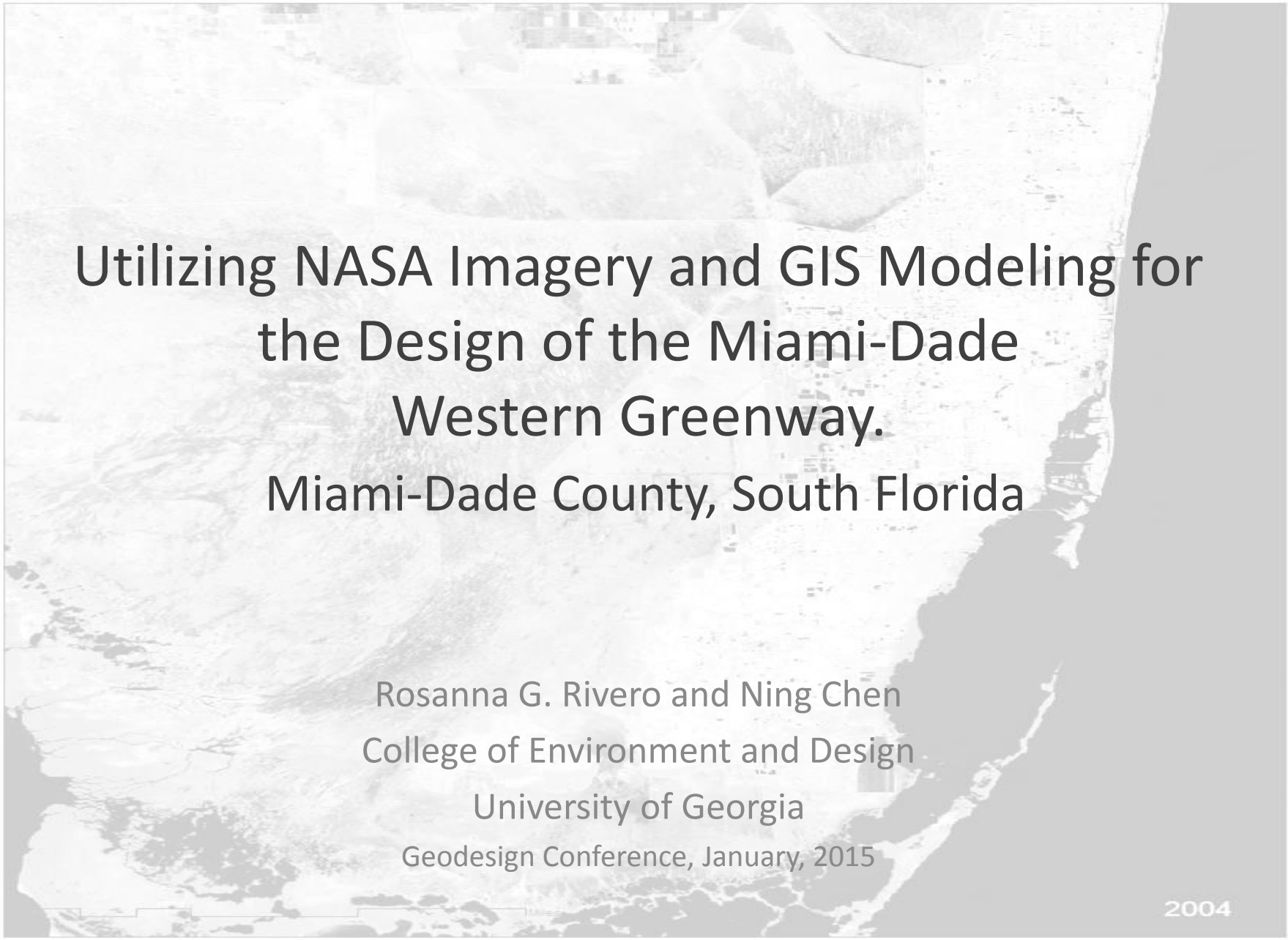
Utilizing NASA Imagery and GIS Modeling for the Design of the Miami-Dade Western Greenway.

Miami-Dade County, South Florida

Rosanna G. Rivero and Ning Chen
College of Environment and Design
University of Georgia

