U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Siting Study Framework and Survey Methodology for Marine and Offshore Hydrokinetic Energy Projects Offshore Southeast Florida

INTERNATIONAL CONFERENCE

Renewable Ocean Energy & the Marine Environment: Responsible Stewardship for a Sustainable Future

Palm Beach Gardens, Florida

November 3-5, 2010

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Project team

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- Dehlsen Associates, LLC has been awarded a grant by the United States Department of Energy Golden Field Office.
- Dehlsen Associates is working in cooperation with:
  - Ecology & Environment, Inc.;
  - Nova Southeastern University Oceanographic Center; and
  - Florida Atlantic University/Harbor Branch Oceanographic Institute

NOVA SOUTHEASTERN UNIVERSITY OCEANOGRAPHIC CENTER

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Ocean Science for a Better World™

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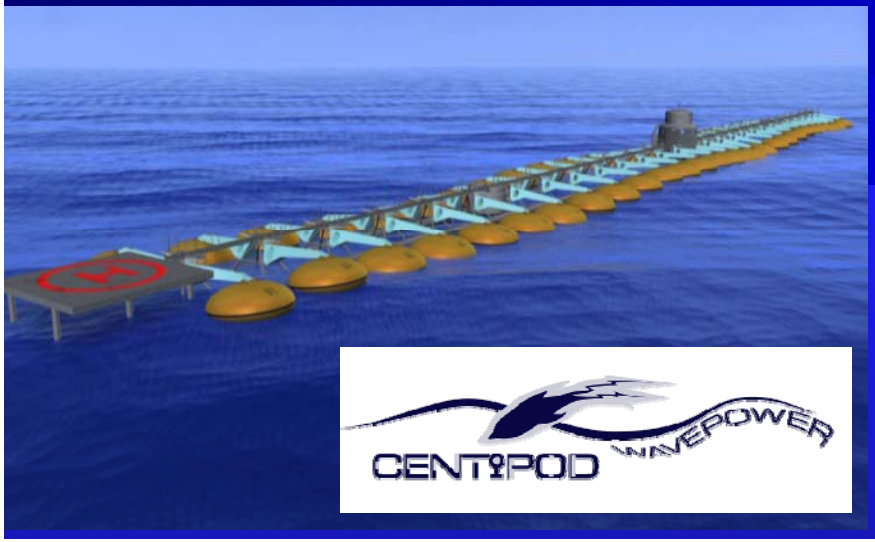
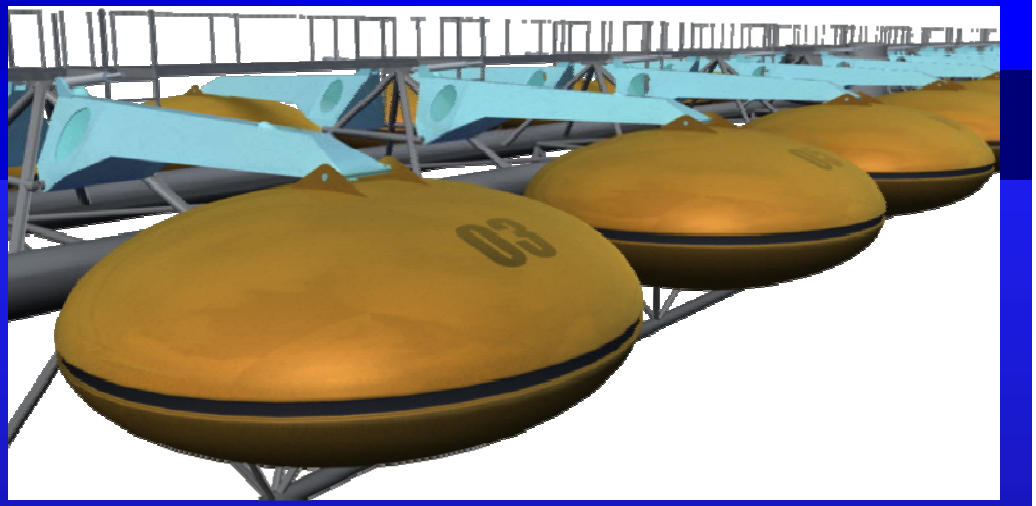
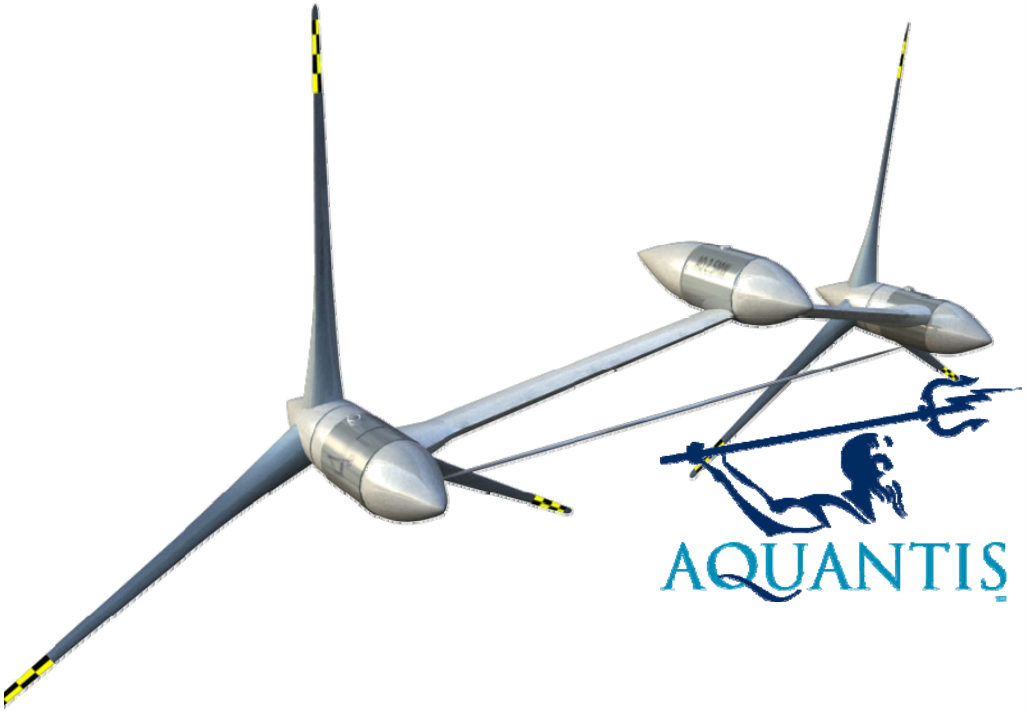
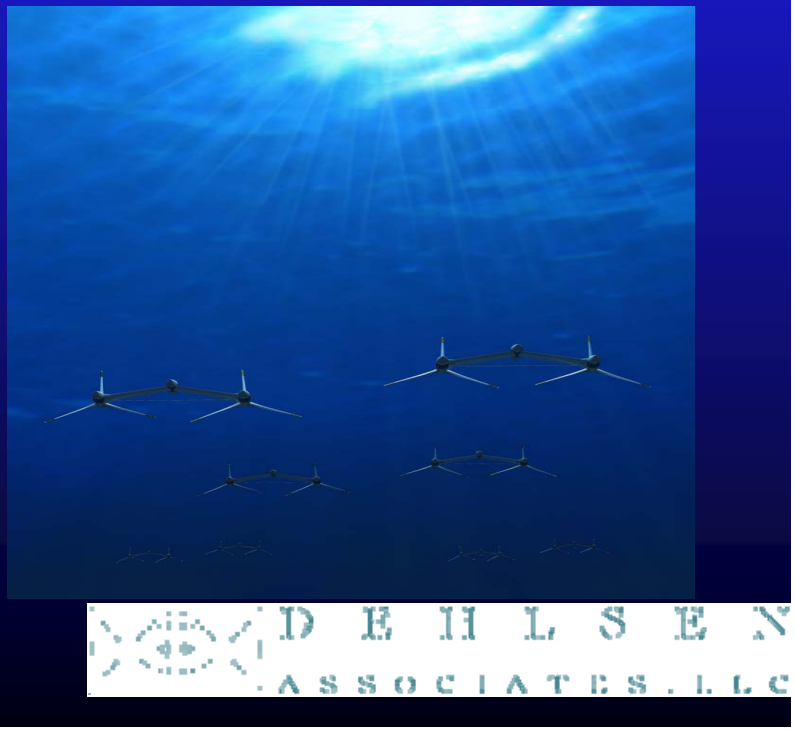
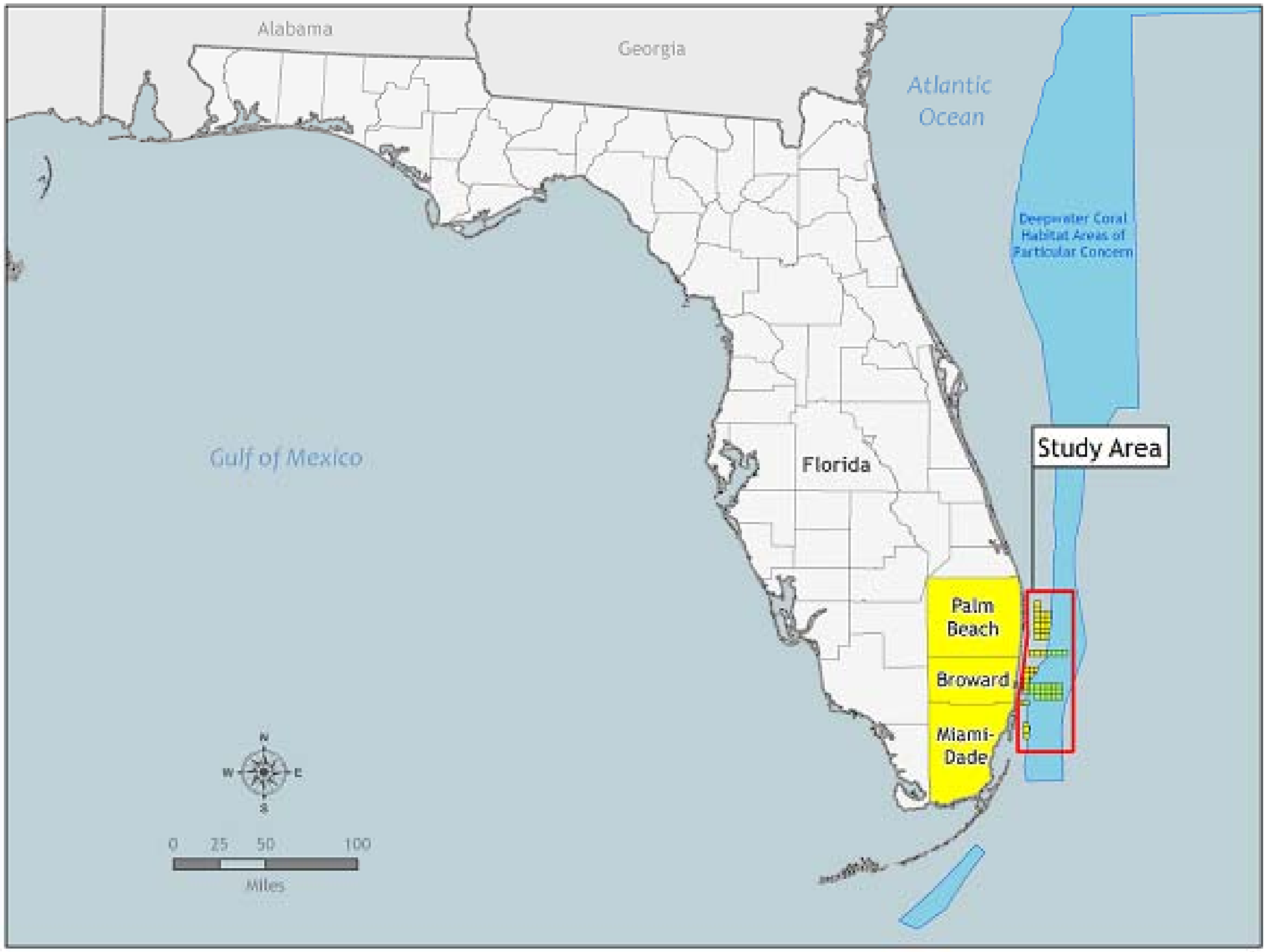








