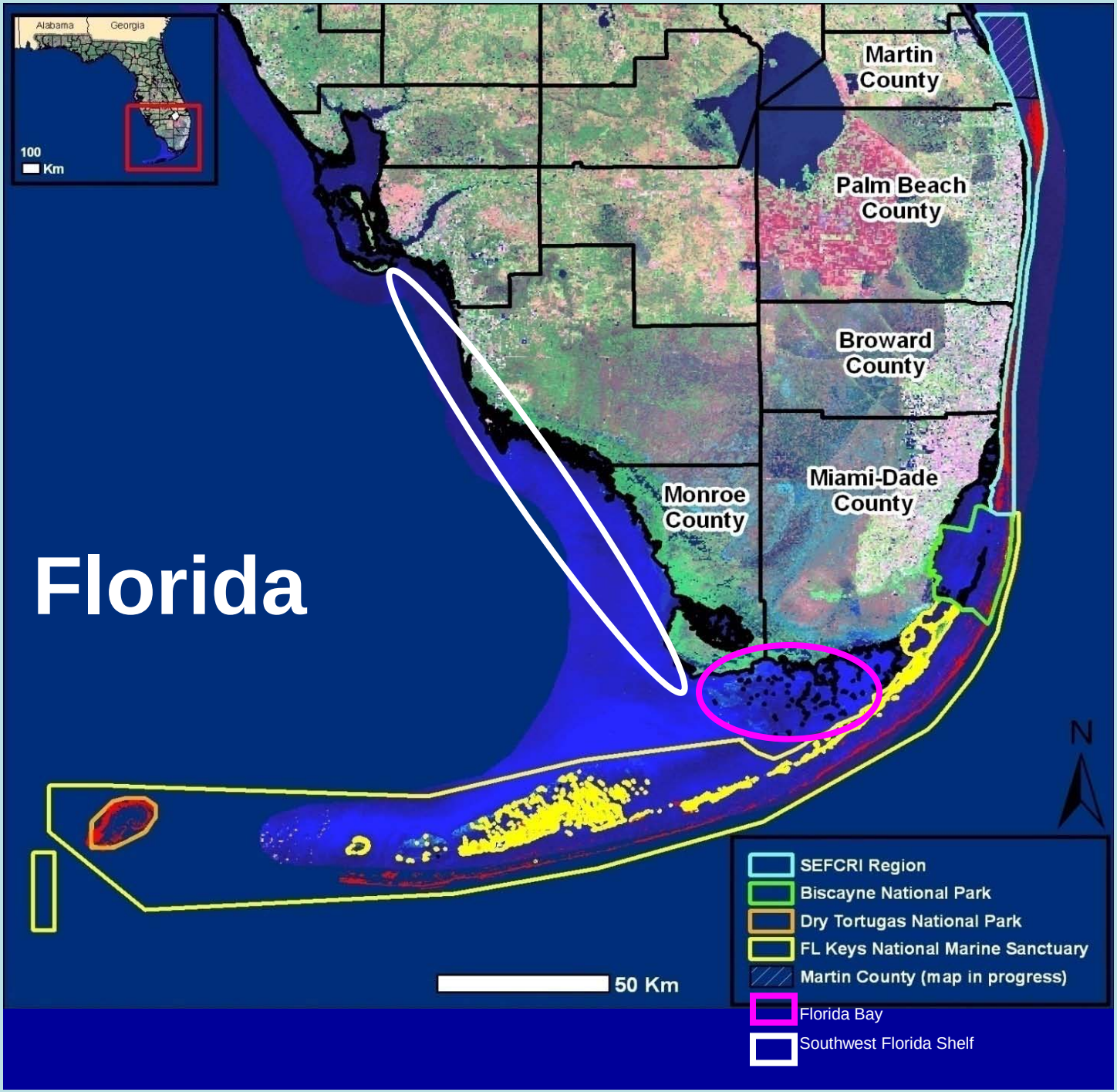
Florida's

Priority Coral Reef Mapping and Monitoring Needs

Presentation for
Atlantic/Caribbean CREIOS
Workshop, May 13, 2009


Alabama
Georgia
100
Km
Martin County
Palm Beach County
Broward County
Miami-Dade County
Monroe County
Florida
N
50 Km
SEFCRI Region
Biscayne National Park
Dry Tortugas National Park
FL Keys National Marine Sanctuary
Martin County (map in progress)
Florida Bay
Southwest Florida Shelf

