CHIMMP/MWG Workshop 2024
Breakout Discussion Results

Topic: What works?

Strategies and networks for optimizing coastal wetland restoration, conservation, and management in Florida. Workshop participants were asked to describe what effective mangrove restoration, conservation, and management looks like in Florida.

Regional and large-scale collaborations

- Effective mangrove restoration, conservation, and management rely on collaborative efforts.
- Working across diverse partner groups can meet multiple needs. Diversity in backgrounds and expertise helps the knowledge base of the partnership.
- Regional collaborations can help allocate limited resources from one group to another. For instance, one group may have funding but limited people, and another group may have plenty of people but limited funding or resources. Similarly, local partners may have regional knowledge and funding, but not the necessary scientific skills to enact a project.
- Land acquisition and management may be eased with strong relationships with public and private partners, including community groups and citizens.
- Professional networks are beneficial to building partnerships. Science collaboratives, such as the National Estuarine Research Reserve System, are an example of a helpful, regional partnership.

Standardized methodology and unified data sharing

- When data are collected using similar methods, this increases sample size and large-scale comparisons across time and space. Data sharing on online platforms such as SEACAR promote data-sharing and awareness of monitoring projects.
- Methodology, especially for monitoring mangroves, varies widely across the state and even within a group between projects. It can be difficult to compare results due to these differences in methodology. A statewide standardized monitoring plan would be very useful, but it would be challenging to implement due to differences in methodology, differences in forest type (e.g., mangrove basin vs. scrub forest), scale (e.g., plot size, number of plots), or research question. If a statewide standardized protocol was established, these factors would need to be taken into consideration.
- Similarly, mapping efforts vary widely and can be difficult to compare, thus standardized mapping methods would be useful. Differences are commonly observed in mapping resolution and classification of wetland/coastal habitat type (e.g., pooling mangroves and saltmarsh, separating live and dead mangroves or mangrove species).
- Sharing spatial data via a portal would be helpful to promote effective leveraging of available data. Options for data-sharing include online software such as GitHub and StoryMaps.

Informed and data-driven restoration with long-term monitoring

- Restoration, conservation, and management are most effective when they are driven by research and techniques that are proven to be effective. Long-term monitoring and sharing of results and lessons learned help to determine what is most effective.
- Effective restoration is persistent and provides ecosystem functions. This may require planning for future changes in inundation, creation of space for upland migration, and understanding tolerance of an ecosystem to future stressors to promote long-term resilience of the habitat.
- Efforts should focus on restoring full ecosystem function, not just a target of habitat acreage.
- Restoration efforts need to plan for future human development.
- We need more long-term monitoring of outcomes to gain a better understanding of what mangrove restoration looks like in 20+ years.
- Effective restoration includes adaptative management based on results from long-term research studies. This should include effective temporal and spatial planning using long-term models.
- Hydrologic restoration and achieving appropriate inundation patterns is key to successful coastal wetland restoration.
- Bathymetry and elevation changes (e.g., through the use of dredge material) can be used to achieve desirable elevations for each ecosystem type.

Strong mangrove regulations and enforcement

- The Mangrove Trimming & Preservation Act provides some protection to mangroves, but further protection and enforcement is needed.
    - We cannot allow any further mangrove deforestation. The amount of mangrove habitat being removed has decreased, but deforestation is still allowed with mitigation.
    - Obtaining permits for trimming or cutting down mangroves should be more difficult and more regulated.
    - We need better enforcement of ecosystem violations or degradation. Land developers are more likely to remove mangroves if consequences are not enforced or if the fine is much less than the monetary gain of development.
- There should be easier permitting pathways for mangrove and coastal habitat conservation.
- We need to develop migration corridors for ecological continuity now!

Having a unified message

- Public perception is vital to the success of restoration, conservation, and management. By having a unified message to use in outreach and when educating the public, we support each other. This messaging should include what the co-benefits of restoration are (e.g., wave attenuation, filtration).
- There needs to be communal integration. As researchers and managers, we need to know what our targets are for restoration and conservation.
    - Models can be used to determine targets.
- We need to be working with people rather than thinking we are protecting habitats from people. For example:

- Educate property owners on the insurance benefits of single-use properties near mangroves.
- Partner with the real estate industry to promote mangroves on properties and educate homeowners on how to manage these habitats responsibly so that they still fulfill an ecological function rather than serving as a decorative hedge.
- Partner with private companies (e.g., insurance providers or those looking for blue carbon credits) to enhance conservation or restoration.
- Provide tax breaks for sustainable developments.

