



SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

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Schedule **South Atlantic Ecosystem Model Workshop**

**Florida Fish and Wildlife Resource Institute (FWRI)
St. Petersburg, Florida
February 10-11, 2015**

Tuesday, February 10, 2015 – 8:30 a.m. to 4:30 p.m.

Facilitation: Brett Boston – Group Solutions

1. Review of recently developed prey/forage based Eco-Path model to initiate development of a new expanded and updated model focused on Council managed species – Tom Okey, Univ. of Victoria / Ocean Integrity Research

Summary: The existing South Atlantic Eco-Path model is a standard modeling approach that has evolved over time. The tool kit continues to improve as the user based expands. The existing model could be useful, if the model was further expanded. This would include expanding the coverage area within the model.

The advantages of the model are that it enables users to pull in additional data and continuously expand the elements under consideration. The weakness of the existing model is that the data sets have not been validated or verified.

As a management tool, it would be useful for people to understand complexity of the system. The model has the potential to provide gaming scenarios.

2. Overview of the Atlantic Coast Ecosystem Simulation (ACES) model to frame development of the South Atlantic Ecosystem Model (SAES) - a model focused on South Atlantic managed species, atmosphere-ocean dynamics, prey species and habitats – Jerry Ault, University of Miami

Summary: The ACES Model answers 21st Century challenges through its' inter-relate layers: fishing, human impacts, and economics. Other layers include predatory layers, prey layers (age,

numbers, length weight, fecundity, position x,y,z and swimming speed), coastal ocean atmosphere and freshwater inflow layers, habitats and a coastlines layer.

There is an opportunity of creating different models that all draw on the same inputs. Our goal should be to help the Council see their mandates are not just direct individual population mandates, but also include system dynamics.

The Eco-Path and Eco-Space are more statistically based models. They can be used as inputs for the other model to get the total biomass

3. Development of Conservation Blueprint Version 2.0 and Connectivity Modeling Coordinated through the South Atlantic Conservation Cooperative (SALCC) and Southeast Aquatic Resource Partnership (SARP) – Rua Mordecai, SALCC

Summary: SALCC offers the terrestrial linkage to any South Atlantic Ecosystem Model that might be created. Additional linkages would need to be built to the Peninsular Florida LCC, which covers Florida from Ocala to the Keys. SALCC is on its second version of an ecosystem blueprint to answer climate change and sea level rise questions throughout the five-state region it covers.

Rapid prototyping, winning fast (or losing fast), and continuous updates are part of the LEAN design process adopted by SALCC for ecosystem modeling. Built the model in two years and will have version 2.0 done in 3.

The blueprint has a science team that works with modelers to improve the science of the model and a user team that works with early adopter to ensure the tools are easy to use.

Coastal, estuarine, and river system linkages should be explored.

Modeling offers an opportunity to finally put uncertainty and risk into useful context for decision makers. The key is defining the system. Define what the connectivity in the food web looks like in the Southeast. It is important to really understand the connections between key components.

Overview of oceanographic models (supported by SECOORA) which characterize the State of the South Atlantic ocean and are available for use in other modeling efforts

1. State of SECOORA Regional Coastal Observing System (RCOOS) - Vembu Subramanian, SECOORA

Summary: The current timing for developing an ecosystem model for the South Atlantic works well for approaching SECOORA on its ability to provide analysis and support a working model.

Critical opportunities to be used to compliment stock assessments with existing capabilities.

There are funding opportunities for modeling and revising long-term data gathering if we act quickly.

2. Regional Oceanographic Circulation and Associated South Atlantic Biophysical Modeling – Ruoying He, North Carolina State University

Summary: The main model has three dynamic components sharing data real-time. A Wave Model (SWAN), a Circulation Model (ROMS) that feeds Marine Ecosystem and Sediment Transport Components, and an Atmospheric Model (WRF). The three models dynamically share data with each other.

Physical-Biogeochemical Interactions have a compelling predictive capability.

The use of enhanced sensing gliders is a cost-effective way to improve data and models.

3. High Resolution Coastal and Estuarine Hydrodynamic and Ecosystem Modeling – Peter Sheng, University of Florida, Gainesville

Summary: People live around estuaries and that's where all the problems are growing.

Coastal estuarine modeling can be used to simulate sediments, water quality, light, seagrass, larvae, oil spill impacts, storm surge, algal blooms, salinity, and coastal resiliency in the face of climate change.

Understanding the impact of re-suspension of sediments and nutrients is important.

A regional scale model would produce more accurate freshwater flux and sediment flux information. Connections from the shelf to the estuaries are essential for understanding life cycles and complete impacts on species of all factors.

In Florida, topography of the estuaries is available from the counties.

4. Remote Sensing for Ecosystem Modeling – Mitch Roffer, Roffer's Ocean Fishing Forecasting Service, Inc.

Where are the fish? Looking at fish migrations around the world, migration paths based on sea surface temperature. Data missing in the Southeast because of politics about catch data. Way to get data is working with fisherman locally so they will send you the information.

We were looking into the ability to track Sargassum from satellite images. Despite peer review, we don't believe it is possible. Without research crews going out and looking at what's actually going on out in the ocean, we cannot verify the satellite images.

DAY TWO

Wednesday, February 11, 2015 – 8:30 a.m. to 4:30 p.m.

