Florida Department of Environmental Protection's
Coral Protection and Restoration Program
Project Summaries and Outcomes for Fiscal Year (FY) 2022-23

Mission: The DEP Coral Protection and Restoration Program (CPR) was established in 2020 to holistically protect and restore Florida's Coral Reef (FCR) to ensure sustainable coral reef ecosystem functions and services by:

- Effectively administering state and federal funding for FCR priorities.
- Providing leadership for the Florida's disturbance response and recovery initiatives including:
  - Stony coral tissue loss disease (SCTLD) response.
  - Restoration of FCR.
  - Enhancement of regional water quality, with a focus on Biscayne Bay.
- Guiding regional, state, and national coral reef authorities, policies and procedures to ensure consistency and effectiveness of reef management actions.

The following are summaries of completed projects funded by the CPR Program. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the state of Florida, DEP or the DEP CPR Program.

Coral Water Quality Monitoring, Protection and Management

Water quality monitoring in the Kristin Jacobs Coral Reef Ecosystem Conservation Area (Coral ECA) *// Nova Southeastern University* and *Broward County*

Managed by the DEP Coral Reef Conservation Program (CRCP), this is a continuation project from FY 2021-22 that continues to characterize the ambient water quality every month offshore of Martin, Palm Beach, Broward and Miami-Dade counties. The goal was to identify both the constituents and impacts of land-based sources of pollution on the Coral ECA. No final report; data products available upon request to FLCoralFunding@FloridaDEP.gov

Acute Exposure of *Acropora cervicornis* to Port Everglade Sediments *// K. Bahr (Texas A&M University Corpus Christi)*

The objectives of this project were developed with technical guidance from DEP CRCP in support of a Local Action Strategy to determine the impact of turbidity exposure to corals. The study found that the physical aspects of acute (72-hour) turbidity exposure treatments, specifically light reduction, had minimal impacts on the biology and physiology of *Acropora cervicornis*. Differences were observed in the responses of different genotypes, highlighting the significance of genetic variability. Exposure to elevated turbidity levels caused an increase in coral respiration suggesting that prolonged exposure to turbidity can affect the metabolic activity of corals. Physiological changes were detected in the corals, indicating that the impacts of turbidity on coral health may be delayed and not immediately apparent. These findings contribute to our understanding of how acute turbidity exposure impacts coral reef ecosystems and inform management and conservation efforts. Final Report

How do long sediment-laden algal turfs affect coral recruitment on Florida's Coral Reef? *// A. Duran (Florida International University)*

This project evaluated the impact of long sediment-laden algal turf (LSAT) on coral recruitment on FCR. LSATs are a proportion of the benthic sediment that is bound within algal turfs. Results indicated that LSAT covered approximately 42% of FCR's seafloor, creating challenging conditions for settlement and survival of corals.

Researchers found a significant negative relationship between juvenile coral presence and LSAT abundance and sediment thickness. The high abundance of LSAT region-wide might be related to the levels of sedimentation, which appeared to increase gradually from north to south. The experimental removal of sediment revealed that plots with turf algae gained on average one millimeter more sediment than turf-free plots. However, turf grew quickly and started accumulating sediment as well. More research is being conducted to understand the seasonal changes on LSAT abundance and its impact on coral recruitment. Final Report

Real-time Water Quality Monitoring for the Florida Keys National Marine Sanctuary (FKNMS) *// J. Fourqurean (Florida International University)*
This project established real time water quality monitoring stations in the form of four long-term water quality monitoring buoys which were deployed at Fowey Rocks, Molasses Reef, Sombrero Key and Sand Key, along FCR in the FKNMS. The northernmost buoy was deployed at North Patch Reef in the FKNMS temporarily, while awaiting National Park Service approval for deployment at Fowey Rocks. The data buoys were custom designed and consisted of a DB600 buoy fit with a Xylem Ai1 data logger, freely rotating inductive swivel, high-tensile strength wire rope, a subsurface buoy and in-line sonde mounting system for rapid replacement and maintenance. Data sondes were configured with an array of sensors, including turbidity, pH, temperature, dissolved oxygen, conductivity and depth. Surface air temperature is also recorded by the onboard computer at the surface. Data is telemetered via cellular connection to Hydrosphere (Xylem) every 15 minutes. Sites were revisited after one week, one month and 90 days for calibration and maintenance. Final Report

