

Florida United Malacologists



Program and Abstracts

April 13, 2024

José H. Leal, Organizer



Bailey-Matthews
National Shell Museum
& Aquarium

WELCOME TO FUM 2024!

Dear FUM 2024 Participants,

Welcome back to Sanibel, and the Museum is thrilled to again host this important forum and all of you. We are looking very much forward to the presentations and dialogue.

Thank you for your interest, preparation, participation – it is the essence of FUM. I hope you will join me in extending an extra special thank you to Dr. José H. Leal, Science Director and Curator of the Bailey-Matthews National Shell Museum & Aquarium for his tireless efforts in organizing this event.

We are also grateful to the Sanibel Community Association for the use of The Community House as the venue for this year's FUM. The Community House has stood as a gathering place for this community since 1927, including the earliest iterations of the Sanibel Shell Show. The Community House was severely damaged by Hurricane Ian, but admirably bounced back to host events such as ours this season.

If your time allows, I hope you may have the chance to visit the Museum, which reopened partially to the public on March 1 and is open Tuesday–Saturday. Currently the Living Gallery of Aquariums is open and features many new exhibits about the biology of mollusks and how we care for and enrich these animals at the Museum. We continue our work on a full redesign and reinstallation of the Great Hall of Shells, which we expect to be ready sometime this summer.

Enjoy FUM!



Sam Ankerson
Executive Director
Bailey-Matthews National Shell Museum & Aquarium

Dear FUM 2024 Participants,

I am so glad we are getting together again, although not at the Museum this one time. FUM 2024 is breaking another attendance record, with 92 registrants and 18 presentations! I want to thank Executive Director Sam Ankerson for his unwavering support amidst the formidable efforts of Museum reconstruction/re-opening and Chris Whitt and Tom Annesley for logistical help. Last but not least, thanks to Kimberly Shunk for sponsoring lunch and to all of you for making FUM 2024 happen!



José H. Leal, Ph.D.
Science Director | Curator
Bailey-Matthews National Shell Museum & Aquarium

FLORIDA UNITED MALACOLOGISTS 2024
APRIL 13, 2024
PROGRAM

9:00 Sam Ankerson, BMNSM Executive Director

WELCOME AND OPENING REMARKS

José H. Leal, BMNSM Science Director & Curator

ANNOUNCEMENTS

SESSION 1

9:15 Carole Marshall

Dr. Harry George Lee, 1941–2024

9:35 Duane Kauffmann

Trends in species frequency: data from two popular beaches

9:55 Robert A. DePalma, Anton O. Oleinik

Unlikely heroes of fossil preparation: neritid snails in the workplace

10:15 Stephen P. Geiger, Erica A. Levine, Christopher J. Kirby

Oysters are an ecological indicator for Everglades Restoration

10:35 Break 1 – 10 minutes

SESSION 2

10:45 Christopher Gleason, Elias Gianopoulos, Katherine Johnston, Maria Criales

A spotlight on curation: Revitalizing a crucially important collection of Atlantic invertebrates

11:05 Eugene V. Coan, Jean-Michel Pacaud, Alan R. Kabat

Gérard-Paul Deshayes (1796–1875) and his taxa

11:25 Gregory S. Herbert, Stephen P. Geiger

Setting priorities for the conservation of Florida marine mollusks

11:45 Greg Curry, Sr.

Scaphella junonia and its subspecies

12:05 Group Photo

ON COMMUNITY HOUSE GROUNDS

12:15 LUNCH – Break 2

LUNCH PROVIDED: YOUR CHOICE OF REGULAR OR VEGETARIAN SANDWICHES, PLUS ASSORTED CHIPS, SOFT DRINKS, WATER (LUNCH COURTESY OF KIMBERLY SHUNK)

SESSION 3

1:00 José H. Leal, Gregory S. Herbert, William Fenzan, Aaron Avery, Federico Márquez
Geometric morphometrics reveal that *Conus anabathrum* should be an accepted species

1:20 José H. Leal, Chris Whitt
“Mobilizing Millions of Mollusks of the Eastern Seaboard”: Collection digitization activities at the Bailey-Matthews National Shell Museum and Aquarium

1:40 Richard L. Goldberg
Field observations of the genus *Lucerna* (formerly *Pleurodonte*) in Jamaica

