

**Southeast Florida Coral Reef Initiative (SEFCRI)
 Technical Advisory Committee
 Meeting Minutes**

Date: December 14, 2023

Meeting Objectives and Main Outcomes:

- Present updates on ongoing and recently completed Local Action Strategy and other reef-related projects.
- Gain an understanding of the Coral Protection and Response program and funded projects.
- Present an overview of the Kristin Jacobs Coral Reef Ecosystem Conservation Area Action Plan and discuss the role envisioned for SEFCRI TAC.
- Presentations and discussion on water quality sampling methods and projects.

Attendance

Staff

Name	Affiliation	December 14, 2023
Alycia Shatters	DEP CRCP	X
Mollie Sinnott	DEP ORCP	X
Jessica Price	DEP CRCP	X
Maya Bhalla-Ladd	DEP ORCP	X
Stephanie Stinson	DEP CRCP	X
Patrick Connelly	DEP CRCP	X
Elena Kampian	DEP CRCP	X
Michelle Baptiste	DEP CRCP	X
Lara Bracci	DEP CRCP	X
Taylor Tucker	DEP CRCP	X
Ellen Skelton	NSU	X

SEFCRI TAC Members

Name	Affiliation	December 14, 2023
Erick Ault	FWC FWRI	X
Ken Banks		
Don Berhinger	UF	X
Richard Dodge	NSU OC	X
John Fauth	UCF	X
Piero Gardinali	FIU	X
Dave Gilliam	NSU OC	X

Lew Gramer		
Kurtis Gregg		
Jay Grove	NOAA SEFSC	X
Joe Lopez	NSU OC	X
Caitlin Lustic	TNC	X
Arthur Mariano		
Valerie Paul	Smithsonian Marine Station	X
Stephanie Schopmeyer	FWC FWRI	X
Xaymara Serrano	NOAA NMFS	X
Manoj Shivlani		
Jack Stamates		
Joshua Voss	FAU HBOI	X
Brian Walker	NSU OC	X
Dana Wusinich-Mendez	NOAA CRCP	X

Public Attendees

Name	Affiliation	December 14, 2023
Alastair Harborne	FIU	X
Amy Hirons	NSU	X
Angela Delany	Broward County	X
Aston Lyon		X
Bailey Reins		X
Brooke Robinson	DEP CPR	X
Chris Taylor	NOAA	X
Courtney White		X
Cristin Krasco	TNC	X
Jocelyn Karazsia	NOAA	X
Dayna Hunn		X
Derek Cox	SFWMD	X
Dimitri Giarikos	NSU	X
Ellie Baker	Horsley Witten Group	X
Gary Jennings	American Sportfishing Association	X
Janelle Barriero		X
Jessica Clawson	FWC	X
Jessica Patronis	DEP DEAR	X
Kristen Sapp	DEP DEAR	X
Kristi Kerrigan	DEP CPR	X
Kylie Morgan	DEP CPR	X
Lauren Theis	Martin County	X
Maria Gudnitz	DEP ORCP	X
Matt Harold		X

Nia Wellendorf	DEP DEAR	X
Peter Wilson		X
Sam Cook	NSU/DEP CPR	X
Sara Thanner	Miami Dade County	X
Sarah Noble	DEP DEAR	X
The Florida Channel		X
Tyler Bouma	SFWMD	X
Wade Lehmann	EPA	X

December 14, 2023

Welcome and Introduction – *Alycia Shatters, DEP CRCP*

- Alycia Shatters from Florida DEP was the moderator and facilitator of the TAC meeting.
- Good morning and thank you for joining us today.
- Thank you to Friends of the Florida Reef for allowing us to use their zoom today and for their support.
- To introduce myself, I am the manager of DEP’s Coral Conservation Program.
- I am also introducing Mollie Sinnott, the Southeast Regional Manager for the Office of Resilience and Coastal Protection, and Jessica Price who has moved into the assistant manager position for the Coral Reef Conservation Program. She will also be maintaining her role as the reef intervention and response coordinator. Happy to have you guys here!
- We will quickly run through some zoom functionality for today’s meeting. Please remember to mute your mic unless you are actively speaking. Please use the chat box or raise your hand using the reactions to participate in the meeting.
- Next, we will run through ground rules for the meeting including minimizing distractions, mute yourself after speaking and do not interrupt others, please say your name before speaking and be on time from breaks.
- TAC members will be given priority when it is time for discussion.
- The public comments period will be right before lunch, limited to three minutes per person. Only comments submitted in writing will be added to the meeting minutes.
- Overview of meeting agenda.
- Now we are going to start with our project updates, starting with Jessica Price.

LAS and Project Updates

Reef Injury Prevention and Response – *Jessica Price, DEP CRCP*

- Thank you, Allie. I appreciate the introduction and am excited to continue my professional growth at DEP with my position as assistant manager as well as continuing as the RIPR coordinator.
- CSI for coral reef refresher.
 - o Meeting discussing coral reef protection including county, state, federal, and academic resources trustees.
 - o Meet with trustees annually to train new staff and ensure QA/QC for the state’s coral reef protection act enforcement cases.
 - o Trustees also discussed the coral reef protection act enforcement protocols to ensure methods and analysis are consistent with federal and academic guidelines.
- Ongoing projects: other projects include funding the county mooring buoy programs.
 - o This year’s funding allocated to Miami-Dade, switch between counties for funding every year.
 - o Currently finalizing a vendor so that supplies can be ordered.
- Clipper Lasco and Spar Orion grounding stabilization and monitoring year 8 takeaways.

- Sites not recovering naturally, substrate stabilized, and boulders installed in 2015, annual monitoring funded by RIPR trust. Monitoring helps with having long term data on how reefs are impacted by anthropogenic events and to address the question of if using boulders increases stabilization more effectively.
- Monitoring done by Dave Gilliam's Coral Reef lab at NSU.
- Some major takeaways include:
 - Boulders are viable for restoring substrate complexity and stability.
 - Sooner you stabilize the better.
 - Long term monitoring very important.
 - Continued biological restoration would also be a good idea.
- Continue monitoring with annual updates and in 2025 we will have 10-year monitoring report.

Land Based Sources of Pollution – *Alycia Shatters, DEP CRCP*

- Thank all of you for your time and expertise in establishing TAC.
- Coral ECA water quality assessment.
 - Ongoing since 2016, started with NOAA funding, has since moved to state funding.
 - Monthly samples taken at 115 sites.
 - 4 sites added in November 2023, co-located with SECREMP sites.
 - Measuring mostly nutrients and a few other analytes.

Awareness and Appreciation – *Maya Bhalla-Ladd, DEP CRCP*

- Started with DEP this May, after I graduated with my M.S. in tropical marine ecosystem management.
- My background is in biogeochemistry, but I specialize in cross disciplinary strategies for engagement and community education.
- AA 35 update (coral reef educational trunks):
 - We are looking for a contractor to create videos to accompany the existing lesson plans.
 - Talking to some people, trying to get an estimate.
 - Creating two new additional teaching trunks for the two most popular grade level brackets, which are 3-5 and K-2.
 - Our teaching trunk program brings the magic of coral reefs into classrooms, which is important in our community.
 - Boat access is a major inequity to accessibility of coral reef ecology, which we hope to address through digital media.
- AA 20 and 23 (Community outreach events and materials):
 - More than four events each in spring, summer, and fall.
 - Met with stakeholders and community members to discuss challenges facing Florida's Coral Reef and identify avenues for collaborative action.
 - Some highlights include:
 - Tabling at the annual iCast conference on a collaborative 3D reef booth in tandem with Mote Marine Lab.
 - Served as experts on Florida's Coral reef.
 - Help put together the first Frost ReefFlorida symposium, which will be annual.

SEAFAN and Marine Debris – *Lara Bracci, DEP CRCP*

- Hello everyone, I am the associate coordinator at DEP CRCP and coordinator for SEAFAN.
- SEAFAN introduction:
 - Citizen science reporting and response system designed to improve the protection and management of SE Florida's offshore coral reefs.
 - Enhances the marine debris cleanup efforts, including response to marine vessel groundings, anchor damage and other biological harmful incidences.
- 50 reported incidents in 2023, 42 on image is an old number.

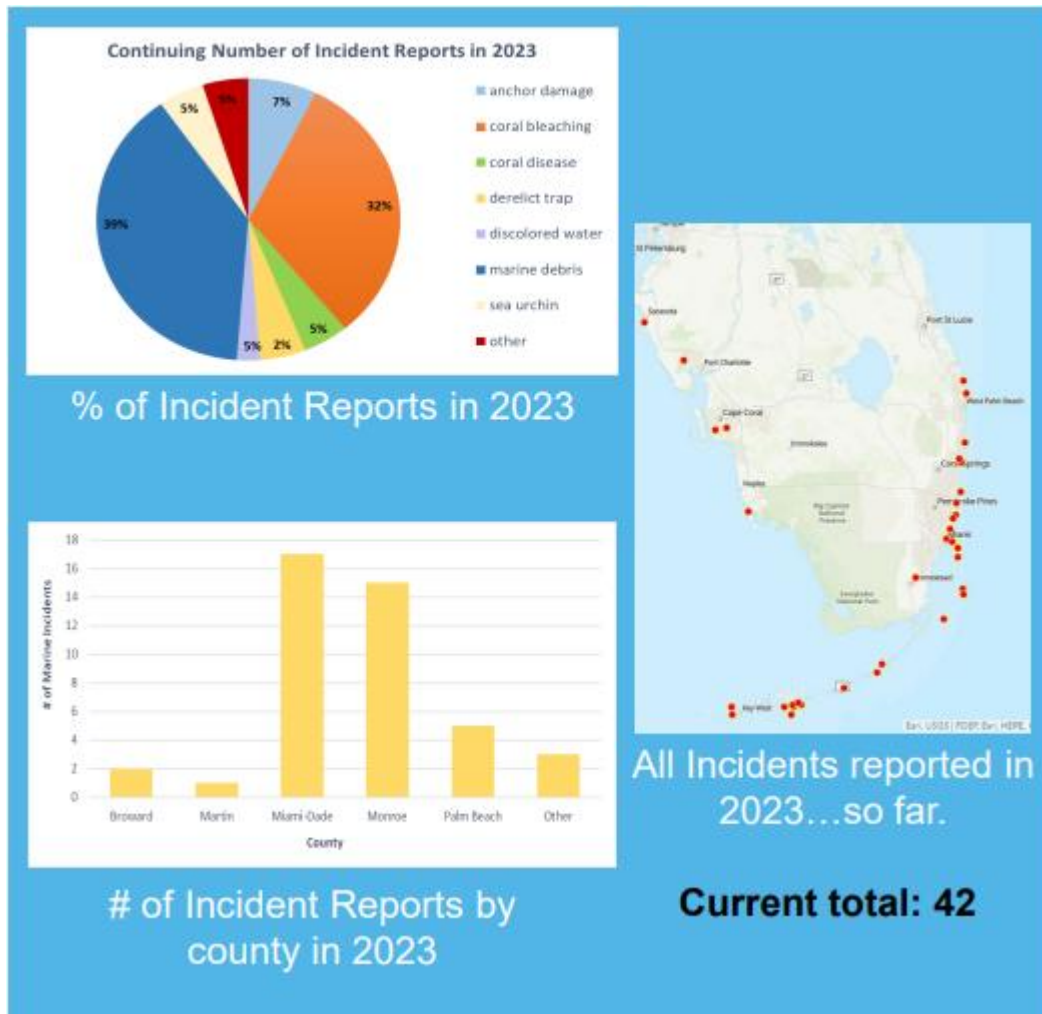


Figure 1: SEAFAN incident reports in 2023. The top pie-chart details the different types of incidents that were reported, with coral bleaching and marine debris making up 71% of reported incidents. The bar graph shows the number of incidents reported in each county, with Monroe and Miami-Dade having the most incidents reported with 15 and 17, respectively. The map on the right indicates the locations of each incident report in South Florida. The number of total incidents listed here, 42, is an out-of-date number, with the actual number of incidents at the time of this meeting being 50.

- Most reports are marine debris and coral bleaching.
- Added Monroe County recently, as we have started to partner more with them.
 - o We now accept SEAFAN reports in Monroe County and then disseminate them to our partners in the Keys.
 - o We had 5 reports from the Keys in 2022 and this year in 2023 we've had 20 in Monroe County.
- Marine debris annual reef cleanup in July and August, successful season.
 - o Most debris were plastic and metal, mostly from trash and fishing.
 - o The reef clean ups covered 17 reef sites, had 102 participants, and removed 484 pounds of debris.
 - This is up from 2022's amount of 42 pounds, increasing efforts have been impressive.
 - o In Martin County, there were 25 cleanup sites, 1,146 volunteers, and 7,650 pounds of debris removed.
- Have waterproof SEAFAN stickers with QR codes for captains so they can scan and report debris.
- Partnered with Debris Free Oceans, got an interview with channel 10 news on this year's coral bleaching season.

Reef Resilience – Taylor Tucker, DEP CRCP

- Welcome and thanks for joining, I am the reef resilience coordinate and am based in West Palm Beach.
- CRCP 15 coral rescue holding at NSU.
 - o Tasked with maintaining a bio-secure space for maintaining and housing a variety of rescue corals.

- One senior aquarist and two staff aquarists are responsible for the maintenance of the rescue corals.
- Maintaining water quality and equipment checks and repairs.
- Coral health inspections.
- Fed three times weekly, cleaned.
- Damaged diseased or bleached quarantined.
- Acclimates oncoming corals to the nursery conditions.
- Manage packing and transport between NSU and other facilities.
- Ensure there is adequate space for emergency corals, such as when there was mass bleaching this year.
- 76 corals brought in in July for holding before being sent to a long-term holder.
- Bleachwatch program – Citizen science with our local community.
 - Within SEAFAN.
 - Help to monitor coral bleaching and disease within the ECA.
 - Hosted the first instructor training in three years at Aquatic Ventures in May.
 - Over 2 days we trained 9 new bleachwatch instructors, both in the classroom and in the water, to teach local divers to identify coral bleaching, disease and different species.
 - Hosted SEAFAN bleachwatch workshop at ReeFLorida in November to help educate restoration managers, scientists, and graduate students on the importance of teaching citizen science methods to the public.
 - This year we had a record number of reports and observers.
 - 163 reports submitted this year (almost half of the total reports).
 - 262 new bleachwatch observers into the program.
 - Taught 10 new classes.
 - Currently have over 1000 bleachwatch observers.

Fishing, Diving, and Other Uses – Stephanie Stinson, DEP CRCP

- Hello, I am the CRCP's new fishing, diving, and other uses coordinator and I just joined DEP about two months ago.
- SEFCRI LAS-FDOU 5: A Holistic Assessment of Aquatic Resources and Habitats in the Kristin Jacobs Coral Reef ECA.
 - Work started on phase two led by USF Principal Investigator Joshua Kilborn in October 2023.
 - The next phases will investigate coral diversity, abundance, and size compositions trends in fish resources and natural habitats and look at changes in water quality and benthic habitats.
 - Some specific research questions include:
 - Are there unique ecological communities of fish and benthos throughout the coral ECA?
 - How are they spatially arranged?
 - What are the ecological characteristics of and differences between the unique reef regimes?
 - The first quarterly meeting for phase two was held on Nov. 29, 2023. Next two meetings will be March and May 2024.
 - If you have previously expressed interest in being part of a project team, but have not been receiving emails from Dr. Kilborn, please let me know.
 - Final deliverables submitted June 2024.
- SEFCRI LAS-FDOU 522 (Completed): Data needs for fisheries management – Stakeholder engagement process updates.
 - Work has been completed by the UF contractor team and a final report delivered Nov 30, 2022.
 - Stakeholder process ran from June 2020 to Nov 2022 with 18 fishing stakeholder representatives participating in 23 online meetings.
 - Resulted in 54 recommended management actions.
 - CRCP staff later identified what recommendations fall outside of DEP's purview and reorganized, citing the relevant organization or agency.
 - Working to maintain these relationships with fishing stakeholders, including attending west palm beach fishing club meetings starting in the new year.

Marine Industry and Coastal Construction Impacts – Patrick Connelly, DEP CRCP

- MICCI 28: identifying and testing methods of measuring turbidity and suspended sediments.
 - Phase 1 developed several years ago.

