Rare Pine Rockland Plants of Big Pine Key

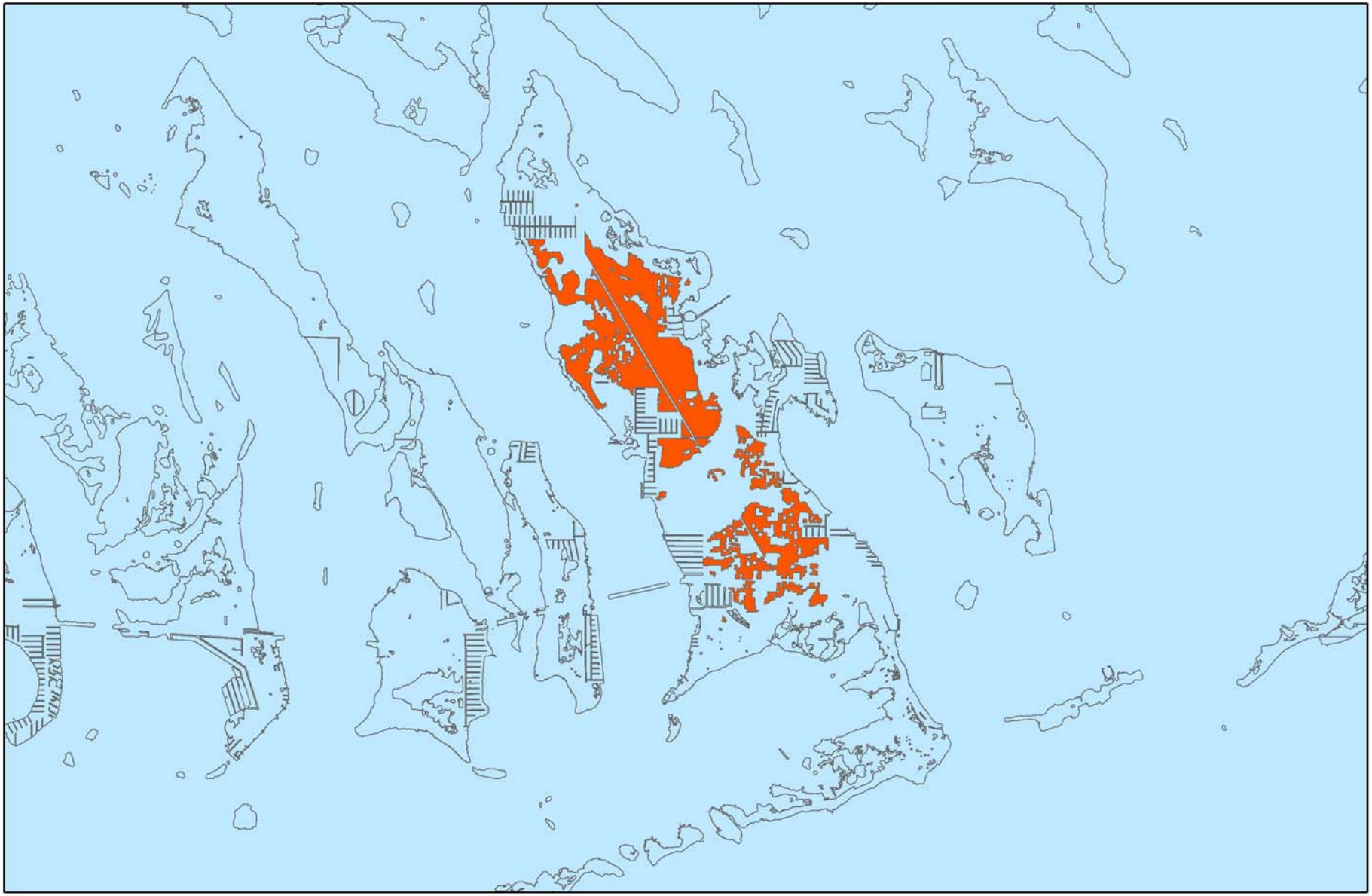
Keith A. Bradley

The Institute for Regional Conservation

Pine Rockland in the Florida Keys

Map by Keith A. Bradley
The Institute for Regional Conservation
February 2006

Pine Rockland on Big Pine Key



There are 582 hectares of pine rockland on the island (ADID)
There used to be 1049 hectares (Folk 1991)

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Rare Plants of Big Pine Key Pine Rocklands

- Federal Candidates
  - *Argythamnia blodgettii* (Blodgett's wild mercury)
  - *Chamaesyce deltoidea* subsp. *serpyllum* (Wedge sandmat)
  - *Chamaecrista lineata* var. *keyensis* (Big Pine partridge pea)
  - *Linum arenicola* (Sand flax)
- IRC Critically Imperiled
  - *Caesalpinia pauciflora* (Fewflower holdback)
  - *Catesbaea parviflora* (Dune lilythorn)
  - *Dodonaea elaeagnoides* (Smallfruit varnishleaf)
  - *Evolvulus grisebachii* (Grisebach's dwarf morning glory)
  - *Strumpfia maritima* (Pride-of-Big-Pine)

Rare Plants of Big Pine Key's Pine Rocklands

Chamaesyce deltoidea subsp. *serpyllum*
(Wedge sandmat)

Only found on Big Pine Key

Rare Plants of Big Pine Key's Pine Rocklands

Chamaecrista lineata var. *keyensis*
(Big Pine partridge pea)

Known from Big Pine Key, Cudjoe Key, and Lower Sugarloaf Key.

Rare Plants of Big Pine Key's Pine Rocklands

Linum arenicola
(Sand flax)

