Systematic Reconnaissance Flights and Exotic Plant Species Mapping at Selected National Wildlife Refuges in Florida

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September 21, 2005*

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Cover photo: An island in Matlatcha Pass National Wildlife, Steven W. Woodmansee.

*This report has been amended and corrected from the May 11, 2005 version.

Introduction

The Institute for Regional Conservation (IRC) was hired to map invasive exotic vascular plant species during systematic reconnaissance flights across nine National Wildlife Refuges in Florida.

Methods

In February and April 2005 systematic reconnaissance flights were conducted over nine National Wildlife Refuges. Flights over Arthur R. Marshall Loxahatchee and Florida Panther National Wildlife Refuges were done in February during the time period when the pond cypress (*Taxodium ascendens*) have shed their needles enabling biologists to better see exotic plant species. IRC staff hired a pilot and rented a fixed wing aircraft to fly over all National Wildlife Refuges. Over Florida Panther, Arthur R. Marshall Loxahatchee, Ten Thousand Islands, St. John's, and Merritt Island National Wildlife Refuges a square kilometer grid was created and east/west transects along this grid were flown starting on the south end of each refuge. It was decided by IRC staff, and agreed upon by USFWS staff, that rather than fly transects across the remaining refuges (Island Bay, Pine Island, Matlatcha Pass, and Caloosahatchee National Wildlife Refuges) that each individual island within the refuge would be flown over and observations were to be hand written on a sketch map brought aboard the aircraft. In addition, the northeast portion of Merritt Island National Wildlife Refuge, a barrier island, flights were made along the coast of each side of the island. While flying transects across the remaining area, a GPS recorder was brought on board and coordinates, species, and local infestation intensity of each exotic plant encountered were recorded by IRC biologists. Exotic plant density levels were defined as single stem, sparse, and dense categories. Transects were flown at an altitude of 500 feet as allowed by law at a speed of approximately 60 mph as conditions permitted.

Although every attempt was made to gain permission from the U.S. Air Force and NASA, restricted airspace (surrounding the space shuttle and launch pad) within Merritt Island National Wildlife Refuge was not surveyed.

Data were downloaded, and using a mapping program, overlaid on maps of each refuge. Data were interpreted and each island or square kilometer cell (cell) within the refuges was assigned a value. Due to the lag time during GPS position recording, species located 130 meters outside the grid toward the directional heading were assigned to the previous cell. Maps were then created for all exotic species observed at each refuge.

Plant taxonomy follows Wunderlin (1998).

Results

A total of 16 exotic plant taxa were mapped during this survey. Among them *Acacia auriculiformis, Casuarina equisetifolia*, *Cocos nucifera*, *Colubrina asiatica*, *Imperata cylindrica*, *Lygodium microphyllum*, *Melaleuca quinquenervia*, *Pistia stratioides*, *Roystonea regia*, *Scaevola sericea*, *Schinus terebinthifolius*, and the partial taxon *Agave/Furcraea* sp. were invading intact plant communities. *Bambusa sp., Panicum maximum*, *Pennisetum purpureum*, and *Ricinus communis* were observed in disturbance areas at Merritt Island National Wildlife Refuge.

Although listed by the Florida Department of Agriculture and Consumer Services as endangered in the state of Florida, *Roystonea regia* was mapped since in these preserves, it occurred outside of its natural range. In addition, in the case of the *Agave/Furcraea*, positive identification of the taxon should be made on the ground to verify that this is not a native species before removal takes place.

For maps of exotic plants see figures 1-30. In addition to this report all the electronic files include ARC Map documents and JPEGs of all the maps.

Acknowledgements

The authors wish to acknowledge Ron Auringer who piloted the aircraft and George Sigler of Speed Aviation Inc. who provided the aircraft. William G. Thomas Jr. helped by providing contact information of refuge managers and other key persons. Jeffrey Schardt of Merritt Island National Wildlife Refuge greatly aided us in obtaining permission from U.S. Air Force in NASA to fly in restricted air space at the refuge. Cheri Erhardt from Merritt Island National Wildlife Refuge supplied maps of the refuge. Mike Barry, Florida Panther National Wildlife Refuge, provided information on his observations of exotic pest plants within the refuge. We also wish to thank the U.S. Air Force and NASA for permitting us to fly in portions of their restricted air space.

References

Wunderlin, Richard. P. 1998. Guide to the Vascular Plants of Florida. Gainesville, University Press of Florida.

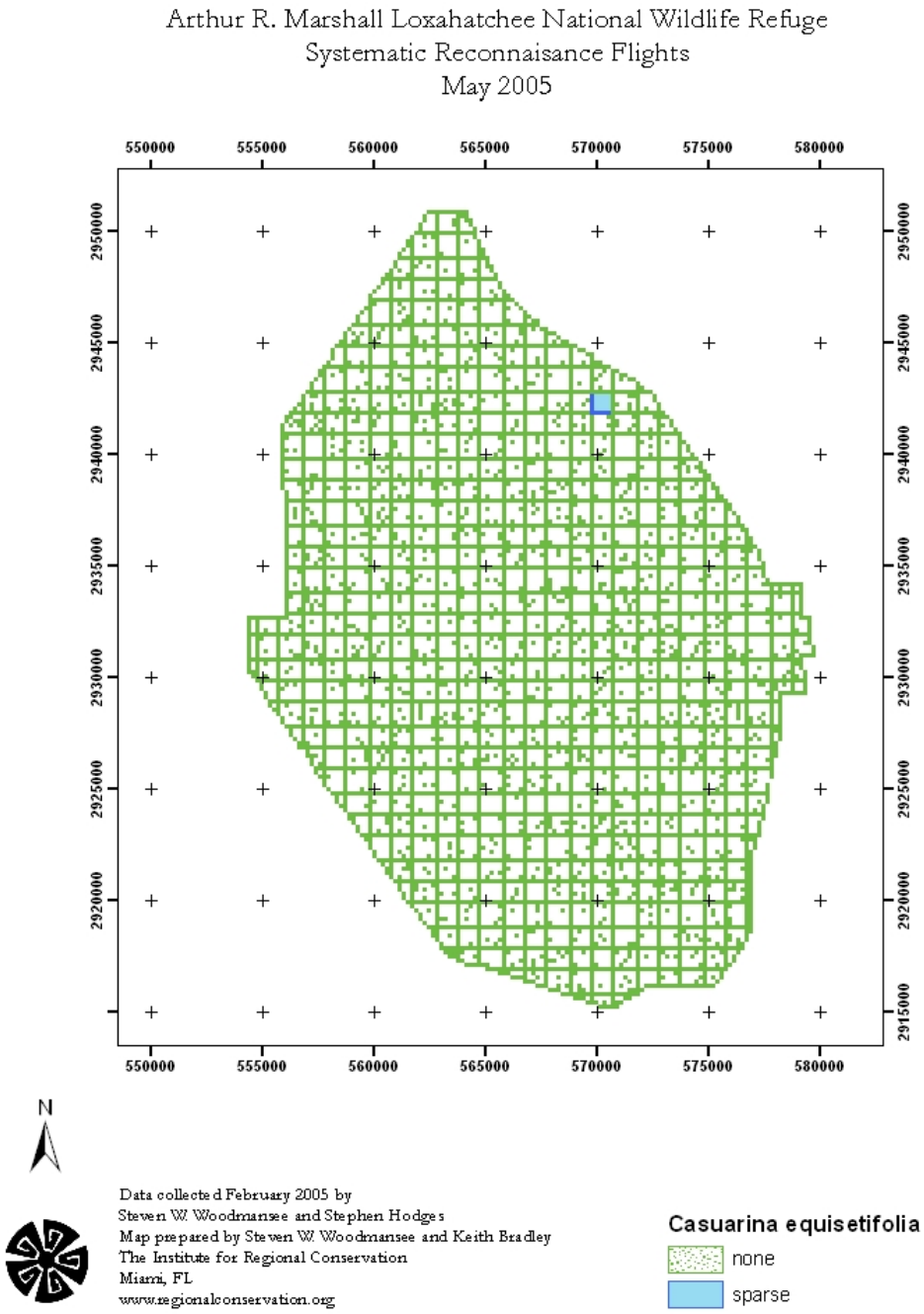


Figure 1: 2005 Arthur R. Marshall Loxahatchee National Wildlife Refuge - *Casuarina equisetifolia* SRF.

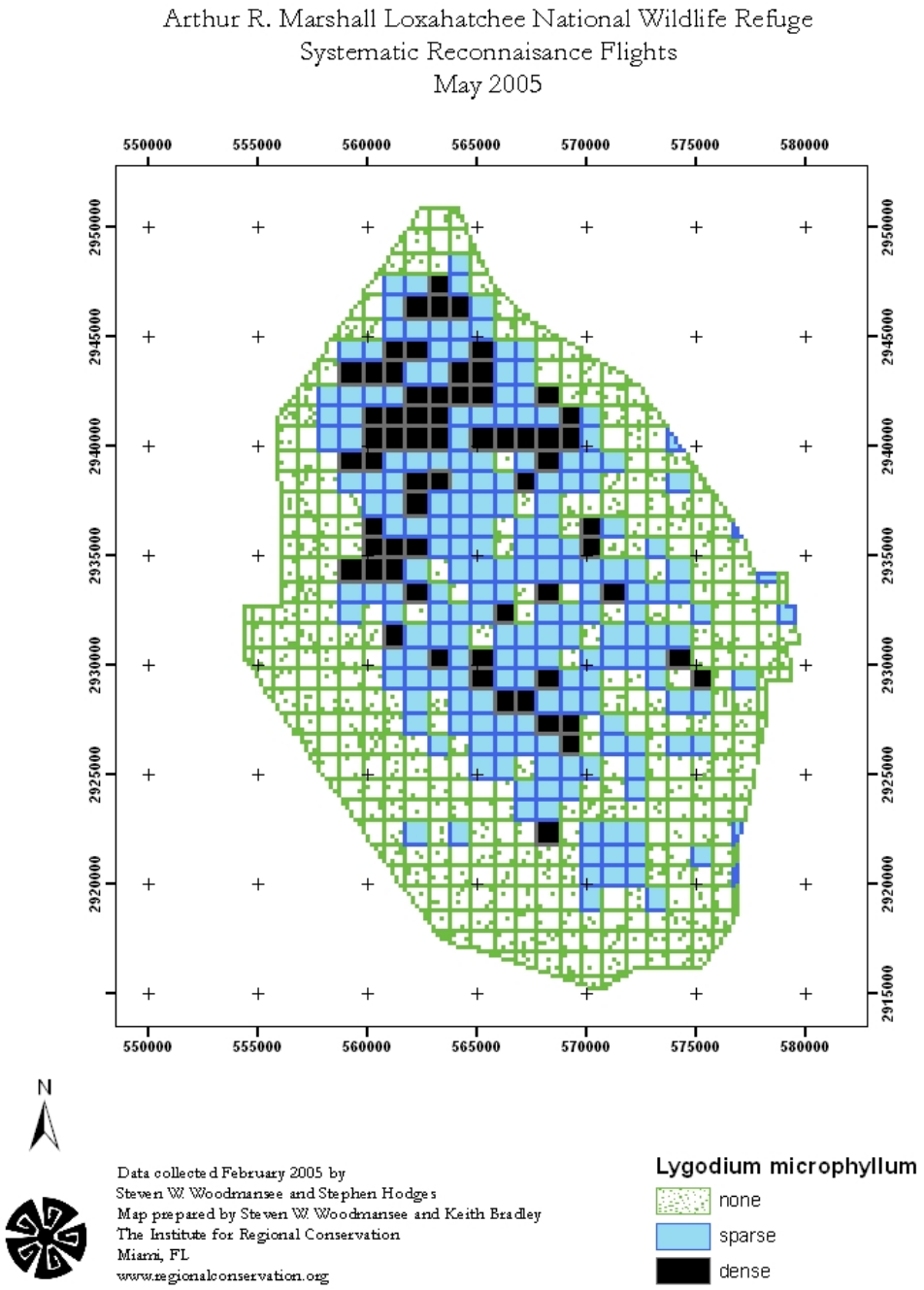


Figure 2: 2005 Arthur R. Marshall Loxahatchee National Wildlife Refuge – *Lygodium microphyllum* SRF.

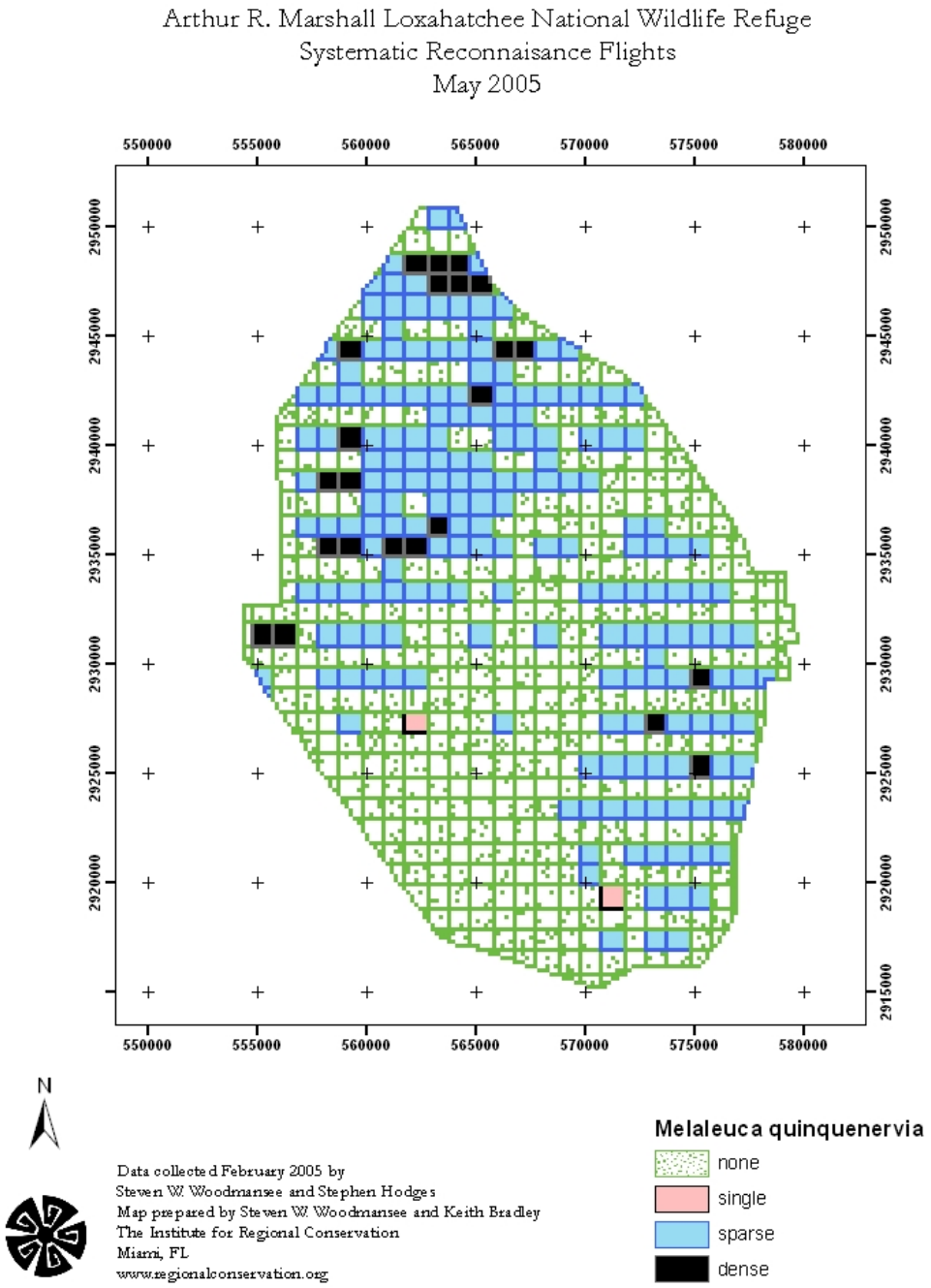


Figure 3: 2005 Arthur R. Marshall Loxahatchee National Wildlife Refuge – *Melaleuca quinquenervia* SRF.