Assessing the contribution of groundwater phosphorous loadings to canals and tributaries discharging into Biscayne Bay *// P. Gardinali, M. Ceccopieri (Florida International University) and P. Sweeney, C. Grossenbacher (Miami Dade County)*
In 2019 and 2020 Miami-Dade County (MDC) conducted an effort to characterize nutrient concentrations in north Dade using existing shallow groundwater wells at permitted industrial sites. This previous survey showed concerningly high concentrations of total phosphorous (TP) in many sites near tributaries, canals and water bodies that likely contribute to direct discharges to Biscayne Bay. This project revisited 10 sites which were each re-sampled times in April and May 2023. Sampling was conducted by MDC and the chemical analysis was performed by Florida International University. With varying results between sites, the data confirms the high concentrations of TP and indicates the contribution of multiple intermittent sources of pollution to the groundwater. Final Report

Curry Hammock Tidal Creek Restoration *// R. Tyler Strickland (Gresham Smith)*
Within the Florida Keys, historical tidal connections on either side of Long Point Key were filled in during the construction of Flagler's railroad early in the last century. This led to large areas of stagnant, non-flushing water, resulting in degraded water quality and regular fish-kill events. This project sought to design actions to reestablish flow and allow for water movement from Florida Bay to the Atlantic Ocean. Final Report

Research and Epidemiology

Identification and virulence testing of symbiont-associated viral particles from Florida corals *// B. Ushijima (University of North Carolina Wilmington), V. Paul (Smithsonian Marine Station) and M. Heck (United States Department of Agriculture Agricultural Research Service)*
Continuation of a project from FY 2021-22 that focused on identifying the potential viruses observed to be associated with microalgae within Florida corals and determining if they were associated with disease. Using

multiple lines of methodology, the research team found that while there was an overall increase in the number and types of viruses present in diseased corals, a single virus could not be identified as the primary pathogen of SCTLD. As part of this project, the team also produced a standardized methodology for a specialized type of microscopy that will help ensure comparability for future research within the field. Final Report

Meta-transcriptomics to determine if and how viruses are involved in SCTLD infection status and/or disease susceptibility // *R. Vega-Thurber (Oregon State University) and A. Correa (Rice University)*
Continuation of a project from FY 2021-22 that focused on identifying the potential viruses observed to be associated with microalgae within Florida corals and determining if they are associated with disease. Using a multi-factor approach, the researchers mapped out the viral community present across all coral health states. They found that opportunistic infections of resident virus lineages do seem to increase in SCTLD-affected coral tissues; however, they hypothesize that while filamentous viruses are diverse and differentially abundant in diseased samples, they are likely not the sole pathogenic agent of SCTLD. Coral species, health state and symbiont lineage all influence the viral consortia. They proposed that increased activity by diverse viruses, resulting from an unknown trigger, contribute to SCTLD etiology as a secondary infection. Final Report

Development of physical and sequence enrichment methods for the detection of species and strain-level variations in SCTLD-associated bacteria to characterize their functional potential *// L. Baker, (University of Miami), S. Rosales (University of Miami / Cooperative Institute for Marine and Atmospheric Studies) and N. Traylor-Knowles (University of Miami)*
This project aimed to identify bacteria associated with SCTLD to a lower taxonomic level than what was previously achieved. The researchers tested two techniques inspired by human medicine to separate the bacteria residing within the coral, from the coral itself. Because bacteria make up such a small part of the overall coral holobiont, identifying potential pathogenic bacteria has been similar to finding a needle in a haystack. For both methodologies tested, sufficient genetic material was unable to be produced to identify bacteria to a species level. While a specific bacterium was unable to be identified, this research helped grow our understanding of different methodologies that can be used when examining the coral microbiome. Final Report

