Mangrove Colonization Patterns and Rates along the Coastal Everglades

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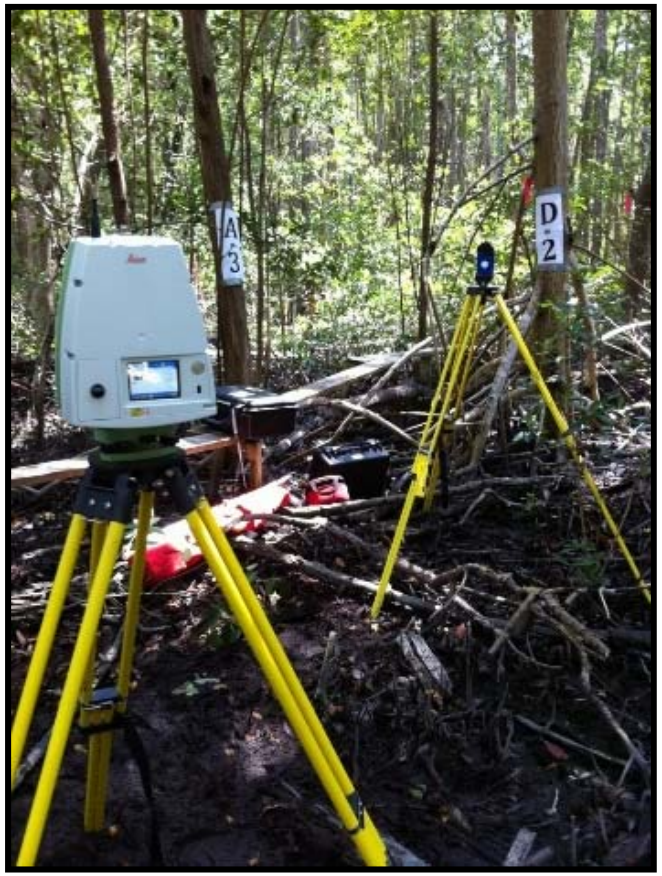
2. **Korea Polar Research Institute**

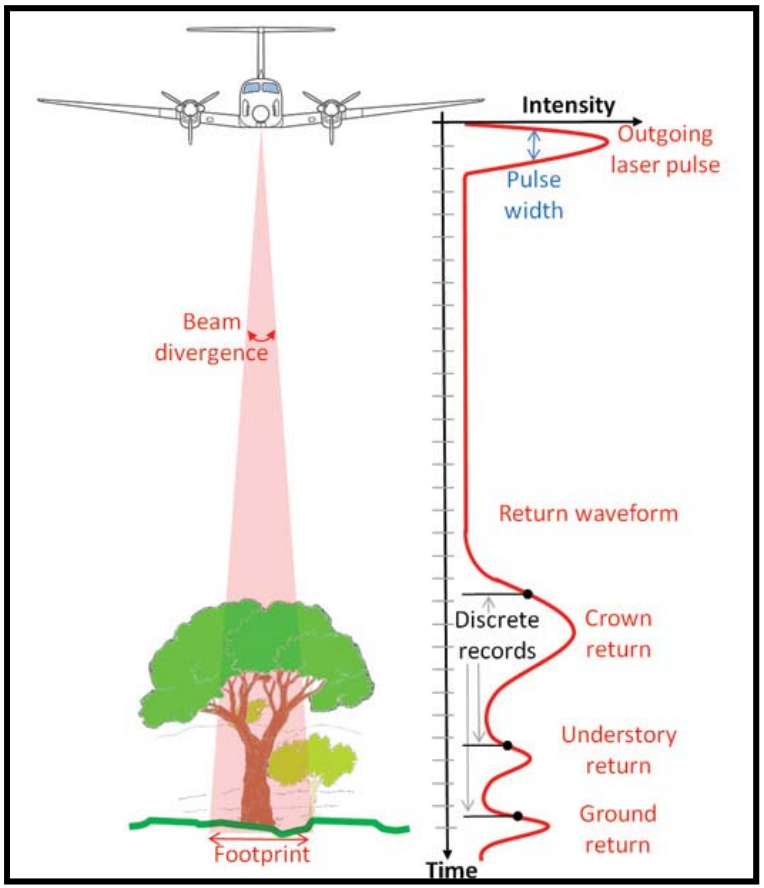
Above ground Biomass (AGB) of mangroves using remote sensing technologies

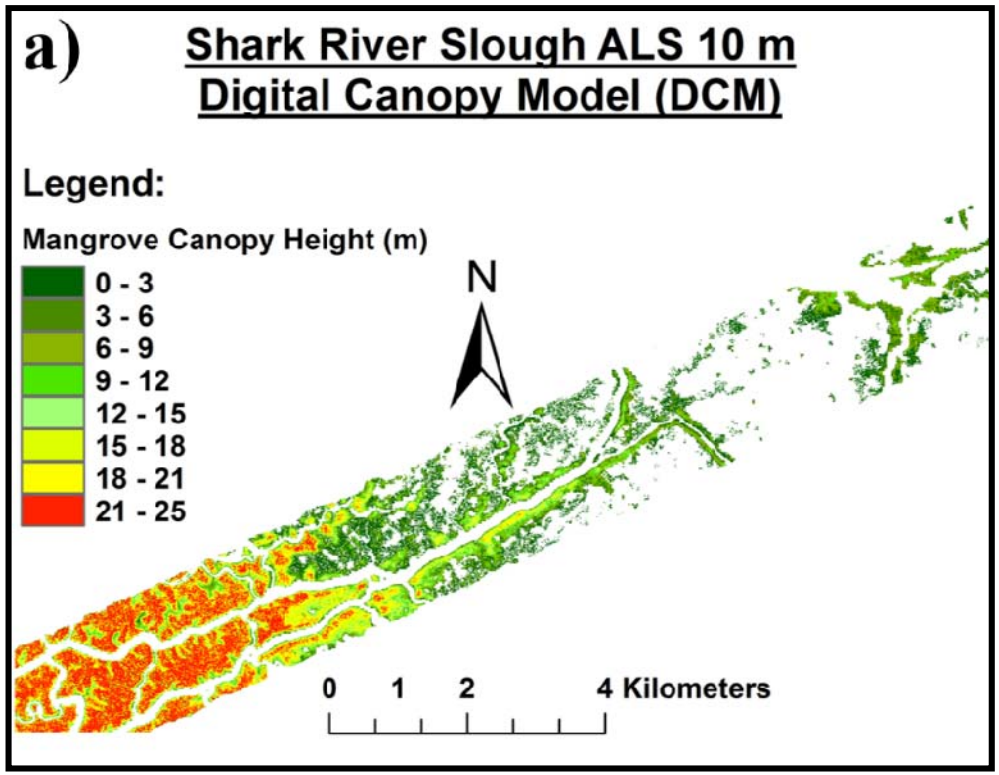
Terrestrial Laser Scanner (TLS)



