Lumnitzera racemosa

A non-native mangrove
at Fairchild Tropical Botanic Garden
& Matheson Hammock Park

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A non-native mangrove
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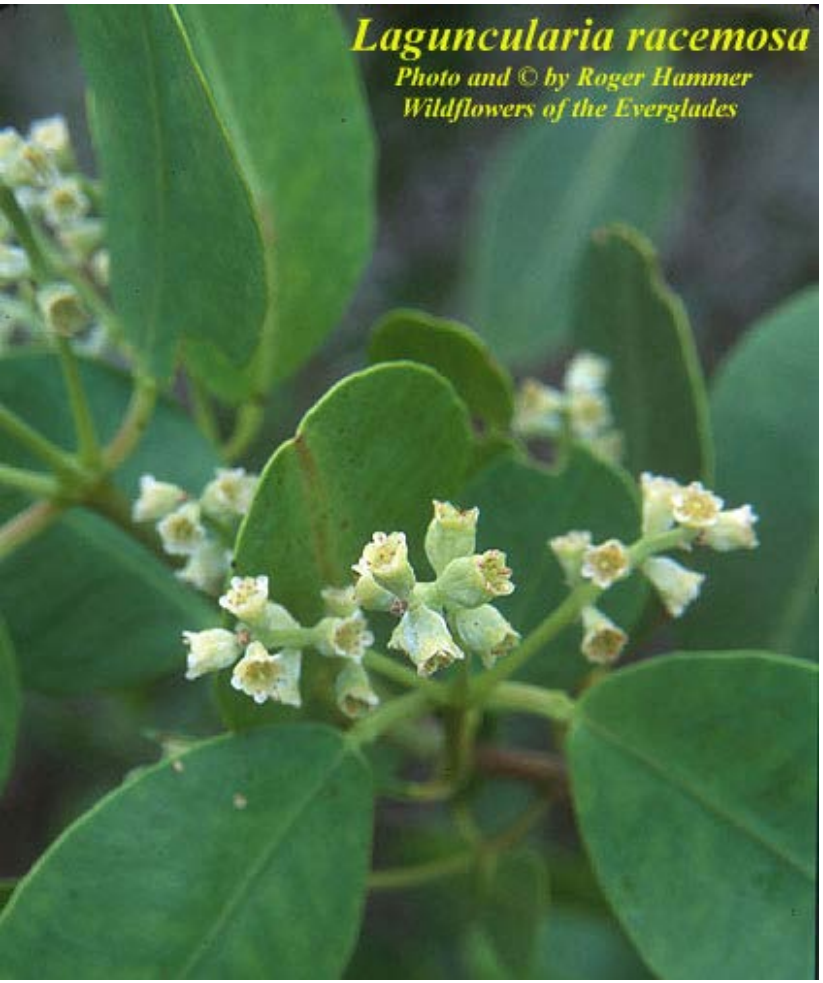
1. **About *Lumnitzera racemosa***
2. **Introduction and spread: 1964-2008**
3. **Eradication efforts: 2009-Present**
4. **Research**
5. **The Future**

Lumnitzera racemosa

NATIVE RANGE: Asia, Australia

FAMILY: Combretaceae.

Looks similar to white mangrove (*Laguncularia racemosa,* also Combretaceae)



Flowers spring-summer
Single-seeded floating fruit
Leaves <u>opposite</u>
Leaves with <u>petioles</u>

Flowers summer-fall
Single-seeded floating fruit
Leaves <u>alternate</u>
Leaves <u>sessile</u> (no petioles)

White mangrove – no gland, midvein prominent on both sides

Lumnitzera – gland on bottom side, midvein barely visible on top side

Images: Doug Goldman, USDA

Lumnitzera racemosa

HABITAT: Thrives in dwarf red mangrove stands and on slightly higher ground than our native mangroves.