Assessing the effects of environmental cofactors on Stony Coral Tissue Loss Disease (SCTLD) transmission and progression rates *// A. Palacio-Castro, M. Studivan, B. Young (University of Miami) and I. Enochs (National Oceanic and Atmospheric Administration, Atlantic Oceanographic and Meteorological Laboratory)*
This project aimed to test if laboratory controlled environmental co-factors (ammonia & temperature) can exacerbate or mitigate SCTLD transmission. The researchers designed and utilized an automated high-replication system capable of running independent disease transmission assays while at the same time incorporating high-precision dosing of stressors. They found that corals exposed to higher temperatures (31 °C vs 28 °C) experienced lower disease transmission rates, independently of the nutrient treatment. These experimental results support previous field studies that have found a reduction in SCTLD activity during the summer hotter months. Final Report

Investigating stony coral tissue loss disease (SCTLD) susceptibility in brain coral recruits *// A. Baker, O. Williamson (University of Miami) and K. O'Neil (The Florida Aquarium)*
This project aimed to further explore results from a previous study that indicated crosses between naïve rescue corals and wild coral colonies resulted in offspring that are less susceptible to SCTLD than offspring produced from two naïve parents. To test this, the research team exposed recruits (baby corals) from three 'highly susceptible' coral species whose parents came from 'pre-invasion colonies (that are naïve to SCTLD and putatively susceptible to it) and 'endemic' colonies (presumed to have been exposed to SCTLD and be putatively more resistant). They found that rates of infection and mortality were similar across all species and parentage, suggesting that parentage likely does not play a role in susceptibly. However, they found that some recruits remained apparently

healthy throughout the experiment and propose that there is likely differential susceptibility between coral and symbiont species. Next steps include analyzing the coral holobiont to see if certain traits may be heritable. See FY 2023-24 for project continuation. Final Report

The use of algal symbiont cultures (Family Symbiodiniaceae) as model systems to study SCTLD: Use of fractionated disease isolates to help with pathogen identification *// R. Karp, C. Dennison, N. Kron and A. Baker (University of Miami)*

This research project investigated the role of algal symbionts in SCTLD and explored the use of algal symbiont cultures as model systems for pathogen identification. The research team found they could induce signs of ill health in some strains of symbiont cultures when they exposed them to water that had been taken from around diseased corals and then filtered through different size filters. This data supports the idea that algal symbionts may be the primary target of a potential SCTLD pathogen. Based on the fractionation size that induced disease (0.2um -0.8um), they suggest the pathogen may be a giant virus or small bacterium that is replicating within the algal symbiont. Final Report

SCTLD Resistance Research Consortium (RRC) Summary Report through May 2023// *B. Walker, K. Neely, S. Buckley, R. Sharkey, H. Noren (Nova Southeastern University), A. Baker, N. Traylor-Knowles (University of Miami), A. Hawthorne, T. Work (United States Geological Survey), D. Whitall, C. Woodley (National Oceanic and Atmospheric Administration), V. Paul, G. Aeby (Smithsonian Marine Station), N. Garg (Georgia Tech University), J. Meyer (University of Florida), J. Voss (Florida Atlantic University) and G. Williams (Symbioseas Inc.)*

Between July 2021 and March 2023, the SCTLD Resistance Research Consortium (RRC), undertook an integrated approach to understanding the underpinnings for SCTLD resistance and susceptibility among Florida *Orbicella faveolata* (mountainous star coral) populations. This team was assembled to target many various components in disease investigation: genomics, transcriptomics, metabolomics, proteomics, lipidomics, histopathology (tissue and subcellular structure), microbiomes, endosymbionts, tissue regeneration and fecundity. Analysis will continue through FY 2023-24.

