Kristin Jacobs Coral Aquatic Preserve Management Plan

Florida Department of Environmental Protection
Office of Resilience and Coastal Protection
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Photo 1: Acropora cervicornis coral with a school of grunts swimming through it.

Mission Statement

The Office of Resilience and Coastal Protection's mission is to conserve, protect, restore, and improve the resilience of Florida's coastal, aquatic, and ocean resources for the benefit of people and the environment.

The four long-term goals of the Office of Resilience and Coastal Protection's Aquatic Preserve Program are to:

1. Protect and enhance the ecological integrity of the aquatic preserves.
2. Restore areas to their natural condition.
3. Encourage sustainable use and foster active stewardship by engaging local communities in the protection of aquatic preserves.
4. Improve management effectiveness through a process based on sound science, consistent evaluation, and continual reassessment.

Executive Summary

Lead Agency: Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP)

Common Name of Property: Kristin Jacobs Coral Aquatic Preserve (KJCAP) and Cape Florida Aquatic Preserve (CFAP)

Location: Miami-Dade, Broward, Palm Beach, and Martin counties, Florida

Acreage: Kristin Jacobs Coral Aquatic Preserve = 239,107 acres
Cape Florida Aquatic Preserve = 4,163 acres (included in KJCAP acreage)

Management Agency: DEP's ORCP

Designation: Aquatic Preserve

Unique Features: The natural resources of Kristin Jacobs Coral Reef Ecosystem Conservation Area Aquatic Preserve, hereafter referred to as Kristin Jacobs Coral Aquatic Preserve (KJCAP), which extends from the northern boundary of Biscayne National Park to the St. Lucie Inlet, have been a critical part of the livelihoods, recreation, and culture of Southeast Florida since the Tequesta, Miccosukee and Seminole tribes first inhabited the area. KJCAP extends from the mean high water line to state water limits three (3) nautical miles offshore, and encompasses 105 linear miles of Florida's Coral Reef, which continues beyond the aquatic preserve and connects additional managed areas in South Florida that include a combined 350 miles of offshore coral reef habitat. KJCAP encompasses the entire area of Biscayne Bay-Cape Florida to Monroe County Line Aquatic Preserve, hereafter referred to as Cape Florida Aquatic Preserve (CFAP), which sits off the eastern coast of Key Biscayne, extending roughly 3 miles into the Atlantic Ocean with a southern border that mirrors KJCAP's. The combined area of KJCAP and CFAP will be referred to as KJCAP, unless there is a fact or strategy specific to CFAP, then it will be called out.

This complex ecosystem of the combined aquatic preserves is home to more than 6,000 marine species and provides shoreline protection, economically, recreationally and culturally important resources, and tourism opportunities. There are 18 threatened or endangered species that use KJCAP for at least part of their life cycle, of which seven have designated critical habitat within KJCAP. The four counties that lie adjacent to KJCAP are some of the most densely populated in Florida and support a variety of land use including agricultural, commercial and residential. This plan seeks to improve the long-term ecological function of KJCAP and to increase coordinated management across the entirety of Florida's Coral Reef and associated ecosystems.

Archaeological/Historical Sites: The coral reef within KJCAP has a long history of shipwrecks. Three wrecks are currently designated as Florida Underwater Archeological Preserves and listed by the Florida Division of Historical Resources: *Lofthus, SS Copenhagen* and *Half Moon*

(Map 7). All three are in shallow water between 8 and 30 feet deep and are popular diving and snorkeling sites as well as educational tools.

Area Breakdown by Benthic Habitat Type*

Benthic Habitat	Area within KJCAP (km^2)
Coral Reef and Colonized Hardbottom	209.49
Unconsolidated Sediment (Sand)	601.22
Artificial Habitat	15.88
Seagrass Bed	16.07
Undefined Marine	124.65
Total Area (km^2)	967.63

* These benthic habitat types are based on benthic habitat communities as described for southern Florida by the National Oceanic and Atmospheric Administration (Monaco, 2007) and adapted for KJCAP (Riegl et al., 2004; Walker & Klug, 2014). Florida's Unified Reef Maps (FWC, 2016) were used to calculate the total area for each of the benthic habitats found within KJCAP. Florida Natural Areas Inventory (FNAI) natural community type maps do not yet extend into the majority of KJCAP. Descriptions and a crosswalk of benthic habitat types is included in section 3.3.7.

Management Needs

Water Quality: Optimized offshore monitoring that is comparable with water quality monitoring in adjacent managed areas is needed to improve our understanding of how nutrients and pollutants travel from land-based sources to KJCAP ecosystems. Additionally, forming strong consulting and coordinating relationships with county and municipal agencies is needed to reduce point and nonpoint sources of pollution, particularly from sewage leaks, septic systems, stormwater runoff, freshwater discharges, beach nourishment, dredging activities and coastal development.

Sustainable Economic and Recreational Use: Further studies are needed to understand fishing, diving, boating and cultural use patterns in KJCAP. Identification of high use areas will inform management actions and educational programs aimed at mitigating user conflicts and reducing the impacts from non-extractive uses. Additionally, KJCAP will also support FWC regulatory, fisheries monitoring, research and educational programs that reduce impacts from extractive uses.

Ecosystem Disturbance Response and Recovery: Loss of benthic habitat due to diseases, sedimentation, coral bleaching and physical impacts threatens the ecosystem services provided by KJCAP. Participation in multi-agency disturbance response efforts including monitoring, combined with a reduction in vessel groundings, anchoring incidents and sedimentation from coastal projects, will support the high levels of biodiversity needed in order for the ecosystems within KJCAP to provide the services that natural and human communities depend on.

Community Education, Engagement, and Access: There needs to be continued and expanded outreach to inform the public about KJCAP, specifically its establishment and how the

issues and goals in this management plan are tied directly and indirectly to all communities in Southeast Florida. Increased engagement of both local communities and visitors is also needed with the goal of fostering greater stewardship among the groups that enjoy and depend on KJCAP resources. Furthermore, there needs to be active management to reduce the inequities of access to KJCAP for all communities.

Ecosystem Resilience: A variety of impacts are already apparent in the ecosystems found in KJCAP, especially with the increased frequency and severity of disturbance events such as major storms and rising sea temperatures that are already leading to shifts in species distribution and loss of biodiversity. While national and international agencies seek to address contributing factors to environmental change, science-based ecosystem resilience evaluations are needed to better understand the vulnerabilities of coral reef and submerged aquatic vegetation communities within KJCAP. This in turn provides a foundation from which it is easier to identify management strategies and actions that can best support KJCAP ecosystems in resisting or adapting to likely environmental and other changes.

Public Involvement: Public support is vital to the success of conservation programs. The goal is to create and foster an understanding of the challenges that KJCAP ecosystems are facing and increase engagement in the steps to manage these precious resources. The creation of this management plan was guided by recommendations that resulted from previous public processes related to this area including the Our Florida Reefs Community Working Groups and Fisheries Committee. The Southeast Florida Coral Reef Initiative (SEFCRI) Team and Technical Advisory Committee (TAC) were consulted before public meetings were held on the development of the draft KJCAP management plan. The draft management plan was edited based on the feedback of the KJCAP management plan advisory committee and public meetings will be held to receive additional feedback. After further edits, the final management plan will be presented to the Acquisition and Restoration Council.

Goals

Many of the issues impacting Kristin Jacobs Coral Aquatic Preserve could be prevented or minimized with improved water quality, enhanced enforcement, expanded public education campaigns and a better understanding of and plan to address anthropogenic impacts now and into the future. Optimized resource monitoring and risk evaluation will guide management practices and make them more responsive and effective overall. Addressing user conflict will also reduce other negative impacts associated with overuse and encourage more sustainable use of the aquatic preserve.

Issue A: Water Quality Impacts from Land-Based Sources of Pollution, including Marine Industry and Coastal Construction Impacts

Goal A1: Improve water quality both within KJCAP and in waters entering KJCAP from adjacent ICAs to meet the needs of natural resources.

Objective A1.1: Optimize and integrate water quality monitoring within KJCAP to identify sources of pollution flowing through inlets, and support data analysis to understand effects of and inform mitigation strategies for LBSP on benthic habitats (**OFR N-71)**.

Objective A1.2: Engage intra-agency programs, local water management entities, local governments and federal partners to reduce point and non-point land-based sources of pollution including wastewater, stormwater and groundwater that enter KJCAP and associated watersheds to improve water quality and benthic habitat condition through management actions. (**OFR N-78 and FDOU 52)**.

Goal A2: Increase public and industry engagement in actions to improve water quality in KJCAP.

Objective A2.1: Work with the local community, visitors and agency partners to assess perceptions of and increase engagement in actions to reduce land-based sources of pollutants entering storm drains and waterways (**N-1)**.

Objective A2.2: Coordinate the reduction of vessel-based discharges.

Issue B: Sustainable Economic and Recreational Fishing, Diving, and Other Uses

Goal B1: Characterize user groups and analyze patterns of use within KJCAP and compare them with related datasets to identify trends.

Objective B1.1: Update studies on user groups, use patterns, crowding (i.e., social acceptance of other activities and user groups), areas of use conflicts, and impacts on KJCAP resources by various resource users.

Objective B1.2: Support continuation of and explore options for expansion of fisheries monitoring programs and protocols to gain a better understanding of the state of fisheries compared to use trends and impacts in KJCAP.

Goal B2: Evaluate and implement management approaches to reduce impacts from fishing, diving, and other uses (recreational and commercial) in KJCAP to support ecosystem integrity and function.

Objective B2.1: Coordinate research and work with partners to synthesize recommendations to reduce impacts from fishery use pressure on benthic habitats in KJCAP.

Objective B2.2: Coordinate research and work with partners to synthesize recommendations to reduce impacts from diving use pressure on affected resources.

Objective B2.3: Evaluate and recommend approaches to minimize impacts from pressure at high-use areas and intra- and/or inter-group conflicts over resources.

Goal B3: Comprehensively assess and increase awareness of unsustainable resource use and engage communities in protecting KJCAP ecosystems through best practices.

Objective B3.1: Assess current levels of public awareness of the wide-ranging impacts sustained by marine resources through unsustainable use and of best practices to utilize and appreciate marine resources that minimize negative impacts.

Objective B3.2: Develop and implement strategies to increase awareness of unsustainable resource use and increase engagement in best practices to minimize negative impacts on marine resources.

Objective B3.3: Continue to support partner agencies in the enforcement of marine regulations and promotion of best use practices.

Issue C: Ecosystem Disturbance Response and Recovery

Goal C1: Continue, expand and optimize regular monitoring of corals, submerged aquatic vegetation and other KJCAP benthic resources to inform management of KJCAP.

Objective C1.1: Continue, expand and optimize benthic monitoring to inform the management of KJCAP.

Objective C1.2: Optimize and integrate monitoring related to coastal construction within and adjacent to KJCAP to inform management processes aimed at reducing impacts to benthic resources.

Goal C2: Continue to improve management and maintenance activities related to coastal construction by working with intra-agency programs to reduce impacts to benthic resources (including nearshore reefs), create more sustainable beaches, and minimize impacts from nourishment projects **(S-120)**.

Objective C2.1: Evaluate and reduce habitat loss from physical and coastal development impacts on benthic resources in KJCAP.

Objective C2.2: Support improvement of minimization and mitigation activities for unavoidable impacts to resources to reduce and offset lost ecosystem functions in KJCAP **(OFR N-117 and FDOU 52)**.

Objective C2.3: Identify and reduce other physical impacts in KJCAP.

Goal C3: Strengthen public and partner engagement in resource protection and collaborative decision-making for effective disturbance response.

Objective C3.1: Promote and optimize community engagement in reporting disturbance events and foster interagency data sharing to support informed disturbance response in KJCAP.

Goal C4: Improve ecosystem understanding to facilitate decision-making that accounts for ecosystem-scale processes.

Objective C4.1: Engage other FCR resource managers and researchers to develop a deeper understanding of ecosystem function in KJCAP and adjacent managed areas, guiding coordinated and holistic management across FCR.

Issue D: Community Education, Engagement, and Access

Goal D1: Comprehensively evaluate and improve access (virtual, physical, educational) to KJCAP for all communities.

Objective D1.1: Identify existing forms of access and equity of access to KJCAP.

Objective D1.2: Develop and implement tailored approaches to improve modes and equity of access to KJCAP, targeting underserved communities identified in Objective D1.1.

Objective D1.3: Assess the effectiveness of access approaches implemented in Objective D1.2 within KJCAP.

Goal D2: Evaluate and build awareness of how KJCAP resources and conservation goals are directly connected to communities via education and outreach.

Objective D2.1: Establish a baseline to measure and monitor the level of awareness among stakeholders and the general public and identify existing outreach strategies and gaps concerning KJCAP resources and conservation goals.

Objective D2.2: Develop and implement strategies based on results from Objective D2.1 to increase awareness and foster stewardship of KJCAP and its conservation goals and ecosystem attributes across all communities associated with KJCAP.

Objective D2.3: Develop and implement strategies to increase awareness of ongoing stressors and ecosystem pressures in KJCAP.

Objective D2.4 Evaluate the effectiveness of outreach and education programs.

Issue E: Building Ecosystem Resilience

Goal E1: Identify and evaluate the effects and impacts of environmental change on KJCAP resources.

Objective E1.1: Conduct an ecosystem resilience evaluation and develop an adaptive framework to assist managers in monitoring, assessing and responding to effects from environmental change on ecosystem function (e.g. productivity) within KJCAP over time.

Goal E2: Evaluate and implement adaptive management measures that promote KJCAP ecosystem recovery and resilience.

Objective E2.1: Evaluate and implement the use of ecosystem restoration and propagation techniques for KJCAP benthic species.

Objective E2.2: Provide guidance and consultation on science-based criteria for local adaptation measures (e.g., engineered structures, nature-based solutions and restoration) to promote resilience and recovery of KJCAP resources.

Objective E2.3: Identify and implement measures to reduce the impact of invasive or problematic species on native KJCAP ecosystems, preserving biodiversity and ecosystem resilience

Goal E3: Build programmatic resilience by ensuring the long-term fiscal viability of KJCAP management.

Objective E3.1: Develop and implement a sustainable finance plan to support KJCAP conservation efforts and maintain operational capacity **(N-123)**.

ORCP approval date:
ARC approval date:
State approval date:

Acronym List

Abbreviation	Meaning
AA	Awareness and Appreciation
ACE	United States Army Corps of Engineers
AIC	United States All Islands Coral Reef Committee
ATBA	Area To Be Avoided
BBAP	Biscayne Bay Aquatic Preserve
BIPP	DEP's Beaches, Inlets, and Ports Program
BNP	Biscayne National Park
CCCL	Coastal Construction Control Line
CERP	Comprehensive Everglades Restoration Plan
CFAP	Cape Florida Aquatic Preserve
CPR	Coral Protection and Restoration Program
CRCA	Coral Reef Conservation Act
CRCP	DEP's Coral Reef Conservation Program
CRPA	Coral Reef Protection Act
CSO	Citizen Support Organization
CZMA	Coastal Zone Management Act
DEAR	DEP's Division of Environmental Assessment and Restoration
DEP	Florida Department of Environmental Protection
DNR	Department of Natural Resources
ECA	Ecosystem Conservation Area
EPA	United States Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
F.A.C.	Florida Administrative Code
FCR	Florida's Coral Reef
FCR3	Florida's Coral Reef Restoration and Recovery Initiative
FDACS	Florida Department of Agriculture and Consumer Services
FDOU	Fishing, Diving, and Other Uses
FKNMS	Florida Keys National Marine Sanctuary
FNAI	Florida Natural Areas Inventory
FOFR	Friends of Our Florida Reefs
F.S.	Florida Statute
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
GIS	Geographic Information Systems
GC	Gulf Council

Abbreviation	Meaning
ICA	Inlet Contributing Area
ICW	Intracoastal Waterway
IRL	Indian River Lagoon
JCP	Joint Coastal Permit
KJCAP	Kristin Jacobs Coral Aquatic Preserve
LAS	Local Action Strategy
LBSP	Land-Based Sources of Pollution
LiDAR	Light Detection and Ranging
LWL	Lake Worth Lagoon
MICCI	Maritime Industry and Coastal Construction Impacts
MMPA	Marine Mammal Protection Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
NCCOS	National Centers for Coastal Ocean Science
NCRMP	National Coral Reef Monitoring Program
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NOAA CRCP	NOAA's Coral Reef Conservation Program
NPS	National Park Service
NSU	Nova Southeastern University
OFR	Our Florida Reefs
OFW	Outstanding Florida Waters
ONMS	Office of National Marine Sanctuaries
ORCP	Office of Resilience and Coastal Protection
PSSA	Particularly Sensitive Sea Area
RBM	Resilience-Based Management
RIPR	Reef Injury Prevention and Response
RMA	Recommended Management Action
RR	Reef Resilience
SAFMC	South Atlantic Fishery Management Council
SCTLD	Stony Coral Tissue Loss Disease
SEACAR	Statewide Ecosystem Assessment of Coastal and Aquatic Resources
SEAFAN	Southeast Florida Action Network
SECREMP	Southeast Florida Coral Reef Evaluation and Monitoring Project
SEFAST	Southeast Florida Action Strategy Team
SEFCRI	Southeast Florida Coral Reef Initiative
SEFSC	Southeast Fisheries Science Center
SFRPC	South Florida Regional Planning Council

Abbreviation	Meaning
SFWMD	South Florida Water Management District
SGD	Submarine Groundwater Discharge
TAC	SEFCRI Technical Advisory Committee
TNC	The Nature Conservancy
UM RSMAES	University of Miami Rosenstiel School of Marine, Atmospheric, and Earth Science
UMAM	Uniform Mitigation Assessment Method
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
USCRTF	United States Coral Reef Task Force
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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Photo 2: Close up of the polyps of a Montastraea cavernosa coral colony with a resident blenny.

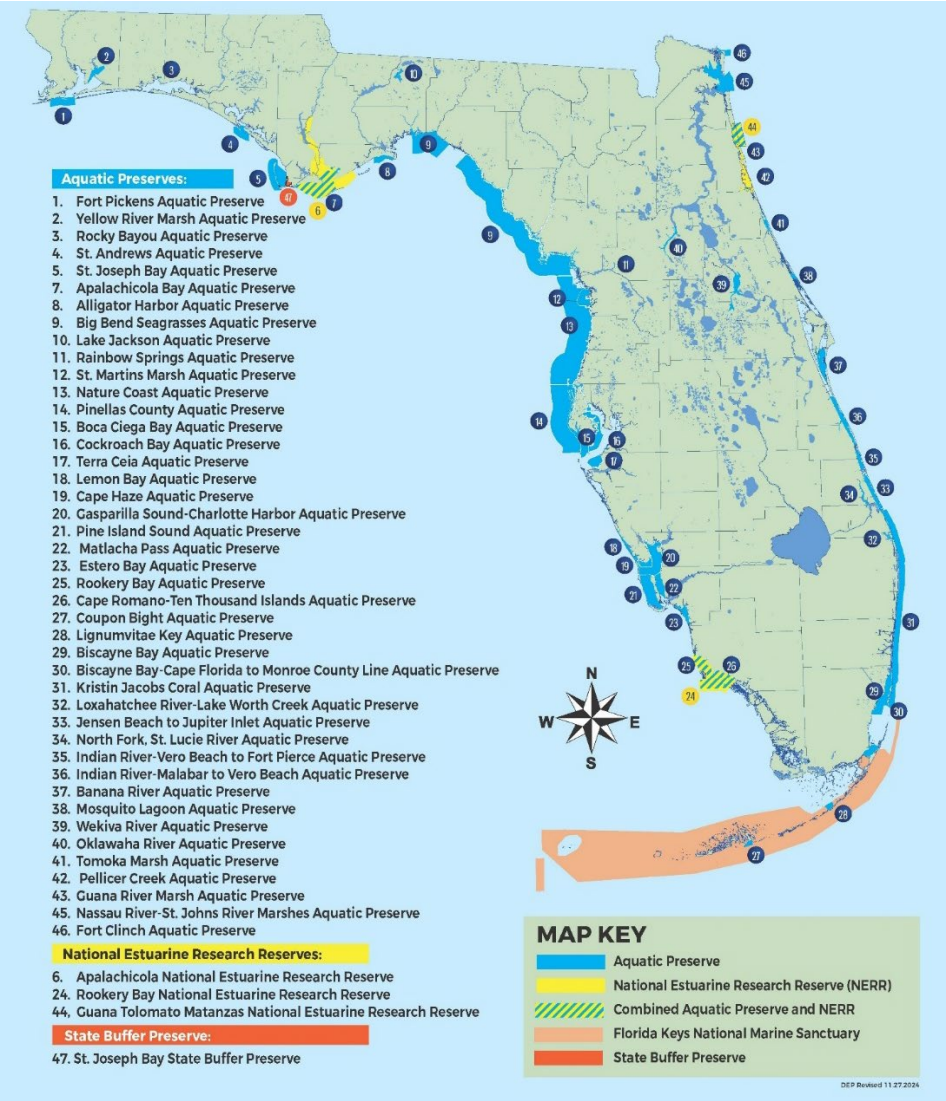
Chapter 1 / Introduction

The Florida aquatic preserves are administered on behalf of the state by the Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP) as part of a network that includes 43 aquatic preserves, three National Estuarine Research Reserves (NERRs), and the co-management of the Florida Keys National Marine Sanctuary (Map 1). This provides for a system of significant protections to ensure that our most popular and ecologically important underwater ecosystems are cared for in perpetuity. Each of these special places is managed with strategies based on local resources, community partnerships, issues and conditions.

Our extensive coastline and wealth of aquatic resources have defined Florida as a subtropical oasis, attracting millions of residents and visitors, and the businesses that serve them. Florida's submerged lands play important roles in maintaining good water quality, hosting a diversity of wildlife and habitats (including economically and ecologically valuable nursery areas), and supporting a treasured quality of life for all. In the 1960s, it became apparent that the ecosystems that had attracted so many people to Florida could not support rapid growth without science-based resource protection and management. To this end, state legislators provided extra protection for certain exceptional aquatic areas by designating them as aquatic preserves.

Title to submerged lands not conveyed to private landowners is held by the Board of Trustees of the Internal Improvement Trust Fund (the Trustees). The Governor and Cabinet, sitting as the Trustees, act as guardians for the people of the state of Florida (§253.03, Florida Statutes [F.S.]) and regulate the use of these public lands. Through statute, the Trustees have the authority to adopt rules related to the management of sovereignty submerged lands (Florida Aquatic Preserve Act of 1975, §258.36, F.S.). A higher layer of protection is afforded to aquatic preserves including areas of sovereignty lands that have been “set aside forever as aquatic preserves or sanctuaries for the benefit of future generations” due to “exceptional biological, aesthetic, and scientific value” (Florida Aquatic Preserve Act of 1975, §258.36, F.S.).

The tradition of concern and protection of these exceptional areas continues, and now includes the Rookery Bay NERR in southwest Florida, designated in 1978; the Apalachicola NERR in Northwest Florida, designated in 1979; and the Guana Tolomato Matanzas NERR in Northeast Florida, designated in 1999.



Map 1: DEP’s Office of Resilience and Coastal Protection system.

1.1 / Management Plan Purpose and Scope

Florida's aquatic resources are at risk from both direct and indirect impacts of increasing development and recreational use, as well as resulting economic pressures, such as energy generation and increased fish and shellfish harvesting to serve and support the growing population. These potential impacts to resources can reduce the health and viability of the ecosystems that contain them, requiring active management to ensure the long-term health of the entire network. Effective management plans for the aquatic preserves are essential to address this goal and each site's own set of unique challenges. The purpose of these plans is to incorporate, evaluate, and prioritize all relevant information about the site into a cohesive management strategy, allowing for appropriate access to the managed areas while protecting the long-term health of the ecosystems and their resources.

The mandate for developing aquatic preserve management plans is outlined in Section 18-20.013 and Subsection 18-18.013(2) of the Florida Administrative Code (F.A.C.). Management plan development and review begin with the collection of resource information from historical data, research and monitoring, and include input from individual ORCP managers and staff, area stakeholders and members of the general public. Statistical data, public comment, and cooperating agency information are then used to identify management issues and threats affecting the present and future integrity of the site, its boundaries, and adjacent areas. The information is used in the development and review of the management plan, which is examined for consistency with the statutory authority and intent of the Aquatic Preserve Program. Each management plan is evaluated periodically and revised as necessary to allow for strategic improvements. Intended to be used by site managers and other agencies or private groups involved with maintaining the natural integrity of these resources, the plan includes scientific information about the existing conditions of the site and the management strategies developed to respond to those conditions.

Each aquatic preserve management plan will identify unique local and regional issues and contain the goals, objectives, integrated strategies, and performance measures to address those issues. The plan will also identify the program and facility needs required to meet the goals, objectives, and strategies of the management plan. These components are key elements for achieving the resource protection mission of each aquatic preserve.

1.2 / Public Involvement

ORCP recognizes the importance of stakeholder participation and encourages stakeholder involvement in the management plan development process. ORCP is also committed to meeting the requirements of Florida's Government-in-the-Sunshine Law (286.011, F.S.), including:

- meetings of public boards or commissions must be open to the public;
- reasonable notice of such meetings must be given; and
- minutes of the meetings must be recorded.

Several key steps are being taken during the development of the management plan. First, a draft plan was composed after gathering information on current and historic uses, resource, cultural and historic sites, and other valuable information regarding the property and surrounding areas. Almost two decades of ecological and socioeconomic research and input from local stakeholder groups were synthesized in the creation of the draft plan, with the intent of balancing the ecological needs of the region with extensive commercial, recreational, and economic use.

Second, an Advisory Committee was formed that included representative members of KJCAP communities pursuant to section 259.032 (F.S.), but also including representative members of local user groups such as fisher, divers, local tribes and academic groups. The Advisory Committee met twice, the first time to be presented with and learn the historical context of the formation of KCJAP, gain an understanding of the public process that produced the baseline from which the draft management plan was formed and to establish a working relationship among committee members to foster greater participation. After being given 30 days to review the draft management plan, the second meeting took place at a central location within the counties adjacent to KJCAP where Advisory Committee members spent the day in both facilitated and unstructured small group discussions designed to solicit feedback on the draft management plan, specifically the issues, goals, objectives and strategies drafted to guide management of KJCAP.

This will be updated after the public process.

For additional information about the advisory committee and the public meetings, including meeting minutes and a summary of the feedback received, refer to Appendix C - Public Involvement. Implementation of the plan will be adaptive to the best available science and public input, while also prioritizing outreach to help educate the local community about the importance and efficacy of these protection efforts.

Photo 3: View of the Kristin Jacobs Coral Aquatic Preserve during calm summer weather from ORCP's research vessel.

Chapter 2 / The Florida Department of Environmental Protection's Office of Resilience and Coastal Protection

2.1 / Introduction

The Florida Department of Environmental Protection (DEP) protects, conserves and manages Florida's natural resources and enforces the state's environmental laws. DEP is the lead state government agency for environmental management and stewardship and commands one of the broadest charges of all the state agencies, protecting Florida's air, water and land. DEP is divided into three primary areas: Regulatory Programs, Land and Recreation, and Ecosystem Restoration. Florida's environmental priorities include restoring America's Everglades; improving air quality; restoring and protecting the water quality in our springs, lakes, rivers and coastal waters; conserving environmentally sensitive lands; and, providing citizens and visitors with recreational opportunities, now and in the future.

The Office of Resilience and Coastal Protection (ORCP) is the unit within DEP that manages more than five million acres of submerged lands and select coastal uplands. These areas are

managed for the conservation and protection of natural and historical resources and resource-based public use. This includes 43 aquatic preserves, three National Estuarine Research Reserves (NERRs), and the Florida Keys National Marine Sanctuary (FKNMS). The three NERRs and FKNMS are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA). ORCP also provides management support for these submerged lands through the Coral Reef Conservation Program, the Coral Protection and Restoration Program, the Florida Coastal Management Program, the Outer Continental Shelf Program, the Clean Boating Program, the Resilient Florida Program, and the Beaches Programs. Each of these program areas are discussed below.

ORCP manages sites in Florida for the conservation and protection of natural and historical resources and resource-based public use that is compatible with the conservation and protection of these lands. ORCP is a strong supporter of the NERR system and its approach to coastal ecosystem management. Florida has three designated NERR sites, each encompassing at least one aquatic preserve within its boundaries. Rookery Bay NERR includes Rookery Bay Aquatic Preserve and Cape Romano-Ten Thousand Islands Aquatic Preserve; Apalachicola NERR includes Apalachicola Bay Aquatic Preserve; and Guana Tolomato Matanzas NERR includes Guana River Marsh Aquatic Preserve and Pellicer Creek Aquatic Preserve. These aquatic preserves provide discrete areas designated by additional protection beyond that of the surrounding NERR and may afford a foundation for additional protective zoning in the future. Each of the Florida NERR managers serve as a regional manager overseeing multiple aquatic preserves in their region. This management structure advances ORCP's ability to manage its sites as part of the larger statewide system. In the Southeast region, where there is no NERR, the regional administrator oversees the Coral Reef Conservation Program (CRCP), Kristin Jacobs Coral Aquatic Preserve (including Cape Florida Aquatic Preserve), Biscayne Bay Aquatic Preserve, the Florida Keys Aquatic Preserves (Coupon Bight Aquatic Preserve and Lignumvitae Key Aquatic Preserve), and the co-management of FKNMS.