Study Area


Alabama
Georgia
Atlantic
Ocean
Deepwater Coral
Habitat Areas of
Particular Concern
Study Area
Gulf of Mexico
Florida
Palm
Beach
Broward
Miami-
Dade
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0 25 50 100
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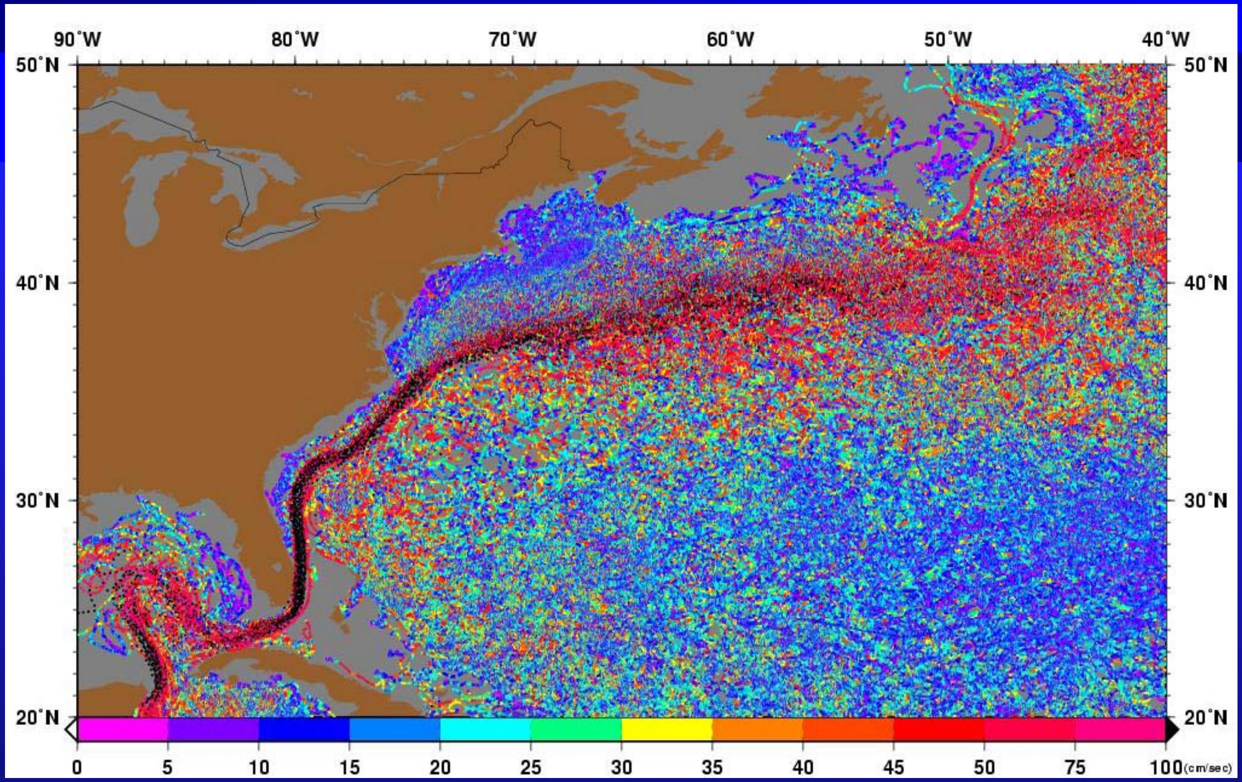
Favorable Oceanographic Conditions



Source: http://oceancurrents.rsmas.miami.edu/atlantic/spaghetti-speed/gulf-stream.jpg

- Gulf Stream dominates ocean currents offshore S.E. Florida.
- The Gulf Stream is represented by the Loop Current in the Gulf of Mexico, continuing as the Florida Current in the Straits of Florida and exiting the Straits of Florida as the Gulf Stream.