RRC updates and Final Report*:*

- The genetics data indicated that the *Orbicella* populations were once successfully recruited throughout the reef system. This level of successful recruitment happens very rarely if at all today even though over 91% of the colonies were fecund. Although differences in sampling times existed, the Lower Keys colonies were the least fecund, especially those with previous lesions.
- Metabolite, lipid and protein data all provided evidence that a coral's state is dynamic over time and varied by region. Differences in resistance were found only in specific regions at specific times of the year. In the Lower Keys, resistance classes differed by metabolite species in June and September, by lipid species in June and March and by protein species in June. In the ECA, no significant differences were found in all metabolites, lipid or protein species between resistance classes.
- The transcriptomics data have not been fully analyzed; however, preliminary results suggest that corals with previous lesions have a fingerprint of the effects in their gene expression that might contribute to recurrent infections.
- Coral disease was dynamic during the study with some corals incurring more disease, some experiencing disease for the first time while others experienced less. While all corals were sampled in healthy-looking tissue away from any disease, tracking these disease states facilitate identifying specific corals with recent disease to investigate resistance and possible disease markers.

- A key missing piece is the microbial data. Progress on this in FY 2023-24 will help elucidate the functions the microbial communities are expressing across time, regions and resistance.
- More research of the data is needed to understand the role of gametogenesis in cell functioning, histopathology, associations with disease and associations with amoxicillin treatments.

Disease Intervention

Development of alternative in situ treatments for SCTLD *// B. Ushijima (University of North Carolina Wilmington), V. Paul (Smithsonian Marine Station) and J. Meyers (University of Florida)*
The overall goal of this project was to increase the number and variety of treatment options available to the state of Florida to combat SCTLD as well as better understand the dynamics of this disease. This year, in addition to testing new probiotics, the team also included a task to compare effectiveness of antibiotics versus probiotics compared to a combination of the two. Results related to new probiotics remain the same as previous years – while there has been some success with known strains, no new successful strains have been identified and the treatment only slows (not stops) disease progression. Results from the comparison portion of the study were unconclusive due to minimal disease at the time of testing. The experiment was run again in May and monitoring will continue through FY 2023-24. Final Report

Advancing Coral Reef Research and Resilience in Southeast Florida // *J. Voss, A. Carreiro, H. Davis, G. Pantoni, E. Shilling, R. Eckart and S. Bell (Florida Atlantic University)*
This project applied multiple complementary approaches to help understand, reduce and mitigate coral reef declines in southeast Florida (SE FL). Continued monitoring of coral disease (SCTLD) incidence and prevalence in the northern portion of the Coral ECA was coupled with ongoing disease intervention experiments, coral population genetics to inform population management and coral restoration for *Stephanocoenia intersepta* and *Montastraea cavernosa* and experimental coral salinity threshold tests. Long-term tracking demonstrated that diseased corals experimentally treated with antibiotics were approximately 4.5 times more likely to survive than corals not treated. After four years of monitoring, only one colony remained active with SCTLD. The researchers' genetic research indicated that coral reefs deeper than 90 feet (mesophotic) may provide critical refuges for impacted shallow populations and that including mesophotic populations in coral genetic assessments is important for understanding coral biodiversity. Following salinity threshold experiments, freshwater releases that expose corals to salinities lower than 20 PSU (for even just 1 day) risk severe impacts and coral mortality with >50% mortality observed in *Montastraea cavernosa* and *Porites astreoides*. Final Report

