

## **Proposed Amelia Island Dune Protection Plan for the City of Fernandina Beach and Nassau County**

### **I) Purpose of plan**

This Dune Protection Plan for the City of Fernandina Beach and Nassau County is hereby jointly enacted to support the Florida legislature's intent in enacting the "Coastal Zone Protection Act of 1985." Florida Code Sections 161.52-161.58. Specifically:

161.53 Legislative intent. —

*(1) The Legislature recognizes that coastal areas play an important role in protecting the ecology and the public health, safety, and welfare of the citizens of the state; that in recent years the coastal areas have been subjected to increasing growth pressures; and that unless these pressures are controlled, the very features which make coastal areas economically, aesthetically, and ecologically rich will be destroyed.*

*(2) The Legislature further recognizes that coastal areas form the first line of defense for the mainland against both winter storms and hurricanes, that the dunes of coastal areas perform valuable protective functions for public and private property, and that placement of permanent structures in these protective areas may lead to increased risks to life and property and increased costs to the public. Coastal areas often protect lagoons, salt marshes, estuaries, bays, marine habitats, and the mainland from the direct action of ocean waves or storm surges; absorb the forces of oceanic activity on their seaward sides and protect calmer waters and stable shores to their landward sides; and are dynamic geologic systems with topography that is subject to alteration by waves, storm surges, flooding, or littoral currents.*

*(3) The Legislature further recognizes that these coastal areas are among Florida's most valuable resources and have extremely high recreational and aesthetic value which should be preserved and enhanced. Coastal areas provide a unique habitat for birds, wildlife, marine life, and plant life and protect waters that are vital to the food chain.*

*(4) The Legislature further recognizes that there is a tremendous cost to the state for postdisaster redevelopment in the coastal areas and that preventive measures should be taken on a continuing basis in order to reduce the harmful consequences of natural and manmade disasters or emergencies.*

*(5) It is, therefore, the intent of the Legislature that the most sensitive portion of the coastal area shall be managed through the imposition of strict construction standards in order to minimize damage to the natural environment, private property, and life.*

This wording in the Plan and any COFB or County of Nassau ordinances required to support the Plan shall use the definitions listed in 161.54 of the Coastal Zone Protection Act.

### **II) Pre-eminence of State and Federal law.**

Nothing in this ordinance shall be presumed to counter the requirements of State or Federal law, they represent additional requirements to meet the legislative intent given natural and human history of Amelia Island.

### III) Goals of this Plan

- 1 Promote natural and nature-based creation and maintenance of the coastal dune system that will protect against at least 100-year storm surge assuming sea level rise projected through 2100.
2. Providing for enhanced beach access that also protects the dune and beach system
3. Promotion and enhancement of the beach and dune system as a niche ecosystem critical to threatened and endangered species with critical wildlife corridors that also must be enhanced
4. Protection of the entire Holocene dune system to assure its top groundwater layers continue to support the tree canopy, dune vegetation, and prevent additional salt water intrusion into groundwater levels important to the entire island and Nassau County mainland
5. Recognition of the entire Holocene dune system as a natural dike system similar to that protecting Holland from catastrophic dune washovers and new channel creation from future storms with probability less than one percent (1%) annual chance.
6. Protection of natural dune vegetation, including the dune hammock forest trees and understory, to protect against wind erosion that will result in loss of sand from the beach/dune system, respiratory health concerns for the public, and property damage down wind from high velocities and salt spray intrusion
7. Promote education of residents and visitors alike to the role of the dunes in the resilience of this barrier island.

### IV) Requirements for the entire Coastal Building Zone

This Plan recognizes and expands on as required the state's requirements for construction in the "Coastal building zone" herein defined as the *"land area from the seasonal high-water line landward to a line 2,500 feet landward from the coastal construction control line as established pursuant to s. 161.053, and, for those coastal areas fronting on the Gulf of Mexico, Atlantic Ocean, Florida Bay, or Straits of Florida and not included under s. 161.053, the land area seaward of the most landward velocity zone (V-zone) line as established by the Federal Emergency Management Agency and shown on flood insurance rate maps.* (Note the 2500' limit is defined because of Amelia Island's designation and concerns as a barrier island)

For purposes of dune protection, the Coastal Building Zone is divided into two subdivisions

- A) The frontal dune zone, (FDZ) is generally east of the FDEP's Coastal Construction Control Line (CCCL). The Plan and any resulting ordinances recognize that the FDEP has primary jurisdiction and must first approve any development east of the CCCL. This ordinance places additional local requirements to protect the critical dune from the additional risk inherent in being on a barrier island.
- B) The Coastal Upland Protection Zone (CUPZ) as identified by State law extends 2500' west (inland) of the CCCL. This area incorporates the rest of the Holocene dune system. The requirement of this Plan and resulting ordinances are intended to protect the entire critical dune system from degradation due to damage to groundwater system (including protection against saltwater intrusion), wind erosion, and the dune hammock's maritime forest destruction. Other provisions of the State requirements for the Coastal Building Zone may also be enforced by the City and County Building Departments.

### V) Dune Protection requirements in the Coastal Building Zone.

It is the policy of the City of Fernandina Beach and Nassau County that no construction, including open deck extensions, including inground swimming pools, shall result in disturbance, regrading, excavation,

filling, damage to vegetation or removal of the existing dune system in the FDZ. Any minor disturbance during construction of approved and permitted minor facilities must be hand regraded to original contours and revegetated in accordance with Appendix A within 30 days of sand disturbance. Construction of inground swimming pools are specifically prohibited seaward of the NA1976 Coastal Construction Setback Line or the Limits of the FEMA VE 500-year or 100-year Special Flood Hazard Zone as currently mapped.

The FDZ dune system includes an aeolian sand covered stone revetment constructed by the United States Army Corps of Engineers sometime after Hurricane Dora hit in 1964. This revetment continues to provide significant protection against storm surge flooding in the City north of Sadler and in American Beach. Therefore, any person or entity removing, damaging, lowering, or widening breaches by removing, displacing or otherwise damaging the revetment dune boulders, rocks, concrete, sand, and vegetation shall be subject to a fine equal to three times the cost for the City or County to repair and restore the effectiveness of the revetment dune but not less than \$1000.00 and up to six months in the Nassau County jail.

