



## DEPARTMENT OF ENVIRONMENTAL PROTECTION

### COASTAL CONSTRUCTION CONTROL LINE DUNE PLANTING GUIDELINES

ISSUE: Beach and dune vegetation is damaged by natural events such as hurricanes or winter storms, or by human activities, such as the building of houses, decks and walkovers, or temporary activities such as clearing for construction access or beach nourishment pipelines. Sterile, dry planting conditions, remote locations and proximity to sensitive natural resources require the careful planning and execution of dune planting projects.

#### BEST MANAGEMENT PRACTICES:

1. Visit <https://floridadep.gov/rcp/coastal-construction-control-line> for information on permit requirements and contact information for your CCCL permit manager and local DEP Beaches field inspector.
2. Survey natural communities.
3. Select plants appropriate for the conditions.
4. Layout planting site for success.
5. Plant in cool, wet periods.
6. Avoid sea turtle nesting habitat and interference with sea turtle nesting.
7. Monitor success.

#### SURVEY NATURAL COMMUNITIES

1. Survey natural communities on-site or in adjacent areas comparable to the planting site. Take measurements of distance from the water line to the seaward-most vegetation line, the dune crest elevation, and dune widths. Measure the existing side slopes. For large projects requiring permitting, hiring a licensed Florida surveyor and mapper will help.
2. Note environmental conditions such as protection from wind and sun. Dig test holes to evaluate soil and soil moisture conditions. Note the depth where the sand becomes damp and more cohesive. This will be the planting zone for burial of the root ball.
3. Make a list of dominant plant types (grasses, herbs, shrubs) and species names existing on-site or on sites with comparable distances to the water line, elevation, soils, etc..

#### PLANT SELECTION

1. Compare the list of dominant species to the plants listed for sale from plant nurseries. Consult the Florida Association of Native Nurseries ([www.fann.org](http://www.fann.org)) to find growers. Inquire whether the nurseries are willing or able to propagate and contract-grow the plants. With several months to a year lead-time, many plants not commonly for sale can be grown.

2. Plant materials are best sourced from the same region as the planting site. If material cannot be found from the county or region, it should at least be true to its Atlantic or Gulf coast.
3. Salvage or transplant material on-site. See the notes below and the dune restoration planting references for recommended species, methods and seasons for transplanting. Many clump-forming grasses such as sea oats, *Uniola paniculata*, or stolon forming plants such as seaside goldenrod, *Solidago sempervirens*, can be divided and planted out successfully.
4. Select a diversity of plant types and plant species for each type. A good rule of thumb is to plant three or more dune species to ensure planting success and spread through the area. Layer the planting with clump forming tall grasses such as sea oats or bitter panicum with low groundcovers such as railroad vine and beach morning glory.
5. Sea oats and other herbaceous beach plants can be successfully planted when purchased as large, mature 'gallon' sized plants, small 'peat pot' propagules, or as bare root sprigs. Check the collected and nursery grown plants for green vigor and lack of brown dead leaves or mushy stems. Pull the plants from the pot and inspect the rootballs. The roots should be firm and bright, mostly white colored, and just holding the soil together.

## TRANSPLANTING SEA OATS

Greater than a 70% success rate is expected for transplanted sea oats. Researchers give a 70% survival rate for sea oats planted, watered in and left to depend on naturally available soil moisture. Commercial planters regularly provide a 90% or greater survival guarantee for installed nursery grown seedling plugs or pots on dune restoration projects and research and experience has shown that replanted sea oats also have high survival if handled properly. The key is not letting the plants dry out and planting them green side up, with the rooting nodes buried greater than 6-inches deep and portions of several leaf blades emergent from the sand.

It only makes sense that sea oat transplants have high survivability because the species is adapted to environments subject to frequent storm damage. Propagation by vegetative fragments is their primary means for reestablishing after storms, more so than seed germination. Once washed out and broken off by storm waves or when dug up, the rhizomes or thick root stems can live exposed to air for several days (3 days according to the research) before needing to be reburied or moistened. Sea oat plants dug and immediately planted and watered won't miss a beat as the feeder type rootlets can survive the "transplant shock." Sea oat plants dug for later planting can be separated and trimmed into planting units, kept under a water mister or "heeled-in" (laid in 6" to 12" troughs and covered back over with leaves sticking out), for several weeks before replanting. During this time the roots can develop new feeder rootlets. Other dune grasses such as bitter panicum, *Panicum amarulum*, and seashore paspalum, *Paspalum distichum*, are similarly adapted for vegetative reproduction and resprout from root fragments following storms.

Sea oat shoots emerging from beach sand. The shoots are estimated to be about four months old with the picture taken on St. Patrick's Day 2022 and the root buried under the sand expected to have been there since a late October 2021 nor'easter washed it up.



Sea oat shoots attached to root fragment broken off, transported and redeposited by storm waves. The lack of chlorophyll in the white stems indicate that the rhizome was buried 4" to 6" under sand. Note the new feeder rootlets emerging from the same nodes along the rhizomes from which the shoots grew.



