

Biscayne Bay Regional Restoration Coordination Team

Meeting Summary

Feb 20, 2019

Welcome and Introductions

Phil Everingham welcomed everyone to the group. Self-introductions were made and there were no remote attendees. Carrie Beeler informed the group that Adam Gelber wanted to attend but had a conflict in his schedule. Phil and others asked that he be invited to the next meeting March 20th.

Heather Bracken-Grissom, AP FIU PRESENTATION: The ecology, biodiversity, and economic importance of shrimp and lobsters in Florida and nearby regions

(Presentation not available until data is published)

Part 1: Investigating the Connectivity of the Florida Spiny Lobster Recruits in South Florida, Nan Yao*, Heather Bracken-Grissom, and Yuying Zhang

Spiny Lobster and shrimp in Florida, Pink Shrimp are related to each other.

Spiny lobster is an economic and ecological important species in the Caribbean. It is widely distributed in the tropical and subtropical waters of the Atlantic Ocean. It has been harvested by 23 countries and supports the most valuable fisheries in the region. Besides, as a benthic feeder and prey for nurse shark and moray eel, spiny lobster is an important link in the food web.

According to FAO, the global production of the spiny lobster in the Caribbean reaches 31,580 metric tons in 2013. In the US, the annual lobster landings peaked at 10 million pounds in 2001 (Sharp et al. 2005). However, this value decreased substantially after 2001. In 2013, the State's annual lobster landing was around 2.4 million pounds. It is less than half of what it was 10 years earlier.

Stock is in decline and effective management strategies are needed for the spiny lobster fishery. Unique drift larvae stage becomes an obstacle in understanding the recruitment dynamics

Investigating the connectivity of the Florida spiny lobster recruits (*Panulirus argus*). They are from the class Decapoda Latreille order Achelata. (without claws). Widely distributed in tropical and subtropical oceans. It is a benthic feeder and is prey for sharks and others.

Unique drift larval. Life cycle:

- Adults release several thousand phyllosoma larvae.
- Phyllosoma dispersal may last up to 24 months.
- Pueruli (decapodid stage) are in charge of recruitment.
- Eggs attached to female

- Transparent hard to see them. They are known to piggyback
- Participate in diurnal migration (part of day spent deeper then at night go nearer to the surface to feed).

Belief is that there is a closed system stock in Florida? Information has been found on biophysical modeling using inferences from ocean current paths. There have been some stable isotope studies. Genetic markers are a good way to study connectivity. Microsatellite gene or DNA sequence is like a DNA fingerprint. Microsatellite A gene or DNA sequence on a chromosome can be used to identify species or individuals.

markers are polymorphic DNA loci containing repeated nucleotide sequences. The repeats highly variable among individuals.

Use genetic and temporal scale change in genetic diversity.

Object 1. Identify genetic structure and variation of the recruits arriving at Florida from August 2014 to July 2016.

Objective 2. Explore the temporal pattern of the genetic variations of the Florida recruits from August 2014 to July 2016

Areas sampled included Long Keys and Big Munson

Findings show there are 3 source populations and over time variables in those population size are shown. The patterns are not repeated yearly.

There is a lot of genetic diversity.

Kinship analysis showed a lot of variation across months-no pattern so a lot of variation from month to month.

- Assuming the wrong life history or ignoring the connectivity among the stocks will hinder the effectiveness of the management.
- South Florida is a demographically open stock, receiving recruits from different source populations.

Part 2: Uncovering cryptic diversity in an economically important genus of estuarine shrimp (*Farfantepenaeus*)

Shrimp have a huge economic and cultural significance in South Florida. In 2015 shrimp contributed \$213 million to Florida's economy.

Research questions?

- Hypothesized to have originated in Pacific and traversed the isthmus of Panama
- Closing of the isthmus prevented back migration
- Little information about what happened once they entered the Atlantic

- *Farfantepenaeus* is a genus of penaeid shrimp commonly targeted in fisheries (pressure can vary by species and nation)
 - A new species (*F. isabellae*) was just described last year
 - Proper management requires an inclusive phylogeny and knowledge of evolutionary relationships
- 9 described species of *Farfantepenaeus* can be hard to ID due to the phylogeny of estuarine pink shrimp

Research Questions

- 1) How are species of *Farfantepaneus* related to one another?