2:00 Lyndsey Grossmann, Erin Pulster
Microplastics, mollusks, and a hurricane in Tampa Bay: A research update

2:20 Alizé M. Hardin, Stephanie A. Sanders, Ziba Shojaei Fakhrabadi, Gregory S. Herbert, Stephen P. Geiger
Death assemblages from the eastern Gulf of Mexico reveal possible population shifts in IUCN mollusk of concern, *Conus anabathrum*

2:40 Break 2 – 10 minutes

SESSION 4

2:50 Cabe Rieck, Holt Rieck, April Lauseng
Observations of cyphomas and their gorgonian hosts in 2023

3:10 Julia Piper, Grace Ferguson, Erika Molina, Samantha Schlegel, Michael Middlebrooks
An analysis of foot strength variation in ecotypes of the sea slug *Elysia crispata*

3:30 Michael L. Middlebrooks, Louis J. Ambrosio, Samantha Schlegel
First report of a population of the photosynthetic Sea Slug *Elysia chlorotica* on the West Coast of Florida

3:50 Stephanie A. Sanders, Gregory S. Herbert, Kendal Jackson, David J. Karlen, Kevin Campbell
Reconstructing seagrass restoration targets through the study of past mollusk communities in Tampa Bay

4:10 Dylan G. Opitz, Anton E. Oleinik, Alexander Modys
Molluscan biodiversity of the nearshore ridge complex off Pompano Beach, Florida

4:30 CONCLUSION, CLOSING REMARKS

5:30 DINNER at Doc Ford's. Prior reservation is required, seating is limited. Address and location map at the end of this booklet. (Attendees will be responsible for their dinner expenses.)

Abstracts FUM 2024

(Listed in alphabetical order by senior authors' last names. In talks with more than one author, the names of presenters are underlined)

Gérard-Paul Deshayes (1796–1875) and his taxa

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A biography and bibliography of Gérard-Paul Deshayes (1796-1875) [pronounced “Dé-ai”] has been prepared and is in press. The paper includes an annotated list of his new molluscan and other taxa, manuscript taxa attributed to him by others, and taxa misattributed to him. A comprehensive index of these more than 4,000 taxa is provided. Deshayes is best known for his monographs on the Cenozoic marine fossil mollusks of the Paris Basin and for having contributed to several French encyclopedic natural history publications. He also published extensively on Recent marine mollusks. A summary of his life and work will be given in this talk.

Scaphella junonia and its subspecies

Greg Curry, Sr.

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This talk will discuss the differences between the subspecies of *Scaphella junonia* and present the areas where they are found. I hope to give the group just a little taste of the variation in this great species.

Unlikely heroes of fossil preparation: neritid snails in the workplace

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Extinct life is a key to understanding the past and deciphering the nuances of ancient biomes. Paleontological research is heavily dependent on preparation of fossils to unlock morphological data that is vital to that pursuit. Techniques to delicately remove rocky matrix from fossil specimens have been evolving for 100+ years. However, recent technological and chemical advancements have greatly augmented the process. Here, we describe a new, entirely biological, fossil preparation technique that is mediated by gastropod mollusks. The technique under development relies on the rhipidiglossate radula of aquatic snails (family Neritidae) to remove matrix that was previously colonized by cyanobacteria. The microscopic sharp apatite spines of the radula achieved more precise removal of matrix than traditional manual preparation tools, exposing anatomical detail that would typically be challenging to uncover. The newly explored technique demonstrates the benefits of utilizing gastropods in the paleo lab setting, on fossils not susceptible to water damage.

Oysters are an ecological indicator for Everglades Restoration

Stephen P. Geiger*, Erica A. Levine, Christopher J. Kirby

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Eastern Oysters (*Crassostrea virginica*) have been monitored as an important biological indicator informing Everglades Restoration status reports since 2000 (Caloosahatchee River) and 2005 (St. Lucie Estuary, Loxahatchee River, and Lake Worth Lagoon). The principal metric, or performance measure, for oysters is acres of oyster habitat, but comprehensive surveys are time consuming and costly. Interim metrics that are monitored include monthly assessment of water quality, disease, settlement and reproduction, growth and mortality, and semi-annual surveys for abundance and size. Unfortunately, oysters are failing to meet restoration targets. At some sites, high salinity results in elevated levels of the parasite *Perkinsus marinus*. At other sites a combination of high freshwater releases combined with the passage of tropical weather systems is also contributing to declining oyster metric scores. In some areas, the largest oysters are a smaller proportion of the population than was common when the study began.

