

FLORIDA KEYS NATIONAL MARINE SANCTUARY
Water Quality Protection Program Steering Committee Meeting

November 29, 2023

DRAFT MINUTES

Steering Committee Members Present

Wade Lehmann, US Environmental Protection Agency (EPA), Region 4 (Co-Chair)
Kim Shugar, Florida Department of Environmental Protection (DEP) (Chair)
Sarah Fangman, Florida Keys National Marine Sanctuary (FKNMS)
Tylan Dean, National Park Service (NPS)
Christian Eggleston, Florida Keys National Wildlife Refuges Complex (FKNWR)
Gil McRae, Florida Fish and Wildlife Conservation Commission (FWC)
Sue Heim, Key Largo Wastewater Treatment District (KLWTD)
Andrea Leal, Florida Keys Mosquito Control District (FKMCD)
Craig Cates, Monroe County Board of County Commissioners (BOCC)
Kelly Cox, FKNMS Sanctuary Advisory Council (SAC)
Chris Bergh, Florida Keys Program, The Nature Conservancy (TNC)
Sandy Walters, Resource Environmental Solutions (RES)
Shelly Krueger, Florida Sea Grant/IFAS Extension Monroe County
Patience Cohn, Marine Industries Association of South Florida (MASTF)

Summary of Resolutions

- Motion 1 (passed): Sandy Walters made the motion to approve the agenda. Patience Cohn seconded the motion. The motion passed with no objections or changes.
- Motion 2 (passed): Sue Heim made a motion to approve the meeting minutes, including those from the March 9, 2023 meeting, as well as the addendum from the follow-up informational meeting on March 29, 2023. Patience Cohn seconded the motion. The motion passed with no objections.
- Motion 3 (passed): Sandy Walters made a motion to re-adopt the Roadways and Water Quality Resolution with the grammatical edits suggested during the discussion. Chris Bergh seconded the motion. The motion passed with no objections.
- Motion 4 (passed): Sandy Walters made a motion to accept the new WQPP resolution template, and to distribute the amended Roadways and Water Quality Resolution to the directors of the Federal Highway Administration and Florida Department of Transportation (FDOT), as well as the director of DOT Region 6. The amended resolution should also be posted on the WQPP website so it is available for further distribution. Chris Bergh seconded the motion. Following discussion and clarification about the resolution being a recommendation, not a mandate, the motion passed with no objections.

I. Introduction and Opening Remarks

Kim Shugar, Division of Ecosystem Assessment and Restoration (DEAR) Director, DEP, called the meeting to order and welcomed everyone. Wade Lehmann, Ocean and Estuarine Section Chief, EPA Region 4, and Ms. Shugar are the meeting co-chairs.

Steering committee members in attendance were recognized.

Karen Bohnsack, FKNMS, introduced the virtual meeting format and instructions for attendee participation. The presentations and materials associated with the meeting will be available at the steering committee page on the Water Quality Protection Program website http://ocean.floridamarine.org/FKNMS_WQPP/.

Ms. Shugar introduced herself and gave the opening remarks on behalf of DEP. Welcome to the meeting; we have great presentations today. Please ask questions, these are important issues for water quality in the Keys.

Dr. Lehmann gave the opening remarks on behalf of EPA. Thanks for joining this meeting. We hope to see everyone in person at the next meeting in February. This program is critical for identifying and taking on challenges in the Keys. Participation is key, and thanks go to the WQPP Technical Advisory Committee (TAC) and Management Committee who do bulk of the work to keep the program moving. NOAA's Coral Reef Conservation Program (CRCP) has been tracking water temperatures and coral bleaching. This year, temperatures were unusually high; the temperature increase across the globe and in the Caribbean is unprecedented. NOAA had to amend the scale to account for extreme heat in nearshore waters. The story is not over- there is mass bleaching across the Caribbean. This is important to point out because all of us - regardless of sector - will have to deal with rising temperatures and loss of coral. EPA is focused on climate resilience. EPA has also selected and is in the process of notifying grant recipients for this year's funding. \$10M in projects are being funded across South Florida, including \$3M from the Bipartisan Infrastructure Law. These funds support climate and environmental justice. Florida Keys projects received \$2.5M in total funding, which will support several initiatives that align with the WQPP's identified priorities, including canal restoration, coral restoration, water quality monitoring in the halo zone, and sponge restoration research, in addition to ongoing monitoring programs.

Agenda and Minutes

Ms. Shugar reviewed the agenda and minutes and requested edits or a vote to approve from the Steering Committee. Sandy Walters made the motion to approve the agenda; Patience Cohn seconded. The agenda was approved with no changes. Sue Heim made the motion to approve the minutes, including those from the March 9, 2023 meeting, as well as the addendum from the follow-up informational meeting on March 29, 2023. Patience Cohn seconded. The agenda was approved with no changes. The minutes passed with no objections.

II. WQPP Administrative Business

Ms. Shugar welcomed Kelly Cox (primary member) and Marisa Carrozzo (designee) as the new Sanctuary Advisory Council (SAC) representatives to the Steering Committee. Kelly is the Director of Everglades Policy with Audubon Florida, and she holds the South Florida Ecosystem Restoration seat on the SAC. Marisa is the Senior Coastal & Wildlife Program Manager with the National Parks Conservation Association, and she is the alternate to the South Florida Ecosystem Restoration seat on the SAC.

Kelly Cox introduced herself. Kelly is a local from Islamorada and is excited to participate in the WQPP. She has participated in the SAC for some time now, where she represents the South Florida Ecosystem Restoration Seat. She is happy to be the new member, in coordination with Marisa, in this role, and is grateful to the SAC for their support. Thanks to Dr. Patrick Rice for his years of service to WQPP and SAC.

Marisa introduced herself. The National Parks Conservation Association is headquartered in Washington D.C., but her work in Florida is focused on ecosystem connectivity between FKNMS, the National Parks and south Florida more broadly. Marisa has worked on a number of water quality issues, Basin Management Action Plans, habitat protection, Everglades Restoration, and other efforts for a number of years. She is happy to be on the SAC and to work with the WQPP.

III. Florida Keys Roadway Improvements and Coastal Resilience Efforts

Florida Department of Transportation (FDOT) Five-Year Work Program

Michael Lucero, FDOT, provided an overview of the FDOT Five-Year Work Program process. First, FDOT is committed to ensuring that infrastructure serves residents and visitors now and the future. The FDOT Compass showcases the six crucial elements for project development: safety, workforce development, technology, communities (specifically, ensuring projects meet the needs of the people), resiliency, and a robust supply chain. These are interwoven into the program.

Tentative Work Program (TWP) Development Process: The Five-Year Work Program is a tentative list of projects that will be carried out in the next 5 years. For District 6, this includes projects in Miami Dade and Monroe counties. This is a rolling transportation plan. Annually, as projects are completed, new projects are added to the 5th year of the plan (currently 2029). Development of the TWP begins in spring with internal coordination among staff to review and update projects already in the pipeline. FDOT receives a list of priority projects from Miami and Monroe BOCCs, which informs new projects to be added to the plan. Funding allocations are received in the fall, at which point staff begin designing projects and balancing the plan. Projects in the TWP cannot exceed the funding allocation. Once a program has been established, FDOT conducts public outreach on the selected projects. A hearing was held on Oct. 10th - this presented the TWP and asked for public input on the selected projects. The TWP was also presented to the Monroe County BOCC on Oct. 18th, at which point the BOCC endorsed the TWP for FY 25-29.

Total current TWP funding is \$4.1B for District 6. This is slightly less than last year's total of \$4.2B. This money is allocated to various categories, with the largest being the state highway system and other roads construction (interstate and arterial roadways). FDOT also administers state and federal grant programs to provide assistance to local governments with their construction projects. Operations and maintenance is the second biggest category. This is the expenditure to maintain and operate systems. Product support consultants include professional engineers and consultants who do planning. Modal development includes other modes of transportation like aviation, seaports, etc. There are currently issues with labor shortages, the supply chain, inflation, etc., but FDOT makes every effort to keep existing projects funded and to add new projects to the program as feasible.

Funding allocated to Monroe County has tripled since 2020. This is a testament to the effectiveness of county officials and staff who partner with FDOT to address county needs. Bridge repair and replacement has been the largest expense. Replacement of the Seven Mile Bridge is in the pipeline. Construction is slated to start in 2030, so this will appear in the next TWP which will cover 2026-2030. That total allocation to the County will go up significantly at that point.

