Everglades Cooperative Invasive Species Management Area

20th Annual Summit

Invasive Plant Operations Overview

Elena Suarez, Broward Co.
Hillary Cooley, NPS
Amy Peters, SFWMD
Jimmy Lange, Smart-Sciences, Inc.
Brendon Hession, SFWMD

ECISMA Priority Plant Species

2021/2022 Long Term Management

- Air potato (*Dioscorea bulbifera*)
- Areca palm (*Dypsis lutescens*)
- Arrowhead vine (*Syngonium podophyllum*)
- Australian-pine (*Casuarina* spp.)
- Bishopwood (*Bischofia javanica*)
- Black sage (*Varronia curassavica*)
- Brazilian pepper (*Schinus terebinthifolia*)
- Carrotwood (*Cupaniopsis anacardioides*)
- Castor bean (*Ricinus communis*)
- Catclaw vine (*Dolichandra unguis-cati*)
- Cogongrass (*Imperata cylindrica*)
- Crested floating heart (*Nymphoides cristata*)
- Cuban bulrush (*Oxycaryum cubense*)
- Day jessamine (*Cestrum diurnum*)
- Earleaf acacia (*Acacia auriculiformis*)
- Golden pothos (*Epipremnum pinnatum*)
- Green hygro (*Hygrophila polysperma*)
- Hawaiian half-flower (*Scaevola sericea*)
- Inch plant (*Tradescantia zebrina*)
- Jasmine (*Jasminum* spp.)
- Java plum (*Syzygium cumini*)
- Kalanchoe (*Kalanchoe spp.*)
- Lantana (*Lantana strigocamara*)
- Latherleaf (*Colubrina asiatica*)
- Lumnitzera (*Lumnitzera racemosa*)*
- Melaleuca (*Melaleuca quinquenervia*)
- Missiongrass (*Cenchrus polystachios*)*
- Old World climbing fern (*Lygodium microphyllum*)
- Napier grass (*Pennisetum purpureum*)
- Oyster plant (*Tradescantia spathacea*)
- Para grass (*Urochloa mutica*)
- Primrose willow (*Ludwigia peruviana*)
- Rosary pea (*Abrus precatorius*)
- Roundleaf toothcup (*Rotala rotundifolia*)
- Seaside mahoe (*Thespesia populnea*)
- Sewer vine (*Paederia cruddasiana*)*
- Shoebutton ardisia (*Ardisia elliptica*)
- Snake Plant (*Dracaena trifasciata*)
- Spurge creeper (Dalechampia scandens)*
- Surinam cherry (*Eugenia uniflora*)
- Torpedograss (*Panicum repens)*
- Umbrella tree (*Schefflera actinophylla*)
- Wedelia (*Sphagneticola trilobata*)
- West Indian marsh grass *(Hymenachne amplexicaulis)**
- Wild taro (*Colocasia esculenta*)
- Winged yam (*Dioscorea alata*)
- Wright's nutrush (*Scleria lacustris*)*

*EDRR Species

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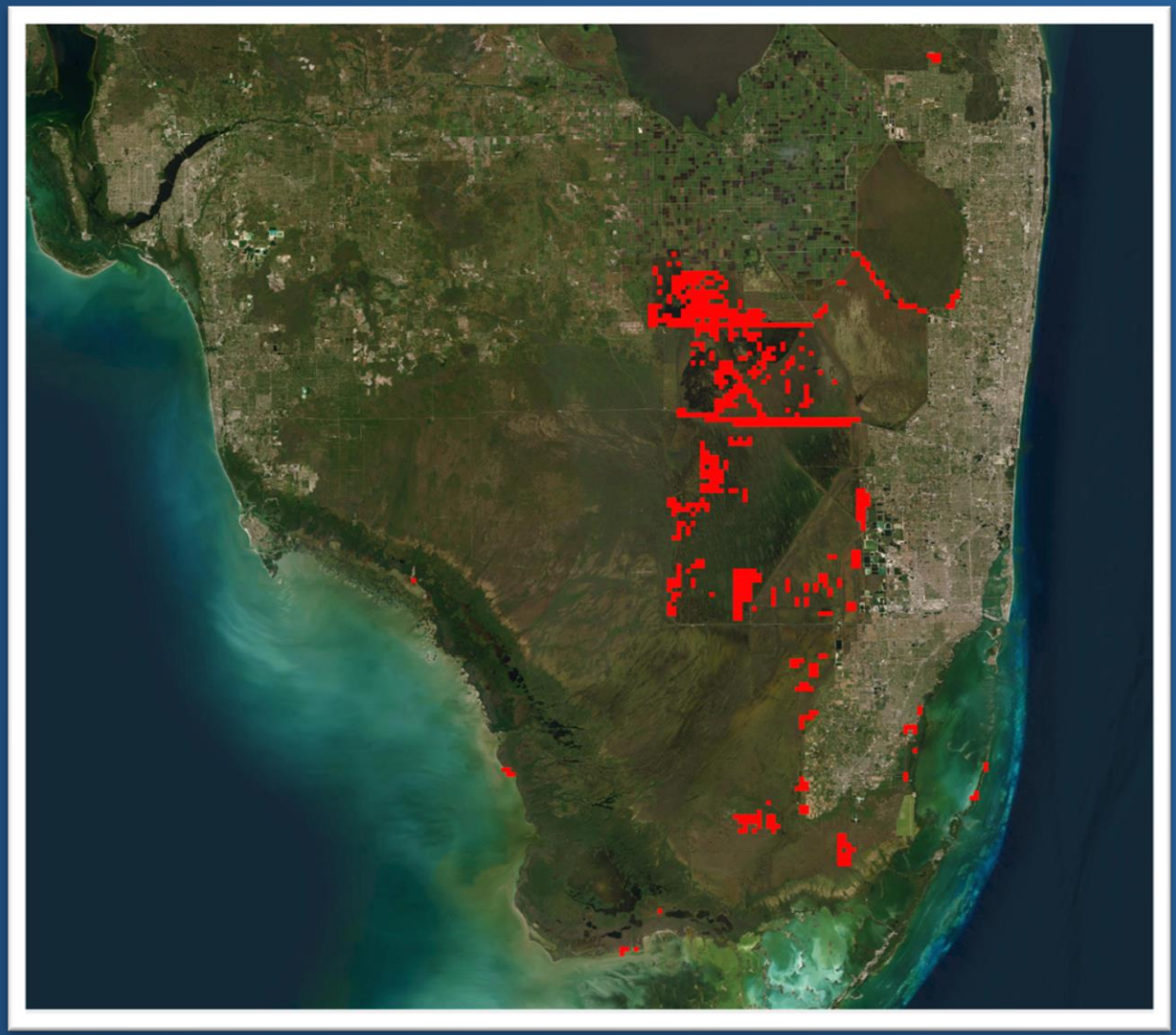
Everglades Cooperative Invasive Species Management Area

2022/2023 Treatments: Brazilian pepper (*Schinus terebinthifolius*)

Treatments in:

- Biscayne National Park
- Broward County
- FWC (ECWMA)
- Everglades National Park & HID
- USFW (Loxahatchee)
- SFWMD

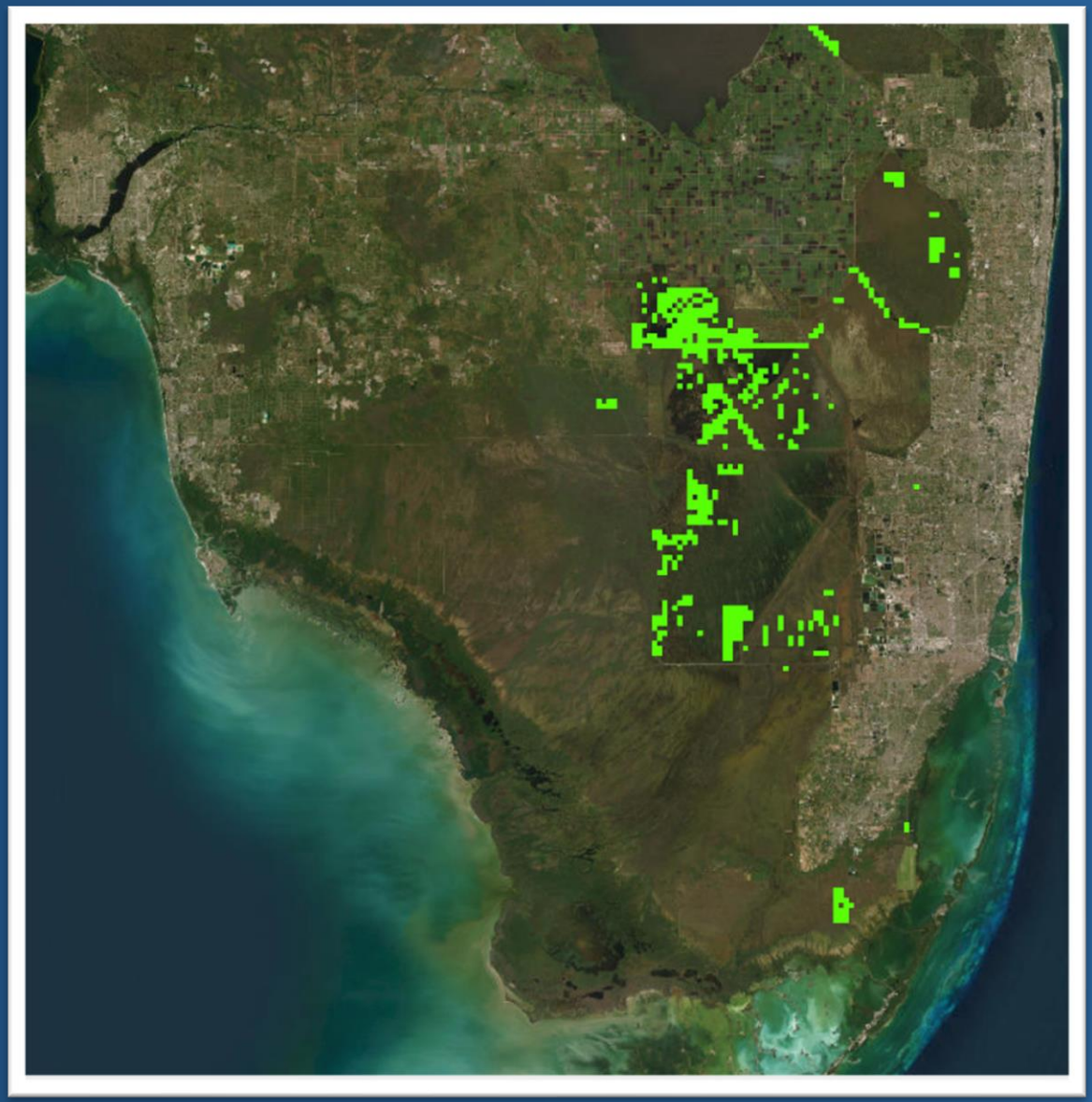
Acres Swept: 12,894
Acres Treated: 9,168
Treatment Costs: $3,072,034