The City of Fernandina Beach recognizes the role that the dune hammock maritime forest (see Appendix A) of the Coastal Building Zone plays in reducing inland storm wind forces; in limiting salt air intrusion and damage to inland vegetation; and in maintaining the groundwater system of the dune system. Any trimming of the primary trees (sand oaks, live oaks, magnolias, loblolly pines, etc.) will require certification of the appropriate City or county approved arborist that the trimming is required to eliminate significant risk to existing homes and infrastructure.

To further protect the trees of the CBZ, removal of vines that can choke them is encouraged. Invasive vines (air potato, stink vine, and others) should be eliminated and native vines controlled. To help discourage the return of the vines, native flowering plants and grasses of the dunes can be planted to crowd out the opportunistic vines,

#### **VI) Dune Construction Requirements in the CUPZ**

In the CUPZ, it is the Fernandina Beach City and Nassau County policy to protect the natural shape, composition, volume, height and vegetative cover of the dune system as much as possible. This is critical to protect the entire barrier island from:

- 1) Loss of integrity of shallow water tables in dunes, including prevention of salt water intrusion further inland
- 2) Damage to the most seaward of the coastal tree canopy allowing increased salt spray intrusion inland.
- 3) Disruption of critical wildlife corridors
- 4) Wind erosion causing air quality issues, damage to neighboring property and infrastructure, and loss of sediment to the beach/dune system.
- 5) Reduction of protection against extreme storm events that could cause washover or new channel creation events.

Any proposed new construction in the CUPZ shall:

- 1) Not leave the property with greater than 40% impervious surface. A lower limit will be required if the new construction will cause flooding or sheet flow off the property on to adjacent property.
- 2) Not cause stormwater runoff to discharge onto adjacent properties.
- 3) Will not damage or remove any vegetation on dune slopes greater than 1V:10H

- 4) Any construction or maintenance activities that require excavation or fill of more than 5 cubic yards of sand shall require a special permit. This grading permit shall be secured from the Fernandina Beach or Nassau County Building Department on an application provided by the City or County Engineer.

The application shall be accompanied by a profile prepared by the applicant's engineer to be approved by the City or County Engineer. Approval will be contingent on:

- a) No excavation greater than 12" deep or fills greater than 18" thickness shall be permitted
- b) All disturbed slopes shall not exceed slopes of 1V:10H.
- 5) Not require retaining walls or structures higher than 30".
- 6) Construct any new driveways, streets, sidewalks, and trails of permeable materials that rest on permeable subbases.
- 7) Encourage use of vegetated drainage infiltration swale. All native vegetation in drainage swales, low spots, and infiltration /retention areas shall not be disturbed during construction.
- 8) Not rely on septic tanks and drain fields which are prohibited in the CUPZ and no building permits may be issued on properties relying on existing septic systems.
- 9) All structures over eight feet (8') in height above existing grade shall be supported on professionally engineered pile foundations. Pile foundations are recommended for all structures, regardless of height.

#### **VII) Special requirements in the Frontal Dune Zone**

- 1) A permit from the FDEP is first required for any construction east of the Coastal Construction Control Line (CCCL)
- 2) In addition to FDEP requirements, the City of Fernandina Beach and Nassau County prohibit removing or disturbing any dune sand seaward of the 100-year or 500-year FEMA VE Flood zone lines
- 3) The removal, cutting, burning or destruction of natural vegetation, sand fences, dune vegetation protection post and rope barriers, or other types of beach protection devices in the FDZ is prohibited, except as necessary for construction authorized by FDEP permit.
- 4) The City and County shall promote planting native dune vegetation to support the dune strength and habitat diversity and prohibit harboring identified invasive plants, all per lists in Appendix A
- 5) All sand fencing shall be installed and maintained in accordance with Appendix B and shall always be accompanied with planting of native beach plants per Appendix A within 30 days of sand fencing installation.
- 6) Access to the beach across the dunes shall be limited to dune walkovers and controlled goat trails developed in accordance with Appendix C
- 7) Fines for littering shall be doubled in the dunes
- 8) Fines shall be assessed for beach accesses that damage native vegetation and/or fauna in the dunes and shall be not less than \$100 per occurrence, nor more than \$500.
- 9) The City of Fernandina Beach and Nassau County prohibit damage to coppice mounds and the driving on or removal of the beach wrack
- 10) Smoking and vaping shall be prohibited in the dunes.
- 11) Overnight storage of materials of any kind shall be prohibited in the FDZ dunes

**VIII) Classifications of Dune Resiliency**

To achieve the goal to have its beach/dune system protect all homes, apartments, hotels, garages, swimming pools and all public infrastructure from a 1% chance of VE storm surge wave special flood hazard per FEMA standards, the City and County identify six classes of frontal dune development. These classes recognize the differing degrees to which Amelia Island’s dune sections stand on achieving the City and County goals. As class numbers increase, the volume of dune sand needed to meet FEMA requirements to keep homes, buildings and public infrastructure also increases. Therefore, the resources of the City and County should be prioritized to increase dune height and volume in higher numbered classes. For example, in planning expenditures for dune walkover repairs, replacements, and additions, the class can be used to help quantify the value of the resiliency factor in prioritizing dune walkover investment per table in Appendix D.

The definition of dune classes and current beach sections in each class is defined as follows:

<b>DUNE CLASS DESCRIPTION</b>	<b>LOCATION FEBRUARY 2023</b>
a) <b>Class 1 Dune:</b> width more than 200’. FEMA VE zone ends in dune	Beach access 35 and south & Access 21 to 3136 S. Fletcher
b) <b>Class 2 Dune:</b> width less than 150’, FEMA VE zone (1%) abuts private infrastructure.	1720 to 1962 S. Fletcher
c) <b>Class 3 Dune:</b> width less than 100’, FEMA VE Zone (1%) impacts structures but no streets	932 to 1720 S. Fletcher & 348 S. Fletcher to Main Beach
d) <b>Class 4 Dune:</b> width adequate but height and/or volume by damaged by uncontrolled vehicle or pedestrian access to beach	3136 S. Fletcher to Walkover 35 & Main Beach
e) <b>Class 5 Dune:</b> width 50’-100’ FEMA VE and AE (1%) Zones includes homes and public infrastructure behind dunes	Dolphin Street to to 1734 N Fletcher and American Beach
f) <b>Class 6 Dune:</b> width less than 50’ FEMA VE and AE (1%) zones impact both sides of Fletcher	348 to 932 S. Fletcher and from the south end of The Sanctuary to north limit Of Amelia Island State Park

Note: Access 16 gets included in Class 6 because of high risk of a washover at that location

**IX) Education**

The City of Fernandina Beach and Nassau County will develop educational materials for tourists and visitors. Hotels, guest houses and short-term rental properties will be required to provide these materials to guests on check-in at all locations in the CUPZ and FDZ.