Mr. Lucero reviewed a number of Monroe County projects in the TWP as examples. These include off system bridges (those off the state highway system). These are administered through a local program to fund bridge replacement. The department will enter into an agreement with the County who designs and administers the construction. There have been quite a few projects funded recently. There has also been a lot of resurfacing in Monroe County over the past few years. A subset of bigger ticket resurfacing projects were shown. In many cases, the project scope includes resilience components. Other types of projects

include Overseas Highway landscaping, aviation capacity for Key West airport, shoreline stabilization in conjunction with USACE, and the Overseas Heritage Trail. Transit demonstration projects are also funded during this cycle. FDOT assists with operating Islamorada's transit service, and provides funds to Key West to enhance its service. The City has contracted with a provider to determine how, where and when they should flex between fixed routes and demand response service.

More information about the TWP projects and public hearings are available online:

<https://www.fdot.gov/topics/fdot-work-program/district-6-wp-public-hearings>.

Questions & Answers/Comments/Discussion:

- Chris Bergh thanked Mr. Lucero for the presentation. He has noticed the coastal protection projects - there are a lot going into the Keys. Unfortunately, he has noticed that these projects often have a wave of invasive plants that come along with them (grasses, etc.). Request/question: Please be careful about sourcing the boulders/rock material used in these projects to ensure it doesn't bring in invasive species. It is also important to make sure there is follow-up and treatment to address those plants before they can take hold and spread into natural areas in the Keys. FDOT has contractors that manage right of way vegetation, but this seems to be falling behind lately. It is important for the right of way and adjacent natural areas that those road areas are maintained.
 - Michael Lucero acknowledged and expressed appreciation for this input on invasive species relative to the stabilization efforts. FDOT has an asset maintenance contractor who is responsible for vegetation management, and he will ensure the maintenance team is properly handling these types of issues and addressing this concern.
- Sue Heim inquired about the resilience part of the resurfacing projects. What do those efforts look like?
 - Sometimes, when they resurface a roadway, the goal is to bring it back to the same condition that it was previously. Monroe County is largely composed of low-lying areas, so resilience projects mostly involve elevating the roadway. FDOT recently completed a project in Upper Matecumbe at Sea Oats Beach (approx. mm74-77), that included roadway elevation - that is considered an element to mitigate coastal washout during storms. When resurfacing in coastal areas in Miami Beach, they are cognizant that the drainage may not be up to par anymore. In those cases, resilience efforts involve replacing drainage pumps.
- Sue Heim inquired about a point of contact the community in the upper Keys and the KLWTD can reach out to discuss issues?
 - FDOT coordinates with the Monroe County BOCC - they prioritize projects for Monroe County. Coordinate with BOCC; if a project is included on their list of priority projects, that is the best mechanism to get them to FDOT.
 - Regarding an inquiry about KLWTD's status as a special district, Michael Lucero and Sue Heim will follow-up offline.

Florida Keys Coastal Storm Risk Management Project

Manny Vianzon, Jr., USACE, provided a high-level overview of the Coastal Storm Risk Management (CSRM) project in Monroe County. Mr. Vianzon is the CSRM project manager at Jacksonville District. This CSRM project was borne out of a feasibility study that occurred between 2018-2021. The result of that feasibility study is a Chief's Report; this was brokered out to the Norfolk District. Once the Chief's Report was complete and signed (September 2023), this project was given back to Jacksonville District.

This project authority is through the Water Resources Development Act (WRDA) of 2022. The CSRM has received an appropriation of \$916k for the pre-construction/engineering/design phase. Notably, this project had a quick transition from authorization to funding; Monroe County is doing something right with Congressional support. The feasibility study focused on issues with structures and critical infrastructure that are vulnerable to coastal storms, damaging wave energy, etc. This includes environmental resources that need to be protected too. The non-federal sponsor is Monroe County; and USACE specifically works with Rhonda Haag, Chief Resilience Officer, Monroe County.

The authorized plan is extensive and includes: dry floodproofing for 53 critical infrastructure buildings, dry floodproofing for 1000+ commercial structures, elevating thousands of residential structures, and shoreline stabilization in six locations along US1, totaling ~5,500 feet of roadway. One shoreline stabilization project (Fiesta Key East) has already been completed via FEMA funds following a recent hurricane. Photos show general locations of these projects along US1.

The recommended plan includes definitions for the types of work that will be performed. For example, dry floodproofing entails floodproofing to a maximum of 3' above the existing first floor elevation to reduce damage from storm surge. Elevation of 4,700 residential structures includes elevation up to 12 feet above ground level to reduce storm surge damage (based on 2084 high projected sea level change). The feasibility study went in depth with sea level rise issues. Shoreline stabilization is the priority that will be done first. There are five remaining rock revetment structures to be completed, which will range in height from five to seven feet. This is in partnership with FDOT, as four of the five locations are in FDOT right of way. This is to protect roads and prevent washout for evacuation and emergency access following storm events.

The cost summary for the authorized plan was presented. In total, this project is projected to cost \$2.7B. These figures were estimated during the feasibility study, and include a 65% federal to 35% non-federal cost share. The cost estimates for the stabilization projects is approximately \$25M, a small portion of the overall project.

The project is currently in the design execution phase. This phase is ~two years. Because the feasibility study was done by Norfolk District, USACE Jacksonville District wants to do an internal review of assumptions made. Mr. Vianzon referenced the invasive species comment on the previous presentation, and noted that USACE also wants to look in depth at the type of rock to be used and work with their environmental folks on other local factors before construction starts. Nonstructural components (housing elevation, flood proofing) are planned for completion by 2035. USACE and Monroe County are working with DOT on the design of the structural components (the five remaining revetments).

Go to <https://www.saj.usace.army.mil/FloridaKeysCSRMFfeasibilityStudy/> for more information about the feasibility study, including maps of the nonstructural housing areas that were recommended for elevation. Nonstructural work will begin as soon as the shoreline stabilization/structural elements are complete. Currently, funding is only available for stabilization efforts; the nonstructural work is still early on. USACE is coordinating with other districts who have started similar housing elevation projects, as well as with FEMA who has initiated early elevation efforts in the Keys, to gather lessons learned.

Questions & Answers/Comments/Discussion:

- Sandy Walters inquired about the design of the shoreline stabilization projects. Do alternatives only include gray infrastructure such as riprap, or are more self-maintaining features like living shorelines and green infrastructure also being considered?
 - Yes, green infrastructure is being considered. The project needs to stay within budget, but green and gray alternatives have already been looked at. This can be incorporated as long as this fits into the budget.

- Chris Bergh asked about how much sea level rise is considered by the 2084 timeline, and noted that a lot of residential structures were put in bad places before we knew about sea level rise and the environmental sensitivity of the Keys. It is important to choose wisely in deciding where nonstructural measures (house elevations) are implemented. Careful consideration here will save us trouble in the future as raised houses would lead to more roads needing to be elevated, etc.
 - The USACE sea level rise assumptions are discussed in detail in the feasibility study report, linked above.
- Rhonda Haag applauded the excellent partnership involved in this effort, and acknowledged that DEP and FDOT have stepped in to pay the local portion of the cost share.

Monroe County Road Elevation Project Update

Rhonda Haag, Monroe County, updated the Steering Committee on the Florida Keys roadway elevation projects. This project is specific to the 311 miles of roads in unincorporated Monroe County. The municipalities are conducting separate efforts. Rhonda showed sea level rise projections: by 2045, ~1 foot is anticipated. Longer term, by 2100 the projection is approximately 5.5 feet of water, which will cover large swaths of islands. The current road elevation program is focused on what needs to be done by 2045, as roads only last for about 25 years.

Future predictions show that water will impact even elevated houses. There is a lot of planning to do - there may be areas that shouldn't be elevated (houses or roads). We continue to get higher flooding in king tides, which goes further and deeper throughout the Keys each year. Looking at the 311 miles of county roads, half will be vulnerable to sea level rise and king tides by 2045, meaning they need to be elevated or they will see flooding. This encompasses about 76% of the population. The focus is to address the most populated areas first, not necessarily the most vulnerable roads. Looking at the plan - 97 neighborhoods will need adaptation by 2045 based on the projected sea level rise and king tides combined. These are areas where we expect at least 6 inches of flooding due to sea level rise, and 6 inches more of flooding due to king tides projected in 2045. These areas are planned to be addressed in a stepwise approach, based on a criticality score. Overall, it is expected that \$1.8B will be required to address these 97 neighborhoods. However, those costs are estimated in 2021 dollars and are likely to be double in today's costs. Additionally, there are operations and maintenance (O&M) costs to run pump stations, etc., which are estimated at \$3M annually. This may be funded by assessments in those neighborhoods.

