Federally Endangered Beach Jaquemontia in Southern Palm Beach County
Partners Meeting: City of Boca Raton, City of Delray Beach

April 25, 2022



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Chief Conservation Strategist

SER Society for Ecological Restoration

International Policy Lead

and

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Fairchild Tropical Botanic Garden

Conservation Program Manager

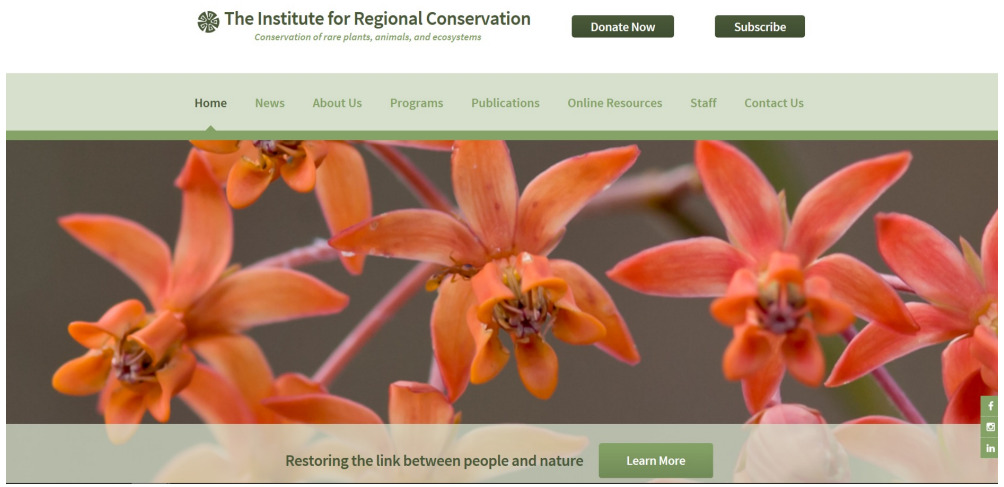
with

Kevin Kalasz

U.S. Fish & Wildlife Service

Agenda

- **Introductions**
- **Background on IRC** and our mission
- **Conservation context i**n South Florida
- **Beach Jacquemontia 2020 Status**
- **Boca Raton and Delray Beach** details
- **Discussion**



IRC aims to protect, restore and manage all biodiversity on a regional basis, and to **prevent local extinctions of native plants, animals and ecosystems**. All conservation is ultimately local. **2022 is our 38th Anniversary Year.** Staff of 8, 13 Associates, 7 Board Members.

Floristic and faunistic inventories

Rare species research

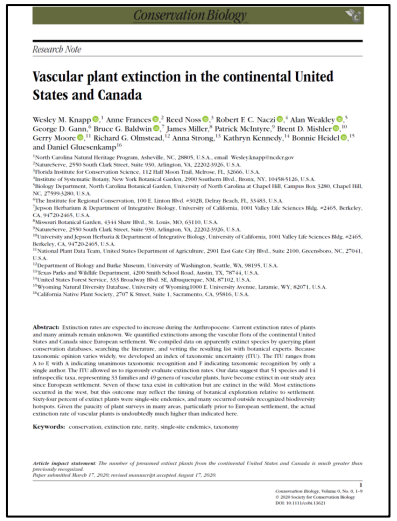
Ecological restoration design and implementation

Educational training and workshops

Online tools and resources

International policy

Uniting Global Thinking with Local Expertise



Conservation Biology

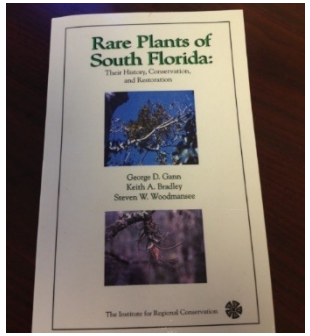
Research Note

Vascular plant extinction in the continental United States and Canada

Wesley M. Knapp, Anne Frances, Reed Noss, Robert F. C. Naczi, Alan Weakley, George D. Gann, Bruce G. Baldwin, James Miller, Patrick McIntyre, Brent D. Mishler, Gerry Moore, Richard G. Olmstead, Anna Strong, Kathryn Kennedy, Bonnie Heidel, and Daniel Ghesquiere

Abstract: Extinction rates are expected to increase during the Anthropocene. Current extinction rates of plants and many animals remain unknown. We quantified extinctions among the vascular flora of the continental United States and Canada since European settlement. We compiled data on apparently extinct species by querying plant conservation databases, searching the literature, and vetting the resulting list with botanical experts. Because taxonomic opinion varies widely, we developed an index of taxonomic uncertainty (ITU). The ITU ranges from A to E with A indicating unanimous taxonomic recognition and E indicating taxonomic recognition by only a single author. The ITU allowed us to rigorously evaluate extinction rates. Our data suggest that 51 species and 14 infraspecific taxa, representing 53 families and 49 genera of vascular plants, have become extinct in our study area since European settlement. Seven of these taxa exist in cultivation but are extinct in the wild. Most extinctions occurred in the west, but this outcome may reflect the timing of botanical exploration relative to settlement. Sixty-four percent of extinct plants were single-site endemics, and many occurred outside recognized biodiversity hotspots. Given the paucity of plant surveys in many areas, particularly prior to European settlement, the actual extinction rate of vascular plants is undoubtedly much higher than indicated here.

Keywords: conservation, extinction rate, rarity, single-site endemics, taxonomy



South Florida

The Floristic Inventory of South Florida
Conservation of rare plants, animals, and ecosystems

GUIDELINES FOR PLANTING A PINE ROCKLAND IN MIAMI-DADE COUNTY, FLORIDA

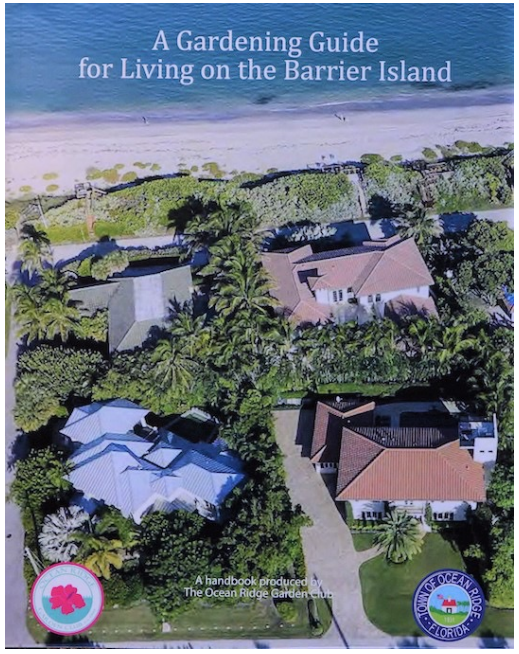
George D. Gann, Jennifer Possley, Steven W. Woodmansee

Version 2.0
October 2020

Why plant a pine rockland? Pine rockland is a critically imperiled ecosystem that has been heavily impacted by urban development and agriculture. Found only in South Florida and the Bahama Archipelago, less than 2% of the original pine rocklands remain in Miami-Dade County outside of Everglades National Park. Pine rocklands of the lower Florida Keys have also been heavily impacted by development, sea level rise, and flooding from hurricanes and tropical storms. Creating a pine rockland is not easy or simple, but it can be extremely rewarding. Pine rocklands provide wonderful habitats for native plants and wildlife, including many species of very rare plants, butterflies, bees and other pollinators, and songbirds. If well-planned and managed they can also be aesthetically pleasing.

Photo courtesy of Haniel Pulido Jr.

Plantas de la Isla de Puerto Rico
Plants of the Island of
Un servicio para la conservación de flora / *A conservation service for the flora*
The Institute for Regional Conservation



Native plant gardening and ecological restoration may be more closely linked than you think. A coastal garden at a dune in Ocean Ridge, Florida, uses local native plants to restore a coastal shrub land. It is both beautiful and restorative. Photo by George Gann.

Looking at the many woes of the world, from COVID-19 to climate change, it is understandable to feel overwhelmed. Yet, we know from ample evidence that the sum of individual actions is as important as those of government, large businesses or big conservation organizations. This is especially true in urban and suburban areas, where our collective individual actions may make the difference between conservation success – or the lack thereof. This need for individual action has never been more urgent, no matter where you live, and is embraced by Plant America with Trees, an emphasis of National Garden Clubs Inc.

At the international level, there is tremendous work being done to address not one, but three global environmental challenges: countering climate change, preventing the extinction crisis and providing adequate ecosystem services to meet the needs of a sustainable world. Meeting these challenges requires transformational change; business as usual just won't work. We know that traditional conservation alone, what we think of as "protection" or "preservation," is insufficient to meet these challenges. Instead, we need

Photo by Kimberlee Duke Pompeo

Ecological Restoration and Community Outreach

Global Uptake of International Principles and Standards for the Practice of Ecological Restoration

ORGANIZERS

SER SOCIETY FOR ECOLOGICAL RESTORATION

SER SOCIETY FOR ECOLOGICAL RESTORATION AUSTRALASIA

The Institute for Regional Conservation

Launched in September 2019

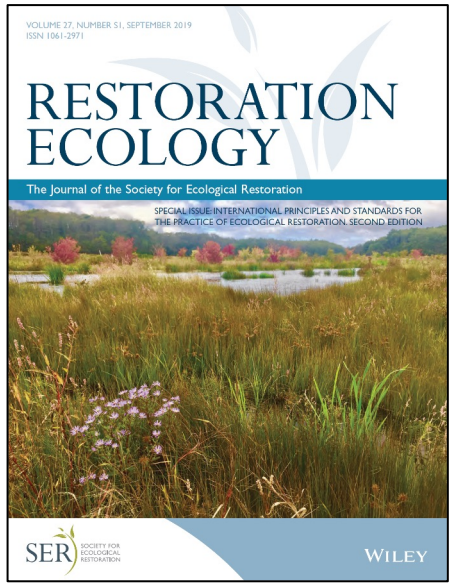
Incorporated into global restoration guidance

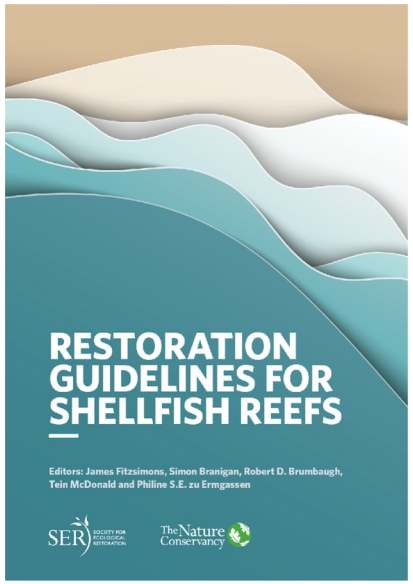
Cited as a key document in the official Strategy of the United Nations Decade on Ecosystem Restoration

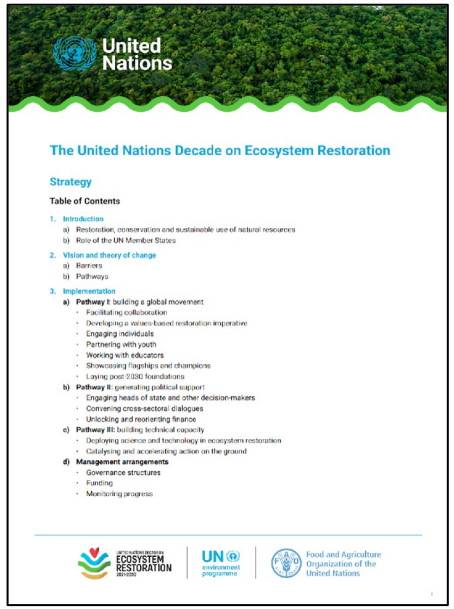
Is the most downloaded manuscript in the history of journal Restoration Ecology (40,000 downloads in 2+ years)

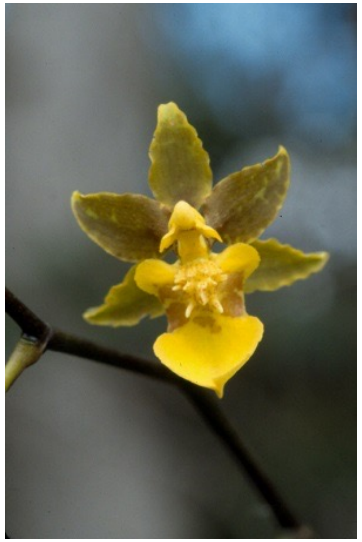
Cited >325 times (Dimensions)