FKNMS**,** established in 1990 by the U.S. Congress and then confirmed in 1997 by the Board of Trustees of the Internal Improvement Trust Fund (Trustees), covers 2.3 million acres of state and federal submerged lands. FKNMS contains unique and nationally significant marine resources, including the southern portion of Florida's Coral Reef, extensive seagrass beds, mangrove-fringed islands and more than 6,000 species of marine life. ORCP leads state co-management efforts in the Sanctuary in partnership with the Florida Fish and Wildlife Conservation Commission (FWC) and NOAA. The Florida Keys Aquatic Preserves, Lignumvitae Key and Coupon Bight Aquatic Preserves, are completely within FKNMS as well as the Card Sound portion of Biscayne Bay Aquatic Preserve.

The Coral Reef Conservation Program (CRCP) manages coral reefs, hardbottom communities, and associated reef resources within KJCAP. CRCP coordinates research and monitoring, conducts education and outreach, develops management strategies, promotes partnerships and encourages stakeholder engagement to protect the coral reefs, hardbottom communities and associated reef resources along Miami-Dade, Broward, Palm Beach, and Martin counties, pursuant to the U.S. Coral Reef Task Force's National Action Plan. CRCP also leads the

implementation of Florida's Local Action Strategy, the Southeast Florida Coral Reef Initiative (SEFCRI). Pursuant to the Florida Coral Reef Protection Act (§403.93345, F.S.), CRCP is responsible for leading response to, and management of, coral reef and hardbottom injuries resulting from direct, unplanned impacts such as vessel grounding, anchoring and cable drag events in Southeast Florida.

The Coral Protection and Restoration Program (CPR) was established in 2020 to support the holistic management of Florida's Coral Reef (FCR). CPR's strategic priority areas include administering funds appropriated from the Legislature, providing leadership for the Florida's Coral Reef Resilience Program, supporting the development and implementation of state restoration priorities, and coordinating information sharing. CPR also leads implementation of the Florida's Coral Reef Recovery and Restoration (FCR3) Initiative, created by Governor DeSantis in 2023 (Executive Order 23-06) and supported by the Florida Legislature. The FCR3 Initiative aims to develop the infrastructure, technology, skilled workforce and logistics necessary by 2050 to support the long-term recovery of no less than 25% of Florida's Coral Reef.

The Florida Coastal Management Program is based on a network of agencies implementing 24 statutes that protect and enhance the state's natural, cultural and economic coastal resources. The goal of the program is to coordinate local, state and federal government activities using existing laws to ensure that Florida's coast is as valuable to future generations as it is today. ORCP is responsible for directing the implementation of the statewide coastal management program. The Florida Coastal Management Program provides funding to promote the protection and effective management of Florida's coastal resources at the local level through the Coastal Partnership Initiative Grant Program.

The Outer Continental Shelf Program is responsible for coordinating the state's review, oversight, monitoring and response efforts related to activities that occur in federal waters on the Outer Continental Shelf to ensure consistency with state laws and policies, and primarily to ensure that these activities do not adversely affect state resources. Reviews are conducted under federal laws, including the Outer Continental Shelf Lands Act; Coastal Zone Management Act, National Environmental Policy Act; Deepwater Ports Act; Marine Protection, Research and Sanctuaries Act; Rivers and Harbors Act; Clean Air Act; Clean Water Act; Marine Mammal Protection Act; the Endangered Species Act as well as their implementing regulations.

The Clean Boating Program includes Clean Marina designations to bring awareness to marine facilities and boaters regarding environmentally friendly practices intended to protect and preserve Florida's natural environment. Marinas, boatyards and marine retailers receive "clean" designations by demonstrating a commitment to implementing and maintaining a host of best management practices (BMPs). Via the Clean Boating Program, the Clean Vessel Act provides grants, with funding provided by the U.S. Fish and Wildlife Service (USFWS), for construction and installation of sewage pump-out facilities and purchase of pump-out boats and educational programs for boaters.

The Resilient Florida Program's mission is synergizing community resilience planning and natural resource protection tools and funding to prepare Florida's coastline for the effects of environmental change, especially rising sea levels. This program is working to ensure Florida's coastal communities are resilient and prepared for the effects of rising sea levels, including coastal flooding, erosion, ecosystem changes, and storm surges. The program is synergizing community resilience planning and natural resource protection tools; providing funding and technical assistance to prepare Florida's coastal communities for sea level rise; and continuing to promote and ensure a coordinated approach to sea level rise planning among state, regional, and local agencies.

A healthy beach and dune system provides protection for upland development and critical infrastructure, preservation of critical wildlife habitat for threatened and endangered species, and a recreational space that drives the state's tourism industry and economy. In order to protect, preserve and manage Florida's valuable sandy beaches and adjacent coastal systems, the Legislature adopted the Florida Beach and Shore Preservation Act, Chapter 161, Florida Statutes, in 1986. The Act provides for the creation of a statewide, comprehensive beach management program that integrates coastal data acquisition, coastal engineering and geology, biological resource protection and analyses, funding initiatives and regulatory programs designed to protect Florida's coastal system both above and below the water line. This comprehensive approach allows DEP's Beaches Programs to collaborate with coastal communities to address erosion caused by managed inlets, imprudent construction, rising seas and storm impacts. DEP's Beaches Programs consist of the following: Beach Survey Services, Coastal Engineering and Geology Group, the Coastal Construction Control Line Program, the Beaches, Inlets and Ports Program (BIPP) and the Beach Management Funding Assistance Group. The Beaches Program also oversees the Joint Coastal Permit process.

2.2 / Management Authority

Established by law, aquatic preserves are exceptional areas of submerged lands and associated waters that are to be maintained in their natural or existing conditions. The intent was to forever set aside submerged lands with exceptional biological, aesthetic, and scientific values as sanctuaries, called aquatic preserves, for the benefit of future generations.

The laws supporting aquatic preserve management are the direct result of the public's awareness of and interest in protecting Florida's aquatic environment. The extensive dredge and fill activities that occurred in the late 1960s spawned widespread public concern. In 1966, the Trustees created the first offshore reserve, Estero Bay, in Lee County.

In 1967, the Florida Legislature passed the Randall Act (Chapter 67-393, Laws of Florida), which established procedures regulating previously unrestricted dredge and fill activities on state-owned submerged lands. That same year, the Legislature provided the statutory authority (§253.03, F.S.) for the Trustees to exercise proprietary control over state-owned lands. Also in 1967, government focus on protecting Florida's productive water bodies from degradation due to development led the Trustees to establish a moratorium on the sale of submerged lands to

private interests. An Interagency Advisory Committee was created to develop strategies for the protection and management of state-owned submerged lands.

In 1968, the Florida Constitution was revised to declare in Article II, Section 7, the State's policy of conserving and protecting natural resources and areas of scenic beauty. That constitutional provision also established the authority for the Legislature to enact measures for the abatement of air and water pollution. Later that same year, the Interagency Advisory Committee issued a report recommending the establishment of 26 aquatic preserves.

The Trustees acted on this recommendation in 1969 by establishing 16 aquatic preserves and adopting a resolution for a statewide system of such preserves. In 1975, the State Legislature passed the Florida Aquatic Preserve Act of 1975 (Act) that was enacted as Chapter 75-172, Laws of Florida, and later became Chapter 258, Part II, F.S. This Act codified the already existing aquatic preserves and established standards and criteria for activities within those aquatic preserves. Additional aquatic preserves were individually adopted with the newest aquatic preserve being designated in 2024.

In 1980, the Trustees adopted the first aquatic preserve rule, Chapter 18-18, F.A.C., for the administration of the Biscayne Bay Aquatic Preserve. All other aquatic preserves are administered under Chapter 18-20, F.A.C., which was originally adopted in 1981. These rules apply standards and criteria for activities in the aquatic preserves, such as dredging, filling, and building docks and other structures that are stricter than those of Chapter 18-21, F.A.C., which apply to all sovereignty lands in the state.

This plan is in compliance with the Conceptual State Lands Management Plan, adopted March 17, 1981, by the Trustees and represents balanced public utilization, specific agency statutory authority, and other legislative or executive constraints. The Conceptual State Lands Management Plan also provides essential guidance concerning the management of sovereignty lands and aquatic preserves and their important resources, including unique natural features, seagrasses, endangered species and archaeological and historical resources.

Through delegation of authority from the Trustees, DEP and ORCP have proprietary authority to manage the sovereignty lands, the water column, spoil islands (which are deposits of sovereignty lands), and some of the natural islands and select coastal uplands to which the Trustees hold title.

Enforcement of state statutes and rules relating to criminal violations and non-criminal infractions rests with FWC law enforcement, DEP Environmental Crimes Unit, and local law enforcement agencies. Enforcement of administrative remedies rests with ORCP, the DEP Districts, and Water Management Districts. FWC through Article IV, Section 9 and Chapter 68 of the Florida Administrative Code, and with support provided by Chapter 379, F.S., regulates saltwater fisheries and provides enforcement authority and powers for law enforcement officers. Additionally, it provides similar powers relating to wildlife conservation and management. FWC is responsible for the management of wildlife resources including finfish and shellfish; permit

authorizations for special activity licenses related to educational and research activities and for the collection of marine species for aquaculture purposes; and development and enforcement of fisheries laws and regulations. FWC represents the main enforcement authority for many issues occurring within KJCAP, including fishing and boating violations, and plays a significant role in the execution of CRCP management objectives. However, DEP also plays a role in the enforcement of environmental laws and regulations. In 2019, DEP reestablished their enforcement program that now includes both the Office of Emergency Response and Environmental Crimes Unit, which was transferred from FWC to DEP. This office is responsible for ensuring compliance with environmental laws through inspection and enforcement as well as responding to reports of incidents that result in environmental impacts.

Permitting and Enforcement

Oversight for activities that may affect ecosystems in KJCAP is split between several federal, state, and county agencies. At the federal level, the Clean Water Act, Endangered Species Act, and the Magnuson Stevens Act all require consultations or permitting for actions within KJCAP. For dredge and fill, as well as other engineering projects, the U.S. Army Corps of Engineers (USACE) is a lead agency in compliance and enforcement for all three federal statutes with required consultations with NOAA Fisheries, USFWS, and the South Atlantic Fishery Management Council (SAFMC). The U.S. Coast Guard is responsible for issuing permits for on-water activities such as airshows, regattas and marine parades, and for establishing safety zones for the protection of the participants, spectators and the environment. The Endangered Species Act and Magnuson-Stevens Act are the authorities with the strongest protection for coral reef and submerged aquatic vegetation related resources. The Endangered Species Act prohibits taking of any of the seven coral species listed as threatened under the act, and the Magnuson-Stevens Act designates all coral reefs in the region, including KJCAP, as Essential Fish Habitat, which gives NOAA Fisheries a consulting role in approving any federal actions that may affect the habitat. Section 404 of the Clean Water Act dictates the permitting process and criteria for projects that may affect water quality and can include provisions for corals (Lindeman & Ruppert, 2011).

Florida has numerous state laws that assign regulatory authority to DEP regarding water quality, submerged lands, and benthic communities. The Environmental Resource Permitting Program (ERP) regulates activities in, on or over wetlands and other surface waters. Proposed dredge and fill projects are subject to environmental regulations under Chapters 403 and 373, F.S., and all Chapters in Florida Administrative Code are used to implement ERP permitting activities. The primary ERP program rules are adopted by DEP as Chapter 62-330, F.A.C. Projects occurring on sovereignty submerged lands are also reviewed for consistency with Chapters 253 and 258, F.S. See Section 1.4.2 of the Environmental Resource Permit Applicant's Handbook Volume I (South Florida Water Management District [SFWMD], 2024) for more information on ERP rules. Regarding corals and submerged aquatic vegetation (e.g., seagrass) specifically, DEP is responsible for evaluating whether an applicant has provided reasonable assurances that a regulated activity will not impact the values of other surface water functions so as to cause adverse impacts to the abundance and diversity of fish, wildlife and listed species or their habitat (Section 10.2.2; SFWMD, 2024). As part of the assessment of the impacts of regulated

activities upon fish and wildlife, DEP will provide a copy of all notices of applications for individual (including conceptual approval) permits that propose regulated activities in, on, or over wetlands and other surface waters to the Florida Fish and Wildlife Conservation Commission for review and comment, in accordance with Section 20.331(10), F.S. In addition, DEP staff may solicit comments from FWC regarding other applications to assist in the assessment of potential impacts on fish and wildlife and their habitats, particularly with regard to listed species.

Florida Statutes 373.413 and 373.414 require an Environmental Resource Permit (ERP) for activities that could affect surface water quality, including dredging and filling. Projects, whether on the beach, including the nearshore zone, or inlet facing the Atlantic Ocean, Straits of Florida or associated inlets must apply for a joint coastal permit (JCP) through the Beaches, Inlets and Ports Program (BIPP). JCP's include statutory authorities of Chapter 161, F.S. (Coastal Construction), Part IV of Chapter 373, F.S. (ERP), and Chapter 253, F.S. (State Lands). Activities that require a JCP include beach restoration or nourishment; construction of erosion control structures such as groins and breakwaters; public fishing piers; maintenance of inlets and inlet-related structures; and dredging of navigation channels that include disposal of dredged material onto the beach or in the nearshore area. Construction of nearshore artificial reefs should also be evaluated for any potential influence on coastal processes. These projects generally are below the mean high water line, extend into the sovereignty submerged lands and are likely to affect the distribution of sand along the beach. BIPP also processes ERPs for navigational dredging of deepwater ports.

Additionally, Chapter 62-302, F.A.C., has multiple sections that establish surface water quality standards for different classes of water bodies. KJCAP is classified as a Class III marine water body, with designated uses of fish consumption, recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife. Further designations would increase the minimum standards and oversight for the water body, such as being listed as an Outstanding Florida Water, which is the highest designation offered by the State.

The Coral Reef Protection Act, § 403.93345 F.S., was established to reduce physical impacts to reefs by giving DEP the ability to levy fines for vessel grounding and anchor damage. In addition, the Marine Life Rule, 68B-42, F.A.C., protects FCR by prohibiting the harvest of any hard corals as well as two sea fan species and fire corals (Lindeman & Ruppert, 2011). DEP is the sole agency responsible for enforcing the civil penalties under the Coral Reef Protection Act, which was last updated in 2020 to increase the civil penalty fee schedule, while the Marine Life Rule is enforced as a criminal process by FWC. FWC also has permitting authority under 68B-8 F.A.C. to require a Special Activity License for activities that may affect corals and submerged aquatic vegetation, including mitigation and restoration activities, such as relocation and outplanting, respectively.

The four counties adjacent to KJCAP also have some degree of permitting regarding coastal construction projects that may affect corals, mangroves, seagrasses, and other significant habitats. Chapter 62-344, F.A.C., (Delegation of the Environmental Resource Permit Program to

Local Governments) provides procedures for delegating all or a portion of the ERP program to qualified local governments. Several local governments implement the ERP program under the delegated authority in Section 373.441, F.S. Broward County has delegated authority, but Miami-Dade County's Department of Regulatory and Economic Resources (RER) only has authority to issue sovereignty submerged lands authorizations. The applicant must obtain a separate permit from RER. Palm Beach and Martin counties do not have their own specific versions of an Environmental Resource Permit but do have environmental protection programs that review permits before approval (Lindeman & Ruppert, 2011).

Mitigation

Coastal construction impacts can be mitigated through the creation, restoration, enhancement, or preservation of ecological communities. ERP and JCP applicants are required to eliminate or reduce adverse direct and secondary impacts to the furthest extent practicable, pursuant to Section 10.2.1, Vol. I (SFWMD, 2024). Upon demonstration that the applicant meets this criterion, the applicant then must provide a mitigation plan to offset all remaining adverse impacts in accordance with Section 10.3, Vol. I (SFWMD, 2024). When impacts are unavoidable, compensatory mitigation is required and "in-kind" mitigation is used to directly offset adverse impacts to the habitat type that was affected by the proposed work. Mitigation can be conducted on-site or off-site, or through a combination of approaches, as long as it offsets anticipated adverse impacts to wetlands and other surface waters and meets all other criteria for permit issuance. Often a project can be completed with enough impact avoidance and minimization that compensatory mitigation is not necessary (Gilliam & Moulding, 2012). When there are unexpected impacts, such as vessel groundings, compensatory mitigation is the only option, and uses in-kind mitigation, including physical restoration with substrate stabilization and construction as well as biological restoration of corals. In some cases, the addition of mooring buoys in the area has been considered in-kind mitigation for anchor damage as it directly helps the area that was affected and reduces the root cause of the impact. Historically, mitigation requirements for coral reefs have involved the installation of limestone boulder artificial reefs to replace hardbottom habitat either on-site or at another suitable location, the relocation of live coral to the area, or some combination of both. However, data shows that by themselves the boulders did not replicate adjacent natural reef communities, never fully replacing the lost ecosystem services (Gilliam, 2012). Therefore, their use is now recommended as part of a package of mitigation actions at an impacted site (USCRTF, 2016). Mitigation for submerged aquatic vegetation due to impacts such as propeller scarring or from grounded or derelict vessels often includes stabilization of disturbed sediments, seagrass restoration or passive seagrass bed fertilization via bird roosting stakes. These methods have produced mixed results when deployed in Florida, and continued monitoring and innovation are needed to optimize submerged aquatic vegetation restoration to be more effective at revegetating disturbed habitat (DEP, 2024b).

Chapter 62-345, F.A.C., Uniform Mitigation Assessment Method (UMAM), establishes a standardized procedure for assessing functions provided by different habitats, the amount those functions are reduced by the proposed impact, and the amount of mitigation needed to offset that impact. The Department of Environmental Protection is responsible for verifying the

information provided and applying this assessment method to determine the amount of mitigation necessary to offset the proposed impacts. The U.S. Coral Reef Task Force believes that “due to the complex nature of the coral reef ecosystem, and the even more complex nature of identifying and providing appropriate compensatory mitigation for lost ecosystem services, the emphasis on maximizing avoidance and minimization of impacts cannot be overstated” (USCRTF, 2016).

Artificial Installations

Habitat restoration and enhancement is also conducted through the installation of artificial reefs. All four counties adjacent to KJCAP have artificial reef programs that place structures at permitted locations. Artificial reefs can achieve certain conservation goals like providing habitat for fish and structure for the recruitment of coral larvae, but they have to be specifically designed to perform those goals. The structures can also provide an alternative fishing and diving location to shift pressure away from natural reefs. If not designed to provide long-term ecosystem services, artificial reefs are considered art form reefs that prioritize aesthetics and serve as an underwater novelty or entertainment. All artificial reef placement within KJCAP requires permits from USACE and DEP ERP, as well as a permit or letter of support from the adjacent county where it will be placed. Depending on the proposed installation, additional permits may also be required. Any new installations proposed within a permitted county-specific area would need review and documented support from the respective county, confirming the proposal aligns with their strategic plans and conservation goals. If there is any outplanting or relocation of corals or other reef-associated organisms proposed along with artificial structure placement, a Special Activity License is required from FWC (FWC rule 68B-8, F.A.C.). More information on Artificial Reef Programs both within KJCAP and the State of Florida can be found on FWC's Artificial Reef webpage (FWC, n.d.a) and Martin County (MC, 2025), Palm Beach County (PBC, 2025), Broward County (BC, 2022), and Miami-Dade County (MDC, 2025) Artificial Reef Programs.

Artificial Installations as Mitigation

Artificial reefs specifically designed for compensatory mitigation may also be used for permitted construction projects (e.g., dredging and beach nourishment) that cannot eliminate their impacts to the natural reef. Most mitigation reefs have been constructed with limestone boulders; however, mitigation reef structures can also be engineered to compensate for replacing or restoring the equivalent of the coral reef injured or ecosystem services lost (Florida Silver Jackets, 2025). As stated above, however, mitigation will never fully replace lost ecosystem functions and should be considered secondary options to avoidance and minimization.

Hybrid Artificial Installations and Shoreline Protection

Hybrid reefs may seem similar to mitigation reefs; however, they differ in their objectives and construction. Hybrid reefs are strategically designed and engineered to address environmental risks such as coastal erosion and storm impacts (Florida Silver Jackets, 2025). They combine the use of natural coral colonies with engineered structures designed to enhance and support coral growth, while also providing ecosystem services like shoreline protection, and should be located with precision to promote ecosystem functionality. Nearshore, permittable substrate

within KJCAP will be prioritized for hybrid reef structures that are designed with the goal of performing shoreline protection. Hybrid reefs will likely impact coastal processes, and therefore need to be evaluated by DEP's Beaches, Inlets, and Ports Program with an accompanying Joint Coastal Permit (JCP).

Artificial Installation Design and Placement Considerations

KJCAP management priorities focus on natural reef enhancement, including outplanting of corals and other reef associated organisms; however, the value of artificial reefs in providing ecosystem services and economic benefits (e.g., mitigation, habitat creation, shoreline protection, reduced anthropogenic pressure on natural reef, public engagement) is recognized. Wallmo and Allen (2024) found that although artificial reefs are relatively less preferred than natural coral reefs, people still believe they benefit from artificial reefs and that they are important to have in Florida. In such cases, any artificial reefs outside of County-permitted deployment areas should be designed to minimize their impact on nearby habitat, are required to be specifically engineered to perform a primary function (e.g., shoreline protection or creating substrate for coral recruitment), and should be designed to functionally mimic the natural habitat. Artificial reef is defined in Chapter 18-20 (F.A.C.) as material acceptable to DEP that is placed "for the purpose of fish attraction, habitat creation, enhancement, or restoration". These intended purposes should be proven through engineered design and locations chosen based on sound scientific data and cannot be assumed based on installment alone. Purpose and location of a proposed artificial reef to be placed within KJCAP will help determine if the project is clearly in the public interest in accordance with Chapter 18-20 (F.A.C.) as well as this management plan, and whether in-kind projects or donations marked for projects within KJCAP will be required. The KJCAP manager and/or staff should be consulted and included in the process to determine public interest for all applications within the aquatic preserve.

Design and choice of materials, when selected according to local guidance, can contribute to artificial reef function (NOAA, 2007b). Allowable materials for artificial reefs are determined by USACE and ERP; however, preferred materials for artificial reef construction in KJCAP are natural materials or those materials that most closely mimic existing coral reef habitats. Materials such as limestone rock and concrete provide habitat that allows for coral recruitment, are non-polluting yet able to withstand marine environments and storms and can be used to create structures that fulfill various intended purposes of artificial reef design (Lindberg & Seaman, 2011). It is recommended to use natural materials, as defined above, whenever possible. Artificial reef deployments should also have sufficient density, weight, thickness and be firmly anchored so as to remain stable at the depth and currents in which they will be deployed. Based on the increased prevalence and severity of extreme weather events along Florida's coastline and the expectation for this trend to continue (Ali et al., 2023), all material placed on an artificial reef site within KJCAP shall be able to withstand a "20-year storm" (i.e., wind, wave, and current conditions that would have a 5% chance of occurring in any given year), or a "50-year storm" for vessels (i.e., wind, wave, and current conditions that would have a 2% chance of occurring in any given year). Stability studies should be performed based on a state-recognized model or evaluation performance of similar materials at similar depths. Artificial reefs with novel designs, or designs that do not have an established or proven tract record in

Florida, may require additional testing, further consultation with local resources managers and more stringent requirements.

Artificial reef should not be placed on hardbottom habitat or other benthic resources, although exceptions for use of artificial reef material may be permitted on a case-by-case basis for activities such as restoring the structural complexity of a site damaged by a vessel. However, it should be noted that placement on hardbottom or coral reef habitat will be considered an impact. The most recent bathymetry and benthic habitat maps should be used to locate existing natural resources and verified with in-water site visits before placement. Where natural resources occur, appropriate buffer zones are necessary to ensure protection of the resources during placement and from the potential of storm-induced movement. Buffer zone distance from resources will be outlined in the required permits but will depend on the size and method of artificial material placement and may vary depending on site specific environmental conditions such as prevailing current direction and strength (Lindberg & Seaman, 2011). For most installations, a minimum buffer distance of at least 200 feet from hardbottom, submerged aquatic vegetation and natural outcrops shall apply. A minimum distance of 500 feet shall apply for all vessels. These minimum buffer distances may vary according to what materials are being placed and what the purpose of the artificial reef is. Increased buffer distances may apply when materials are large or placed in such a way as to generate turbidity (USACE, 2017). It should also be noted that benthic habitats in marine environments can be ephemeral, as they are vulnerable to both natural and anthropogenic disturbances (Tillman, 2024), and the potential exists for benthic habitat changes to occur between the time that a permit is approved and construction begins. One example of this could be hardbottom becoming exposed after a storm event where there was previously only sand or rubble. This could necessitate a permit modification or preclude the placement of artificial reef structure. Also, resurveying a permitted area may be required depending on the time between when the first survey was completed and the start of deployment.

Artificial reef structures and installation methods should be designed to prevent entrapment of sea turtles and other vulnerable species. Solid or close-bottomed designs for prefabricated modules should be used. Open bottom modules may not be used unless it includes a top opening of a minimum width to allow an adult sea turtle to pass through (USACE, 2017). Artificial structures should also minimize entanglement by using low profile materials like rocks or rubble that offer a lower risk of snagging abandoned fishing gear and monofilament than materials like vessels (Barnette, 2017).

In general, artificial reef development should follow designs that have been ground-truthed to perform ecological or biological goals, and strong justification should be provided for how the design of the artificial reef structure will ensure the goal or purpose is met. All artificial reef projects should take the conservation and restoration goals of KJCAP into account. While artificial reefs are a beneficial restoration tool, they are not sufficient as a direct replacement for natural coral reef habitat since it is not feasible to fully reconstruct the intricate complexities of a coral reef ecosystem.

2.3 / Statutory Authority

The fundamental laws providing management authority for the aquatic preserves are contained in Chapters 258 and 253, F.S. These statutes establish the proprietary role of the Governor and Cabinet, sitting as the Board of Trustees of the Internal Improvement Trust Fund, as Trustees over all sovereignty lands. In addition, these statutes empower the Trustees to adopt and enforce rules and regulations for managing all sovereignty lands, including aquatic preserves. The Florida Aquatic Preserve Act was enacted by the Florida Legislature in 1975 and is codified in Chapter 258, F.S.

The legislative intent for establishing aquatic preserves is stated in Section 258.36, F.S.: "It is the intent of the Legislature that the state-owned submerged lands in areas which have exceptional biological, aesthetic, and scientific value, as hereinafter described, be set aside forever as aquatic preserves or sanctuaries for the benefit of future generations." This statement, along with the other applicable laws, provides a foundation for the management of aquatic preserves. Management will emphasize the preservation of natural conditions and will include lands that are statutorily authorized for inclusion as part of an aquatic preserve.

Management responsibilities for aquatic preserves may be fulfilled directly by the Trustees or by staff of DEP through delegation of authority. Other governmental bodies may also participate in the management of aquatic preserves under appropriate instruments of authority issued by the Trustees. ORCP staff serve as the primary managers who implement provisions of the management plans and rules applicable to the aquatic preserves. ORCP does not “regulate” the lands per se; rather, that is done primarily by the DEP Districts (in addition to the Water Management Districts) which grant regulatory permits. The Florida Department of Agriculture and Consumer Services (FDACS), through delegated authority from the Trustees, may issue proprietary authorizations for marine aquaculture within the aquatic preserves and regulates all aquaculture activities as authorized by Chapter 597, Florida Aquaculture Policy Act, F.S. Staff evaluate proposed uses or activities in the aquatic preserve and assess the possible impacts on the natural resources. Project proposals are primarily evaluated in accordance with the criteria in the Act, Chapter 18-20, F.A.C., and this management plan. To view an interactive map that displays location information on shellfish harvesting areas and aquaculture leases, please visit: https://www.fdacs.gov/Agriculture-Industry/Aquaculture/Shellfish-Harvesting-Area-and-Aquaculture-Lease-Map.

