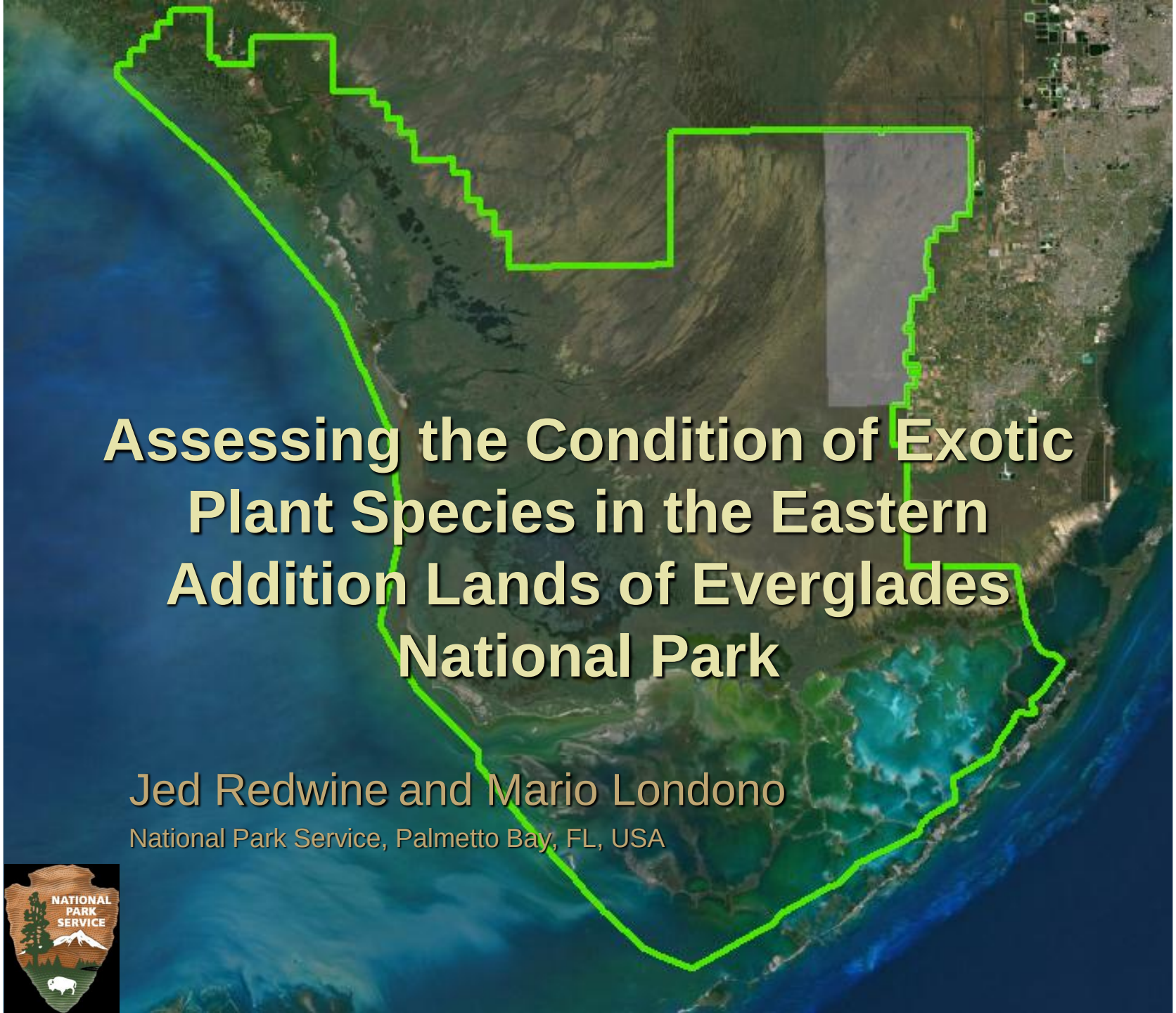


Assessing the Condition of Exotic Plant Species in the Eastern Addition Lands of Everglades National Park

Jed Redwine and Mario Londono

National Park Service, Palmetto Bay, FL, USA

Focus of the presentation

- Assess conditions of exotics using Everglades Exotic Species Management Area (ECISMA) aerial sketch map.

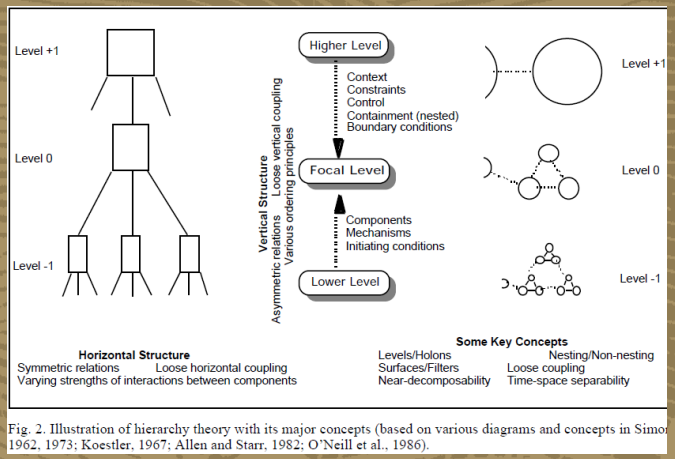
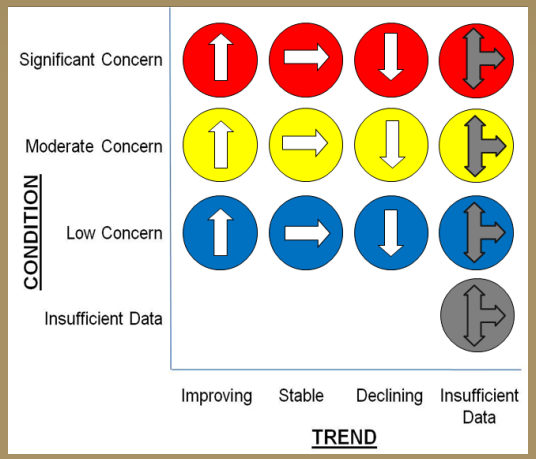


Fig. 2. Illustration of hierarchy theory with its major concepts (based on various diagrams and concepts in Simo 1962, 1973; Koestler, 1967; Allen and Starr, 1982; O'Neill et al., 1986).



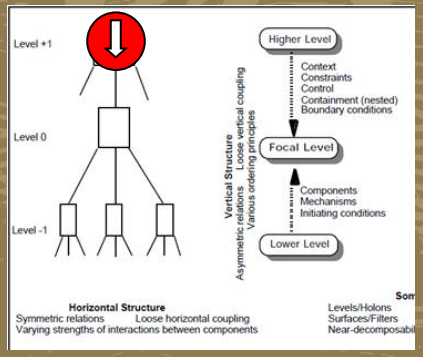
- Identify trends in context of invasion theory

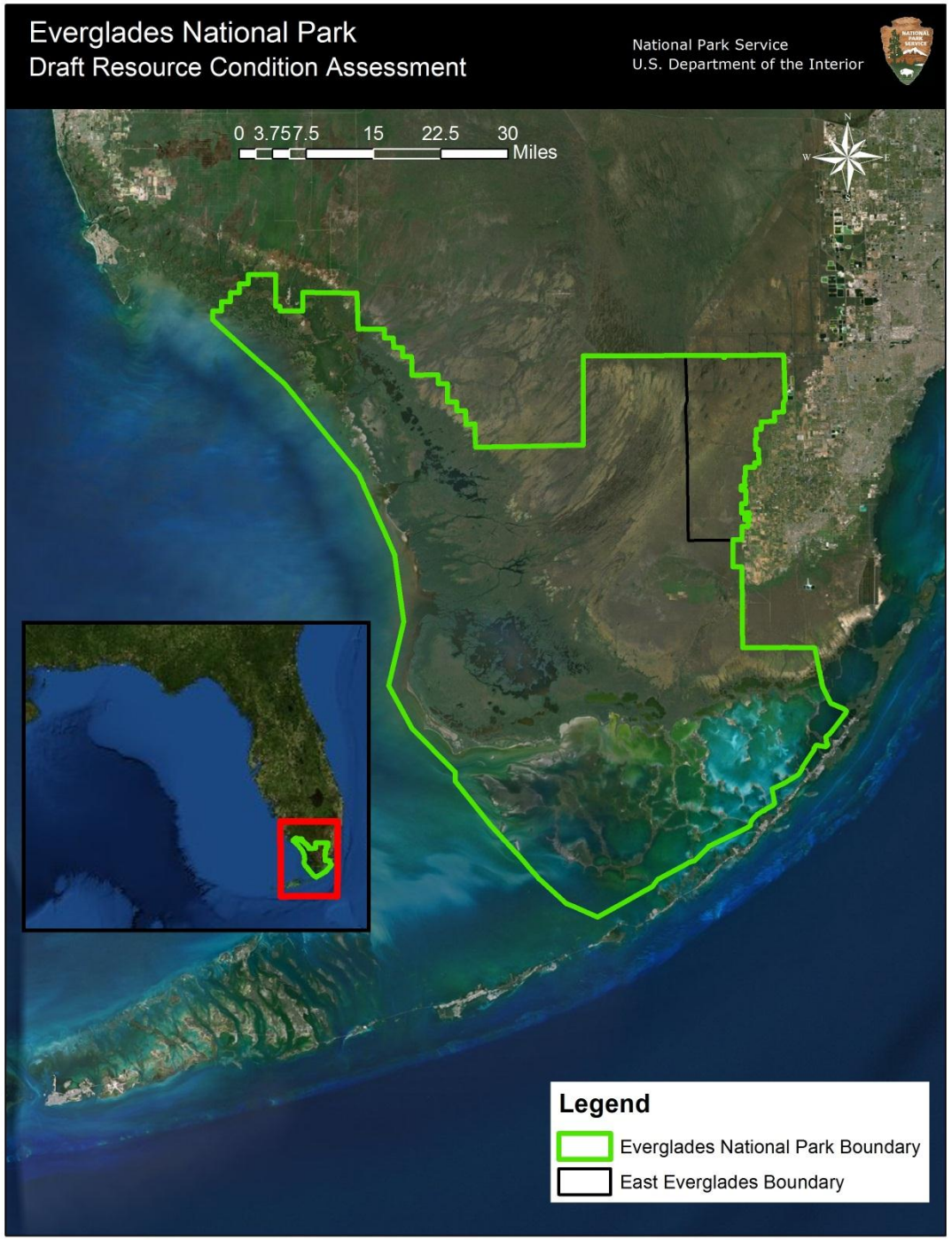
- Describe factors that contribute to exotic expansion – assess these factors if possible

