Assessment

Address _____ Time _____ Date _____
 Contact Person _____ Phone No. _____

SITE CONDITIONS

Notes from Desktop Analysis _____

Erosion: None Light Moderate Severe
 Source of erosion (upland runoff, storm events or major disturbances, undercutting, seaweired induced)

Existing shoreline structures and shoreline type (e.g. seawall, bulkhead, rubble, vegetation, dikes, dock, kayak access, etc.) _____

Wind exposure (approximate distance and direction that shoreline faces)
 Prevailing winds at time of assessment _____
 Energy intensity Low Medium High
 Nearshore (ft in off shoreline) water depth _____

Tidal fluctuation _____ Tide at time of assessment _____

Boating activity
 None or paddlecraft only
 Minimal (occasional small, indigeined watercraft)
 Moderate (regular traffic, small and large motorized watercraft)
 Heavy (regular traffic including yachts, commercial vessels, tug, barges)

Proximity to navigational channel _____

HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

GREEN - SOFTER TECHNIQUES

GRAY - HARDER TECHNIQUES

Living Shorelines



VEGETATION ONLY - Provides a buffer to upland areas and breaks small waves. Suitable only for low wave energy environments.



EDGING - Added structure holds the toe of existing or vegetated slope in place.



SILLS - Parallel to existing or vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.



BREAKWATER - (vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



REVETMENT - Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with pre-existing hardened shoreline structures.



BULKHEAD - Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for areas highly vulnerable to storm surge and wave forces.

UF FLORIDA Extension

Streamlining Resiliency: Regulatory Considerations in Permitting Small-Scale Living Shorelines in Florida

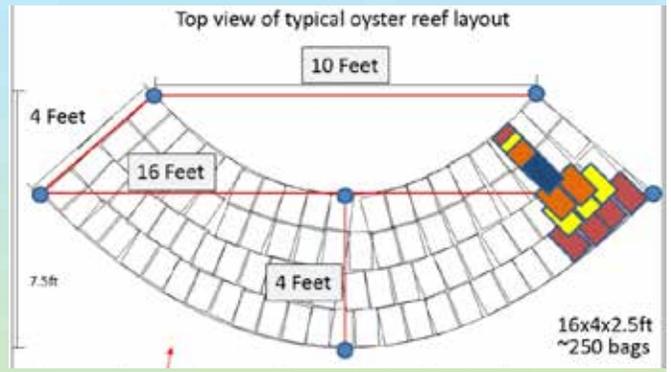
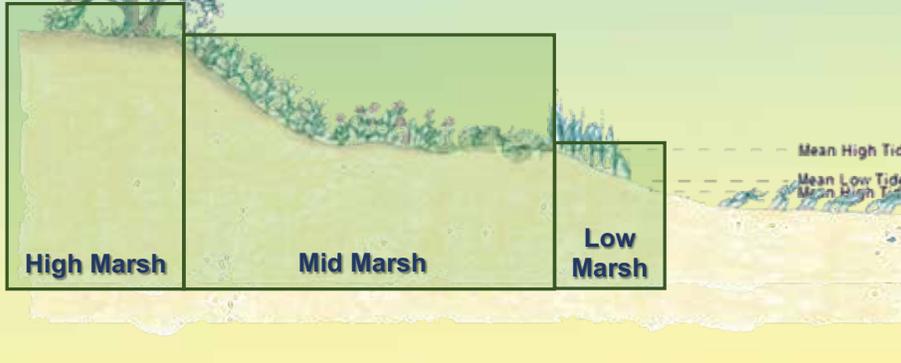
Thomas T. Anderson, Alexandra Benschel, and Valerie Christel

Introduction to Living Shorelines Permitting

"Living shoreline" is a catch-all phrase that describes a riparian area managed with restoration techniques that use natural material such as oyster and mangroves, and small grasses to stabilize the shore and protect erosion. Living shorelines offer a valuable and environmentally friendly alternative to traditional shoreline stabilization and erosion control structures (Hedrick, Mitchell, La Pierre, and Bell 2017). Techniques for managing living shorelines are being widely tested as "gray" or hard-line adaptations emerge from traditional shoreline hardening techniques, such as seawalls (Hedrick, et al. 2017). In addition to shoreline stabilization and erosion control protection, materials used for living shoreline projects also improve water quality by filtering runoff sediments (Lavelle, Gorman, Niekirk, Dyer, and Wilson 2011).

particularly when they are closely with walls and nearby individual structure projects various.

Implementation



Panhandle Materials Suppliers

Examples, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin, and Wakulla counties.

- | Plant Materials | Hardscape Materials |
|--|--|
| <p>Aspen Plants of Florida, Inc.
 8120 Kubler Court
 Sarasota, Florida 34243
 (941) 578-2700
 http://www.aspen.com
 info@aspen.com</p> <p>AKC Gardens/Plant Materials
 1111 E. Parkfield Drive
 Pensacola, Florida 32504
 (904) 469-5887
 Taylor Davis - Nursery Manager</p> <p>Earth Balance - Native Plant Nursery
 2575 Colonnade Pkwy
 North Fort, FL 32289
 (941) 636-1818
 info@earthbalance.com
 http://www.ebf.com</p> <p>Hutchinson Landscapes, Inc. 1528 Little
 North Road Savannah, Georgia 31219
 (912) 527-1545</p> <p>1&1 Tree Farm and Nursery
 (primarily a provider of cord oodgrass)
 7280 State Road 12 N
 Jacksonville, Florida 32286
 (904) 543-1786</p> | <p>ACC Materials (Hwy Florida Road)
 Phoenix (Limestone Quarries)
 5248 Vermont Road
 Marianna, Florida 32446
 (904) 763-4213</p> <p>Marine Driveway Center
 (Coral Bags and Recycled Stone)
 520 Bayshore Blvd
 Gulf Breeze Beach FL 32565
 (304) 428-8838</p> <p>Marlin Materials - Heavy Quarry
 (Hardscape Limestone Quarries)
 20500 N. Gulf Breeze Road
 Gulf Breeze, Florida 32562
 (904) 584-8411</p> <p>Best Construction, Inc.
 (Reef Ball Supplier)
 1128 Central Ave
 Sarasota, FL 34236
 (941) 550-0531</p> |

Follow-up



Moving forward...

- Before and After examples in the following slides.
- Contribute your own examples to <http://floridalivingshorelines.com/> as you build them.
- Contact fara.llami@myfwc.com with any questions.
- Reflect on your goals for attending this course.

September 2004

Before & After MacDill AFB



Phase 1 site – September 2007:
Stabilized site!



Before & After: MacDill AFB



Before & After
Naval Support Activity,
Panama City



2010



2011



2013

Before & After
River Camps on West
Bay, Bay County



Appendices

1. **Streamlining Resiliency: Regulatory Considerations in Permitting Small-Scale Living Shorelines in Florida**
2. **A Homeowner's Guide to the Living Shoreline Permit Exemption Part 1: Florida Department of Environmental Protection**
3. **A Homeowner's Guide to the Living Shoreline Permit Exemption Part 2: United States Army Corps of Engineers**

Streamlining Resiliency: Regulatory Considerations in Permitting Small-Scale Living Shorelines in Florida ¹

Thomas T. Ankersen, Alexandra Barshel, and Valerie Chesnut²

Introduction to Living Shorelines Permitting

“Living shoreline” is a catch-all phrase that describes a riparian area managed with restoration techniques that use natural material such as oyster reef, mangroves, and marsh grasses to stabilize the area and prevent erosion. Living shorelines offer a valuable and environmentally friendly means of stabilizing the shore while restoring and enhancing estuarine habitats (Bilkovic, Mitchell, La Peyre, and Toft 2017). Techniques for maintaining living shorelines are being widely touted as “greener” sea-level rise adaptation strategies than traditional shoreline hardening techniques, such as seawalls (Bilkovic et al. 2017). In addition to shoreline stabilization and estuarine habitat protection, materials used in living shoreline projects also improve water quality by filtering upland stormwater runoff (Gedan, Kirwan, Wolanski, Barbier, and Silliman 2011).

Living shorelines in Florida are typically constructed in the navigable waters of the United States, in state waters, and over sovereign submerged lands. Therefore, federal, state, and sometimes local agencies have regulatory authority over their construction (Pace 2017). Because living shorelines are considered to be beneficial to the environment, these agencies have undertaken coordinated efforts to reduce the regulatory burden required to construct them,

particularly when they are relatively small-scale and involve individual shoreline property owners.



Figure 1. Living shorelines use natural materials like salt marsh grasses to prevent coastal erosion. In just four years, the progress of a living shoreline project in Franklin County, FL is substantial.

Credits: Apalachicola National Estuarine Research Reserve

This publication outlines the various permit options available for constructing living shorelines while focusing on the new, small-scale living shorelines permit exemption.

1. This document is TP233, one of a series of the Florida Sea Grant College Program, UF/IFAS Extension. Original publication date April 2018. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
2. Thomas T. Ankersen, UF/IFAS Extension Florida Sea Grant legal specialist and UF Levin College of Law Conservation Clinic director; Alexandra Barshel, UF Law Conservation Clinic student associate; and Valerie Chesnut, UF Law Conservation Clinic student associate; UF/IFAS Extension, Gainesville, FL 32611.

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U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

Keep in mind that every shoreline is unique. Before proceeding with a project, it is highly recommended that individuals seeking to install a living shoreline contact a UF/IFAS Extension Florida Sea Grant agent to learn about the benefits of living shorelines and options suitable to the locale. UF/IFAS Extension Florida Sea Grant agents will also be able to make referrals about knowledgeable experts in shoreline management and regulations to assist in the construction and permitting process and to ensure that the project does not affect neighboring properties or any protected species and their habitat.

One of the first things to consider before planning a living shoreline project is whether or not it will occur on sovereign submerged lands, which are state owned. Although there are many instances where submerged lands are privately owned, most submerged lands adjacent to the shoreline are held by the state (Fla. Stat. § 253.12(1) 2017). In these cases, the property owner must first obtain sovereign submerged lands authorization from the Florida Department of Environmental Protection (DEP) before proceeding with a permit application. This authorization can come in the form of an exception, a lease, a letter of consent, or consent by rule (Fla. Admin. Code Ann. r. 18-21.005 2009). More detail on the sovereign submerged lands authorization is provided later in this publication.

Small-Scale Living Shorelines Permit Exemption

The DEP regulates the construction of living shorelines through Environmental Resource Permits, but it has created an exemption for qualifying small-scale projects (Fla. Admin. Code Ann. r. 62-330.051(12)(e), 2013). Many individually owned shorelines on public and private property are small enough to fall within the exemption of Ch. 62-330.051(12)(e) of the Florida Administrative Code (Florida Living Shorelines 2017).

To qualify for an exemption, the living shoreline project must meet several criteria and accompanying stipulations (Figure 1).

- The project must be 500 linear feet or less.
- The project must be located no farther than 10 feet waterward of the mean high water line. (Note: When a breakwater is used, this refers to the inner toe of the breakwater.)
- Plantings must be native wetland plants appropriate for the site and must be obtained from commercially grown stock.

- The living shoreline project must also include plans to remove invasive plants and deploy a turbidity curtain to control silt and sediment.
- Qualifying projects may not involve depositing fill materials in surface waters or wetlands (Fla. Stat. § 373.403(14) 2017) unless necessary for a breakwater (Fla. Admin. Code Ann. r. 62-330.051(12)(e) 2013).
- A breakwater may be used if permanent wave attenuation is necessary to maintain the shoreline vegetation (Fla. Admin. Code Ann. r. 62-330.051(12)(e) 2013). If the project requires a breakwater, the inner toe of the breakwater must extend no more than 10 feet waterward of the mean high water line, and it must not be taller than the mean high tideline. Any such breakwater must be composed predominantly of natural oyster shell (in mesh bags having openings of no more than 3 inches, or securely fixed matting) or other stable, non-degradable material. Breakwaters must not be placed within three feet of any submerged grass or emergent marsh vegetation and must have gaps at least 3 feet wide located at least every 20 feet along the breakwater so as to not substantially impede the flow of water (Fla. Admin. Code Ann. r. 62-330.051(12)(e) 2013). (Note: A proposed rule revision to require gaps to be at least 5 feet wide is in process.)



Figure 2. To qualify for a small-scale living shorelines permit exemption, the project must include plans to deploy a turbidity curtain to control silt and sediment.

Credits: Rick O'Connor, Florida Sea Grant

According to DEP (2017a), projects that meet these criteria fall below permitting thresholds and do not cause significant individual or cumulative impacts; therefore these projects would qualify for an exemption. If the project qualifies for the exemption, the shoreline owner should pursue the verification of exemption through DEP's website: <https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/forms/request-verification-exemption>, in order to ensure that it is also

“green-lighted” by the US Army Corps of Engineers (“the Corps”), discussed below.

If the project does not qualify for an exemption, 62-330 of the Florida Administrative Code provides for those common minor projects that qualify for a general permit. However, there is no specific general permit for the installation of a living shoreline (Florida Department of Environmental Protection 2017b). If the project does not qualify for a general permit, it will likely require a more comprehensive review to receive an individual Environmental Resource Permit.

State of Florida Sovereign Submerged Lands Authorization

As stated earlier, even if a living shoreline project is exempt from permitting, its construction will likely occur on state-owned submerged lands and will need sovereign submerged lands authorization (Fla. Stat. § 253.12(1) 2017).

The state of Florida holds title to sovereign submerged lands under Chapter 253, F.S., and 18-21, FAC (Fla. Admin. Code Ann. r. 62-330.051 2013). In this case, the state is operating in a proprietary capacity, rather than a regulatory capacity. The governor and cabinet, sitting as the board of trustees of the Internal Improvement Trust Fund, own sovereign submerged lands in trust for the use and benefit of the people of the state pursuant to the state constitution (Fla. Stat. § 253.001 2017; Fla. Const. art. X, § 11).