This had never been done using genetic data

- 1) Do we see evidence for cryptic or “hidden diversity” in species that have expanded distributional ranges?
- 2) Do we see patterns relating evolutionary history and biogeography?
 - Phylogeny of estuarine pink shrimp

Research Questions

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Some of the sampling places include: Pumpkin Bay, Fakahatchee Bay, Bradley Key Biscayne Bay NOAA Nursery and Biscayne Bay Localities A, B, and C.

Leverage existing gene markers CO1, 16 s, and 12 s. There were approximately 189 new sequences for Pink Shrimp generated.

Genetic Tree was used. Every species in genus is sampled in tree. The “out group” used was white shrimp. Support values of 1.0 is 100% match and statistically significant, those below about .95 are not statistically significant. 2 pacific species were found but were not closely related. It is not confirmed if *F. notialis* is a real species or not. Its range is from Florida to south America, more sampling is needed to determine if it is a species or if it is still nested in *F. duorarum*.

Conclusions:

Evidence suggesting accepted taxonomic characters may create a lack of diagnostic power

- 1) Lack of support for *F. duorarum*-*F. notialis* separation
- 2) Structure suggesting a subspecies of *F. brasiliensis*

- 3) Phylogeographic pattern of latitudinal speciation- Importance of currents. There seems to be a divide near the Equator. Given the reproductive cycle of these species, it may be due to larvae/juveniles being unable to migrate across the Equator.

Nancy Dersing explained that spiny lobsters were found in the Keys ecologic reserve. Due to management actions the natural benthic populations in sediment has come back and the fish have also returned. Marine zone stuff works.

Joan Browder in Biscayne Bay several species were found but in Florida Bay there was less diversity. This could be because there wasn't as much sampling done in Florida Bay and it could be due to sample size.

Craig Grossenbacher remarked that changes such as water temperature and currents associated with climate change could be driving the species from Cuba north explaining why Cuban species were found in Biscayne Bay.

Eon remarked that shrimp has overlaps in populations.

ANNUAL REPORT 2019, Carrie Beeler, Office of Everglades Restoration Initiatives

https://evergladesrestoration.gov/content/bbrrct/minutes/2019_meetings/022019/BBRRCT_Annual_report_2018.pdf

Carrie Beeler went over the organization chart to show the team where they fit it and that they report to the WG. She provided Excerpts of the Charter that showed the teams purpose and directed them to provide an annual report to the WG. A Map of the boundaries was provided that showing the BBRRCT watershed.

She provided the bullet points established in August 2018 as a starting point for discussion. The team added language and began to work the bullet points below. A look ahead at 2019 was also indicated in the bullets below.

- BBCW
 - Completion of BBCW Phase 1 and
 - Expediting BBCW phase 2 planning –see letter provided to WG Nov 2018
 - 2019 prepare for planning and coordination
 - i.e. nitrogen removal...STAs...C102 and C103 (CEPP like)
- Efforts that work with nearby communities to reduce their impacts to the Bay.
 - 2018 BNP ecotours working together
 - 2018 Miami Water Keepers work with public to reduce fertilizer use
 - 2018 Miami Beach garbage collections from water ways??

- 2019 Bay is part of SF restoration watershed and working with communities in that watershed is important.
- Initiatives to help updated and define economic value of the Bay, including the value of seagrass and coral reefs
 - 2015 Pink Shrimp was a \$213 Million industry
 - 2018 presentations from Dr. M Bhat value of Mangroves in Florida Bay
 - 2019 may be looking at funding an updated economic study
- Algal blooms, Seagrass die off and other ecological damages were identified.
 - 2018 We heard about damages to Bay and now...science is leading to watershed to find sources of nutrients entering the canals
 - 2019 We will continue to focus on ...
 - Watershed Recommendation
 - Reasonable assurance Plan (RAP) –local initiative (Miami Water Keepers) facilitated by DEP or others –documentation of our watershed issues and funding for mitigation. Regulatory process in lieu of DEP TMDL local government can agree to do themselves. Water quality coming into the bay. Any municipality doing its own stormwater management is eligible. Prove economically better than continued nutrient loads.
 - Local government can decide not to wait and start making changes. They would then be eligible for grants from federal and state government.
- Governance
 - 2018 Miami Dade county began a process to create a local board to make recommendations on the Bay
 - Feb 5th Commissioner Sosa proposed a resolution to establish a Biscayne Bay Task Force. Membership will be decided over the next couple of months.