Comments from ORCP staff, along with comments from other agencies and the public, are submitted to the appropriate permitting staff for consideration in their issuance of any delegated authorizations in aquatic preserves or in developing recommendations to be presented to the Trustees. This mechanism provides a basis for the Trustees to evaluate public interest and the merits of any project while also considering potential environmental impacts to the aquatic preserves. Any activity located on sovereignty lands requires a letter of consent, a lease, an easement, or other approval from the Trustees. Similarly, many projects in KJCAP must add an additional "public interest" component to ensure that the project is clearly in the public interest as required by chapter 18-20, F.A.C. According to 18-20, F.A.C., For projects in aquatic preserves with adopted management plans, consistency with the management plan will be

weighed heavily when determining whether the project is in the public interest. Public interest projects can be done in-kind by the applicant or their contractors, or the cost of the project can be submitted through entities approved by KJCAP staff on a case-by-case basis (e.g., the Aquatic Preserves Society, Grants and Donations Trust Fund or Friends of Our Florida Reefs) to ensure that it goes toward the intended and approved purpose. Approved purposes that benefit KJCAP include implementation of strategies and priorities described in this management plan, habitat or species restoration, KJCAP operational and capacity needs, or other needs for KJCAP. Aquatic preserve staff should review, evaluate and approve any public interest proposals.

Florida Statutes that authorize and empower non-ORCP programs within DEP or other agencies may also be important to the management of ORCP sites. For example, Chapter 403, F.S., authorizes DEP to adopt rules concerning the designation of “Outstanding Florida Waters" (OFWs), a program that provides aquatic preserves with additional regulatory protection. Chapter 379, F.S., regulates saltwater fisheries, and provides enforcement authority and powers for law enforcement officers. Additionally, it provides similar powers relating to wildlife conservation and management. The sheer number of statutes that affect aquatic preserve management prevents an exhaustive list of all such laws from being provided here.

2.4 / Administrative Rules

Chapters 18-18, 18-20 and 18-21, F.A.C., are the three administrative rules directly applicable to the uses allowed in aquatic preserves specifically and sovereignty lands generally. These rules are intended to be cumulative, meaning that Chapter 18-21 should be read together with Chapter 18-18 or Chapter 18-20 to determine what activities are permissible within an aquatic preserve. If Chapter 18-18 or Chapter 18-20 are silent on an issue, Chapter 18-21 will control; if a conflict is perceived between the rules, the stricter standards of Chapter 18-18 or Chapter 18-20 supersede those of Chapter 18-21. Because Chapter 18-21 concerns all sovereignty lands, it is logical to discuss its provisions first.

Originally codified in 1982, Chapter 18-21, F.A.C., is meant “to aid in fulfilling the trust and fiduciary responsibilities of the Trustees for the administration, management and disposition of sovereignty lands; to insure maximum benefit and use of sovereignty lands for all the citizens of Florida; to manage, protect and enhance sovereignty lands so that the public may continue to enjoy traditional uses including, but not limited to, navigation, fishing and swimming; to manage and provide maximum protection for all sovereignty lands, especially those important to public drinking water supply, shellfish harvesting, public recreation, and fish and wildlife propagation and management; to insure that all public and private activities on sovereignty lands which generate revenues or exclude traditional public uses provide just compensation for such privileges; and to aid in the implementation of the State Lands Management Plan.”

To that end, Chapter 18-21, F.A.C., contains provisions on general management policies, forms of authorization for activities on sovereignty lands, and fees applicable for those activities. In the context of the rule, the term “activity” includes “construction of docks, piers, boat ramps, boardwalks, mooring pilings, dredging of channels, filling, removal of logs, sand, silt, clay, gravel

or shell, and the removal or planting of vegetation" (Rule 18-21.003, F.A.C.). In addition, activities on sovereignty submerged lands must be not contrary to the public interest (Rule 18-21.004, F.A.C.). Chapter 18-21 also sets policies on aquaculture, geophysical testing (using gravity, shock wave and other geological techniques to obtain data on oil, gas or other mineral resources), and special events related to boat shows and boat displays. The rule also addresses spoil islands, preventing their development in most cases.

Chapters 18-18 and 18-20, F.A.C., apply standards and criteria for activities in the aquatic preserves that are stricter than those of Chapter 18-21. Chapter 18-18 is specific to the Biscayne Bay Aquatic Preserve as is noted in that site's management plan. Chapter 18-20 is applicable to all other aquatic preserves. It further restricts the type of activities for which authorizations may be granted for use of sovereignty lands and requires that structures that are authorized be limited to those necessary to conduct water dependent activities. Moreover, for certain activities to be authorized, "it must be demonstrated that no other reasonable alternative exists which would allow the proposed activity to be constructed or undertaken outside the preserve" (Paragraph 18-20.004(1)(g), F.A.C.).

Chapter 18-20, F.A.C., expands on the definition of "public interest" by outlining a balancing test that is to be used to determine whether benefits exceed costs in the evaluation of requests for sale, lease, or transfer of interest of sovereignty lands within an aquatic preserve. The rule also provides for the analysis of the cumulative impacts of a request in the context of prior, existing, and pending uses within the aquatic preserve, including both direct and indirect effects. The rule directs management plans and resource inventories to be developed for every aquatic preserve. Further, the rule provides provisions specific to certain aquatic preserves and indicates the means by which the Trustees can establish new or expand existing aquatic preserves.

Managed areas within the aquatic preserve are designated as resource protection areas to define the resource value of its submerged bottoms. Determination of whether the communities present at a site constitute a primary resource protection area shall be consistent with the most recently approved methodologies. There are three resource protection area designations, as defined by Section 18-20.003, F.A.C.:

Resource Protection Area 1 – Areas within the aquatic preserve which have resources of the highest quality and condition for that area. These resources may include, but are not limited to corals; marine grassbeds; mangrove swamps; salt-water marsh; oyster bars; archaeological and historical sites; endangered or threatened species habitat; and colonial water bird nesting sites.
Resource Protection Area 2 – Areas within the aquatic preserve which are in transition with either declining resource protection area 1 resources or new pioneering resources within resource protection area 3.
Resource Protection Area 3 – Areas within the aquatic preserve that are characterized by the absence of any significant natural resource attributes.

Aquatic preserve management relies on the application of many other DEP and outside agency rules. Perhaps most notably, Chapter 62-302, F.A.C., the surface water quality standards rule

that contains the classification and designated uses of surface waters in the state of Florida, applicable surface water criteria, and the process to designate waters as OFWs. An OFW is a waterbody deemed worthy of special protection because of its natural attributes (e.g., excellent water quality, or exceptional ecological, social, educational, or recreational value). No activity may be permitted within an OFW that degrades ambient water quality unless the activity is determined to be in the public interest. As of the writing of this plan, Outstanding Florida Waters exist within portions of KJCAP, but do not extend to the entirety of the aquatic preserve, until that section is amended into the rule. Cape Florida Aquatic Preserve along the southern border and St. Lucie Inlet Preserve State Park which overlaps with the norther border of KJCAP are the two areas currently designated as OFWs (DEP, 1996b). When determining what activities are permissible within the overlapping aquatic preserve area, the stricter standards of applicable Florida Statutes and Florida Administrative Code will be applied. Once again, the list of other administrative rules that do not directly address ORCP's responsibilities but do affect ORCP-managed areas is so long as to be impractical to create within the context of this management plan.

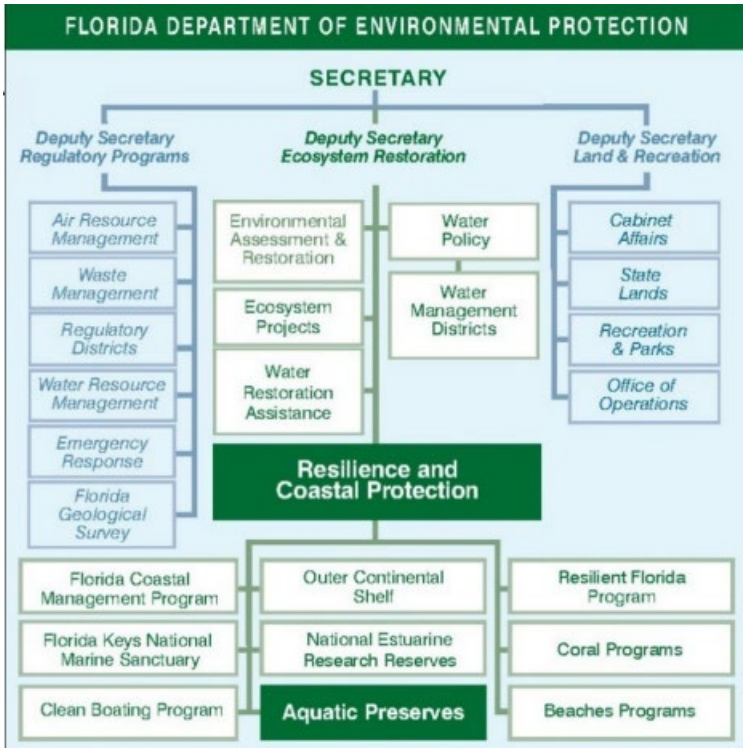


Figure 1: DEP Management Structure.

Photo 4: A benthic community in the Kristin Jacobs Coral Aquatic Preserve including corals, sponges, and algae.

Chapter 3 / The Kristin Jacobs Coral Aquatic Preserve

3.1 / Historical Background

3.1.1 / Indigenous communities

Prior to European contact in the early 1500s, present-day Florida held approximately three quarters of a million indigenous peoples (Henderson et al., 2014). In South Florida, these communities lived from the land and sea for thousands of years, leaving behind evidence of extensive and advanced socio-cultural structures and resource use techniques (Smithers, 2019). In 1513, Juan Ponce de Leon and his crew landed on the Northeast Coast of Florida; while his efforts at colonialization failed to bear fruit, news of his voyage served to precipitate more attempts (Henderson et al., 2014).

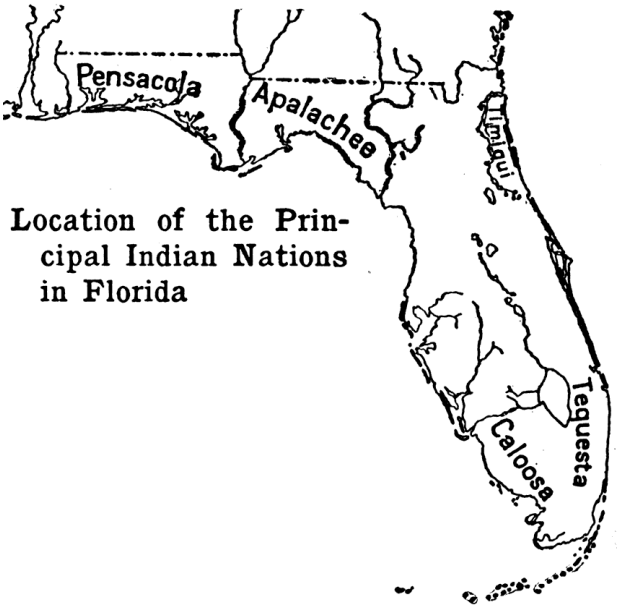


Figure 2: Locations of several indigenous tribes in the 1500s (Brevard, 1919).

3.1.2 / European settlement and forced indigenous migration

Spanish settlements in Florida began in 1565 with Pedro Menéndez de Avilés, who was sent to protect the Gulf Stream route for the Spanish treasure ships by removing French settlements that began to appear in the area (Clark, 2014). Shifting alliances and interactions between the Spanish and the Tequesta tribe remained the norm for several decades, including attempts to build a fort off what is now Miami to establish a strategic position relative to the frequent shipwrecks along the reef tract (Carr, 2012). The extensive shallow coral reef system along the southeastern Florida coastline, historically referred to as the "Florida Reef Tract," is now recognized as part of the *Florida Coral Reef:* the only living coral barrier reef in the continental United States, extending approximately 360 miles from the Dry Tortugas to Martin County (DEP, 2023).

The 1700s saw the populations of the Tequesta and many other South Floridian tribes dwindle, both from diseases brought by the Spanish and raids by the Lower Creeks tribes, to the point where by 1743, the vicinity around the Miami River was host to only six remaining tribes that accounted for about 280 people (Carr, 2012). The few remaining South Floridian indigenous groups were scattered and survived by fishing and trading with Cuba (Carr, 2012).

As the 19th century approached, the English had formed a few settlements in South Florida in their brief control over the region, and some Bahamian developments began in what would become Miami-Dade and Broward counties after the American Revolution (Carr, 2012). Those who did settle in the area relied heavily on the reef, subsisting mainly on catching sea turtles and wrecking, the process of salvaging wrecked cargo for profit (Carr, 2012). Members of what is today known as the Seminole tribe began moving into the area in the late 1700s after the decimation of the Tequesta and Calusa, with the earliest Seminole settlement believed to be on

the border between what is now Miami-Dade and Broward counties (Carr, 2012). Throughout the century, indigenous groups that were forced south from the Second and Third Seminole Wars also settled further inland, with the coastal population being predominantly white. Even with these new settlements coming from both within and outside the United States, South Florida remained perceived as “frontier land” (Carr, 2012).

As indigenous groups were being pushed out, about 100 of them did not comply with forced relocation. Instead, they stayed behind and hid within the Everglades, seeking refuge within tree islands in "hammock-style" encampments (Miccosukee, n.d.). Among this group were members who represent the ancestors of the present-day Miccosukee Tribe of Indians of Florida. For a decade this original group of Miccosukees kept to themselves and resisted external efforts to assimilate. In 1928, as the Tamiami Trail highway approached completion, the tribe began to emerge and accept "New World" living (Miccosukee, n.d.). The Miccosukee Tribe attempted to acquire recognition from the U.S. Bureau of Indian Affairs as a separate tribe from the Seminoles but were not granted such. In response, Miccosukee elders were led by esteemed member, Buffalo Tiger, to Cuba to seek international recognition from Fidel Castro. They were granted recognition as a sovereign country within the United States (Miccosukee, n.d.). Following this, the U.S. Department of Interior Bureau of Indian Affairs accepted the Miccosukee as a separate tribe and in 1962 approved their constitution and bylaws, officially recognizing the tribe as the Miccosukee Tribe of Indians of Florida. With this approval also came the agreement to accept federal aid from the United States (U.S. Department of Interior, 1964), including land from the state of Florida (Godfrey & Catton, 2011). In 1965, as discussions for the establishment of Big Cypress National Preserve took root, the state of Florida divided the land to ensure the Miccosukee Tribe had a land base and granted the tribe 76,000 acres of the lower portion of Big Cypress while the Seminole Tribe of Florida retained the upper 28,000 acres (Godfrey & Catton, 2011). To ease the Miccosukee's worries of being kept from maintaining and expressing their traditional way of life, Congress incorporated language in the Big Cypress legislation specifically stating that the Miccosukee were allowed to continue customary use of their land, including tribal ceremonies, hunting and fishing (Godfrey & Catton, 2011). With the Miccosukee's acceptance of this legislation, as well as federal and state officials and local environmentalists, on October 11, 1974, Big Cypress National Preserve was officially established (Godfrey & Catton, 2011).

The Miccosukee Tribe has played a vital role in the preservation of the Everglades and surrounding natural areas of the state with a focus on water quality. Their advocacy and persistence in adhering to the Clean Water Act and improving water quality standards led to stricter criteria and the adoption of a 10 parts per billion (ppb) phosphorous limit within the Everglades (Godfrey & Catton, 2011), which was ultimately incorporated into the Comprehensive Everglades Restoration Plan (CERP). In 2023, Miami-Dade Board of County Commissioners announced the declaration of October 9 as "Miccosukee Day” and established the second Monday of every October to be recognized as "Indigenous Peoples' Day” in Miami-Dade County (Miami-Dade County, 2023).

3.1.3 / Development of major cities, economy and tourism

Miami-Dade County (originally Dade County) was officially designated in 1836 and originally incorporated much of today's Monroe, Broward, and Palm Beach counties (MDC, n.d.). The Homestead Act brought some new residents from northern states by making it easier to own and keep a home; however, it was not until Henry Flagler expanded the Florida East Coast Railway that the City of Miami, the county, and the counties on the route began to develop into the major population centers that we see today (Clark, 2014; MDC, n.d.). Like many of Henry Flagler's construction projects, the railway was built through leasing convict laborers from the state, and hiring immigrants indebted for their transportation costs, with workers being subjected to harsh working and living conditions (Carper, 1976).

Tourism in Florida began as a prescription for many tuberculosis patients, with physicians sending their patients primarily to St. Augustine (Clark, 2014). Flagler started converting that industry into a winter getaway, building two hotels in St. Augustine and marketing them to his wealthy friends (Clark, 2014). In 1894, as Flagler expanded his hotel businesses further and further south, connecting each one with his ever-expanding railroad, he saw a barrier island across from Lake Worth where he could provide more exclusive experiences for his guests by controlling access to the island (Clark, 2014). He bought swaths of land on either side of the lake, developing the island into Palm Beach with another hotel for the wealthy elite, and the mainland into West Palm Beach for his hotel staff and railroad employees (Clark, 2014). At this point those wealthy guests decided to build houses of their own, leading to a major housing boom in the area (Clark, 2014). The ensuing growth led to the establishment of Palm Beach County in 1909 (Kleinberg, 2006). As access to the area increased, new towns like Boynton Beach, Delray Beach, and Boca Raton sprung up along the railway, originating as farming communities and slowly growing over time (McIver, 1976). In what would later be Martin County, the stop on the route to Palm Beach made the relatively inaccessible area of Stuart open to a new influx of people, also leading to the growth of the city of Stuart and farms emanating from the train station along the St. Lucie River (McGoun, 1998). While Miami saw the highest influx of people in South Florida, the increase was state-wide, leading to the establishment of Pompano, Ft. Lauderdale, and Dania, which all became incorporated in the first decade of the 20th Century, eventually resulting in the establishment of Broward County in 1915 and Martin County in 1925 (McGoun, 1978, 1998).

After extensive lobbying by Julia Tuttle, a resident of Miami who saw its growth potential, Flagler agreed to buy the land necessary to extend the Florida East Coast Railway to Miami (Clark, 2014). In April 1896, the first train rolled into Miami, setting the stage for a major boom in population (Clark, 2014). Almost immediately, new residents flooded in from the rest of the United States and the Bahamas (Bramson, 2007). Through the first quarter of the 20th century land sales were booming; the railroad, followed by the expansion of national highways and the increase in aviation made Southeast Florida more accessible than ever, bringing a dramatic increase in tourism and leading some visitors to settle there (Bramson, 2007; Clark, 2014). An amendment to the State Constitution, which eliminated state income and inheritance tax, also caused an increase in the demand for land with two-thirds of sales to people who had never visited their properties (Clark, 2014). A significant portion of that population increase also came

from South America and the Caribbean as refugees from Cuba, Mexico, Haiti, Nicaragua, the Dominican Republic, and more came to start anew, especially in Miami (Clark, 2014).

The burst of the housing bubble came after the Great Miami Hurricane of 1926. This devastating hurricane made first landfall in downtown Miami on the morning of September 18, killing 372 people, injuring another 6,000, making 18,000 homeless, and destroying many of the new buildings and structures. (Derr, 1998) Two years later, in 1928, another powerful hurricane hit the region, striking West Palm Beach and then moving inland where its powerful winds felled a dike off Lake Okeechobee, washing away the farm towns of Belle Glade and South Bay and killing up to 2,400 people, mostly Black farmers, and injuring thousands more. Shortly after the 1928 hurricane, an exodus of land investors began, followed shortly thereafter by the Great Depression, putting Southeast Florida's rapid growth on hold until WWII. The influx of soldiers in training, followed by a boom in tourism in the 1950s, once again led to the rapid expansion of Florida in general and Southeast Florida in particular (Clark, 2014).

Threats to the marine environment increased as development and construction continued throughout the 20th century. Coastal construction impacts first occurred along the coastal fringe and ridge, followed by the alteration of inland hydrology, and dredging and filling of wetlands through land reclamation processes (Derr, 1998; Kruczynski & Fletcher, 2012). Canals were built to divert freshwater, inlets were dredged to provide vessel access, and outfalls were built to release partially treated wastewater, which have all impacted the offshore environment and its resources. Offshore water quality continued to decline due to coastal development impacts from coastal construction projects and nonpoint sources of pollution (Kruczynski & Fletcher, 2012). As more structures and inlets were built and excavated along the Southeast Florida coastline, beaches began experiencing extensive erosion due to changes in longshore transport and deposition (Wanless, 2009). Port development and maintenance, especially along the three main ports in Southeast Florida, affected almost 600 hectares of corals and associated hardbottom communities (Walker et al., 2012) through the early 21st century.

Port development and increased vessel traffic in the area has contributed billions of dollars to the state's economy, but the increased ship traffic has also increased the risk of associated impacts to sensitive marine habitats. The anchorage grounds lie in close proximity to coral reef and hardbottom habitats, posing risks to these habitats from grounding and anchoring impacts (Walker et al. 2012). In response to repeated ship groundings and anchor impacts on the reef, the U.S. Coast Guard conducted a review of the Port Everglades anchorage, culminating in emergency rule changes that moved the anchorage farther offshore and limited the time ships could spend there (Walker, 2010). A SEFCRI project (MICCI Project 8), investigated how to modify the anchorages at Port Miami and the Port of Palm Beach, eventually leading to the Port Miami anchorage being split into two sections and reduced in overall area from three square nautical miles to 1.5 square nautical miles (33 Code of Federal Regulations [C.F.R.] 110, 2017; Walker, 2010). Recommendations for the modification of the Port of Palm Beach anchorages were made in MICCI Project 8 based on its proximity to artificial reef sites but ultimately were not executed. The location and size of the Port of Palm Beach anchorages remain the same. Apart from the commercial ports, many marinas, docks, and boat ramps exist in each of the four

counties that abut KJCAP. FWC maintains a public boat ramp finder that maps public boat ramps and closures across KJCAP, including information on parking, accessibility and amenities. This online tool can be accessed by visiting the following website: https://gis.myfwc.com/BoatRampFinder/.

3.1.4 / Dredging and drainage to accommodate development

Through much of the 1800s, the shallowness of Biscayne Bay meant that Miami was not a significant port of trade – instead, supplies would come up from Key West where there was a deep-water port (Chapman, 1993). In 1897, after encouragement from Julia Tuttle and William and Mary Brickell, Henry Flagler dredged a 12-foot-deep channel that ran from Cape Florida to Miami and expanded the existing pier infrastructure. When this channel was still too shallow for major passenger and cargo vessels, in 1902 an even deeper channel was established through Miami Beach, separating the southern tip to create Government Cut and Fisher Island. These dredging projects were controversial among many prominent residents given the massive number of spoils they produced, impeding the aesthetics and navigation of waters along the Miami coast.

Port Everglades in Fort Lauderdale hosts many of the world's largest cruise ships. This trajectory began in 1928 with the establishment of its deep-water port, followed in the 1950s and 1960s with rapidly increasing traffic from cargo vessels and ocean liners (Kaye, 2015). As cruise travel to the Caribbean became more popular in the 1970s, Port Everglades was a constant port of call. Major advancements in theme parks and further development of the tourism industry,

The Jupiter Inlet has been documented in maps dating back to 1671 and was historically the only outlet for the Loxahatchee River, Lake Worth Creek and Jupiter Sound. Flow from the St. Lucie and Indian Rivers diverting to the ocean was sufficient to maintain the inlet, but the Jupiter Inlet's size was reduced following the 1892 construction of the St. Lucie Inlet. Changes in

Photo 4: The docking and cargo loading of the Antonia Maceo at Port Everglades in 1953. This vessel was a Cuban car ferry loaded directly from the railroad lines (Photo: State Archives of Florida).

hydrodynamics facilitated the need for management of the Jupiter Inlet to reduce shoaling and maintain a navigable channel. In 1921, Florida State Legislature established the Jupiter Inlet District as an independent special district charged with the maintenance of the Jupiter Inlet. Two parallel 400-foot jetties were constructed at the inlet in 1922 and extended in 1929. The inlet was dredged in 1941 but was closed from 1942 due to World War II and reopened by dredging again in 1947 (Jupiter Inlet District, n.d.). Structural modifications and repairs to the jetties have occurred over the years, primarily for navigational purposes. In 1966, a sand trap was constructed west of the inlet throat to supply sand to the downdrift beaches south of the inlet. Maintenance dredging of the navigation channel and sand trap generally occurs on an annual basis. The U.S. Army Corps of Engineers periodically bypasses material from the Intracoastal Waterway during maintenance dredging events (DEP, 2025e).

The St. Lucie Inlet is one of the widest in Florida, almost half a mile, and thus is vulnerable to changes in sea level. Dredging is typically conducted every two to four years to control shoaling in the three major reaches of this essential channel (MC, 2025). This inlet is unique in that it forms part of the Okeechobee Waterway, a series of artificial waterways that runs through Lake Okeechobee and links Florida's east and west coasts. Private and commercial vessels use this route as an alternative to travelling around the southern tip of Florida.

Bakers Haulover Inlet is a man-made channel connecting the northern end of Biscayne Bay with the Atlantic Ocean located between Port Everglades and Government Cut Inlets (DEP, 2021a). Bakers Haulover Inlet was originally constructed by local interests in 1925 (USACE, 1975). Prior to 1925, Bakers Haulover was the site of a marine railway, which was used to portage marine vessels across the narrow sand barrier between Biscayne Bay and the Atlantic Ocean. Opening an inlet to navigation substantially relieved the effort to portage vessels over land (USACE, 1946). In 1926, a hurricane severely impacted the inlet, destroying the jetties and causing severe erosion. In 1927, the U.S. Army authorized reconstruction of the inlet and reinforcement of the jetties. Several beach nourishment projects have occurred through the years both north and south of Bakers Haulover Inlet. Today, the inlet is an important waterway for recreational boaters, and it also helps to promote flushing of Biscayne Bay (Leatherman et al., 2022).

Lake Worth Inlet is heavily used in south Florida used by freighters, cruise liners, divers, sport fishermen and other recreational boaters. Lake Worth Inlet, also known as Palm Beach Inlet, is a man-made cut through the narrow barrier island between Singer and Palm Beach Islands. The inlet connects the northern part of the Lake Worth Lagoon, which was once the freshwater lake, Lake Worth, with the Atlantic Ocean. In 1866, fresh water was reported to be pouring out of Lake Worth into the ocean through a small opening about ten miles south of Jupiter Inlet. Referred to as Lang's Inlet, after the individual reported to have dug the trench, the inlet tended to silt up and had to be dredged again every few months to sustain the channel. In 1877 a new inlet was dug about a mile north of the original inlet location where a rock formation called the Black Rocks provided some protection for the inlet, but it ultimately migrated south and closed during a storm. In 1915 the Florida Legislature established the Lake Worth Inlet District, which later became the Port of Palm Beach District. The original Lang's inlet location was chosen as a new inlet location and was reopened in 1917. This new Lake Worth Inlet was improved several

times in the following years with the federal government taking responsibility for it in 1935 (Florida Museum, 2025). They continued to widen and deepen the inlet as well as build up the jetties around it. In 1967 the inlet was dredged to 35 feet which is maintained currently. The shoreline south of the inlet began retreating in response to the stabilization of the inlet, so a sand transfer plant was installed north of the north jetty in 1957-58 to pump sand south to facilitate deposition on the downdrift beach (DEP, 1996a).

As the population grew around Lake Worth, the lake became more polluted, and plans were made to create another inlet for better water circulation and improved water quality in the southern end of the lake. As a result, South Lake Worth Inlet (also called Boynton Inlet) was dredged open beginning in 1925 and was completed in 1927 (DEP, 2022). The width of the inlet is stabilized by jetties and varies from 300 feet at the seaward entrance to about 135 feet at the inlet throat. The average depth is about ten feet and is naturally maintained to the underlying rock stratum by swift tidal currents (Olsen 1990). To help offset the erosive effects of the inlet to the downdrift beaches, a sand transfer plant was installed in 1937 on the north side of the inlet to pump sand across to the south side. Although the South Lake Worth Inlet was not intended for navigation, it is regularly used by recreational boaters.

The Boca Raton Inlet is an improved natural inlet connecting the Intracoastal to the Atlantic Ocean through Lake Boca Raton in southern Palm Beach County. Efforts to improve navigation by dredging the inlet were initiated by local interests in 1925-26, followed by the construction of jetties in 1930-31. In 1972, the City of Boca Raton was deeded the inlet and its jetties and accepted the responsibility of maintaining the inlet. In order to maintain navigability, the city purchased a hydraulic pipeline dredge and began efforts to bypass sand to the downdrift beaches located south of the inlet. Over the years the city has repaired and modified both jetties, including the extension of the north jetty and construction of a weir section. Additionally, the city has enhanced its bypassing program through mechanical improvements to its maintenance dredging operation (DEP, 1997a).