- Identified and tested available technology for measuring turbidity such as ISO 7027 which typically provide wide range of turbidity measurements and have larger capabilities and have common usage.
 - This instrument is not allowed under DEP SOPs.
 - Phase 2: Started alternative methods approval.
 - Comparing two different instruments: DEP compliant HACH 2100Q and ISO 7027.
 - Data was comparable over a range of turbidities.
 - Looking into whether we need more data, talking with water quality team and DEAR to figure that out, specifically whether we need data from broader areas since our study was only in one specific location.
 - Project considered complete.
- Turbidity dose response studies.
 - Phase 1: Acute and chronic turbidity exposure.
 - Develop biological benchmarks for turbidity.
 - Contracted two groups for experiments to determine effects of different levels of turbidity on OFAV, Cheryl Woodley at NOAA Keisha Barr at Texas A&M, which is currently ongoing.
 - Phase 2: Multi-stressor exposure.
 - Includes elevated temperature and seeing if sensitivity to turbidity changes.
 - Does elevated temperature lower the threshold for adverse effects of turbidity?
- Osborne Tire Reef
 - Managing contract with Dave Gilliam, who is removing corals from tires.
 - Growth of corals on tires slowing down contractor removing tires as they cannot remove tires with coral on them.
 - 747 corals removed from tires (as of September 2023); some have been relocated and some donated to researchers.
 - The tire removal contractor has been able to target areas that Dave has cleared out.
 - The Restoration of Osborne Tire Reef Act was put into law this fiscal year.
 - DEP required to create a status report (Completed Dec. 1, 2023) and a restoration plan for removing the tires and increasing coral density after removal (Due July 1, 2024).
 - Status report includes history of tire reef, where things have gone wrong, how many tires are left, etc.

Allie Shatters: Thanks everyone, we do have a few minutes for questions on any of the projects.

- Angela Delany: Is the Osborne Tire Reef status report available or is it still in review currently?
 - PC: it is available to share, and I can distribute that, or have Allie distribute that.

Coral Protection and Restoration Overview – Sam Cook, NSU in support of DEP CPR

- Allie: Sam will be giving us an overview of the Coral Protection and Restoration program and give some disease response updates. Some of this might look familiar if you attended the SECRI meeting in August, but we do have some new updates.
- Sam Cook: I am the National Coral Reef Management fellow here in Florida. My work is based out of the Coral Restoration Program or CPR within FDEP. I also assist with the coral disease response coordination, now known as FCRRP (Florida's Coral Reef Response Program).
 - Today we will be going over what CPR does and how is it different from DEP's other coral programs and talk about what we have been doing this year specifically for funded projects.
 - Talk about outcomes and implementations from technical workshop in May.
- DEP coral programs
 - Coral Reef Conservation Program (CRCP).
 - Manages Coral ECA.
 - Leads SEFCRI.
 - Implements Reef Injury and Response Program.
 - Operate as place-based management in SE Florida.
 - Florida Keys National Marine Sanctuary (FKNMS):
 - Comanages FKNMS with NOAA and oversees aquatic preserves.
 - Coral Protection and Restoration program (CPR):

- Takes a more holistic approach by outlining our goals to complement existing management within SE Florida and the Keys.
 - Focuses on larger view than CRCP and FKNMS.
 - Guides regional, state, and national coral reef authorities, policies, and procedures to ensure consistency and effectiveness.
 - Administers state and federal funding for Florida’s Coral Reef (FCR) priorities.
 - Provides leadership and support for Florida’s disturbance response, recovery, and restoration initiatives.
- Coral Protection and Restoration Program.
 - Management and restoration goals.
 1. Represent Florida’s Coral Reef priorities in national policy.
 2. Support Everglades restoration and unify with FCR efforts.
 3. Finalize reef restoration strategy and secure seed funding to jumpstart Florida’s ‘coral restoration economy’.
 4. Support increased funding through EPA’s South FL Geographic Initiative.
 - First goal updates:
 - CPR has a leadership role on US Coral Reef Task Force and All Islands Committee.
 - Groups most recently met in October in the US Virgin Islands.
 - 3 new resolutions passed.
 - Coral Reef Conservation Act (CRCA) was included in the National Defense Authorization Act of 2022.
 - Required to develop a National Coral Reef Resilience Strategy and Coral Reef Action Plans for all US reefs.
 - Both documents will be in development over the next year or two.
 - Established Coral Reef Stewardship Partnerships and Fund which is a partnership mechanism to help implement plans. Members will be able to apply for different pots of funding in the future.
 - When the bill becomes fully appropriated it will include a number of new funding mechanisms including emergency assistance.
 - Authorize Emergency Assistance and Fund.
 - Second goal:
 - FCR coordination team was established earlier this year.
 - Reconnected the South Florida Everglades Restoration Task Force (SFERTF).
 - Focus on big picture water quality needs.
 - Working on creating a unified water quality monitoring framework.
 - Third goal:
 - Provides guidance for restoration strategy development.
 - Ongoing three-tiered projects to help determine the best areas for restoration.
 - Tier one is close to being wrapped up; it was to identify large-scale ecological goals of restoring resilience of FCR.
 - Researchers and managers are now working on tier two, which is focused on specific management areas.
 - Initial conversations began with representatives from the areas within the coral ECA.
 - The goal is eventually to move to tier three which is site specific plans, including those listed in mission iconic reefs.
 - We also have two new sources of funding coming online.
 - We are also developing specific language when thinking about and discussing corals as natural infrastructure.
 - Will allow coral restoration projects to be eligible for FEMA funding.
 - Florida’s Coral Reef Restoration and Recovery (FCR3) initiative.
 - Officially online: aims to develop infrastructure, technology, skilled workforce, and logistics necessary by 2050 to support long-term recovery of at least 25% of FCR.
 - Three phase initiative, currently working on phase one which focuses on growing infrastructure and capacity support.
 - Associated with a \$9.5 million grant.
 - Goal four:
 - The South Florida Ecosystem Enhancement Act re-introduced last year.
 - Kind of at a standstill.

- Increase in water quality monitoring funding.
- Administering funding from legislature for next year.
 - Four main pots of funding:
 - Resilient Coastlines and Waste Funding.
 - Annual, reoccurring funding.
 - \$8 million for coral disease and water quality issues, \$1 million for waste funding, which is currently being used to address Osbourne Tire Reef.
 - 20M Biscayne Bay Water Quality Improvement Grant.
 - The majority was used for construction projects directed at improving water quality.
 - \$9.5 million FCR Restoration and Recovery (FCR3) Initiative grant.
 - New this year.
 - Supporting capacity and infrastructure for propagation efforts within the state.

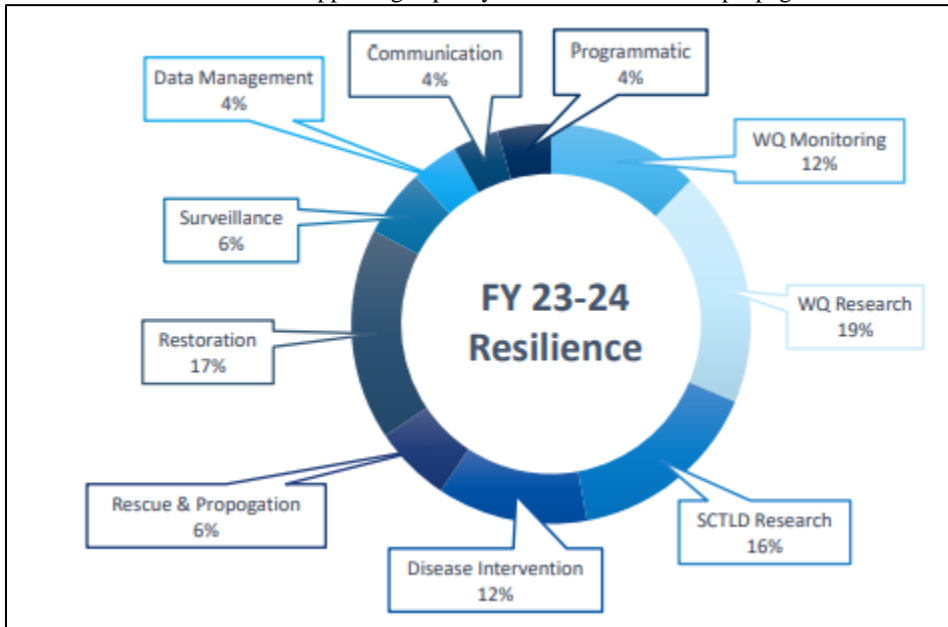


Figure 2: A pie-chart depicting the categories of projects that are funded and the percentage of total funding that goes towards each topic. The largest amount of funding goes to water quality research, restoration, SCTL research, water quality monitoring, and disease intervention, which make up 76% of all projects.

- Four main categories:
 - Water quality:
 - Research and ongoing monitoring efforts.
 - Tire removal.
 - Turbidity.
 - Disease efforts:
 - 20% of the budget.
 - Most is for STCLD efforts.
 - Restoration and propagation:
 - About 23%.
 - Most is restoration research, especially focusing on scaling up efforts.
 - Other categories: surveillance, data management, communication, provide funds for emergency response for this year's thermal stress event.
- The newly announced timeline for resilience funding (see figure below) project ideas needs to be submitted by March fourth.
 - Can email for more information.
 - Funding duration is from July 1, 2024 – June 15, 2025.
 - Project ideas need to be submitted by March 4, 2024.

Early January	CPR funding priorities shared via DAC list-serve
Project Development Meetings (3)	Jan - Feb 2023
Research Project Pre-Proposal Due	March 4, 2024
Acceptance Notification	March 25 - April 1, 2024
Scope of Work & Budget Development	April - May 30, 2024
Scope of Work & Budget Finalized	June 5, 2024

Table 1: Timeline for resilience funding. The priorities were first shared in early January 2023, the research project proposals are due on March 4, 2024, and the budget should be finalized by June 5, 2024.

- Outcomes of 2023 technical workshop:
 - o In May ~70 people met to discuss STCLD response evolution.
 - o The goal is to facilitate recovery of FCR into a resilient self-sustaining ecosystem.
 - o Need a disturbance response component and a recovery component to focus on ecosystem recovery.
 - Disturbance response would be maintaining a network of working groups for quick mobilization in response to existing and emerging disturbances.
 - Recovery component encompasses a broad understanding of recovery including threat reduction, ecosystem restoration, susceptible coral restoration, and restoration of a range of coral reef associated organisms.
 - o Merged with SCTL D response team and resilience program to form FCRRP.
 - Still separated teams to exist for specific conversations, foster more collaboration.
 - Team leads and coordinators identify areas for increased collaboration.
 - o Focal areas for resilience include disturbance response, ecosystem restoration, climate adaptation, and water quality.
 - Recently defined research priorities for each one of these topic areas.
 - o An example of vision for group for disturbance response: research and development on novel intervention approaches to priority disturbances implemented in part to recent stress event.
 - o Thank you! I will take questions and you can also email me at Samantha.M.Cook@FloridaDEP.gov with questions.
- Questions?
 - o No questions.

Break for 15 minutes

Kristin Jacobs Coral Ecosystem Conservation Area Action Plan – Allie Shatters, DEP CRCP

- History of the Coral ECA plan:
 - o How did we get here?
 - SEFCRI and TAC first meetings were in 2003 and were mainly focused on water quality, so we have just hit the 20-year mark.
 - CRCP was created to help facilitate, ordinate, and implement SECRI’s recommendations.
 - SEFCRI works to create Local Action Strategies (LASs), initially over 140 in 2004.
 - At that time there was not a formalized management boundary.
 - 2018 Southeast Florida Coral Reef Ecosystem Conservation Area established; name changed in 2021 to Kristin Jacobs Coral Reef Ecosystem Conservation Area (Coral ECA).

- SEFCRI and CRCP have also completed longer projects including:
 - Florida Reefs Process where we got recommended management actions from the public, which were reviewed and some of them implemented at LASs in 2017.
 - FDOU 52: Conducted to gain insight from the fishing community.
 - The majority of LASs from 2004 and 2017 have been completed while some are ongoing projects, but some highlights include:
 - Mapping the northern portion of the coral reef.
 - Developing a better understanding of existing resources.
 - Building partnerships and engaging with different agencies and stakeholders.
 - Passing the Coral Reef Protection Act in 2009, which made it illegal to damage Florida's Coral Reef.
 - CRCP staff also works on tasks and projects developed internally as priorities but work on LASs as well.
 - Some projects are completed, some are still ongoing, some need updates, and some have been completed by other agencies.
 - We came to a point where there were less LASs to implement, so not as much input was needed from SEFCRI and TAC.
 - Instead of creating a whole new set of LASs, we wanted to develop a more streamlined process for project development, which included how to engage the SEFCRI team and TAC members.
- Creation of the Coral ECA Action Plan: Where are we going?
 - Combine SEFCRI's goals and recommendations with CRCP's strategic goals and program objectives.
 - The plan includes CRCP projects, SEFCRI LAS's, OFR process recommendations, and recommendations from FDOU52 fisheries advisory committee.
 - FDEP compiled several strategies that already existed in some form.
 - The plan details goals, objectives, and strategies to guide DEP's conservation and protection within the Coral ECA.
 - This plan is designed to work with the SEFCRI team and TAC in order to implement.
 - Some of the previous strategies were not things that DEP could directly implement, as some were specific to FWC or NOAA or non-profits. This plan removes the projects where DEP is unable to be directly involved in the final result, but it will include language about partnering with other agencies and supporting partners.
 - In building this plan, we wanted to focus on management projects where DEP can actually have a hand in the result.
 - We have had prior recommendations suggesting additional protections for the Coral ECA and to create a formalized management plan, we have not been designated to do so, so we are hoping to apply for the aquatic preserve designation, which would provide more protections and structure.
 - Internally requested for the ECA to be considered for aquatic preserve, but it has not gone far as of right now.
 - The Coral ECA Action Plan is modeled after aquatic preserve management plan format, so we would be prepared for aquatic preserve designation down the line.
 - It is currently an action plan not a management plan.
 - This plan can be more adaptive than the previous LAS process allowed for.
 - The SEFCRI team and TAC will help to develop the strategies from this plan into projects to be implemented and to help prioritize the order in which we work on them.
- Status of Coral ECA plan:
 - Next steps: A visual workflow is shown in Figure 3.
 - There was a draft that was created by Dr. Minoj Shivlani and his team at the University of Miami.
 - CRCP staff then internally reviewed and edited the draft, including pulling out things that were not the focus of SEFCRI or that do not directly pertain to DEP.
 - This was then sent to FWC and the counties for preliminary review and the comments from this were included in the draft than was then given to the SEFCRI team at the meeting in August.

- CRCP is currently working on reviewing the feedback from that meeting and the next draft will be delivered to SEFCRI and TAC before next Spring (2024).
- The final step will be a formal review by FWC and the counties.

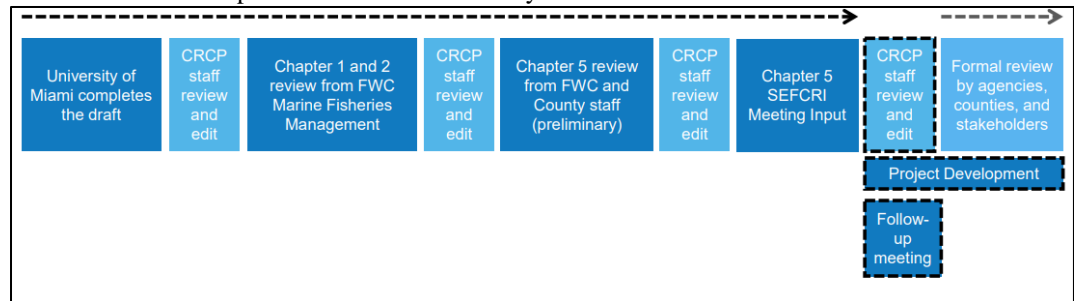


Figure 3: A workflow of the steps involved in finalizing the Coral ECA Action Plan. The plan has gone through four drafts already, with input from University of Miami, FWC, and SEFCRI, with reviews and edits by the CRCP staff after each round of input. We are currently in a phase where CRCP staff are reviewing comments from the August SEFCRI meeting and incorporating those comments into the plan. After this review, there will be a follow up meeting, and then the plan will be reviewed by agencies, counties, and stakeholders.