Facilitation: Brett Boston – Group Solutions

1. Overview of Habitat and Environmental Parameter Modeling to Enhance Fish Stock Assessments, Characterize Species Habitat Distribution and Investigate Climate Variability - Mitch Roffer, ROFFS

Summary: Were trying to integrate environmental data into model (Satellite data and in-situ data.) Environment factors have not been put into the stock assessment so far.

Discussion of chevron-shaped trap for collecting fish and other sampling data.

Sampling discussion: Do you continue historical sampling station that yields no fish or do you learn from that or do you move and take away where the non-zeros are?

We need to begin gathering temperatures at depth.

2. Project: management and conservation of Atlantic Bluefin Tuna and other highly migratory fish in the Gulf of Mexico under IPCC climate change scenarios: a study using regional climate and habitat models - Mitch Roffer, ROFFS

Summary: As the temperatures in the Gulf rise, we are seeing Bluefin spawning in the open ocean, north of the Bahamas. Questions arise if the species will spawn earlier or deeper if we lose the habitat due to higher temperatures.

Still analyzing what the food composition is in the Atlantic, where they are breeding.

Yellow fin and marlin may become the 2050 winners of spawning in the Gulf based on warming water.

The dominant factor in the model was surface temperature, as larvae are in the top 10 meters of the water column.

Group discussion on the importance of more water temperature measurements and a consistent methodology. Gliders were seen as a key part of the solution.

3. Spatial structure from GIS - Tom Oakey, University of Alberta

Summary: Eco-Space can pick up map (various resolutions) depth, primary productions... from GIS via Internet. The map has layers for essential habitat. Marine protected areas are available from a Google link or zip protected file. The interface is on the front through a digital dashboard. You can download metadata, zip-files, and maybe Google connections.

All the life history and habitat connections need to be used to refine the existing Eco-Path Model of the South Atlantic. We also want spatial connections in the model. Combining into the bigger picture would be a huge breakthrough. Want the ability to have the entire snapshot of all the species in our area.

South Atlantic Bight Model: The approach is flexible. If we have good spatial data, we can pursue data on protected times or protected areas and determine what the costs, benefits or exchanges be. The model is capable of integrating all these questions.

4. A Perspective on How Ecosystem Models Could Support/Enhance SAFMC and SSC Review and Evaluation – Luiz Barbieri, FWRI and Marcel Reichert, SCDNR

Summary: Models can assist our work by increasing interpretive capability of either single species or multi-species.

Red tide mortality modeling couldn't explain decrease in landings without accounting for natural mortality. We used Bezhad Mahmoudi's idea of an Eco-Path (ecosystem) model for the Gulf to look at the species distribution, assigning mortality to different age classes. The bodies are very hard to find, so it's hard to know how old the fish was when it died because the bodies are eaten or float away, sink, etc. Integrating (in 2005 and 2014) different levels of information integrating satellite information to give you info about the red tide event. Used own red tide map to develop info and then overlap species distribution map to see if they were there, if so, they probably died.

Gulf Council reacted favorably to the model. They were asking to account for red tide in the models. They still did not like the fact that there were probabilities within the model. They don't want to see too many functional forms in the model. They ask "Which one is right?" We say, "We don't know." And they say, "How do you not know?"

5. Developing a Refined and Focused South Atlantic Eco-Path Model, other models and Data Needs

Summary: Wide-ranging discussions over the two-day event yielded the following major conclusions.

- a. Ecosystem modeling tools would ultimately enable better decision-making capabilities in the South Atlantic.
- b. The existing Eco-Path Model for the South Atlantic could be updated to address a bigger geographical scope, linked to physical and chemical models, and to include additional new data sets.
- c. A formal data strategy for the South Atlantic needs to be rapidly developed. The strategy should include current and future data needs; e.g., specifications for temperatures at the bottom and throughout the water column.

- d. SECOORA might be approached as a possible provider of funding for changes in the data gathering recommended. Now is an opportune time to address this topic.
- e. Linkages to the SALCC Blueprint are important. Connectivity to riverine systems models, estuarine models, water quality, and development is essential for a complete shore to shelf understanding.
- f. SALCC grant funding, coupled with SECOORA funding, might be a good starting point for the funding needed to kick-off the ecosystem project.
- g. The physical models presented provide additional understanding and should be incorporated into any long-term ecosystem modeling effort for the South Atlantic.
- h. The promise of glider technology was exciting for the group and should be integrated into planning efforts.
- i. The group was interested in continuing the dialogue and working together collaboratively to design the elements needed for better modeling of the South Atlantic Bight.
- j. There is a large funding gap between the funding levels the team indicated it would need and sources currently identified.
- k. Connecting the existing physical models to the Eco-Path model is important.
- l. The usefulness of the tools to the Council is a key component of the ultimate success. Currently, the Council is behind in the single species assessments needed to do its work. Adding additional tools that do not help with the decision-making at hand is problematic, at best.
- m. The group felt the upcoming red snapper and triggerfish assessment is key. Focus modeling on the practical pragmatic needs of the Council in the immediate future for a short-term win.
- n. Focus on broader, longer-term goals that are more science-based in nature to get the long-term wins that will make a real difference for management.

Background References/Links Provided by Presenters:

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The general ftp site link with all the papers is:

<ftp://ftp.rsmas.miami.edu/users/jault/safmc/>

The paper-specific links are given below the titles. A Word document with this information is also attached:

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