MEETING SUMMARY

Coastal Oceans Task Force Meeting
Thursday March 13, 2014
Florida Atlantic University
Majestic Palm Room
777 Glades Road
Boca Raton, FL 33431

COTF members present:

Steven Abrams, Palm Beach County Commission
John Haddox, Martin County Commission
Susan Haynie, City of Boca Raton
Eula Clarke, City of Stuart
Dana Wusinich-Mendez, National Oceanic and Atmospheric Administration
Jeff Torode, South Florida Dive Headquarters
Mike Kennedy, Recreational Fishing
Claire Schubert, Town of Hillsboro Beach Commission
Frank Caplan, Village of Key Biscayne
Vice Mayor Stuart Dodd, Town of Lauderdale-by-the-Sea
Bonnie Fischer, Town of South Palm Beach
James Byrne, TNC
John Sprague, MIAF
Dick Dodge, NSUOC

Alternates present:

Ed Tichenor-Reef Rescue
Jamie Monty, FDEP

COTF Members absent:

Kristin Jacobs, Broward County Commission
Dawn Pardo, City of Riviera Beach
Michelle Kligman, Town of Surfside
Jocelyn Karazsia, National Oceanic and Atmospheric Administration (alt)
Bob Jones, Southeastern Fisheries Association
Becky Hope, Port of Miami
Alex Lewy, City of Hallandale Beach
Joanna Walczak, FDEP

Also present:

Carman Vare, Palm Beach County
Dan Clark, Cry of the Water
Bob Gebbia, League of Cities, North Palm Beach

Mason Smith, FWC – Marine Fisheries Management
Paul Davis

Welcome – Vice Chair Abrams

Welcome to new member, Vice-Mayor Stuart Dodd, Town of Lauderdale-by-the-Sea

Phil Aridas, Town of Lantana has resigned and been replaced by his alternate Bonnie Fischer of Town of South Palm Beach

Presentations:
Climate Change Implications and Planning Efforts in Southeast Florida, Dr. Jennifer Jurado, Broward County Natural Resources Planning and Management Division

Why is Climate Change Relevant?

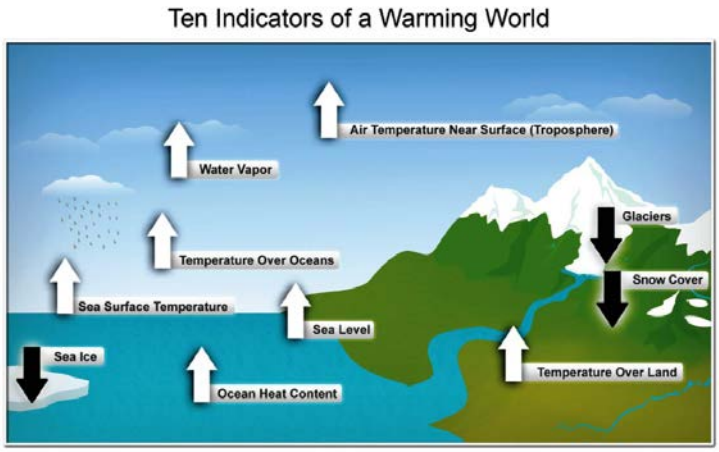
- Southeast Florida has been identified as one the most vulnerable regions to the impacts of sea level rise
- However, climate change portends more than rising seas and implications for vulnerable coastal infrastructure
- Severe weather, rising temperatures and ocean acidification are all predicted to challenge the resilience of built and our natural systems.

National Climate Assessment

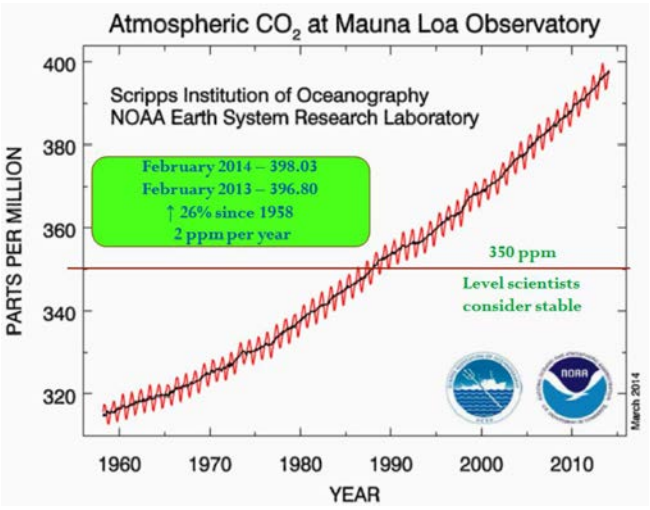
- The US. Global Change Research Program is required to conduct a National Climate Assessment (NCA) every 4 years.
- Third report has been released in draft and reinforces much of what is being observed at the local and regional level
- Presents significant data analyses, trends and projections for geographic regions
- Findings are impactful, with notable implications for southeast Florida.