Above ground Biomass (AGB) of mangroves using remote sensing technologies

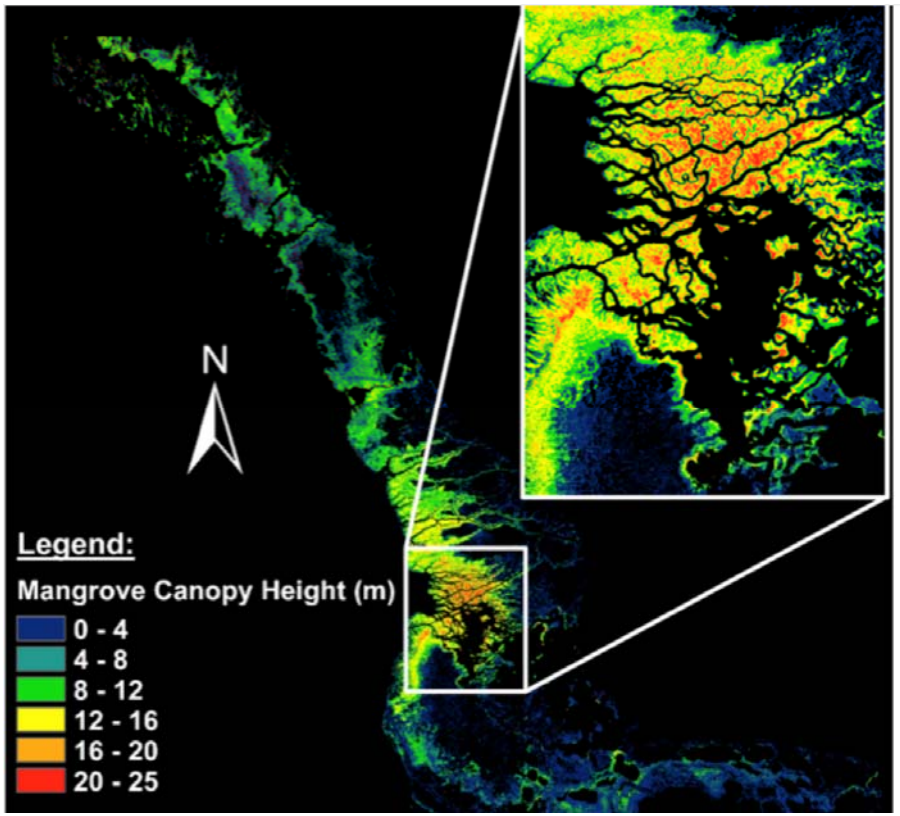
Air-borne Lidar





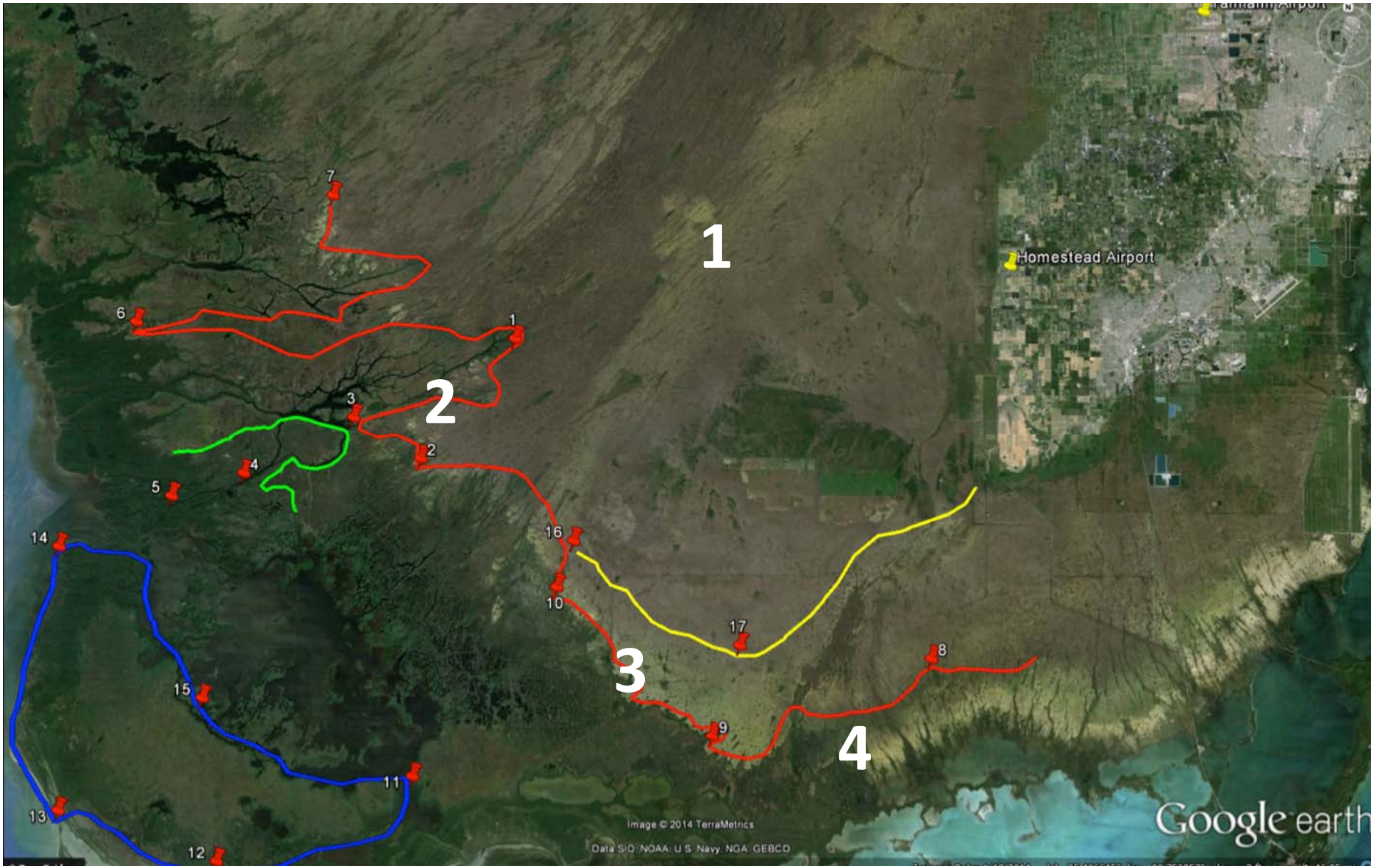
Above ground Biomass (AGB) of mangroves using remote sensing technologies