2022/2023 Treatments: Old World climbing fern (*Lygodium microphyllum*)

Treatments in:

- Big Cypress National Preserve
- Broward County
- FWC (ECWMA)
- Everglades National Park
- USFW (Loxahatchee)
- SFWMD



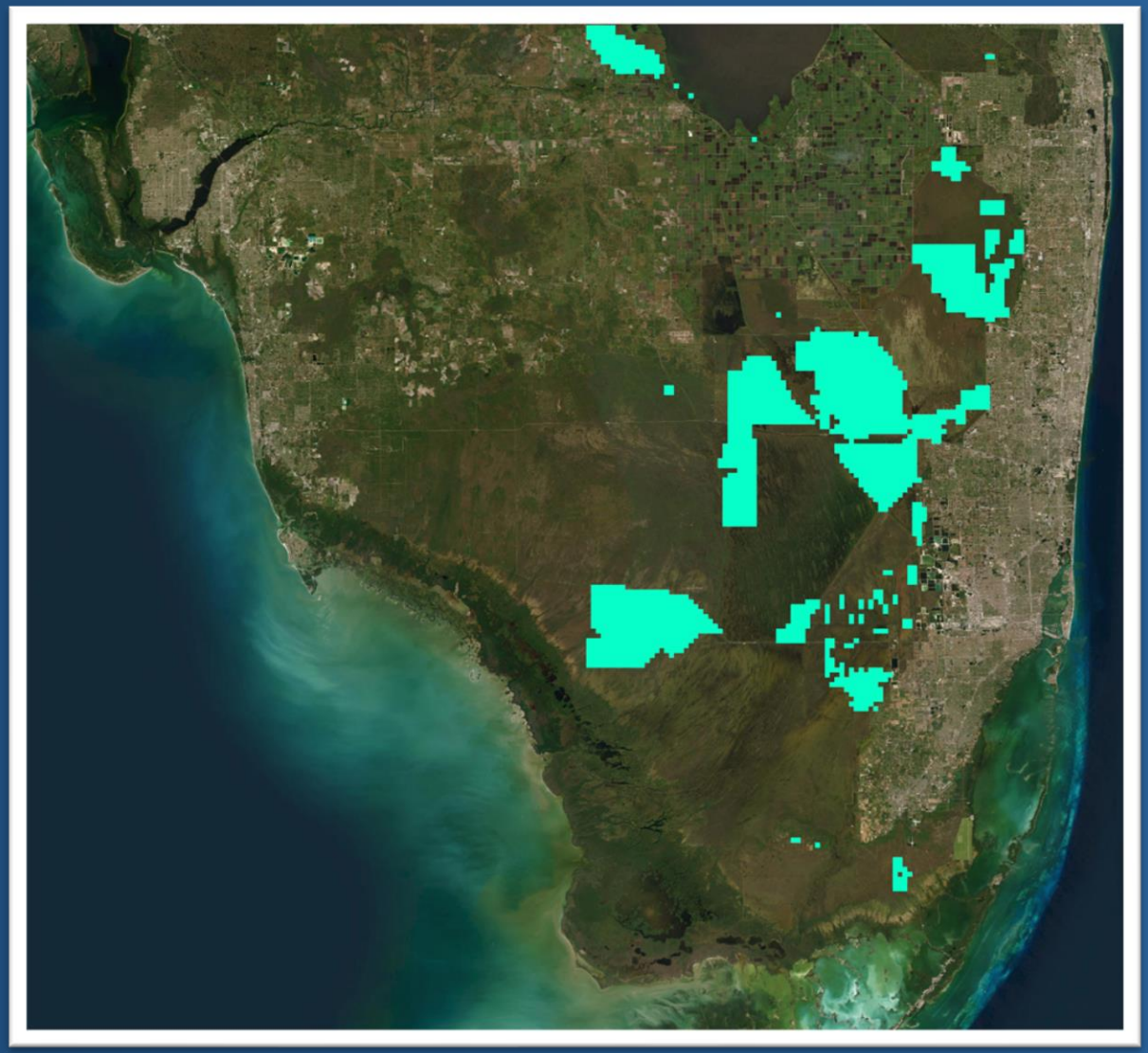
Acres Swept: 15,451
Acres Treated: 866
Treatment Costs: $2,416,418

2022/2023 Treatments: Melaleuca (*Melaleuca quinquenervia*)

Treatments in:

- Big Cypress National Preserve
- Broward County
- FWC (ECWMA)
- Everglades National Park & HID
- USFW (Loxahatchee)
- SFWMD

Acres Swept: 30,9349
Acres Treated: 12580
Treatment Costs: $5,124,774

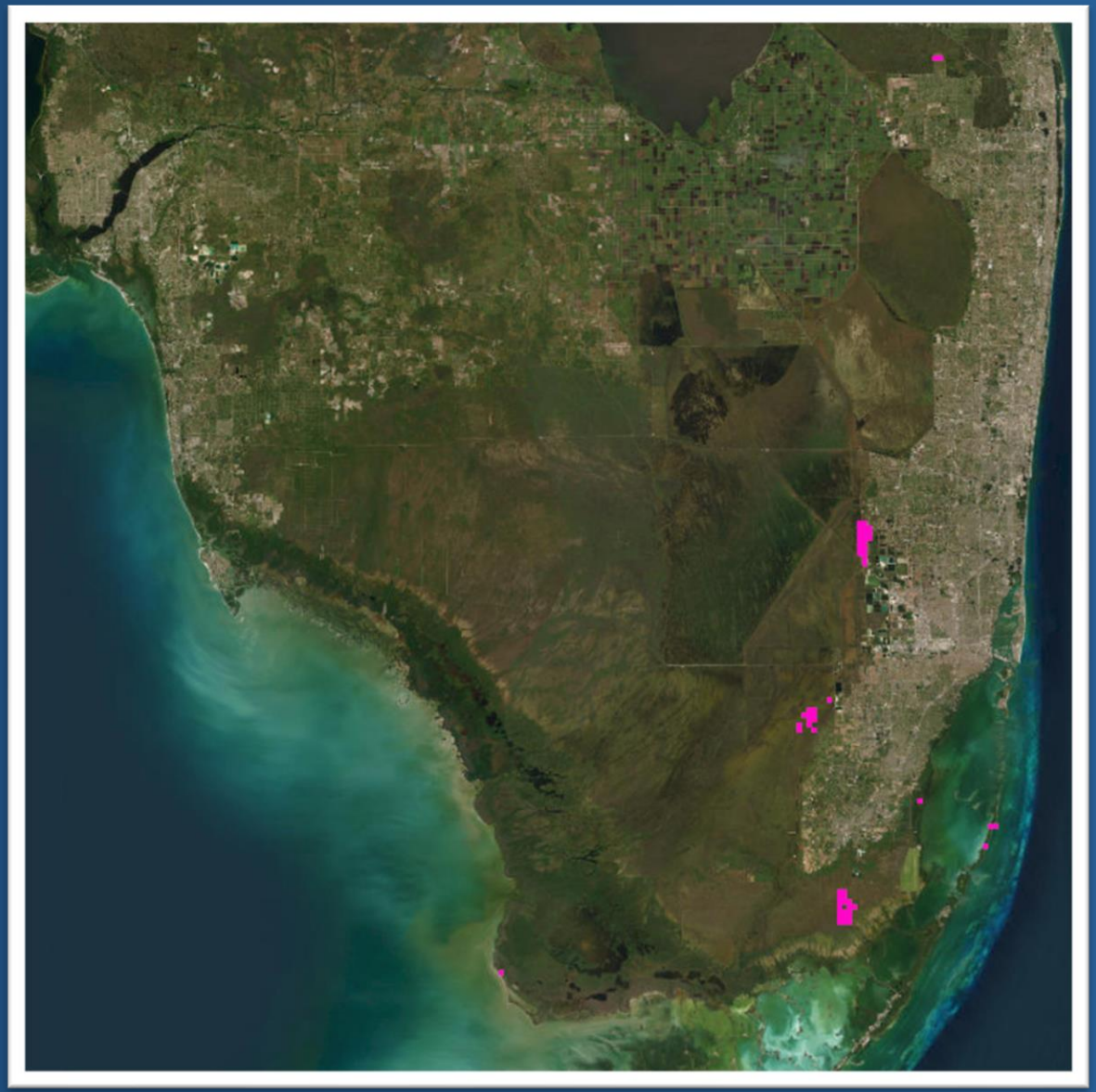


2022/2023 Treatments: Australian-pine (*Casuarina equisetifolia*)

Treatments in:

- Biscayne National Park
- Broward County
- Everglades National Park & HID
- SFWMD