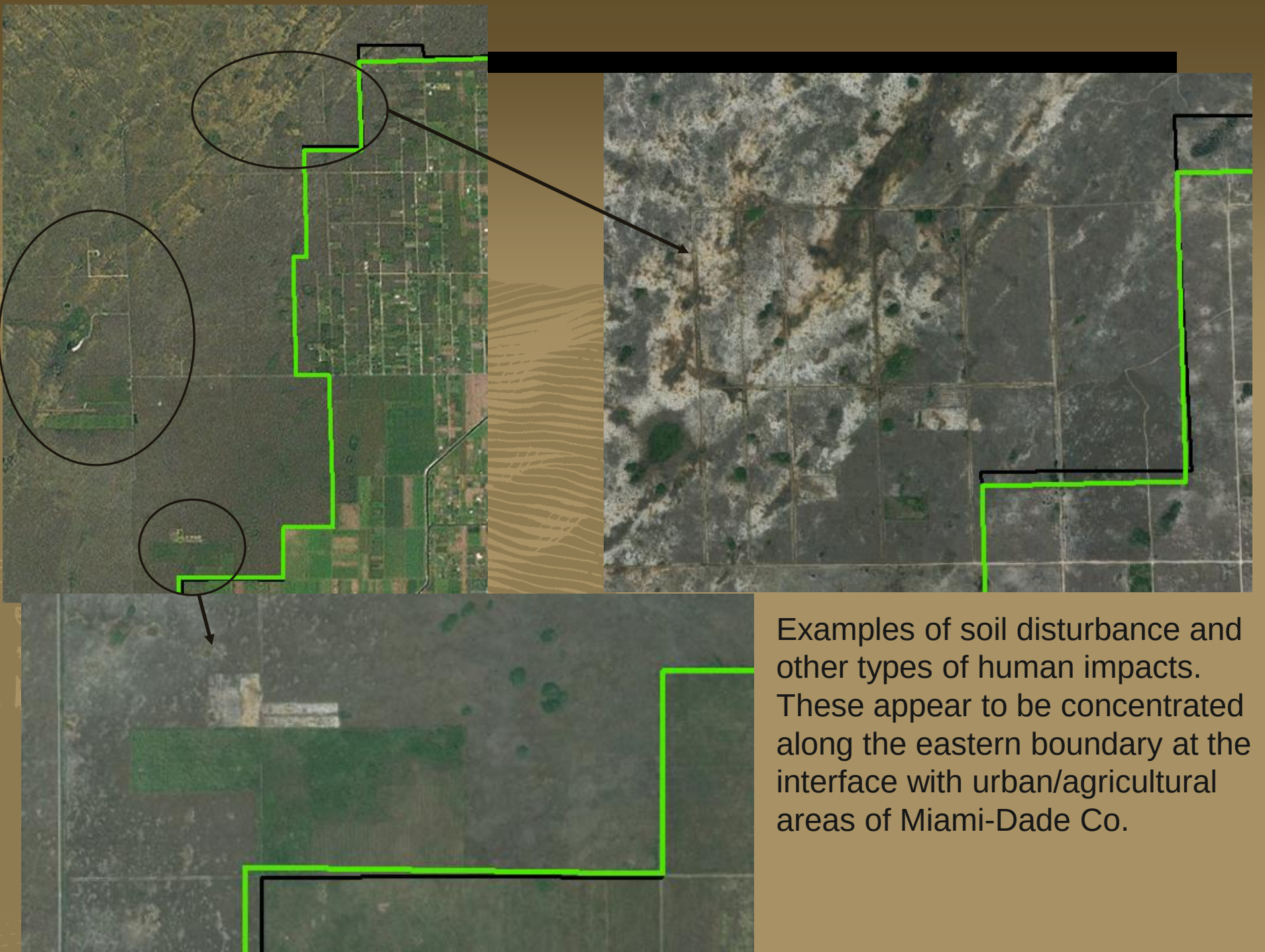
Eastern Everglades Addition Lands

- Added to ENP in 1989
- 44,095 hectares / 108,961 acres
- Adjacent to major metropolitan area
- Upstream inflows blocked by water management infrastructure
- Contains a significant number of roads, camps, agricultural areas, and areas with other types of soil disturbance

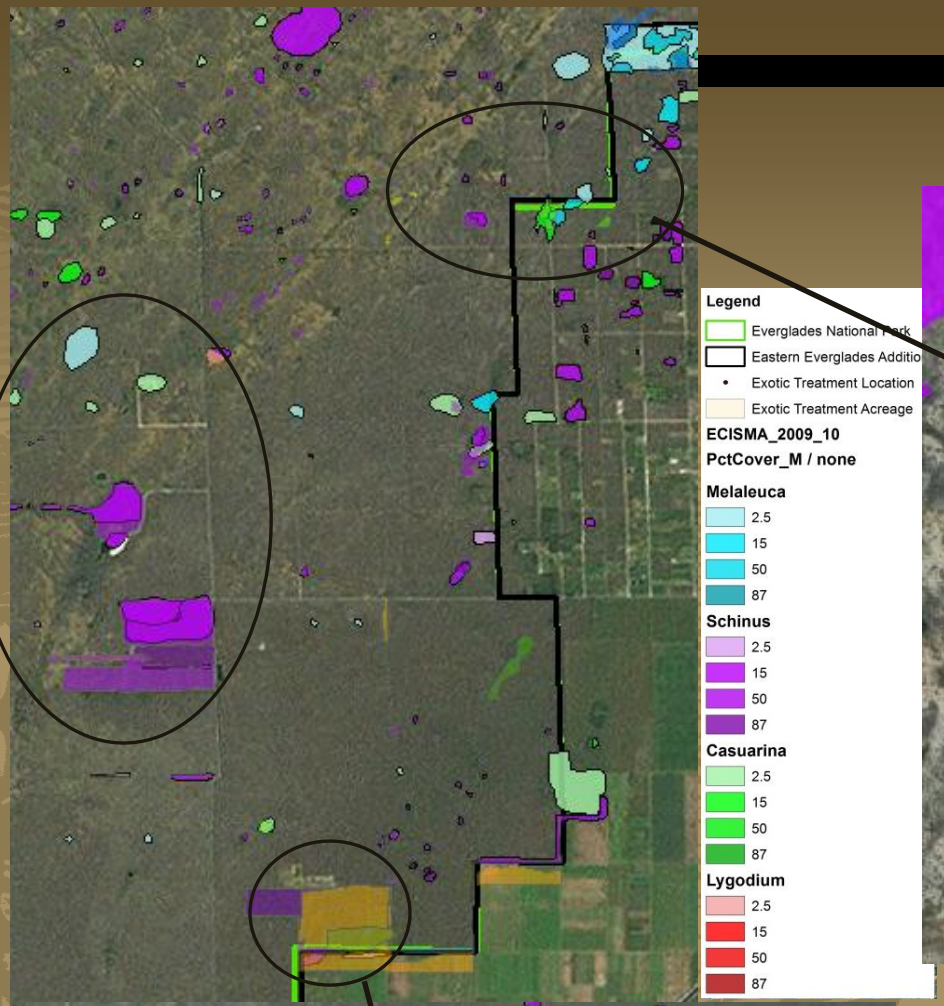
Significant concern and deteriorating position in the landscape

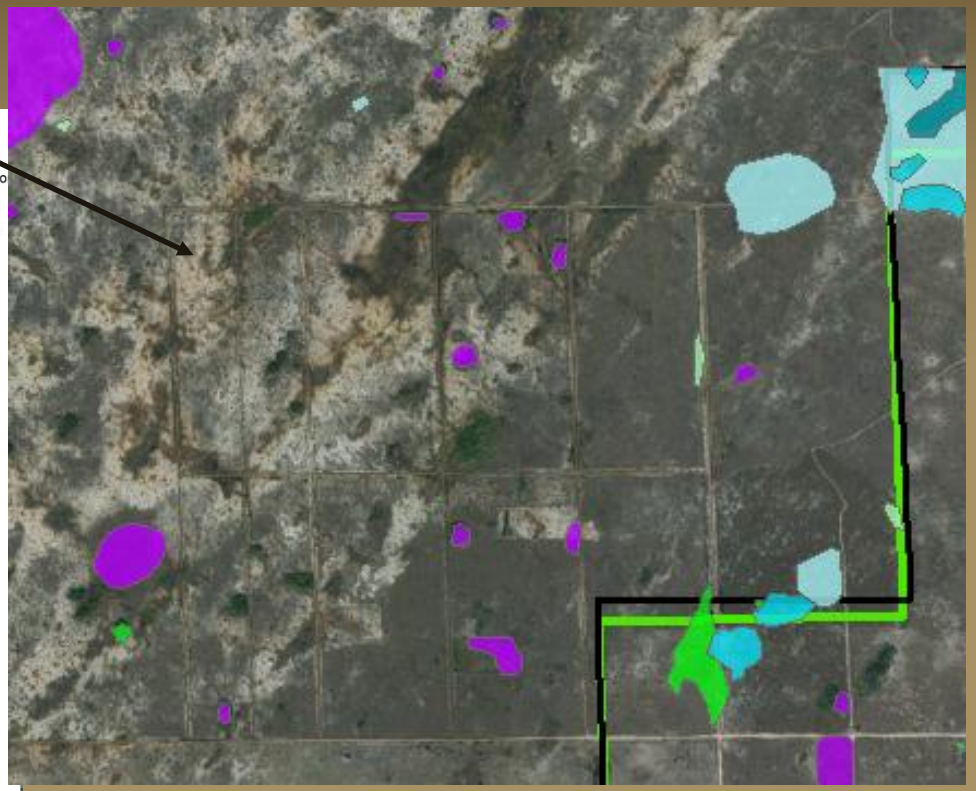






Examples of soil disturbance and other types of human impacts. These appear to be concentrated along the eastern boundary at the interface with urban/agricultural areas of Miami-Dade Co.

