Tyndall AFB Stakeholder Working Group

Date: February 5th, 2025

Time: 10-11:30 am

Location: Teams

Prepared by: SASJBEP

Attendees: Garey Payne (USAF AFCEC CFDP), Jonathan Feldman (AFCEC REPI Program Manager), Cheri Moon (Tyndall AFB), Jessica Graham (SASJBEP), Jeff DeQuattro (TNC Gulf Program), Bob Bendick (TNC Gulf Program), Christine Shepard (TNC Gulf Program), Katie Konchar (TNC Gulf Program), David Bell (Jacobs), Beatriz Marin-Diaz (University of Florida), David Bushek (Rutgers University), Mike Sharp (NFWF), Cassidy Manzonelli (FWC), Simeon Urek (USGS), Jessica Black (NOAA Restoration Center), Erica Felins (NUWC Newport), Jake Goodwin (DARPA), Eric Christianson (Emerald Coast Regional Council), Kent Wimmer (Defenders of Wildlife), Tunch Orsoy (Jacobs), Kent Smith (FWC), Eric Sparks (MS State), Melanie Kaeser (USFWS), Rick Harter (Harter Restoration and Consulting), Dr. Catherine Campbell (DARPA), Daniel Medrano (DARPA/Ctr), Stephanie Dohner (Naval Research Lab), Jake Goodwin (DARPA), Jenny Shinn (Rutgers – DARPA), Nigel Temple (University of South Alabama), Lt Col Katherine Plichta (HAF/A8P Planning), Scott Pippin (UGA), SMSgt Blake Fagan III (325 OSS/Airfield Management)

Thirty-one (31) attendees representing approximately twenty-two (22) organizations participated in the information sharing session focused on resilience work being performed adjacent to Tyndall AFB, including the detailed review of 90% design plans for three of the keystone NBS projects. Additional discussion among stakeholders explored the feasibility of compiling bay-wide information to streamline the implementation of nature-based solutions, in particular living shorelines."

Meeting Objective: The objective of this meeting was to inform stakeholders of the resilience work being performed near Tyndall AFB and explore opportunities to scale up this type of work.

Meeting Summary:

Dr. Jessica Graham with the St. Andrew and St. Joseph Bays Estuary Program (SASJBEP) started the stakeholder working group meeting by welcoming everyone and requesting that they enter their name and organization into the chat for attendance. Jessica reviewed the agenda and the excitement of seeing 90% designs for some of the restoration work. She then handed it off to Mr. Garey Payne for a welcome from Tyndall AFB.

ST. ANDREW & ST. JOSEPH BAYS ESTUARY PROGRAM at FSU PANAMA CITY

Meeting Details:

Mr. Garey Payne (USAF) welcomed the attendees and echoed the excitement of seeing 90% designs coming to fruition.

Jacobs 90% Design Update

Mr. David Bell (Jacobs) presented a review of the 90% design submittal for the Coastal Resilience Pilot Project.

Background on previously presented information was reviewed briefly.

- Last meeting, Jacobs presented alternatives for the three projects and have been working to find the most efficient and effective design looking at spacing, geometry, wave attenuation, performance.
- The 60% design package provided the basis for design, modeling report, drawings, technical specifications, and cost estimates.
- Once selected Jacobs has now been focusing on more critical details of putting it out for bid and construction while coordinating regulatory review as it relates to NEPA and getting ready for permitting.

David presented the selected alternatives for the living shoreline project, oyster reef breakwater, and submerged shoreline stabilization as shown below. All of the reef structures are about 200 or so in length and then you can see the gap width.

	Living Shoreline	Oyster Reef Breakwater	Submerged Shoreline Stabilization
Number of Structures	4	6	12
Average Gap Width	150	150	100
Total Length of Project (Structures + Gaps)	1,250	1,950	3,500
Wave Attenuation Performance Behind / Adjacent to Reefs	Up to 65%	Up to 90%	Up to 80%
Wave Attenuation Performance Area-Wide	Up to 20%	Up to 15%	Up to 30%

David summarized that the major updates between 60 and 90% design would be four main bullet points:

1. Minor adjustments to geometry, materials and layering of materials in an effort to optimize.
2. Removed geotextile sublayer from LS and ORB. There were comments made previously where we had proposed a layer of geotextile to help with the settling at the living shoreline

site but those were removed. However, they remain for the Gulf side's submerged shoreline stabilization.

3. Quantity of ORB precast units reduced – much was for cost purposes.
4. Modified bedding stone specification to include potential for Recycle Concrete Aggregate (RCA) – allows for the recycled concrete aggregate if available.