What do we know?

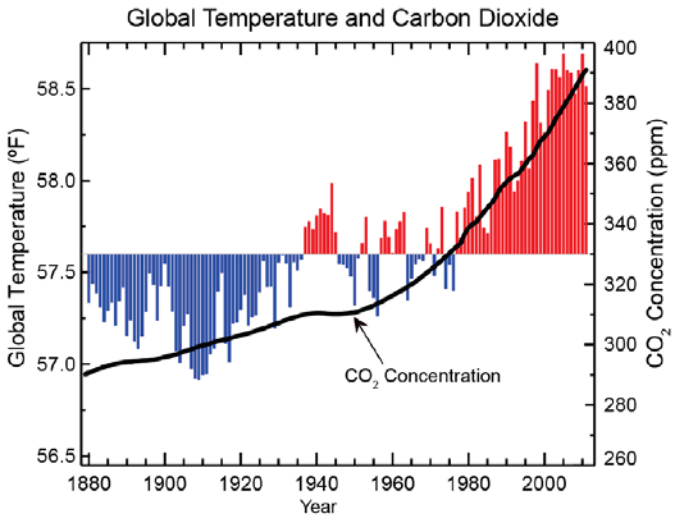
- The earth is warming
- CO_2 emissions are the primary cause
- Global indicators point to a warming planet
- Regional data confirm similar and related trends



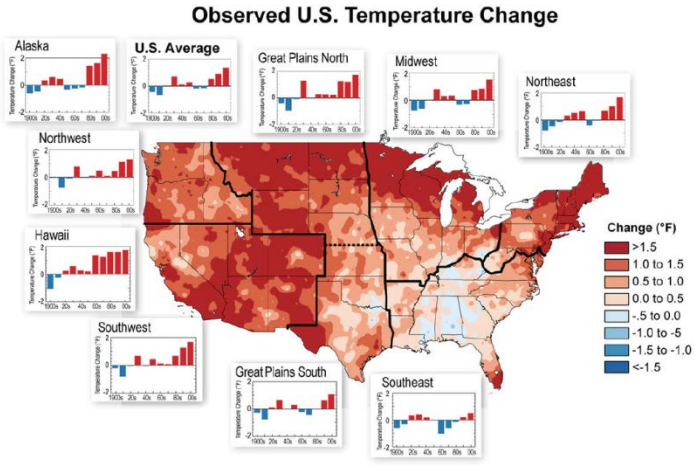
CO2 has increased substantially since 1958



Which correlates with increased global temperature

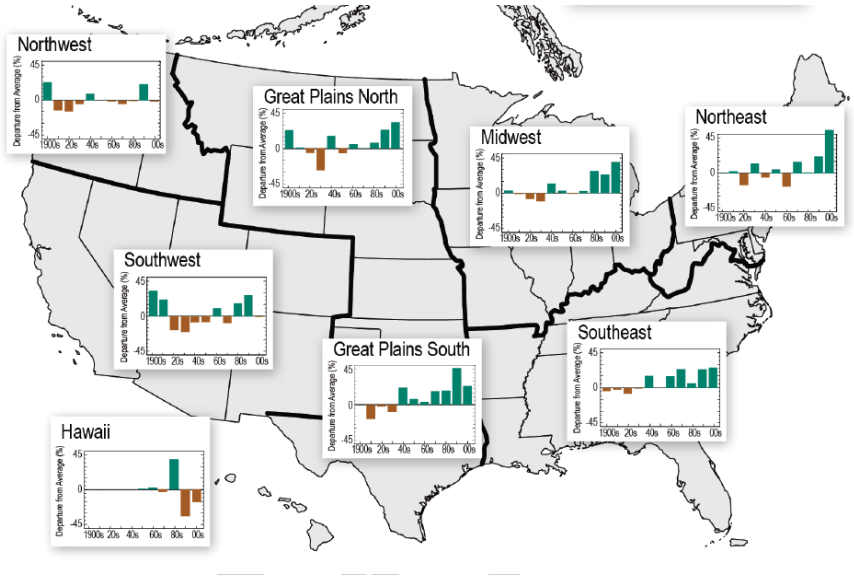


And increased local temperature in the US



Temperatures are projected to increase 3 to 5^{o}F in south Florida

Heavy Precipitation has increased in the US since the 1940s. Changes in southeast Florida reflect this increase