Hillsboro Inlet was historically a meandering natural passage to the Atlantic Ocean in Broward County. In 1930, the inlet was first improved with the construction of a 200-foot rock jetty on the north side, then in 1952 a 500-foot timber jetty was constructed on the south side of the channel. A rock structure was built to reinforce the south jetty, and a detached breakwater extension was built on the north side of the jetty, thus creating a weir section between the original and new jetty. At the same time the inlet channel was deepened so that the channel was 175 feet wide and 10 feet deep. Currently the inlet district maintains the existing channel and interior sand trap (DEP, 1997b).

This period also saw the drainage of the Everglades, an idea encouraged since the 1840s that finally came to fruition under Governor Broward (Clark, 2014; McGoun, 1978). In 1913, the State Legislature allowed all localities to drain as they wished, leading to the development of tracts of land, first for agriculture, and eventually for residential and urban areas across South Florida (Clark, 2014). The rapid population growth that caused —and was aided by— the draining of the Everglades has caused ecological effects that are still being felt today in marine

estuaries and coastal environments throughout South Florida. One of the first large-scale water alteration projects was the construction of the Herbert Hoover Dike. Construction for the dike surrounded Lake Okeechobee on all sides, and the completed project effectively blocked natural sheet flow south to the Everglades. Although the southern part of the Everglades was nominally protected as a national park in 1947, that same decade witnessed the start of the Central and Southern Project for Flood Control, the largest civil works project in the nation that in 20 years would restructure waterflow in the region, including Southeast Florida (SFWMD, n.d.b). These profound alterations from the natural hydrology of the region alongside increased land use for agriculture precipitated many of the issues we see today on Florida's Coral Reef. Currently, runoff from the Everglades, which reaches the reef, includes water that has flowed through the agricultural and urban regions from as far north as Orlando. During periods of increased runoff (e.g., high rainfall events), there are greater influxes of nutrients from throughout the watershed into the coastal waters of South Florida, increasing likelihood of eutrophication and associated coral reef stress (Lapointe et al., 2019).

3.1.5 / History of management affecting Florida's Coral Reef

Management of Florida's Coral Reef began in the early 1900s with the federal designation of the National Wildlife Refuge System, followed by the designation of the Fort Jefferson National Monument in 1935, and continued in 1960 with the establishment of John Pennekamp Coral Reef State Park, the first undersea park in the United States. Federal involvement continued when Congress designated the Biscayne National Monument in 1968, which was later expanded to become Biscayne National Park in 1980. The development of managed areas continued in the Florida Keys where the Key Largo National Marine Sanctuary was established in 1975, followed shortly by the Looe Key National Marine Sanctuary in 1981. Continued degradation of coral reef ecosystems throughout the 1980s led to the development of the Florida Keys National Marine Sanctuary and Protection Act in 1990, which unified federal and state management of Florida's Coral Reef in the Keys. Later, additional areas such as the Tortugas Ecological Reserve and Dry Tortugas National Park were established for increased conservation and protection and are managed by the National Park Service (NPS).

A series of spatial and regulatory measures were ushered in with the prohibition of all coral harvest from inside park boundaries of John Pennekamp Coral Reef State Park (§370.114, F.S.), including banning the take of sea fans, stony corals, and fire corals; fishery gear regulations to minimize impacts on coral habitat; contamination regulations; and stricter dredge and fill requirements (Gulf Council [GC] & SAFMC, 1982). While most of these regulatory measures did not require ecosystem science research (e.g., long-term monitoring), the actions did stimulate long-term studies on Florida's coral reefs.

Throughout the 1970s new environmental policies and permitting requirements were implemented (e.g., for the construction of seawalls, fishing piers, inlet hardening, inlet dredging and beach nourishment). Federal oversight and support for the state's efforts in environmental conservation was initiated by the passage of several key federal environmental legislation, including but not limited to the National Environmental Policy Act (NEPA), the Coastal Zone Management Act (CZMA), Marine Mammal Protection Act (MMPA), the Clean Water Act,

Endangered Species Act (ESA), and Marine Protection, Research, and Sanctuaries Act (MPRSA), (Andrews, 2006; Chandler & Gillelan, 2004; Kraft, 2000). Additionally, state-federal cooperation also began in the 1970s through the protection of stony corals, octocorals, and sea fans, which became illegal to harvest in any quantity under §370.114, F.S. and were similarly protected in federal waters, with the exception of a small harvest of octocorals under the Fishery Management Plan created by the Gulf Council and South Atlantic Fisheries Management Council (GC & SAFMC, 1982).

The South Atlantic Fishery Management Council, created under the Fisheries Conservation and Management Act of 1976 (reauthorized in 2006 as the Magnuson-Stevens Act), passed several Fishery Management Plans and related amendments that address KJCAP resources and habitats, such as the 1982 Coral Reef Fisheries Management Plan, the 1982 Coastal Migratory Pelagic Resources Management Plan, the 1982 Spiny Lobster Fishery Management Plan, and the 1983 Snapper Grouper Fishery Management Plan, among others (SAFMC, n.d.). Each of these plans led to long-term stock assessment and habitat research and monitoring, over time leading to a shift towards ecosystem-based management since 2010 (SAFMC, n.d.).

Additionally in 1983, the legislature created the Marine Fisheries Commission to specifically manage marine fisheries resources. In 1999, the management of these resources was consolidated with freshwater fish and wildlife management through a constitutional ballot initiative that established the Florida Fish and Wildlife Conservation Commission (FWC). FWC is constitutionally mandated to manage areas and species within KJCAP pursuant to Article IV, Section 9 of the Florida Constitution, Chapter 68 of the Florida Administrative Code (F.A.C.), and Chapter 379, F.S. FWC oversees Critical Wildlife Areas, Wildlife Management Areas, and species associated with coral reefs and submerged aquatic vegetation that are essential to the ecological integrity of KJCAP.

However, despite the creation of these parks along with the passage of strict harvest prohibitions, the decline of Florida's Coral Reef has persisted over the last three decades (Good et al., 2021). Driven by concerns over chronic stressors, declining trends, and the first ever recorded global coral bleaching event, the federal government moved to strengthen coral reef protection in U.S. states and territories (Craig, 2000).

U.S. Coral Reef Task Force

In 1998, President Bill Clinton established the United States Coral Reef Task Force (USCRTF) by Presidential Executive Order No. 13089 to lead U.S. efforts in the preservation and protection of coral reef ecosystems. The USCRTF is made up of representatives from 12 federal agencies responsible for various aspects of coral reef conservation, seven U.S. states, territories, and commonwealths, and three freely associated states (Micronesia, Marshall Islands, and Palau). The seven states, territories, and commonwealths include American Samoa, the Commonwealth of the Northern Mariana Islands, Florida, Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands.

In 2000, the USCRTF adopted the U.S. National Action Plan to Conserve Coral Reefs (USCRTF, 2000). This was the first roadmap for U.S. action to address coral reef resource protection. During the eighth meeting of the USCRTF, held in Puerto Rico in 2002, the Task Force adopted the Puerto Rico Resolution, which called for the development of Local Action Strategies (LAS) by each of the seven member U.S. states, territories, and commonwealths. These LAS were three-year, locally driven roadmaps for collaborative and cooperative action among federal, state, territory and non-governmental partners which identify and implement priority actions needed to reduce key threats to coral reef resources.

The goals and objectives of the LAS were closely linked to those found in the U.S. National Action Plan to Conserve Coral Reefs (DEP, 2004; USCRTF, 2000). From the 13 goals identified in the National Action Plan, the USCRTF prioritized the following six threat areas as the focus for immediate local action: overfishing, land-based sources of pollution, recreational overuse and misuse, lack of public awareness, environmental change and coral bleaching, and disease.

USCRTF members continue to meet biannually to discuss key issues, propose new actions, present progress reports, and update the coral community on past accomplishments and future plans. In cooperation with state, territory, commonwealth, and local government partners, the USCRTF continues to support:

- Coral reef mapping and monitoring.
- Research projects aimed at identifying the major causes and consequences of degradation to coral reef ecosystems.
- Conservation, mitigation, and restoration as solutions to land-based sources of pollution, sedimentation, collection of coral reef species, direct destruction and other issues.
- International cooperation to assess the U.S. role in international trade and protection of coral reef species and implement appropriate strategies and actions to promote conservation and sustainable use of coral reef resources worldwide.

Coral Reef Conservation Act and NOAA's Coral Reef Conservation Program
In December of 2000, the Coral Reef Conservation Act (CRCA) was signed into law, establishing the NOAA Coral Reef Conservation Program (NOAA CRCP), in order to preserve, sustain and restore the condition of coral reef ecosystems (16 U.S.C. 6401 et seq.). NOAA CRCP brings together expertise from across NOAA for a multidisciplinary approach to understanding and conserving coral reef ecosystems, focusing on four main pillars of work: increased resilience to climate change, reducing land-based sources of pollution, improving fisheries' sustainability and restoring viable coral populations. The CRCA created a mechanism to fund research, conservation and restoration projects through grants to states, territories, non-governmental organizations and local communities to address local issues that affect coral reef ecosystems. KJCAP continues to depend on funding from NOAA CRCP for operational and project support.

Southeast Florida Coral Reef Initiative
As a member of the USCRTF, the state of Florida committed to uphold Executive Order No. 13089, which calls for the preservation and protection of the biodiversity, health, heritage, and

social and economic value of U.S. coral reef ecosystems and the marine environment. Originally named the Southeast Florida Action Strategy Team (SEFAST), the Southeast Florida Coral Reef Initiative (SEFCRI) Team was formed and first gathered in May 2003 to focus on coral reefs and associated reef resources in the area that ultimately became KJCAP. This region was chosen because the coral ecosystems are close to shore, co-exist with intensely urbanized areas, remained relatively unstudied, and lacked a coordinated management plan (like that of the Florida Keys National Marine Sanctuary).

DEP and FWC coordinated the formation of SEFAST from agency resource-related representatives (state, regional and federal), research professionals, and reef use stakeholders. Non-agency participants were part of Issue Teams that provided feedback and guidance to SEFAST. However, in August 2004, recognizing that more collaboration between stakeholders and agency representatives needed to occur, the agency and non-agency members were brought together as one team under SEFCRI, including representatives from academia; non-governmental organizations; the fishing and diving communities; marine industry; and state, local, and federal agencies. Florida charged SEFCRI with developing Local Action Strategies (LAS) to preserve and protect Southeast Florida's coral reefs and associated reef resources from Miami-Dade through Broward, Palm Beach, and Martin counties, emphasizing the balance between resource use and protection, in cooperation with all interested parties. More information about the SEFCRI Team can be found by visiting http://southeastfloridareefs.net/.

The SEFCRI Team originally chose to target four priority focus areas:

- Land-Based Sources of Pollution (LBSP)
- Maritime Industry and Coastal Construction Impacts (MICCI)
- Fishing, Diving, and Other Uses (FDOU)
- Awareness and Appreciation (AA)

LBSP, FDOU, and AA were previously identified as priorities by the U.S. National Action Plan to Conserve Coral Reefs and by NOAA's Coral Reef Conservation Program; however, MICCI was created specifically for Florida based on a unique need local to this jurisdiction. Initially, there were 140 projects outlined in the 2004 LAS under these four focus areas. Because of the dearth of information on the northern region of Florida's Coral Reef, most of the projects sought to better understand the physical, biological, and socioeconomic dynamics of the ecosystem, while the remainder focused on management initiatives. Until this time, the northern region of Florida's Coral Reef remained relatively unstudied, except for circumstances involving opportunistic research and offshore impact studies due to coastal construction activities and local university studies. Simply put, the LAS studied where the reefs were, what lived on them, how healthy they were, how they were used, what was impacting them, and what could be done to reduce those impacts.

The initial goal of completing the original LAS projects in 3 years was extended, and ended up taking over a decade to complete due to the previously mentioned lack of existing data in the norther portion of FCR and the complex nature of many of the questions the LAS projects were designed to answer. By 2017, most of the original LAS were completed or neared completion

leading the team to develop updated LAS, incorporating those 2004 strategies that remained and introducing 28 new projects to reflect the evolving coral reef ecosystem. At this time, a fifth focus area was introduced, Reef Resilience (RR), to address the ability of the ecosystem to respond to major events, including storms and disease outbreaks, as well as the long-term issue of environmental change and resulting bleaching events and acidification.

The SEFCRI Team continues to identify ongoing and emerging stressors to Southeast Florida's coral reefs and associated reef resources and recommends and develops priority SEFCRI LAS projects to address those stressors. SEFCRI Team members serve as liaisons between their constituents and communities and the DEP Coral Reef Conservation Program, keeping DEP CRCP staff informed of issues and concerns, as well as performing supportive outreach to their respective communities regarding the SEFCRI LAS. SEFCRI Team members are also a resource to the DEP CRCP and strive to identify, investigate, and secure possible funding mechanisms and other opportunities for SEFCRI LAS implementation.

In 2004, the SEFCRI Team identified the need for specific technical expertise that did not exist, or was not sufficient within their current membership, specifically regarding the LBSP focus area. The SEFCRI Technical Advisory Committee (TAC) was a specific LAS project (LBSP Project 4) identified to provide technical and scientific guidance on LBSP LAS projects. The TAC is composed of members with appropriate levels of scientific and technical expertise in specific areas. Members of the TAC are selected for and asked to represent their area of expertise, not their agency or organization, as is the case for the SEFCRI Team. As part of the 2012 charter revision, the SEFCRI Team reviewed their progress to date, as well as projections for the future, and subsequently determined that the TAC expertise should be expanded to provide guidance to all the SEFCRI focus areas (LBSP, MICCI, FDOU, and AA). The expansion of the SEFCRI TAC has resulted in a body of scientists with expertise in coral reef ecology, coral biology, coral restoration, coral pathology, coral physiology, water quality, oceanography, chemistry, fish ecology, spatial ecology, ecosystem management, and socioeconomics.

Coral Reef Conservation Program

The Coral Reef Conservation Program (CRCP) was established in 2004 by DEP and was charged with managing the coral reef resources from the northern boundary of Biscayne National Park in Miami-Dade County through the St. Lucie Inlet in Martin County, and from Mean High Water to the offshore boundary of state waters at three nautical miles. The initial role of the CRCP was to oversee SEFCRI and provide leadership for Florida's LAS, to contribute to the National Action Plan for Coral Reefs as part of the USCRTF, and to manage the cooperative funding agreement between the National Oceanic and Atmospheric Administration's Coral Reef Conservation Program (NOAA CRCP) and the state. CRCP was also charged with coordinating research and monitoring, developing management strategies, and promoting partnerships to protect the coral reefs, hardbottom communities, and associated reef resources of Southeast Florida.

The scope of CRCP's mission expanded beyond Florida's LAS when they also gained the responsibility of coordinating the Reef Injury Prevention and Response (RIPR) Program in 2008,

which leads the state's response to and management of unplanned, direct coral reef injuries in Southeast Florida, such as vessel groundings and anchor damage incidents. Their authority and duties were further solidified with the passage of the Florida Coral Reef Protection Act (CRPA) by the Florida Legislature in 2009 (§403.93345, F.S.), which makes it illegal to damage coral reef hardbottom habitats in the Southeast Florida five county region (Monroe County through Martin County). The CRPA authorizes DEP to pursue enforcement action against the responsible parties for civil penalties and damages. Any recovered funds are deposited into a trust fund and are designated for coral reef-specific uses, such as injury event response and restoration. In July 2020, the CRPA was updated with an increased civil penalty schedule and higher maximum penalty per incident. It is also worth noting that civil penalties may increase for incidents occurring within an aquatic preserve, among other aggravating circumstances.

Originally, CRCP was made up of only one staff member, the CRCP Manager, who was tasked with managing the SEFCRI Team and subsequent projects. It was immediately recognized that one staff member was insufficient to manage the SEFCRI Team, provide Team leadership, and implement the 140 LAS projects in the three-year timeline set by the USCRTF; this is why several of the original LAS included hiring full-time focus area coordinators. Over the years, new and emerging stressors were identified by the SEFCRI Team.

Stakeholder Engagement Process

Stakeholder engagement is essential to the effective management of KJCAP, providing valuable local expertise and knowledge from those who closely interact with its economically and ecologically valuable resources. Since 2003, CRCP has engaged with and received input from the SEFCRI team and the TAC. In addition to this diverse stakeholder input, expertise and feedback is consistently sought from the academic sector through the SEFCRI Technical Advisory Committee, which includes representatives from various fields of research including, molecular genetics, microbial symbiosis, coral restoration, physical oceanography, coral disease, algal blooms, toxicology, larval settlement and dispersal, socioeconomics, ocean acoustics, coastal water quality, spatial ecology and planning, disturbance response, and microbiology. CRCP further implemented two stakeholder engagement processes, Our Florida Reefs (OFR) and a Fishery Stakeholder Committee, to gather input from a larger number of resource users and ensure participation management of KJCAP. The research, monitoring, and threat reduction data; public comments; and cooperating agency information, particularly the strategies developed by SEFCRI, the OFR community planning process, and the Fisheries Stakeholder Committee, have been used to identify management issues and stakeholder-based recommendations that will drive the present and future management of KJCAP, including development of this management plan.

Our Florida Reefs Community Planning Process

One of the original 2004 LAS's, FDOU Project 26A, was initiated and hosted by the SEFCRI Team in 2013. This planning process, called Our Florida Reefs (OFR), was a community planning process where members from various interest groups, including divers, fishers, academics, and governmental and non-governmental organizations were recruited to serve on Community Working Groups tasked with developing Recommended Management Actions

(RMAs) specifically for the KJCAP region, then known as the SEFCRI region. The Community Working Groups developed the RMAs based on the results of the original SEFCRI LAS projects. The Community Working Groups met monthly starting in March 2014 until they had compiled a draft RMA list, which went through a large-scale public review process before being finalized by the working groups in June 2016. In total, the working group members dedicated over 10,000 volunteer hours and received thousands of public comments used in the development of 68 RMAs, which helped define many of the strategies included in this management plan ensuring a strong link between the community and ecosystem conservation. OFR recommendations that were not included in this plan were forwarded to the appropriate agencies with authority to address the recommendation. Although management issues related to fishing were included in the OFR process and RMA's, towards the end of OFR the fishing community disengaged, and as a result, input and support for the OFR developed RMA's was lacking from this stakeholder group. This led to the development of another stakeholder engagement process in 2020, FDOU Project 52, which organized a fisheries committee to create additional recommended management actions supported by the fishing community.

Fishery Stakeholder Engagement Process

A two-year long fishery stakeholder engagement process was completed in partnership with FWC and NOAA as a stakeholder supported SEFCRI Local Action Strategy Project called FDOU 52: Data Needs for Fisheries Management. A fisheries committee was formed which included members representative of the recreational, charter, commercial, spearfishing, and marine industry sectors. The committee developed 54 recommended management actions, which were either used to define strategies in this management plan or forwarded to the appropriate agency with authority to address the recommendation. These recommendations were developed through in-depth discussions among members on a variety of environmental issues and concerns including water quality, habitat degradation and restoration, fisheries and boating, education and outreach, and agency processes. The committee's recommendations received input from the wider fishing community, the general public, and the networks of both the fisheries committee and SEFCRI through a survey and a public meeting. The evaluation of support for the management actions developed by the fisheries committee was a key component of this process that aids in improved resource management prioritization and decision making.

Establishment of Kristin Jacobs Coral Aquatic Preserve

Prior to 2018, only the southern two-thirds of Florida's Coral Reef had been formally recognized and designated as uniquely valuable ecosystems requiring coordinated management (NOAA, 2007a). Despite this notable lack of coordinated management, the northern third of Florida's Coral Reef (from the northern boundary of Biscayne National Park to the St. Lucie Inlet) is no less uniquely valuable as it includes extensive near-shore reef resources adjacent to a highly urbanized shoreline. In 2003 with the formation of the SEFCRI Team and TAC, coordination and communication between researchers, stakeholders, agencies, and non-governmental organizations began to be coordinated north of the Biscayne National Park and the Florida Keys. This area was known informally as the SEFCRI region; however, there was still no formalized management boundary.

The Florida legislature established the Southeast Florida Coral Reef Ecosystem Conservation Area on July 1, 2018, and subsequently renamed the area the Kristin Jacobs Coral Reef Ecosystem Conservation Area (Coral ECA) in 2021, honoring the tremendous support the late Representative provided to this area. The Coral ECA consisted of the "sovereignty submerged lands and state waters offshore of Broward, Martin, Miami-Dade, and Palm Beach counties from the St. Lucie Inlet to the northern boundary of the Biscayne National Park" (Florida Statutes 253.90), equivalent to the area previously referred to as the SEFCRI region. While the area was now formally recognized by the Florida Governor and Legislature, there still were no additional protections added or a designated management entity. This changed in 2024 when the Florida Legislature passed a bill that included designating the Kristin Jacobs Coral Reef Ecosystem Conservation Area as an Aquatic Preserve, referred to as the Kristin Jacobs Coral Aquatic Preserve (KJCAP), and it became Florida's 43rd aquatic preserve. This recent designation formalized the managing relationship between the northern portion of Florida's Coral Reef and DEP's Coral Reef Conservation Program, as well as providing additional biological, aesthetic, and scientific protection for the northern portion of Florida's Coral Reef. The aquatic preserve designation also ensures holistic management of the area by improving coordination of coral reef restoration and shoreline stabilization projects, streamlining water quality monitoring efforts, and solidifying Florida's commitment to protecting its coral reef habitat and resources.

DEP's CRCP as part of the Office of Resilience and Coastal Protection (ORCP) has developed this management plan for KJCAP to coordinate inter-agency efforts and guide management activities to restore and enhance the marine environment within the boundaries of KJCAP. ORCP recognizes the inherent complexity in governance that exists within KJCAP due to the delegation of management authorities to different federal, state, and local governmental agencies, including DEP, FWC, NOAA, counties, and municipalities. Within Florida's Coral Reef, there are a variety of managed areas, including Dry Tortugas National Park, the Florida Keys National Marine Sanctuary, Biscayne National Park as well as numerous state parks, aquatic preserves, critical wildlife areas, and wildlife management areas. In addition to the multi-agency coordinated management efforts, ORCP also understands the importance of stakeholder participation and encourages their involvement in the management plan development process.

Continued collaborative action among researchers, government and non-governmental agencies, and stakeholders will allow key issues impacting resources within KJCAP to be addressed, which include water quality/land-based sources of pollution; marine industry and coastal construction impacts; sustainable, economic, and recreational use; ecosystem disturbance response and recovery; community education, engagement, and access; and building ecosystem resilience. Issues affecting KJCAP are addressed using an approach that integrates principles of Ecosystem Science, Resource Management, Education and Outreach, and Public Use Programs, which are overseen by ORCP. This approach (issue-based management) allows the goals, objectives, and strategies associated with an issue to have a greater chance of being accomplished through the actions of multiple partners, in addition to CRCP.

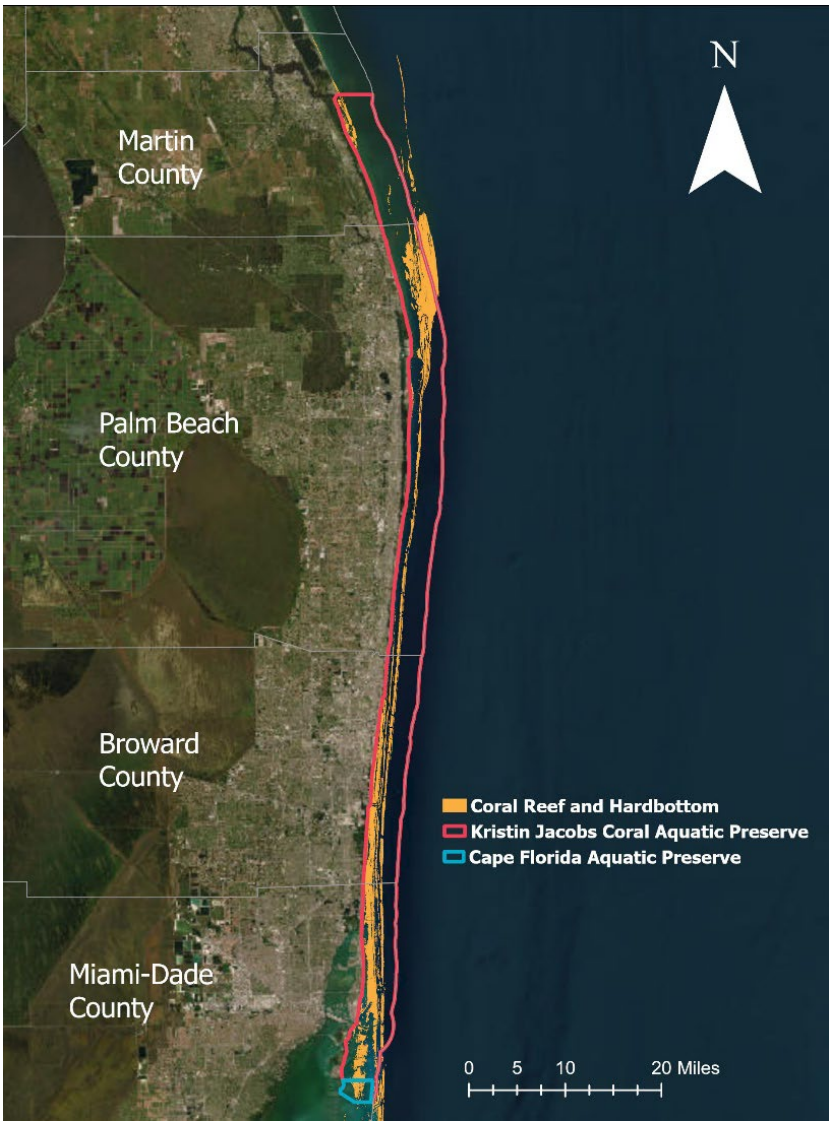
The long-term decline of the environment within KJCAP has led to collaborative action to enhance the conservation of Southeast Florida's vital ecosystems, including the efforts to develop this management plan. Southeast Florida's growing population has led to increased development, water quality issues including sedimentation and land-based sources of pollution, habitat degradation, and intended and unintended impacts from recreational and commercial use, which have reduced the health and resilience of the ecosystems within KJCAP. More formal management is needed to ensure the long-term health of and to address the complexities of KJCAP, which is one part of an inter-connected system of managed areas that make up Florida's Coral Reef. The purpose of this plan is to incorporate, evaluate, and prioritize all relevant information about the region into a cohesive management strategy, allowing for access to the managed area while balancing use with protecting the long-term health of the ecosystems and their resources.

Cape Florida Aquatic Preserve

Cape Florida Aquatic Preserve (CFAP), formally known as Biscayne Bay-Cape Florida to Monroe County Line Aquatic Preserve, was first designated in 1970. It initially encompassed a vast area of submerged lands and islands, stretching offshore from southern Key Biscayne out to Florida state waters, southward to the Monroe County line and northward along the Intracoastal Waterway back to Key Biscayne, including Bill Baggs Cape Florida State Park. However, with the establishment of Biscayne Bay Aquatic Preserve in 1974 and then Biscayne National Monument in 1980 (later expanded and renamed Biscayne National Park), the preserve's acreage was significantly reduced. Today, the preserve exists as a smaller area off the eastern shore of Key Biscayne. Despite its reduced size, the preserve remains a crucial part of Florida's aquatic ecosystem, providing habitat for diverse marine species.

Historically, CFAP has been managed by Biscayne Bay Aquatic Preserve (BBAP) program. When KJCAP was established, its boundary entirely encompasses CFAP, therefore KJCAP staff have assumed management of this aquatic preserve. Not only do these areas overlap, they also have the same habitats, ecosystems, and natural communities, making the KJCAP staff suited to manage this area. Biscayne Bay Aquatic Preserve staff will continue to provide technical and logistical assistance whenever needed for the monitoring of marine seagrass communities within CFAP. While BBAP is administered under Chapter 18-18, Florida Administrative Code (F.A.C.), that rule does not extend to CFAP, another reason why management was transferred to KJCAP since they are both administered under Chapter 18-20, F.A.C. CFAP is designated as an Outstanding Florida Water (Rule 62-302.700, F.A.C.), which provides additional regulatory protections. In this management plan, the areas designated as KJCAP and CFAP will be referred to together as the Kristin Jacobs Coral Aquatic Preserve (KJCAP), unless there is a fact or strategy specific to CFAP, in which case it will be called out.

3.2.1 / Location/Boundaries



Map 2: KJCAP (red) and CFAP (blue) boundaries

Kristin Jacobs Coral Aquatic Preserve is oriented towards the northern 105 miles of Florida's Coral Reef, including the sovereignty submerged lands and state waters (from the Mean High-Water Line to three nautical miles) offshore of Martin, Palm Beach, Broward and Miami-Dade counties from the St. Lucie Inlet to the northern boundary of Biscayne National Park. The northern border of KJCAP overlaps with the offshore waters included within the St. Lucie Inlet Preserve State Park, and KJCAP's southern boundary encompasses CFAP. KJCAP is uniquely situated in a subtropical climate and in close proximity to the warm waters of the Gulf Stream (Banks et al., 2008).