The DEP performs the major functions related to the management of submerged lands for the board of trustees (2017; Fla. Admin. Code Ann. r. 18-21.002 2009). The board has delegated some but not all the authority to authorize use of sovereign submerged lands to DEP. Authorization to use these lands can come in the form of an exception, a lease, a letter of consent, or consent by rule (Fla. Admin. Code Ann. r. 18-21.005, 2009). Unless the submerged land is owned by a public or private non-state entity (which is rare), a living shoreline project will need sovereign submerged lands authorization, regardless of whether the activity is exempt from DEP permitting.

Unlike the DEP regulatory exemption, there is no exemption for living shorelines in the rule governing submerged lands authorizations, and there is nothing to suggest that they would be given authorization under the consent by rule provision (Fla. Admin. Code Ann. r. 18-21.005 2009; Fla. Stat. § 403.813 2017). Instead, it would appear that living shorelines require a letter of consent, based on two applicable activities set forth in the rule. Rule 18-21.005(1)

(c)15., FAC, requires a letter of consent for “[h]abitat restoration, enhancement or permitted mitigation activities without permanent preemption by structures or exclusion of the general public...” This seems to apply to living shorelines that do not contemplate an oyster breakwater—arguably a permanently preemptive structure. If an oyster breakwater is included, then the applicant would also need to consider 18-21.005(1)(c)6., FAC, which allows for authorization by letter of consent for “[p]lacement, replacement, or repair of riprap, groins, breakwaters... no more than 10 feet waterward of the line of mean or ordinary high water.”

US Army Corps of Engineers Options for Small-Scale Living Shorelines Permitting

The Corps currently has four regulatory mechanisms in place to streamline permitting for living shorelines: State Programmatic General Permit V, and nationwide permits 13, 27, and 54. Two of these—nationwide permits 13 and 27—encompass a broader spectrum of activities that living shorelines fall within: bank stabilization and habitat restoration, respectively. Nationwide permit 54 was recently enacted by the Corps specifically for small-scale living shorelines. However, for those living shorelines that have been verified as exempt by DEP, SPGP V, discussed below, allows DEP to “green light” the project, obviating any Corps review.

Department of the Army Permit State Programmatic General Permit (SPGP V)

State Programmatic General Permits, or SPGPs, are general permits designed to avoid the inefficient duplication of permitting between the Corps and state regulatory programs (US Army Corps of Engineers 2017a).

The Corps has adopted State Programmatic General Permit V, a fast-track approach that allows a spectrum of activities that are exempt under the state of Florida’s rules to receive little or no further review. This permit specifically includes state-exempted living shorelines. Therefore, a project that qualifies for a small-scale living shorelines permit exemption in Florida would also qualify under SPGP V. In this case, the shoreline owner would not need to pursue the other nationwide permits.

SPGP V avoids duplication of effort between the Corps and the DEP for a variety of minor projects located in Florida

Breakwater & Planting Stipulations

A **breakwater** may be used if permanent wave attenuation is necessary to maintain the shoreline vegetation and:

- The inner toe must extend no more than 10 feet waterward of the mean high water line and must not be taller than the mean high water line.

- Must be composed predominantly of natural oyster shell (in mesh bags having openings of no more than 3 inches, or securely fixed matting) or other stable, non-degradable material.

- Must not be placed within 3 feet of any submerged grass or emergent marsh vegetation

- Must have gaps at least 3 feet wide located at least every 20 feet along the breakwater so as to not substantially impede the flow of water. (Note: rule revision to require 5-foot gaps is underway.)

Plantings must be native wetland plants appropriate for the site and obtained from commercially grown stock.

Does Your Project Qualify for a Small-Scale Living Shorelines Permit Exemption?

and associated federal approval

Fla. Admin. Code Ann. r. 62-330.051(12)(e).

April 2018

Note:

Every shoreline is unique. This graphic only provides a conceptual path to the small-scale living shorelines permit exemption and does not confer legal or professional advice. Before proceeding, individuals seeking to install a living shoreline should first consult with an expert knowledgeable in shoreline management and regulations.

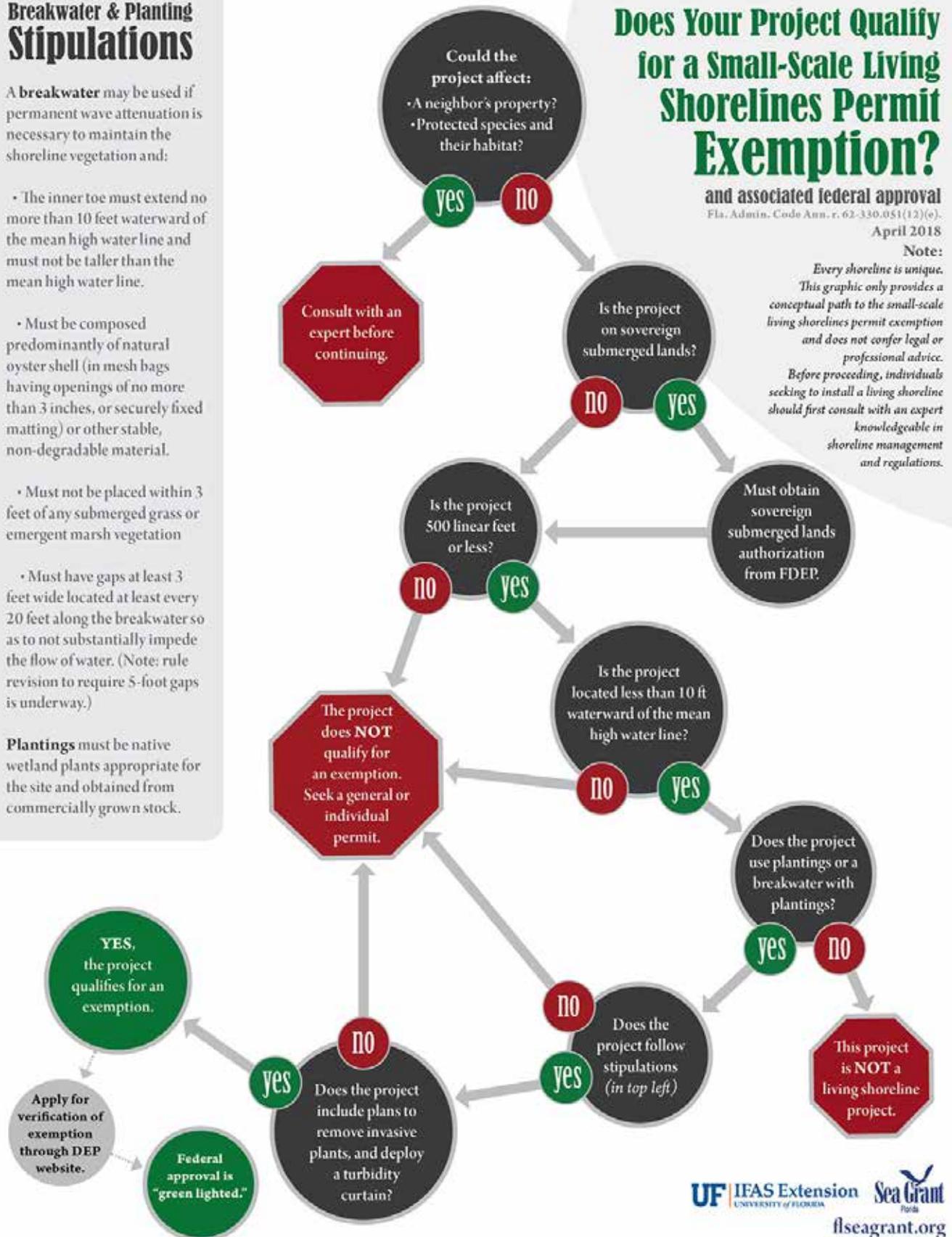


Figure 3. A conceptual path to small-scale living shorelines permit exemptions in Florida. Credit: Florida Sea Grant

that are also located in US waters (Florida Department of Environmental Protection 2017c; Fla. Stat. § 373.4144(2) 2017). The permit reduces the need for separate approval from the Corps for the approved project types. Approved project types include shoreline stabilization, specifically including living shorelines exempted under 62-330(12)(e), FAC (US Army Corps of Engineers 2016).

Eligible permit applications are submitted directly to the DEP, which is authorized to employ a “stoplight approach” to processing. Instead of immediately forwarding a copy of the applications to the Corps, DEP will review the project and give it a ranking. Projects ranked as green will be processed by DEP and will not be forwarded to the Corps. Projects ranked as yellow will be forwarded to the Corps, and the Corps must reply whether they wish to treat these projects as red, yellow, or green with the addition of special conditions. Finally, projects ranked as red will be reviewed by the Corps and DEP separately (US Army Corps of Engineers 2016). Projects are likely to receive a ranking of yellow or red if any adverse impacts to the environment are suspected (US Army Corps of Engineers 2016).

Under SPGP V, the following stipulations have been placed on living shorelines (US Army Corps of Engineers, 2016):

- Only native plant species will be planted.
- Living shorelines must not be more than 500 linear feet in length.
- Living shorelines must not be more than 35 feet waterward of the high tide line (note that the DEP exemption requires living shoreline construction to remain within 10 feet of the mean high water line (Fla. Admin. Code Ann. r. 62-330.051(12)(e) 2013)) or result in more than a half-acre area between the natural shoreline and the breakwater structure.
- No discharge of earthen fill material, other than earthen material associated with vegetative planting, is allowed.
- Construction, maintenance, and removal of approved permanent, shore-parallel wave attenuation structures are authorized. Approved permanent wave attenuation materials include oyster breakwaters, clean limestone boulders, and prefabricated structures made of concrete rebar that are designed in a manner that cannot trap sea turtles, smalltooth sawfish, or sturgeon. Reef balls that are not open on the bottom, triangle structures with a top opening of at least 3 feet between structures, and reef discs stacked on a pile may be used.
- For oyster breakwaters:

- Reef materials shall be placed in a manner to ensure that materials (e.g., bagged oyster shell, oyster mats, loose cultch surrounded and contained by a stabilizing feature, reef balls, and reef cradles) will remain stable and prevent movement of materials to surrounding areas.
- Materials must be placed in designated locations (i.e., shall not be indiscriminately/randomly dumped) and shall not be placed outside of the total project limits.

The SPGP V remains valid for five years from the date of issuance unless suspended or revoked by issuance of a public notice by the district engineer (US Army Corps of Engineers 2016). The Corps, in conjunction with other federal resource agencies, will conduct periodic reviews to ensure that continuation of the permit during the five-year period is not contrary to the public interest. If revocation occurs, all future applications for activities covered by the SPGP V must be evaluated by the Corps (US Army Corps of Engineers 2016).

Reevaluations of permits may occur at any time the circumstances warrant it (US Army Corps of Engineers 2016). Circumstances that could require a reevaluation include, but are not limited to:

- a. The Applicant fails to comply with the terms and conditions of the permit.
- b. The information provided to obtain the permit proves to have been false, incomplete, or inaccurate.
- c. Significant new information surfaces that this office did not consider in reaching the original public interest decision (US Army Corps of Engineers 2016).

The time limit for completing the work authorized by the SPGP V ends on July 26, 2021 (US Army Corps of Engineers 2016).

Letter of Permission

In instances where a living shoreline activity does not fall within the state exemption, and hence SPGP V may not be applicable, the Corps has created a simplified individual permit process for certain listed activities through letters of permission (33 C.F.R. § 325.2(e)(1)). Among the categories to which the letter applies in Florida and which may apply to living shorelines are “erosion control activities not to exceed 0.2 acre of fill” (Jacksonville District Corps of Engineers 1996).

Nationwide Permits

Nationwide permits, or NWP, are federal permits that apply uniformly to certain classes of activities in jurisdictional waters and wetlands throughout the country (US Army Corps of Engineers 2017a,b). The Corps issues NWPs to activities that occur in the navigable waters of the United States under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act of 1899 (US Army Corps of Engineers 2017b). NWPs are only awarded to activities that result in no more than minimal individual and cumulative adverse environmental effects and are intended to limit the amount and delay of paperwork (US Army Corps of Engineers 2017b;). There are now 54 NWPs (US Army Corps of Engineers 2017b). Three of these are especially relevant to the construction of a living shoreline: NWP 13, NWP 27, and, most recently, NWP 54.

NWP 13—Bank Stabilization

NWP 13 authorizes relatively minor activities designed to shore up eroding banks. It provides for multiple methods of bank stabilization to be used, including hard structural measures (such as bulkheads and revetments), vegetative options, and hybrid techniques that involve both hard materials and vegetation components (US Army Corps of Engineers 2017c). For example, a bank may be graded, plant materials may be installed to stabilize portions of the bank, and riprap may be placed at the bottom of the bank for toe protection. It is important to note that NWP 13 has always had the flexibility to authorize a variety of types of bank stabilization measures depending upon the environment (US Army Corps of Engineers 2017c).

NWP 27 Aquatic Habitat, Restoration, Establishment, and Enhancement Activities

NWP 27 includes activities associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas; the restoration and enhancement of non-tidal streams and other non-tidal open waters; and the rehabilitation or enhancement of tidal streams, tidal wetlands, and tidal open waters, provided those activities increase aquatic resource functions and services (US Army Corps of Engineers 2017d). Activities authorized by this NWP include but are not limited to the removal of accumulated sediments; the installation, removal, and maintenance of small water-control structures, dikes, and berms; and activities needed to reestablish vegetation, including plowing for seed bed preparation (US Army Corps of Engineers 2017e).



Figure 4. For living shorelines projects, oyster shell must be contained using mesh bags.