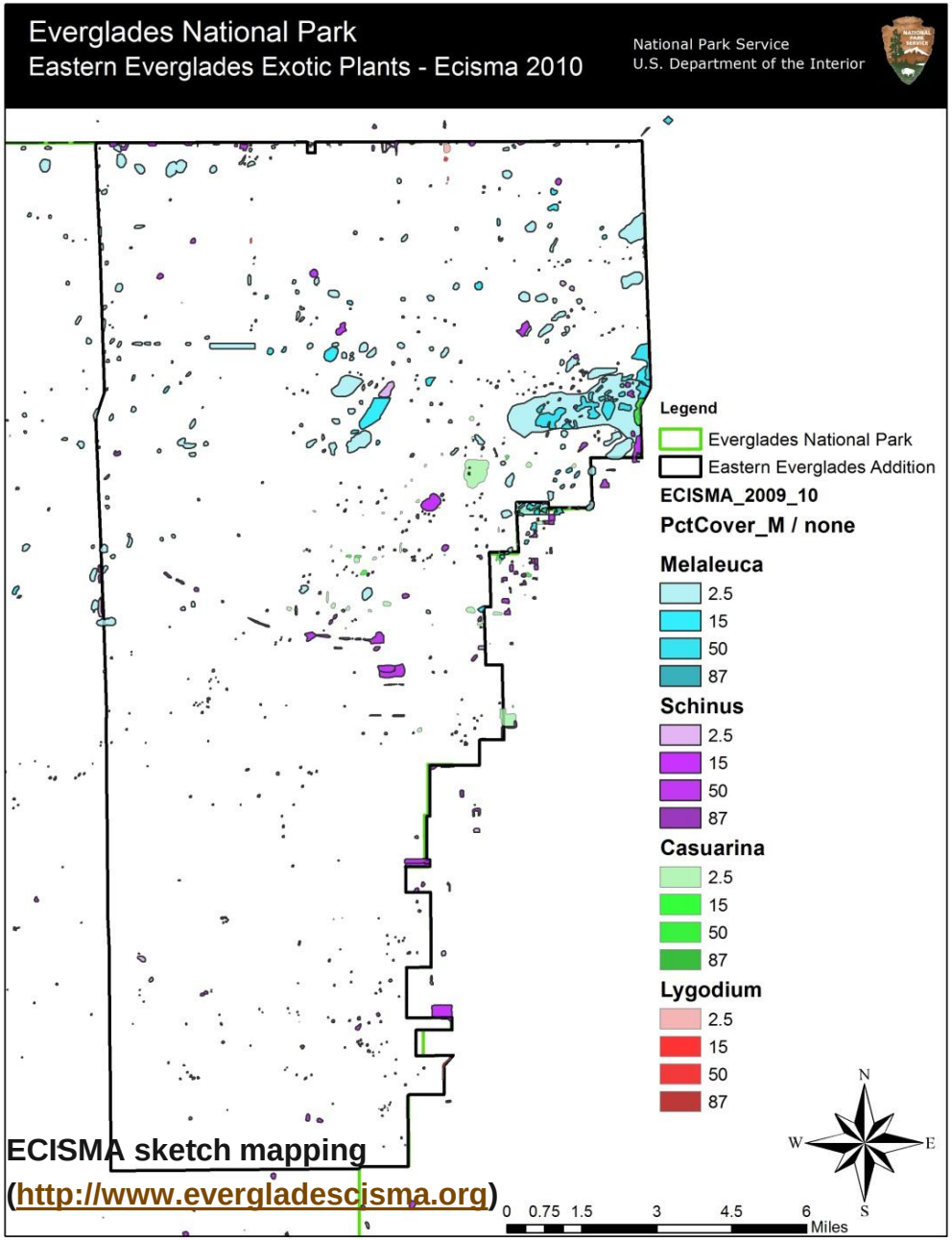




These soil disturbances are correlated with exotic species presence

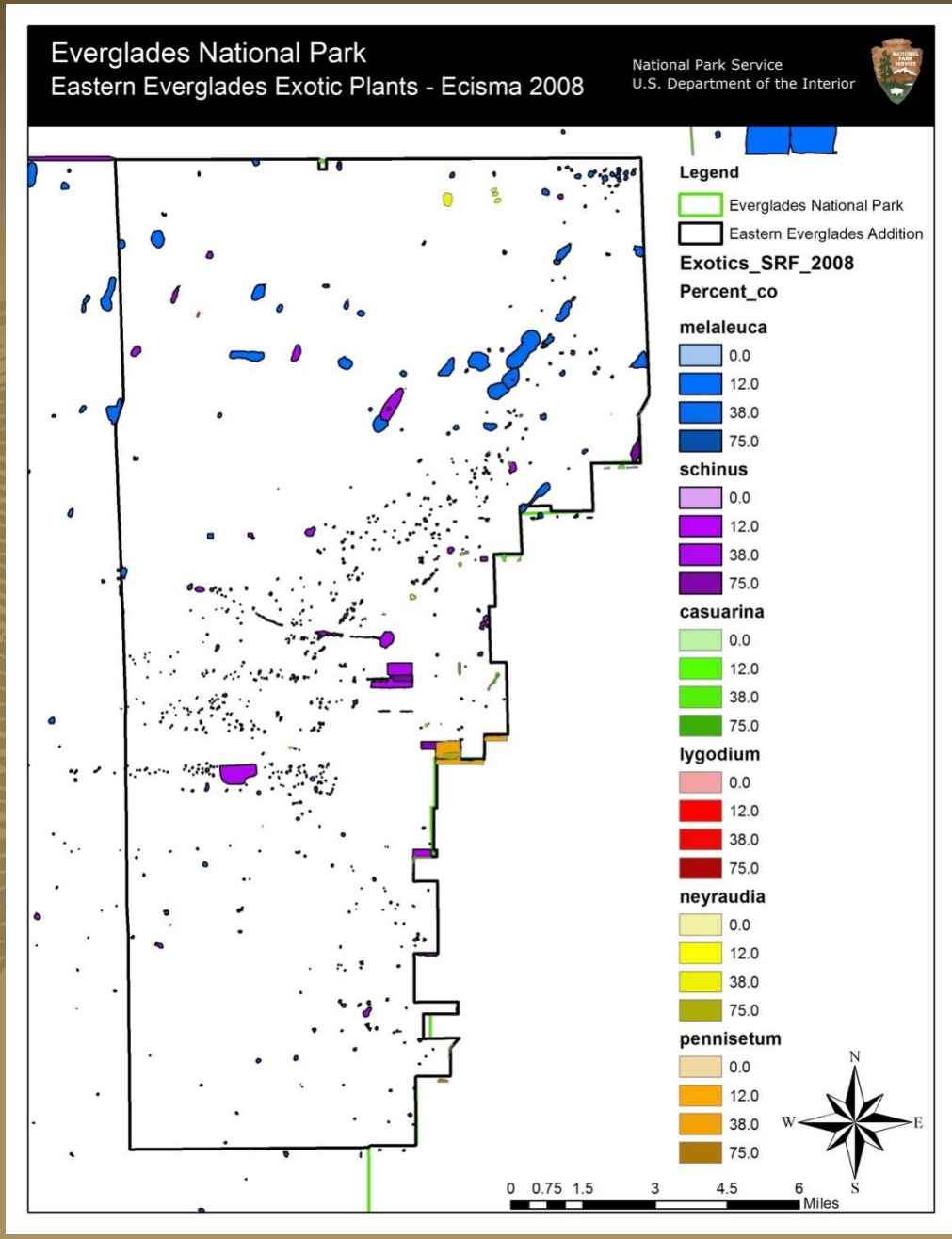
Most Recent Status (2010)

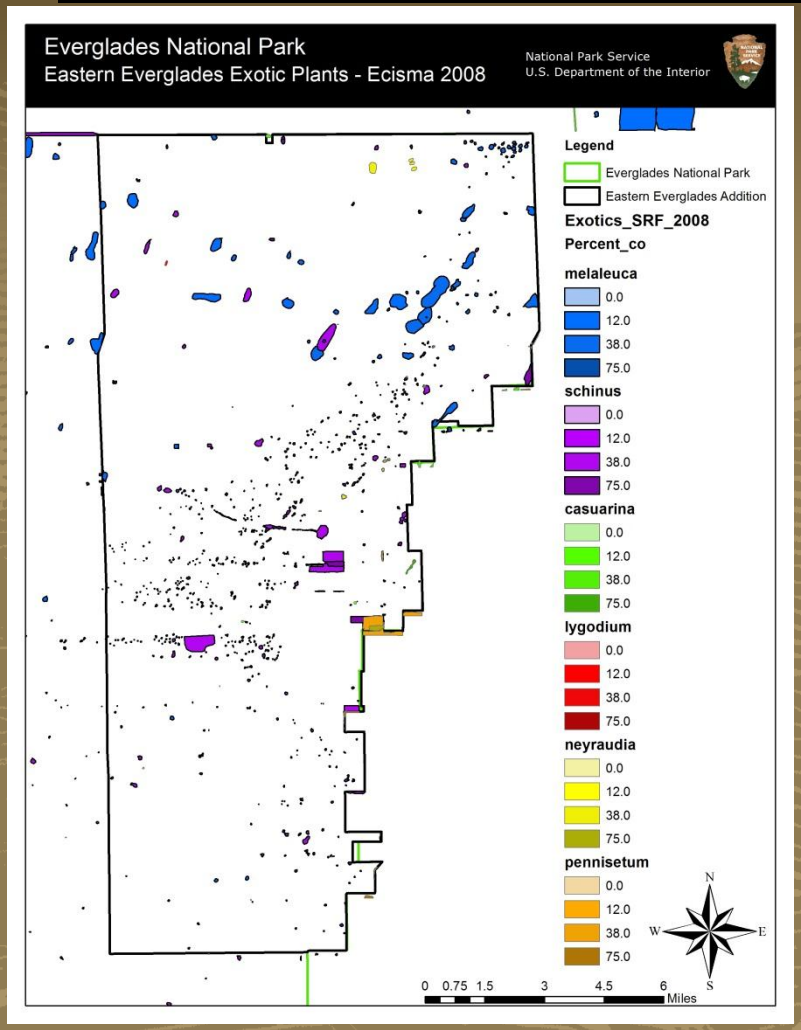
Species	% Cover	# of patches	Acres	Gross Acres
Casuarina	< 5	55	350.02	8.75
	>5-25	9	44.1	5.51
	26-75	11	30.51	15.25
	> 76	2	0.75	0.66
Cas_sum		77	425.38	30.17
Lygodium	< 5	5	15.97	0.4
	>5-25	6	16.44	2.06
	26-75	1	2.99	1.5
	> 76			0
Lyg_sum		12	35.4	3.95
Melaleuca	< 5	197	2979.3	74.48
	>5-25	34	315.62	39.45
	26-75	31	439.24	219.62
	> 76	1	4.88	4.27
Mel_sum		263	**3739**	337.82
Schinus	< 5	67	126.6	3.17
	>5-25	120	438.42	54.8
	26-75	84	328.85	164.4
	> 76	18	25.33	22.16
Sch_sum		289	**919.2**	244.56
Sums	< 5	324	3471.9	86.8
	>5-25	169	814.58	101.82
	26-75	127	801.59	400.8
	> 76	21	30.96	27.09
Grand totals		**641**	**5119**	**616.5**

