PLANNING FOR SEA LEVEL RISE IN THE MATANZAS BASIN

OVERVIEW

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Transfer Workshop, Waquoit Bay NERR

Introduction

Action Research Objectives

- Pilot and evaluate adaptation planning in a place
- Share approaches, tools, and lessons learned with other places
  - This workshop at Waquoit Bay NERR
  - Planning resource document (Guidebook, Toolkit)
  - PlanningMatanzas.org

Sea Level Rise Adaptation Planning

Matanzas Inlet and Summer Haven, south of St. Augustine, Northeast Florida

Guana Tolomato Matanzas (GTM) National Estuarine Research Reserve

UF-GTM 3-year project “Planning for Sea Level Rise in the Matanzas Basin”

How Project Was Developed

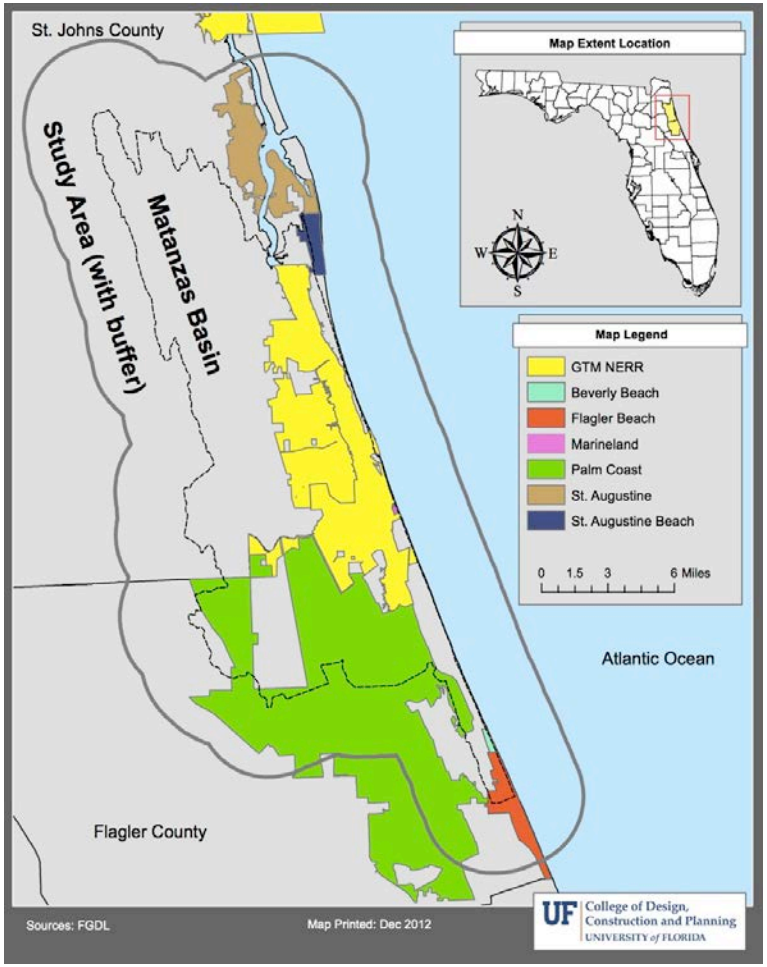
- Guana Tolomato Matanzas (GTM) NERR
  - Basic idea – vulnerability to sea level rise, outreach
- University of Florida (UF)
  - Added – vulnerability to future development and storm surge, conservation priorities, potential adaptation strategies, social science
- NERRS Science Collaborative
  - Three year grant, $600,000

Matanzas Project Objectives

- Initiate planning for sea level rise adaptation
- Provide information and data
  - Vulnerability to sea level rise and other changes
  - Adaptive capacity of the region
  - Potential adaptation strategies

Project Video

Matanzas Basin Study Area



Developed Areas

St. Augustine

Palm Coast-Flagler Beach

Planning Context

- Northeast Florida
  - No planning for sea level rise adaptation
  - Conservative, business-oriented culture
- Florida
  - Governor Scott climate change denial
  - State agency leadership for sea level rise adaptation and coastal resiliency
  - Growth management
    - Required local comprehensive plans

How Does This Relate to You?

Big Ideas

Foundational

- Leadership and organizational capacity
  - GTM NERR
  - UF
  - Local Steering Committee
- Information and data
  - Best available science, including public input and social science
  - Written findings report, detailed appendices, and GIS data
- Community and regional dialogs

Collaborative

- Interdisciplinary, applied science and practice
- Science translation
- Organizational partnerships
- Networks
- Stakeholder based
- Consensus building