The overall plan includes a range of projects. The highest grade elevation is 3.17 feet, with an average road elevation of 6 inches. Smaller elevations may be combined with heavy pumping. The longest project length is 7 miles, the shortest is 0.03 miles. The highest construction cost estimate is \$100M. Visit <https://www.keysroadsplan.com/> to see the conceptual design for all projects, maps, etc.

Moving forward, there are two pilot projects that have been designed and permitted. This includes Twin Lakes in Key Largo and Sands Subdivision in Big Pine Key. Funding has been obtained for these projects, but bids are much higher than the original cost estimates, so there is a need to make up the difference. The County hopes the Key Largo project bids will come in closer to estimated amounts, but it has been harder to get bids in the Lower Keys.

New project awards include Stillwright Point (estimated \$40M road elevation); only the design is funded thus far from the State of Florida. The Issue with this project is that the residents in that neighborhood do not want to wait for that project to be completed; they are looking for cheaper and faster alternatives. Monroe County will host a workshop on December 12th to bring the community in and present alternatives to the current \$40M plan. Conch Key is another new project which was awarded \$3.2M in funding through Resilient Florida. This was only 50% funded through that grant, and the County is

responsible for the other half. Unfortunately, costs have now doubled, so only about 25% of the project is funded. Winston Waterways in Key Largo is in a similar situation. The cost estimate has increased to \$51M, and only \$14M is funded. There is a need to find funding for the differential. Big Coppit also has some funding and the County is seeking supplemental funding now. Ms. Haag noted that Monroe County would need to become a charter county to allow a penny sales tax to be implemented. It is estimated that this would raise ~\$50M per year, and \$30M would go to the county for resilience funds. Meanwhile, other funds, such as the hazard mitigation grant program, are being investigated. The county will try to link these sources to meet the state and federal match requirements for these various projects.

Questions & Answers/Comments/Discussion:

- Sue Heim asked about the timeline for the Winston Waterways and Stillwright Point projects to be completed, most importantly Stillwright Point. This question was asked with a consideration for how much more water will be on those roads by the time the elevation projects are done, as the flooding in these areas affects the wastewater treatment plant.
 - Stillwright Point: The design is underway for another year. They have applied for construction funding, and are waiting for those awards to be announced. Still that award would only cover half the cost. Additional funding is needed to make up the difference. Once that is found, and bid out, the projection is ~2 years.
 - The other factor with this neighborhood is that the residents don't want to wait. They may opt for something else that is faster, such as applying several inches of paving. At this point, it's unclear what that would mean for the rest of the project, as it is currently being planned. If the residents opt for a cheaper and faster fix now, it is unknown if that's all this neighborhood will get, or if they will get two projects.
- Wade Lehmann asked about plans to include green or renewable infrastructure with these elevation projects?
 - Yes, anywhere they can, this will be included. They will especially try to use natural features on the "nature" sides of projects. FDOT has been great about including natural infrastructure along the US1 projects.
- Chris Bergh asked for more information about the pumps associated with some elevation projects. This is the WQPP. Where is that water being pumped? What is the depth if injection wells are being used?
 - In the Keys there is no room for stormwater retention ponds so shallow injection wells are in the plans for stormwater. These are 120' deep. Swales will be included to help with pretreatment if there is room.

IV. WQPP Roadways and Water Quality Resolution Follow-Up

Ms. Shugar reminded the WQPP Steering Committee about the resolution passed during the March 2023 meeting, and invited additional discussion on distribution of that, and future, WQPP resolutions. As part of this discussion, Karen Bohnsack introduced a potential template for use with this and future resolutions. This was modeled after the SAC letterhead that is used to document resolutions passed by that group. This provides context about the WQPP and also disclaimer language. In this format, all members can access and transmit resolutions directed to outside agencies/organizations as appropriate. Depending on context, for any given resolution a specific member/seat may be identified to specifically forward that to the intended recipients.

Questions & Answers/Comments/Discussion:

- Sandy Walters identified that there is still a need to address who this resolution will be sent to. She expressed support for the new proposed format as this answers questions that might come up. Ms Walters recommended that this be submitted with a cover letter to the secretary of FDOT with

a copy to District 6. This document should also be available for any member of the Steering Committee to distribute to whomever could also benefit from it.

- Karen agreed that in this format, and once posted online, anyone could possibly pull this to distribute elsewhere. It is part of the record at that point.
- Sarah Fangman noted that the FKNMS SAC has used a version of this template to great success, and expressed support for this format with the added context and disclaimer language. Once agreed upon, this is an official document of this body, so it seems that it could be shared by members to others as they feel it is relevant or as they are interested.
- Patience Cohn requested this be announced on social media once this is approved and posted on the website.
 - Karen Bohnsack and Sarah Fangman agreed this could be announced on FKNMS' social media platforms.
- Sue Heim requested grammatical edits to the resolution language that was passed on March 9, 2023. The edits were incorporated into the draft in track changes for all participants to review.
- Chris Bergh expressed support for the template and for sharing this and any other water quality relevant action passed by this body or the SAC. This should be shared on social media; FKNMS gets criticized for not doing enough for water quality and this could help with that perception.
- Gil McRae noted he was not present at the meeting where this was originally discussed and asked for clarification as to whether this language refers only to new roadways. This action is clearly consistent with the WQPP mission. How has the Steering Committee made these types of recommendations in the past?
 - Sandy Walters clarified that is not intended to apply to just new projects; in fact it's the opposite. This is attempting to address roadway projects that just involve resurfacing (which are currently exempt from including water quality improvements). The goal is to enable water quality improvements to be included on any project, not just new projects.
 - Karen Bohnsack asked for input from others on the WQPP about how more formalized recommendations have been made in the past, noting that certainly the WQPP has made recommendations to great effect. Lacking a specific known template/mechanism for formalizing these in recent years, the current proposed template has been drafted for use going forward.
 - Chris Bergh added that the WQPP has made other resolutions in the past; We should take this type of action intentionally because it's in our purview. We need to choose battles, and this was a good battle.
- Sue Heim asked for confirmation that the Director of the Federal Highway Administration is also included in the list of recipients.
 - Karen Bohnsack confirmed that, per the notes when the resolution was passed in March and the discussion today, the list of recipients include: The directors of the Federal Highway Administration and Florida Department of Transportation, as well as the director of DOT Region 6. As discussed, members of the Committee are welcome to distribute this more widely.
- Craig Cates acknowledged the importance of this effort and his personal support for its intention. However, as a representative of the BOCC, he expressed concern that this will become a problem in the future - e.g., projects with less treatment during the forthcoming road elevation efforts will be affected or not able to move forward. The cost of elevating roads is already out of the reach of the county; without outside help/state grants to cover increased costs the roads will be flooded. Concern about this being a blanket recommendation or requirement for all roads; how do we address roads that don't apply? Concern this creates a policy that will affect overall elevation efforts.
 - Sandy clarified that this is not a mandate. Instead, it urges that funding be made available to include stormwater treatment for roadway projects. The resolution does not say that every roadway must be funded to include this. Right now, a road being resurfaced cannot

acquire funding for adding stormwater treatment; this urges that the option be made available.

- Wade Lehmann reiterated that this is a recommendation. Any large infrastructure project has a cost basis and this recommendation fits in at the early assessment stage. Instead of water quality being cost prohibitive, this could be accounted for earlier in the planning process. The aim is to add water quality to the table to at least be considered as part of future roadway improvements.

Motion (passed)

Sandy Walters made a motion to re-adopt the Roadways and Water Quality Resolution with the grammatical edits suggested during the discussion. Chris Bergh seconded the motion. Co-Chair Shugar called the question. The motion passed with no objections.

Motion (passed)

Sandy Walters made a motion to accept the new WQPP resolution template, and to distribute the amended Roadways and Water Quality Resolution to the directors of the Federal Highway Administration and Florida Department of Transportation, as well as the director of DOT Region 6. The amended resolution should also be posted on the WQPP website so it is available for further distribution. Chris Bergh seconded the motion. Craig Cates expressed concern about this hampering future roadway efforts, and asked for clarification about the intent of this resolution. Following confirmation from the Steering Committee that this is a recommendation, not a mandate, Co-Chair Shugar called the question. The motion passed with no objections.

V. Coastal Projects Submerged Habitat Database

Sandy Walters introduced the topic of a comprehensive statewide database for managing submerged habitat information associated with beach and shoreline projects. Having participated in the WQPP for many years, she has seen the value of the long term database on habitats and water quality in the Keys. Other places in Florida do not have as comprehensive of a database, and the Florida Keys can be an example of what we ought to be doing.