Acres Swept: 93
Acres Treated: 25
Treatment Costs: $14,411



2022/2023 Treatments: Other Species

Acres Swept: 7075

Acres Treated: 3517

Treatment Costs: $2,439,927

SFWMD

Burma reed, Naelley's sprangletop*, rotala, lead tree, Java plum, day jessamine, black olive, Bishopwood, castor bean, Ceasear's weed, carrotwood, Pongam tree, earleaf acacia, laurel fig, Indian rosewood, climbing cassia, umbrella tree, Johnson grass, wild taro, Senegal date palm, wedelia

FWC-Everglades Complex Wildlife Management Areas

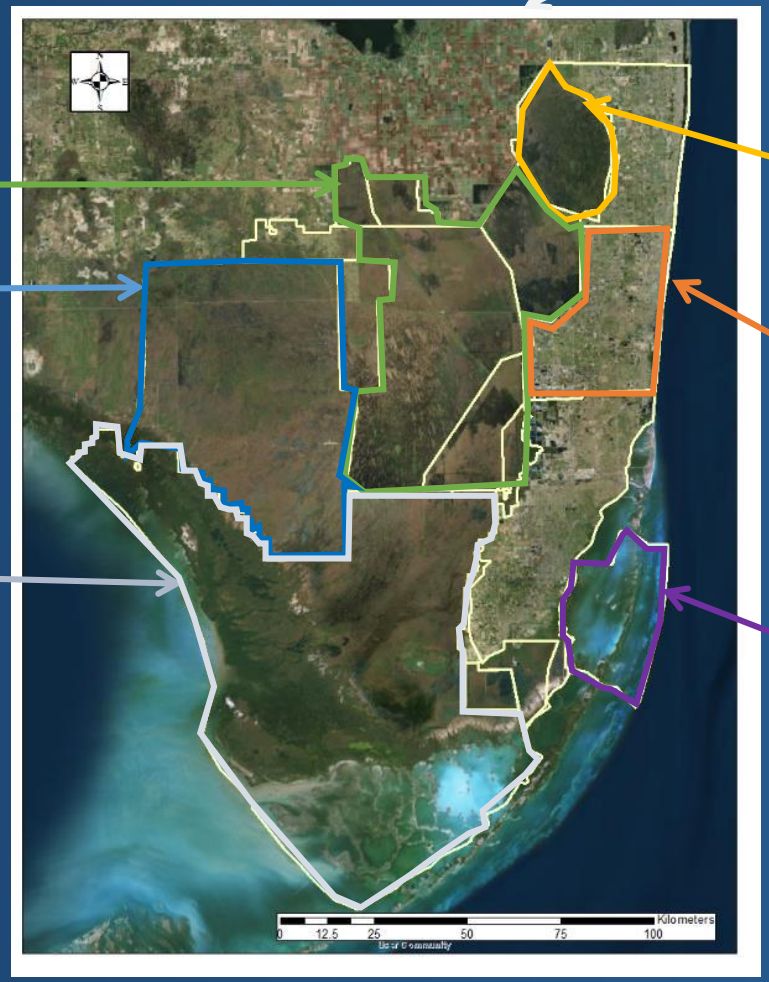
Bishopwood, giant break fern

Big Cypress National Preserve

Java plum, shoebutton ardisia

Everglades National Park

Burma reed, Ceasar's weed, cogongrass, common reed, devil's horsewhip, guava, Jaragua, lantana, Napier grass, paragrass, Peruvian primrose willow, torpedograss, white leadtree, wild taro



USFWS-Loxahatchee

Australian-pine, climbing cassia, Cuban bulrush, rosary pea, Senegal date palm, water lettuce

Broward County

sisal hemp, Ceasar's weed, coconut palm, lather leaf, crowsfoot grass, lantana, Senegal date palm, beach napuku

Biscayne National Park

Australian-pine

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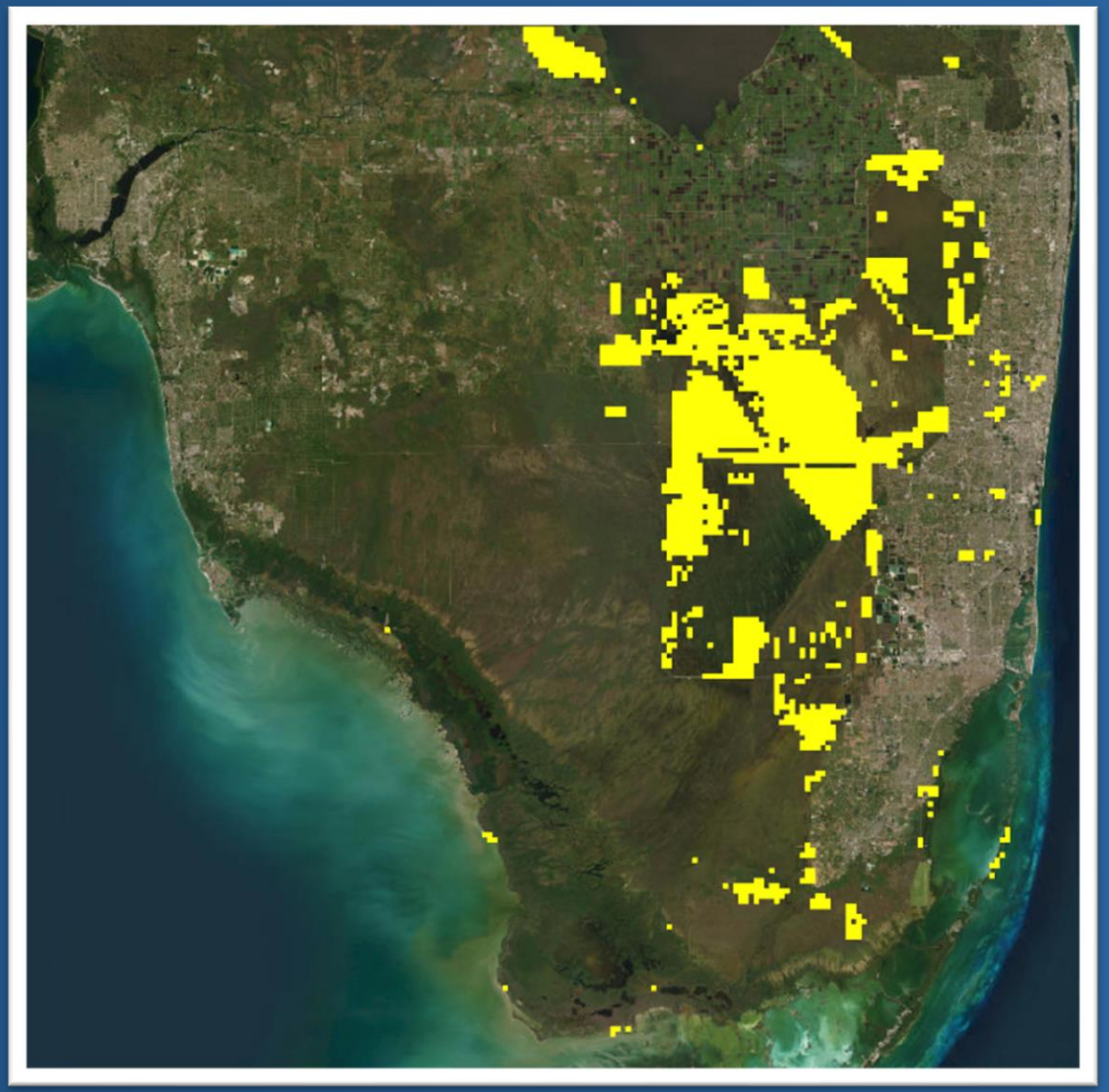
2022/2023 Treatments: Combined

Between July 1, 2022 and June 30, 2023 ECISMA partners and cooperators swept ~340,000 acres and spent Over $10 Million on invasive plant treatment



Everglades Cooperative Invasive Species Management Area

Florida Fish and Wildlife Conservation Commission
Invasive Plant Management Section

Funding for Invasive Plant Control **ECISMA Footprint** (July 1, 2022 to June 30, 2023)		
Everglades NP and FLP corridor	$367,115	3,251 acres
Loxahatchee	$1,000,000	2,296 acres
Melaleuca	$1,000,000	288,504 acres
Miami Dade	$236,083	530 acres
Everglades Complex of WMAs	$1,551,231	11,663.2 acres
Big Cypress NP	$329,724	14,882 acres