## LAYOUT PLANTING SITE FOR SUCCESS

1. Grasses and groundcovers are spaced throughout the designated area in staggered rows an average distance of 9-inches to 18 inches apart. Dune grasses benefit more from being close to other grasses than suffer from the competition.
2. The most salt tolerant and hardy plants, such as sea oats, railroad vine, sea rockets and beach elder, are planted in the seaward rows. Less hardy plants, but equally important to the backdunes, such as beach sunflower and salt tolerant shrubs saw palmetto, woody goldenrod and scrub balm, are planted approximately 25 - 50 feet landward, in the lee of the dune or sand fences.
3. Plantings can emulate natural dune formation through the planting of a future dune crest, or spine along a sand fence parallel to the beach. Space subsequent planting rows seaward and landward of the spine further apart; eg. Center three rows of spine 12 inches on center, the adjacent seaward and landward rows 18 inches on center, then 24, then 36.

## PLANT IN COOL, WET PERIODS

1. Plantings during prolonged rainy periods require no supplemental irrigation.
2. Planting holes are dug the planting zone determined in the initial site survey. There, the roots are in the capillary zone of soil moisture within the dune. This will be a minimum of 6" deep for plants with a small aboveground portion. Larger planting units can be planted deeper.
3. Irrigating the planting site in dry times will ease the preparation of root holes. Deep, forestry style spades ensure the deep set of planting units. Modified tomato planters have been successfully used in dune plantings.
4. All planting units are fertilized and watered-in at the time of installation and thereafter irrigated and fertilized only as necessary until the plants are established and meet the survival criteria below. Periodic deep watering may be required for larger planted specimens and when there is a several week lack of rain during the first growing season.
5. Fertilization helps, especially with planting. Supplemental fertilization with ammonium nitrate at a low rate increases plant growth. Slow-release pelletized fertilizers work well.
6. Absorbent gels are not recommended as soil amendments in dune plantings. Water absorbent gels have not shown a benefit in research and can hold the moisture tighter than roots can pull the moisture out of them. Gels need to be properly mixed into the soil media to function, which may be possible in nursery growing media but difficult to perform correctly in the field. Gel that is placed in the bottom of a planting hole and not mixed will push the plant up out of the ground when re-hydrated and expanded.

## AVOID SEA TURTLE NESTING HABITAT

1. Avoid working within sea turtle nesting habitat on or seaward of the frontal dune or coastal armoring (e.g. seawall) during sea turtle nesting season, which is March 1 – October 31 in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties, April 15 – October 31 in Monroe and May 1 – October 31 in all other coastal counties.
2. Do not allow ground disturbance (such as digging), use of heavy equipment (trucks) or nighttime storage of heavy equipment or materials on the beach, on or seaward of the frontal dune crest or coastal armoring during sea turtle nesting season.
3. Schedule all activity during sea turtle nesting season in daylight hours and after the completion of all necessary marine turtle surveys and conservation activities within the project area.
4. In the event a nest is accidentally disturbed or uncovered during removal activities, work must stop and the FWC contacted immediately at 888-404-FWCC (3922), by calling \*FWC or #FWC, or sending a text to Tip@MyFWC.com, and by emailing marineturtle@MyFWC.com. If a nest(s) cannot be safely avoided, all activity within the affected project area will be delayed until complete hatching and emergence of the nest.

## MONITOR

1. Monitoring depends on project goals. Long term ecological restoration requires the most intensive monitoring.
2. Initially, document survival within the first week, month, three months, six months and year. Within 180 days, a minimum 80 percent overall survival rate of the planting units should be established, 80 percent of the planted area covered with the selected species and no significant gaps should be evident in the shore parallel direction.
3. Survival rates are determined by counting a minimum of 24 out of 30 randomly selected, initial planting units. Plants are considered to be surviving if they show clearly vigorous rhizomes and white, turgid roots. Grass species are expected to have achieved root penetration of 9-inches or greater as measured from the top of the root ball.
4. Setting up photo sampling sites in the same location and direction is a quick and easy ways to document planting success.
5. All deficient areas are replanted and the plantings maintained until the above success criterion are met. Irrigation systems and other structures placed during plant installation should be removed after the plantings are established.

## REFERENCES

"An Assessment of Florida's Remaining Coastal Upland Natural Communities." A.F. Johnson, J.W. Muller and K. Bettinger, Florida Natural Areas Inventory. August 1992.

"Atlas of Florida Vascular Plants," [www.plantatlas.usf.edu](http://www.plantatlas.usf.edu). Institute for Systematic Botany, University of South Florida. 2002.

"Dune Restoration and Enhancement for the Florida Panhandle." D.L. Miller, M. Thetford, C. Verlinde, G. Campbell and A. Smith. Florida Sea Grant College Program, UF/IFAS Extension. Document SGEb-76, available on the EDIS website at <http://edis.ifas.ufl.edu>. June 2018.

Florida Association of Native Nurseries. Plant Locator tool available at <https://www.fann.org/>.

"Hurricane Opal Beach and Dune Recovery: Sea Oats Planting Program," PBSJ. Florida Department of Environmental Protection. April 2001.

"Native Plants for Coastal Restoration: What, When, and How for Florida." Williams, M.J. USDA, NRCS, Brooksville Plant Materials Center, Brooksville, FL. 51p. Retrieved from <http://www.fl.nrcs.usda.gov/programs/pmc/flplantmaterials.html>. 2007.

"Restoration and Management of Coastal Dune Vegetation," Broome, etal. NCSU Cooperative Extension Bulletin AG-591.

"Potential Use of *Uniola paniculata* Rhizome Fragments for Dune Restoration." D.L. Miller, L. Yager, M. Thetford and M. Schneider, University of Florida. Retrieved from <https://onlinelibrary.wiley.com/doi/abs/10.1046/j.1526-100X.2003.00006.x>. August 2003.