It is policy of the City of Fernandina Beach and Nassau County to encourage a “whole island” planned development concept to mitigate anthropogenic impacts on the long-term maintenance of all beaches and dunes. The City and County will support local community non-profits groups developing programs to help educate residents and guests about the importance of beach dune habitat and initiate participative projects such as dune revegetation programs. It will develop or support development of a website to provide information to employees, residents, and guests on the status, management, and natural history regarding species of concern associated within this habitat.

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## Appendix A: Vegetation and Wildlife protection in the Beach/Dunes

Amelia Island has been described as a couple of piles of sand sitting on a bed of mud (a geomorphic technical term for silt and clay), all held together by native vegetation. Across the FDZ and the CUPZ on Amelia Island, the beach/dune system transitions across several essential native plant zones so critical to the resilience of the island

Taking the FDZ as being centrally on the beach, the dunes grade upwards to more upland areas including the dune hammock forest and maritime forest and slope down to the beach flats/intertidal beach to the aquatic marine habitats like the surf zone and near shore (shallow shelf). Below is a brief description of some of the major transitional zones and the native plant species this plan seeks to protect and support:

1. The **Active Beach** consists of the nearshore out to the depth of closure, the sub-tidal surf zone, which is constantly underwater, and the intertidal beach which is landward of the surf zone and is usually flooded at high tide and exposed when the tide is low. This is the area where the wave energy of the ocean seeking to destroy land is dissipated by friction with the bottom. This is the region where the storm waves carry the sand reserves from the dunes to create a larger and more effective energy dissipation zone during said storms. Post -storms, normal wave energy levels slowly return the excess sand to the beach flat.

a) **Vegetation:** On Amelia Island very little vegetation occurs in this area due to the changes caused by waves, currents, and tides. However, in south Florida and other more tropical areas, the mangroves prosper and help in absorbing the ocean's wave energy.

b) **Wrack or Drift line:** This is a zone of debris located on the high, high tide mark, often referred to as "wrack". The debris is mostly composed of smooth cordgrass washed down from the river and creek systems. It provides the nutrients for the dune system on an otherwise nutrient-poor dune system and the home for some of the lowest members (therefore most important) of the beach food chain. This area marks the daily boundary between the intertidal beach and the beach flat or upper beach. The importance of the wrack to the overall health of the beach dune system is why it is illegal to drive on, rake, burn or otherwise remove the wrack from the beaches on Amelia Island. It is acceptable and promoted to remove sea trash and plastics from the wrack material, but removal or destruction of wrack is subject to fines of up to \$50.00 per cubic yard of material removed or damaged.

2) The **Dry Beach** is an area of unconsolidated sand and shell between the intertidal beach and the fore dunes. It is affected by sand and salt spray leaving it sparsely vegetated. This is particularly true on beaches where the dunes have grown seaward to their natural limits. However, where the proper sand is available, the groundwater is shallow enough and winds are strong enough, sea oats, panic grass and other dune front plants will grow on the dry beach. With adequate winds, these can create incipient dunes and coppice mounds, a sign that Nature wants to expand the dune system in the area. Destroying or damaging native dune vegetation anywhere on the dunes or dry beach on Amelia Island is prohibited.

3) The **Foredune** is the first line of the dune coming from the water. In accreting (growing) dune systems it can be a hummocky collection of discontinuous dune mounds or foredune ridges that are relatively straight and uniform in slope and height. On the beaches of the southeast US coast, the foredunes are created by the natural trapping of windblown sand by the highly adapted oceanfront dune plants listed below.

Dune restoration and growth projects generally call for the proper planting (i.e. deeply enough for the entire root system to extend into the moist vadose zone in the sand just above the water table) of these

same plants. As these plants grow and prosper, they help trap sand and build, reinforce, and rebuild the dunes. Not planting deep enough and over irrigation are common causes of failed dune vegetation (Rogers and Nash, 2003). Sea oats and bitter panic grass should be planted very deep, during the spring or early summer, which is the early part of their growing season. Fixed irrigation systems are unnecessary as excessive irrigation can remove salt spray and encourage other plant species to invade the dune. Seedlings may require watering once a week until they are established, and then watering should be discontinued. The following list of native plants can be planted ten to twenty feet east of the most seaward dune line but not further east than the wrack line to help build dune height, volume and strength. At least four species of those listed should be utilized or present to help develop the entire foredune vegetation community.

Sand fencing can also help the dune growth process as described in Appendix B.

a) Plants of the foredune and back dry beach.

Perennials: Sea Oats (*Uniola paniculate*), Beach morning glory (*Ipomoea imperati*), Panic grass (*Panicum amarum*), Beach elder (*Iva imbricata*), Sea Purslane (*Sesuvium portulacastrum*), Railroad Vine (*Ipomoea pes-caprae*), and Seashore dropseed (*Sporobolus virginicus*).

Annuals: American Searocket (*Cakile edentula harperi*) will often appear in the early spring near the wrack line and foredune front slope to provide color and help in restoration

One invasive plant usually arrives by sea, the Russian Thistle (*Salsola kali*). Residents should be familiar with it and notify the Parks and Recreation Department if it is discovered on the beach or dunes

b) In high traffic areas of the beach, dune restoration post and rope “fencing” should be considered to provide protection to dune growth plantings while they are young. FDEP local approval is required, the rope must have at least three feet of clearance over the sand during the May 1 through November 1 Sea turtle season. Post and ropes must not narrow the dry beach width to less than 20 feet at high tide. Posts should be 1-1/2” by 3-1/2” (2 by 4) untreated wood, buried up to 2 feet into the sand.

c) Damaging FDEP permitted post and rope and any dune plantings is prohibited in the City of Fernandina Beach and Nassau County, subject to fines of up to \$500 and up to three months in the City Jail.