Credits: Laura Tiu, Florida Sea Grant

NWP 54—Living Shoreline

NWP 54 was made effective in March 2017 (US Army Corps of Engineers 2017f). NWP 54 complements NWPs 13 and 27 to provide general permit authorization for a living shoreline approach to bank stabilization. This NWP authorizes structures and work in navigable waters of the United States and discharges of dredge or fill material into waters of the United States for the construction and maintenance of living shorelines. The permit defines living shorelines as consisting mostly of native material and incorporating vegetation or other “soft” elements alone or in combination with “hard” shoreline structures such as oyster reefs (US Army Corps of Engineers 2017f). NWP 54 provides for limiting the placement of structures and fills to within 30 feet of the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. The project must be 500 feet long or shorter along the shore.

Conclusion

Living shorelines provide a viable and resilient approach to protecting upland properties while restoring and enhancing the ecologically valuable riparian zone along Florida’s coasts. Both state and federal agencies have worked to facilitate a streamlined process to increase the use of living shorelines, especially for small-scale projects carried out by individuals. Regardless of the size of the living shoreline, it is recommend to contact a UF/IFAS Extension Florida Sea Grant agent to learn about the benefits of living shorelines and options suitable to the locale. UF/IFAS Extension Florida Sea Grant agents will also be able to make referrals about knowledgeable experts in shoreline management and regulations to ensure that the project will not run into any permitting difficulties.

Additional Resources

Florida Master Naturalist Program Coastal Shoreline Restoration Course (http://masternaturalist.ifas.ufl.edu/docs/FMNP_Coastal_Shoreline_Restoration_Flier.pdf)

Florida Living Shorelines (<http://floridalivingshorelines.com/>)

NOAA Fisheries Living Shorelines (<https://www.fisheries.noaa.gov/insight/living-shorelines>)

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A Homeowner's Guide to the Living Shoreline Permit Exemption Part 1: Florida Department of Environmental Protection¹

Savanna Barry, Sara Martin, and Eric Sparks²

Background

“Living shoreline” is a catch-all phrase that describes a riparian area managed with restoration techniques that use natural material such as oyster reef, mangroves, and marsh grasses to stabilize the area, prevent erosion, and protect property. The construction or placement of materials typically occurs within state waters, which includes public lands located waterward of the mean high-water line. Therefore, the Florida Department of Environmental Protection (DEP), among other entities, regulates the placement of living shorelines through a permitting and submerged-land-authorization process. This process ensures that project activities do not conflict with the public interest, defines actions that must be taken when a project is expected to have negative impacts, and grants permission for the project to be constructed on state-owned submerged lands.

In the interest of streamlining the approval process for environmentally beneficial projects such as living shorelines, the DEP has defined an exemption for small-scale living shoreline projects that meet certain criteria (see more on exemption criteria: <http://edis.ifas.ufl.edu/sg155>). A permit exemption allows qualified projects to move ahead without a permit, greatly simplifying the process for homeowners.



If you are a homeowner who is considering installing a living shoreline on your property and you believe your project is exempt, this guide will assist you in submitting a complete Request for Verification of Exemption form to DEP. If approved, this request will result in an official Verification of Exemption and State Land Authorization letter from DEP.

While not required, filling out the form and obtaining the Verification of Exemption is highly encouraged because it will help you ensure that you are meeting regulatory requirements. It will help you avoid penalties and fines and obtain a Submerged Lands Authorization from DEP. Remember, DEP staff at your regional regulatory office are willing to meet with you or talk with you over the phone

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2. Savanna Barry, F IFAS Extension Florida Sea Grant Agent with the UF IFAS Nature Coast Biological Station; Sara Martin, Mississippi State University Extension Coastal Research and Extension Center; and Eric Sparks, Mississippi State University Extension Coastal Research and Extension Center; UF/IFAS Extension, Gainesville, FL 32611.

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U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

about your project. DEP highly encourages you to schedule a “pre-application” meeting before you submit any documents, especially if you are new to the process.

If you elect to proceed with your project without an official Verification of Exemption letter, you will still need to request a Submerged Lands Authorization from your regional DEP regulatory office (see: <https://floridadep.gov/districts>). You will also need to contact the US Army Corps of Engineers (also known as the Corps) office in your region (see Part 2 of this guide).

While this process may appear daunting, requesting a Verification of Exemption from DEP is actually straightforward. You probably already have all of the required information at your fingertips. As a regulatory agency, DEP’s goal is to ensure your project follows the rules for exemption. It is necessary to provide enough detail so DEP staff can assess compliance, but lengthy explanations are not required.

What This Guide Covers

For each application section, the guide provides example text that you can adapt to your needs. The example text covers all of the bases but is still no longer than one paragraph for each section. You may hand-draw site drawings or produce them using widely available software that you probably already have on your computer. As long as you have all the information and drawings handy, completing and submitting the form should take roughly 30 minutes.

You have two main options for completing the DEP Request for Verification of Exemption form: online submission through the DEP Business Portal or submission of the PDF form by mail or email. The first section of this guide covers submission through the Business Portal. The second section covers submission using the PDF form. Both methods require the same information and a processing payment of \$100, but the former method integrates all of the steps and may be more convenient to use.

The glossary provides definitions for several key terms you will need to understand when preparing your application.

How to Use This Guide

Steps to complete the Verification of Exemption Request form are presented below. Each step includes explanatory text followed by a screenshot that illustrates the important points for each step. Pick which method you will use to submit the exemption request, either Method 1—Online Portal or Method 2—PDF form, and jump to that section to get started.

After You Submit

Approval of the Verification of Exemption Request typically takes about 30 days. Your DEP regulatory office will notify you during the review process of additional information and/or permitting requirements that may be needed. Currently, many projects that are exempt under DEP’s rules may also be exempt under the US Army Corps of Engineers (Corps) rules. However, if your project has certain features—such as extending past neighboring shorelines or occurring within essential habitat for an endangered species—it may also require approval from the Corps. If you are notified by DEP that you need Corps approval, see Part 2 of this guide for help preparing a permit application for the Corps. Both the DEP and the Corps applications require very similar information, so do not be daunted by this extra step. There is no fee to submit a permit application to the Corps, and the waiting period for approval is typically 60 days. The benefits of installing a living shoreline along your property are worth the initial investment.

Method 1— Online Portal

Step 1: Navigate to www.fldepportal.com/go and create an account. Once you have confirmed your email address, return to the portal home page and click “Apply”.



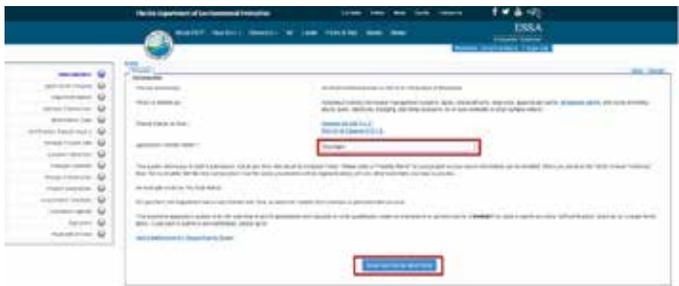
Step 2: On the next page, click “Build”.



Step 3: Then, select “Request Verification of ERP Exemption.” The abbreviation “ERP” stands for Environmental Resource Permitting.



Step 4: Give your project a name and click “Save and Go to Next Step” to advance.



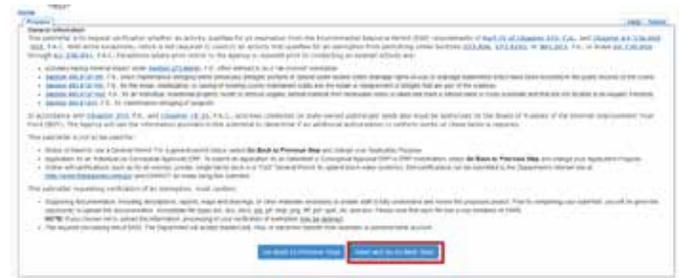
Step 5: Select the option for “Request Verification for Exemption from Permitting.”



Step 6: The next page shows an important notice regarding federal permits that may be required. If your project does not fit the requirements for a streamlined permitting exemption, you will need to submit an application to the Corps (covered in Part 2 of this guide). You will be notified during the review process by the state permitting authority (DEP) if this is the case. This is explained more fully at <http://edis.ifas.ufl.edu/sg155>.



Step 7: The next page is a notice that you are applying for the Verification of Exemption and lists the acceptable file types for your supporting documentation (doc, docx, jpg, gif, bmp, png, tiff, pdf, spdf, xls, and xlsx). It also lists the processing fee of \$100.00.



Step 8: On the next page, click the check box next to “Shoreline stabilization.”



Step 9: Select the check box next to “Naturalized shoreline restoration.” If your project includes addition or improvement of riprap or a seawall, you must also check the boxes pertaining to those. However, this guide addresses living shoreline projects that do *not* include these elements. Additional steps and fees may be required if seawalls and/or riprap revetments are included.



Step 10: The next page requires you to enter your street name (do not include street number), zip code, and city in order to determine whether your project site is already in the system. Enter this information and click the “Search and Continue” button. If you have never applied for a permit with DEP before, then it is likely that your site will not be in the system. However, it is possible that a previous homeowner or contractor has applied in the past.



Step 11: If your site (home) is in the database already, select the property by clicking the radio button next to it and advance to Step 12 by clicking “Continue.”



If your site (home) is not in the database already, you will need to click the “Add New Facility” button and follow the prompts.



Enter your address and indicate whether or not it is a mailing address. Step 12: On the next page, confirm that all information about your site has been provided (look for a green check mark icon under the “Status” column). If more information is needed, then click the pencil icon and provide missing information. Once status is green, click “Done with All Facilities” to continue.



Step 12: On the next page, confirm that all information about your site has been provided (look for a green check mark icon under the “Status” column). If more information is needed, then click the pencil icon and provide missing information. Once status is green, click “Done with All Facilities” to continue.



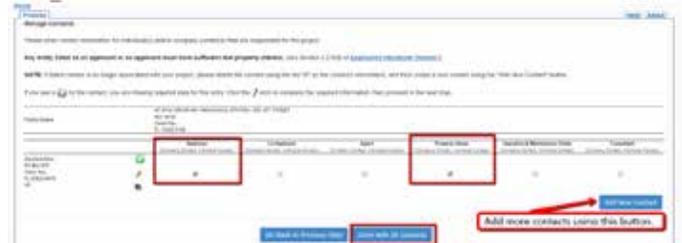
Step 13: The next page will load a mapping tool where you will be asked to select the approximate center of your project. Use the tool to navigate to your site (home), hover the cursor over where you will install the living shoreline, and click. A green box should appear where you clicked, and a blue highlighting should appear around your parcel. Click “Continue.”



Step 14: The same mapping tool will load again, and you should confirm that the correct location is highlighted with an orange box and the words “My Location.” If everything is correct, click “Continue.” Click “Start Over” to go back to the first mapping screen and try again.



Step 15: On the next screen, you will be able to add contacts for the project. This includes any co-applicants, authorized agents, or contractors, etc. At a minimum, there must be one contact listed who is both the applicant and the property owner, which is likely to be your situation. But if you are working with a contractor or other organization, such as a non-profit or homeowner’s association, you may need/want to list them here. To add a contact, click “Add New Contact” and follow the prompts. When you are done adding contacts, click “Done with All Contacts” to continue.



Step 16: To complete this step, you will need to know your tax parcel identification number. You can find your tax parcel ID number by looking at your most recent tax bill, visiting your tax collector’s webpage, or by contacting your local tax assessor’s office. If you choose to input dates, be sure to allow time for permit approval (generally, at least

30 days for DEP approval, and up to 60 days for US Army Corps of Engineers approval).



Step 17: In this step, you can choose to enter your descriptive text directly in the box, upload a separate document, or both. See below for some example descriptions of three different project types: planting only, breakwater/sill only, and breakwater/sill with planting. Feel free to adapt the example text below for your own use. See the glossary at the end of this document for definitions of important terms.

NOTE: *The figures given in the text below are only examples. You should consult with a local expert to determine the appropriate plant species, oyster reef heights, and materials to use in your project. Useful resources can be found at www.floridalivingshorelines.com, www.flseagrant.org, or your local UF/IFAS Extension office.*

Example Text

PLANTINGS ONLY

I plan to install native marsh vegetation along the shoreline of my backyard (100 linear feet). My property, located in Nature Bay, FL, has been experiencing erosion over the past few years, likely because of seawalls on either side of my property. In order to slow and reverse this erosion, I will obtain smooth cord grass (*Spartina alterniflora*) from a local nursery and plant it in the intertidal zone along the shoreline. I will plant clumps of plants on 2-foot centers along a 10-foot-wide section of shoreline (5 rows of plants that will extend no more than 10 feet waterward of the mean high-water line). Planting will occur at low tide over the course of 2 to 3 days. Plants will be monitored for survival, and any plants that die within the first three months may be replaced with fresh specimens (also obtained from a nursery). There is currently no submerged aquatic vegetation in the project vicinity.

BREAKWATER/SILL ONLY

I plan to install an oyster reef breakwater in front of my property (90 linear feet) in Nature Bay, Florida, to protect my shoreline from further erosion. The erosion is likely being caused by seawalls on either side of my property. I will deploy clean oyster shell from Nature Bay Shell Recycling

contained within heavy-duty plastic mesh bags or metal gabion cages (approx. 4 to 5 gal. of shell per bag/gabion). The bags will be deployed in the intertidal zone with the waterward toe of the bags occurring no more than 10 feet seaward of the mean high-water line. Bags will be stacked on top of each other in alternating orientations in order to achieve a height of 2 feet, allowing the bags to reach the ideal zone for oyster recruitment and growth. Bags/gabions will be deployed at low tide over the course of 1 to 2 weeks and will be secured in place using rebar stakes. There will be one 6-foot gap in the center of the oyster reef breakwater. There is currently no submerged aquatic vegetation in the project vicinity.