Known from Miami-Dade County and other populations in the Florida Keys

Monitoring Rare Organisms on Big Pine Key

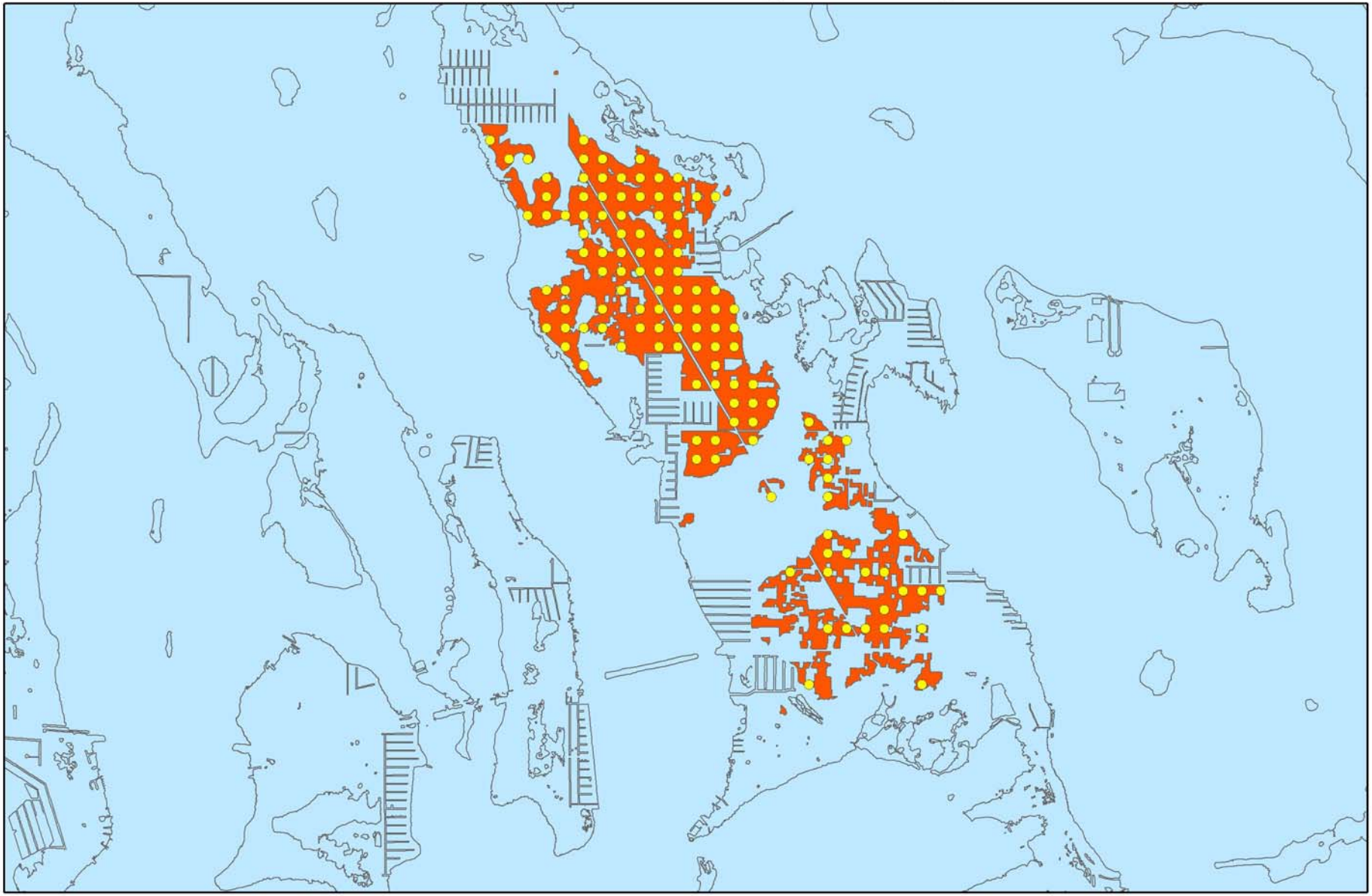
Monitoring Rare Plants on Big Pine Key

Besides the big warm & fuzzy things, we need to make sure that the ecosystem and all of its rare organisms are being managed.

We developed a project to gather data on the current status of three plant species that are candidates for listing under the US Endangered Species Act:

- *Chamaesyce deltoidea* subsp. *serpyllum* (Wedge sandmat)
- *Chamaecrista lineata* var. *keyensis* (Big Pine partridge pea)
- *Linum arenicola* (Sand flax)

Plot Locations on Big Pine Key



Plots were placed every 200 meters in publicly-owned pine rockland (n=123)

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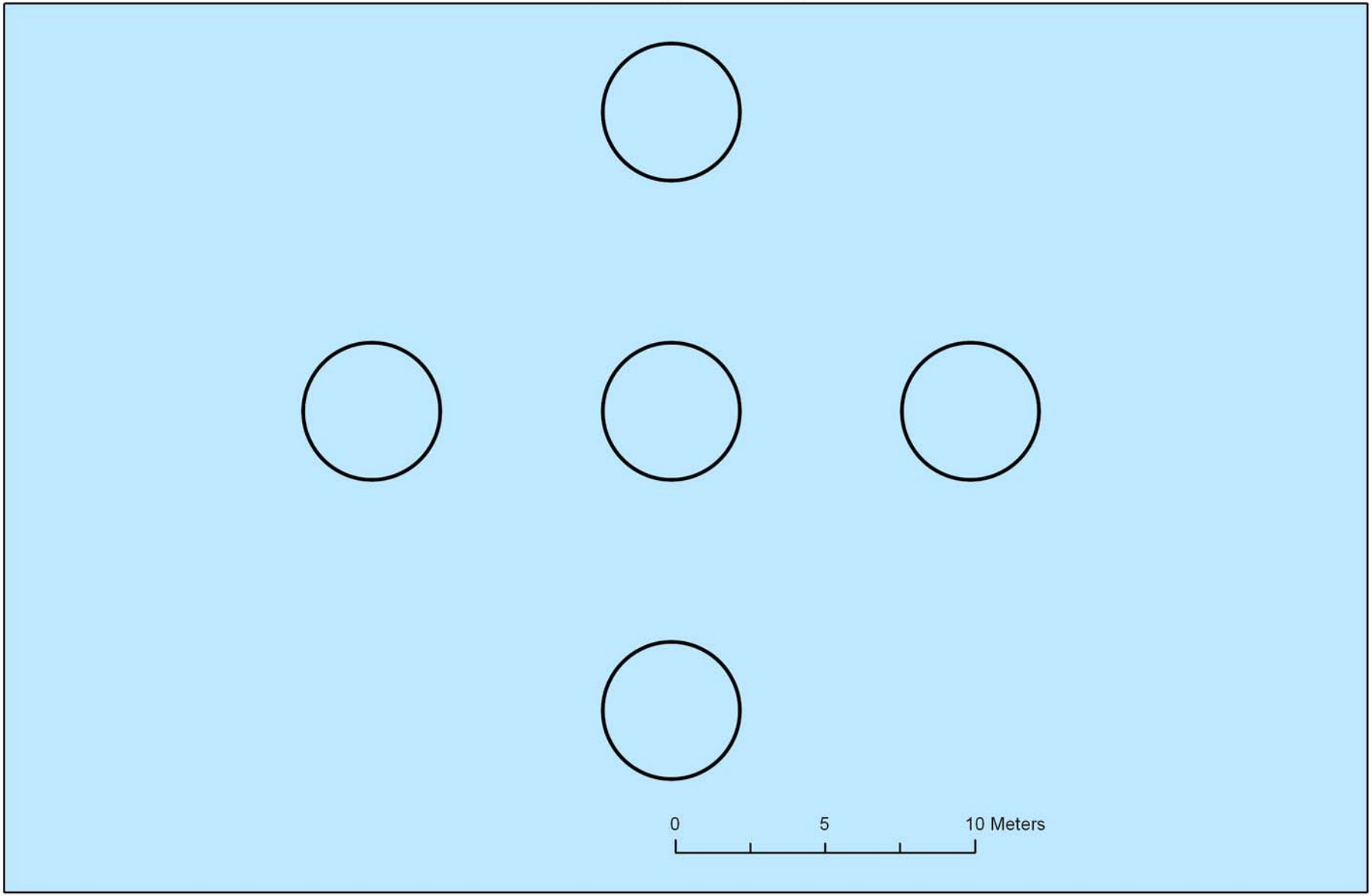
Sampling Design