Stakeholder Based and Consensus Building

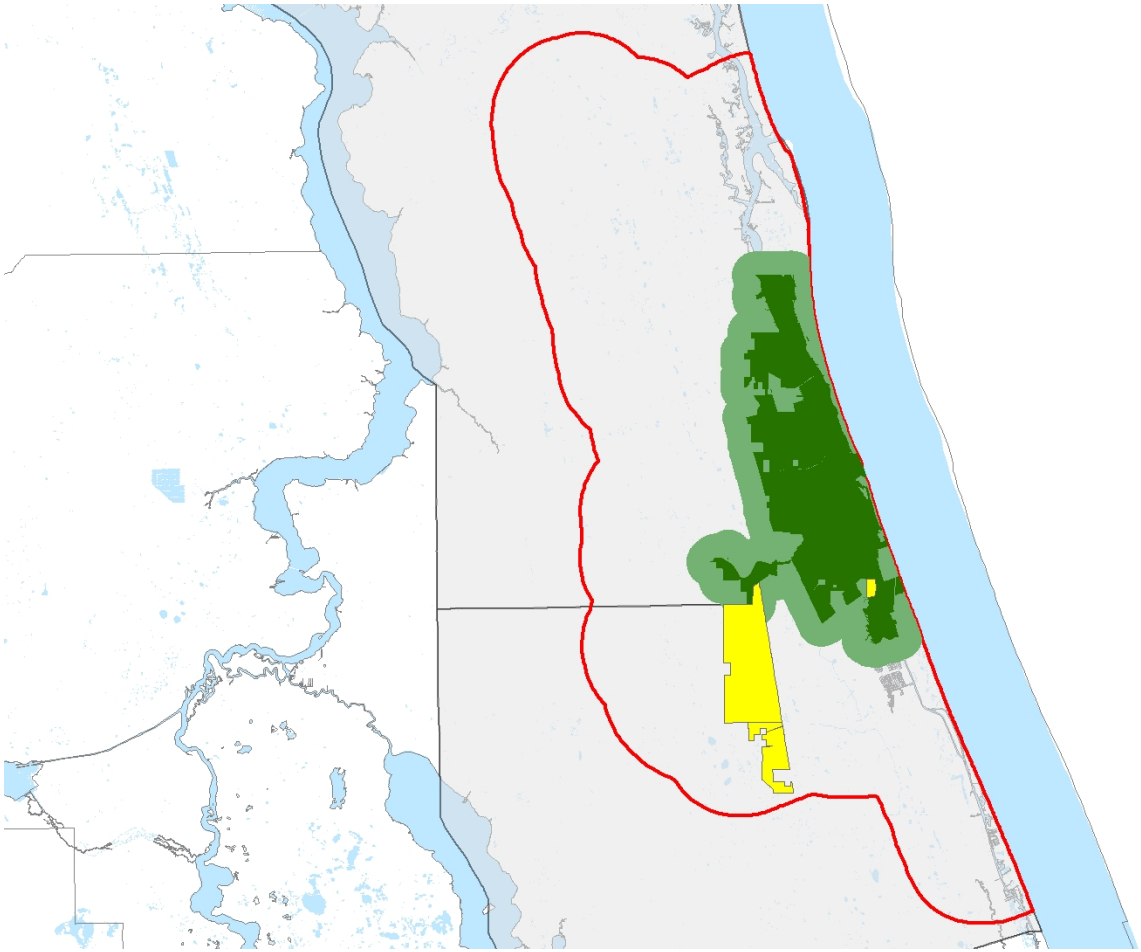
Steering Committee

Public Workshops

Regional Resilience

- Linked environmental, social, and economic systems
- Maintain healthy economy, quality of life, ecosystems
- Embrace planning and change, always “becoming”
- Nested scales for planning
- Capacity building
  - Understand community and region holistically, changes over time
  - Access resources
  - Flexibility and creativity

Nested Planning Scales



Multiple Values and Stakeholders

Adaptive Governance

- Multiple scenarios
- Shared leadership and planning
- Project flexibility, use public input and information gathered
- Shared GIS data
- Expect surprises

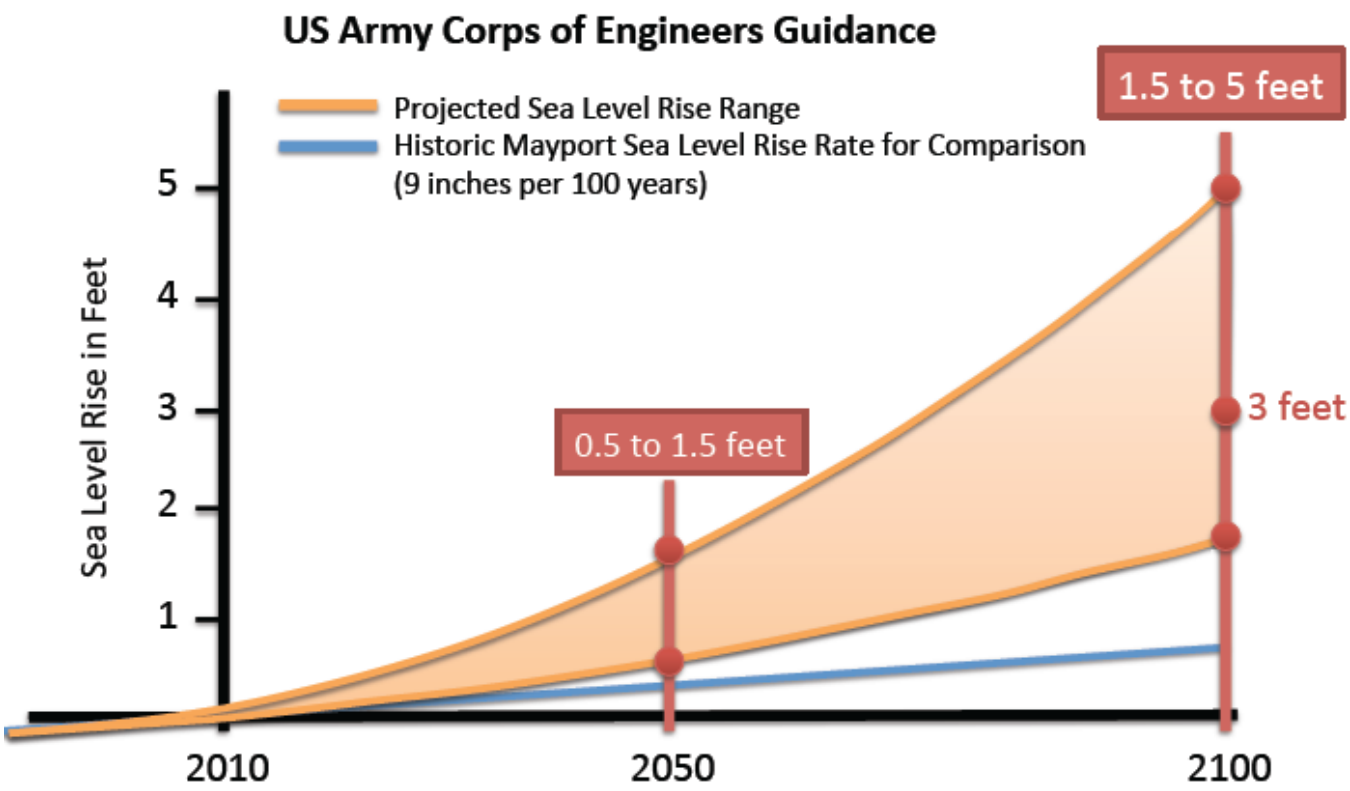
How Does This Relate to You?

Project Principles and Approaches

Current and Future Sea Level Rise

Globally, average sea level is increasing due to climate change.

Locally, sea level change relative to land depends on several factors.