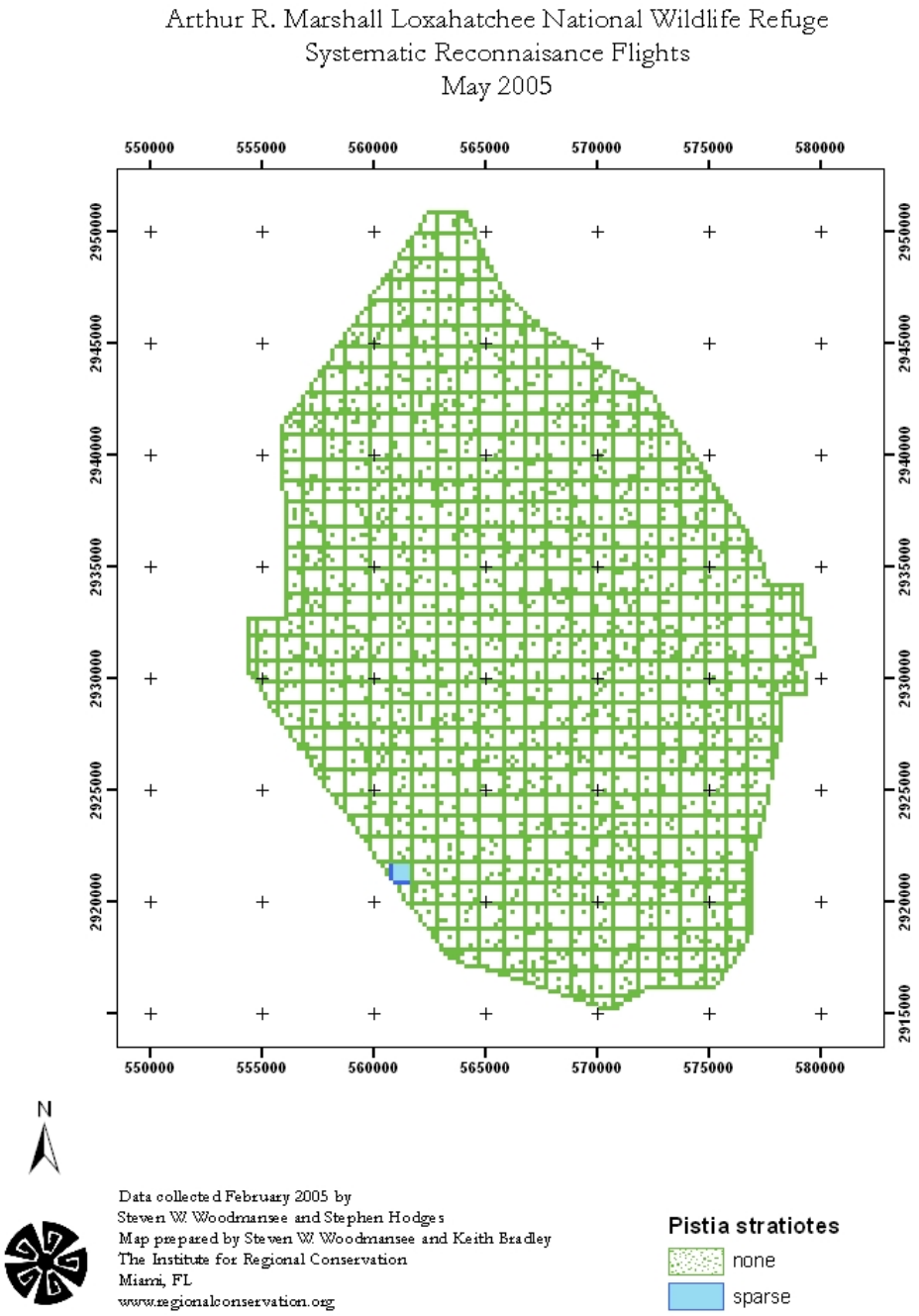


Figure 4: 2005 Arthur R. Marshall Loxahatchee National Wildlife Refuge – *Pistia stratioides* SRF.

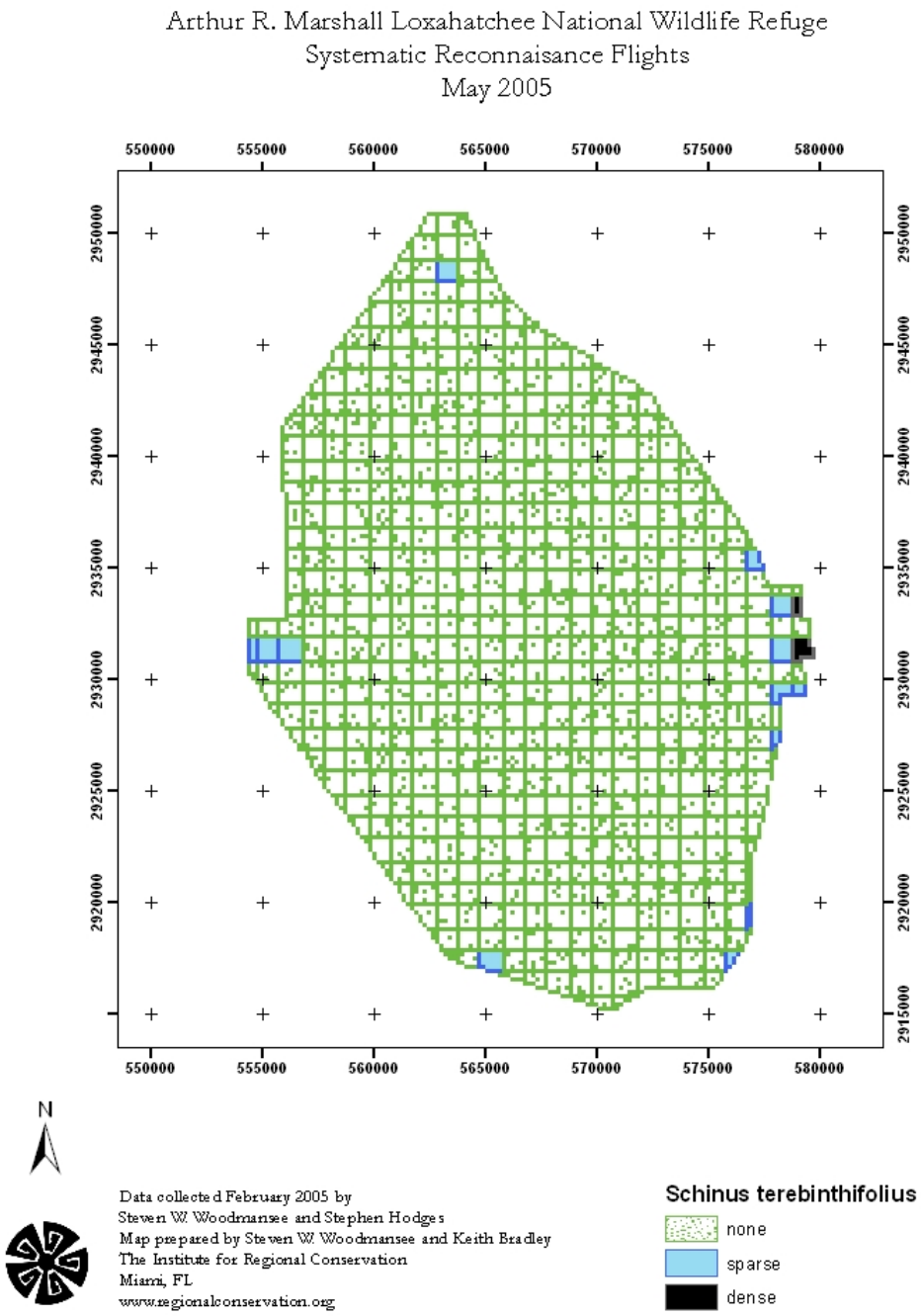


Figure 5: 2005 Arthur R. Marshall Loxahatchee National Wildlife Refuge – *Schinus terebinthifolius* SRF.

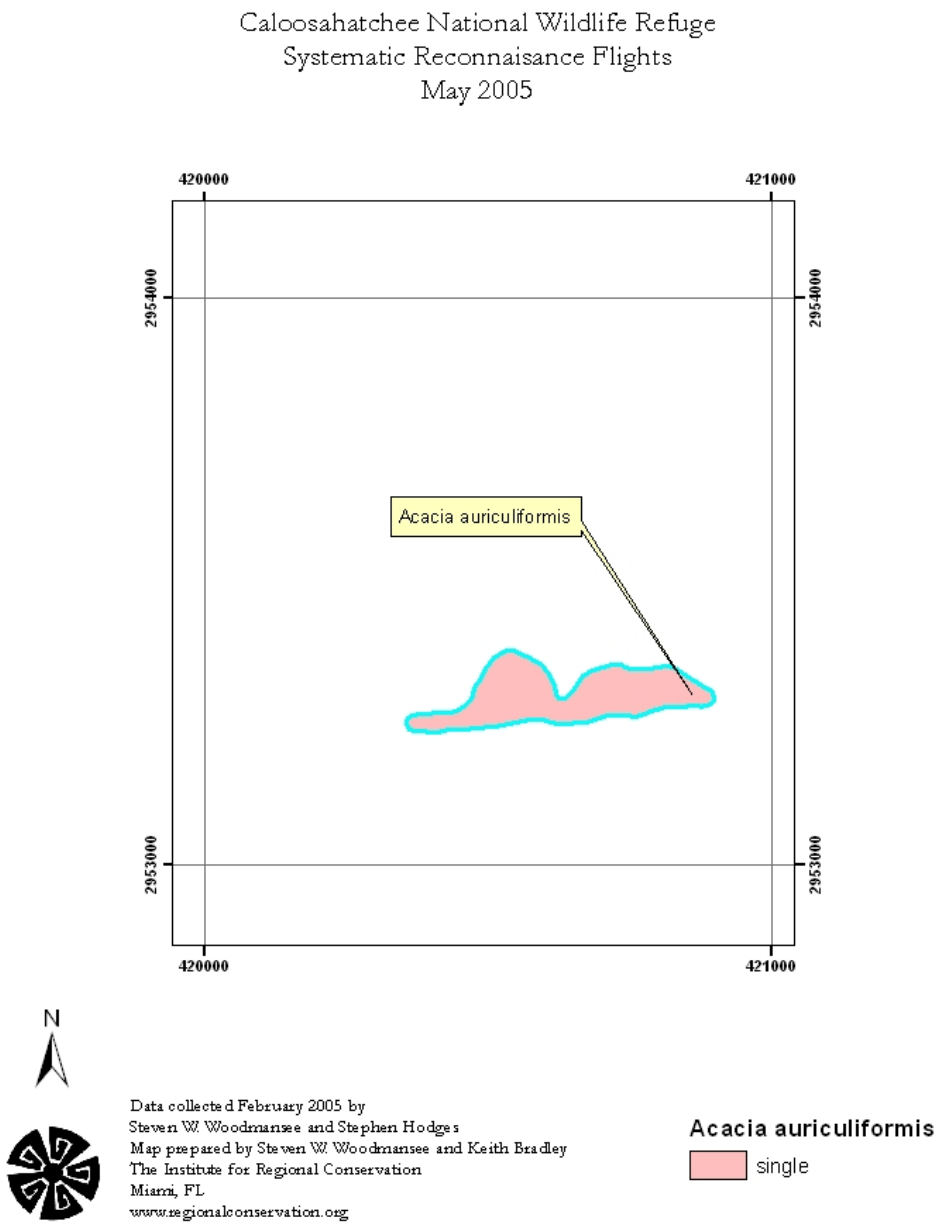


Figure 6: 2005 Caloosahatchee National Wildlife Refuge – *Acacia auriculiformis* SRF.