Lumnitzera racemosa

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Does just fine in standing salt water

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Timeline: *Lumnitzera racemosa* at Fairchild (Thanks to M. Griffiths)

1964 – 150 seeds collected from Hengchun Tropical Botanic Garden in Taiwan

1966 – 2 trees from ‘64 seed collection survived to be planted at FTG, near native mangroves

1969 – 100 seeds collected from the 2 at FTG for propagation.

1970 – 6 (of 10 offered) sold at Ramble for 1.50 each.

1970& 1971 – 12 “F2” seedlings planted at Fairchild

……

2008 – Infestation discovered

2008 – Infestation discovered

Fourqurean, J., T.J. Smith, J. Possley, T.M. Collins, D. Lee, and S. Namoff. 2010. Are mangroves in the tropical Atlantic ripe for invasion? Exotic mangrove trees in the forests of South Florida. Biological Invasions 12(8):2509-2522.

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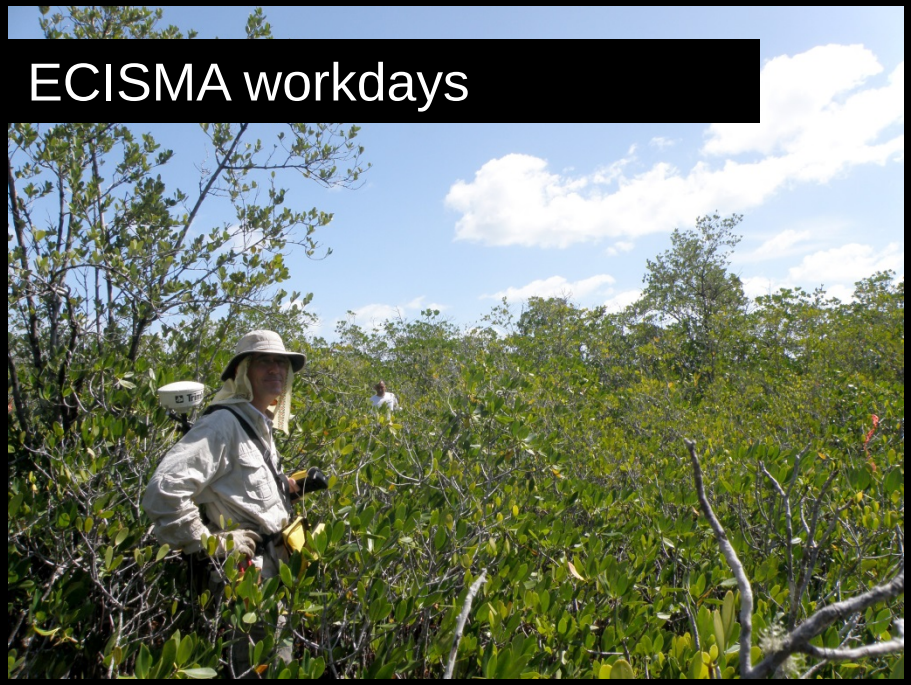
- Step 1: Fairchild, Miami-Dade Parks joined forces with Everglades CISMA

CISMA

- Eradication Step 1: Joined forces with Everglades CISMA
- Eradication Step 2: Held volunteer removal workdays