- There are seven total chapters in the plan, but we will be focusing on chapter 5 today.
- Overview of all chapters:
 - 1: Introduction, which includes the management plan purpose and scope and public involvement.
 - Florida’s Coral Reef as a network of managed areas.
 - Why are we working to protect this particular area?
 - Complexity in governance.
 - Importance of stakeholder engagement.
 - 2: FDEP’s Office of Resilience and Coastal Protection (ORCP).
 - Overview of ORCP and our programs.
 - Management including USCRTF, SEFCRI and LAS, DEP authority.
 - Statutory Authority: 253.90 established the Coral ECA and its boundaries.
 - 3: The Coral Reef ECA action plan.
 - Historical significance.
 - Physical resources.
 - Natural resources.
 - Cultural resources.
 - Management in the Coral ECA surrounding land use.
 - Adjacent public lands and designated resources.
 - 4: ORCPs management programs.
 - Ecosystem science management.
 - Resource management.
 - Education and outreach.
 - Public access and use.
 - 5: Issues (strategic plan portion).
 - Issue based management.
 - Five major issues:
 - Water quality.
 - Sustainable economic and recreational use.
 - Ecosystem disturbance response and recovery.
 - Community education, engagement, and access.
 - Building resilience.
 - This chapter was provided to the SEFCRI team at the meeting in August.
 - 6: Administrative plans.
 - Division office and staff.

- Regional office and staff.
 - Local offices and staff.
 - Partnerships.
 - Internships and volunteers.
 - Future personnel capacity needs.
 - 7: Facilities plans.
 - Building and infrastructure.
 - Vehicles and vessels.
 - Local offices and staff.
 - Future facilities construction and maintenance needs.
- Chapter 5: Issues.
 - We will be going over, in more detail, the specific goals and objectives of the Coral ECA plan.
 - Overall, there are too many strategies to discuss today, but we can share those if anyone is interested.
 - Issue A: Water quality.
 - Goal A1: Improve water quality both within and entering the Coral ECA to meet the needs of natural resources.
 - Objective A1.1: Maintain, expand, and coordinate a unified monitoring program and support data analysis to detect and identify sources of pollution flowing through inlets.
 - Objective A1.2: Coordinate with municipalities and local governments to reduce point and non-point land-based sources of pollution that enter into the Coral ECA.
 - Objective A1.3: Coordinate with municipalities and local governments to reduce wastewater, stormwater, and groundwater pollution to watersheds associated with priority reef areas to improve water quality and reef condition.
 - Objective A1.4: Reduce vessel-based discharges.
 - Goal A2: Increase public and industry awareness about water quality issues in the Coral ECA and actions that can be taken to improve water quality.
 - Objective A2.1: Educate the local community and visitors on the effects of land-based sources of pollution to encourage reduction of the amount of pollutants entering storm drains and waterways.
 - Issue B: Sustainable economic and recreational use.
 - Goal B1: Characterize the different uses and use trends in the Coral ECA.
 - Objective B1.1: Update stakeholder studies on uses, use patterns, crowding (social acceptance of other activities and stakeholder groups), areas of use conflicts, and impacts on Coral ECA resources by various resource users.
 - Objective B1.2: Establish monitoring programs and protocols for uses and use patterns and impacts in the Coral ECA.
 - Goal B2: Reduce impacts from fishing, diving, and other uses (recreational and commercial) in the Coral ECA to support ecosystem integrity and function.
 - Objective B2.1: Support evaluation management options to reduce fishery pressure on benthic habitat.
 - Objective B2.2: Support evaluating management options to reduce diving use pressure on affected resources.
 - Objective B2.3: Evaluate and implement approaches to minimize pressure at high use areas and intra- and/or inter-group conflicts over resources.
 - Goal B3: Increase stakeholder and public awareness on use-resource linkages, use impacts, and best practices.
 - Objective B3.1: Assess stakeholder and public awareness on use-resource linkages, use impacts, and best practices.
 - Objective B3.2: Develop strategies to increase stakeholder and public awareness on use-resource linkages, use impacts, and best practices.

- Objective B3.3: Assess the effects of stakeholder and public awareness strategies, as related to building awareness on user-resource linkages, use impacts, and best practices.
- Issue C: Ecosystem disturbance response and recovery.
 - Goal C1: continue and expand regular monitoring of corals and other coral ECA benthic resources.
 - Objective C1.1: Continue and expand benthic monitoring in the Coral ECA.
 - Objective C1.2: Continue and optimize monitoring related to coastal construction adjacent to the Coral ECA.
 - Goal C2: Reduce local and regional stressors on the coral ecosystem.
 - Objective C2.1: Reduce direct and indirect impacts in the Coral ECA.
 - Goal C3: Educate the public and stakeholders on Coral ECA habitats, ongoing stressors, and approaches to remediation, protection and/or restoration.
 - Objective C3.1: Improve public involvement in resource protection.
 - Goal C4: Support efforts to minimize coastal development impacts on corals and associated resources in the Coral ECA.
 - Objective C4.1: Continue to improve management and maintenance activities of beaches to reduce impacts to coral reefs (including nearshore reefs), create more sustainable beaches, and minimize impacts from future renourishment projects.
 - Objective C4.2: Support improvement of impact minimization and mitigation activities for unavoidable impacts to resources to reduce and offset lost ecosystem functions.
 - Goal C5: Improve ecosystem understanding to facilitate decision-making that accounts for ecosystem-scale processes.
 - Objective C5.1: Work with partner agencies to develop an ecosystem-based understanding and framework of the Coral ECA to improve holistic management.
- Issue D: Community education, engagement, and access.
 - Goal D1: Evaluate access and equity of access to the Coral ECA.
 - Objective D1.1: Identify existing forms of access and equity of access to the Coral ECA.
 - Objective D1.2: Develop approaches to improve Coral ECA access across different communities.
 - Objective D1.3: Assess the effectiveness of adopted access approaches to the Coral ECA.
 - Goal D2: Build awareness of what the Coral ECA is and its goals and attributes via education and outreach.
 - Objective D2.1: Measure and monitor the level of awareness among stakeholders and the general public concerning the Coral ECA.
 - Objective D2.2: Increase awareness of the Coral ECA and its goals and attributes.
 - Objective D2.3: Evaluate the effectiveness of the outreach and education program.
- Issue E: Building ecosystem resilience.
 - Goal E1: Evaluate the effects of environmental change on Coral ECA resources.
 - Objective E1.1: Establish a framework to assess climate change effects on ecosystem function within the Coral ECA over time.
 - Goal E2: Evaluate and implement adaptation measures that promote coral reef ecosystem recovery and resilience.
 - Objective E2.1: Integrate the use of coral reef restoration and propagation techniques.
 - Objective E2.2: Promote long-term state and local adaptation measures that minimize effects of short-term and long-term disturbances, including climate change, to Coral ECA resources.

- Objective E2.3: Reduce the impacts of invasive species on native coral reef ecosystem communities.
 - Goal E3: Develop and implement outreach programs to educate stakeholders on the effects of climate change on coral reef ecosystems.
 - Objective E3.1: Increase awareness of the effects of climate change within the Coral ECA among stakeholders and the public and promote best practices for using the resource within local communities.
 - Goal E4: Build programmatic resilience by ensuring the long-term fiscal viability of Coral ECA management.
 - Objective E4.1: Develop and implement a sustainable finance plan to support coral reef conservation efforts in the Coral ECA.
- TAC Involvement:
 - That was an overview of how the action plan was put together and a brief review of what is included in the plan.
 - We did not go over strategies, as there are over 100, and we are still changing them slightly to incorporate feedback from the SEFCRI meeting.
 - If you want to know more details, come to the SEFCRI meeting next spring, which is when we will go over the incorporation of that feedback.
 - There is no date yet.
 - The goal of Coral ECA plan is to take the strategies and develop them into projects, which is where TAC comes in.
 - Once the plan is in place, we will be needing to use the expertise embodied in the TAC group to help develop, implement, and prioritize these projects.
 - Issues from chapter 5 don't exactly follow individual focus areas of the SEFCRI team, which are mirrored in the CRCP coordinator positions, but there is a lot of overlap.
 - Strategies were written to be more general than in the previous LAS language.
 - Discussions will be required to figure out how best to implement and build out projects from those strategies.
 - TAC will be the main entity we will reach out to be included in those discussions.
- Question:
 - Brian Walker: Are these goals and objectives ready to be referenced in future proposals? If so, how do we refer to this document?
 - AS: None of this is in a format that is ready to be referenced right now. These are the same slides from the SEFCRI meeting in August, so we are still in the process of incorporating that feedback. There will be a more formal review by FWC and the counties afterward. We can keep everyone updated as these changes and reviews go on and we have a more specific timeline.
- Question for TAC attendants:
 - There are three open seats on TAC.
 - We have historically tried to fill them with members of the same expertise, which we could do again.
 - Alternatively, we have an opportunity to look at what expertise is being called out in the plan and assess if there are any gaps in the current expertise represented by TAC members.
 - Do we already have all our bases covered by existing members? Where would redundancy be helpful?
 - Don't need to decide today, just food for thought.

Topic	Number of objectives from Coral ECA Plan
Natural Resource Management	8
Local government coordination	4
Stakeholder engagement	4
Working across resource management agencies	4
Socio-economics (perception and knowledge)	3
Conservation marketing	2
Direct and indirect impacts	2
Socio-economics (demographics of access)	2
Working with fisheries management agencies	2
Beach management	1
Benthic monitoring	1
Biological stressor reduction	1
Climate change effects on coral reefs	1
Coastal construction and turbidity	1
Coral reef restoration and propagation	1
Diving/Tourism	1
Ecosystem-based framework	1
Environmental psychology	1
Environmental stressor reduction	1
Fisheries and Fish Ecology	1
Impact minimization and mitigation	1
Reducing pollution (point and non point LBSP)	1
Reducing pollution (vessels)	1
Reducing pollution (wastewater and stormwater)	1
Socio-economics (monitoring activity)	1
Socio-economics (perception and activity)	1
Sustainable financing for coral conservation	1
Water quality monitoring and analysis	1

Total # of objectives: 31

Table 2: A list of the variety of expertise included in the goals of the Coral ECA action plan and how many objectives fall within that topic. The areas of expertise with the most objectives falling within each are highlighted in green. These include natural resource management, local government coordination, stakeholder engagement, working across resource management agencies, socioeconomic (perception and knowledge), conservation marketing, direct and indirect impacts, socioeconomic (demographics of access), and working with fisheries management. Created by Rachel Skubel.

- Several topics match with current expertise represented in TAC, but some may be underrepresented.
- Open the floor for discussion on how we may want to fill these open TAC seats (either with members that had the same expertise as previous, or by looking at what is included in the Coral ECA plan and if there is an area of expertise needed that is underrepresented in the TAC).

- Val Paul: I think this is a good approach, but I would also advocate for climate change expertise, since that will be an important factor in the future. I don't think we have to be compelled to fill the open positions with exactly the same expertise from before unless we are missing key expertise there.
- Dana Wusinich-Mendez (in chat): Might be good to include some technical expertise on coral restoration.
 - Brian Walker: We have several practitioners on the TAC.
- Joshua Voss: Can you remind us of what the three open seats are?
 - AS: About a year ago, I sent a spreadsheet to all the TAC members and asked them to update their expertise, which is where I am pulling this information from. The three empty seats were previously filled by microbiology, disease and toxicology, and coral reef science communication and education.
 - JV: I would like to echo what Dana said, we don't have to hold ourselves to these expertise. I think we should also consider whether these topics have equal weight, not just in terms of the rankings, but also the scope of the topic. For example, all of fisheries and fish ecology is just one line in that table, but pollution is separated into three lines. So just using those broad topics may have some issues. I think what is most obvious here is the need for more socio-economic skill sets relative to the tasks identified in the action plan.
 - AS: Thanks. I understand where you are coming from with the weighting; this list does not necessarily reflect that as it is more of just a count.
- Jay Grove (in chat): I agree with this approach (i.e., fill seats with expertise needed not necessarily previous seat's expertise).
- Maria Gudnitz (in chat): Geoscience backgrounds would also be useful for understanding our historical reefs.
- JV: One other thing is that a lot of the representation on the team fills these blocks and goals so maybe more formally inviting the TAC or encouraging the TAC to come to some of the team meetings or having dual meetings to combine expertise.
 - AS: That is an interesting thought. So not necessarily needing to increase capacity, just pulling on things that might not be completely represented in one group by combining them.
 - JV: Exactly.
- Caitlin Lusic (in chat): I agree with Josh about social science/socioeconomics as a need if we don't already have that expertise.
 - AS: There is some of that expertise on the TAC, but again it could call into question what Josh said about some of the weighting of these different topics.
 - Joe Lopez and Michelle Baptist reacted with a "thumbs up" to this comment.
- BW: This list is not very representative of our expertise of the TAC; I think that many members check these boxes or many boxes. If we were going to use this approach to select a new member, I would suggest that we look at categorizations and the actual expertise of the member prior to the decision. Do we have a need for an expert in MPA or managed areas science or design implementation?
 - AS: I would be interested to hear the TAC's opinion on that. There is not a lot of language that specifically calls out MPAs and things like that in this action plan.
 - BW: I know James Bern has filled that role in the past, but not sure what his involvement is now or what other TNC involvement is currently on the TAC.
 - AS: We have maintained TNC representation on the TAC.
- JV: I agree with Brian. It would be nice to have a leading expert on integrating broad scale data to support projections of MPA success at both the community or population level and reaching out to Will White or Carrie (from the US West Coast) if they have colleagues more familiar with this area.
- I appreciate everyone's thoughts. Again, we don't need answers today, just trying to get the conversation started. And we don't necessarily need to use this representation to decide how to fill these seats.

Public Comment

None.

Water Quality

Allie Shatters: I'd like to thank DEAR for sending out their staff to share some information about water quality with us. Sarah Noble is up first and will be sharing information about quality assurance and alternative methods for environmental sampling.

QA Rule and Alternative Methods – Sarah Noble, DEP DEAR

- Today I will be going over the requirements of Quality Assurance rule 62-160, going over the difference between limited alternative methods and state alternative methods, when you would need an alternative method, and going over turbidity experiments and available resources.
- Chapter 62-160, F.A.C. (The QA rule).
 - o QA Rule contains a lot of information on environmental data, including field procedures, laboratory certification, sample preservation and holding time, audits, etc.
 - o We are going to focus on the rules more specific to environmental sampling and laboratory analysis as well as the field and lab alternative method procedures.
- Rule 62-160.110: Purpose, scope, and applicability.
 - o Ensure reliable environmental data.
 - o Covers all environmental data required by or reported to DEP.
 - o Applies to every step of the process (e.g. sample collection, field testing, lab activities, certain vendor services, data review, and data validation).
 - o Supersedes QA requirements in other DEP rules except in permits, contracts orders or other rules that have more stringent QA requirements.
- What is environmental data?
 - o Includes measurement of environmental matrices and media for biological, chemical, or physical characterization.
 - Water, plant or animal tissue, sediment, soil, bioassessment, field testing, etc.
 - DEP has specified Data Quality Objectives (DQOs) for the data.
 - Requirements and procedures for sample collection or measurement (DEP SOPs).
 - Other program-specific criteria for data quality.
- Rule 62-160.210: Approved field procedures.
 - o Requires the use of DEP SOPs for sample collection and field-testing activities including bioassessment methods.
 - All data generators that conduct or support field activities and field measurements shall follow the applicable procedure and requirements described in the DEP SOPs for field and bioassessment activities.
- Rule 62-160.220: Approval of alternative field procedures.
 - o Specifies process and criteria for obtaining approval of alternative or modified procedures not in the DEP SOPs.
 - Any alternative field procedure must be approved by the department prior to use.
 - o Lists procedures for which alternative field procedures cannot be approved:
 - FT 3000, BRN 1000, LVI 1000, SCI 1000 (bioassessment SOPs).
 - o Limited use approval vs. statewide use approval.
 - o Approval typically requires side by side equivalency study of the two procedures (modified and unmodified) with a comparison of paired samples.
 - o DEP SOP FA 2000.
 - Describes the application to use alternative procedures and outlines the approval process including the requirements for a completed procedure validation package.