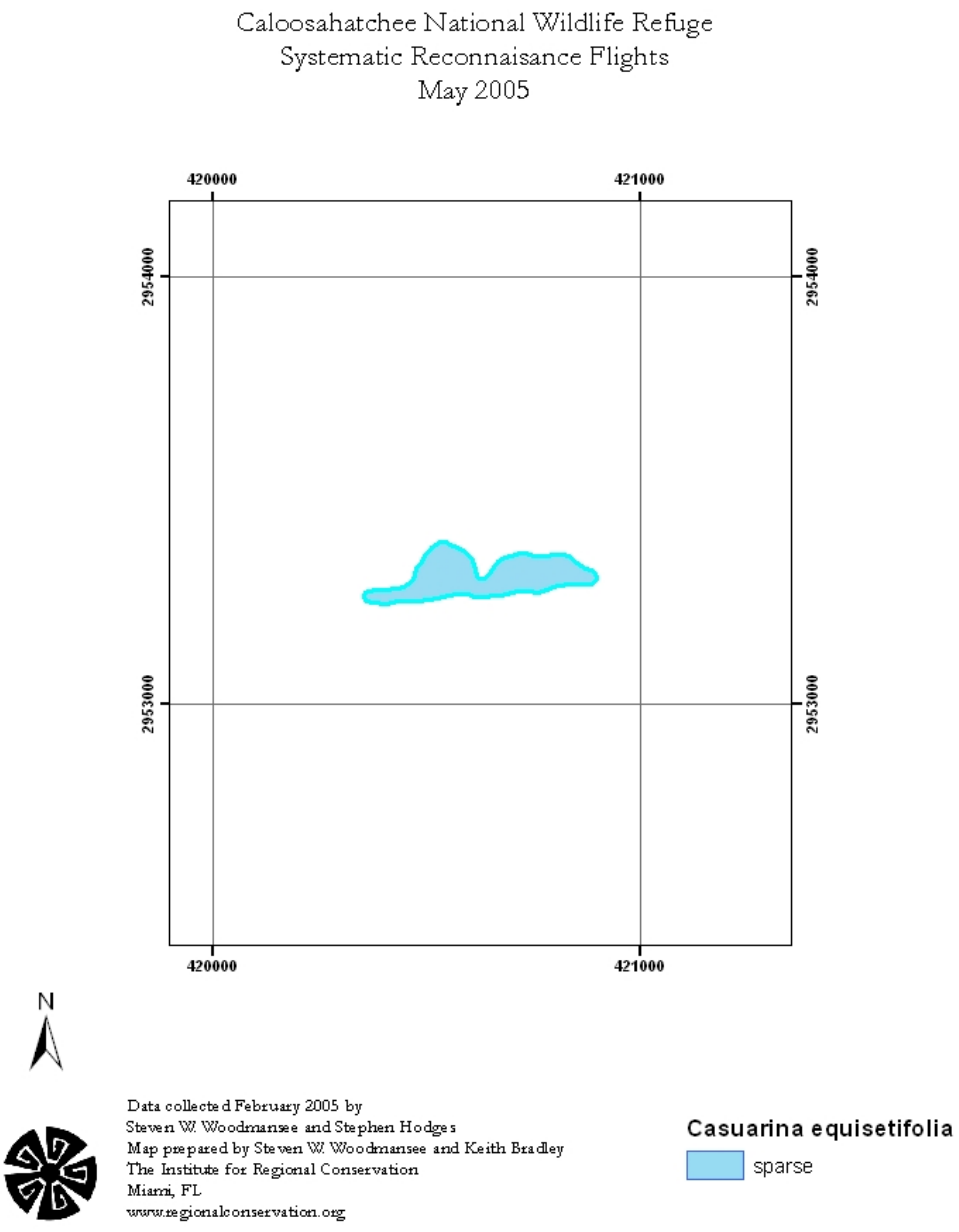
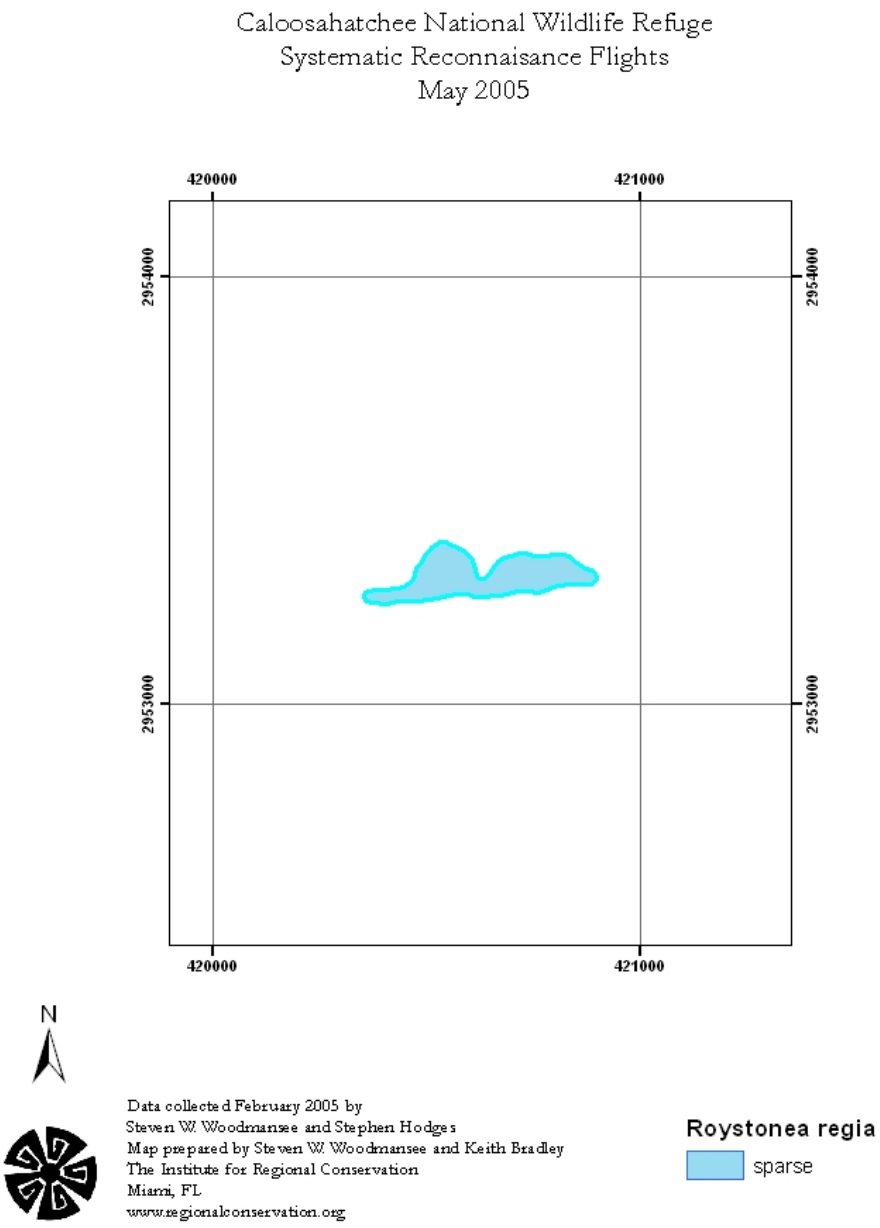


Figure 7: 2005 Caloosahatchee National Wildlife Refuge – *Casuarina equisetifolia* SRF.



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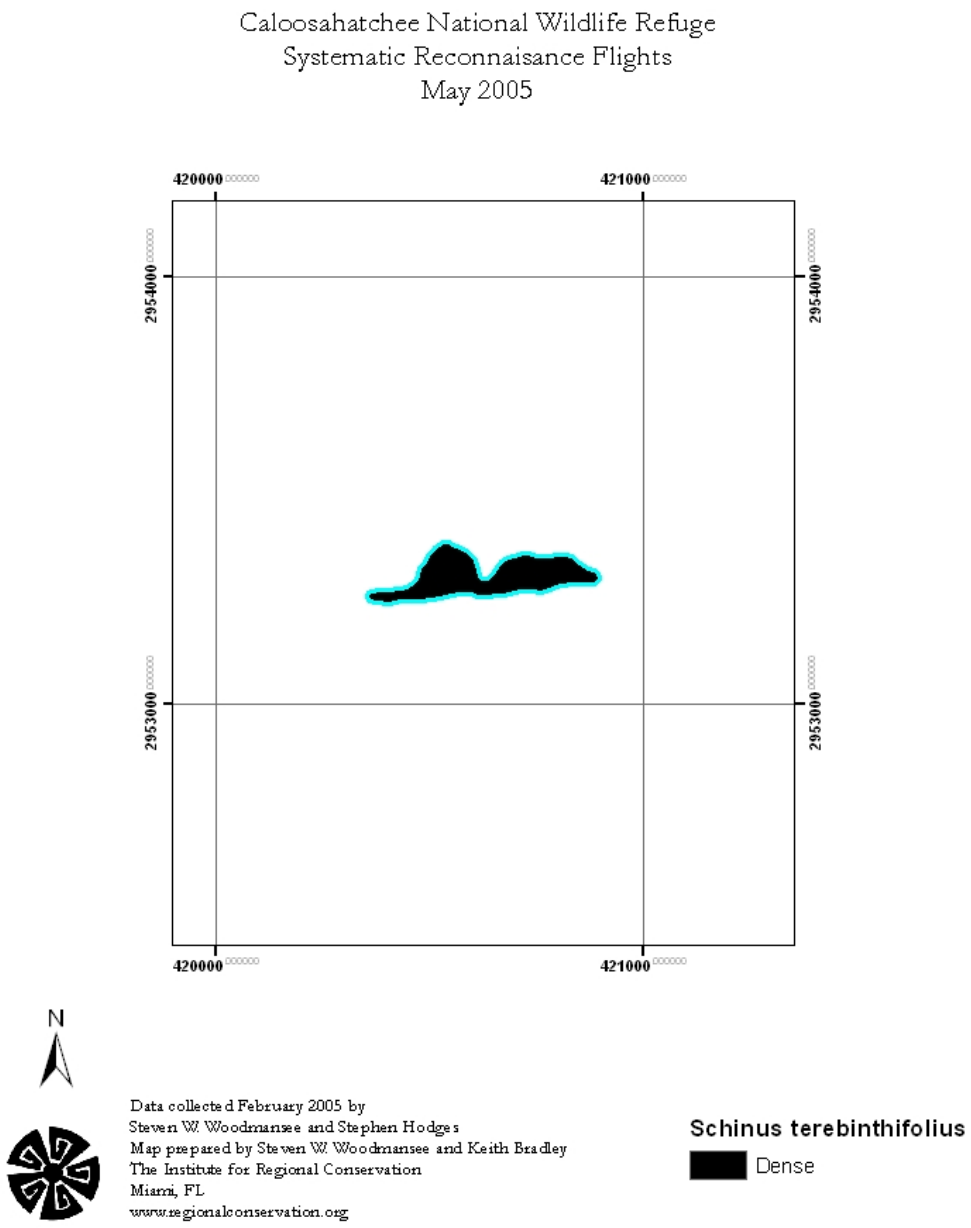


Figure 9: 2005 Caloosahatchee National Wildlife Refuge – *Schinus terebinthifolius* SRF.

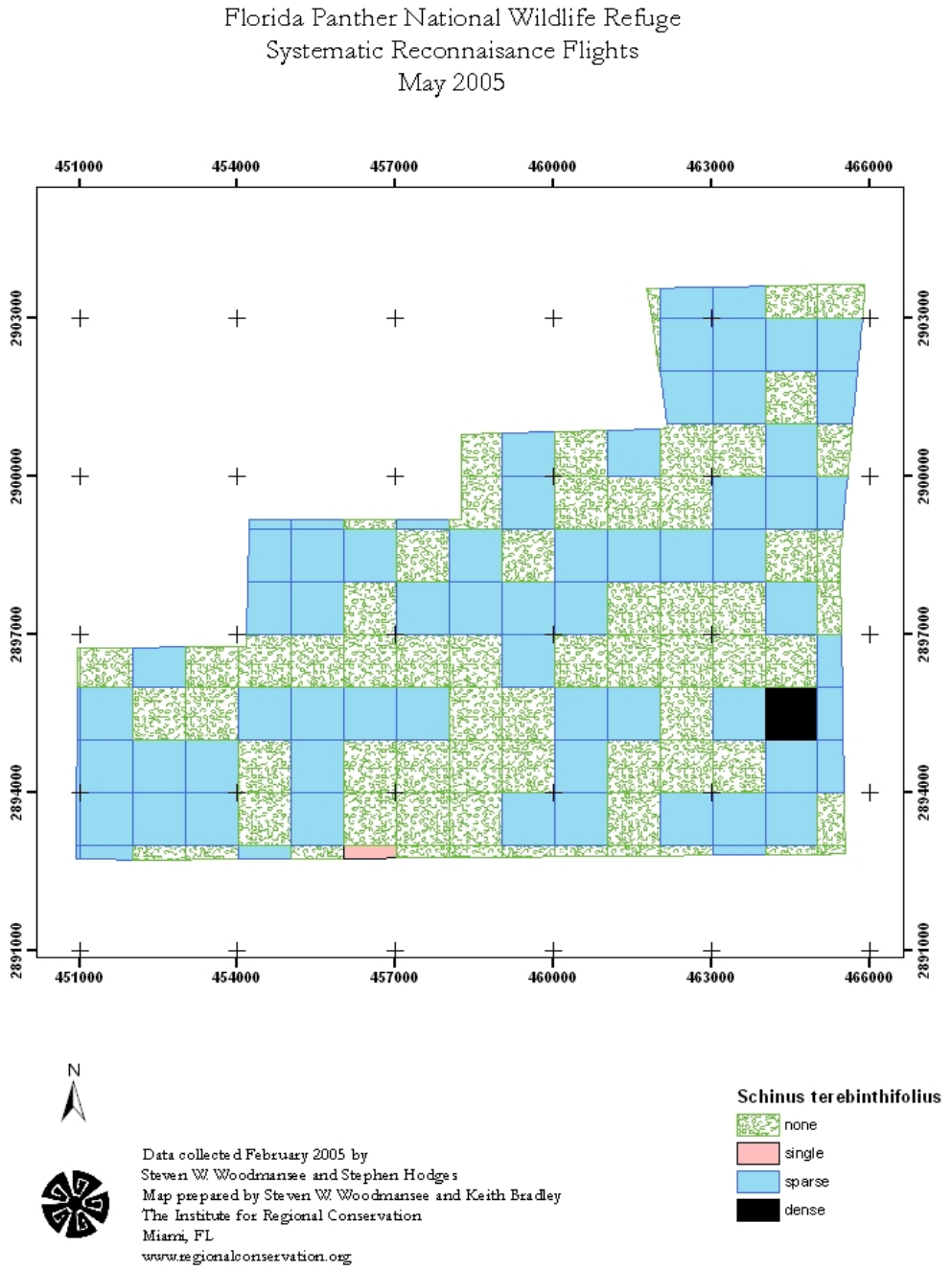


Figure 10: 2005 Florida Panther National Wildlife Refuge – *Schinus terebinthifolius* SRF.

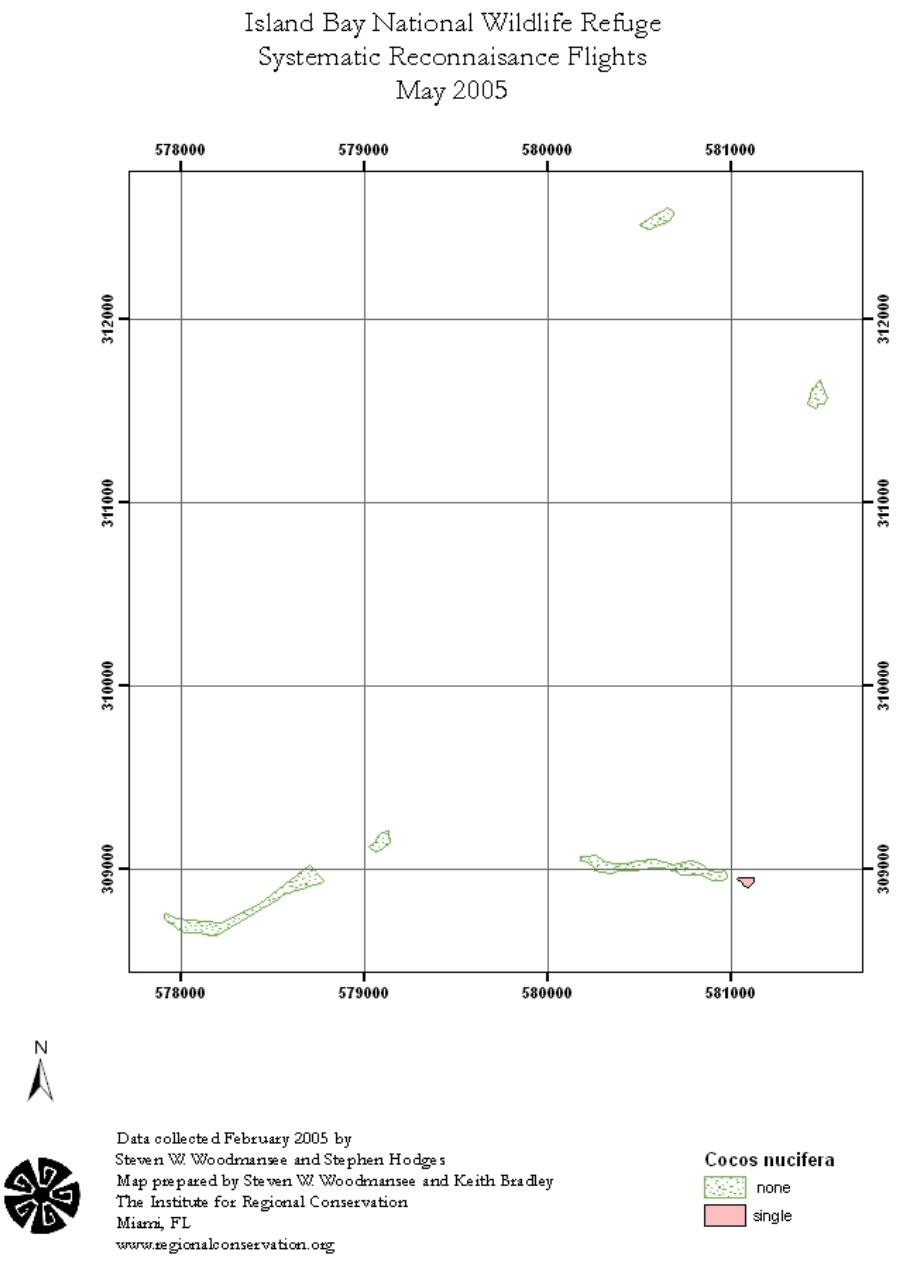


Figure 11: 2005 Island Bay National Wildlife Refuge – *Cocos nucifera* SRF.