Space-borne SAR interfermetry
TanDEM-X satellite system



Ground truthing by a helicopter survey

Helicopter survey

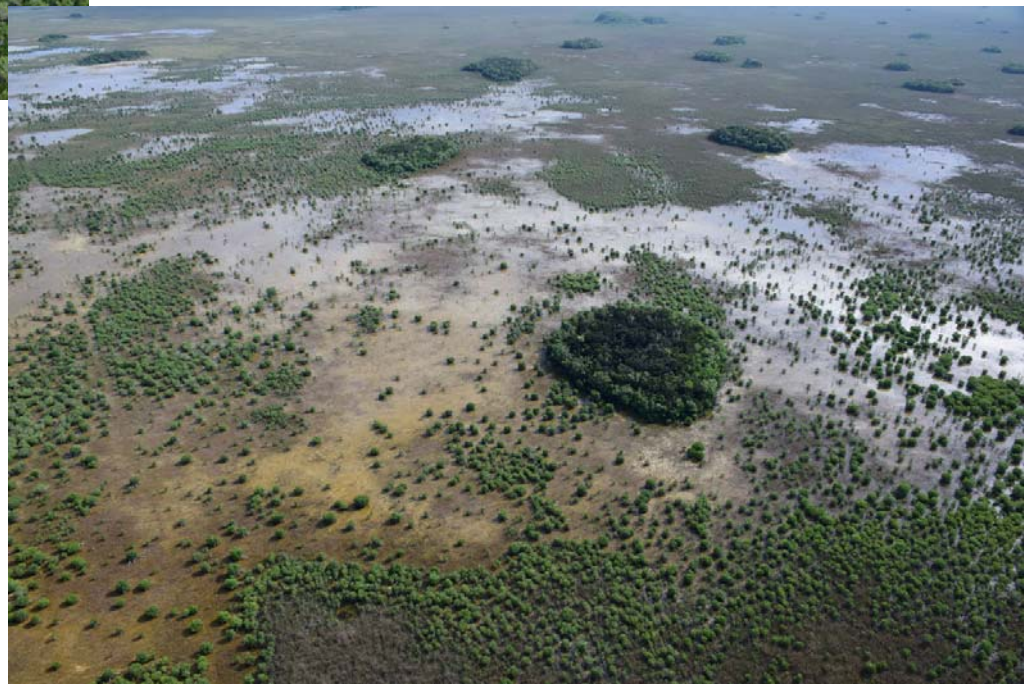


Fingering colonization pattern

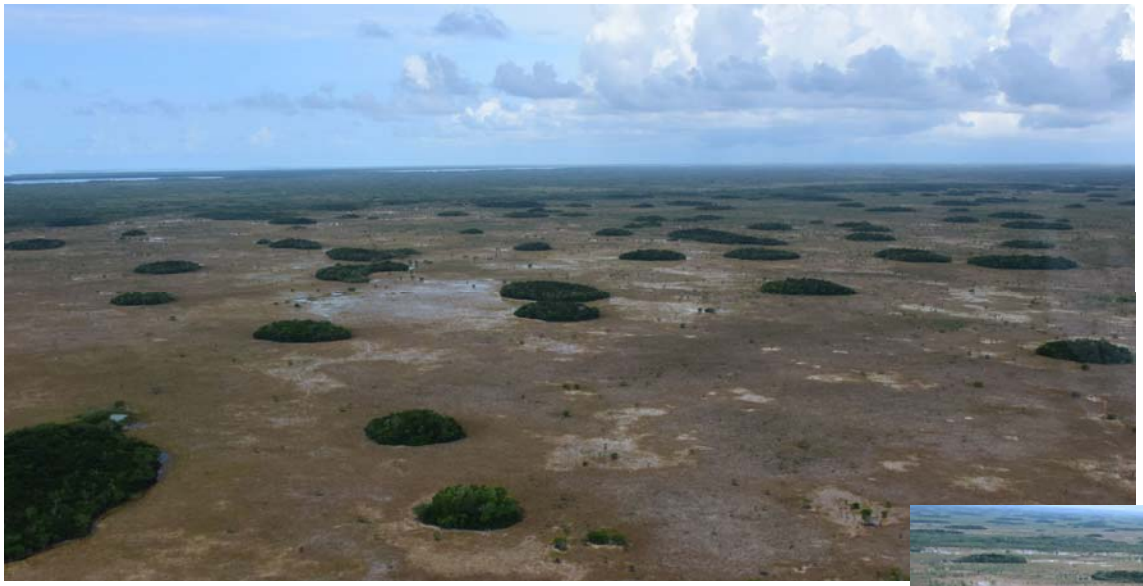