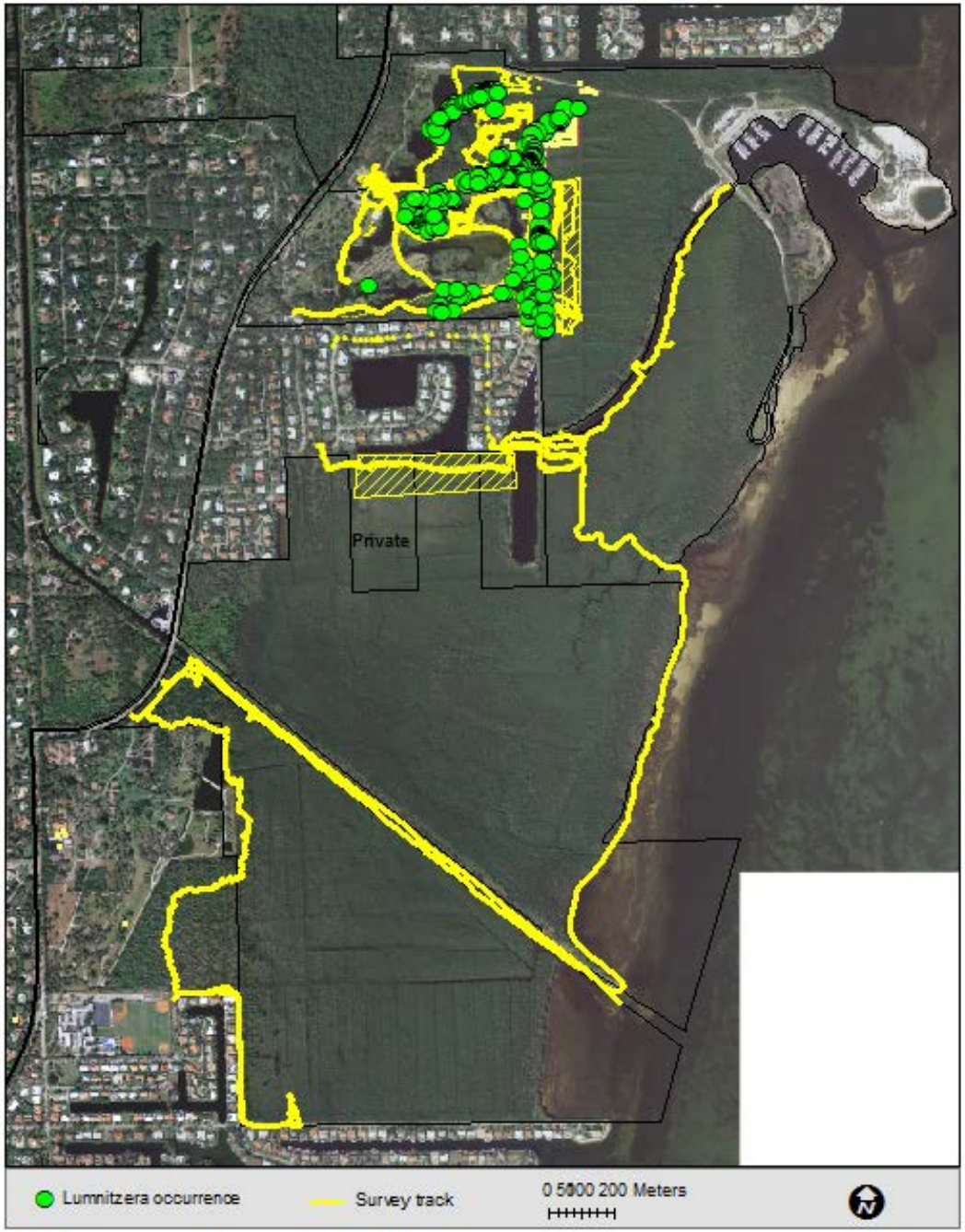
ECISMA workdays

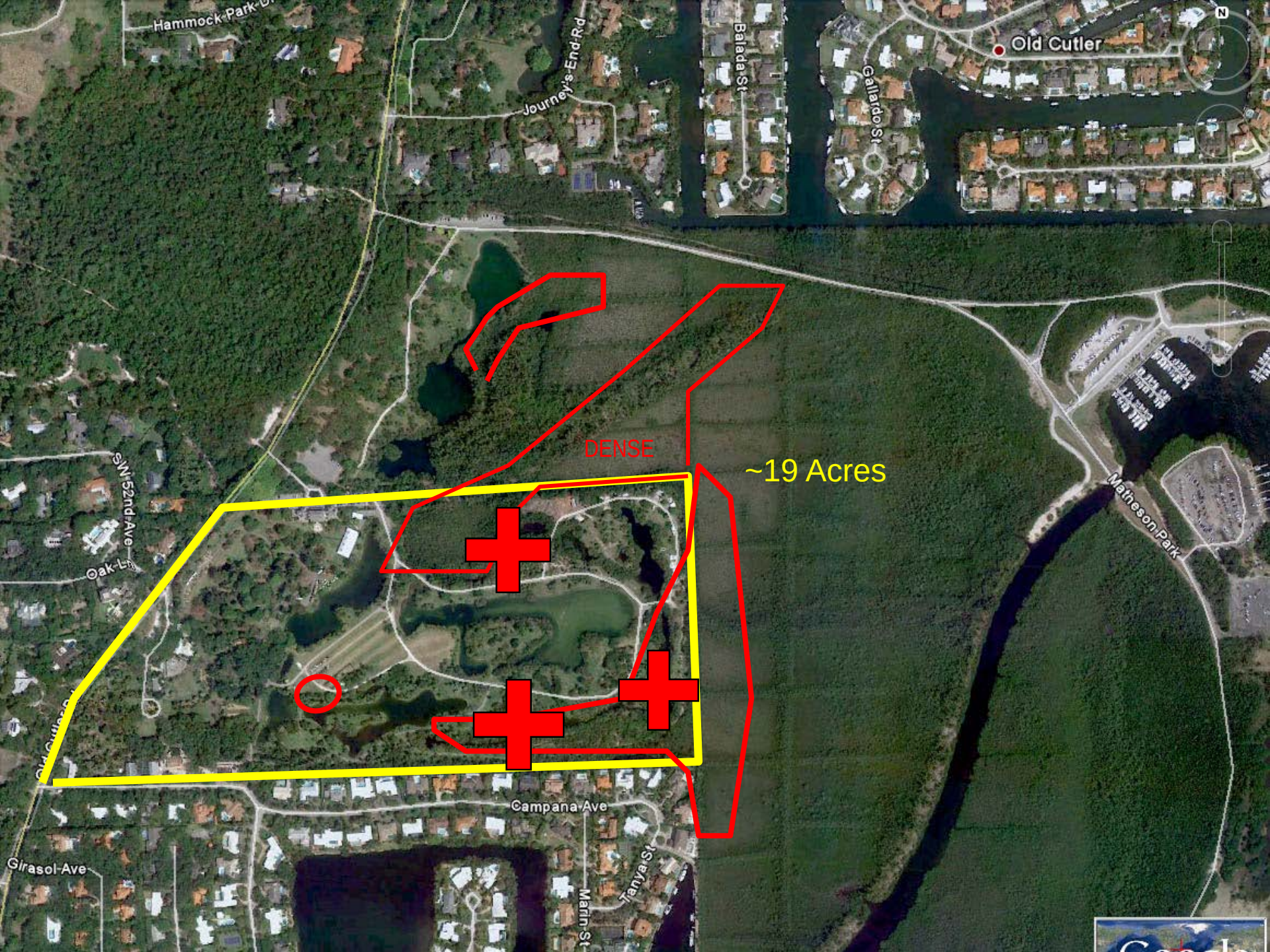


- Eradication Step 1: Joined forces with Everglades CISMA
- Eradication Step 2: Held volunteer removal workdays
- Eradication Step 3: Surveyed with GPS/GIS to determine distribution


COCOPLUM CIRCLE
83A
1000A
USDA/CHAPMAN FIELD
Imagery Date: 12/15/2014 lat 25.670173° lon -80.219873° elev

All recorded tracks and positions for Lumnitzera racemosa surveys in Fairchild and Matheson
Through March 2015




Hammock Park Dr
Journey's End Rd
Balada St
Gallardo St
Old Cutler
DENSE
~19 Acres
SW 52nd Ave
Oak Ln
Matheson Park
Campana Ave
Girasol Ave
Marin St
Tanya St

