Town of Highland Beach
Notice of Public Meeting Protocol

The Town of Highland Beach is committed to serving the needs of the public while also working to ensure the safety and health of the town's staff, the community, and visitors alike. In accordance with the State and the County's easing of the COVID-19 restrictions, effective June 01, 2021, all town departments reopened with regular operating hours.

That said, as an added layer of protection for the safety of all attending meetings in the Commission Chambers, the wearing of facial coverings or masks is required. Also, until further notice, social distancing requirements and in-person meeting capacity limits remains in place. For those interested, Zoom Video Communications and telephone participation are offered.

The following information is guidance for preregistration for in-person, Zoom or telephone participation, and for viewing and providing public comments at the meeting:

PREREGISTRATION FOR IN-PERSON ATTENDANCE/PARTICIPATION AT ALL MEETINGS:

- All interested persons, Quasi-Judicial meeting applicants, their representatives, and witnesses **must preregister** to attend/participate in a meeting by sending an email to Town Clerk Lanelda Gaskins at publiccomments@highlandbeach.us or contacting (561) 278-4548 no later than one (1) business day prior to the meeting date **(e.g. by 4:30 P.M. on a Monday, if the meeting is scheduled for that Tuesday, etc.)** The subject matter to be discussed must be included in the preregistration request. If the meeting is a **Public Hearing Quasi-Judicial meeting**, the subject matter and application number must be included in the preregistration request.
- In-person attendance/participation will be based upon the order in which the preregistration requests are received by the Town Clerk's Office. For **Public Hearing Quasi-Judicial meetings**, precedence into the Commission Chambers will be given to applicants, their representatives and/or witnesses over all others preregistered parties. The Quasi-Judicial meeting participants will also be allowed in the Commission Chambers at the time of the hearing that is relevant to their applicant/client.
- The Zoom Video Communications is an option for those individuals who are interested in participating on the meeting online or via telephone.

ZOOM PARTICIPATION:

Online or Telephone Access – Access to the meeting will begin on the date and time of the meeting.

- To Join Meeting: All interested persons **must preregister** to participate by contacting Town Clerk Lanelda Gaskins at publiccomments@highlandbeach.us or by calling (561) 278-4548 no later than one (1) business day prior to the meeting date **(e.g. by 4:30 P.M. on a Monday if the meeting is scheduled for that Tuesday; and by 4:30 P.M.).**
- Meeting access information and instructions will be provided to those persons two hours prior to the meeting.
- The video camera display feature will only be enabled for Public Hearing Quasi-Judicial matters and during public comments only. The video camera display feature will be disabled for public use.

For additional information on using Zoom, please visit Zoom Support by click on the following link: https://support.zoom.us/hc/en-us.

Viewing Only - To view the meeting, preregistration is not required. The public can view the meeting on the following:

- Highland Beach TV Channel 99 online streaming on the Town's website and via Highland Beach YouTube at https://www.youtube.com/channel/UCTAGr8WCa44Y3Q2Bb6UN2mw.

PROVIDING PUBLIC COMMENT:

Persons desiring to provide public comments must do so by one of the methods listed below. Public comments will be limited to five minutes (three minutes for special Commission meeting items only) per person during the designated section of the agenda. If an interested person desires to provide written public comment, all comments must be directed to Lanelda Gaskins, Town Clerk as follows:

TO SEND COMMENTS IN ADVANCE VIA EMAIL:

- To submit public comments, click on the link https://mmportal6.teammunicode.com// to go to the Agendas and Meeting webpage. At the top of the page click on "Public Comments" to submit your comments, or
- Submit your comments to publiccomments@highlandbeach.us.
- The Town will receive such public comments no later than two (2) hours prior to the meeting. If timely received, Town staff will read the public comment at the meeting.
- Live Zoom Video Participation - If attending via Zoom online, please follow Zoom instructions above. Once the meeting gets to the applicable public comment period, the host of the meeting will allow public participants (audio only) into the meeting from the waiting room, to provide live public comment.
- Live Zoom Telephone Participation - If attending via Zoom by telephone, please follow the instructions above. Once the meeting gets to the appropriate public comment period, the host of the meeting will allow public participants into the meeting from the waiting room, to provide live public comment.

Should you have any questions, please feel free to contact the Town Clerk's Office at (561) 278-4548.

Published: 05.26.2021/Updated 08.02.2021

AGENDA

NATURAL RESOURCES PRESERVATION ADVISORY BOARD REGULAR MEETING

Wednesday, February 02, 2022 AT 1:00 PM

TOWN OF HIGHLAND BEACH, FLORIDA
3614 S. OCEAN BOULEVARD
HIGHLAND BEACH, FL 33487
Telephone: (561) 278-4548

Website: www.highlandbeach.us

TOWN HALL COMMISSION CHAMBERS

1. **CALL TO ORDER**
2. **ROLL CALL**
3. **PLEDGE OF ALLEGIANCE**
4. **APPROVAL OF THE AGENDA**
5. **PUBLIC COMMENT** *(limited to three (3) minutes per speaker)*
6. **PRESENTATIONS**
   - A. Marine Patrol Vessel- Chief Craig Hartmann
   - B. Update on the November 3, 2021 Board recommendations to the Town Commission, and the previous recommendation pertaining to the palms located in the right-of-way along State Road A1A
7. **APPROVAL OF MINUTES**
   - A. November 03, 2021 Regular Meeting Minutes
8. **UNFINISHED BUSINESS**
   - A. Discussion on Scheduled Meeting Time

B. Board Members Updates

1. Dune Restoration- Margarita Chappelear

2. Bucket Tree Update- Nicole Stansfield

9. **NEW BUSINESS**

10. **ANNOUNCEMENTS**

February 08, 2022 - 1:00 P.M. Code Enforcement Board Regular Meeting

February 10, 2022 - 9:30 A.M. Planning Board Regular Meeting (Cancelled)

February 15, 2022 - 1:30 P.M. Town Commission Meeting

February 21, 2022- Town Hall Closed in Observance of Presidents' Day

11. **ADJOURNMENT**

Any person that decides to appeal any decision made by the Natural Resources Preservation Advisory Board with respect to any matter considered at this meeting, such person will need to ensure that a verbatim record including testimony and evidence upon which the appeal is based. (State Law requires the above Notice. Any person desiring a verbatim transcript shall have the responsibility, at his/her own cost, to arrange for the transcript.) The Town neither provides nor prepares such record. There may be one or more Town Commissioners attending the meeting.

In accordance with the Americans with Disabilities Act (ADA), persons who need accommodation in order to attend or participate in this meeting should contact Town Hall at (561) 278-4548 within a reasonable time prior to this meeting in order to request such assistance.

File Attachments for Item:

B. Update on the November 3, 2021 Board recommendations to the Town Commission, and the previous recommendation pertaining to the palms located in the right-of-way along State Road A1A

TOWN OF HIGHLAND BEACH
AGENDA MEMORANDUM

MEETING TYPE: Natural Resources Preservation Advisory Board ("Board") meeting

MEETING DATE February 2, 2022

SUBMITTED BY: Ingrid Allen, Town Planner, Building Department

SUBJECT: Update on the November 3, 2021 Board recommendations to the Town Commission, and the previous recommendation pertaining to the palms located in the right-of-way along State Road A1A

SUMMARY:

On December 7, 2021, the Town Commission reviewed and considered the November 3, 2021 Board recommendations. The Board recommendations are provided below (in bold) along with corresponding Commission direction.

- **To emphasize the consideration of a marine patrol vessel or boat and implement a program which would protect manatee populations and mangrove populations by slowing down traffic on the Intracoastal.** The Town Commission did not provide any direction to the Board regarding this recommendation. In the Recommendation Memorandum provided to the Town Commission, staff provided the various laws that currently protect both manatees and mangrove populations. The Town Code of Ordinances does not currently have any provisions regarding manatee protection; however, the Code does provide provisions specific to mangrove protection which are found in Chapter 20 (Planning and Development") (see Attachment No. 1). Note that at the December 7, 2021 Town Commission meeting, the Commission approved the purchase of a marine boat for the Town's Police Department Marine Patrol Unit. The Police Department will be making a presentation to the Board at the February 2, 2022 meeting regarding the status of the marine patrol vessel.

- **Expand the obligations of our current code compliance officer to walk the beach or do an evaluation of the beach so as to know what is or is not appropriately being done on the beach.** Consensus from the Town Commission was that they thank the Board for their input and suggested scheduling a follow-up discussion early next year. Note that the Town Commission will be discussing Town Strategic Priorities in February/March 2022.

Attached is the recommendation memorandum as it was presented to the Town Commission as well as the minutes from the December 7, 2021 Town Commission meeting.

At the November 3, 2021 Board meeting, staff advised the Board that the Town had contracted with Bartlett Tree Experts to conduct an assessment of the population of palms situated in the right-of-way along State Road A1A. On November 5, 2021, the Board was emailed the "Assessment of Roadway Palms" report provided by Bartlett Tree Experts (see attached). In an effort to advise residents of the report's recommendations, the Board may want to consider uploading the report to the Board's webpage and providing a Board summary of the recommendations in the next Manager's Minute. Note that Section 28-10 of the Town Code of Ordinances provides the following provisions regarding landscaping on the public right-of-way:

Sec. 28-10. Maintenance standards for cultivated landscape areas.

(a) General: The owner, and/or lessee of land subject to this chapter shall be responsible for the maintenance of all landscaping located on their property and on adjacent public rights-of-way, which shall be maintained in good condition so as to present a healthy, neat and orderly landscape area which shall include, but not be limited to, weeding, mulching, fertilizing, pruning, mowing, and edging as generally set forth in this section.

***

(c) Maintenance of plants, trees and landscaping; replacement: All required plants, trees and landscaping shall be maintained in a healthy, pest-free condition. Within six (6) months of a determination by the building official that a plant, tree or other landscaping is dead or severely damaged or diseased, the plant, tree or landscaping shall be replaced by the property owner or owners in accordance with the standards specified in this chapter. If the plant, tree or other landscaping is located in the public right-of-way and the plant, tree or landscaping dies or is severely damaged or diseased, the adjacent property owner shall be required to replace the plant, tree or other landscaping. However, if the palm tree, that is dead, diseased or severely damaged, was initially installed by the town or the state, then the adjacent property owner shall not be required to replace the palm tree.

(d) Removal of dead, diseased or dangerous trees or shrubs: It shall be the responsibility of each private property owner to remove any dead, diseased or dangerous trees or shrubs, or parts thereof, which overhang or interfere with traffic control devices, public sidewalks, rights-of-way or property owned by the town. The town shall have the authority to order the removal of any such trees or shrubs.

ATTACHMENTS:

Attachment No. 1 – Mangrove-related provisions (Town Code of Ordinances).

Board Recommendation Memorandum provided to the Town Commission on December 7, 2021.

Town Commission minutes – December 7, 2021.

Bartlett Tree Experts report

Sec. 20-138. Special provisions for the protection of mangroves[1].

(a) *Generally.* In addition to the foregoing tree protection requirements, the following special provisions shall apply to the removal or alteration of mangroves (Black Mangrove, *Avicennia germinans;* White Mangrove, *Laguncularia racemosa;* Red Mangrove, *Rhizophora mangle*).

(b) *Replacement.* Mangroves may not be removed unless the developer replaces or relocates on the same development site at least an equal number of mangroves, necessary to revegetate a land area equal to or greater than the land area from which mangroves were removed. The developer shall provide a plan to be approved by the building official or designee, to assure the survival of the replaced or relocated mangroves and to stabilize the shoreline from which mangroves were removed. The approved plan is an express condition of any permit. Failure to carry out any provision of the plan shall be a violation of this Code.

(c) *Other protective measures.* The following protective measures apply to all mangroves.

(1) A permit shall be obtained from DER for any alteration of mangroves in jurisdictional waters.

(2) A permit shall be obtained from the town for any alteration of mangroves which are exempt from DER permit requirements.

(3) Standards for alteration of mangroves shall be those contained in Rule 17.27, Mangrove Protection, of the Florida Administrative Code.

(Ord. No. 597, § 1(2.19), 8-22-90)

1 Note that certain exemptions to this provision apply including lots or parcels of land on which a single-family home is used as a residence, except historic or specimen trees on such parcels.

TOWN OF HIGHLAND BEACH
RECOMMENDATION MEMORANDUM

TO: Town Commission

MEETING DATE: December 7, 2021

FROM: Ingrid Allen, Town Planner, on behalf of the Natural Resources Preservation Advisory Board ("Board")

SUBJECT: November 3, 2021 Board recommendations

ACTION:

At the November 3, 2021 Board meeting, the Board provided the following recommendations (in bold) to the Town Commission (staff comment is provided in italics):

1. **To emphasize the consideration of a marine patrol vessel or boat and implement a program which would protect manatee populations and mangrove populations by slowing down traffic on the Intracoastal.** *Staff advised the Board of the Town Commission's discussion at both the September 21 and October 19, 2021 meetings regarding the potential establishment of a Town of Highland Beach Marine Patrol Unit including Police Chief Hartmann's presentation on such topic on October 19, 2021. Board discussion, prior to the above recommendation, included amending the Town Code of Ordinances (Chapter 5 - "Beaches and Boats") in an effort to provide protection for manatees and mangroves. Based on the latter discussion, staff suggested that the Board look at other municipal codes to see how they address manatee and mangrove protection. Note that the Florida Legislature enacted the 1996 Mangrove Trimming and Preservation Act. This law regulates the trimming and alteration of mangroves statewide. In addition, manatees are protected by the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973 and the Florida Manatee Sanctuary Act of 1978. Pursuant to Section 2-140(g) of the Town Code, the Board can assist the Town Commission, upon Commission request, with items and issues related to waterways within the corporate limits of the town including boat wakes, manatee protection and mangroves.*

2. **Expand the obligations of our current code compliance officer to walk the beach or do an evaluation of the beach so as to know what is or is not appropriately being done on the beach .** *On July 1, 2020 the Board made a related recommendation to the Town Commission to hire an environmental maintenance employee "to traverse the beach and pick up debris." Given the Town Commission adopted a hiring freeze during the state of local emergency declared as a result of the COVID-19 Pandemic (Reso No. 20-009), the recommendation was not considered (Note that the hiring freeze*

has since been lifted). Board discussion included the enforcement of the following "littering" provisions found in Section 5-9 of the Town Code:

> *Beaches means that area abutting the Atlantic Ocean consisting of predominantly sand, whether below or above the mean high water mark.*
>
> *(b) Prohibited. No person shall leave or deposit any trash, refuse or debris on any beach. Any such trash, refuse or debris shall be placed, when available, in a container clearly marked by the town for such purpose. If there is no receptacle, or if the receptacle is full, all trash or refuse must be removed from the beach.*
>
> *(c) Private beaches. In regard to that portion of the beach determined to be private property, no person shall place or deposit on any such beach any trash, refuse or debris. Further, the owner of the private property shall not allow trash, refuse or debris to remain on his property for a period of time greater than seven (7) days after notification by the town. Any such trash, refuse or debris located upon private beachfront property shall be properly disposed of in a manner otherwise provided by the codes and regulations of the town.*
>
> *(d) Violation. Any private property owner found to be in violation of this section shall be subject to the jurisdiction of the town's code enforcement ordinance, and subject to penalties prescribed by the code enforcement board for each day a violation is determined to exist.*

ATTACHMENTS:

None.