2022-2023 SE FL ECA Reef-building-coral Disease Intervention and Preparation for Restoration // *B. Walker, H. Noren, R. Sharkey, S. Buckley and A. Zummo (Nova Southeastern University)*
To ensure the survival of priority coral colonies in southeast Florida, monitoring and intervention techniques continue to be applied to pre-identified large corals (defined as one meter or larger in diameter) as necessary to maintain their health. This project has been ongoing since 2018. Of the 107 monitored corals between July 1, 2022, and May 31, 2023, a total of 455 antibiotic ointment treatments were conducted on 55 colonies with a 75.4% effectiveness on lesions. FY 2022-23 had two months (July and September) with the highest number of treatments and treated corals in the four years of this work. Monitoring efforts continued to support future restoration activities, treat additional diseased colonies and apply novel intervention techniques when appropriate. As of June 15, 2023, a total of 1,451 colonies have been treated by the coral disease interventions strike teams in the Coral ECA since 2018. In addition, three newly identified recon sites were discovered including the largest patch of yellow finger coral ever reported, and two rare large boulder star coral colonies, one in a patch of dense corals. Final Report

Florida Keys Coral Disease Intervention Strike Teams *// K. Neely (Nova Southeastern University)*
The purpose of this project was to support coral disease in-water intervention and actively save priority corals, reef sites and species from SCTLD within Florida Keys National Marine Sanctuary. Field teams conducted field and land-based activities to monitor and re-treat corals, treat new corals and support overall coral reef conservation and management efforts in Florida. From July 1, 2022 – May 31, 2023, a total of 1,333 newly infected corals were assessed and treated. Additionally, new lesions on 793 previously treated corals were treated. Fate-tracking of treated corals documents a 92% survival rate after four years, with minor but significant differences between onshore/offshore reefs and among species. Final Report

Coral Rescue and Propagation

Coral Propagation: Land-based and Offshore Nursery Phase IV *// J. Figueiredo & D. Gilliam (Nova Southeastern University), L. Fix and C. Gregory, DVM (The Reef Institute)*
This project aimed to assist propagation of coral species affected by SCTLD in Coral ECA, by increasing reef-building coral biomass available for restoration and growing and propagating corals in land-based and in-water systems with high genetic diversity that are better adapted to local and global stressors. This year, successful spawning was observed in land-based systems for the first time in three reef-building species. Over 4,400 corals were produced that have been or will soon be transferred to the offshore nursery or outplanted on the reefs of the Coral ECA. The increased production of corals for outplanting has been the result of research conducted in this and previous years. The larvae of seven species were also used in experiments to assess their survival over time and competency dynamics. This data was incorporated into bio-physical dispersal models to make recommendations on the best reefs to restore along the FCR and within its several regions, including the Coral ECA. The Reef Institute (TRI) was subcontracted to continue their work in coral holding and coral care as part of the Florida Coral Rescue Project. Since 2019, TRI has been housing corals to gene-bank critical lineages of SCTLD-susceptible species, including the threatened species, Pillar Coral. Corals that were salvaged from Port Everglades and Fisher Island prior to the start of construction projects were brought into holding and care. TRI now holds the largest quantity of *Favia fragum* (golf ball coral) than any other holding facility with over 200 corals in captivity to later be used for outplanting and restoration. Final Report

Osborne Tire Reef Coral Removal, Relocation, and Monitoring *// D. Gilliam (Nova Southeastern University)*
Managed by the Coral Reef Conservation Program, the objective of this project was to remove corals growing on tires that are part of the Osborne Tire Reef so that commercial divers can subsequently remove tires from the seafloor. This effort was an extension of the tire removal project that is permitted and managed by DEP's Division of Waste Management. A total of 700 corals were removed from tires, most of which were outplanted to natural reef to evaluate small colony survival and changes in health conditions. Other corals were donated to universities for research related to coral restoration, symbiont communities and immunity and growth and predation. An additional 700 corals are planned to be removed from tires during the following fiscal year. Final Report

Examining novel techniques in lab-based spawning to upscale for coral restoration efforts *// N. Fogarty, L. Rich, A. Weeks and M. Van Horn (University of North Carolina at Wilmington)*
This project focused on three promising areas of research: (1) enhancing methods in land-based coral spawning, rearing and grow-out by exploring the role of light, (2) researching potential probiotics to use in coral propagation efforts and (3) testing whether fusing different genotypes of the same species can produce improved survival and growth for corals used during outplanting. This year, the researchers found the optimal light spectrum to grow one of our key bouldering restoration species – knobby brain coral. They also identified three new probiotic strains

that have enhanced recruit growth and survival and found that different genotypes of branching corals could fuse into one within the first six months of life. Final Report