Discussions held with Reef Managers and Scientists that provide management driven science

- Miami-Dade Department of Environmental Resources Management
- Florida Department of Environmental Resources Protection – Office of Beaches and Coastal Systems
- Florida Department of Environmental Resources Protection – Coral Reef Conservation Program
- Florida Fish and Wildlife Conservation Commission
- Florida Fish and Wildlife Conservation Commission – Florida Wildlife and Research Institute
- NOAA NMFS SERO and SEFSC - Protected Resources Division
- NOAA NMFS, Habitat Conservation Division
- NOAA Florida Keys National Marine Sanctuary
- Florida Institute of Technology
- Jacksonville University
- Nova Southeastern University/ National Coral Reef Institute
- Broward County Department of Environmental Protection and Growth Management
- U.S. Environmental Protection Agency
- South Atlantic Fishery Management Council
- Everglades National Park
- Dry Tortugas National Park
- Biscayne National Park
- John Pennekamp Coral Reef State Park
- U.S. Fish and Wildlife Service – National Wildlife Refuge
- Florida International University
- University of Miami
- The Nature Conservancy
- South Florida /Caribbean Inventory and Monitoring Network/NPS
- University of South Florida

Florida Context

- The Florida Reef tract runs from southeast, east-central Florida to the Dry Tortugas, and includes:
  - Florida Keys National Marine Sanctuary
  - Biscayne National Park
  - Everglades National Park and the Dry Tortugas
  - Southeast Florida Coral Reef Initiative area (northern extension of the Florida reef tract)

- Southwest Florida Shelf

- From June 2000 to May 2001, reef-related expenditures generated $6.1 billion and 71,000 jobs (Hazen and Sawyer 2001, 2004)

- Supported by two Fishery Management Councils
  Gulf of Mexico and South Atlantic

Issue 1: Mapping
existing

- Palm Beach County and Broward County, Miami-Dade County maps complete (90% + accurate). Martin County in progress. Maps are used on a daily basis to make reef management decisions (e.g., port anchorage relocation).
- Lower Keys patch reef mapping and benthic habitat mapping
- Dry Tortugas National Park has recently finished a benthic habitat map based on 2006 IKONOS imagery (80% + accurate) high resolution bathymetry data is currently been collected for the Park
- Biscayne National Park has satisfactory maps out to the 60 ft contour – can identify over 5,000 individual patch reefs.
- Currently mapping the area between Key West and the Dry Tortugas (including Marquesas)

Issue 1: Mapping
future needs

- Need to determine extent of coral reef habitat and shifts in zoogeographic breaks that may result from climate change
- Need to complete Martin County
- 53% of FKNMS remains unmapped

  - Need to map deep reefs >60 ft within the FKNMS and BNP

  - Need to map Hawk channel (potentially resilient reefs)
- Need bathymetry maps to assist with restoring grounding sites and damage assessment, zoning, etc.
- Prioritize completion of hydrographic surveys of Port of Miami anchorage area
- Acropora location maps needed
  - Managing protected species, including critical habitat, recovery planning, population trends
  - Restoration
  - Damage assessment, delineating anchorages, dredging impacts

Issue 2: Biological Monitoring *background*

- Identifies & Quantifies change over time and in response to different management actions
  - Designation of Protected Areas
  - Recovery of protected species and ecosystems
  - Response to disturbance events
  - General trends in ecosystem health
  - Once change has been detected, research can tell us “why”