3.2.2 / International/National/State/Regional Significance

Florida is the sole continental state to have a nearshore coral reef ecosystem. Florida's Coral Reef is comprised of many different types of reefs that were formed across various geological time periods, but which combined are best classified as a bank-barrier reef. The reef structure is supported by stony corals and associated biotic communities; this reef structure provides habitat for more than 6,000 species, including many important fisheries species such as spiny lobster, reef fish, and marine ornamentals (Banks et al., 2008). Seagrass beds within the aquatic preserve are prime feeding areas for wading birds and a valuable nursery area for juvenile fish

and invertebrates, including many of commercial interest. The counties bordering the aquatic preserve are densely urbanized, home to almost 6.4 million residents (United States Census Bureau [U.S. Census], 2020). South Florida's economy and way of life are inextricably linked to its coastal and marine environments. The coral reef, submerged aquatic vegetation and associated ecosystems sustain a variety of ecosystem services that provide numerous economic, social, and cultural benefits to the surrounding communities including dive and snorkel tourism, fisheries, biomedicine, and shoreline protection from flooding and storm damage, among many others.

Florida's Coral Reef hosts diverse assemblages of stony, or reef-building corals, octocorals, sponges, and algae that contribute to the integrity and vitality of the reef platform, as well as a myriad of fish, crustaceans, mollusks, and other marine life associated with the ecosystem. As previously stated, the coral reef ecosystem and its productivity are closely tied to nearshore and inshore habitats, namely seagrass beds, mangroves and other estuarine habitats. Apart from being connected in terms of water quality, nutrient flows, and other biogeochemical processes, these landward habitats are often important refuges for key life stages of ecologically and commercially significant species. While some species may display periodic movements across habitats, others migrate permanently to the reef as the species mature in an age-driven (ontogenetic) migration.

Ecosystem Values

KJCAP provides many important ecosystem services; however, among the most critical is its role as a barrier reef. Healthy coral reefs help to prevent flooding by serving as breakwaters that attenuate wave energy. Reefs in KJCAP help to protect a population of 6.4 million from Miami-Dade to Martin County (Office of Economic and Demographic Research, 2019). Seagrass beds, in addition to their contribution to carbon sequestration and habitat provision, contribute to coastal protection as well via both their above ground shoots and below ground biomass (Christianen et al., 2013; Forrester et al., 2024). These communities already represent some of the most environmental change-vulnerable in the country; this vulnerability results from (1) exposure to flooding and shoreline erosion from rising sea levels and (2) environmental change-related increases in the frequency and intensity of hurricanes and severe storms, in combination with (3) vulnerable individuals and communities in the region (Beck et al., 2018; Benevolenza & DeRigne, 2019). Thus, the shield that benthic communities such as coral reefs can offer to these exposed communities will become even more important with time (Elsner et al., 2008; Hauer et al., 2016). Cities like Miami Beach, which are already spending hundreds of millions of dollars on flood mitigation, will see those costs skyrocket as the extent of land and infrastructure impacted by a 100-year storm will increase by an additional 116% by 2100 under the business-as-usual model (Beck et al., 2018; Kulp & Strauss, 2017). Florida's Coral Reef has the potential to provide almost $324 million per year in flood protection benefits to buildings and to protect $286 million in annual economic activity in peninsular Florida (Storlazzi et al., 2019).

Strategies identified in Chapter 4 of this management plan, and the conservation of KJCAP, help to protect these critical values and represent an investment into the future of Florida´s economy and ecology.

Transportation Hub

Southeast Florida is the most populous and densely urbanized region in the state, consisting of approximately a third of Florida's 23.4 million residents, with large metropolitan areas, several major cities (Miami, Fort Lauderdale, and West Palm Beach), and dozens of municipalities along the shoreline of KJCAP (U.S. Census, 2024). Communities throughout the four-county region are connected by Florida's Turnpike, Interstate 95, and several large east-west interstates. There is a total of nine inlets that provide coastal access from the Atlantic Intracoastal Waterway to KJCAP. There are two inlets in Miami-Dade County (Government Cut and Baker's Haulover), two inlets in Broward County (Port Everglades and Hillsboro), four inlets in Palm Beach County (Boca Raton, Boynton, Palm Beach, and Jupiter), and one inlet in Martin County (St. Lucie).

Southeast Florida is a hotspot for commercial maritime traffic that's seen significant increases in shipping activity over the years, especially freight and cruise. There are three main ports, and associated deep-water anchorages, in Southeast Florida that border KJCAP that result in heavy vessel traffic through the area: Port of Miami, Port Everglades, and the Port of Palm Beach (Florida Seaport Transportation and Economic Development Council [FSTEDC], 2019). All three of these ports are landlord ports, where the port authority (county or port district) owns the land and infrastructure, but the day-to-day operations are run by private operators who lease it from the port "landlord." Port of Miami provides county funds through the leases of private companies, is the leading cruise ship port in the world, and its 330,000 jobs contribute around $43 billion annually to the local economy (FSTEDC, 2019). Port Everglades in neighboring Broward County also brings in significant revenue at more than $30 billion annually, supporting over 230,000 jobs (FSTEDC, 2019). The Port of Palm Beach, another landlord port, is the smallest of the three, generating $260 million in private revenue and $12 million for the state and federal governments, and providing convenient access to the local railroad (FSTEDC, 2019).

3.2.4 / Cultural Significance

KJCAP ecosystems are also culturally important, providing a sense of place, identity, and community, indicated by the number of visitors and residents that snorkel, dive, fish and recreate in KJCAP. The ecosystems found in KJCAP are amazing expressions of nature and have deep connections to coastal communities. The cultural importance of these ecosystems is difficult to quantify but extends through ceremonial and holiday practices to food availability and consumption to personal symbolic or spiritual connections. KCAP's cultural significance is also reflected in the education, research, and artistic communities and outputs it supports (Cramer et al., 2022). A survey of residents in South Florida showed that over three quarters believed that coral reefs were important to their family's cultural beliefs and practices, and that most residents support management strategies to protect coral reefs (Allen, 2021).

Coastal ecosystems hold significance for many local and indigenous populations as they are tied to folklore, spiritual beliefs, and serve as part of their identity and heritage. These communities hold extensive historical knowledge of KJCAP's ecosystems that can inform a

deeper understanding of what holistic conservation should look like. Conservation and management of protected areas is more effective when local and indigenous communities are consulted and engaged to identify and address environmental challenges (Dawson et al., 2021).

3.3 / Aquatic Preserve Description

3.3.1 / Surrounding Population Data and Future Projected Changes

Florida is the third most populous state in the U.S. with a population of 23.4 million residents, exceeded only by California and Texas (U.S. Census, 2024). Home to a population of 6.4 million, Southeast Florida's population has grown significantly over the past 50 years, increasing by 464% from 1970 to 2019, and it is expected to grow another 23% through 2045, by adding another two million residents.

Southeast Florida's warm climate and expansive coasts contribute greatly to its popularity for both residents and visitors. Tourism is among the most important economic drivers for the state, playing an essential role in the region's economy. In 2019, tourism had a total economic impact of $96.5 billion, with 145.4 million out-of-state tourists visiting the state (Rockport Analytics, 2021). In Southeast Florida, tourism accounted for $35.1 billion in total economic impact and contributed to 494,000 jobs, second only to central Florida. Miami-Dade County alone recorded 24.2 million visitors in 2019, and the county's beaches and climate were the main draw for both overnight visitors and day trippers (Greater Miami Convention and Visitors Bureau [GMCVB], 2020). Regional studies (Johns et al., 2001; Johns, 2004) have shown the importance of Florida's Coral Reef for recreation and tourism, and more recent extrapolations (e.g., Spalding et al., 2017) have shown a strong, continued use of and demand for KJCAP resources. Stakeholder research conducted in support of SEFCRI priorities has similarly determined the high level of extractive and non-extractive uses in KJCAP region (Shivlani, 2006; Shivlani & Villanueva, 2007).

The growing population and significant tourism load in Southeast Florida present both opportunities and threats to KJCAP's coral reef ecosystem and associated habitats and resources (Johns et al., 2001). The opportunities range from the economic value that KJCAP provides via visitor expenditures and local employment options, the varied seafood products that the coral reef ecosystem supports for the commercial fishing industry and consumers, and the protection that an intact and healthy coral reef offers a coastal zone otherwise vulnerable to coastal flooding and erosion (Spalding et al., 2017; Woodhead et al., 2019). By contrast, challenges to the integrity and health of KJCAP and its resources can result from the rapid increase in population and tourism. Specifically, increases in resident and tourist populations are expected to: create the need for greater infrastructure development; lead to higher amounts of wastewater discharge through point and non-point sources; lead to more urban stormwater runoff and other land-based sources of pollution; build pressure for developing or modifying watershed hydrology to accommodate human use and habitation; increase fishing pressure; increase the risk of physical damage generated by anchoring, divers, and snorkelers; and

increase the risk of vessel-based oil pollution and other hazardous discharges/accidents (Collier et al., 2008).

3.3.2 / Topography, Geomorphology, and Geology

Southeast Florida's continental shelf, which encompasses KJCAP, is relatively narrow, ranging from 3-4 km in width (Banks et al., 2008). A series of ridges, or terraces, run parallel to the region's coastline, separated by sediment layers of varying thickness. Coral reefs and associated communities grow on these ridges, comprising the inner, middle, and outer reefs of Southeast Florida that extend in a north-south axis from northern Palm Beach County to southern Miami-Dade County. Along its northern extent, past Hillsboro Inlet off northern Broward County, the inner and middle reefs of the nearshore ridge complex are buried due to the seaward accretion of the present-day coast. The outer reef ends off Palm Beach County in a convergence with a series of beach ridges. A Deep Ridge Complex that begins in Palm Beach County extends 2 km into Martin County and consists of three ridges that vary in depth from 18 m to 25 m (Walker, 2012). There is also notable shallow hardbottom habitat around the St. Lucie Inlet at the northernmost point of KJCAP (Walker, 2012). In the southern portion of the region, only the middle and outer reef remain in southern Miami-Dade County, which eventually also disappear under sand seaward of Biscayne Bay (Banks et al., 2008). South of the outer reef terminus, offshore the southern end of Key Biscayne, three small linear reefs occur, but it is unclear whether these structures are a continuation of the outer reef, an independent structure, or the beginning of the Florida Keys reefs (Banks et al., 2008). The overall offshore area available to support shallow water coral reef ecosystems off Southeast Florida is 19,653 square kilometers; while early and mid-Holocene conditions did support reef building (i.e., an increase in overall reef infrastructure via carbonate accretion) along Florida's Coral Reef, the reefs at present are not in a framework building phase (Toth et al., 2022).

The outer reef terrace ranges from 16-36 meters below sea level and is an old Acroporid - framework reef that extends from Biscayne Bay northward to Delray Beach (Banks et al., 2008). The species, location, and zonation of the terrace implies that the outer reef terrace crested in much shallower water than it does today. Geomorphic features, such as reef gaps that occur along the reef zones, suggest the existence of old inlets or river channels in the underlying substrate. The middle reef terrace crests at 15 meters below sea level and runs from southern Miami-Dade County north to southern Palm Beach County near the Boca Raton Inlet. It is likely that the middle reef was a shoreline when the outer reef was still actively accreting, and it - like the outer reef - has erosional channels, which indicates the existence of paleo-rivers that cut through the inner, middle, and outer reefs. Also present between all three terraces is low ridge-like formations mostly covered by sediment, which may have been framework ridges or lithified sand ridges. The inner reef terrace crests at eight meters below sea level and is comprised mainly of an *Acropora palmata* framework, which begins off northern Miami-Dade County and extends north to Hillsboro Inlet. Unlike the outer reef, the inner reef is discontinuous, consisting mainly of patch reefs fused to form longer structures in some areas. The nearshore ridge complex, which sits landward of the three main reef terraces (Figure 3), extends from Miami-Dade County north to Hillsboro Inlet, and is comprised of shoreline deposits and karst features, creating a series of pavement and ridges between 3-5 meters below sea level. On the outer, or

eastern edge of the ridge complex, a feature exists at six meters below sea level with a vertical relief of approximately 1.5 meters, resembling what Banks et al. (2008) and Raymond (1972) interpreted as a wave-cut cliff, possibly a shoreline from the time the inner reef was alive and accreting.

Detailed mapping studies have been conducted under the LBSP SEFCRI focus area. From 2004 to 2013, researchers from Nova Southeastern University developed detailed benthic habitat maps for each of the four counties in KJCAP. Using LiDAR bathymetry surveys, aerial photography, acoustic ground discrimination, and video ground truthing, approximately 954 km^2 of ocean floor was surveyed within the region, identifying changes in substrate and sub-habitats along the reef and between the three offshore reefs (Riegl et al., 2004, 2007; Walker, 2009; Walker et al., 2012). These offshore mapping efforts allowed for the discovery of over 110 undocumented large coral colonies at the onset of the SCTLD outbreak (Walker and Klug, 2015), as well as a deeper understanding of the distribution of coral species listed as threatened under the ESA within KJCAP (Walker, 2017).

There are no known mineral resources within KJCAP.

3.3.3 / Sediment

Marine sediments in KJCAP include calcium carbonate silt derived from skeletal remains of reef-building and other calcifying organisms, marl, mud, sand, shell and organic matter (FNAI, 2010). However, these sediment types have not been mapped. Compositions are influenced by coastal currents, depth of the seabed, and coastal erosion. Sediment and nutrients originate from a variety of sources on land; during rainfall, these sediments and nutrients will frequently

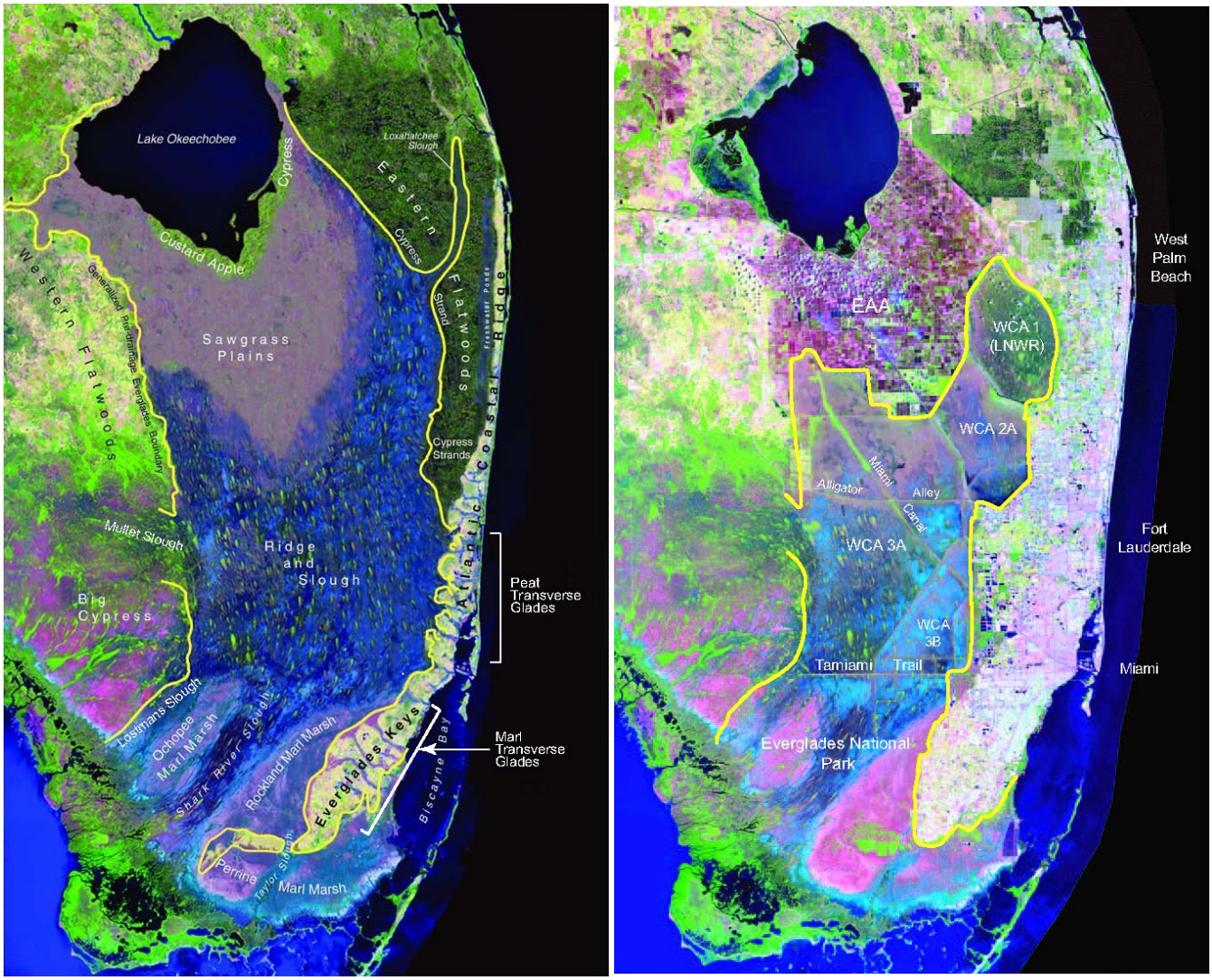
Figure 3: Illustration of a typical reef terrace structure as an example of what can be found in KJCAP.

wash into inland waterways and are then carried to the ocean. Common sources of nitrogen and phosphorus include fertilizers that are used on commercial farms and residential lawns, as well as human and animal waste (Whitall et al., 2019). Coastal development, dredging, and beach nourishment projects are some examples of common anthropogenic activities with high risk of mobilizing sediment into coastal waters. Accumulation of heavy metals, oils, pesticides, and bacteria in marine sediments can become resuspended from wave action or storms, or from anthropogenic activities such as inlet dredging, and harm or kill marine organisms, in particular benthic communities (Giarikos et al., 2023).

3.3.4 / Hydrology and Watershed

Before dense urbanization, the South Florida hydrologic system covered an area of about four million acres (Obeysekera et al., 2011) and functioned as an interconnected mixture of freshwater wetlands, uplands, estuaries, and marine ecosystems. Surface waters from the Kissimmee River basin flowed into Lake Okeechobee with the only outlet being periodic overflow of the southern shore during the rainy summer season (June through October). The overflowing water was slowed and filtered across the Everglades thick sawgrass plain, much of it infiltrating into the ground prior to draining into Florida Bay. The Atlantic Coastal Ridge, a marine limestone covered with thin sheets of quartz sand, partially separates the wetlands of the Everglades from the eastern coastal region, rising to a maximum of 20 feet above sea level in some areas. In the north, it spans a width of 3 – 5 miles and in the south, 10 miles (NPS, 2018). The ridge that runs approximately along the current location of Interstate 95 prevented much of the water in the Everglades from flowing east into the Atlantic Ocean, except for a few flow connections in the south, called the transverse glades (Obeysekera et al., 1999). The southern region of what is currently Miami-Dade County, the primary source of freshwater flow into estuaries was through upwelling from the Biscayne Aquifer.

During the late 1800s, coinciding with steady human population increase, water management began to alter the natural slow-moving sheet flow of water through the construction of canals, ditches, dams, and levees. This was done to accommodate agricultural use, oil and gas exploration, and urban development. The Central and South Florida Flood Control Project was initially created in response to disastrous flooding events that occurred in 1926, 1928, and 1947 (Obeysekera et al., 2011). The engineered water management system constructed by the U.S. Army Corps of Engineers (USACE) successfully prevented flooding, while at the same time significantly altering the region’s ecology by decreasing the areal extent of the Everglades by half, reducing flow of freshwater to Florida and Biscayne Bays, and significantly increasing freshwater to estuarine systems in the north (Indian River Lagoon, St. Lucie Estuary, and the Caloosahatchee Estuary).



Map 3: Everglades Ecosystem
A reconstruction via satellite images of the Everglades ecosystem and surrounding watershed (a) pre-drainage, circa 1850, and (b) post-drainage (1994). Yellow lines indicate the extent of the Everglades ecosystem at both points in time (Source: McVoy et al., 2011)..

The construction of deep water ports and coastal inlets also altered the hydrology of KJCAP and upstream systems. The creation of inlets connected water coming from the Everglades to the reefs and while it did provide natural flushing action to remove storm water runoff from upstream estuaries and lagoons, the inlets and associated maintenance caused changes in microbial diversity in reef sediments (Krausfeldt et al., 2023), increased sediment in runoff over seagrass and coral habitat, and increased the flow of nutrient-laden freshwater to nearshore coral reefs (Pickering & Baker, 2015).

The Loxahatchee River, one of the most ecologically and culturally significant waterways in Southeast Florida, has a long and complex history. The name *Loxahatchee*, derived from the Seminole language meaning “river of turtles,” reflects its ecological richness and historical

connection to indigenous communities (Loxahatchee River District, n.d.). During the 19th and early 20th centuries, the river supported vast sawgrass swamps, cypress floodplains, and hardwood hammocks that served as a natural corridor for transportation, trade, and conflict, including during the Seminole Wars (DEP, n.d.c). The river's natural hydrology began to change dramatically in the mid-20th century with extensive canal building, levee construction, and the permanent opening of the Jupiter Inlet in 1947, which increased saltwater intrusion and disrupted freshwater flows (DEP, 2025e). In recognition of its outstanding ecological value, 10.3 miles of the Northwest Fork were designated as Florida's first *National Wild and Scenic River* in 1985, emphasizing the importance of preserving its natural character and biodiversity (Loxahatchee River District, n.d.).

Today, the Loxahatchee River and Lake Worth Creek system continue to play an important hydrological and ecological role in the region. The river discharges through the Jupiter Inlet into the Atlantic Ocean, directly influencing the nearshore marine environment adjacent to KJCAP. Alterations in flow regime, nutrient enrichment, and urban runoff from its watershed contribute to variations in salinity, turbidity, and nutrient dynamics that affect downstream seagrass and coral reef habitats (Loxahatchee River District, 2023). Ongoing restoration projects led by SFWMD, USACE and partner agencies aim to restore natural freshwater flow, reduce saltwater intrusion, and re-establish bald cypress floodplain forests (USACE, 2025). These upstream restoration and management efforts are crucial for maintaining water quality and ecological resilience within KJCAP submerged aquatic vegetation and coral reef systems.

Subsequent to the realization of the deleterious effects of altering the state's hydrologic system, the state and federal governments have for the last two decades undertaken many major projects to restore some freshwater flow through the Everglades, as well as to the wetlands adjacent to southern Biscayne Bay.

Hydrology in the region is driven by flat topography, highly variable rainfall, rainfall-generated run-off, groundwater recharge and discharge, and evapotranspiration. The South Florida water management system, alternatively known as the Central and Southern Florida Project, is a vast engineering project, including approximately 2,200 miles of canals, 2,100 miles of levee/berms, and 1,400 water control structures (operated under regulation schedules and operational rules) (SFWMD, 2020). This system was designed to provide flood protection, maintain adequate groundwater elevations in agricultural and urban areas for water supply needs of a growing population, and inhibit potential saltwater intrusion into the freshwater aquifers (Strowd et al., 2017). Constructed wetlands called the Everglades Storm Water Treatment Areas and flow equalization basins for water quality treatment are also components of the South Florida water management system. In addition to surface waters, several groundwater aquifers contribute to the hydrology in South Florida, most responding quickly to rainfall and surface water conditions. The agencies responsible for the region's water resource management, the South Florida Water Management District (SFWMD) and USACE, have divided the area into four main planning regions: the Kissimmee Basin, Upper East Coast, Lower West Coast, and the Lower East Coast. Each region is supplied water for various uses from their associated aquifers. The primary source of groundwater for the Lower East Coast is the Biscayne Aquifer and for the

Upper East Coast, the Surficial Aquifer (SFWMD, 2020). Water Conservation Areas have also been constructed to support urban water supply and protect fish and wildlife in the Everglades.

The connectivity between surface, ground, and seawater is prominent due to the porous limestone which allows surface water to quickly enter the ground, then flow into various waterways until reaching the ocean. This connectivity between ground and surface water can be illustrated through water chemistry. For example, dissolved oxygen in ground water is commonly very low, so an abnormally low concentration in surface waters may indicate higher than usual inflows of groundwater (DEP, 2019). Nitrogen is also naturally very low in groundwater, so the presence of organic and inorganic nitrogen in human or animal waste, and/or the use of fertilizers can result in increased plant and/or algal growth in surface and coastal waters. Surface waters from the Everglades and north are connected to estuaries and coastal waters through a large network of canals in addition to a few small rivers, remnants of the natural flow. This network drains nutrient-rich fresh waters from local basins and Lake Okeechobee into the estuaries and the coastal waters, resulting in reduced salinity, and increased phosphorus and nitrogen concentrations, which fuel algal blooms.

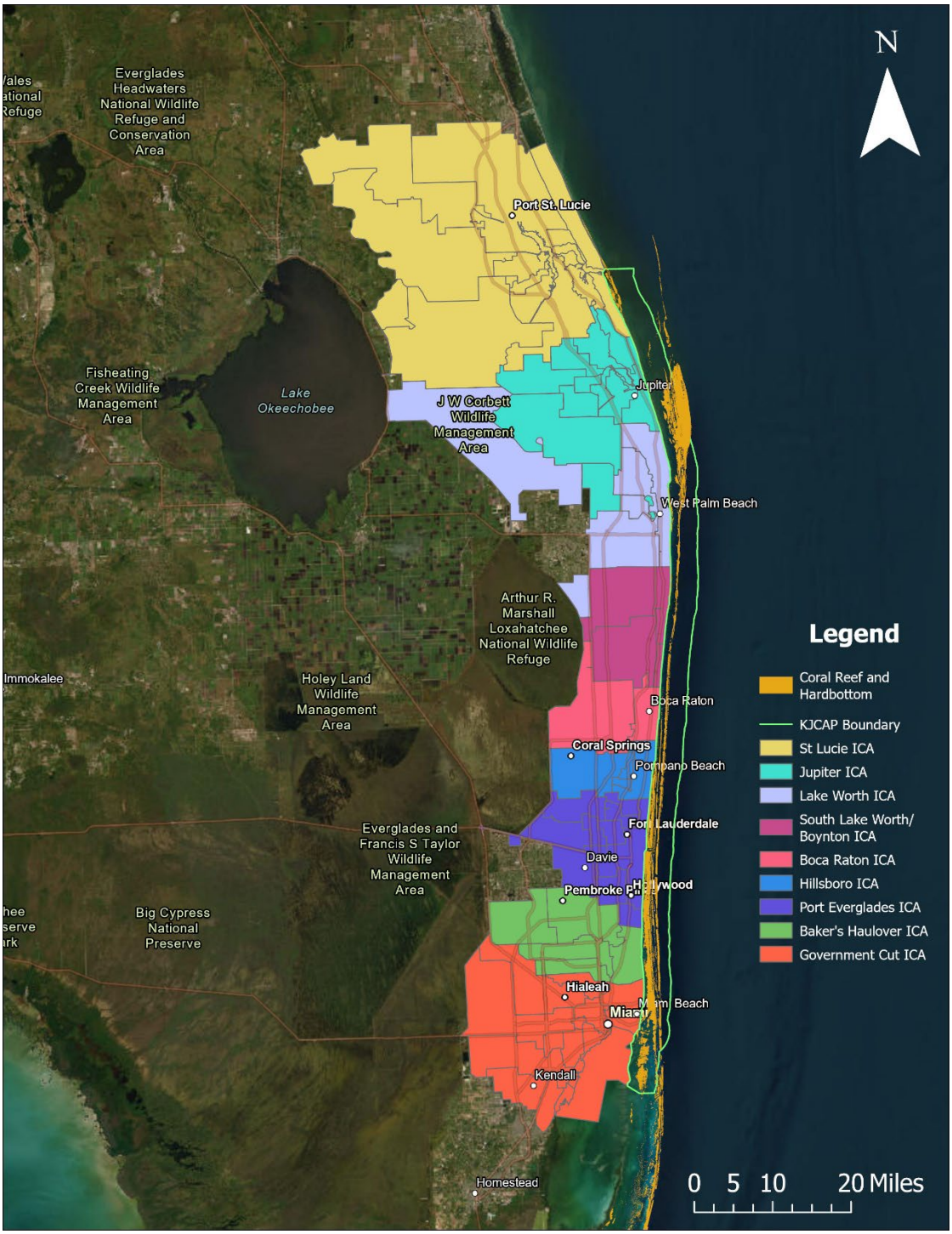
Water resources in South Florida are managed in a three-tiered fashion. The primary canal system manages regional water levels, flows, and discharge flood waters throughout the 16-county jurisdiction of the SFWMD. This system's primary function is to provide regional flood control and groundwater recharge, managed by SFWMD and USACE. Secondary canal systems are governed by designated drainage Districts or private entities and function by collecting runoff from smaller watersheds and draining them into the primary canal system, receiving lakes, or coastal waters. The tertiary drainage system is the smallest subdivision of water management and includes ditches, swales, storm sewers, and detention ponds most commonly owned and maintained by property owners or homeowner associations. These systems generally operate under Environmental Resource Permits issued by SFWMD (SFWMD, n.d.a).