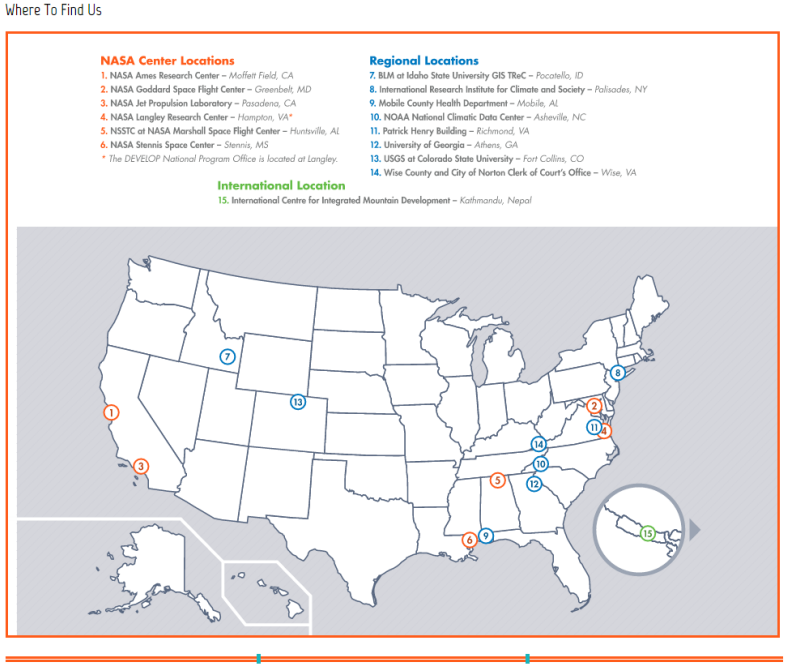
Geodesign Conference, January, 2015



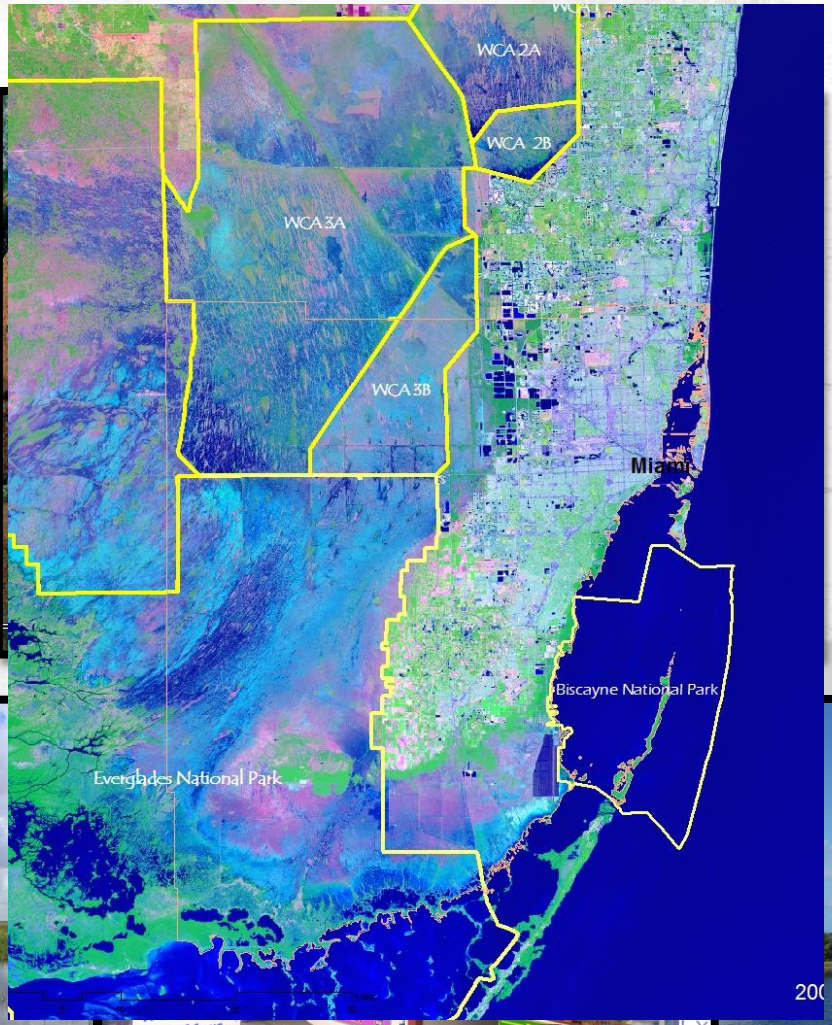
Background: The Team

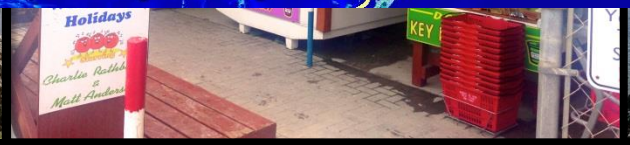
- NASA Develop – University of Georgia being one of only 14 National locations
  - DEVELOP is unique in that young professionals lead research projects that focus on utilizing NASA Earth observations to address community concerns and public policy issues.

- Opportunity to partner with:
  - Miami-Dade Parks, Recreation and Open Spaces Department
  - Trust for Public Lands