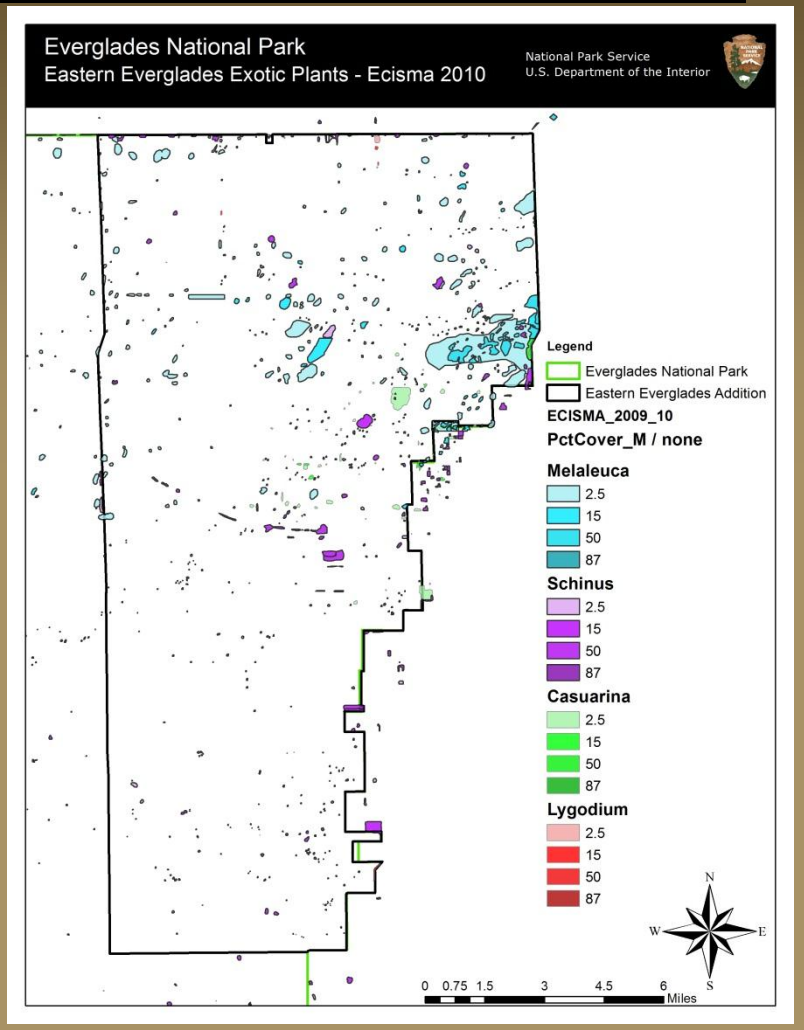


Status in 2008

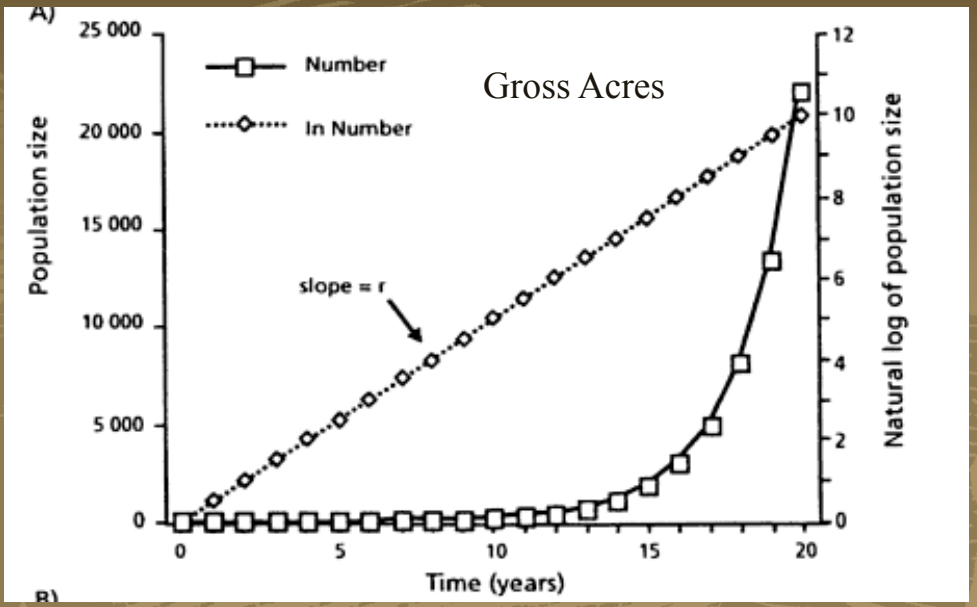
Species	Percent Cover	% Cover	Patch number	Acreage covered	Gross Acres (area * %cover)
Melaleuca	low	<25%	39	508.94	63.62
	med	25-50%	140	1385.47	519.55
	high	> 50%	2	5.27	3.95
Mel sum			**181**	**1899.68**	**587.12**
Schinus	low	<25%	20	50.89	6.36
	med	25-50%	550	1540.63	577.74
	high	> 50%	56	187.09	140.32
Sch sum			**626**	**1778.61**	**724.42**
Casuarina	low	12.5	4	6.3	0.79
	med	25-50%	4	12.02	4.51
	high	> 50%	8	17.92	13.44
Cas sum			16	36.24	18.74
Lygodium	low	<25%	0	0	0
	med	25-50%	1	3.92	1.47
	high	> 50%	3	0.35	0.26
Lyg sum			4	4.27	1.73
Sum	low	<25%	**64**	**566.34**	**70.79**
	med	25-50%	**710**	**3175.32**	**1190.75**
	high	> 50%	**73**	**253.21**	**189.91**
Grand Totals			**847**	**3994.87**	**1451.445**







Changes 2010-2008	Number of patches	Acreage covered	Gross Acres (area*%cover)
Grand Totals	**-206**	1124.11	**-834.94125**
Cas_sum	61	389.14	11.43925
Lyg_sum	8	31.13	2.21675
Mel_sum	82	1839.32	**-249.29725**
Sch_sum	**-337**	**-859.41**	**-479.85875**
main_spp_sums	**-186**	**1400.18**	**-715.5**



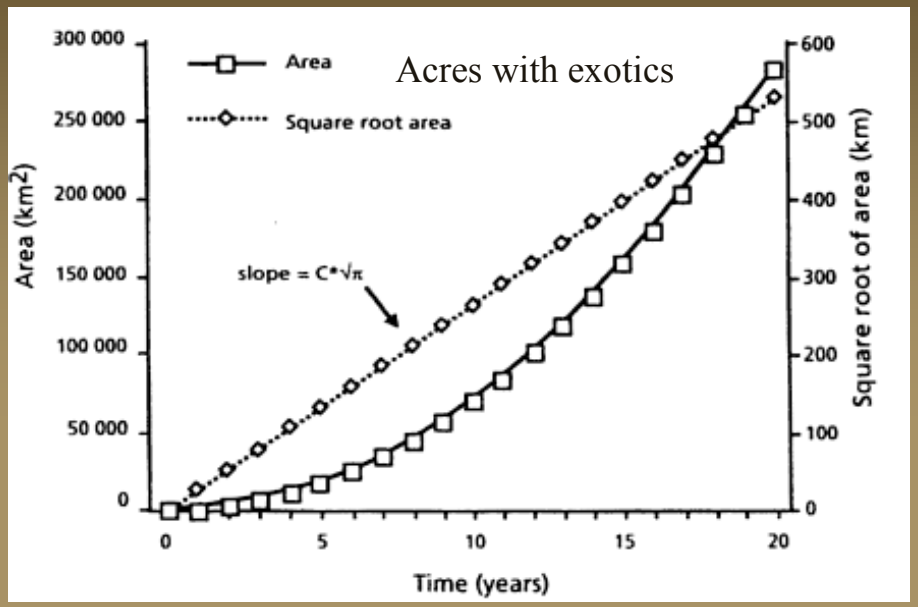


Figure 7.1 Local population growth (A) and areal expansion (B) of populations. For population growth, intrinsic increase r = 0.5/yr. For areal expansion, velocity of range expansion (C) = 15 km /yr and the correction factor (Ω) = 0.