Ms. Walters reviewed an example project: The Key Biscayne Submerged Aquatic Vegetation (SAV) Study, which RES completed for USACE as part of the Miami-Dade County CSRM Feasibility Study. This study included 145 acres of area and an evaluation for a then-listed species of seagrass. The study included two phases: a preliminary visual reconnaissance to inform a survey design, then a detailed SAV survey. This study involved 43 inshore to offshore transects at 50m intervals, and two dive teams collecting extensive qualitative and quantitative data. Data was collected every 5 meters with 1 m² quadrats. The resultant data set includes documentation and maps that show seagrass distribution along the shoreline, including percent cover by different species; total seagrass density (Braun Blanquet scores), health, etc.

The objective of this presentation is to explain that there are a number of beaches in Florida that are subject to this type of study. Every time a beach restoration project occurs, this excellent detailed data is being collected following standardized methodologies, as required by both the state and federal agencies. However, this data is not archived anywhere. Florida could benefit from a regularly maintained archive of this type of data, to include all of these studies that occur in conjunction with coastal projects. These are public projects and thus have similar studies that generate this large volume of data. With a centralized archive, this data could then be available to support comparisons through time and between areas to study benthic conditions and trends. This could greatly further our understanding of Florida's shoreline seagrass resources and habitats.

We have a 20+ year database in the Keys, which seems like an ideal template for a statewide system. Ms. Walters requested input from the Steering Committee on how this could be moved forward. Can the WQPP, as a leader in this area, suggest a way for the state to implement this type of program?

Questions & Answers/Comments/Discussion:

- Chris Bergh expressed his support for this idea, and inquired if Gil McRae was on the line to discuss more of the FWC efforts, such as the [Coastal Habitat Integrated Mapping Program](#) (CHIMP). The state also maintains seagrass and marsh data. Perhaps this could be folded into those existing efforts..
- Gil McRae noted his appreciation that this has been brought forward. FWC has a number of efforts related to this statewide network. CHIMP focuses on mangroves. They also have the [Seagrass Integrated Monitoring and Mapping](#) (SIMM) Program, and a similar oyster-focused program. They generally only capture monitoring projects done outside of the regulatory process. Data collected as part of beach renourishment and other coastal projects is held by a private company, so it can be difficult to get that information. However, FWC does have mechanisms to collect, archive and integrate these data into systems already maintained by FWC. Gil offered to share appropriate contacts and engage in follow-up conversations about how to get data into these types of systems.
- Sandy Walters acknowledged that she would be happy to coordinate with Gil on potential contacts and follow-up conversations. She also suggested that the State Resilience Officer might have an interest in this. While these are involved with regulatory processes, the data and reports should be available to the public. She will also discuss this with USACE. It may be relatively straightforward to develop a relationship with USACE to provide this data. They ask for everything - GIS files, GPS coordinates, etc. - in conjunction with these coastal project studies.
- Sue Heim referenced the draft WQPP Report to Congress and inquired whether there is something in here that could be included in that report?
 - Sandy Walters supported this suggestion. Efforts by local, state, and federal partners to address environmental issues in the Florida Keys is a terrific template. Point out that we can lead by example in terms of deep databases for study. This is a positive example of what has come out of the money spent and what we have done well in the Keys.
 - Sue Heim reiterated the suggestion that the Congressional Report should provide more information on the databases used in the Keys for collecting information.
- Kim Shugar added that DEP and the Chief Resilience Officer are supportive of making data and reports available to managers and the public. Protocols are different, so it's not as easy as you may think to get information into a centralized database, but it is important to make information available.
- Chris Bergh suggested that if any data collectors are reluctant to share their data; it could be a permit condition. If so, then the methods could also be specified to allow information to be seamlessly incorporated into a standard database.

Break

VI. Use of Shallow Injection Wells for Wastewater Disposal

Impact of Shallow Wastewater Injection in the Florida Keys

Lee Kump and Miquela Ingalls, Penn State University, provided an overview of their latest findings from an EPA-funded special study to investigate the impact of shallow injection wells on surface waters of the Florida Keys National Marine Sanctuary. EPA and students were acknowledged for their support of this project.

Dr. Ingalls presented first. Early into this study, the Supreme Court passed the *County of Maui v. Hawaii Wildlife Fund* decision, which determined that a Clean Water Act permit would be required if a pollutant discharged from a point source that travels through groundwater to surface waters of the United States is the “functional equivalent” of a direct discharge from a point source to a surface water of the United States. This motivated the original research question, specifically: Is shallow injection the functional equivalent of direct discharge into surface waters?

The study site for this project is the City of Marathon Area 3 Wastewater Treatment Facility, where treated wastewater effluent is injected to a depth of 18-27 meters (~60-90 feet) below the surface. A map was presented with the injection well location; along with monitoring well clusters established as part of this project. The monitoring well clusters were drilled to depths of 3, 6, 15 and 27 meters (10, 20, 50 and 90 feet) below the surface at nine locations radiating away from the treatment facility.

Remediation of wastewater-derived nutrients in the subsurface relies on chemical, abiotic reactions between phosphate and the carbonate karst bedrock, as well as microbial denitrification. The focus of this presentation is on the phosphate findings. Dr. Ingalls referenced slide #4 and highlighted that the right hand image illustrates dissolved phosphate’s affinity to adsorb onto calcium carbonate mineral surfaces. However, this phosphate can desorb when it interacts with high salinity water due to ion interactions. Whether these phosphate-mineral interactions sufficiently remove phosphate from groundwater before that water reaches surface waters of FKNMS is central to informing the underlying question of whether shallow injection is the functional equivalent of direct discharge into surface waters.

The objectives of this project are to: a) characterize wastewater plume geometry, composition and migration at a single disposal facility in the Florida Keys; b) to quantify the impact of shallow well effluent injections on the nitrogen and phosphorus contents of groundwater and nearshore water in the halo zone; and c) to evaluate the generalizability of these findings to sites with different geology, effluent chemistry and volume, and plume migration, with the goal of informing FDEP regulatory decisions. To achieve the first two objectives, the project team performed analyses of nutrients, dissolved ions, and pharmaceuticals; conducted resistivity surveys (previously reported to the WQPP in November 2021, this demonstrated that the treated wastewater plumes mostly gather under the surface and above the saline groundwater); and a dye tracer study to evaluate the timing of the effluent plume’s migration. These data collection efforts are ongoing and inform groundwater transport modeling.

Dr. Ingalls presented a series of figures and explained that similar figures will be presented throughout the presentation. The figure on the left is a north-south cross section depicting the distribution of well data in the subsurface; the figure on the right is an east-west cross-section. The circles on the figures depict the monitoring well clusters (again, drilled to depths of 3, 6, 15, and 27 m), and MW0 is the location of the injection well at the wastewater treatment facility.

The first set of figures (slide 7) show the spatial distribution of salinity, as measured in the January 2023 sampling event. The gray bar at MW-0 shows the injection depth (18-27 m) at the treatment facility. The white space is where not enough data were available to accurately contour salinity values. The figure shows that the groundwater surrounding the plume at depth is the highest salinity, which is essentially the same salinity as seawater. The lowest salinities are at the site of the injection, where the plume quickly buoys to the surface because of the density contrast, and in the upper few meters that are likely influenced by a rainwater lens.

Similar figures were shown characterizing the plume geometry using soluble reactive phosphorus (SRP), a wastewater-derived nutrient. The average SRP of the treated effluent prior to injection was measured at 75 to 100 uM over a two year study period. None of the subsurface samples after injection have SRP concentrations comparable to the treated effluent, but this analysis shows a preferred travel path between

the 6 and 15 m well depths. Sample SRP values were not expected to be the same as that of the effluent, because as soon as the effluent is injected into the subsurface it mixes with the saline groundwater.

Dr. Ingalls presented a figure of salinity vs. SRP, with effluent wastewater and saline groundwater as the two end points. All the measured well waters fall below the mixing line, which indicates that another process removes phosphate beyond dilution. In Ingalls' opinion, for injection to be a functional equivalent of direct discharge, one would expect nutrient concentrations to follow the line of conservative mixing due only to dilution by saline groundwater. (Subsequent to their presentation, Kump and Ingalls learned of the draft guidance issued by EPA on November 20, 2023. That document discusses the types of information needed to determine whether discharges through groundwater and direct discharge are functional equivalents. Their comments on whether wastewater is the functional equivalent of direct discharge should not be interpreted to conform with that draft guidance.) One hypothesis is that phosphate is adsorbing to carbonate lattice sites. A shallow rainwater lens though creates a three-way mixing effect on the sample waters, so conservative mixing itself can create deviations from the original mixing line. These three end members include: (a) rainwater (low salinity, low SRP); (b) saline groundwater (high salinity, low SRP); and (c) wastewater (low salinity, high SRP). The relative contribution of each member to each sample was calculated using salinity to trace seawater and sucralose to trace wastewater.