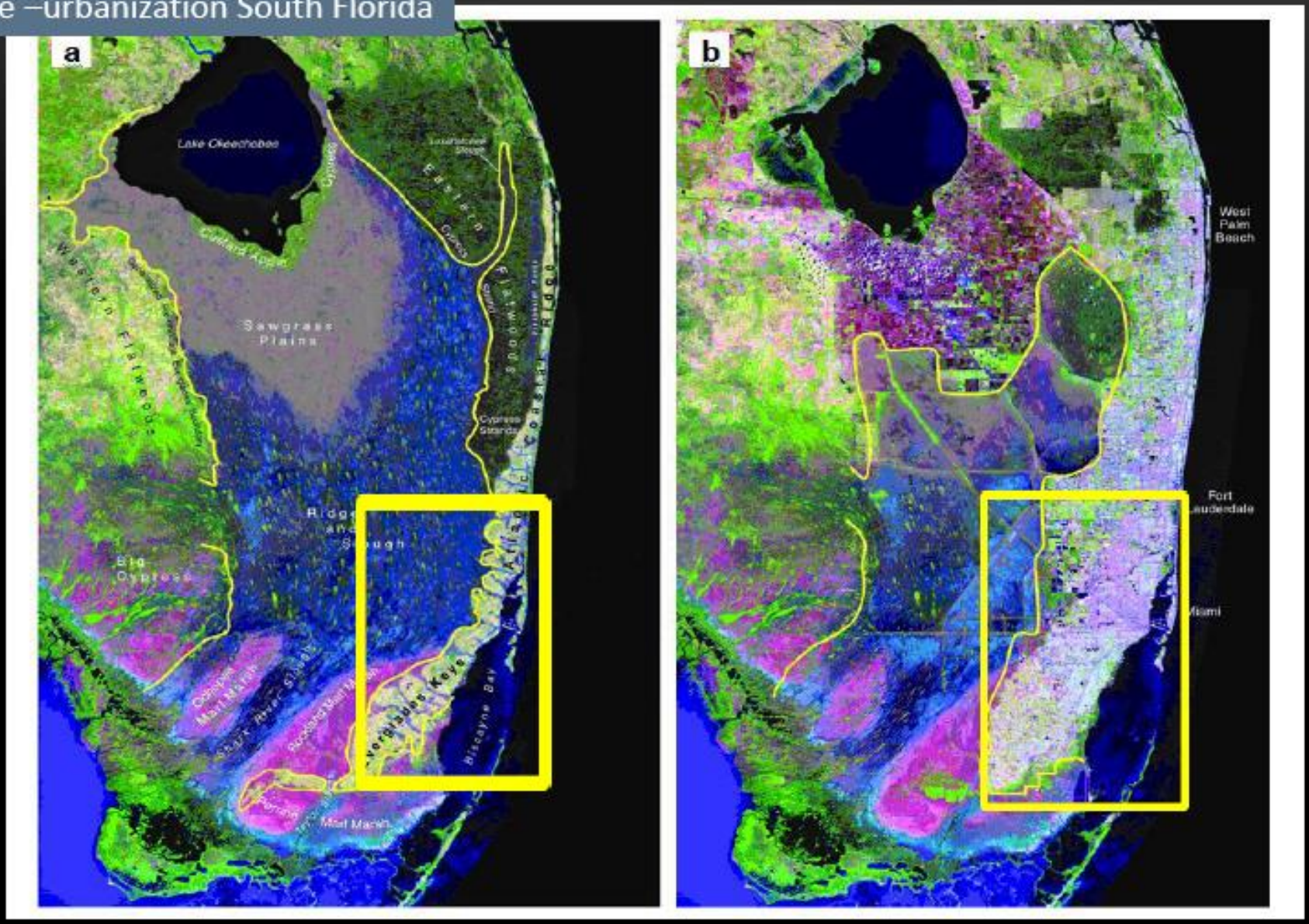


Background: The City of Miami





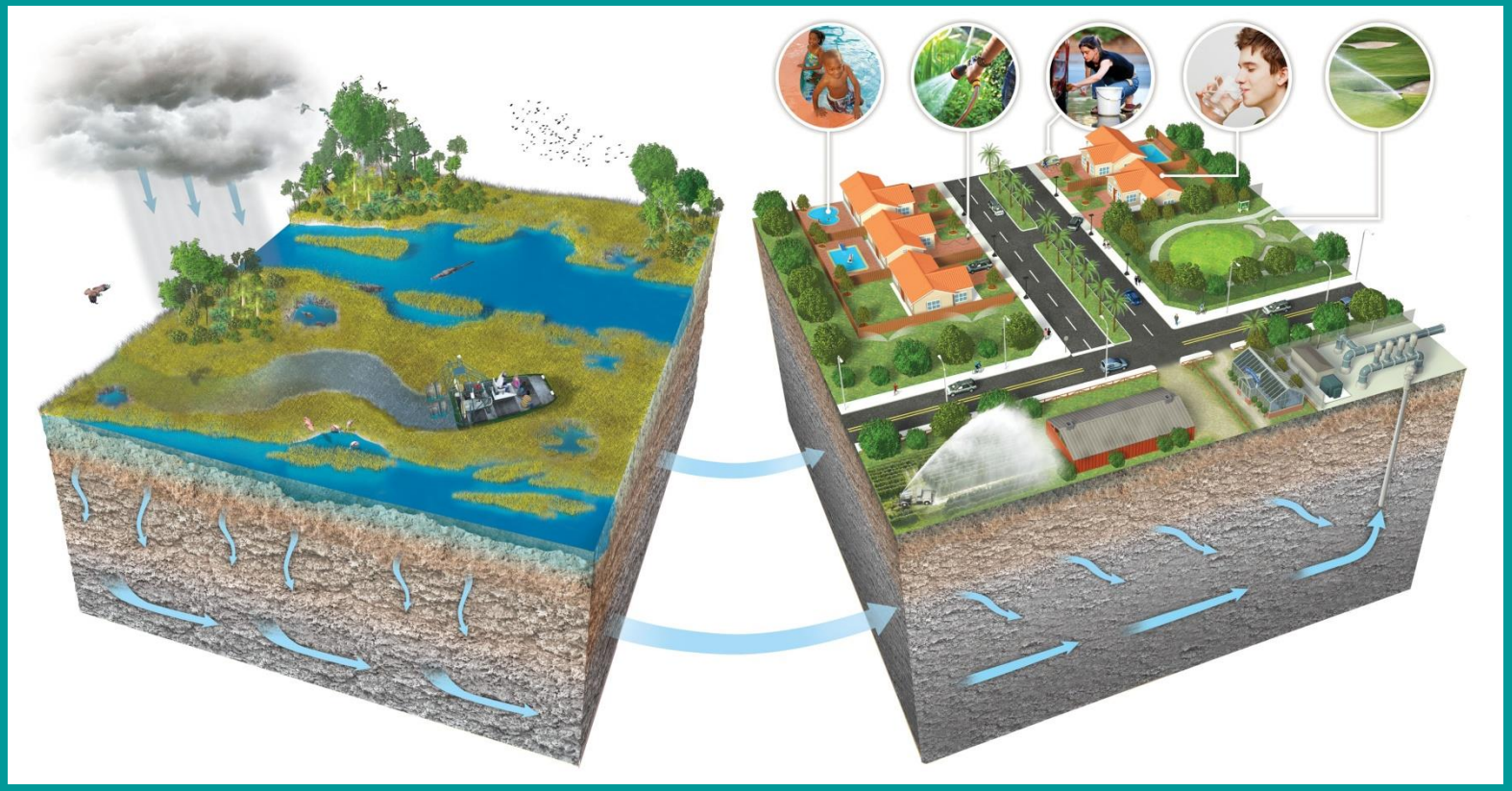
Pre –urbanization South Florida



Credits: South Florida Water Management District

Connection between the natural and the urban system

- Aquifer recharge
- Buffering effect to prevent saltwater intrusion
- Economics of Everglades restoration
- Recreational opportunities