At each sample location 5 plots with radius of 2.5m were established

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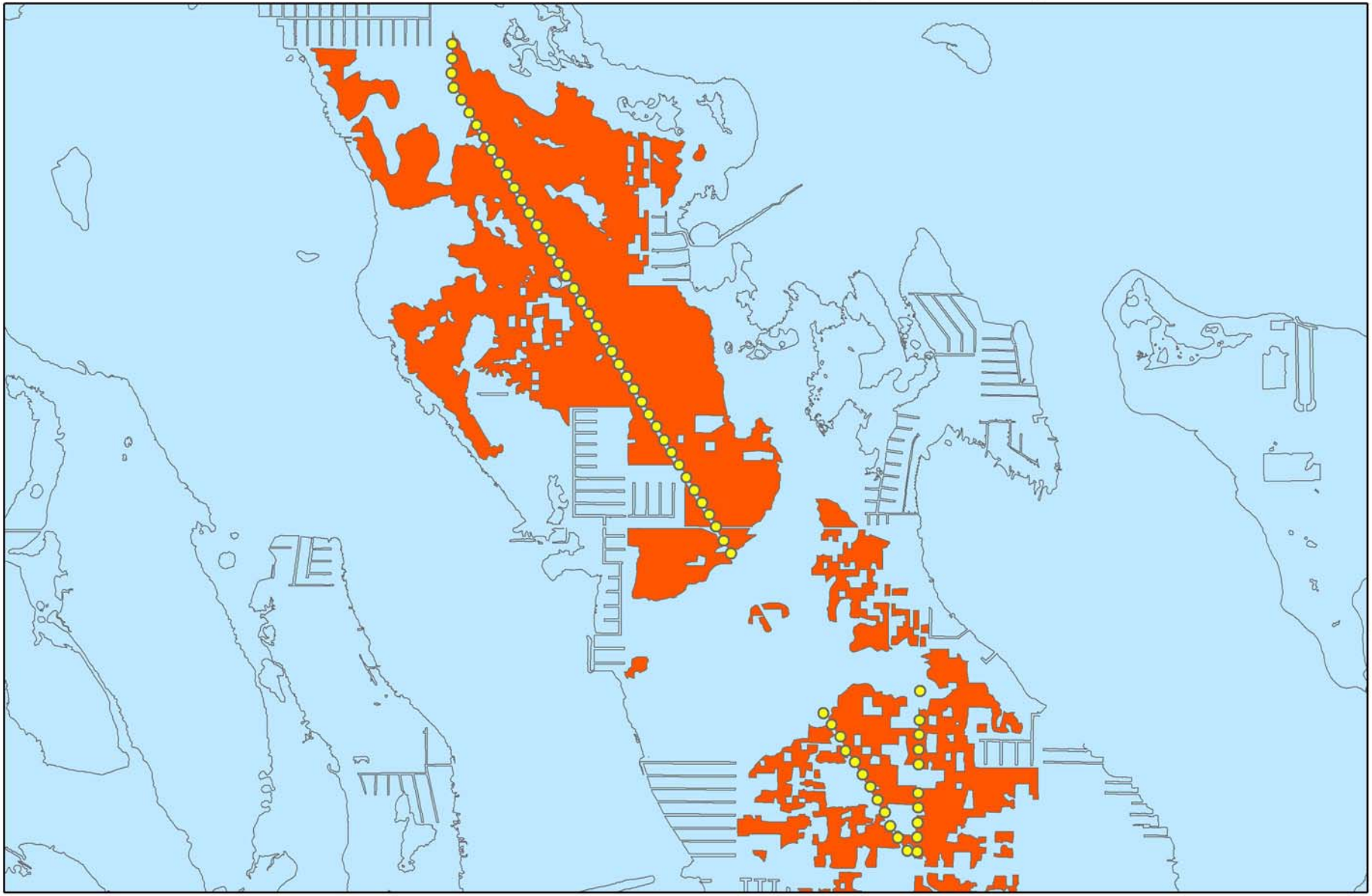
Roadside Plot Locations on Big Pine Key



Plots were placed every 100 meters
next to pine rockland (n=128)

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Data Collection

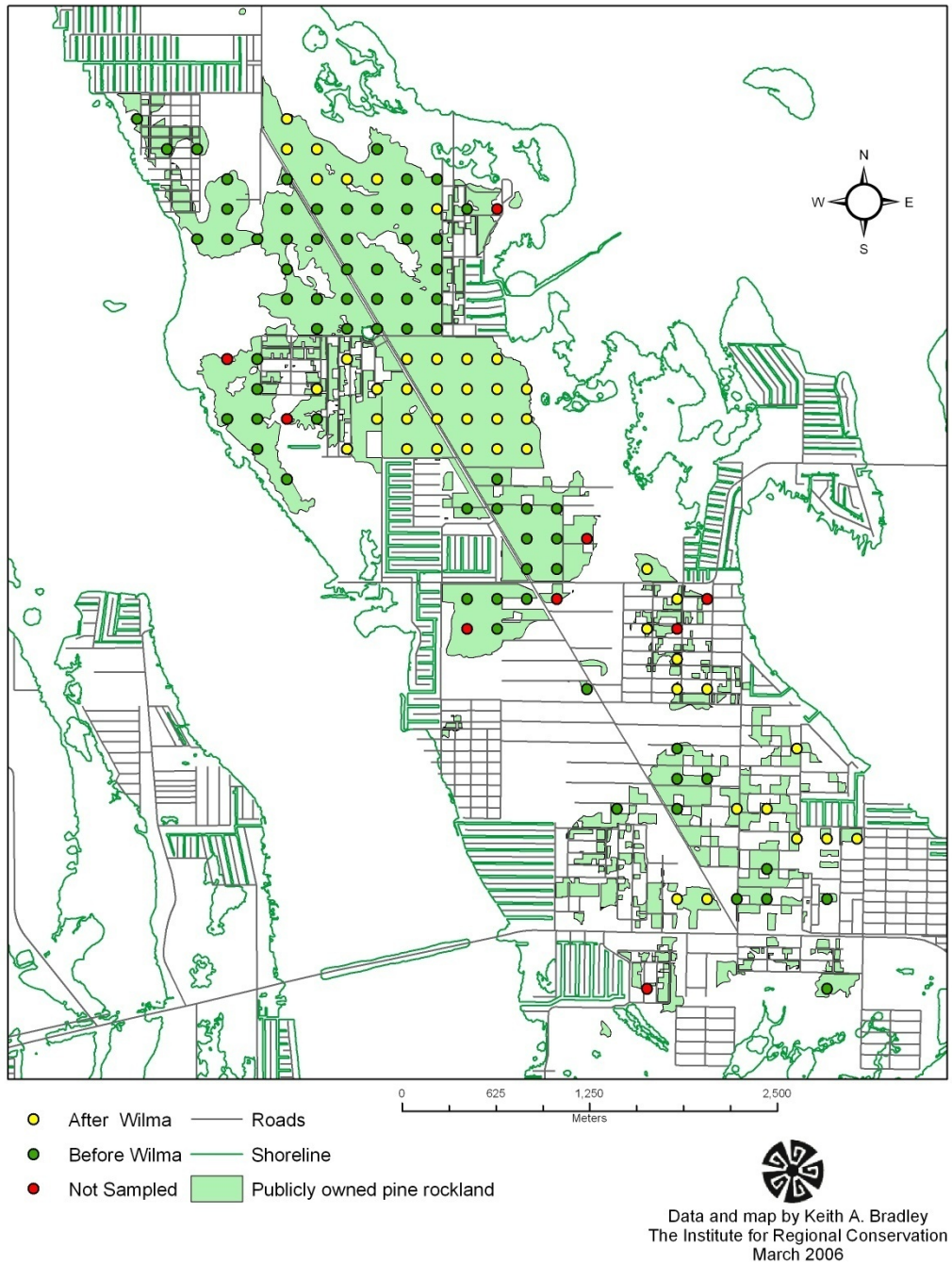
- Counted individuals of each rare plant (both Federal Candidates and IRC Critically Imperiled)
- Recorded vegetative cover of each plant species in each plot
- On each side of road shoulder counted rare plants in a 5 m wide strip
- Sampling done in May, June, and December, 2005