1 Year

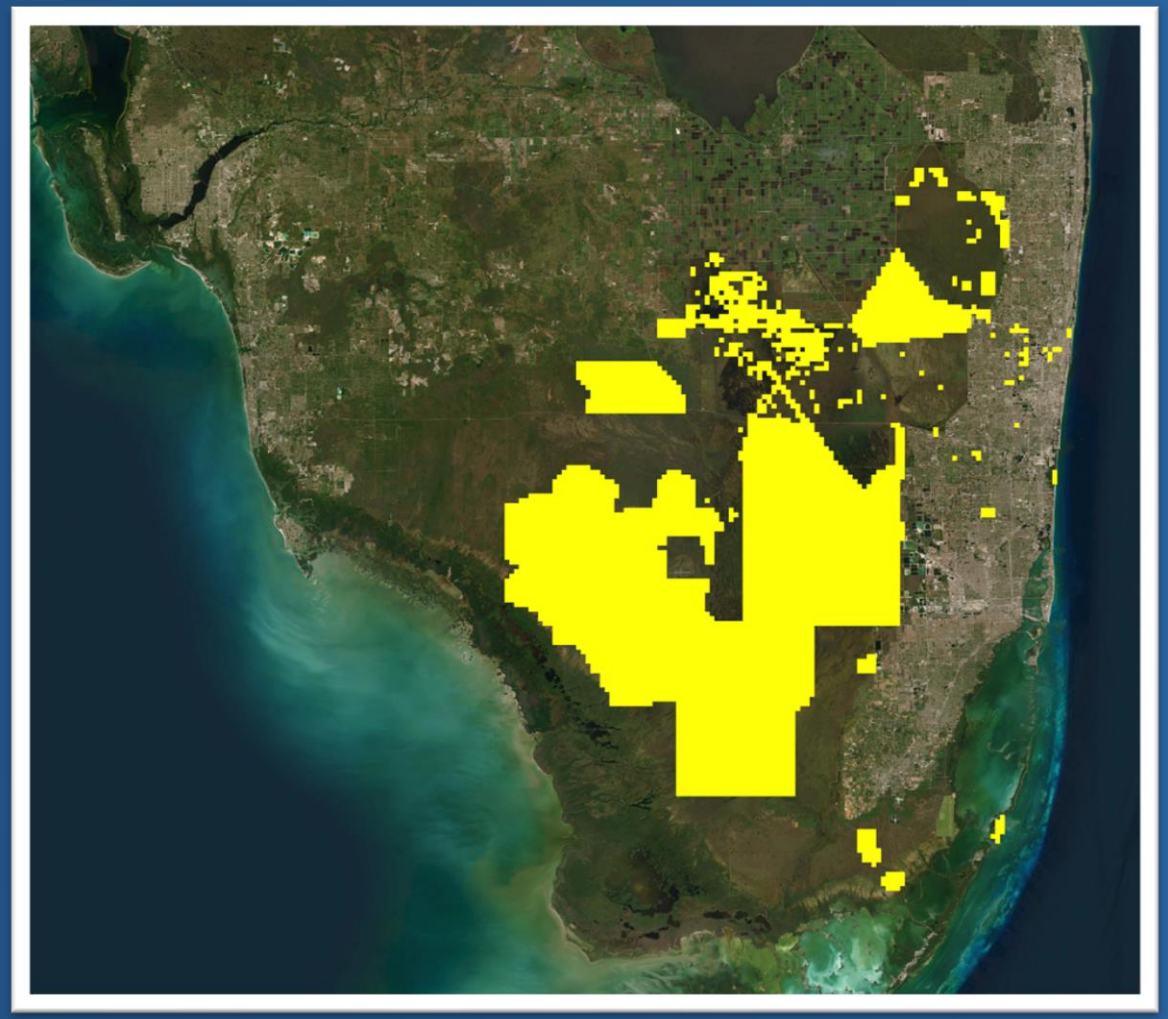
321,166 Acres

$4,484,153.00

ECISMA

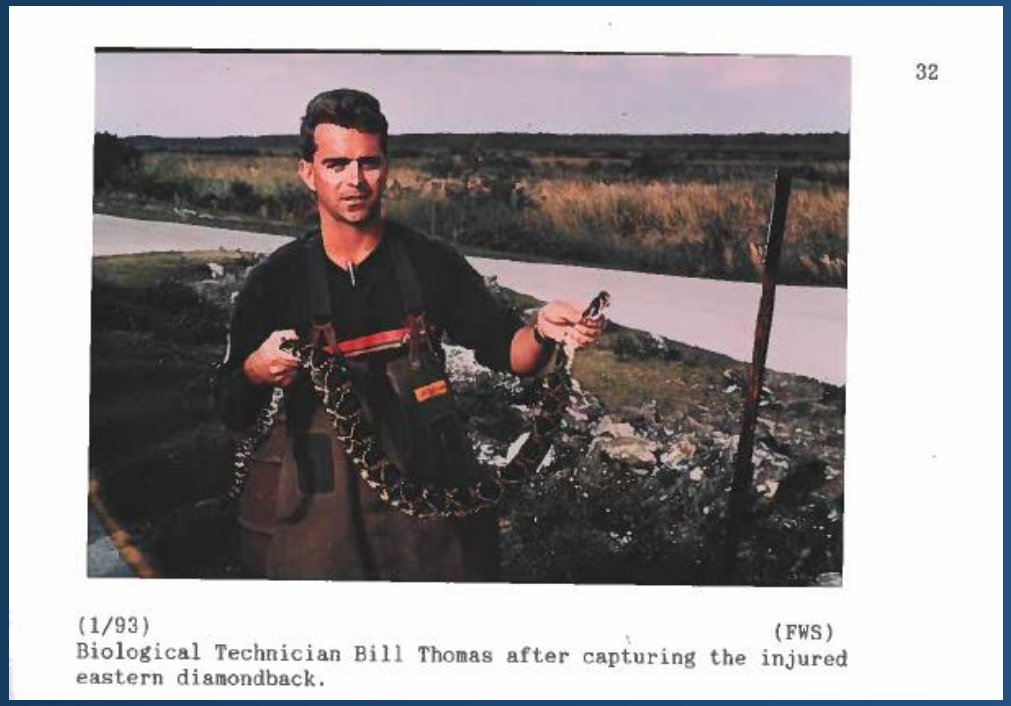
2023/2024 Proposed Treatments

All species: ~439,000 acres



Bill Thomas- US Fish and Wildlife Service

Bill Thomas celebrates 31 years with the agency! He first started working with the Loxahatchee NWR in 1992, he then did a stint at a different refuge (Ding Darling NWR on the west coast of FL), but eventually (fortunately) came back and has been working at LOX since! Bill is a force for invasive species removal and is passionate about training interns and the next generation about invasive species and methods for controlling them, as well as native wildlife.



Bill holding an injured eastern diamondback rattlesnake over 20 years ago

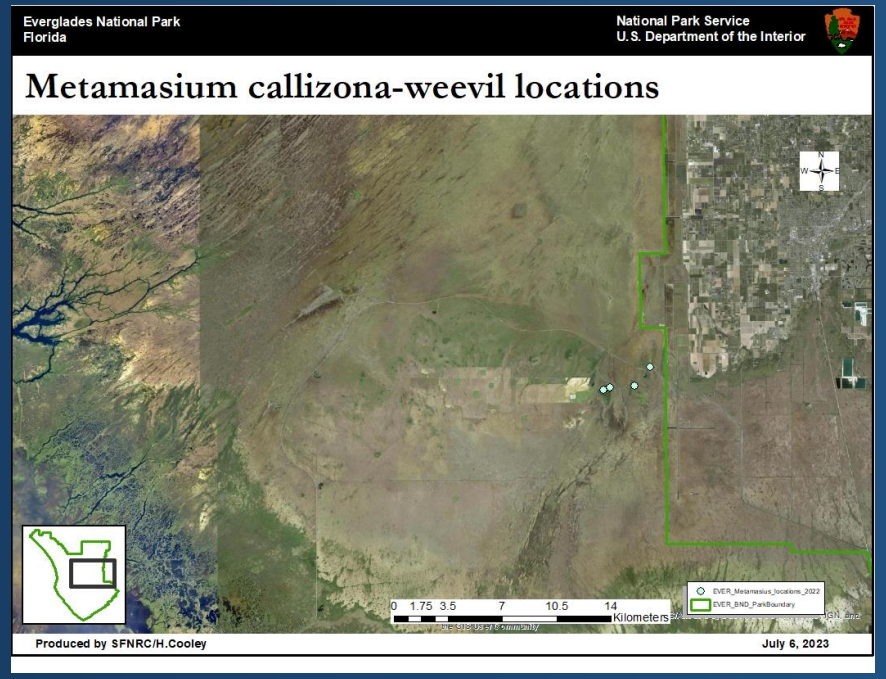
Bill working with Refuge staff and interns to remove invasive plants in 2023.

Photos by USFWS staff.

Everglades National Park- Insect detection

(Metamasius callizona) Mexican bromeliad weevil

- Coe and Royal Palm Visitor Center Parking lots and Pine Island housing areas
- June, 2021 and December, 2022



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2021/2022 Newly Detected Plant Species

(Limnophila sessiliflora) Asian marshweed- Old Tamiami Trail Road Removal-March, 2023

NPS photo- M. Vasquez

(Jacaranda mimosifolia) Jacaranda tree-Key Largo Ranger Station-June, 2023

NPS photo- B. Shamblin

Photo from: Jacaranda mimosifolia - Photos - ISB: Atlas of Florida Plants (usf.edu)

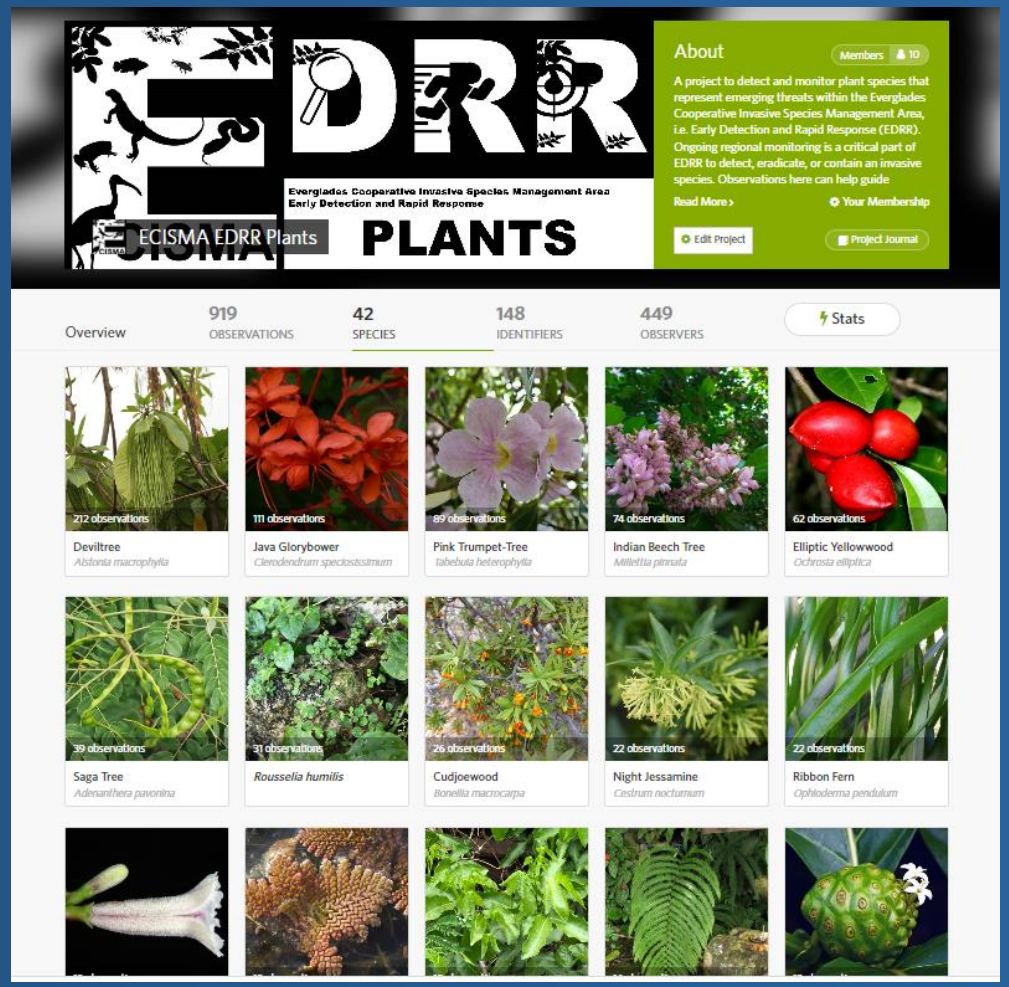
Everglades Cooperative Invasive Species Management Area