Physical environmental characteristics that increase vulnerability to climate change include

- Flat
- Low-lying
- Dense coastal development
- Porous geology
- Home to natural resources of national significance

The anticipated effects of increasing temperature (2^{o} to 10^{o}F by 2100) include

- increasing occurrence of extreme weather
  - o ↑ Storm intensity
  - o ↑ Max day temperatures
  - o ↑ Drought frequency
  - o ↑ Record rainfall
  - o ↑ Cold snaps
- Sea level rise of 1 to 4 ft
- Ocean acidification

There are implications for our oceans due to climate change (has increased nearly 1^{o}F over last century)

- Ocean stratification
- Changes in ocean circulation
- Ocean productivity
- Prevalence of pathogens and disease
- Ocean acidification
- Rising sea level
- Rising salinity
- Changes in wave height
- Changes in oxygen content
- Loss of critical habitat
- Loss of vital ecosystem services.

Local and regional impacts of climate change

- Threats to public and private infrastructure
  - Coastal/Tidal Flooding
  - Inland Flooding
  - Beach Erosion
  - Wind Damage
- Impacts on water supplies
  - Water shortages
  - Salt water intrusion
- Compromised natural systems
  - Coral Reefs
  - Everglades
  - Wetlands
  - Tidal systems
- NCA Florida-specific analyses
  - Verified trends
    - Increase in max temp and severe thunderstorms
    - Doubling in rate of SLR rise over previous decade (3 to 3.5 mm/yr)
    - Highest energy consumption and vulnerable populations
  - Predictions
    - Most significant increase in max temp
    - Fewer but more severe storms
    - Extreme wet and dry seasons
    - Increases in saltwater intrusion
    - Impacts to coastal resources
- Sea level rise and saltwater intrusion
  - SLR and pumpage have doubled the rate of saltwater intrusion

Implications of climate change for our coral reefs

- In Florida, all reefs are rated as threatened to combined impacts of climate change and local stresses
- South Florida reef ecosystems bring in over $6 billion in annual income and 71,000 jobs
- Coral growth is negatively affected by ocean acidification, turbidity, and rising temperature
- At the same time, increasing temperatures support proliferation of pathogens and disease.

Impacts on beach erosion

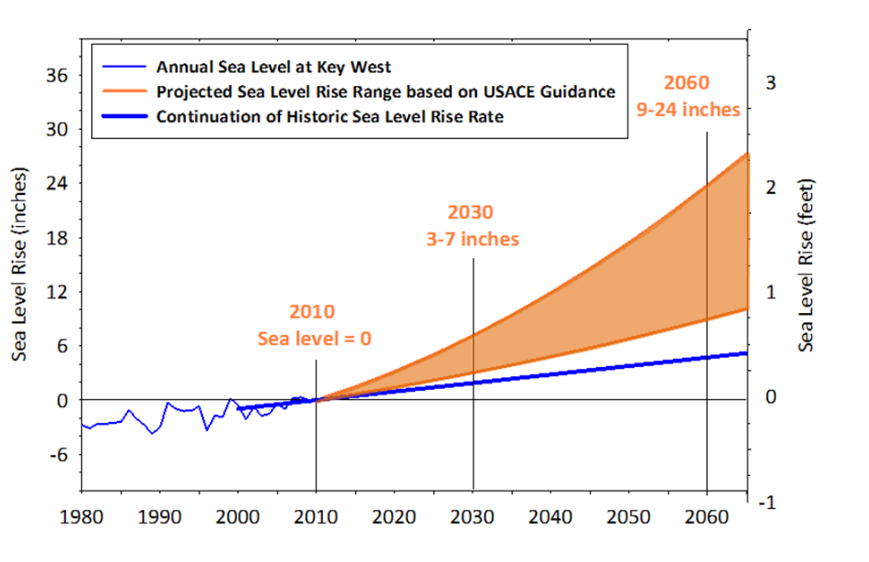
- Beaches are important economic resource, supporting $4B/year in economic activity (Broward)
- An additional $4 billion in coastal infrastructure is protected by our beach (Broward)
- Beach erosion control efforts cost our county an estimated $8.5 million/year
- Costs are expected to grow as erosion is compounded by rising seas and increasing storm intensity