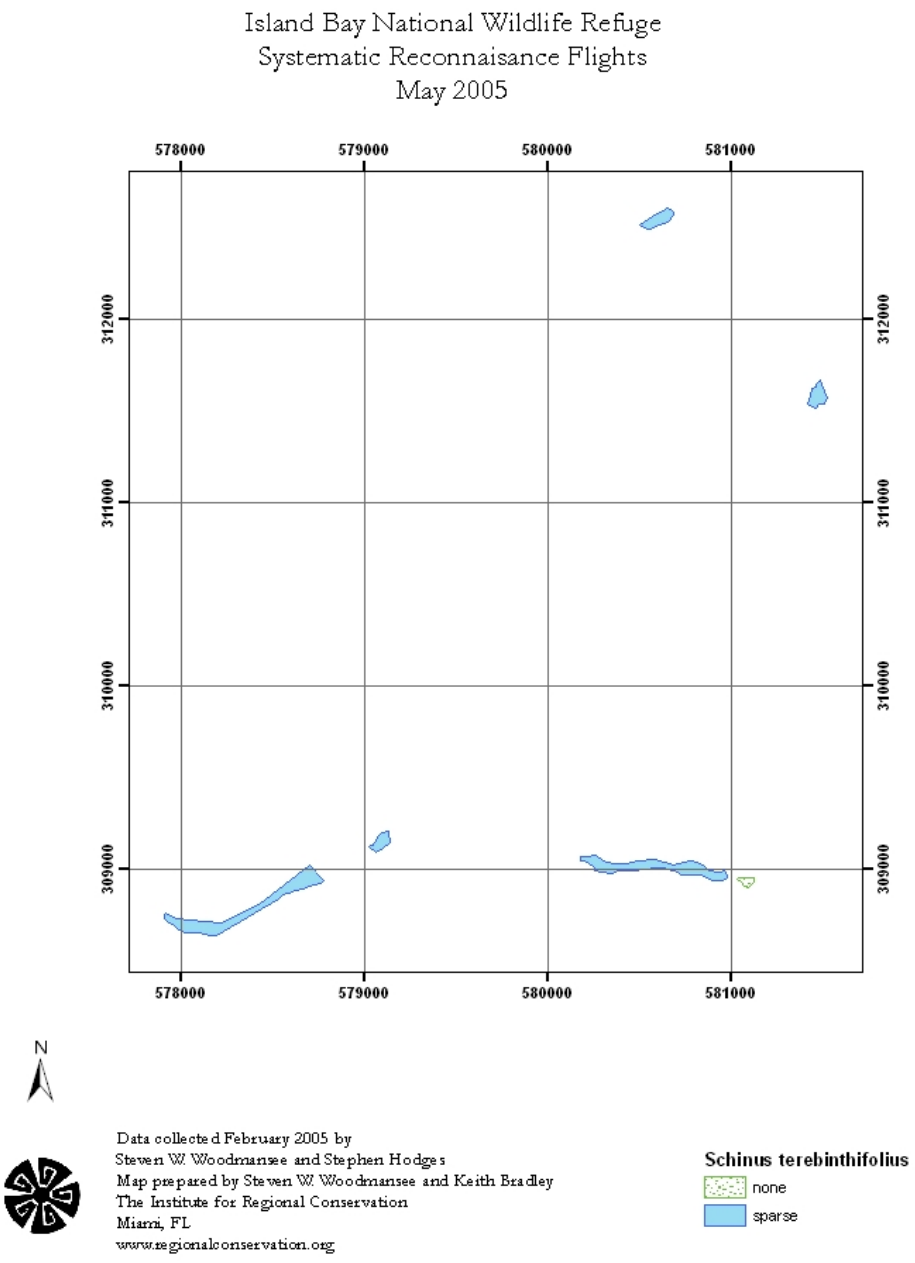


Figure 12: 2005 Island Bay National Wildlife Refuge – *Schinus terebinthifolius* SRF.

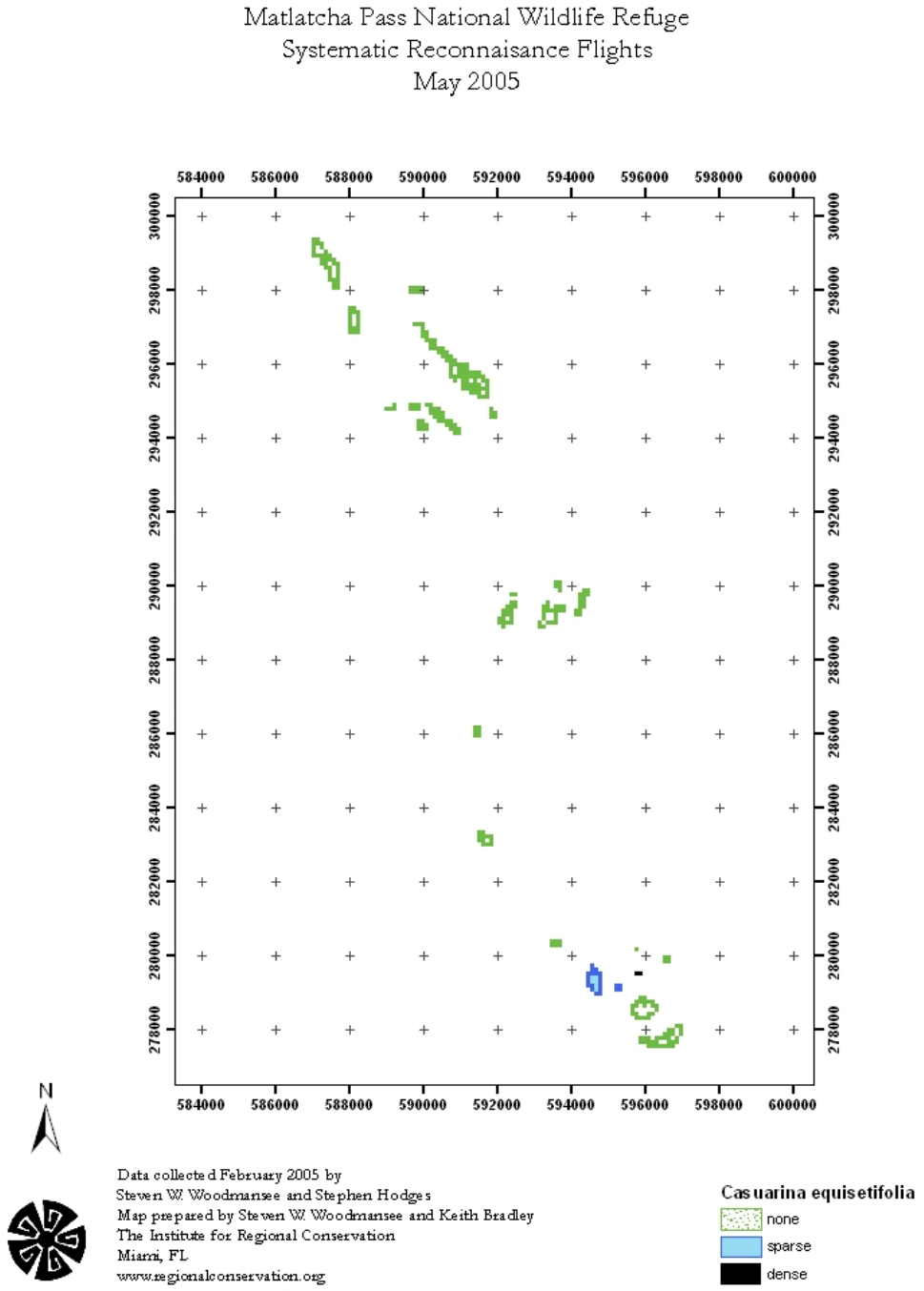


Figure 13: 2005 Matlatcha Pass National Wildlife Refuge – *Casuarina equisetifolia* SRF.

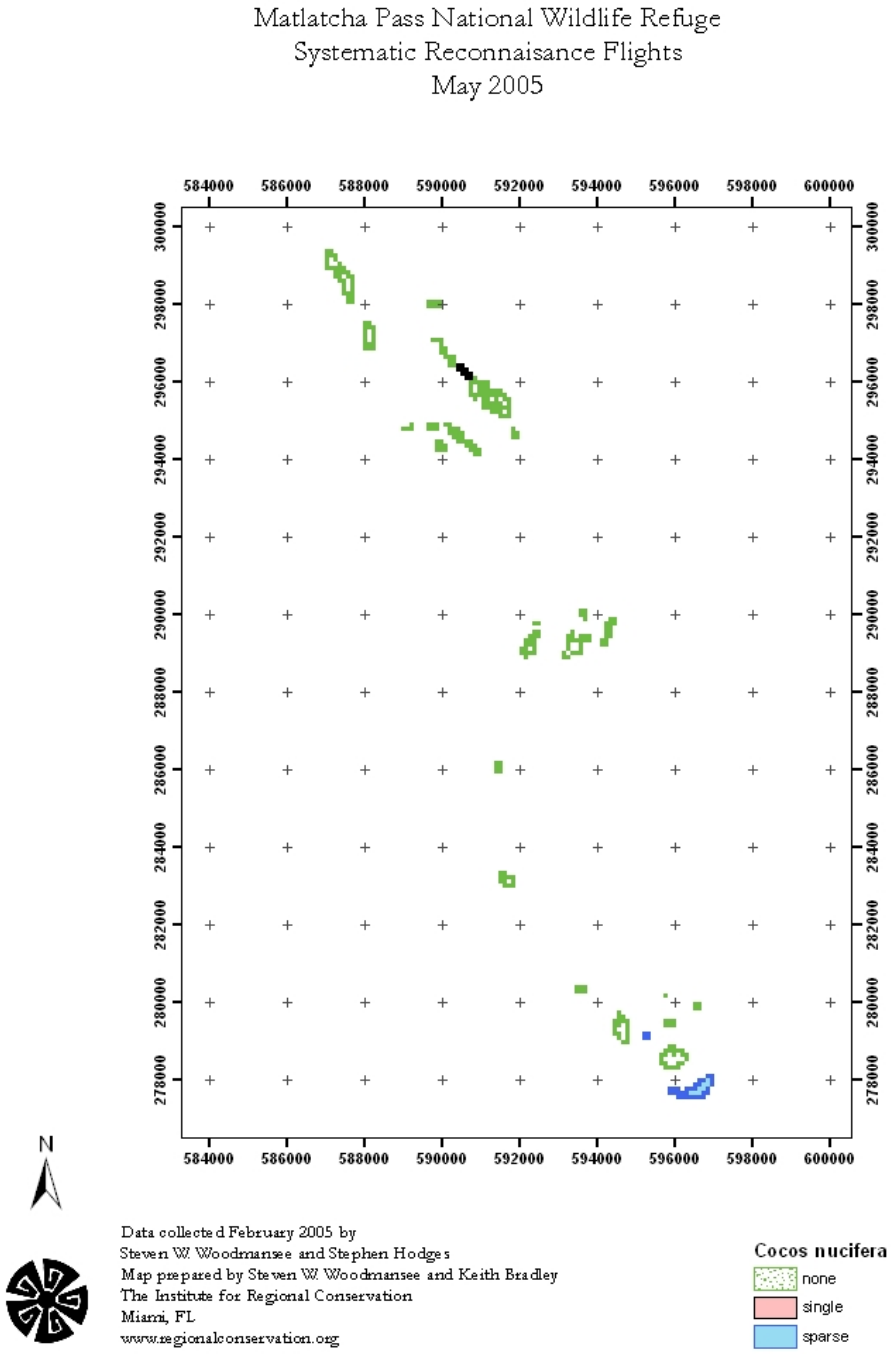


Figure 14: 2005 Matlatcha Pass National Wildlife Refuge – *Cocos nucifera* SRF.