Hurricane Wilma

October 2005

332 plots sampled before Wilma

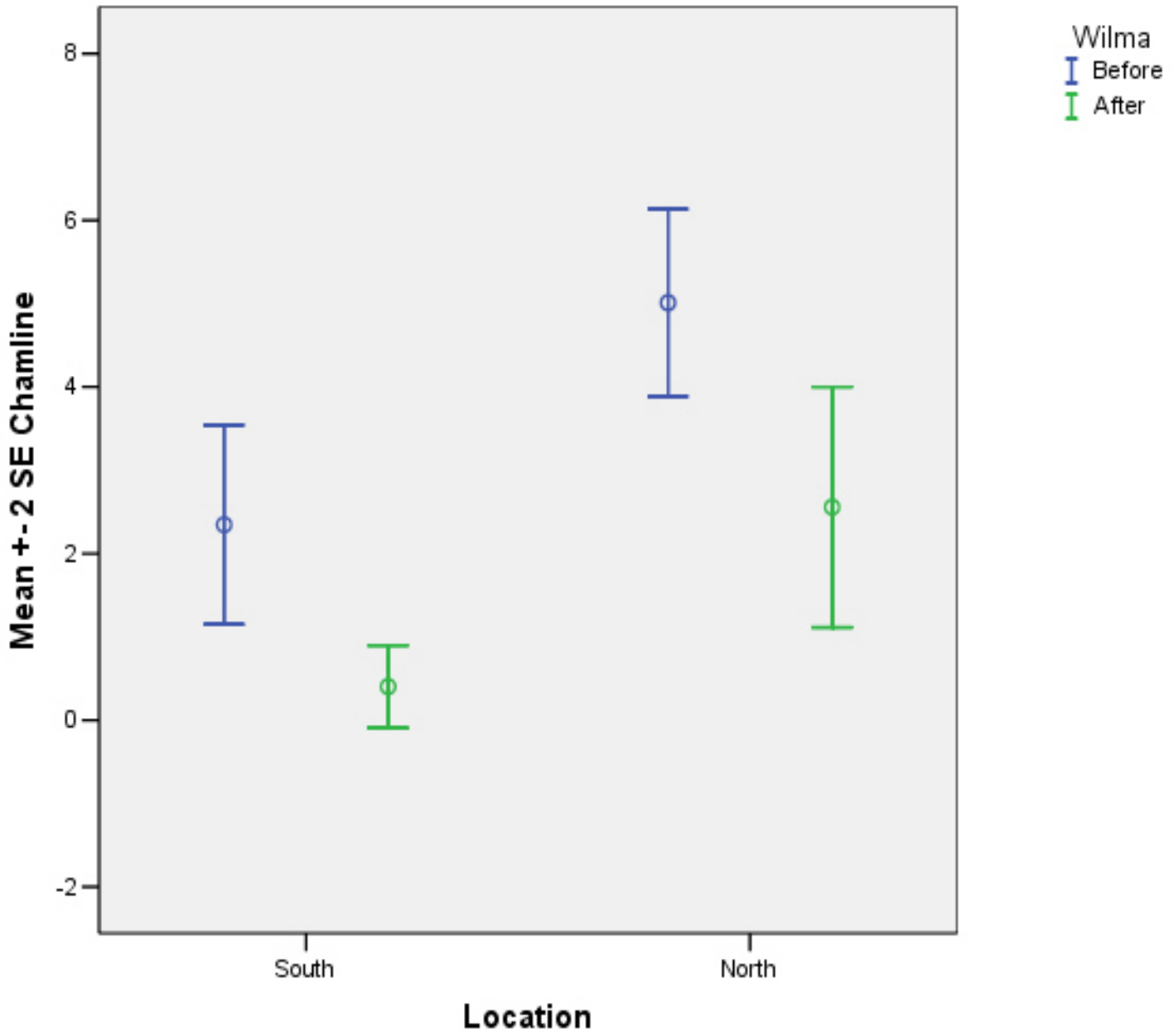
209 plots sample after



Results

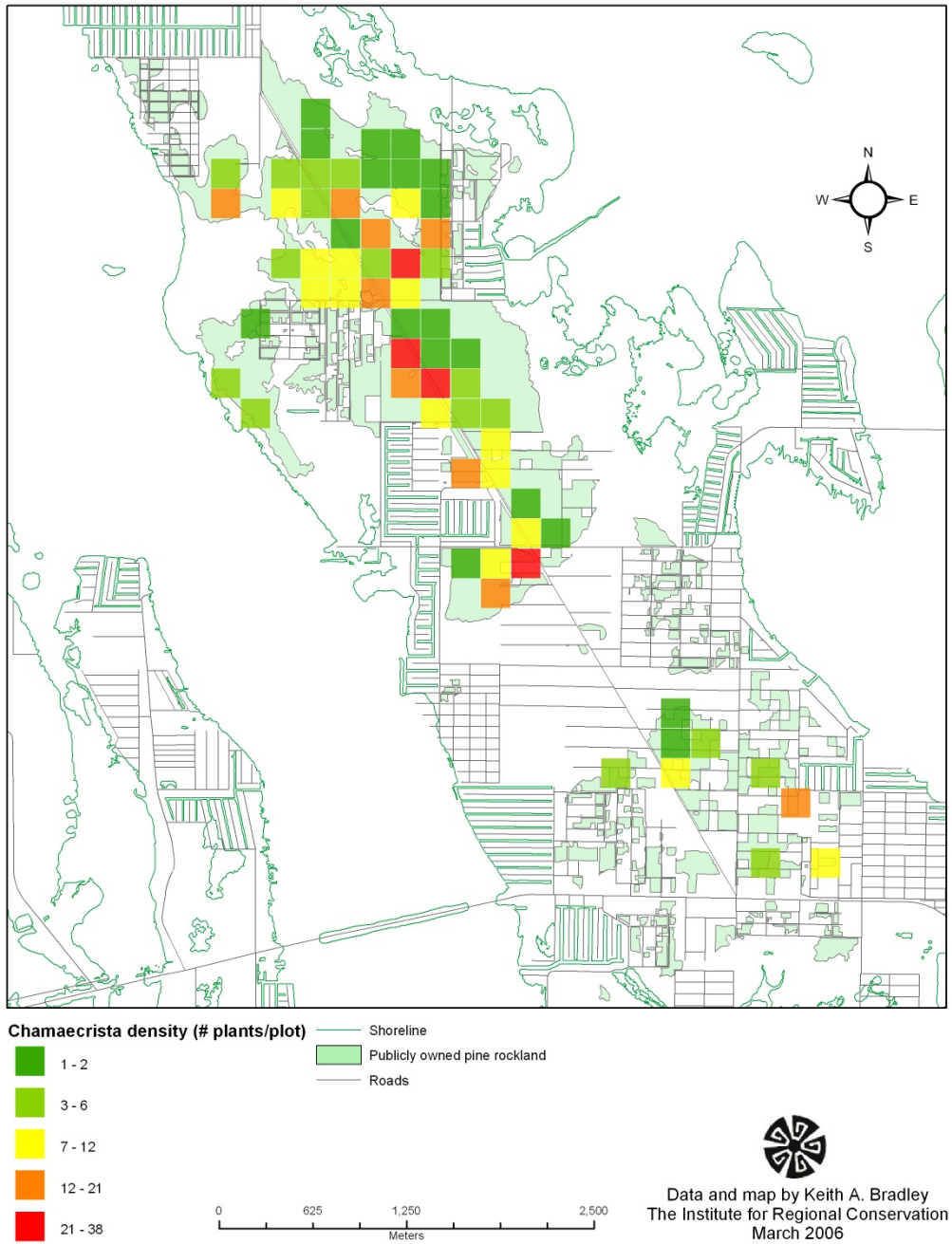
Chamaecrista lineata var. *keyensis*

- Surveyed 584 plots (1.15 ha)
- Recorded 1,903 plants in 197 plots (33.7%)
- Density was 1,659/ha (+/- 337), over 3 x denser in north
- On roadsides found 53 plants in 13 plots (10%), density = 82/km (+/- 58.2)
- Pre-hurricane there were between 950,000 and 1.5 million individuals