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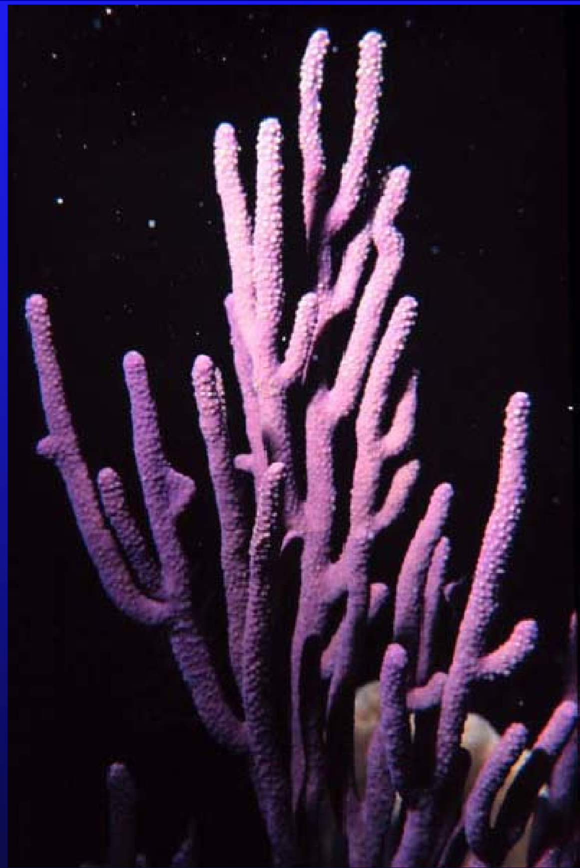
Why is this study helpful to developers and regulators

- **This study would:**
  - **Expand the spatial coverage of habitat mapping in deepwater areas (water column between 250 and 500 meters), and**
  - **Expand knowledge of the study area within the Florida current.**



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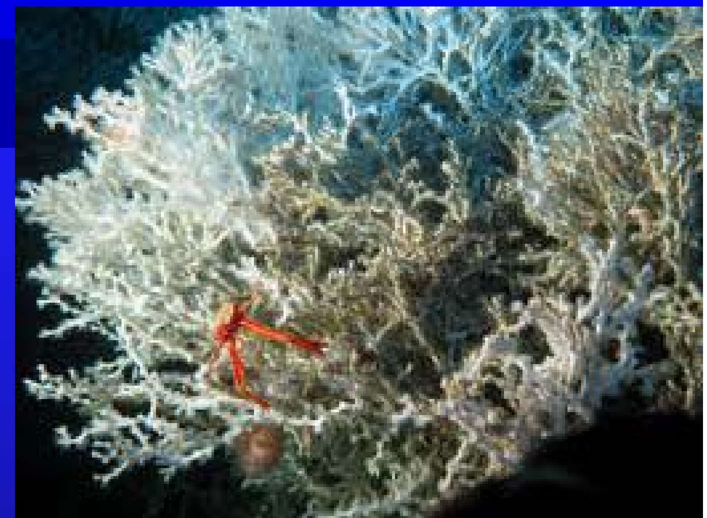
Purpose of project

- **Develop a bottom habitat survey methodology in consultation with regulatory & resource management agencies.**
- **Enhance the certainty of the survey requirements and regulatory review processes for marine and offshore hydrokinetic energy projects offshore Southeast Florida**
- **Where possible, reduce the time and costs associated with siting and permitting of these projects.**



Project focus

- Develop acceptable protocols for collecting baseline information:
  - Review of existing/available data
  - Gathering new geophysical survey data, and
  - Gathering of new benthic habitat data
- Gather field data for use by:
  - Prospective project developers,
  - Regulators and other interested stakeholders
- How can the data be used?
  - In making ***project siting decisions*** that avoid or minimize adverse impacts to sensitive marine habitats