2023 ECISMA EDRR Plant List

- 48 species
- 22 added in 2022
- 5 removed
  - Likely eradicated
    - *Chrysopogon aciculatus*
    - *Cordia currasavica*
  - Widely established
    - *Agave sisalana* (FISC II)
    - *Pteris tripartita* [FISC Cat II (2023 w/ *Thelypteris dentata*)]
  - Other
    - *Heteranthera limosa* (ephemeral, questionable nativity)

2023 ECISMA EDRR iNaturalist Project

- "ECISMA EDRR Plants"
- 919 observations
- 42 species
- 148 identifiers
- 449 observers
- 5 observations in 2016
- 166 so far in 2023
  - As of 6/24/2023

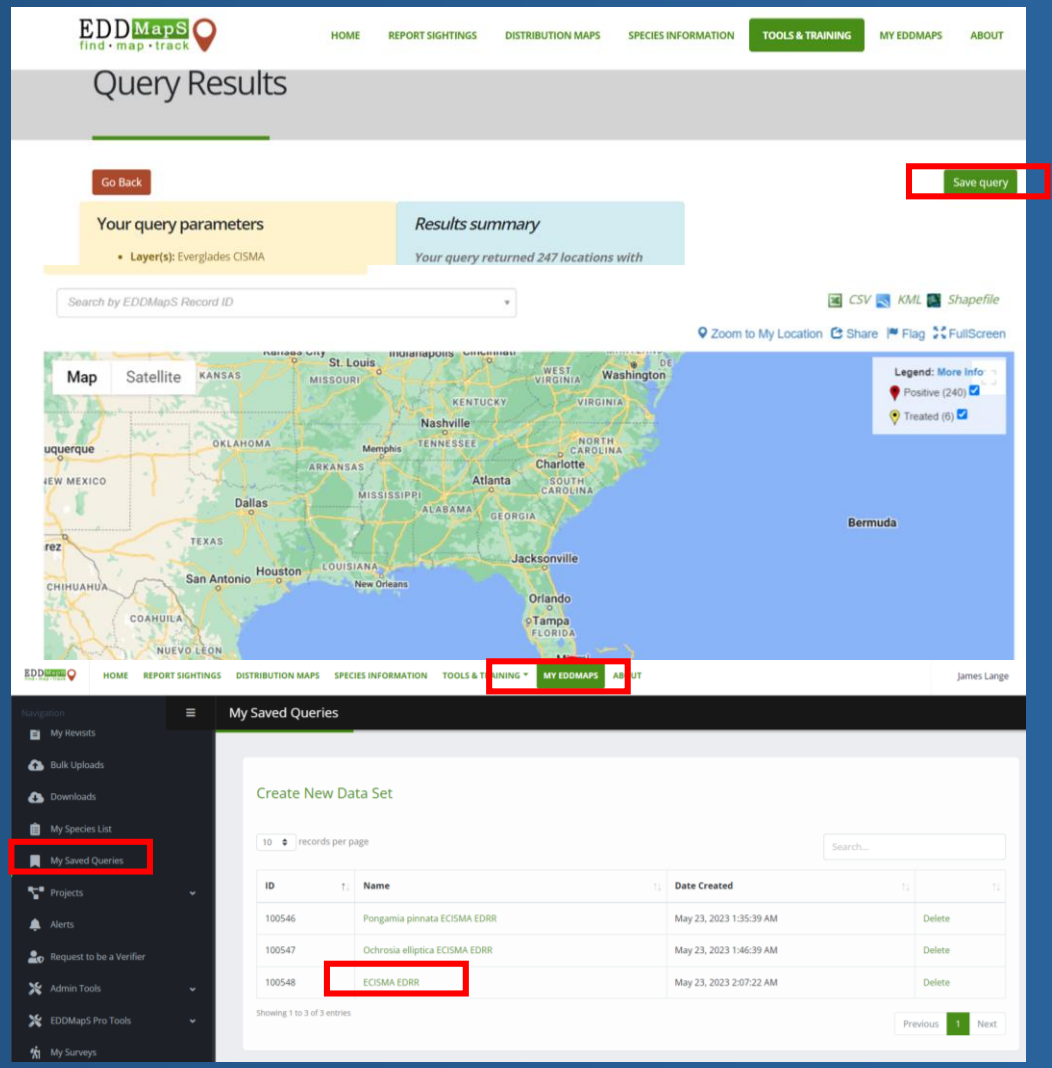


Everglades Cooperative Invasive Species Management Area

2023 ECISMA EDRR EDDMaps Saved Query

- 247 locations with records
- 23 species
  - As of 6/24/2023

- 60 observations in 2010
- 4 in 2022



Newly naturalized species

- *Fuirena simplex* (new to Florida)
- *Chloris pectinata* (new to Florida)
- *Cynodon nlemfuensis* (new to ECISMA)
- *Senna polyphylla* (cultivated, newly naturalized in FL)




Fuirena simplex (Western umbrella-sedge)

- Low stature (<1m), densely rhizomatous sedge
- Native to central U.S., C.A., W.I., and S.A.
- Freshwater wetlands
- First collected in Florida in September 2022

Fuirena simplex in FL

- At least 10 current populations in Miami-Dade and Broward
- Likely dozens more

Fuirena simplex identification

F. simplex

F. breviseta

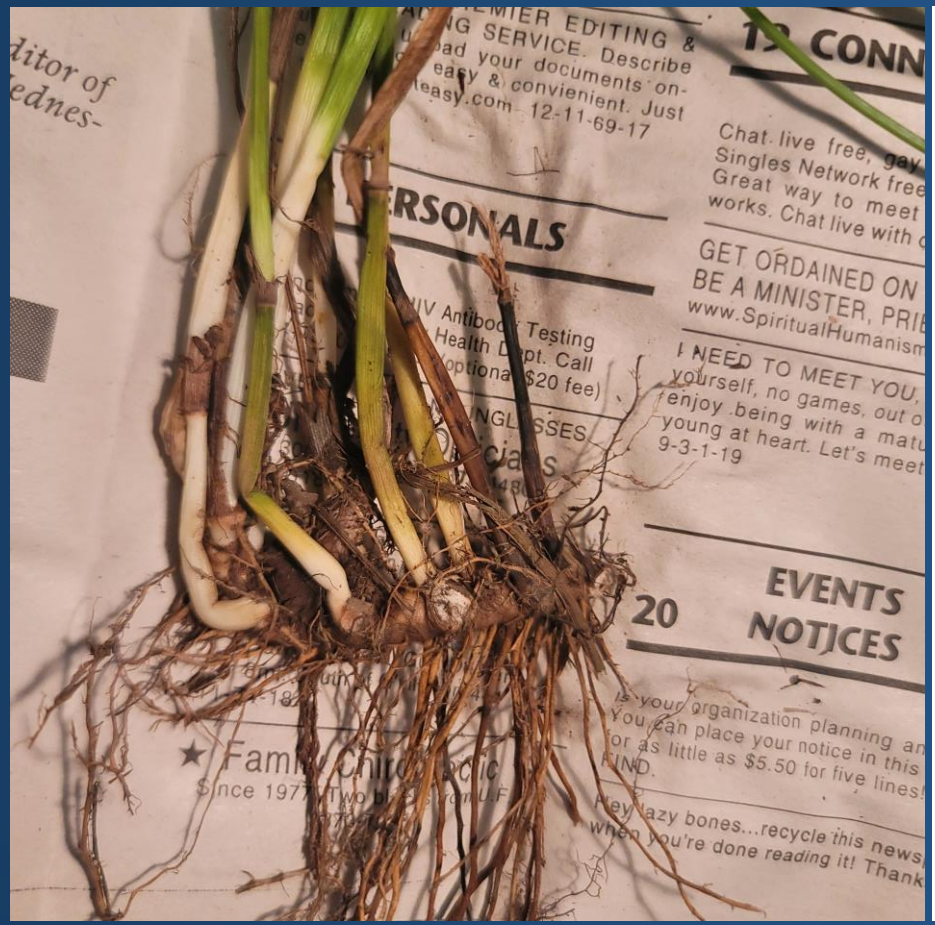
F. breviseta

F. simplex

Fuirena simplex identification

- Dense colonies
- Glabrous sheaths
  - Cf *F. breviseta* and *F. pumila*
- Rhizomatous
  - Cf *F. pumila*