Wilma
Before
After
8
6
4
2
0
-2
Mean +- 2 SE Chamline
South
North
Location

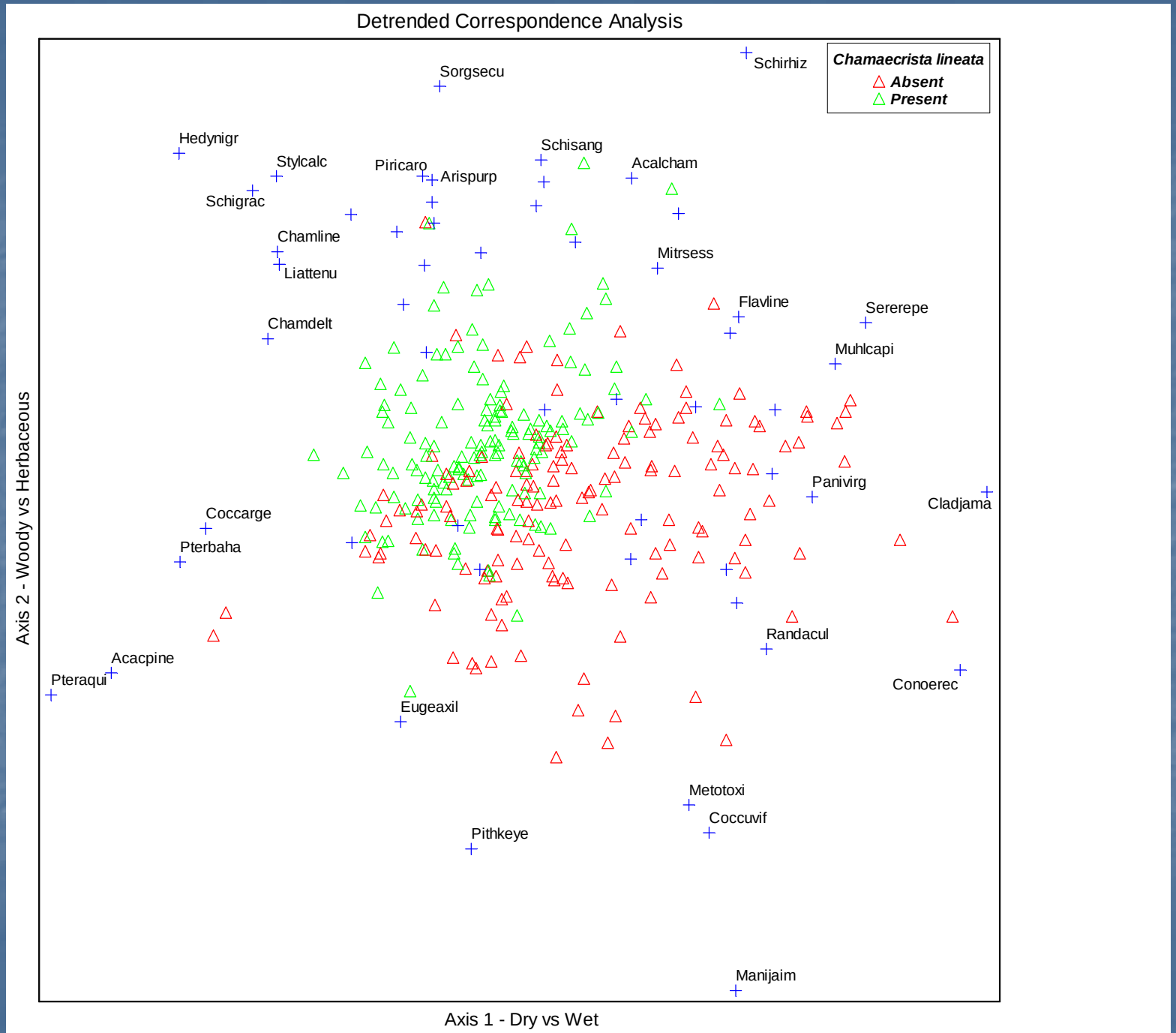
C. lineata
Density Distribution

Plants denser in north, especially closer to Key Deer Blvd. in center of island

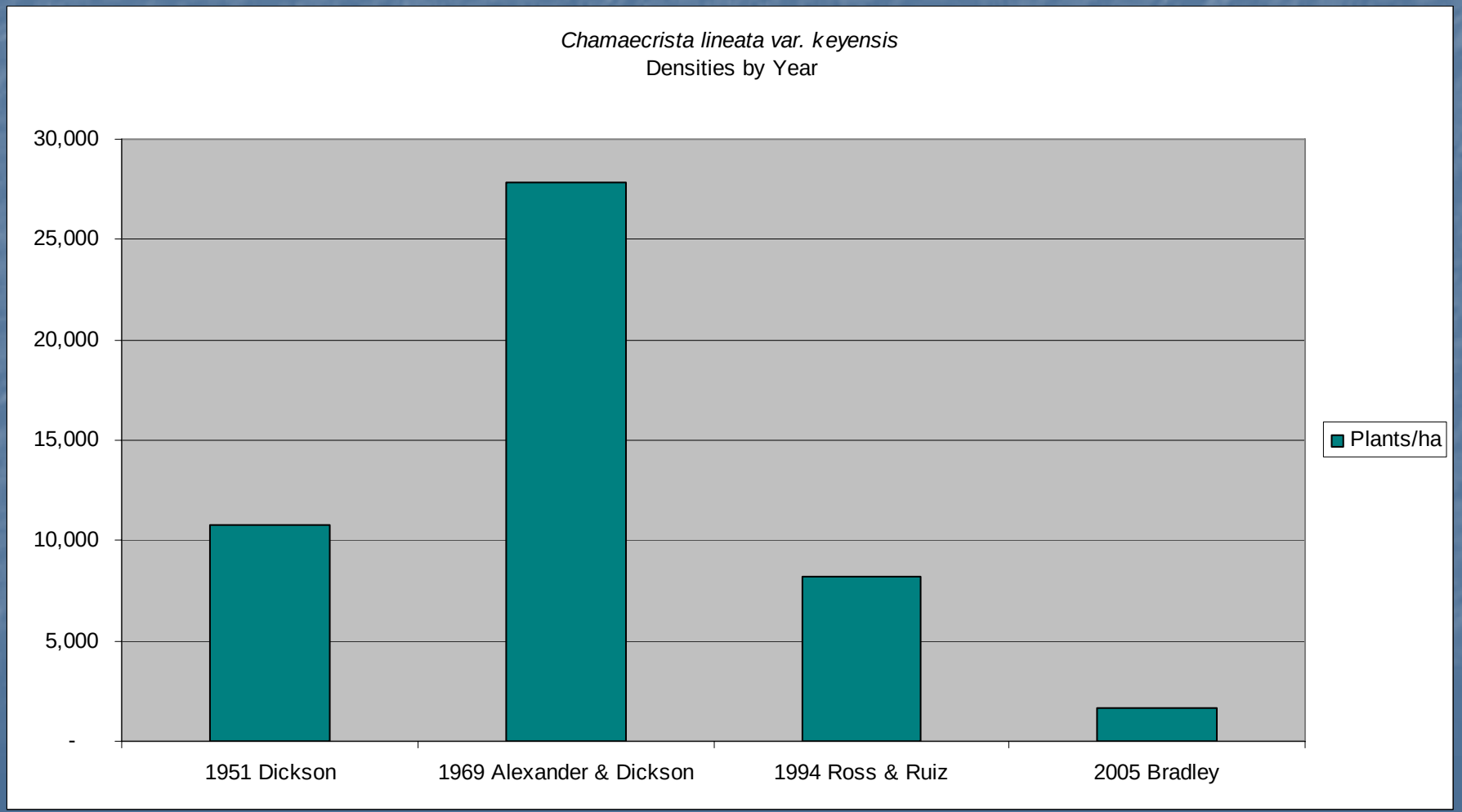


C. lineata var. keyensis Habitat Characters

- Negative correlations with:
  - Total vegetation cover
  - Native cover
  - Exotic cover
  - Hardwood cover
  - Pine and palm cover, but these not significant
- Positive correlations with:
  - Herb cover
  - Native species richness