David also provided some cost estimates based on the updated quantities that gave some idea of where the contractor prices may come in and the next steps are looking to finalize the contracting documents using these packages to go out for bid with initial focus on the Oyster Reef Breakwater project.

David provided an update on the permitting process and current phases of review for the Programmatic Environmental Assessment required to satisfy NEPA; A final determination is expected shortly. Once NEPA is completed, permit applications can be submitted to the relevant state and federal agencies. It's been a lot of work to get to this point but looking to wrap up the coordination and anticipating 12 months for submittal and review but could be longer depending on their backlog.

Floor Opened for Questions and Discussion

- Question in the chat asking about the design process which has been answered in the 60-90% discussion. Jessica requested that David review the stakeholder process from the 60 to 90% design.
    - Coordination is ongoing with The Nature Conservancy, University of Florida providing great monitoring information, and hearing from the base as well as this Stakeholder group. Tyndall's NEPA Program manager and folks on Tyndall have been extremely supportive and collaborative and also getting a lot of agency coordination and comments throughout the entire process.
- Question in the chat asking about monitoring after these projects are deployed and Katie Konchar answered that question in the chat.
    - A comprehensive scientific monitoring protocol focusing on core metrics has been developed for each of the three NBS projects. Pre-construction monitoring will be completed within 12 mo. Of construction. Post-construction monitoring will commence within 3-6 months of construction and continue annually thereafter for 3 years.
- Question from Jessica Graham asking about the recycled concrete aggregate and if there has been research on that compared to limestone on the success of oyster recruitment?
    - David stated that based on what he has heard that it is comparable but really depends on the site as well as timing of placement etc. The recycled concrete use is looking at a broader sustainability as well because getting quarried limestone has it's own impacts and costs. He opened it to others that could provide additional information.

    - Rick Harter shared results from Apalachicola Bay where they have seen excellent recruitment on recycled concrete and timing had an impact but over time we should be able to see patterns but overall, we have seen great recruitment on recycled concrete.
- Question from Katie Konchar asking if David could go back through the wave attenuation differences between the projects.
    - David brought the slide back up and reviewed that the difference in the two bottom rows on wave attenuation performance were the key characteristics that we looked at. Hydrodynamic modeling and the wave transport modeling looked at multiple locations or different ways on how these reefs will attenuate waves. The two locations were immediately behind the reef and then the larger area not just behind the reefs. This was an average of the total areas that are reported in the table.
- Question regarding the wave condition used in the design.
    - David answered that the wave condition was an 'operational wave environment' so more of a day to day condition with around a 2' wave and was not a storm event because these projects are focused more on the day to day conditions and minimizing chronic erosion.

Broader Tyndall Coastal restoration projects

Jessica shifted the meeting over to Katie Konchar with The Nature Conservancy. Katie gave huge kudos to David and the Jacobs team and how much they have worked to adjust the designs based on the comments and considerations brought forth by this group and others.

Overall, David reviewed a few of the projects but those are just a few and the keystone and first nature based solution projects identified at Tyndall from the Coastal Resilience Implementation Plan but there is a fourth project that is the seagrass restoration project that is funded by Bay County's RESTORE Direct Component pot. The seagrass restoration project is integrated with the submerged shoreline stabilization project.

The location of this project is just across from the inlet and has intense wave energy and is currently experiencing quite a bit of rapid shoreline erosion. Seagrass restoration will be integrated into the installation of the breakwater structures and the monitoring would occur with both projects. While we await the permitting and construction, TNC and partners at University of Florida and the US Naval Research Laboratory is moving forward with an immediate stop gap measure to slow the loss of seagrass as much as possible. Bamboo stakes will be installed to deter any herbivory activity but not exclude to try and keep seagrass loss along the actively eroding edge at a minimum.

Katie provided a timeline of projects and the grant stacking that they have done in order to move these projects forward.

Floor opened for questions and discussion

- Jonathan Feldman provided an update on some of the funding. There was about $395,000 missing from the project needs and Tyndall provided funding directly to these projects but is holding it currently for construction and we have about $900k from last year's REPI proposal that they are working to get to the project and we should know in the next month or so.
- Jake Goodwin asked what it means when putting on the street for bid regarding the oyster breakwater project.
    - Katie described the process of design and then construction requires documents such as those described today that will then be announced for competitive bids to be received to do the construction part of the job.

