TREE ISLAND RESTORATION IN THE FLORIDA EVERGLADES: REVERSING THE EXOTIC PLANT INVASION

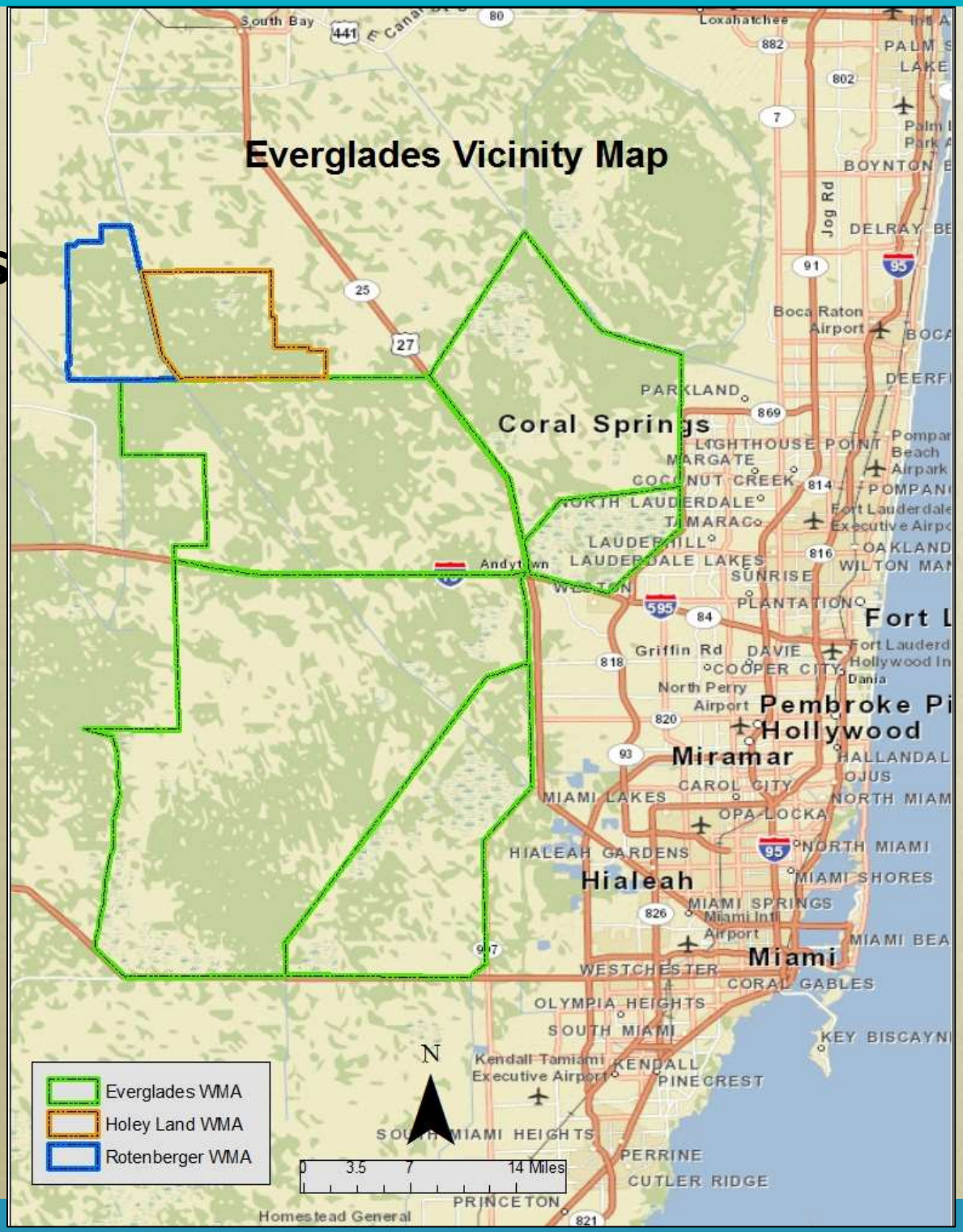
Greater Everglades Ecosystem Restoration 2017

Marsha Ward, District Biologist
Florida Fish and Wildlife Conservation Commission