A set of cross plots depicting sucralose (left figure) and SRP (right figure) vs. salinity were presented (slide 12). Sucralose is a conservative tracer of wastewater because it is an anthropogenic compound; thus, the only way that sucralose should fall below the conservative mixing line is by dilution by a third end member. The project team used a mixing model to calculate the fraction of groundwater, rainwater, and wastewater in each sample. On slide 13, green circles (the shallowest samples at 3 m depth) are shown to be more influenced by rainwater than wastewater. Deeper waters (15 and 27 m depth) are primarily composed of groundwater. The yellow circles (6 m depth) have the largest fraction of wastewater.

A final set of north-south and east-west cross section figures were presented (slide 14), which use the results of the mixing model to depict the fraction of wastewater present in the samples. Yellow-green colors show the highest concentration of wastewater, while dark blue-purple have less wastewater. Large data points, like at 6 m depth at MW-0, have the most SRP. If shallow injection is the functional equivalent of direct discharge, one would expect SRP levels to correlate with the fraction of wastewater. This appears to be true immediately after injection at MW0, and in the low concentration of SRP in the rainwater lens at 3m. However, at 6m depth, along the path of plume transport with the highest fraction of wastewater, SRP is low. This departure of measured SRP values from what would be predicted based on conservative mixing is attributed to adsorption. The magnitude by which the measured SRP values deviate from the expected SRP based on the fraction of wastewater and conservative mixing was presented in slide 15, where a negative Δ SRP is interpreted to be due to adsorption. All well samples fell either on the line of expected SRP, or in the realm of adsorption, particularly in the 6m well depths.

Dr. Lee Kump provided the second half of the presentation, and explained that a dye tracer study was also conducted to get a sense of time and to understand rates of uptake. A few hundred gallons of dye were blended with wastewater at the point of injection. Two dye injections were conducted in May/June 2022 and, with the help of the high school student volunteers, the spread of the wastewater and dye was traced by sampling the wells across the well field. On slides 16 and 17, MW0 is the monitoring well cluster closest to the point of injection; ME1 is the closest well cluster to the east; and MN1 is the closest well cluster to the north of the point of injection.

The MW0 graph shows the highest concentration and most rapid arrival times of the dye. Wastewater rises vertically at the point of injection and mixes with the rain/freshwater lens at the surface. The highest concentrations of dye were measured close to the point of injection and at the 6m (20ft) depth. Dye shows

up within hours to a day; then goes away quickly as non-dyed water follows and dilutes it, at which point the patch of dye moves out with the background flow in the groundwater. The fast arrival of the dye to ME1 (located ~700 m east of the injection) was surprising. The highest concentration and fastest arrival of dye occurred at 15m depth, with later arrival at the 6m intermediate depth. Generally, the highest concentration appeared in the 6m wells; this is the main depth where the wastewater plume expresses itself in the subsurface. High peak arrivals were observed at 6m depth; at 3m depth water was diluted by the freshwater lens above it. Wastewater arrives more slowly to the surface at ME1 than at depth.

This dye tracer study confirms dominant flow paths are to the north and east, as evidenced by the earliest arrival times to the wells to the north and the east. From past tracer studies, there was a sense of transport being predominantly to the south, which was explained due to tidal pumping. Specifically, Florida Bay is hydrodynamically higher than mean sea level in the Atlantic, which drives cross island flow in a southerly direction. In Marathon, this study has found the flow to be counter to that. This may be due to the smaller tidal offset between Florida Bay and the Atlantic because of the open passes at Long Key and the Seven Mile Bridge (which provides a smaller driving set up for tidal pumping). Also, because of the wastewater injection influence, much of the groundwater flow is driven by injection itself and is less influenced by tidal effects. Still, the dye was observed to arrive to the south and west over time. Rising concentrations were observed at the north end of the island (shoreline of Florida Bay) at the MN2 well cluster at 3m and 6m.

Surface waters were also sampled adjacent to Area 3 for anthropogenic sucralose, although this was not done as comprehensively as has been done in the past for nutrient concentrations. Single grab samples were obtained to look at sucralose distribution and to see if there is an indication of elevated phosphate concentrations. Sampling occurred in Florida Bay adjacent to the MN2 well cluster; in the canals near the ME2 well, and in Boot Key Harbor. In all locations, significant concentrations of sucralose were observed. Phosphate concentrations were also elevated above what would be considered a background concentration, and above target concentrations established in the Florida Keys Reasonable Assurance Document. The total phosphorus (TP) target for nearshore waters is 0.42 $\mu\text{mol}/\text{kg}$, however concentrations were seen to be two to three times higher than that target. This is not directly attributable to the influence of shallow injection wells, but concentrations measured in effluent wastewater also exceed the TP targets. There is evidence of phosphate discharge into nearshore surface waters.

Preliminary model results showing the mass concentration of salinity, sucralose, and phosphate at the 3m depth mark include both a top-down view, and a north to south cross section of the monitoring well field. These models show the injection rising to the surface, then spreading laterally. The sucralose distribution is different because it traces wastewater itself. Phosphate has a more restricted lateral distribution because of the adsorption process.

In conclusion, this project has determined the following.

- Wastewater injection at Area 3 in Marathon creates a wastewater plume that rises to the surface and spreads laterally, mixing with a small, natural freshwater lens.
- Phosphate is diluted through mixing with the freshwater lens and the saline groundwater, and partially removed from the wastewater plume through interaction with the limestone substrate.
- Sucralose that appears at the terminus of the subsurface wastewater flow paths in Florida Bay, Boot Key Harbor, and adjacent canals is likely of wastewater origin, indicating that wastewater is impacting surface waters.

While these data do not show the functional equivalent of direct discharge (N.B. see note above about the new EPA analysis and draft guidance around functional equivalency), shallow wastewater injection at Area 3 is releasing nutrients and other contaminants to surface waters of the halo zone of the Florida Keys.

Questions & Answers/Comments/Discussion:

- Chris Bergh noted that these results were as expected, and having the science to show the facts is key. In thinking about shallow injection wells in general, do you have a sense of what would happen if you injected seawater into these wells with whatever pollutants it contained? Earlier in this meeting we had discussions about injecting seawater from roads and canals into shallow injection wells. Because it wouldn't have a different density, where would it go?
 - This project originally intended to incorporate blending experiments with this question in mind. This may still be done. There are other ways to combine data and show that phosphate adsorption is time dependent, meaning a longer time spent subsurface results in better adsorption. Adsorption is also salinity dependent, so there may be a counterintuitive effect whereby you increase time subsurface but decrease effectiveness of adsorption because of competing ion effects with saltwater. If you pump saltwater to the subsurface, that flow set up can bring wastewater to the surface. We should be careful about the rate of saltwater injection and how that impacts the flow. This may have unanticipated consequences. The project team has discussed a limited duration experiment to evaluate this with the City of Marathon. This would include a limited amount of time, but enough time to allow detection of impacts before the entire plume would be affected.
 - Chris indicated his support for continuing this examination; we have a network of wells and baseline data, we should use it.
- Wade Lehmann highlighted that most interactions are chemical, not biological. Are we pushing the limestone to a saturation point with phosphate? Is there limited adsorption capacity or is there some degradation over time that allows continuous adsorption?
 - Biological processes are a major part of nitrate reduction in the subsurface. Phosphate reduction is more of a physical/chemical process. Looking at the chemical interaction of minerals in the subsurface, lab studies have shown that flowing high phosphate concentration through carbonate does approach some maximum adsorption. At that point, phosphate will not go down because the lattice points in the limestone have all been filled. So, there is some limit to this process. Phosphate concentration in wells varies between sampling seasons. This is a dynamic system, with tidal pumping and variations in the salinity of wells likely reflecting variations in wastewater injection rate and thus the size of the wastewater plume. We do have some evidence that a transient increase in salinity at the edge of the wastewater plume, possibly due to a reduction in injection rate, can lead to temporary desorption.
 - Overall, the wells show a substantial reduction in phosphate concentrations in the area even after years of high-volume injection into that substrate. There is a theoretical limit to the amount of uptake, but wells are not exhibiting that saturation behavior. Still, there is measurable elevated phosphate at the most distant wells, so the uptake process still only has a limited ability to remove phosphate completely within the migrating plume. That could also be a function of time; those travel paths are fairly fast. There is concern about this limit.
 - Referring back to Bergh's mention of mixing denser seawater into the wastewater stream to reduce the buoyancy of the wastewater, Kump indicated they have an interest in conducting that experiment but expect that it may also release phosphate through desorption. Nevertheless, it should increase the time spent in the subsurface and, thus, the overall ability to further reduce phosphate loadings. In previous experiments conducted in the late 1990s and with some preliminary observations from experiments conducted at Penn State in association with this study, we've seen evidence for the potential for formation of phosphate minerals (apatite group minerals) which are relatively insoluble even in the presence of saline groundwater. If this process is occurring and if it could be

enhanced, there would be a more permanent sink associated with precipitation of those minerals, but the crystallization process takes time and is not yet well understood.