Changes 2010-2008	Number of patches	Acreage covered	Gross Acres (area*%cover)
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Figure extracted from: Invasive Species and Biodiversity Management edited by Odd Terje Sandlund, Peter Johan Schei, Åslaug Viken

Lag times in population explosions of invasive species: Causes and implications

JEFFREY A. CROOKS and MICHAEL E. SOULÉ
Scripps Institution of Oceanography, La Jolla, California; and University of California, Santa Cruz, California, USA

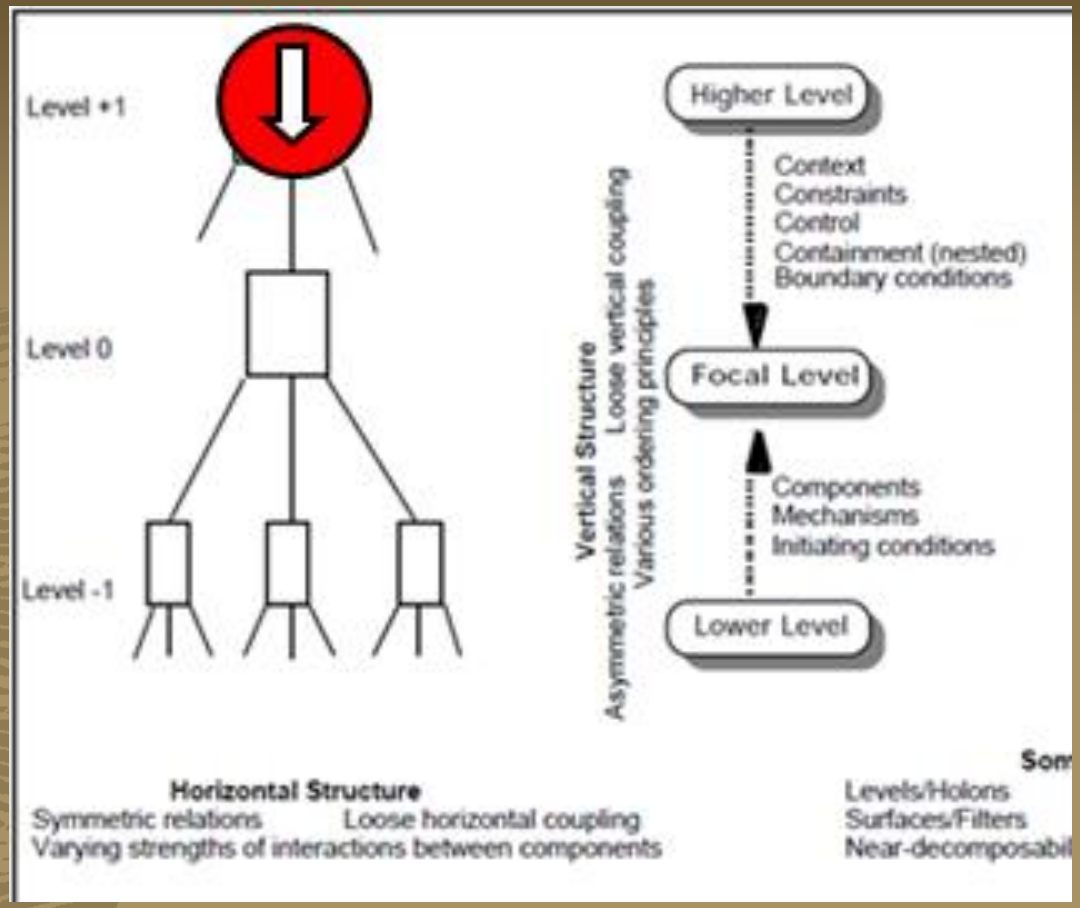
Constructing a hierarchical assessment

Moderate concern, improving trend

Gross Acres

Acres with exotics

Moderate concern, declining trend



Low intensity/small area infestations

Significant concern, insufficient data for trend

or

Unknown concern, insufficient data for trend

or

Unknown concern, declining trend

?

Applying theory

Assessment Theory

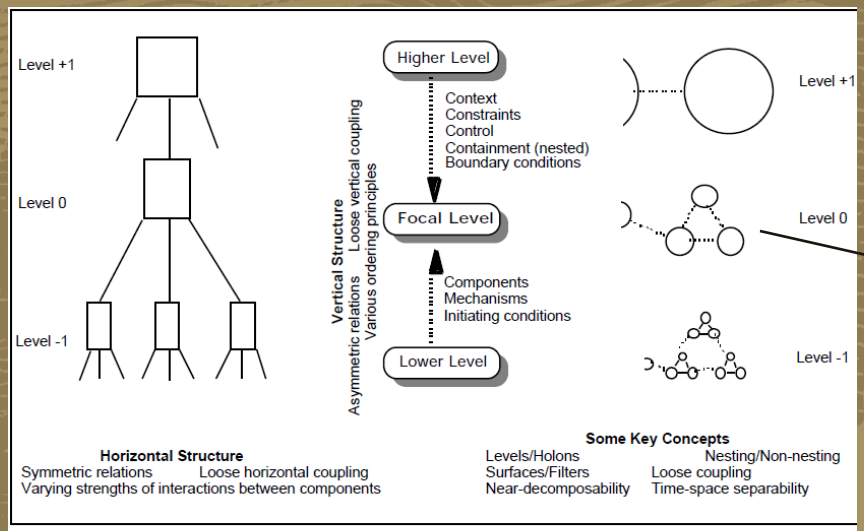
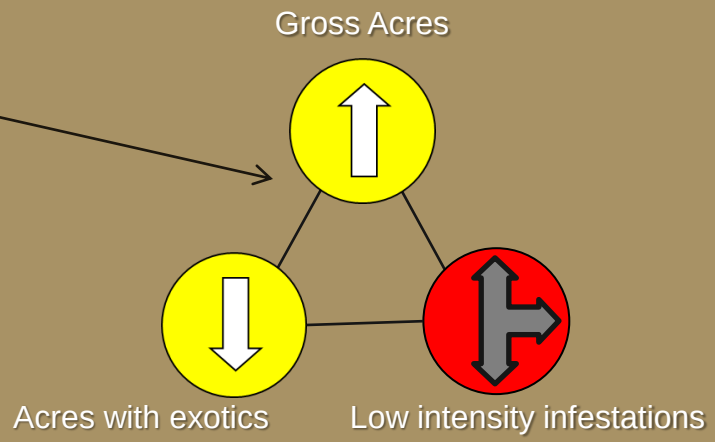


Fig. 2. Illustration of hierarchy theory with its major concepts (based on various diagrams and concepts in Simo 1962, 1973; Koestler, 1967; Allen and Starr, 1982; O'Neill et al., 1986).