Source: Everglades Foundation

The Project: Western Greenway

Three Goals:

- Provide Recreation Access
- Promote Agricultural-Tourism
- Protect Natural Resources and Climate Resilience

Methods and Resources:

- Use of NASA satellite imagery to obtain a vegetation health map
  - 15 meter-resolution Terra ASTER image of Miami-Dade county from March 7th 2011
- LUCIS – Land Use Conflict Identification Strategy
  - Carr and Zwick, University of Florida

The Process

- During a 10-week period, students have a rigorous timeline of deliverables:
  - Abstract and outline
  - Poster
  - Video
  - Technical Report
  - Final Presentation

Student products in the 10 week period

Field work and meetings with partners and stakeholders

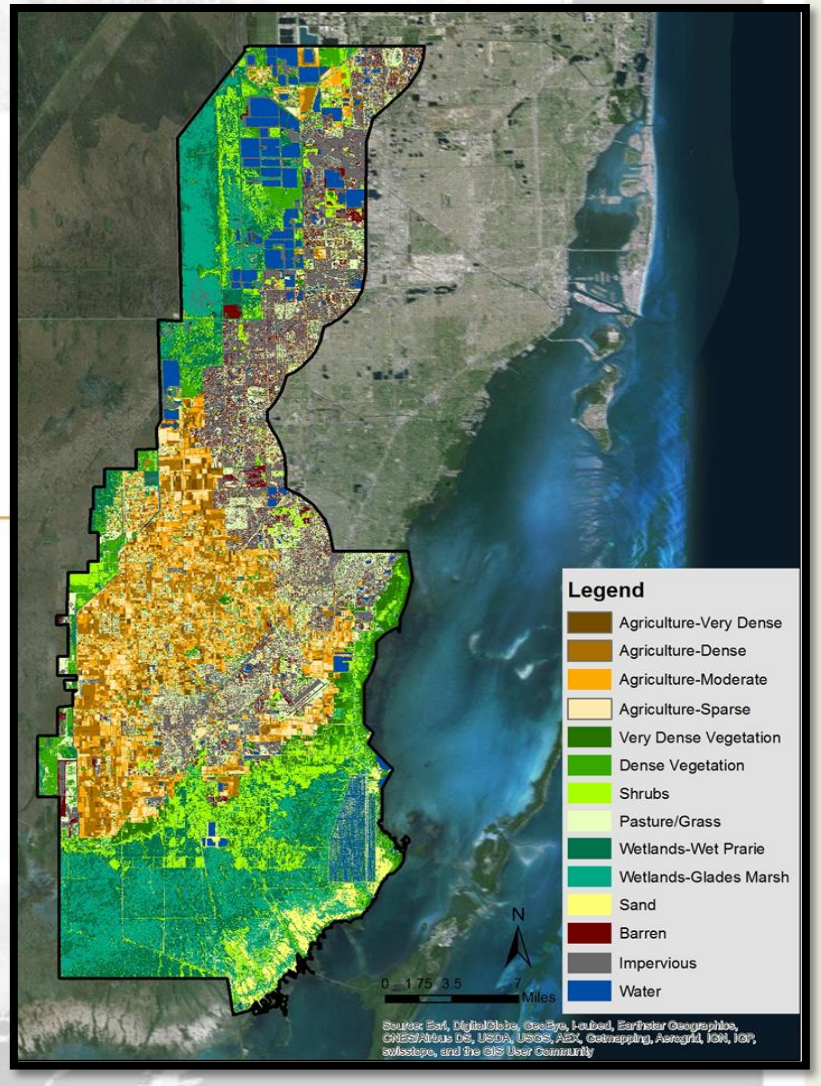
Reports, Poster, and Video to deliver to NASA