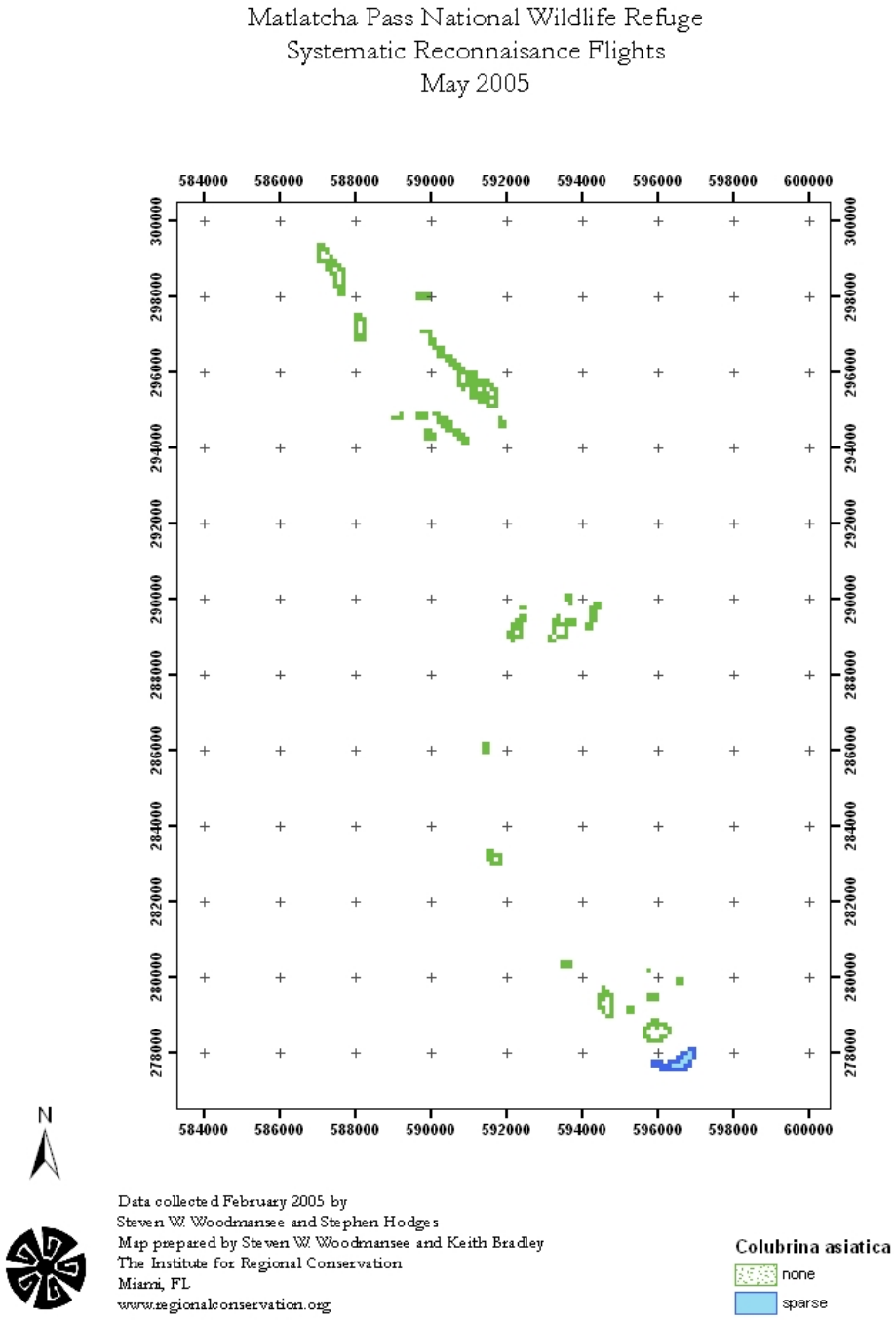
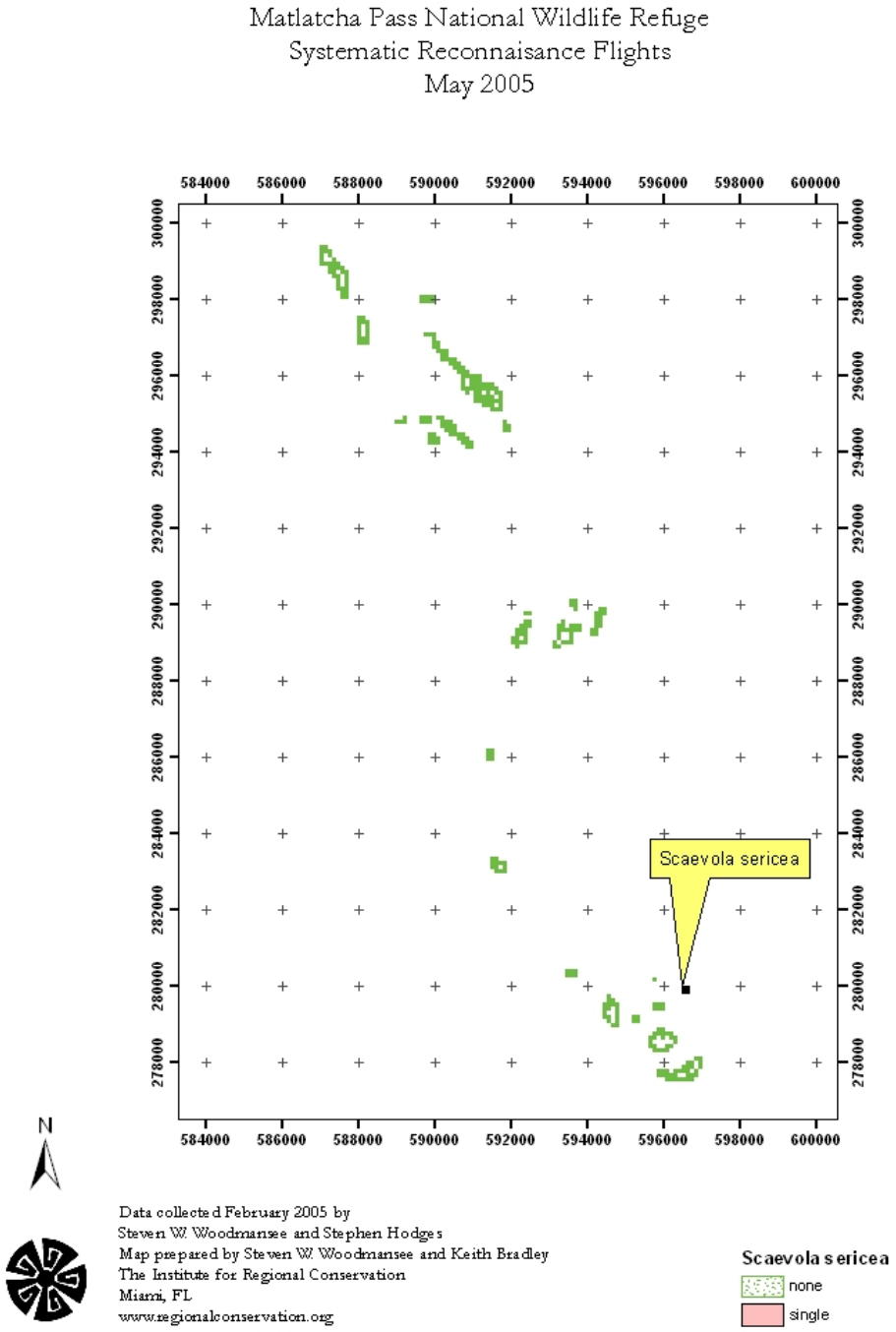


Figure 15: 2005 Matlatcha Pass National Wildlife Refuge – *Colubrina asiatica* SRF.



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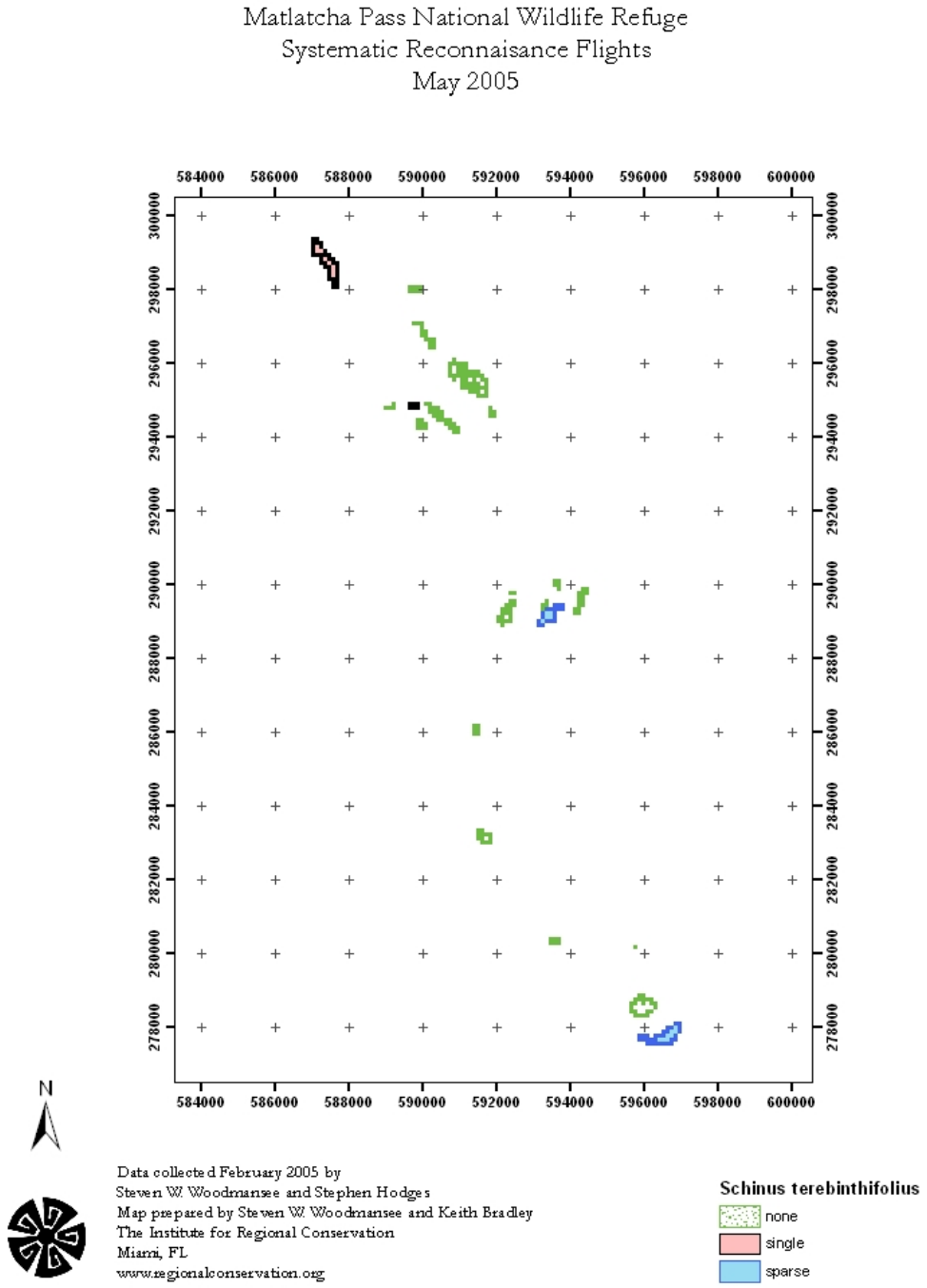
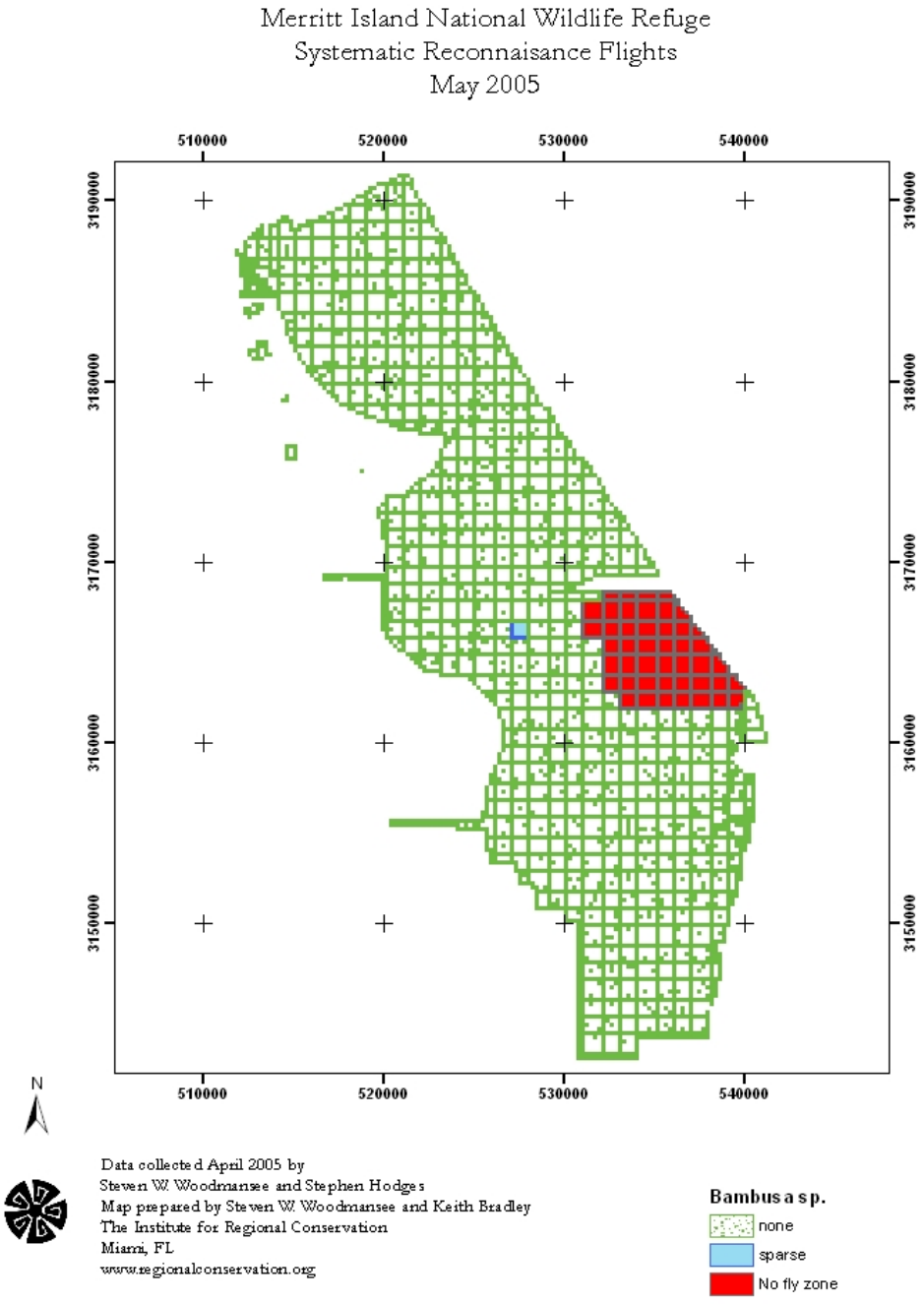


Figure 17: 2005 Matlatcha Pass National Wildlife Refuge – *Schinus terebinthifolius* SRF.