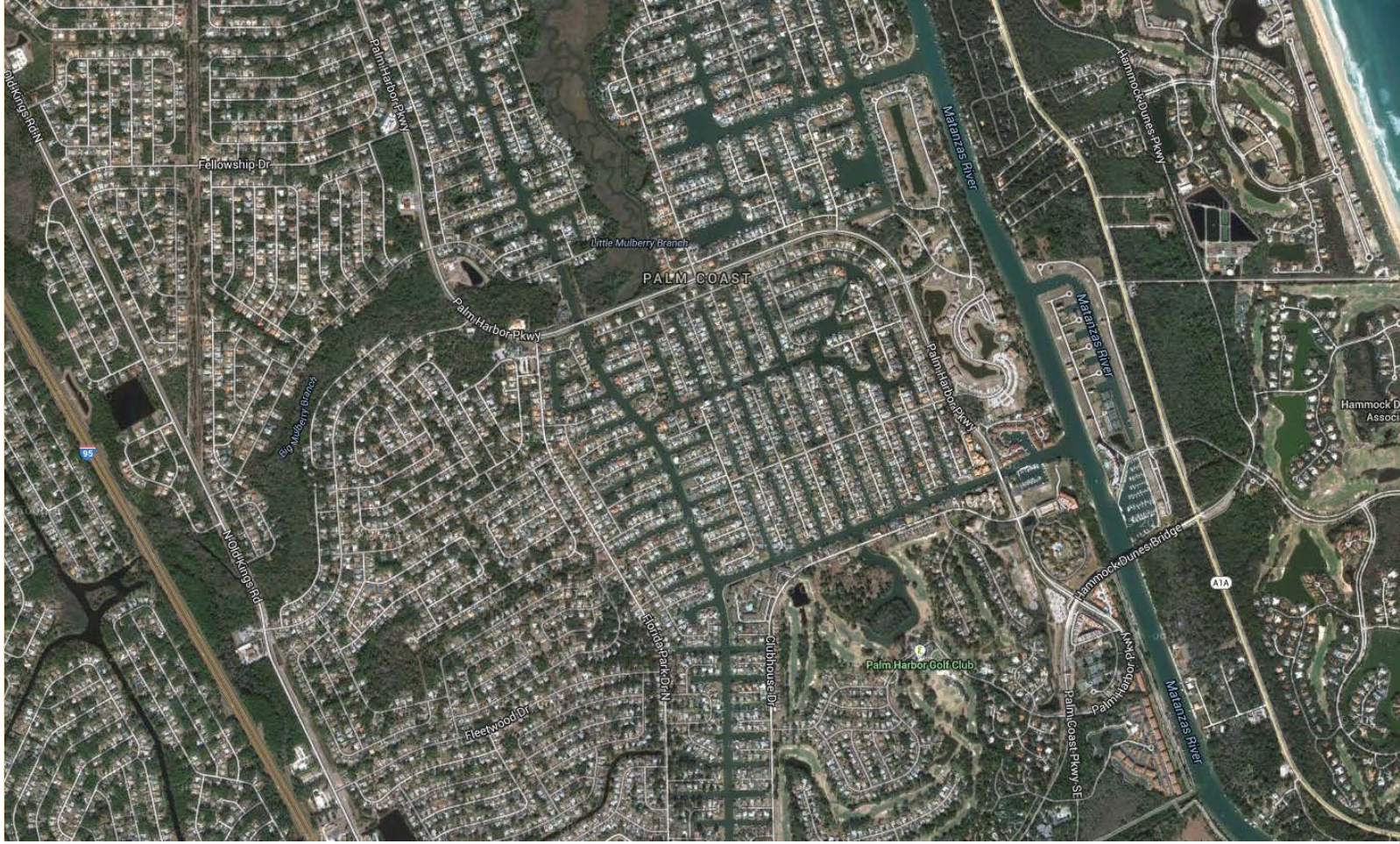


Sea level rise scenarios for Northeast Florida
Range of uncertainty, long time horizons

Impacts of Sea Level Rise and Coastal Dynamics

High stakes:

Increasing erosion, flooding, corrosion, pollution releases, saltwater intrusion in aquifers, habitat and species changes, etc.



Other Coastal Dynamics

City of Palm Coast, Matanzas Basin

Population growth and development, climate change, etc.

Diverse Adaptation Strategies

- Protection
- Accommodation
- Retreat
- Guiding future development
- Natural conservation and restoration
- Community and regional resilience

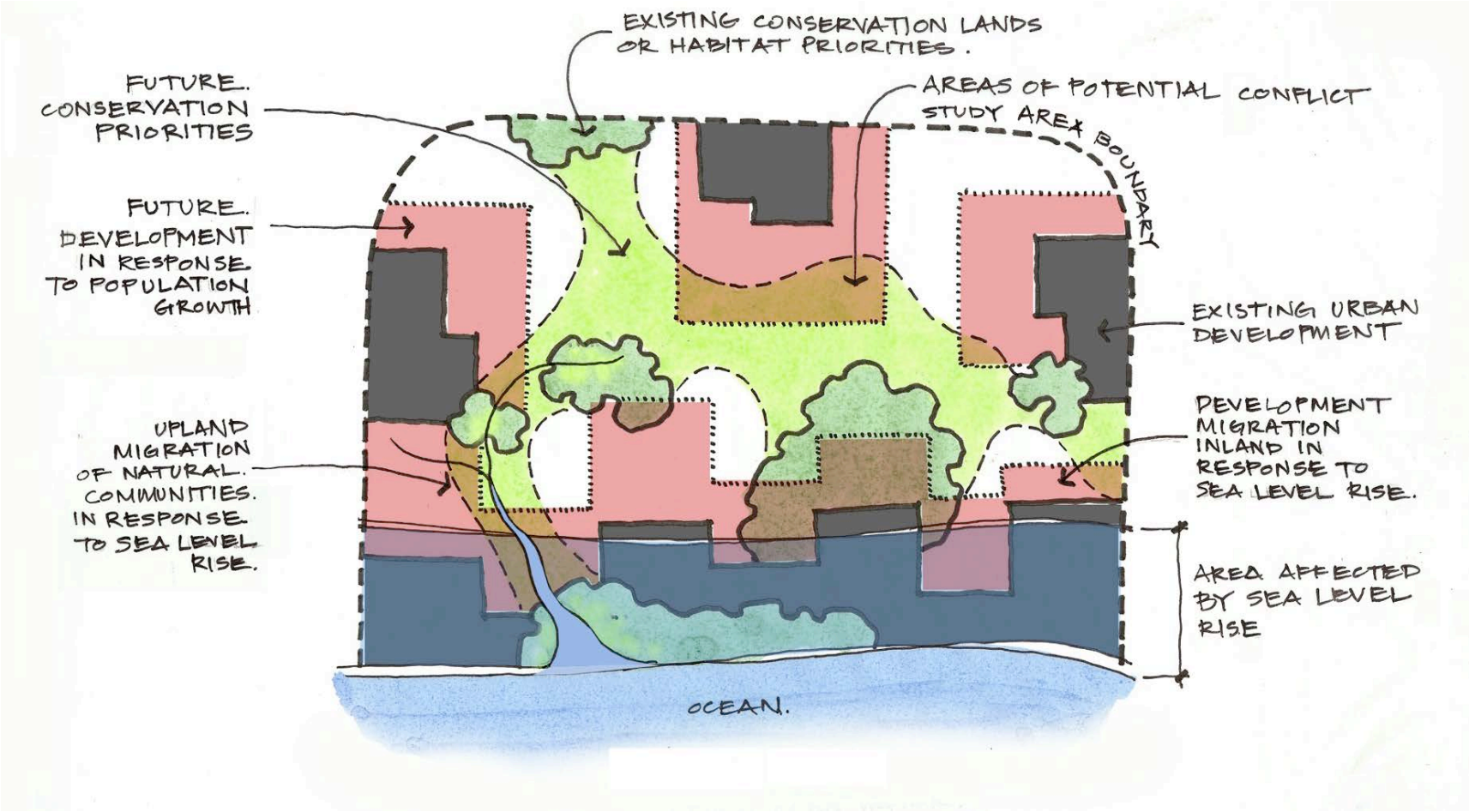
Example: Inland Development with Public Beach Access