Reefense Project update

David Bushek provided an overview of the Reefense project. Reefense has designed and installed an oyster habitat mosaic with different habitats behind each breakwater. This project is funded by DARPA and asked us to develop a novel materials or find different ways of using existing materials either in combination or alone. Reefense started developing and with materials that were going to be recycled. Concrete was one of the things but we are working on trying to reduce the carbon footprint and also looked at biodegradable materials. This has been developed with a 15-20 year life span but it is quite expensive so moved away from it toward something that has a low carbon footprint.

Then examined wave attenuation working with the team in Australia that developed a module that is a reference module that is designed to control flow and create a lot of drag when waves come in both wind and currents. The target was for a 20 year return period and asked to achieve 70% in phase 1 and 90% in phase 2 which has been achieved for phase 1. There were different scenarios explored with solid core vs. permeable core. The permeable core didn't quite meet the 90% design requirements and so went with a solid core.

The project team has explored different kinds of arrangements and settled on one with sloping edges that mimics a more natural reef structure. Deployed as a test outside Rutgers and saw good recruitment but also a bit of scour so went back to Australian team that came up with a solution but could also put out some shell bags to reinforce the edges and that method eliminated the scour. These bags would need to be biodegradable to eliminate plastic use.

The result is what the team is calling a Chevrons that have fingers that come off the backs of the reef and the shoreline will be on the back side. The dark color in the slide represents modules that are full height and the lighter gray is three quarter height and then the white ones that are half the height. The gaps are specified by the living shoreline recommendations of every 75' and if you comply with certain requirements then can get things approved and don't need to go through

further review. The gaps needs to be 5' minimum to allow manatee passage is one of these compliance requirements.

Construction occurred in October off Tyndall at Baker's Point. The materials were constructed and then shipped down to Panama City. Ideally, would want to find a local precaster that could do these to save on the shipping expenses. A 50 meter reef was installed and it is performing well with some of the structure exposed at low tide.

Another component of the project was get oysters to not only colonize the structures but also survive predation and disease. The team has been working to develop an oyster population that was resilient to disease while growing relatively fast and recruit well. The team has been monitoring for two years and have seen that dermal disease varies from year to year but when you around 1.5 then you tend to see population declines and that is about the level that has been seen over the past two years in East Bay. This is probably the case across the Gulf with some variations. We are using genomic selection to determine if we can select for a more resistant strain of oysters but rather than going through random breeding and selecting for those that survive we are exploring the genome and using the Snipp array for an area that indicates the individual may have more resistant genes. This will accelerate the phenotypic process using genomic selection.

Now looking at methods to seed the oysters on the reefs structured and testing multiple methods that all have variable costs associated with it and will begin in the summer.

Additional efforts include some shoreline plantings and integrating with other projects on Tyndall including deploying some modules on a smaller scale. The full size modules are 2x2 fit and have half scale ones that are 1x1. These are deployed in different methods with shell bags as reinforcement in some cases that is found to be very stable where they are just alternated and angled with a notch.

The research team has also looked into the porosity of the mosaic structure and performance at attenuating waves. The goal is to develop a set of mathematical equations that can be transferred to anywhere in the world where there is oyster habitats that could benefit from mosaic structures.

Floor opened for questions and discussion

- Jeff DeQuattro asked if the mosaic structure was envisioned from the beginning or was it something that came up during the research and asked what the purpose or idea behind the mosaic is for?
    - Dave confirmed that the mosaic has been envisioned from the beginning but the emphasis has been getting the breakwater installed but then looking at the shoreline habitat where it may be beneficial to giving the marsh grasses the opportunity to migrate towards the breakwater and provide additional protection.
    - Jeff had a follow up question asking if any bird monitoring has been completed yet or planning to be completed in the future.

    - Dave stated that there was some bird monitoring needed for the permitting where a whole suite of species that were present had to be documented. There are plans to look at what happens afterwards once restoration is completed but will not be intensive monitoring. Dr. Nigel Temple added that they would be using The Nature Conservancy's bird monitoring protocol implemented in Pensacola and Perdido Bays. This is done once monthly.
- Jeff DeQuattro asked for a clarification of when the modules would be installed.
    - Dave confirmed that they would be starting on the 17th (February) and be planting juncus and spartina plants
- Jessica asked for confirmation that the disease results were the lab results.
    - David confirmed yes and stated that the lab would always give the strongest result because in the field there are multiple stressors.