Fingering colonization pattern

Continuous colonization pattern

Continuous colonization pattern

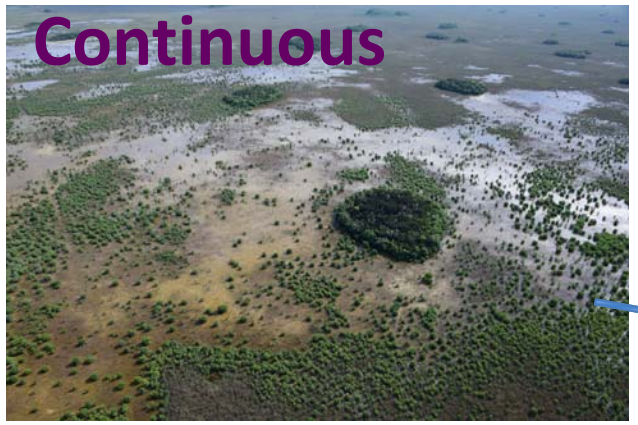


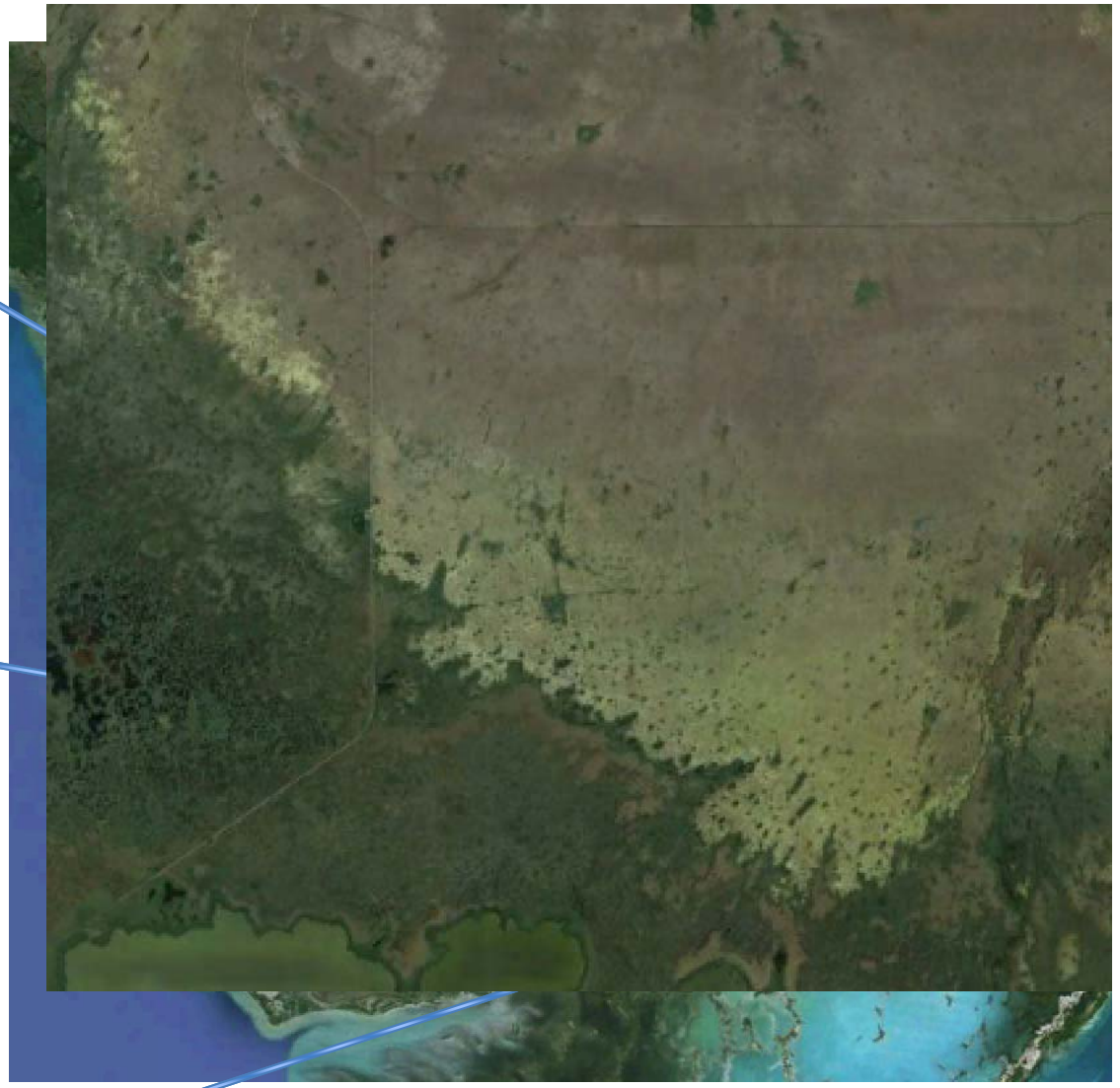
Sporadic colonization pattern
The “White” zone