The region's watershed and hydrology affect the water quality within KJCAP through two primary avenues: surface water (including urban and agricultural runoff) draining out of nine inlets and six treated wastewater outfalls positioned near the outer reef.

Inlet Contributing Areas

Due to the flat terrain and highly managed network of drainage canals in Southeast Florida, the flow of water is not dictated by natural changes in elevation that normally control downslope water movement and define watersheds; instead, the canals and hydraulic systems make waterflow to the coast largely human-controlled (Pickering & Baker, 2015). Consequently, the Southeast Florida region adjacent to KJCAP is divided into nine Inlet Contributing Areas (ICAs, Map 4) that define how water moves through the various artificial pathways into inlets that then feed into KJCAP.

In 2015, a watershed scale planning effort was initiated to reduce land-based sources of pollution and map the linkage of land-to-inlet water flow by delineating watersheds, or ICAs, that



Map 4: Inlet contributing areas (ICAs) that flow into KJCAP.

Table 1: Summary of estimated nutrient loads (lb/yr) from land uses in each Inlet Contributing Area within KJCAP. (Pickering & Baker, 2015)

Inlet Contributing Area	Counties	Phosphorus Loads (lb/yr)	Nitrogen Loads (lb/yr)
St. Lucie Inlet	Martin/St. Lucie County	643,011	2,809,205
Jupiter Inlet	Martin/Palm Beach County	99,741	552,635
Lake Worth Inlet	Martin/Palm Beach County	157,076	816,053
Boynton/S. Lake Worth Inlet	Palm Beach County	155,710	592,053
Boca Raton Inlet	Palm Beach/Broward County	107,031	432,698
Hillsboro Inlet	Broward County	85,087	335,189
Port Everglades Inlet	Broward/Miami-Dade County	167,143	683,677
Baker's Haulover Inlet	Broward/Miami-Dade County	144,331	610,017
Government Cut Inlet	Miami-Dade County	247,342	1,098,439
TOTAL		1,806,472	7,929,966

contribute to the flow out of the nine major inlets within KJCAP that would likely make an impact on the nearshore coral reefs (Pickering & Baker, 2015). To an extent, each ICA is connected by the Intracoastal Waterway (ICW). The hydrodynamic processes within the ICW and its connection to the Atlantic Ocean are not well understood, however, recent findings in hydrographic modeling suggest a substantial impact on KJCAP from inlet nutrient loads that can be exacerbated during high rainfall (Dobbelaere et al., 2024). Intense weather events complicate these processes when mixing, flow or wind direction changes for some interim period. Pickering and Baker (2015) state this as a vital data gap hindering the ability to assess and manage land-based sources of pollutant impacts to estuaries and the reef. The amount of management, monitoring, and land use differs among each of the ICAs. Land use, or cover, varies between ICAs; the southern ICAs have more urban development, while the northern ICAs have more agricultural cover (Pickering & Baker, 2015). Based on land use in each ICA, pollutant loads can be estimated using land use runoff coefficients developed by SFWMD. Because these coefficients had not been developed for the watersheds throughout Southeast Florida, Pickering and Baker (2015) used the coefficients developed by SFWMD in the St. Lucie River Watershed Protection Plan (SFWMD, DEP & FDACS, 2009) to estimate nutrient loads for each of the nine ICAs. The ICA with the highest estimated total phosphorus and total nitrogen loads from land use was the St. Lucie Inlet (643,011 lb/yr and 2,809,205 lb/yr), followed by Government Cut (247,342 lb/yr and 1,098,439 lb/yr), see Table 1 (Pickering & Baker, 2015). This estimate does not incorporate the additional load from septic systems.

In addition to nutrient enrichment, turbidity and sedimentation are additional components of water quality that can affect coral reef condition within KJCAP through surface waters.

Discharge from water management canals through inlets can lead to rapid changes in salinity, turbidity, sedimentation, and siltation (PBC, 2008; SFWMD, 2008; SFWMD, DEP & FDACS, 2009). Turbidity is a measurement of water clarity, defined as an optical measure of water and is a measurement of the amount of light that is scattered and absorbed rather than transmitted through the water column. Research has indicated that turbidity shares close relationships with suspended sediments and other particulate matter, such as algae and bacteria (U.S. Geological Service [USGS], n.d.). Turbidity can fluctuate naturally from storm events, land runoff, tidal fluctuations, high winds, waves, or strong currents. Anthropogenic sources of turbidity include dredging, beach nourishment, agricultural activities, urban runoff, construction activities, and resuspension from boat activity. Sedimentation can bury or smother corals and other benthic organisms, leading to partial tissue necrosis and, in cases where corals have difficulty shedding the sediments, complete mortality (Miller et al., 2016; Erftemeijer et al., 2012). Other documented effects of increased sedimentation on corals include reduced reproductive ability, reduced species richness, less live tissue cover, lower growth rates and calcification, increased disease prevalence, changes in species composition, and lower rates of reef accretion (Harvell et al., 1999; Rogers, 1990).

Wastewater Treatment Plant Outfalls

Secondary-treated wastewater effluent is discharged through six wastewater outfalls between one and three miles offshore. In 2005, wastewater was released at a combined flow rate of 425 million gallons per day with a projected rate of 474 million gallons per day by the end of 2025 (Koopman et al., 2006). The wastewater released offshore has been treated to remove biodegradable organics and suspended solids (DEP, 2010), which excludes the removal of a significant percentage of nutrients, pharmaceuticals, heavy metals and personal care products (Bloetscher & Gokgoz, 2001). In 2008, the Florida legislature passed legislation that scheduled these ocean outfalls to be decommissioned by 2025. However, in 2013, amendments were added to allow the for occasional use of ocean outfalls during periods of peak flow after 2025. These outfalls represent a significant source of nutrients and other pollutants, including antibiotic-resistant microorganisms, to KJCAP (Carsey et al., 2010). Antibiotic resistance is a recent emergent environmental contaminant that affects pathogen virulence and is a major public health concern (Griffin et al., 2019). Antibiotic- laden sources of pollution, such as wastewater ocean outfalls, can sustain the presence of antibiotic-resistant pathogens presenting human and ecosystem health risks (Griffin et al., 2019). Recent research focused on determining the prevalence of antibiotic resistant genes in bacterial populations near Southeast Florida's wastewater outfall pipes detected several antibiotic resistant genes with an increase in frequency during the region's wet season compared to the dry season (Griffin et al., 2019).

Groundwater and Atmospheric Deposition

Two additional mechanisms that potentially affect water quality in KJCAP are through submarine groundwater discharge and atmospheric deposition of nitrogen. Submarine groundwater discharge most often occurs as diffuse seepage, rather than a single vent feature (Swarzenski et al., 2001). To date, there is little data that describes the quantity and composition of groundwater inputs from submarine groundwater discharge to KJCAP. However,

historically, Biscayne Bay was well known for its artisanal freshwater flows where sailors could refill their drinking water.

In addition to surficial wastewater flowing through the ICA's and outfalls, waters potentially high in nutrients and other pollutants reach KJCAP through sewage injection wells, beachfront air conditioning wastewater injection wells, and septic tanks in Florida. This has inspired more recent research efforts to focus on determining the influence of submarine groundwater discharge on offshore ecological benthic communities (Griffin et al., 2020).

Nitrogen from the atmosphere is deposited directly onto surface waters of marine coastal ecosystems from sources like precipitation and can accumulate in upstream ecosystems. Increased reactive nitrogen emissions to the atmosphere are documented to originate from combustion of fossil fuels and ammonia volatilization of nitrogen-based fertilizers used in agriculture and lead to excess nitrogen deposition to natural ecosystems (Galloway et al., 2003; Li et al., 2016). Accumulation of reactive nitrogen in marine coastal regions has the potential to transfer to downstream ecosystems, contributing to eutrophication. Every year, hundreds of millions of tons of mineral-rich dust from the Sahara and Sahel regions of Africa are transported across the Atlantic and deposited in Florida and the Caribbean (Shinn et al., 2001; USGS, 2010). These dust plumes deliver nutrients (iron, phosphorus, nitrogen) that may stimulate microbial or algal growth, but they also carry viable fungal and bacterial spores and have been correlated with increased coral disease events in Florida and the Caribbean region (USGS, 2010).

Stakeholder observations of declining water quality in KJCAP, accompanied by the lack of offshore data led to the establishment of a water quality monitoring program in 2016, which was relevant to reef health within KJCAP. Because the natural ecosystems in Southeast Florida have been altered, true baseline water quality values cannot be established. However, a nutrient baseline, recognizing the reef's current impairment from over a century of anthropogenic stress, has now been established. This may allow for the detection of future changes in water quality and serve as a performance measure for evaluating the effectiveness of management actions (Whitall et al., 2019). Whitall et al. (2019) reported the first three years of data and indicated the following key findings:

- The biogeochemical signal of the inlets is readily apparent in offshore coastal waters and the discharge from the canals generally drives water chemistry to the system.
- The wastewater outfalls result in elevated levels of certain nutrients (urea and ammonium) that are different from the signals observed from freshwater inflow from the inlets.
- Observed levels of nutrients in KJCAP are elevated when compared to previously published threshold values above which corals are likely to be outcompeted by benthic algae.

Spatial patterns in water quality are correlated with indices of biological reef health, but more research is needed to better understand this relationship, especially given that impacts to coral reefs are increasingly subjected to multiple stressors.

3.3.5 / Climate

The climate in Southeast Florida, defined as a tropical savanna, is characterized by a hot and humid wet, or rainy, season that occurs from late spring into the fall, and a dry season from late fall through spring (Banks et al., 2008). There is less seasonal temperature variation in Southeast Florida than in almost any other place in the continental United States. The Gulf Stream, a warm water current that runs through the Florida Straits north along the east coast of Florida, strongly influences air temperatures, resulting in warmer winters and cooler summers than experienced by other Southeastern states. This is due to the high-heat capacity of water buffering heat exchange at the air-sea interface. Temperatures from January 2010 to 2019 recorded at a Fort Lauderdale weather station ranged from 62.2°F – 76.3°F (16.8°C – 24.6°C) over winter months and from 82.0°F – 85.8°F (27.8°C – 29.9°C) over summer months (NOAA, 2020).

Cold fronts from the northeast occur in southern Florida during the fall and spring months, bringing strong winds that last between 2 and 3 days. According to data from the National Weather Service and NOAA, occasionally cold fronts can depress average temperatures over longer periods, such as the historic cold snap of January 2010 when over 12 days, West Palm Beach, Fort Lauderdale, and Miami experienced daily average temperatures of 49.4°F (9.67°C), 52.1°F (11.17°C), 52.7°F (11.50°C), respectively. This extended cold snap resulted in significant coral bleaching and mortality (Lirman et al., 2011). Over the spring months, weather in the region can be highly variable depending on the position and size of the Bermuda High, which can impede convective cloud development, thereby delaying the wet season.

Rainfall in South Florida averages 53 inches per year with approximately 64% of the precipitation occurring over the five-month wet season from May through October (SFWMD, 2020). Within each wet and dry season, there can often be occurrences of short dry periods during summer and mid-winter heavy rains. Winter precipitation is typically associated with the passage of cold fronts. Wet season precipitation is attributed to differential heating and tropical storms, ranging in severity from thunderstorms to hurricanes. Differential heating results in mesoscale fronts, which promote sea breezes that blow moisture-rich air from various water bodies. Historically, the high humidity in the Everglades results in a low-pressure trough across the peninsula, generating thunderstorms that move from inland to the coast. This daily or “diurnal monsoon” is driven by sea breeze circulation and peaks over the summer and fall months. However, changing environmental conditions have made this less regular.

Southeast Florida lies within “hurricane alley”, a region highly vulnerable to tropical cyclones over the Cabo Verde and Caribbean hurricane season, which runs nominally from June 1 to November 30 of each year. However, tropical cyclones can form as early as March and as late as December. The number of named storms in the 2020 season was unprecedented, totaling 30 named storms, which included a Category-5 storm (Hurricane Iota, which reached Category-5

status on November 16, 2020). Tropical cyclones form when water temperatures are warm and can provide the energy necessary to form and support a developing system. A few of the more recent major hurricanes (Category 3 or higher) to directly impact Southeast Florida since Hurricane Andrew in August 1992, include Hurricane Wilma (2005) and Hurricane Irma (2017) that both made landfall as a Category 5.

While these are the current conditions, environmental change is already causing average sea surface temperatures to rise throughout Florida's Coral Reef, especially in the summer months (Heron et al., 2016). In addition to warming, increased atmospheric carbon dioxide is absorbed by seawater, leading to ocean acidification, reduction in pH and carbonate ion availability that impairs coral calcification and skeletal growth (Feely et al., 2009). Long-term monitoring in Florida and the wider Caribbean has shown declining aragonite saturation states, indicating conditions less favorable for reef accretion and recovery following bleaching events (Manzello et al., 2012). The rise in temperature is increasing the frequency and severity of coral bleaching events and hurricanes (Heron et al., 2016; Maynard et al., 2017). Coral species composition within KJCAP has the lowest bleaching resistance of any region along Florida's Coral Reef, likely in part a product of stress selection over the past few decades. Recent extreme sea surface temperature anomalies have driven dramatic declines in acroporid corals, with live cover of *Acropora cervicornis* in Southeast Florida dropping from approximately 34.8% in 2003 to 2.4% in 2022, largely due to repeated heat stress events (Lunz et al., 2025). While restoration efforts continue, only remnant wild populations of acroporids now persist in the region, making KJCAP among the last strongholds for these reef-building species in Florida (Vargas-Ángel et al., 2024). Additionally, driven by the increased temperatures from environmental change, global sea levels are rising at an increasing rate, up to 3.1 mm/year (Page & Swanenberg, 2014). If the rate of sea level rise continues to accelerate, it could put corals in jeopardy by increasing their depths and reducing light penetration (Page & Swanenberg, 2014). *Acroporid* corals, in particular, have an accretion rate of 10 mm/year, and future projections put them at risk from sea level rise impacts (Page & Swanenberg, 2014). Looking forward, our actions to manage KJCAP are critical to increase its resilience and ensure its sustainability through the changing climate.

3.3.6 / Oceanographic Patterns

The oceanographic regime for KJCAP, especially as it relates to the presence of reef building corals and associated communities, is influenced by the northward flow of the Florida Current, a portion of the Gulf Stream that affects the Southeastern Florida shelf. As this western boundary current moves northward, characterized by its warm, deep, and fast-moving water, it influences much of the coastal circulation along the shelf (Jaap & Hallock, 1990). Southward-flowing countercurrents have been documented on the western flank of the Florida Current in the form of an undercurrent jet attached to the Florida shelf, a seasonally variable coastal countercurrent, and an intermittent countercurrent on the Miami Terrace (Soloviev, et al. 2017). Mesoscale eddy dynamics, Ekman transport, internal waves, shelf topography, etc. are factors influencing coastal upwelling in Southeast Florida (CSA International Inc., 2009). The Florida Reef Tract ends in Martin County, where the Gulf Stream diverges at the widening of the continental shelf, allowing colder water from the north to bathe the coast. Eddies form off the boundary of the Gulf

Stream and propagate northward along the coast, generating cold-water upwelling events where temperatures can fluctuate by 10 degrees lasting days to weeks. These events have been implicated as a cause for different benthic communities of the northern part of the Florida Reef Tract in Martin County (Walker et al. 2013).

Water temperatures in KJCAP can vary as much as 53.6°F (12°C) between maximum and minimum monthly averages, but temperatures in the shallow water above the reef tend to gain and lose heat faster than do waters seaward of the reef (Banks et al., 2008).

The average semi-diurnal tidal amplitude along the Southeast Florida coast is only 0.8 meters, and tides affect circulation mainly along the nine inlets such that water is exchanged from inlets to the shelf over high and low tides. Inlet configurations, the width of the shelf at individual inlets, salinity, the distance of the Florida Current, and seasonal precipitation rates are among the factors that affect coastal circulation (Banks et al., 2008).

King tides are tides that are higher than usual that typically occur in the fall around the new or full moon, when factors like currents, wind and warmer water temperatures drive water levels to be higher during this time of year. King tides often cause nuisance flooding in coastal and low-lying areas and can be exacerbated when coinciding with bad weather conditions or when they align with perigean spring tides. Sea level rise is expected to cause these tides to happen more frequently and increase in severity in the near future, and significant adaptations to infrastructure, including installation of tidal valves and pumps, raising seawalls and updating drainage systems are all proposed actions for cities to manage impacts in the future (Miami Waterkeeper, 2019).

Another alarming concern of King tides are the contaminants from urban coastal landscapes that are being picked up and transported into coastal waters through tidal waters. The tidal waters can pick up oil and gas from roads, fertilizers from lawns and bacterial, potentially causing exposure to both humans and marine habitats (NOAA AOML, 2016). Additionally, saltwater intrusion into coastal aquifers poses a threat to freshwater resources (FAU, 2025).

Much of the east coast of Florida is affected by long period swells over winter months, resulting from the formation of low-pressure systems over the U.S. east coast; however, the Bahamian Archipelago does prevent Broward and Miami-Dade counties from receiving such high energy waves. These long period, wind-driven waves can and do reach the northern half of KJCAP (Palm Beach and Martin counties), delivering increased sediments to the shallow waters along the coast.

3.3.7 / Natural Communities

The benthic communities in KJCAP are classified using NOAA Coral Reef Conservation Program’s hierarchical classification scheme for mapping shallow-water coral ecosystems of southern Florida (Monaco, 2007) which were adapted specifically for the KCAP region and used in prior efforts to map the coral reef habitats in Southeast Florida (Riegl et al., 2007; Walker & Klug, 2014). Florida’s Unified Reef Maps (FWC, 2016) were used to calculate the total area for

each of the benthic habitats found within KJCAP. Aquatic preserve management plans often use the natural community classification system as developed by the Florida Natural Areas Inventory (FNAI, 2010). However, FNAI mapping does not yet extend into the majority of KJCAP so the benthic community classification scheme described below was used instead. A crosswalk between the FNAI natural communities and closely related benthic habitats within KJCAP is provided in Table 2 below.

Table 2: Crosswalk between FNAI Natural Communities and KJCAP Benthic Habitats.

FNAI		Florida/NOAA CRCP	
Category	**Natural Community**	**Benthic Habitat**	**Type**
Marine and Estuarine	Coral Reef	Coral Reef and Colonized Hardbottom^	Colonized Pavement
	Octocoral Bed		Ridge
	Sponge Bed		Scattered Rock in Sand
	Worm Reef		Patch Reef
	Consolidated Substrate		Linear Reef
	Algal Bed		Spur & Groove
	Seagrass Bed	Submerged Vegetation	Seagrass
	Unconsolidated Substrate	Unconsolidated Sediment	Sand
	Composite Substrate*	Artificial Habitat+	Artificial Reef
			Dredged/Excavated

**FNAI defines composite substrate as consisting of any combination of marine and estuarine sessile flora or fauna natural communities. Any of the Florida/NOAA CRCP benthic habitats could exist within a composite substrate community. Much of the coral reef and colonized hardbottom in KJCAP exist as composite substrate including stony corals, octocorals, sponges, algae, and unconsolidated substrate all living among each other.*

^All of the FNAI Marine and Estuarine Natural Communities listed in Table 2 are found within KJCAP, but the area each covers is not yet mapped and they are often found overlapping or interspersed with each other. The benthic habitats and types describe more clearly the different structural zones found within KJCAP that contain the various FNAI natural communities.

+FNAI lists Altered Landcover Types, but none are comparable to marine artificial reef and/or dredged/excavated habitat as defined by the benthic habitat types.

This section also describes the major natural communities found adjacent to KJCAP, as defined by FNAI since the benthic habitat types don't apply upland of the Mean High Water line. While these natural communities are not documented within KJCAP, they still significantly impact the aquatic preserve. These include mangrove swamp, beach dune, coastal berm, coastal strand and maritime hammock. Before the population explosion and mass development of the 20th century, Southeast Florida held larger tracts of coastal mangroves, freshwater marshes, seagrass beds, and coral reefs. Over the past hundred years, however, mangroves and marshes have been significantly reduced and drained to make way for waterfront development. Only remnants of these ecosystems outside the major parks are left and many small fragments are surrounded by other land uses, particularly urban areas. The fragmented habitats that remain are not secure and are functionally islands of habitat that likely support fewer species.

Map 5: Florida's Unified Reef Habitats within the KJCAP boundaries (FWC, 2016).

Table 3: Summary of benthic habitat types in KJCAP (Florida's Unified Reef Map [FWC, 2016]).

Habitat Type	Martin County	Palm Beach County	Broward County	Miami-Dade County	Total (Entire KJCAP)
Coral Reef and Colonized Hardbottom	7.72 [0.01]	87.46 [0.09]	50.21 [0.05]	64.10 [0.07]	209.49 [0.22]
Unconsolidated Sediment	313.57 [0.32]	145.40 [0.15]	47.73 [0.05]	94.52 [0.10]	601.22 [0.62]
Artificial Habitat	2.37 [0.002]	3.23 [0.003]	2.63 [0.003]	7.65 [0.01]	15.88 [0.02]
Seagrass	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	16.07 [0.02]	0.00
Undefined Marine					124.65 [0.13]
All Habitat Types					967.64 [1]

Area (km^2) per habitat type [% total area] within KJCAP

Coral Reef and Colonized Hardbottom

Coral reef and colonized hardbottom in Southeast Florida is defined as hardened substrate formed by the deposition of calcium carbonate by reef-building corals and other organisms (old or ongoing) that has some colonization by live coral (Monaco, 2007; Riegl et al., 2007).

The main benthic habitat type found in KJCAP is ridge, characterized by discontinuous bands of low relief features oriented parallel to shore and found throughout KJCAP (Riegl et al., 2007). Ridge habitat type is colonized by macroalgae, hard coral, gorgonians, and other sessile invertebrates. It is presumed that the Ridge was the foundation for the formation of Linear Reefs found south of Martin County, which are linear coral formations that follow the contours of the shore. Patch Reefs are isolated coral formations often surrounded by sand or other habitats with no organized structural axis relative to the contours of the shore. Spur and Groove habitat is characterized by alternating sand and coral formations that are oriented perpendicular to the shore, with high vertical relief on the coral formations (spurs) compared to the sand channels (grooves) that separate them. Patch Reefs and Spur and Groove formations diminish toward the northern portion of KJCAP. Colonized Pavement is found throughout KJCAP and is comprised of flat, low relief, solid carbonate substrate colonized by macroalgae, hard coral, gorgonians, and other sessile invertebrates. Scattered Rock in Sand is used to describe areas of primarily sand bottom with scattered rocks that are too small to be delineated individually.

The natural communities found among the types of coral reef and colonized hardbottom include coral reef, worm reef, octocorals, sponges and algae (FNAI, 2010). Maps of the distribution of benthic biomass of certain indicator groups including gorgonians, macroalgae, and barrel sponges were created for portions of KJCAP (Riegl et al., 2007). They are most often found living and growing interspersed with one another, rather than finding monoculture beds of just hard corals or just sponges, for example. Coral reefs are formed from various carbonate

precipitating organisms of the phylum Cnidaria, primarily Hydrozoa and Anthozoa. Hydrozoans include fire corals and are capable of withstanding temperate water temperatures; however, they are not considered true corals. The class Anthozoa is divided into two subclasses: Octocorallia and Zoantharia. Octocorallia, which includes gorgonians, sea fans and sea whips, and are distinguished by their soft bodies and polyps with eight tentacles surrounding the mouth, which is why they are commonly called octocorals. Zoantharia includes the order Scleractinia, which are the true hard corals that are primarily responsible for building reef structures. Coral reefs serve as important feeding ground and nursery habitat for several species of turtles, fish and invertebrates, and help protect Southeast Florida's shorelines from erosion.

KJCAP is home to over 45 species of reef-building corals, three species of which account for 69% of the region's stony corals (*Porites astreoides*, *Siderastrea siderea* and *Agaricia agaricites)* (Gilliam et al. 2020). The six most common species make up 93% of the total abundance (*Porites astreoides*, *Siderastrea siderea*, *Agaricia agaricites, Stephanocoenia intersepta, Montastraea cavernosa,* and *Porites porites*), which is a higher percentage than in past years, meaning that, while overall diversity is consistent, the abundance of stony corals is becoming more concentrated in fewer species (Gilliam et al., 2020). Mortality events from SCTLD have caused two of the area's historically dominant species (*M. cavernosa* and *Meandrina meandrites*) to decrease in abundance since 2015 (Gilliam et al., 2020).

Sponges, of the phylum Porifera, are also found interspersed with Anthozoans throughout coral reef and colonized hardbottom habitat. They provide habitat for several species such as the Caribbean spiny lobster (*Panulirus argus*). Some common species of sponges found in KJCAP include the giant barrel sponge (*Xestospongia muta*) which is among the largest on reef habitat and red boring sponge (*Cliona delitrix*) which can be seen colonizing portions of live hard corals.

Worm rock reef is characterized by large colonial assemblies of Sabellariid worm tubes made from grains of sand and attached to form massive mounding reef-like structures. Within KJCAP, worm reef is mainly found offshore of Martin County in St. Lucie Inlet Preserve State Park but can also be found throughout the other counties adjacent to KJCAP (FWC, 2009). Worm rock serves as nursery for juvenile fish, critical habitat for crustaceans, mollusks and sponges, and foraging grounds for sea turtles. They also stabilize sands and provide coastal protection (Sloan & Irlandi, 2008).

Large populations of macro and micro algae can be found throughout KJCAP, often competing with other organisms like hard corals for space to colonize due to increases in land-based nutrient pollution (Lapointe et al., 2005). Algal species commonly seen in KJCAP include *Dictyota*, *Halimeda*, *Codium* and *Lyngbya* species. Typical populations can quickly grow into thick accumulations that cover reef surfaces and smother many sessile organisms and outcompete corals and other aquatic vegetation for space when waters are nutrient-enriched.

Submerged Aquatic Vegetation – Seagrass Beds

Seagrass beds in KJCAP are characterized as expansive stands of vascular plants. This community occurs in subtidal (rarely intertidal) zones, in clear, coastal waters where wave energy is moderate. Seagrasses, including the epiphytic algae and invertebrates commonly found attached to the leaf blades, serve as important food sources for manatees, marine turtles, and many fish, including spot croaker (*Leiostomus xanthurus*), and sheepshead (*Archosargus probatocephalus)*. The dense seagrasses also serve as shelter or nursery grounds for many marine invertebrates, as well as fish, such as tarpon (*Megalops atlanticus*), bonefish (*Albula vulpes*), seahorses (*Hippocampus,* spp.*),* and Florida pompano (*Trachinotus carolinus*).

The dense leaf blades reduce wave energy and facilitate settling of suspended particles, while the network of roots and rhizomes of seagrasses helps to stabilize the particles of the unconsolidated substrates on which they typically occur and promote soil accumulation. Underneath the soil, seagrasses store immense amounts of organic carbon and can keep it sequestered for much longer periods of time than terrestrial forests where wildfires periodically release stored carbon (Fourqurean et al., 2012). Consequently, seagrass die-offs are not just reducing the ocean's capacity for carbon storage but also release a significant amount of carbon into the atmosphere (Fourqurean et al., 2012).

One of the more important factors influencing seagrass communities is the amount of solar radiation reaching the leaf blades. In general, the water must be fairly clear because turbidity blocks essential light necessary for photosynthesis. The rapid growth rate of seagrass under optimum conditions rivals that of most intensive agricultural practices and occurs without energy input from humans. Marine and estuarine seagrass beds are often associated with and grade into unconsolidated substrate, coral reefs, mangrove swamps, and salt marshes, but they may also be associated with any other marine and estuarine natural communities. Marine and estuarine seagrass beds are extremely vulnerable to human impacts. Many have been destroyed through dredging and filling activities, vessel groundings and prop scars, or have been damaged from degraded water quality by wastewater and stormwater outfalls. In these instances, the seagrass beds are either physically destroyed or succumb as a result of decreased solar radiation from increased water turbidity.

Currently, continuous and discontinuous beds of seagrass are prevalent in the southern portion of KJCAP, north of CFAP, and east of both Key Biscayne and Virginia Key (FWC, 2021b). Seagrasses are an important habitat in the Miami-Dade County portion of KJCAP, comprising 16.55% of the total habitat in mostly continuous meadows. However, while there is no continuous seagrass habitat elsewhere in KJCAP, discontinuous beds exist throughout the ICW adjacent to KJCAP, and there are large, continuous beds in the Indian River Lagoon, just north of the St. Lucie Inlet where KJCAP terminates (FWC, 2021c).