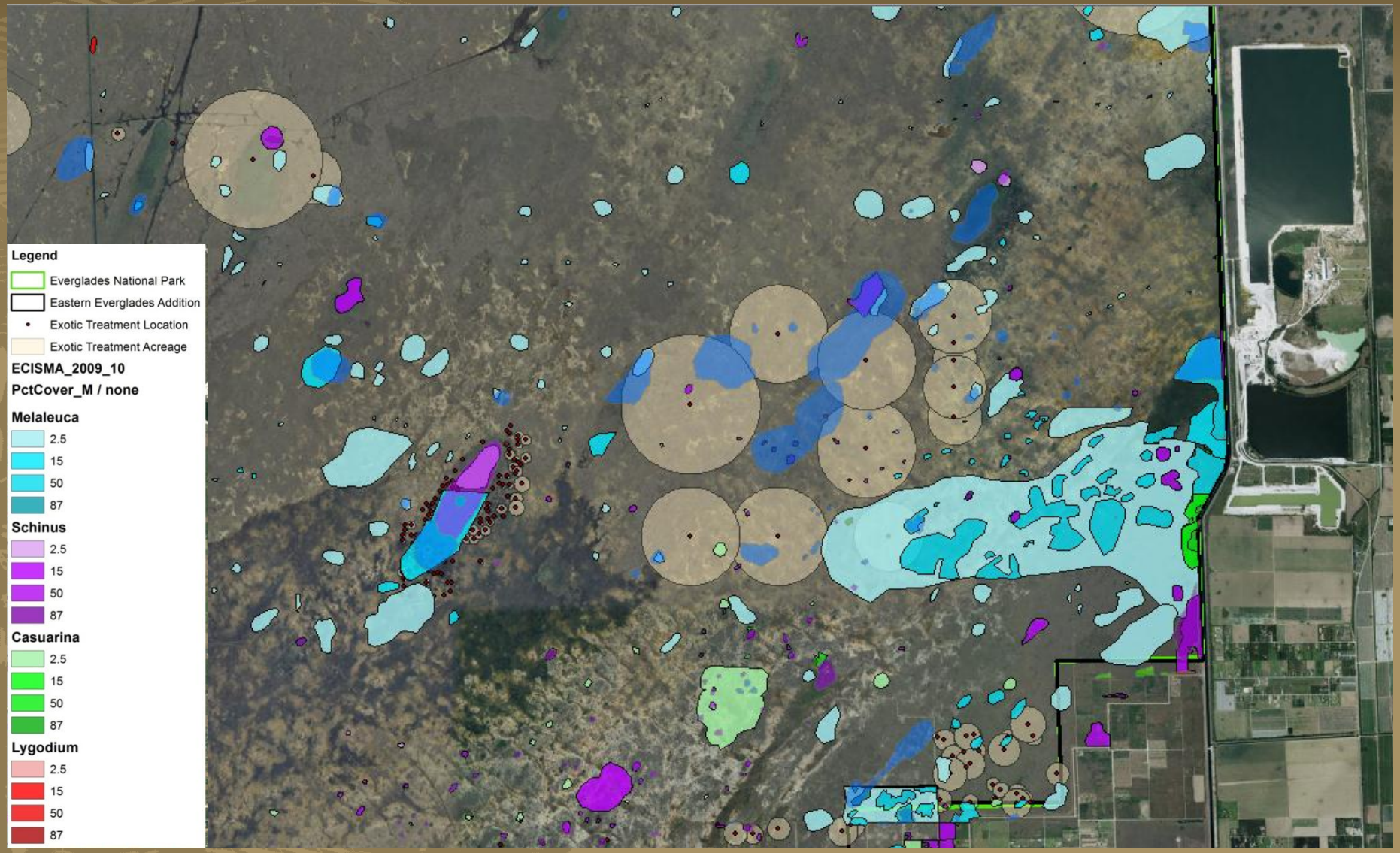
Practical Assessment

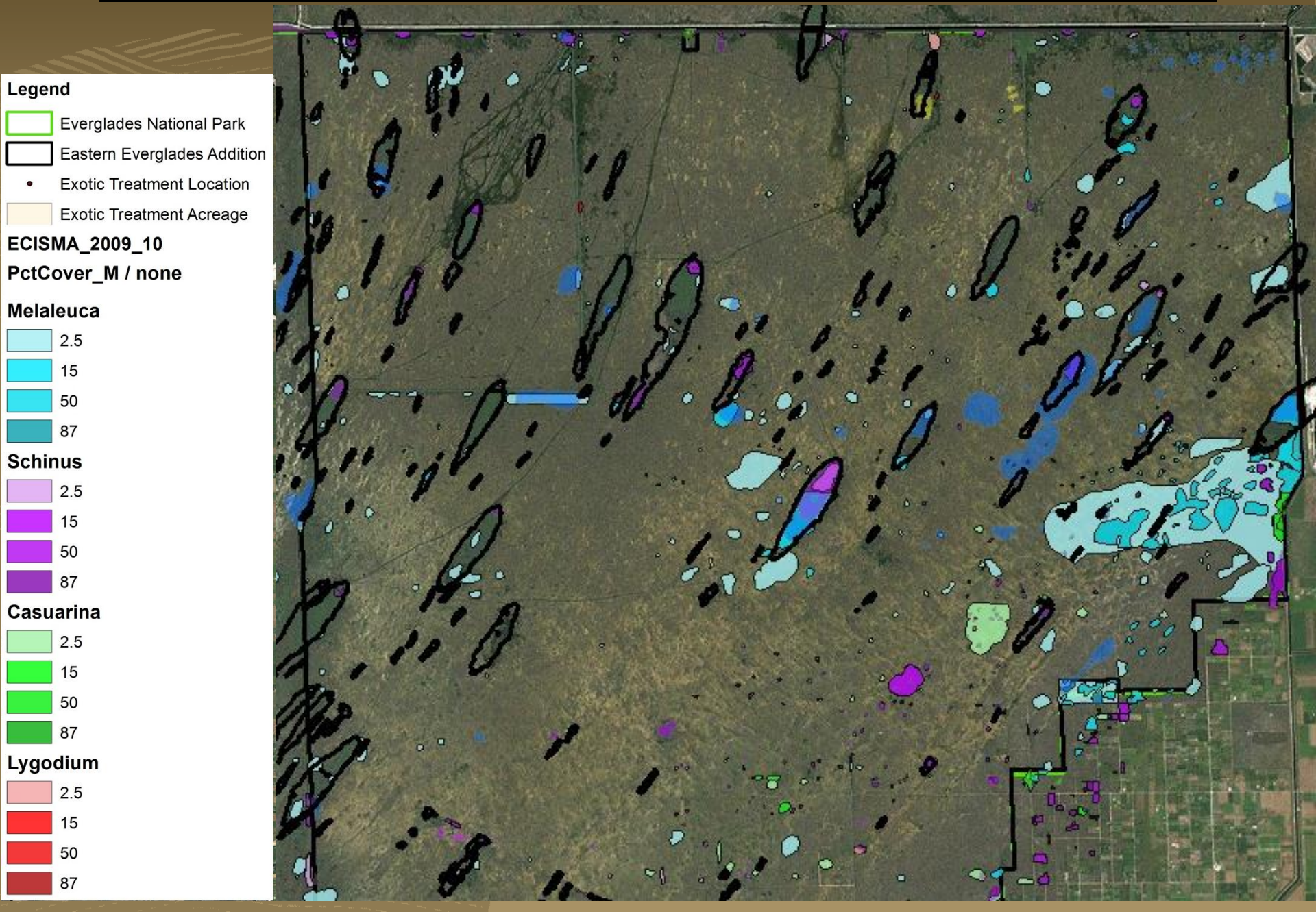


Changes are increased number of sparsely populated patches of Melaleuca, but fewer dense patches of Melaleuca and Schinus

Why are exotics changing?

- Factors potentially affecting changes in exotic presence:
  - Management Actions (spraying herbicide, biological controls, and other forms of removal)
  - Soil patterns/disturbance
  - Effects of edges (surrogate for introductions by humans)
  - Fire pattern alteration
  - Hydrology changes
  - Altered vegetation patterns
- Interactions of these factors


Legend
Everglades National Park
Eastern Everglades Addition
Exotic Treatment Location
Exotic Treatment Acreage
ECISMA_2009_10
PctCover_M / none
Melaleuca
2.5
15
50
87
Schinus
2.5
15
50
87
Casuarina
2.5
15
50
87
Lygodium
2.5
15
50
87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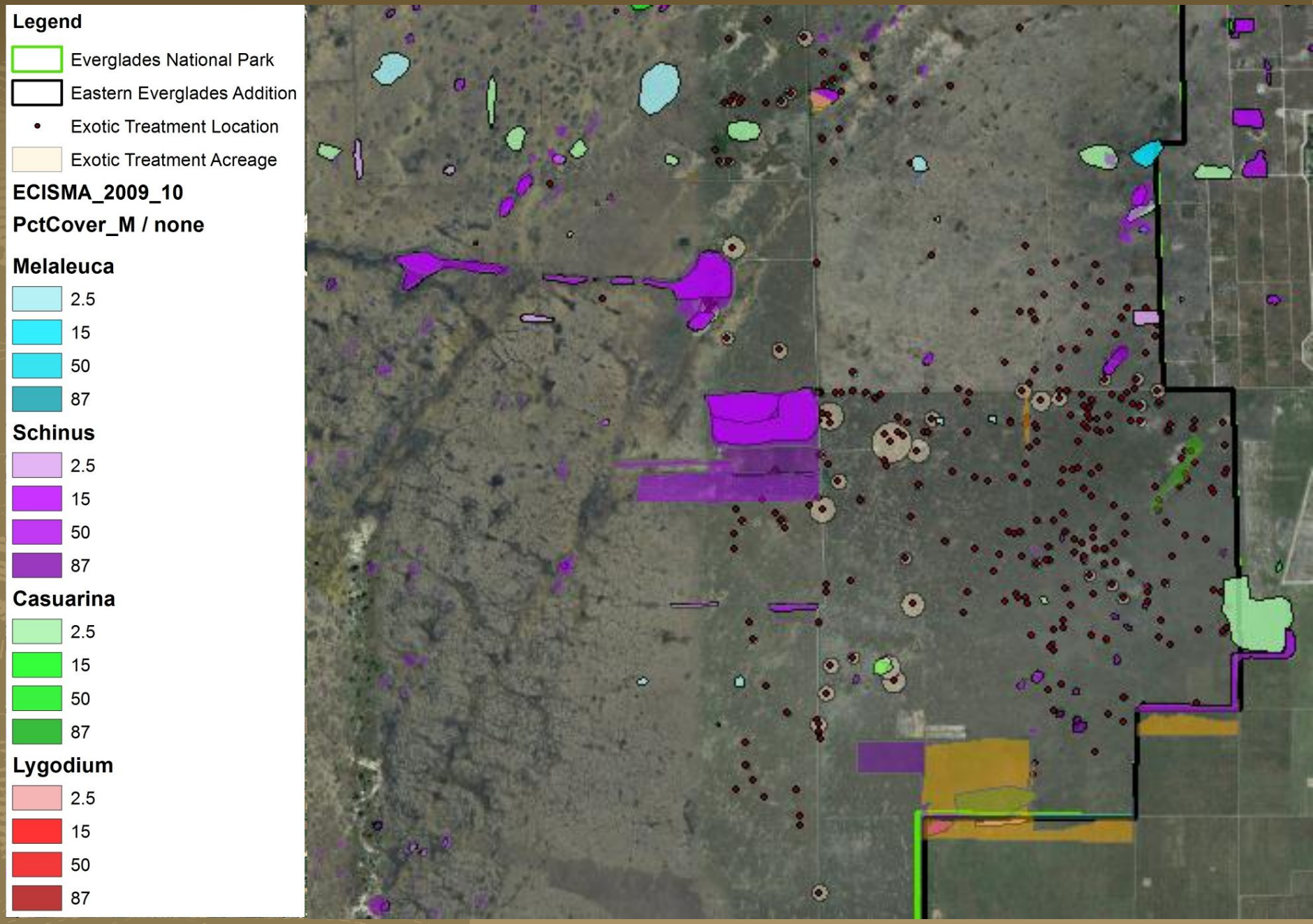
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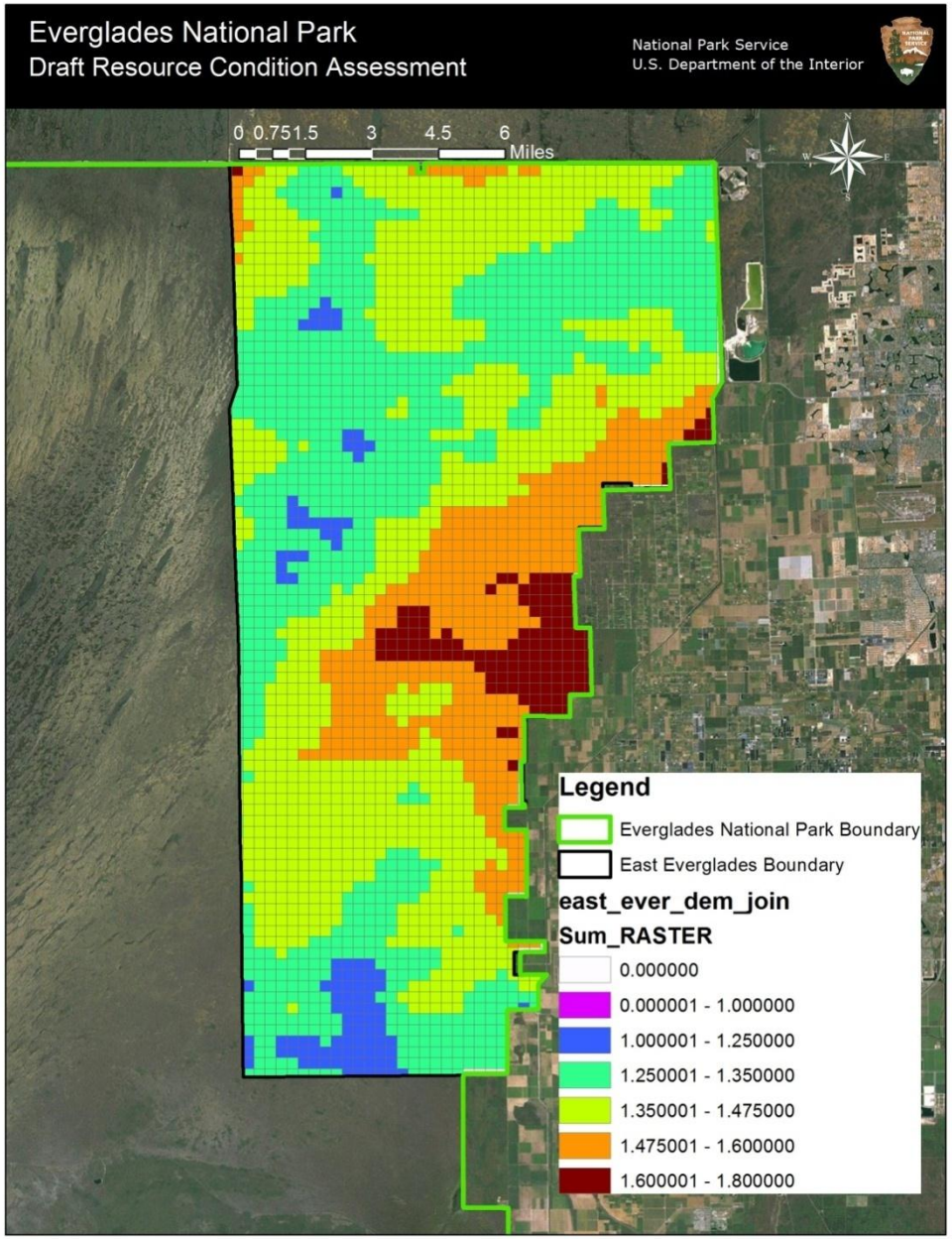
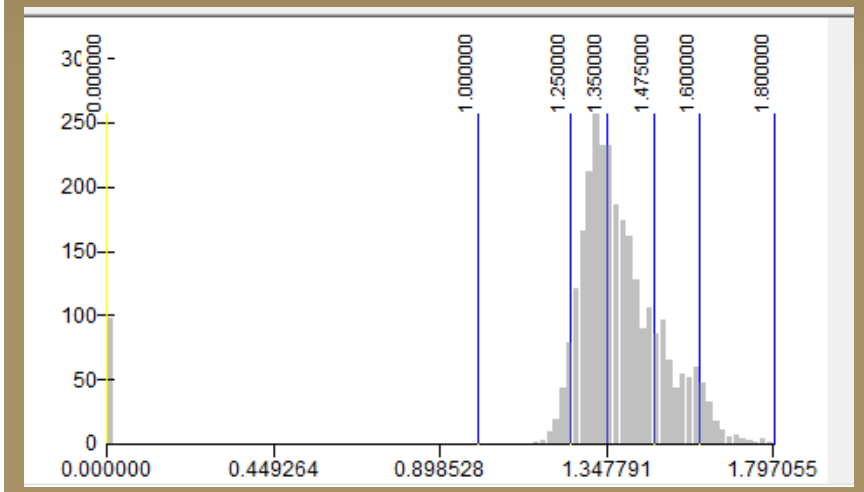
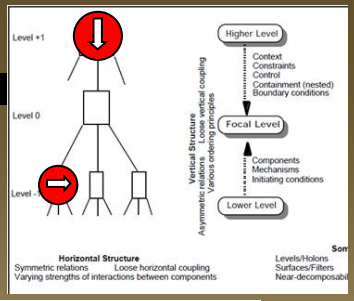