- Rule 62-160.300: Laboratory Certification.
 - o Requires certification of DOH environmental Lab certification (ELCP) for most data reported to DEP.
 - Certification based on defined matrices.
 - Labs may report “equivalent methods” based on certifications in non-potable water matrix.
 - o Describes exceptions to certification requirements including:
 - Using drinking water methods for non-potable water tests.
 - Reporting data prior to receiving certification.
 - Drinking water tests conducted by a licensed operator.
 - Field tests covered by DEP SOPs.
 - Lab tests conducted for research projects.
 - Statutorily created volunteer monitoring organizations that have undergone review by DEP.
 - Matrix/method/analyte combinations not included in DOH ELCP scope of accreditation.
- Rule 62-160.320: Approved laboratory methods.
 - o Methods approved by DEP.
 - Cited in other DEP rules, contracts, orders, or permits.
 - If a specific method is cited by a rule, contract, or permit then that method must be used.
 - If a method is not cited, can be approved per DEP’s list of “recognized” methods and sources.
 - DEP SOP methods required for lab portions of DEP bioassessment methods.
 - o No set list of methods approved for ambient water quality assessment or monitoring, so published methods are acceptable and must be performed by a certified lab.
- Rule 62-160.330: Approval of alternative laboratory methods.
 - o Alternative laboratory methods are often approved for regulatory purposes where specific methods are required.
 - o Defines “alternative” methods.
 - Disallows alternative or modified methods for: “Method-defined analytes” and DEP SOP bioassessment lab methods.
 - “Method-defined analytes” is defined by the EPA as “An analyte whose result is dependent on how the measurement was made”.
 - Example is carbonaceous biological oxygen demand (CBOD) or oil and grease.
 - o Defines “method modification” with respect to “published methods.”
 - Defined “method modification” as any change to a published analytical method that alters the scope and applicability specifications, procedures, steps, performance criteria, or any other requirements described in the published method.
 - o Describes criteria and procedures for DEP evaluation and approval of alternative and modified methods.
 - Includes “limited use” vs. “statewide use”.
 - Describes how approvals may be rescinded.
 - DEP-QA-001/01, Alternative and modified analytical laboratory methods.
 - Discusses the requirements for method validation and documentation which can include a demonstration of capability, determination of MDLs and PQLs, demonstration of method equivalency, and inter-laboratory collaborative method validation studies.
- Rule 62-160.400: Sample preservation and holding times.
 - o Alternative methods commonly requested here.
 - o Cites DEP SOP FS 1000, part FS1006 (and FS 1000 Appendix tables) for preservation, containers, and holding times.
 - Several tables which go over the holding times and preservation for non-potable water, misc. analytes, drinking water analytes, solid and waste matrices, volatile organic compounds (VOCs) in soils and wastes, biosolids and protozoans, fish tissue, synthetic precipitation leaching procedure (SPLP) and toxic characteristic leaching procedure (TCLP) analytes.
 - o Defers to analytical method or best available info for analytes not in above tables.

- Rule 62-160.600: Research field and lab procedures.
 - o Typically, only required for direct contracts with DEP or for special regulatory projects.
 - Includes development and/or evaluation of innovative technologies, sampling procedures, or analytical methods.
 - If developed for regulatory use, alternative method requirements apply.
 - Other designated non-regulatory research projects.
 - o Procedure must be described in contracts, study plan, works plans, or research proposals.
 - Rule lists minimum applicable topics required.
 - Upon review, DEP will decide if lab certification is required for any methods.
 - DEP will decide whether any standards of the National Environmental Laboratory Accreditation Commission (NELAC) Institute (TNI) apply.
- Rule 62-160.670 Data validation by DEP.
 - o Any data submitted to or used by DEP may be subject to validation and verification.
 - Usability determinations only apply to intended use, which may be different than original use or purpose of data generation.
 - o Evaluation criteria for data usability include:
 - Sample collection, preservation, and handling procedures, lab analytical methods, adequate QC measurements for analytical results, acceptable instrument calibrations, ability to reconstruct and track sample history via field and lab documentation and linkage, laboratory certification status for audited results, and evaluation per DEP-EA-001/07 (data usability document).
- Summary
 - o The Quality Assurance rule applies to all entities involved with sampling, field testing, lab analysis, data review and presentation, and vending services for sampling supplies or instrument calibration.
 - o Most sampling and field testing is routine and must follow DEP SOPs.
 - o Most lab analyses must be performed by certified labs.
 - o Alternative or modified field and lab procedures and methods must be pre-approved by DEP.
 - o Following DEP SOPs and using certified laboratories ensures that data are appropriate and reliable and are collected and analyzed by scientifically sound procedures for department use.
 - o DEP must verify that data are usable.
 - Consistent with Data Quality Objectives and program requirements.
- Limited vs. Statewide Alternative Methods Approvals.
 - o Limited use methods:
 - Can only be used by the person or organization submitting the request based on the info and data provided to department.
 - Incredibly specific in scope and applicability.
 - Not incorporated into the DEP SOPs.
 - o Statewide-use methods:
 - Can be used by all persons and organizations.
 - Requires the design of a collaborative study conducted by two or more independent persons/organization to investigate the efficacy.
 - Does not guarantee applicability for all potential uses.
 - Will eventually be incorporated into SOPs.

	Limited-Use	Statewide-Use
Who submits application?	Entity that conducted the study or wants the approval.	Anyone, but requires demonstration from several entities.
Who has approval?	The entity that applied for the matrix/analyte combo. Must keep a letter showing approval.	Everyone that reports that matrix/analyte combo. Will be incorporated into the DEP SOPs if a field method.

Table 3: The difference between limited-use and state-wide use alternative methods approval. For limited-use approval, the individual entity that wants the approval can submit the application and only that entity can use the alternative method. For state-wide use, anyone can submit the application, but it requires demonstration from several entities, and then everyone can use the alternative method.

- Completed procedure validation package requirements:
 - o Identification of submitter.
 - o Applicability and scope of alternative or modified procedure.
 - o Complete description of procedure.
 - o Equivalency study and results .
 - o Refer to DEP SOP FA 2000 for info regarding field alternative methods procedures and Alternative and Modified Analytical Laboratory Methods (DEP-QA-001/01) for info regarding preparation/laboratory methods.
 - o Please reach out to the QA team prior to initiating an equivalency study for a discussion to see if an alternative method is needed and to make sure all the required components of the study are completed.
- Field Equivalency study.
 - o The department will evaluate the proposed alternative or modified procedures for current available information, bias, variability, matrix interferences, or other performance concerns.
 - o Perform a side-by-side comparison of the unmodified procedure and the alternative procedure.
 - Wherever possible, take readings or samples at the same time and location, simultaneously.
 - o Take a minimum of 30 measurements or samples over several days or longer, under a variety of conditions, as applicable.
 - o Perform appropriate statistical and other evaluations of the results with an appropriate summary of conclusions. Use accepted, standard statistical tests for pair-wise comparisons at the 95% confidence level.
- Lab equivalency study.
 - o Alternative method must be shown to be equivalent to the replaced method at a 95% confidence level.
 - o Two options:
 - Overlap of confidence intervals.
 - Using the relevant field sample matrix shown to be free of the analytes of concern with a minimum of 7 replicates for both methods.
 - The spiking level must be at the known or established PQL of the replaced method.
 - Statistical evaluations use information derived from EPA procedures.
 - Pair-wise comparisons of co-collected samples.
 - Similar to pairwise comparison in the field equivalency study.
 - May be required for increased confidence.
- When do you need an alternative method?
 - o Alternative field method.
 - When protocols in DEP SOPs are unsuitable for a specific application, such as:
 - Proposed procedure is to be used in place of the DEP SOP specified procedure.

- Proposed modifications are not specifically allowed in the original published procedure.
 - Procedure includes stepwise, procedural modifications using the equipment listed in a specified or required DEP SOP that alter the integrity, nature or representativeness of the sample.
 - Procedure uses equipment composed of materials that may contaminate the sample with substances that interfere with preservation or analysis.
 - Procedure requires the use of substantially different equipment.
 - Procedure requires the use of substitute reagents or chemicals.
 - Procedure involves the use of entirely new procedures or technology not discussed in the DEP SOPs.
 - Alternative lab methods.
 - Using a different method in place of one that already exists.
- Method modification.
 - Any modification to an approved field procedure or analytical laboratory method that is specifically allowed by the approved method. Method modifications are not considered alternative methods and do not require approval by the department prior to use.
- Specific examples of needing an alternative method.
 - Field: when changing preservation, equipment material type, or extending holding time.
 - Laboratory: when changing extraction volumes, surrogate standards, or alternate solvents.
- Example of an approval of an alternative method.
 - Statewide use approved in 2020, this is the only state-wide approval that we have.
 - Technology approved: reagent-less in-line chlorine meter that contains an amperometric 3-electrode sensor to find residual chlorine.
 - Only used in domestic wastewater facilities on non-potable reclaimed wastewater.
 - Previously received many limited use applications for this method, which were approved.
 - Statistical evaluation used 201 pairs of data from five different wastewater treatment facilities.
- Limited-use Alternative field procedures examples.
 - Adjust maximum holding time and preservation.

Analyte	DEP Requirement	Alternative Approval
NO ₂	Ice within 15 minutes, analyze within 48 hours	Filter and ice in field, freeze if not analyzed within 48 hours, and analyze within 28 days
NO ₂ +NO ₃	Acid-preserve with H ₂ SO ₄ and ice within 15 minutes, analyze within 28 days	Filter and ice in field, freeze if not analyzed within 48 hours, and analyze within 28 days
NH ₃ /NH ₄		Filter and ice in field, freeze if not analyzed within 48 hours, and analyze within 28 days
TP		Ice in field, add HCl acid within 48 hours, store at 2-6°C, and analyzed within 28 days
TN		Ice in field, add HCl acid within 48 hours, store at 2-6°C, and analyze within 28 days
TOC		Ice in field, store at 2-6°C, and analyze within 28 days
	Acid-preserve with HCl, H ₂ SO ₄ , or H ₃ PO ₄ , and ice within 15 minutes, analyzes within 28 days	

Table 4: A list of DEP required methods and DEP approved limited-use alternative methods for the storage times and analysis of various analytes including nitrate, nitrite, phosphorus, and organic carbon. Disclaimer: These limited-use alternative methods for preservation and holding time may NOT be used by another organization without separate review and approval by the department.

- Turbidity.
 - o DEP SOP approved technology -FT1600.
 - A turbidimeter or spectrophotometer consists of a light source and photoelectric detectors with a readout device to indicate the intensity of light.
 - Tungsten filament lamp operated at a color temperature between 2000 and 3000K.
 - o Non-standard instruments -FT1600.
 - *In situ* probes with turbidity sensors for screen purposes.
 - Do not report results from non-standards for regulatory purposes unless given specific permission and approval.
 - All “non-standard” instruments must be calibrated and verified according to the requirements in FT 1600.
- Turbidity: Status
 - o EPA 180.1 (approved) vs ISO 7027 (alternative).
 - o NTU vs FNU.
 - Dependent on light source (white light vs. infrared).
 - o Both methods have interferences of color and particle size.
 - o Are the methods equivalent?
 - o Ongoing evaluations of method comparability.
 - o If data from these two methods cannot be used interchangeably, they must be treated as different methods, rather than primary and alternative.
 - o Challenging, but working through it and we should have more information in the coming months.
- QA Website.
 - o Can find: QA rule information, DEP SOPs and forms, quality plans, training presentations, list of FDOH certified labs, and alternative method approvals.
 - o Quality_Assurance@FloridaDEP.gov
- Questions?
 - o None.

SEFCRI TAC Discussion

- Allie Shatters: To follow up that presentation, I wanted to have a discussion about water quality and any frustrations of required methods. We asked Sarah to present today because we wanted to give a more detailed explanation of why we ask contractors to use certain methods and what those methods are, as well as give an example of a new method being incorporated when evaluated properly. Data used with other methods can be used for research priorities but cannot necessarily be used to make management decisions. Streamlining methods also increase comparability between projects. If water quality standards are more protective of corals has been discussed, but to use data for these purposes they would need to be justifiable in legal framework, not just research framework. A lot of the work being done is already following DEP SOPs. I thought a useful conversation would be to think about alternative methods approval process and to identify potential areas where they could be applied to benefit ongoing or planned projects, including the Coral ECA plan.
- Peiro Gardinali: As we go along trying to provide solutions for water quality, we often come up with methods that are not going to be used for regulatory purposes but can be used to inform other things. So, I think it would be beneficial for everybody working on this to come up with a consensus quality system to be implemented for everything that we measure. Because much of the discussion on how to request an alternative method approval is for us to collect enough QA/QC information so we can document that process. I think it would be helpful if there was a guideline of what kind of quality system needs to be implemented with these methods for us to follow that.
- AS: Thank you, that is something we can keep in mind. I am sharing my screen to ask some specific questions for discussion.
 - o Are there any common methods used to generate WQ data in the ECA region that you know don't meet DEP requirements that could benefit from being considered for DEP compliance and

- alternative methods testing? Especially as it applies to long-term research and emerging research and technology.
 - Are there any methods that could be explored further that aren't commonly employed currently? Especially looking at things outside of Florida or looking at emerging technologies.
- PG: When measuring total and soluble Phosphorus, we are constantly struggling with detection limits. New technology based on ICPMS exists that has lower detection limits if we are willing to test it. We have done some limited comparison of certified numbers vs. total phosphorus used in ICPMS and the results are very encouraging. We should try to explore some methods that will get us to lower detection limits. The colorimetric detection for phosphorus was developed 60 years ago, there should be something better available now.
 - Nia Wellendorf: Lower detections limit technology may not be considered an alternative and therefore may not need approval. ICPMS are accepted methods, although maybe not for phosphorus. When it comes to looking at methods for ambient water evaluation, methods that are published, approved, as a consensus publication, with multiple people and incorporated is better. There are modifications within existing methods that are already allowable.
 - PG: Yes, but this is a different technology so I will be flagged if tried to get certified because it is not a technology that is allowable for the method. So, there is some leg work that we have to do. But some of the challenges is that when you try to get certified for a new technology and they just say well its not an approved technology.
 - NW: Yes, I realized that you said you were experimenting with this, and it was not in any approved methods or standards anywhere.
 - PG: Phosphorus is not usually approved for ICPS machines, but there are new machines that are better at it now, we just have to go back to the table. Maybe it will be easier to include phosphorus in the trace element analysis than to get it on the nutrient side.
- AS: No more questions. Thank you again to the DEAR Staff (Sarah, Nia, and Jessica) for taking the time to join us and for sharing that information.
- NW: One comment before we move on, Sarah did a great job talking about the turbidity example but if anyone here has additional info that they think we should consider regarding the use of the turbidity probes, comparisons between the two, what each is appropriate for, if they could be used together, etc. We are open to evaluating anything that people want to send us.
- AS: Thank you, most of you know how to get in touch with me and the email for the quality assurance was listed previously to reach out to for those methods.

Water Quality Project Updates

Rapid Evaluation of Endocrine Disrupting Compounds in Surface Waters of the Florida Keys and SEFCRI Region – John Fauth, UCF & Craig A. Downs, Haereticus Environmental Laboratory

- Today I am going to be presenting the initial results of this project.
- This was done in collaboration with Craig Downs at Haereticus Environmental Lab.
- I would like to start by acknowledge several groups:
 - US EPA for funding this project.
 - The participants and other stakeholders and managers who helped us to identify sampling stations (including several members of the TAC).
 - The assistance of many boats and captains.
 - This was done during the Covid outbreak, we completed the work from self-contained campers.
 - Evelyn Downs for coming with us.
 - Special thank you to 101st airborne division vaccine unit.
- Introduction:
 - Endocrine disruptor definition: “Endocrine disruptors are chemicals found in many products that mimic, block, or disrupt the normal function of hormones” according to US EPA OIG Report No. 21-E-0186.
 - Can be found in pesticides, plastics, pharmaceuticals, and personal care products.
 - Example: Oxybenzone acts as a skeletal endocrine disruptor in coral planulae.