5. PRESENTATIONS / PROCLAMATIONS

A. Resolution No. 2021-036

A Resolution of the Town Commission of the Town of Highland Beach, Florida, ratifying the selection, appointments, and term of office of members of the Code Enforcement Board; and providing for an effective date.

Mayor Hillman read the title of Resolution No. 2021-036.

Town Manager Labadie presented this item.

The Town Commission interviewed Mr. James Murray and inquired about his interest to serve on the Code Enforcement Board.

MOTION: David/Gossett-Seidman - To approve Resolution No. 2021-036 appointing James B. Murray to the Code Enforcement Board.

Resolution No. 2021-036 was approved unanimously on a 5 to 0 vote.

B. Presentation by the Natural Resources Preservation Board Chairperson Steven Parks on Beach Raking (This item was added to the agenda)

Chairperson Parks presented a PowerPoint presentation and discussed beach raking on the beach, beach raking equipment, an article on the necessity of seaweed also known as sargassum on the beach, and showed a Permit issued by the Florida Department of Environmental Protection for Beach Raking.

Mr. Robert Patek of 4217 South Ocean Boulevard, Highland Beach, Florida, provided comments about the beach related to dogs on the beach, nuisances, beach cleaning, and beach raking debris.

Town Clerk Gaskins passed out a handout provided by Mr. Patek that included his recommendation to the Town Commission. Mayor Hillman asked that Mr. Patek consider coming back to the Town Commission at a later date to provide the rest of his comments.

C. Beach Rakers Presentation (Information Only) (This item was formally 5B)

Mayor Hillman read the title of Item 5.C.

Town Manager Labadie explained the purpose of the item was to update the Town Commission on beach raking.

Mr. Clayton Peart of Universal Beach Services, Corp., and Mr. Chip Jones of Beach Raker was present. Both of the gentlemen spoke about beach raking in Highland Beach and their equipment to rake the beach.

Mayor Hillman asked that Mr. Peart and Mr. Jones figure out a way to stop leaving tire tracks on the beach.

Mr. Patek proceeded with his comments about beach raking on the beach related to trash picked up, the burial of the debris, and tire ruts caused by the beach raker's equipment.

Natural Resources Preservation Advisory Board Chairperson Parks also continued with his comments about raking on the beach.

Following the presentations, Mayor Hillman suggested scheduling a follow-up discussion early next year.

6. PUBLIC COMMENTS

A. Mr. Jeffrey Kleiman's Email

Town Clerk Gaskins read Mr. Jeffery Kleiman's email commending the Town Commission, Town Manager and Police Chief on their latest achievement related to public safety, such as the creation of the Fire and Rescue Department, the Police Marine Unit, enhanced crosswalk lighting, safety flags, public education, and the Building Recertification program.

Mr. Greg Harrington of 3115 Ocean Terrace inquired about the safety of the large group of bicyclists traveling through the Town. Also, Town Manager Labadie and Chief of Police Craig Hartmann provided remarks about the bicyclists and the Town's efforts on this matter.

7. ANNOUNCEMENTS

Board Vacancies

Code Enforcement Board - One vacancy for an unexpired term ending September 2022

Financial Advisory Board - One vacancy for an unexpired term ending April 30, 2022

Mayor Hillman read the announcements as follows:

Meetings and Events

December 09, 2021 - 9:30 A.M. Planning Board Regular Meeting

December 21, 2021 - 1:30 P.M. Town Commission Meeting

December 24, 2021 - Town Hall Closed in Observance of the Christmas Holiday

Board Action Report

None.

MOTION: David/Hillman - To approve Resolution No. 2021-042 designating Vice Mayor Natasha Moore as a Highland Beach Canvassing Board member.

Resolution No. 2021-042 passed unanimously on a 5 to 0 vote.

B. Approve the purchase of the Fluid Watercraft marine boat in the amount of $163,799.00 for the Highland Beach Police Department Marine Patrol Unit.

Mayor Hillman read the title of item 11.B. into the record.

Chief of Police Hartmann introduced this item.

Town Attorney Torcivia mentioned preparing a Standard Addendum Agreement for this purchase.

MOTION: David/Gossett-Seidman - To approve the purchase of the Fluid Watercraft marine board in the amount of $163,799.00 for the Highland Beach Police Department Marine Patrol Unit.

The motion passed unanimously on a 5 to 0 vote.

C. Natural Resources Preservation Advisory Board November 03, 2021 recommendations.

Mayor Hillman read the title of item 11.C. into the record.

Town Planner Ingrid Allen presented and spoke about the Natural Resources Preservation Advisory Board November 03, 2021 recommendations.

There were discussions about the condition of the beaches, adding more bucket trees, and how the condominiums maintain their beaches. There was also discussion on whether or not there should be an ordinance restricting tire tracks on the beach.

D. Approval of Commission Meeting Minutes

Mayor Hillman read the title of item 11.D. into record.

November 09, 2021 Commission Meeting Minutes

December 02, 2021 Commission Meeting Minutes

MOTION: David/Moore - To approve the November 09, 2021 and December 02, 2021 Commission Meeting Minutes as amended.

The Meeting Minutes were approved unanimously on a 5 to 0 vote.

E. Update on Educational Campaign for the Charter Questions (This item was added to the agenda)

November 3, 2021

Mr. Pat Roman
Town of Highland Beach
3616 South Ocean Boulevard
Highland Beach, Florida 33487

Re: Assessment of Roadway Palms

Mr. Roman,

I have performed a limited visual assessment of a population of palms situated in the rights of ways for the Town of Highland Beach. This report is being written per your request. My assignment is to assess the condition of the subject palms and provide recommendations for management. My assessment is limited to the condition of the palms as observed on September 27, 2021. The purpose of this report is intended as a tool to allow the tree owner to make an educated tree management decision. My assessment was performed from the ground. I did not climb any trees or use any aerial lift equipment. No tree risk assessment was performed as this was outside the scope of the assignment.

The subject palms are situated along the Town's rights of ways. This is a coastal community on the barrier island in South Florida. The properties along this stretch of road comprise of single family residences and condominumiums. These buildings vary in height. The palms are just a couple hundred feet from the ocean.

The majority of the roadway palms are comprised of royal palms (*Roystonea regia*). The palms range from a poor to good condition. Many of the royal palms are showing damage to the lower fronds. This damaged is expressed as discolored, frizzled palm fronds. The palms are also showing signs of nutrient deficiency, which is common in South Florida.

The site conditions for this area can be hostile to plant material. Salt spray can be pushed up over the dune and affect plants. The salt desiccates the foliage, creating a "burned" appearance. The soil is primarily sand. These soils lack the specific nutrients that palms prefer, they do not retain nutrients very well so the nutrients often leach deep down into the soil, and the soils are very alkaline and have a high pH.

Different plant species have varying tolerance to salt spray. Some plants have a high tolerance for salt spray and some plants have a low tolerance. Royal palms are reported to have "moderate" tolerance to salt spray. The Florida Native Plant Society list royal palm as having some tolerance to salty wind but not to direct salt spray. Anecdotally, I would suggest that this species of palm is not very tolerant to salt spray.

The exposure of these palms to direct salty winds varies based on its location along the roadway. Some of these palms are well protected by tall buildings. Other palms are very exposed to direct winds coming off the ocean. The direction of the winds also change throughout the year, with winter winds being predominately from the northeast direction. It is very common to observe plants with salt damage in winter along the South Florida coast. Even plants that are reported to have a high salt tolerance such as coconut palms (*Cocos nucifera*) or date palms (*Dactylifera spp.*) show salt damage to the lower leaves.

I would suggest that the damage that can be observed on the royal palms is mostly due to salt damage. They are also showing signs of nutrient deficiency, specifically potassium. Potassium deficiency causes the lower fronds of palms to turn brown and die prematurely. Once the palm fronds are damaged or discolored, that particular palm frond will never recover. The frond will remain discolored or damaged until it falls off or is removed. Palms are genetically programmed to only produce a predictable number of palms fronds each year. It is important to keep the palms as healthy as possible to allow them to retain as many healthy fronds as possible at all times.

Salt damage can be difficult to mitigate. Management would start by selecting plant material that is very salt tolerant. Washing the leaves off with fresh water can mitigate salt burn, but this treatment is time consuming and would not likely be practical on the Town's palms. By promoting good cultural practices, it may be possible to increase the number of live and unaffected palm fronds in the crowns of these palms to improve appearances. Cultural practices would include proper irrigation, mulch over the roots of the palms, and proper fertilization.

Based on my observations I would recommend the following:

- Audit and ensure adequate irrigation based on current rainfall.
- Remove any turf and install a layer of organic mulch to create a tree ring around the palms. Mulch should be installed to a depth of 2 inches.
- Begin a fertilization program as recommended by University of Florida. This would include quarterly application of 8-2-12 or 8-0-12 palm special granular fertilizer applied at a rate of 1.5 pounds of granular per 100 square feet of palm canopy area. Applications should be made every three months and can be supplemented with a granular sulfur product to adjust pH.
- Or, affected palms can be removed and replaced with a species with higher salt tolerance such as coconut palms or date palms.

If you have any questions about my observations or recommendations, please contact me.

Regards,
Jonathan

Jonathan S. Frank
ASCA Registered Consulting Arborist #618
ISA Board Certified Master Arborist #FL-5250BT
FDACS Certified Pest Control Operator #JF283138

Limits of the Assignment

The tree assessment was performed from the ground for visual conditions. This tree inventory was not a tree risk assessment. As such, no trees were assessed for risk in accordance with industry standards, nor are there any tree risk ratings or risk mitigation recommendations provided within this report.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

Illustrations, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

Information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection. There is no warranty or guarantee, expressed or implied, that problems of deficiencies of the plans or property in question may not arise in the future.

There is no guarantee for the preservation of the trees contained in this report, however, the preservation plan is made with the best interest intended for the trees being preserved.

Fertilization of Field-Grown and Landscape Palms in Florida[1]

Timothy K. Broschat[2]

Palms growing in Florida landscapes or field nurseries are subject to a number of potentially serious nutrient deficiencies. These deficiencies are described and illustrated in document ENH1018. Prevention and treatment of these deficiencies is the subject of this document. Chemical symbols used in this document are as follows: N=nitrogen, P=phosphorus, K=potassium, Mg=magnesium, Ca=calcium, Mn=manganese, Fe=iron, B=boron, Cu=copper, Zn=zinc.

Fertilizer Formulation

Nutrient deficiencies are more easily prevented than corrected once they occur. Correction of nutrient deficiencies can take as long as 2 or 3 years for some elements. Research at the UF/IFAS has shown that regular use of a fertilizer having an analysis (the three numbers on all fertilizer labels which refer to their N-P_2O_5-K_2O content) of 8N-2P_2O_5-12K_2O +4Mg with micronutrients can correct mild to moderate deficiencies and prevent their recurrence in most soil types in south and central Florida (Broschat 2015b; Broschat et al. 2008). However, not all fertilizers that have an analysis of 8N-2P_2O_5-12K_2O+4Mg with micronutrients are effective and, if improperly formulated, may be worse for palm health than no fertilizer at all.

It is essential that 100% of the N, K, and Mg in such a fertilizer be in slow release form. Since Florida's soils have very low capacities to retain these elements in the root zone during periods of heavy rainfall or irrigation, the only effective way to keep these elements readily available to plants during the 2 to 3 month interval between fertilizer applications is to use slow release sources (Broschat 1996; Broschat 1997). A water-soluble source applied one day could be completely leached out of the root zone the next day by a heavy rainfall, and the palm would receive no benefit from the application. Controlled-release fertilizers are not greatly affected by rainfall or irrigation intensity. Since they release more slowly than water-soluble fertilizers, they are also less likely to burn plant roots during periods of drought.

Unlike the macronutrients N, K, and Mg that should be in slow release form, most micronutrients need to be in a water soluble form. However, granular slow release forms of boron are safer and more effective for Florida landscape soils.

Effective sources for N include sulfur-coated urea, urea-formaldehyde, resin-coated urea, and resin-coated ammonium salts. Of all the slow-release K sources tested, sulfur-coated potassium sulfate was found to be the most effective and economical (Broschat 1996). Prilled kieserite (a more slowly soluble form of magnesium sulfate than Epsom salts) is an effective and low-cost slow release form of Mg. Coated Mg products tend to release too slowly to be effective (Broschat 1997; Broschat and Moore 2006). Slow release B sources, such as Granubor, are less affected by leaching than the water soluble B sources often used in landscape fertilizer blends (Broschat 2008). The only

1. This document is ENH1009, one of a series of the Environmental Horticulture Department, UF/IFAS Extension. Original publication date September 2005. Revised October 2011, September 2014, and November 2016. Reviewed December 2017. Visit the EDIS website at http://edis.ifas.ufl.edu.

2. Timothy K. Broschat, professor, Environmental Horticulture Department; UF/IFAS Fort Lauderdale Research and Education Center, Davie, FL 33314.

recommended Mn, Zn, and Cu sources are the sulfate forms of these elements (Broschat 1991). Since iron sulfate is rather ineffective on most Florida soils, granular chelated products such as Trachelene Fe are preferred for blending into palm maintenance fertilizers (Broschat 2005).

Another reason why 100% of the N, K, and Mg must be in controlled release form is that the release rate of a nutrient source can determine the "effective analysis" of the blend. If heavy rainfall or irrigation occurs, any water soluble nutrients will be rapidly leached out of the root zone, while controlled-release sources are still releasing nutrients into the soil. This differential leaching of soluble vs controlled-release nutrient sources can alter the effective ratios among the various elements, often with detrimental effects on palm nutritional health. The soil N:K, N:Mg, and K:Mg ratios are very important for palm health, and it is essential that all three elements have similar release rates in order to keep these ratios constant over time.