Elevation patterns

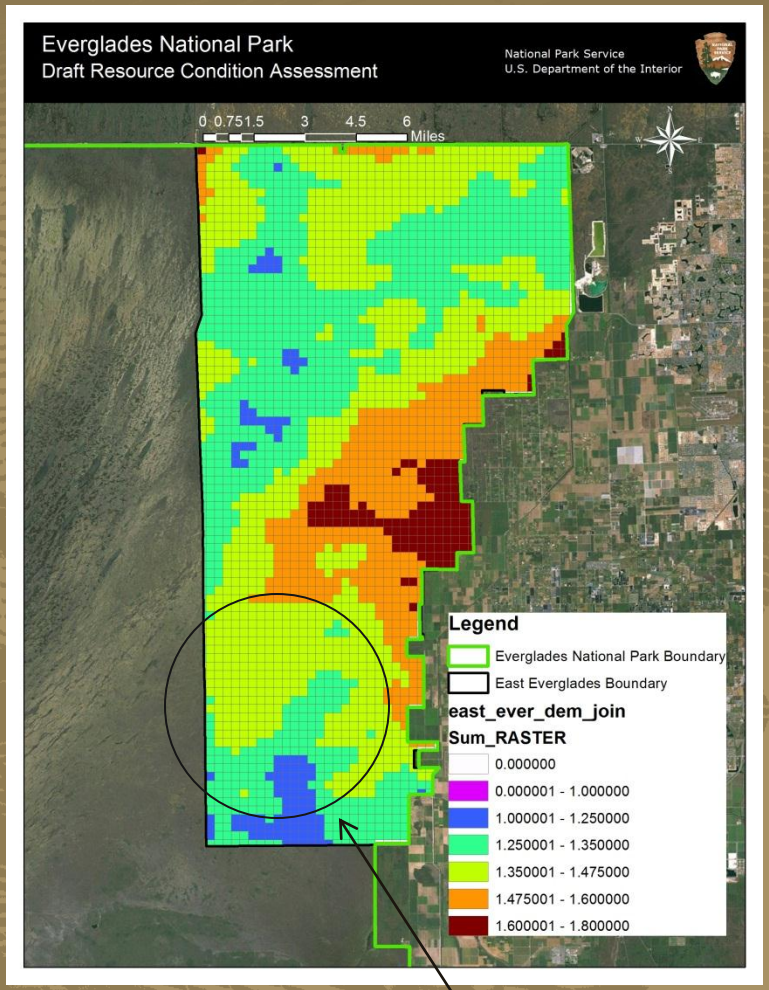


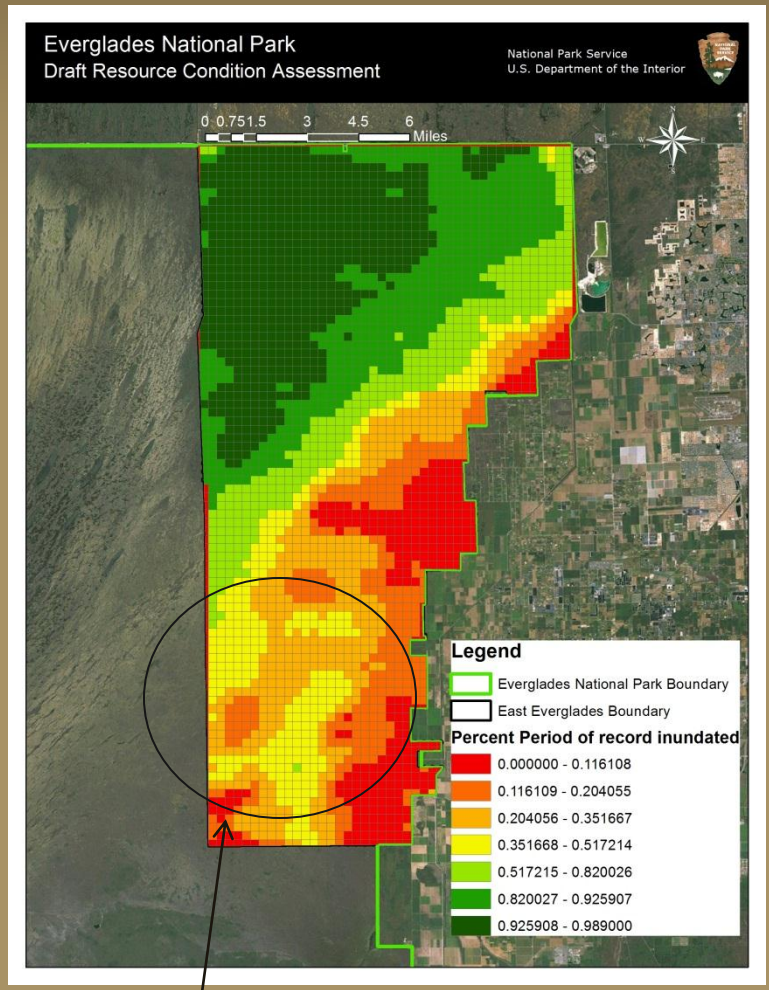
Potential contributing factor to exotic expansion - assess these factors if possible

Significant concern, stable trend



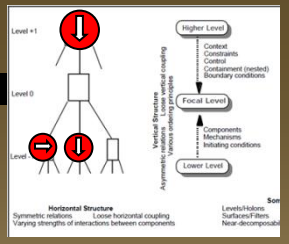
Hydrological distortions increase to the south





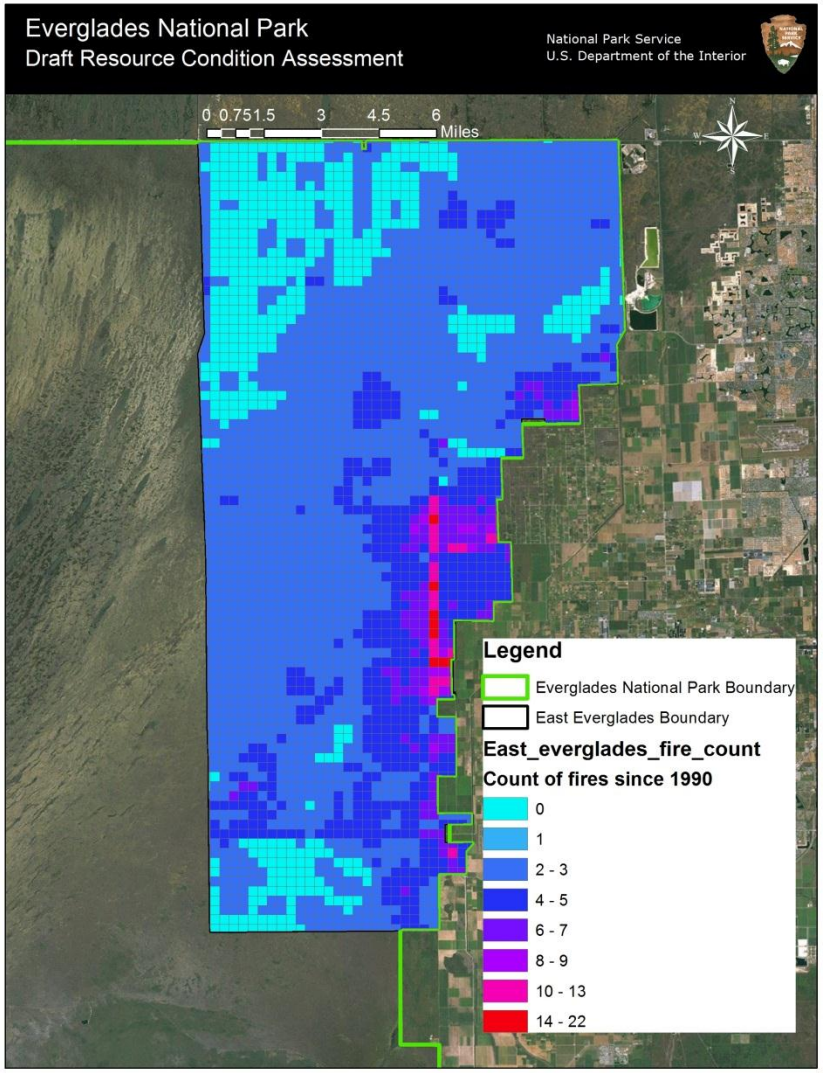
Hydroperiods should be longer at these low elevations