Timeline with weekly deliveries, that encourage project management

2004

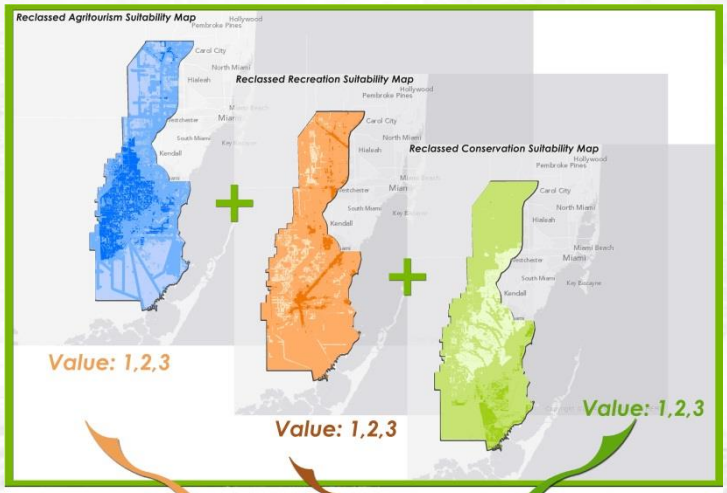
Methods

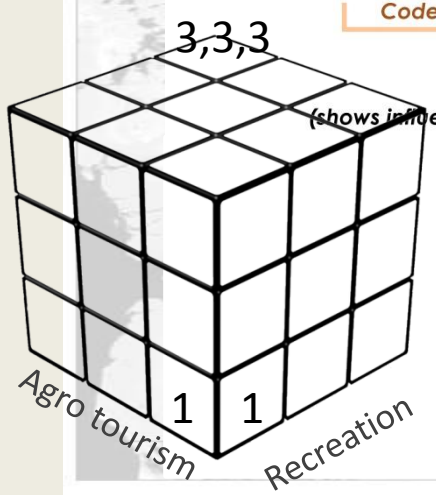
DATA PREPARATION	IMAGE PROCESSING	ANALYSIS
ASTER Data: Image captured March 7th , 2011 was acquired from the USGS GLOVIS website	Atmospheric Correction ENVI 5.0 QUick Atmospheric Correction (QUAC)	NDVI Classification
		LUCIS Model analysis
Acquired Miami-Dade County 2013 Land Use Management Application (LUMA) data set	A composite image was created from bands 3, 2,1 and NDVI	A Land Cover Classification Map was created from the Composite ASTER Bands
Acquired Florida Area Natural Inventory (FNAI) dataset	Land use information was integrated with ASTER imagery	Conservation, Agritourism, and Recreation



Decision Support Tool

LUCIS –Land Use Conflict Identification Strategy (*)