3. The **Coastal Strand /scrub** (sometimes referred to as the Maritime Dry Grassland) covers the active dune immediately inland from the foredune): The dune system vegetation moving landward of the foredune has several vegetative transitional graduations, largely based on ability to tolerate the salty air off the ocean. The topography of this part of the dune included swales, old foredune ridges, and terraces so ability to reach the ground water and handle its salinity is critical for vegetation survival because the permeability of the sand leaves the upper layers very dry and well drained. The stronger and continuous winds off the ocean salt-prune the entire beach/dune system.

This coastal strand/scrub provides protection against storm surge but also provides a unique micro-ecosystem critical for a lot of fauna from pollinators to gopher tortoises.



a) Native vegetation of the Coastal Strand/scrub (Maritime Dry Grassland) includes the plants of the foredune zone and adds plants moving landward including: Gulf Croton (*Croton punctatus*), Stinging nettle or Tread softly flower (*Cnidioscolus stimulosus*), Camphorweed (*Heterotheca subaxillaris*), Standing cypress (*Ipomopsis rubra*), \*Dune sunflower (*Helianthus debilis*), Greenbriar (*Smilax spp.*), \*Spiderwort (*Tradescantia ohlensis*), \*Seaside goldenrod (*Solidago sempervirens*), \*Prickly pear (*Opuntia stricta*), \*Spanish bayonet (*Yucca aloifolia*), \* Salt Meadow Cordgrass (*Spartina patens*), \*Blanket Flower (*Gaillardia pulchella*), \*Sea Oxeye daisy (*Borrchia frutescens*), \*Muhly grass, (*Muhlenbergia capillis*), Partridge pea (*Chamaecrista fabaceae*), \*Saw Palmetto (*Seronia repens*) \* seedlings and small plants available from native plant nurseries.

b) Several non-native plants have become damaging invasives in the dunes, specifically Kalanchoe or Mother of Millions (*Kalanchoe x houghtonii* and *Kalanchoe diagremontianum*), Asparagus fern (*Asparagus aethiopicus*), Air potato (*Dioscorea bulbifera*), Beach vitex (*Vitex rotundifolia*), and non-sterilized *Lantana camera*. It is prohibited to buy, sell or plant outdoors any of these plants in the Coastal Zone of Fernandina Beach and Nassau County. Any found growing in the area should be removed as soon as possible to avoid additional spread

4. **Intra-dune ponds:** These are depressions found in the swales between dunes that have permanent or seasonal water associated with them.

5. **Maritime Hammock:** Moving gradually landward toward and into the CUPZ, wind pruning and salt damage becomes less of an influence on the plants. There is a thickening of the vegetation, and it increases their heights and is termed a “thicket.” Many plants found in the grassland are also found in the thickets, which are located on these more landward dune structures. Here we also find more woody plants such as Wax Myrtle (*Morella cerifera*), Southern Red Cedar (*Juniperus virginiana*), Yaupon (*Ilex vomitoria*), Red Bay (*Persea borbonia*), Florida Privet (*Forestiera segregate*), Live Oak (*Quercus virginiana*), Poison ivy (*Toxicodendrod radicans*), and Salt bush (*Baccharis dioica*)

Unfortunately, several invasive plants listed above can work their way into the maritime scrub and Forest, perhaps no one more damaging than the Brazilian Pepper tree.

To control growth of all invasives, building permits will require that all listed invasives have been removed from the property and related dunes before occupancy

6. **Maritime Forest:** The maritime forest stands at the edge of the CUPZ dunes system. It is made up of all the species that are found in the maritime shrub thicket. The distinguishing factor is the height of the tallest plants. Once the height of the canopy reaches 5 meters (approximately 16 feet), it is considered maritime forest. Plants include sand oak, live oak, loblolly pine and wax myrtle.

Unfortunately, several invasive plants listed above can work there way into the maritime forest

## Wild Life in Dunes Area

There are many animal species associated with the beach and its transitional zones. Some species are characteristic of particular habitats already described.

1. **Surf Zone/Intertidal Beach/Beach Flats:** There are several invertebrate species that occupy these zones. The Ghost Crab (*Ocypode puadmata*), Coquina Clam (*Donak variables*) and Mole Crab (*Emerita talpoida*) are among the inhabitants of this zone. These smaller animals serve as a food supply for shore birds and sea birds. The Piping Plover (*Charadrius melodus*), the Willet (*Gatoptrophorus semipalmatus*),

the Sanderling (*Calidris alba*), and the Red Knot use this area to forage. Terns and gulls use this area as a resting space and scavenge dead animals washed ashore. Many migrating shore birds stop to feed on their arduous, sometime almost North Pole to South Pole seasonal migrations. Harassment of any shore birds by humans or their pets is prohibited in Fernandina Beach and Nassau County and subject to a fine not to exceed \$100.

2. Beach Flat: Several varieties of sea turtle use the beach flat for nesting. Loggerhead (*Caretta caretta*), Green (*Chelonia mydas*), and Leatherback (*Dermochelys coriacea*) turtles utilize Amelia Island beaches. The beach flat and associated dunes provide nesting sites for the Least Tern (*Sterna antillarum*), Wilson's Plovers, and Willets. Disturbing nesting shorebirds in any of the beach and dune areas is prohibited in Fernandina Beach and Nassau County subject to a fine not to exceed \$500.

3. Coastal Strand /scrub (Maritime Grassland): This area is an important forage site for a variety of birds including the Common Ground Dove (*Columbina passerina*), Uncommon Ipswich Savannah Sparrow (*Passerculus sandwichensis prenceps*) and Wilson's Plover (*Charadrius wilsonia*).

4. Intra-dune Ponds: These areas can be an important source of drinking water for birds and mammals. The water associated with these ponds is usually brackish or fresh.

5. Maritime Hammock: Because of the thickness and variety of cover offered in the thicket, wintering and neotropical birds use these areas as cover. In addition to the many small birds that use the thicket for cover, several hawks and other birds of prey forage here.