Fertilizer Application

How you apply a fertilizer can also determine whether the application will be effective or not. Concentrating fertilizer in holes, as spikes, or in bands around the trunks of palms is less effective than spreading the same amount of fertilizer uniformly throughout the area under the canopy. This is because nutrient movement is almost exclusively downward in direction, and thus only that small proportion of the palm root system directly under concentrated fertilizer will ever be exposed to these nutrients. A concentration of fertilizer is also much more likely to burn palm roots than fertilizer spread out over a larger area. Injecting water-soluble fertilizers into the "root zone" of palms is never recommended because 1) water-soluble fertilizers are readily lost to leaching, 2) lateral movement of injected fertilizer is minimal, and 3) injecting any nutrients deeply enough to avoid turfgrass roots will also miss the majority of the palm's fine feeder roots, which tend to intermingle with turf roots near the soil surface.

Although trunk injection of micronutrients such as Mn has been shown to be effective (Broschat and Doccola 2010), this method is not recommended for palms except in cases where soil applications have been ineffective in alleviating chronic micronutrient deficiency symptoms. Since palms lack a vascular cambium and, thus, the ability to heal over wounds in the trunk, any holes created in the process of injecting palm trunks will remain as permanent scars and may provide entry sites for diseases or insect pests.

The 8N-2P_2O_5-12K_2O+4Mg with micronutrients maintenance fertilizer blend described above should release nutrients for up to three months, and thus a three-month application interval is recommended. The suggested application rate for south Florida landscapes is 1.5 lbs of the 8N-2P_2O_5-12K_2O+4Mg with micronutrients fertilizer (not N) per 100 sq. ft. of palm canopy area, bed area, or landscape area. Field nurseries typically apply twice that amount to maximize growth (Broschat 2015b). For landscapes in central and north Florida, winter applications can be omitted and lower application rates may also be adequate, although field nurseries in those regions will probably benefit from the higher south Florida application rates.

Fertilization in Areas where Summer Applications of N and P Are Prohibited

Some counties or municipalities in Florida prohibit the application of P fertilizers unless soil tests demonstrate that P is deficient. In addition, all N and P-containing fertilizers may be prohibited during the rainy months of June through September. Since this is a period when palm nutrient demands and leaching of existing soil nutrients are the greatest, proper fertilization is essential. However, earlier studies have suggested that N may not be as limiting during this warm wet season due to higher rates of natural organic matter decomposition. A recent study has shown that P fertilization may not be necessary at all under most Florida landscape conditions and an 8N-0P_2O_5-12K_2O+4Mg was as effective as the traditional 8N-2P_2O_5-12K_2O+4Mg formulation (Broschat 2015a). This study also showed that if the 8N-0P_2O_5-12K_2O+4Mg product was applied in February, May, and November, but the August application received a similar controlled release palm fertilizer that contained no N or P, then the resulting palm quality was as good as for those palms that received the 8N-0P_2O_5-12K_2O+4Mg product for all four applications. These no N or P palm fertilizers have an analysis of 0N-0P_2O_5-16K_2O+6Mg plus micronutrients. Contact your county Extension agent for information about the availability of these products in your area.

The 8N-0P_2O_5-12K_2O+4Mg fertilizers described above are suitable for all palm species growing in all soil types found within the state of Florida except for the muck soils of the Everglades Agricultural Area. In those soils, sufficient N is released naturally to provide more than enough N for optimum palm growth. However, if the standard 8N-0P_2O_5-12K_2O+4Mg fertilizer is used on these soils, the additional N from the fertilizer combined with that released from the

soil can result in excessive N relative to K, Mg, and other elements and could make deficiencies of those elements more severe. In those soils, the 0N-0P_2O_5-16K_2O+6Mg formulation described above is recommended.

Use on Entire Landscape

While the 8N-2P_2O_5-12K_2O+4Mg with micronutrients maintenance fertilizer described above was developed primarily for the nutritional requirements of palms, other types of plants, including broadleaf trees, shrubs, herbaceous ornamentals, fruit trees, and even turfgrass growing in the same soil are subject to the same inherent nutritional deficiencies in these soils (Broschat et al. 2008). Since palm nutritional requirements are higher than those for other types of plants, a fertilizer that is suitable for palms will be more than suitable for other types of plants. Comparative trials at the UF/IFAS Ft. Lauderdale Research and Education Center have shown that St. Augustinegrass fertilized with the above palm maintenance fertilizer had quality equal to that produced by a high quality turf fertilizer (Broschat et al. 2008).

Use of the above 8N-2P_2O_5-12K_2O+4Mg with micronutrients fertilizer is recommended for use on the entire landscape. This not only simplifies fertilization by having to use only a single product, but eliminates a serious problem encountered when high N turf fertilizers are applied to turf areas with palms growing nearby. Roots of large palms typically extend out 50 feet or more from the trunk in all directions and will take up whatever fertilizers have been applied to the turfgrass. The high N:K ratio and the lack of any Mg in most turf fertilizers forces rapid growth in palms, but without sufficient K or Mg to support that growth, this growth dilutes the existing K and Mg reserves within the palm and induces or exacerbates K and/or Mg deficiencies in the palms. High N fertilizers applied to turfgrass, even 30 feet away from a palm on one side only, have been known to kill palms from induced K deficiency. Given the high value of most specimen palms, applying high N fertilizers to the palms or to nearby turfgrass is no bargain, no matter how much less it may cost.

Sometimes it may not be possible to control what kinds of fertilizer are applied within the area covered by a palm's root system. For example, you may have a large palm relatively close to your property line. While you may be properly fertilizing your palm and lawn with the recommended 8N-2P_2O_5-12K_2O+4Mg, your neighbor may be fertilizing his lawn with typical turf fertilizers that will negatively affect the health of your palm. A recent study has shown that if the turfgrass near a palm has been fertilized with a typical high N:K ratio turf fertilizer, the negative impacts can be prevented by fertilizing the area under the canopy of the palm with the no N or P 0N-0P_2O_5-16K_2O+6Mg fertilizer discussed above instead of the usual 8N-2P_2O_5-12K_2O+4Mg (Broschat 2015a). This approach may also be more cost effective than fertilizing the entire landscape with 8N-2P_2O_5-12K_2O+4Mg for mixed landscapes containing palms and turfgrass.

Treatment of Severe Deficiencies

Finally, while the palm maintenance fertilizer described above is suitable for prevention of all nutrient deficiencies and correction of mild to moderate deficiencies, what can be done to correct existing severe deficiencies? For severe N deficiency, this palm maintenance fertilizer will be adequate by itself, and re-greening of the foliage should occur within a month or two.

When applying K fertilizers to correct a severe K deficiency, it is important to also apply about 1/3 as much Mg to prevent a high K:Mg ratio from causing a Mg deficiency problem. For severely K-deficient landscape palms, broadcast a 3:1 blend of slow release potassium sulfate and prilled kieserite uniformly to the soil under the canopy at a rate of 1.5 lbs per 100 sq ft of canopy area. A slow release palm fertilizer like the 0N-0P_2O_5-16K_2O+6Mg mentioned above works well for this purpose and is more readily available than slow release potassium sulfate and kieserite. This application should be repeated in three months. Three and six months after that, a 1:1 mixture of the 0N-0P_2O_5-16K_2O+6Mg and a 8N-2P_2O_5-12K_2O+4Mg palm maintenance fertilizer should be substituted at the rate of 1.5 lbs of fertilizer per 100 sq ft of canopy area. After one year, use only the 8N-2P_2O_5-12K_2O+4Mg palm maintenance fertilizer at the same rate.

Treatment of K deficient palms typically requires from one to three years or longer, since the entire canopy of the palm will need to be replaced with new, symptom-free leaves. Potassium-deficient palms support fewer leaves in their canopies than K-sufficient palms, and the symptomatic older leaves will not be eliminated until a full, rounded canopy of leaves has been produced (Broschat and Gilman 2013). Removal of discolored older K-deficient leaves on a regular basis has been shown to accelerate the rate of decline from this disorder and can result in premature death of the palm (Broschat 1994).

Treatment of severely Mg-deficient palms can require a year or more and is accomplished by broadcasting a controlled-release magnesium source (prilled kieserite is an excellent

source) at rates of 2 to 5 pounds per tree 4 to 6 times per year to the area under the canopy. This treatment is to be considered as a supplement to regular applications of a balanced 8N-$2P_2O_5$-$12K_2O$+4Mg palm maintenance fertilizer. To reduce the potential for salt injury, Mg and maintenance fertilizer applications can be offset by six weeks.

For Mn-deficient palms, soil applications of manganese sulfate are effective, but spraying the foliage with this product may achieve more rapid, though short-term, results, especially on alkaline soils. This should be considered as a supplement to soil applications, not as a replacement. Manganese sulfate solutions to be applied to the foliage can be made by mixing 3 lbs of this product in 100 gals of water.

Soil application rates are dependent on palm species, soil type, and severity of Mn deficiency. These rates will range from as low as 8 oz for a small palm or one growing on an acid sand soil to 5 lbs for a large species growing on a limestone soil. Broadcast this product over the soil under the palm canopy. Applications can be repeated every 2 to 3 months, depending on the severity of the problem and soil type, but a response may not be seen until 3 to 6 months after applications. Avoid using composted sewage sludge or manure products near palms (Broschat 1991). Excessive Mn applications normally result in an induced Fe deficiency, with its characteristic new leaf chlorosis.

For treatment of Fe deficiencies, soil applications of iron sulfate are generally less effective than some of the chelated compounds such as FeDTPA, FeEDDHA, or FeHEEDTA, because free Fe^{++} ions are rapidly oxidized under most soil conditions to the less soluble Fe^{+++} form. On alkaline soils, FeEDDHA is the most effective product, followed by FeHEEDTA and FeDTPA (Broschat and Elliott 2005). FeDTPA is the most effective product for foliar application, but it is important to note that all of these chelates can be phytotoxic to palms and other plants when applied at high rates. Follow application guidelines on the label for these products. Keep in mind that most Fe fertilizers can cause brown staining, so take precautions to keep them away from non-target objects.

Fertilization to correct or prevent B deficiency in palms is problematic at this time. The most common B sources used on palms are water soluble sodium borates. In high rainfall climates, such as that of Florida, an application of water-soluble B can be completely leached out of the root zone with a single heavy rain shower. Slow release B fertilizers such as Granubor are an obvious solution to this problem because they release over a 3 to 4 month period (Broschat 2008). However, appropriate application rates for this product on palms have yet to be determined. It is extremely important not to overdose palms with B fertilizers since the difference between deficiency and toxicity levels of B is rather small, and correction of a B toxicity caused by over-application of slow-release B fertilizers could be very difficult.

Current recommendations for correcting B deficiencies in palms are intentionally conservative because of the potential for toxicity. Dissolve about 2–4 oz of Solubor or Borax in 5 gallons of water and drench this into the soil under the palm canopy (Dickey 1977). Do not repeat this for at least 5 months because it will take this long to see the results of the first application.

Selected References

Broschat, T.K. 1991. "Effects of manganese source on manganese uptake by pygmy date palms." HortScience 26:1389–1391.

Broschat, T.K. 1991. "Manganese binding by municipal waste composts used as potting media." *J. Environ. Hort.* 9:97–100.

Broschat, T.K. 1994. "Removing potassium-deficient leaves accelerates rate of decline in *Phoenix roebelenii* O'Brien." *HortScience* 29:823.

Broschat, T.K. 1996. "Release rates of soluble and controlled-release potassium fertilizers." *HortTechnology* 6:128–131.

Broschat, T.K. 1997. "Release rates of controlled-release and soluble magnesium fertilizers." *HortTechnology* 7:58–60.

Broschat, T.K. 2008. "Release rates of soluble and controlled release boron fertilizers." *HortTechnology* 18:471–474.

Broschat, T.K. 2015a. "Fertilization of landscape palms to reduce nitrogen and phosphorus inputs to the environment." *HortScience* 50:469–473.

Broschat, T.K. 2015b. "Nitrogen and potassium requirements for field-grown areca and Mexican fan palms." *HortScience* 50:1567–1571.

Broschat, T.K. and J. J. Doccola. 2010. "Effects of soil-applied and trunk and petiole-injected manganese on manganese content of coconut palm (*Cocos nucifera*)." *Arbor. and Urban Forestry* 36:272–274.

Broschat, T.K. and M.L. Elliott. 2005. "Effects of iron source on iron chlorosis and Exserohilum leaf spot severity in *Wodyetia bifurcata*." *HortScience* 40:218–220.

Broschat, T.K. and E.F. Gilman. 2013. "Effects of fertilization and pruning on canopy leaf number and potassium deficiency symptom severity in *Sabal palmetto*." *Palms* 53:84–88.

Broschat, T.K. and K.A. Moore. 2006. "Release rates of ammonium-N, nitrate-N, P, K, Mg, Fe, and Mn from seven controlled release fertilizers." *Commun. Soil Sci. Plant Anal.* 38:843–850.

Broschat, T.K., D.R. Sandrock, M.L. Elliott, and E.F. Gilman. 2008. "Effects of fertilizer type on quality and nutrient content of established landscape plants in Florida." HortTechnology 18:278–285.

Dickey, R.D. 1977. Nutritional deficiencies of woody ornamental plants used in Florida landscapes. UF/IFAS Extension Bull. 791.

Not All Landscape Palm Fertilizers Are Created Equal[1]

Timothy K. Broschat[2]

Palms are widely planted in Florida landscapes throughout the state, especially in the central and southern parts, for their aesthetic effects. Their bold leaf textures create a tropical or Mediterranean look that is highly desired by residents and tourists alike. However, palms have very high nutritional requirements (see *Nutrient Deficiencies of Landscape and Field-Grown Palms in Florida*, http://www.edis.ifas.ufl.edu/ep273), and deficiencies of any nutrient element can result in highly conspicuous and unattractive symptoms on their large leaves.

Sixteen elements are required by palms for normal growth: carbon (C), hydrogen (H), oxygen (O), nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulfur (S), iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), molybdenum (Mo), and chlorine (Cl). Of these, N, K, Mg, Fe, Mn, B, and occasionally P often are deficient in Florida's sandy, calcareous, and organic soils and must be added as fertilizers to prevent or correct deficiencies in landscape or field-grown palms (see *Fertilization of Field-Grown and Landscape Palms in Florida*, http://www.edis.ifas.ufl.edu/ep261). One of the problems encountered when fertilizing plants is that some nutrient elements are antagonistic to others, so that too much of one element could induce or exacerbate a deficiency of another.