- Eradication Step 1: Joined forces with Everglades CISMA
- Eradication Step 2: Held volunteer removal workdays
- Eradication Step 3: Surveyed with GPS/GIS to determine distribution
- Eradication Step 4: Conducted herbicide trials

2009/2010 – Herbicide Trials

21 meter-square plots

7 treatments

- Renovate (triclopyr) at 0.5%, 1%, 2%
- Rodeo (glyphosate) at 0.5%, 1%, 2%
- A mix of 0.5% of both

3 reps per each treatment

2009/2010 – Herbicide Trials

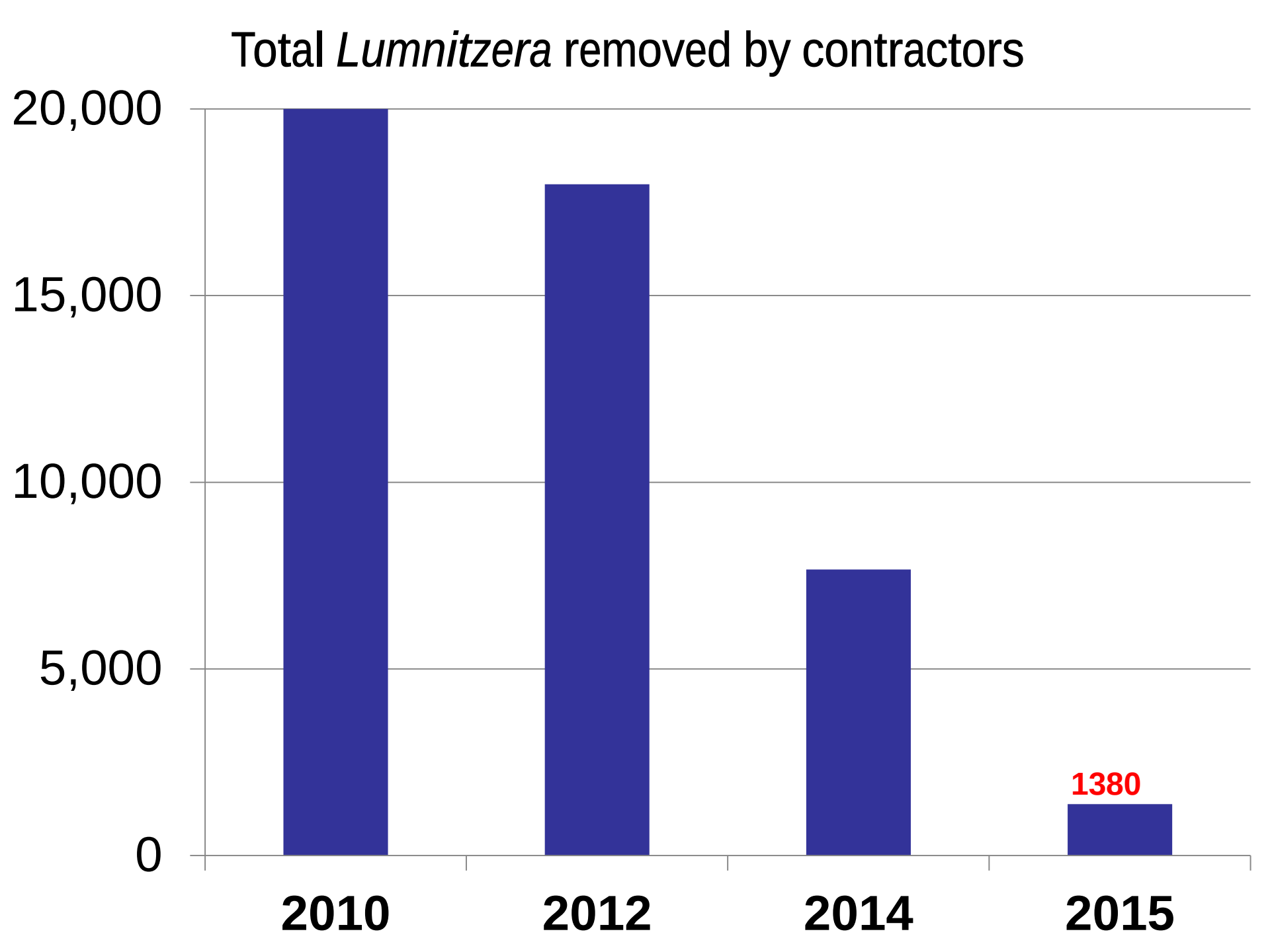
- All seven treatments resulted in a decrease in *Lumnitzera* stems.
- Renovate was more effective than Rodeo.
- Concentration did not have a significant difference.
- All native mangroves were susceptible to off-target damage, but at relatively low levels