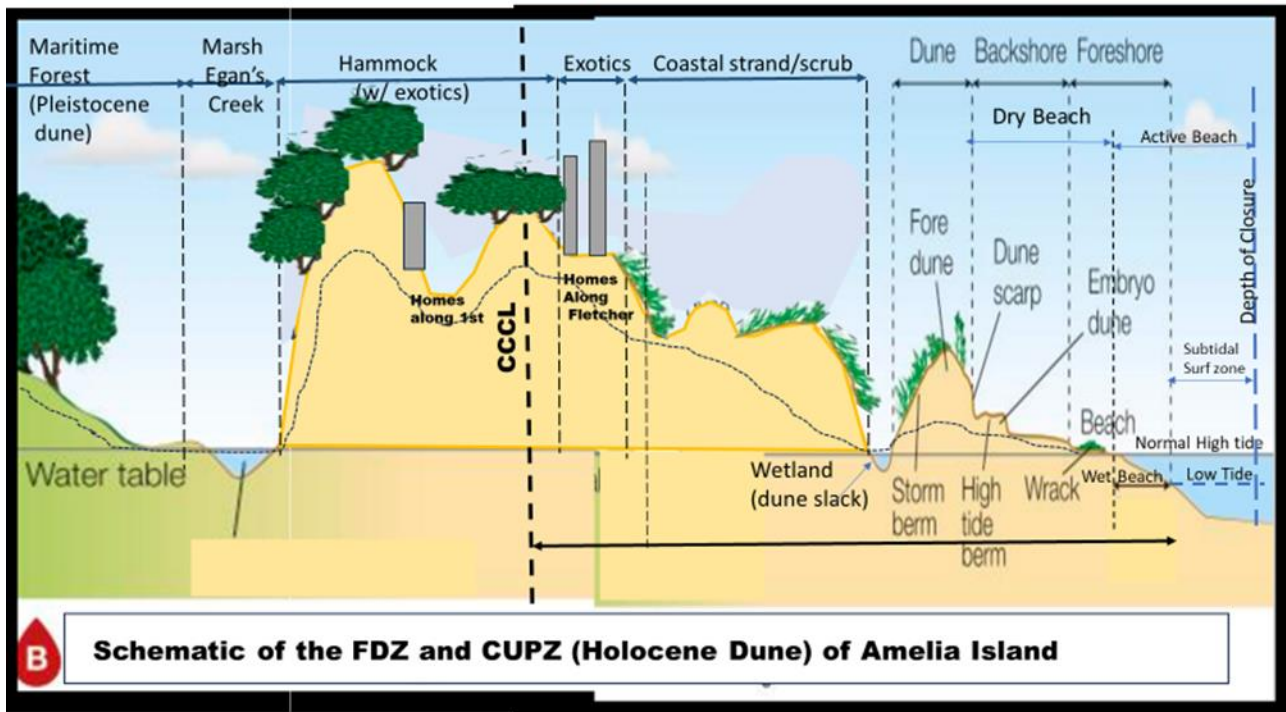
The existence and condition of the surf-beach-dune-maritime forest ecosystems is the reason why a tour operator advertises that there “are over 470 species of birds located on Amelia Island which might be why bird watchers around the country refer to Amelia Island as the “birder’s paradise” <https://florida-adventure-sports.com/birds-of-amelia-island/>. The City of Fernandina Beach and Nassau County are committed to developing and protecting its beach-dune system to enhance this reputation.

### **Vegetation pruning in the dune protection areas**

The City of Fernandina Beach and Nassau County prohibit pruning or cutting vegetation in the FDZ or CUPZ dune protection areas without written approval from the City Parks Department or the County arborist, certifying that it is done under the following conditions:

1. Work will be performed by a certified arborist who is approved by the City or County arborist. American National Standards Institute (ANSI) “A300 (Part 1) Tree, Shrub, and Other Woody Plant Maintenance – Standard Procedures (Pruning)” will be adhered to unless deviations are mutually agreed upon between the City or County Arborist and the arborist doing the work.
2. Pruning on the primary dunes may be performed only to remove noxious, non-native species.
3. The optimal pruning window for vegetation under four-inch (4”) DBH is during the months of December, January, and February.
4. Removal of trees of 4” DBH or greater shall be governed and permitted under the Tree Protection ordinance.

5. More extensive pruning may be permitted for quick growing, nonsensitive species such as wax myrtles and yaupons. However, the City reserves the right to restrict pruning and prohibit trimming or removal of certain sensitive dunes species.
6. All native plant cuttings will remain in the dunes and be allowed to decompose as a source of nutrition and to provide cover for wildlife. Exception: cuttings will be removed from boardwalks and beach accesses.
7. Chemicals and chemical applications may not be used on the dunes.



**Appendix B Sand fences:**

Nature-based methods of restoring coastal dunes and preventing wind erosion on coastal dunes includes properly located and erected sand fencing. However, because improperly located and erected sand fencing may interfere with emergency beach access, cause accumulation of debris, and discourage sea turtle nesting, no sand fencing shall be installed without a permit from the FDEP and City/County in the FDZ and the COFB or Nassau County in the CUPZ.

- 1) Sand fencing shall be a fence normally constructed of untreated and unpainted wood slats held together with twisted steel wire, with the fence being nailed or wired (Steel wire) to a minimum of 1.5 inch by 3.5-inch (2x4) wood posts that are spaced at intervals not less than five feet and are embedded no more than two feet into the sand. Post and fencing may not extend higher than four feet above grade. Plastic ties shall not be used to attach the fence to the post to prevent additional contribution to the oceanic micro-plastic pollution.
- 2) All sand fencing in the FDZ installed for dune building shall be installed in individual lengths of ten feet or less, running northwest to southeast (approximately on a 135-degree azimuth). The sections of sand fence will be spaced at least ten feet apart, parallel to each other, to allow sea turtles and pedestrians to pass through. This method of sand fencing encourages sand accretion and minimizes negative impacts to nesting sea turtles.
- 3) No later than the first April 1st following installation of any sand fencing, at least 20 dune plants shall be installed within three feet of the sand fence section installed
- 4) The land side of each sand fence shall be placed within five feet of the base of a dune scarp or front base of a healthy foredune.
- 5) Sand fencing will require maintenance and should be raised to continue effectiveness once sands cover 18" of any part of the fence.
- 6) Where sand wood slat fencing is used to prevent wind erosion of construction sites in the CUPZ, it should be installed at least ten feet northeast of the downwind property line. For controlling wind erosion only in the CUPZ, sand fencing by Access Rec LLC may be installed within three feet of the property line. Limits on length and spacing do not apply to any sand fencing in the CUPZ installed to control wind erosion.
- 6) The City Building Inspector shall have the authority to summarily remove, abate, or remedy any sand fence determined dangerous or prejudicial to public safety whether by reason of its location, or its subsequent state of disrepair or damage. Any fence so removed will be delivered to its owner if known, and if not, will be disposed of by the Public Works Department in an appropriate manner.
- 7) Property owners are encouraged to plant native vegetation on the frontal dune on their property.
- 8) Walking or transversing on the FDZ is prohibited except that ocean front property owners or their agents may traverse on (or over) the specific portion of the frontal dune within the limits of their property (above the mean high water mark), so as to make minor dune repairs, plant vegetation, install sand fencing and otherwise maintain the frontal dune on their property so that it may afford the intended degree of flood protection per this section.