High level siting considerations

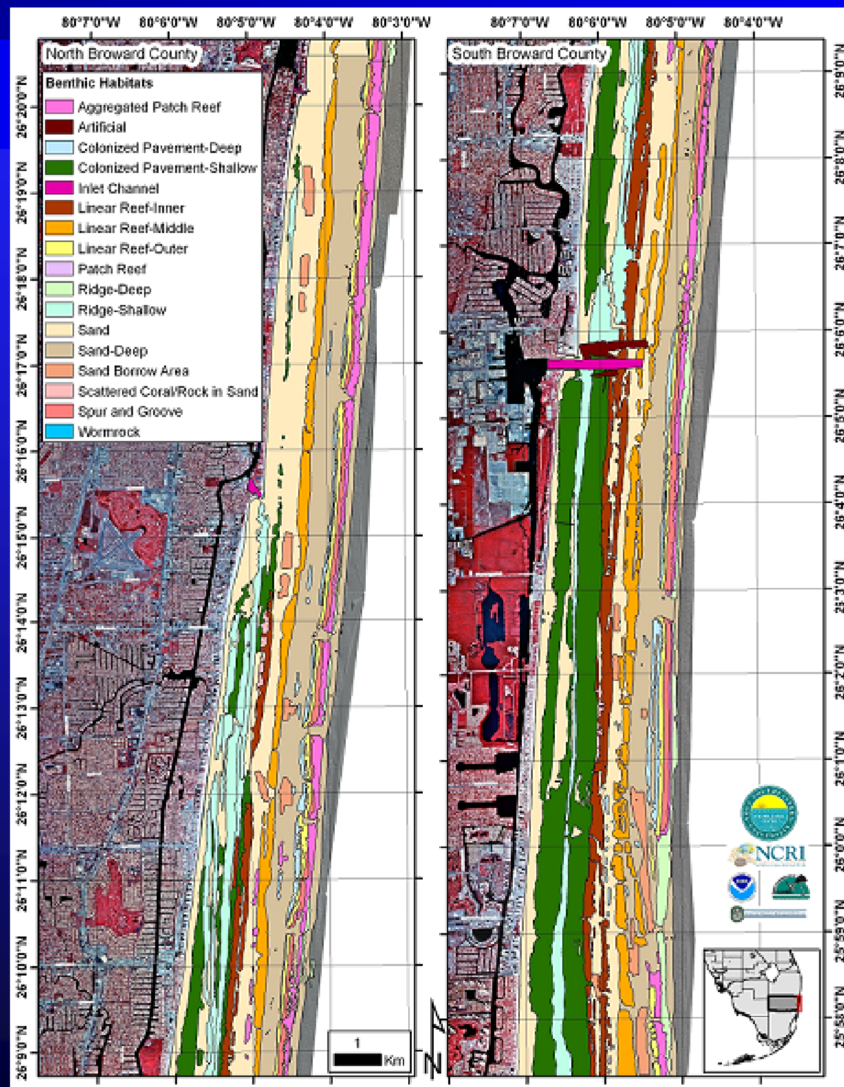
<u>Site potential for energy generation: marine or hydrokinetic</u>

- Take advantage of the Florida current (Deployments in water column depths ranging between 200 and 500 meters appear to be target depths)

<u>Challenges</u>

- Presence of reef and ridge complex located from the shoreline to approximately 3 miles offshore of target counties.
  - Installation of power transmission cables under the reef and ridge complexes
  - In 2009, the State of Florida enacted the Coral Reef Protection Act which authorizes FDEP to protect coral reefs in State waters
- Presence of deepwater corals: NOAA Final Rule of June 22, 2010 establishes extensive areas of Coral Habitat Areas of Particular Concern (c-HAPC) in the Atlantic Ocean offshore of the S.E. United States