Local action across the region

- Adoption of GHG reduction targets
- Creation of climate change task force
- Development of sea level rise projection
- Assessment of vulnerable areas
- Climate and energy policy advocacy
- Similar efforts duplicated across region

Southeast Florida Climate Change Compact

- Fully Ratified January 2010
- Commitments include:
  - Policy Collaboration
  - Develop Regional Tools
    - Unified SLR Projection
    - Inundation Maps
    - GHG Emissions Baseline
  - Create a Regional Action Plan
    - Mitigation and adaptation strategies
  - Convene Annual Summits
- Expansion of steering committee
  - Municipal Representation
    - City of Boynton Beach
    - City of Fort Lauderdale
    - City of Miami Beach
    - City of Key West
  - Ex-Officio
    - Jim Murley, South Florida Regional Planning Council
    - Chris Bergh, Nature Conservancy
    - Rod Braun, SFWMD
- Collaborating partners
  - FIU
  - FAU
  - UM
  - UF
  - USGS
  - USACE
  - The Nature Conservancy
  - NOAA
  - SFWMD
  - EPA
  - Institute for Sustainable Communities
  - Florida Division of Emergency Management
  - Climate Leadership Initiative
- Regional greenhouse gas baseline
  - Emissions show stability between 2005 and 2009
  - 44% of emissions are from transportation, 28% from residential, 26% from commercial sources, and 1% from industrial
- Unified sea level rise projection
  - 1 foot = 2040 – 2070; 2 feet = 2060 – 2115; and 3 feet = 2075-2150



- Vulnerability Work Group
  - Inundation mapping
    - Regional digital elevation model
    - 1, 2, and 3 foot scenarios
    - Common method to express potential risk
    - Identifies areas with LiDAR elevation at the mean higher high water line
  - Vulnerability analysis
    - Prioritized infrastructure for analysis
    - Tested geospatial analytical methods
    - Included uncertainty
- Economic assessment for sea level rise scenarios

Taxable Value of Property for 1 – 3 ft Sea Level Rise

	Monroe	Broward	Palm Beach
1 foot	$ 2,763,294,786.00	$ 403,069,831.00	$ 396,618,089.00
2 feet	$ 8,388,138,219.00	$ 1,751,104,870.00	$ 1,251,877,561.00
3 feet	$ 15,087,755,147.00	$ 6,900,509,868.00	$ 3,559,471,158.00

- Regional action plan planning process
  - Public process involving
    - Governmental agencies
    - Private industry
    - Academic institutions
    - Not-for-profits
    - Others
  - Topical work groups
    - Built environment
    - Transportation
    - Land and natural systems
    - Agriculture
  - Role of work groups

        - Develop recommendations
        - Assist with response to public comment
- Report Structure and Participants
    - Planning areas
        - Sustainable Community and Transportation Planning
        - Water Supply, Management and Infrastructure
        - Risk Reduction and Emergency Management
        - Energy and Fuel
        - Natural Systems
        - Agriculture
        - Public Policy and Outreach
    - Participants
        - Fed, State, local governments
        - Water Managers/utility directors
        - Economic Development
        - Planning Agencies
        - Emergency Management
        - Transportation
        - Consultant Engineers
        - USGBC
        - Environmental
        - Academics
- SE Florida Regional Climate Change Action Plan
    - Completed October 2012
    - Product of 3-year planning and public process
    - Reflects contributions of 135+ Work Group members
    - Details 106 recommendations across 7 planning areas
    - Includes companion Implementation Guide
    - Advancements
        - Policy Advocacy resulted in integration of Adaptation Action Areas in State Law
        - Integration of climate change in comp plans of all 4 counties and adoption of SLR projection
        - Contracted first Regional Public Health Index Assessment focused on climate change and vulnerable populations - FPHI
        - Advancing Property Assessed Clean Energy throughout region
        - Re-invest (sea walls) and FHWA (transportation vulnerability assessment) grants awarded to region and partners
        - Celebrated 5th Annual Summit in December 2013
    - Climate change vulnerability scenarios are being modelled
        - Water supply and drainage/flood control
        - High and low SLR scenarios
        - Design storm events
        - Extreme high tide
        - Adaptation strategies
    - Use updated maps and models to advance new design criteria for:
        - Surface water management systems
        - Transportation planning
        - Base floor elevations