BREAKWATER/SILL AND PLANTINGS

I plan to install a concrete dome breakwater in front of my property in Nature Bay, Florida, to protect my shoreline (300 linear feet) from further erosion. The erosion is likely being caused by seawalls on either side of my property. Domes will be deployed by professional contractors in the intertidal zone with the waterward toe of the concrete domes occurring no more than 10 feet seaward of the mean high-water line. Domes will be approximately 1.5 feet tall, placing a high percentage of the surface area within the ideal zone for oyster recruitment and growth. Domes will be deployed continuously regardless of tidal stage using hand-carry/float methods over the course of 1 week. There will be four, 70-foot-long breakwaters with 5-foot gaps in between each. After installation of the domes, the shoreline behind the breakwater will be planted with native vegetation to further reduce erosion and increase habitat value. I will obtain smooth cord grass (*Spartina alterniflora*) from a local nursery and plant clumps of plants on 2-foot centers behind the 10-foot wide section of shoreline protected by the breakwaters (5 rows of plants that will extend no more than 10 feet waterward of the mean high water line). Planting will occur at low tide over the course of 2 to 3 days. Plants will be monitored for survival, and any plants that die within the first three months may be replaced with fresh specimens (also obtained from a nursery). There is currently no submerged aquatic vegetation in the project vicinity.



Step 18: Select “Yes” in this step because the living shoreline project will occur within state waters if it is below mean high tide, which is almost always the case. You may have special conditions at your site that do not fit the norm, but in this this guide we will focus on the typical case. Usually, living shorelines are used to build new wetlands or restore wetlands that existed previously. Therefore, there are usually no negative impacts to wetlands, but we still must check “Yes” at this step.



Step 19: As in Step 17, you can choose to enter your descriptive text directly in the box, upload a separate document, or both. See below for some example descriptions of exemption compliance. Feel free to adapt the example text below for your own use, but keep in mind that you should consult with an expert for help choosing the best method for you.

Example Text PLANTINGS ONLY

This project aims to create/restore wetlands in order to benefit from the ecological functions. By installing native vegetation, this project will benefit the local ecosystem as well as my personal property. All exotic/invasive vegetation will be removed from the site prior to project activities, and the project will occur on a shoreline shorter than 500 linear feet. Plantings will extend no more than 10 feet seaward of the mean high-water line. No fill will be added other than soil imported with nursery grown transplants.

BREAKWATER/SILL ONLY

The breakwater will be constructed in the intertidal zone in water deeper than mangroves and marsh grass can survive. It will create substrate for oyster recruitment and will have an overall benefit on the local ecosystem. The breakwater will not encroach upon and will not be placed anywhere within 3 feet of any submerged or emergent vegetation. The coastal area behind my home is a sandflat that does not contain any seagrass meadows. The waterward toe of the breakwater will not be placed more than 10 feet seaward of the mean high-water line. We will use stable, natural materials (bagged oyster shell) to construct the breakwater, and the bags will be secured using rebar stakes. Shell will be contained in heavy duty mesh bags or metal gabion cages with 2.5-inch openings. Shell material will be sourced only from a trusted organization that has seasoned the shells outside in the sun for at least 6 months. Additionally, the two 47-foot-long breakwaters will have a 6-foot-wide gap

between them. Oyster shell bags/gabions will be deployed using hand-carry methods, and, thus, no equipment with the potential to damage the shoreline will be used. The project will occur on a shoreline shorter than 500 linear feet.

BREAKWATER/SILL AND PLANTINGS

This project aims to create/restore wetlands in order to benefit from the ecological functions. By installing native vegetation and oyster-recruitment substrate, this project will benefit the local ecosystem. All exotic/invasive vegetation will be removed from the site prior to project activities, and the project will occur on a shoreline shorter than 500 linear feet. Plantings will extend no more than 10 feet seaward of the mean high-water line, and the waterward toe of the breakwater will likewise extend no further than this line. No fill will be added other than soil imported with nursery-grown transplants. The breakwater will not encroach upon and will not be placed anywhere within 3 feet of any existing submerged or emergent native vegetation. The coastal area behind my home is a mudflat, and there are no seagrass meadows within 0.5 mile of my home. The breakwater will be constructed of stable materials (concrete domes) and will be secured using fiberglass stakes. Rows of domes will have 5-foot-wide gaps every 70 feet along the shoreline. Domes will be deployed using hand-carry and float methods by professional contractors, and, thus, no equipment with the potential to damage the shoreline will be used.



Step 20: As in steps 17 and 19, you can choose to enter your project description text directly in the box, upload a separate document, or both. See below for some example descriptions of sediment and erosion control. Feel free to adapt the example text below for your own use, but keep in mind that you should consult with an expert for help choosing the best method for you.

PLANTINGS ONLY

Plantings will occur at low tide and cease when the tide covers the work area. There will not be any sediment releases or turbidity associated with planting at low tide because resuspension of sediments will be impossible without water present. Sediments loosened by digging holes

for plants will be packed back into place immediately upon placing the plant in the hole.

BREAKWATER/SILL ONLY

The breakwater will be installed at low tide and all activity will cease when the tide covers the work area. There will not be any sediment releases or turbidity associated with deploying oyster bags/gabions at low tide because resuspension of sediments will be impossible without water present at the site. No heavy equipment or tools (other than a hammer to drive in rebar stakes) will be used in this project.

BREAKWATER/SILL AND PLANTINGS

Plantings will occur at low tide and cease when the tide covers the work area. There will not be any sediment releases or turbidity associated with planting at low tide because resuspension of sediments will be impossible without water present. Domes will be deployed using hand-carry and/or float methods, and very limited resuspension of sediments will occur with this method (walking across the site). No heavy equipment or tools (other than a hammer to drive in a narrow fiberglass rod) will be used in this project. The disturbance to sediments at the site will be minimal.



Step 21: As in previous steps, you can enter descriptive text directly in the box, upload a separate document, or both. In this step, you are asked to provide any additional information or justification that may apply to your project. *This step is not mandatory but may help your chances of swift approval if you are able to provide additional details that assure your compliance with the exemption.* For example, you might make the case that you understand the exemption well because you have been involved with living shorelines before; you have taken a class (such as the Florida Master Naturalist Program’s Coastal Shoreline Restoration module); or you have consulted with your local UF/IFAS Florida Sea Grant Extension agent. Add whatever information you may wish.



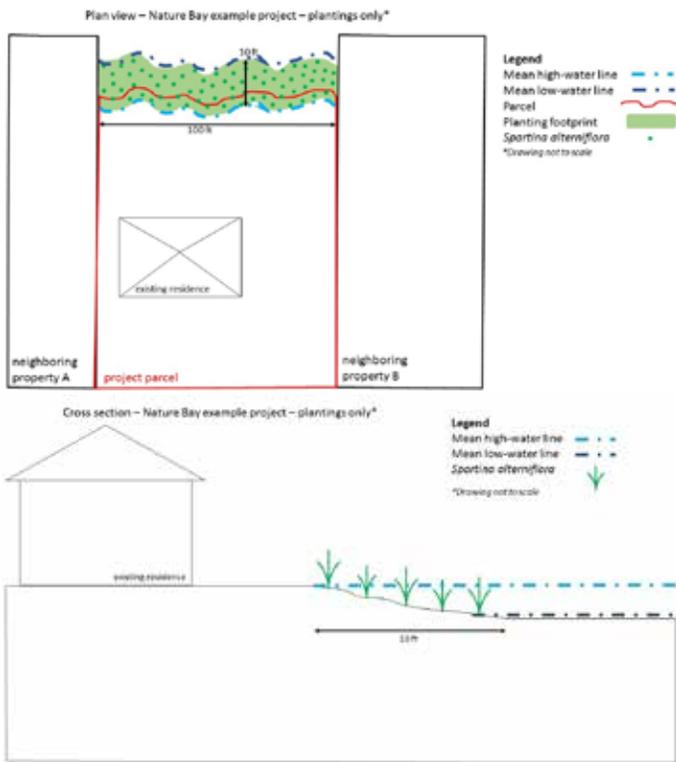
Step 22: In this step, you must indicate whether or not you will include attachments that provide additional details about your project. These attachments are required for approval of your exemption verification. If you elect not to upload your attachments electronically, you will need to email or mail the documents to the address provided on the screen (note that the email and mailing addresses for your area may be different than those in the screenshot). Uploading your documents to the DEP portal gives you the best chance of a shorter processing time.



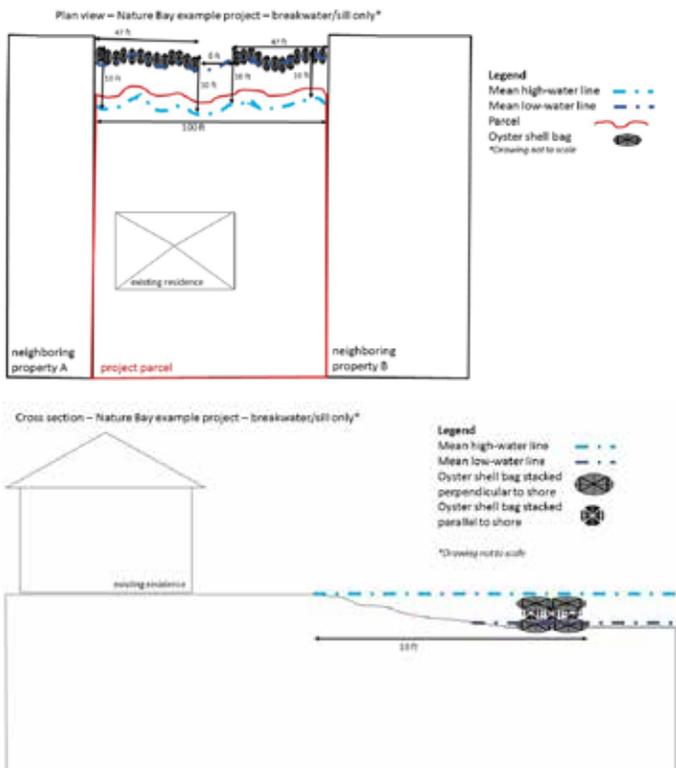
Step 23: You must provide, at a minimum, a detailed set of drawings that depict both a cross-section of the project and an overhead (plan) view. These drawings must show: 1) the location of the mean high-water line/ordinary high-water line and the mean low-water line (see glossary for definitions and tips for measuring); 2) the linear distance along the shoreline covered by the project; 3) the linear distance the project will extend into the water as measured from the mean high-water line/ordinary high-water line; 4) planned spots for placement of plants, breakwater elements (oyster bag, gabion, concrete dome), and gaps in breakwaters with linear distances and/or heights noted; 5) existing structures; and 6) any nearby habitats and the approximate locations of the shorelines of neighboring properties. You may produce these drawings yourself, either by hand or using simple shape illustrations available in computer programs such as Microsoft PowerPoint. Drawings need not be to scale, as long as this is noted on the drawing. It may be helpful to include extra photographs of the site to aid in your explanation. Of course, you always have the option of hiring a contractor that will provide the drawings as part of the contract, but this is typically not necessary for simple projects. To give you an idea of the level of detail required, see the example cross section and plan view drawings below. We have provided an example for each of the three

basic project types mentioned above: plantings only, breakwater/sill only, and breakwater/sill and plantings.

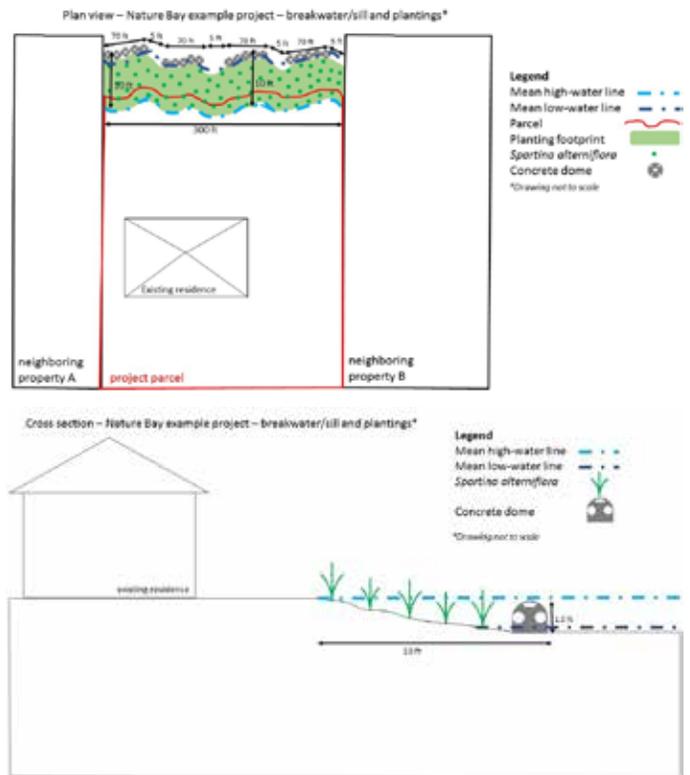
PLANTINGS ONLY



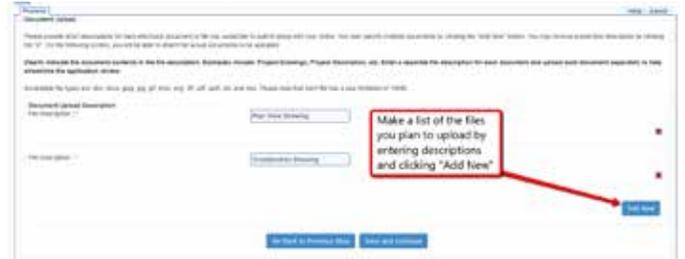
BREAKWATER/SILL ONLY



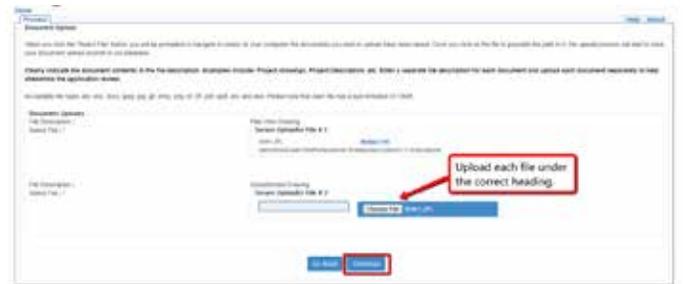
BREAKWATER/SILL AND PLANTINGS



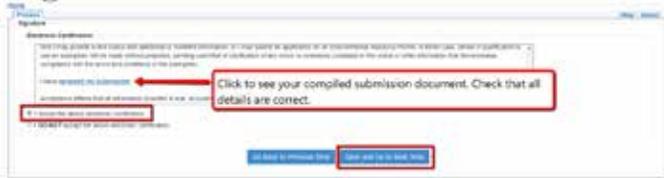
Upload as many files as are necessary to satisfy the requirements by adding a file description and clicking “Add New” for every file. At a minimum, you should list two documents: a plan-view drawing and cross-section drawing. You may add supporting information as needed or desired.