Broward Reef and Ridge Complex



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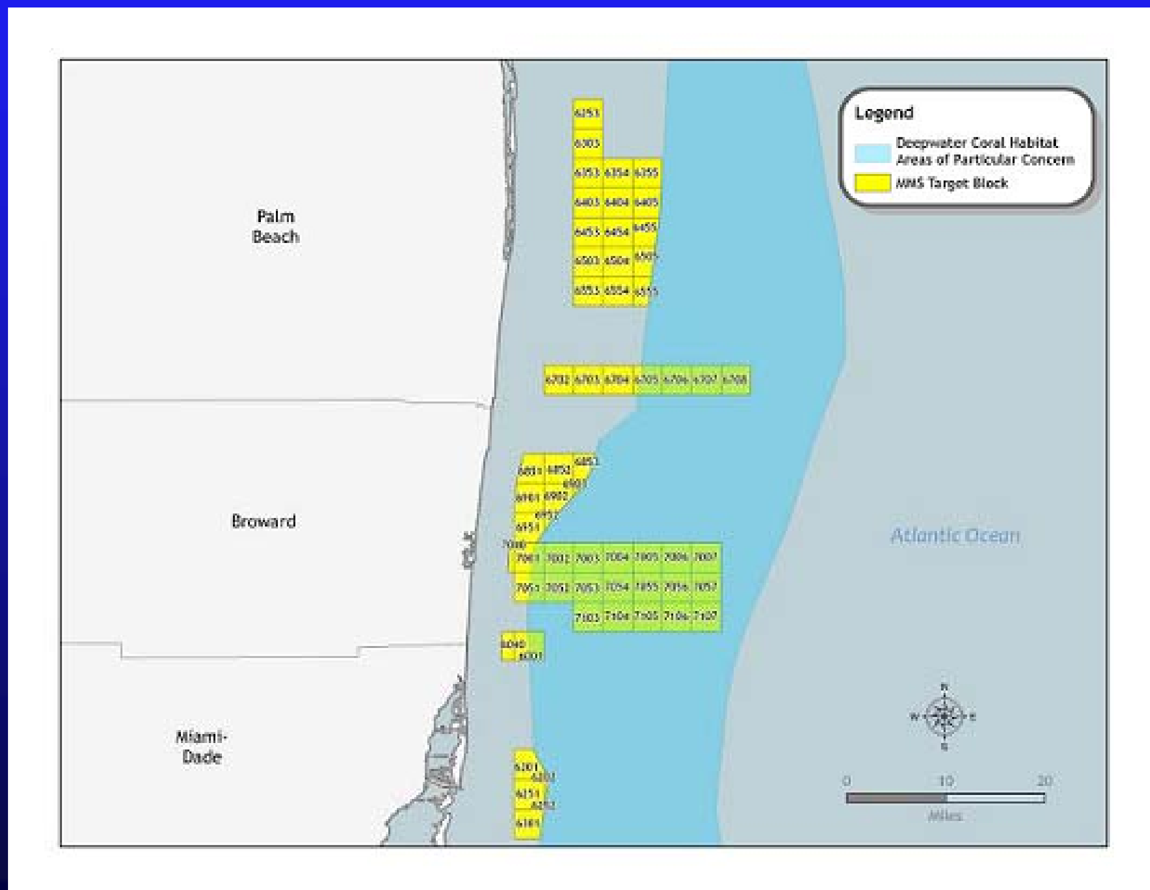
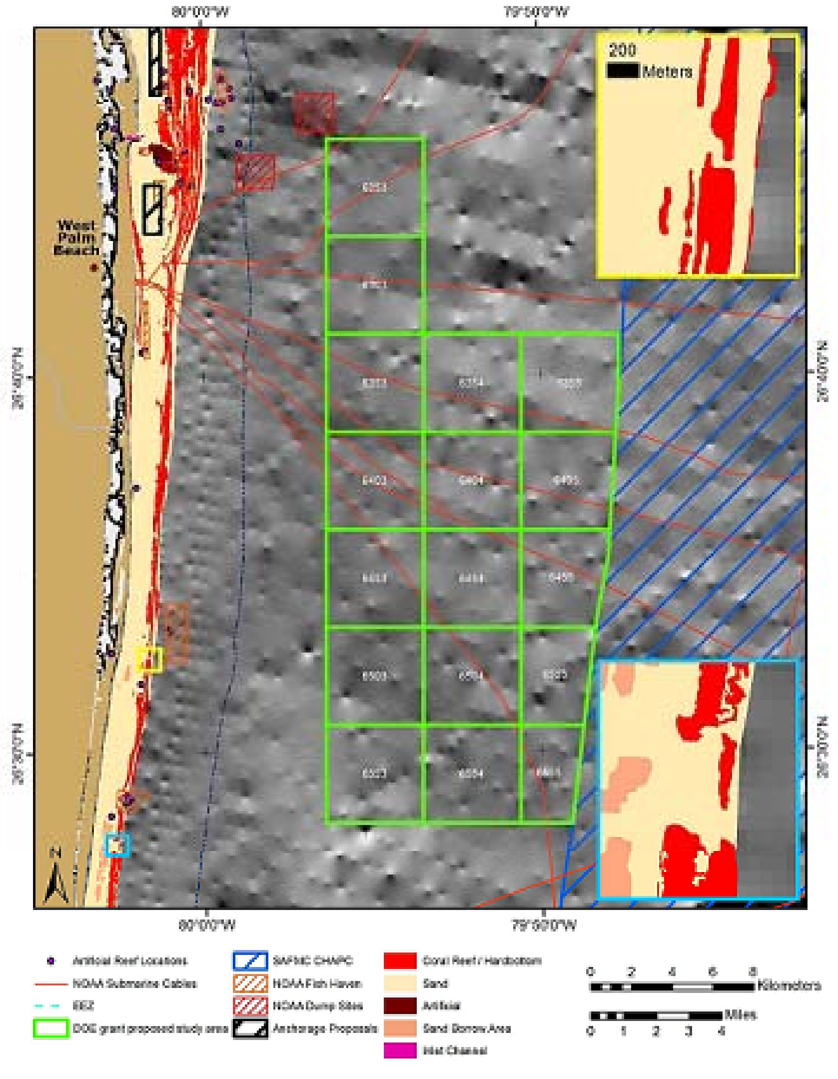
High Level Siting considerations (Cont.)

June 22, 2010, NOAA finalized designation of the Stetson-Miami Terrace deepwater c-HAPC which includes the Miami Terrace and Escarpment



High Level Siting considerations (Cont.)

- There are five designated reef gaps, including four in Palm Beach County and one in Broward County.
- Palm Beach is simplified because there is only one main reef line, so reef gaps may be used to route transmission cables.
- Broward is complicated by 2-3 contiguous parallel reef lines inshore of the outer reef.



High Level Siting considerations (Cont.)

Possible use conflicts considered includes presence of:

- **Navy's offshore testing range (Naval Surface Warfare Center Carderock Division, Dania, FL)**
- **Areas designated as Fish Havens (NOAA Designation)**
- **Areas designated as dump sites (NOAA Designation)**
- **Fiber optic cable crossings**
- **Existing offshore mining sites of beach-quality sand**
- **Ship Traffic, proximity to shipping lanes, and ports**
- **Commercial and Recreational Fishing**