Unconsolidated Sediment

Unconsolidated sediments found within the KJCAP, defined as having less than 10% cover of submerged vegetation (Walker et al., 2012), comprise expansive, open areas of sand that lack substantial populations of sessile plant or animal species due to the unsolid nature of the

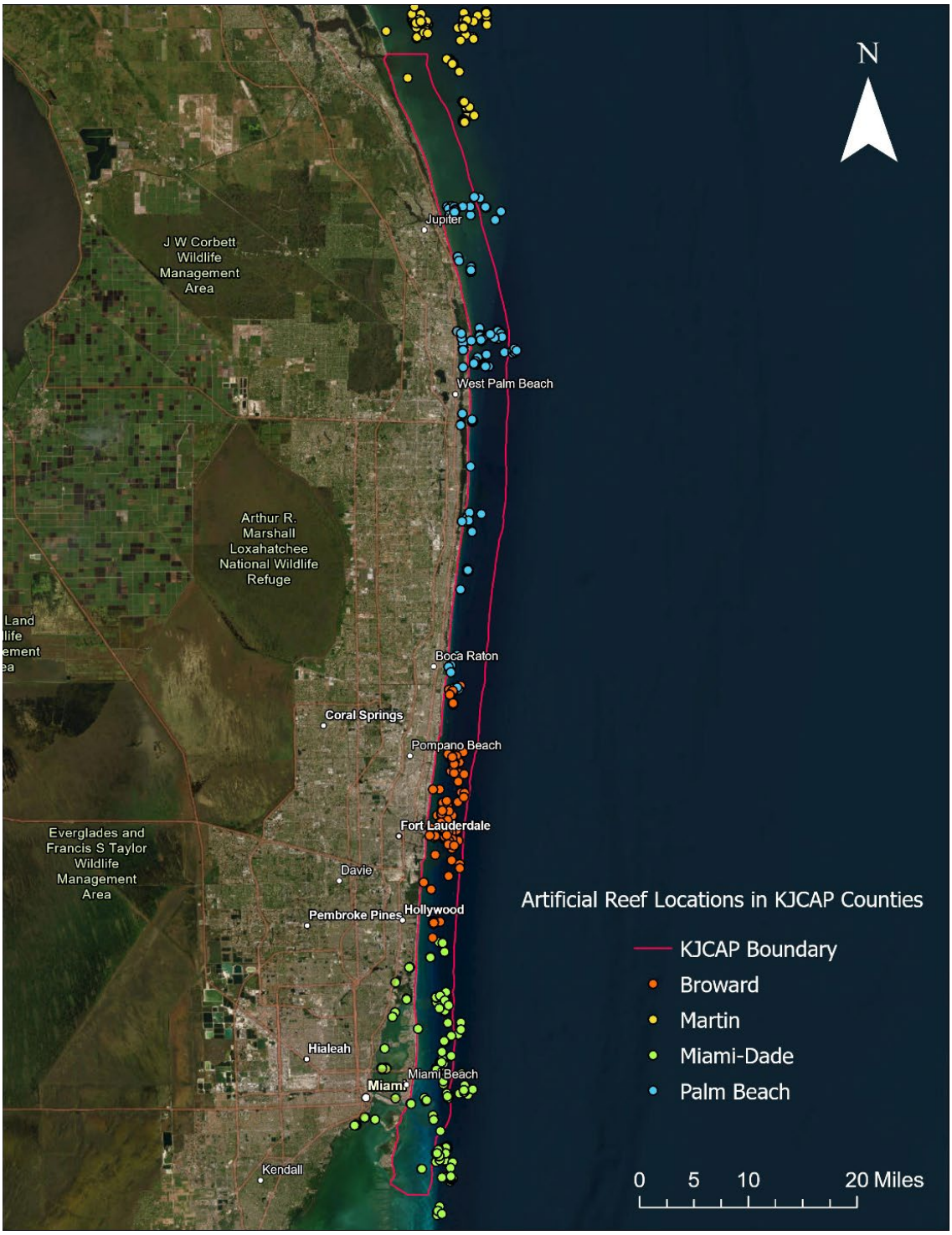
material comprising the substrate type (FNAI, 2010). The habitat instead supports infaunal species (i.e., invertebrate species living in the benthic substrate) and transient pelagic and planktonic species. Much of KJCAP is dominated by unconsolidated substrates, especially as shallow and deep sand habitats, which increase as a percentage of total habitat extending north from Miami-Dade County to Martin County.

Adjacent to Miami-Dade County, sandy patches are evident throughout the different habitats; however, the portions that are sand-dominant are divided into shallow and deep sections (Walker, 2009). The deep section is found at depths deeper than the 20 m reef formations with finer sand and some scattered *Halophila* spp. and turfed macroalgae (Walker, 2009). The shallow section (<20 m) is dominated by mobile pockets of sand buffered by the higher energy wave environment west of the inner reef, particularly along the shoreline (Walker, 2009). Broward County has a similar configuration as that adjacent to Miami-Dade County, with both shallow and deep sandy environments, although the deep sand primarily acts as the divide between the inner, middle, and outer reefs (Riegl et al., 2004). Palm Beach County showed the same characteristics with deep and shallow sand segments, although the depth margin was 25 m, based on changes in the infaunal composition (Riegl et al., 2007). In Martin County, the reef tract shows a significant change in composition with the majority of the seafloor composed of sand and the majority of the hardbottom habitat located adjacent to the St. Lucie Inlet where KJCAP ends (Walker, 2012). Here, the dividing line between the shallow and deep sand segments is around 25 m (Walker, 2012). Lastly, there are several pits of dredged sand, both in the form of inlet channels and as the remains of beach nourishment projects.

Artificial Habitat

Artificial, or man-made, habitat in KJCAP includes submerged wrecks, large piers, submerged portions of rip-rap jetties, and materials placed as artificial reefs (Monaco, 2007; Riegl et al., 2007). Many of these structures were placed in the KJCAP as part of the counties' artificial reef programs.

Artificial habitat in KJCAP also includes areas where natural geomorphology is disrupted or altered by excavation or dredging (Monaco, 2007). These habitats and the natural communities once found there have been converted or altered by direct anthropogenic activity. Artificial reef creation has become a tool in restoring and enhancing hard-bottom/coral reef throughout the KJCAP. Artificial reefs have been a component of the southeast Florida seascape since the mid-twentieth century, initially established to enhance fisheries productivity (Pybas, 1997). Over subsequent decades, artificial reef development in the region has transitioned from opportunistic deployment of secondary materials to the implementation of engineered structures informed by ecological design principles and regulatory standards (Seaman & Jensen, 2000; FWC, 2010). Current artificial reef programs reflect lessons learned from previous decades of reef construction, emphasizing material stability, spatial siting relative to natural reef resources, and proven designs that perform specific ecological functions (Lukens & Selberg, 2004; SEFCRI, 2011).



Map 6: Artificial reef locations within KJCAP.

For information specific to each county's artificial reef program, including GPS coordinates for artificial reefs, please visit their respective websites provided below:

- Martin County: https://www.martin.fl.us/martin-county-services/artificial-reef-locations
- Palm Beach County: https://PBCreefs.com

- Broward County: https://www.broward.org/NaturalResources/BeachAndMarine/Pages/ArtificialReefProgram.aspx#Artificial%20Reef%20Locations
- Miami-Dade County: https://www.miamidade.gov/environment/reefs-artificial.asp

Mangrove Swamp

Mangrove swamps are dense forests found along low energy marine and estuarine shorelines, dominated by species like red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*) and white mangrove (*Laguncularia racemosa*). These swamps feature varying densities and heights of mangroves, with different zones dominated by specific species based on tidal influence. The soils in mangrove swamps are anaerobic and water-saturated, and mangroves are equipped with specialized aerial roots (pneumatophores) to help them survive in waterlogged environments. Mangroves thrive in these ecosystems despite varying soil types and salinity levels (Nagarajan et al., 2025).

Mangrove swamps are significant due to the ecosystem services they provide for coastal and adjacent habitats. The roots serve as a shelter, nursery and feeding grounds for marine and estuarine species, many of which spend important life stages in mangrove swamps before migrating to coral reefs, including snook, groupers and snappers, as well as various invertebrates. Mangrove swamps also protect inland communities by absorbing storm/hurricane winds and surge as well as by preventing coastal erosion (Sánchez-Núñez et al., 2020). In addition to providing habitat during critical life stages to many reef species, mangroves are a major carbon sink, sequestering almost twice as much carbon per hectare than terrestrial forests (Adame et al., 2015). Therefore, protecting and restoring both mangrove and seagrass habitat is critical to maintaining ecosystem function and mitigating the source of climate change, as well as considered an ecologically sustainable and cost-effective solution for coastal protection (Sheng, 2017; Peters et al., 2015). These swamps are legally protected, though their range is limited due to urban development.

Because the boundary of KJCAP does not extend landward of the mean high-water line, most mangrove swamp habitat is not legally considered part of KJCAP with the exception of those areas that experience over wash through inundation by mean high tide conditions. Adjacent to KJCAP, mangroves can be found mainly along the coasts of Virginia Key and Key Biscayne, but patches of varying sizes exist throughout the ICW (FWC, 2021b). The St. Lucie Inlet Preserve State Park has more than three square kilometers of mangroves directly adjacent to KJCAP with the inlet providing an easy connection for migratory species (FWC, 2021b). Functionally, all coastal mangrove swamps play an essential role in maintaining a healthy coral reef ecosystem.

Beach Dune

Beach dune is a predominantly coastal herbaceous community of specialist salt-tolerant grasses and herbs on the vegetated upper beach and foredune (first dune above the beach). This community is usually built by sea oats (Uniola paniculata), a perennial rhizomatous grass. Sea oats´ stems trap sand grains blown off the beach, building up the dune by growing upward to keep pace with sand burial. Dunes form when wind speeds are sufficient (at least 10 - 12

mph) and individual grains of sand start to roll and bounce along the beach surface. Stems and leaves of coastal vegetation are critical for slowing wind speeds and causing sand to be deposited. (Williams, 2007). Other grasses that can tolerate sand burial are bitter panicgrass (*Panicum amarum*) and saltmeadow cordgrass (*Spartina patens*). Camphorweed (*Heterotheca subaxillaris*) often grows with sea oats where sand burial is absent or moderate. Seacoast marshelder (*Iva imbricata*), a succulent subshrub, is found at the seaward base of the foredune. These species may occupy the seaward face and crests of taller backdunes or storm overwash plains where the sand is not stabilized by vegetation. Several animal species are dependent on beach dunes for foraging or nesting, including beach mice, shorebirds, and sea turtles (FNAI, 2010). In Florida, sandy coasts with sea oats dunes are continuous on the Atlantic coast from the state line south to Cape Florida, including several of the state parks. Beach dunes are threatened by foot traffic from high numbers of visitors each year. Signage and boardwalk areas may be needed in the future to reduce future impacts.

Coastal Berm

Coastal berm communities are found along low energy coastlines in south Florida and the Florida Keys. Coastal berm is a short forest or shrub thicket found on long narrow storm-deposited ridges of loose sediment formed by a mixture of coarse shell fragments, pieces of coralline algae, and other coastal debris. These ridges parallel the shore and may be found on the seaward or landward edges of mangroves or further inland depending on the height of the storm surge that formed them. They range in height from 1 to 10 feet (0.3 to 30.05 meters). Structure and composition of the vegetation is variable depending on height and time since the last storm event. Coastal berms share many of the same species with coastal strand communities and may be confused with maritime hammock communities (FNAI, 2010). The Florida prairie-clover (*Dalea carthagenensis*) is federally listed as endangered,and is dependent on this community. It is a woody shrub that averages six feet in height. In Florida, coastal strand is relatively continuous along the sandy portion of the Atlantic coast.

Coastal Strand

Coastal strand is an evergreen shrub community growing on stabilized coastal dunes in the Florida Peninsula, often with a smooth canopy due to pruning by salt spray. It usually develops as a band between dunes dominated by sea oats (*Uniola paniculata*) along the immediate coast, and maritime hammock, scrub, or swamp communities further inland. On broad barrier islands or prograding (depositing sediments) coasts, it may also occur as patches of shrubs within a coastal grassland matrix. Along the Atlantic coast, species composition of coastal strand changes from north to south (FNAI, 2010).

Maritime Hammock

Maritime hammock is a predominantly evergreen hardwood forest growing on stabilized coastal dunes lying at varying distances from the shore. Species composition changes from north to south with tropical species increasingly prevalent south of Cape Canaveral. Diverse tropical canopy species such as gumbo limbo, false mastic (*Sideroxylon foetidissimum*), strangler fig (*Ficus aurea*), seagrape (*Coccoloba uvifera*), poisonwood and Spanish stopper are often prevalent (DEP, 2012). The trees often deflect wind, preventing hurricanes from uprooting them.

Temperate and tropical maritime hammocks serve as crucial resting and foraging areas for migrating birds, such as the white-crowned pigeon (*Patagioenas leucocephala*), on their fall and spring migrations to and from the tropics (Cox, 1988). Although maritime hammock originally occurred in virtually continuous bands with coastal strand, it is now dissected into short strips by development and is rapidly disappearing (FNAI, 2010). Exotic plant species should be controlled in all the maritime hammock areas.

3.3.8 / Native Species

The diverse and rich fauna found in KJCAP varies by habitat and depth, supporting nearshore, reef, and offshore species within its boundaries. KJCAP's seagrass meadows, limited to its southern extent, serve as a food source and habitat for a number of important species. The Florida manatee is a significant grazer, and while it can be found along other nearshore portions of KJCAP, its feeding distribution is linked mainly to the seagrass communities. Also associated with seagrasses are important recreational species such as bonefish, pompano, spotted sea trout, tarpon, and permit. Commercial species that are also found in and around seagrasses include hogfish, stone crab, spiny lobster, pink and brown shrimp, and various species of grouper and snapper. Also, these and other nearshore areas of KJCAP host transient populations of marine turtles, transient and resident populations of marine mammals, elasmobranchs (sharks and rays), and seabirds, as well as commercially and recreationally important coastal migratory species, such as dolphin, wahoo, cobia, king mackerel, and Spanish mackerel.

Faunal communities along the coral reef and other hardbottom communities of KJCAP consist of numerous species, including commercially and recreationally important species, such as spiny lobster and various reef fish including grouper and snapper, (Appendix B.3.1). Fish communities vary across the northern (northern Palm Beach and Martin counties) and southern regions (Miami-Dade, Broward, and central Palm Beach counties), likely due to the differences in temperature regimes resulting from cold-water upwelling and the divergence of the Florida Current in the northern region. Species richness is at its highest off southern Palm Beach County, where the mixing zone between the warm and cold-water regimes leads to overlap between tropical and more temperate fish communities. Over 350 fish species have been identified in Miami-Dade and Broward counties (Kilfoyle et al., 2018), and 400 fish species in Palm Beach County (Banks et al., 2008). Deep, or mesophotic, reefs adjacent to KJCAP also support a large variety of fish species, which differ from those found in shallower water.

Highly migratory species found in the offshore environment within KJCAP include tuna, sharks as well as billfish (e.g., sailfish, marlin and swordfish). These species support a large charter and recreational fishing fleet in Southeast Florida (Shivlani & Villanueva, 2007). By nature, these species' life stages extend beyond the boundaries of KJCAP to include coastal and pelagic habitats in the Caribbean and western Atlantic; they link the food chains of those habitats as well. Many of these migrations and subsequent reproductive events (spawning, mating, and giving birth) are driven by seasonal cues such as water temperature (Farmer et al., 2017). For instance, blacktip sharks (*Carcharhinus limbatus*) that spend the warmer summer months in the coastal waters of North Carolina, South Carolina, and Georgia to give birth will

migrate to South Florida when the northern waters begin to cool (Kajiura & Tellman, 2016). KJCAP's reef fish population is a critical prey source to these predators. By sustaining this population, KJCAP helps to sustain the ecosystem services that the migrating sharks provide in other regions they visit, and vice versa. Similarly, Mahi-Mahi (*Coryphaena hippurus*) spend time in KJCAP ahead of spawning further off the coast (Schlenker et al., 2021).

The reef benthic community is also highly diverse, including more than 45 species (Appendix B.3) of stony coals, 35 species of octocorals, as well as sponges, other invertebrates and algae. Stony corals are the primary reef-building organisms on Florida's Coral Reef; common species seen in KJCAP include brain star and finger corals. Common octocorals include sea whips, sea plumes and sea fans. Sponges, such as the giant barrel sponge, also contribute to the reef's structure and help to filter the water. Herbivores such as wrasses, parrotfish and sea urchins help corals by grazing on algae that compete for space on the reef.

3.3.9 / Listed Species

Rapid human population growth in Florida stresses species that are dependent on coastal habitats. Listed species can become threatened due to habitat destruction, over-utilization, disease or natural or anthropogenic factors. Listed species include any species determined to be in danger of extinction or likely to become extinct within the foreseeable future throughout all or a significant portion of its range based upon the best scientific and commercial data available. All federally listed species that occur in Florida are now also included on Florida's list as Federally-designated endangered or Federally-designated threatened species. In addition, the state has a listing process to identify species that are not federally listed but at risk of extinction. These species will be called "State-designated Threatened." More detailed descriptions and management prescriptions are available on the FWC website (FWC, 1999b). State and/or federal agencies provide special protection and conservation measures to promote recovery of a listed species. "Conserve" is defined under the ESA as all measures and procedures needed to delist a species. Under Article IV, Section 9 of the Florida Constitution, the FWC has constitutional authority to "exercise the regulatory and executive powers of the state with respect to wild animal life and freshwater aquatic life, and shall also exercise regulatory and executive powers of the state with respect to marine life...".

Protected species found in KJCAP include a variety of finfish, reptiles, marine mammals, and invertebrates. Five threatened and endangered marine turtle species, the green sea turtle (*Chelonia mydas*), the hawksbill sea turtle (*Eretmochelys imbricata*), loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermochelys coriacea*) and Kemp's ridley sea turtle (*Lepidochelys kempii*), are found in KJCAP waters (NPS, n.d.). Marine turtles rely on KJCAP at every stage in their life history, with hatchlings using offshore sargassum mats, juveniles using the nearshore areas, and larger juvenile and adults feeding, mating and/or moving within or through KJCAP boundaries. Juno and Jupiter Beaches, located adjacent to the northern boundary of KJCAP, are among the world's most densely nested sea turtle beaches. During the 2023 nesting season, a record-breaking 25,025 nests producing more than one million hatchlings across three species were documented along just 9.5 miles of shoreline by the Loggerhead Marinelife Center. Throughout nesting season (March 1–October 31), thousands of

sea turtles utilize the waters of KJCAP. In response, the Loggerhead Marinelife Center collaborated with the community to establish a voluntary Sea Turtle Protection Zone, encouraging boaters to reduce speeds, wear polarized sunglasses, and use spotters while transiting offshore of Palm Beach County (Loggerhead Marinelife Center, n.d.). The main issues facing marine turtles include a warming climate that affects sex ratios of hatchlings and overall hatching success, marine debris, vessel collisions and light pollution, among others. Degraded water quality including elevated nutrients, contaminants, and turbidity has been linked to impaired turtle health, reduced hatchling success, and increased disease incidence in marine turtles in Florida waters (Fuentes et al., 2023). Further, bycatch from both commercial and recreational fisheries remains an important threat: modelling across the southeastern U.S. has shown that juvenile sea turtles are caught at substantial rates in coastal fisheries, particularly recreational hook-and-line and small-scale gear, thereby limiting population recovery potential (Putman et al., 2023).

Florida manatees are also found in KJCAP, mainly occupying shallow nearshore areas and seagrass meadows, and regularly transit through inshore canals, rivers estuaries and bays, moving through fresh, saline and brackish waters. Within KJCAP, manatees regularly transit between busy inlets and have been spotted in the swim zone area of Broward County beaches. Manatees were down-listed from endangered to threatened by the U.S. Fish and Wildlife Service in 2017 but still face threats in KJCAP and across their range from vessel-related collisions. Between 2020-2022, Florida manatees faced an Unusual Mortality Event (UME) where 1,255 manatee carcasses were documented and 137 rescues were conducted. This unprecedented number of manatee deaths were linked to starvation due to seagrass decline in Indian River Lagoon. State and federal agencies joined to initiate a widespread collaborative response effort to investigate the cause of the event and implement immediate and long-term solutions, including rescue collaboration, supplemental feeding efforts, aquatic habitat restoration, and monitoring improvements. Since late 2023, mortality events have returned to the expected levels and there have been no indications of manatees on the Atlantic Coast in compromised condition due to the significant seagrass decline in the Indian River Lagoon (FWC, 2025).

Along with manatees, there are other species that have critical habitat that extends into parts of KJCAP, including the federally-listed American crocodile (*Crocodylus acutus*) and smalltooth sawfish (*Pristis pectinata*). Other threatened species found within or migrating through waters of KJCAP include the giant manta ray (*Mobula birostris*), Oceanic whitetip shark (*Carcharhinus longimanus*), Nassau grouper (*Epinephelus striatus*), and North Atlantic right whale (*Eubalaena glacialis*). (NOAA Fisheries, 2025)

The queen conch (*Aliger gigas*) is listed as a threatened species and is protected from all fishing efforts within the state of Florida. Boulder star coral (*Orbicella franksi*), elkhorn coral (*Acropora palmata*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), rough cactus coral (*Mycetophyllia ferox*), and staghorn coral (*Acropora cervicornis*) are federally listed as threatened and pillar coral (*Dendrogyra cylindrus*) is federally listed as endangered under the ESA (USFWS, n.d.a; NOAA Fisheries, 2020; NOAA Fisheries, n.d.-a). KJCAP is part

of the designated critical habitat for all seven of these listed species of coral (NOAA Fisheries, 2019; NOAA Fisheries, 2024).

3.2.10 / Invasive Non-native and/or Problem Species

Invasive non-native species are species that have been introduced to an area and begin to thrive where they don't naturally live, causing environmental or economic harm including changing or displacing natural habitats, competing with native wildlife, and threatening biodiversity (USFWS, n.d.b). Not all introduced, non-native species become invasive and the ones that do are generally opportunistic, aggressive, and early colonizing species in their native range. In some cases, native wildlife may also pose special management problems including property damage, labelled as nuisance animals (FWC, 1999a). Florida is second only to Hawaii in the United States in the number of established invasive species (Simberloff, 1994). Introductions of non-native marine invertebrates and seaweeds to coastal habitats in the United States have increased one hundred-fold in the last 200 years (Jacoby et al., 2005, and invasive fish species can have lasting implications on marine and coastal biodiversity (NOAA Fisheries, n.d.b).

One of the most significant non-native species that has settled in KJCAP is the Indo-Pacific lionfish (*Pterois volitans*) (Côté et al., 2013; Morris & Whitfield, 2009). The species was first reported off Dania Beach in 1985 and since then has proliferated over all of Southeast Florida and, in fact, much of the southeastern U.S., Caribbean Sea, and even in the tropical Atlantic to northern Brazil. Lionfish populations are of particular concern because they are prolific spawners (and year-round), venomous, and voracious carnivores. They feed on native fish and compete for food and habitat with native predators. In its introduced range, the lionfish has no predators and is thus not subject to any significant top-down control. FWC has a comprehensive strategy to manage lionfish, including education and awareness programs that teach divers how to target and handle lionfish, derby fishing tournaments that incentivize lionfish harvest, and culinary shows and recipes that promote lionfish consumption, as described on the FWC lionfish website (FWC, n.d.b). FWC acknowledges that its strategy and other actions will not be sufficient to eradicate lionfish from the region, but research, monitoring, and control efforts are essential in controlling the species' impact on native populations and habitats.

Two other invasive species in KJCAP are the orange cup coral (*Tubastraea coccinea*) and the *Caulerpa brachypus* macroalgae (Lapointe & Bedford, 2010; Office of National Marine Sanctuaries [ONMS], 2011). Orange cup coral is native to the Indo-Pacific and was first documented in the Caribbean in 1943, appearing in Curaçao and Puerto Rico (Fenner & Banks, 2004). It was first noticed in Florida off Key Largo in 1999, and has since spread into KJCAP (ONMS, 2011). While the orange cup coral is generally only found on artificial reefs, particularly wrecks, it has developed into a persistent problem due to its ability to outcompete and even cause partial mortality of native coral species (ONMS, 2011). Major macroalgal blooms off Broward and Palm Beach counties from the late 1980s through the 1990s coincided with the invasion of *C. brachypus,* which thrived because of elevated nitrogen levels supplied by land-based sources of pollution, including sewage (Lapointe & Bedford, 2010). The thick mats

formed by *C. brachypus* continue to pose a threat to native algae species through competition and pose a threat to corals and seagrasses that depend on sunlight (Lapointe & Bedford, 2010).

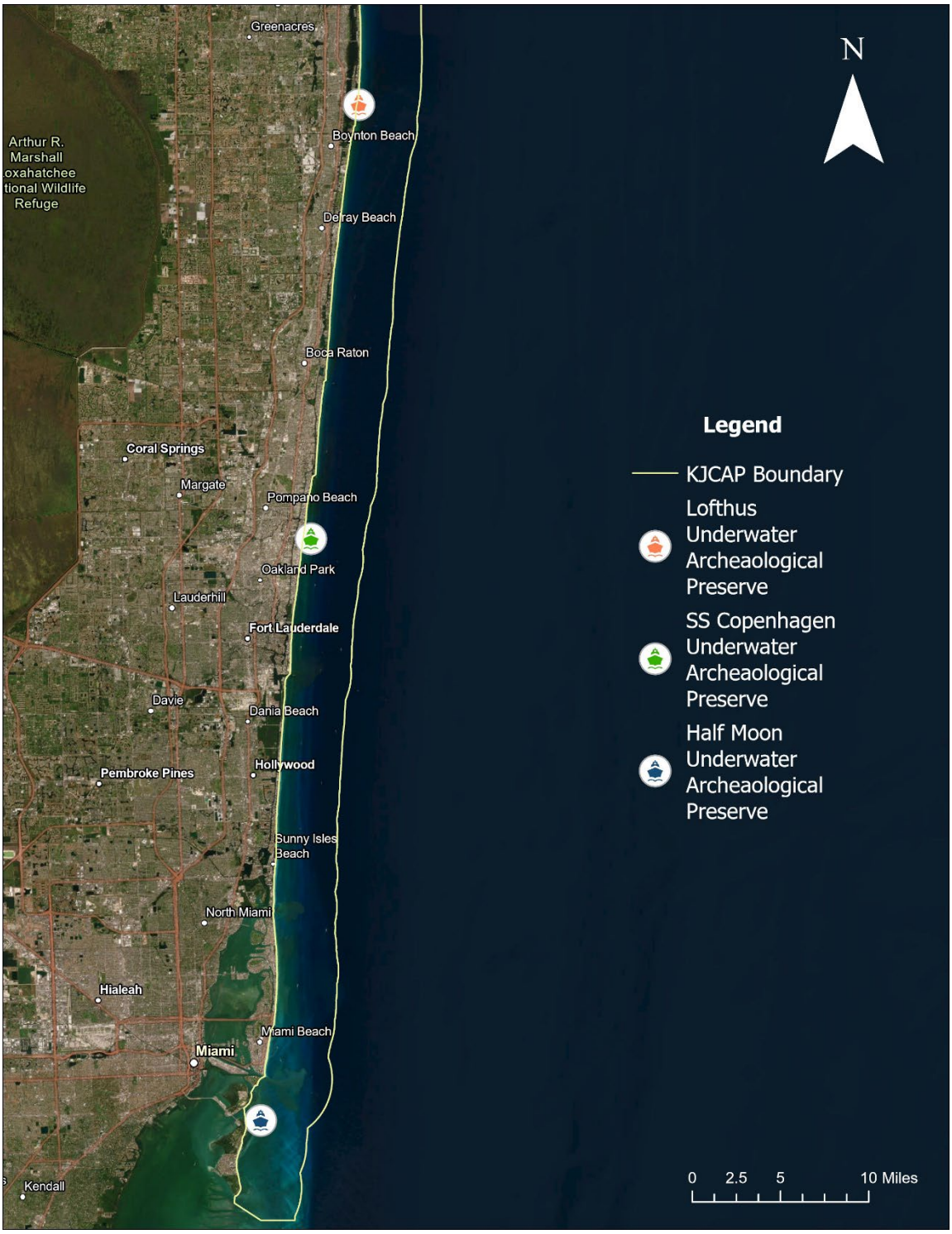
A non-invasive problem that is pervasive in KJCAP is benthic cyanobacteria. Multiple species of the genus *Lyngbya* have had increasingly frequent and widespread periodic blooms in South Florida reefs since it was first seen off Broward County in 2002 (Paul et al., 2005). Anthropogenic factors, such as increased sea surface temperatures and nutrient pollution, have created conditions for cyanobacteria to thrive, and their presence has been shown to have a negative impact on coral larval settlement and recruitment (Arthur et al., 2009; Kuffner & Paul, 2004).