Step 24: You will see the list of files you made in the previous step with a “Choose File” button next to each one. Click the “Choose File” button under each heading and ensure you upload the correct file under each one. Double check your file choices and then click “Continue” if everything is correct.

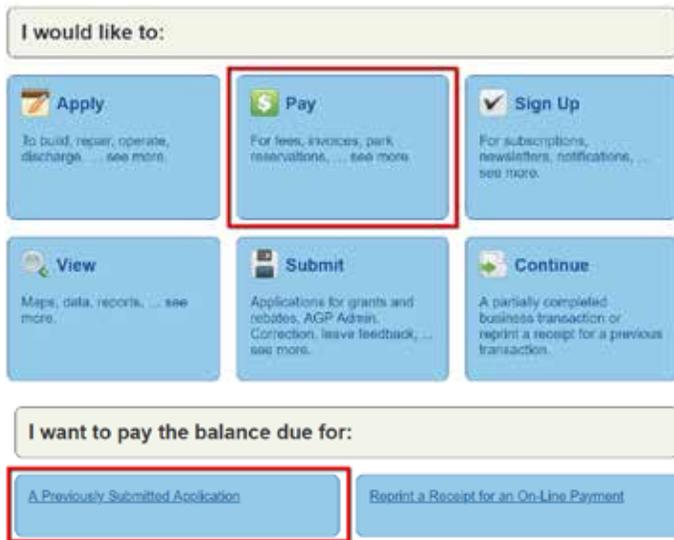


Step 25: Review your submission and accept the electronic certification of the details you provided. Scroll to the bottom of the window and click “I have **reviewed my submission**” to view the compiled application the system will generate. Check over all details and select the circle next to “I accept the electronic certification” if all details are correct. You will not be able to move to the next step until you click this button. *Your application will be final and will be submitted to DEP once you click “Save and Go to Next Step.”*



Step 26: You must pay the \$100.00 processing fee. You may be taken to the payment page directly or you may be asked to wait for a confirmation email from DEP. If you are taken directly to the payment page, complete the online payment and save your confirmation details for your records. You are now finished.

If you have to wait for a confirmation email, you will need to navigate back to the portal at <http://www.fldepportal.com/go/> and login when you receive it. You can then select “Pay,” then “Balances Due,” then “Previously Submitted Application.”



On the next screen, you will need the Application ID assigned to you in your confirmation email. Have your payment details handy. You can then follow the prompts to submit your payment online.



Method 2—PDF Form

The Request for Verification of an Exemption PDF form can be downloaded at https://floridadep.gov/sites/default/files/62-330_050_0.pdf. You can fill out this form electronically using Adobe Acrobat, or you may wish to print it and fill it out by hand. The steps below will guide you through each page of the form and are followed by an example of a filled-out form. Note: the example form below is an older version of the form, but the instructions refer to the new version of the form.

Pages 1 and 2: These pages outline the instructions and sections of the Florida Administrative Code that define where exemptions apply. If you are applying for a living shoreline project, then you should check the first box on page 2 and fill in the blanks to read “051(12e).” See example of Page 1 below.

Pages 2 and 3: On these pages, you will need to provide general information such as your contact information, information about your property (location, tax parcel ID, and GPS coordinates), and a description of the activity you are proposing. It is important that you are thorough and provide enough information for DEP to assess whether or not your activity is exempt. Incomplete information in any of the sections on this or other pages will result in delays. Some specific tips and points to consider for Pages 2 and 3:

- Your Tax Parcel ID Number can be located via several methods:
- Look for it on your most recent property tax bill
- Visit the website of your local tax assessor
- Call your local tax assessor’s office and request the information
- You can locate the coordinates for your property using free tools such as Google Earth or <https://www.latlong.net/>. *Important:* When entering coordinates for your project, make sure you provide them in the requested format (DMS = degrees, minutes, seconds). If the tool you use to locate the coordinates does not provide them in DMS format, then you can use a free online coordinate converter such as <http://www.earthpoint.us/Convert.aspx>.

- If you enter project start and end dates, then be sure to allow time for permit approval (generally, at least 30 days for DEP approval and up to 60 days for Corps approval).
- You may append as many extra sheets to the project description as needed, so feel free to provide as much detail as possible. You can find examples of several acceptable project descriptions under Step 17 of the Method 1 section. The example form below is filled out using the “Plantings Only” example.

Page 4: On this page, you will need to provide more detail about your project. Almost all living shoreline projects will occur below the mean high-water line. Therefore, you need to check “Yes” under section E, and below you will need to provide descriptions of how your project meets the exemption. For living shorelines, this pertains to the criteria outlined in FAC Ch. 62-330.051(12)(e). These criteria are described in detail in the resource located at <http://edis.ifas.ufl.edu/sg155>. See Step 19 and Step 20 in the Method 1 section for several examples of acceptable responses to the requests on this page. You will also need to print your name, sign, and date the application at the bottom.

Pages 4 and 5: The final pages ask for your acknowledgment of two important paragraphs and describe instructions for submitting the form. The procedures you must follow will differ depending where you live in the state. Explore <https://floridadep.gov/districts> or <http://www.dep.state.fl.us/water/wetlands/erp/wmd.htm> to determine where you must send the form and the mandatory \$100.00 fee. You may need to contact your regional office to determine this.

NOTE: when you submit the PDF form, you must also include a map with enough detail to allow someone to find the project, an overhead (plan) view, and cross-section drawings of your project. You can easily export a directional map using free software such as Google Maps. See Step 23 in the Method 1 section for examples of acceptable plan view and cross-section drawings.

Conclusion

If you provided complete and correct information on your application, within 30 days you should receive confirmation that your project qualifies for the state permit exemption. Confirmation will come in the form of a Verification of Exemption letter from DEP. The letter will notify you that your project meets the criteria for permit exemption and will include a Submerged Lands Authorization, allowing you to conduct the work on the section of public land that intersects with your project. Be sure to read the letter you receive from DEP thoroughly, and make note of any

additional permits or follow-up information you may need to provide. To avoid fines, fees, or other regulatory action, make sure you construct your project exactly as planned. If you find you need to make changes to your project, notify DEP *before* you make them to verify that the change will not jeopardize your exempt status.

Helpful Resources

Florida Sea Grant Living Shorelines: <https://www.flseagrant.org/news/tag/living-shorelines/>

Florida Living Shorelines Project Example Page: <http://floridalivingshorelines.com/florida-sampler/>

Florida Living Shorelines Resource Database: <http://floridalivingshorelines.com/resources/>

NOAA Understanding Living Shorelines: <https://www.fisheries.noaa.gov/insight/understanding-living-shorelines>

NOAA Climate Resilience Toolkit: <https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion>

NOAA Living Shorelines: <https://www.habitatblueprint.noaa.gov/living-shorelines/>

NOAA Tools for Planning: <https://www.habitatblueprint.noaa.gov/living-shorelines/applying-science/tools-for-planning/>

NOAA Guidance and Training: <https://www.habitatblueprint.noaa.gov/living-shorelines/applying-science/guidance/>

NOAA Consultations and Permits: <https://www.habitatblueprint.noaa.gov/living-shorelines/consultations-permitting/>

StormSmartCoasts - Erosion Control Structures: <http://ms.stormsmart.org/before/mitigation/only-as-a-last-resort-flood-and-erosion-control-structures/>

StormSmartCoasts - Non-structural Shore Protection: <http://ms.stormsmart.org/before/mitigation/non-structural-shore-protection/>

REQUEST FOR VERIFICATION OF AN EXEMPTION

Instructions: submit this form to request verification whether an activity qualifies for an exemption from the Environmental Resource Permit (ERP) requirements of Part IV of Chapter 373, F.S., and Chapter 62-330.050-0511, F.A.C. With some exceptions, notice is **not required** to conduct an activity that qualifies for an exemption from permitting under Sections 373.406, 373.4145, or 403.813, F.S., or Rules 62-330.050 through 62-330.0511, F.A.C. Exceptions where prior notice to the Agency is required prior to conducting an exempt activity are:

- Activities having minimal impact under Section 373.406(6), F.S., often referred to as a "de minimis" exemption.
- Section 403.813(1)(f), F.S., when maintenance dredging within previously dredged portions of natural water bodies within drainage rights-of-way or drainage easements which have been recorded in the public records of the county.
- Section 403.813(1)(t), F.S., for the repair, stabilization, or paving of existing county maintained roads and the repair or replacement of bridges that are part of the roadway.
- Section 403.813(1)(u), F.S., for an individual, residential property owner to remove organic detrital material from freshwater rivers or lakes that have a natural sand or rocky substrate and that are not located in an Aquatic Preserve.
- Section 403.813(3), F.S., for maintenance dredging at seaports.
- Rule 62-330.0511, F.A.C., for minor silvicultural surface water management systems

In accordance with Chapter 253, F.S., and Chapter 18-21, F.A.C., (April 14, 2008) activities conducted on state-owned submerged lands also must be authorized by the Board of Trustees of the Internal Improvement Trust Fund (BOT). Certain activities on state-owned submerged lands may qualify for Consent by Rule under paragraph 18-21.005(1)(b), F.A.C. All authorized activities on state-owned submerged lands must comply with the General Conditions for Authorizations under subsection 18-21.004(7), F.A.C. The Agency will use this form to determine if an additional authorization to perform works on these lands is required.

Requests to "self certify" a private, single-family dock must be submitted to the Department's Internet site at: <http://www.dep.state.fl.us/secretary/portal/permit.htm> and CANNOT be made using this notice. However requests to verify construction of a dock that does not qualify for self certification may be made using this form.

In addition to the information described in this form, any submittal requesting verification of an exemption, must also include:

- Location map(s) of sufficient detail to allow someone who is unfamiliar with the site to travel to and locate the specific site of the activity.
- One set of plans and drawings, calculations, environmental information, and other supporting documents that clearly and legibly depict and describe the proposed activities in sufficient detail to demonstrate that the work qualifies for the exemption.
- The required fee.

Please identify the exemption you are requesting to use:	
<input checked="" type="checkbox"/>	Subsection/Paragraph 62-330. <u>051</u> (<u>12e</u>), F.A.C.
<input type="checkbox"/>	Section 373.406(6), F.S. (known as the "de minimis" exemption — see section 3.4.3.7(c) of Applicant's Handbook Volume I for additional information)
<input type="checkbox"/>	Section 373.4145(6) (____), F.S. (for certain "grandfathered" activities)
<input type="checkbox"/>	Section 403.813(1)(____), F.S. (generally, "dredge and fill" exemptions)
<input type="checkbox"/>	I do not know the exemption number
Please provide numbers for additional Exemptions if you are requesting to use more than one:	



PART 1: GENERAL INFORMATION

A. CONTACT		
Name: Last: Alligator	First: Alberta	Middle: E
Title: Mascot	Company: University of Florida	
Address: 157 Gale Lemerand Dr., Ben Hill Griffin Stadium		
City: Gainesville	State: FL	Zip: 32611
Home Telephone: (352) 123-4567	Work Telephone: (352) 123-4567	
Cell Phone: (352) 123-4567	Fax: (352) 123-4567	
E-mail Address: Alberta.E.Alligator@ufl.edu		
Preferred correspondence method: <input checked="" type="checkbox"/> email <input type="checkbox"/> US Mail		

B. Location of proposed activities:	Tax Parcel Identification Number: 12345678910
Address: 123 Coastal Road	
City: Nature Bay	County: Alligator Zip: 12345
Latitude (DMS) 28° 17' 39" 123	Longitude (DMS) -81° 39' 51" 969
C. Date activity is proposed:	To Commence: 6/30/18 To be Completed: 9/30/18

D. Proposed Activities (be specific; use additional sheets as necessary)

Describe in general terms the proposed project, system, or activity (including materials to be used and construction methods):

I plan to install native marsh vegetation along the shoreline of my backyard (100 linear feet). My property, located in Nature Bay, FL, has been experiencing erosion over the past few years, likely because of seawalls on either side of my property. In order to slow and reverse this erosion, I will to obtain smooth cord grass (Spartina alterniflora) from a local nursery and plant it in the intertidal zone along the shoreline. I will plant clumps of plants on 2' centers along a 10' wide section of shoreline (5 rows of plants that will extend no more than 10' waterward of the mean high tide line). Planting will occur at low tide over the course of 2 to 3 days. Plants will be monitored for survival and any plants that die within the first three months may be replaced with fresh specimens (also obtained from a nursery).

E. Is any work proposed in wetlands or other surface waters? Yes No. If yes, please specifically describe, with specific references as to how the limits of the proposed work will comply with the terms and conditions of the above exemption:

This project aims to create/restore wetlands in order to benefit from the ecological functions. By installing native vegetation, this project will benefit the local ecosystem as well as my personal property. All exotic/invasive vegetation will be removed from the site prior to project activities and the project will occur on a shoreline shorter than 500 linear feet and plantings will extend no more than 10' seaward of the mean high tide line. No fill will be added other than soil imported with nursery grown transplants.