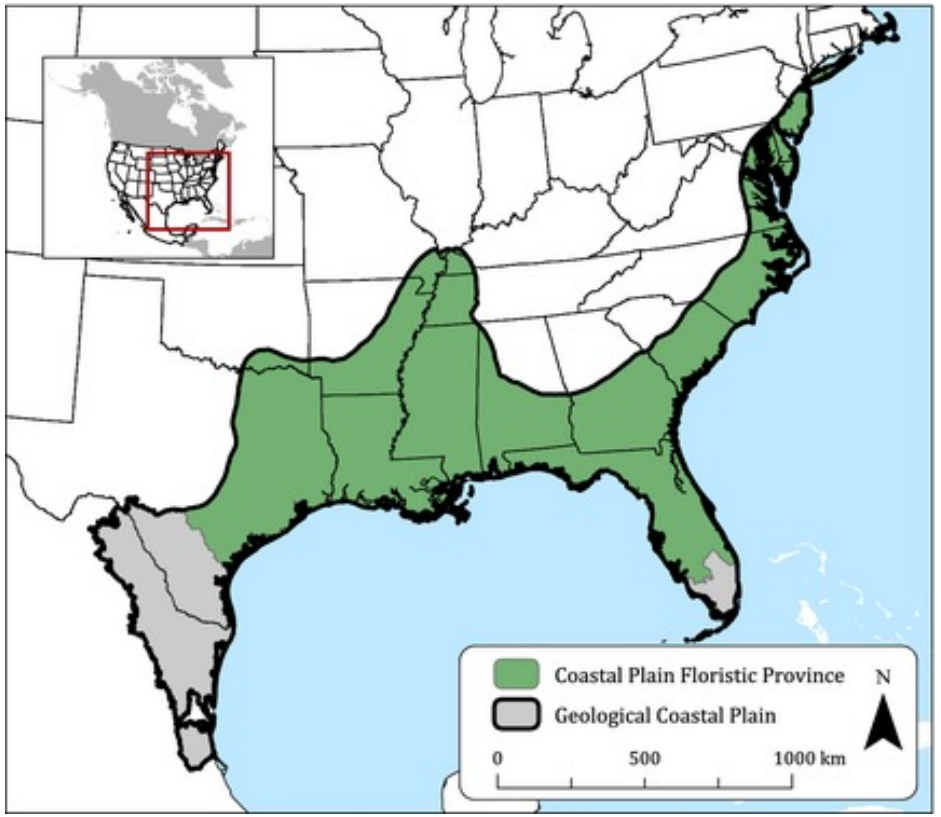
www.ser.org/standards, or https://doi.org/10.1111/rec.13035







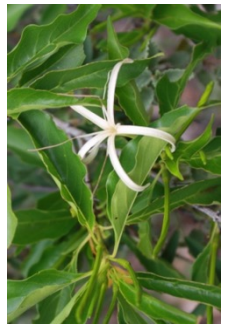
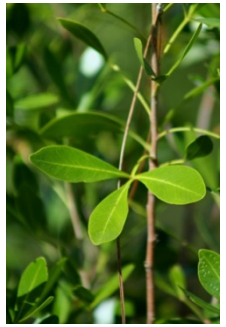


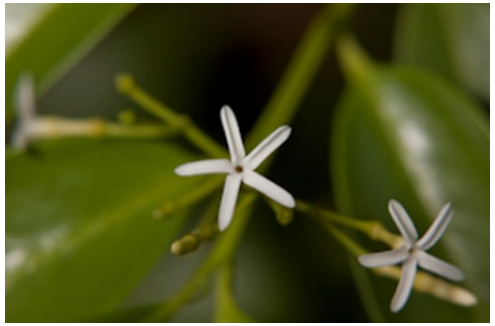
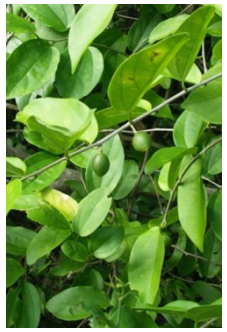


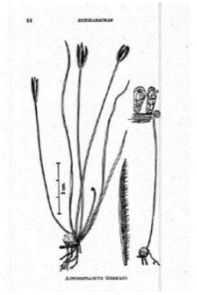
North American Coastal Plain Global Biodiversity Hotspot

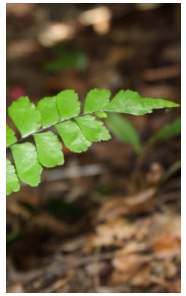
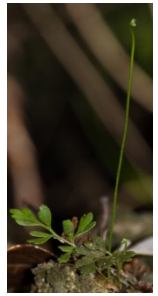
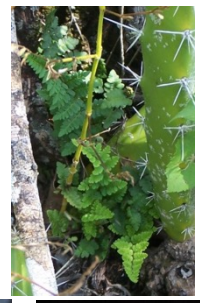
Noss et al. 2014

Local Biodiversity Matters For Conservation and Sense of Place

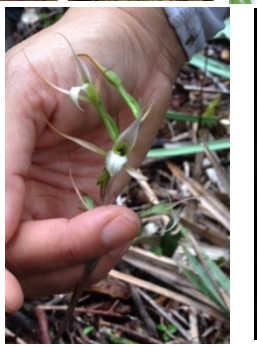



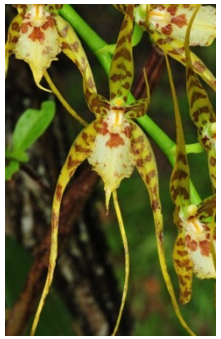





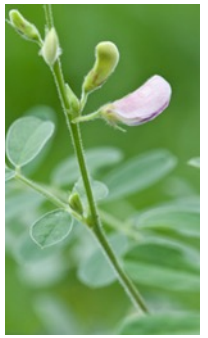










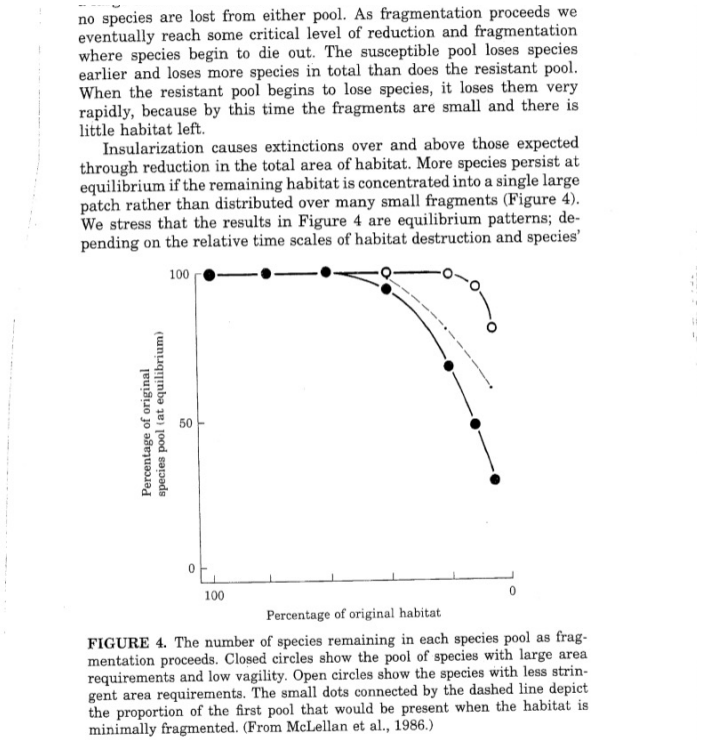


Species of Management Concern in Everglades National Park, hardwood hammocks.

>50% of region in conservation; United Nations Convention on Biological Diversity (CBD) 2020 Protected Areas Target was 17%. Everything should be great. But it's not, due to lack of protection of coastal and upland ecosystems.

NASA Johnson Space Center; August 14, 2013

Fragmentation leads to inexorable loss



no species are lost from either pool. As fragmentation proceeds we eventually reach some critical level of reduction and fragmentation where species begin to die out. The susceptible pool loses species earlier and loses more species in total than does the resistant pool. When the resistant pool begins to lose species, it loses them very rapidly, because by this time the fragments are small and there is little habitat left.

Insularization causes extinctions over and above those expected through reduction in the total area of habitat. More species persist at equilibrium if the remaining habitat is concentrated into a single large patch rather than distributed over many small fragments (Figure 4). We stress that the results in Figure 4 are equilibrium patterns; depending on the relative time scales of habitat destruction and species'

FIGURE 4. The number of species remaining in each species pool as fragmentation proceeds. Closed circles show the pool of species with large area requirements and low vagility. Open circles show the species with less stringent area requirements. The small dots connected by the dashed line depict the proportion of the first pool that would be present when the habitat is minimally fragmented. (From McLellan et al., 1986.)

Wilcove 1986

Some species and groups go faster, some slower

Plant Biodiversity is Key to Animal Biodiversity and visa-versa

Image by Mary Trulio Fesmire

Image by Joe Mdo

Extinction Debt

Refers to the time delay between the impact of environmental changes and the time species go extinct.

(from Tilman et al. 1994)

Dark Diversity

Refers to the missing portion of a species pool for a given habitat in a given region.

(from Pärtel et al. 2011)

Are we in the
extinction prevention business?

Or the biodiversity recovery business?

How do we actually *Save Species*?

And ourselves?

Restoring the Gold Coast

2022-2023
Phase II

COMMUNITY FOUNDATION
for Palm Beach and Martin Counties

Major Sponsors

Palm Beach County Impact100 — The Power of Women Giving as One — www.impact100pbc.com — 2019 Award Recipient

NEW YORK LIFE

Sponsors

Beach Property Owners' Association B.P.O.A.

ERIN L. DEADY, P.A.

BOCA RATON FLORIDA

TOWN OF OCEAN RIDGE 1931 FLORIDA

SURFRIDER FOUNDATION

Collaborators

ATLANTIC COMMUNITY HIGH SCHOOL

BOCA COMMUNITY HIGH SCHOOL

CITY OF DELRAY BEACH

Florida Coalition for Preservation

FTBG

OUTDOOR YOUTH ADVENTURES

Keep Palm Beach County Beautiful

MILAGRO CENTER

Ocean Ridge Garden Club

Palm Beach County Florida

Palm Beach County Chapter with Florida Native Plant Society

SANDOWAY DISCOVERY CENTER

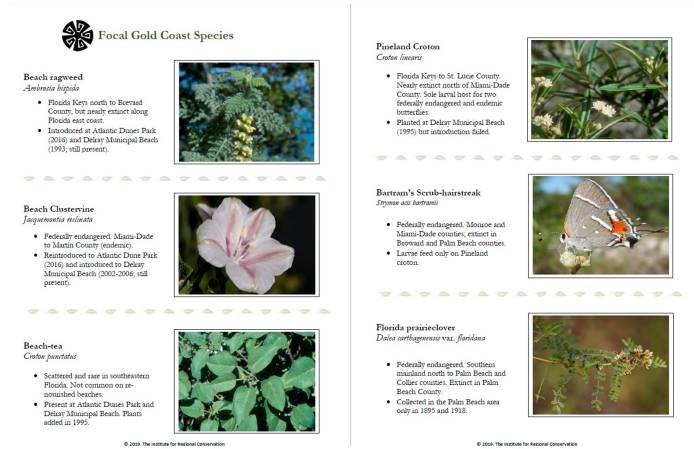
S.E.A. Turtle Adventures

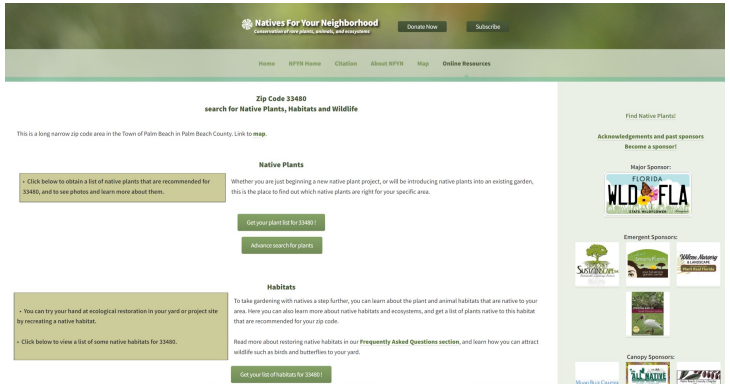
Town of Briny Breezes Florida

Activities of the Restoring the Gold Coast Program

Piriqueta cistoides subsp. *caroliniana*

Trichostem dichotomum





Facilitate Recovery of Biodiversity

Contribute to Science-based Restoration

Provide Education & Tools for Students, Local Communities, and Visitors

Foster Habitats for Birds and Butterflies

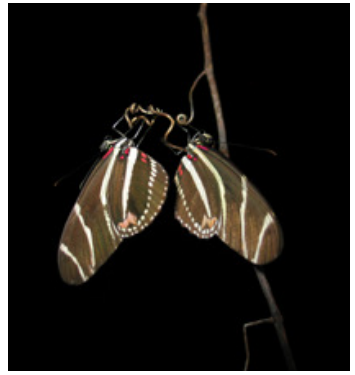
Four Larval Host Plants – 10 Coastal Butterflies