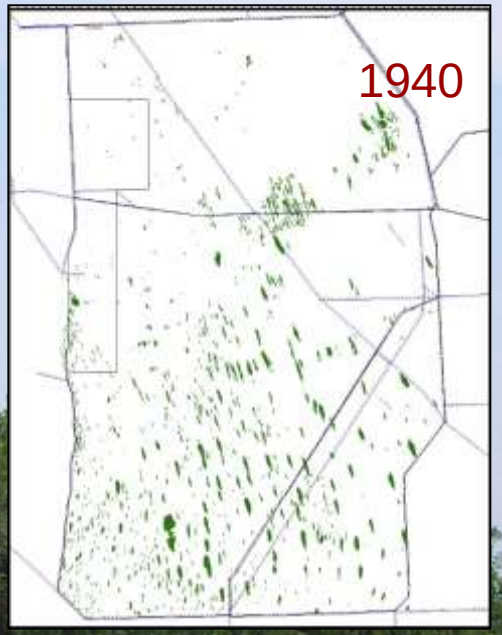
- **Everglades & Francis S. Taylor WMA**
  671,831 acres

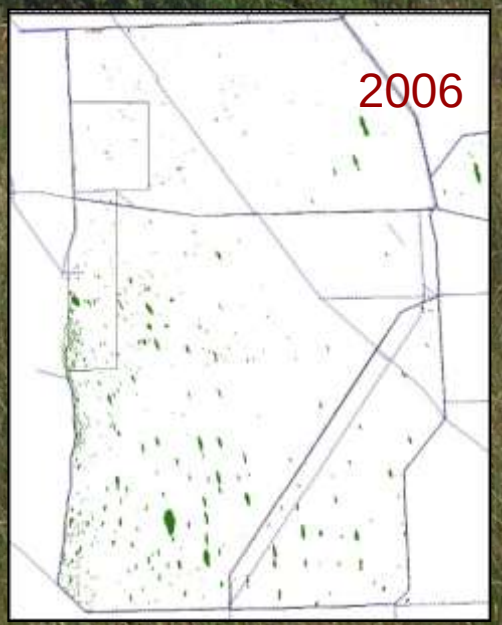
- **Rotenberger WMA**
  29,700 acres

- **Holey Land WMA**
  35,350 acres



Tree Island Loss





- Limestone outcrop inches – several feet higher than landscape
- Oxidation of soil during massive drainage efforts started in the early 1900s
- Subsidence of soil from burning
- Invasive plant species (i.e. Brazilian pepper, Lygodium)
- Over half of the historic islands lost or degraded