The optimum amounts and ratios in fertilizers of the seven frequently deficient elements for landscape palms in Florida have been experimentally determined to be 8N-0 or $2P_2O_5$-$12K_2O$-4Mg plus about 2% Mn and Fe (0.1-0.2% if chelated), and 0.15% of B, Cu, and Zn (hereafter referred to as 8-2-12-4Mg), but note that 8-0-12-4Mg also is acceptable (Broschat 2009, 2015). However, just because a fertilizer has this analysis does not mean that it will be effective. The source of each individual element is just as important. Landscape fertilizers are mixtures or blends of 8 or more individual nutrient elements, and a number of different sources of each of these elements are available. Some of these sources are completely insoluble, some are slowly soluble or controlled release, and some are completely soluble. Thus a large number of possible combinations of these various elemental sources could be created. Some of these blends could do great things for your palms, some might do nothing at all, and some might induce or exacerbate deficiencies rather than correcting them and possibly kill the palm over time.

Plant nutrients must be in a water-soluble form for plant roots to be able to take them up, and their solubility often is regulated by soil pH. For example, the solubility, and thus plant availability, of micronutrients such as Fe and Mn drops off rapidly as pH increases (Lindsay 1972). Under these conditions, the most effective fertilizer sources for these elements are the most water-soluble ones. For Fe, Mn, Zn, and Cu, sulfates are commonly used and are effective, but chelates of Fe such as EDTA and DTPA are even more effective than the sulfate form (Broschat 1991; Broschat and Elliott 2005). Unfortunately, due to their lower costs, some fertilizer manufacturers use oxides or sucrates (essentially molasses-coated oxides) of these elements. These compounds have been shown to be almost completely insoluble

1. This document is ENH1255, one of a series of the Environmental Horticulture Department, UF/IFAS Extension. Original publication date March 2015. Reviewed December 2017. Visit the EDIS website at http://edis.ifas.ufl.edu.

2. Timothy K. Broschat, professor, Environmental Horticulture Department; UF/IFAS Fort Lauderdale Research and Education Center, Davie, FL 33314.

in neutral to alkaline soils, and even in acid soils they are solubilized so slowly that they do not provide adequate amounts of these elements to palms (Broschat 1991; Broschat and Elliott 2005).

On the other hand, many commonly used fertilizer sources of N, K, Mg, and B are highly soluble in water and are thus highly leachable through Florida's sand and calcareous soils which lack significant cation-exchange capacity. For these elements, slow-release (slowly soluble compounds) or controlled-release (coated soluble compounds) sources help keep these nutrients available to the plant over a longer period of time under leaching conditions (see *Controlled-Release and Slow-Release Fertilizers as Nutrient Management Tools*, http://www.edis.ifas.ufl.edu/hs1255). For difficult-to-treat deficiencies such as K deficiency, simply increasing the amount of water-soluble K applied has not been effective, since large amounts of water soluble K are just as quickly lost to leaching as are smaller amounts. The only way that K deficiency can be eliminated in most Florida landscape soils is through the use of controlled-release K sources like sulfur-coated potassium sulfate. While resin-coated fertilizers generally are considered to be superior to sulfur-coated materials, the release of K and Mg from resin-coated sulfates has been shown to be too slow to be effective, compared to N sources prepared with the same coating (Broschat and Moore 2007).

Since oxides and carbonates of Mg are too insoluble to be useful sources of Mg, and resin-coated magnesium sulfate releases Mg too slowly, the best controlled-release source available at this time is kieserite, a naturally-occurring, slowly soluble form of magnesium sulfate (Broschat 1997). While soluble forms of B such as Borax® or Solubor® have been used in blended fertilizers, their high solubility makes them readily leachable under typical Florida landscape conditions. Furthermore, these materials are powders that quickly settle to the bottom of the bag when blended with granular fertilizers. This means that fertilizer taken from the top of the bag could contain too little B, while that taken from the bottom of the bag could contain toxic amounts of B. Studies evaluating a number of slow-release forms of B have identified Granubor® as the best material for blending since it has a granular form and releases over a three-month period, like sulfur-coated potassium sulfate (Broschat 2008).

While it is important to have the correct ratios of the various elements in a blended palm fertilizer, if the wrong sources are used those ratios can change over time due to differential leaching of the more soluble components. For example, an 8-2-12-4Mg palm fertilizer having N in controlled-release form but K in water-soluble form might initially have the correct N:K ratio, but over time the water-soluble K will be leached out of the root zone while the controlled-release N source continues to provide N to the palm. This N will stimulate new growth, but since there eventually will be no new K to support that new growth, the amount of K already in the palm will be diluted among a larger number of leaves, thereby reducing the concentration of K and resulting in more severe K deficiency symptoms than prior to fertilization. A similar situation could occur if the K source is controlled-release but the Mg source is water soluble. Over time, the water-soluble Mg will be leached out of the soil but K will still be available from its controlled-release source, upsetting the effective K:Mg ratio in the soil. Thus it is essential not only to provide the correct elemental ratios initially, but also over time by matching the release rates of the controlled-release sources of the N, K, Mg, and B (Broschat 2009).

How can you tell if you have an effective 8-2-12-4Mg palm fertilizer? Unfortunately, examination of fertilizer labels can be more misleading than helpful due to the terminology used and the types of testing done on fertilizers by state regulatory laboratories, all required by Florida fertilizer laws. For example, a fertilizer containing only coated N or K will appear on a Florida fertilizer label as being 100% water soluble due to the fact that water-soluble sources are enclosed within the coating and the coatings are crushed in the laboratory testing procedure.

Our research has shown that the most effective fertilizer has 100% of the N, K, Mg, and B sources in slow-release or controlled-release form and all of the Mn, Fe, Zn, and Cu sources should be water soluble (generally these will be sulfates, except for Fe, which can be chelated with EDTA or DTPA) (Broschat 1991a, 1996, 1997, 2009; Broschat and Elliott 2005). To determine if a fertilizer contains the correct nutrient sources, examine the ingredients section of a fertilizer label (it may be called "derived from" or something to that effect). Look for any source of N, K, Mg, or B that is water soluble. If any are present, then 100% of those elemental sources cannot be slow release and thus the fertilizer does not meet our specifications. Although activated sewage sludge is considered a slow-release form of N, it should never be used in palm fertilizers as it can induce severe Mn deficiencies in palms and other ornamental plants (Broschat 1991b). For the remaining micronutrients, look for water-soluble sources such as sulfates or chelates, but avoid oxides or sucrates if they are the sole or primary source of Mn and Fe. Table 1 lists the most effective sources

for the seven critical elements in Florida landscape palm fertilizers.

For Mg, it can be difficult to tell if the magnesium sulfate listed on the label is the slow-release form called kieserite (magnesium sulfate monohydrate) or the very soluble form known as Epsom salts (magnesium sulfate heptahydrate) unless the manufacturer indicates this somewhere on the label. If this information cannot be obtained from the manufacturer, a simple visual examination of the material will reveal the presence of kieserite, since it will constitute a significant proportion of the blend. Kieserite is creamy white and is the largest granule in the blend, making it very conspicuous (Figure 1).

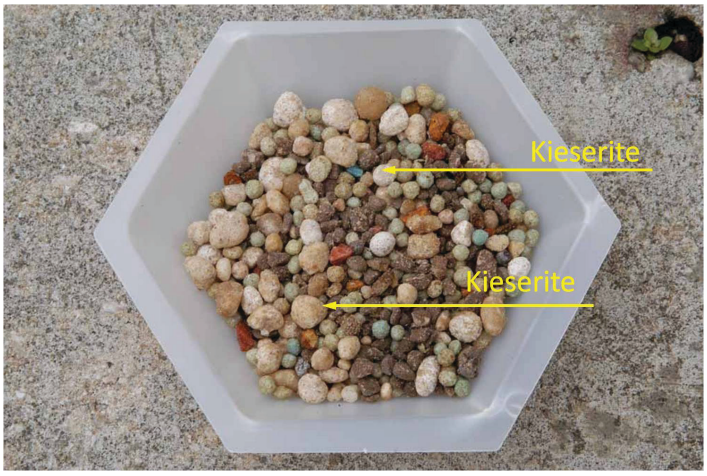


Figure 1. A sample of an 8-2-12-4Mg landscape palm fertilizer showing the conspicuous granules of kieserite, a slow release form of magnesium sulfate.
Credits: T. K. Broschat, UF/IFAS

Similarly, it can be difficult to determine if a powdered, water-soluble form of B like Solubor® or Borax® is used or if the product contains the slowly soluble Granubor®. All of these materials are sodium borates, so one must inquire about which form is included if the label does not indicate the source.

Finally, it should be apparent from the above discussion that 8-2-12-4Mg palm fertilizers can be formulated in more than one way. Unfortunately, the most effective sources of most of the critical elements in palm fertilizers also are more expensive, so some fertilizer companies make products which superficially meet our specifications (e.g., have the correct analysis), but upon closer examination do not. They have substituted some or all of the required controlled-release N, K, Mg, or B with water-soluble sources and have used insoluble micronutrient sources like oxides or sucrates to reduce costs. Thus if you request bids for the lowest-cost 8-2-12-4Mg palm fertilizer you likely will end up buying a formulation that will not be effective and may make your palms look worse than if they had never been fertilized. **The only way to ensure that you will be getting an effective fertilizer is to specify that 100% of the N, K, Mg, and B sources are slow release and that the Mn, Fe, and other micronutrients are present in sulfate or chelated form.**

Literature Cited

Broschat, T. K. 1991a. "Effects of Manganese Source on Manganese Uptake by Pygmy Date Palms." *HortScience* 26:1389–1391.

Broschat, T. K. 1991b. "Manganese Binding by Municipal Waste Composts Used as Potting Media." *J. Environ. Hort.* 9:97–100.

Broschat, T. K. 1996. "Release Rates of Soluble and Controlled-Release Potassium Fertilizers." *HortTechnology* 6:128–131.

Broschat, T. K. 1997. "Release Rates of Controlled-Release and Soluble Magnesium Fertilizers." *HortTechnology* 7:58–60.

Broschat, T. K. 2008. "Release Rates of Soluble and Controlled-Release Boron Fertilizers." *HortTechnology* 18:471–474.

Broschat, T. K. 2009. "Palm Nutrition and Fertilization." *HortTechnology* 19:690–694.

Broschat, T. K. 2015. "Fertilization of Landscape Palms to Reduce Nitrogen and Phosphate Impacts on the Environment." *HortScience* 50:469–473.

Broschat, T. K. and M. L. Elliott. 2005. "Effects of Iron Source on Iron Chlorosis Severity and Exserohilum Leaf Spot in *Wodyetia bifurcata*." *HortScience* 40:218–220.

Broschat, T. K. and K.A. Moore. 2007. "Release Rates of Ammonium-Nitrogen, Nitrate-Nitrogen, Phosphorus, Potassium, Magnesium, Iron, and Manganese from Seven Controlled Release Fertilizers." *Commun. Soil Sci. Plant Anal.* 38:843–850.

Lindsay, W. L. 1972. "Inorganic Phase Equilibria of Micronutrients in Soils." In *Micronutrients in Agriculture*, edited by J. J. Mortvedt, P. M. Giordano, and W. L. Lindsay. Madison, WI: Soil Science Society of America, 41–57.

Table 1. Effective fertilizer sources for blending Florida landscape palm fertilizers with three-month release rates.

Element	Recommended Sources[1]
N	Sulfur-coated urea, resin (or polymer)-coated urea or ammonium salts, urea-formaldehyde
P	Superphosphate, triple superphosphate, coated diammonium phosphate
K	Sulfur-coated potassium sulfate (may have additional polymer coating)
Mg	Kieserite (magnesium sulfate monohydrate) granules
Mn	Manganese sulfate
Fe	Iron sulfate, FeEDTA and/or FeDTPA
B	Granubor® (sodium borate)

[1] Based on data from Broschat (1991, 1996, 1997, 2008) and Broschat and Elliott (2005)

File Attachments for Item:

A. November 03, 2021 Regular Meeting Minutes

DRAFT

TOWN OF HIGHLAND BEACH
NATURAL RESOURCES PRESERVATION ADVISORY BOARD REGULAR MEETING MINUTES

Town Hall / Commission Chambers
3614 South Ocean Boulevard
Highland Beach, Florida 33487

Date: November 03, 2021
Time: 1:00 PM

1. CALL TO ORDER

Chairperson Parks called the meeting to order at 1:02 P.M.

2. PRESENT UPON ROLL CALL

Member Margarita Chappelear
Member Virginia Egan-Eastwood
Member Diane Matthewman
Member Nicole Stansfield
Vice Chairperson Nievecita Maraj
Chairperson Steven Parks
Administrative Support Specialist Ganelle Thompson

ADDITIONAL STAFF PRESENT

Town Planner Ingrid Allen

ABSENT

Member Leonard Brenner

3. PLEDGE OF ALLEGIANCE

The Board led the Pledge of Allegiance.

4. APPROVAL OF THE AGENDA

MOTION: Chappelear/Matthewman - Moved to approve the agenda as presented.

The motion passed unanimously on a 6 to 0 vote.

5. PUBLIC COMMENT

There were no preregistered public comments.

6. PRESENTATIONS (Item 8A was discussed in this section.)

Update on the August 11, 2021 Board recommendations to the Town Commission

Town Planner Allen presented this item. She provided the Board with an update on the Town Commissions responses to their August 11, 2021 recommendations as follows:

- Town Commission asked the NRPAB members to make calls to Homeowners Associations (HOA) to obtain feedback so the Town Commission can make their decision regarding additional beach bucket trees.
- Town Commission plans to invite the two beach raking vendors to the December 7, 2021, Town Commission meeting and requested the Natural Resources Preservation Advisory Board Members attend.
- The Town is contracted with Bartlett Tree Experts, who assessed the Palm Trees situated in the right-of-way along State Road A1A and concluded a salt issue.
- Vice Chairperson Maraj's article was published in the October issue of the Manager's Minutes.
- Town Planner Allen spoke with Public Works Director Pat Roman about adding lower pegs on the beach bucket trees.

Chairperson Parks welcomed Nicole Stanfield to the Natural Resources Preservation Advisory Board.

Board discussion followed, and Member Stansfield volunteered to contact the HOA in Highland Beach with inquiries about the progression and usage of the bucket trees.

Member Maraj also inquired about adding information to the Natural Resources Preservation Advisory Board webpage regarding the disposal of plastic bags.

7. APPROVAL OF MINUTES

A. August 11, 2021 Minutes (This item was discussed after Item 6A.)

MOTION: Chappelear/Eastwood-Egan - Moved to approve the August 11, 2021 meeting minutes as presented.

The motion passed unanimously on a 6 to 0 vote.

8. UNFINISHED BUSINESS

A. Update on the August 11, 2021 Board recommendations to the Town Commission (This item was discussed during 6A)

B. Board Members update on assigned task.

Chairperson Parks presented this item and asked each member to update on their assigned task from the August 11, 2021 Board meeting.