F. Please provide a description of all sediment and erosion controls to be used during the completion of this activity (such as use of turbidity and erosion controls):

Plantings will occur at low tide and cease when the tide covers the work area. There will not be any sediment releases or turbidity associated with planting at low tide because resuspension of sediments will be impossible without water present. Sediments loosened by digging holes for plants will be packed back into place immediately upon placing the plant in the hole.

PART 2: ACKNOWLEDGEMENT

I understand this notice is being provided solely to seek verification of qualification to use this exemption(s), and that I am NOT requesting the Agency to process this notice as an application for a permit.

I hereby understand that the Agency will undertake reasonable efforts to determine, within 30 days of receipt of this notice, whether the activity contained in this notice qualifies for the above exemption. If it does not, the Agency will provide its determination that the requested activity does not meet the terms and conditions of the exemption, at which time I may provide a new notice with additional or modified information, or I may submit an application for an Environmental Resource Permit. In either case, denial of qualification to use an exemption will be made without prejudice, pending submittal of clarification of any errors or omissions contained in this notice or other information that demonstrates compliance with the terms and conditions of the exemption.

Alberta E. Alligator

Typed/Printed Name



Signature

6/1/2018

Date

SUBMITTAL AND FEES

This notice and the appropriate fee, should be submitted to the agency having regulatory authority for the activity. Operating Agreements between the Department and the water management districts spell out which agency will process any given application. For more information go to <http://www.dep.state.fl.us/water/wetlands/erp/wmd.htm>.

Several agencies now allow this application form to be submitted electronically on the Internet; in those cases, follow the on-line submittal requirements of that agency:

- **Northwest Florida Water Management District:**
http://www.nwfwmd.state.fl.us/permits/erp/epermit_home.html
- **St. Johns River Water Management District:**
<https://permitting.sjrwm.com/epermitting/jsp/AccountOverview.do?command=init>
- **Southwest Florida Water Management District:**
<http://www.swfwmd.state.fl.us/permits/epermitting/>
- **South Florida Water Management District:** <http://my.sfwmd.gov/ePermitting/MainPage.do>

If submitting a paper application, please see (Appendix A) of the Environmental Resource Permit Applicant's Handbook Volume I for submittal locations.

Contact information for professionals working on living shorelines in your region can be found at <http://florida-living-shorelines.com/contacts/> or your local UF/IFAS Extension Office.

Glossary of Terms

Breakwater—generally, a structure built to provide a barrier to or protection from waves. There are many definitions of the term “breakwater,” but usually they are offshore structures designed to reduce incoming wave energy, resulting in calmer water between the shoreline and the structure. Oyster reef breakwaters are built at intertidal heights (submerged at high tide) out of materials conducive to colonization by oysters. In Florida, breakwaters built as part of small-scale living shorelines are only exempt from permitting if they are built no higher than the mean high-water line.

Clean oyster shell—Oyster shell used in living shorelines must be clean of disease and pests in order to be a safe material. There are several sources of clean oyster shell, including recycled shell and fossilized shell, from both non-profit and for-profit organizations. Recycled shell that comes from seafood restaurants must be cured outdoors in a sunny area in piles that are routinely turned for at least 6 months. This prevents the spread of oyster pests and disease. The DEP will usually request information about the specific source of the shell when reviewing an application for Verification of Exemption.

Concrete dome—concrete forms in the shape of domes. This method of oyster reef construction uses molded, pre-cast concrete forms designed to mimic the attributes of the natural three-dimensional structure of oyster reefs. In some cases, the concrete mixture is fortified with an additive to increase oyster recruitment. There are many commercially available forms.

Cross-section drawing—A depiction of your living shoreline project in cross-section, including information about the slope of the shoreline, approximate mean low-water and mean high-water locations, breakwater heights, spacing of plants, location of existing structures, etc.

Erosion—process of sediment being carried away from an area. In coastal environments, the major driving processes of erosion are storms, flooding, wave action, sea level rise, and human activities (i.e., boating, seawall construction, development). Erosion is a natural process in coastal ecosystems, but it becomes an issue when homes and other infrastructure are threatened.

Environmental Resource Permit—a type of permit required before beginning any construction activity that would affect wetlands, alter surface-water flows, or contribute to water pollution in Florida. This is the permit from which homeowners are exempt for small-scale living shorelines meeting certain criteria.

Emergent vegetation—wetland plants that are rooted with stiff or firm stems, like cattails. Emergent vegetation usually stands above the water surface, but in some cases can be found submerged during occasional periods of high water. Lily pads and many marsh plants are considered emergent plants.

Exotic/invasive species—exotic species are those that are not native to an ecosystem. Invasive species are those that are not native to an ecosystem *and* cause harm to native species and/or ecosystem functions. Examples of invasive plants in Florida’s coastal environments include the invasive Brazilian pepper and *Phragmites australis* marsh grass. You can check to see if a plant is invasive at <https://assessment.ifas.ufl.edu/assessments/>.

Intertidal—Describes the area that is above water at low tide and under water at high tide (in other words, the area between tide marks), commonly inhabited by oysters.

Gabion—a wire framework container that provides a structured foundation for shell material. Made of a material similar to chain-link fencing, gabions are filled with shells and ballast, then stacked and wired together to construct sturdy, three-dimensional structures.

Marsh vegetation—herbaceous (non-woody) plants that thrive in wetlands. A wetland is an area that is inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, under normal circumstances, a prevalence of vegetation typically adapted for life in saturated soils. Most living shorelines deal with the creation of low and middle marsh that are more frequently inundated by water than the upper marsh zone.

Mean high-water line (MHWL)—The line on a chart or map that represents the intersection of the land with the water surface at the elevation of mean high water (the average of all the high water heights observed over the period of time defined by the National Tidal Datum Epoch). Homeowners can roughly estimate the MHWL using physical markers like stakes or flags placed at high tide over a period of weeks, or by observing and marking the location of at the tidal wrack lines (lines formed by debris washing up at high tide), or by looking at aerial photos. DEP suggests

erring on the upland side instead of the waterward side when approximating the MHWL. The MHWL can also be determined by a licensed surveyor.

Mean low-water line (MLWL)—The line on a chart or map that represents the intersection of the land with the water surface at the elevation of mean low water (the average of all the low water heights observed in the period of time defined by the National Tidal Datum Epoch). Homeowners can roughly estimate the MLWL using physical markers like stakes or flags placed at low tide over a period of weeks or by observing aerial photos. The MLWL can also be determined by a licensed surveyor.

National Tidal Datum Epoch—The specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken and reduced to obtain mean values (e.g., mean lower low water, etc.) for tidal datums. It is necessary to standardize mean tide level in this way because of periodic and apparent trends in sea level.

Native vegetation—plants that occur naturally in an area.

Ordinary high-water line (OHWL)—the analogue of the mean high-water line for freshwater bodies such as rivers, streams, and lakes. The OHWL is typically determined by using the best evidence available, including water marks, soil and vegetation indicators, and historical aerial photos.

Oyster-recruitment substrate—structure such as shell or concrete deployed in the intertidal zone of the coast for the purpose of increasing oyster attachment opportunities.

Plan-view drawing—A depiction of your living shoreline project from an overhead perspective, including information about the approximate mean low-water and mean high-water lines, breakwater/sill placement and spacing, spacing of plants, locations of existing structures, locations of parcel boundaries, etc.

Sill—material deployed at the base (toe) of a vegetated zone for the purpose of reinforcing and protecting the area from moderate energy waves and currents. Sills can be constructed out of materials such as shell, concrete, or coconut fiber logs. Sills differ from breakwaters in that they are constructed directly adjacent to the vegetated area.

Submerged aquatic vegetation (SAV)—Grasses that grow to—but not above—the surface of shallow water. This includes seagrasses and freshwater aquatic grasses.

Turbidity—the measure of suspended solids, which influence water clarity. Murky water has high turbidity.

Waterward toe—the bottommost portion of the offshore side of a structure such as a sill or breakwater.

Sources

Florida Administrative Code 62-330.051(12)(e)

Florida Master Naturalist Program—Coastal Systems Manual

Florida Master Naturalist Program—Coastal Shoreline Restoration Manual

<https://aquaplant.tamu.edu/plant-identification/category-emergent-plants/>

<https://chesapeakebay.noaa.gov/submerged-aquatic-vegetation/submerged-aquatic-vegetation>

<https://shoreline.noaa.gov/glossary.html>

https://tidesandcurrents.noaa.gov/datum_options.html

<https://www.swfwmd.state.fl.us/business/epermitting/environmental-resource-permit>

<https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion>

Appendix

LIVING SHORELINE EXEMPTION CONDITIONS

62-330.051(12)(e) Exempt Activities for the Construction, Replacement, Restoration, Enhancement, and Repair of Seawall, Riprap, and Other Shoreline Stabilization.

The activities meeting the limitations and restrictions below are exempt from permitting. However, if located in, on, or over state-owned submerged lands, they are subject to a separate authorization under chapters 253 and 258, F.S., as applicable.

(12) Construction, Replacement, Restoration, Enhancement, and Repair of Seawall, Riprap, and Other Shoreline Stabilization -

(e) Restoration of an eroding shoreline with native wetland vegetative enhancement plantings, provided:

1. The length of shoreline is 500 linear feet or less;
2. Plantings are native wetland plants appropriate for the site obtained from commercially-grown stock;
3. Plantings extend no farther than 10 feet waterward of the approximate mean high water line (MHWL) or ordinary high water line (OHWL);
4. All invasive and exotic vegetative species along the shoreline is removed in conjunction with the planting to the extent practicable;
5. Biodegradable natural fiber logs or mats that are secured in place, such as with the use of wooden stakes, may be used if necessary to support the vegetative plantings; and
6. No fill is placed other than that needed to support the vegetative plantings, except that a breakwater is authorized to be installed concurrent with the planting if permanent wave attenuation is required to maintain the shoreline vegetation, provided:
 - a. The waterward toe of the breakwater extends no more than 10 feet waterward of the approximate MHWL or OHWL, with a top height of no more than the mean or ordinary high water elevation;
 - b. The breakwater is composed predominantly of natural oyster shell cultch (clean and fossilized oyster shell) or other stable, non-degradable materials such as oyster reef, reef balls, boulders, clean concrete rubble, riprap, rock sills, or triangular concrete forms. Oyster shell cultch, if used, shall be enclosed in mesh bags having openings of no more than three inches, or securely fixed to matting prior to placement in the water. Oyster bags and mats must be anchored to prevent movement of shell from the project area;
 - c. The breakwater shall not be placed over, or within three feet (in any direction) of any submerged grass-bed or existing emergent marsh vegetation;
 - d. The breakwater shall be placed in units so that there is at least one opening measuring at least five feet in width located every 75 linear feet along the breakwater, with a minimum of one opening, to allow the flow of water and the passage of fish and aquatic wildlife;
 - e. All equipment used during construction shall be operated from, and be stored in uplands; and

- f. All work is conducted in compliance with subsection 62-330.050(9), F.A.C.

Rulemaking Authority 373.026(7), 373.043, 373.4131, 373.4145, 403.805(1) FS. Law Implemented 373.406, 373.4131, 373.4145, 373.415, 403.813(1) FS. History–New 10-1-13, Amended 6-1-18.

A Homeowner's Guide to the Living Shoreline Permit Exemption Part 2: United States Army Corps of Engineers¹

Savanna Barry, Sara Martin, and Eric Sparks²

Background

“Living shoreline” is a catch-all phrase that describes a riparian area managed with restoration techniques that use natural material such as oyster reef, mangroves, and marsh grasses to stabilize the area, prevent erosion, and protect property. Living shorelines typically involve construction or placement of materials within navigable waters of the United States. Therefore, the US Army Corps of Engineers (also known as the Corps) regulates the installation of living shorelines through a permitting process. This process ensures that project activities do not conflict with the public interest and defines actions that must be taken when a project is expected to have negative impacts. In the interest of streamlining the approval process for environmentally beneficial projects such as living shorelines, the Corps has created a permit process that operates like an exemption for small-scale living shoreline projects that meet certain criteria (see: <http://edis.ifas.ufl.edu/sg155>). The Corps process is similar but not identical to the Florida statewide exemption available through the Florida Department of Environmental Protection (DEP).



Credit: NOAA

Part 1 of this guide covers the DEP permit exemption and Submerged Lands Authorization process. If you have already navigated the DEP application process and received an official Verification of Exemption letter, Submerged Lands Authorization and if your DEP office also issued you a federal permit, *then no further action is required before proceeding with your living shoreline project*. However, if you did not receive a federal (Corps) permit through DEP, which is typically the case, then you must submit a separate permit application to the Corps.

1. This document is SG189, one of a series of the Florida Sea Grant College Program, UF/IFAS Extension. Original publication date March 2019. Visit the EDIS website at <https://edis.ifas.ufl.edu> for the currently supported version of this publication.
2. Savanna Barry, Florida Sea Grant agent, Nature Coast Biological Station; Sara Martin, Mississippi State University Extension, Coastal Research and Education Center; and Eric Sparks, Mississippi State University Extension, Coastal Research and Education Center; UF/IFAS Extension, Gainesville, FL 32611.

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U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

You probably already have all of the required information at your fingertips. The Corps permit application is short and free to submit, and it requires information very similar to that requested by DEP. Remember, Corps staff at your regional regulatory office are willing to meet with you on site or talk with you over the phone about your project during a “pre-application” meeting.