Sporadic colonization pattern
The “White” zone

Mangrove Colonization Patterns

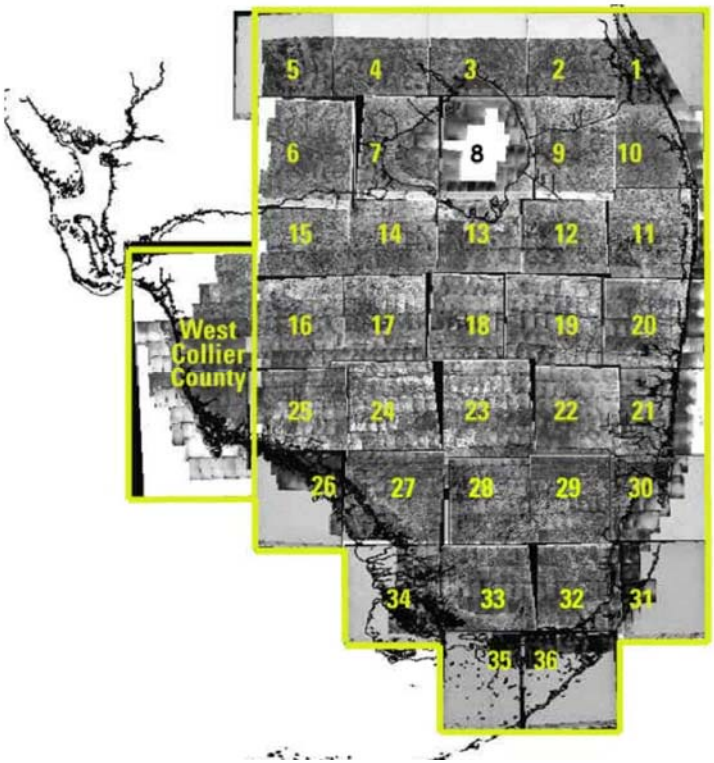


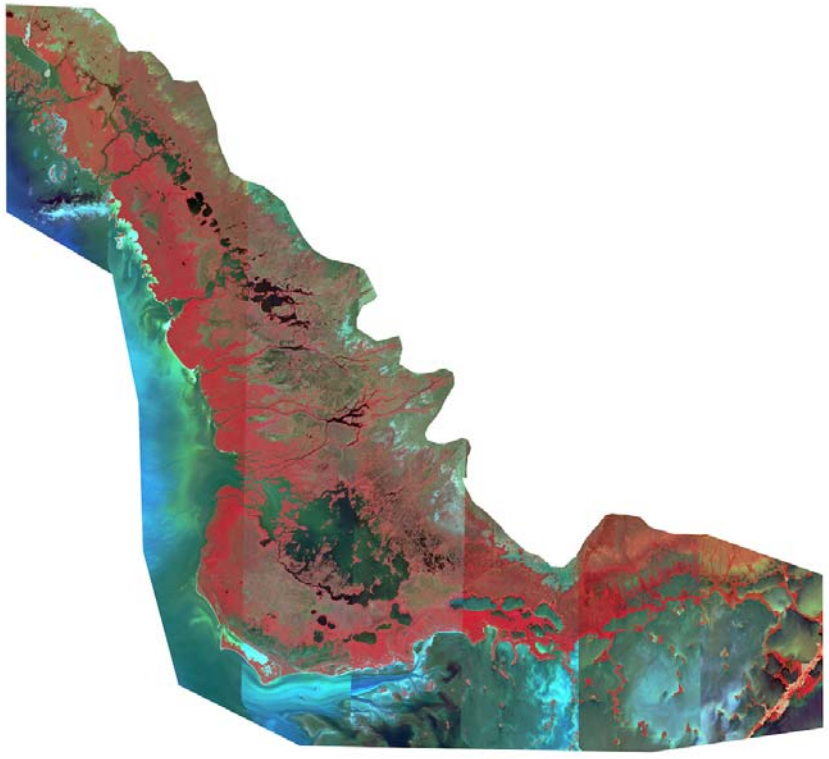


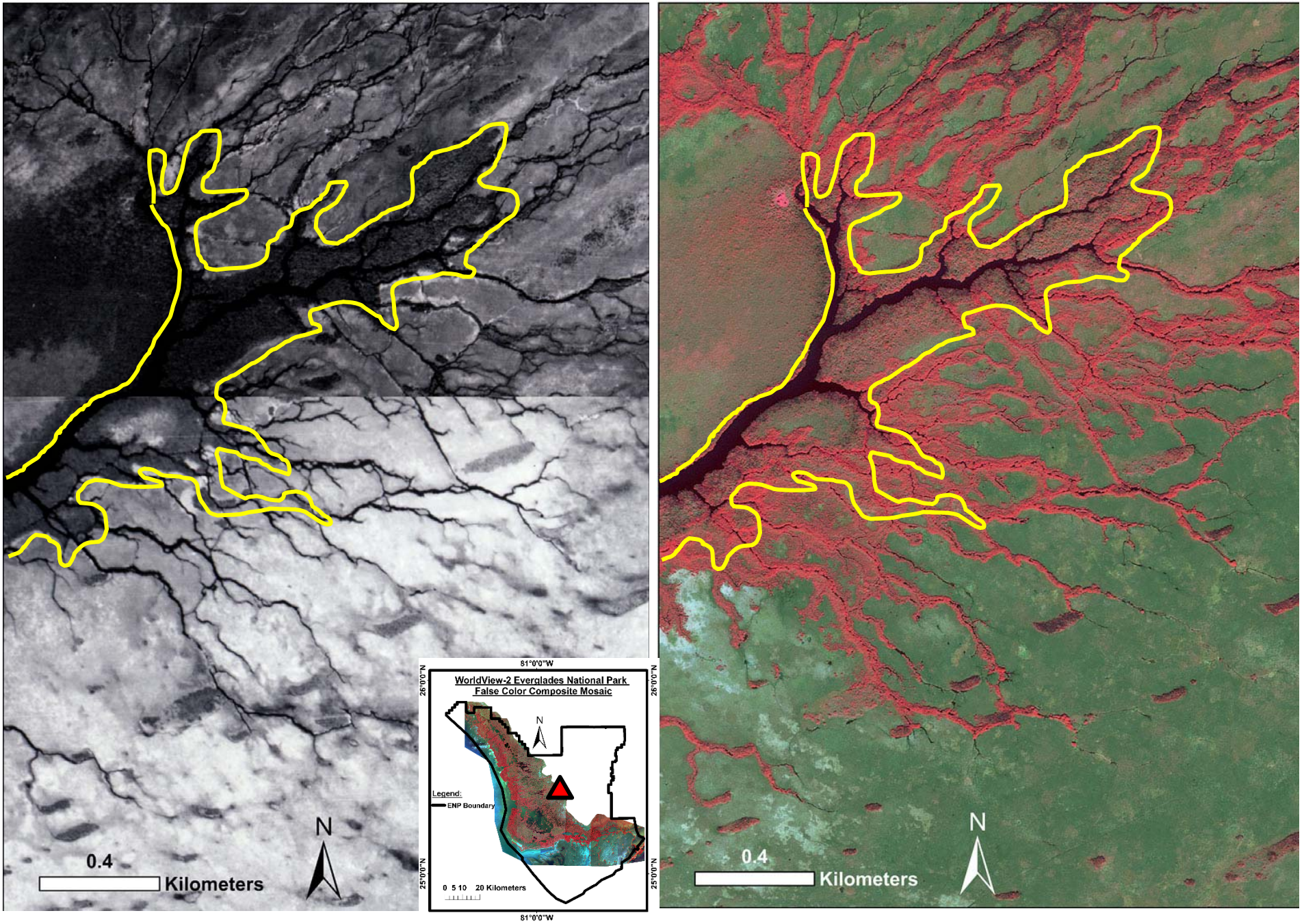
Estimating colonization rate

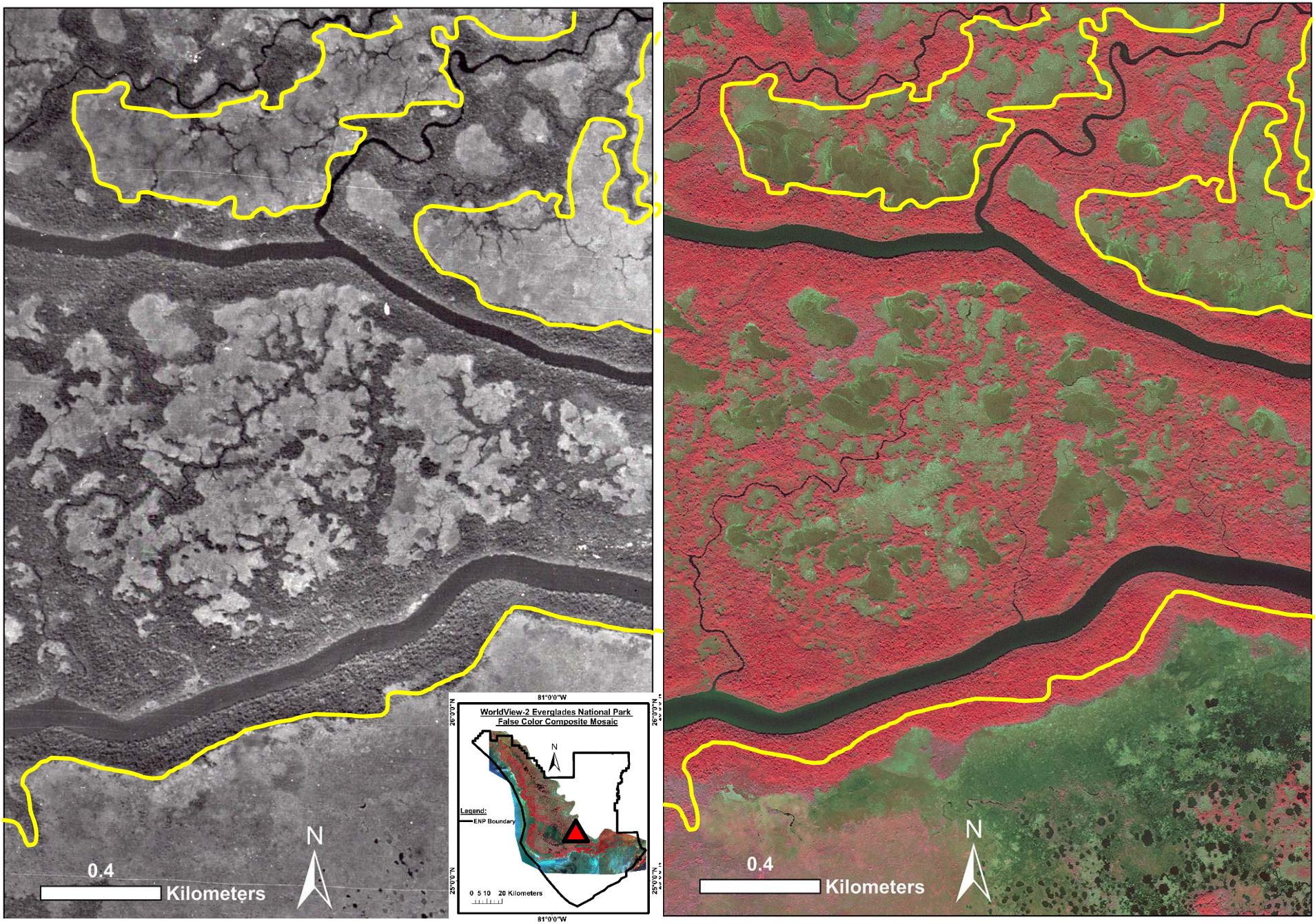
Remote sensing analysis: Comparison between

- 1940 Greater Everglades and South Florida Aerial Photoset (http://sofia.usgs.gov/exchange/aerial-photos/) - 2 m pixel resolution.
- 2015 WorldView-2 satellite imagery - 1.85 m pixel resolution. False color composite (bands - 7,5,3)