New ideas and ways of thinking

Multifunctional, resilient

Broad support

Land Use Planning for Adaptation



Multiple Sources of Information

- Literature and documents, including internet
- Field visits
- Networking
- Public workshops
- Geospatial (GIS) data analysis and modeling

Broad Communication

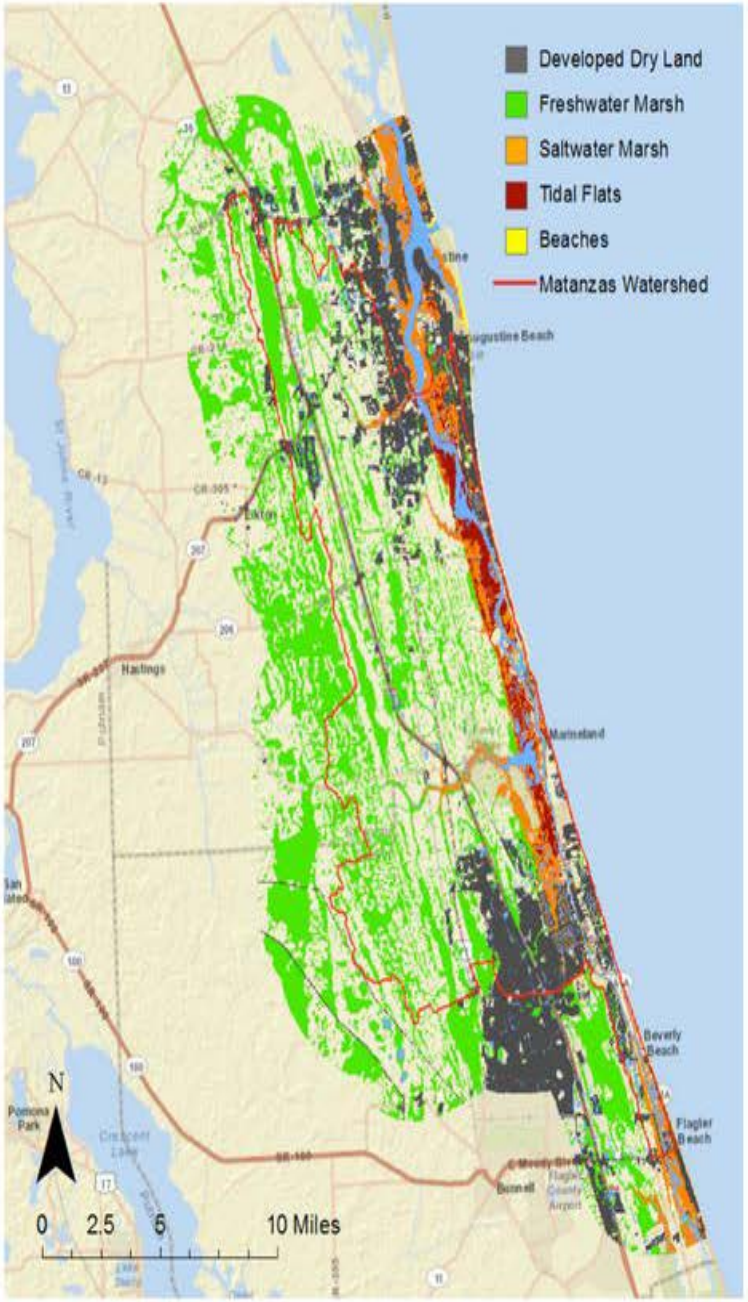
- Website
  - Blog
  - Pages
  - Videos
- Media
  - Reporters
  - Press releases

How Does This Relate to You?