Significant concern, declining trend

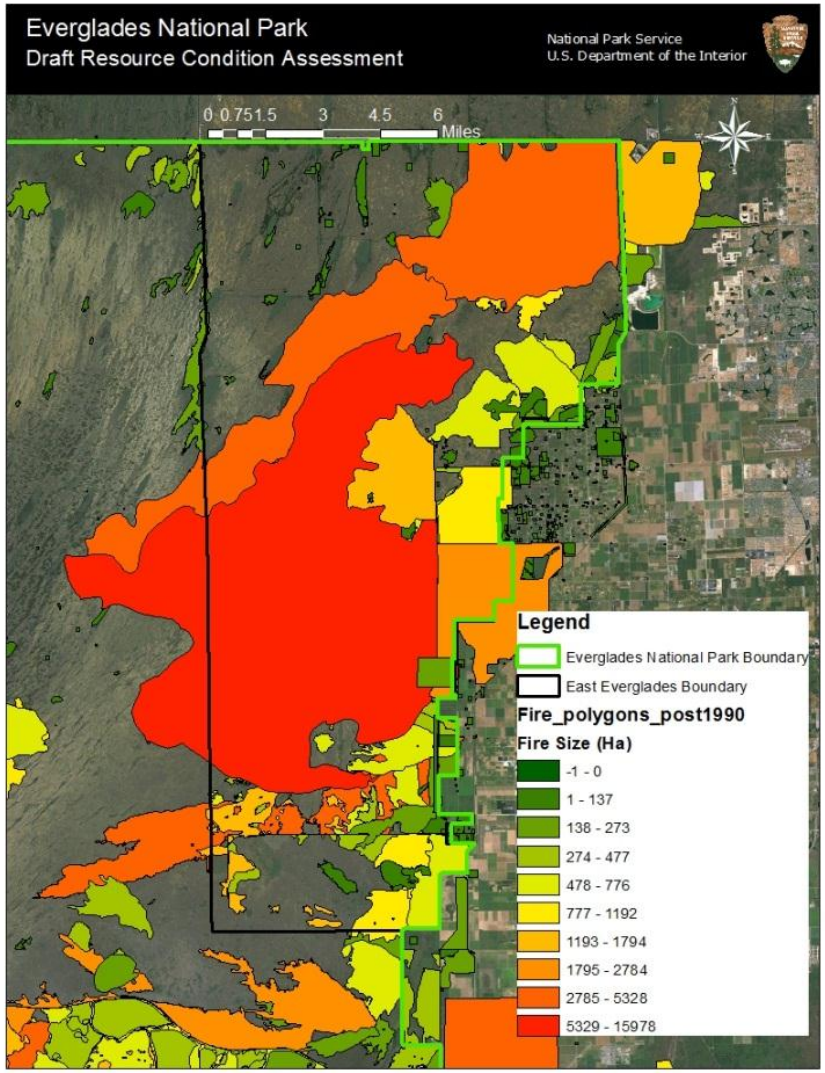


Fire Pattern

Count of fires since 1990



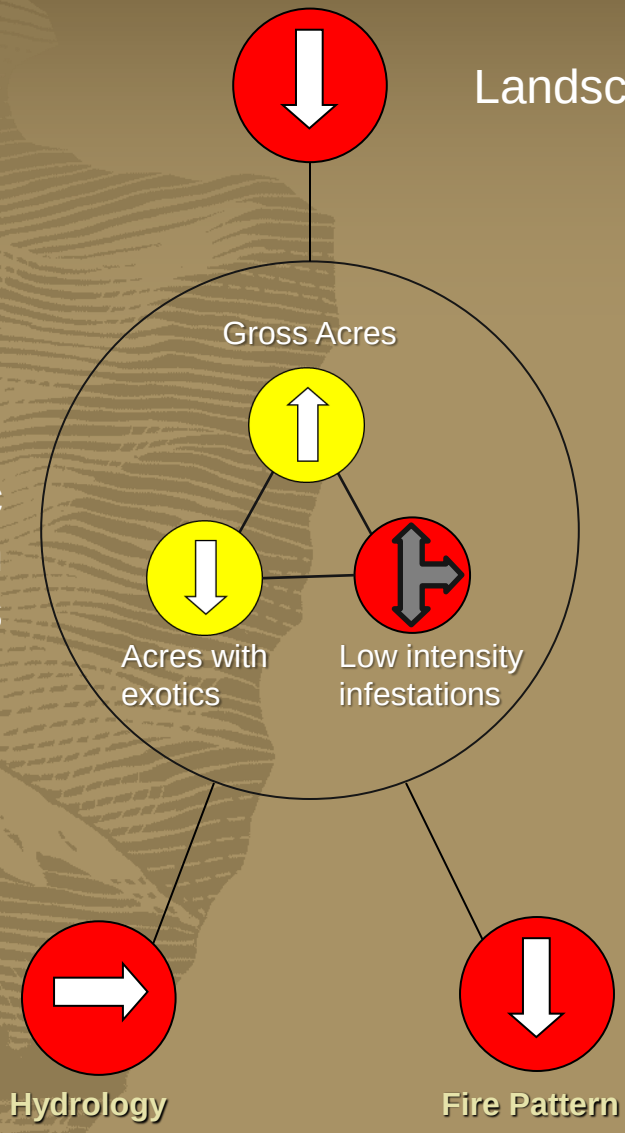
Fire Polygons since 1990



Preliminary Assessment

Landscape context

Focal level:
The status of exotic species in the Eastern Everglades



Contributing factors

Thanks so much!

(more to come on this topic)

Tony Pernas (NPS)– ECISMA dataset and exotics treatment dataset (Weeddar from SFWMD)

Mayavati Vaidya (ENP) – Fire dataset

Ted Schall (USACE) - Tree Island maps

2008 Exotic Species in South Florida

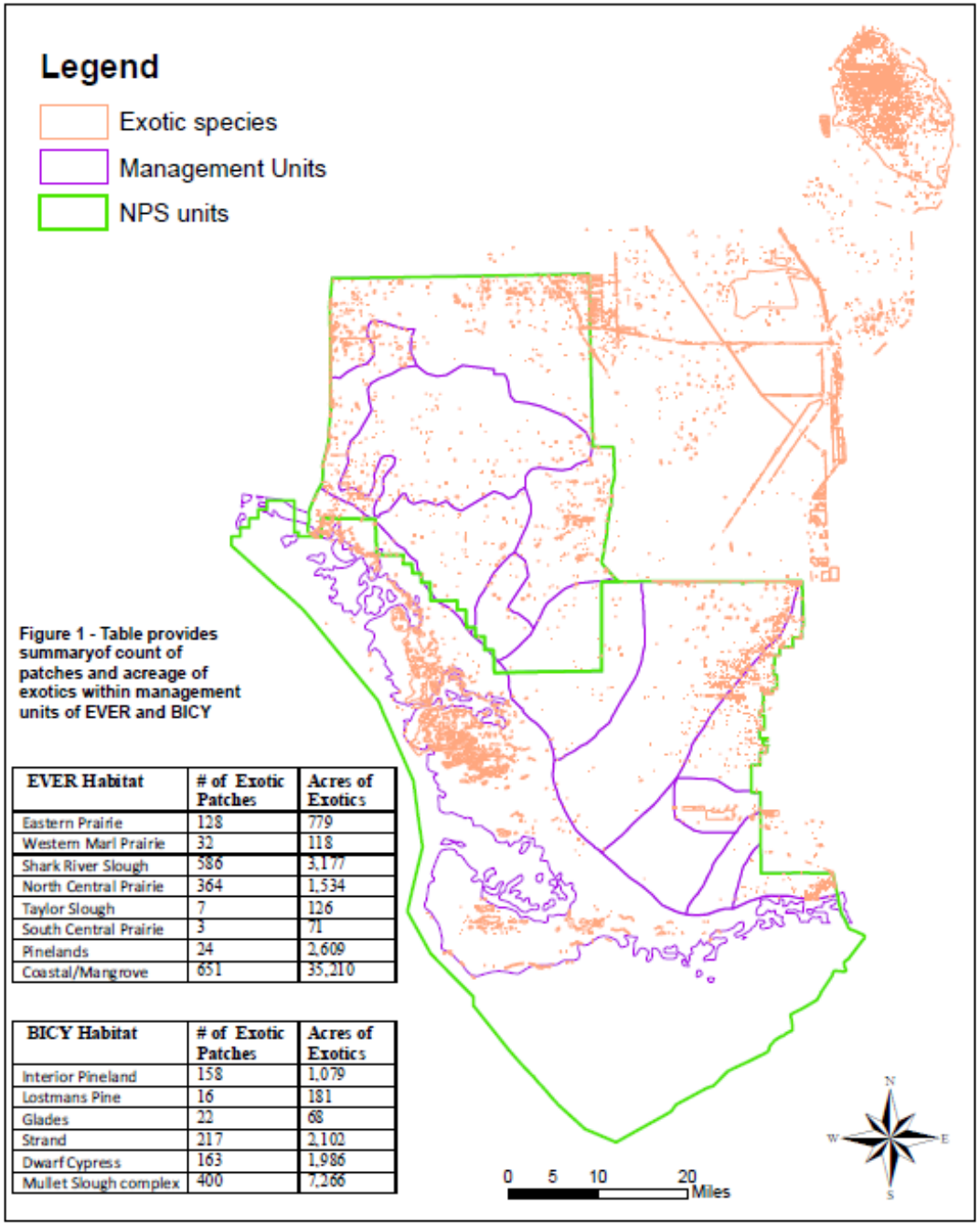


Figure 1 - Table provides summaryof count of patches and acreage of exotics within management units of EVER and BICY

EVER Habitat	# of Exotic Patches	Acres of Exotics
Eastern Prairie	128	779
Western Marl Prairie	32	118
Shark River Slough	586	3,177
North Central Prairie	364	1,534
Taylor Slough	7	126
South Central Prairie	3	71
Pinelands	24	2,609
Coastal/Mangrove	651	35,210

BICY Habitat	# of Exotic Patches	Acres of Exotics
Interior Pineland	158	1,079
Lostmans Pine	16	181
Glades	22	68
Strand	217	2,102
Dwarf Cypress	163	1,986
Mullet Slough complex	400	7,266