This guide provides example text for each application section that covers all of the bases but is still no longer than a paragraph for each section. You can adapt the example text to your needs. Site drawings can be hand drawn or easily produced using widely available software that you probably already have on your computer. As long as you have all the information and drawings handy, completing and submitting the form should take roughly 30 minutes. As stated above, this information is very similar to that requested by DEP, and thus there will be overlap between the information below and the information provided in Part 1 of this guide.

What This Guide Covers

This guide is a companion to the document *A Homeowner’s Guide to the Living Shoreline Permit Exemption Part 1: Florida Department of Environmental Protection*. Consult **Part 1** to learn about how to apply for the living shoreline permit exemption and Submerged Lands Authorization available through DEP. This guide (Part 2) covers the federal permit application managed by the Corps, *a step which may not be necessary if the DEP issued both a federal and state permit for your project*.

In Florida, permit applications are managed by the Jacksonville District of the Corps through a series of regional offices. Visit <https://www.saj.usace.army.mil/Missions/Regulatory/Office-Locations/> for a map of the counties in Florida covered by each regional office. You will need to complete the ENG FORM 4345 linked below. Complete it electronically or by hand and submit it by mail or email to the contacts listed on the regional offices web-page along with the required project drawings. There is no fee to submit the form. This guide will help you complete and submit the form correctly.

Steps to complete the Corps’ permit application form are presented below, in a page-by-page fashion. You may also find value in the application instructions and checklist available as a PDF from the USACE at https://www.saj.usace.army.mil/Portals/44/docs/regulatory/sourcebook/permitting/forms/Checklists/Checklist_ENG4345fillable.pdf.

The glossary provides definitions for several key terms you will need to understand when preparing your application.

After You Submit

Processing and approval of a permit application to the Corps typically takes about 60 days. If you fail to include any of the necessary information, a Corps officer will contact you with a request to provide the information or elaborate on certain aspects of the project. Failure to provide all of the necessary information may result in delays to your project approval.

PDF Form

The permit application form (ENG FORM 4345) can be downloaded by clicking the “Application Form” link at <https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit/>. You may fill out this form electronically, or you may print it and complete it by hand. The steps below will guide you through each page of the form. The final section shows examples of the vicinity map and drawings you are required to submit.

Page 1: On this page, you will need to provide general information such as your contact information, information about your property (location, tax parcel ID, and GPS coordinates), and (*optional*) the contact information of your agent, if any, and your signature authorizing the agent. Usually, the agent would be a contractor you are working with, but it is likely you will not have an agent if you plan to complete the project yourself.

Some specific tips and points to consider for Page 1:

- You can designate any project name or title that you wish
- The name of the waterbody should be name of the estuary, bay, river, stream, marsh, or creek where you will build your living shoreline project.
- You can locate the coordinates for your property using free tools such as Google Earth® or <https://www.latlong.net/>. *Important:* When entering coordinates for your project, make sure you provide them in the requested format (DD = decimal degrees). If the tool you use to locate the coordinates does not provide them in DD format, then you can use a free online coordinate converter such as <http://www.earthpoint.us/Convert.aspx>.
- Find your tax parcel ID number in any of several ways:

Page 2: On this page, you must provide driving directions to your project site starting from a known landmark, such as an interstate exit, nearby town or city, or major highway intersection. You must also provide information about the project, including the nature of activity and project purpose. It is important that you are thorough and provide enough information for the Corps to assess whether or not your activity is allowable. Incomplete information in any of the sections on this or other pages will result in delays. You may append as many extra sheets as you need, with the block number of the question noted at the top of the extra sheet. If you first completed the Request for Verification of Exemption form for DEP, you will be able to re-use much of the descriptive text you already gathered.

Some specific tips and guidance for Page 2:

- See below for examples of nature of activity descriptions for three different scenarios: planting only, breakwater/sill only, and breakwater/sill with planting. Feel free to adapt the example text below for your own use. *Note: the figures given in the text below are only examples. You should consult with a local expert to determine the appropriate plant species, oyster reef heights, and materials to use in your project. Useful resources can be found at www.floridalivingshorelines.com, www.flseagrant.org, or your local UF/IFAS Extension office.*

Example Text:

Plantings only—I plan to install native marsh vegetation along the shoreline of my backyard (100 linear feet). My property, located in Nature Bay, Florida, has been experiencing erosion over the past few years, likely because of seawalls on either side of my property. In order to slow and reverse this erosion, I will obtain smooth cord grass (*Spartina alterniflora*) from a local nursery and plant it in the intertidal zone along the shoreline. I will plant clumps of plants on 2-foot centers along a 10-foot-wide section of shoreline (5 rows of plants that will extend no more than 10 feet waterward of the mean high-water line). Planting will occur at low tide over the course of 2 to 3 days. Plants will be monitored for survival, and any plants that die within the first three months may be replaced with fresh specimens (also obtained from a nursery). All exotic/vegetation will be removed from the site prior to project activities. No fill will be added other than soil imported with nursery grown transplants.

Breakwater/sill only—I plan to install an oyster reef breakwater in front of my property (90 linear feet) in Nature Bay, Florida, to protect my shoreline from further

erosion. There are seawalls on either side of my property. I will deploy oyster shell contained within heavy-duty plastic mesh bags or gabions (approx. 4 to 5 gal. of shell per bag/gabion). The bags/gabions will be deployed in the intertidal zone with the waterward toe occurring no more than 10 feet seaward of the mean high-water line. Bags/gabions will be stacked on top of each other in alternating orientations in order to achieve a height of 2 feet, allowing them to reach the ideal zone for oyster recruitment and growth. Bags will be deployed at low tide over the course of 1 to 2 weeks. The breakwater will not encroach upon and will not be placed anywhere within 3 feet of any submerged or emergent vegetation. There are no seagrass meadows in the vicinity of my project. seagrass meadows. The waterward toe of the breakwater will not be placed more than 10 feet seaward of the mean high tide line. We will use stable, natural materials (bagged oyster shell/oyster shell contained in gabions) to construct the breakwater and the bags/gabions will be secured using rebar stakes. Shell will be contained in heavy duty plastic mesh bags or metal gabions with 2.5-inch openings. Shell material will be sourced from Nature Bay Shell Recycling that has seasoned the shells outside in the sun for at least 6 months. Additionally, the breakwater will have a 6-foot wide gap every 47 feet along the shoreline. Oyster shell bags will be deployed using hand carry methods and, thus, no equipment with the potential to damage the shoreline will be used.

Breakwater/sill and plantings—I plan to install a concrete dome breakwater in front of my property on Nature Bay, Florida, to protect my shoreline (300 linear feet) from further erosion. There are seawalls on either side of my property. Concrete domes will be deployed by professional contractors in the intertidal zone, with the waterward toe of the concrete domes occurring no more than 10 feet seaward of the mean high-water line. Concrete domes will be approximately 1.5 feet tall, placing a high percentage of the concrete dome surface area within the ideal zone for oyster recruitment and growth. Concrete domes will be deployed continuously regardless of tidal stage using hand-carry/float methods over the course of 1 week. After installation of concrete domes, the shoreline behind the breakwater will be planted with native vegetation to further reduce erosion and increase habitat value. I will obtain smooth cord grass (*Spartina alterniflora*) from a local nursery and plant clumps of plants on 2-foot centers behind the 10-foot-wide section of shoreline protected by the concrete domes (5 rows of plants that will extend no more than 10 feet waterward of the mean high tide line). Planting will occur at low tide over the course of 2 to 3 days. Plants will be monitored for survival, and any plants that die within the

first three months may be replaced with fresh specimens (also obtained from a nursery). All exotic/invasive vegetation will be removed from the site prior to project activities. Plantings will extend no more than 10 feet seaward of the mean high tide line and the inner toe of the breakwater will likewise extend no further than this line. No fill will be added other than soil imported with nursery-grown transplants. The breakwater will not encroach upon and will not be placed anywhere within 3 feet of any existing submerged or emergent native vegetation. The coastal area behind my home is a mudflat, and there are no seagrass meadows within 0.5 mile of my home. The breakwater will be constructed of stable materials (concrete domes) and will be secured using fiberglass stakes. Rows of concrete domes will have 5-foot-wide gaps every 70 feet along the shoreline. There will be four, 70-foot-long breakwaters with 5-foot gaps in between each. Concrete domes will be deployed by professional contractors using hand-carry and float methods, and, thus, no equipment with the potential to damage the shoreline will be used.

- See below for some example descriptions of project purpose. Feel free to adapt the example text below for your own use, but keep in mind that you should consult with an expert for help choosing the best method for you.

Example text:

Plantings only—This project aims to create/restore wetlands in order to benefit from the ecological functions. By installing native vegetation, this project will benefit the local ecosystem as well as my personal property.

Breakwater/sill only—The breakwater will be constructed in the intertidal zone in water deeper than mangroves and marsh grass can survive. The primary purpose of the project is to mitigate erosion along the shoreline adjacent to my property. The project will create habitat for oyster recruitment and overall will benefit the local ecosystem.

Breakwater/sill and plantings—This project aims to create/restore wetlands in order to benefit from the ecological functions. By installing native vegetation and oyster recruitment substrate, this project will benefit the local ecosystem.

- Unless you are installing plants only, you will need to fill out the dredge/fill material sections (blocks 20–23). In the eyes of the Corps, materials such as oyster bags, gabions, cinder blocks, and rocks are considered fill material. Therefore, you will need to fill out this section if your project incorporates oyster shells, concrete domes, gabions, coir logs, sand fill or other structural elements.

Feel free to adapt the example text below for your own use, but keep in mind that you should consult with an expert for help choosing the best method for you.

Plantings only

Block 20. There will not be any discharge associated with the project other than that imported with nursery-grown plants. Plants must be installed to mitigate erosion.

Block 21. N/A

Block 22. N/A; wetlands will be created, not filled in.

Block 23. Plantings will occur at low tide and cease when the tide covers the work area. There will not be any sediment releases or turbidity associated with planting at low tide because resuspension of sediments will be impossible without water present. Sediments loosened by digging holes for plants will be packed back into place immediately upon placing the plant in the hole.

Breakwater/sill only

Block 20. In order to mitigate erosional forces of waves and currents, it is necessary to deploy a breakwater/sill structure. I have selected bagged oyster shell as the appropriate material to place in front of my property to achieve erosion control.

Block 21. Type: bagged oyster shell; amount in cubic yards: 18.7*

*Amount in cubic yards can be estimated by:

1. calculating the length of the project in feet, subtracting any mandatory gaps (90 feet minus 6-foot gap = 84 feet in this example);
2. estimating the height and width in feet (2 and 3 feet, respectively, in this example);
3. multiplying the three numbers together (length × width × height) to yield the volume in ft (504 ft in this example); and
4. dividing by 27 to yield the value in cubic yards (18.7 cu yd in this example).

Block 22. N/A; wetlands will be created, not filled in.

Block 23. The breakwater will be installed at low tide, and all activity will cease when the tide covers the work

area. There will not be any sediment releases or turbidity associated with deploying oyster bags at low tide because resuspension of sediments will be impossible without water present at the site.

Breakwater/sill and plantings

Block 20. In order to mitigate erosional forces of waves and currents, it is necessary to deploy a breakwater structure with plants behind it. I have selected *Spartina alterniflora* and concrete domes as the appropriate material to place in front of my property to achieve erosion control.

Block 21. Type: concrete domes; amount in cubic yards: 40*

*See above for instructions on how to estimate cubic yards

Block 22. N/A; wetlands will be created, not filled in.

Block 23. Plantings will occur at low tide and cease when the tide covers the work area. There will not be any sediment releases or turbidity associated with planting at low tide because resuspension of sediments will be impossible without water present. Concrete domes will be deployed using hand-carry and/or float methods, and very limited resuspension of sediments will occur with this method (walking across the site). No heavy equipment or tools (other than a hammer to drive in a narrow fiberglass rod) will be used in this project. The disturbance to sediments at the site will be minimal.

Page 3: On this page, you must provide background information about any work that has already been completed (usually none for a living shoreline), contact information for neighboring properties, and any permits or authorizations you have already received. Finally, you need to sign and date the permit application. See <https://www.saj.usace.army.mil/Missions/Regulatory/Office-Locations/> for information about where to submit your permit. Select the regional office that serves your county, and either email or mail the application and all attachments (see below) to the appropriate location.

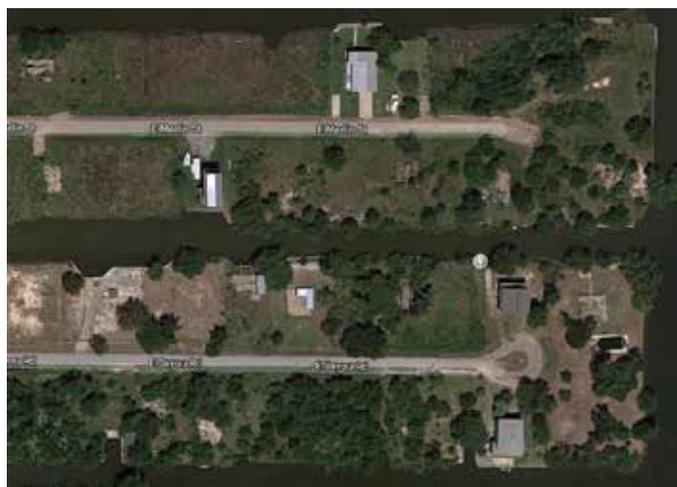
Attachments: You must include 1) a vicinity map with enough detail to allow someone to find the project, 2) an overhead (plan) view and cross-section drawings of a) the present site condition and b) your project when you submit the PDF form. See below for examples of acceptable plan view and cross-section drawings.