Cassius Blue

Large Orange Sulphur

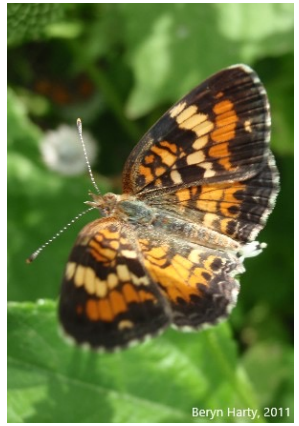
Martial Scrub-Hairstreak

Common Buckeye



Zebra Heliconian

Gray Hairstreak



Phaon Crescent

White Peacock

Gulf Fritillary

Julia Heliconian

Historical Ecosystems of Palm Beach County – Beach Dune

Phipps Ocean Park

Delray Beach

Historical Ecosystems of Coastal Palm Beach County – Maritime Hammock

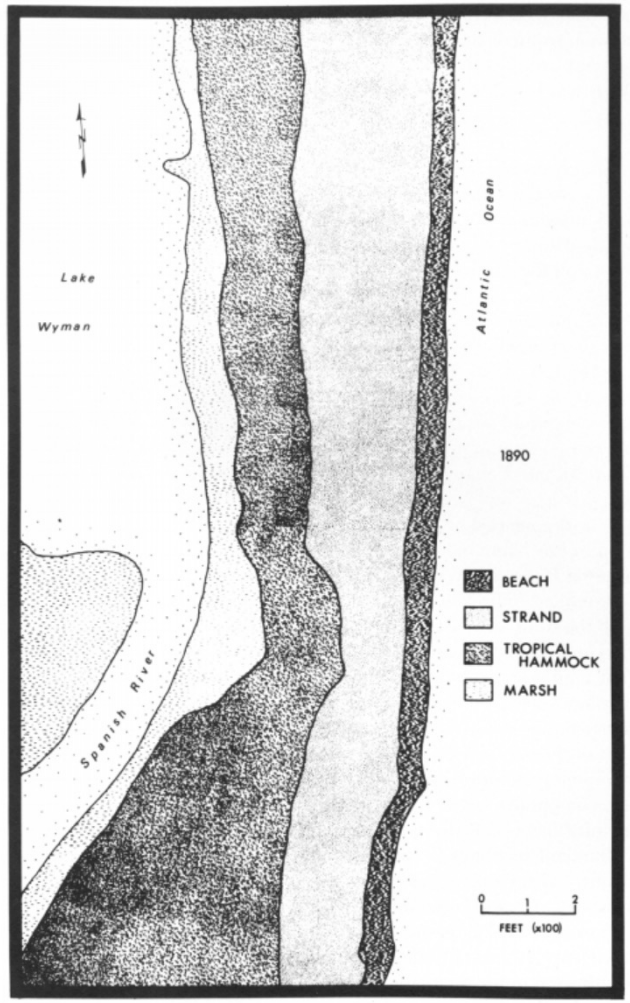


FIG. 1. Interpretation of the plant associations on the Boca Hammock region in 1890. Based on 1845 and 1870 surveys and 1940 aerial photography.

PRESENT ASSOCIATIONS—The fresh water marsh that previously existed in the Intracoastal Waterway basin no longer exists. A mangrove association has replaced this fresh water community. Mangrove invasion took place largely after 1921 (Long, 1921) when the Hillsboro Canal was opened. A survey by Butler in

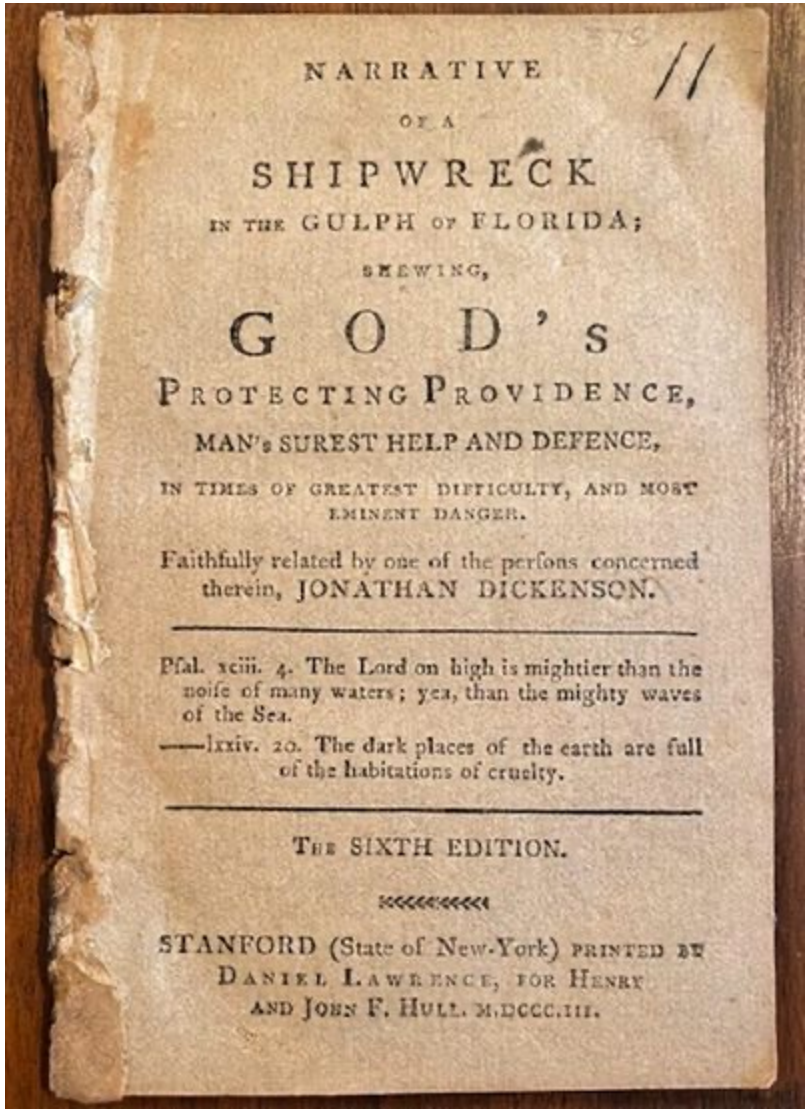
Boca Hammock, Boca Raton

Canaveral National Seashore

Washington Oaks Gardens State Park, Palm Coast

"The Florida Indians Capture the Shipwrecked Company," from Pieter van der Aa, *Naaukeuirge Versameling der Gedenk-waardigste Zee en Landreysen na Oost en West-Indien* (1707). Florida Memory • The Jupiter Inlet Hurricane of 1696

- Indigenous people lived on the barrier islands
- They arrived in South Florida about 12,000 y ago
- Glades Indians (Jaega and others) extinct by 1770s
- Miccosukee and Seminole tribes permanently settled in southern Florida in the early 1800s
- **Indigenous fire** increased and maintained grassy and shrubby ecosystems that benefited wildlife and species diversity



NARRATIVE

OF A

SHIPWRECK

IN THE GULPH OF FLORIDA;

SHEWING,

GOD'S

PROTECTING PROVIDENCE,

MAN'S SUREST HELP AND DEFENCE,

IN TIMES OF GREATEST DIFFICULTY, AND MOST EMINENT DANGER.

Faithfully related by one of the persons concerned therein, JONATHAN DICKENSON.

Pſal. xciii. 4. The Lord on high is mightier than the noiſe of many waters; yea, than the mighty waves of the Sea.

——lxxiv. 20. The dark places of the earth are full of the habitations of cruelty.

THE SIXTH EDITION.

STANFORD (State of New-York) PRINTED BY DANIEL LAWRENCE, FOR HENRY AND JOHN F. HULL. M.DCCC.III.

Story of Jonathan Dickinson, 1696

Historical Ecosystems of Palm Beach – Coastal Strand

US Lifesaving Service House of Refuge
Delray Beach 1876

Palmetto Park Road and A1A, Boca Raton
c. 1925

To the Newcomer, the Barrier Islands
Were Stark, Prickly Landscapes

Reference Sites for Coastal Strand

Courtesy: Rob Barron

Canaveral National Seashore. Courtesy: Rob Barron

Kissimmee Prairie State Park

Delray Municipal Beach

Freshwater Lakes, Marshes, Interdunal Swales, and Swamps were present, but we know less about them

These wetlands were and are critical for wildlife

By mid-20th century the transformation of many barrier islands was complete.

Town of Palm Beach

Where Did the Native Biodiversity Go?