- Shoreline Resilience Workgroup
  - Compact Work Group created with goal to improve coastal resilience by increasing the efficacy, number and scale of nature-based erosion control and flood attenuation projects
  - Provides coordinated evaluation, identification and pursuit of qualifying projects as part of regional resilience strategy and community outreach

Florida Coastal Zone Grants

- Resilient Communities Project
- Outreach to 13 coastal municipalities
  - provides individual assessments (maps, elevations, infrastructure)
  - Delivers policy and planning resources
- Adaptation Action Area (AAA) pilot
  - Adopted into law in 2011
  - Prioritize projects and funding to address impacts of sea level rise
  - Provides guidance document and communication tools

RECOMMENDATIONS

- Many existing sustainable use strategies, such as establishing protected areas and conserving habitat are known to increase resilience and adaptive capacity of our oceans.

- Improving/reducing stormwater runoff is an important strategy which should be prioritized to reduce existing and future stressors.

- Provide support for engineered "living shorelines" and hybrid "grey-green" approaches to coastal resilience that provides coastal protection to the SE Florida mainland or the Florida Keys.

- Urge valuation and consideration of ecosystem services as part of local, state, and federal project planning and land use decisions.

Discussion and comments followed, the main points of which were:

How do we change the public's perception that sea level rise in south Florida is only a coastal issue. Educate them that sea level rise affects inland areas just as much or more?

Desalination is a one of the more expensive forms of water treatment/conservation.

2nd Presentation

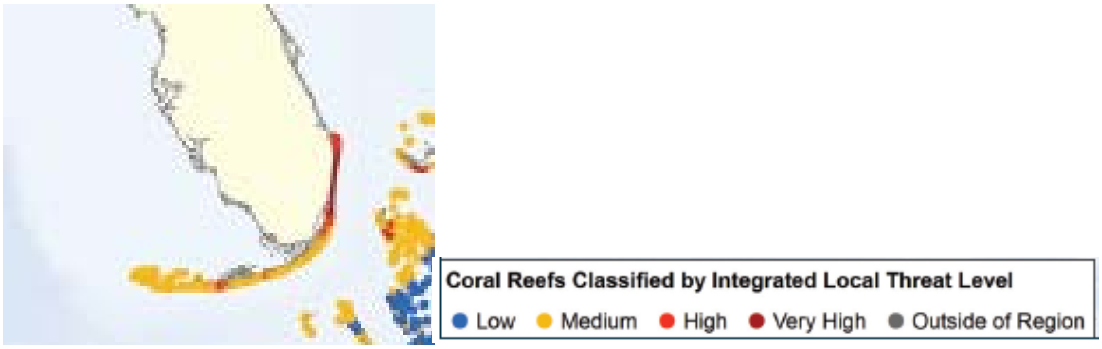
Impacts of Climate Change on Southeast Florida Coastal Marine Resources, James Byrne, The Nature Conservancy

The following factors are associated with climate change and can impact marine resources

- Storm frequency & intensity
- Precipitation, drought & runoff
- Changing circulation

- Sea level rise
- Sea temperature
- Ocean acidification

Stressors can compound and result in synergistic impacts. A report by Burke et al. (2011), Reefs at Risk Revisited, showed that the combination of integrated local threats, such as overfishing, pollution, coastal development, coupled with high thermal stress represented a high risk factor for coral reefs in the Atlantic.



Sea surface temperature (SST) trends across the Caribbean basin over the past 22 years indicate current warming is occurring at 0.2 to 0.5°C per decade. This, especially if accompanied by high ultraviolet light levels, can cause corals to expel the algae that normally live in their tissues (and give them color) if under stress.

- Bleaching can lead to disease and sometimes death.
- Death due to bleaching reduces coral reef biodiversity by decreasing coral species and coral cover.
- Declines in coral cover can cause a decrease in abundance of reef fish and a large decline in the number of reef species.*
- Increased frequency in bleaching events will allow less time in between for coral reefs to recover. In the last 26 years the Caribbean has seen 6 major bleaching events, which is greater than 1 event within 5 years.
- Massive bleaching events in Florida occurred around 1983, 1987, 1990, 1997, and 1998.