0.4
Kilometers
N
81°0'0"W
25°0'0"N
26°0'0"N
WorldView-2 Everglades National Park
False Color Composite Mosaic
N
Legend:
ENP Boundary
0 5 10 20 Kilometers
81°0'0"W
25°0'0"N
26°0'0"N
0.4
Kilometers
N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81°0'0"W
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False Color Composite Mosaic
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Legend:
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0 5 10 20 Kilometers
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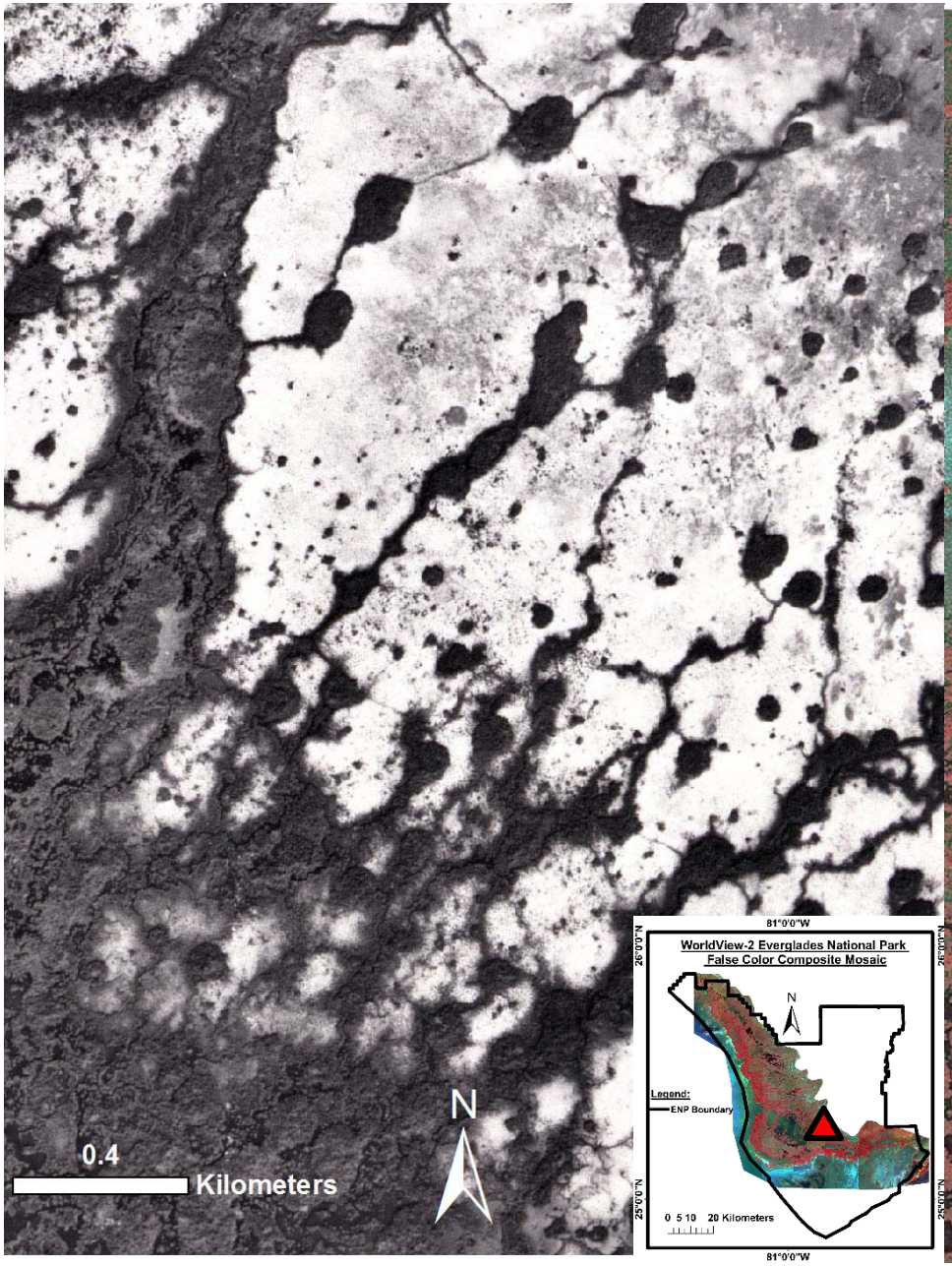
0.4
Kilometers
N