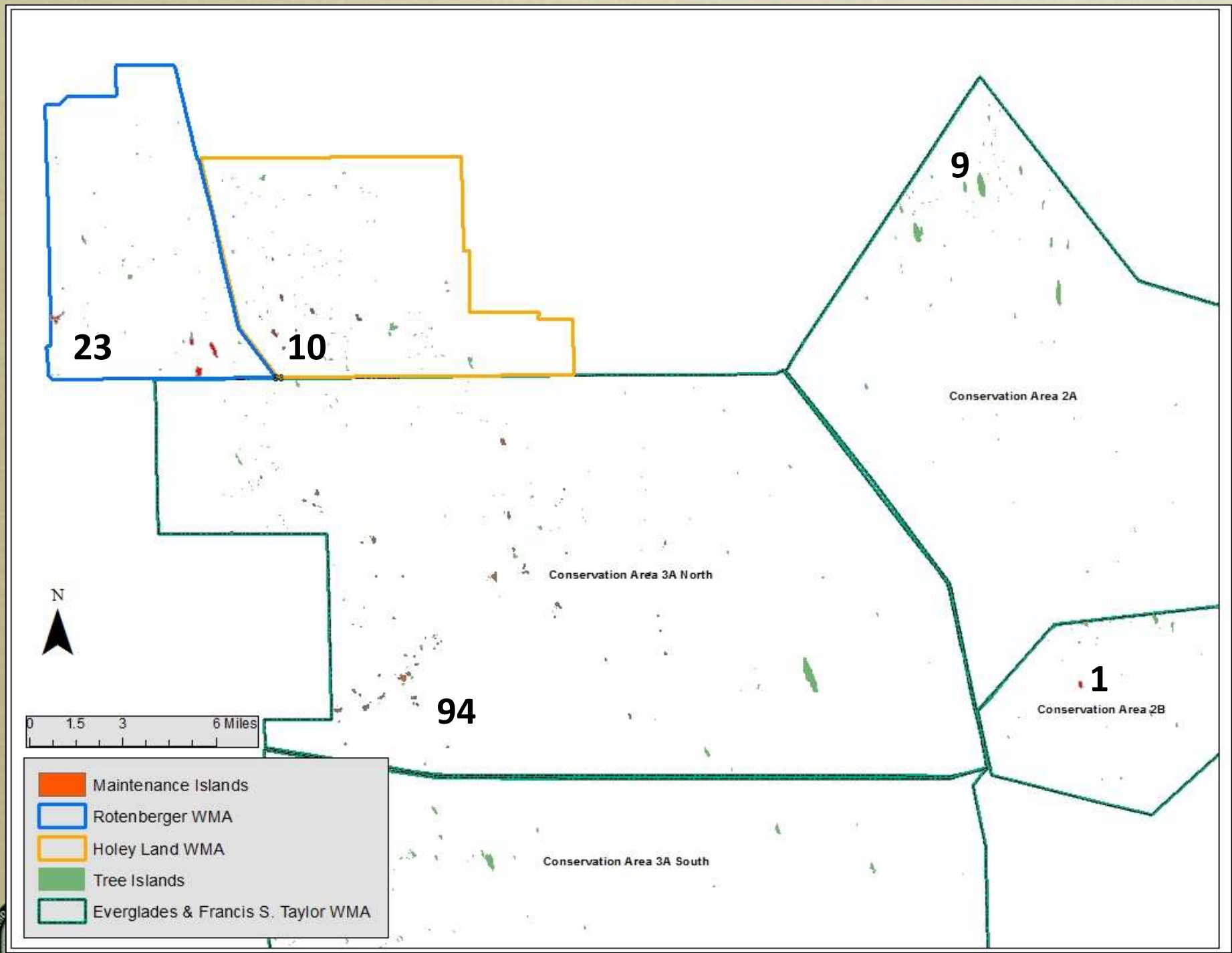
Tree Island Importance

- 2-3x plant and animal diversity than surrounding marsh
- >80% of woody vegetation diversity in Everglades
- Breeding colonies and nurseries for much of the wildlife
- Refuge and forage for terrestrial wildlife during high water

Tree Island Restoration

Since 1990s

- Invasive control
- Native tree and shrub plantings
- Maintenance of planted trees and shrubs
- Plant survival monitoring
- Prescribed fire
- Monitoring
- Water recommendations
- Goals


23
10
9
Conservation Area 2A
Conservation Area 3A North
94
1
Conservation Area 2B
Conservation Area 3A South
N
0 1.5 3 6 Miles
Maintenance Islands
Rotenberger WMA
Holey Land WMA
Tree Islands
Everglades & Francis S. Taylor WMA

Invasive Removal

Planting Techniques

- Planning!
  - Island characteristics
- Plant native historical species
  - Transport
  - Materials

Planting Examples

- **Island 661**
- **18 ac; 2005: 3002 plants**

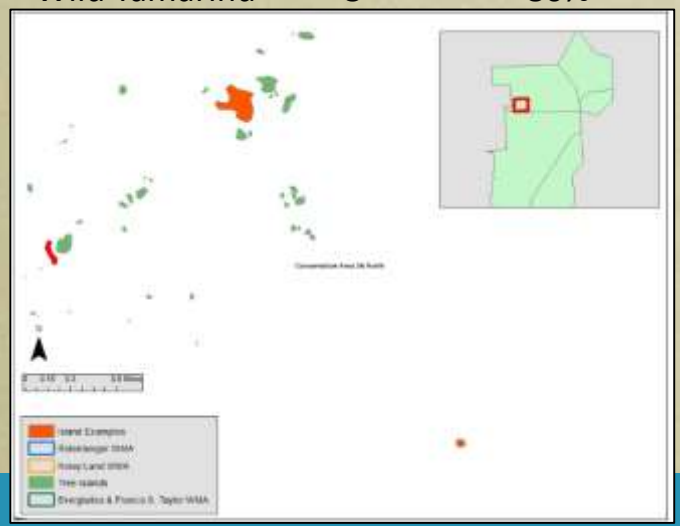
Species	Planted	% Survival
Carolina Willow	45	89%
Cocoplum	499	64%
Dahoon Holly	172	82%
Firebush	381	90%
Myrsine	198	65%
Pond Apple	662	60%
Pop Ash	337	98%
Red Maple	305	95%
Sweet Bay	329	83%