Fuirena simplex identification



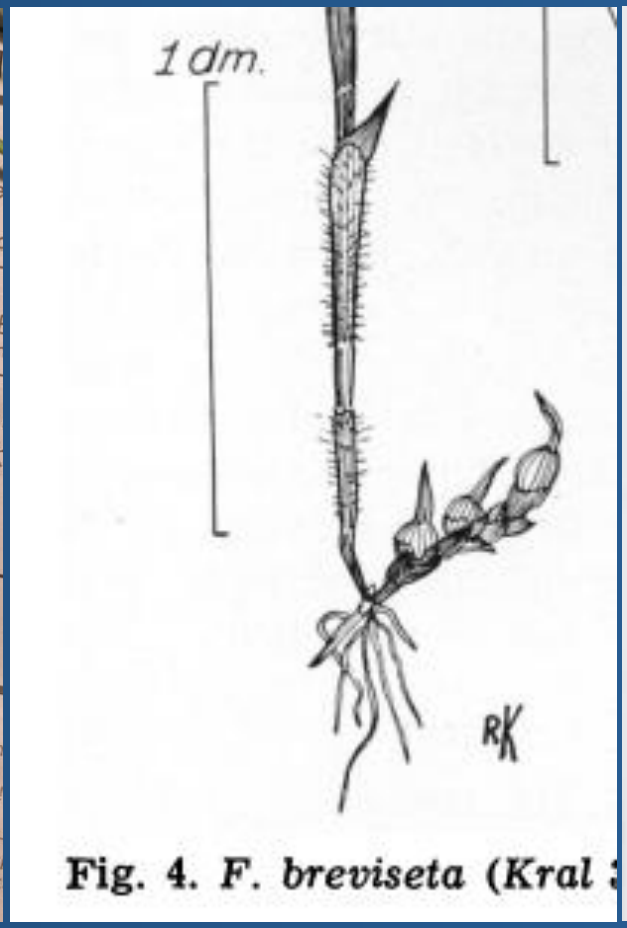
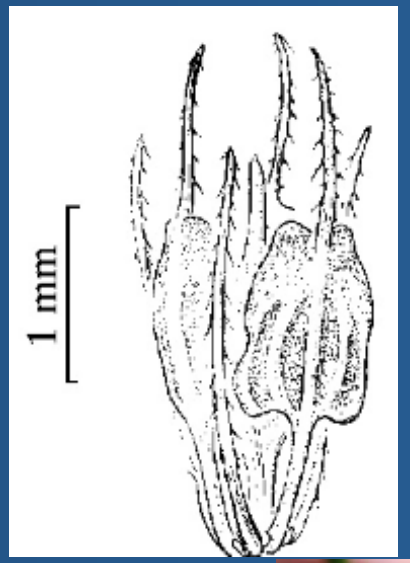


Fig. 4. *F. breviseta* (Kral

Everglades Cooperative Invasive Species Management Area

Fuirena simplex notes:

- Most variable in perianth of American *Fuirena*
- Common form has one set of bristles
- Latin American
  - tumid apex conical with reduced bristle
- Sea-coastal races
  - Extensive creeping rhizomes
  - Often develop clones of gigantic size
  - Tending toward glabrous



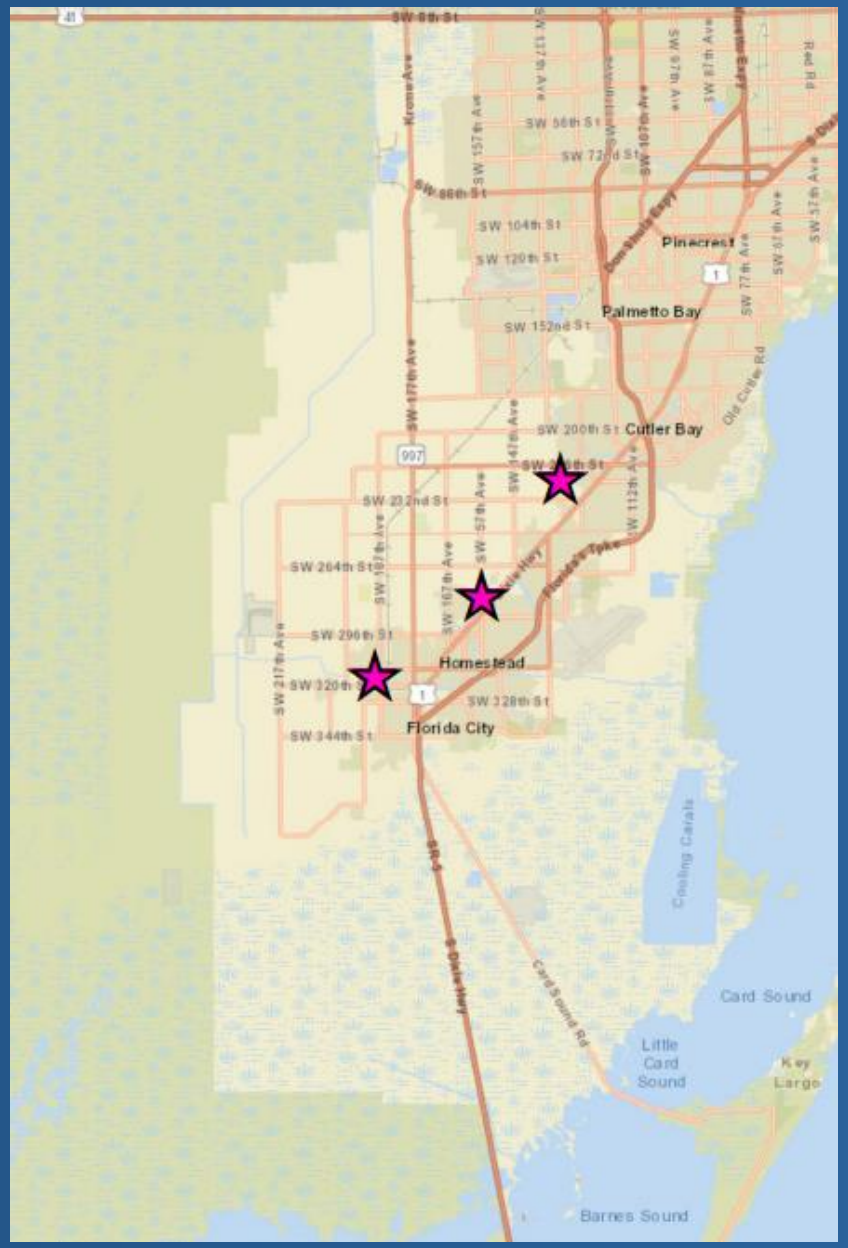
- Kral, R. 1978. A Synopsis of Fuirena (Cyperaceae) for the Americas North of South America. *Sida, Contributions to Botany,* 7(4) pp. 309-354,

Chloris divaricata (Slender Chloris)

- Small, caespitose or short-stoloniferous, perennial grass
- Native to Australia
- Introduced in Czech, Fiji, Hawaii, Japan, TX, NM, et al.
- First collected in FL January 2023

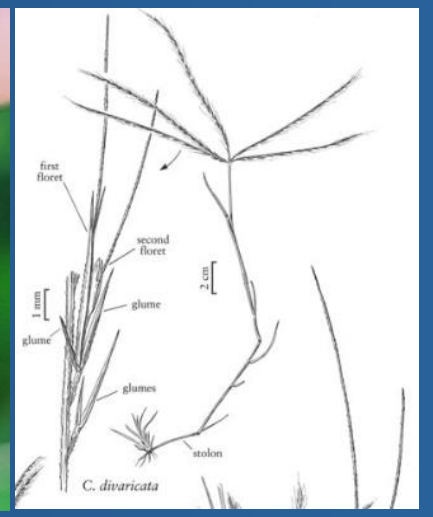
Chloris divaricata in FL

- At least 3 current populations in SW Miami-Dade
- Calcareous uplands (near pine rockland preserves)
- Cited as invasive in Fiji, Hawaii, Midway Atoll, Taiwan
- Mainly listed for:
  - Dry, disturbed areas (hillsides)
  - Roadsides
  - Pastures



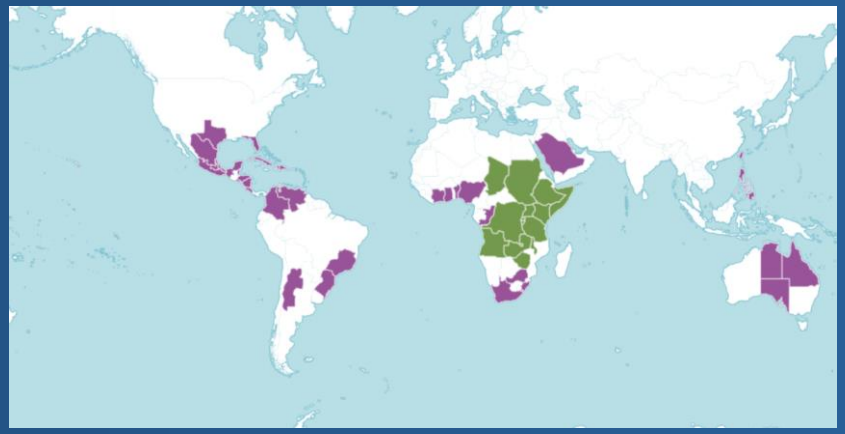
Chloris divaricata identification

- Low-stature (20-50 cm)
- Digitate, thin
- Resembles Bermuda grass (*Cynodon dactylon*) but with awns
- Perennial, caespitose (sometimes w/ stolons; only caes. observed in FL so far)
- 2 florets/spikelet