- Endocrine disruptors are an existential threat to ecosystems and human health.
- Overview:
 - Rapid Evaluation of Endocrine Disrupting Compounds.
 - Focused on the 5 counties that comprise SEFCRI region and the Florida Keys.
 - Comprehensive sampling design and high-throughput analyses.
 - Sampled stations in both Spring and Fall 2021.
 - Includes both estrogenic and androgenic disruptors.
 - Objective: Rapidly identify possible exposures to and adverse effects of endocrine disruptors in South Florida.
 - Goal: Provide actionable information to resource managers and policy makers.
- Sampling design:
 - Sampled surface water at 10 station types within each of the 5 counties.
 - The station types included: Residential canals at tide line, agricultural canal at its source and the tide line or other discharge point, inlet, ocean outfall, area serviced by septic tanks, offshore from a “natural area”, recreational beach, nearshore coral reef, and offshore reef.
 - Targeted sampling design.
 - Sampled surface water.
 - Done so that there was consistency in sampling.
 - Directly sampled by deploying a bottle on a line and dipping it up and down.
 - There were some challenges in accessing certain sites.
- Xenometrix yeast estrogen screen (YES) and yeast androgen screen (YAS).
 - High throughput *in vitro* screening assays, 96-well plate format.
 - Use genetically modified yeast (*Saccharomyces cerevisiae*) with gene for human estrogen or androgen receptor with a B-galactosidase reporter system.
 - Induces color change in substrate which is measured with a spectrophotometer.
 - These bioassays are done on whole water sample which contains mixture of potential endocrine disruptors, but with this approach we can get the bioassay response and work backwards.
- Identifying endocrine disruptors.
 - Samples positive for YES or YAS bioassays can contain one or more endocrine disruptors.
 - Identified potential endocrine disruptors in a subset of samples using gas-chromatography mass spectrometry / mass spectrometry (GC-mS/MS).
 - Samples run with quantitative standards to both identify and quantitate the endocrine disruptor.
 - A solvent control was included, as well as blanks between each sample run.
- Results: The expected bad news.

	County				
	Martin	Palm Beach	Broward	Miami-Dade	Monroe
Number of stations with valid, positive responses for estrogenic and/or androgenic activity in both Spring and Fall, 2021 samples	3	6	5	8	4
Total number of stations	9	10	10	10	7
Minimum percentage of stations consistently exhibiting endocrine disruption	33%	60%	50%	80%	57%

Table 5: The distribution by county of the number and percentage of valid, positive responses for the YES and/or YAS assays in both Spring and Fall. Miami-Dade County had the highest percentage of stations exhibiting endocrine disruption, with 80%, and Martin County had the lowest with 33%.

- Valid positive responses for endocrine disruption were detected at 57% of stations in both Spring and Fall.
 - This is a conservative estimate.
 - Miami-Dade County had the highest percentage of consistently positive samples while Martin County had the lowest percentage.
 - The patterns seen reflect differences in urbanization and levels of human activity.
 - Endocrine disruptors are broadly distributed across South FL.
- A limitation:

Station Type	County				
	Martin	Palm Beach	Broward	Miami-Dade	Monroe
residential canal at tide line	X	S	X	X	X
agricultural canal at source		X	X	X	
agricultural canal at discharge		X		X	
inlet	X	X	S	X	
ocean outfall		S	SF	X	
area served by septic tanks	X	X	X	X	X
offshore from natural area		X		F	X
recreational beach			X	X	X
nearshore coral reef	S	F			X
offshore coral reef	S	X	X	X	

Table 6: A table depicting the station types and counties where endocrine disruptors were found, which is indicated with an “X.” The eight stations highlighted in yellow had failed controls for at least one assay in either Spring (S) or Fall (F). The two ocean outfall stations in Palm Beach and Broward County are circled in red.

- Samples from certain stations had failed positive or negative controls for either the YES or YAS assay (or both) during either Spring or Fall, which limits inferences about those stations.
 - Some oceanic samples would not freeze even at -20°C, which impacted our ability to test them.
- Results: Sources of endocrine disruptors.
- Positive samples were consistently associated with areas served by septic tanks, residential canals at tide line, and agricultural canals at their sources.
- Results: Potential sources extend to Orange County, FL.
- Shingle creek in Orange County is the northernmost headwaters of the Everglades.
 - Included as one of 10 supplemental samples.
 - Valid positive test for estrogenic activity in Spring 2021 and both estrogenic and androgenic activity in Fall 2021.
 - When we are looking at the SEFCRI region and watershed, we have to look farther inland and farther north.
- Results: a repeated pattern.
- Consistently saw positive estrogenic tests in the Spring and then positive estrogenic and androgenic tests in the Fall.
 - Initially expected that the tests would either be positive or negative for both estrogenic and androgenic activity.
 - However, stations with single valid test mainly displayed only estrogenic activity, and this was more pronounced in the Spring.
 - Fall followed the more expected pattern.
- Results: The relatively good news.
- Valid positive responses for estrogenic and/or androgenic activity in both Spring and Fall 2021 were limited to just one station offshore of a natural area and one nearshore coral reef.

Station Type	County				
	Martin	Palm Beach	Broward	Miami-Dade	Monroe
offshore from natural area		X			
recreational beach			X	X	X
nearshore coral reef					X
offshore coral reef		X	X	X	

Table 7: The distribution of valid positive estrogenic or androgenic activity by county at four station types. Estrogenic or androgenic activity was found offshore from a natural area in Palm Beach County, at recreational beaches in Broward, Miami-Dade, and Monroe Counties, at a nearshore coral reef in Monroe county, and at an offshore coral reef in Palm Beach, Broward, and Miami-Dade Counties.

- These are areas of concern for eco-tourism and exposure to humans.
- Results: more good news
 - Several stations had valid negative and positive controls and no evidence of endocrine disruption.

Station	County	Station Type	Sampling period
Hobe Sound National Wildlife Refuge	Martin	offshore from "natural area"	Spring & Fall
Juno Beach	Palm Beach County	recreational beach	Spring & Fall
PB1	Palm Beach County	inshore reef	Spring
John McKeithen Park	Broward	agricultural canal at discharge	Spring
C-103 Canal at 217th Avenue, Homestead	Miami-Dade	agricultural canal at discharge	Spring
Offshore of Long Key State Park	Monroe	offshore from "natural area"	Spring
USCG Cutter <i>Duane</i>	Monroe	offshore reef	Spring

Table 8: The seven individual stations which showed no evidence of endocrine disruptors in the Spring and/or fall of 2021. Two stations, Hobe Sound National Wildlife Refuge and Juno Beach did not show evidence of endocrine disruptors in either Spring or Fall, while the other five stations only showed no evidence of endocrine disruptors in the Spring.

- No detections at agricultural canals at their discharge points.
- More work ahead.
 - We are still evaluating hand-annotated data on ~350 pesticides and pharmaceutical products that were recorded as below detection limits but may be present.
 - The samples for this represent a stratified random design.
 - There is at least one station of each type.
 - 10 samples from Fall 2021 and five samples from Spring 2021 (one from each county).
 - Two samples from each county for Fall 2021 samples.
 - Randomized but with constraints.
 - Ongoing work for this spring.
- Conclusions and recommendations.
 - YES and YAS identified endocrine disruptors relatively quickly.
 - Areas served by septic tanks and residential canals consistently had valid, positive tests for endocrine disruption.
 - Waters offshore of natural areas and nearshore coral reefs did not consistently have valid positive tests for endocrine disruption.
 - While more research and sustained comprehensive sample for endocrine disruptors is needed nationwide, that should not delay management action.
 - We recommend transitioning neighborhoods served by septic tanks to centralized, advanced wastewater treatment systems, like is currently being done in the Florida Keys.
 - We recommend accelerating efforts to reduce pollution in residential canals.
- Questions:

- Dimitri Giarikos (in chat): What is the concentration at which the assay shows a positive result?
 - JF: It's not a dose response assay. It uses as raw a water sample as possible and is a complex mixture of whatever the water contains. So, what you are seeing is the cumulative impact of that on the bioassays.
 - Wade Lehmann: detection limit for 17β-estradiol in the YES assay about 5 x 10⁻¹² M or 1.4 ng/L.
 - JF: We'll be doing a deep dive into the mixture of contaminants this spring.

Potential Environmental Impacts from Port Everglades Sediment – Dimitri Giarikos & Amy Hiron, NSU

- Focusing on heavy metals and heavy metals in coral reef sites.

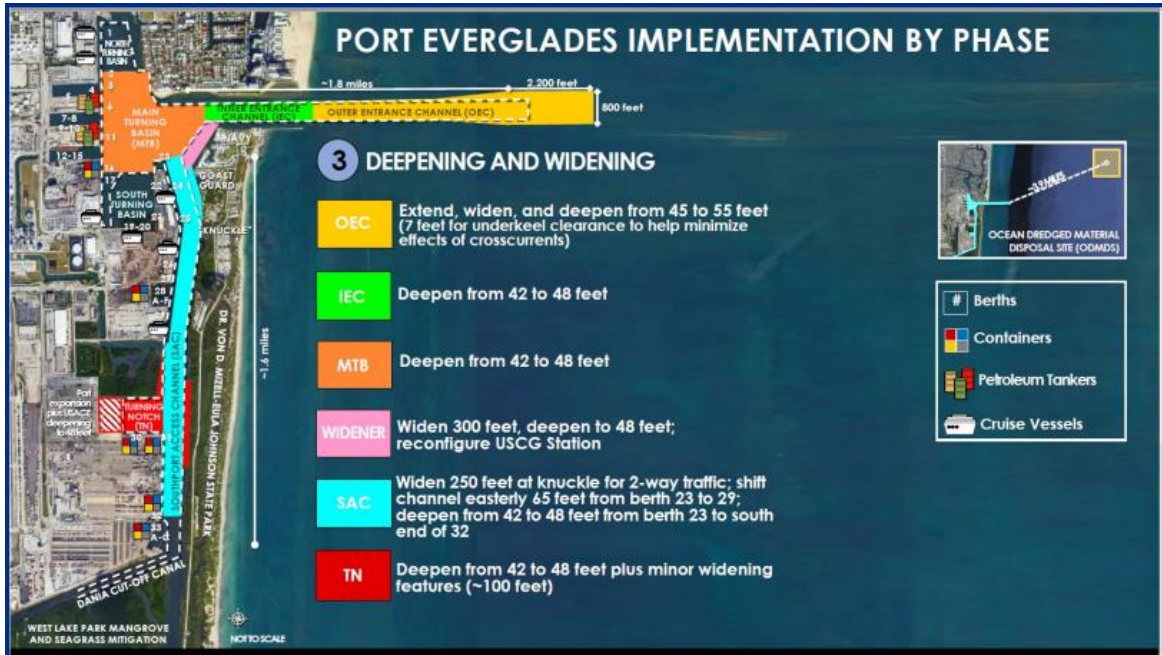


Figure 4: A map of port everglades showing the proposed plan for its deepening and widening. This includes six different sections of the port which will be either deepened or widened or both.

- Port Everglades is a high traffic port.
 - Expecting a dredging event to widen and deepen the outer entrance or the port, the inlet, and all the way to the Dania cutoff canal, but there is no official date yet.
 - The plan is that all this dredged material is going to be placed at the ocean dredged material site offshore.
- Ocean dredged material disposal site (ODMDS).
 - 4.9 miles northwest from the entrance to the port.
 - 1.1 miles from the outer part of the reef tract.

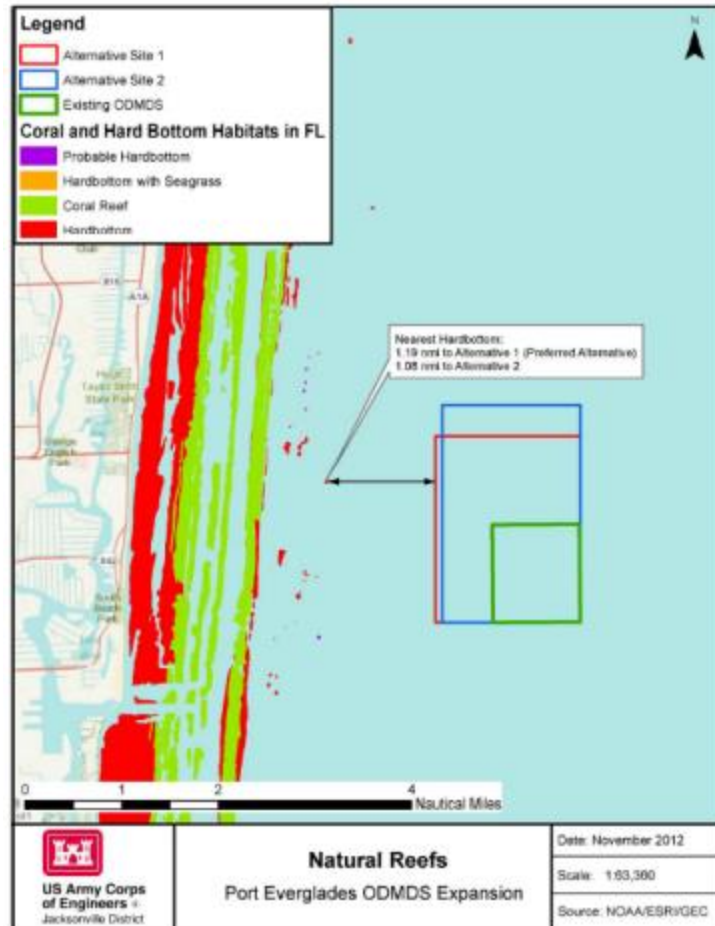


Figure 5: A map of the current and proposed ODMDS expansion in relation to existing coral reefs (green) and hardbottom (red). There are two different options for the expansion, one outlined in red and one outlined in blue.

- Expected to be direct and indirect impacts on coral.
 - 29 acres of coral directly impacted.
 - 120 acres of coral indirectly impacted.
 - Indirect impacts are mostly from sedimentation piling up on the reef.
- But what about the impacts from contaminants that will be mobilized during dredging?
 - So far there has not been much consideration about this.
- Research Questions/Objectives:
 - Assess heavy metal concentrations in Port Everglades sediment cores in 2023 and compare with 2019 data.
 - Compare heavy metal concentrations in Port Everglades to “control” site with limited access to Intracoastal Waterway (West Lake).
 - Compare heavy metal concentrations in Port Everglades sediment to surface sediment from six coral reef sites and sediment traps (three north and three south of the inlet).
 - Collect abiotic data (pressure, temperature, salinity, dissolved oxygen, pH, turbidity) at six coral reef sites.
- Ecological indices: used to determine toxicity effects.
 - Threshold effect level (TEL): Toxic response beginning to be observed in benthic organisms.
 - Probable effect level (PEL): large percent of benthic population shows a toxic response.
 - Geo-Accumulation Index (Igeo): verifies magnitude of contamination of individual element.

- Potential Ecological Risk (PER): considers the cumulative impact of elements to ecological environment considering the different background values of the geography.
 - Continental Crust (Background): elemental composition ($\mu\text{g/g}$) of the present continental crust.
 - Enrichment Factor (EF): assesses presence and intensity of anthropogenic contaminant deposition on sediment by normalizing one element concentration in sediment to concentration of a reference element (Al and Fe).
- Sampling sites:

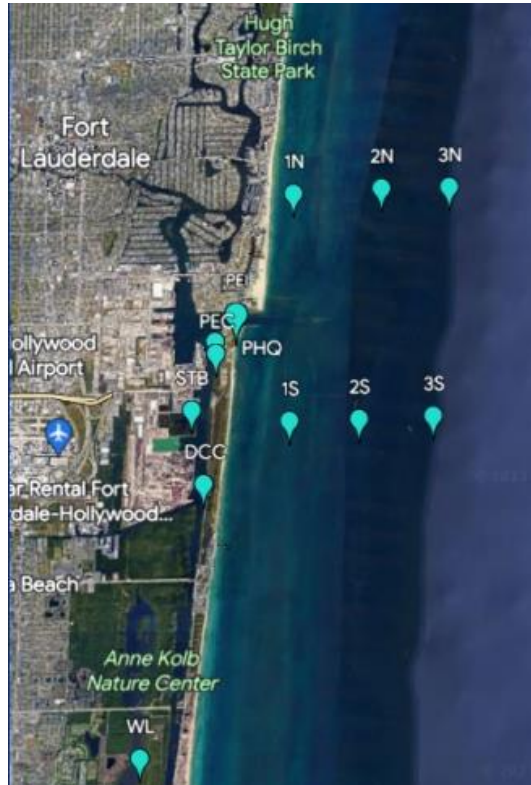


Figure 6: A map of the sampling sites in Port Everglades, at the offshore reefs, and the west lake control sites. The sites are Port Everglades inlet (PEI, 2023 only), park headquarters (PHQ), park education center (PEC), south turning basin (STB), Dania cut-off canal (DCC), West Lake (WL, control), north reef sites (N), and south reef sites (S).