Topic: What more do we need?

Addressing limitations and filling knowledge gaps in coastal wetland research and management
Workshop participants were asked what they see as the current limitations or barriers to effective research, restoration, conservation, or management of coastal wetlands in Florida.

Managing water resources

- Improve old failing infrastructure and wastewater management systems.
- Integrate more ideas for using nature to improve water quality for stormwater, which will improve conditions downstream.

Funding

- Funding is allocated for shovel-ready projects, but not always as available for research, equipment, or personnel.
  - Lack of funding for personnel leads to rapid turnover; thus, there may be funding for projects but no one to implement them. We have funding for technicians but not specialists. With turnover, we lose knowledge and time.
- There is limited money for long-term monitoring; therefore, monitoring projects must be short term.
- Funding and monitoring need to be built into restoration plans.
- There is a need for larger nursery capacity at coastal wetland plant nurseries.

Remote sensing

- We need standardized habitat maps and remote sensing techniques.
- We need better remote sensing tools for classification of vegetation in coastal communities. Current tools are not reliable to delineate habitat types (e.g., mangrove, bald cypress). We need to be able to delineate habitats with higher resolution so that we can track land cover change over time.
  - Map imagery for land cover change can be outdated by the time it becomes available.
  - Fieldwork to accomplish the same tasks is incredibly expensive and laborious, so the use of remote sensing is important. However, maps still need to be ground truthed for accuracy.

Improved processes and permitting

- There is too much red tape around implementation of restoration projects. Permitting is too complicated and sometimes capricious. There are different requirements between local, federal, and state agencies. It takes too much time to get permits for research and restoration.
- Challenges related to permitting include:
    - Plans need to be modified due to changes to planning and zoning.
    - Some permitting practices are becoming more conservative.
    - Regulations must look at all parameters (e.g., developers).
    - A lack of accountability at various levels (e.g., private, public).
- Competing interests that complicate restoration or monitoring in coastal wetlands include:
    - Private property blocking access for land acquisition or management.
    - Property may include private ownership, riparian rights, and/or carbon rights.
    - The property may have competing uses for space (e.g., mosquito control, fishing, pedestrian usage).
    - It is expensive to dispose of contaminated sediment (e.g., soil containing PFAS) when grading elevation. Sometimes clean soil is not available. This can be an issue on military bases.

Perception and political support

- Public perception: Legacy perceptions regarding cost of restoration projects and the visibility of 'failures' of some mangrove, seagrass, and oyster restoration projects should be used as lessons learned for future restorations.
    - Set realistic goals for restoration and communicate early and often with the public.
    - More recent restorations have been more successful, and costs are slowly falling. If costs continue to fall, we can scale up restoration in these habitats.
- Political support: Adaptive policy is needed outside of election cycles. It should be a priority to get legislators on board, fill research gaps, and reduce uncertainties for decision makers.
    - Improve stakeholder education, especially politicians. We need to be better at marketing ourselves and science. Better education could mean more funding for research, restoration, conservation, etc.
- Community buy-in: Many people do not want their view blocked by mangroves. Community collaborations and outreach can help educate the public how the benefits of ecosystem services are more important than an ocean view.
    - Improve urban mitigation strategies that are agreeable to property owners (e.g., retrofit solutions for pre-existing seawalls).
- Communication: Improve communication with the public and private companies regarding agency activities. Provide a unified message and materials on important topics (e.g., mangrove expansion, blue carbon) to bring awareness to these topics and make them public knowledge. Private homeowners may not be amenable to restoration activities near their homes (e.g. "ruining their beach with a living shoreline", "putting sharp oysters on our beach") even when on public lands.
    - Involving locals (especially trusted community members) can have a large impact.
    - Communications can also be improved with contractors, so they understand the purpose and function of restoration projects.