A spotlight on curation: Revitalizing a crucially important collection of Atlantic invertebrates

Christopher Gleason*, Elias Gianopoulos, Katherine Johnston, Maria Criales

Gil and Nancy Voss Marine Invertebrate Collection
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The University of Miami's Voss Marine Invertebrate Collection (VMIC) seems small at first glance. Founded in the 1940s and grown under the leadership of Gilbert Voss, the VMIC today contains well over 80,000 specimens across 17 invertebrate phyla with a particular emphasis on mollusk diversity. In addition to a comprehensive array of Atlantic cephalopods, the VMIC contains an extensive dry collection of mollusk shells acquired during multiple research cruises and donations. Much of this dry collection remains incompletely cataloged and in need of reorganization. We will briefly present an overview of the VMIC's scope and scientific value before exploring our personal projects to preserve, maintain, and revitalize this crucial museum. In our current times of global climate upheaval, studying the Earth's biodiversity is incredibly important yet severely underappreciated. We hope to shine a spotlight on the importance of taxonomic and curatorial work, especially as it relates to small regional collections.

Field observations of the genus *Lucerna* (formerly *Pleurodonte*) in Jamaica

Richard L. Goldberg

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During the past 40+ years I have explored the entirety of Jamaica studying the terrestrial mollusks of the island. The largest and most widespread of these terrestrials are the species classified in the genus *Pleurodonte*. A project that I embarked upon some two decades ago involved photographing as many living *Pleurodonte* species from localized populations, recording accurate GPS data for each, and cross-referencing the shells produced by each mollusk to build an island-wide visual guide of the genus that was used, in part, for a taxonomic revision of the Helicoidea and Sagdoidea (Sei et al., 2017). Among their findings, their research led to a taxonomic revision of the genus *Pleurodonte* in Jamaica, which is now classified in the genus *Lucerna*. This presentation will illustrate some of my results with field photos of the animals and a glimpse at the unique diversity of the genus *Lucerna* of Jamaica.

Sei, M., Robinson, D.G., Rosenberg, G. 2017. Double helix: Sagdoidea is the overlooked sister group of Helicoidea (Mollusca: Gastropoda: Pulmonata). *Biological Journal of the Linnean Society* 122 (4) December 2017: 697–728, <https://doi.org/10.1093/biolinnean/blx082>

Microplastics, mollusks, and a hurricane in Tampa Bay: A research update

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Microplastics (MPs) are now considered ubiquitous contaminants across all the planet's habitats. In the Tampa Bay estuary, microplastics ingested by filter- and deposit-feeding invertebrates, such as mollusks, can reduce feeding efficiency and fertility, increase inflammation and neurotoxicity, and change gene expression. MPs are currently difficult to remove from the environment. For this reason, determining the source and transport of MP pollution to the environment is needed to remedy the pollution before it happens. This presentation provides an update on current efforts to explore patterns of MP fallout from the atmosphere around Tampa Bay. Patterns derived from spatial variation, differing land use area, and meteorological variables such as wind speed and rainfall volumes will provide knowledge on local pollution sources and transport mechanisms to help preserve Tampa Bay's mollusk communities.

Death assemblages from the eastern Gulf of Mexico reveal possible population shifts in IUCN mollusk of concern, *Conus anabathrum*

**Alizé M. Hardin^{1*}, Stephanie A. Sanders¹, Ziba Shojaei Fakhrabadi¹, Gregory S. Herbert¹,
Stephen P. Geiger²**

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For decades, coastal marine ecosystems have been affected by anthropogenic activity. Although our understanding of these effects is limited to data beginning around 1950, highlighting the importance of utilizing deep-time perspectives for effective conservation management. A recent dredge survey of mollusks from the west Florida shelf provides pertinent information needed to gain insight into pre-anthropogenic communities. In this study, we utilize dredge samples to model changes in density distribution of *Conus anabathrum* over long-time scales. Occurrences of *C. anabathrum*, both living and dead, are relatively rare in the survey dataset in terms of total numbers (0.005%) but are more frequent in terms of station occurrences (14%). The analyzed shells varied from grade I, characterized by intact ornamentation and luster with ages dating back a few decades, to grade II shells, with ages ranging from centuries to millennia, demonstrating partial or complete loss in both ornamentation and luster. Occurrences of dead grade II shells were found across a range of depths, from shallow (4 m) to the outer shelf depths (91 m), with higher counts and station densities observed at lower latitudes along the west Everglades. However, grade I and live records were almost entirely restricted to shallower inshore waters less than 20 m depth. This observation aligns with historical trends for the species in presence-only records from museum collections, which suggests that the pattern is consistent. This project is part of a larger transdisciplinary effort with Florida Fish and Wildlife to assess threatened species for informing management and policy decisions.