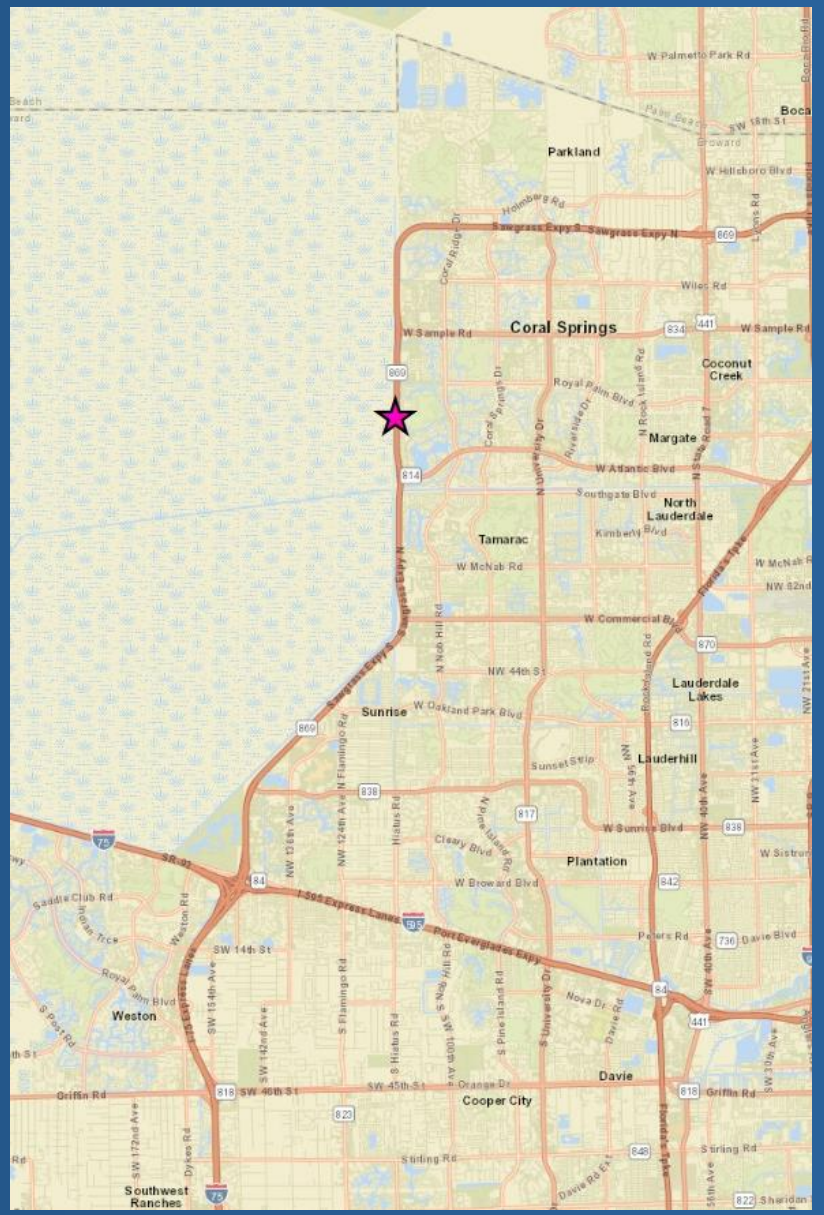
Cynodon nlemfuensis (African Bermuda grass)

- Medium-sized, woody stoloniferous, perennial grass
- Inflorescence
- Native to E,C Africa
- Introduced in tropical/subtropical Americas, Australia, Japan, et al.
- First collected in CISMA January 2023
- Northern Palm Beach and 5 other counties



Cynodon nlemfuensis in ECISMA

- At least 1 current population in W Broward
- Disturbed Uplands (canal levee)
- Cited as invasive in Costa Rica, Cuba, Mexico, PR and HI
- Listed for:
  - Disturbed areas
  - Roadsides
  - Pastures
  - Scrub/shrublands
  - Grasslands



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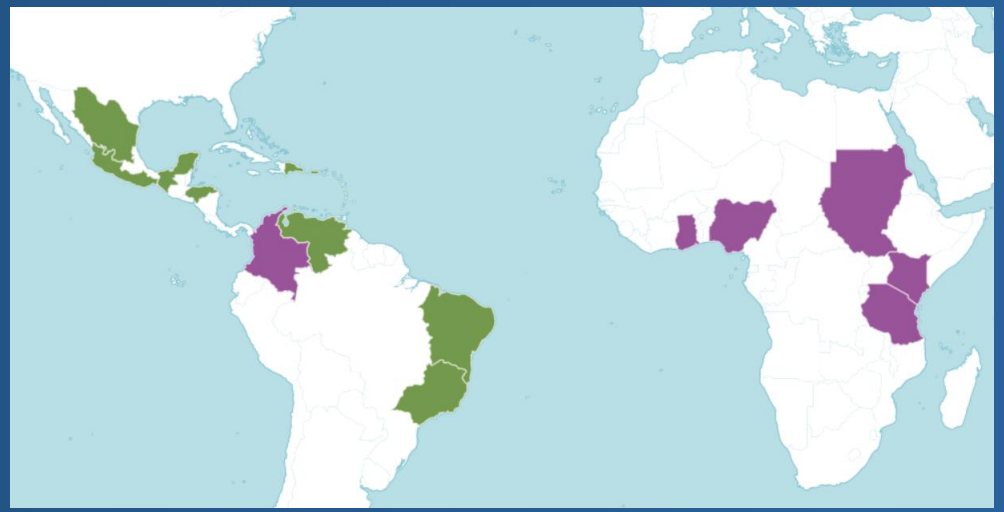
Cynodon nlemfuensis identification

- Med-stature (to 90 cm)
- Digitate, thin, red/brown
- Resembles Bermuda grass (*Cynodon dactylon*) but larger, more robust, and red/brown inflorescence
- Perennial, **woody stolons**
- Can form dense colonies




Senna polyphylla (Desert Cassia)

- Shrub to small tree
- Native to Hispaniola, PR, CA, SA
- Introduced in Africa, Colombia, FL
- Uncommon, used in landscaping
- First collected June 2023



Senna polyphylla identification

- Shrub to small tree
- Yellow flowers
- 3-15 pairs if tiny leaflets
- Linear, flattened pods

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Everglades Cooperative Invasive Species Management Area

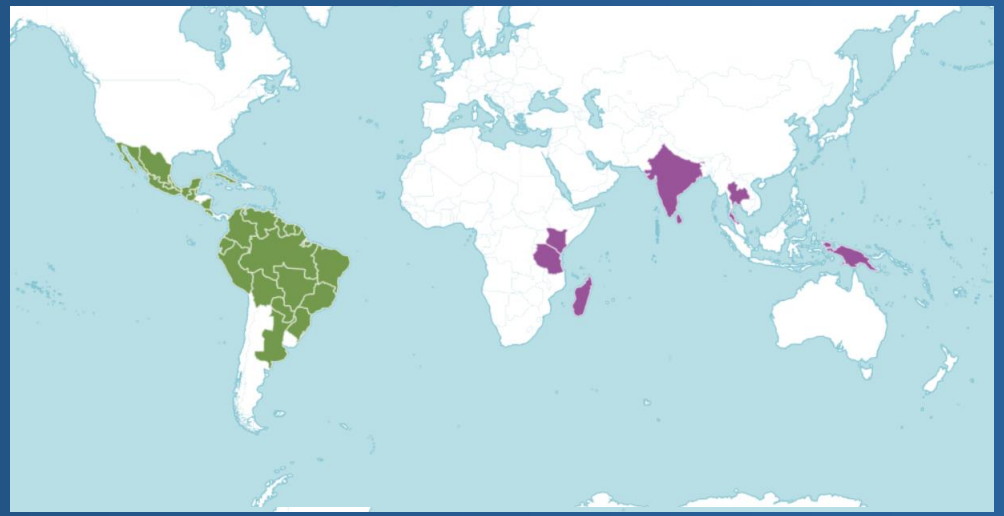
Senna polyphylla

- Slow growth
- Typically found in areas where competition is minimal
- Dry, rocky, excessively drained, overgrazed, subject to periodic fires
- Bare ground probably necessary for recruitment
- Principal mode of dispersal today is livestock
- Seedlings in the wild are scattered and not abundant

- Francis, John K., ed. 2004. **Wildland shrubs of the United States and its territories: Thamnic descriptions, Volume 1**. Gen. Tech. Rep. IITF-GTR-26. San Juan, PR: U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry; Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 830 p.

Distimake cissoides (Roadside woodrose)

- Weedy vine (Convolvulaceae)
- Native to CA, SA, Cuba
- Introduced in Africa, India, New Guinea, Thailand
- Ornamental introduction
- First collected Nov 2000 (Broward)
- Collected at HARB pine rockland in April 2023 (Miami-Dade)



Distimake cissoides identification

- Palamately compound
- Small, white morning-glory flowers
- <u>Glandular trichomes; whole plant **sticky to the touch**</u>

Everglades Cooperative Invasive Species Management Area

Loxahatchee National Wildlife Refuge (Water Conservation Area 1)