Delray Beach, circa 1970

Delray Beach, early renourishment

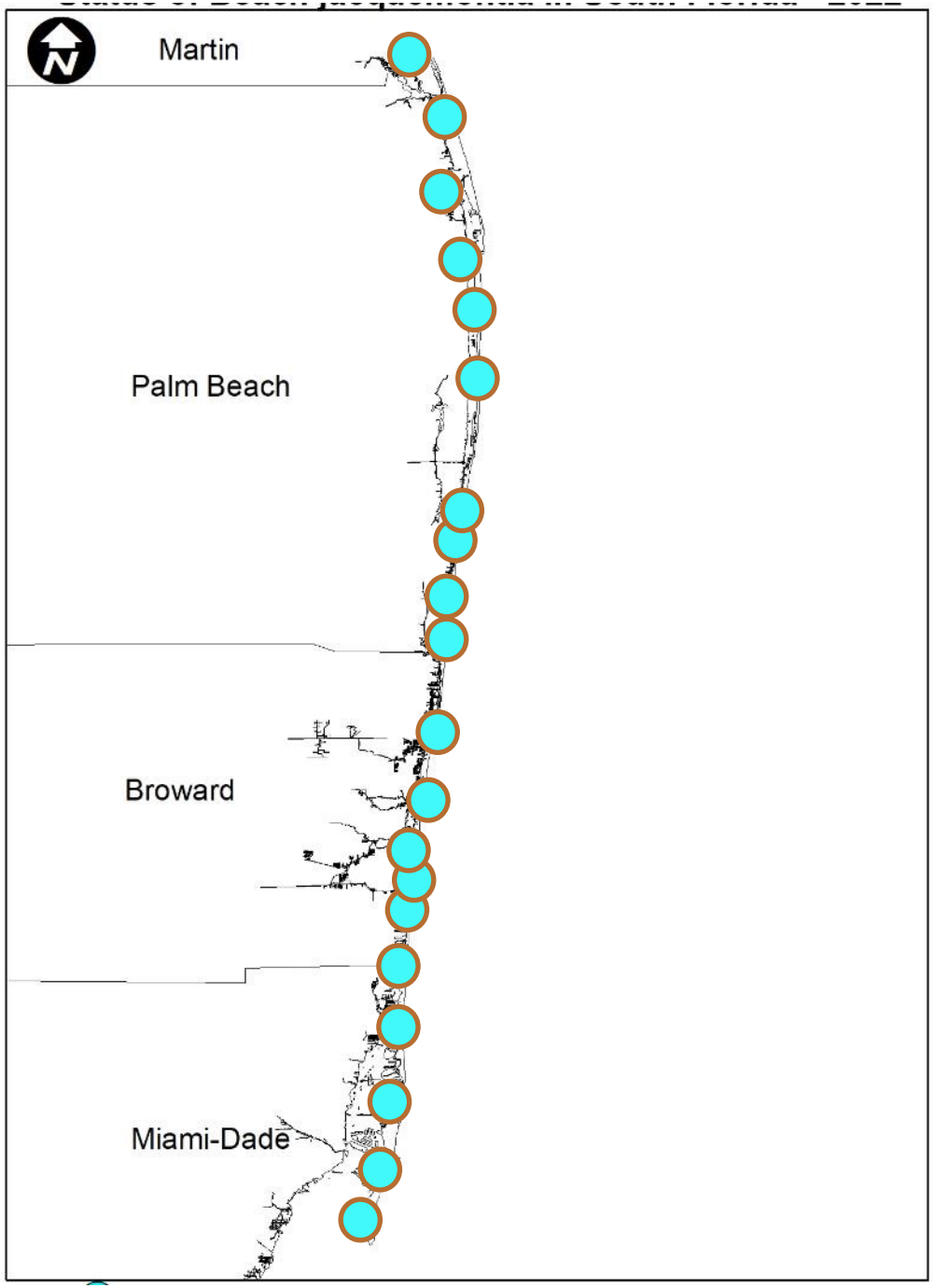
Beach jacquemontia 2022 global status

Jennifer Possley, Conservation Program Manager
Fairchild Tropical Botanic Garden

FAIRCHILD
TROPICAL BOTANIC GARDEN

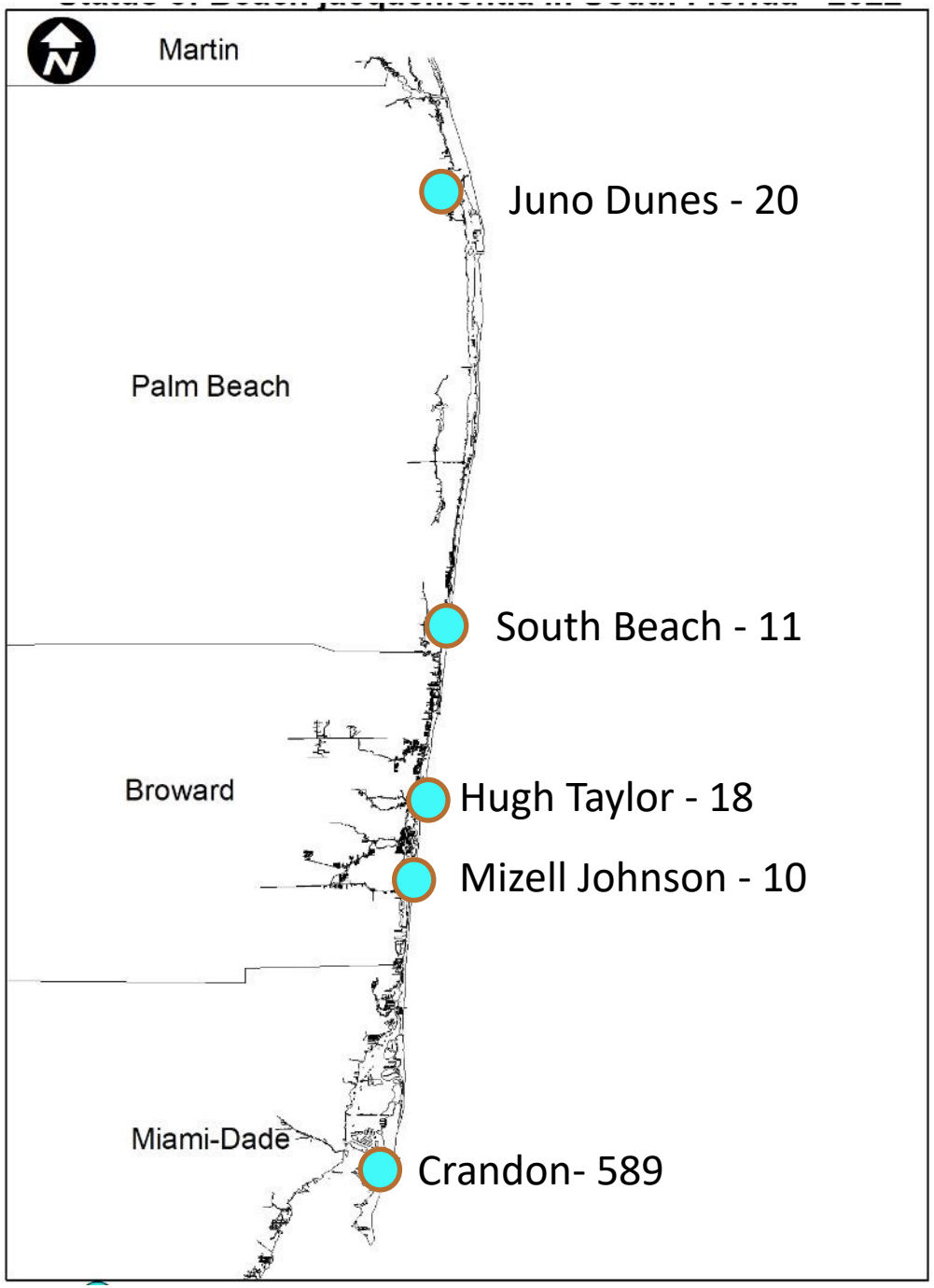
Fairchild & partners – 30+ yrs of Jacquemontia research & recovery

- **Habitat** – open grassy areas in stabilized dune
- **Seed biology / banking** – Forms a short-lived soil seed bank, seeds are orthodox, ~15 years in storage
- **Breeding system** – Mixed. Flowers can self-pollinate, but outcrossing results in much greater seed set. Visitors = many spp of flies, wasps, butterflies.
- **Genetics** – Variation with pops, not between – except Oakland Park
- **Demography** – Highly variable by site/year
- **Horticulture** – Easily cultivated from seed (scarification required) and cuttings.