- **Island 838, 3.6 ac**
- **2003: 771 plants**

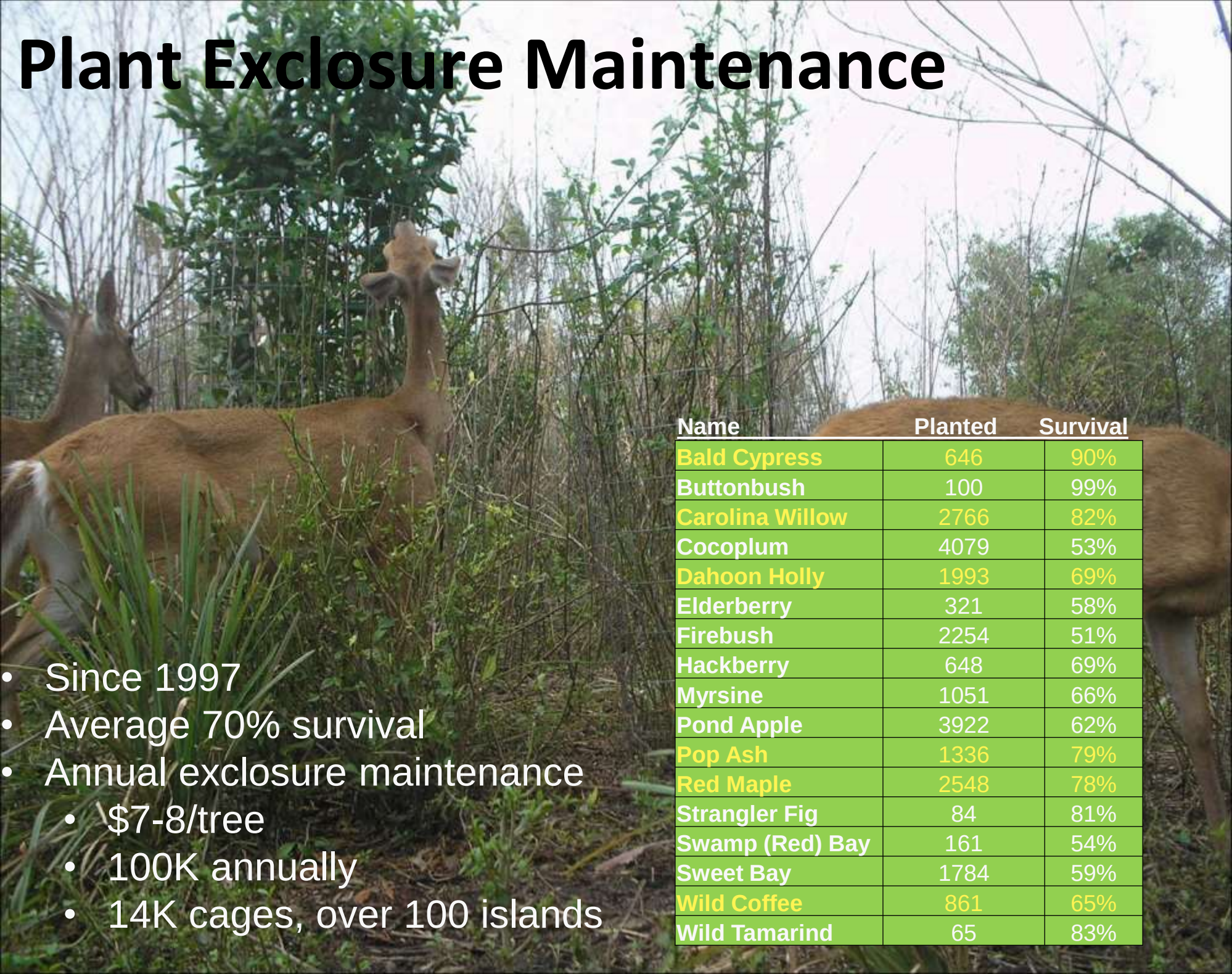
Species	Planted	% Survival
Carolina Willow	103	85%
Cocoplum	235	55%
Dahoon Holly	50	96%
Firebush	101	38%
Hackberry	28	43%
Pond Apple	101	90%
Red Maple	51	94%
Sweet Bay	102	82%

- **Island 872, 1.4 ac**
  - **2012: 181 plants**
  - **2014: 215 plants**

Species	Planted	% Survival
Bald Cypress	33	100%
Carolina Willow	45	69%
Cocoplum	32	78%
Dahoon Holly	19	84%
Elderberry	11	64%
Firebush	25	52%
Hackberry	12	75%
Myrsine	21	52%
Pond Apple	104	89%
Pop Ash	26	58%
Red Maple	24	71%
Strangler Fig	7	86%
Sweet Bay	22	36%
Wild Coffee	10	50%
Wild Tamarind	5	80%



Plant Exclosure Maintenance



- Since 1997
- Average 70% survival
- Annual exclosure maintenance
  - $7-8/tree
  - 100K annually
  - 14K cages, over 100 islands