Detrended Correspondence Analysis
Chamaecrista lineata
Absent
Present
Schirhiz
Sorgsecu
Hedynigr
Schisang
Stylcalc
Piricaro
Arispurp
Acalcham
Schigrac
Chamline
Mitrsess
Liattenu
Flavline
Sererepe
Chamdelt
Muhlcapi
Panivirg
Cladjama
Coccarge
Pterbaha
Randacul
Acacpine
Pteraqui
Conoerec
Eugeaxil
Metotoxi
Coccuvif
Pithkeye
Manijaim
Axis 2 - Woody vs Herbaceous
Axis 1 - Dry vs Wet

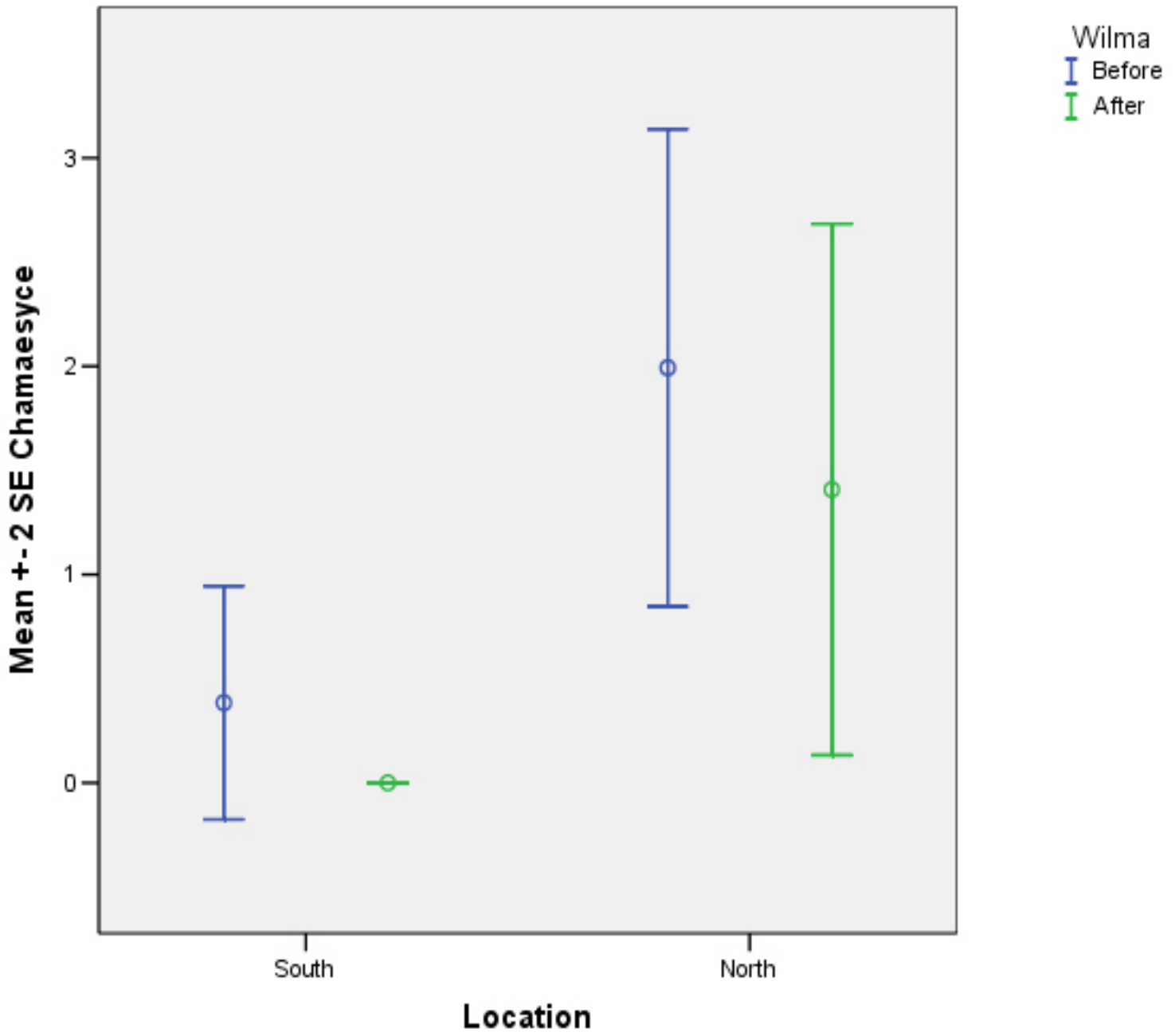
Results
Chamaecrista lineata var. *keyensis*



Results

Chamaesyce deltoidea subsp. serpyllum

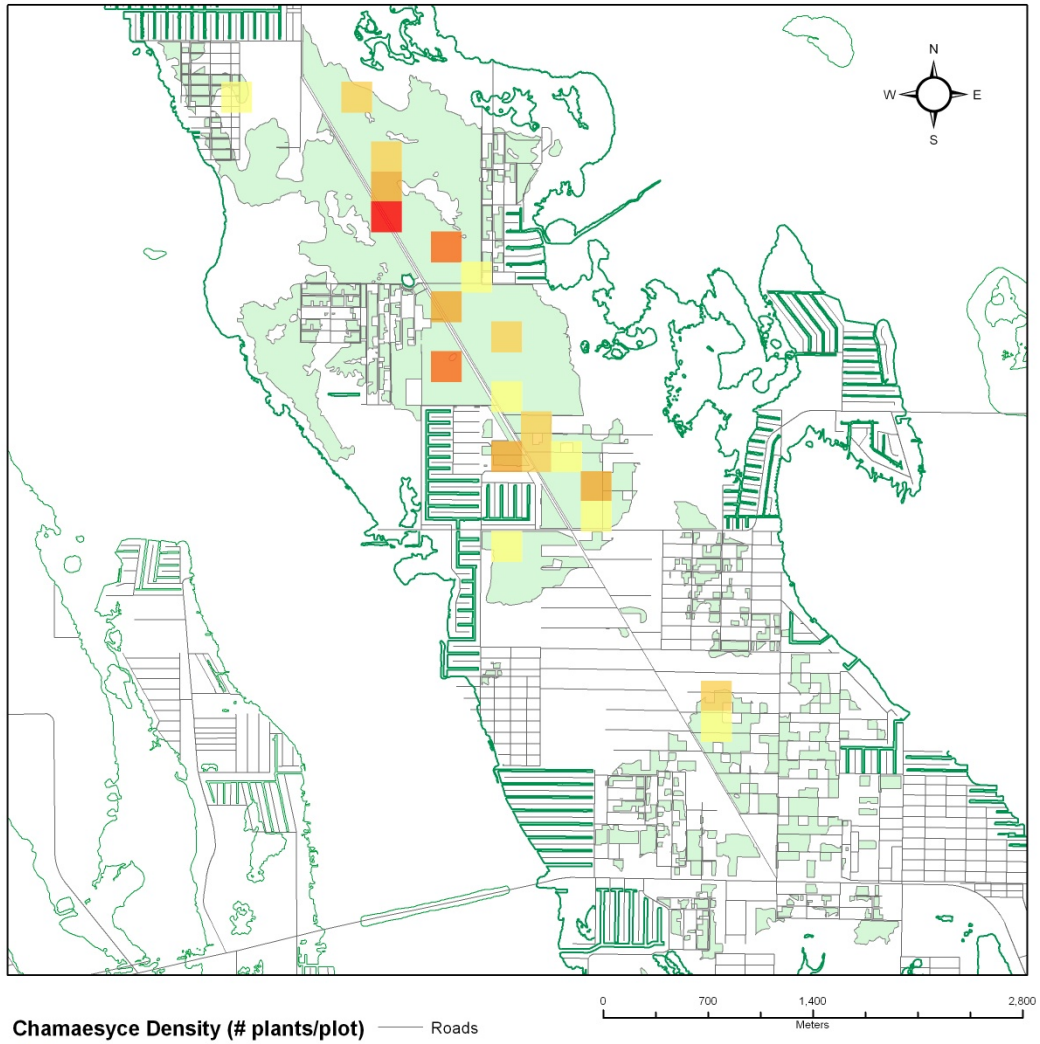
- Surveyed 584 plots (1.15 ha)
- Recorded 785 plants in 40 plots (5.1%)
- Density was 735/ha (+/- 320)
- On roadsides found 191 plants in 8 plots (6.3%), density = 3,820/km (+/- 3,654!)
- Pre-hurricane there were between 200,000 and 710,000 individuals