Florida Disease Response Coral Rescue and Propagation - NSU *// A. Renegar (Nova Southeastern University)*
This project continues to provide support for the ongoing care of coral rescue corals (species susceptible to SCTLD). Starting in 2018, naive and endemic corals were rescued as part of the SCTLD response effort and brought to NSU's land-based nursery systems for ongoing care and maintenance. In FY 2022-23, efforts were expanded to include asexual propagation (through micro-fragmentation) of key reef-building species. As of June 30, 2023, the onshore nursery holds 4,684 corals in total: 337 colonies and 4,347 fragments. Since the start of 2023, a total of 2,093 corals have been outplanted from the onshore nursery systems, more than double the 2022-2023 target number. Additional corals of opportunity have been added to the coral nursery stock, which have been used to expand the microfragment program by increasing the number of species represented as well as the number of unique colonies per species. Final Report

Restoration

Improving and expanding the portfolio of grazers available for coral co-culture and reef restoration *// J. Patterson (University of Florida), K. O'Neil (The Florida Aquarium), M. Ladd (National Oceanic and Atmospheric Administration / Cooperative Institute for Marine and Atmospheric Studies) and J. Spadaro (Mote Marine Laboratory)*
This project demonstrated the utility of invertebrate grazers (snails and urchins) in co-culture with sexually propagated SCTLD-susceptible corals. Significant resources have been dedicated to holding and spawning Florida corals in land-based systems. This work sought to improve the return on that investment by exploring how to reduce staff time spent on algal control during the grow-out phase. While almost all grazers tested resulted in reduced algal cover, specific grazers and assemblages resulted in increased growth to both small symmetrical brain coral colonies and grooved brain coral recruits – two restoration priority corals. This project affirmed herbivore co-culture as a feasible propagation strategy and the researchers suggest that next steps should include further investigation to refine grazer species, sizes, biomass and density used in coral co-culture. Final Report

The Role of Outplant Density on Coral Survivorship, Growth, Predation Impacts, and Disease Spread *// D. Lirman, M. D'Alessandro University of Miami in collaboration with FORCE BLUE, SECORE, Frost Science Museum, The Florida Aquarium and National Oceanic and Atmospheric Administration's Atlantic Oceanographic Meteorological Laboratory*
This collaborative project of restoration partners evaluated the role of coral outplant density on the survivorship and growth of both branching and massive corals. They found that fish predation was the main driver of tissue losses in massive corals. While differences in predation impacts were found among species and sites, outplant density was not a significant driver of predation impacts. Thus, planting corals in dense arrays does not appear to provide any benefits to corals through predation dilution. In addition, the research team completed the assisted migration of endangered Elkhorn colonies from Monroe County into Miami-Dade and Broward counties to increase the genetic and genotypic diversity of this species. In total, 54 individual genotypes of Elkhorn coral were outplanted onto five reefs from Monroe to Broward County. Three months after outplanting, survivorship was ~97%. No disease was observed on any of the outplanted corals or the areas surrounding the outplant plots during this study. Final Report

Role of Sponge Filtration in Transforming Coastal Water Quality in the Florida Keys *// M. Butler (Florida International University) and J. Lopez (Nova Southeastern University)*
Given the important role of sponges in shallow marine ecosystems, their decline in south Florida – both in terms of biomass and biodiversity – is likely to have had deleterious ecological consequences, particularly for water quality. Dr. Butler's research team has been studying sponge ecology and the restoration of sponge communities in south Florida for over two decades and, in partnership with colleagues at the Florida Fish and Wildlife Conservation Commission, have pioneered the methodology necessary for large-scale sponge community restoration. This project constitutes the next logical step in the development and understanding of the likely positive consequences of large-scale sponge restoration for the improvement of coastal water quality and nursery habitat in south Florida. While preliminary findings indicate that water quality among field sites differing in benthic substrate vary little, laboratory trials have revealed that all sponge species tested could reduce E. coli in coastal waters. Final Report

