Seagrass Restoration Technology Development Initiative Technology Advisory Council Meeting Minutes

Pensacola, Florida

Wednesday, September 2, 2026 – 9:00 AM CT

Attendees:

In Person	Online	Online
Kevin Claridge	Megan Conkling	Dr. Michael P. Crosby
Eve Iavarone	Irene Arpayoglou	Beau Williams
Dom Gallery	Treiana Zuill	rajohnson6
Liz Longstreet	Lauren Hall	JHansen
Josh Adams	aleah.ataman	Carter Henne
Becky Prado	Stephanie Erickson	jdouglass
Lex Agnew	Joanna Walczak	Jenna Harper; Florida DEP
Whittney Scheffel	Lori Morris	Jessy Wayles
Matt Posner	Theresa Strazisar	Robert Johnson
Sydney Garber	RJ Harris	Robin Sarabia FDEP
Darryl Boudren	Jennifer h	Carla Perscky
Erin Cox	matthew anderson	Rebecca Cray
Dottie Byron	Veronica Lopez (FDEP-BBAP)	Valerie Tovar
Nate L'Esperance	Sarah Marmion	Toufiq Reza
Don Blancher	Robin Sarabia	bellj
Alex Hoey	Thomas Ries	Kasey MacLeod
Iris Segura	Amanda	Amanda Kopas
	Scott Eastman FDEP	Robert Fitak
	Dave Reed	Sarah Davis
	Brad Furman	wingardk
	Laura Reynolds	Tristan Clute - Water Quality - Biscayne Bay AP
	Ryan Moyer (TerraCarbon)	Kari
	ljwalter	Mia Braun
	Duane De Freese	Johannes Krause
	Megan Christopher	Jim Fourqurean
	Ed Sherwood	Melynda Brown-DEP Aquatic Preserves
	Susan Bell	Mallory Sea
	bethany	Sean Baxley

<u>Pensacola & Perdido Bays Estuary Program – Matt Posner & Whitney Scheffel</u>

- Matt: Thank you for joining our field trip with City of Orange Beach, the Nature Conservancy, and Moffatt & Nichol
- Working towards a national estuary program designation
- Whitney: Overview of programs
    - Microbial source tracking, juvenile fish Twals, water quality collaborative, seagrass surveys, spat and larval monitoring, living shoreline monitoring
- New mapping using aerial imagery, SIMM Funding for next report

- Looking into how living shorelines and seagrass are connected
- Scott: you mentioned AI use for processing imagery, what is the workflow for that?
    - Whitney: I can share that information, it is a complicated process to get into a lot of details
- Scott: Where is the data available for this?
    - FWC will have the data, and we can share that
- Becky: has anyone crosswalked the methodologies with what is being done on the Nature Coast?
    - Talked to Carlton for Big Bend, and then also work being done in South Florida
- Ed Sherwood (online) linked paper for reference to satellite monitoring

Co-Chair opening comments

- Dr. Crosby: apologized for not being able to make it, state is so big it's hard to get everywhere in person
    - Dr. Gallery is doing great work with the genetic library and working with Dr. Reynolds at UF. This is the first time that researchers have used this specific methodology to sequence plant data, and they only have a very small amount of plant material to do the extractions on
    - Remember that we are trying to identify these resilient genotypes and implement this restoration program with restoration partners. The science side must identify these genotypes to help with restoration
    - In our fourth year, year five we will need to pivot towards implementation and outplanting of initially identified resilient genotypes
    - Great work going on, and appreciate all of the partnership that is a part of the Initiative
- Dr. Reynolds: happy to be here, so rare to have so many presentations in a row with your research interests. Sad to not be there in person, because these relationships are such an important part of the work
- Scott: also apologizing to not make it in person, but lots of FDEP participation online. Agree with Dr. Crosby that we need to start with the implementation portion
- Carter: great speaker list and presentations and excited to listen in,

Florida Sunshine and Public Records Laws and FAR Notice – Kevin Claridge

- The Florida Sunshine Law applies to the Seagrass Restoration Technology Development Initiative, Technical Advisory Council.
- Florida's Sunshine Law was created to protect every Floridian's right to public access to meetings and records concerning government programs, which provides transparency.
- This applies to any meeting where official acts are to be taken or public business will be discussed.
- The public must be given reasonable notice of meetings that are to occur.
- DEP generally recommends notice for public advisory group meetings to be published in the Florida Administrative Register no less than 7 days before the meeting and ensure that it is posted on the Initiative website.
- Posted on August 10th, 2026
- Minutes of meetings must be taken and documented, but do not have to be verbatim.