- Tried for three cores at each time point, but some 2019 samples were only able to get two cores.
 - Cores were taken at a depth of 1-2.5 meters.
 - Have sediment samples from traps at offshore sites.
 - Multiple sensors on sediment traps looking at abiotic data at offshore sites.
- Sediment cores.
- Cores varied from different sites.
 - Especially differences in organic material, which will be looked at later on.
- Digestion process and inductively couple plasma-mass spectrometry (ICP-MS).
- Subsampled every 5cm on each core in 2019 and every 10cm on each core in 2023.
 - Digestion (2019).
 - Dry weight of sample recorded and EPA method 3050B used.
 - ICP-MS analysis (2019).
 - Analysis performed using ThermoFisher Element XR ICP-MS at University of Southern Mississippi for 14 heavy metals: Arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), tin (Sn), vanadium (V), and zinc (Zn).

- ICP-MS analysis (2023).
 - Analysis performed using ICP-QQQ-MS at Brooks Applied Labs (NELAC) for 16 heavy metals: Aluminum (Al), arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), tin (Sn), vanadium (V), and zinc (Zn).
 - Addition of aluminum and iron to be used for the enrichment factor.
- Arsenic concentration.

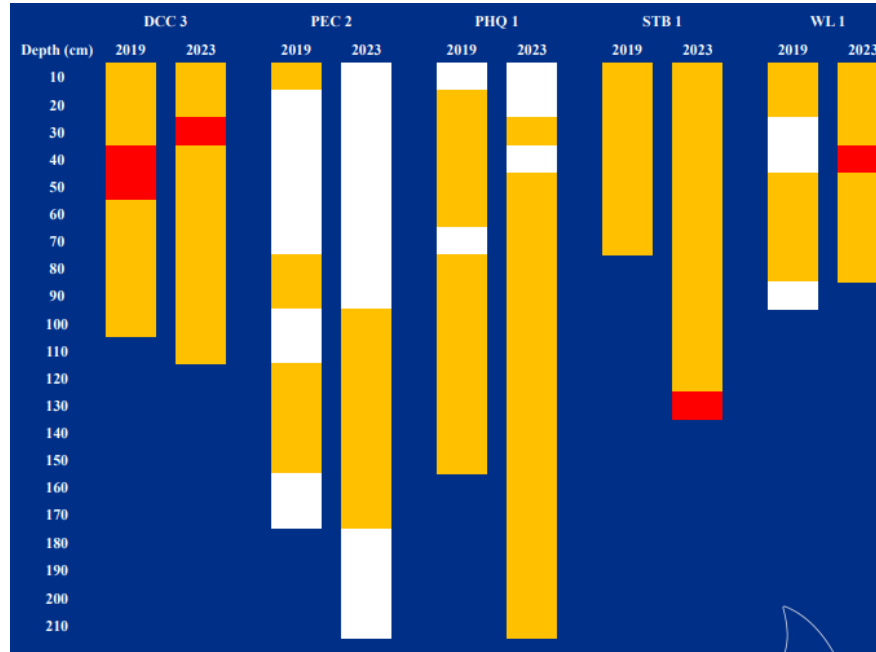


Figure 7: A bar graph depicting arsenic concentration values at various depths from sediment cores from five sites in both 2019 and 2023. Values below the TEL are shown in white; values above the TEL (7.24 µg/g) are shown in orange; and values above the PEL (41.6 µg/g) are shown in red. Overall, arsenic concentrations increased from 2019 to 2023, including at the control site.

- Homogenized samples from 0-10cm.
- Arsenic high in the port and in the control.
- There does not appear to be much difference between 2019 and 2023.
 - Currently working on statistics.
- Molybdenum concentration.

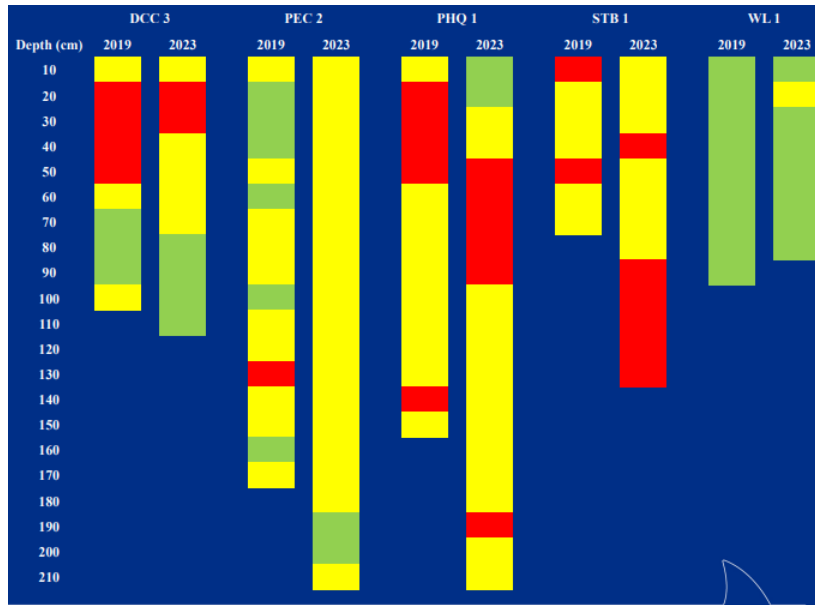


Figure 8: A bar graph depicting molybdenum concentration values at various depths from sediment cores from five sites in both 2019 and 2023. Values below the background ($1.5 \mu\text{g/g}$) are shown in green; values ranging from $1.5 - 30 \mu\text{g/g}$ are shown in yellow; and values above $30 \mu\text{g/g}$ are shown in red. All of the port sites have higher concentrations than the control site.

- Molybdenum does not have a TEL or PEL currently, so we don't know what the toxicity levels are.
 - So, we are looking at the concentration vs expected background levels instead.
 - Normal background concentration in sediment is $1.5 \mu\text{g/g}$.
- West lake (control) has a few values above background.
- What is considered toxic for molybdenum?
- Potential ecological risk.
 - Cumulative impact of all heavy metals to the ecological environment considering background values.

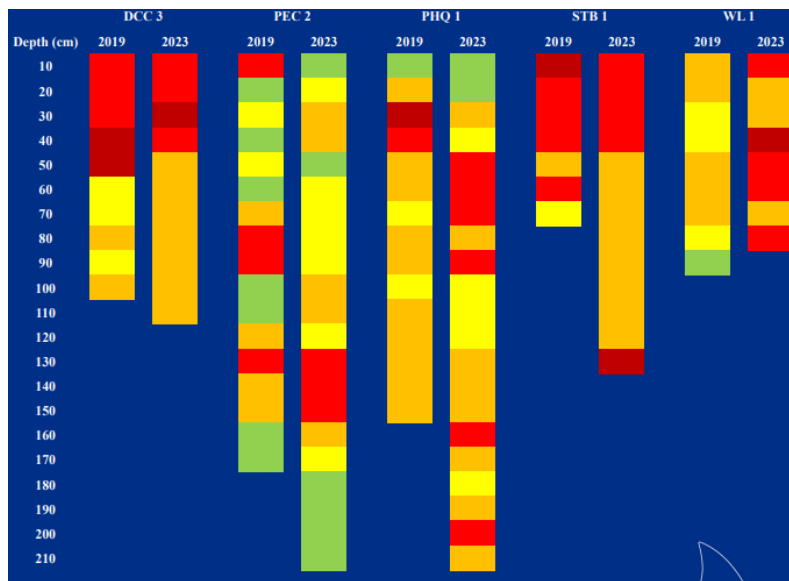


Figure 9: A bar graph depicting the potential ecological risk at various depths from sediment cores from five sites in 2019 and 2023. Green shows a low ecological risk, yellow shows a moderate ecological risk, orange is a considerable ecological risk, bright red is a high ecological risk, and dark red is a significantly high ecological risk.

- Increase at control site from 2019 to 2023 mainly due to arsenic.
 - Generally similar between the two time points.
 - We are concerned because the sediment from the port is going to be moved closer to the reefs and these heavy metals could be mobilized and cause a significant impact to the reefs.
- Geo accumulation index for As (Igeo).

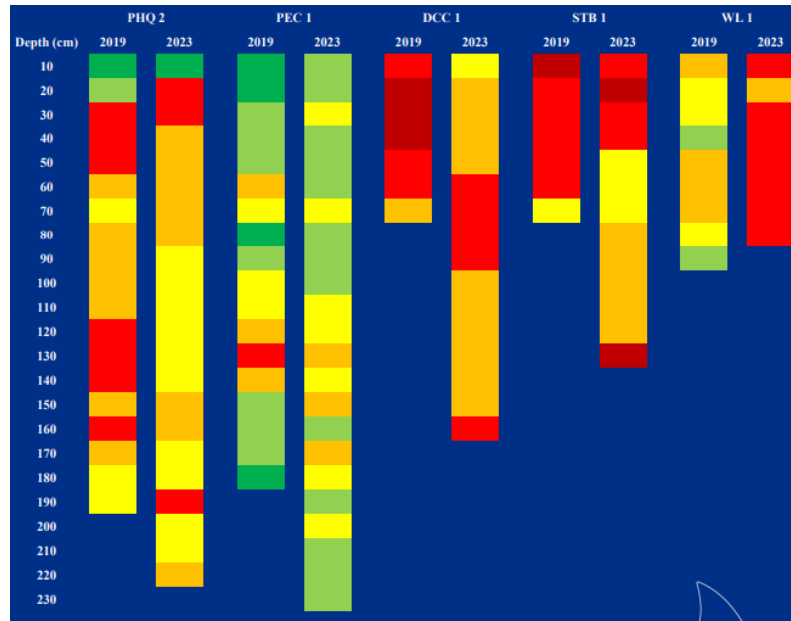


Figure 10: A bar graph depicting the Geo-Accumulation index for arsenic at various depths from sediment cores from five sites in 2019 and 2023. Dark green is uncontaminated, light green in uncontaminated to moderately contaminated, yellow is moderately contaminated, orange is moderately to strongly contaminated, bright red is strongly contaminated, dark red is strongly to extremely contaminated, and gray is extremely contaminated.

- Verifies the magnitude of contamination of each individual element.
 - Arsenic keeps popping up as metal of concern.
 - 2019 and 2023 results are similar, but again the control site values increased from 2019 to 2023.
- Geo accumulation index for molybdenum.

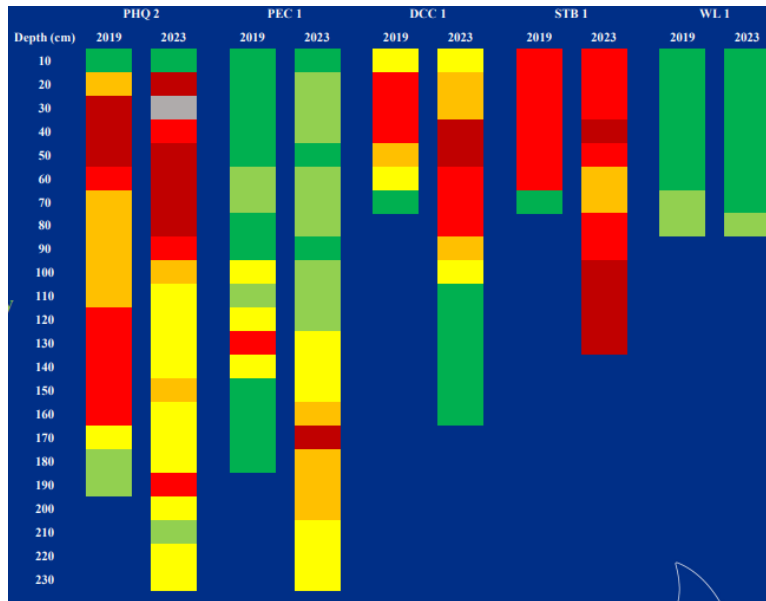


Figure 11: A bar graph depicting the Geo-Accumulation index for molybdenum at various depths from sediment cores from five sites in 2019 and 2023. Dark green is uncontaminated, light green in uncontaminated to moderately contaminated, yellow is moderately contaminated, orange is moderately to strongly contaminated, bright red is strongly contaminated, dark red is strongly to extremely contaminated, and gray is extremely contaminated.

- Molybdenum is a contaminant of concern.
- Control was not different between years like it was for arsenic.
- Enrichment factor for arsenic.
 - Not done in 2019, only in 2023.

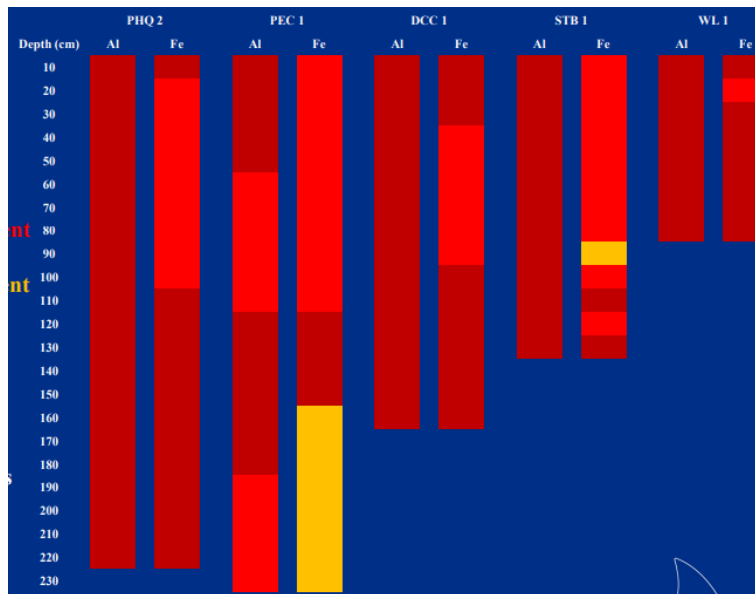


Figure 12: A bar graph depicting the enrichment factor for arsenic at various depths from sediment cores from five sites in 2023 only. Enrichment factors for both aluminum and iron are shown for five sites. Green depicts a depletion to mineral enrichment, yellow depicts moderate enrichment, orange depicts significant enrichment, bright red depicts very high enrichment, and dark red depicts extremely high enrichment.

- EF is a means of quantifying the enrichment of a potentially contaminant derived heavy metal in sediment relative to a defined background composition using Fe and Al as references.
- These enrichment factors may not be the most accurate because the reference metal concentrations were lower than expected in the upper continental crust.
- Enrichment factor for Mo.

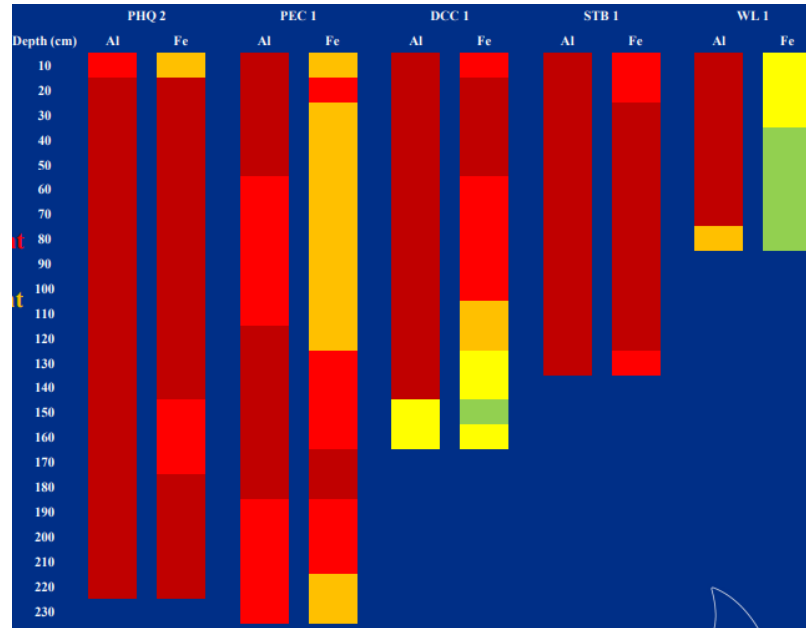


Figure 13: A bar graph depicting the enrichment factor for molybdenum at various depths from sediment cores from five sites in 2023 only. Enrichment factors for both aluminum and iron are shown for five sites. Green depicts a depletion to mineral enrichment, yellow depicts moderate enrichment, orange depicts significant enrichment, bright red depicts very high enrichment, and dark red depicts extremely high enrichment.