Member Matthewman provided an update and stated that it is the Towns responsibility for the fertilization of the palm trees on State Road A1A and the beach and dunes. She also provided comments as it relates to the removal of nuisance species.

Member Chappelear presented a PowerPoint presentation about a boat speed reduction plan for Highland Beach. She covered various topics, including the recent fatal boating accident on Bel Air Dr. in Highland Beach. She also discussed an operator's responsibility for their wakes, traffic congestion, blind corners; she also explained that in addition to reducing the speeding boats, she also wants to draw attention to the Manatees' safety and preservation of the mangroves.

Town Planner Allen provided information about the Towns Plans of a marine patrol unit.Vice Chairperson Maraj exited the meeting at 2:02 P.M.

MOTION: Parks/ Chappelear - To emphasize the consideration of a marine patrol vessel or boat and implement a program that would protect manatee populations and mangrove populations by slowing down traffic on the Intracoastal.

The motion passed unanimously on a 5 to 0 vote.

9. NEW BUSINESS

A. Discussion of miscellaneous Board projects regarding the survey of beaches.

Town Planner Allen presented this item.

Chairperson Parks provided information about the lack of an erosion control line in Highland Beach, dune restoration, and beach preservation.

Members Matthewman and Stansfield both volunteered to contact local municipalities to find out about their processes regarding beach raking.

MOTION: Parks/Chappelear - To have the code compliance officer evaluate the beach to know what should and should not be done on the beach.

Member Stansfield exited the meeting at 3:22 P.M.

B. Discussion on dune management and restoration project.

Town Planner Allen presented this item.

Chairperson Parks asked for a volunteer to do research on dune restoration.

Member Chappelear volunteered stating that she would look into dune restoration.

C. Consideration of the Natural Resources Preservation Advisory Board 2022 calendar year meeting dates

MOTION: Chappelear/Eastwood-Egan Moved to approve the calendar year 2022 meeting schedule as presented.

The motion passed unanimously on a 4 to 0 vote.

10. ANNOUNCEMENTS

Chairperson Parks read the announcements as follows:

A. November 09, 2021 - 1:30 P.M. Town Commission Meeting

November 10, 2021 - 9:30 A.M. Planning Board Regular Meeting

November 11, 2021 - Town Hall Closed in observance of Veterans Day

November 16, 2021 - 1:30 P.M. Town Commission Meeting

11. ADJOURNMENT

Chairperson Parks adjourned the meeting at 3:30 P.M.

APPROVED at the November 03, 2021, Natural Resources Preservation Advisory Board Meeting.

ATTEST:

Steven Parks, Chairperson

Transcribed by Ganelle Thompson

Administrative Support Specialist

Ganelle Thompson,
Administrative Support Specialist

Date

Disclaimer: Effective May 19, 2020, per Resolution No. 20-008, all meeting minutes are transcribed as a brief summary reflecting the event of this meeting. Verbatim audio/video recordings are permanent records and are available on the Town's Media Archives & Minutes webpage: https://highlandbeach-fl.municodemeetings.com/

File Attachments for Item:

A. Discussion on Scheduled Meeting Time

TOWN OF HIGHLAND BEACH
AGENDA MEMORANDUM

MEETING TYPE: Natural Resources Preservation Advisory Board Meeting

MEETING DATE February 02, 2022

SUBMITTED BY: Ganelle Thompson

SUBJECT: Natural Resources Preservation Advisory Board Meeting Time

SUMMARY:

At the November 03, 2021 meeting, the Natural Resources Preservation Advisory Board approved the following meeting schedule for Calendar Year 2022.

2022 Natural Resources Preservation Advisory Board Meeting Schedule

- **February 2, 2022**
- **May 4, 2022 – Organizational Meeting**
- **August 3, 2022**
- **November 2, 2022**

The meetings are held on the first Wednesday, of February, May, August, and November at 1:00 P.M., as needed. Per Sec. 2-158. of the Town's code of ordinance, (Ordinance No. 18-004 O) an Organizational Meeting of the Natural Resources Preservation Advisory Board shall be held May 1 of each year, or as soon thereafter as is practicable.

Staff suggests that the Board discuss a meeting time.

FISCAL IMPACT:

N/A

ATTACHMENTS:

NRPAB adopted meeting schedule

RECOMMENDATION:

Staff recommends the Board discuss a meeting time

File Attachments for Item:

B. Board Member Updates

1. Dune Restoration- Margarita Chappelear

2. Bucket Tree Update- Nicole Stanfield

File Attachments for Item:

1.Dune Restoration - Margarita Chappelear

ROBERT H. BARRON
COASTAL MANAGEMENT AND CONSULTING
7611 Lawrence Rd, Boynton Beach, FL 33436
Cell 561-441-1446, <beachmaker@aol.com>

Coastal Management and Consulting is a beach/dune design and permitting consulting business. Robert H. Barron, principal, also owns Coastal Growers Inc., the associated research nursery and dune landscaping contractor.

Mr. Barron has been working on Florida and Caribbean coastlines since 1973 and has planned and executed nearly two thousand private and public dune restoration projects. Most have been designed to fall within the FDEP field permit or exemption level to minimize administrative costs to the projects, and have encouraged more than four million dollars in private investment in coastal conservation. The scopes of work have ranged from large scale hurricane repair projects with miles of shoreline to intricate and comprehensive beach dune and strand zone habitat restorations.
The companies specialize in projects which seek to replicate the natural coastal ecosystem utilizing a balanced mix of native plant species which do not require supplemental irrigation. A significant portion of the projects address oceanside landscaping of private homes, balancing natural dune function with an attractive and sustainable vista.

Coastal Growers Inc. specializes in the propagation and production of rare and listed coastal plant species which are generally not available in the trade. The Company has rescued from development sites many populations of threatened or endangered plants. These are nursery cultured to then optimize survival in restorations without sprinkler systems. Coastal Growers has developed propagation protocols for more than sixty dune species, and shares those with other native nurseries to ensure rare species survival and commercial availability. The nursery produces many of its sixty plus native species as a sole source supplier.

Representative projects: (total body of work since 1973 more than eighty miles of Fl. shoreline)

- **City of Delray Beach**, Florida – Since 1980. Dune design, permitting, and installation. Three miles of public and privately owned dune restoration on an artificially nourished sand beach. Typical width of the dunescape is 140 feet with over one hundred ten plant types, including reproducing populations of rare and endangered species.
  Town of Palm Beach, Florida – Since 1990. Design, permitting and installation of Clarke Avenue storm repair and Midtown dune installation. Collaboration with PB Garden Club to research and develop methods for non irrigated dune restoration. 150+ private projects.
- **Town of Jupiter Island**, Florida - 1990 to present. Five miles of nourished shoreline dune restored, typically 40 feet wide with vegetation installed to reduce erosion. 100+ private projects.
- **Elbow Key, Bahamas** - 1999. Designed and supervised locally sponsored project to restore 5 miles of hurricane damaged shoreline.
- **Hutchinson Island**, Florida – 2006 to 2009. Post hurricane dune repair. Eight miles of pioneer zone dune installed on renourished beach, followed by extensive 30 species strand zone enhancement.
- **Private preserve, Indigo Island**, Bahamas - 2002. Consulting and design services to a large and complex private mitigation project in the Bahamas Land and Sea Trust Preserve.
  FPL Nuclear Plant Strand Dune Restoration. 1999, 2000. Design, permitting and construction of $1/3 million, 50K plant, 60 species, one mile, no sprinkler, strand dune restoration.

Rob regularly addresses professional organizations and conferences on topics related to coastal policy, plant science and management practices. Audiences have included the National Conference on Beach Preservation Technology of the U. S. Shore and Beach Preservation Association, the Florida Rare Plant Task Force Annual Conference and the Florida Native Plant Society Annual Meeting and Conference. Rob teaches CEU classes on dune management to landscape architects for the Florida Association of Native Nurseries. He has also tenaciously and successfully lobbied for revisions to coastal management policy and regulation at both State and Local levels.

USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

Native Plants for Coastal Dune Restoration:

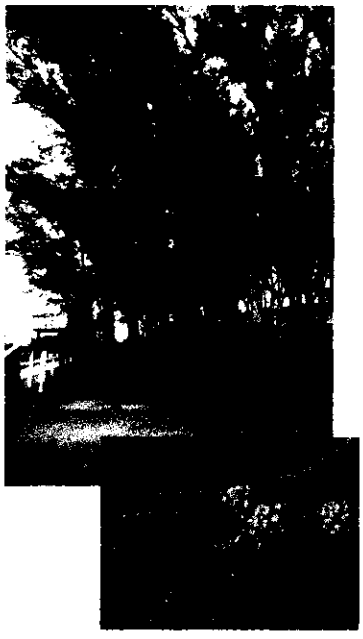
What, When, and How for Florida

Contents:

Acknowledgements ii
Native Plants for Coastal Dune Restoration Sites in Florida (Table of Common Names) v
Introduction 1
Coastal Ecology 1
Beach and Dune Formation 3
Dune Vegetation 4
Frontal Zone 4
Backdune and Forest Zone 5
Dune Restoration 6
Considerations Prior to Starting 6
Sand Fencing 7
Planting Material and Planting – Herbaceous 8
Planting Material and Planting – Woody 9
Fertilization 10
Irrigation 10
Maintenance 11
Information on Specific Coastal Plants 11
Grasses
Distichlis spicata 13
Muhlenbergia filipes 14
Panicum amarum 15
Paspalum vaginatum 16
Schizachyrium spp. 17
Spartina patens 18
Sporobolus virginicus 19
Uniola paniculata 20
Other Herbaceous Plants
Cakile spp. 22
Canavalia rosea 23
Helianthus debilis 24
Hydrocotyle bonariensis 25
Ipomoea imperati 26
Ipomoea pes-caprae 27
Sesuvium portulacastrum 28
Trees and Shrubs
Argusia gnaphalodes 30
Ceratiola ericoides 31
Chrysobalanus icaco 32
Coccoloba uvifera 33
Conocarpus erectus 34
Croton punctatus 35
Dalbergia ecastaphyllum 36
Ilex vomitoria 37
Iva imbricata 38
Lantana involucrata 39
Morella cerfera 40
Prunus spp. 41
Quercus geminata 42
Sabal palmetto 43
Scaevola plumieri 44
Serenoa repens 45
Suriana maritima 46
Yucca aloifolia 47
Coastal Plants Sources 48
Photo/Illustration Credits 48
Coastal Exotic Invasives – Species to Avoid 49
References 50

Coastal Exotic Invasives – Species to Avoid

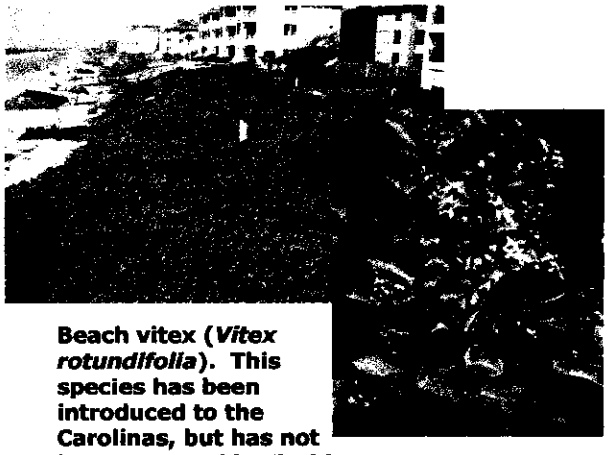
Non-native, invasive plant species are all too common throughout Florida. Coastal dunes and their associated ecosystems are not immune to invasive species becoming established. The species can severely impact the integrity of coastal sites as they displace native plants, degrade wildlife habitat, and disrupt the ecological functioning of the community. Therefore, avoid use of non-native, invasive species at all times, and quickly remove such species as soon as possible when they are discovered. More information on the species listed here can be found at http://www.fleppc.org or http://www.beachvitex.org.



Australian pine (*Casuarina glauca* or *C. equistifolia*).

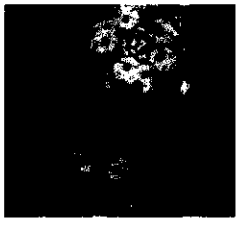
Beach naupaka (*Scaevola sericea*). Note white fruit; the native species fruit is black.

Seaside mahoe or portia tree (*Thespesia populnea*).



Beach vitex (*Vitex rotundifolia*). This species has been introduced to the Carolinas, but has not been reported in Florida.

Schefflera or umbrella tree (*Schefflera actinophylla*).



Lantana (*Lantana camara*).

Santa Maria (*Calophyllum antillanum*).

Sources of Coastal Plants for Florida

Association of Florida Native Nurseries (http://www.afnn.org)

Commercial Suppliers of Sea Oats in Florida (2003) DGEF 150 (http://nsgl.gso.uri.edu/flsgp/flsgpg03002.pdf)

List of Native Plant Nurseries in Florida and Alabama (http://www.aces.edu/waterquality/streams/Vegetation/native%20nusery%20list%20florida.doc)

For sources of the named plant materials developed by the Brooksville Plant Materials Center, please contact the Brooksville Plant Materials Center staff (352-796-3385).

Additional sources of coastal plants can be found in "Seed & Plant Vendors Guide of Conservation Plants for the Mid & Southeast U.S" http://www.ms.nrcs.usda.gov/technical/2006SeedandPlanVendorsof.pdf)

Photo/Illustration Credits:

Except where noted, all photos taken by Tim McCabe, photographer, NRCS, Washington, D.C., and other NRCS staff.