Wilma
Before
After
Mean +- 2 SE Chamaesyce
3
2
1
0
South
North
Location

C. deltoidea

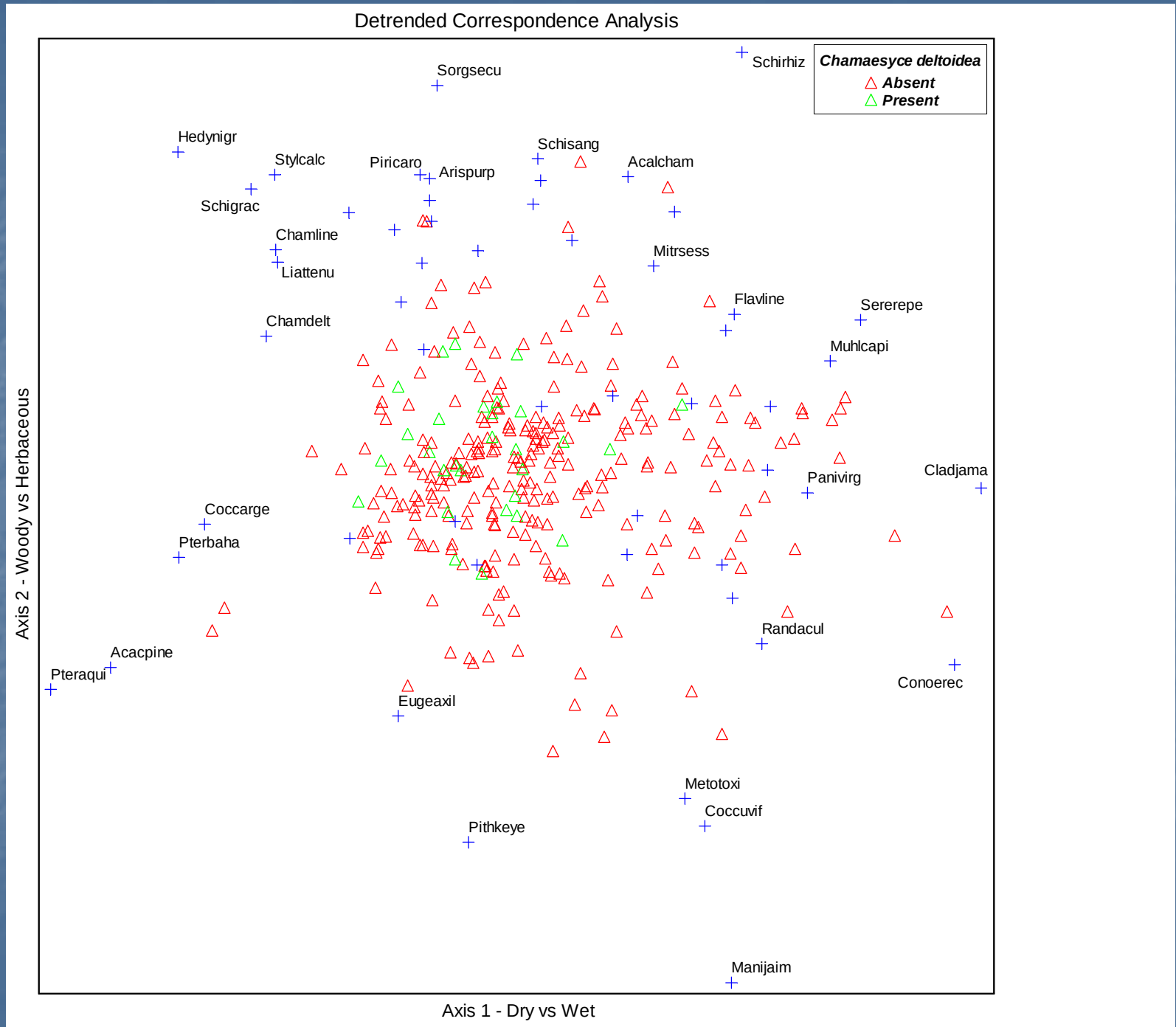
Density distribution

Almost absent from south, denser populations along Key Deer Blvd.



C. deltoidea subsp. *serpyllum* Habitat Characters

- Negative correlations with:
  - Total vegetation cover
  - Native cover
  - Hardwood cover
  - Palm cover
  - Pine and exotic, but these not significant
- Positive correlations with:
  - Herb cover
  - Native species richness


Detrended Correspondence Analysis
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Randacul
Acacpine
Pteraqui
Conoerec
Eugeaxil
Metotoxi
Coccuvif
Pithkeye
Manijaim
Axis 2 - Woody vs Herbaceous
Axis 1 - Dry vs Wet