The detailed set of drawings should depict both the current site conditions and the project in cross section and in overhead (plan) view. These drawings must show:

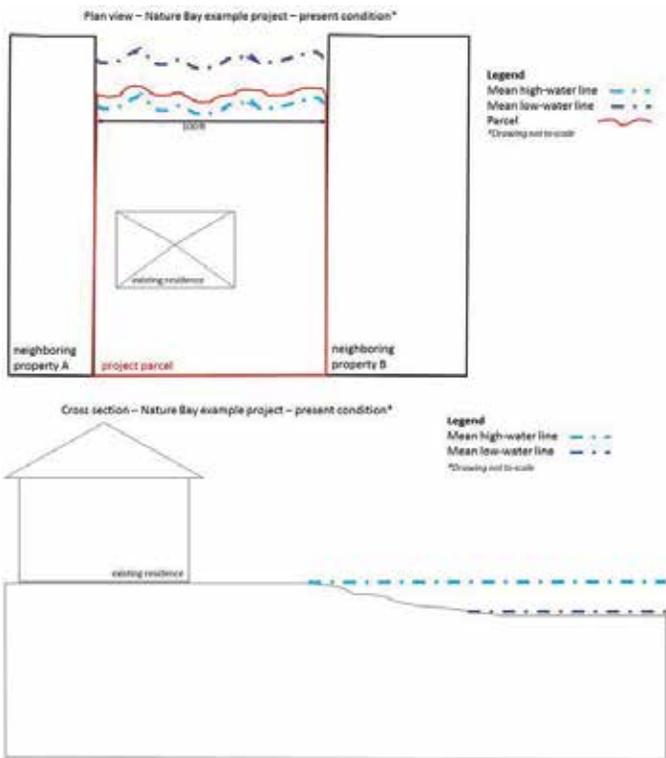
- 1) The location of the mean high-water and mean low-water lines;
- 2) The linear distance along the shoreline covered by the project;
- 3) The linear distance the project will extend into the water, as measured from the mean high-water line;
- 4) Planned spots for placement of plants, breakwater/sill elements, and gaps in breakwaters with linear distances and/or heights noted;
- 5) Existing structures;
- 6) Any nearby habitats and the approximate location of the shoreline of neighboring properties.

You may produce these drawings yourself either by hand or using simple shape illustrations available in computer programs such as Microsoft PowerPoint. Drawings need not be to scale, as long as this is noted on the drawing. It may be helpful to include extra photographs of the site to aid in your explanation. Of course, you always have the option of hiring a contractor who will provide the drawings as part of the contract, but this is typically not necessary for simple projects. To give you an idea of the level of detail required, see the example cross section and plan view drawings below. We have provided an example for each of the three basic project types mentioned above: plantings only, breakwater/sill only, breakwater/sill and plantings.

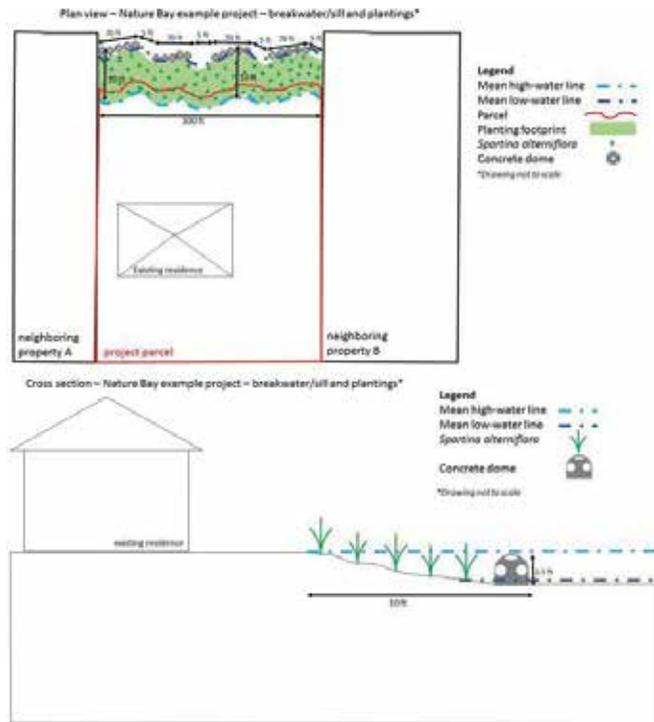
Vicinity Map



Present Condition



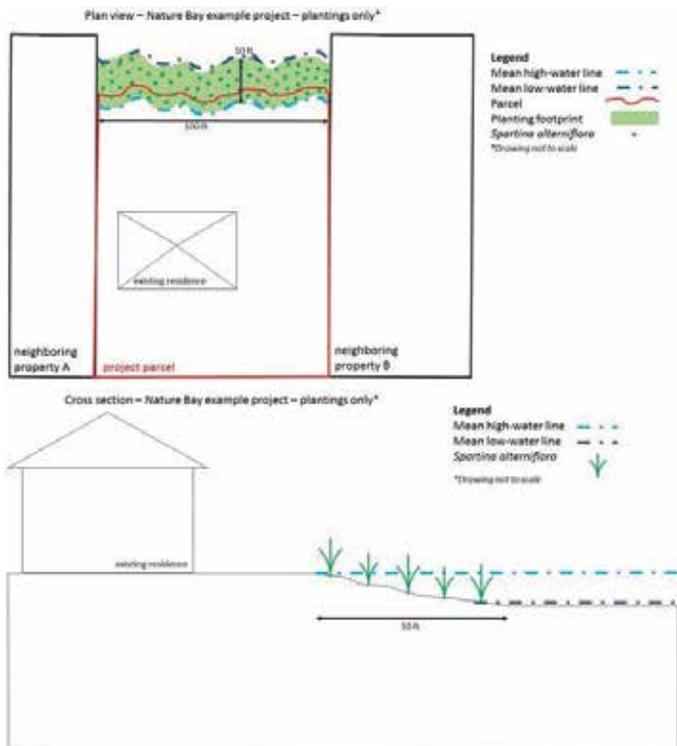
Breakwater/Sill Only



Conclusion

This guide covered the process for applying for a stream-lined living shoreline permit from the US Army Corps of Engineers. We covered background information about living shoreline permits, provided sample text for several sections of the Corps application, and outlined the process for creating acceptable project drawings for small-scale projects. We gave instructions for submitting the permit application to the Corps. If you provided complete and correct information on the application, within 60 days you should receive confirmation that your project is approved. The Corps will send you a permit letter with attachments. The letter will notify you that your project has been approved and outline instructions for communicating with the Corps regarding construction activities. Be sure to thoroughly read the letter you receive, and make note of any additional permits or follow-up information you may need to provide. To avoid fines, fees, or other regulatory action, make sure you construct your project exactly as planned. If you find you need to make changes to your project, notify the Corps *before* you make them to verify the changes will not jeopardize your approval.

Plantings Only



Helpful Resources

Florida Sea Grant Living Shorelines: <https://www.flseagrant.org/news/tag/living-shorelines/>

Florida Living Shorelines Project Example Page: <http://floralivingshorelines.com/florida-sampler/>

Florida Living Shorelines Resource Database: <http://floralivingshorelines.com/resources/>

NOAA Understanding Living Shorelines: <https://www.fisheries.noaa.gov/insight/understanding-living-shorelines>

NOAA Climate Resilience Toolkit: <https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion>

NOAA Living Shorelines: <https://www.habitatblueprint.noaa.gov/living-shorelines/>

NOAA Tools for Planning: <https://www.habitatblueprint.noaa.gov/living-shorelines/applying-science/tools-for-planning/>

NOAA Guidance and Training: <https://www.habitatblueprint.noaa.gov/living-shorelines/applying-science/guidance/>

NOAA Consultations and Permits: <https://www.habitatblueprint.noaa.gov/living-shorelines/consultations-permitting/>

StormSmartCoasts - Erosion Control Structures: <http://ms.stormsmart.org/before/mitigation/only-as-a-last-resort-flood-and-erosion-control-structures/>

StormSmartCoasts - Non-structural Shore Protection: <http://ms.stormsmart.org/before/mitigation/non-structural-shore-protection/>

Contact information for professionals working on living shorelines in your region can be found at <http://floralivingshorelines.com/contacts/> or your local UF/IFAS Extension Office.

Glossary of Terms

Breakwater—generally, a structure built to provide a barrier to or protection from waves. There are many definitions of the term “breakwater,” but usually they are offshore structures designed to reduce incoming wave energy, resulting in calmer water between the shoreline and the structure. Oyster reef breakwaters are built at intertidal

heights (submerged at high tide) out of materials conducive to colonization by oysters. In Florida, breakwaters built as part of small-scale living shorelines are only exempt from permitting if they are built no higher than the mean high-water line.

Clean oyster shell—Oyster shell used in living shorelines must be clean of disease and pests in order to be a safe material. There are several sources of clean oyster shell, including recycled shell and fossilized shell, from both non-profit and for-profit organizations. Recycled shell that comes from seafood restaurants must be cured outdoors in a sunny area in piles that are routinely turned for at least 6 months. This prevents the spread of oyster pests and disease. The DEP will usually request information about the specific source of the shell when reviewing an application for Verification of Exemption.

Coir logs—biodegradable logs made from coconut fiber often used in construction of sills in living shorelines.

Concrete dome—concrete forms in the shape of domes. This method of oyster reef construction uses molded, pre-cast concrete forms designed to mimic the attributes of the natural three-dimensional structure of oyster reefs. In some cases, the concrete mixture is fortified with an additive to increase oyster recruitment. There are many commercially available forms.

Cross-section drawing—a depiction of your living shoreline project in cross-section, including information about the slope of the shoreline, approximate mean low-water and mean high-water locations, breakwater heights, spacing of plants, location of existing structures, etc.

Emergent vegetation—wetland plants that are rooted with stiff or firm stems, like cattails. Emergent vegetation usually stands above the water surface, but in some cases can be found submerged during occasional periods of high water. Lily pads and many marsh plants are considered emergent plants.

Erosion—process of sediment being carried away from an area. In coastal environments, the major driving processes of erosion are storms, flooding, wave action, sea level rise, and human activities (i.e., boating, seawall construction, development). Erosion is a natural process in coastal ecosystems, but it becomes an issue when homes and other infrastructure are threatened.

Exotic/invasive species—exotic species are those that are not native to an ecosystem. Invasive species are those that are not native to an ecosystem *and* cause harm to native species and/or ecosystem functions. Examples of invasive plants in Florida’s coastal environments include the invasive Brazilian pepper and *Phragmites australis* marsh grass. You can check to see if a plant is invasive at <https://assessment.ifas.ufl.edu/assessments/>.

Intertidal zone—the area that is above water at low tide and under water at high tide (in other words, the area between tide marks), commonly inhabited by oysters.

Gabion—a wire framework container that provides a structured foundation for shell material. Made of a material similar to chain-link fencing, gabions are filled with shells and ballast, then stacked and wired together to construct sturdy, three-dimensional structures.

Marsh vegetation—herbaceous (non-woody) plants that thrive in wetlands. A wetland is an area that is inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, under normal circumstances, a prevalence of vegetation typically adapted for life in saturated soils. Most living shorelines deal with the creation of low and middle marsh that are more frequently inundated by water than the upper marsh zone.

Mean high-water line (MHWL)—the line on a chart or map that represents the intersection of the land with the water surface at the elevation of mean high water (the average of all the high water heights observed over the period of time defined by the National Tidal Datum Epoch). Homeowners can roughly estimate the MHWL using physical markers like stakes or flags placed at high tide over a period of weeks, or by observing and marking the location of at the tidal wrack lines (line formed by debris washing up at high tide), or by looking at aerial photos. DEP suggests erring on the upland side instead of the waterward side when approximating the MHWL. The MHWL can also be determined by a licensed surveyor.

Mean low-water line (MLWL)—the line on a chart or map that represents the intersection of the land with the water surface at the elevation of mean low water (the average of all the low water heights observed in the period of time defined by the National Tidal Datum Epoch). Homeowners can roughly estimate the MLWL using physical markers like stakes or flags placed at low tide over a period of weeks or by observing aerial photos. The MLWL can also be determined by a licensed surveyor.

National Tidal Datum Epoch—the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken and reduced to obtain mean values (e.g., mean lower low water, etc.) for tidal datums. It is necessary to standardize mean tide level in this way because of periodic and apparent trends in sea level.

Native vegetation—plants that occur naturally in an area.

Ordinary high-water line (OHWL)—the analogue of the mean high-water line for freshwater bodies such as rivers, streams, and lakes. The OHWL is typically determined by using the best evidence available, including water marks, soil and vegetation indicators, and historical aerial photos.

Oyster-recruitment substrate—structure such as shell or concrete deployed in the intertidal zone of the coast for the purpose of increasing oyster attachment opportunities.

Plan-view drawing—a depiction of your living shoreline project from an overhead perspective, including information about the approximate mean low-water and mean high-water lines, breakwater/sill placement and spacing, spacing of plants, location of existing structures, location of parcel boundaries, etc.

Sill—material deployed at the base (toe) of a vegetated zone for the purpose of reinforcing and protecting the area from moderate energy waves and currents. Sills can be constructed out of materials such as shell, concrete, or coconut fiber logs. Sills differ from breakwaters in that they are constructed directly adjacent to the vegetated area.

Submerged aquatic vegetation (SAV)—Grasses that grow to—but not above—the surface of shallow water. This includes seagrasses and freshwater aquatic grasses.

Turbidity—the measure of suspended solids, which influences water clarity. Murky water has high turbidity.

Waterward toe—the bottom-most portion of the offshore side of a structure such as a sill or breakwater.

Sources

Florida Administrative Code 62-330.051(12)(e)

Florida Master Naturalist Program—Coastal Systems Manual

Florida Master Naturalist Program—Coastal Shoreline Restoration Manual

<https://aquaplant.tamu.edu/plant-identification/category-emergent-plants/>

<https://chesapeakebay.noaa.gov/submerged-aquatic-vegetation/submerged-aquatic-vegetation>

<https://shoreline.noaa.gov/glossary.html>

<https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion>

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- Digital Coast.*** National Oceanic and Atmospheric Association.
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