©Larry Allain @ USDA-NRCS PLANTS Database.
- p. 13 Saltgrass plants
- p. 25 Largeleaf pennywort flower
- p. 31 Florida rosemary stems and leaves

©Shirley Denton @ http://www.shirleydenton.com
- p. 14 Hairawn muhly seedhead
- p. 19 Seashore dropseed plant
- p. 22 Searocket plant and flower
- p. 23 Baybean plant and flower
- p. 30 Sea lavender flowers
- p. 33 Seagrape plant
- p. 34 Buttonbush fruit
- p. 35 Silverleaf croton plant
- p. 36 Coin vine plant and seedpods
- p. 39 Buttonsage
- p. 40 Waxmyrtle fruit
- p. 41 Hog plum tree and Chickasaw plum fruit
- p. 42 Sand live oak acorn
- p. 43 Cabbage palmetto trunk
- p. 44 Gullfeed fruit
- p. 45 Saw palmetto flower stalk
- p. 47 Spanish bayonet plant
- p. 49 Beach naupaka plant and fruit

©William S. Justice @ USDA-NRCS PLANTS Database
- p. 38 Seacoast marshelder stem

©Dr. Charles Gresham, Clemson Univ.
- p. 49 Beach vitex plant and flower

©Ann Murray @ Univ. Florida Center for Aquatic and Invasive Plants (http://plants.ifas.ufl.edu)
- p. 49 Seaside mahoe
- p. 49 Santa Maria

©Fred Nation @ http://www.plantatlas.usf.edu
- p. 31 Florida rosemary plant

©Vic Ramey @ Univ. Florida Center for Aquatic and Invasive Plants (http://plants.ifas.ufl.edu)
- p. 49 Schefflera

Forest and Kim Starr @ http://www.hear.org
- p. 14 Gulfhairawn muhly plants
- p. 27 Railroad vine habitat
- p. 28 Seashore purslane plant
- p. 29 Cabbage palms on beach
- p. 32 Cocoplum shrub and fruit

©Thomas Socha, US Army COE, Charleston, SC
- p. 8 Bitter panicum transplants

©Robert Soreng @ USDA-NRCS PLANTS Database
- p. 20 Seaoats seedhead

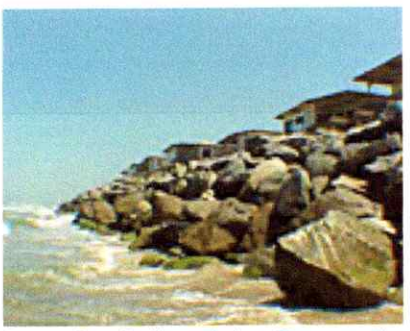
Native Plants for Coastal Dune Restoration Sites in Florida[1]			
		Most likely occurrence	
Common name	Scientific name	Frontal Zone	Backdune Zone
Grasses			
Saltgrass	*Distichlis spicata*		X
Gulfhairawn muhly	*Muhlenbergia filipes*	X	
Bitter panicum, bitter panicgrass	*Panicum amarum*	X	
Seashore paspalum	*Paspalum vaginatum*	X	
Seacoast bluestem, coastal little bluestem	*Schizachyrium* spp.	X	
Saltmeadow cordgrass, marshhay cordgrass	*Spartina patens*	X	
Seashore dropseed	*Sporobolus virginicus*	X	
Seaoats	*Uniola paniculata*	X	
Other herbaceous plants			
Searocket	*Cakile* spp.	X	
Baybean, beachbean	*Canavalia rosea*	X	
Beach sunflower	*Helianthus debilis*	X	
Largeleaf pennywort	*Hydrocotyle bonariensis*		X
Beach morningglory, fiddle-leaf morningglory	*Ipomoea imperati*	X	
Railroad vine, bayhops	*Ipomoea pes-caprae*	X	
Seapurslane, shoreline purslane	*Sesuvium portulacastrum*	X	
Trees and shrubs			
Sea lavender, sea rosemary	*Argusia gnaphalodes*	X	
Florida rosemary, sandheath rosemary	*Ceratiola ericoides*		X
Cocoplum	*Chrysobalanus icaco*		X
Seagrape	*Coccoloba uvifera*	X	
Buttonwood, button mangrove	*Conocarpus erectus*		X
Silverleaf croton, gulf croton, beach tea	*Croton punctatus*		X
Coinvine	*Dalbergia ecastaphyllum*	X	
Yaupon holly	*Ilex vomitoria*		X
Seacoast marshelder, seashore elder	*Iva imbricata*	X	
Buttonsage, lantana	*Lantana involucrata*		X
Waxmyrtle, southern bayberry	*Morella cerifera*		X
Plum	*Prunus* spp.		X
Sand live oak	*Quercus geminata*		X
Cabbage palm, cabbage palmetto	*Sabal palmetto*		X
Gullfeed, inkberry	*Scaevola plumieri*	X	
Saw palmetto	*Serenoa repens*		X
Bay cedar	*Suriana maritima*		X
Spanish bayonet, aloe yucca	*Yucca aloifolia*	X	

[1]Adapted from Craig, 1991.

Beachapedia.org

Responses to Erosion

Seawalls



See the full article: Seawalls

When coastal buildings or roads are threatened, usually the first suggestion is to "harden" the coast with a seawall. Seawalls are structures built of concrete, wood, steel or boulders that run parallel to the beach at the land/water interface. They may also be called bulkheads or revetments. They are designed to protect structures by stopping the natural movement of sand by the waves. If the walls are maintained they may hold back the ocean temporarily. The construction of a seawall usually displaces the open beach that it is built upon. They also prevent the natural landward migration of an eroding beach.

See this gallery of photos of seawalls, revetments and other attempts at shoreline armoring from around the world.

When waves hit a smooth, solid seawall, the wave is reflected back towards the ocean. This can make matters worse. The reflected wave (the backwash) takes beach sand with it. Both the beach and the surf may disappear.

Seawalls can cause increased erosion in adjacent areas of the beach that do not have seawalls. This so-called "flanking erosion" takes place at the ends of seawalls. Wave energy can be reflected from a seawall sideways along the shore, causing coastal bluffs without protection to erode faster. When it is necessary to build a seawall, it should have a sloped (not vertical) face. Seawalls should also have pockets and grooves in them that will use up the energy of the waves instead of reflecting it.

Usually the most cost-effective, environmental solution is to move the building away from danger. Building seawalls will buy time against natural processes, but it will not "solve the problem" of erosion by waves.

Building Back the Sand Dunes

Building Back the Sand Dunes

Sand dunes are naturally occurring dynamic coastal features which are formed by the accumulation of wind blown sand. When sand dunes are damaged from storms or human activity they can be repaired or restored. The basic steps are simple but careful planning is needed. Your dune restoration project should be designed to create a dune that matches the existing natural dune pattern in the area. You can help speed up nature's work by using sand fences and dune plants to collect sand more rapidly.

P. 1 of 4

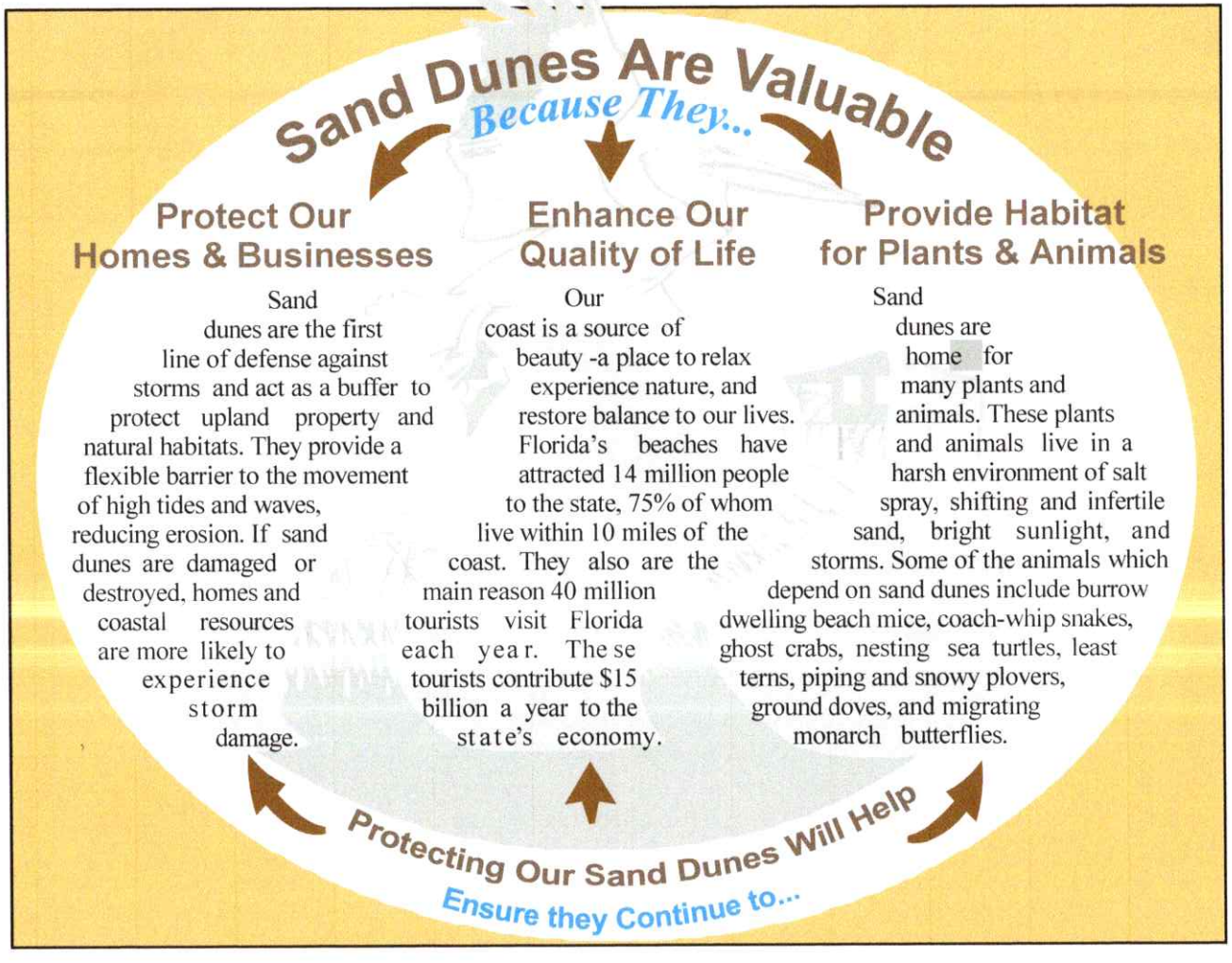
Before You Start...

Permits from the Florida Department of Environmental Protection (FDEP) and possibly local governments may be required for installing sand fences, constructing dune walkovers, and dune plantings. This brochure does not provide all the necessary information or authorize any construction. Please contact the appropriate FDEP district office listed on the back for information about obtaining a permit or for guidance to help you get started. There is usually no cost for sand fencing and dune planting permits.

2 Ways to Help Rebuild Sand Dunes

Dune Planting. Plants build and anchor the sand dunes. The roots and stems of sea oats and other native coastal plants trap wind-blown sand. As the sand piles up around the plants, new roots develop on the recently buried stems while new stems emerge from the sand's surface. This traps even more sand and the sand dune builds. Sea oats and other vegetation can be planted along with the installation of sand fences or by themselves.

Sea oats (*Uniola paniculata*) should be planted first and should cover 60-80% of the total area. Bitter panicum (*Panicum amarum*) can be planted in the remaining areas. Seedlings should be planted at least 6 inches deep since shallow plantings may fail. Space



the plants 24 inches apart in alternate staggered rows. Planting should occur during the early fall or spring so that minimal watering is needed. Planting at other times of the year may require more watering depending on the amount of rainfall. It is better to water heavily and less often than to water lightly and more often. Check with your local nursery, appropriate state or federal agency, or county extension agency for plant sources.

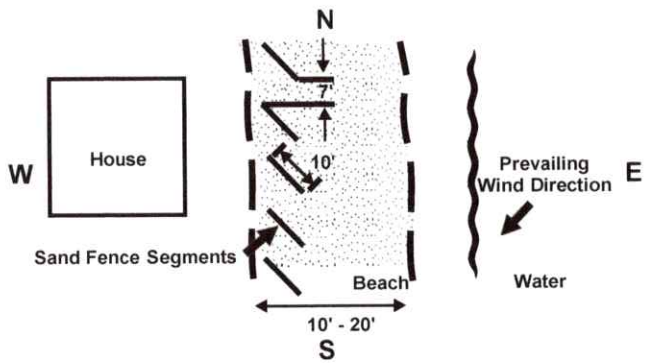
Sand Fencing. Sand is carried along the beach by the wind. Sand fences help build sand dunes by trapping and collecting this wind driven sand. Sand fences are usually made of wood, biodegradable, or plastic material. To keep the dune "growing", raise the fence before the sand accumulates to a depth of 18 inches. If the fence is buried, it will no longer work and it may pose a hazard to nesting birds and sea turtles.

The use of sand fencing may be restricted along the southeast coast due to the potential for adverse impacts in high density marine turtle nesting beaches. Sand fencing may also be restricted in other places such as the barrier islands along the southwest coast where the dry beach area may not be wide enough to supply the necessary amounts of wind driven sand.

The initial dune restoration project area should be about 10 to 20 feet in width. To maximize sand building, the fence should be located as far landward as possible and the spaces between and waterward of the fences should be planted with dune vegetation. The fence should be placed in 10 foot sections with at least 7 feet between each section to provide space for sea turtles to approach the beach, lay their eggs, and return to the sea. Each segment of fence should be angled to take advantage of predominate wind direction and strength. Please refer to the chart below for the recommended sand fence alignment for your area.

SANDFENCE ALIGNMEN	
Northern Atlantic coast:	NW-SE
Southern Atlantic coast:	NE-SW
Eastern panhandle coast:	NE-SW
Central panhandle coast:	NE-SW
Western panhandle coast:	NW-SE
Southern Gulf coast:	NW-SE

Change the alignment to take advantage of local and seasonal variations in the predominate wind direction and strength.



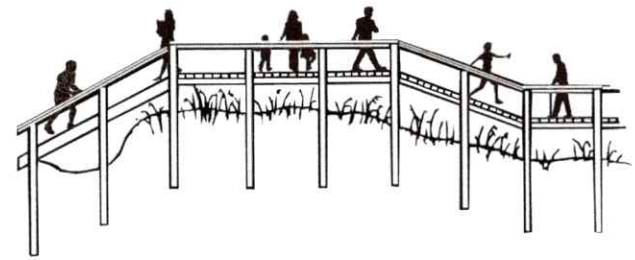
The figure above illustrates the placement and NW-SE alignment of sand fences for the northern Atlantic coast.

3 Things You Can Do to Protect Sand Dunes

Use Dune Walkovers and Designated Beach Access Points to Cross the Dunes. Without dune vegetation, sand dunes become unstable. Dune plants tolerate harsh beach conditions including wind, salt spray, storms, scarce nutrients, limited fresh water, and intense sunlight and heat. However, they cannot withstand the pounding of feet and vehicles.

Restore Damaged Sand Dunes. Established sand dunes provide a strong defense against storms. When sand dunes are damaged, you can help speed their recovery by installing sand fences and planting native dune vegetation. Increase the benefits of your work by encouraging your neighbors to join with you in your dune restoration projects.