Beach jacquemontia

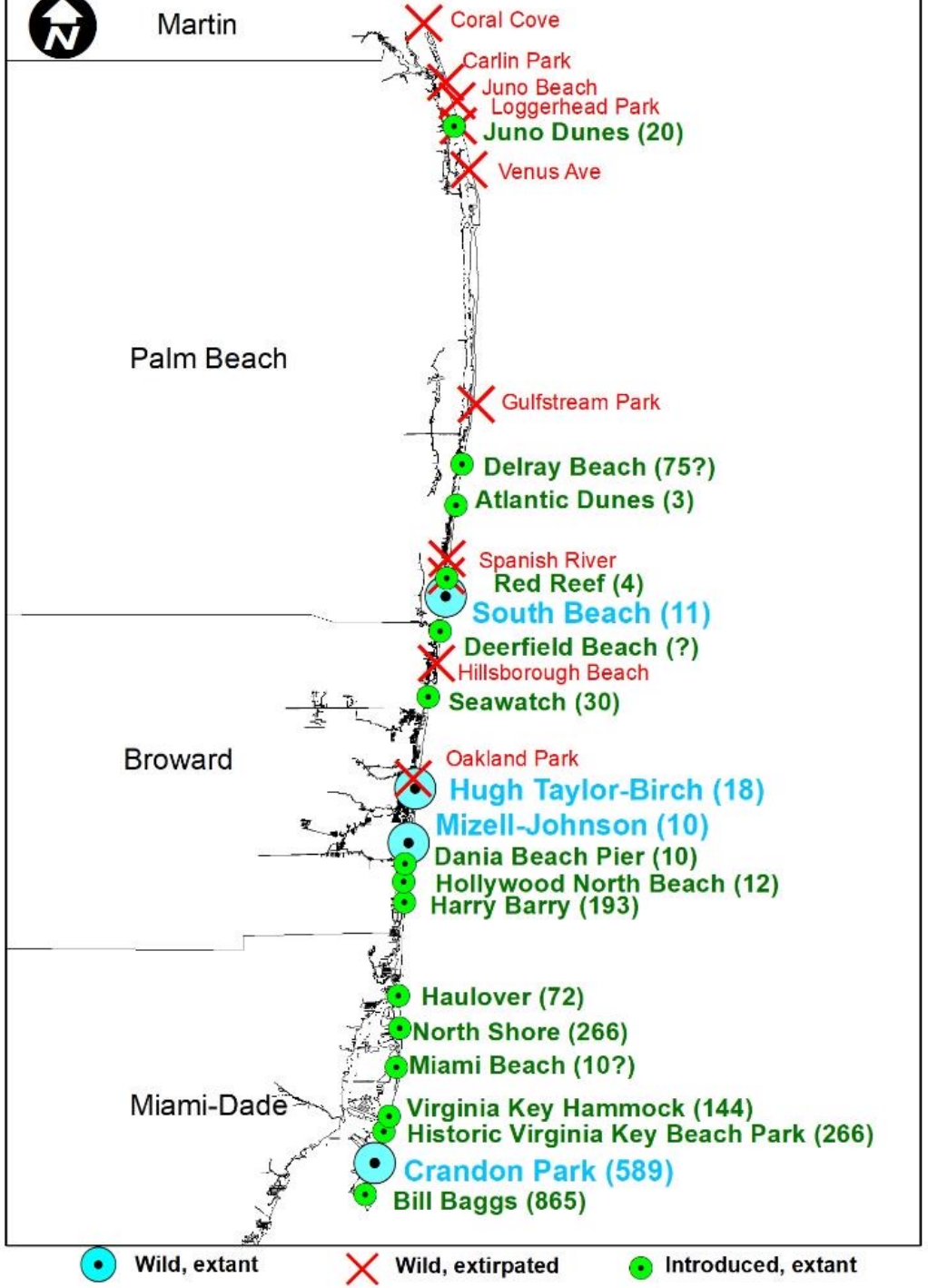
approximate historic distribution



Wild beach jacquemontia today

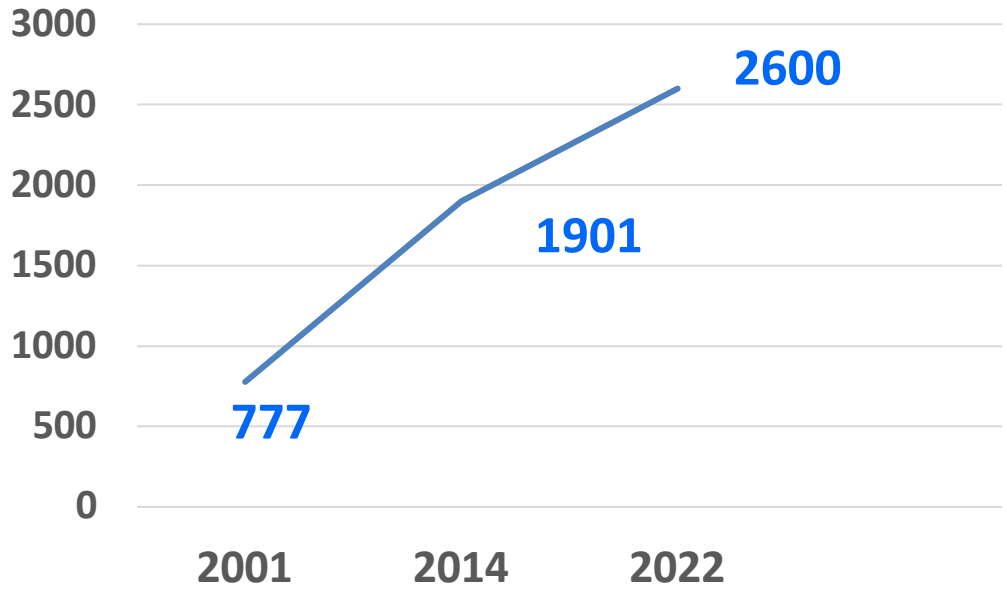
648 plants

Loss of connectivity

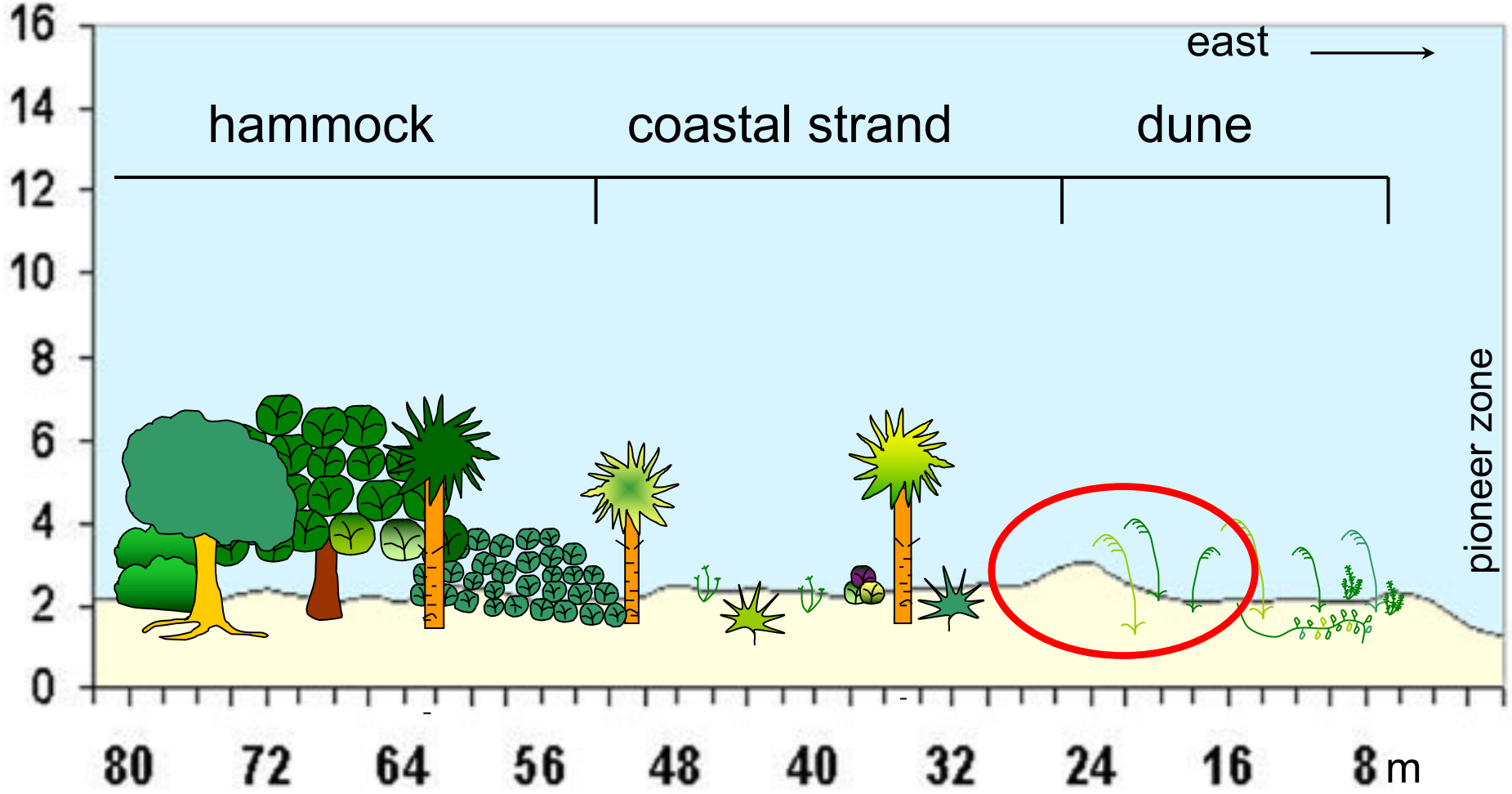


Wild + Reintroduced 2022

Total number of plants in South Florida



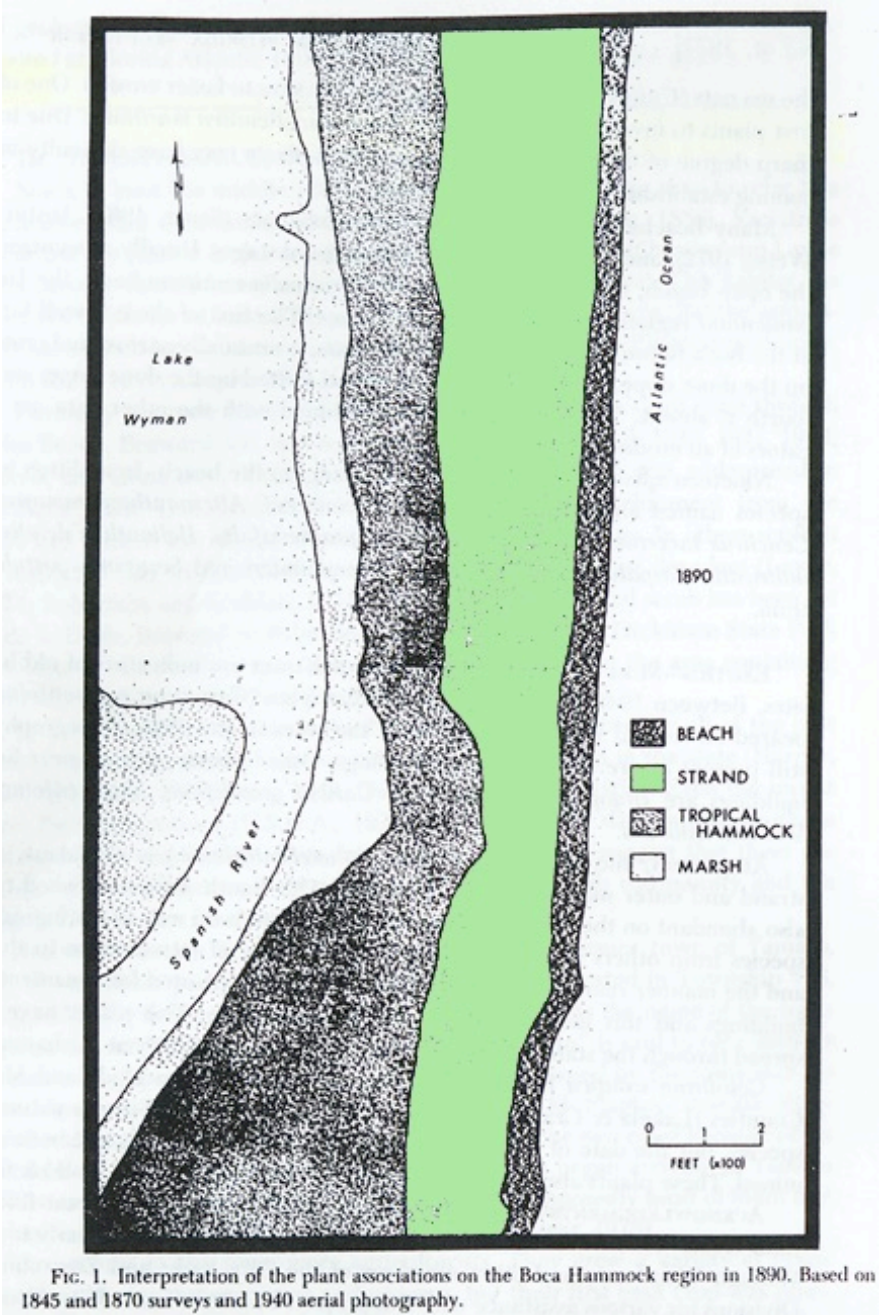
Causes of extirpation & decline



Hammock succession
Development
Invasive Species

Storms, erosion
beach management

Loss of strand, dune in Boca Raton, 1900 vs 2007



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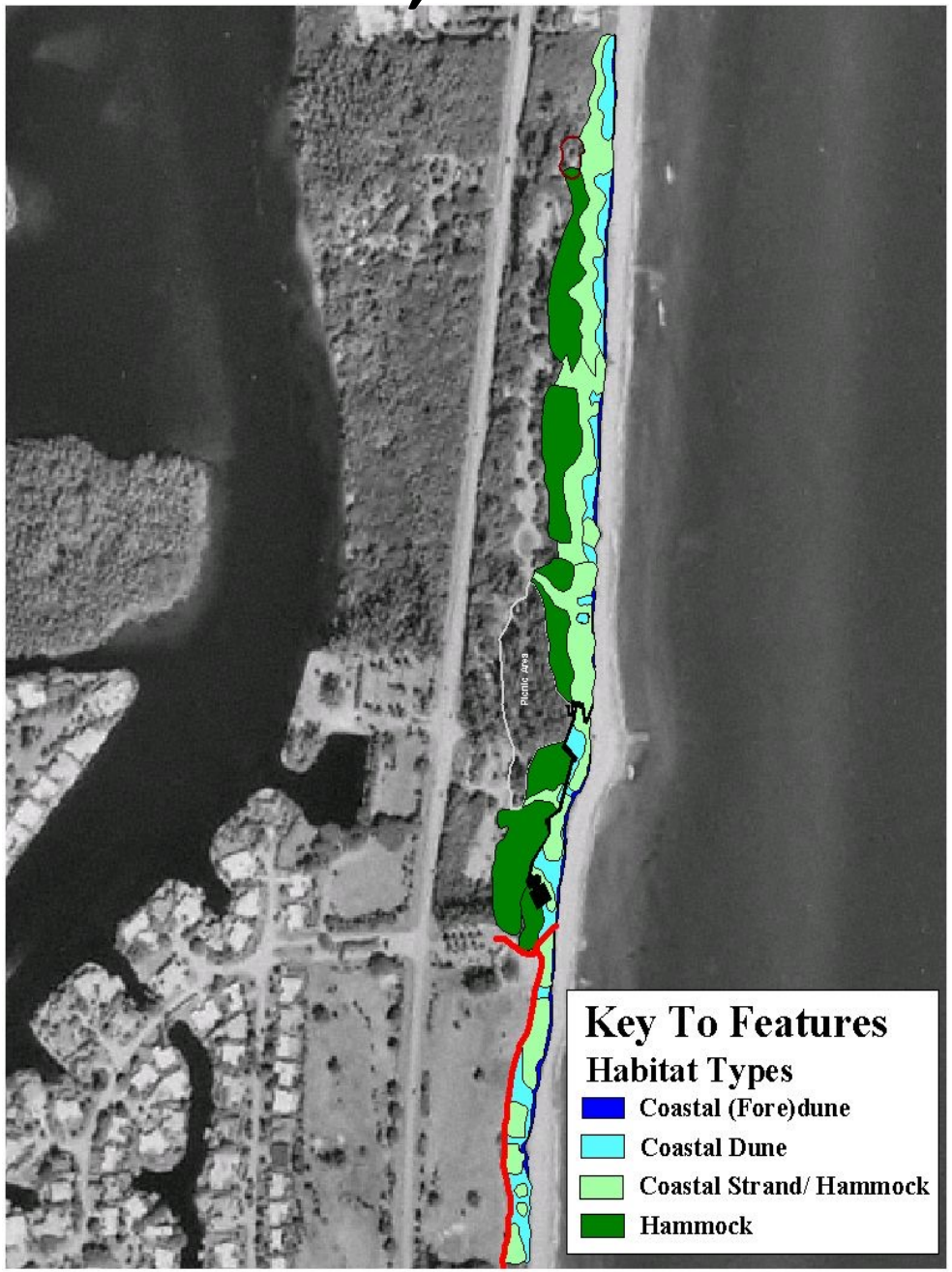
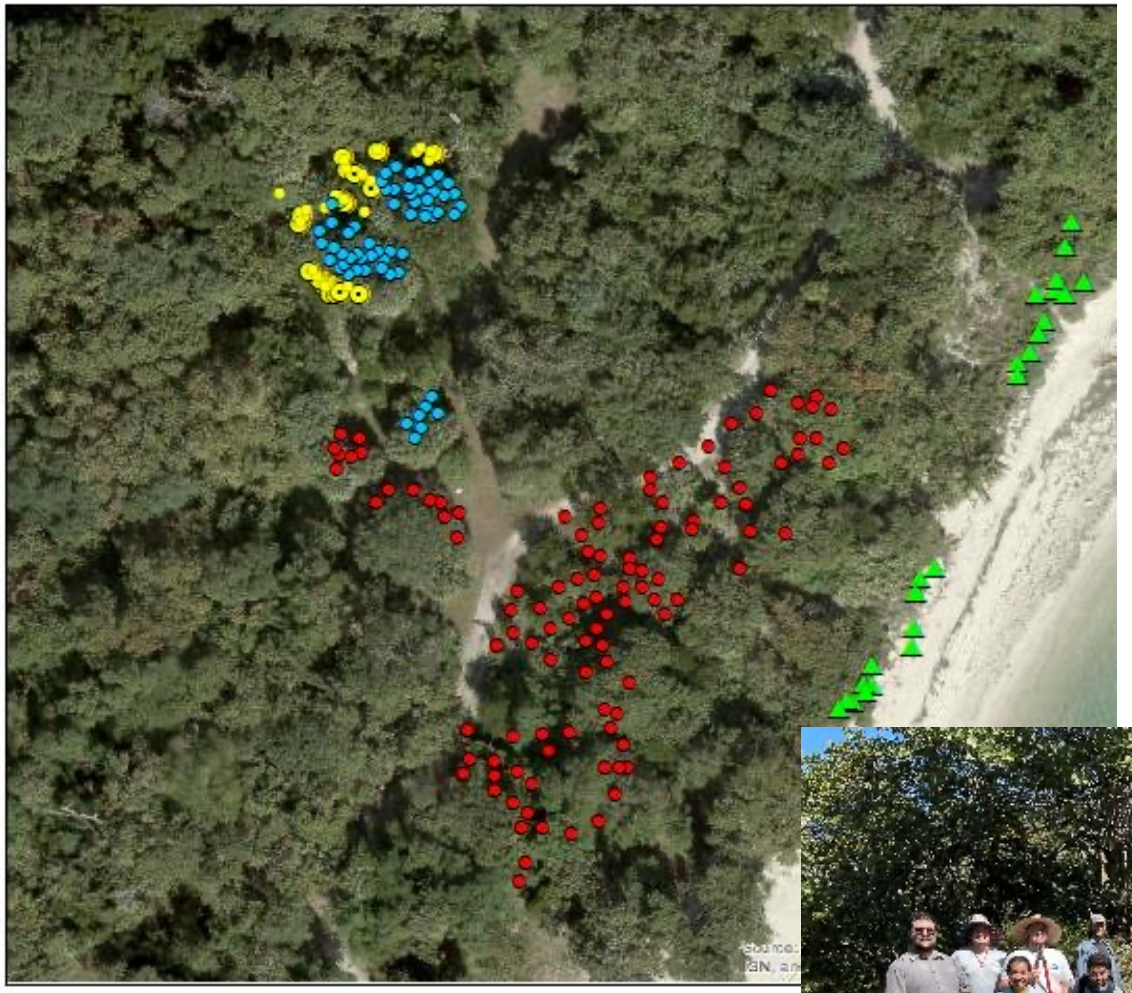


Loss of strand, dune in Virginia Key Hammock, 2006 vs. 2022



Historic Virginia Key Beach Park - today

Richardia grandiflora

Historic Virginia Key Beach Park - today

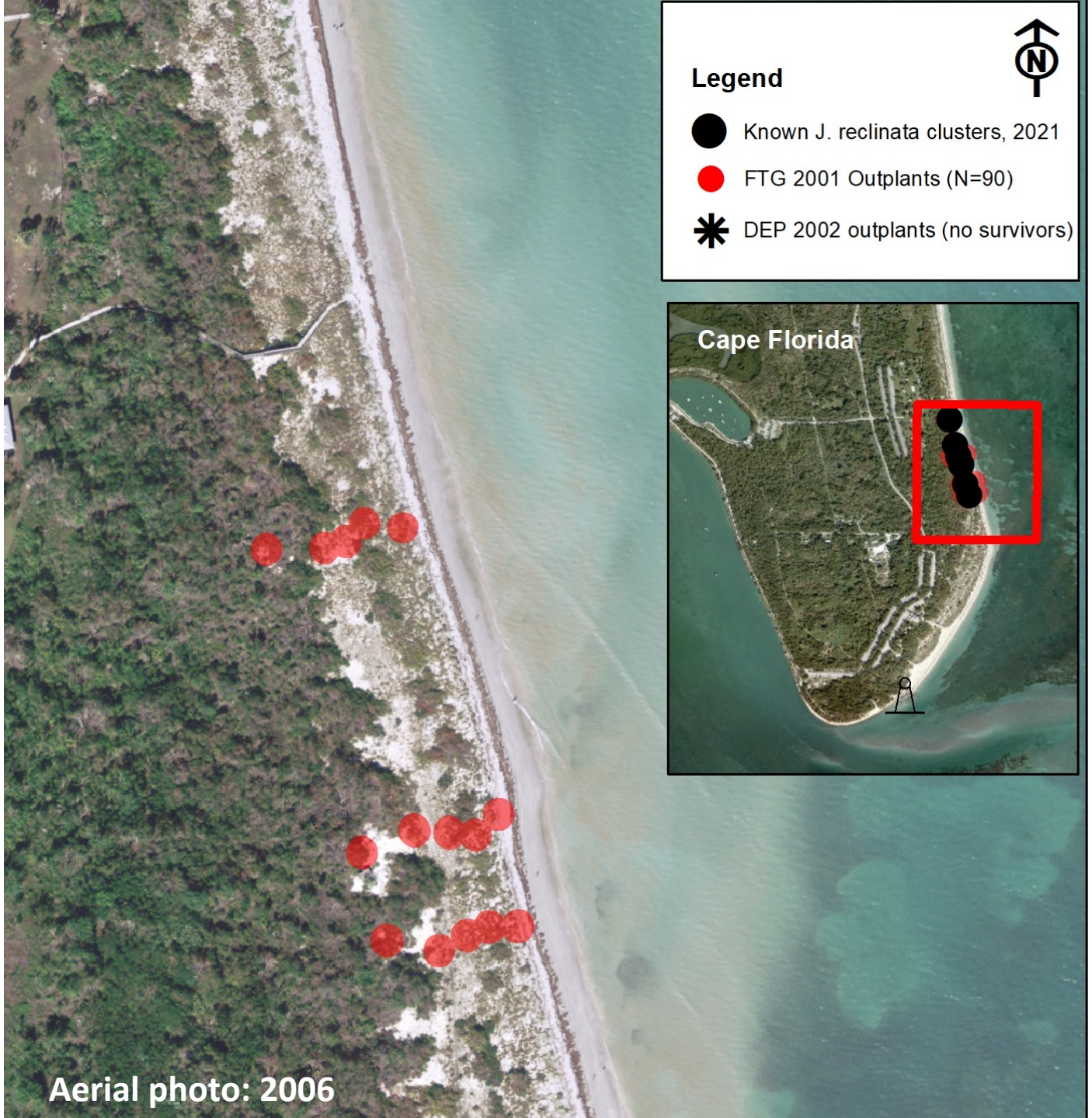
North Beach Open Space Park – 266 plants

Invasive species mgmt., including sea grape (beach raking)


Crandon Park – 589 plants
Invasive species mgmt., esp. coinvine (Richardia)


Haulover Beach Park – 72 plants
Invasive species mgmt., including sea grape


Bill Baggs Cape Florida – 865 plants
Invasive species mgmt. & fire



Bill Baggs Cape Florida

2001 Outplants (90)

VS

2021 Distribution (865)

Bill Baggs Cape Florida

2001 Outplants (90)

vs

2021 Distribution (865)

Please scroll to the bottom for more images.