Collaboration

- More collaboration is needed across all levels.
- Too frequently, projects occur without the knowledge of local groups (e.g., local researchers and managers) and we all could benefit from improved communication.
- We need more strategic planning for restoration.
    - Create a database with spatial locations of where various work is being conducted so people working on similar projects can find one another.
    - A statewide restoration plan could identify prioritized projects.
- We need a standardized monitoring methodology and restoration metrics.
- We lack interdisciplinary approaches. Hydrologists, geomorphologists, social scientists are hard to find. Academic structure prevents specialization beyond ecology. Universities are also very expensive to partner with on projects due to overhead costs being too high. Research is sometimes then not even written into project funding proposals. Collaboration with the private sector and academia could help shape this kind of curriculum, which would also benefit the private sector/practitioners and engineers.

Data-sharing networks

- We need good records of past, present, and future monitoring efforts, such as a repository to find technical report literature (e.g., reports from agencies and consultants).
    - However, sharing costs money and takes time to manage so this would need to be a funded project.
- The lack of communication between sectors creates gaps and is inefficient. Outside of academia, there is sometimes little drive to publish peer-reviewed literature. Reports are often not posted online and so are not available as open resources or are difficult to search for.

Long-term monitoring

- Restoration projects need to commit to long-term monitoring, not just a few years. The funding for this needs to be factored into project budgets.
- Monitoring requirements should be put on developers.
- More long-term monitoring is needed to better understand the tradeoffs between saltmarsh vs mangroves.
- We need more data on elevation and accretion rate changes, which can only be obtained through long-term studies.
- Improving knowledge of best management practices and monitoring for results of management actions.

Topic: Data gaps

Workshop participants were asked to identify current knowledge gaps in coastal wetland research, mapping, and/or monitoring.

Topics and research questions in need of further study include the following:

- Impact of freezing and heat stress on mangroves.
- What should we do about impounded wetlands? How does altering these systems impact human health (e.g., mosquitos)?
- Invertebrate communities in coastal wetlands.
- Fisheries impacts on coastal wetland health.
- Invasive species impacts on coastal wetlands.
- Improved future climate scenarios.
- Emission reduction; Florida is adapting to warm waters/emission instead of researching the cause.
- Mitigation strategies for shorelines and sea-level rise.
- Tradeoffs and ecological transformation between salt marsh vs mangroves.
- How will sediment elevation and accretion keep pace with sea-level rise?
- How effective are strategies such as thin layer placement in mangroves and mangrove/marsh habitats?
- How do we clearly discern the impact of sea-level rise stress on coastal wetlands vs other co-occurring stressors?
- What is the inundation tolerance range of coastal wetland vegetation?
- How can we predict where wetlands will be able to migrate with sea-level rise?
- Information beyond extent and species of coastal wetland vegetation is needed to fully understand the ecosystem. Knowledge of historic and baseline hydrology and water quality is also needed to assess the impact of sea-level rise and plan restoration.
- At what point do uplands become wetlands (e.g., fluctuations)? What do we know about this transition period?
- Habitat evolution models.
- Nutrient cycling in coastal wetlands.
- How does upland land use influence coastal environments (e.g., fertilizer bans)?
- Improve methods for monitoring wave and wind energy (e.g., from hurricanes and boat wakes).
- Belowground carbon storage potential.
- Carbon science data (ex. CO_2 fluxes and C burial rates). Need sediment samples flux towers, and SETs, etc., but this is costly.
    - Carbon financing requires data as close as possible to a target area (geospatially), and it is not typically available at the scale of need for carbon financing.
- Long-term monitoring looking at success of restoration and function of the system (e.g., how will a 60-year project function?). What is the level of performance and money going into the project (e.g., blue carbon credits)?
- How does mangrove trimming impact mangrove health?

Mapping gaps and needs

- We need higher resolution maps, especially for smaller habitats (e.g., fragmented or highly urbanized mangroves, vertical oyster beds).
- Mapping should separate mangroves that have high hurricane damage from those that had minimal damage.
- Land cover classifications should be more specific.
- We need comprehensive maps that are easily accessible online and regularly updated.
- We need good elevation data for different types of coastal ecosystems and to improve Lidar methods.
- There are discrepancies in global, regional, site mapping of mangroves. How do we rectify across spatial scales? Every mapping effort is so different depending on needs.
    - Technology advancements can aid in rectifying discrepancies.
- Enhance utilization of drones and AI.
- Increase ground truthing of remotely sensed data.