Additional topics suggested

- Marine Debris
- 2019 influences of hypersalinity water temperature, endangered species, freshwater demands and other concerns from watershed?
- 2019 additional clean, fresh water availability for the Bay

Charles Grisafi, NOAA Marine Debris Program. Save Our Seas federal legislation and impact on NOAA's Marine Debris Program.

https://evergladesrestoration.gov/content/bbrrct/minutes/2019_meetings/022019/Grisafi_SOS_Act.pdf

Program Pillars: Removal, prevention, research, emergency response, regional coordination.

The Save Our Seas Act passed the House and Senate with unanimous consent and is being celebrated as a triumph of bipartisanship. Senator Sullivan (R-AK) and Senator Whitehouse (D-RI) were co-sponsors of the bill and made it a priority for passage Oct 2018.

What stays the same?

- Existing program elements
- Authorization of appropriation level =\$10M

What changes? Areas of Emphasis

- Interagency Collaboration
- Emergency Response: Severe Marine Debris Events
- International Action
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Here the law has a few tweaks to include adding a few key agencies as members of the Interagency Marine Debris Coordinating Committee. This Committee was established in our founding legislation in 2006 to coordinate marine debris research and activities among federal agencies, and the SOS Act officially added Department of State and Department of Interior as members. For example, Biscayne National Park could now be a partner.

- Next regarding interagency collaboration, it directs NOAA to work with Federal agencies to develop outreach and education strategies to address sources of marine debris.

Act gives NOAA discretion to determine SMDE

- NOAA Administrator
- At request of Governor of affected state

Changes match requirements for grants if SMDE declared

- 25 percent match from partner required of total project cost
- Limits NOAA's discretion to waive match requirements
- To our program, the most significant change is the language on Severe Marine Debris Events. The Act gives NOAA the discretion to determine whether there is a severe debris event, either on its own or at the request of a Governor of an affected state. This sounds simple but requires us to establish definitions, criteria and process on how and when to declare a Severe Marine Debris Event.
- In addition, the law changes the grant match requirements for affected states where a severe marine debris event is declared. In the past NOAA has had the flexibility to waive cost-share requirements if the Administrator determines the applicant cannot meet the matching requirement and the probable benefit of such project outweighs the public interest in such matching requirement. Under the new language, a "severe marine debris event" declaration would trigger a different cost-share requirement. Specifically, the affected states seeking support would need to provide 25% of the total project cost in some sort of match.

No extra \$ for severe event. NOAA can waive match requirement.

Develop Interpretive Guidance Doc

- Definitions – what is a SMDE?
- Criteria for making a determination
- Process for making declaration

Directs NOAA to work in consultation with the Department of State and other Federal agencies to promote international action

Language does not provide NOAA independent authority to enter into international agreement, receive funds from foreign sources, or fund activities in foreign jurisdictions

- Another key part of the Act is the “Sense of Congress” provision stating that “It is the sense of Congress that the President should” support federal funding for research and development to reduce marine debris, work with representatives of foreign countries to mitigate the risk of, and find solutions to, marine debris, and encourage the United States Trade Representative to consider the impact of marine debris in future trade agreements.
- This language does not have a legally binding effect and is considered a recommendation. As such we have yet to start digging in on this language specifically but again it is a strong signal from Congress that the President should seek opportunities to better understand where debris is coming from, how best to address this debris through R&D and to work with the relevant countries to enter into international agreements to reduce debris entering the ocean.
- The Sense of Congress language is best addressed by other agencies with expertise in the areas of waste management, such as EPA.

Strategic plan for next 5 years will include SOS. Also, they will hire a FTE to focus on international affairs.

Adjourn