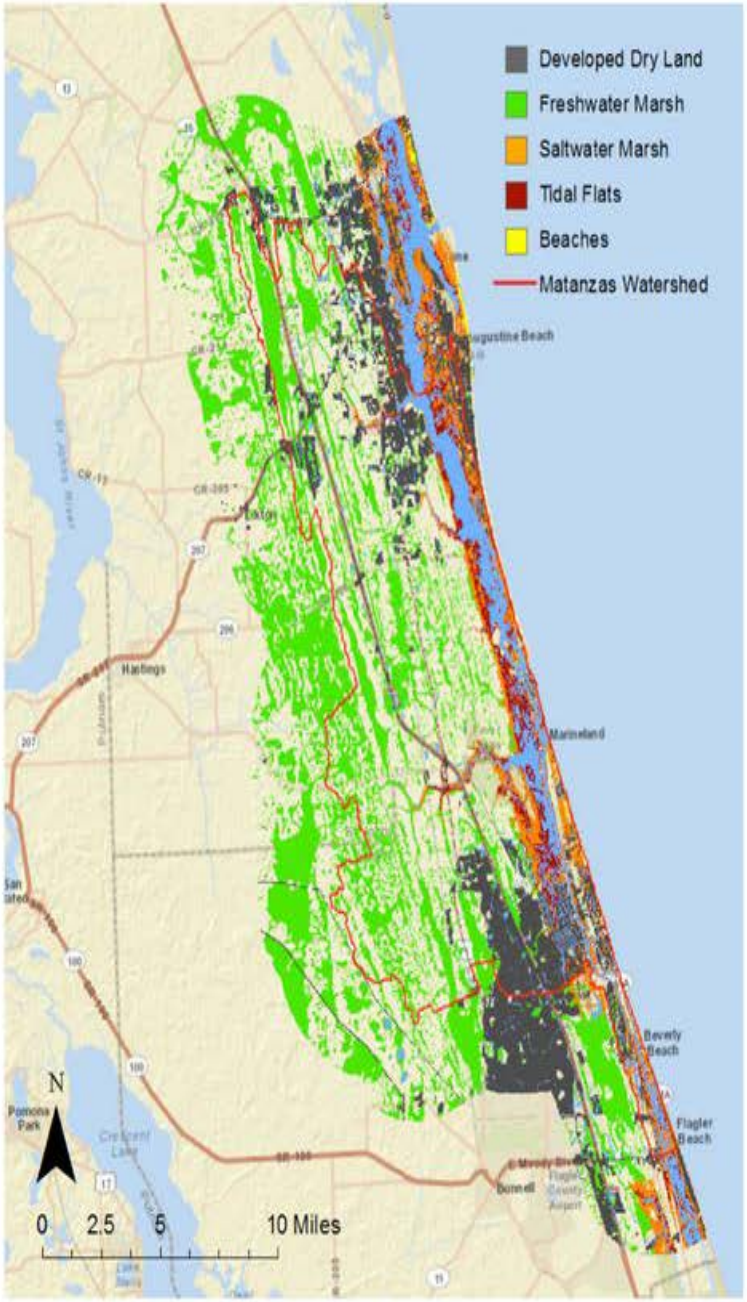
Geospatial Analyses

Future Changes Due to Sea Level Rise

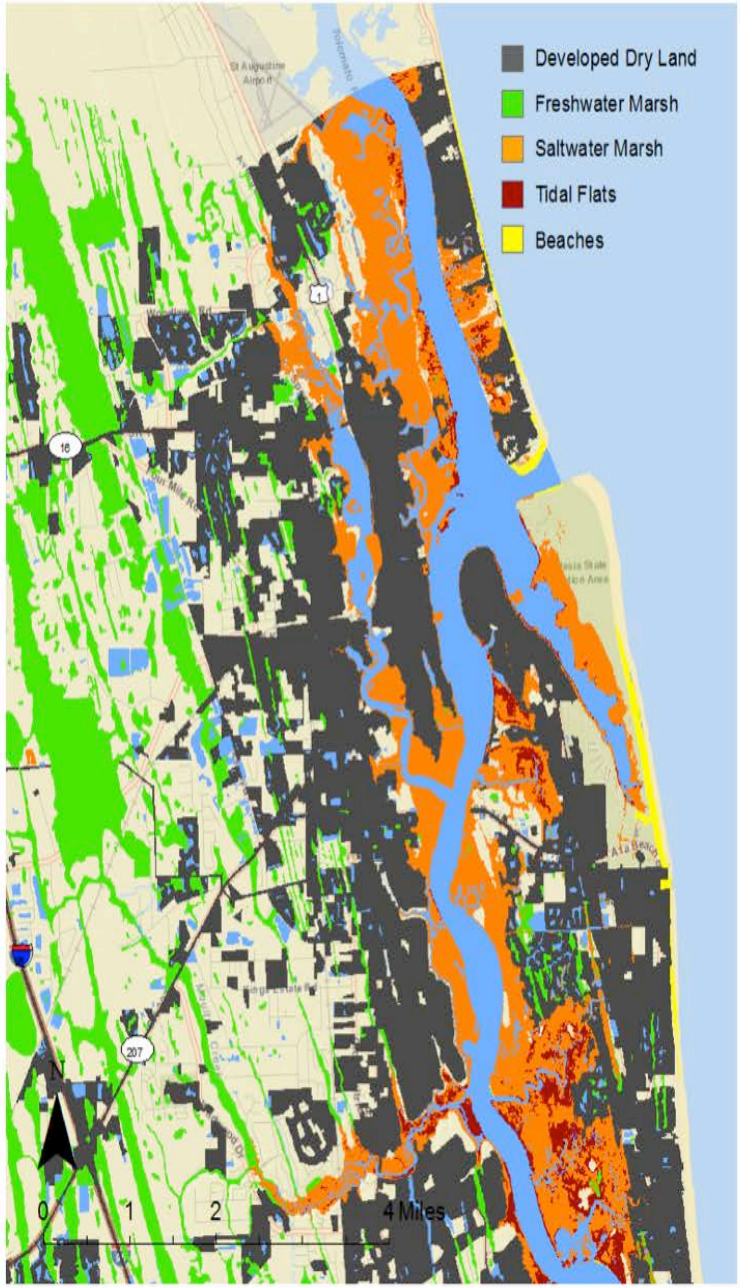
- Sea Level Affecting Marshes Model (SLAMM)
- GIS-based
- Input sea level rise curves, other inputs
- Predicts changes in coastal, terrestrial and wetland habitats due to sea level rise
- Can model with or without changes to developed areas



2008



3 ft. SLR by 2100



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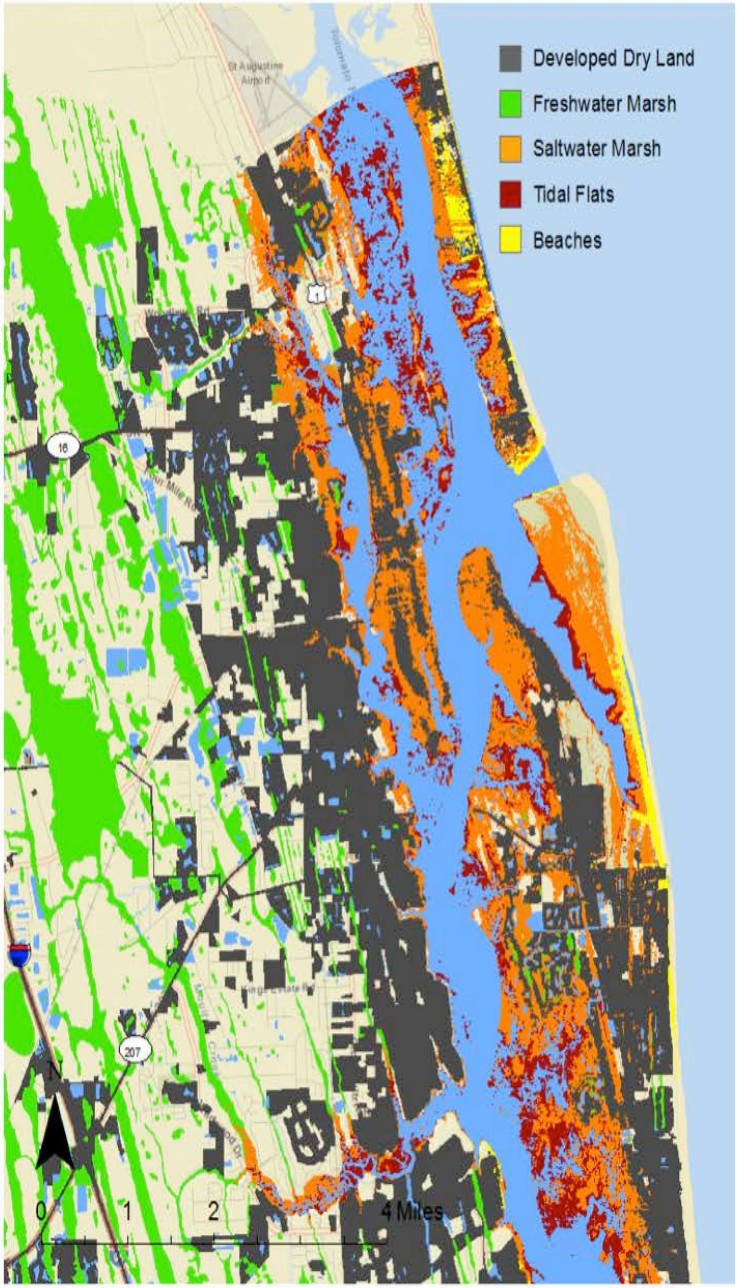