Jacquemontia reclinata **House**

Beach clustervine, Beach Jacquemontia

Family: Convolvulaceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Perennial

Native Range: Endemic to South Florida along the east coast from Miami-Dade County to Martin County.

Map of select IRC data for peninsular Florida

***NatureServe** Global Status*: Critically Imperiled

United States Federal Status: Endangered

State of Florida Status: Endangered

***Florida Natural Areas Inventory** State Status*: Critically Imperiled

IRC SOUTH FLORIDA Status: Critically Imperiled

SOUTH FLORIDA Occurrence: Present

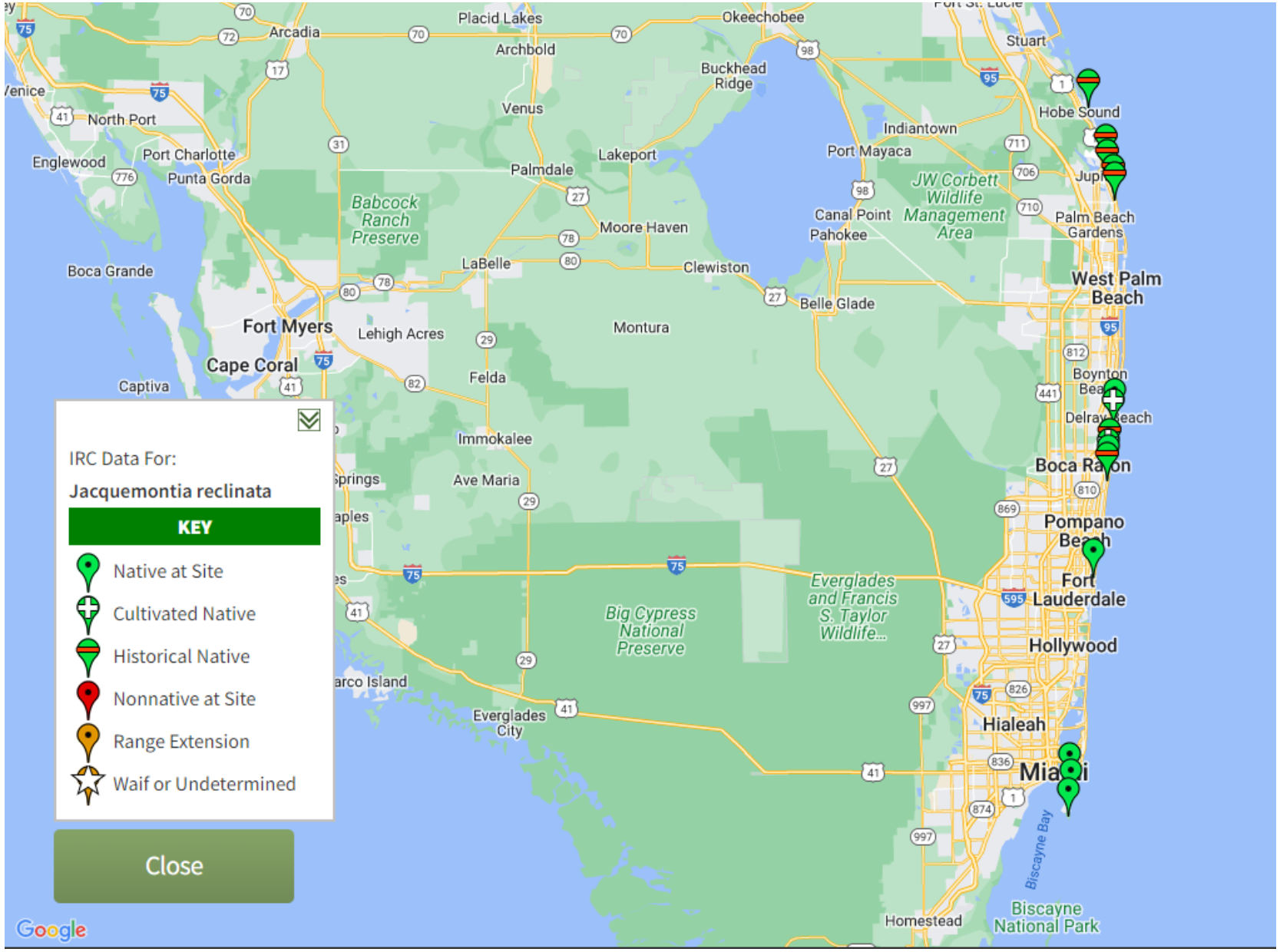
SOUTH FLORIDA Native Status: Native

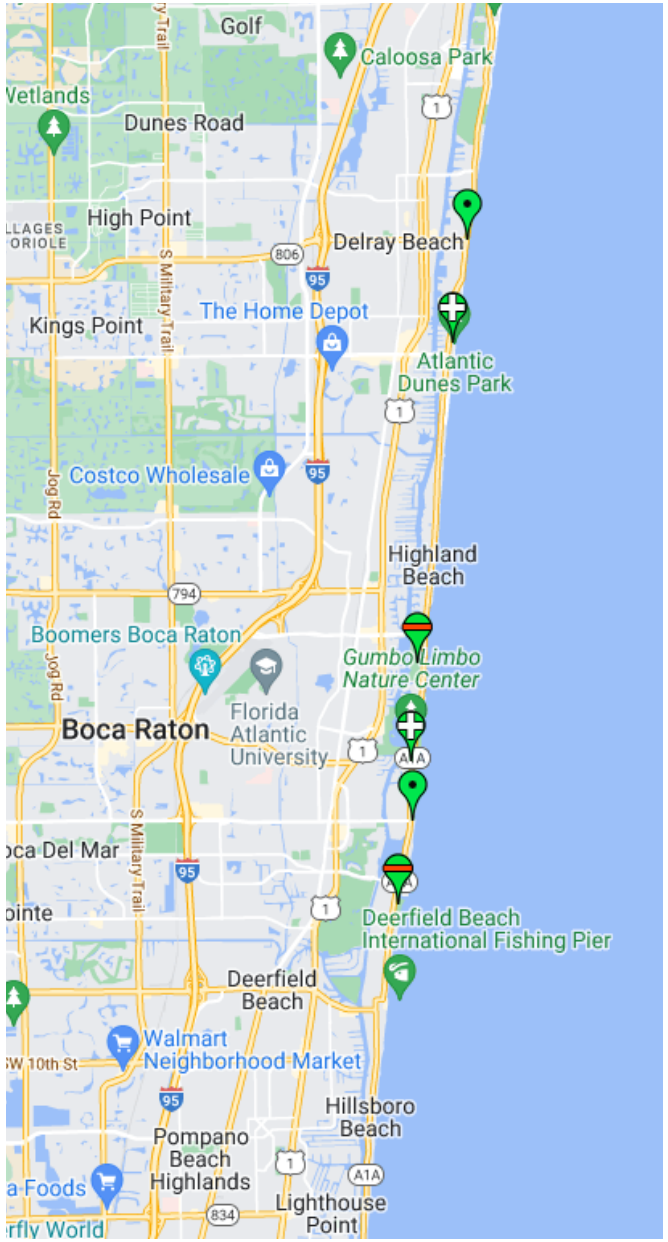
South Florida History and Distribution: For a federal review of *Jacquemontia reclinata* throughout its range, see the U.S. Fish and Wildlife **Species Profile**. See also the species account from the 1999 **South Florida Multi-Species Recovery Plan**, pp 1049-1055, Florida Natural Areas Inventory's **Field Guide to the Rare Plants of Florida** page (Chafin 2000), and **Rare Plants of South Florida** (Gann et al. 2002, pp 451-453).

Copyright by: Kristen Finch

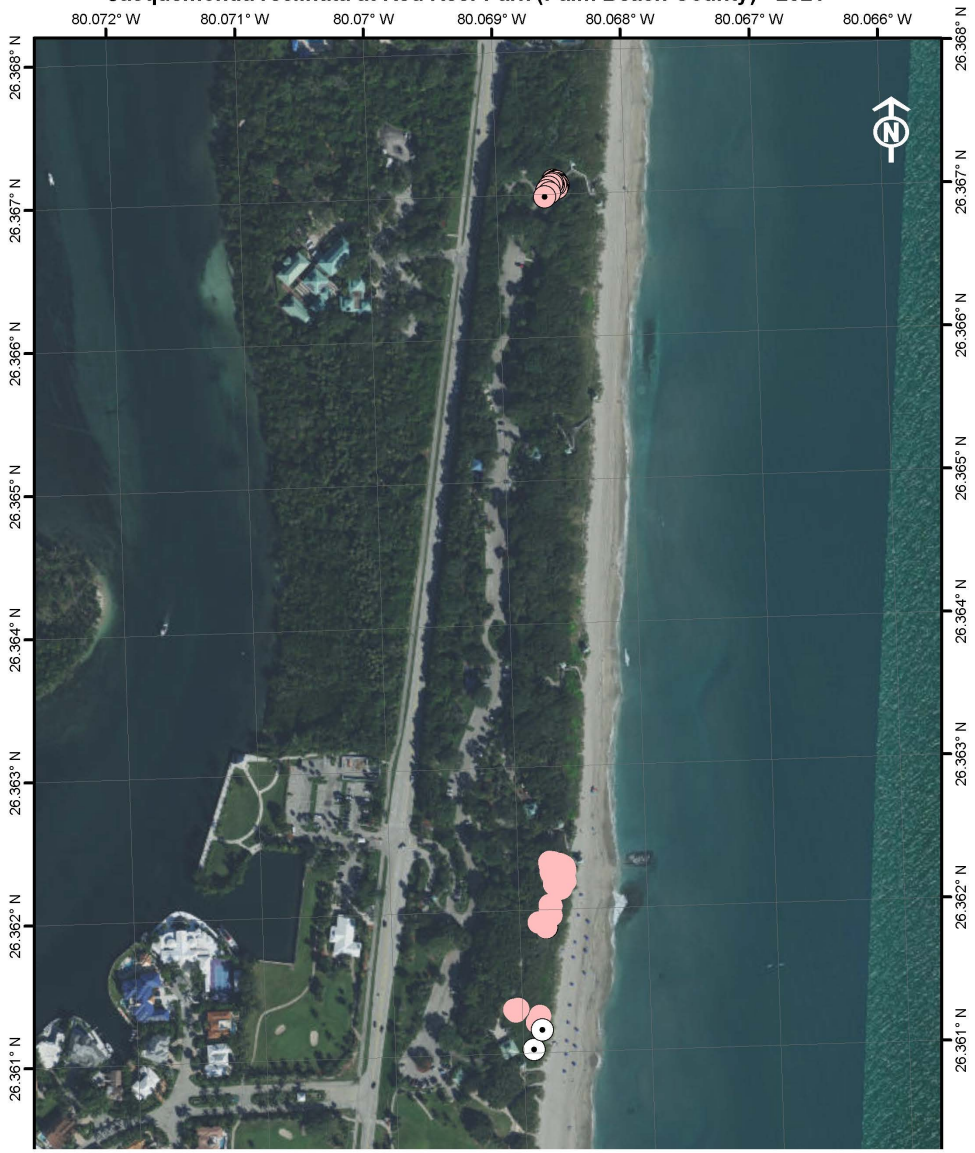
in cultivation, Palm Beach County, Florida