Setting priorities for the conservation of Florida's marine mollusks

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Florida's marine mollusks face a range of threats, such as coastal development, overharvest, habitat disturbance, and natural system modifications. However, efforts to assess their vulnerability to extinction have lagged far behind those for terrestrial and freshwater organisms. Among Florida's marine mollusks, only two cone snails and a nudibranch have been comprehensively assessed and included in the state's Wildlife Action Plan, which allocates resources for conservation action and monitoring. Current efforts led by Fish and Wildlife Research Institute to rank and prioritize additional species for conservation action are focusing on geographic distribution, depth distribution, and size because those data are readily available for many species and relevant to vulnerability. In this talk, we provide an overview of these ongoing efforts as well as the development of new metrics and new sources of data that can more accurately identify and rank threatened species.

Trends in species frequency: data from two popular beaches

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The marine environment of west central Florida has been subjected to many stressors: red tide, warm temperatures, hurricanes, varied pollutants, beach restoration, etc. This study addressed the question as to whether the cumulative effect of the impacting variables has had a notable impact on the number of molluscan species that can be found. Two west central Florida beaches, both in Sarasota County, were selected for repeat visits over a span stretching to 15 years. A total of 286 (208 gastropods and 78 bivalves) species were recorded from South Lido Beach and 270 (196 gastropods and 74 bivalves) from Siesta Key Beach. The taxonomic data show a similar number of species identified over the time period studied. Indeed, 3 of the 4 data streams show a slight increase in species number. Thus, it appears that the number of species of both gastropods and bivalves remains strong. While the strategy chosen provided quantitative results, it is important to exercise caution in interpretation and to recognize the limitations of the data given the numerous uncontrolled variables.

Geometric morphometrics reveal that *Conus anabathrum* should be an accepted species**

José H. Leal^{1*}, Gregory S. Herbert², William Fenzan³, Aaron Avery², Federico Márquez^{4,5}

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In 2022, the accepted name for a marine gastropod species from Florida until then known as *Conus anabathrum* Crosse, 1865 was replaced by *Conus floridanus* Gabb, 1869. The main argument was that the type of *C. anabathrum*, a specimen with no type locality indicated in the original description, actually represents the eastern Pacific species *C. scalaris* Valenciennes, 1832. This allocation of the type of *C. anabathrum* to an eastern Pacific taxon was based on several factors, with shell shape as the main determinant. We demonstrate via geometric morphometrics that the type of *C. anabathrum* actually falls outside the morphospace of *C. scalaris*, belonging instead in the morphospace of the Floridian taxon. We also discuss other arguments presented to assign the type of *C. anabathrum* to the eastern Pacific species. These discussions and our geometric morphometrics analytical results show that the type of *C. anabathrum* in fact stands for the Floridian species, and that *Conus anabathrum* should be the accepted name for that taxon.

**In press at the *Journal for Molluscan Studies*. This research was funded in part by the National Science Foundation under the project "Digitization TCN: Mobilizing Millions of Mollusks of the Eastern Seaboard" (grant award DBI-2001528) to JHL.

“Mobilizing Millions of Mollusks of the Eastern Seaboard”: Digitization activities at the Bailey-Matthews National Shell Museum & Aquarium**