Learn More About Sand Dunes and the Ways You Can Help Protect Them. If you aren't a good steward of the coastal environment, who will be? Tell others about the importance of protecting sand dunes and the coastal environment. You don't have to be an environmental expert to help protect sand dunes, you just have to care. For more information about the coastal environment and volunteer opportunities in your area, contact the U.S. Fish and Wildlife Service or the Florida Department of Environmental Protection at the numbers listed on the back of this brochure.



FDEP District Offices

For Bay, Escambia, Franklin, Gulf, Okaloosa, Santa Rosa, or Walton Counties:
Northwest District
160 W. Government Street, Suite 308
Pensacola, FL 32502
(850) 595-8300

For Duval, Flagler, Nassau, or St. Johns Counties:
Northeast District
8808 Baymeadows Way West, Suite 100
Jacksonville, FL 32256
(904) 256-1700

For Manatee or Pinellas Counties:
Southwest District
13051 N. Telecom Parkway
Temple Terrace, FL 33637
(813) 470-5700

For Brevard or Volusia Counties:
Central District
3319 Maguire Boulevard, Suite 232
Orlando, FL 32803
(407) 897-4100

For Charlotte, Collier, Lee, or Sarasota Counties:
South District
Post Office Box 2549
Fort Myers, FL 33902
(239) 344-5600

For Broward, Dade, Indian River, Martin, Palm Beach, or St. Lucie Counties:
Southeast District
3301 Gun Club Road, MSC7210-1
West Palm Beach, FL 33406
(561) 681-6600

State of Florida
Department of Environmental Protection
Coastal Construction Control Line Program
Mail Station 3522
2600 Blair Stone Road
Tallahassee, FL 32399
(850) 245-8336
http://www.dep.state.fl.us/beaches/

U.S. Fish and Wildlife Service
http://www.fws.gov/
http://southeast.fws.gov/

Jacksonville Field Office:
7915 Baymeadows Way
Suite 200
Jacksonville, Florida 32256
(904) 731-3045

Panama City Field Office:
1601 Balboa Avenue
Panama City, Florida 32405
(850) 769-0552

S. Fla. Ecosystem Field Office:
1339 20th Street
Vero Beach, Florida 32960
(772) 562-3909

Removal of Species Require Expertise

Brazilian Pepper Removal
5 Things Every Property Owner Should Know

1. A Permit may be required.

Permit requirements vary according to whether the property is developed or vacant and whether Brazilian pepper will be cleared using hand-held equipment or heavy machinery. Permits are issued by the City's Planning Department. You may obtain the permit yourself or authorize your contractor to do so.

Property	Equipment	
	Hand-held	**Heavy Machinery**
Developed	No Permit Required	Development Permit
Undeveloped	Vegetation Permit	Development Permit

2. In order to successfully control Brazilian pepper, all Brazilian pepper tree stumps MUST be treated with an appropriate herbicide.

In most cases, a product containing the active ingredient **triclopyr** is the best choice for controlling Brazilian pepper; however, the method of application may vary depending on the maturity of the pepper being treated. **Mature** trees should be cut as close to the ground as possible. **Within 5 minutes,** herbicide should be applied to the cambium (living tissue just inside the bark). This is known as "cut stump" application. In some cases, mature trees that are not visible from adjacent properties, roadways, or other structures may be treated by "basal bark" application (killing the tree in place). Small **seedlings and re-sprouts** may be treated with either basal bark or foliar treatments.

3. The State of Florida requires professionals that apply ANY pesticide (including herbicides) as part of their job to be certified to do so.

A contractor hired to remove and treat Brazilian pepper must have a City Vegetation Competency Card AND an Herbicide Applicator's license/certification from the State of Florida. A list of Contractors that meet these requirements is available from the Natural Resources Department.

4. Brazilian pepper debris must either be removed completely *and* hauled away or chipped on site.

Stumps do not have to be removed as long as they have been cut flush to the ground. **Pepper debris to be picked up by Waste Pro MUST be placed *neatly* within 6 ft of the curb by 6:30 AM on your regular yard waste day and MUST be less than 4 ft in length and less than 50 lbs per container, plastic bag, or tied bundle**. Brazilian pepper mulch can be used for landscaping; however, if the mulch contains berries it should be allowed to sit and compost (thus killing the seeds) for at least 28 days before spreading.

5. Even when treated properly, some Brazilian pepper is likely to re-sprout and new seedlings may appear.

It is highly recommended that your entire property be inspected and retreated for any new seedlings or re-sprouts within 3 months of the initial treatment and every 6 months thereafter. If this is not done, more extensive and expensive pepper removal work can be expected.

For additional information contact the City of Sanibel Natural Resources Department at (239) 472-3700.

Guidelines
P.1

Dept of Env. Resources Mgmt

Palm Beach discover.pbcgov.org

Preserving Your Beach

The Department of Environmental Resources Management sponsors beach restoration projects throughout the county. The projects include dune restoration, beach nourishment, inlet sand transfer operations and the construction of breakwaters, groins, and other erosion control structures. Project funding is obtained through county, state, federal and local governments. County funds for beach restoration and enhancement projects are primarily obtained through taxes paid by tourists on hotel and motel rooms. County staff are also available to provide technical assistance and suggestions for managing dunes on private property.

Palm Beach County
Board of County Commissioners

Department of Environmental Resources Management
2300 N. Jog Road – Fourth Floor
West Palm Beach, FL 33411-2743
561-233-2400
www.co.palm-beach.fl.us/erm

Department of Environmental Resources Management

Guidelines for Beach & Dune Management

PROTECTING THE COAST
PRESERVING OUR NATURE
ENJOYING THE BENEFITS

Preserving Native Dune Plants

Dunes are important reservoirs of sand, replacing sand lost from the beach through erosion. Native dune plants are important parts of a healthy dune.

Native salt-resistant vegetation is essential to the beach and dune system as it both accumulates and stabilizes sand. Vegetation traps wind blown sand which collects around the plant and builds up the dune – a process known as "accretion". As the plants become buried, new roots develop on the recently buried stems while new stems emerge from the sand. A dense stand of sea oats and sea grapes can significantly minimize erosion during high tides and storms.

Sea oats are protected under regulations of the Florida Department of Environmental Protection (FDEP). Sea oats seed can not be collected without a permit and the plants can not be cut back or removed.

Sea grapes, which grow on the back dune and have large ping-pong paddle-shaped leaves, act as a highly efficient barrier to blowing sand and result in significant accretion of the backdune. They are also protected under FDEP regulations.

NATIVE DUNE VEGETATION SHOULD BE:

- ☑ **PROTECTED from pedestrian traffic**
- ☑ **PRUNED SPARINGLY without exposing light to the beach**
- ☑ **REPLANTED AS NEEDED to keep it healthy**

Removing Exotic Dune Plants

Invasive exotic plant species tend to overgrow native plant species and are less effective in maintaining the dune ecosystem.

The Hawaiian half-flower (*Scaevola frutescens*) is a common invasive exotic dune plant. The plant's shallow roots and fragile stems are easily destroyed in high winds or storms making it far less effective in dune stabilization than sea oats and other native species. Don't confuse this exotic with its endangered native counterpart – inkberry (*Scaevola plumieri*) – which is protected by Federal law.

Exotic Hawaiian half-flower
Note white fruit and long leaves

Endangered Native Inkberry
Note black fruit and rounded leaves

Another invasive exotic dune plant is the Australian pine. Australian pines inhibit the growth of other plants by their shading effect and the acidic nature of their needles. They eventually create a "weak spot" that makes the dune vulnerable to storm erosion. In all cases where exotics have been removed, the area should be replanted with natives typical of that portion of the dune. Where lawn grasses adjoin the dune area, a distinct buffer zone should be maintained by herbiciding, mulching, and edging to control the encroachment of these grasses into the dune.

Guidelines
P.2

Pruning Vegetation

Pruning dune vegetation may seem desirable to a property owner in order to provide a clear ocean view. Removing too much vegetation can hurt the fragile dune structure and impact sea turtles.

A well-developed stand of sea grapes is essential to the stability of the beach and dune, and protection of upland buildings from storm-induced erosion and blowing sand and salt spray. Sea grapes also block light from the beach where it could otherwise interfere with sea turtle nesting and disorient emerging hatchlings. For these reasons, it is recommended that property owners limit pruning to only that necessary for a view.

SEA GRAPE PRUNING GUIDELINES:

- ☑ **Do not remove more than 1/3 of the height**
- ☑ **Do not remove more than 1/3 of the leaf area**
- ☑ **Do not reduce the height to less than 6 ft.**
- ☑ **Do not expose lights to the beach**

ANY PRUNING BEYOND THIS LIMIT REQUIRES AN FDEP PERMIT

All pruning of sea grapes seaward of the Coastal Construction Control Line is subject to the permitting requirements of the FDEP. The best policy is to let a hard winter freeze and salt spray control the height of dune sea grapes naturally. Consider creating "view corridors" to reduce pruning requirements.

Irrigation & Fertilization

In contrast to ornamental plants, dune vegetation is adapted to low water and nutrient requirements. Irrigation and fertilization of dune areas should be done sparingly.

Excessive watering of the dune usually results in the establishment of undesirable, invasive exotic plants. It is therefore important that all sprinklers near the dune be adjusted to avoid overspray onto the dune. New plantings may require temporary watering until the plants establish a well-developed root system.

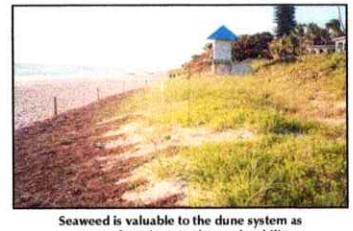
Native dune plants require very little maintenance to remain healthy. Top left to right: dune sunflower, sea purslane, agave, beach peanut Bottom left to right: railroad vine, sea lavender

The nutrient requirements of native dune plants are generally low and fertilization can result in impacts similar to those caused by excessive watering such as promoting weeds and noxious vines. The best method to ensure an adequate nutrient supply is to leave organic material such as leaf litter and seaweed in place on the dune.

Beach Raking

Beach raking is the mechanized removal of seaweed and other natural materials from the beach. Removing this nutrient-rich organic layer can seriously effect the health of the beach and dune.

Seaweed is beneficial to the beach and an important component of the ecosystem. The Department of Environmental Resources Management recommends that beach raking be limited to the more heavily used beaches. Beach raking too close to the dune can destroy new seedlings establishing at the leading edge of the dune. Although seedlings in this pioneer zone often become buried by wind-blown or storm-deposited sand, they usually grow through the new sand layer and continue to stabilize the area. Beach rake operators should stay well away from the toe of the dune. Seaweed removed from the beach can be deposited in a thin layer (2-3") at the toe of the dune.



Seaweed is valuable to the dune system as a source of nutrients and a sand stabilizer.

Recreational Activities

Dune plants are highly sensitive to human disturbances. Even minimal impact can cause damage and increase erosion. Recreational activities should be moved away from the dune.

To protect valuable dune plants, all recreational activities should be kept at least 10 feet away from the leading edge of the foredune. Do not walk on the dune. Use dune crossovers to access the beach. Boats, surfboards, beach chairs and cabanas should never be stored on the dune or within 10 feet of the foredune. Repeated disturbances to the dune will destroy the vegetation and weaken the dune system, leaving the beach as well as upland buildings vulnerable to storm damage.

Following storm events, the change in beach profile should be noted. Has erosion occurred, or has sand simply been pushed higher on the beach covering previously exposed vegetation? In the case of the latter, recreational activities and cabanas should be kept far enough away from this location to allow the buried vegetation to re-emerge through the sand.

Use dune crossovers when accessing the beach.

File Attachments for Item:

2. Bucket Tree Update - Nicole Stanfield

Highland Beach Bucket Tree Use Initial Research Findings

HOA	HOA Contact Information	Property Management Contact	Feedback / Survey Participation Notes
Bel Lido	President: Ron Brown Tele. No.: 561-266-0299 Email: rdbrown1@aol.com	NA	Reached out to Mr. Ron Brown 3 times via email. Provided background information and survey link. No response as of 1/23/22
Highlands Place (2901 S. Ocean Blvd.)	President: David Stern Tele. No.: 561-702-3655 Email: highlandplace@bellsouth.net	Heather Rubin Campbell Property Management 561-276-4722 HRubin@campbellproperty.com	Property manager shared survey with community after board approval. See survey results documents for more information.
Toscana (3701 S. Ocean Blvd.)	President: Bart Satsky Tele. No.: 973-985-7043	Virgil Teca First Service Residential 561-272-2269 Virgil.teca@fsresidential.com	After multiple calls and emails inquiries was finally able to speak with Mr. Virgil Teca over the phone on Friday, 1/21/22. He verbally reported that his beach club attendants claim that the bucket tree is never utilized. He also shared that 3 of the of the 4 original buckets were missing, a fact that I confirmed myself by walking by. Was not sure if board would approve survey link distribution.
Trafalgar (2917 S. Ocean Blvd.)	President: Deborah Hurd Tele. No.: 561-706-7114	Anna Thomas Castle Group 561-276-1949 athomas@castlegroup.com	Property manager shared survey with community after board approval. See survey results documents for more information.

Highland Beach Bucket Tree Use

Please take a moment to complete the following questions regarding the use of the Highland Beach Bucket Tree found at your community. All responses are COMPLETELY CONFIDENTIAL and do not have any name(s) associated with them.