FISF Maps


IRC Data For:
Jacquemontia reclinata
KEY
Native at Site
Cultivated Native
Historical Native
Nonnative at Site
Range Extension
Waif or Undetermined
Close
Google
Placid Lakes
Okeechobee
Arcadia
Archbold
Buckhead Ridge
Stuart
Venus
Hobe Sound
Indiantown
North Port
Port Mayaca
Englewood
Port Charlotte
Punta Gorda
Lakeport
Palmdale
JW Corbett Wildlife Management Area
Babcock Ranch Preserve
Canal Point
Pahokee
Palm Beach Gardens
Moore Haven
Boca Grande
LaBelle
Clewiston
West Palm Beach
Fort Myers
Lehigh Acres
Belle Glade
Montura
Cape Coral
Captiva
Felda
Boynton Beach
Delray Beach
Immokalee
Boca Raton
Ave Maria
Pompano Beach
Everglades and Francis S. Taylor Wildlife...
Big Cypress National Preserve
Fort Lauderdale
Hollywood
Everglades City
Hialeah
Miami
Biscayne Bay
Homestead
Biscayne National Park


Golf
Caloosa Park
Wetlands
Dunes Road
High Point
Delray Beach
Kings Point
The Home Depot
Atlantic Dunes Park
Costco Wholesale
Highland Beach
Boomers Boca Raton
Gumbo Limbo Nature Center
Florida Atlantic University
Boca Raton
Deerfield Beach International Fishing Pier
Deerfield Beach
Walmart Neighborhood Market
Hillsboro Beach
Pompano Beach Highlands
Lighthouse Point

Jacquemontia reclinata at Red Reef Park (Palm Beach County) - 2021



Wild Jacquemontia reclinata mapped in 2000 (N=178) EXTIRPATED

Jacquemontia reclinata planted in 2003 (N=15) EXTIRPATED

Jacquemontia reclinata planted in 2021 (N=6)

0 25 50 100 Meters

2021 Aerial Photo

Jacquemontia reclinata at South Beach Park (Palm Beach County) - OVERVIEW

Historic wild Jacquemontia reclinata (245 plants mapped in 2000)

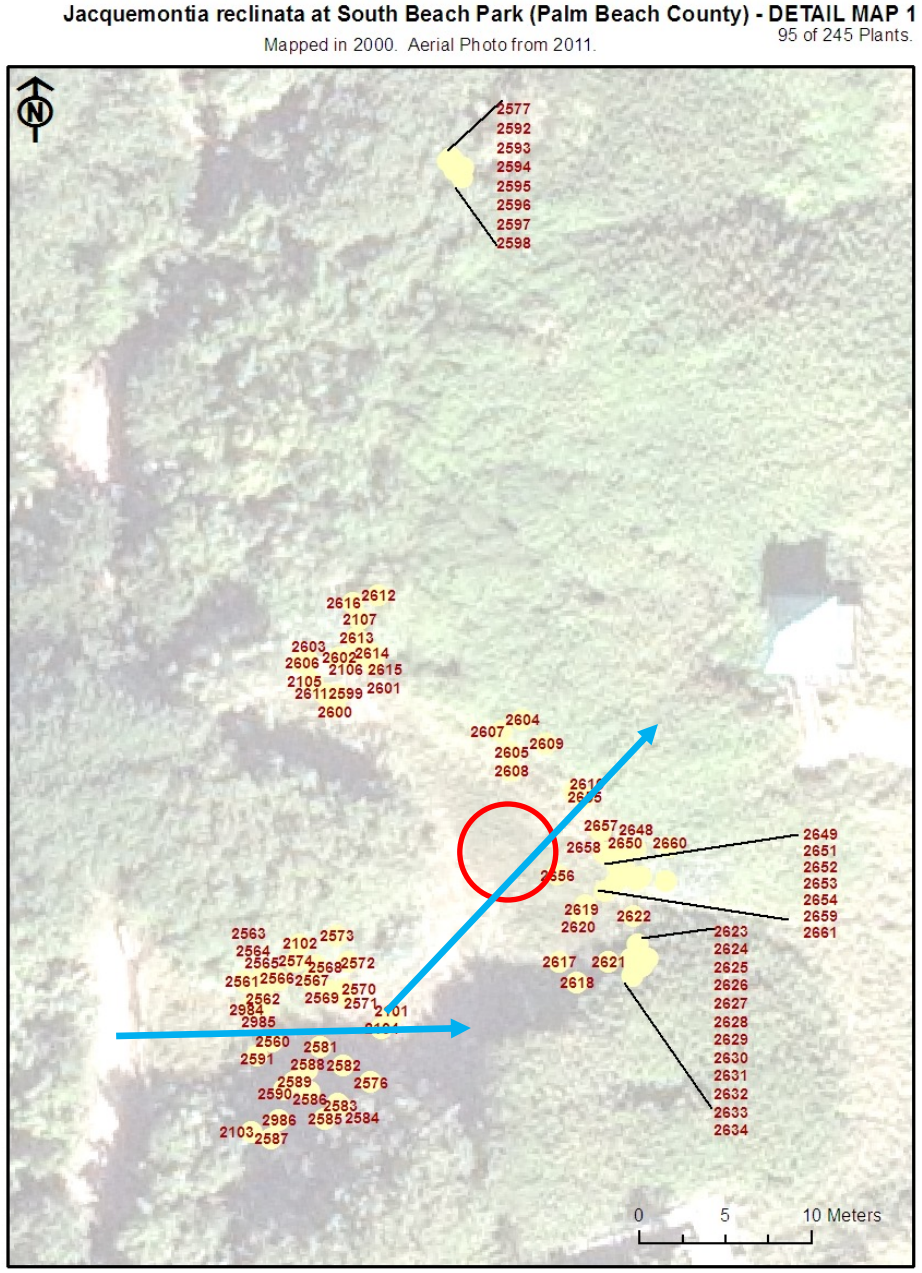
Wild Individual (1 plant mapped in 2021)

Additional plant(s) 2021

0 25 50 Meters

2021 Aerial Photo

South Beach
North Patch
After 2 treatments


Jacquemontia reclinata at South Beach Park (Palm Beach County) - DETAIL MAP 1
Mapped in 2000. Aerial Photo from 2011.
95 of 245 Plants.
0
5
10 Meters

2014, J. Lange


2020 before


ENVIRONMENTALLY
SENSITIVE AREA
HELP PRESERVE THIS AREA
PLEASE USE
BOARDWALK FOR
BEACH ACCESS
2020 after


2014


2020 before


2020 after


2022 after


2004 or later

South Beach, South Patch

Red Reef Park, South Patch
Site of Historical Population at Pavilion

South-Central Patch
FTBG Images 2005

Jacquemontia reclinata at Atlantic Dunes Park

Jacquemontia reclinata in 2002 (26 plants)

Jacquemontia reclinata planted in 2021 (__ plants)

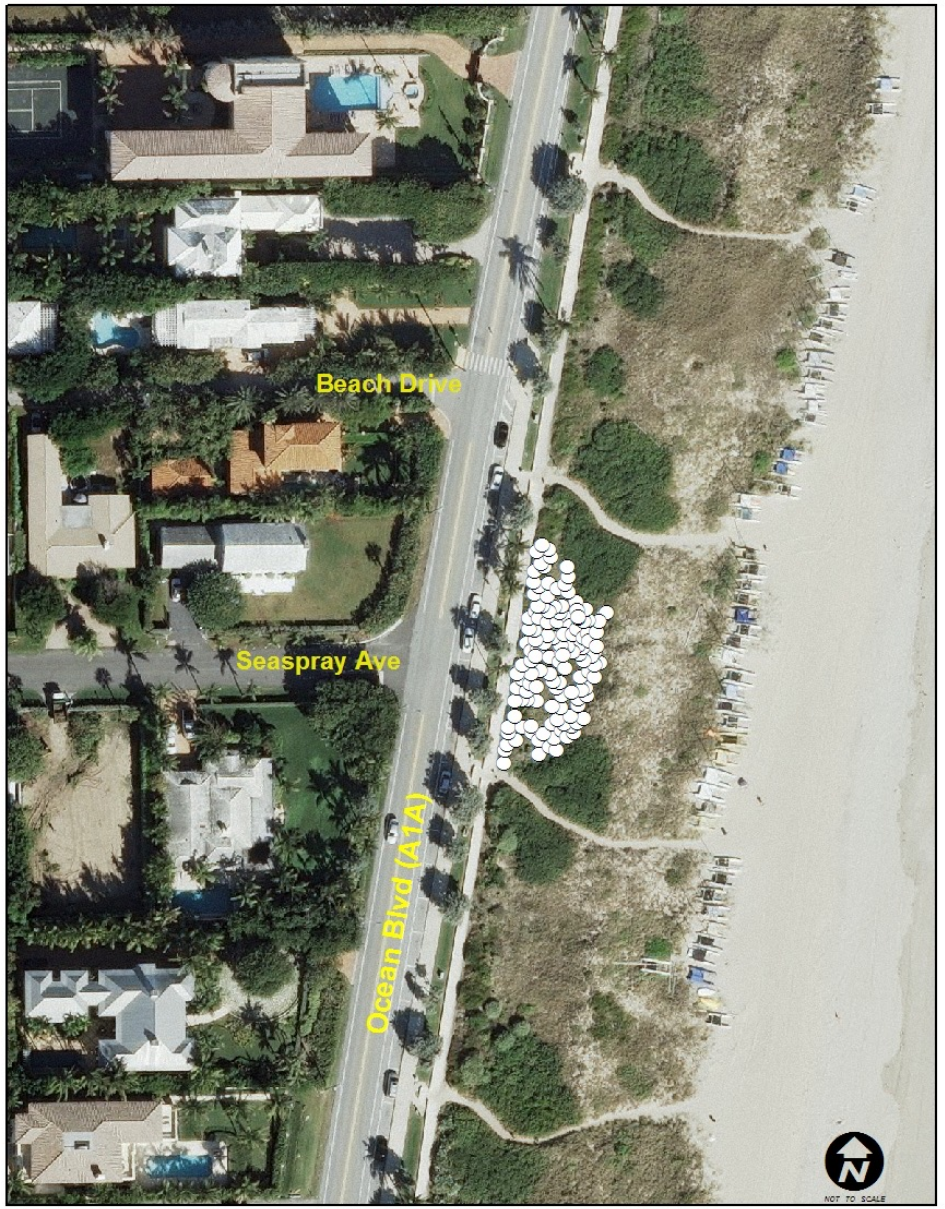
Trails (mapped in 2002)

0 5 10 20 M

Aerial from 2021

133 Jacquemontia reclinata planted at Delray Beach in 2005 - OVERVIEW

2011 Aerial from www.labins.org



Map by JP

0 5 10 20 Meters

“A sea of Jacquemontia” FTBG 2011

2015 IRC Surveys

Same area planted by FTBG in 2005

Additional areas documented by IRC

2020 Planting

50 plants added

Mar 2004, after clearing Dec 2003

Interior populations lost. Completely overtopped by Brazilian-pepper and sea-grape.

Brazilian-pepper, Scaevola, Seagrape Invasion. Incremental restoration, removing invasives, restoring coastal strand west of dune crest.

Pushing west into interior

South patch

North patch with *Tephrosia curtissii*

1991 freeze at
Atlantic Dune Park
Seagrape, cocoplum frozen to grade
Courtesy: Rob Barron

Causes of Seagrape Expansion

- Planting
- Lack of fire
  - Loss of Indigenous burning
  - No prescribed burning
  - Fire suppression
- Fewer freezes
- Competition for light
  - Exotics in interior and on edges
- Added nutrients
  - Fertilizer from landscapes
  - Fertilizer from dune plantings
  - Other contamination
- Changes in wind dynamics
  - Exotics on dune and in interior
  - Renourishment
  - Buildings

If Jacquemontia reclinata is going to persist in the future…, then some large changes to the habitat have to happen. Fire somehow needs to become a component again of the ecosystem. If fire is not possible then these large stands of hammock trees need to be removed or reduced from the coastal strand and back dune. If any replanting is to take place then only habitat appropriate plants should be installed: low lying shrubs, wildflower and grasses. Sam Wright, FTBG, 2009.