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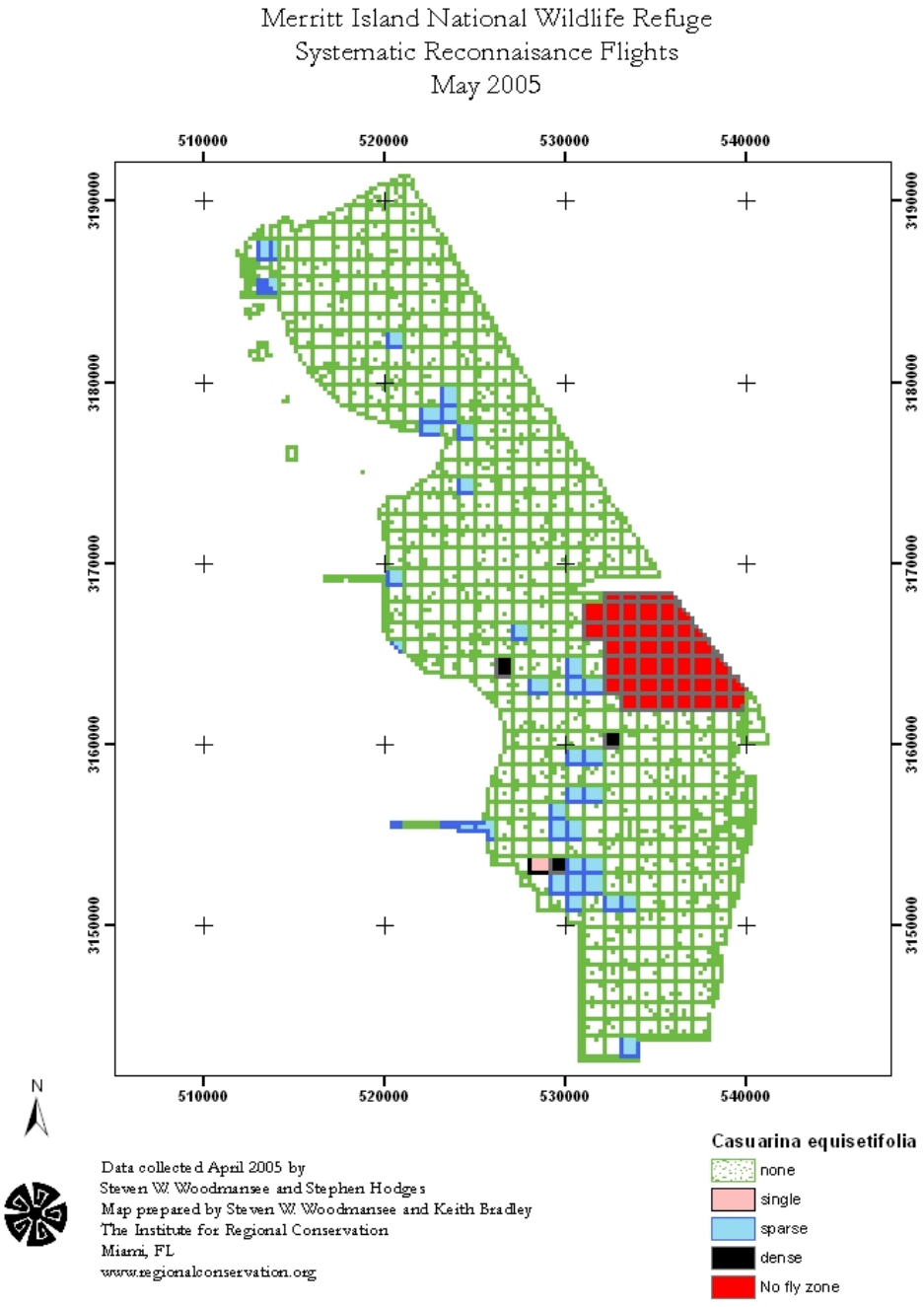
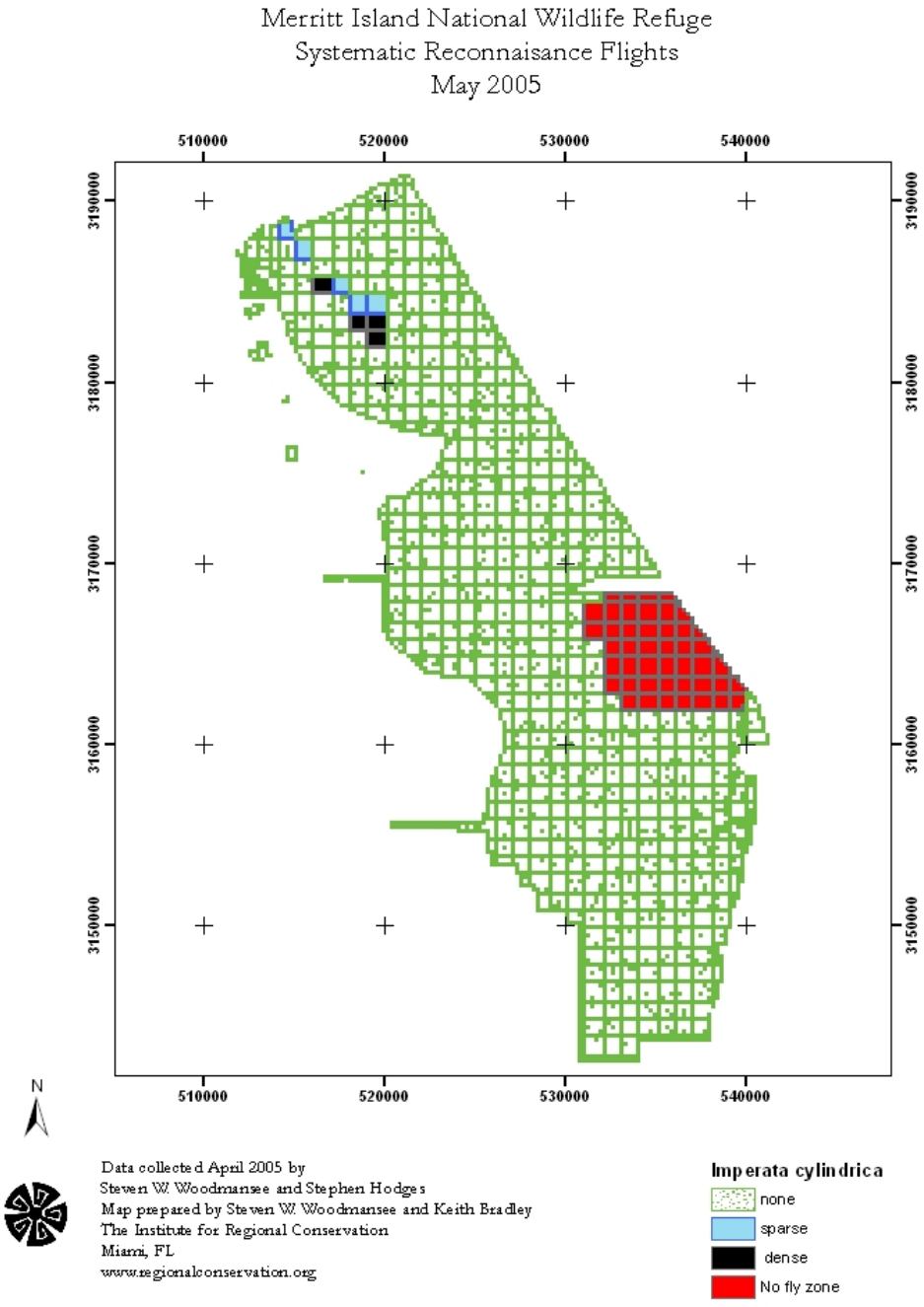


Figure 19: 2005 Merritt Island National Wildlife Refuge – *Casuarina equisetifolia* SRF.



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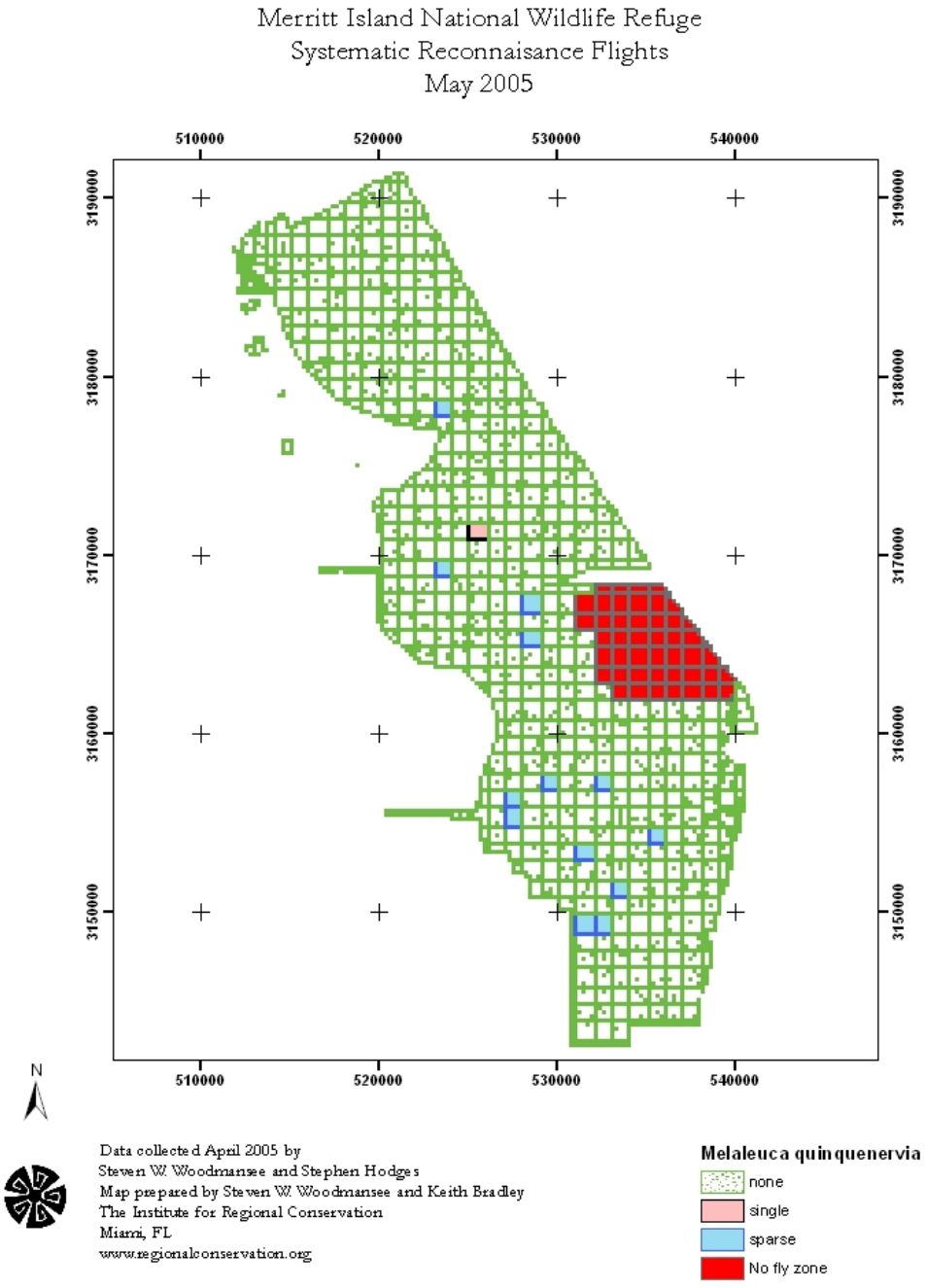
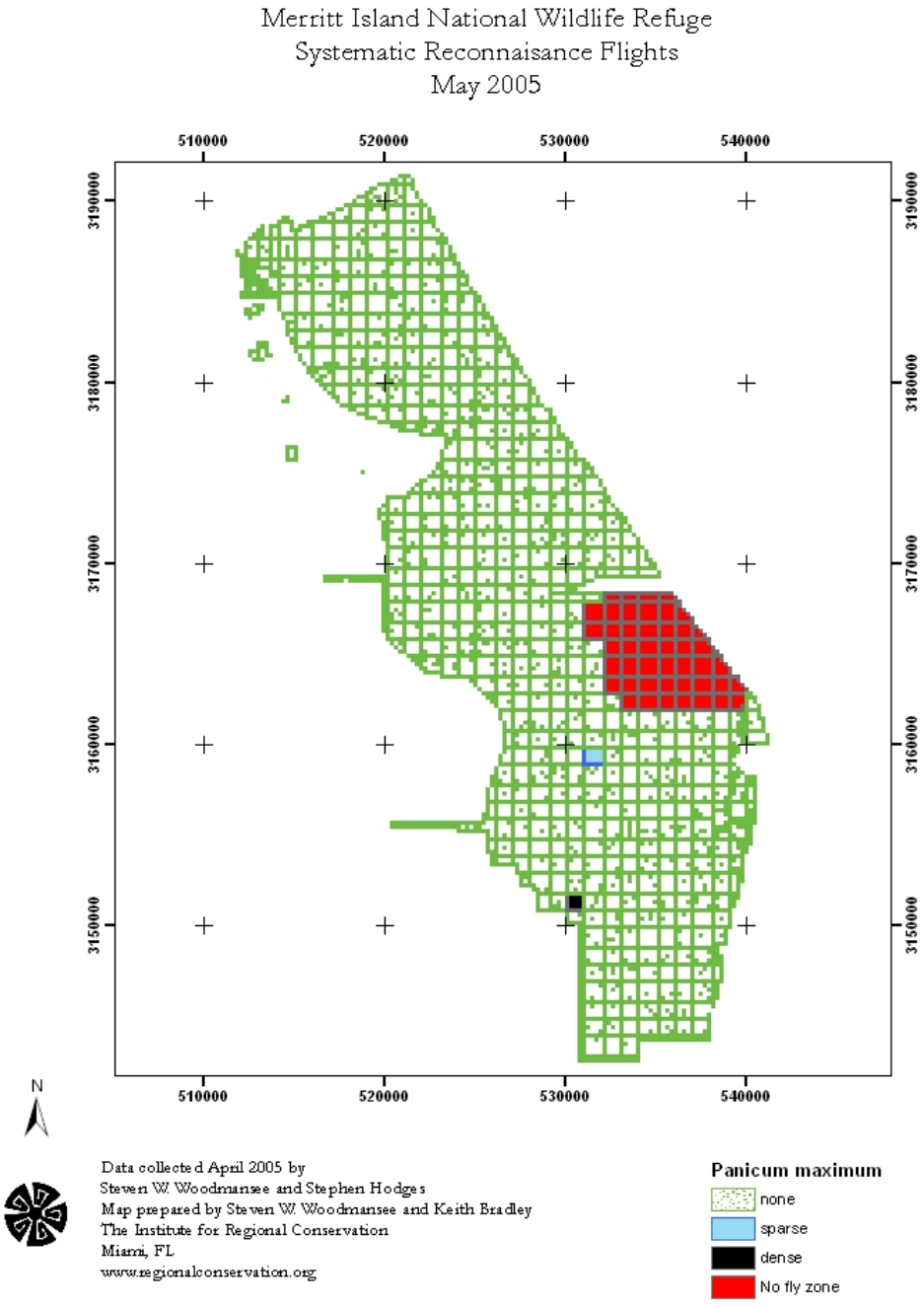


Figure 21: 2005 Merritt Island National Wildlife Refuge – *Melaleuca quinquenervia* SRF.