3 ft. SLR by 2100

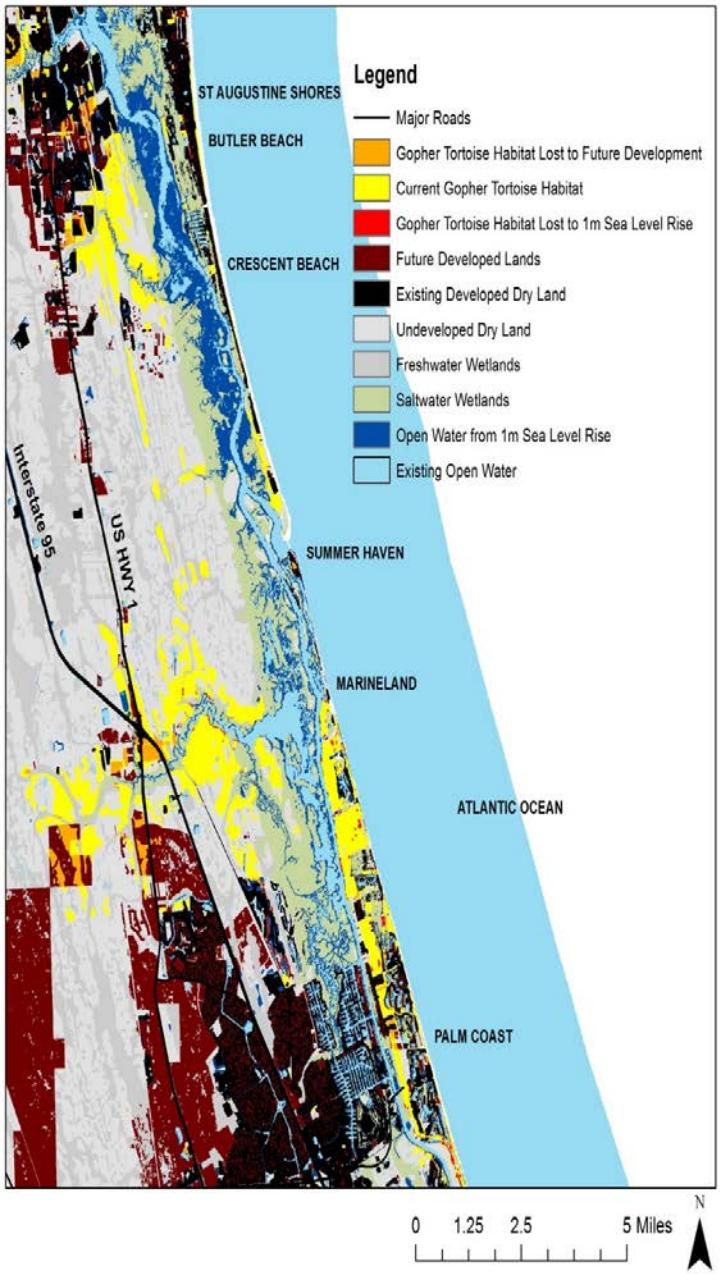
Spatial Statistics

Land Cover Type	0.2m	0.5m	1m	1.5m	2m
Developed Dry Land	-0.7%	-2.5%	-7.7%	-14.7%	-20.8%
Undeveloped Dry Land	-1.2%	-2.2%	-3.5%	-5.5%	-7.1%
Swamp	0.6%	-0.1%	-2.5%	-4.3%	-6.4%
Cypress Swamp	-0.1%	-0.3%	-2.3%	-4.0%	-8.2%
Inland-Fresh Marsh	-0.1%	-0.1%	-2.2%	-4.5%	-5.7%
Traditional Salt Marsh	-19.9%	36.0%	81.4%	78.5%	56.1%
Regularly-Flooded Marsh	20.6%	-16.0%	-31.0%	-2.6%	12.1%
Tidal Flat	0.6%	82.5%	49.0%	62.6%	86.2%
Vegetated Tidal Flat	0.0%	-0.1%	-14.7%	-46.7%	-98.6%
Beach	-1.2%	9.0%	35.4%	101.3%	143.7%
Open Water	2.4%	8.3%	56.9%	89.3%	132.3%

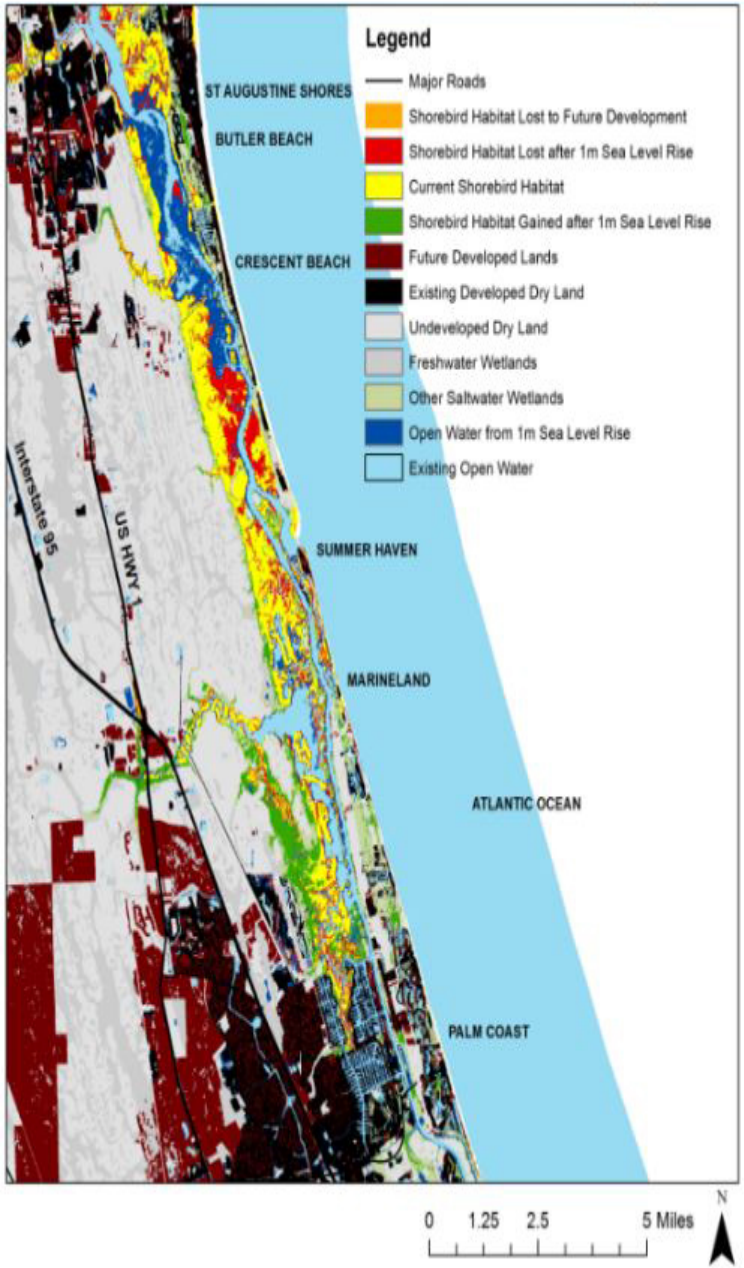
Conservation Impacts and Priorities

- Species
  - Focal species
  - Habitat models
- Natural communities, such as wetlands
- Water