Survey Questions

Please indicate in which community you reside

Choose

1. I am aware that there is a town sponsored bucket tree available on the beach access for my community. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	◉	Strongly Agree

2. I understand the purpose of the town sponsored bucket tree on the beach access for my community. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	◉	Strongly Agree

3. I have used the buckets on our bucket tree to collect trash on Highland Beach. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	◉	○	Strongly Agree

4. I believe that the bucket tree program is a beneficial program that helps keep Highland Beach clean. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	◉	Strongly Agree

5. I encourage others in my community to use the buckets found on the bucket tree. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	◉	Strongly Agree

6. I would like to see additional bucket trees installed at other communities along the beach. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	◉	Strongly Agree

Comments - anything else you would like to share

Please indicate in which community you reside	1. I am aware that there is a town sponsored bucket tree available on the beach access for my community.	2. I understand the purpose of the town sponsored bucket tree on the beach access for my community.	3. I have used the buckets on our bucket tree to collect trash on Highland Beach.	4. I believe that the bucket tree program is a beneficial program that helps keep Highland Beach clean.	5. I encourage others in my community to use the buckets found on the bucket tree.	6. I would like to see additional bucket trees installed at other communities along the beach.	Comments - anything else you would like to share
Highlands Place	5	5	4	5	5	5	
Highlands Place	5	5	2	1	1	1	
Highlands Place	2	1	1	1	3	1	I have not seen one of the three buckets ever moved from the tree. So I can make an intelligent assumption that these buckets are not being used and therefore have not impact on the community. I never even knew what they were there for until this email.....just ugly buckets hanging on a "tree" in front of our unit.
Highlands Place	5	5	1	5	5	5	
Highlands Place	5	5	5	5	5	5	
Highlands Place	5	5	1	3	1	3	
Highlands Place	5	5	1	5	1	5	
Highlands Place	5	5	1	1	1	1	
Highlands Place	5	5	5	5	5	5	I would love to see representatives from buildings to spend 15 minutes to walk along beach and pick up trash on their walk and deposit in their buckets.
Highlands Place	1	5	1	5	5	5	Who empties the buckets?
Highlands Place	1	2	1	3	3	4	
Highlands Place	5	5	1	5	5	5	
Highlands Place	5	5	5	5	5	5	Really great initiative!
Trafalgar	2	1	1	4	2	4	A flyer that explains the program would be nice to hang in our mailroom.
	5	5	1	5	1	5	
Trafalgar	1	1	1	3	3	3	at trafalgar there is a garbage can adjacent to the tree-- as a result I do not believe I have seen anyone use the tree...
Trafalgar	4	3	1	5	5	5	
Trafalgar	5	5	5	5	5	5	Soooo much better than a baggy and with the nice trash receptacle their is great. Thank you
Trafalgar	5	5	1	3	1	1	We have a large garbage can right underneath the tree where everyone puts their garbage. So far Trafalgar it is unnecessary
Trafalgar	5	5	5	5	5	5	
Trafalgar	5	4	2	5	5	5	
	5	4	5	5	5	5	
Trafalgar	4	5	5	5	1	5	People may be hesitant to pick up trash with Covid circulating
Trafalgar	5	5	5	5	5	5	
Trafalgar	4	4	4	4	3	3	Please have gut removed at beach next to trafalgar it encroaches on trafalgars property and is an eyesore and blocks view of many residents. It is never used or maintained and doesnâ€™t belong at that location
Trafalgar	5	5	5	5	5	5	
Trafalgar	1	1	1	1	1	1	
Trafalgar	2	2	2	3	3	3	
Trafalgar	5	5	5	5	5	5	I love using the bucket when I clean up trash daily on the beach. I think having long handled tongs would be very helpful and much easier on my back. I am also wondering if along side of our garbage can there could be a recycling can as well. Thank you for your efforts in helping the environment.

Highland Beach Bucket Tree Use

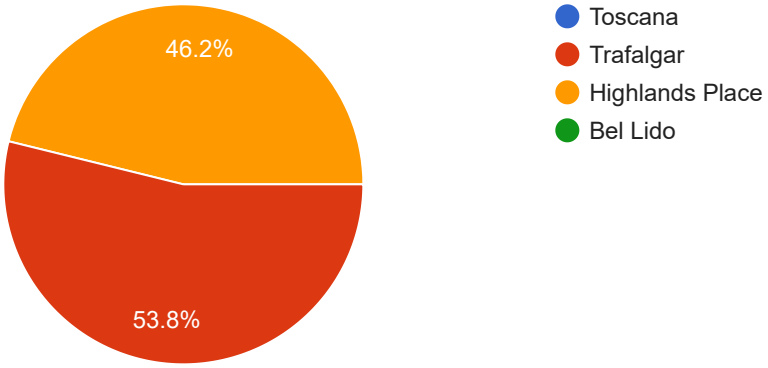
29 responses

Publish analytics

Survey Questions

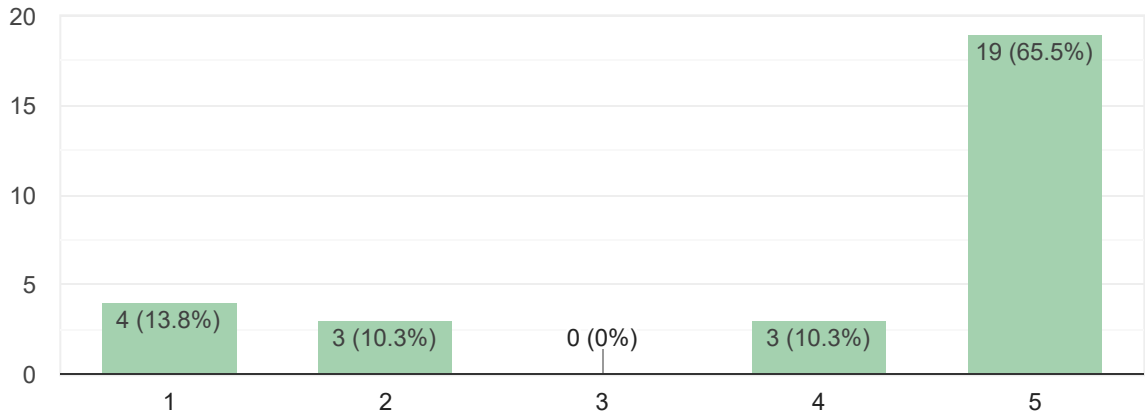
Please indicate in which community you reside

26 responses



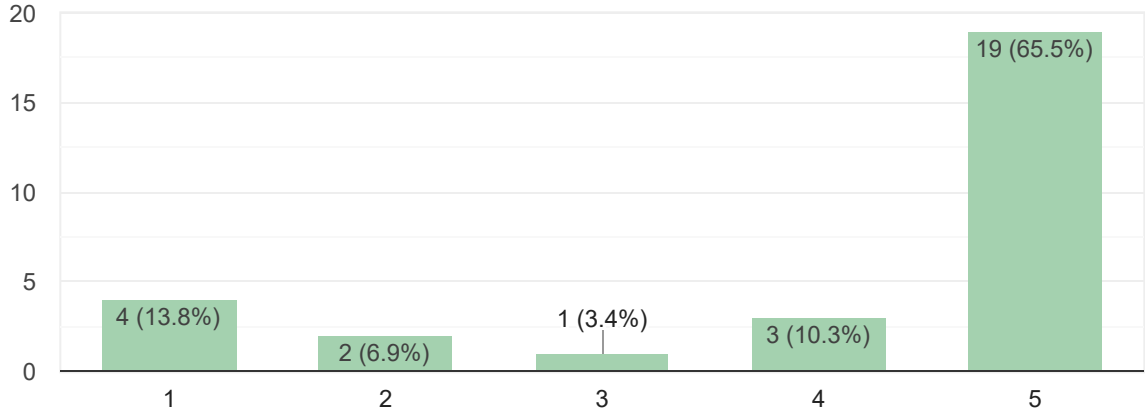
1. I am aware that there is a town sponsored bucket tree available on the beach access for my community.

29 responses



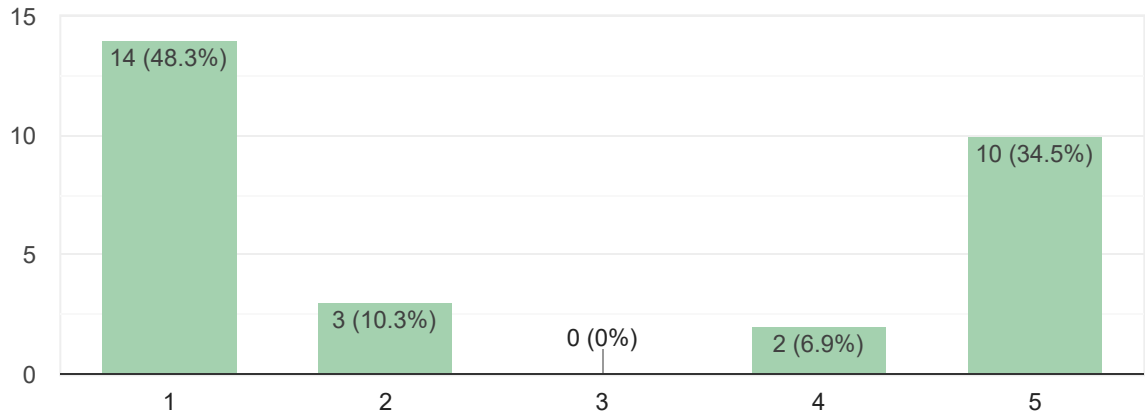
2. I understand the purpose of the town sponsored bucket tree on the beach access for my community.

29 responses



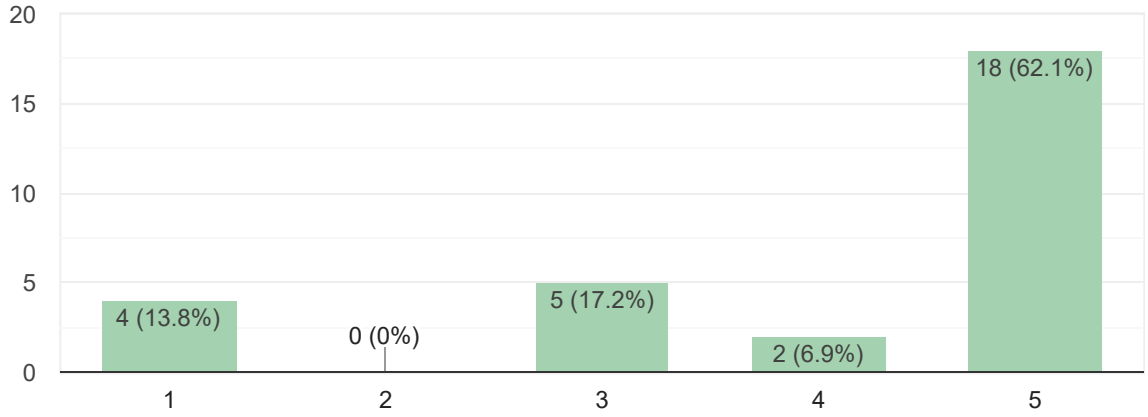
3. I have used the buckets on our bucket tree to collect trash on Highland Beach.

29 responses



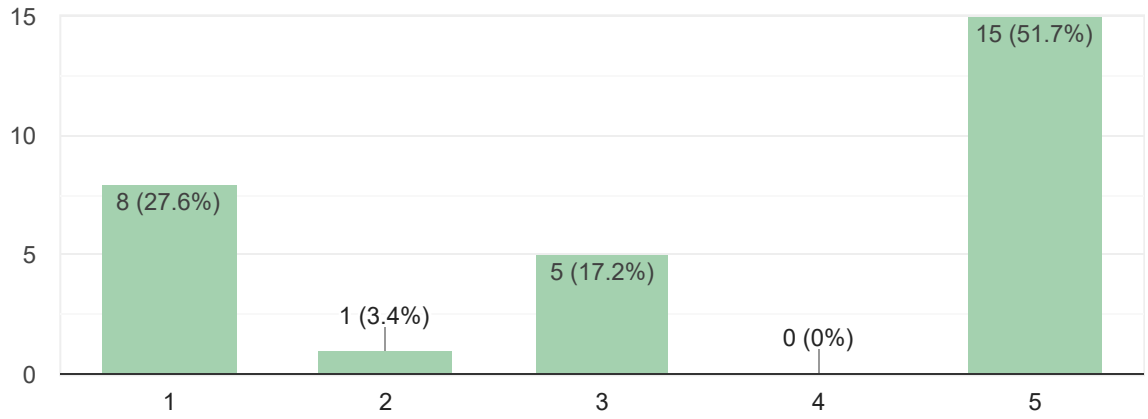
4. I believe that the bucket tree program is a beneficial program that helps keep Highland Beach clean.

29 responses



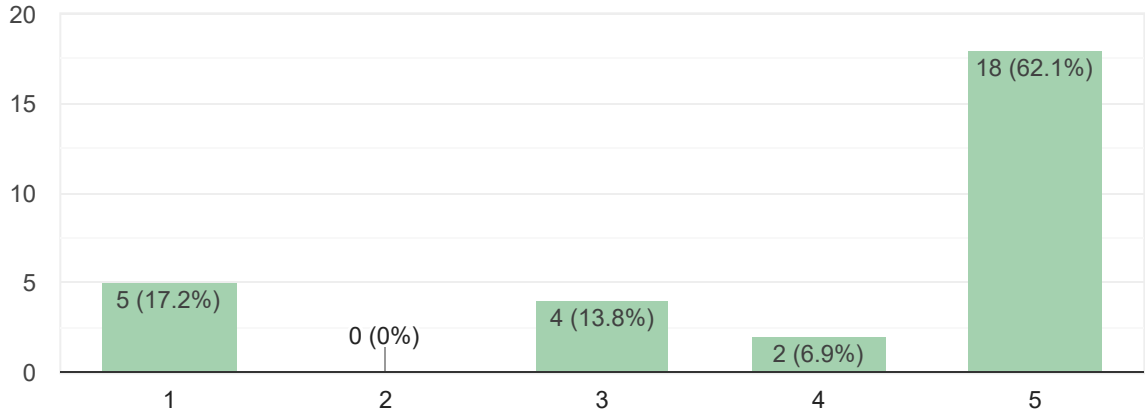
5. I encourage others in my community to use the buckets found on the bucket tree.

29 responses



6. I would like to see additional bucket trees installed at other communities along the beach.

29 responses



Comments - anything else you would like to share

11 responses

Soooo much better than a baggy and with the nice trash receptacle their is great. Thank you

I love using the bucket when I clean up trash daily on the beach. I think having long handled tongs would be very helpful and much easier on my back.
I'm also wondering if along side of our garbage can there could be a recycling can as well. Thank you for your efforts in helping the environment.

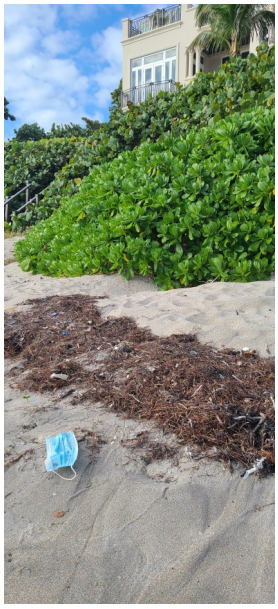
at trafalgar there is a garbage can adjacent to the tree-- as a result I do not believe I have seen anyone use the tree...

People may be hesitant to pick up trash with Covid circulating

Please have gut removed at beach next to trafalgar it encroaches on trafalgars property and is an eyesore and blocks view of many residents. It is never used or maintained and doesn't belong at that location

A flyer that explains the program would be nice to hang in our mailroom.







To date, The Highland Beach Club community has completed 3 beach walk clean-ups. (11/6/21, 12/4/21 & 1/8/22). 10-20 individuals participate at any given time for a 30 -45 minute beach walk. On average, two commercial size trash bags are filled. The majority of the trash is collected along the dunes in front of beach residences. The most common items found are plastic bottle caps and plastic water bottles.