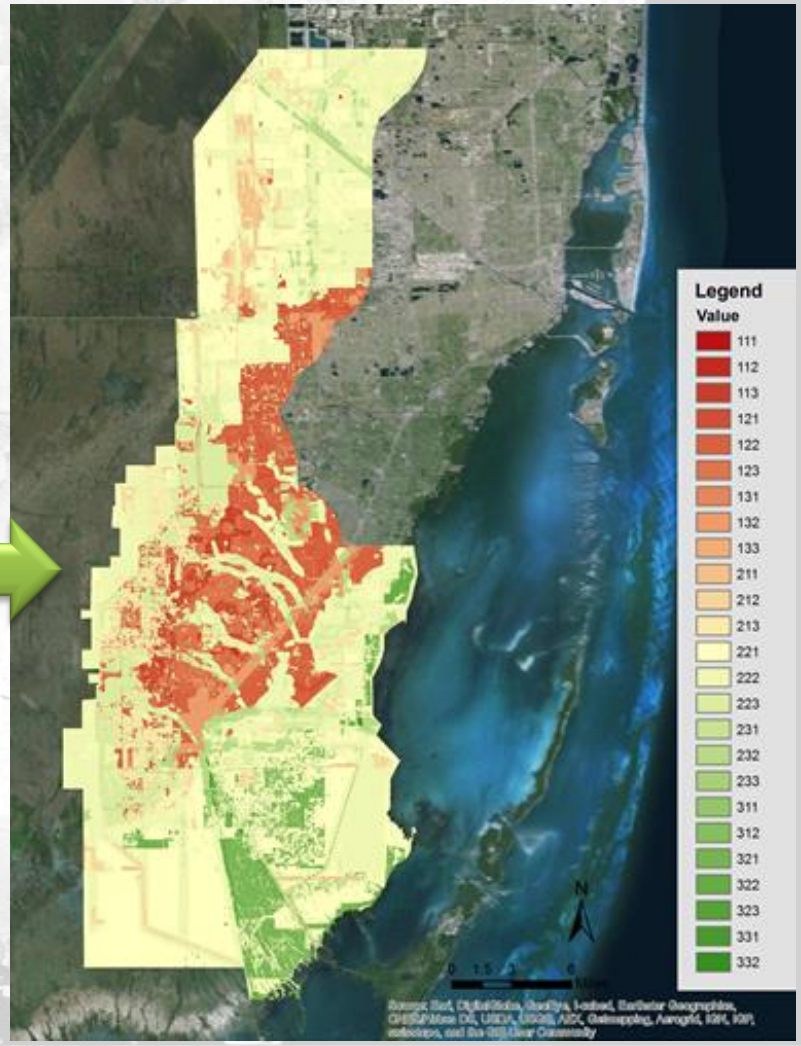




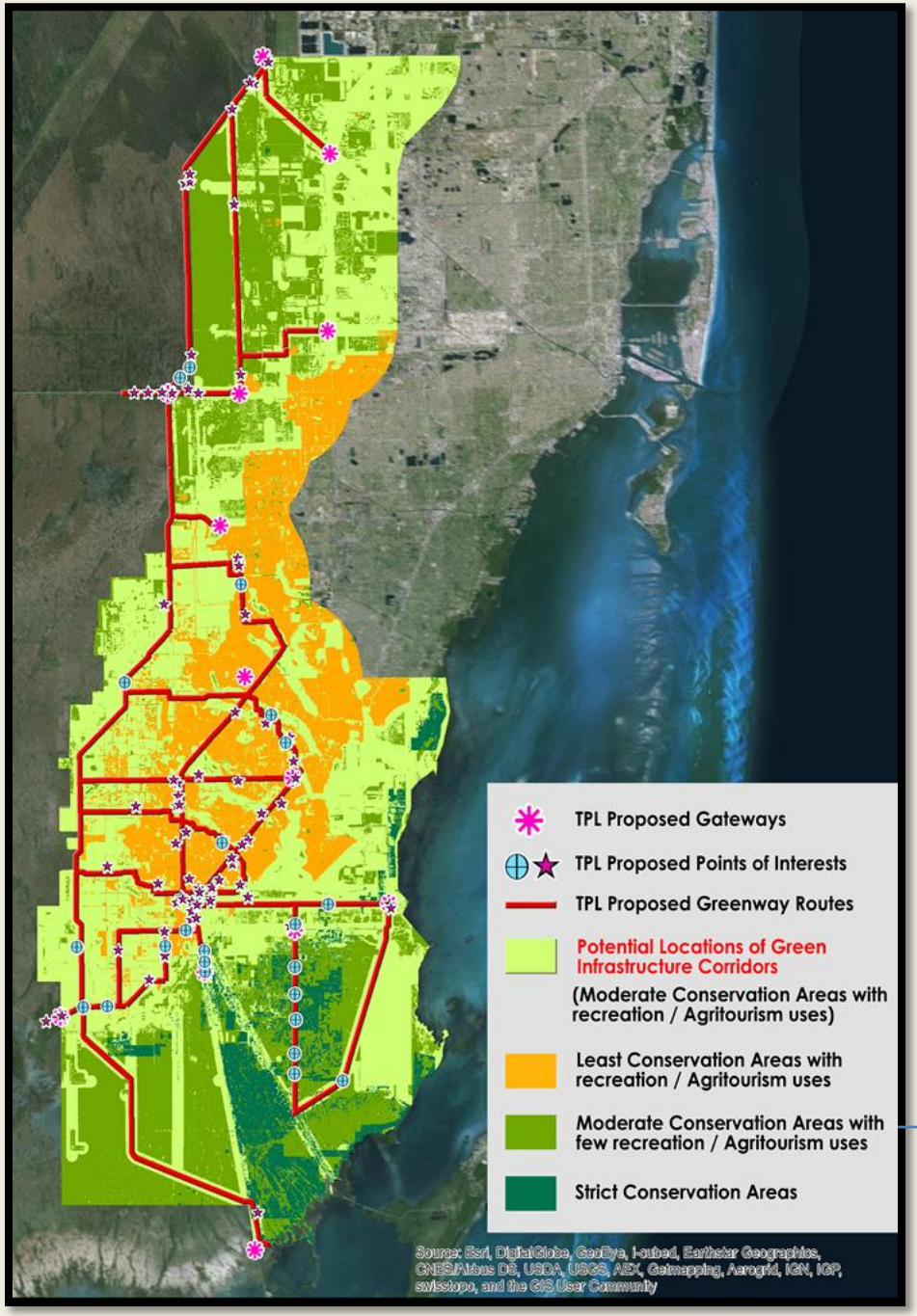
111-222-333 Major Conflict

YXX – Moderate Conflict

3xx
X3x -– Dominant preference
xx3 of 1 category

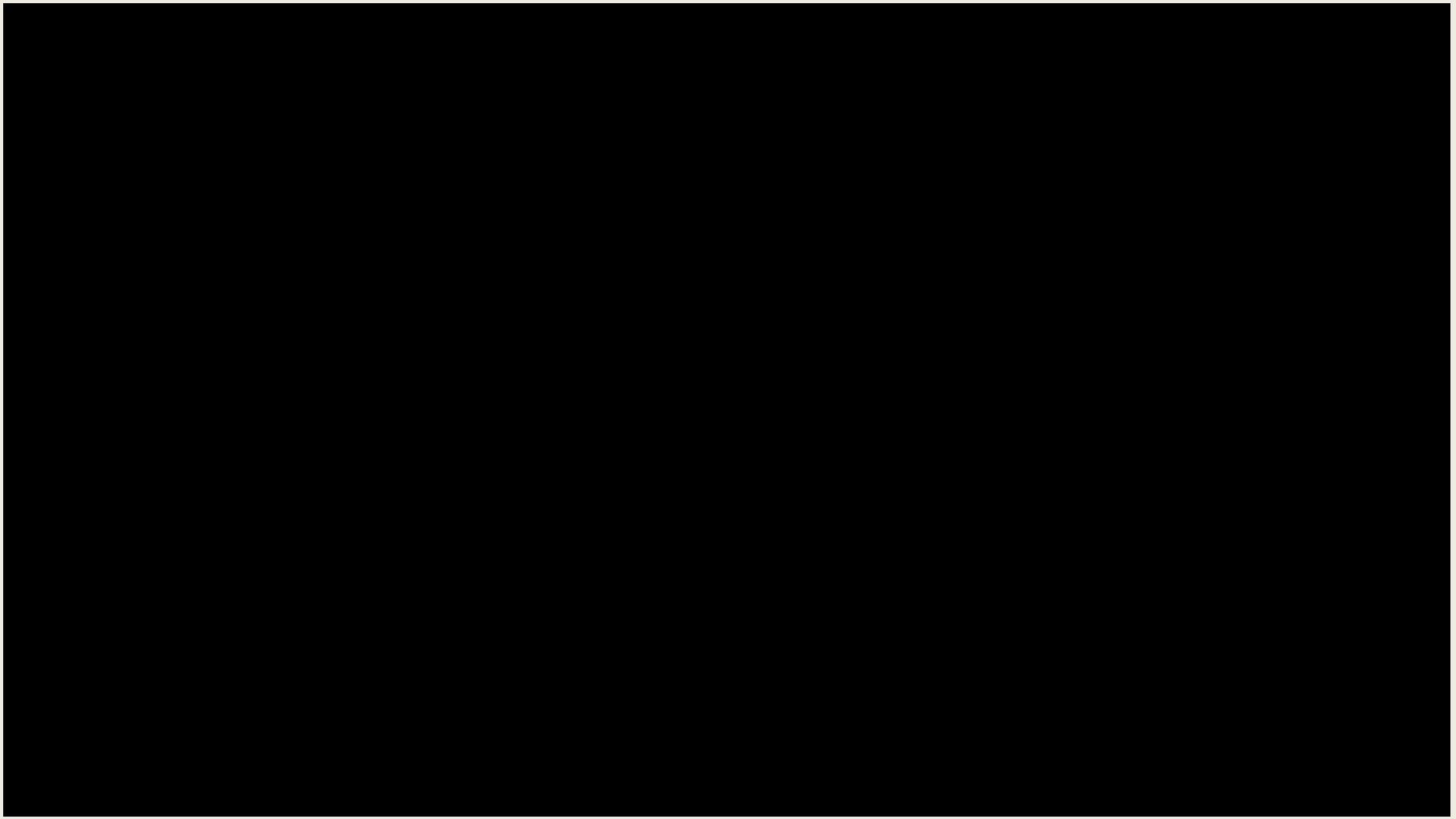


(*) Carr and Zwick. Smart Land Use Analysis. The LUCIS Model.