Potential Habitat After 3 ft. of Sea Level Rise

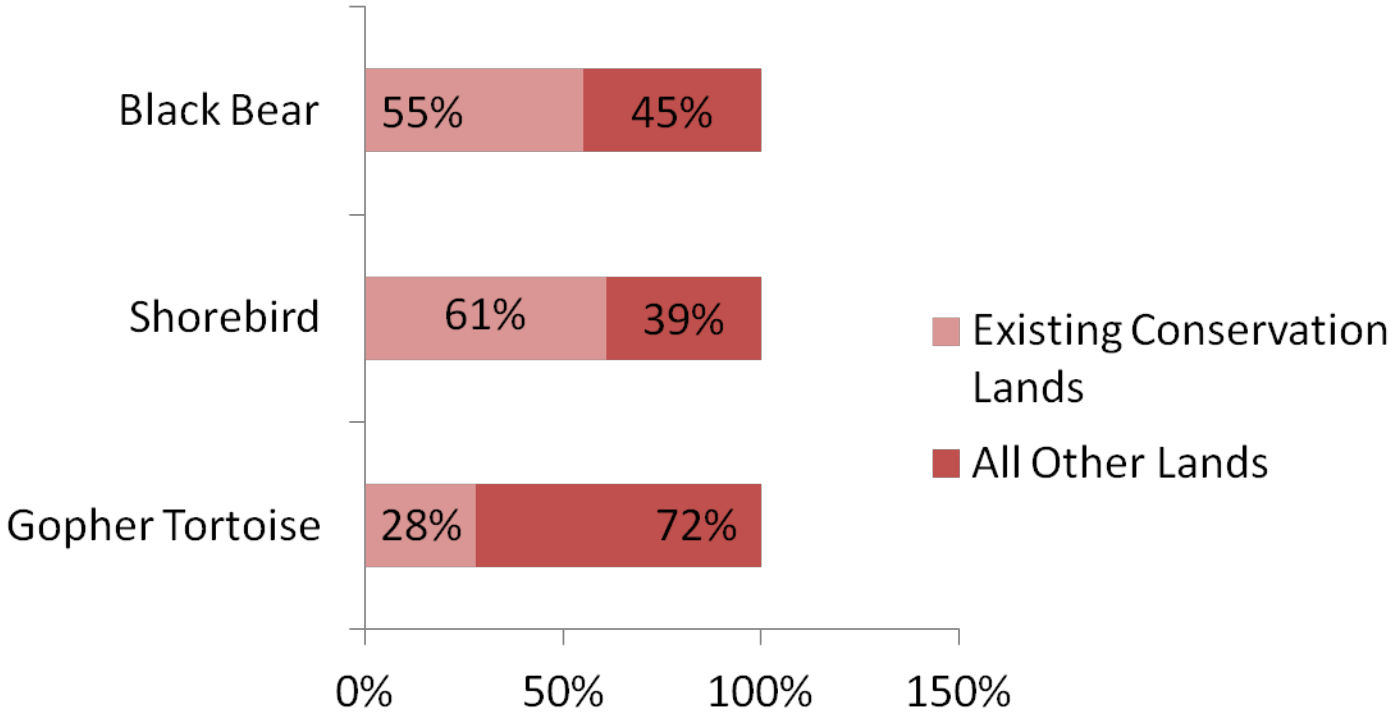


Gopher Tortoises



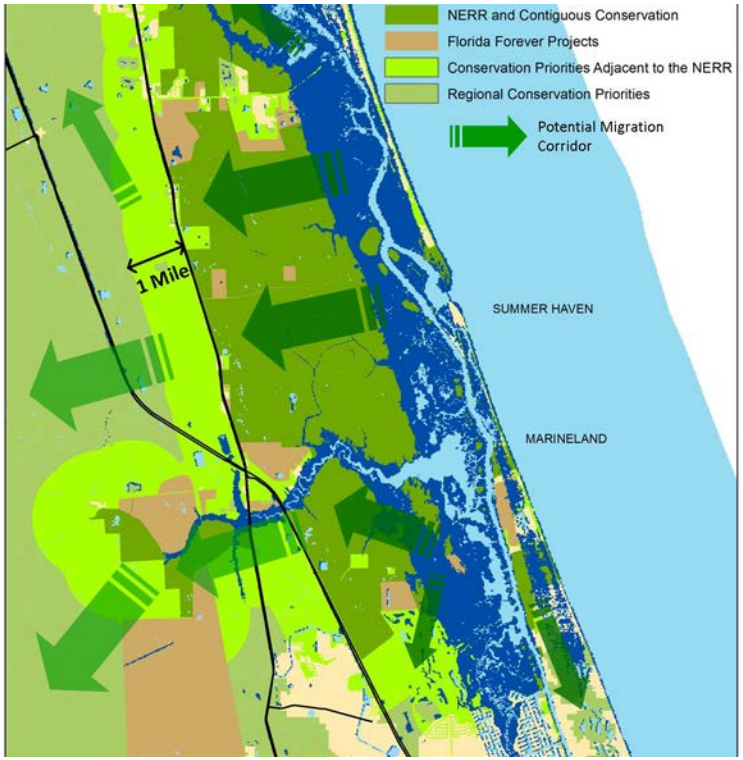
Shorebirds

Spatial Statistics

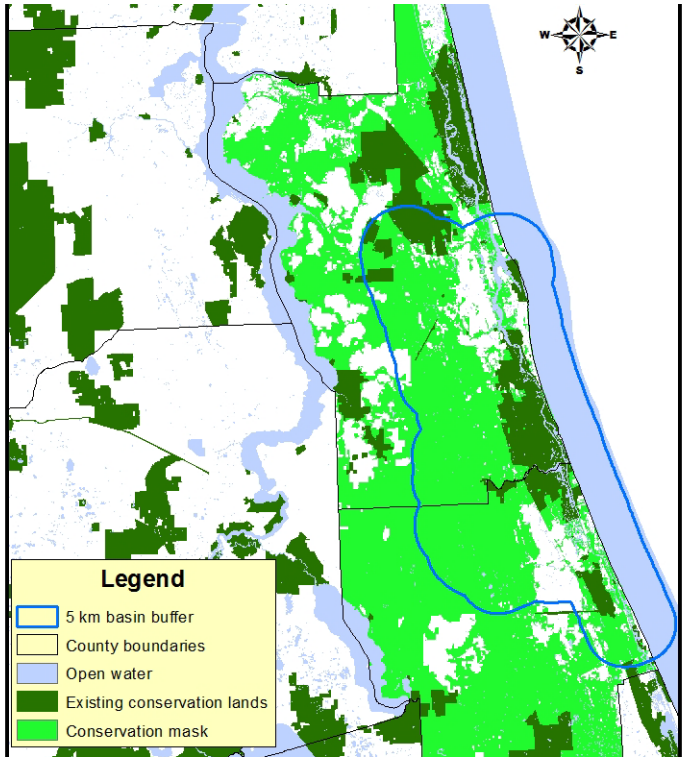


Conservation Priorities

Reserve Resilience



Regional



Adaptation Strategies

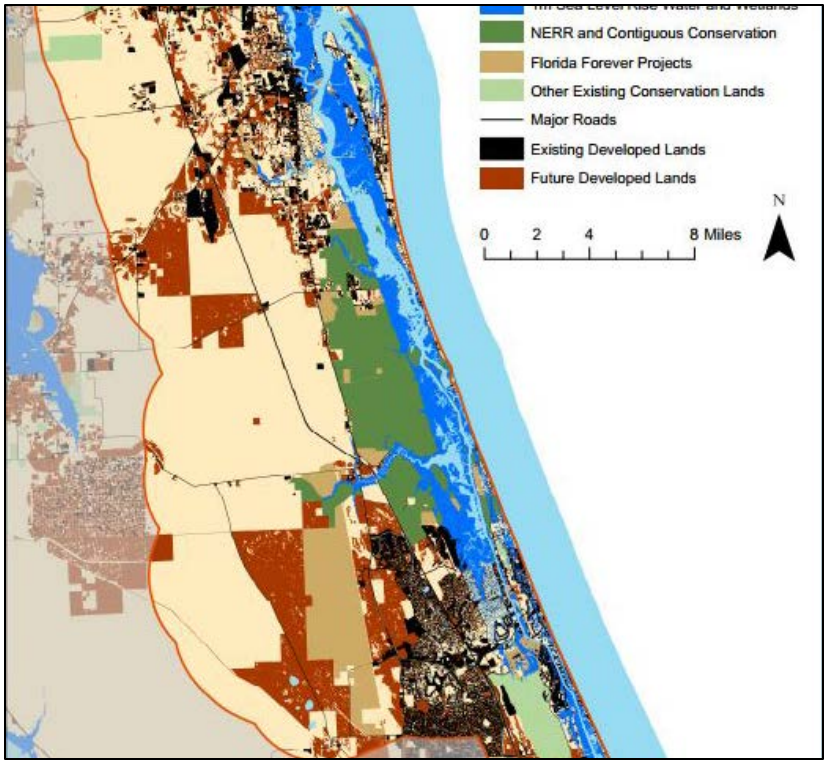
- Current development
- Conservation
- Future development

Future Land Use Scenarios

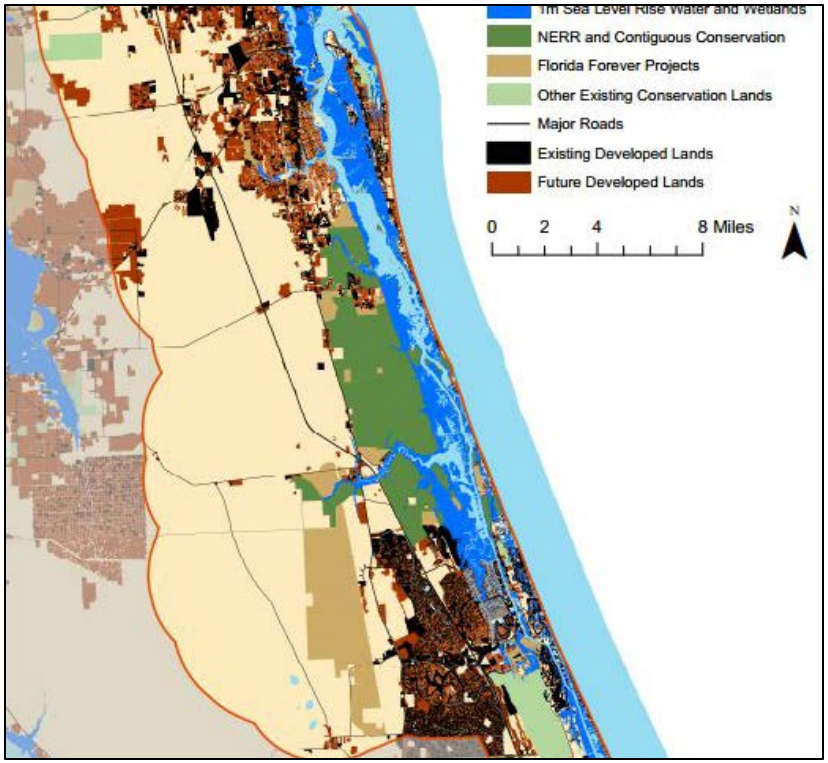
- Without and with sea level rise adaptation
- Current development pattern trends and "conservation" (growth management) patterns
- Land Use Conflict Identification Strategy (LUCIS) modeling

LUCIS Modeling

Current Development Trend



Conservation Development Trend



How Does This Relate to You?

Project Findings

Vulnerability

- Current resident concerns
  - Erosion and storm surge
  - Water supply
  - Wildlife
- Long-term sea level rise
  - Dramatic changes to GTM NERR
  - Increasing impacts to coastal cities and shoreline development
  - Long-term water and growth concerns

Adaptive Capacity

- Support for sea level rise adaptation planning
- Inland areas less vulnerable to inundation
- Interest in community and regional resilience, integrated adaptation planning

Challenges to the Science

- Climate change skeptics
  - Basis for the sea level rise projections
- Environmental advocates
  - Growth projections
- Our response
  - Be direct but focused on planning
  - Change the communicators
  - Accept we will not reach everyone initially
  - Develop alternative ways of outreach

How Does This Relate to You?

Project Outcomes

Use of Information and Data

- GTM NERR
- Steering Committee members
- Regional, state, national, international

Growing Momentum for Planning

- See news articles at http://planningmatanzas.org/documents/

Project Limitations

- Did not model
  - Surface and ground water systems
  - Erosion
  - Other climate change impacts
- Study focus on GTM NERR, regional resilience
  - Not detailed study of developed areas
- Did not conduct economic analyses or choose adaptation strategies
- Future studies can address these

How Does This Relate to You?

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