- Kim Shugar inquired if there is a report or published document that can be distributed.
 - The slides shared today can be distributed. A manuscript is in process, which will be submitted for review in the next month or so. Phosphate results from this data are included in that; for the rest of the project they are working to get the nitrogen story and modeling done.
- In response to a question, Lee Kump summarized that sucralose is the best indicator of the presence of wastewater, as it is conservative and has slow degradation in this environment (although it does degrade some; need to be aware of this). With nitrogen, we have ammonium, nitrate, and nitrite data that show non-conservative behavior - meaning the data show a significant reduction in nitrogen. Wastewater is injected into this reducing environment and denitrifying bacteria are efficiently converting the nitrogen.

City of Marathon Wastewater Update

George Garrett, City of Marathon, was unable to participate in the meeting. This presentation on the City of Marathon's investigation into alternative methods for wastewater disposal has been deferred to a future WQPP meeting.

VII. WQPP Congressional Report Update

Katie Bozza, DEP, provided an update on the status of the WQPP Congressional Report and invited input from the Steering Committee. Discussion included missing content, recent updates from several programs, and the value of including certain types of information. The following points were addressed:

- Village of Islamorada's Phase 1 Stormwater project was completed in 2020 (per Pete Frezza, Village of Islamorada).
- The City of Marathon's Stormwater updates are still needed.
- Summary information for canal restoration is needed, including the year canals were assessed and the total number restored as of 2023. Rhonda Hagg will provide this information for the County; the municipalities will need to provide their canal restoration numbers separately. Pete Frezza will check for the Village of Islamorada.
- For the wastewater treatment standards section, Sue Heim recommended that standards need to be separated out by agency. She will provide this information for the KLWTD.
- For the Part 1 section summarizing the long-term monitoring programs, the committee discussed whether a brief summary of trends should be included (noting that a more thorough overview of those programs will be presented in Part 2).
 - Wade Lehmann recommended that instead of discussing a trend, we should highlight big ticket items that have come out of those programs. For example, the halo zone issue that was uncovered by these programs. Specifics can remain in Part 2.
 - Sue Heim requested an emphasis on the long-term database and the value of the long-term dataset (per the conversation earlier during Sandy Walters' presentation):
 - Wade Lehman noted that water quality data is incorporated into the larger statewide database, this could be a recommendation for the coral and seagrass data.
 - Chris Bergh suggested that the people who manage the long-term monitoring programs should identify the big-ticket outputs from them. A few summary sentences can be included in Part 1; don't just say what the trends are, but what they mean. This should help explain why this investment has been made and what it's worth.
 - Specific ideas for inclusion include: Stony Coral Tissue Loss Disease discovery and movement through the coral reef system (coral); halo zone (water quality), Florida Bay

issues (possibly under seagrass?). These can be covered in greater depth later in the report.

- Regarding the total number of special studies that have been completed, a question arose about the date that would be used as a point of reference - e.g., How many special studies since when? Steve Blackburn, EPA, noted that this may be a moving target and not so straightforward. The South Florida Geographic Initiative (SFGI) funding covers a larger area than the Keys, so that level of specificity may be difficult to obtain
 - Chris Bergh added that having a number is fine, but it is most important to highlight big findings. A number was included in the 2013 report, so if we can obtain a number since then, that would be logical.
- The Committee discussed the newly added content within the special studies section on marine debris efforts and its relevance to the WQPP.
 - Chris Bergh noted that the WQPP hasn't focused on this, largely because others are so there hasn't been as much need. This is still germane to water quality, so it should be added as long as the content can be finalized relatively quickly (it's not worth further delaying the report for this). There is a lot of focus on derelict vessels and criticism toward the sanctuary about this, so this is a good place to capture this information and make it available to others.
 - Sarah Fangman is able to provide data on Goal: Clean Seas relatively quickly, if needed. Steve verified that Goal Clean Seas has been funded as a special study, so the WQPP has supported this effort and it should be included.
 - Sue Heim requested that the section on Irma funding be renamed; the document was updated to say "Post-Hurricane Marine Debris Cleanup."
- There was support to include pumpout efforts in the report. KLWTD has its own pumpout policy, which could be mentioned. This section should also reference the no-discharge zone.

The Committee was asked to please review this document and help curate missing information - specifically focusing on the highlighted section. Any additions can be emailed to karen.bohnsack@noaa.gov. The Committee was also asked to review the section entitled "Future Needs and Priorities" to ensure this captures the collective priorities of the WQPP.

VIII. Public Comment

Maurizio Martinelli, FL Sea Grant

This is a quick update to share information on new state initiatives. A few months ago, the Stony Coral Tissue Loss Disease (SCTLD) response was merged with the Florida Reef Resilience Program (FRRP). The idea is to take the benefits from the response structure, such as rapid action, movement of personnel and funding, etc. and merge that with the resilience focus of FRRP. This is now called Florida's Coral Reef Resilience Program (FCRRP), which will tackle coral conservation issues at the state level. FCRRP is currently working to develop research priorities for four focal areas: Disturbance Response, Ecosystem Restoration, Climate Adaptation, and Water Quality. Annual research priorities will be produced for each topic area, as was done for the SCTLD response in the past. The idea is to integrate these priorities into funding decision making, to assist PIs in project development, etc. The group does not want to reinvent the wheel, so an effort has been made to take priorities that already exist and integrate them into this program however makes sense. We looked at the WQPP priorities and have adapted them into the FCRRP water quality priorities. These will be sent out in the next few weeks. For more information - contact Maurizio at mmartinelli1@ufl.edu.

Rhonda Roff, Sierra Club Committee Member

I'm curious whether the FDOT representative is still around. Will DOT use phosphogypsum in the Keys' road projects? Does the WQPP have concerns about leachate from this if it will be used?

Trisston Brown, USACE

I want to call the committee's attention to the 2022 Water Resources Redevelopment Act (WRDA), which authorizes another \$100M for the Florida Keys Water Quality Improvement Program (WQIP). This may be an ask for a future agenda item. Has there been discussion on how this allotment will be partitioned among the different municipalities? USACE is tracking this item internally, and we want to see if it's on the WQPP's radar.

- Chris Bergh asked for clarification. The original WQIP authorized \$100M for the Keys wastewater program. As of the last update to the WQPP, we had spent a substantial amount of that. Is this a new \$100M added to the authorization?
- Trisston Brown confirmed that yes, WRDA 2022 has a line item for another \$100M.
- Members of the committee acknowledged that this is excellent news for Keys water quality.
- Rhonda Haag referenced Mr. Brown's inquiry about how the allotment will be partitioned, and explained that this is a conversation that is happening amongst County and municipal staff.

Additional comments for the Steering Committee's attention were submitted in writing following the meeting and are attached below:

- Dottie Moses, Keys Last Stand (Attachment 1)
- Caron Balkany, Counsel for Friends of the Lower Keys (FOLKs) (Attachment 2)
- Donald Maynard, Resident of Big Pine Key, FL (Attachment 3)

IX. Steering Committee Member Updates

Allison Higgins, City of Key West

For the new budget year that started on October 1, 2023, the City of Key West budget includes:

- \$60K to continue monitoring partnership with CFK for cruise ships; sucralose and oxybenzone will also be added.
- \$100K for Coral Reef Restoration that will be competitively bid this year.
- \$1,500 for water quality educational materials, most likely beach water quality signage, with links back to FDOH data.
- \$1,200 for new Monofilament Stations

The draft Key West Water Quality Improvement Plan was presented to the Key West Commission, they loved it all and asked how they could help, especially on policy-based items. The next step is to turn the goals into actual actions and steps to reach those goals. The sub-team composed of Karen Bohnsack, Nick Parr, Shelly Krueger, Brittany Burtner, Emily Hall and Mil McCleary will have their first meeting next Friday.