### Appendix C - Dune Access Requirements

1. Wherever possible, existing public access maintained by the State, Nassau County or City of Fernandina Beach shall be preferred over private access. Therefore, the preferred access to the beach will be via public access for properties that directly abut or are adjacent to these access ways.
2. Wherever possible, common or shared access servicing multiple properties will be encouraged.
3. Site conditions and projected usage patterns will help identify if an elevated dune walkover or boardwalk is preferred over an at-grade access (Goat Path). This will be determined upon the dune class, the height of the foredune and the slope of the seaward dune face. Class 1 dunes with single family access, particularly those with a gradual foredune seaward dune face may be suitable for at-grade access. If the site is suitable for at-grade access it shall be no wider than 36 inches and the alignment shall be well marked. If the associated housing is subject to rental, rope and rope guide paths shall be installed. The actual crossing of the foredune shall be made from the northwest to southeast direction and never perpendicular to the waterline. Temporary (overnight) storage of beach gear or other materials along the goat paths is prohibited.
4. Where site conditions require an elevated private or publicly owned dune walkover or boardwalk, they must be approved by the Florida Department of Environmental Protection (FDEP) under the CCCL permitting process. Regional office approval may be obtained if all the following requirements are met. Deviations which may better meet the goals of the Office of Resilience and Coastal Protection, Coastal Construction Control Line Program to “encourage coastal resilience design features for beach access and dune walkovers to protect dune topography, dune plants and coastal wildlife from construction impacts, damaging foot traffic and to allow for the natural recovery of damaged or eroded dunes” must be approved by the Program’s Tallahassee office.
  - 1) Permits for walkovers contain standard conditions that require construction to be conducted in a manner that minimizes short-term disturbance to the dune system and existing vegetation.
  - 2) Replacing vegetation destroyed during construction with similar plants suitable for beach and dune stabilization *from the appropriate list in Appendix B* is required.
  - 3) Only limited excavation for the placement of support posts is allowed
  - 4) Walkovers cannot be constructed during the marine turtle-nesting season, which extends May 1 through October 31
  - 5) The walkover must be located and designed to protect dune features and to minimize disturbance of native vegetation.
  - 6) Walkovers must be located to not obstruct lateral beach access
  - 7) Design will minimize the amount of construction material that may become debris during a storm, *therefore no skirts, lattice or similar trim components, or spindle and post handrailing will be allowed in the part of a walkover in the 100-year FEMA VE Special flood hazard zone.*
  - 8) Note that on-grade permanent beach mats are structures that require CCCL permits.
  - 9) Walkovers are generally constructed over the frontal dune and perpendicular to the shoreline.
  - 10) Dune walkovers are designed to extend at least to the seaward toe of the frontal dune or the existing line of vegetation and are allowed no farther than 10 feet seaward of the vegetation.
  - 11) The optimum siting of the walkover structure can be determined by contacting a CCCL field inspector.

12) Walkovers are designed to be minor, expendable structures that pose only minimal interference with coastal processes and generate minimal amounts of debris. Therefore, extensive handrail systems including spindles or other dense side rails are prohibited.

13) Walkovers constructed across native beach and dune vegetation need to be post-supported and elevated a sufficient distance above the existing or proposed vegetation to allow for sand build-up and clearance above the vegetation.

14) *Decking of the walkover must permit rainwater to fall through to the dune vegetation at least every foot of run.*

15) Stairways and ramps leading from the dune bluff or crest down to the beach need to completely span the seaward slope of the dune without installing posts into unstable slopes steeper than approximately 30 degrees. Piles shall not be installed in the top of the foredune.

16) The structure must be designed to minimize the quantity of material used in construction, such as avoiding the use of vertical wood pickets, and reducing the length and width of construction on the beach.

17) Single family walkovers are not to exceed 4 feet in overall width and the support posts are not to be greater than 4-inch-wide posts.

18) Multi-family walkovers are not to exceed 6 feet in overall width and solid support posts are not to be greater than 6-inch-wide posts.

19) Round posts are preferred to square posts.

20) Support posts cannot be encased in concrete

21) Support posts are to have a minimum 5 feet of soil penetration or embedment.

22) Cross bracing is not required for most structures when following the designs in the document "Beach/Dune Walkover Structures," referenced at the end of this document.

23) Local governments and property owners are advised to consult with a CCCL Permit Manager prior to requesting a permit for a walkover that contains switchbacks, long ramps or other features required to comply with the Americans with Disabilities Act Accessibility Guidelines.

24) In crossing the coastal strand habitat characterized by more stable soil conditions with less blowing sands and infrequent storm overwash events, these more stable conditions allow for the development of a mature woody vegetation dominated by saw palmetto plant community. In addition to thick above ground stem and leaf vegetation between 5 and 15 feet in height, this plant community has an extensive below ground woody root mat. Walkovers in these upland habitats need be elevated only a sufficient distance above the ground to avoid disturbance of the soil and root systems or cutting of low tree and palmetto trunks. An elevation of the stringers from 6" to 2'-0" above existing grade is expected to be sufficient in many cases.

25) Walkover elevations crossing coastal wetlands within upland areas may require increased elevation above the surface.