- Eradication Step 1: Joined forces with Everglades CISMA
- Eradication Step 2: Held volunteer removal workdays
- Eradication Step 3: Surveyed with GPS/GIS to determine distribution
- Eradication Step 4: Conducted herbicide trials
- Eradication Step 5: FWC contracted removal

2010 – Habitat Restoration Resources, Inc., 5 weeks
~courtesy of FFWCC

2012 – The Institute for Regional Conservation, 4 weeks
~courtesy of FFWCC

2014 – Miami-Dade County Natural Areas Management, 5 weeks
2015 – Miami-Dade County Natural Areas Management, 3 weeks
~courtesy of FFWCC


Total *Lumnitzera* removed by contractors
20,000
15,000
10,000
5,000
0
1380
2010
2012
2014
2015

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Research interest in *Lumnitzera racemosa*

1. Jim Fourqurean, Tim Collins, Tom Smith, Sandra Namoff, Jennifer Possley et al. – FIU, USGS, Fairchild

Biological Invasions (2010)

"We argue that the species-depauperate nature of tropical Atlantic mangrove forests and close taxonomic relatives in the more species-rich Indo-Pacific region result in the susceptibility of tropical Atlantic mangrove forests to invasion by Indo-Pacific mangrove species."

Research interest in *Lumnitzera racemosa*

2. Emily Dangremond – Smithsonian Marine Station, Ft. Pierce, FL –Environmental Tolerances and Distributions of Rare, Common and Invasive Mangroves.

   (Research in review with *Oecologia*)

"The invasive species Lumnitzera racemosa *was tolerant of all treatments and thrived in the most stressful conditions (full sun and hypersaline)."*

Research interest in *Lumnitzera racemosa*

3. John Parker, Mike Lehmann (Smithsonian and FIU) - Comparative xylem physiology in mangroves, including freezing tolerance

Research interest in *Lumnitzera racemosa*

4. Danielle Demers- USF

The Florida Center of Excellence for Drug Discovery and Innovation at

Study of the endophytic fungi and bacteria of Florida mangroves, screening for drug discovery

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The Future

Is it too late?

- Did *Lumnitzera* spread beyond the known infestation area?
- What happened to those 6 plants sold in 1970?

Where do we go from here?

- Continue surveys in/near known infestation area
- Donna Devlin – FAU Harbor Branch - Research on seed propagation, seed viability, genetics & workshops for general public

- Request FWC funds again if needed

Thanks!

- FFWCC for funding
- Everglades CISMA – chairs Dennis Giardina and Tony Pernas and all workday participants
- Habitat Restoration Resources Inc., The Institute for Regional Conservation, and Miami-Dade Natural Areas Management for contracted removal

GULF & SOUTH ATLANTIC REGIONAL PANEL ON AQUATIC INVASIVE SPECIES

Bahia Mar, Fort Lauderdale, FL

May 5th, 2015

20 minute time slot