Tree Controversy

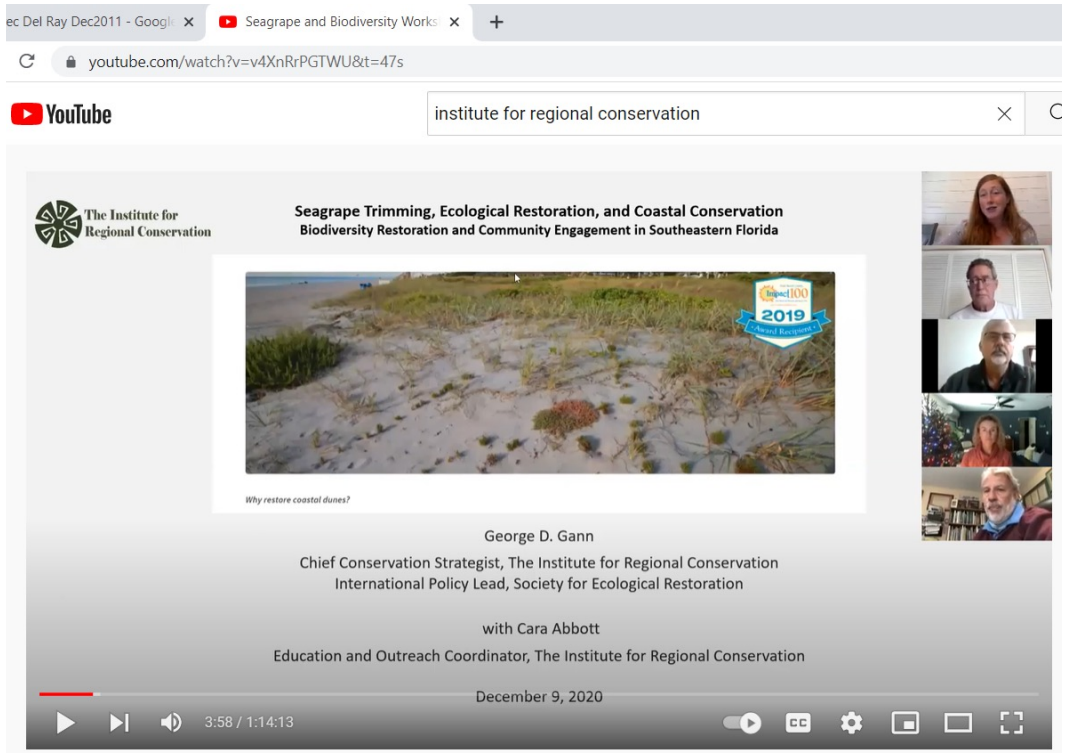
Like 0

Sea grape dispute: Delray Beach — mid-August

Posted by **Mary Kate Leming** on September 2, 2020 at 18:25

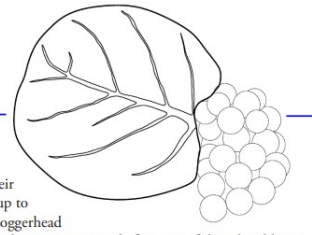
Coastal Star

The iconic sea grape tunnels near the Atlantic Avenue pavilion likely will be spared from the chain saw, following an outcry from some Delray Beach residents. Conflicting environmental views and a wish to keep the beachscape character in place are the main issues. **ABOVE:** Elsewhere in the public beach dune, trimmed sea grapes soon will sprout branches and limbs. The trims kept with the decades-long belief that the sea grapes shade out other native plants that provide a more diverse habitat. **BELOW:** One of the tunnels. At the end of a 61/2-hour meeting on Aug. 18, one commissioner brought up a Beach Property Owners Association's email that supported trimming all sea grapes. Vice Mayor Ryan Boylston and two other commissioners agreed to this, but the next day Boylston asked the commission to reconsider the height of sea grapes, which it plans to do Sept. 10. In February an Aptim Environmental study advised leaving the tall



Seag

Sea Grape Trimming and Sea Turtles



What are sea grapes and how do I know if I have them?

Sea Grape, *Coccoloba uvifera* is a remarkable native, salt-tolerant species of plant found along many of Florida's beaches. Plants may appear as low spreading bushes or tall continuous hedges along the sand dunes. This plant can be identified by its thick circular leaves 8" to 10" in diameter and its grape-like clusters of fruit. This fruit is consumed by a number of native birds and mammals, while the protective canopy provides habitat for animals including songbirds, lizards, gopher tortoise and beach

and the hatchlings will make their way as a group to the sea. For loggerhead turtles, it may be 15 to 20 years before one of these hatchlings returns to her natal beach to nest for the first time.

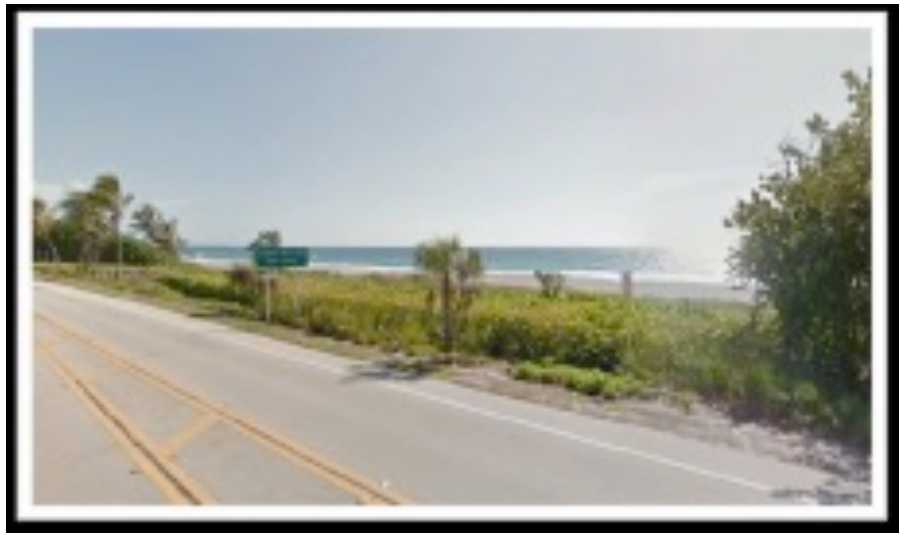
How can trimming my sea grapes affect sea turtles?

Lighting Impacts of A1A Viewing Corridors on Sea Turtle Disorientations

Ali Courtemanche, Sydney Jimenez, Rebecca Mannen, Emily Mirowski, Taylor Roe, Annalise Wershoven, David Anderson, and Kirt Rusenko, PhD
Gumbo Limbo Nature Center, 1801 North Ocean Blvd, Boca Raton, FL 33432

Abstract

The city of Boca Raton, the southernmost city in Palm Beach County, includes 4.9 miles of vegetated coastline in the center of a rapidly growing suburban community. Sea turtle nesting success depends on many factors, but one main factor is the presence of a dark beach front. When hatchlings are exposed to artificial light, they disorient, causing unnecessary energy expenditure, an increased likelihood of predation, and an overall lowered survival rate. Viewing corridors along a portion of A1A allow drivers to see the ocean from the road. These were created by removing large sections of dune vegetation. Vehicle headlights, as well as more urban sky glow, are now visible on the beach in these corridor areas. Mapping nest success and hatchling disorientations allows for the analysis of the impact that the viewing corridors have on the beach front and Boca Raton's sea turtle conservation efforts.



Sea Grape Trimming and Beach Renourishment: How Dune Height And Beach Width Affect Loggerhead Nesting in Boca Raton, FL

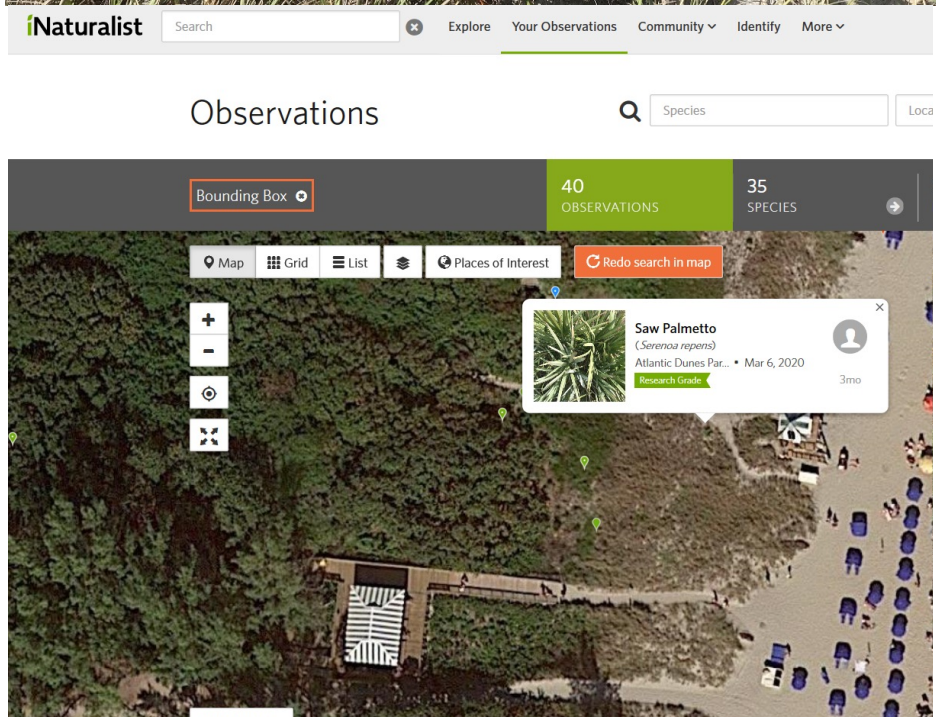
David Anderson and Kirt Rusenko, PhD
Gumbo Limbo Nature Center, 1801 North Ocean Blvd., Boca Raton, FL 33432

Introduction

Boca Raton's Sea Turtle Conservation and Research Program is one of the oldest sea turtle monitoring and protection programs in Florida. For almost 40 years, sea turtle nesting activity has been recorded along the city's beaches. From 1977 to 1988, 2.5 miles of city park beaches were monitored and since 1988, all five miles are covered. Three species nest along Boca Raton's beaches; the loggerhead (*Caretta caretta*), the green (*Chelonia mydas*), and the leatherback (*Dermochelys coriacea*). This study primarily focused on loggerhead nesting within the northernmost mile of Boca Raton where a combination of sea grape trimming (2011-2012) and beach renourishment (2014) took place.

Loggerhead (Caretta caretta)

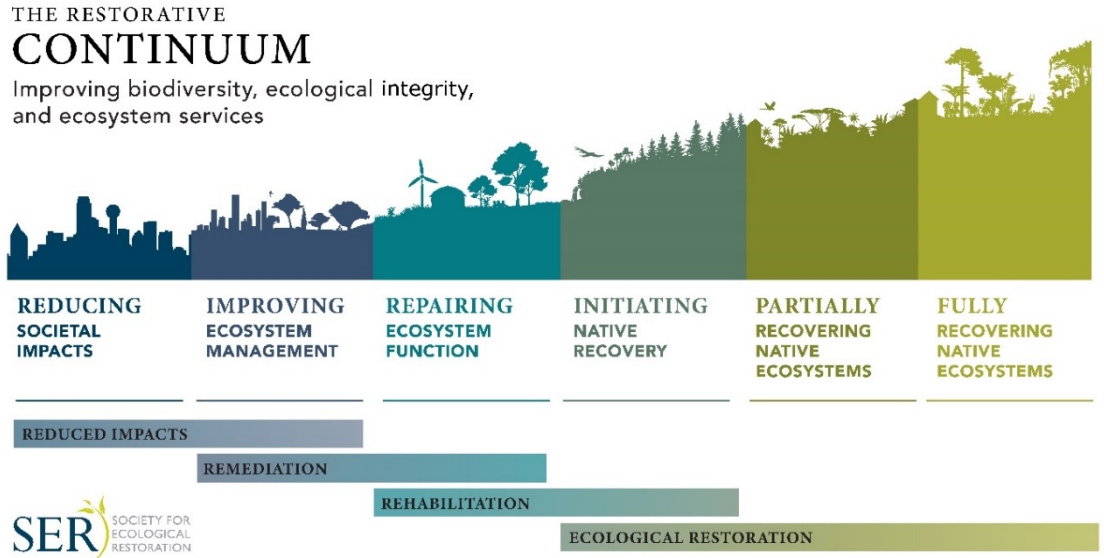
Loggerhead Nest



Opportunity. Bringing coastal strand east by using cues from natural recruitment.

What happens in Palm Beach County matters

www.ser.org/Standards



All restorative activities matter, no matter how small. But some activities many not be restorative at all (e.g., some mitigation, afforestation of native grasslands).

Business As Usual Thinking

1. Sustainability is about **reducing impact**
2. Emphasis is on **gray infrastructure**, not green infrastructure

Transformative Thinking

1. The **baseline is neutrality** (carbon, biodiversity, ecosystem services)
2. The **goal is restorative** (e.g., bending the curve, net gain, moving the needle, ecological uplift) with regard to biodiversity and ecosystem services and, where appropriate, carbon.

Rapid Assessment of Native Coastal Uplands at Red Reef Park, Boca Raton, Florida

George D. Gann

March 29, 2021

Submitted by:
The Institute for Regional Conservation
100 East Linton Boulevard, Suite 302B
Delray Beach, FL 33483

Submitted to:
Greg Stevens & Lindsey Nieratka
City of Boca Raton
201 W. Palmetto Park Road
Boca Raton, Florida 33432

Preliminary Ecological Restoration and Management Plan for Native Coastal Uplands at Red Reef Park, Boca Raton, Florida

George D. Gann

October 19, 2021

Submitted by:
The Institute for Regional Conservation
100 East Linton Boulevard, Suite 302B
Delray Beach, FL 33483

Submitted to:
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City of Boca Raton
201 W. Palmetto Park Road
Boca Raton, Florida 33432

Boca Raton

Delray Beach

COASTAL MANAGEMENT

LIVE
WORK
PLAY
GROW

GOALS, OBJECTIVES, AND POLICIES

GOAL CME 1	PRESERVATION, PROTECTION, RESTORATION, AND MANAGEMENT
GOAL CME 2	BALANCE BETWEEN BUILT AND NATURAL ENVIRONMENTS
GOAL CME 3	PREPARATION AND ADAPTATION FOR THE IMPACTS OF CLIMATE CHANGE AND PERIL OF FLOOD
GOAL CME 4	NATURAL DISASTER PREPAREDNESS IN THE COASTAL AREAS
GOAL CME 5	PUBLIC PARTICIPATION AND STRATEGIC PARTNERSHIPS

DISCUSSION