- These enrichment factors may not be the most accurate because the reference metal concentrations were lower than expected in the upper continental crust.
- Comparisons between the north and south coral reef sites.
 - Surface sediments (first 0-5cm) only.
 - The only value above TEL range is for arsenic in 2019 at the north reef (7.27 $\mu\text{g/g}$).
 - Value in 2023 was very similar, just dipped below the TEL level (6.95 $\mu\text{g/g}$).
 - At the north sites, the elements that increased in concentration quite a bit from 2019 to 2023 were copper, molybdenum, lead, and zinc.
 - At the south sites the elements that increased in concentration quite a bit from 2019 to 2023 were molybdenum and lead.
 - Moderate ecological risk at both sites.
 - For arsenic specifically, moderately contaminated at the north reef and uncontaminated to moderately contaminated at the south reef.
- Possible sources of heavy metals.
 - Stormwater/rain: Channeled via canals and inlets.
 - Fertilizers and pesticides: runoff through canals from agriculture and golf courses.
 - Atmospheric deposition: Coal-fired power plants and combustion of municipal waste.
- Contaminant source example.
 - Bonaventura golf course.
 - Had a lot of arsenic from herbicides, close to canal.
 - Davie landfill and Wingate Road municipal.
 - Both close to canal.
 - Examples of atmospheric deposition.

- Arsenic is a big contaminant from incinerating trash.
 - From 2005-2007 arsenic in canals and the intracoastal near these sites had arsenic concentrations ranging from 0.623 – 19.4 $\mu\text{g/g}$.
- Abiotic data: (Amy Hirons).
 - Six stations along reef tract (three north and three south).



Figure 14: One of the underwater sediment traps with sensors attached that is deployed at the six reef sites.

- We have had some interesting turbidity events during the time of data collection.
 - A lot of sand, sediment, algal growth, and biological materials.
 - Collect data every month on average.
- Pressure:
 - Measurement for depth.
 - Pressure increases moving from inshore to offshore as expected.
 - Can see tidal cycles in pressure data.
- Temperature:
 - May 2023 through November 2023.
 - Follows seasonal patterns.
 - Can see weather events (e.g. significant rainfall) in this data.
 - Had large rainstorm in south FL the week before Thanksgiving which impacted several abiotic factors.
- Salinity:
 - Generally consistent but drops significantly during periods of heavy rainfall.
 - The furthest offshore site had the largest drop in salinity.
- Dissolved oxygen:
 - Expect to see variations related to temperature differences.
 - Can see changes in data relative to storm event.
- pH:
 - Relatively consistent but again drops due to storm event.
- Turbidity:
 - Several distinct turbidity events.
 - Collected sediment from traps twice, on 9/12/23 and 11/29/23.
 - The sedimentation rate was greatly increased (about 100x more mass) from 9/12 to 11/29 than from 5/9 to 9/12.
 - Again, likely corresponds to storm event.
- Conclusions (Dimitri).

- Port Everglades sediment cores have As concentrations above TEL and PEL levels and high Mo concentrations above background levels.
- Potential ecological risk in most cores is high to significantly high.
- The Geo-accumulation Index for As and Mo in most cores is strongly to extremely contaminated.
- Current coral reef sediments have low elemental concentrations except for As.
- Correlations between heavy metals from 2019 and 2023 are similar in port cores but slightly elevated at coral reef sites.
- Variability in abiotic data among six coral reef sites, salinity greatest variability offshore.
- Turbidity fluctuates with storm events (wind and water input).
- Future Work:
 - Determine sediment type and organic composition of current sediment cores to complement elemental contaminant assessment.
 - Establish detailed sedimentation rates and sediment type by event in sediment traps.
 - Analyze suite of pertinent persistent organic pollutants (POPs): PFAS (manufacturing), PCBs (pesticides), PBDEs (flame retardants), PAHs (petroleum) in sediment cores.
 - Analyze heavy metals in surface sediment in vicinity of coral reef tracts at varying distances from port inlet.
 - Collect and analyze oceanographic data, particularly turbidity, relative to storm/wind events and currents.
 - Perform As and Mo dosing on coral species to determine exposure limits.
 - Statistical analyses.
- Acknowledgements:
 - Florida Department of Environmental Protection.
 - Coral Protection and Restoration Program.
 - St. Petersburg Coastal and Marine Science Center.
 - U.S. Geological Survey.
 - President Faculty and Research Development Grant from NSU.
 - Center for Trace Analysis/ School of Ocean Science and Technology at the University of Southern Mississippi.
- Questions:
 - Peiro Gardinali: The geology of Florida is very different than the average crustal values. Did you consider using regional data for the EFs? Schropp plots are available for FL. Miami-Dade County also have average soil data values for common trace metals.
 - DG: Yes, that is something that we are looking at. When we actually started looking at our values for iron and aluminum that was our clue that we needed to look more closely at those values in order to be able to evaluate this properly.
 - DG, Maria Gudnitz and Wade Lehmann reacted “thumbs up” to PG’s statement.
 - PG: Here is MDC link <https://www.miamidade.gov/environment/library/memos/soil-study.pdf>.
 - John Fauth: Other potential historical sources of arsenic are from cattle dip tanks (used to control ectoparasites), use on citrus fruits, and in antifouling paint.
 - DG: Yes.
 - PG: We also had to generate local enrichment plots for South Florida using relatively unimpacted areas of the Everglades.
 - Xaymara Serrano: Great presentation Dimitrios. How "stable" over time do you think these heavy metals are in sediments? Also, any plans to conduct dose studies with arsenic exposure?
 - DG: We have been working with applied labs quite a bit about stability. They feel pretty confident that six months at minimum as far as stability, and they have seen that several times with other things, but they said that it could be up to 12 months. That is something that we are very interested in investigating in the near future: how stable these are and for how long, because it is not exactly known. The arsenic exposure, we are currently doing that right now. We have Dr. Abby Renegar helping us with dose experiments with arsenic. And just to put it out there we are actually looking at two species of arsenic, we are looking at arsenate and arsenite to determine toxicity.

- Patrick Connelly: Hey Xaymara, I can answer your second question. This dose-response study is taking place this FY. And we can share that SOW if you'd like.
 - XS: Thanks Patrick! Yes, if you can share that SOW that would be great.
- WL: <https://www.epa.gov/ocean-dumping/site-management-and-monitoring-plan-smmp-port-everglades-harbor-ocean-dredged> - this details management of the ODMDS you mentioned. All dredged materials are tested (physical/chemical/bio) and EPA reviewed, prior to being allowed offshore.
 - DG: Thank you for the info!
- Maria Gudnitz: Given Florida's carbonate basement, with most sediments derived from carbonate-producing organisms and quartz from the Appalachians, wouldn't elevated concentrations of any heavy metals within our reef tracts hold higher value versus comparing against background crustal values?
 - DG: Probably but hard to determine. We also had a lot of organic material in the cores.
- MG: Are you able to share which methods and species you're planning to use for dosing experiments?
 - DG: Arsenate and arsenite with *A. cervicornis* and *O. faveolata*. four semi-static 96-h exposure assays.
- Joe Lopez: I was going to quickly add that we are also currently analyzing the same sediment core samples with metagenomics methods, and generally support the metal results. We should be able to present some of this data at the next TAC meeting next year.
- *A pdf was shared directly between PG and DG*
 - DG: Thank you! We will recalculate our ecological indices using FL values.
 - PG: I believe we provided the equations in the paper but if you need the electronic data let me know. Nice work!
 - DG: That would be fantastic, would save us time. If possible please email me at gairikos@nova.edu.

Government Cut Watershed Management Plan – Ellie Baker & Lori Kennedy, Horsley Witten

- About seven or eight years ago, we started trying to map sub watersheds across south Florida to be able to better plan and manage watersheds. We successfully completed a pilot in Boynton inlet and now we are looking to do something similar in Miami area.
- Project purpose: protect coral reefs and the habitats that support and are supported by coral reefs in SE FL by reducing land-based sources of pollution, including nitrogen, phosphorus, and sediment.
- Government Cut Inlet Contributing Area

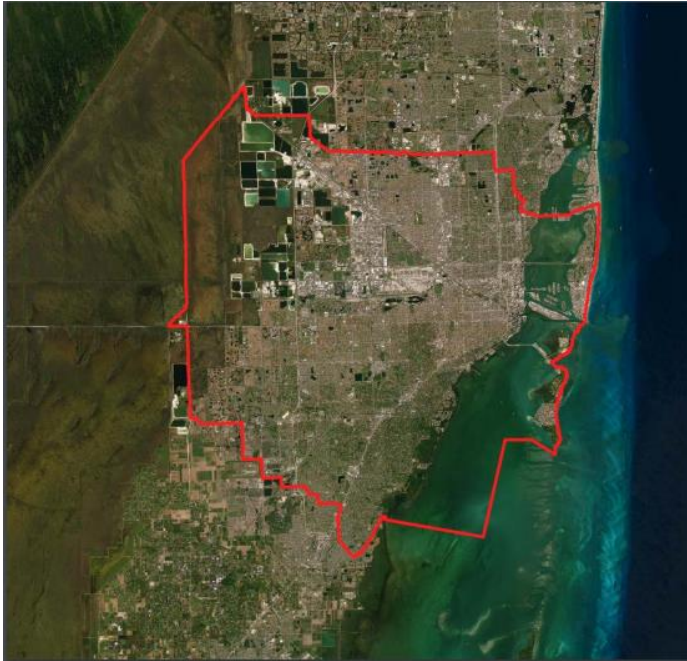


Figure 15: A map showing the study area is outlined in red and includes the greater Miami area.

- Delineating watersheds that contribute to an inlet.
- Client and partners:
 - Client: NOAA CRCP.
 - Rob Ferguson and Dana Wusinich-Mendez.
 - Working-group partners.
 - EPA, NOAA, FDEP, Maimi-Dade County, and the South FL water management district.
- Previous projects:
 - Inlet Contributing area (ICA) delineations and characterization in 2015.
 - Nine total areas delineated.
 - Delineated nine inlet contributing areas.
 - Used Boynton ICA watershed management plan as pilot in 2018, essentially repeating in Miami.
- Scope:
 - Sub watershed characterization and prioritization.
 - Detailed assessments for priority sub watershed.
 - What are some of the pollution sources?
 - What solutions we can provide for those sources?
 - Best management practices.
 - Partner coordination and stakeholder engagement.
 - Get stakeholder input on problems, priorities, and potential solutions.
 - Watershed management plan.
 - Completion target: July 2024.
 - Product: Develop a watershed management plan for the Government Cut ICA that will guide future investments.
- Government Cut ICA update.
 - Revisited boundaries and revision to ICA delineation.
 - ICA delineations were based on SFWMD guidance circa 2014.
 - Adjusted ICA boundary to include full C-7 Little River watershed.
- Sub watershed characterization and prioritization.
 - GIS analysis to quantify and compare sub watershed characteristics.

- Initial site visit in May.
 - Places to observe typical sources of pollution such as eroding slopes, dirt roads, over-fertilized landscapes, large expanses of impervious surfaces (parking lots), highly polluting land uses.
 - Looking for sites with good opportunities for mitigation as well such as public parks and golf courses, public schools, buildings, parking lots, boat ramps, vacant land, canal rights of way, barren streetscapes, neighborhoods with drainage issues, publicly owned retention/detention basins, private property with willing owners.
 - Green infrastructure is a big focus of this project.
- Typical mitigation practices.
 - Erosions stabilization.
 - Improved vegetated buffers.
 - Pavement removal and revegetation.
 - Trees with enhanced tree wells.
 - Green stormwater infrastructure.
 - Retrofitted/ naturalized retention ponds for water quality treatment.
 - Stormwater parks with larger-scale stormwater facilities and amenities.
- We look for a variety of settings where we can implement green stormwater improvements, including:
 - Institutional, commercial, industrial, residential.
 - Golf courses.
 - Parking lots.
 - Roads and streetscapes.
 - Pocket parks and large regional parks.
 - Unused open space.
 - Vacant land.
 - Waterfronts.
- Asked working group for ideas of sites to visit based on these criteria.
 - Created a webmap to collect suggestions.
 - Logged field assessments.
 - Visited 70 sites, still processing some information.

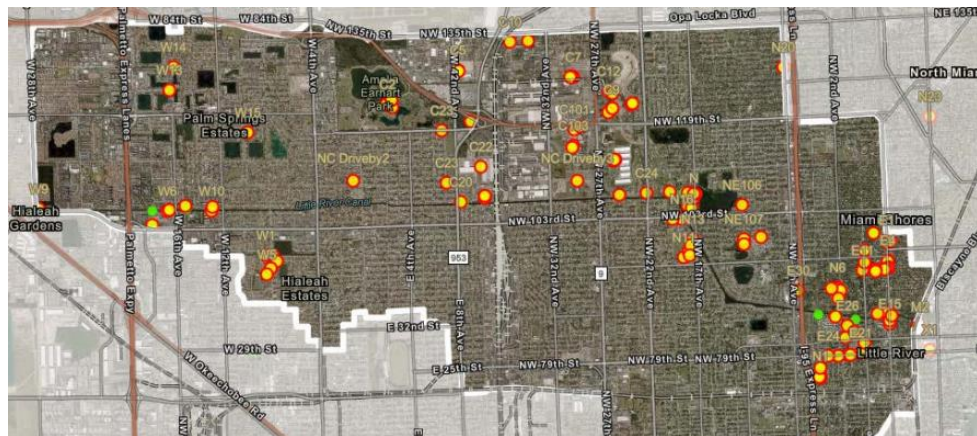


Figure 17: Map showing all potential sites in the Little River sub watershed suggested from working groups.

- Themes and Observations from sub watershed site visits.
 - Small scale green infrastructure practices can be sprinkled throughout the landscape.
 - Trees are not used to their fullest.
 - Some people don't want trees in their yard so they can have parking or don't want to deal with maintenance.
 - Vegetation management on canal banks leads to erosion and chemical impacts to ecology.
 - It is done to maintain flow and capacity of canals.
 - Trash and dumping are significant issues.

- Enforcement is a challenge.
 - Regulations are there in many cases, but don't have people to enforce.
- Construction sites are a challenge.
- Drainage system mechanical improvements could help.
- Vacant lands are an opportunity for green stormwater infrastructure.
 - Various sizes.
- Examples of how parking lots can be moved or created toward greener infrastructure.
 - Trend of draining to the middle of lot instead of draining to the green spaces or tree trenches.
 - Hard to retrofit.
 - Improve water quality treatment with minor adjustments in some places.
 - Try to understand and reverse design trends in parking lots.
 - Co-benefit of additional trees (shading, cooling, improved air quality).
 - Field sketches of potential improvements.



Figure 18: Some sketches drawn over images of potential sites of some possible improvements to stormwater management and infrastructure.

- Take sketches and make notes in the field for potential improvements.
- Have to understand how sites are already used.
- Examples include adding small retention ponds, reducing erosion by making it clearer where people should drive, adding natural pre-treatment of stormwater above drains.
- Example from elementary school:
 - In the middle of the bus turnaround, there was a large bioretention pond to capture drainage from road.
 - Connects to drainage system.
 - Could open for education with signage and posters to explain how it is helping the environment.
- Spraying herbicide in canal for vegetation management.
 - Increasing vegetation helps with water treatment, but vegetation is sprayed/removed to help increase the canal capacity.
 - Need to improve buffer vegetation along the edges of the canals and reduce the use of chemicals.
- Open spaces of various sizes can be turned into bioretention areas.
- Large open space by canal that could be used as a treatment area by diverting the canal slightly and then bringing it back.
 - Treatment with potentially some constructed wetlands.
- Lots of trash.
 - Some work is being done on canals to collect and manage trash, but it is a big issue.
- Stormwater parks:
 - Can be done on any residential lots that are not being used.