- This meeting's minutes will be posted on the Mote Seagrass Ecosystem Research & Restoration website with previous meetings' minutes, agenda, and presentation.
- Advisory Boards are not required to have audio recordings of their meetings; but if a meeting is recorded by a member or staff then it is a public record.
- Any discussion between two or more members of the Technical Advisory Council discussing a topic which may foreseeably come before their board must occur in the sunshine.
- You are not restricted from socializing with other members of the Council, but you may not discuss anything that may foreseeably come before the board.
- Discussion of official matters outside of a public meeting is a violation of the Sunshine Law.
- This Technical Advisory Council is subject to Florida's Public Records Law (even if you yourself are not a government employee), because records relating to the Seagrass Restoration Technology Development Initiative are made or received in connection with the transaction of the official business of the State.
- Public Records are ALL documents, papers, letters, maps, books, tapes, photographs, films, sound recordings, data processing software, etc. regardless of the physical form…or means of transmission made or received in connection with official action of an agency. Sec. 119.011(12), F.S.
- Public records must be open and available for the public to inspect and copy.
- This includes emails, text messages, and social media.

<u>Seagrass Initiative Overview – Kevin Claridge</u>

- Signed into law by Florida Governor DeSantis in July 2023
    - 403.93344 Florida Statutes
    - Partnership with DEP and UF
- $10 million over 5 years contracted by DEP to Mote
    - Grant Agreement Executed February 2024
- Legislative intent:
    - establish a collaborative and coordinated effort among public and private research entities to develop restoration technologies and approaches to address the loss of seagrass and the cascading ecological and economic impacts of that loss to communities in this state
    - department shall award funds specifically appropriated by the Legislature for the initiative to Mote Marine Laboratory, which shall function as the lead administrative component to achieve the goals of the initiative
    - initiative shall leverage state-appropriated funds with additional funds from private and federal sources
    - Mote Marine Laboratory and the University of Florida shall create a 10-year Florida Seagrass Restoration Plan to implement tools and technologies developed under the initiative

<u>Initiative Partners</u>

- University of Florida - Coastal and Marine Ecology Lab in the Department of Soil, Water, and Ecosystem Sciences
- Florida Department of Environmental Protection - Aquatic Preserve Program

DEP Grant Agreement and Reporting Requirements – Eve Iavarone

- Annual Report due on January 15th to the Governor, the President of the Senate, the Speaker of the House of Representatives, the Secretary of Environmental Protection, and the executive director of the Fish and Wildlife Conservation Commission
- DEP Contract Technical and Financial Reports
- Public Website
- TAC Meetings – FAR, Presentations, Public Comments and Minutes
- Public Records

Seagrass Initiative Progress

- Mote Administrative Structure
- 1st , 2nd , and 3rd Accomplishments and Priorities Report
- Leveraged Funding
    - NOAA
    - Philanthropic
        - Publix Seagrass Genetics Research Hub
        - Wolf Foundation Biogeochemical Carbon Sequestration Building
- Initiative Technical and Financial Reports submitted
- Released three competitive RFPs
    - 19 proposals received in latest RFP
- 24 project contracts for new and continued research
- Additional projects selected for funding in Year 4
- Staff in Lower Keys are working out of a temporary Office and Outreach Center at Bahia Honda State Parks as signage and construction plans are finalized with DEP State Parks
- Groundbreaking ceremony at John Pennekamp Coral Reef State Park in April for Mote's new seagrass and coral nursery
- Continued work with consulting firm, Moffatt & Nichol, on the 10 Year Seagrass Restoration Plan
    - Draft Plan Framework
    - Draft habitat suitability model in progress
- Greenhouse structure operational
    - Projects in progress and completed
    - Expansion structure has been built
- Outfitting "house" for visiting researcher lodging

Florida Seagrass Stewardship Certification Program

- Leveraged funds from The Wolf Family Foundation
- Working with TerraCarbon LLC
- Scope: Certified statewide (FL) seagrass restoration and conservation certificate program
    - Claims around a voluntary financial contribution that supports restoration or conservation of discrete area of seagrass habitat in Florida.
        - Claims can be made at the start when funding is provided and after each annual verification based on achieved outcomes
    - Not a carbon credit or offset
    - Based on monitored and verified metrics