CISMA

2023 Everglades Invasive Species Summit

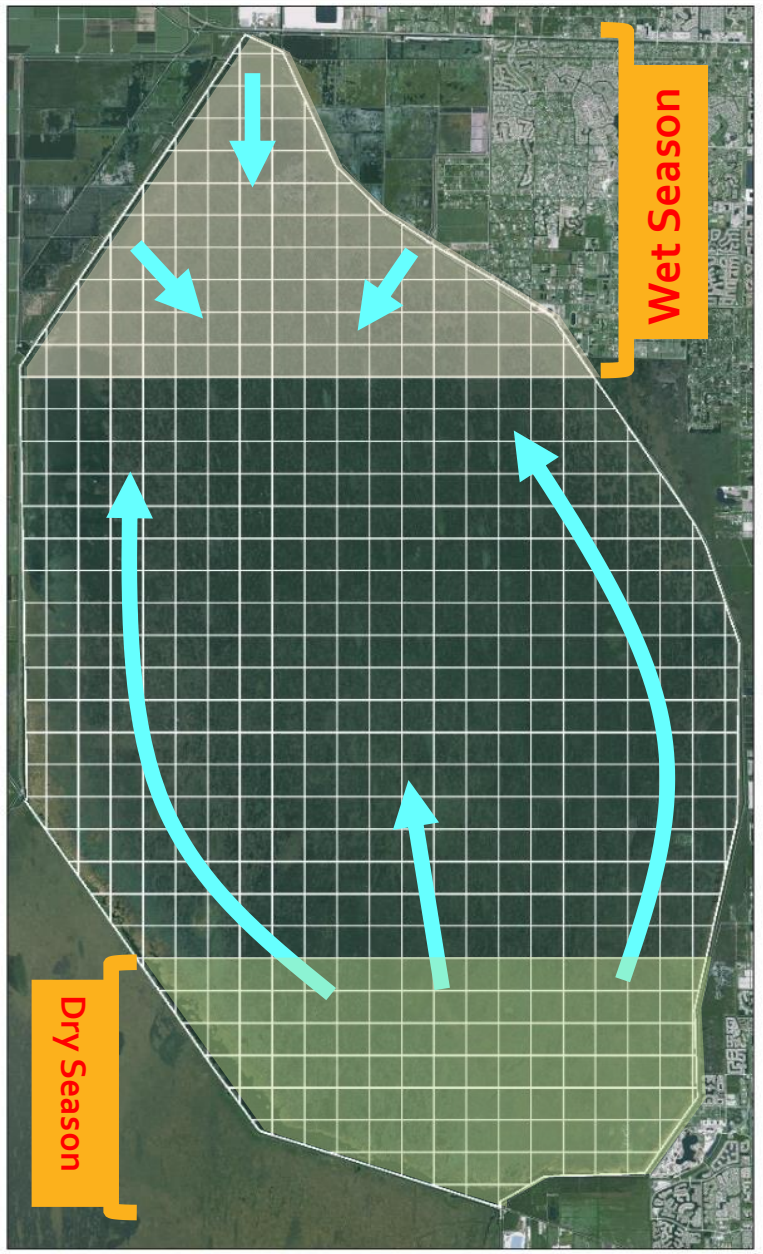
July 11-12, 2022

Overview

- Joint effort between SFWMD, FWC, FWS
- Program Goal: Achieve maintenance control of priority invasive plants
- Primary focus is on melaleuca and lygodium
  - Scleria lacustris, crested floating heart and Azolla pinnata also targeted

Strategy

- Utilizing 1 km grid and ground/aerial-based monitoring to assess, plan, and track treatments
- Coordinating herbicide treatments with USFWS burn program
- Take advantage of hydrology to target seasonally accessible areas.
- Categorize large strand tree islands based on canopy status and infestation levels then schedule treatments accordingly.



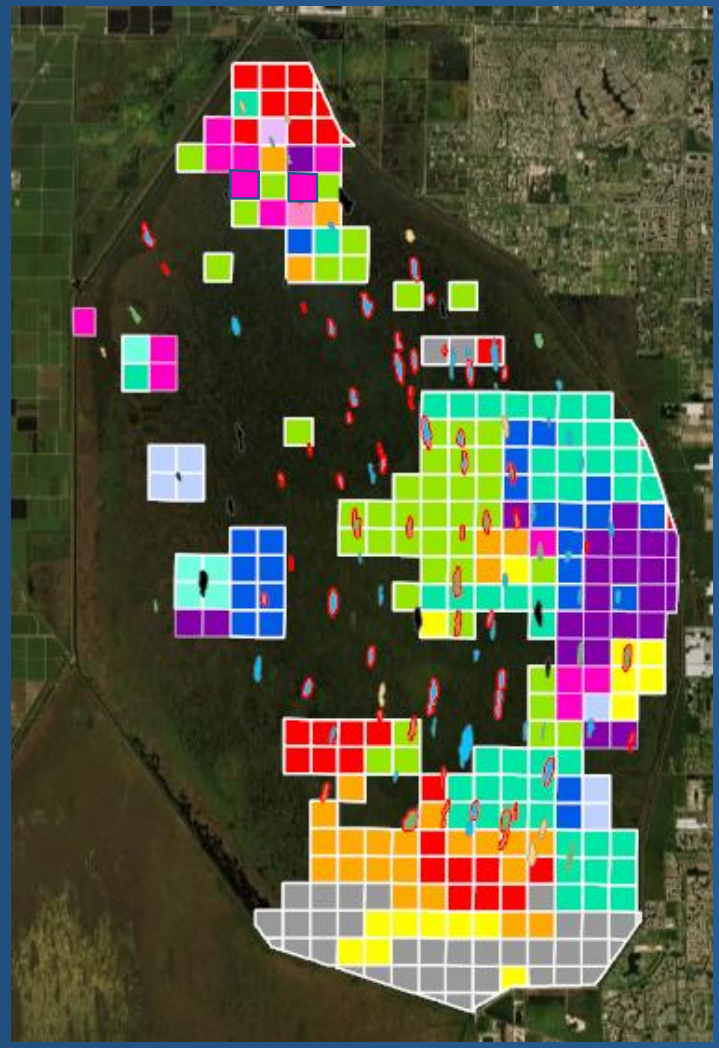
Challenges

- Balancing maintenance work with initial treatments
- Balancing melaleuca and Lygodium work
- Contractor availability
- Water levels
- Infestation levels
  - Melaleuca expansion in the north
- Prescribed fire coordination
- Optimizing ground crew configurations
- Aerial treatment integration

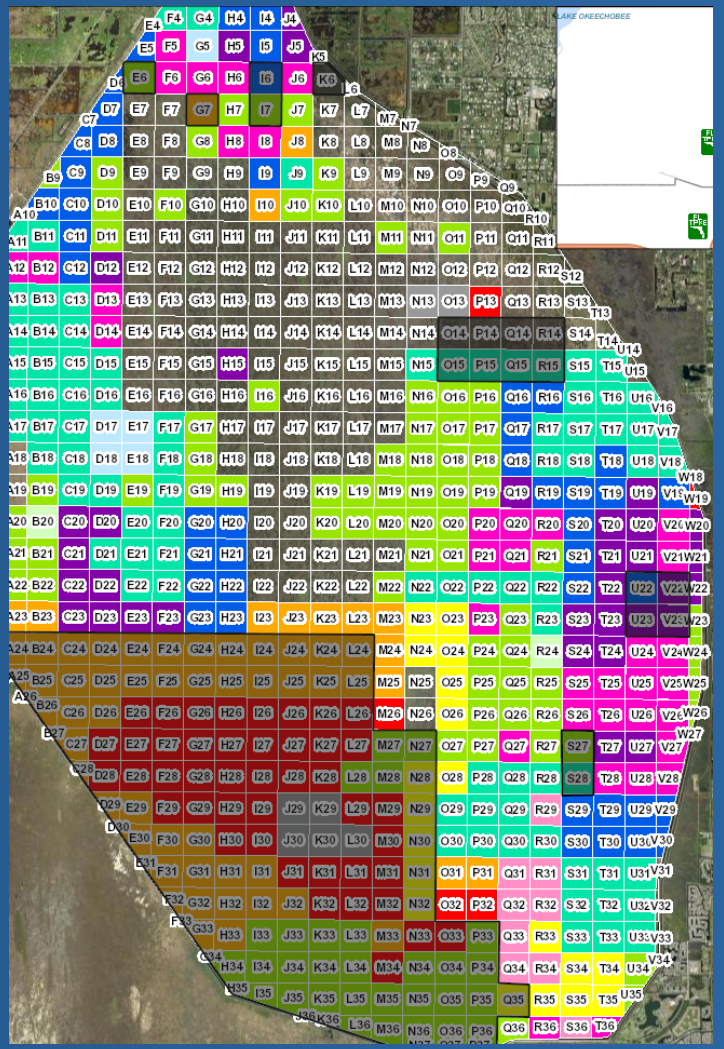
Progress to Date

Treatments since Feb 2018	Acres Covered	Acres Treated
OWCF	33,704	10,083
Melaleuca	92,929	18,725

- WCA1_1KM_CHEMTREAT GRID
- WCA1_1KM_CHEMTREAT_MEL_2022
- WCA1_1KM_CHEMTREAT_MEL_2022_PARTIAL
- WCA1_1KM_CHEMTREAT_MEL_2021
- WCA1_1KM_CHEMTREAT_MEL_2020
- WCA1_1KM_CHEMTREAT_MEL_2020_PARTIAL
- WCA1_1KM_CHEMTREAT_MEL_2019
- WCA1_1KM_CHEMTREAT_MEL_2018
- WCA1_1KM_CHEMTREAT_MEL_2018_PARTIAL
- WCA1_1KM_CHEMTREAT_MEL_2017
- WCA1_1KM_CHEMTREAT_MEL_2016
- WCA1_1KM_CHEMTREAT_MEL_2015
- WCA1_1KM_CHEMTREAT_MEL_2014
- WCA1_1KM_CHEMTREAT_MEL_2014_PARTIAL



Lygodium Treatments



Melaleuca Treatments

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Everglades Cooperative Invasive Species Management Area

Amy Peters (SFWMD)
Ellen Allen (SFWMD)
LeRoy Rodgers (SFWMD)
Brendon Hession (SFWMD)
Billy Snyder (NPS- Big Cypress)
Shelby Moneysmith (NPS- Biscayne)
Hillary Cooley (NPS- Everglades)
Kevin Brookes (NPS- Everglades)
Maria Vasquez (NPS- Everglades) Brooke Shamblin (NPS- Region)
Shea Brucia (NPS-Region)

Thank you & Questions

Jonathon Ieno (Broward County)
Erik Eckles (Broward County)
Elena Suarez (Broward County)
Rebekah Gibble (USFWS-Loxahatchee)
Josiah Freese (FWC- Everglades and Francis S. Taylor WMA)
Jacob Larsson (FWC- Rotenberger & Holey Land WMA)
Linda King (FWC)
Jimmy Lange (Smart-Sciences, Inc.)
Grant Steelman (Seminole Tribe of Florida)

CISMA

Think Locally, Act neighborly
invasive species know no boundaries!