26) Elevation of the walkover above the leaf canopy is in most cases impractical in coastal scrub or coastal strand habitats where careful pruning needs to be limited to removal of only those aerial branches to create an open passage. Deck elevations need to be no higher than five feet above grade to provide clearance for vegetation, and the movement of sand, water, and sea turtles underneath the structure.

27) Walkover Elevations over Bluffs. The low stringer elevation recommended for uplands can be carried to the landward side of the bluff line. This will reduce the length of a ramp or

walkover from the crest down to the beach. Again, the objective in establishing the walkover elevation is to reduce damage to coastal scrub soils and root systems.

28) Walkover Elevations over Dune Crests. Dune environments are characterized by mobile sands subject to storm effects (which lower grade elevations) and wind effects (which can raise elevation as sand is trapped). Dunes are dominated by coastal grassland plants adapted to the dynamic environment. These include sea oats, bitter panicum, and little bluestem. Walkovers sited within active dune systems are required to be elevated sufficiently to allow for sand movement and growth of vegetation. Walkover designs published in "Beach/Dune Walkover Structures" referenced below specify a 3'-10" minimum clearance from existing grade to the bottom of the stringers of an up to 6-foot wide (overall dimension) multi-family or public beach access structures, and a 3'-0" minimum clearance to the top of the deck for 4-foot-wide single family walkovers.

29) Walkover Elevations on Seaward Dune or Bluff Slopes. The elevation of the walkover at the dune crest and the distance of the seaward terminus from the water's edge determine the height of the steps or ramps crossing the seaward slope. The design objective is to get the structure down to the beach in as short a shore-normal (perpendicular to the shoreline) distance as possible while reducing the shore-parallel coverage of the slope.

30) FDEP guidelines require that the seaward terminus of the structure be no farther seaward than 10 feet from the line of permanent beach dune vegetation or the toe of the frontal dune. Reducing the seaward encroachment and shore-parallel width decreases the potential for storms interacting with the structure, interference with sea turtle nesting habitat, and interference with lateral public beach access.

*However, with increasing use of beach wagons, specialized wheeled chair and fishing stands, the COFB and Nassau County prefers to not use stairways to make elevation changes with new Community walkovers and will rely on ramp with slopes not to exceed 1V:6H slope, unless the location is suitable for ADA access in which case the slope will not exceed 1H:12H*

31) Walkovers designed for the Americans with Disabilities Act often increase the length of walkover ramps on the beach. *In Fernandina Beach, where the post-1964 constructed rock revetment running from Sadler Boulevard to the Fort Clinch State Park still provides a critical but mostly covered part of the dune/dike coastal protection system, long ramps will also be required for many ADA approved walkovers on the parking/road side also.* This rock revetment was also constructed at American Beach. Walkovers in these locations require a site-specific review for environmental impacts and to prevent any damage to the historic rock and concrete rubble revetment that runs from the north city limit to Sadler Boulevard and at American Beach.

32) The burial of the ramp or step terminus a minimum amount (0.5 to 1.0 feet)-foot below grade may allow for use of the walkover after some lowering of the beach elevation from minor storms. However, placement of this terminus below the depth of a post storm beach profile is discouraged as this portion of the walkover will most likely have been damaged by larger storms and to have interfered with coastal processes.

33) Elevated walkovers are not necessary in all site conditions and use situations. Where dune development is minimal, beach dune vegetation is sparse, and the use infrequent, on-grade footpaths may be preferred. The Department discourages solid concrete walks and footpath surfaces such as steppingstones that create debris or missiles. Other surfaces such as geotextile fabrics, cabled wood planks, or shell require a case-by-case review. No permanent path surfaces are allowed farther seaward than 10-feet from the dune or vegetation line or

within sea turtle nesting habitat. The height from the dune surface (sand) to the lowest horizontal part of the boardwalk (excluding piles or other vertical supports) shall be a minimum of 18 inches for retrofitted boardwalks and a minimum of 24 inches for new boardwalks or as high as it is wide, whichever is appropriate. The design height above the dune shall also consider the height of the surrounding dune.

*Additional requirements of the COFB and Nassau County include:*

*34) The dune walkover shall be designed to allow modifications as the dune grows in height and width with minimum damage to the dune.*

*35) If the ramp or stairs from the walkover lands on the active beach, designs with removable, retractable or breakaway sections may be considered. Use of pressure treated woods for breakaway section is prohibited to prevent collections of hazardous wastes on the beach.*

*36) Vertical supports shall be pilings or posts that are driven and are not to be encased in concrete or other footings. No heavy equipment or machinery shall be used to install the vertical supports.*

*37) Any portion of the boardwalk or stairs that are removed on a seasonal basis shall not be stored on beach or any portion of a vegetated dune. Storage is recommended to be on portions of the walkover that are not removed.*

#### **Dune Walkover materials of construction.**

The historic construction material for dune walkovers (and docks and boardwalks) called for wood, generally held together with galvanized steel nails, screws and bolts. These materials do not last long in coastal environments so a variety of toxic, water soluble wood preservatives were developed and generally universally used to extend the life of these facilities. Maintenance costs remained high while the usable life of the materials remained in the 10-25-year range. In the early 2000s, the EPA reviewed the most used of the outdoor wood preservatives, the so-called CCA (Copper, Chromate, Arsenic), for its hazards to public and worker health and safety and the environment. The EPA accepted a voluntary proposal of the wood products industry withdrawing sales of the pressure treated wood for children's playground materials and any enclosed structural use. Use for other outdoor uses like telephone poles, marine piling, dune walkovers, and boardwalks continued to be acceptable with appropriate warnings for worker, user, and environmental concerns. The EPA cited the lack of suitable alternatives for continuing to use the CCA treated wood in these applications.

In the past twenty years, researchers and manufacturers have developed a variety of chemically inert products that provide valid alternatives to the traditional pressure-treated wood. While these materials generally remain more costly than pressure-treated wood initially, their 50-year lifespan with minimal maintenance cost often makes them the low-cost option on a lifetime-of-ownership basis. This may not be true for any facility or part of a facility expected to be destroyed by storm surge every ten to twenty years.