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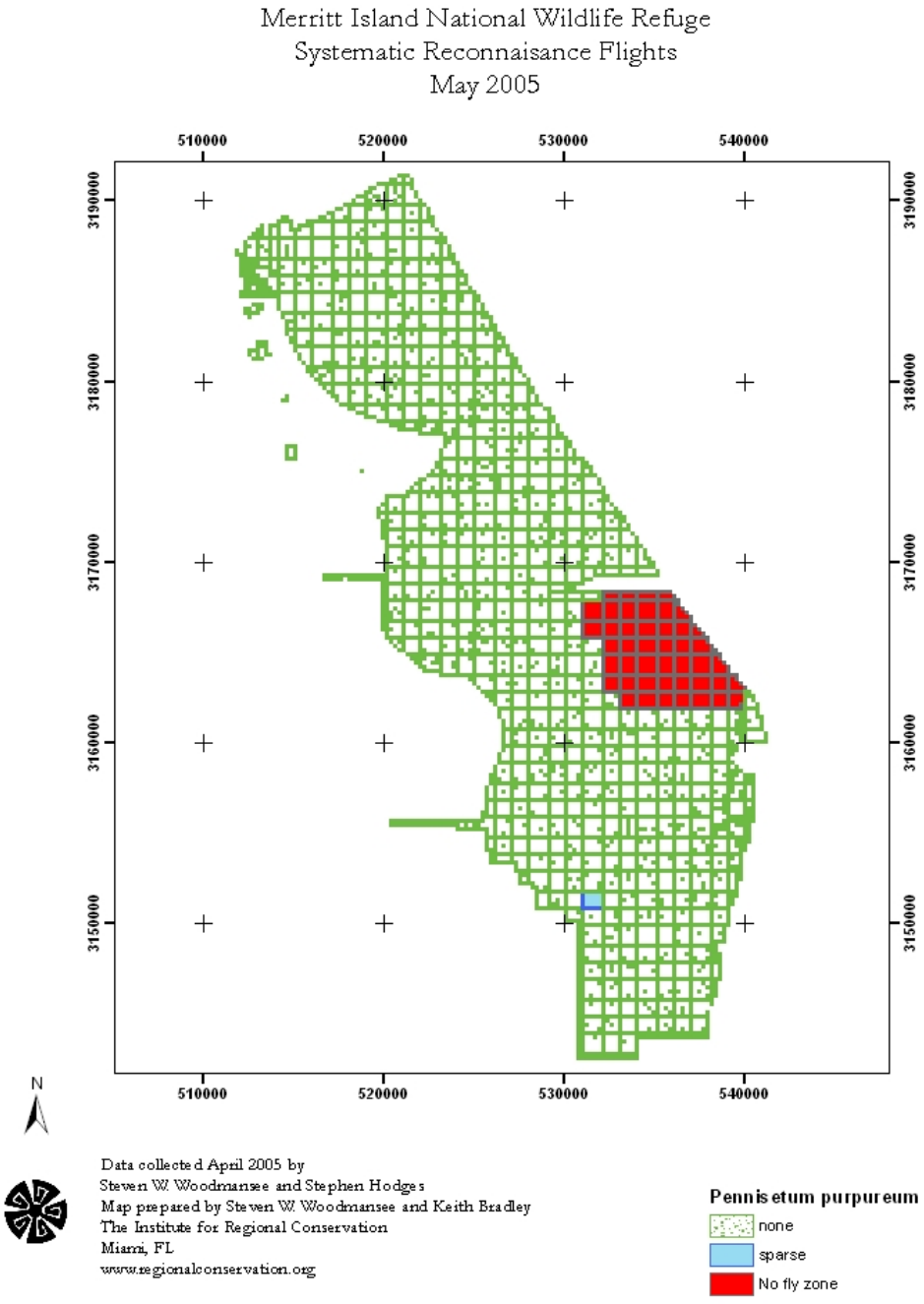

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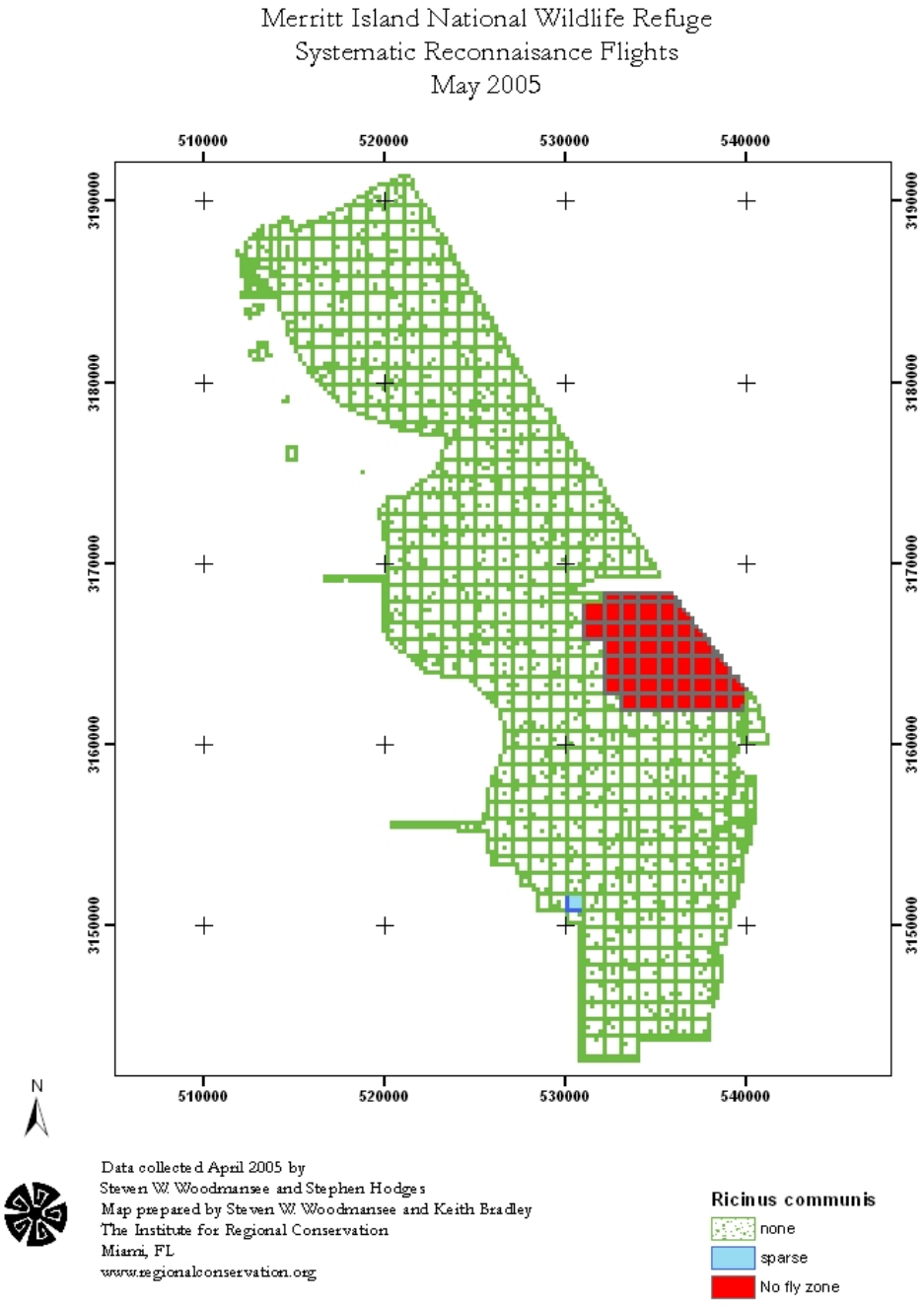

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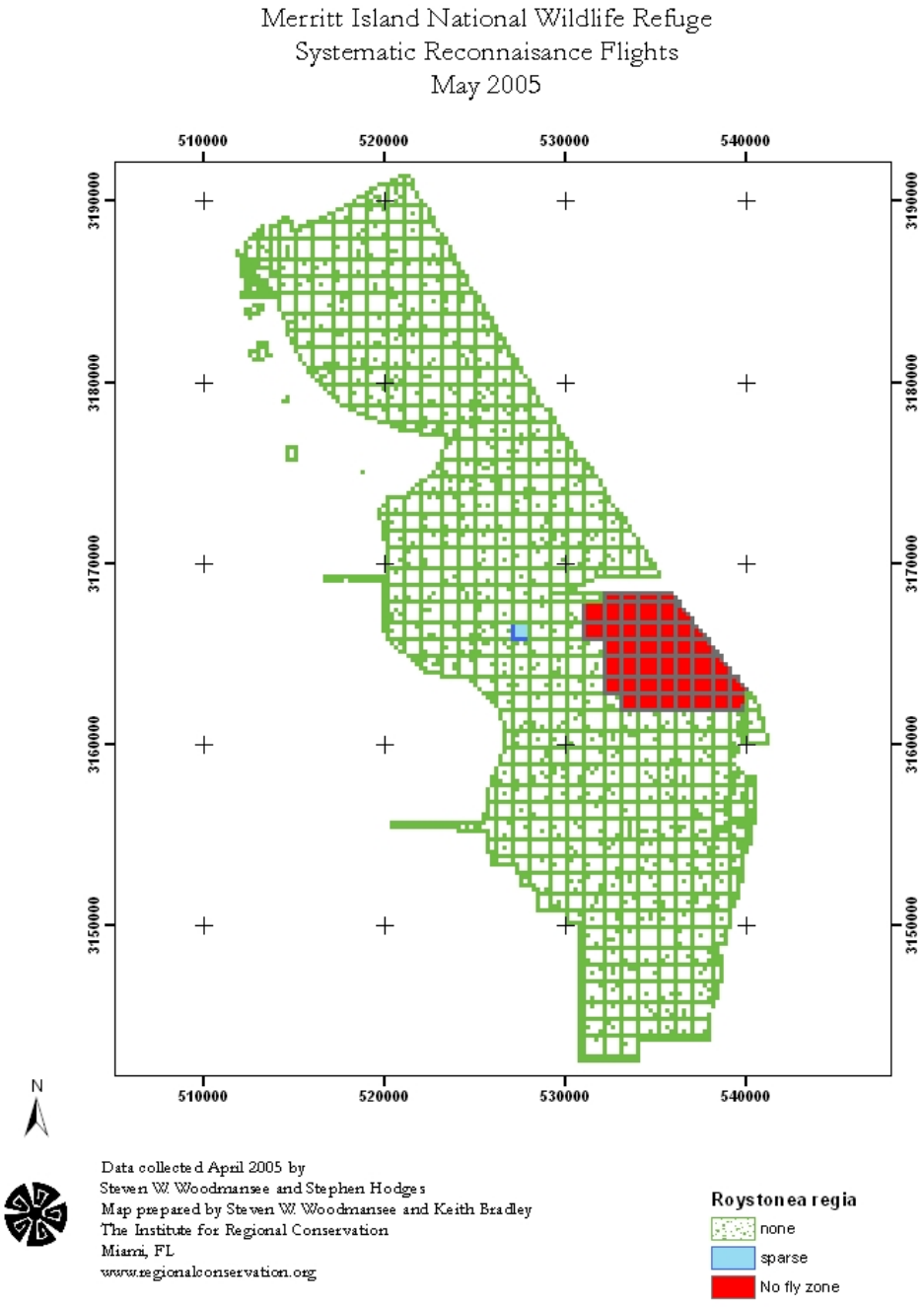

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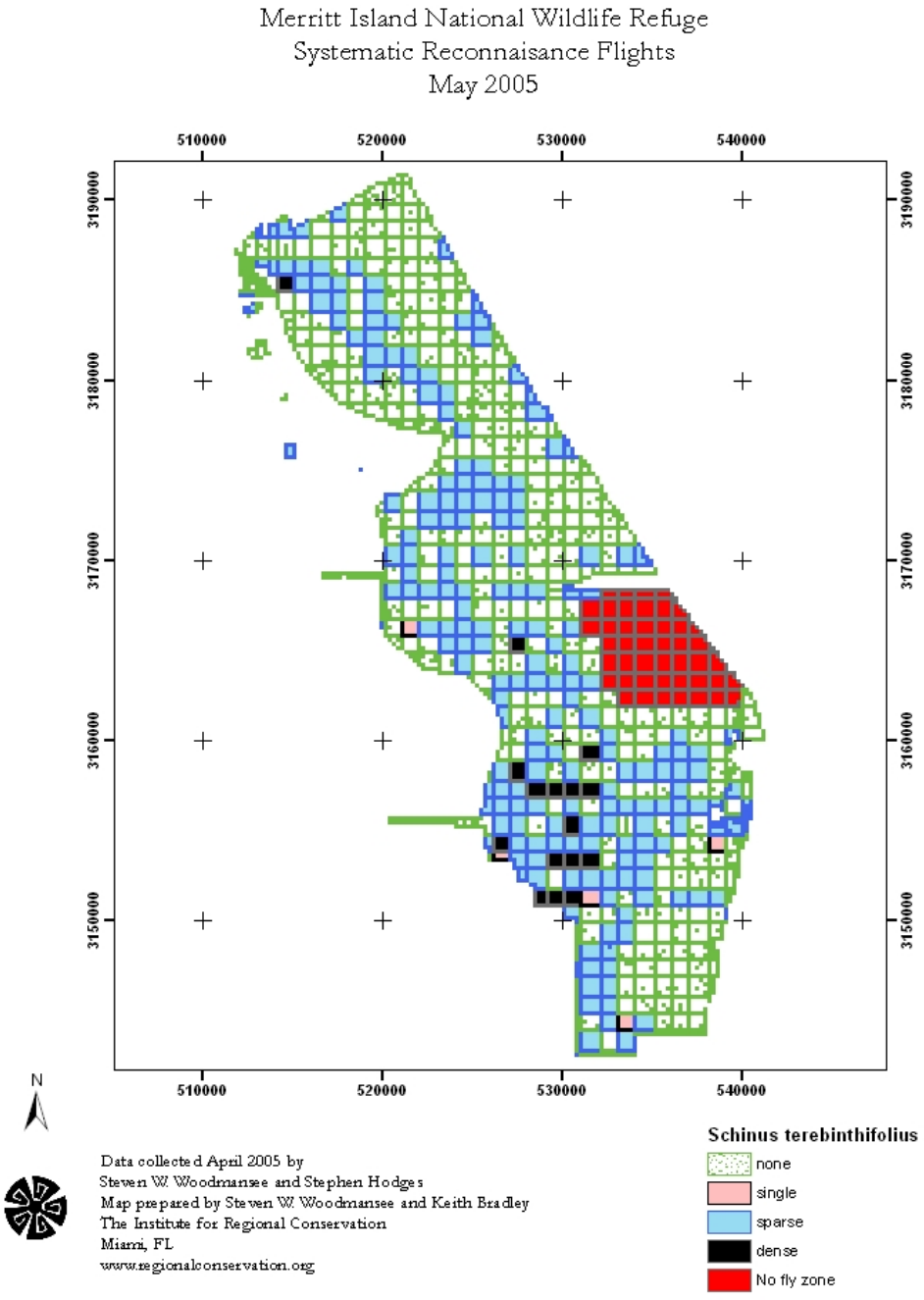