Issue 2: Biological Monitoring *existing programs*

- Reef Visual Census (RVC)
  - Biscayne Bay to Tortugas
  - Multi-agency program
  - Direct management utility (MPA effectiveness, temporal changes, stock assessment)
- Acropora Monitoring
  - Site specific indicators of change
  - Coupled with large scale demographic monitoring (NURC/FKNMS, SECREMP)
  - Recruitment, Viability & genetic monitoring
- Coral Reef Evaluation and Monitoring Program (CREMP) in the Keys since 1996 – 36 sites, 103 stations; Dry Tortugas 8 sites, 27 stations since 1999, 6 new patch reef sites in the Keys 2009
- Southeast Florida CREMP (SECREMP) since 2003 – 13 sites, 52 stations (2010 will add 4 new sites, 16 stations)
- NPS Inventory and Monitoring - 20 sites DRTO, 20 more in BISC by 2010

Issue 2: Biological Monitoring
general future needs

- Continue and expand successful and useful programs such as Acropora, RVC monitoring programs, FIU Seagrass monitoring, CREMP, SECREMP
- Standardize high-priority monitoring activities across jurisdiction
- Make sure monitoring programs are comprehensive enough to capture impacts of LBSP, Fishing, and Climate

Issue 2: Biological Monitoring
specific future needs

- Need more revisit CREMP/SECREMP survey design and applicability
  - Add More Sites
  - Visit more often
  - Adopt a stratified/random approach in conjunction with fixed sites?
  - Collect coral demographic and condition data to determine trends in ecosystem health
  - Add coral recruitment
  - Key species relevant to management needs
  - Add fishery independent data
- Need to expand Acropora monitoring
  - Throughout its range, increase genetic assays, study recruitment
- Need to have the ability to monitor in response to disturbance events (hurricanes, HABs, upwellings, bleaching, disease outbreaks)
  - Emergency fund
- Spawning aggregation identification, success/recovery of spawning activities
- Collect fishery dependent data (DTNP)

Issue 3: LBSP/WQ Monitoring
background

- Assess the current **status** of coastal water quality by developing a long term database
- Evaluate the temporal and spatial **trends** in water quality in the surrounding waters
- Combine the separate projects to provide a more **regional integration** of water quality
- Determine the relative effects of **external vs internal influences** on water quality
- LBSP may impact reefs differently in the Keys vs off mainland Florida

Issue 3: LBSP/WQ Monitoring
existing programs

- FACE program (Florida Area Coastal Environment)
- EPA WQ monitoring in the Keys since 1995 (quarterly)
- WQ monitoring in the SEFCRI area will commence in 2009 (quarterly; currently funded for only one year)
- SEAKEYS Oceanographic Monitoring Program (need 2009 and beyond funding)
- Port Everglades Ship Channel Observatory (PESCO) 2009
- Florida Bay fledgling chl a, DO monitoring program
- NPS I&M collecting temp data at all sites
- SECREMP (and subset of CREMP sites) collecting temps data at all sites

Issue 3: LBSP/WQ Monitoring *future needs*

Long-term, targeted water quality program needs to be expanded to the SEFCRI area with the same effort and frequency as monitoring in the Keys

- will require partnerships with other State and Federal programs

Limitations to quarterly/annual water quality sampling

- Stochastic and fine scale events are not captured - need to implement a tiered sampling approach
- Need more science to develop predictive capabilities for algal bloom, disease, upwelling events
- CREWS/ICON (Integrated Coral Observing Network) stations
- Use of more sophisticated WQ monitoring tools (e.g., gene expression analysis) to help better determine cause-effect relationships to better manage the causes of reef stress.

Additional Issues

- Quantification and impacts of recreational fishing
- Monitoring in nearshore areas that are the most impacted by coastal development and dredge and fill projects (biological and physical monitoring)
- Need to update economic valuation of coral reefs in Florida
- Continue to discuss comparable regional monitoring and mapping approaches
- A central repository for monitoring and mapping data needed
- Drawing relationships between stressors and effects (esp. disease and bleaching)
- Invasives (lionfish, *Tubastrea*)
- Develop numeric nutrient criteria