- Unit: Area-based unit of ecosystem condition (m2)
- Purpose: Provide additional, private-sector funding for effective conservation and management of seagrass meadows in FL
- FSSC holder can make verified claims regarding support for seagrass restoration and/or conservation
- Some next steps include working on legal approval of program (meetings with FDEP), continued meetings with stakeholders (NEPs, potential buyers, WMDs), continue technical design and program governance build out

Facility Updates – Liz Longstreet

- Greenhouse expansion underway
- Completion expected late 2026
- To book a tour or reserve tanks reach out to Liz at LLongstreet@mote.org

Genetic Management Plan update – Dr. Dom Gallery

- We have received samples from over 10 projects
    - Keep sending samples following the provided sampling SOP and uploading your metadata to the website
- Whitney: we can provide more samples to you
- We have contracted BreedBase at the Boyce Thompson Institute located at Cornell University to track genotypes and associated metadata
    - Built the initial accession for individuals we have received so far
    - Began integrating the two platforms together
- Extracted over 1200 samples of 4 species of seagrass for the genetic library
- Optimized the seagrass extraction protocol
- Library preparations for 600 samples have been completed
- 400 individuals have been sequenced to date
- Troubleshooting
    - Working with extremely small amounts of tissue (5mg or less of dried samples)
    - Complicates getting enough DNA to do the library preparations for sequencing
    - We now can successfully extract high quality DNA from samples as small as 2.0 mg dried tissue (compared to 50mg that has been previously published)
    - This high quality DNA can be used in downstream applications, such as 2bRAD genotyping or whole genome sequencing
    - Now that our extraction protocol is completed, we have successfully sequenced approximately 400 Halodule wrightii samples for the genetic library
- Scott: what happened on the far right of the source plot (IRL and nature coast)?
    - The way the individuals cluster together there are three breaks off of the top of the dendrogram. At the third break, the IRL individuals on the right are more genetically similar to the Nature Coast individuals, but the fact that they are on the far side of the screen doesn't necessarily mean they are very different from the other IRL individuals.

Moffatt & Nichol – Becky Prado

- Dr. Crosby: What is the primary forcing function for these suitability areas?
    - Did initial engagement with IRL watershed, and what you are talking about is what stakeholders have brought up about waste water, septic, and outflows
- Dr. Douglass: exciting to identify missing pieces of suitability based on water quality

    - I think annotating / validating the suitability model results with qualitative descriptions of seagrass status and trends in those areas (observations of algae blooms, seagrass dieoffs, hyper/hyposalinity events, etc.) will help make the model relatable.
- Dr. Crosby: For the habitat suitability model, we should expand the data and zoom in where possible, as long as its not cost prohibitive
    - Noted, and we plan to do that with a smaller grid size for analysis
- Kevin: discuss why we chose this area for the next pilot
    - We looked at a lot of different watersheds, and we want to do all of them eventually. SEACAR has made a lot of this possible
- Duane De Freese: Continuing offer - the IRLNEP is available to assist when needed. Our IRLNEP Management Conference meets quarterly with 3 advisory committees representing 33 research organizations, 51 resource managers, and 19 citizens representing the 5 counties along the IRL. When you are ready, a full presentation to these 3 advisory committees and the IRL Council Board of Directors might provide a valuable peer review opportunity.
- Scott: An aspect that hasn't really been discussed, but should be accounted for are the existing seedbanks, etc.. I imagine that is a part of the "place-based management." And to Dr. Crosby's point, perhaps incorporate information about stormwater infrastructure, etc..
- Kevin: What is the timeline for the plan?
    - We can share it as a draft for anyone who wants to see

Year 2 Funded Project Presentations

- *Seagrass Strikes Back: A new hope for fighting Marine heatwaves (MHWs) with Thermo-Priming* – Carla Perscky, University of Central Florida
- Continued work from Dr. Laura K. Reynolds, University of Florida
    - Dr. Douglass: Interesting thinking about certain stresses (cold, high salinity, low nutrients) trigger flowering in Thalassia. Though maybe the anthropogenic stressors we often have today (hot, low salinity, high nutrients) are not the types that trigger that adaptive response?
        - Yes! I think there are many things that can trigger flowering. I think the low P correlation may be specific to this region. It would be fun to investigate this over bigger scales
    - Scott: And I guess the magic question is - do the expressed stress related genes, those derived from either heat or light treatment, provide greater tolerance to stressors other than heat and reduced light.. e.g., disease resistance.
        - Yes! In other species, tradeoffs are common
- *Comprehensive assessment of the genomic variability in Syrangodium filiforme populations in relation to environmental and stressor heterogeneity across Florida* – Dr. Iris Segura Garcia, Florida Atlantic University Harbor Branch
    - Dr. Douglass: That would definitely be useful to have genetic markers for Syringodium sex. Do we have genetic markers for sex of our other seagrasses?
        - Dr. Reynolds: Dom is working on Halodule.