Tasks of Grant

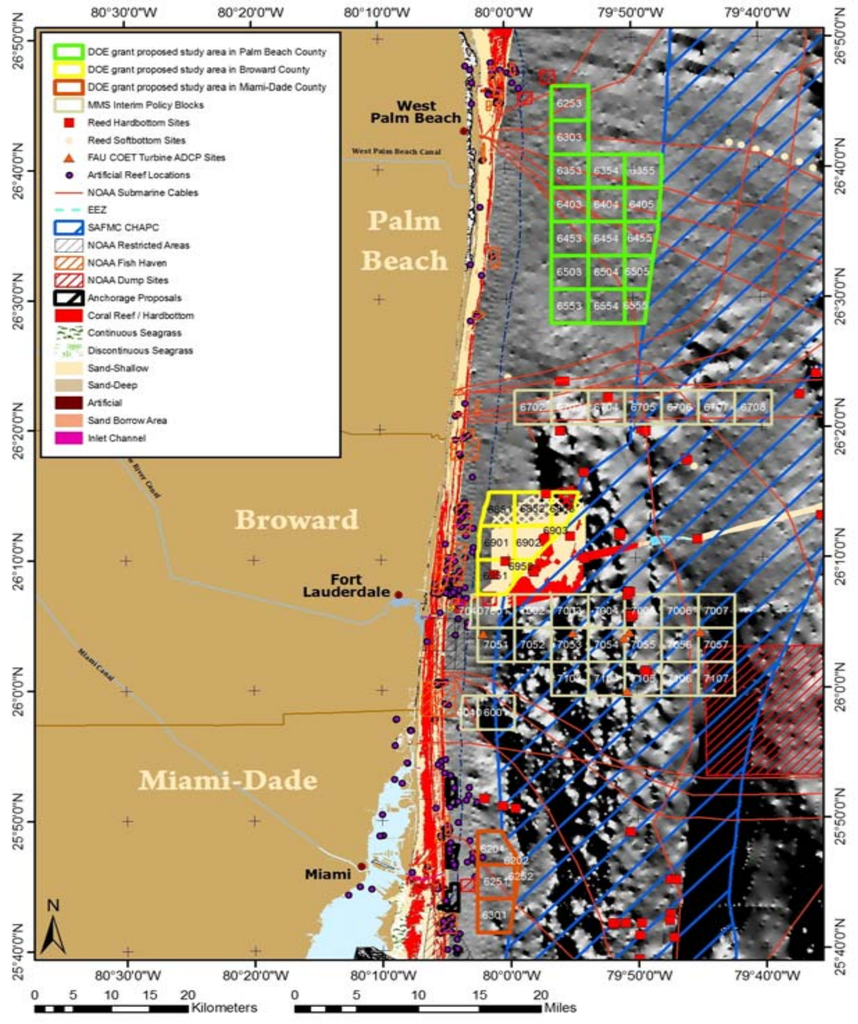
- **Task 1 - Compile habitat mapping from existing data sets:**
  - **Assessed currently known coverage of benthic habitats;**
  - **Created maps from available data of nearshore and offshore reef complexes/hard bottom;**
  - **Described the general composition and biological significance of the various coral reef and associated benthic communities; and**
  - **Developed common terminology for previously mapped habitat types and biotic assemblages.**

- **Task 1 is 100 % completed except for possible adjustments as a result of field survey to be conducted.**

Gathering of available data and generation of maps

Over 40 data sources were consulted, including:

- **NOAA National Geophysical Data Center;**
- **South Atlantic Fishery Management Council;**
- **NOAA Coastal Services Center;**
- **NOAA Office of Coast Survey;**
- **Database of relevant publications for deepwater habitat and geology in the study area;**
- **Deepwater coral and hard bottom surveys; and**
- **Records from deepwater benthic video/photographic surveys**



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Tasks of Grant (Cont.)

- **Task 2 - Develop Framework and Field Survey Methodology**
  - Collected Information from Project Developers
  - Developed Siting Study Framework
  - Consulted with key agencies
  - Prepared Draft Work Plan
  - Submitted Work Plan to key agencies
  - Addressed comments from agencies
  - Resubmitted Final Work Plan to agencies
- **Task 2 is 100 % completed**

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WORK PLAN

Siting Study Framework and Survey Methodology
for Marine and Offshore Hydrokinetic Energy Projects
in the
Atlantic Ocean, Offshore Southeast Florida

April 6, 2010

Submitted to:
Dehlsen Associates, LLC

Submitted by:
Ecology & Environment, Inc., Miami Lakes, Florida,
Nova Southeastern University Oceanographic Center, Dania Beach, Florida,
and
Florida Atlantic University Center for Ocean Energy Technology/
Harbor Branch Oceanographic Institute, Dania Beach, Florida

Consulted Stakeholder Agencies

- Bureau of Ocean Energy Management, Regulation and Enforcement (BOEM); formerly known as Mineral Management Services (MMS)
- FDEP Office of Intergovernmental Programs Offshore Projects Section
- National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries)
- Florida Fish and Wildlife Conservation Commission
- South Atlantic Fishery Management Council
- Florida Department of State - State Historic Preservation Office