- Can help improve drainage in neighborhoods.
 - Can be done at a community level.
 - Challenges related to maintenance and unfamiliarity.
 - Part of the issue is people parking in their yards, which could be used for increased vegetation and bioretention areas, but we would have to change the culture a bit first.
 - When water in canals is too high, it sometimes goes back into drainage area.
 - Pumps would be useful here.
- Regulatory program Review (Did not talk about for time).
 - Focus on Miami-Dade County and three other municipalities.
 - Start by reviewing prior studies, assessments, and recommendations.
 - Talk with county and city staff.
 - Review how ordinances, regulations, plans, and reports address specific issues.
 - Develop preliminary recommendations for discussion.
- Topics to be considered:
 - Land use planning and design standards.
 - Construction-site waste, erosion, and sediment control.
 - New development and redevelopment stormwater management.
 - Public education, watershed friendly behaviors.
 - Septic systems.
 - Tree preservation, planting, and care.
 - SSO and illicit discharge prevention/elimination.
 - Good housekeeping practices (e.g. street sweeping).
 - Fertilizer management.
- Next steps:
 - Processing site assessment from December 2023 visits.
 - Fleshing out themes observed- problems and solutions.
 - Developing concept designs for up to 10 sites to illustrate potential solutions for different settings.
 - Regulatory review summary.
 - Once we finish the review on the sub watershed, hopefully we will be able to extrapolate to the full watershed.
- Questions:
 - Ellie Baker: If anyone has any questions please reach out to me at ebaker@horsleywitten.com, I will be happy to chat with anybody.
 - Dana Wusinich-Mendez: I had a question for Wade based on this information. Can the types of activities that Ellie and her team are starting to identify be funded by grants?
 - Wade Lehmann: It is possible, but that is outside of my knowledge. I will look into it, but I believe so and I can find a point of contact.
 - WL: EPA R4's Florida POC for 319 (Nonpoint source) grants is Tiana Blount: blount.tiana@epa.gov. That said, the state handles their own 319 program and folks within DEP should be able to find that contact for us.
 - Brian Walker: How can I get an updated GIS shapefile of the ICAs?
 - EB: Yes, we can do that.
 - Allie Shatters: Yes, I can help facilitate that.

Assessing Fish Spawning Aggregations in SE Florida to Inform Ecosystem Management – Erick Ault, FWC and Chris Taylor, NOAA

- Introducing team members (Chris Taylor).
 - Chris Taylor, Xaymara Serrano, Erick Ault, Dayna Hunn, and Stephanie Stinson.
- Reef Fish Spawning Aggregations (FSAs).
 - Formed by many reef fish species, such as snappers and groupers which are commercially valuable.
 - Spatially and temporally predictable.

- They are often near certain reefs or geologic features.
 - Spawning often co-occurs with lunar periods.
 - Though they are not always where or when you predicted.
 - Easily exploited, high risk over exploitation by fisherman.
 - Most of the aggregations we know about were told to us by fishermen first.
 - Protection has shown to be an effective management tool.
 - An example is mutton snapper protections at Riley’s Hump and Tortugas South Ecological Reserve in FKNMS.
 - Identifying and confirming FSA locations is a critical first step.
 - High priority in fisher and diver groups.
- Project history and key collaborators.
 - 2009: partnered with FWC to complete literature review, interviews with fisherman, and intensive field assessment over six years.
 - 2015-2017: conducted intensive tag telemetry for key taxa at Western Dry Rocks.
 - 2017-2019: maintained telemetry array and assemble other biological data on spawning timing for key taxa.
 - 2020-2021: Bonefish Tarpon trust campaign for protection of FSAs at Western Dry Rocks.
 - Established a seasonal closure of Western Dry Rocks in 2021 to protect the multi-species aggregations.
- Acoustics and visual.
 - Conduct echosounder surveys to detect large aggregations.
 - Helps to inform/pinpoint where we put divers to start looking.
 - Also helps to map the seabed.
 - Use diver observations to validate species.
 - Report/document observations in a large geo-database.
 - This database went into the regulatory review for the Florida Keys National Marine Sanctuary.
 - Report on these through their documentation.
 - Reported several FSAs along Florida Keys.

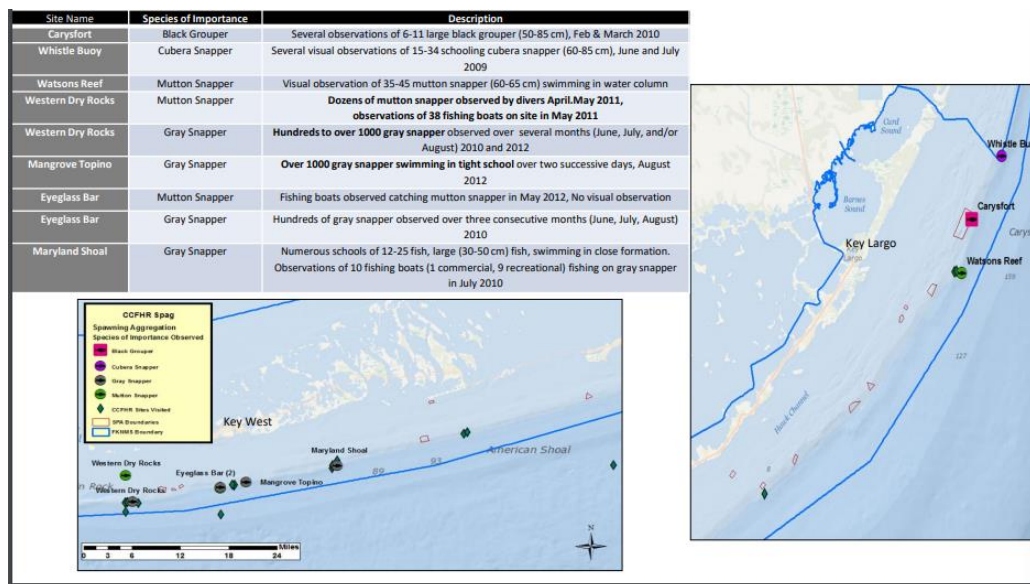


Figure 19: At the top of the figure is a list of several of the documented aggregations and their associated locations along the Florida Keys. The maps to the right and at the bottom show the locations of these aggregations.

- Extending FSA assessments to SE FL.
 - Asked to do the same work that we did in the Florida Keys in the SEFCRI area.
 - 2014-2017:

- Began with same principles.
 - Intensive literature reviews and interviews with fishermen, divers, and stakeholders began in 2014.
 - Field assessment.
 - Identified five species and focus areas (goliath grouper, gag, vermilion and hogfish, and mutton snapper).
 - Limited field validation.
 - 2021-2023:
 - CRCP and FL prioritized key taxa.
 - Focus on gray snapper in Martin County.
 - Increase efforts in telemetry.
 - Geography matters, we have the best results when we can get into the field as often as possible.
 - Need field validation at the right place and right time.
- Passive Acoustic Telemetry (Erik Ault).
 - First, I want to familiarize everyone with this technology.
 - How do they work?
 - Have receivers (detects signals), transmitters (emit unique signals), and attachment (surgical or external).
 - When a tagged individual swims within range of a receiver, the position information is recorded.
 - Need to physically retrieve and download data from receiver.
 - Then we can start to compile data into something we can analyze.
 - A closer look:
 - More reliable tracking of fish data.
 - Over time we can account for the whereabouts of many fish.
 - We can see when they were moving around a lot and when they were staying in one place.
 - Not quite real-time tracking, but it is much closer than previously.

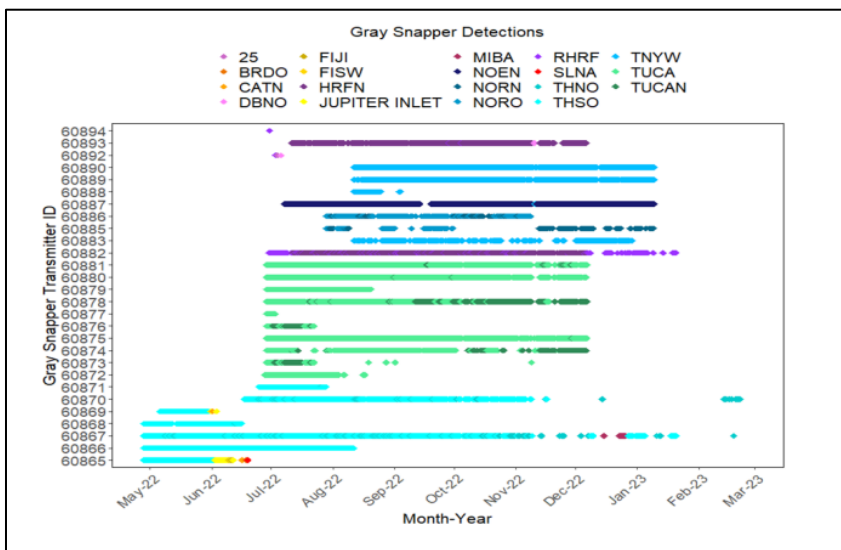


Figure 20: An example of the data that can be collected from these receivers. This abacus plot shows the different locations over time of individual tagged fish. The different colors indicate different locations. The y-axis represents individual transmitters. The x-axis represents time.

- FWC East Coast Core array:
 - Monitor 121 receiver stations currently.
 - Along 128 km (80 miles) of coastline.
 - The latest version of telemetry has temperature receivers built in.
 - As well as some other features.

- Collaborative networks (FACT/iTAG).
- Area partnerships (Martin and Palm Beach County).
- Sampling area:
 - First, we had to identify the sampling area and then find specific sites to target.

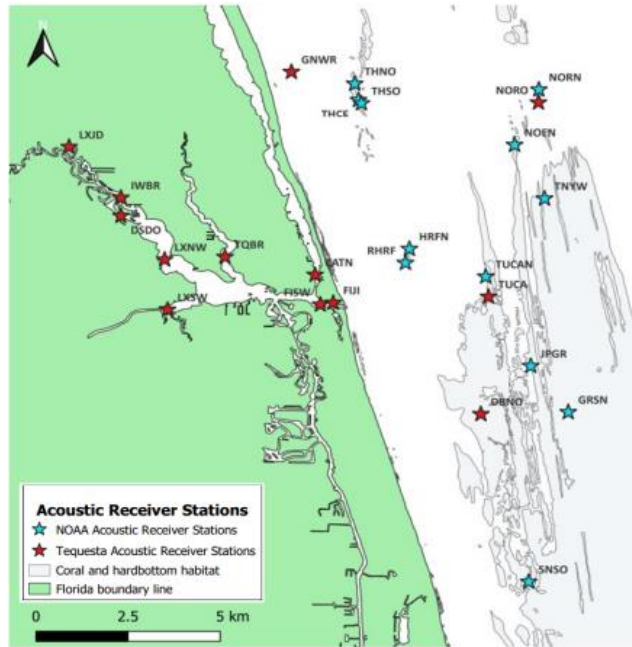


Figure 21: Map of the locations of receivers off the coast of Southeast Florida. The light blue stars indicate the receivers that were deployed specifically for this project and the red stars indicate existing receivers.

- 11 new stations deployed.
- Embedded within existing infrastructure.
- Selection criteria.
 - Higher density of gray snapper (more than 20 individuals).
 - Identified sites from previous data from our previous work, FWC, NCRMP-RVC, and other regional data.
- Engaging stakeholders (anglers and divers).
 - What do they think are important areas?
- Acoustic Transmitter deployments:
 - 75 tags deployed over 2 years (30 in 2022, 45 in 2023).
 - Nine total locations (six in 2022, six in 2023, three of which were in both 2022 and 2023).
 - Tagged similar size classes in both years.
 - Range of 257-248mm with an average of 309.5mm total length.
 - All tagged individuals were mature, spawning capable fish.
 - We did not differentiate or determine between male and female.
 - Did an outreach event with West Palm Beach fishing club.
- Preliminary findings:
 - The tags we use have an approximate 500-day lifespan.
 - Got back information from 27 out of the 30 tagged fish in 2022.
 - This number is expected to decrease for 2023 as we have had some reports of harvesting associated with the tags.
 - There were 744,159 total detections across 19 stations.
 - The number of stations that an individual fish visited ranged from 1-7, with an average of 2.29.
 - The amount of movement of an individual ranged from 0-17.96km, with an average of 2.49km.
 - We want to differentiate between “stayers and movers.”
 - Look at the number of stations visited by an individual.

- Most individuals are not moving a great distance from where we capture and tag them.
 - Some of the farther movements may be associated with predation events.
 - Fish not moving great distance from where they were captured and released.
 - The stations that had the largest number of visits were in the sites where we captured and tagged more individuals.
 - We are looking for connectivity where fish from different areas aggregate in a specific site which we can then target.
- Next steps:
 - Additional analyses.
 - Residency index, site fidelity, connectivity.
 - Identify patterns (seasonal, lunar, diurnal).
 - Habitat usage and environmental factors.
 - Depth information / virtual position system.
 - Hot spots, special locations.
 - Hits from hurricanes impact fish movement and behavior.
 - Maybe we can capture this information with this data?
 - Can communicate with and track down receivers if/when they get transported in big storms.
 - New pressure tags will be able to tell the individual's position in the water column.
 - Help to establish a baseline and look for deviations.
 - If hot spots are identified, can deploy more of the newer receivers to get more specific information.
- Acoustics and Visual Observations (Chris Taylor).
 - Co-located tracked fish suggesting aggregations will guide in-water surveys.
 - Acoustic and dive-visual verification.
 - Time field observations with purported spawning season around summer full moons.
 - Report size, coloration, and behavior.
 - Opportunistic biological samples to assess spawning conditions.
- Where we've been and where we are going (Xaymara Serrano).
 - 2021-2023:
 - Tagged 75 gray snapper.
 - Conducted ad hoc field observations.
 - Download receiver data, including from other receivers in FACT/iTAG array.
 - Gray snapper will tell us what to do next!
 - 2024-2026:
 - This issue was identified as a high priority issue and was awarded additional funding.
 - Guide additional tagging for gray snapper.
 - Identify future work on additional species or geography.
 - Collaborate with other spawning aggregations studies (e.g. FL Keys).
 - More engagement with user groups and regional managers such as:
 - South Atlantic Fishery Management Council (SAFMC).
 - Fishing and diving community.
 - Local groups (e.g. WPB Fishing Club).
 - SECFRI TAC.
 - SEFCRI TAC Input:
 - We would like additional input from this group.
 - What are some additional locations or species to focus on?
 - What is the value of this data?
 - How can we disseminate this data to stakeholders?
 - How can this data assist with other conservation and restorations efforts?
 - Data can be used for other purposes such as informing thermal stress events.
- Questions:
 - John Fauth: I have a suggestion for another, slightly different, project. When sampling near outfalls, I often see a lot of recreational boats fishing there and the claim has been that these are pelagic fish that don't stay near these outfalls but is that true? Is there evidence for that or are they staying close to these outfalls?

- Xaymara Serrano: That is a very interesting suggestion, and something we could probably do with the larger FACT array. Do you know if they have receivers in the area by the outfalls?
- Erick Ault: FWC is a bigger player in that area, it has not been something we've looked at yet but yeah could be very interesting. We did identify several species to target but started with gray snapper. We have talked about expanding our geographical range and our species, but we can also talk about including different features as well that may play a role.
- JF: Yeah, I would love to see you expand and answer new questions because the data you have presented to TAC previously has always been remarkable. If you get the funding and time, it would be great to tack on some new questions along the way.

Closing remarks – *Allie Shatters, DEP CRCP*

- If anyone has any questions about any of the presentations, you can always reach out to me, and I can make sure that information gets to them.
- Thank you to everyone for another successful SEFCRI TAC meeting.
- Thank you for all the presentations.
- Thank you for everyone taking the time to meet with us today and participate in the discussions.
- I will send out meeting minutes when available (usually after a month or two).

Meeting Adjourns