    - Rebecca Cray: Is seagrass flowering always a stress response or can it sometimes occur when seagrasses are healthy/conditions are good and they're able to direct their energies to reproduction instead of other things like growth?
        - Dr Reynolds: It definitely is not always a stress response.
- *Differential gene expression and productivity in response to ocean warming for two Halodule wrightii populations across a latitudinal cline* –Mya Wayne, University of New Orleans
- *Assisting the role of interspecific competition and sediment quality stressors on shoal grass restoration* – Dr. Jennifer Hansen, Brevard Zoo
- *Supporting Seagrass Restoration in Lake Worth Lagoon* –Joanna Walczak, Loggerhead Marinelife Center, presented by Amanda Kopas, Nova Southeastern University
    - Dr. Douglass: Do you expect any of these contaminants to be at levels damaging to the seagrasses themselves, or are they a concern mainly because of potential transfer to higher trophic levels?
        - It is possible considering all of the runoff from anthropogenic sources. The canals run through about 350,000 acres of land so I am excited to see the results I get. If the concentrations of heavy metals are too high then that could have an affect on the species itself. It's possible that some species thrive in those conditions while others do not. It is a main issue though when it comes to higher trophic levels as they can bioaccumulate in tissues.
- *Influence of biochar on seagrass growth, health, and ecological interactions* – Dr. Toufiq Reza, Florida Institute of Technology
    - Dr. Douglass: Dr. Reza, what is the current thinking about how a material like biochar might be applied at scale in the field?
    - Scott: I had a very similar question - what would real-world implementation look like?
        - Excellent question. We want to apply it directly to the open water. For our HAB projects, we will be using Mote's sprayer that they use for modified clay. The other idea we have is to make a biochar-based seagrass sod that will directly applied to IRL with the hope that we can overcome some of the transplantation stress
    - Scott: Is there an optimal extent? or is that still TBD. I would think that the seagrass sod approach might help with assessing the direct relationship (does it work), minimize non-target impacts, and would go over better in regards to public perception, etc.. Just a thought.
        - It is still TBD. We have a very good idea on how to make a seagrass sod (with coconut coir, sediment and biochar), however, we are yet to test the system. We proposed this idea to EPA but didn't get the funding this cycle.
- *The Resiliency of Halodule wrightii to Increased Temperature, Freshwater Discharge, and Light Limitation Florida* — Dr. Megan Conkling, Florida Atlantic University Harbor Branch

    - Dr. Douglass: Dr. Conkling- Just wanted to say I really liked your time series graphs of the different stresses you applied in the experiment. Great way of showing the kind of manipulations that can be done at the new facility.
        - There is so much information so I am glad it was clear. It is a great facility and can't wait to see what is done in it.
- *Investigating the Influence of Ocean Acidification on Seagrass Resilience to Nutrient Loading* – Dr. Robert Johnson, University of Wisconsin-Madison
    - Dr. Douglass: Dr. Johnson, that transplant shock dynamic definitely seems to bedevil seagrass experiments. Any thoughts on best ways to deal with it or account for it moving forward?
        - It definitely does. I think using longer acclimation periods could certainly help with this. I know there are a number of folks and projects that are using harvested seeds to grow plants, and it was my understanding that these plants don't show the same transplantation stress effects (though it takes a long time to have adult plants for an experiment).
        - One way we're also planning to address this in our data is by comparing all results to data collected at the end of the Acclimation period, rather than comparing to Week 0 when they were transplanted
    - Carter: Plant shock is pretty common in all stock. In general keeping the plants roots stable (not disrupting root hairs), and keeping the plants cool when out of the water, and acclimation help.