Results

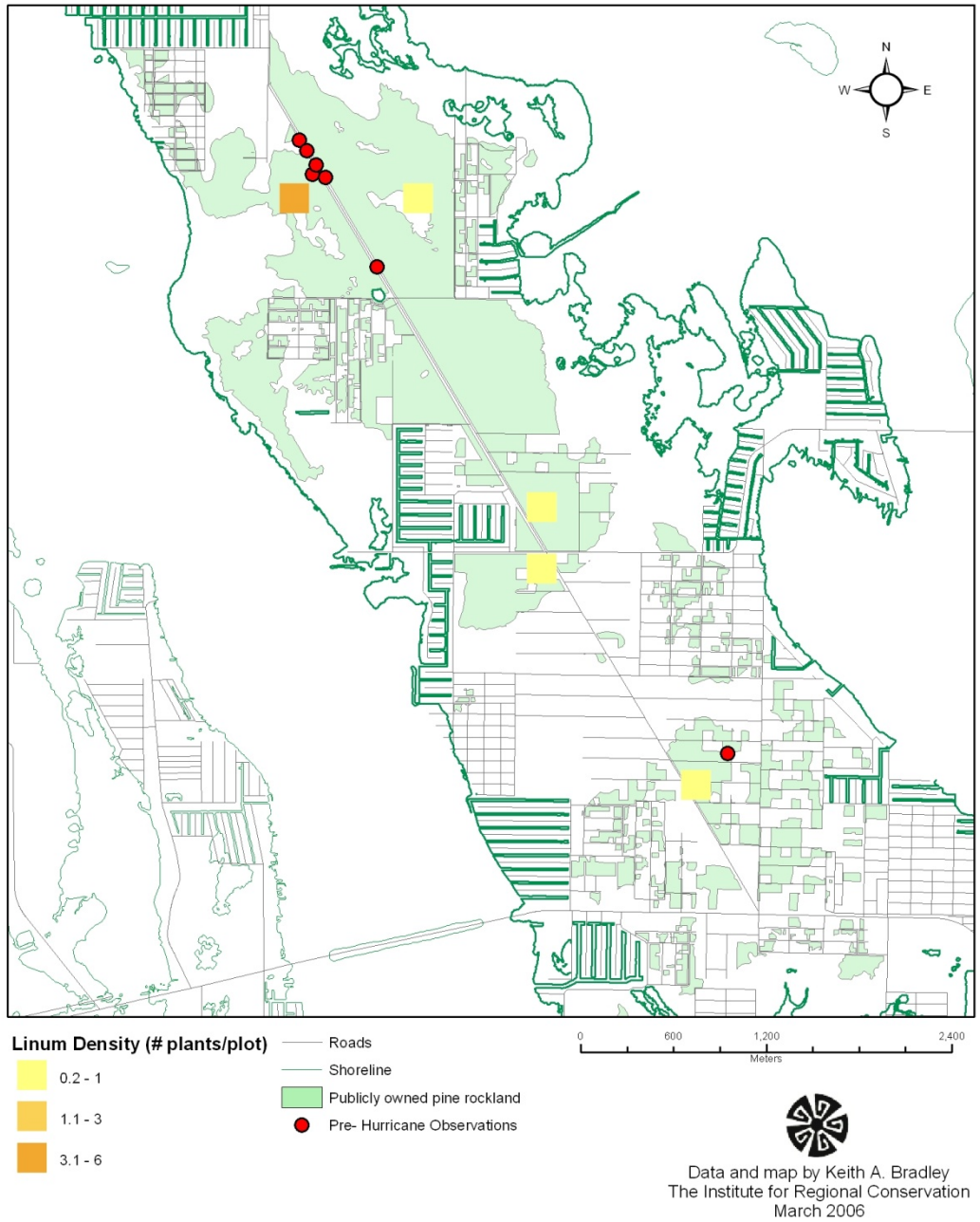
Linum arenicola

- Surveyed 584 plots (1.15 ha)
- Recorded 33 plants in 7 plots (1.2%)
- Density was 28.8/ha (+/-32.4 – very high)
- Found no plants in roadside plots
- Found 8 colonies outside of plots
- To infrequent to calculate population size

L. arenicola

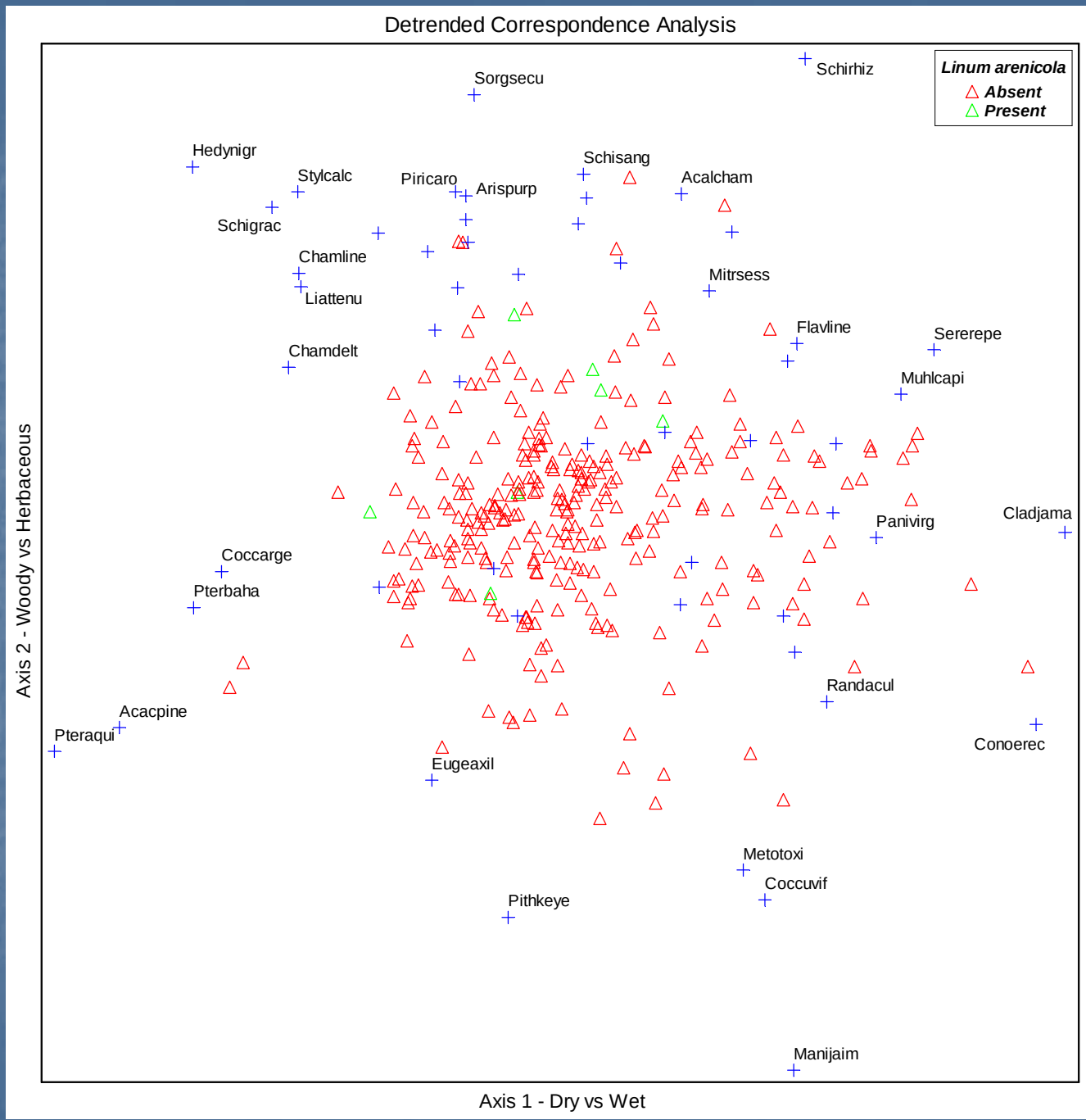
Density distribution

Only seen in 5 plots. Also seen in a few other spots between plots and on road edges.



C. deltoidea subsp. *serpyllum* Habitat Characters

- Positive correlations with:
  - Herb cover
  - Native species richness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Present
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Arispurp
Acalcham
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Acacpine
Pteraqui
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Coccuvif
Pithkeye
Manijaim
Axis 2 - Woody vs Herbaceous
Axis 1 - Dry vs Wet

Other Rare Plants

Seven additional critically imperiled plants were observed in plots (as well as Pisonia rotundata)

Scientific Name	Pre Wilma		Post Wilma	
	Total Individuals	Total Frequency	Total Individuals	Total Frequency
Argythamnia blodgettii	5	3	0	0
Caesalpinia pauciflora	0	0	96	13
Catesbaea parviflora	16	5	13	5
Dodonaea elaeagnoides	3	1	0	0
Evolvulus grisebachii	7	1	24	4
Indigofera miniata var. *florida*	1	1	0	0
Strumpfia maritima	48	3	32	7

Discussion

- *Chamaecrista* may be declining, but we need continued monitoring. It is now at a much lower density than historically reported. This is probably due to recent storms, changes in fire regime, forest fragmentation, and an artifact of different sampling designs
- *Chamaesyce* may also be at lower densities but there is little historical data
- *Linum* is at much lower densities than expected and in the Keys is now mostly restricted to disturbed areas
- Only *Chamaecrista* was seen in fire suppressed areas, and always at low densities
- Restoration of southern pine rockland will be important to potentially increase population sizes of rare plants

- Study will be repeated later this year