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"Mobilizing Millions of Mollusks of the Eastern Seaboard" (ESB) is a project sponsored by the National Science Foundation that improves our knowledge of mollusks from the East and Gulf coasts of the US. The four-year project is making taxonomically vetted, and completely georeferenced occurrence data for 535,000 specimen lots representing 4.5 million specimens available online on the iDigBio, GBIF, and OBIS data aggregators. The ESB region includes 18 states, nearly 6,000 km from Maine to Texas. In the ESB project, 17 major US collections, containing 85% of molluscan holdings from the ESB in all US molluscan collections, are collaborating. The ESB project improves reliability of and access to molluscan collection data for examining changes in distribution, morphology, population size, and genetic variation within and across species. The Museum collection had been digitized (cataloged electronically) at the start of the project (including 21,283 ESB lots); accordingly, the main goals of the project were cleaning data (improving the taxonomy, locality, dates, collecting data) and adding geolocation (geographic coordinates) to these lots. In addition, since the beginning of the project, we digitized an additional 3,897 ESB newly acquired lots consisting of 14,500 specimens. Other achievements are cleaning and standardizing collection metadata for 12,730 lots, adding geolocation data for 23,952 lots and photographing 320 lots. Currently, the total number of ESB lots is 25,180, of which 24,201 have geolocation data.

**This project is funded by the National Science Foundation under the project “Digitization TCN: Mobilizing Millions of Mollusks of the Eastern Seaboard” (grant award DBI-2001528) to JHL.

Dr. Harry George Lee, 1941–2024

Carole P. Marshall

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On January 8, 2024, Dr. Harry Lee went beyond our earthly plane, leaving behind a legacy of new species, clarification of old species, and some newly named shells in his honor. His knowledge of mollusks was epic, from bivalves to land snails, gastropods, and fossils, he knew them all. From his vast knowledge of the zoological code to the CITES regulations, there was no aspect of malacology he was not acquainted with. I would like to touch on some of the mollusks he helped name and some of those that were named for him, as well as some of his contributions to Conchology as a whole.

First report of a population of the photosynthetic Sea Slug *Elysia chlorotica* on the West Coast of Florida

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Sacoglossan sea slugs are a group of herbivorous heterobranch gastropods. They feed suctorially on a variety of filamentous and macroalgal species. Most sacoglossans are oligophagous, feeding on only a few closely related species of algae. Due, in part, to camouflage with their host algae and their cryptic nature sacoglossans are generally understudied and little is known about basic information such as natural history and geographic distributions. *Elysia chlorotica* is a sacoglossan sea slug from the Northeast United States and Canada. The slug is best known for its ability to maintain long-term photosynthesis via chloroplasts stolen from its host algae. Here we report on large a population of *E. crispata* on the West Coast of Florida living on a mat of *Vaucheria* sp. algae. At the time of discovery, the slugs were laying eggs and undergoing senescence, suggesting that we found them at the end of their life cycle.

Molluscan biodiversity of the nearshore ridge complex off Pompano Beach, Florida

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The shallow waters off Pompano Beach are home to considerable marine mollusk diversity, despite being located along the densely populated and urbanized coast of southeast Florida. This study focuses on an area within the boundaries of the nearshore ridge complex (NRC), located less than 250 m from the shore in 2 to 6 m depth. Several identified bottom types within this complex represent critical habitats for benthic mollusks. In order to document the diversity of mollusks within the different habitats of the NRC, SCUBA-based roving surveys were conducted between 2011 and 2019. In addition, sediment samples were collected in 2021 and 2022 from each of the bottom types to study mollusk diversity patterns. This combination of survey methods resulted in the identification of 325 species of hard-shelled mollusks (representing 103 families and 4 classes), providing a significant update to previous data from the area (109 species, 42 families). To test differences in community structure between bottom types, relative abundance data of mollusks from the sediment samples was analyzed using multivariate analyses including NMDS ordination, ANOSIM, and hierarchical cluster analysis. Results indicated statistically significant differences in mollusk species composition between NRC bottom types, possibly indicating habitat preferences. This data can be used as a comparative baseline for future biodiversity studies in the area.

An analysis of foot strength variation in ecotypes of the sea slug *Elysia crispata*

Julia Piper*, Grace Ferguson, Erika Molina, Samantha Schlegel, Michael Middlebrooks

Department of Biology

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Elysia crispata is a photosynthetic sacoglossan sea slug with two morphologically distinct ecotypes. The *clarki* ecotype typically lives in low wave energy mangrove swamps and has a thin green foot. The *crispata* ecotype lives on coral reefs/rubble in higher wave energy environments and has a thicker opaque white foot. Fifteen specimens from each ecotype were collected from Key Largo, FL, USA and their individual foot strength was tested using a flume apparatus with varying strengths of waterflow. The length of time the slug withstood this flow before being dislodged, as well as the velocity of the flow during dislodgement was recorded. The *clarki* ecotype was dislodged at higher velocities or failed to be dislodged more often compared to the *crispata* ecotype. The *clarki* ecotype may have increased mucus production, allowing them to better adhere to the limestone rather than rely solely on foot strength. Additionally, the *crispata* ecotype may be able to persist in higher wave energy areas by utilizing protected microhabitats.