Name	Planted	Survival
Bald Cypress	646	90%
Buttonbush	100	99%
Carolina Willow	2766	82%
Cocoplum	4079	53%
Dahoon Holly	1993	69%
Elderberry	321	58%
Firebush	2254	51%
Hackberry	648	69%
Myrsine	1051	66%
Pond Apple	3922	62%
Pop Ash	1336	79%
Red Maple	2548	78%
Strangler Fig	84	81%
Swamp (Red) Bay	161	54%
Sweet Bay	1784	59%
Wild Coffee	861	65%
Wild Tamarind	65	83%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Bushnell
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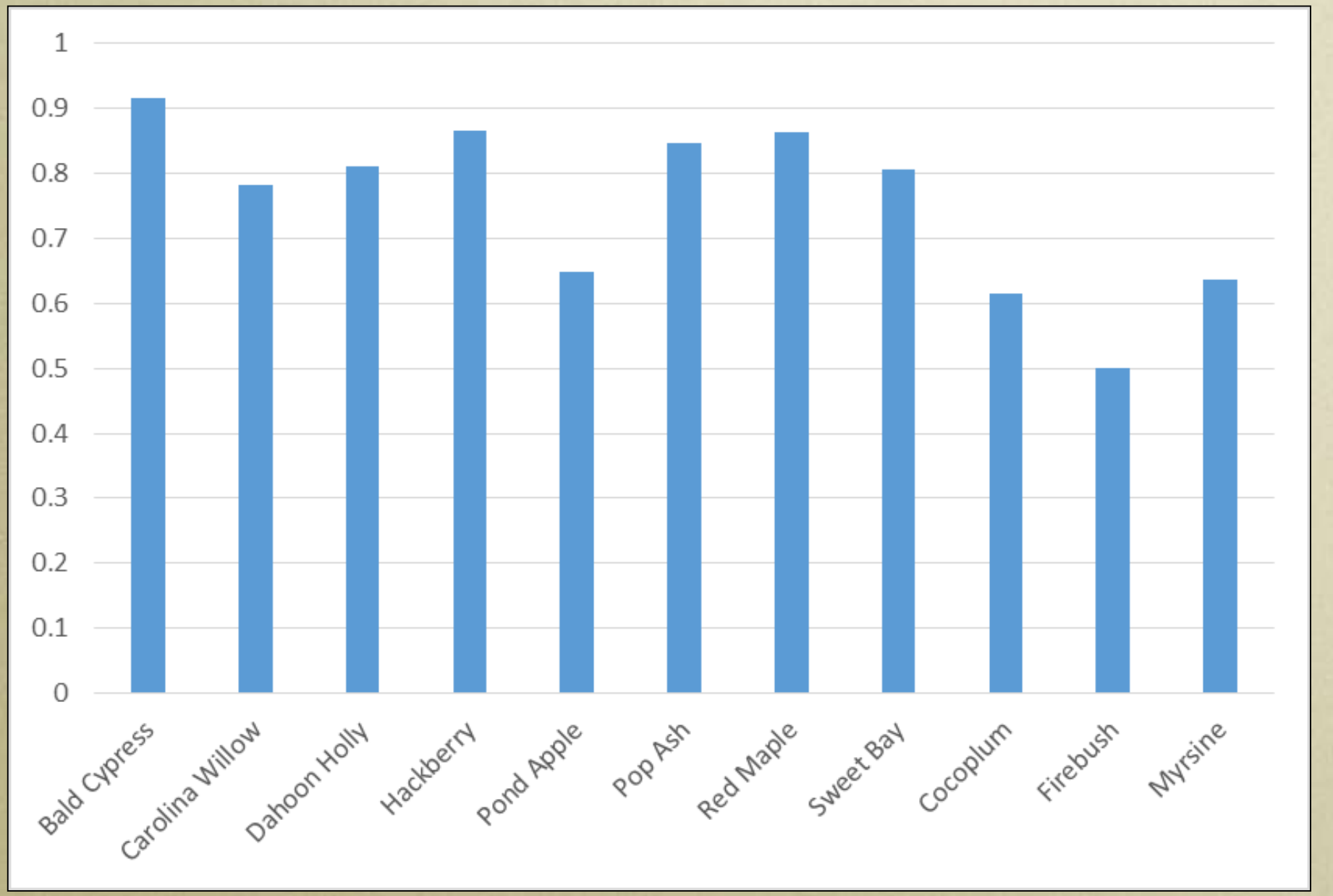
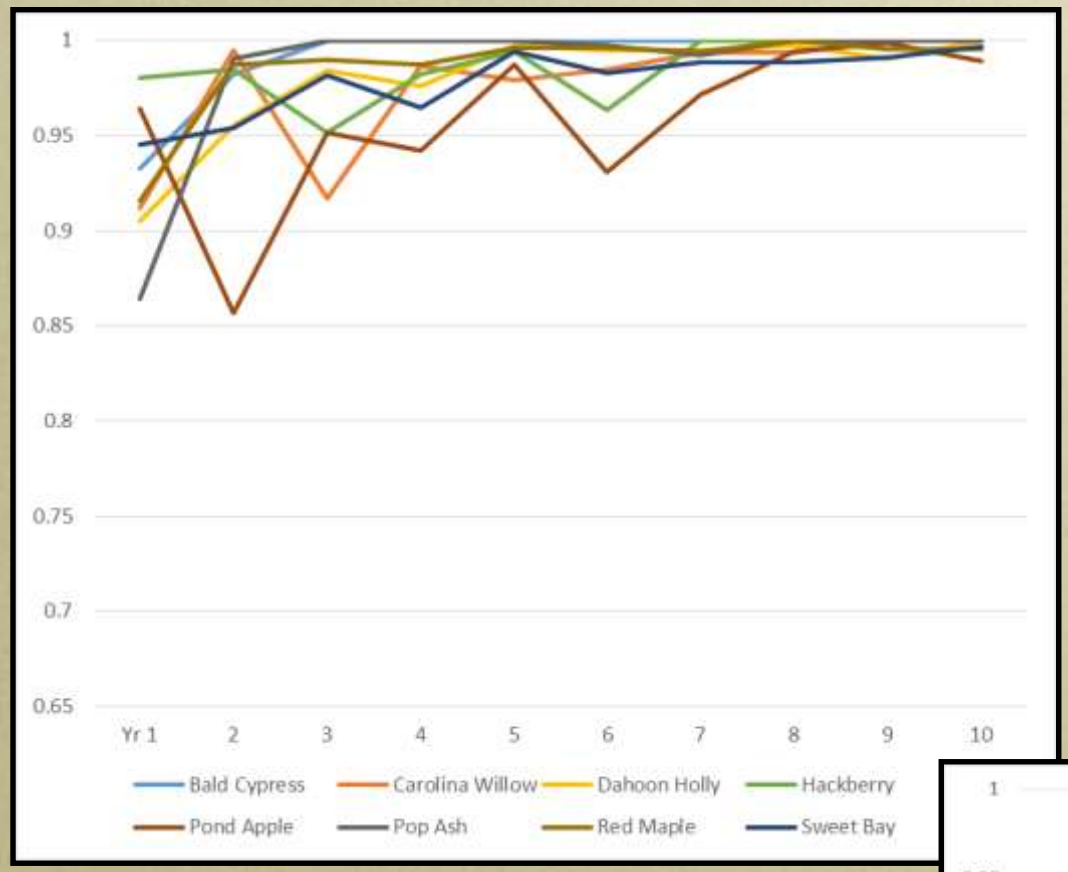