Results

Combining county/ TPL proposals for gateways and points of interests with categories of less conflicting areas for the 3 uses, and discussing various alternatives with partners, this is the resulting map.



Future Perspectives

- Geodesign offers the possibility of integrating science and decision-making, by interpreting complex data into relatively simple categories that can be used, manipulated, and adapted for negotiation, by a group of stakeholders, based on their particular interest.

- Integrating traditional suitability, with users preferences, gives more power to geodesign tools, and allows for a more informed negotiation between stakeholders.

- By teaching students from various disciplines how to integrate these tools into their regular set of research strategies, we help them being more driven into helping them informed land managers and other decision-makers.

Thanks to …

- **Authors:**
  Ning Chen, Project Lead (University of Georgia)
  Mohamed Amin (University of Wisconsin-Madison)
  Lauren Anderson (University of Georgia)
  Erick Braun (Georgia State University)
  Tunan Hu (University of Georgia)
  Linli Zhu (University of Georgia)
- **Mentors/Advisors:**
  Dr. Rosanna G. Rivero (College of Environment and Design, University of Georgia)
  Dr. Sergio Bernardes (Department of Geography, University of Georgia)
  Dr. Marguerite Madden (Department of Geography, University of Georgia)
- **Past/Other Contributors (Miami-Dade Ecological Phase I):**
  Ike Astuti (University of Georgia)
  Becky Lynn (University of Georgia)
  Caren Remillard (University of Georgia)
  Dr. Francisco J. Escobedo (School of Forest Resources and Conservation, University of Florida)

Partners:
Brenda Faber, Project Lead (The Trust for Public Lands)

Alissa Turtletaub, Miami-Dade, Western Greenway Project Manager, MDC-Parks Recreation and Open Space

Sponsor:

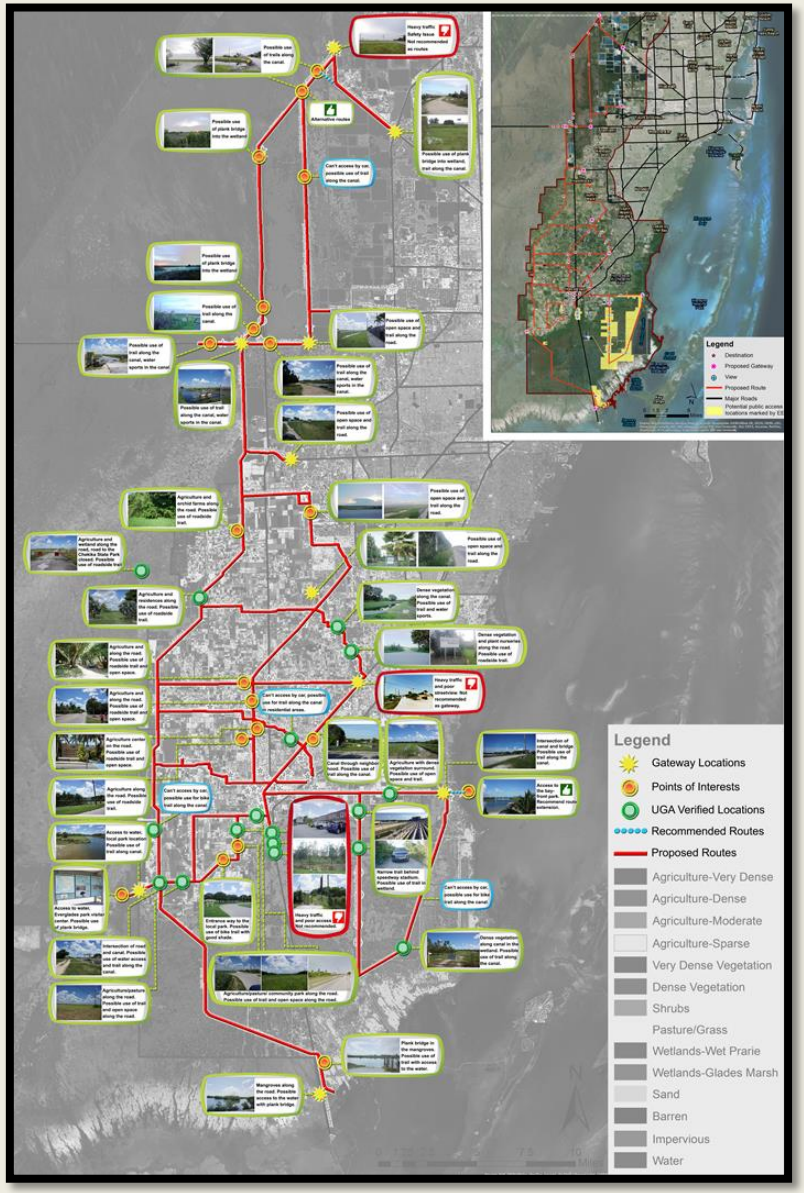
NASA Develop

2004

For more information: rrivero@uga.edu

Earthzine Video @ http://earthzine.org/2014/08/03/exploring-a-sustainable-coexistence-between-miami-and-the-everglades/