81°0'0"W
26°0'0"N
WorldView-2 Everglades National Park
False Color Composite Mosaic
N
Legend:
ENP Boundary
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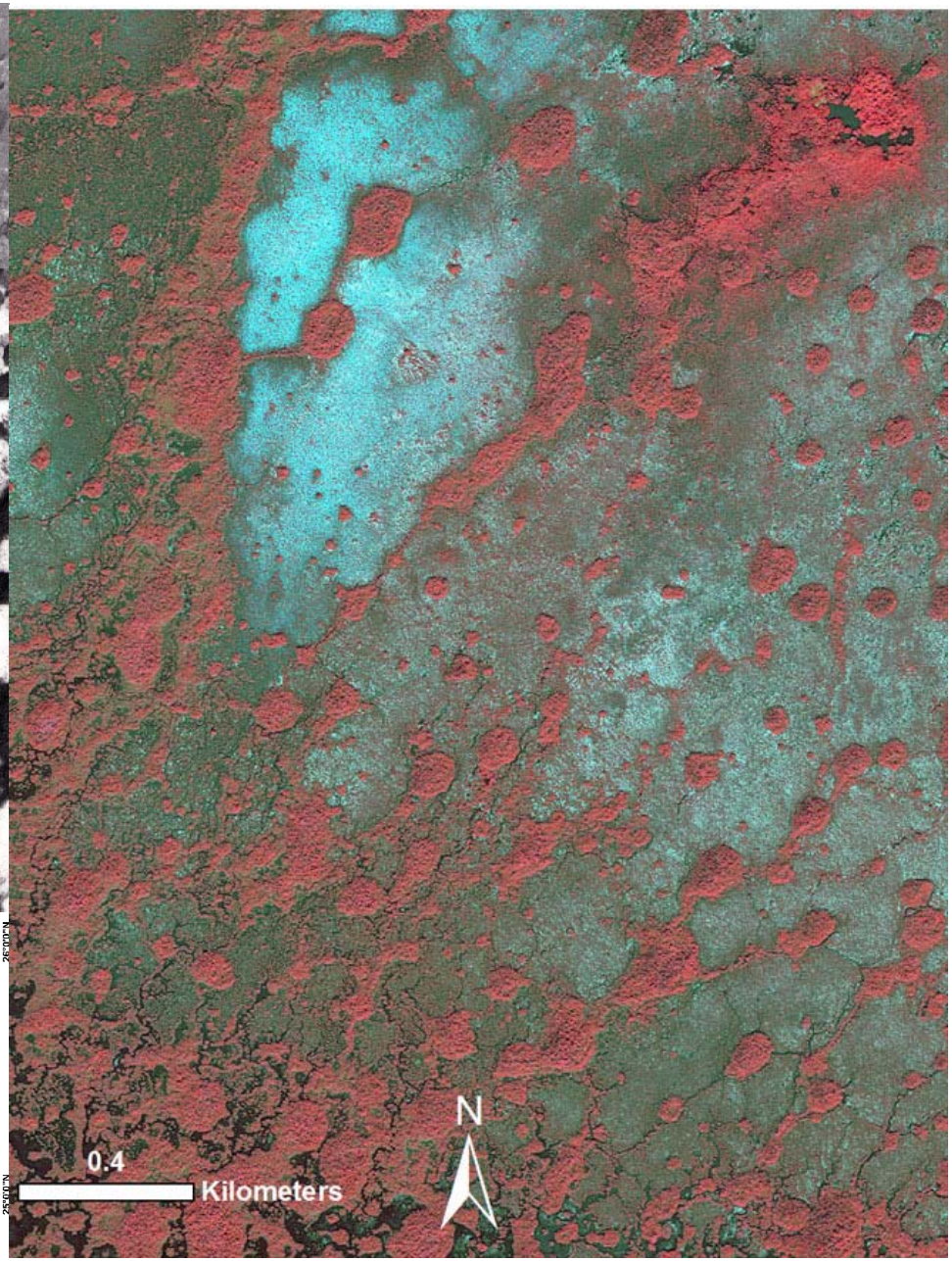
81°0'0"W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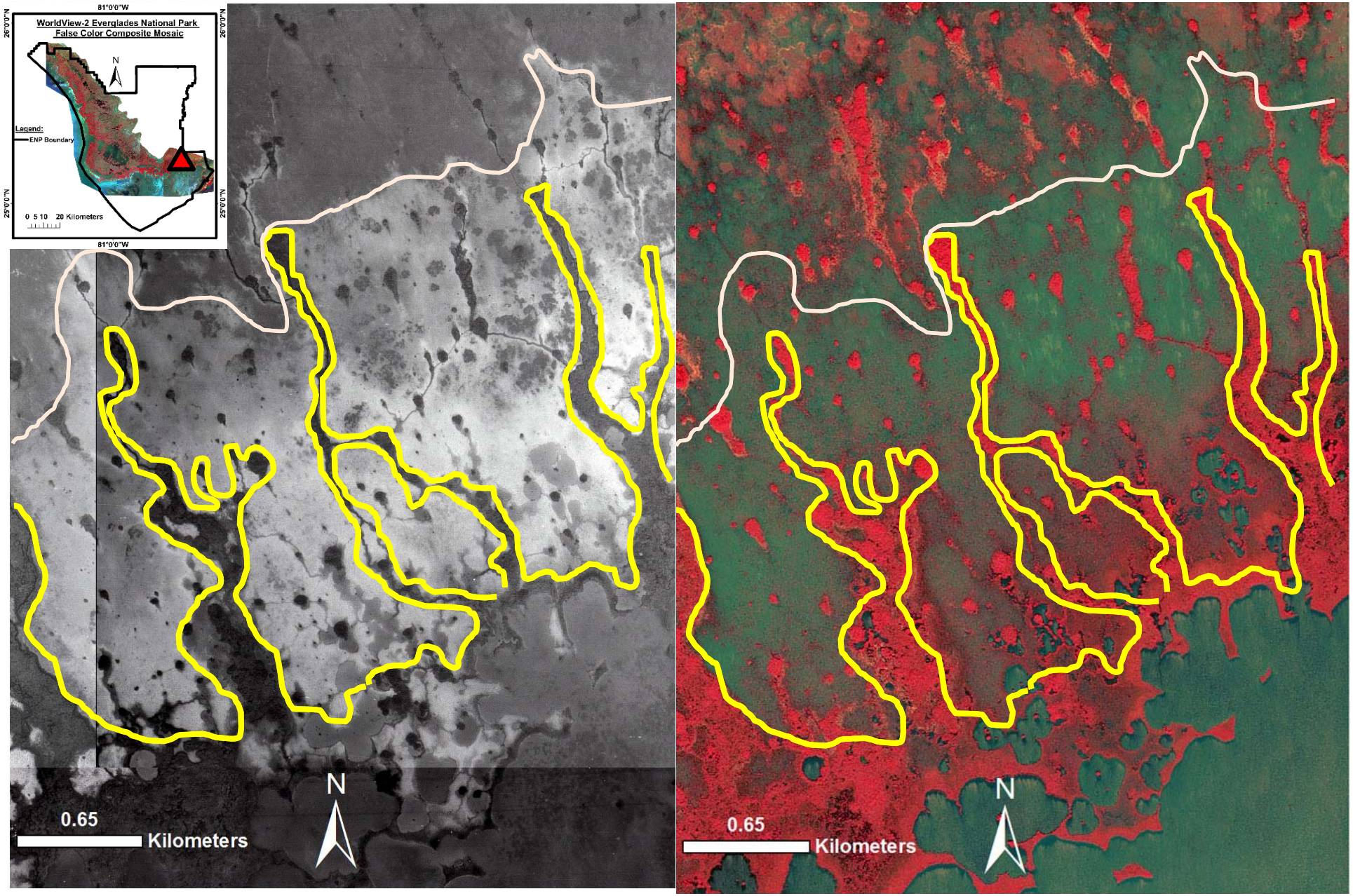
81°0'0"W
WorldView-2 Everglades National Park
False Color Composite Mosaic
N
Legend:
ENP Boundary
0 5 10 20 Kilometers
25°0'0"N
81°0'0"W
0.65
Kilometers
N
0.65
Kilometers
N

Summary

- **We identified three colonization patterns**
  - **Fingering**
  - **Continuous**
  - **Sporadic (“white” zone)**
- **The different patterns reflect the combined effect of:**
  - **Topography**
  - **Tidal channel propagation**
  - **Freshwater supply**
- **Colonization rate is estimated by comparing 1940 areal photoset with 2015 WorldView-2 imagery**
  - **Preliminary results indicate a maximum of 1.4 km of eastward expansion (1400 m/ 75 yrs ~ 20 m/yr).**

Acknowledgements

Data

- Digital Globe Foundation - WorldView-2 Satellite Imagery
- SOFIA (USGS) – 1940 areal photoset

Support

- NASA
- NSF