Sue Heim, KLWTD

At the KLWTD Board Meeting yesterday, it was announced that the FKAA is not interested in entering into any reuse programs right now or for the foreseeable future. This impacts KLWTD because they have been looking for reuse grants. Those efforts will now be put on hold since FKAA does not intend to engage in any reuse activity.

Kelly Cox, SAC

At their last meeting, the Sanctuary Advisory Council passed a resolution urging the Biscayne Bay and Southeastern Everglades Ecosystem Restoration (BBSEER) Project Delivery Team (PDT) to maximize the delivery of ecological benefits for marine sanctuary waters in upcoming project modeling and the tentatively selected plan. That resolution is available and can be circulated. This is an important project for FKNMS (in particular Card Sound, Barnes Sound, and Manatee Bay) and the National Parks. We've long awaited this project to deliver more water south.

Chris Bergh, TNC

Follow-ups on the public comments/questions:

- Thank you, Maurizio Martinelli for the information on FCRRP. Water quality is a priority. There are water quality priorities within the WQPP, there are those of the Southeast Florida Coral Reef Initiative (SEFCRI) and the new node of the SFERTF, Florida's Coral Reef Coordination Team (FCRCT), is also working on water quality. No specific recommendation, but please collaborate and get on the same page. We benefit from communication and cohesive collaboration.
- Would like to learn more about phosphogypsum and if that's on roadways in the Keys. Thanks to Rhonda Roff for bringing this to our attention.
- To USACE, thanks for the great news that another \$100M has been authorized for water quality in the Keys. We need to tell the public what's going on with water quality. While details about how this will be used are not available yet, just that this opportunity exists is big news.
- Alison - That is good news from the City of Key West. The monitoring effort is important; we need to know what the large vessels are doing to the waters around Key West.

Meeting Wrap-Up and Adjourn

Kim Shugar thanked everyone for participating in the meeting and reviewed accomplishments and next steps. Wednesday, February 21st was suggested as the date for the next Steering Committee Meeting; this would take place in-person, in Marathon. When asked about potential conflicts, it was noted that the County Commission is meeting in Key West that same day. There is also a sea level rise adaptation workshop for terrestrial protected species that may affect participation. More information about the next Steering Committee meeting will be shared in the coming weeks as the details are worked out.



Karen Bohnsack - NOAA Affiliate <karen.bohnsack@noaa.gov>

Re: Thank you for attending FKNMS Water Quality Protection Program Steering Committee Meeting

Dottie Moses <dpmoses@bellsouth.net>

Thu, Nov 30, 2023 at 7:14 PM

Reply-To: Dottie Moses <dpmoses@bellsouth.net>

To: "karen.bohnsack@noaa.gov" <karen.bohnsack@noaa.gov>

It was a very informative meeting and I am glad I listened in.

I agree with the speaker who was concerned about phosphogypsum in the asphalt. What would the run-off from that phosphogypsum asphalt do to the water quality of near shore waters? The EPA has determined that phosphogypsum poses a cancer risk from its radon emissions. What impact could it have on the marine life in the FKNMS?

I hope the Sanctuary and the DEP continues to look at the impacts of shallow injection wells on Sanctuary water quality and considers those impacts when permitting shallow wells.

Can the Sanctuary address vessels that anchor in seagrass? During storms these vessels drag anchor and create huge scars in the seagrass beds. In the Key Largo, after the recent no-name storm event, these same vessels are now sunk all over the Florida Bay.

Thank you for allowing me to comment.

Dottie Moses

Attachment 2 - Public Comment

December 12, 2023

Good afternoon WQPP and other interested persons.

I'm happy to advise that the lawsuit brought by Friends of the Lower Keys (FOLKs) against Marathon to stop its use of shallow sewage wells has now been amicably resolved. Today, December 12, 2023, Marathon's City Council approved the Consent Decree which governs the settlement and the parties' conduct and which remains within the federal court's jurisdiction for enforcement.

Marathon will develop a deep well, to be completed before the end of 2028, and thereafter will use the shallow wells only for emergencies and as backup during maintenance. The partially-treated effluent from the five wastewater treatment plants will continue to use advanced wastewater treatment (AWT). Although Florida law allows only secondary treatment for deep wells, there are data that it should continue to be AWT, which is more protective. The deep well will be at least 3000 feet deep into the boulder zone. Marathon retains the opportunity for reuse of the effluent. If Marathon decides to use land application of its partially-treated effluent, additional salinity treatment (reverse osmosis) will be required in order to reduce the impact of runoff on the nearshore waters. Marathon will provide reports to FOLKs on an ongoing basis.

In exchange, FOLKs will drop its administrative challenges to Marathon's pending shallow sewage well permit applications. After 2028, those permits are required to comply with the Consent Decree, and the shallow wells will no longer be used for disposal of sewage effluent. Additionally, FOLKs gave up its rights to claim several million dollars in civil penalties from Marathon under the Clean Water Act, and dismissed the claims in the lawsuit.

Almost four years ago, FOLKs brought the WQPP our concerns about shallow sewage wells in Marathon, along with some of our water quality sampling data showing high concentrations of sucralose, indicating the presence of sewage effluent in the halo zone waters of Crane Point in Marathon.¹ You did not ignore our concerns. Instead, you had robust and transparent discussions about Marathon's long-standing water quality issues, and about shallow sewage wells. This resulted in your support for an EPA-funded study by Pennsylvania State University: *"Quantifying the impact of shallow wastewater injection on groundwater nutrient fluxes to surface waters in the Florida Keys National Marine Sanctuary."*

On behalf of the thousand plus FOLKs members and supporters, I'm writing to thank the WQPP sincerely for listening to the concerns of people who live in the Keys and want to protect our invaluable waters.

The PSU study has now produced helpful site-specific data which have demonstrated that "...shallow wastewater injection at Area 3 is releasing nutrients and other contaminants to surface waters of the halo zone of the Florida Keys" and that the impact on the halo zone surface waters is in excess of EPA total phosphorous Strategic Targets. This, and much more, is what

FOLKs' water quality sampling also revealed, and is the basis for FOLKs' Clean Water Act lawsuit against Marathon, now amicably resolved. FOLKs thanks and congratulates Professors Miquella Ingalls and Lee Kump and their team for the excellent research.

However, FOLKs and geologist Donald Maynard do disagree with the Ingalls and Kump opinion in the study report that Marathon's sewage discharge is not the functional equivalent of a direct discharge under the US Supreme Court's decision in the *Maui* case.² Unfortunately, the November WQPP Steering Committee meeting took place at the same time as the mediation where FOLKs and Marathon settled the Clean Water Act litigation, so I was unable to comment at the meeting. I'll do so briefly here. A PDF of this email is attached for easier reading.

¹ Your water quality discussions motivated FOLKs to continue sampling Marathon's halo zone waters for sucralose. In addition to the Crane Point elevated sucralose levels, FOLKs collected evidence of extremely high concentrations of sucralose in Boot Key Harbor, offshore Area 3. We videotaped visible evidence of a plume arising from the bedrock; later sucralose analysis of this plume revealed extremely high levels of sucralose. Dr. Brian Lapointe, who has been studying sewage pollution in the Keys for decades, also took water samples offshore Area 3 which indicated even higher concentrations of sucralose. His sampling of Crane Point halo zone waters revealed high levels of sucralose as well. He took photographs depicting the benthic damage to which he states the over-nutrication from the Marathon shallow sewage wells contributes. See *Coast* report at <http://www.coastecology.org/science/wastewater.html#science-nav-bar>. FOLKs also collected water samples from canals and shallow waters near the Area 6 shallow sewage wells, again showing high concentrations of sucralose. Data available by request.

² *Cnty. of Maui, Hawaii v. Hawaii Wildlife Fund*, 140 S. Ct. 1462, 1476 (2020).

The Supreme Court stated in *Maui* that “**Time and distance will be the most important factors in most cases**, but other relevant factors **may** include, e.g., the nature of the material through which the pollutant travels and the extent to which the pollutant is diluted or chemically changed as it travels.” (emphasis added). Ingalls and Kump did not indicate how (or if) they evaluated those “most important factors.” The data they have released doesn’t include or interpret “time and distance” nor consider any of the other *Maui* factors. Although the report noted “fast arrival” during the dye tracer test, it was not quantified, and the study reported difficulty in the dye tracer tests, which were intended to measure time and distance.