The materials available currently include:

For vertical supports (piles)

- 1) Eco-piles made by Shoreline Plastics in Jacksonville Florida, a recycled PVC product reinforced with a fiberglass skin and internal webbing in an otherwise hollow tube or post



- 2) Pure spiral wound fiberglass piles made by Pearson Pilings of Somerville MA and a similar design by Fortress Piling of Georgia
- 3) Traditional wood piles covered with a PVC shrink sleeve, also manufactured by Shoreline Plastics in Jacksonville
- 4) PVC jackets installed over wood piles in place, with concrete injected into the annular space. The concrete and jacket provide additional strength and also contain the CCAs, destroy anything attacking the wood pile, and protect against additional damage. The jackets are also made by Shoreline Plastics.

For the substructure and pile caps:

- 1) Pultruded fiberglass structural members (C-Channel, I-Beams, Wide Flange Beams). With a strength to weight ration four times that of carbon steel, these provide significant advantage where long spans (over foredunes and other sensitive areas) or large load are expected. Those produced and machined by Bedford Reinforced in Bedford PA or equal are acceptable.
- 2) Structural reinforced composites (plastic woods) like those manufactured by Owens-Corning Wear Deck (Ocala FL) or equal will work to support pedestrian loads on the typical spans on dune walkovers.

Decking and handrailing materials.

- 1) Structural reinforced composites like the above-mentioned Wear Deck materials make excellent deck boards. Wear Deck consists of high density polyethylene (HDPE) encased with fiberglass tape and provided an epoxy skin with anti-slip, anti UV, and optional low heat retention additives. A wood grain is embossed on the skin.
- 2) PVC based 45% open surface deck boards like the Sunwalk Series 90 deck boards manufactured by Sunwalk Docks work well at the beach end of stair or ramps they will let the wave and wind energy through, reducing the potential to have the boards washed away in a storm. It also minimally disturbs sunlight and rainwater from reaching the dune under the walkover where maintaining vegetation growth is important
- 3) Pultruded fiberglass decking boards, Bedford Reinforced or equal, work well for heavy loadings
- 4) Marine grade 316 stainless steel horizontal wire railing systems, if approved by the FDEP, can be used with HDPE, Wear Deck type, or pultruded fiberglass vertical support post can create a very clean, modern looking handrail system with low wind resistance

Connectors

Given the long life of these new materials and the exposure to salt spray, marine grade 316 Stainless Steel hardware, nuts, bolts and screws are required to connect the parts of a non-wood dune walkover.

### **Dune walkover maintenance**

A properly maintained dune walkover can provide access to the beach that is safe for user and the dune and reflect the traditional image of the beach scene. One that is not built and maintained properly can be a safety risk to people, a threat to the health of the dune, and a visual eyesore. It shall be the policy of the COFB and Nassau County that before any Permit is issued on a property with an

associated dune walkover, that part of the permit process will include requirement that the walkover be safe and not represent an eyesore or it shall be removed. In Class 2-6 dune classifications, walkovers must extend to the beach side of the foredune or the building permit shall require fencing be installed at the back of the developed part of the property to restrict direct beach access across the dune.

**Publicly-Owned Dune walkovers design and bidding**

Whereas new materials for dune walkovers have developed at a rapid pace since the last update of the Walton and Skinner paper “Beach/Dune Walkover Structures, SUSF-SG-76” in 1999., the COFB will open the design and contractor bids to include all non-wood options. Bids packages should be prepared with a configuration, property survey, and required design load and criteria to allow the contractor to develop designs that can give the city the lowest lifetime cost. Prior to bidding, the City and County shall prepare an algorithm to calculate present value cost over a fifty-year lifetime, including the cost of capital and inflation rates. Bidders will be asked to estimate annual maintenance cost for their option.

In all bids, a separate cost to restore the dune surface to its original grade and re-vegetate with native plants will be required.

DRAFT

**Appendix D. City of Fernandina Beach Dune Walkovers and Accesses. (COFB only)**

Walkovers are often required to best meet the conflicting needs of dune protection and convenient beach access. Unfortunately, these are costly to build, and if not designed properly, even more costly to maintain.

In 2021, the COFB convened a “Dune walkover prioritization” committee of eight citizens to attempt to prioritize for the City Manager which walkovers had the highest priority in a rational way. This committee did great work in identifying criteria to make these choices; however, the committee charter did not permit them to look at the one critical factor: the need to improve the resilience of City by developing all dunes to meet the FEMA 540 rule to get beachfront property out of the VE Special Flood Hazard Zone.

The City Commissioners will reconvene the prioritization committee to review their earlier work plus consider the Dune Classification factors (Location of Boundary of FEMA VE Special Hazard Zone) in re-confirming the rank order of walkover investments that should be made.

The spreadsheet below will allow calculation of an overall priority. It requires assignment of a number from 0 to 6, relative to the structural and surface safety of the existing walkover, with 0 meaning perfect condition and 6 representing the need to be removed immediately as a safety hazard. Goat paths are given a safety rating of 3 by definition. The next criterion is public usage, a factor well considered by the 2021 Committee in their work. The most heavily used earn a 6 rating, down to the sparsely used earning a 0.

The third criterion relates to the need to support dune growth and development to enhance resiliency and strive to achieve the goal of eliminating the FEMA VE Zone in the City. The dune classification system described in Section IX is used to assign rankings, with the Class 1, which today provides total protection against the 100-year storm, getting a 1 and the areas where both sides of Fletcher are currently in the VE Zone rating a 6.

On the bottom of the chart is the relative weight assigned to each of the factors in determining the overall ranking. The Committee shall review and approve or modify these factors before application.

To encourage creating public-private partnerships in the development of walkovers and decrease the number of walkovers in the system, a public participation factor is finally applied. If adjoining property owners or a non-profit organization wants to contribute construction of a particular walkover, the ranking will be raised by a factor equal to unity plus the percentage of the walkover cost the private party(ies) are willing to contribute. Such a factor shall be applied as soon as a cost sharing arrangement is developed between the COFB and the private parties.

The Committee plus the City Engineer, the Parks and Rec Department representative and the Chief resiliency officer will meet annually on or about March 1 to re-evaluate the ranking for the coming budget cycle.



Example of storm surge entering the residential community through dune access paths. Photo taken during Matthew in North Myrtle Beach, SC on October 8, 2016.