Collaborative Science to Assess Restoration Success (C-STARS) Project update

Jessica Graham presented a brief overview of the CSTARS project led by the St. Andrew and St. Joseph Bays Estuary Program (SASJBEP). It has been in operation for a little over a year now and is a large collaborative project monitoring existing living shoreline sites across Pensacola, Choctawhatchee, and St. Andrew Bays. The goal is to obtain post restoration monitoring data for projects that have been installed at various time periods and quantify ecosystem services provided by these projects. This information will be used to help message the benefits of living shorelines and help set restoration targets.

Jessica described the three-pronged approach to create this information:

1. Existing data from existing living shoreline projects
2. New data we are gathering from living shoreline projects
3. Ecosystem services model creation

Existing data has been acquired and year 1 new data have been collected and is in the process of QA/QC. Jessica presented some very preliminary information that looked at oyster recruitment and density across different construction materials and what was found was that the limestone had a higher density than bagged shells and prisms.

Overall, will be working to work the data into the ecosystem service models and will be happy to talk to anyone that may want to learn more.

Floor opened for questions and discussion

- Katie Konchar asked if the ecosystem service quantification will be broken down by category or by living shoreline type in any way for those projects that may or may not involve oyster reef breaks.

- Jessica confirmed that the ecosystem services would be broken down but we are still figuring out a way to break down the service by habitat type.

Jessica ended with a brief announcement of a product that the SASJBEP recently completed which is the State of the Watershed Report and you can go online and find the interactive tool and explore the conditions for each of the indicators. Jessica then went through how to read the executive summary and where the information came from for the group.

Facilitated Discussion

Jessica led the group in a facilitated discussion targeting the needs to transfer existing knowledge from multiple projects across the area to help alleviate the costs associated with installing living shorelines. There are so many projects that have gathered site specific information and perhaps we can find common data gaps that have delayed projects and added cost that could be tackled at a greater scale and how to scale these restoration projects up across a broader area.

Jessica started the discussion with questions regarding lessons learned.

Floor opened for questions and discussion

- David Bell with Jacobs started the discussion acknowledging site specific needs and these lessons don't always translate to other locations. The project with Tyndall has a lot of unique characteristics including the coordination with the military base alone that has a lot of additional engagement which is true for any landowner that the project is interacting with. Overall, the stakeholder process to help define project objectives and performance requirements is one of the most important pieces.
- David Bushek echoed the points made and added that having very defined perimeters helps with the permitting side of things and goals of what you are hoping to achieve. Also need to develop relationships with the contacts at the permitting agencies and need to ensure all of the stakeholders are supportive.
- Katie Konchar discussed ideas of trying to build a database of sorts to have design plans to share information regarding the different structures that are out there and a place to highlight information regarding different potential materials as mentioned by Dave Busheck. Additionally, developing monitoring approaches that are transferable from project to project and enhancing monitoring efficiencies where we can so there can be some transferability from project to project.
- Jessica Graham added to the conversation regarding the CSTARS funded grant and the interest the sponsor have had in trying to explore existing data limitations and ways to provide recommended monitoring for future projects.

Jessica moved the conversation to focus a bit more on the scalability for specific project implementation. She asked the group if there was a way to develop a check list of needs that every

project requires in order to even begin the design phase and if unavailable, it will be required to support the engineering firm to gather which gives an idea of timing.

Floor opened for questions and discussion

- David Bell agreed that there is a lot of data available both locally and regionally from multiple sources that we can take advantage of. One of the key aspects that will impact design is the risk tolerance and the nature of the project. If there is low risk tolerance than we need to take more time to get the data right and ensure that we are accounting for everything vs. a project that may have a higher risk tolerance.
- David Bushek added that for scalability is to also think about the supply chain and the limitations that as things scale up there are real challenges to the materials that you are looking to use. For example if you want to use limestone from Kentucky vs. recycled concrete, what is the supply chain for each of those items and timeline regarding securing enough material. A private company with a trademark on something will also be challenging to get enough material mass produced.
- Jessica Graham agreed and provided insight on creation of a Native Plant Network to help with those issues on the shoreline planting side.

Jessica presented the group with another question to discuss around what data is needed by the engineers so that it can be worked into monitoring or other aspects of other projects to fill in those data gaps and how can we go from ground 0 to 25% to at least get a leg up in competitiveness to get funding in the door.

Floor opened for questions and discussion

- David Bell pointed out that the agencies that review the projects should also be consulted because they can ask for very specific information that would be generated by data collection and modeling and need to know that as well when identifying data gaps.
- Katie Konchar also added one last comment that with the information gathered from all of the projects on Tyndall how can we look at these and perhaps plug and play these designs at other places around Tyndall and see how they perform.

Jessica thanked everyone for attending and asked for announcement from partners to be placed in the chat as the scheduled time was up.