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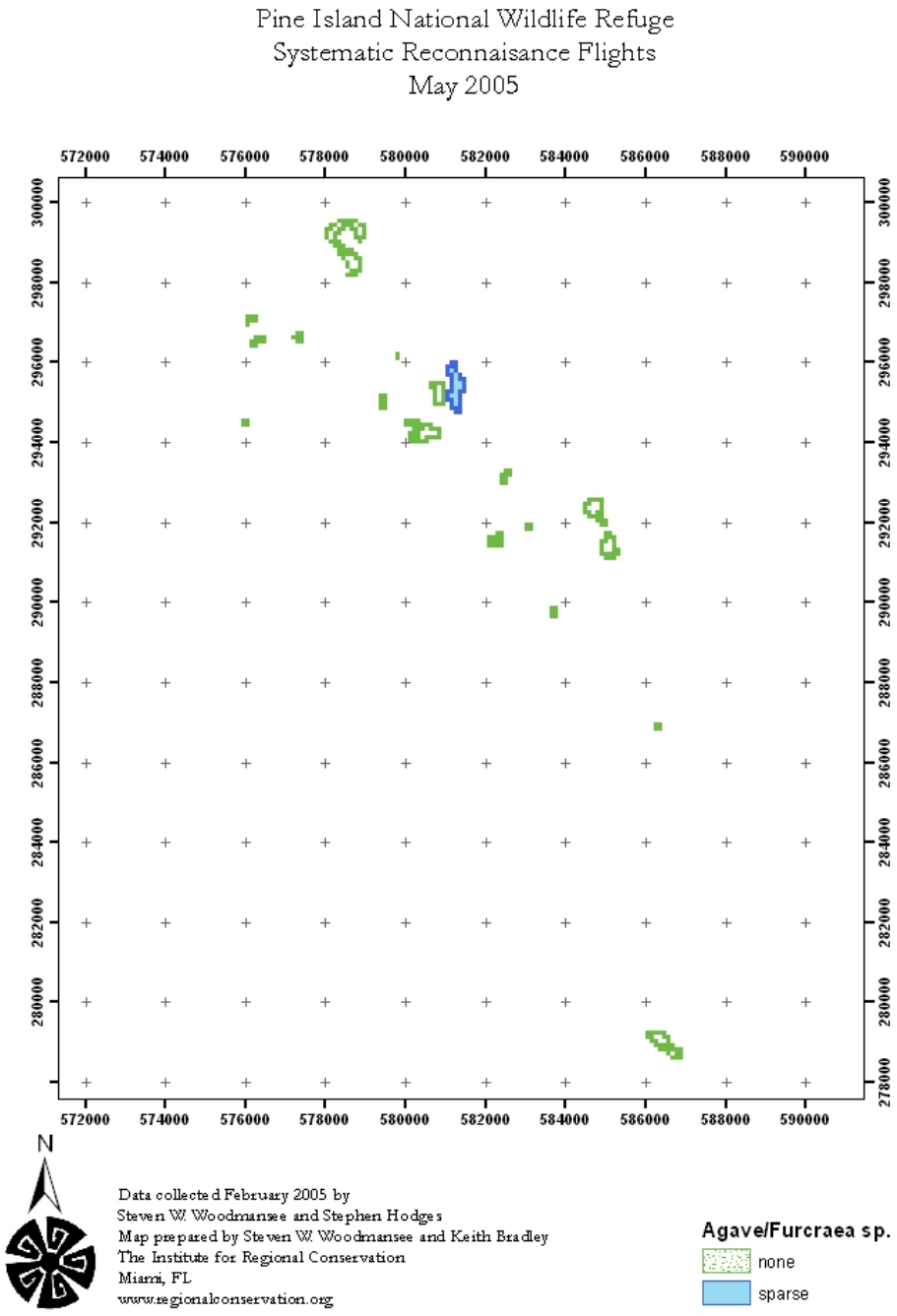
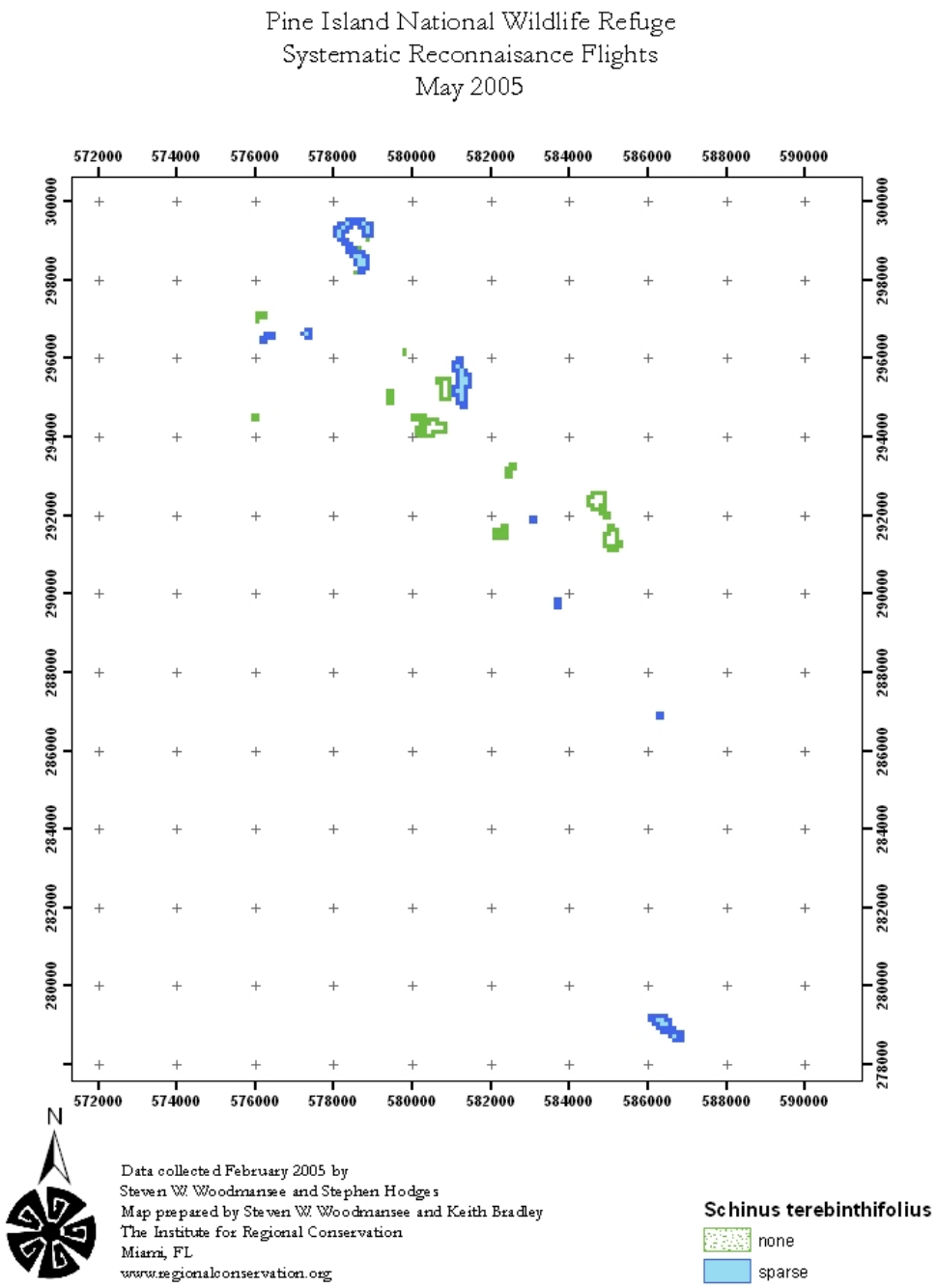


Figure 27: 2005 Pine Island National Wildlife Refuge – *Agave/Furcraea* sp.SRF.



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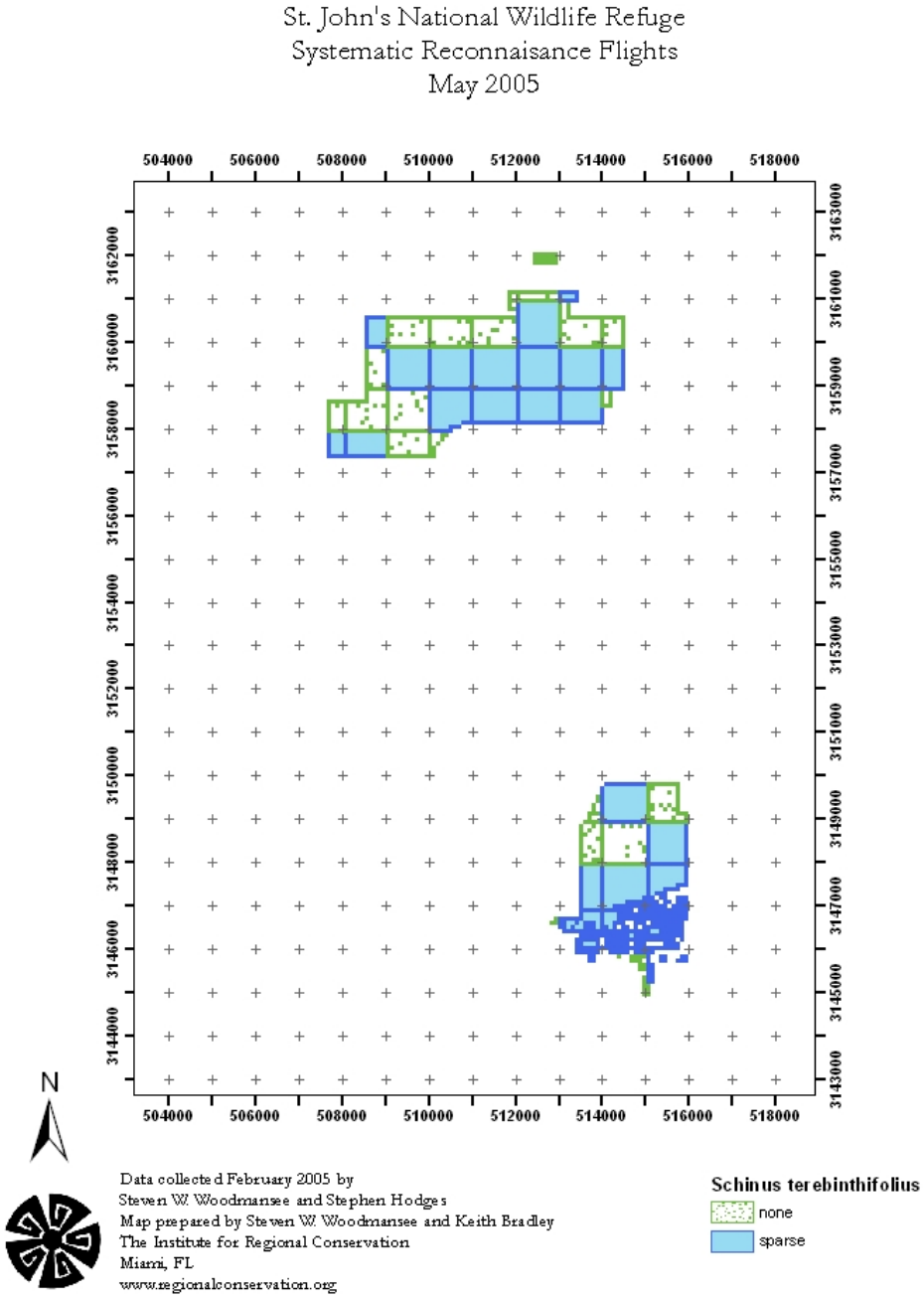

Figure 29: 2005 St. John's National Wildlife Refuge – *Schinus terebinthifolius* SRF.

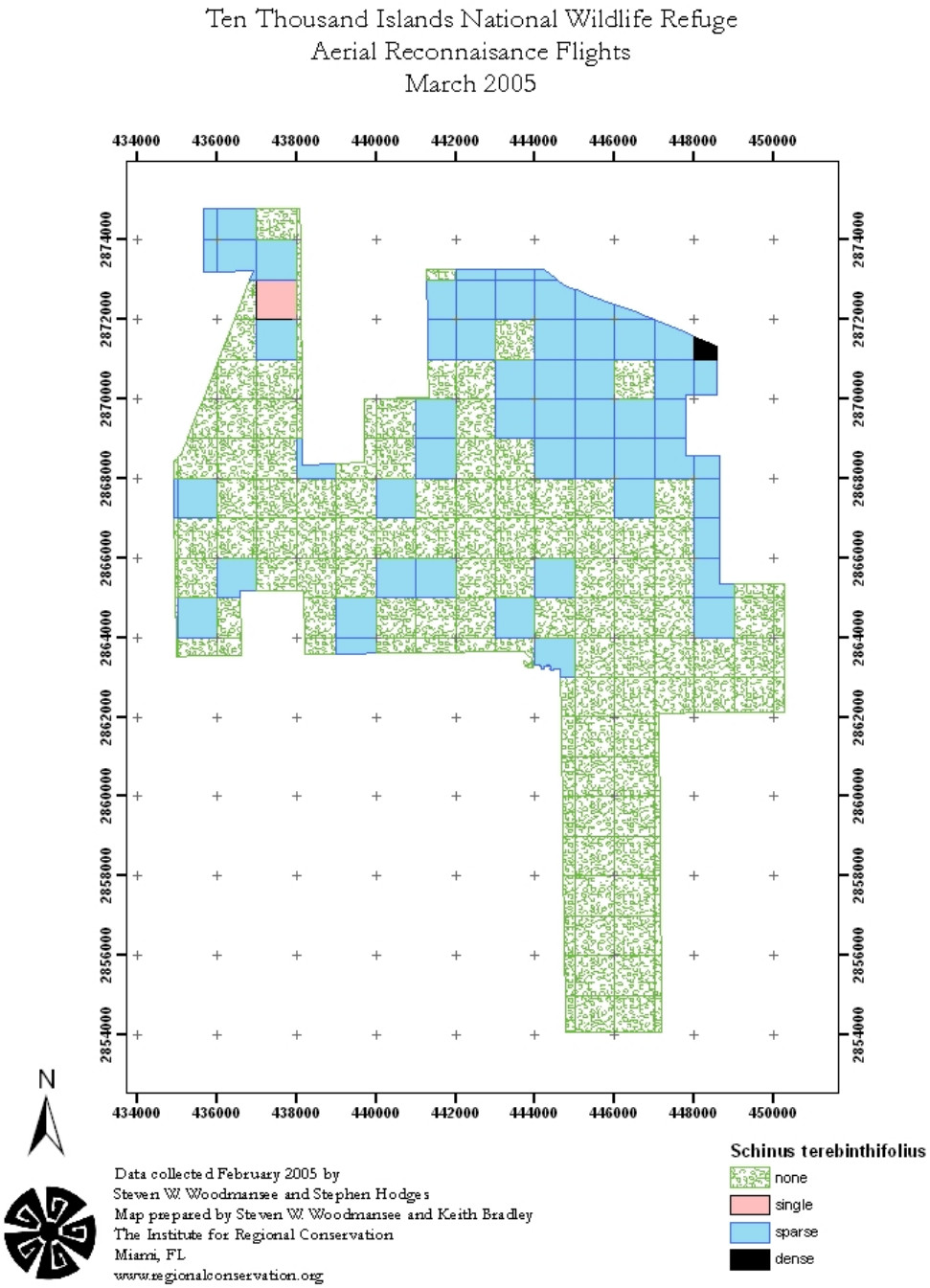

Figure 30: 2005 Ten Thousand Islands National Wildlife Refuge – *Schinus terebinthifolius* SRF.