Cumulative survival of select species planted on 30 tree islands over 10 years.



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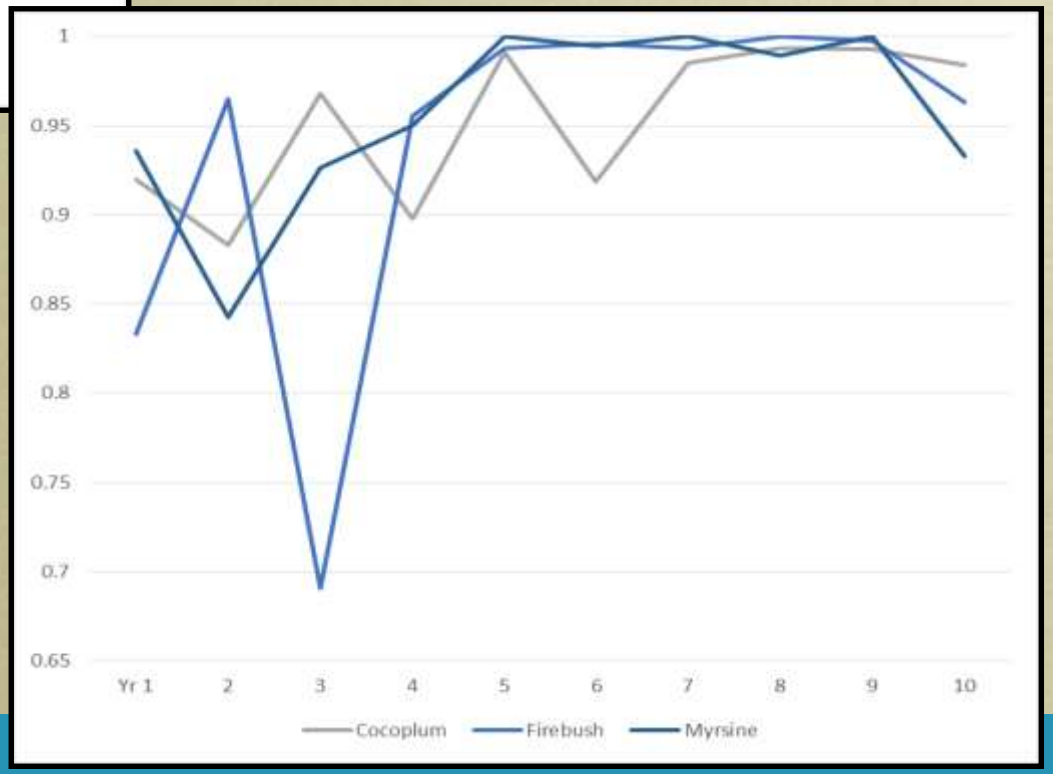