Surveillance

Heavy Metal Implications to Sediment Microbiome and Coral Reef Community *// A. Hirons, D. Giarikos and J. Lopez (Nova Southeastern University)*
This study aimed to provide key information to develop an ecological risk assessment to understand the impact port dredging may have on nearby coral reef communities and to help create new management and environmental dredging risk assessments. The researchers collected and analyzed sediment from Port Everglades, coral reef sites adjacent to the port and a nearby control site. Preliminary results indicate moderate to high ecological risk to benthic organisms from heavy metal (mostly Arsenic) contaminated port sediment. The control site has a distinct microbial community suggesting that human activities have altered the port microbiomes. Next steps include analyzing the sediment collected in sediment traps placed within the port over the next year for heavy metal concentrations and microbiome profiling, to determine if sedimentation (rather than sediment cores) have any heavy metal and/or bacterial contaminants. This project was developed with technical guidance by DEP's Coral Reef Conservation Program. Final Report

Calibration of the Biological Condition Gradient (BCG) for Florida's Coral Reef *// P. Bradley and B. Jessup (Tetra Tech)*
During the last year, a coral reef Biological Condition Gradient (BCG) (originally developed for the Caribbean coral reef ecosystem) has been applied to the near shore coral reefs within Florida's Coral Reef, including sites in the Dry Tortugas, the Florida Keys, Biscayne National Park and the Kristin Jacobs Coral Reef Ecosystem Conservation Area. The BCG is a conceptual model that describes how biological attributes of aquatic ecosystems change along a gradient of increasing human disturbance. Highly knowledgeable coral reef experts and ecologists throughout Florida were asked to characterize coral reef attributes based on prevalence, life history traits, susceptibility to bleaching and disease and sensitivity to pollution. They reviewed the data and developed numerical rules that distinguished between BCG levels (Levels 1-5) which were then incorporated into the model. The predictive BCG model was accurate (93%) in replicating assessment decisions made by experts in the field. Florida's Coral Reef BCG can be used to identify high quality reefs, evaluate Best Management Practices' (BMP) effectiveness, support biological criteria development and prioritize protection and restoration of coral reef ecosystems. Final Report

Data Management

Florida's Coral Reef Water Quality Data Compilation, Analysis and Decision Support Year Three *// K. Bohnsack, A. Bruckner, A. Fine, L. Gentry, C. Kelble, D. Kochan, L. McEachron, K. Montero, F. Muller-Karger, T. Murray, D. Otis and O. Ramzy*

This project is built upon previous and ongoing work that leverages existing databases, multiple water quality sampling efforts and satellite imagery products from regional sources to create a unified water quality monitoring database. In FY 2022-23, several additional water quality datasets and monitoring programs were added to the database, for a total of seven datasets stretching from Port St. Lucie to the Dry Tortugas. Map layers and web apps were updated to depict water quality data and trends that include the new 2022 data. Final Report

Coral Disease Response Data Management *// N. Alcarez (Florida Fish and Wildlife Commission – Fish and Wildlife Research Institute)*

As part of the Data Management Team (DMT) under the SCTLD response effort, Florida Fish & Wildlife Research Institute (FWRI) Information Science & Management staff support data access, storage, analytics and visualization for the SCTLD response effort. Throughout the 2022-2023 funding period, staff continued to implement an integrated data management strategy through the following: (1) maintaining and enhancing existing data management tools and developing data management solutions for priority needs as they arose; (2) supporting existing third-party data management solutions; (3) identifying and deploying a software system to addresses data audit project requirements; (4) working to develop a decision support system (DSS) database for coral reef conservation and (5) continuing development of an in-situ modular data buoy. No final report; data products available upon request to FLCoralFunding@FloridaDEP.gov