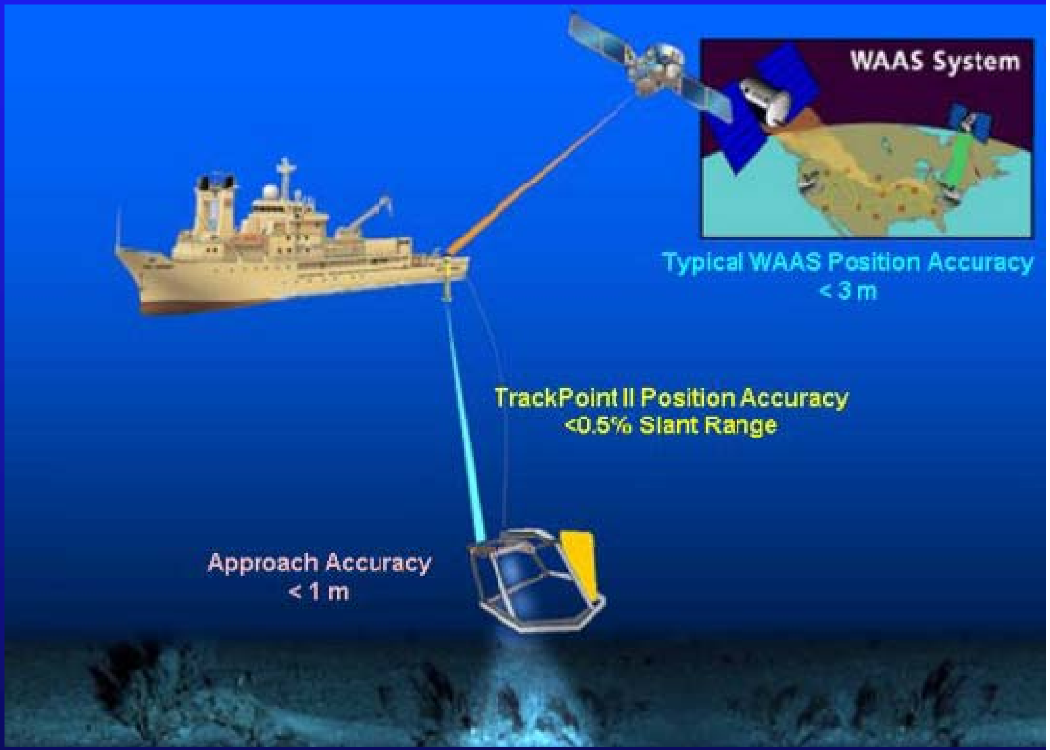
Tasks of Grant (Cont.)

Task 3 - Geophysical and Benthic Video Surveys

-Two phases of field work:

1. **Geophysical survey**
2. **Benthic video survey**

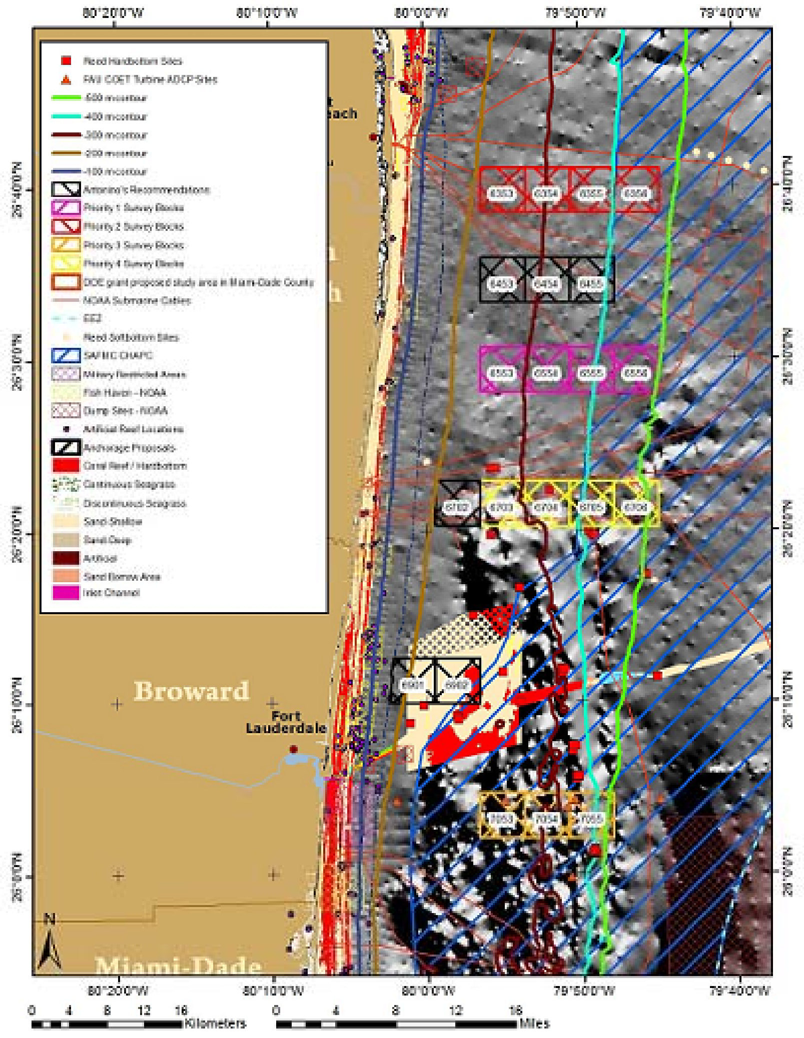
Task 3 is anticipated to resume November 2010.



Conceptual Benthic Video Survey set up

Geophysical Survey Target Locations Using Multibeam

- **Multibeam survey to start November 2010**
- **Likely to move from south to north**
- **Interpreted data available 2011**



Tasks of Grant (Cont.)

- **Task 4 – Presentation of Siting Study Results**
  - **Results of the work conducted under this grant will be presented at professional and scientific conferences and meetings as new data becomes available.**
- **Task 4 is anticipated to take place thru fall of 2011.**

Summary

- 6-month delay in the project
  - Gulf oil spill caused shortage of suitable vessels to do surveys
  - First mobilization (August 2010) of the geophysical survey halted due to multiple equipment problems
- Back on track
  - Multibeam survey is anticipated to start in November 2010
  - Benthic video survey is expected to take place in the first trimester of 2011
  - Reporting is expected to be completed spring/summer 2011
- Presentation of results will take place during fall/winter 2011