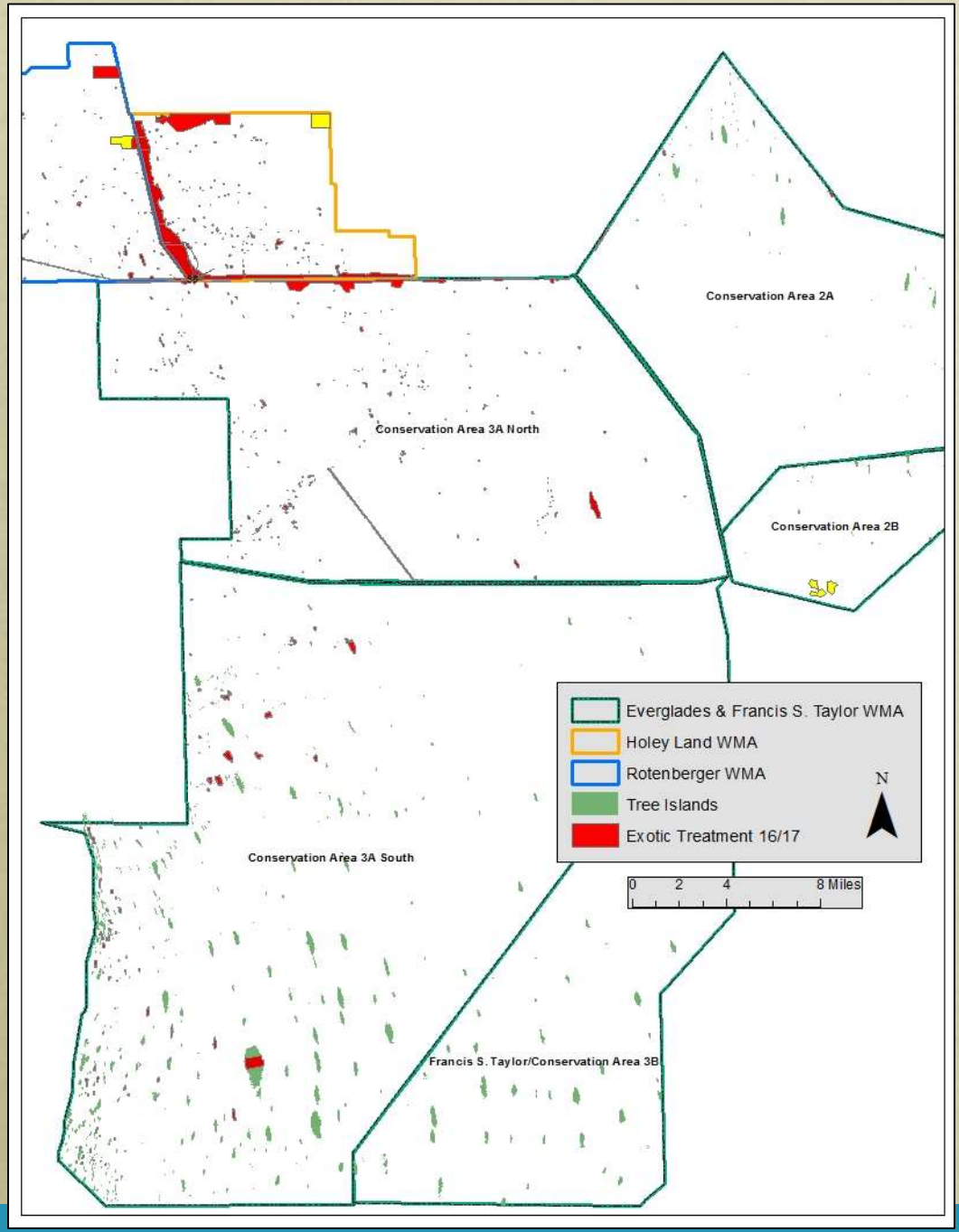
WCA 3AN: #711 Lemon Head

Wildlife Monitoring

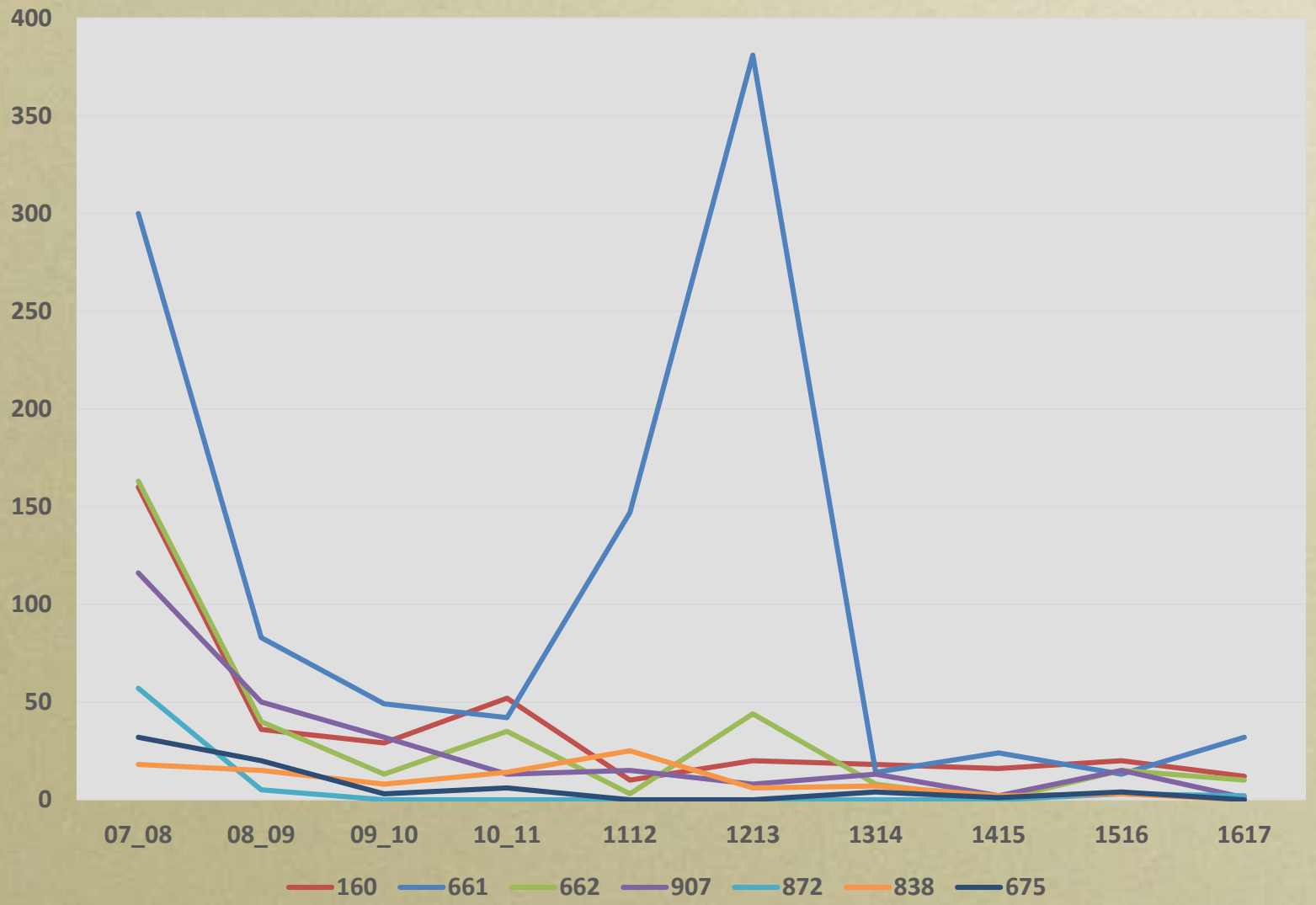
- Camera trapping/surveillance

Continued Invasive Control

- Annual treatments/monitoring
  - Over 6,000 acres
  - 1.4 million dollars
  - $63-314/acre
- Tree islands, levees, spoil islands
- BP, Lygodium, Napier, grasses
- Cooperative work w/ SFWMD
  - Surveys and treatments
  - ArcGIS online map



Annual tracking of Brazilian pepper stem counts on select tree islands in Everglades WMA.



Prescribed Burning

Lessons Learned

- Short-term negative impacts to wildlife
- Planning/exclosures are critical
- Shrubs lower survival, but still >50%
- Could have to plant again
- Invasive control
- Fringe benefits
- Plant diversity and wildlife benefits
- Guide future management actions


Questions?