Observations of cyphomas and their gorgonian hosts in 2023

Cabe Rieck^{*}, Holt Rieck^{*}, April Lauseng^{*}

Citizen Scientists

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Cyphomas are predatory sea snails of the family Ovulidae that live on gorgonian octocorals. In early summer 2023 (late June), while snorkeling in the shallows (less than 5 m) in the Lower Florida Keys, we photographed active cyphomas on live gorgonians. Follow-up trips were planned with the intention of studying the life cycle and population density of cyphomas. By late July, record-breaking water temperatures severely affected hard corals, gorgonians, and echinoderms, possibly affecting cyphomas. During the first follow-up visit in mid-August, no cyphomas were observed. Two subsequent trips (at the end of November and December 2023) did not provide any additional sightings. Other mollusk species were observed and photographed throughout the snorkeling trips. These observations may give insight into changes in cyphoma and other mollusk populations in the areas surveyed. Future trips are planned to continue this observational study.

Reconstructing seagrass restoration targets through the study of past mollusk communities in Tampa Bay

Stephanie A. Sanders^{1*}, Gregory S. Herbert¹, Kendal Jackson¹, David J. Karlen², Kevin Campbell²

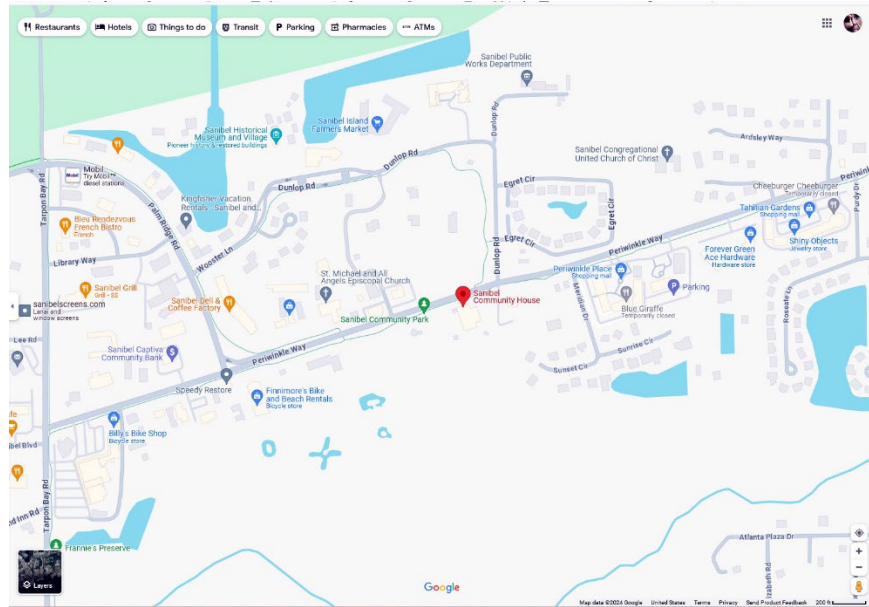
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Seagrass ecosystems are crucial for coastal biodiversity and resilience but face degradation without clearly defined restoration benchmarks. This study addresses the baseline problem by employing a geohistorical perspective of Tampa Bay's seagrass and bivalve communities. Using data extracted from sediment cores from the bay, we aim to shed light on stratigraphic trends in species richness, composition, size, relative abundance, and trophic diversity. By developing a comprehensive metric for long-term seagrass restoration success, we align with the mission of the Florida Fish and Wildlife Conservation Commission (FWC) to manage marine resources sustainably, benefitting both ecosystems and coastal communities. Work is ongoing, our current focus is on mollusk identification, abundance, and diversity analysis, with the anticipation of providing valuable insights for effective restoration and management strategies.

**Location of FUM 2024:
Sanibel Community House
2173 Periwinkle Way
Sanibel, FL 339157**



**Location of 5:30 PM dinner venue:
Doc Ford's
2500 Island Inn Road
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(239)472-8311**