It is unknown whether the authors took into account the fact that Marathon significantly reduced the normal rate of effluent flow at Area 3, sending it instead to Area 4, during the dye tracer experiments and some of the groundwater sampling.³ The reduced rate creates an artificial baseline for the experiments, likely reducing the gradient and therefore the time of travel as well as the concentrations found in the monitoring wells. Perhaps this is why these data were not included, but accurate time and distance data are necessary for an adequate functional equivalency analysis.

Neither do the study authors address the “other contaminants” in the effluent which the study data show also reach the halo zone waters. The determination of functional equivalence does not apply only to one element of the waste stream. Marathon’s effluent has multiple contaminants, including pesticides, hormones, opiates, DEET, cocaine, endocrine disrupters, nitrogen, and others.

We sent Ingalls and Kump a copy of the recently released draft EPA guidance to interpretation of *Maui* factors, which was not available at the time they were preparing their presentation. In part it states:

“[A] finding of a lack of functional equivalence established for one constituent pollutant does not necessarily demonstrate that the functional equivalent of a direct discharge does not exist for the remaining constituent pollutants if the one analyzed pollutant is not a reasonable indicator for the other pollutants.” *Applying the Supreme Court’s County of Maui v. Hawaii Wildlife Fund Decision in the Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Program to Discharges through Groundwater, EPA Draft Guidance, November 20, 2023, 88 Fed. Reg. 82891.* (emphasis supplied).

We know that phosphorous is not a “reasonable indicator for the other pollutants.” But the PSU presentation does provide data relevant to one of the *Maui* factors: “the extent to which the pollutant [in this case, phosphorous] is diluted or chemically changed as it travels.” (*Maui*). There would still need to be a determination as to how non-permanent renovation should be considered as well as what amount of chemical change or dilution would indicate whether the discharge is or is not a functional equivalent of a direct discharge. DEP or EPA or the courts, in evaluating what quantity of change would indicate a discharge is no longer a functional equivalent, potentially will consider whether there is a functional equivalence in impacts on the surface waters. Here, discharge of the concentrations of phosphorus indicated by the PSU data --whether directly from a

point source or indirectly through groundwater -- will have functionally equivalent impacts on the shallow nearshore waters: e.g., algae blooms and further damage to the ecosystem.

Kump indicated to us, concerning the report conclusions, that "...our only point was that phosphate (and nitrogen as well) are being removed from the flow and/or converted to non-nutrient forms, in that sense not functional equivalents of direct discharge." They had not seen the draft EPA guidance at the time of their presentation, and also stated that "...our comments on whether wastewater is the functional equivalent of direct discharge should not be interpreted to conform with that draft guidance."

They will be issuing a caveat to their report to this effect.

FOLKs supports additional funding to help inform further regulatory efforts. But it's important to consider that *Maui* and the EPA guidance both require site-specific data. Time and distance probably will be different at each site, as will, potentially, other *Maui* factors which must be considered.

But this data as it now stands will definitely assist regulators in addressing shallow sewage wells elsewhere in the Florida Keys. FDEP is mandated by Florida law to require a wastewater permittee to find an alternative if the discharger's sewage disposal methods, even if permitted, contribute to water quality degradation. 403.086(11)(h) FS. Thus, the PSU data showing wastewater injectate migration and impact on surface waters will definitely be of assistance to FDEP.

The research undertaken by Professors Kump and Ingalls also has helped motivate Marathon to study feasible alternatives to shallow sewage wells, and to choose a deep well -- potentially supplemented by land application after additional treatment for salinity (reverse osmosis) - in order to permanently stop the use of shallow sewage wells in Marathon.

We thank the Marathon City Council for agreeing to stop this long-standing water pollution practice.

There are other shallow sewage wells still being permitted for use in the Florida Keys. The data you have made available will enable other facilities to voluntarily eliminate use of shallow sewage wells. If not, hopefully FDEP will use these data to require them to do so.

³ Discharge Monitoring Report data from FDEP available on request.

The WQPP has done a great service to the Sanctuary waters and to all of us who value and want to protect them, and we are grateful.

Caron Balkany, Esq., for FOLKs
PO Box 420859
Summerland Key, FL 33042
1 305 8491073 - phone
1 8664056610 - fax
balkany@aol.com



Karen Bohnsack - NOAA Affiliate <karen.bohnsack@noaa.gov>

Comment on WQPP Meeting 2023.11.29

1 message

DonMaynard <DonMaynard@protonmail.com>

Thu, Dec 14, 2023 at 1:53 PM

To: Karen Bohnsack - NOAA Affiliate <karen.bohnsack@noaa.gov>

Karen:

Provided below are my comments (as a member of the public) on the recent November 29, 2023 meeting.

Professors Ingalls and Kump of Pennsylvania State University presented an update of their EPA-funded groundwater/surface water study of the Marathon Area 3 treated sewage effluent injection to the Florida Keys National Marine Sanctuary Water Quality Protection Program Steering Committee on November 29, 2023. Following is my review of that presentation conducted as a Florida Professional Geologist.

The presentation discussed, but did not provide estimates, of the travel time and distance for the injected effluent to reach surface water. It also included consideration of two constituents of the effluent: the artificial sweetener sucralose and the nutrient phosphorous, as well as brief mention of unnamed other "contaminants". It was rewarding to hear that the on-site data support my previous predictions of rapid travel times over the short distances to surface water, and the presence of unacceptable phosphate impacts to surface water from the injected effluent. The data demonstrates phosphorous and sucralose impacts both north in Florida Bay and south in Boot Key Harbor.

The report contains an opinion from Kump and Ingalls that the shallow sewage effluent discharges are not the functional equivalent of direct discharges.^[1] However, the report itself concludes that "...shallow wastewater injection at Area 3 is releasing nutrients and other contaminants to surface waters of the halo zone of the Florida Keys" and that the impact on the waters is in excess of EPA Target Standards. These conclusions seem to directly contradict the opinion.

In any event, the data as presented are too limited to support a functional equivalency opinion. It is unclear if the authors took into account the fact that Marathon significantly reduced the normal rate of effluent flow at Area 3, sending it instead to Area 4, during the dye tracer experiments and some of the groundwater sampling. The reduced rate created an artificial baseline for the experiments, likely reducing the gradient and therefore the time of travel as well as the concentrations found in the monitoring wells. In addition, the presented material did not provide or evaluate the date(s) of the sampling events, the variation in concentrations over time, changes in the fresh water lens thickness, or the tidal conditions at the times of sampling. In such a dynamic environment, these variations in conditions likely had a large impact on the measured constituent concentrations at each sample location. One would expect these details and evaluation of them will be provided in the final report.

The limited data presented show phosphorous concentrations decrease in groundwater with distance from the injection well; likely due to dilution with saline groundwater and the rainwater/freshwater lens, and to limited sorption to the rock matrix (sorption is a reversible chemical attachment of the phosphorous to limestone). The final figure in the presentation suggests percent sorption of phosphate after two days ranges from 5% to more than 80%,

depending on where and when the samples were collected. This large range is likely due in part to the cavernous karst nature of the limestone under the Florida Keys. Higher sorption occurs in cemented lime mud, where groundwater moves slowly and is in close contact with the rock, while minimal sorption occurs in the caves and tunnels where the majority of the effluent flows rapidly to surface water.

If a drinking water well (and/or potable aquifer) were being impacted, the highest observed concentrations and fastest travel times would be used to evaluate if the water were safe to drink. Should the evaluation of preventable impacts to surface water be any less stringent (especially in view of the continued deterioration of the nearshore waters around Marathon)?

We do not know what levels of adsorption, dilution, chemical change, partial or temporary removal the authors used in their determination of functional equivalency. The authors did not describe how (or if) they evaluated tidal pumping, or desorption of phosphorous back into the dissolved groundwater plume, although they did acknowledge that tidal pumping and desorption occurs. Additionally, it is unclear if or how the multiple changes in groundwater chemistry caused by mixing of the low salinity wastewater with saline or the fresh groundwater lens were evaluated. The biologists tell us that even small amounts of phosphorous added to these already impaired waters will contribute to algal blooms and adverse changes to the ecology.

Donald Maynard, FL PG
Resident of Big Pine Key, FL

[1] The presentation indicated a change in the motivation and critical question of the study to include an evaluation of functional equivalency in relation to the federal Clean Water Act. The study was initially funded and approved by EPA based upon proposals and work plans designed to quantify the impacts to the surface water ecology from injected wastewater effluent, and had no mention of the Clean Water Act or the legal term "functional equivalent", so the change in focus is unexpected. The conclusion of no functional equivalency, apparently based solely on reduction of phosphate concentrations in the subsurface, is concerning.