The Florida Reef Resilience Program (FRRP)

- This program originated in discussions among NOAA, the Australian Great Barrier Reef Marine Park Authority, the State of Florida, and The Nature Conservancy.
- This is a resilience-based management concept (increasing resilience allows organisms to tolerate higher stress levels)
- A program is in place to monitor the entire south Florida reef tract (Martin County southward through Monroe County), Disturbance Response Monitoring (DRM)
    - Monitor coral reef health after disturbances
    - 2005-13 focused on coral bleaching
    - Trained experts survey stony corals on FL reef tract during peak annual temperatures (6-8 weeks)
    - Follow-up surveys after moderate/severe bleaching years (e.g. 2005)
    - Can be used for other disturbances (e.g. hurricanes, cold water)
    - Field methods

        - Random sites generated and assigned to teams
        - 1 x 10m belt transects (2/site)
        - Measure/assess all corals (>=4 cm)
        - Species level identification
        - Degree of bleaching and presence of disease
        - Data entered online
        - Database queried for results
    - From 2005 to 2013, 1758 sites were surveyed
    - In 2013, 100 survey sites were surveyed
        - 0 – 50% of sites showed mild to moderate bleaching
        - Moderate bleaching occurred in the Upper Keys, Biscayne and Broward sub-regions due to paling of tissues
- Goals
    - Identify reefs that are likely to resist or recover from bleaching
    - Guide the protection & management of those reef areas
- Current FRRP partners
    - TNC
    - USF
    - FDEP
    - Miami-Dade County
    - Broward County
    - Palm Beach County
    - Martin County
    - SEFCRI
    - NOAA
    - USFWS
    - Mote Marine Laboratory
    - US RSMAS
    - FIT
    - Nova OC
    - Inst for Marine Remote Sensing
- Bleaching Response Plan
    - Chapter 1: Early Warning System
    - Chapter 2: Impact Assessment
    - Chapter 3: Communications
    - Chapter 4: Management Actions
- For more information, www.frrp.org

Enhancing coastal protection (coastalresilience.org)

- A coral wave tool is being developed to model how coral reefs in south Florida affect ocean waves in rising sea level scenarios.
- A meeting will be held April 16 and 17, at the University of Miami, Rosensthiel Marine and Atmospheric Sciences (RSMAS).

RECOMMENDATIONS

- Increase resilience of coral reefs by:
    - Protecting refugia
    - Improving water quality
    - Maintain biodiversity
    - Maintain connectivity among related ecosystems and within ecosystems

For consideration by COTF

What policy changes will be needed to create enabling conditions for swift and effective implementations of the recommendations coming out of the task force?

Discussion, questions and comments followed:

- Cold water resulting from winter cold snaps that lower the bay and inlet water temperatures can kill corals.
- Can corals adapt to warmer water temperatures? *Yes, but it takes time over generations, and if there are other stressors like impaired water quality it can take even longer.*
- What about seeding the reef with baby corals? *It is being done but will take a great amount of time to see any results. Australia is considering starting to seed the Great Barrier Reef in anticipation of reef loss due to rising sea temperatures.*
- Water discharged from Lake Okeechobee is believed to have affected reefs in the Port St. Lucie and Caloosahatchee estuaries in the past. Is this still happening? *It is believed so. A baseline is being developed in order to accurately measure the impact of discharged water.*
- Are there any hotspots, such as outfall pipes or inlets, that seem to jump out as being areas of low reef activity or quality? *Nothing that was definitive. It was noted that the patch reef at Hawk's channel in the Keys is more vigorous and more diverse than previously realized. There may be some protection from UV light due to pigments in the water.*
- Is there a direct relation between water temperature rising and acidification and coral bleaching? *No, they are independent events. One noted impact from ocean acidification is the disruption of chemical signals utilized by marine species.*
- Is paling of the coral caused by bleaching? *Yes, paling is the start of a coral bleaching.*

SEFCRI Update: Jamie Monty, FDEP

Our Florida Reefs (OFR) had kick-off meetings March 12, one for Martin and Palm Beach counties and one for Broward and Miami - Dade counties. As presented previously, their main task was to develop recommendations on how to improve south Florida reef's health.

Draft list of recommendations from presenters: Ken Banks, Broward County NRPMD

> This will be a running list that will be updated and presented at each meeting. Hopefully, there will be time for discussion of the list at next month's meeting.

New business: none

Public Comment: Dan Clark, Cry of the Water

Message he got from the presentations was that everything is connected and the reefs are important in many ways to South Florida. He would like the Task Force to address:

- Beach projects: Silt and sediment (from beach projects) degrade water quality.
- Broward County offshore waste tire removal (from the sea floor)
- Create a beach management plan and get it implemented.

Next scheduled meeting is April 10, 2014. It was agreed that the FAU, Boca Campus is a central site and will be scheduled for that meeting. The topic will be *Marine Industry and Coastal Construction related Impacts.*

Meeting adjourned 3:45 PM.