Year 3 Funded Project Presentations

- *Information on seagrass genetic diversity (Year 1) in Tampa Bay offers insight into restoration protocols and sets the stage for the next sets of field and mesocosm studies* – Dr. Christina Richards, Ecosphere Restoration Institute/USF
- *Developing Technology for Kilometer Scale Seagrass Restoration in Florida* – Nate L'Esperance, Ulysses Ecosystem Engineering
    - Dr. Crosby: Do you have the permit to plant in FKNMS? Have you compared your sites to the HSM designed by Moffatt & Nichol?
        - Have applied for the permit, but don't have it in hand yet. We also have not compared the sites to the HSM, but will do that.
- *Assisting seagrass recovery in Southwest Florida: Examination of transcriptome-wide gene expression variation to identify low-light resilient Halodule wrightii genotypes* – Dr. Mallory Sea, Gulf Shellfish Institute
    - Dr. Crosby: positive feedback loop from clams with the feces and psuedofeces may take some amount of time before you see the effects
        - We have questions around the timescale of experiments and when to expect to see the effects
    - Dr. Douglass: Nice Work, Dr. Sea. Keeping a filter feeder and a plant happy in the same tank at the same time seems tough but it looks like you're on the right track.
- *Continued exploration of the potential for seed-based restoration using Manatee Grass* – Treiana Zuill, Florida International University

Mote Marine Laboratory Final Topics and Discussion

- Year 4 RFP
    - Opened April 1st – May 15th
    - Use of Mote facilities/infrastructure is free of charge
    - Collaboration with Mote, UF, and DEP encouraged but not required
    - 19 proposals
    - 10 Projects Funded
    - Some projects have been split up or allocated to Year 5
- Next TAC Meeting to be held at Manatee Lagoon — An FPL Eco-Discovery Center with Friends of Manatee Lagoon
    - Please fill out the poll and choose you preferred date, February 18th or 25th
- Dr: Douglass: Want to make sure that I am coordinating enough with other researchers doing genetic research, and that we are covering all the bases
    - Kevin: everything is going into the genetic library and being organized and kept in there
    - Dom: we are accepting any species for the GL, we process them as they come in
- Scott: Perhaps rhetorical – how do we capture what we know now that we didn't know before, and how do we apply this information to better inform restoration? How will results from these funded studies be incorporated into the 10-year restoration plan? How do we ensure the science keeps updating the guidance rather than running in parallel to it.
    - Brad: Second that. What is the process for distilling project results into guidance for the 10-y plan?
    - Kevin: start packing that and connecting it into the tiers and story map. It will be a big lift to do this.
    - Scott: one big publication
    - Ryan Moyer: a special issue in a targeted journal?
    - Laura: great idea
- Scott: not looking at the terrestrial interface and upland infrastructure for the HSM, so trying to include that as well could be good
- Laura: should we spend the next meeting as a working group as opposed to or in addition to the presentations.
- Kevin: we can work with Moffatt & Nichol to get an organizational plan to start this
- Brad: a lot of times we get to the end of the meeting, and we've heard a lot and we need more time to discuss synthesizing this. Suggest Moffatt & Nichol do more literature review, validating and certifying seed release, then turning that into best management practices
- Dr. Douglass: please share any resources so the rest of the TAC members can do the work to review this too
- Brad: I'll bring those resources to an additional discussion meeting
- Laura: should we bring people that have been doing this work and have them present to us?
- Brad: that will help us get a broader framework for how to determine the BMPs
- Dr. Douglass: maybe envision the best case and worst-case scenarios
- Scott: to make sure we don't go too far off the rails, I agree
- Dr. Crosby: one of the worst outcomes would be at the end of this Initiative, we end up with 5 annual reports that talk about great research but haven't done anything to apply this science and restore this seagrass around the state that is built on seagrass

- Carter: I want to agree with you, but Year 1 we had significant impacts to the infrastructure for the testing of these ideas, but rushed outcomes would also not be good. Actionable outcomes are what we need to have
- Laura: I have a different meeting where we will be using tools to facilitate discussions
- Dr. Crosby: lack of 100% certainty can paralyze a project, we can monitor seagrass into non-existence. I agree that we don't want to transfer any diseases, but we have some disaster areas that need to be restored using the best available practices, and the longer it takes the worse the situation can become. Coral reefs is an example where lack of 100% certainty and overemphasis on what to do caused the situation to get worst
- Dr. Douglass: look at where stressors have caused an issue, and see how we can do restoration with this specific task
- Carter: if anyone on the call is looking to implement additional experiments, Sea & Shoreline has projects on the east and west coast and panhandle that have been completely permitted and can assist with work.
- Laura: that could be a great way to get some of this tested in the field
- Dr. Douglass: we have some plan As and Bs, we have been trying to get *Vallisneria* to grow in the river but maybe we can get them to grow in the stormwater infrastructure area, and maybe work in different areas even if they are not the official goals
- Public Comments – 3 minutes each or via card/email
    - None