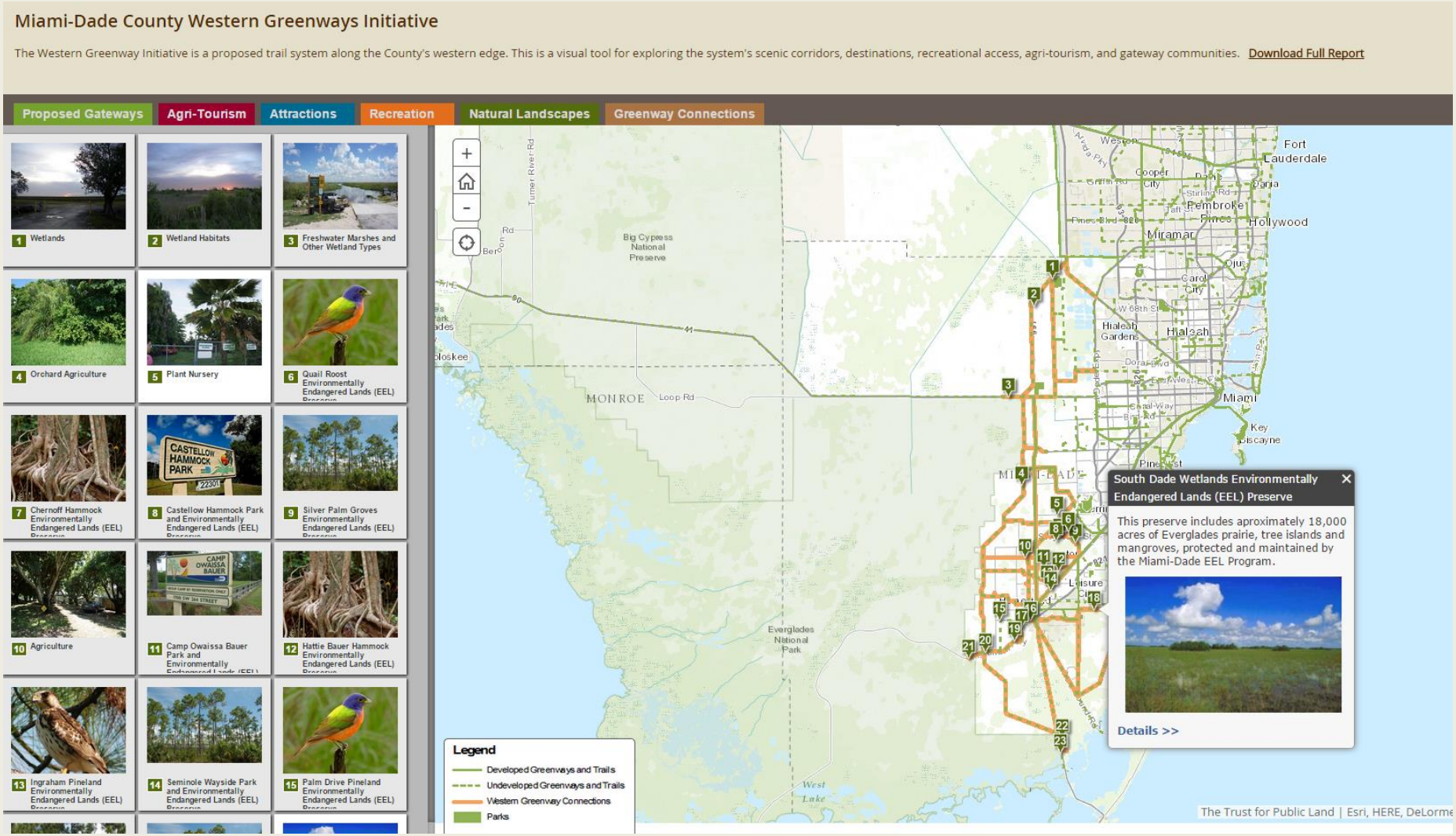
Trail Analysis Map



Visualizations

- **Conceptual Ideas**

Website


Miami-Dade County Western Greenways Initiative
The Western Greenway Initiative is a proposed trail system along the County's western edge. This is a visual tool for exploring the system's scenic corridors, destinations, recreational access, agri-tourism, and gateway communities.
Download Full Report
Proposed Gateways
Agri-Tourism
Attractions
Recreation
Natural Landscapes
Greenway Connections
1 Wetlands
2 Wetland Habitats
3 Freshwater Marshes and Other Wetland Types
4 Orchard Agriculture
5 Plant Nursery
6 Quail Roost Environmentally Endangered Lands (EEL)
7 Chernoff Hammock Environmentally Endangered Lands (EEL)
8 Castellow Hammock Park and Environmentally Endangered Lands (EEL)
9 Silver Palm Groves Environmentally Endangered Lands (EEL)
10 Agriculture
11 Camp Owaissa Bauer Park and Environmentally
12 Hattie Bauer Hammock Environmentally Endangered Lands (EEL)
13 Ingraham Pineland Environmentally Endangered Lands (EEL)
14 Seminole Wayside Park and Environmentally Endangered Lands (EEL)
15 Palm Drive Pineland Environmentally Endangered Lands (EEL)
Big Cypress National Preserve
MONROE
Everglades National Park
Fort Lauderdale
Hollywood
Miramar
Hialeah
Miami
South Dade Wetlands Environmentally Endangered Lands (EEL) Preserve
This preserve includes aproximately 18,000 acres of Everglades prairie, tree islands and mangroves, protected and maintained by the Miami-Dade EEL Program.
Details >>
Legend
Developed Greenways and Trails
Undeveloped Greenways and Trails
Western Greenway Connections
Parks
The Trust for Public Land | Esri, HERE, DeLorme