How do we fill the gaps previously mentioned?

Regional and large-scale collaborations (See Topic: What Works)

- Hold knowledge-sharing workshops and meetings like CHIMMP.
- Improve interdisciplinary collaborations between research, private sector, and academia. Integrate private sector monitoring/knowledge/research and make their data products more accessible and shareable. Streamline knowledge sharing (e.g., Github or other online tools).
- Funding hub/resource hub/website for finding funding opportunities.

Set standards

- Standardized format for organizing information/data to be shared.
- Standardized monitoring.

Science communication

- Provide a unified message appropriate for the audience. Improve marketing of conservation and science. We should team up with social scientists more and use their resources. Promoting the big picture (e.g., long-term ecosystem services vs short-term needs).
- Link eco-issue to known public concerns.
- Relate ecosystem services to economic value provided.
- Improve public education for mangrove trimming.

Learn from failure

- We need to share not just successes but also failures, especially for restoration projects. Journals do not publish when studies fail so we are unable to read about lessons learned. Outside of journals, it can be difficult to readily share information with each other. Especially as we move forward and do not know how our ecosystems will respond to future climate scenarios, we need to find a way to share this information with each other and avoid making the same mistakes.

- To evaluate success and allow for adaptive management, we need regionally focused monitoring networks and funding for long-term monitoring.
- Long-term monitoring needs to be translated to restoration practitioners.

Other gap-filling measures

- Policies need to be based on scientific research.
- Carbon markets need to change.
- Provide more incentives. For example, provide real estate industry incentives for responsible development as the population continues to rise in Florida.
- Reduce fees for permitting for living shorelines/flood insurance. Streamline the permitting process between agencies.
- Fund more skilled and specialized staff for projects. It is difficult to find people willing to work in coastal systems so we need appropriate pay for those who will.

Topic: How will this change in the future?

Integrating future climate change scenarios into restoration planning and management. Workshop participants were asked how we should integrate future climate change scenarios and population growth into wetland management and restoration planning.

Create coastal wetland corridors

- Acquire land for future conservation lands in areas adjacent to coastal wetlands that are likely to be future wetland habitat to create marsh and mangrove migration corridors.
- Ally with insurers to protect green spaces and create wetlands.
- Create interdisciplinary partnerships (e.g., with landscape architects, urban developers and planners) to plan marsh/coastal ecosystem restoration and landward migration. This planning should include future water levels and have an adaptable design to incorporate worst-case scenarios (e.g., urban parks may be future wetlands).
- Put more pressure on or provide incentives for local government to give land for restoration. Local government may be the key for land acquisition.
  Design restoration projects with buffer areas for landward migration.

Plan for the worst-case scenario

- Plan for the worst-case scenario. Ask for the most rather than be in a situation where we underestimated, and it is too late. Be aspirational in our goals.
- Use sea-level rise models to plan restoration projects. Historic habitats may not last and should not always be used for restoration. It may be time to accept some of the land cover changes. We should focus on what is most likely to be successful in the future. Spatial and temporal matrices can be used to calculate short-term and long-term restoration benefits.
- Promote better shoreline stabilization.
- Think ahead – where will people and resources migrate? Desirable properties will shift from coastal to upland to avoid flooding and disadvantaged communities will move from upland to coastal.
- Connect climate change scenarios for a particular time and place to human populations.

- Consider not just the rate of change over time, but also the increasing rate of change with time.
- Part of planning for the worst-case scenario is educating the public about what is going to happen. We need to educate all audiences of climate change implications in living in Florida. We need to make resources readily available to the public.
- Once educated, the community must be involved in decision-making.
- Distinguish between anthropogenic-induced ecological change and natural changes.
- Reduce the developmental pressure on our ecosystem.
- Consider groundwater withdrawal. The more groundwater is removed from the aquifer, the more impacts to springs and coastal areas. We will be seeing more saltwater intrusion as tides increase and groundwater decreases. This impacts more than shifts in plant communities. This will impact agriculture and drinking water for the people of Florida. We need to plan ahead.

The summaries were compiled from notes documenting verbal discussion and written comments during the workshop.