Emerging seagrass and algae species are becoming an increasing concern in South Florida's coastal ecosystems. The invasive seagrass *Halophila stipulacea* has so far been documented only inshore in Miami-Dade County, but there is potential for it to spread offshore into the KJCAP region, where it could compete with native seagrass and alter habitat structure. Additionally, *Caulerpa microphysa* is being closely monitored; samples are currently being collected for genetic analysis by Florida International University in partnership with Nova Southeastern University, Miami-Dade County and DEP. Even if *C. microphysa* proves to be native, it is already exhibiting problematic behavior, forming dense mats that blanket underlying habitats and kill native organisms, posing a threat to ecosystem health and resilience.

3.2.11 / Archaeological and Historical Resources

Because KJCAP covers the areas east of the mean high-water line, it does not include the many bridges, structures, and historic sites that comprise Southeast Florida history, such as the many pre-Columbian sites and remains of coastal settlements. However, these places are inextricably linked to KJCAP, both in terms of how the region developed over time and how that development affected KJCAP and its resources.

The Florida Division of Historical Resources recognizes three shipwreck preserves in KJCAP (Map 7). These preserves are recognized attractions for divers and snorkelers that host an abundance of marine life and are living museums showcasing KJCAP's past. CRCP acknowledges that they are required to consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archeological or historical resources, such as the three historical shipwrecks detailed below. The southernmost of these preserves is the *Half Moon*, a German-built, two-masted schooner yacht that sank in the early 1930s and came to rest just outside of Bear Cut between Virginia Key and Key Biscayne in central Miami-Dade County. The 154-foot vessel can be easily accessed, as it sits in 8-10 feet of water. The wreck was officially added as the seventh Underwater Archaeological Preserve in November 2000 and a year later was listed on the National Register of Historic Places.



Map 7: Depicts the locations of three underwater archaeological shipwreck sites found within the boundary of the KJCAP. Map generated with data from the Florida Division of Historical Resources.

The *SS Copenhagen*, a 325-foot-long steamer, is another underwater preserve, located in 15-30 feet of water outside the second reef on the Pompano Ledge, which is 0.75 miles offshore of Lauderdale-By-The-Sea in Broward County. The vessel ran into a reef in May 1900 and while efforts were taken to dislodge the steamer from the reef, it was finally considered a total loss and sank over time. Recognized as the fifth Underwater Archaeological Preserve in 1994, the *SS Copenhagen* was listed on the National Register of Historic Places in 2001.

The third of the historic shipwrecks in KJCAP is the *Lofthus*, a 222.8-foot iron sailing ship which ran aground in 1898 off Manalapan in south-central Palm Beach County. Located in 15-20 feet of water, the *Lofthus* is accessible 175 yards from the shore. The wreck sits in different sections on the seafloor as a result of the vessel first being stripped and then destroyed through the use of dynamite. The *Lofthus* became the eighth Underwater Archaeological Preserve in 2001 and was listed on the National Register of Historic Places in 2003.

3.4 / Economic Values

Infrastructure projects are often thought of as benefits provided by gray infrastructure, or man-made structures like sea walls or bridges. However, natural landscape features and nature-based infrastructure such as managed wetlands and natural habitat restoration provides services such as flood protection and water treatment. Gray infrastructure often only provides the service for which it was designed, while natural and nature-based infrastructure provide additional benefits such as protection of wildlife habitat and community areas for social and cultural uses (Bean et al., 2019). Recent studies have been able to quantify the value of coral reefs in providing protection for coastal communities from erosion, flooding, and other coastal hazards (Reguero et al., 2021; Storlazzi et al., 2019; Storlazzi et al., 2025). Researchers and coral reef managers worked to disseminated these data to local policy makers and to the USCRTF, laying out an argument for coral reefs as natural infrastructure protecting coastal infrastructure and vulnerable communities alike. Florida's Coral Reef alone protects thousands of people and $675 million in infrastructure and economic activity annually – or over $1 billion during severe storm events (Storlazzi et al., 2019). As a result, in 2023 the USCRTF Resolution 47.2 Coral Reefs as National Natural Infrastructure (USCRTF, 2023) was approved. This resolution formally recognized the value of coral reefs in coastal risk mitigation and provided a framework for coastal communities to apply for federal funding to support coral reef restoration. Coral reef restoration is now an eligible mitigation option under funding streams that were previously unavailable for this type of activity in Florida, such as FEMA Hazard Mitigation Assistance and Public Assistance grant programs (USCRTF, 2023).

Species diversity and abundance in KJCAP support a lucrative recreational fishery and a robust commercial fishing industry. Southeast Florida has historically been well known for excellent opportunities for fishing. Revenue and income from recreational, charter, and commercial fishing-related businesses comprise a vital part of Southeast Florida's economy, and the presence of coastal operations maintains a historic working waterfront (i.e., a waterfront area supporting commercial fishing infrastructure and open to the public for launching and storing

vessels). Certain reef-dependent species, such as spiny lobster, stone crab, and reef fish, comprise key commercial fisheries in the region, supporting the working waterfronts in southern and central Miami-Dade County. Seagrass meadows in the region also contribute to the sustainability of commercially valuable fisheries, including reef-dependent species, by providing habitat for these species during juvenile stages of their life cycle (Yarbro & Carlson, 2016). Due to this important role, seagrass beds in Florida add a value of over $20 billion each year to the economic health of the state (Yarbro & Carlson, 2016). Commercial fishing operations further north, from Broward to Martin counties, rely on a mix of reef-related and coastal migratory fin fish (Flinn, 2014; Johnson et al., 2007; Shivlani & Villanueva, 2007). Recreational fishing contributes considerable revenues across a variety of different fishing modes - shoreline, reef, and offshore angling, spear fishing, lobster diving - and accounts for over two-thirds of all fisheries catch in Southeast Florida (Johnson et al., 2007). Fishing and diving provide major economic benefits to the region. For example, Florida's recreational fishing industry on its Atlantic and Gulf coasts are individually larger than any other state in the country (NOAA Fisheries, 2021). NOAA estimates the economic value of coral reefs in Florida add up to a total economic contribution of $4.4 billion in local sales, $2 billion in local income, and over 70,400 jobs (NOAA, 2020). Follow-up work conducted by Wallmo et al. (2021b) that focused on a narrower set of economic impacts directly associated with coral reefs estimated that over the course of one year, reef-related snorkeling and diving activities generated $902 million in total economic output and supported 8,688 jobs in the Southeast Florida region including the four counties adjacent to KJCAP as well as the Keys. Although the full impact of smaller industries like water sports, boat rentals, and liveries is not fully known they do contribute to the larger economic impact of KJCAP.

KJCAP is an important economic driver through recreation, education, and scientific research. Spalding et al. (2017) used a coarse method based on total visitation by distance from the coast to calculate reef visitation for Florida's Coral Reef at 3.2 million users per year, resulting in a total annual value of $1.1 billion. Florida has the most registered vessels in the U.S., and in 2024, the four-county region abutting KJCAP accounted for 17.3% (178,092 vessels) of the state's 1,030,053 registered vessels; about 2.6% (4,557) of the region's total were commercial vessels, a category that consists mainly of fishing vessels (Florida Highway Safety and Motor Vehicles [FLHSMV], 2024). Shivlani (2006) determined that between 68-74% of recreational vessel owners in Miami-Dade and Broward counties take fishing trips within KJCAP, making it among the most popular activities.

In addition to positive economic impact and ecosystem services, sponges and coral hold a promising role in the development of biomedical discoveries, including pharmaceutical, anti-cancer, anti-inflammatory and bone repair applications (Cooper et al., 2014; El-Seedi et al., 2025). Studies in this area began in the 1950's when scientists discovered two molecules in the sponge *Tectitethya crypta* that led to breakthrough developments in treatments for HIV AIDS, leukemia and herpes (Jimenez et al., 2018; Altmann, 2017). Since then, several medical and therapeutic products and treatments have been possible through the isolation of marine natural products [MNP] (Martins et al., 2014). Florida's Coral Reef would be no exception in continuing this endeavor. In fact, molecules have been isolated from gorgonian coral *Eunicea fusca,* native

to South Florida, that exhibit major anti-inflammatory properties and have shown to carry therapeutic benefits that are promising in the clinical application for rheumatoid arthritis (Cooper et al., 2014). An estimated global economic value of over $8.6 billion has been attributed to treatments derived from marine compounds, including coral and sponge (Martins, et al., 2014).

3.5 / Citizen Support Organization

Citizen Support Organizations (CSOs) are recognized by statute (Sections 20.058 and 112.3251, F.S) as citizen-support led organizations with a special interest in the managed area they support. The Aquatic Preserve Society is a CSO of DEP ORCP, whose goal is to protect, conserve and restore unique natural resources through public awareness and support. They seek to increase awareness of the aquatic preserves throughout Florida and work to raise and support funds for aquatic preserve and CSO activities. They also provide communication and coordination between local COSs.

Specifically for the KJCAP region, local citizens from the four-county Southeast Florida region formed Friends of Our Florida Reefs (FOFR) in April 2015, inspired by DEP CRCP's community planning process, known as Our Florida Reefs. FOFR helps bridge the gap between stakeholders and management as KJCAP's Citizen Support Organization. FOFR acts as the official extension of KJCAP programs into the community and is able to connect with communities and functions beyond ORCP purview, while still maintaining the shared goals, and outreach messaging. FOFR's mission is to assist and enhance the critical efforts of KJCAP to conserve and protect the northern third of Florida's Coral Reef. FOFR accomplishes this by helping fill budget gaps, preparing for rapid response to reef-related emergencies, initiating and participating in education and outreach activities, and other self-initiated direct actions. According to FOFR's CSO Agreement with DEP, FOFR is authorized to support CRCP work through projects, events, volunteer activities, grants and donations administration and public educational and interpretative activities (DEP, 2024a). The funds they generate are used for the direct benefit of KJCAP. Since its inception, FOFR has supported logistical efforts for stakeholder meetings affecting KJCAP including meetings of the SEFCRI Team and Technical Advisory Committee Our Florida Reefs community planning process and the Advisory Committee who provided feedback on this draft management plan. FOFR successfully collected funds and in-kind support to assist CRCP in hosting the 2017 U.S. Coral Reef Task Force meeting in Fort Lauderdale, Florida where members from all coral reef jurisdictions were able to report on local initiatives and discuss resolutions regarding coral reefs and their conservation. FOFR has helped to enhance the on-going Southeast Florida Action Network BleachWatch coral bleaching and disease community science monitoring program through funding instructor workshops. In 2018, FOFR purchased a 3D printer for CRCP outreach, enabling in-house production of 3D coral polyp models using materials that allow for the demonstration of bleaching at outreach or other educational events, including the Traveling Trunk Program. Additionally, local educators can request to be loaned the 3D Printer by coordinating with CRCP staff. Support for coral restoration efforts was provided by FOFR through the donation of supplies to local practitioners performing land-based coral propagation. The organization has also provided support to update and renew materials used in public school coral reef educational kits that are sent to different teachers throughout the region and school year. FOFR

also continues to support CRCP's efforts to promote clean reefs by aiding with advertisement, logistical planning, promotion of outreach events on social media and fundraising for the Southeast Florida Annual Coral Reef Cleanup in partnership with local dive shops. Committed to maintaining funding reserves, FOFR also raises additional funds for their operational expenses and CRCP approved needs. FOFR files annual articles of incorporation as a 501(c)(3) nonprofit organization with the Florida Department of State.

With the creation of DEP's Coral Protection and Restoration Program (CPR), FOFR's CSO agreement with DEP was expanded to include support to the new program. As CPR was established to support the holistic management of the entirety of Florida's Coral Reefs, the potential to expand FOFR's support to include the two aquatic preserves in the Florida Keys – Coupon Bight and Lignumvitae Key Aquatic Preserves – is currently in discussion. This would unify support for the state-managed areas of Florida's Coral Reef and would make uniform outreach messaging easier.

3.6 / Adjacent Public Lands and Designated Resources

3.6.1 / Monroe County

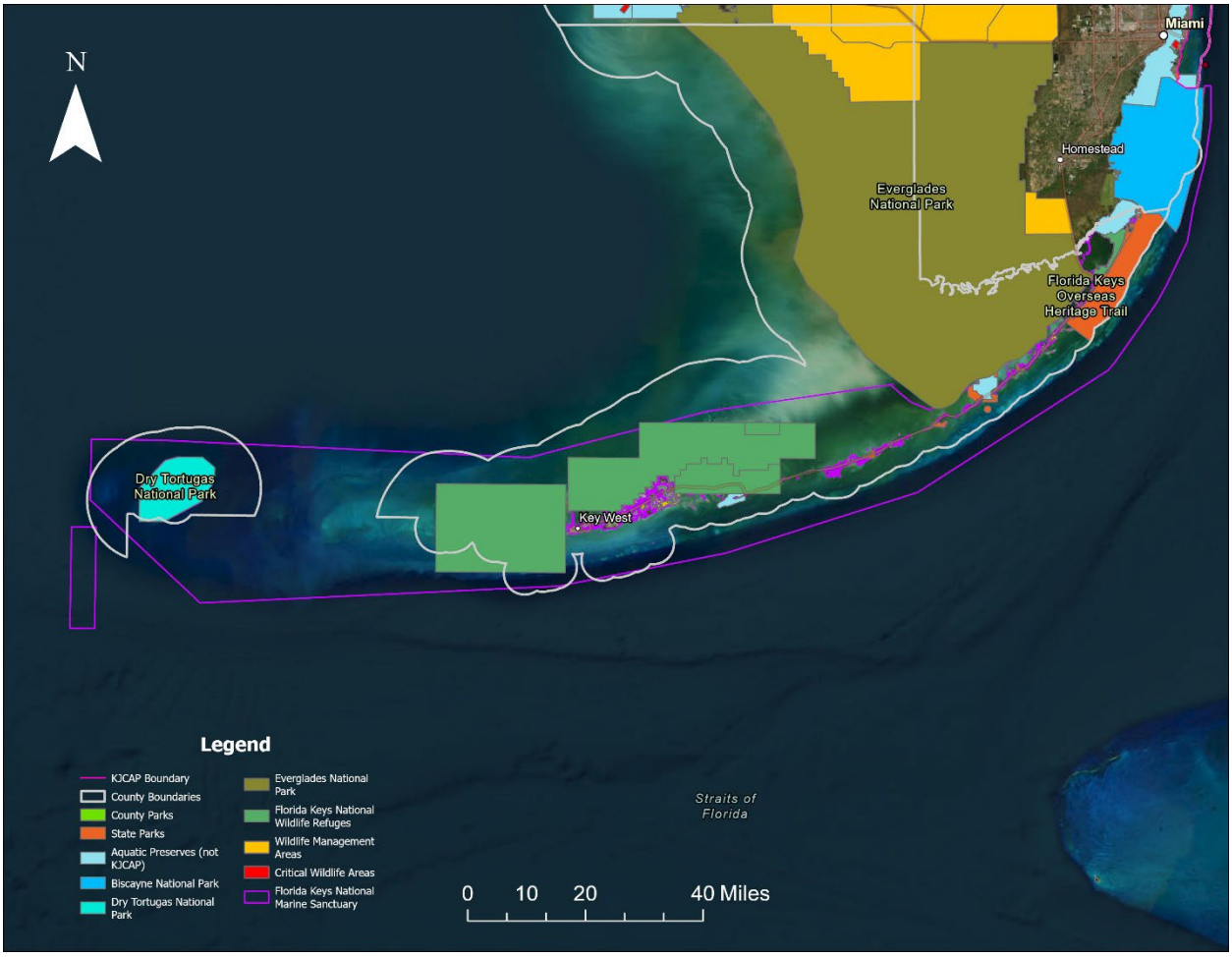
Florida Keys National Marine Sanctuary (FKNMS)
The FKNMS organizes their strategies into a series of action plans that address (among other strategies): marine zoning, mooring buoys, waterway management, and water quality, which is their top priority (NOAA, 1996; NOAA, 2007a; NOAA, 2024). The zones have several different levels of restrictions that vary depending on the state of the area and the purpose of protecting it. For example, the Sanctuary Preservation Areas (SPA), which only permit limited catch-and-release fishing, are designated around shallow reef habitats that face a high concentration of user groups, leading to conflicts and physical degradation. The Ecological Reserves are even more stringent with regards to extractive uses, and they are designed to protect critical habitat for the life cycles of the species, such as feeding or mating grounds. The Mooring Buoy and Waterway Management Action Plans both serve to reduce physical impacts on corals by eliminating the need for anchoring and by guiding vessels away from shallow habitats. The Water Quality Action Plan's goal is to coordinate efforts between federal, state, and local authorities to monitor and protect the water quality of FKNMS by conducting water quality sampling, assisting in the development of management plans for neighboring areas, and by helping to improve waste management facilities.

John Pennekamp Coral Reef State Park
First established in 1960, John Pennekamp Coral Reef State Park (originally named Key Largo Coral Reef Preserve (DEP, n.d.b) encompasses 72 nautical square miles and allows both commercial and recreational fishing throughout the park (Department of Parks and Recreation & DEP, 2019). The park has also established Protected Zones, which limit terrestrial development that would impact certain plant and animal species, including all corals. The zones also serve to implement restoration efforts that aim to recover coral and seagrass species and to re-establish natural water flow in certain areas of the park that have been disturbed by development

projects. Coral restoration had been limited to repairing areas affected by boat groundings; however, the DEP Division of Recreation and Parks included plans for a more proactive monitoring and restoration effort involving staghorn coral (*Acropora cervicornis*) in its 2019 management plan.

Florida Keys' Particularly Sensitive Sea Area (PSSA)

The Florida Keys' PSSA was created in 2002 to enhance protection of the 3,000 square miles around the Florida Keys coral reefs, specifically from international shipping vessels. A PSSA is an area that needs special protection through action by IMO because of its significance for recognized ecological, socio-economic, or scientific attributes where such attributes may be vulnerable to damage by international shipping activities (International Maritime Organization, 2005).



Map 8: Monroe publicly managed conservation lands.

This map shows the publicly managed conservation lands and designated resources adjacent to KJCAP within Monroe County. These lands include state parks, county parks, aquatic preserves, critical wildlife areas, wildlife management areas, Biscayne National Park, Dry Tortugas National Park, Everglades National Park, and the Florida Keys National Marine Sanctuary.

3.6.2 / Miami-Dade County

Biscayne National Park (BNP)
The Biscayne National Park identified physical impacts from fishers, boaters, and divers to be the main threat to the corals within the park and utilizes a zoning approach to try and balance resource use and protection. By protecting the reef from physical damages, the corals will hopefully be resilient enough to withstand the impacts from environmental change as well as land-based sources of pollution that are common in the area. Approximately 70% of the coral reef areas remain open to recreational fishing, but slow speed and idle zones, combined with no anchoring zones, aim to reduce groundings and physical damage. The marine reserve zone, where extractive activities are prohibited except for lionfish hunting, does allow swimming, snorkeling, and SCUBA diving in order to protect critical species while allowing visitors to witness a healthier reef. BNP is currently (as of 2025) revising their General Management Plan and Fisheries Management Plan, to guide management for the next two decades.

Bill Baggs Cape Florida State Park
The Bill Baggs Cape Florida State Park (est. 1967) is located at the southern tip of Key Biscayne and acts as a convergence point between the waters of Biscayne Bay and the Atlantic Ocean. The state park has a 400-foot-wide management zone that extends into KJCAP from the shore where roughly 95% of the area is dominated by seagrass. Its southernmost point is home to the oldest standing structure in Miami-Dade County, the Cape Florida Lighthouse. The Cape Florida Lighthouse was a meeting place for enslaved people to board ships to seek freedom in the Bahamas. In 2004, the park was designated a National Underground Railroad Network to Freedom Site. The park allows both single day and overnight anchoring for a fee. Fishing is allowed where it falls within Biscayne Bay Aquatic Preserve and CFAP and conforms to their regulations. The area is marked off for swimmers, which prevents prop scarring from most boats. However, they note that more enforcement is needed to address boats coming to shore to pick up and drop off visitors, and there needs to be regular trash cleanups of the seagrass. The 2012 management plan will guide management through the present.

Oleta River State Park
Oleta River, originally known as Big Snake Creek, links the Everglades with Biscayne Bay. It served as a passage south for federal troops during the Second Seminole War in 1841, and as a commercial fishing operation since 1938, the Blue Marlin (DEP, 2025g). Oleta River State Park, Florida’s largest urban park, serves as an access point to BBAP, and hosts a mangrove swamp, two offshore islands, and seagrass beds in the surrounding waters. Visitors can enjoy fishing from the pier and along the shoreline, a swimming beach and paddle sports.

Biscayne Bay Aquatic Preserve (BBAP)
For BBAP, water quality is a priority issue, the preserve undertakes extensive monitoring operations to keep track of conditions and trends within the bay. Their data assists managers in developing total maximum daily load levels and informing lawmakers on how to address these significant issues. Additionally, the legal authority allows DEP regulatory staff to regulate and restrict harmful development around the preserves that would degrade habitat and water quality, especially as it is designated Outstanding Florida Waters. The overlap between KJCAP and

CFAP provides strong protection for the corals and seagrasses that reside in that portion of KJCAP. BBAP management plan has recently been approved to guide management from 2025-2035.

Critical Wildlife Areas

The **Bill Sadowski Critical Wildlife Area** is a 700-acre area northwest of Virginia Key. The Critical Wildlife Area boundary includes the lagoon and emergent vegetation areas where a variety of birds roost and forage. The area is also a manatee protection zone and closed year-round to all vessels.

County Beach Parks

Crandon Park (est. 1947) is located on the north side of Key Biscayne, opposite to Bill Baggs, and is managed by Miami-Dade County. A marina is located on the bay side adjacent to Bear Cut, providing quick access to KJCAP waters. The **Half Moon Underwater Archeological Preserve** is adjacent to Crandon Park near Bear Cut. It protects a racing sailboat that sunk in shallow waters in 1930 and seven decades later was listed on the National Register of Historic Places. The park is home to many important species, many of which can be seen in The Bear Cut Preserve, which has walking and biking trails throughout the upland portion of the park. Eco-tours and kayaks are available in the park, but fishing is not allowed.

Haulover Beach Park (est. 1948) is also managed by Miami-Dade County and located just north of Miami Beach. This Park contains the longest stretch of undeveloped beach in Miami-Dade County. Historically, the site was part of the mail carrier walking route from Miami to Palm Beach and a site of liquor offloading during Prohibition. Today, the park is home to a marina with 152 wet slips and a boat ramp for visitors, situated on the Intracoastal side of the park. Baker's Haulover Inlet was cut in 1925 and opens to the Atlantic Ocean. Fishing is permitted at certain sites along the Intracoastal and the Cut, as well as along the beach front. The northern section of Haulover Beach is a popular clothing-optional beach.

Historic Virginia Key Beach Park (est. 1945) was first designated as a park by the city of Miami in 1945 after protests from the African American community in Miami sought the right to use the beach at Bear Cut, which at that time was only accessible by boat. The area became a significant social gathering place and even hosted religious services. The city closed the park in 1982, but in 1999 local activists established the Virginia Key Beach Park Civil Rights Task Force to prevent proposed development of the area, eventually leading to the management under the Virginia Key Beach Park Trust. In 2002, the preservation of the park was ensured by being added to the National Register of Historic Places, and eventually reopened as the Historic Virginia Key Beach Park in 2008. There are numerous endangered plant and animal species within the protected habitat and fishing is prohibited as a rule in all city parks. The park is the site of a mangrove restoration project.

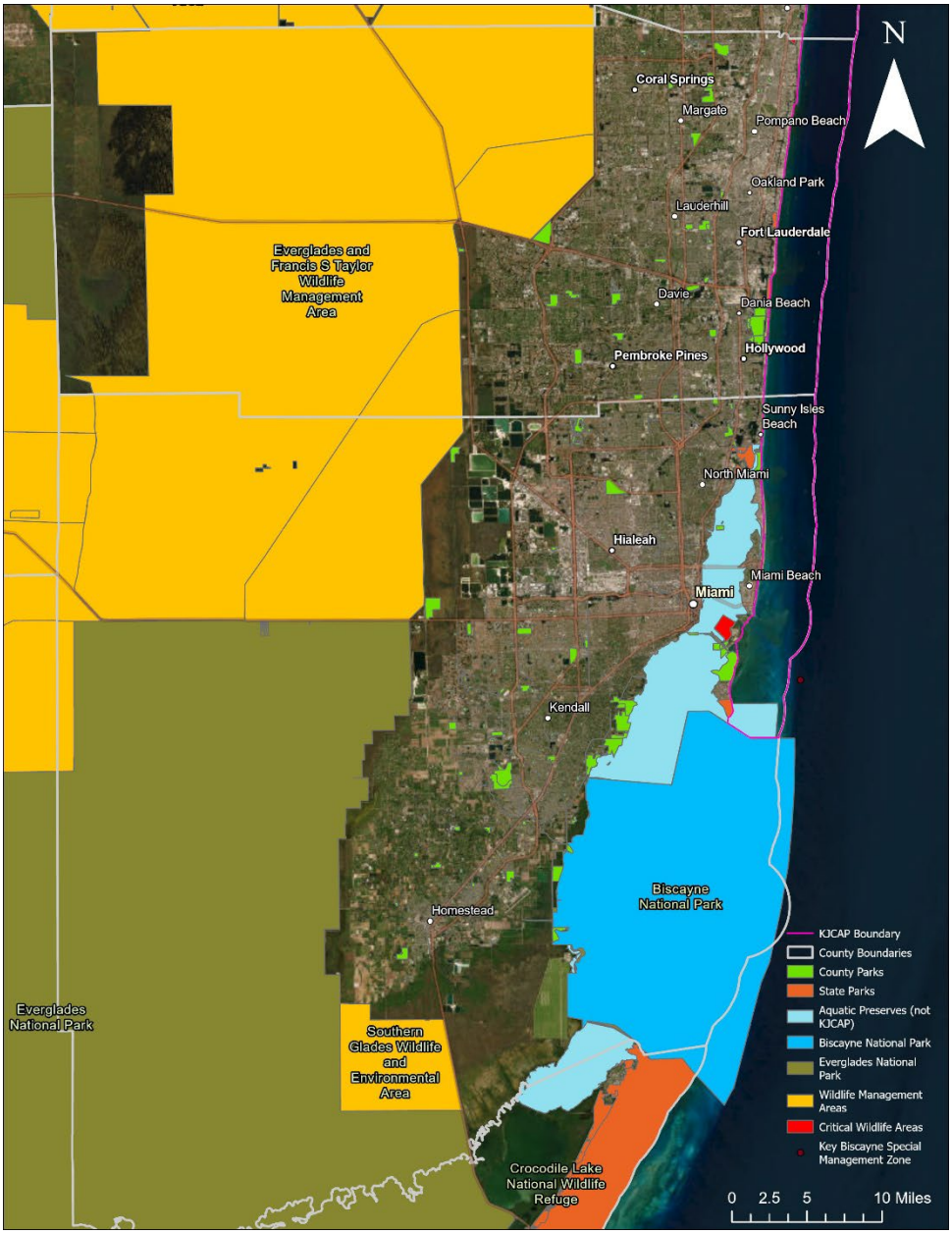
Key Biscayne Special Management Zone

The Key Biscayne Artificial Reef site was designated as a special management zone in 1990 by the National Oceanic and Atmospheric Administration in order to limit the impacts of

“unrestrained fishing pressure” (i.e., highly efficient or selective fishing gear), while maintaining most recreational uses of the site. Fish traps, bottom longlines, and spear guns of any type, are prohibited from use within the special management zone. A portion of the Key Biscayne Special Management Zone now overlaps with the expanded boundaries of FKNMS.

Municipal Parks

There are nine municipal parks with access to KJCAP in Miami-Dade County, all of which are managed by the City of Miami Beach: South Pointe Park, Marjory Stoneman Douglas Ocean Beach Park, Lummus Park, Collins Park, Indian Beach Park, Beach View Park, Allison Park, Altos del Mar Park, and North Beach Oceanside Park.



Map 9: Miami-Dade and Broward publicly managed conservation lands.

This map shows the publicly managed conservation lands and designated resources adjacent to KJCAP within Miami-Dade and Broward Counties. These lands include state parks, county parks, aquatic preserves, critical wildlife areas, wildlife management areas, Biscayne National Park, and Everglades National Park.

3.6.3 / Broward County

Dr. Von D. Mizell-Eula Johnson State Park

Dr. Von D. Mizell-Eula Johnson State Park (est. 1973) was originally named John U. Lloyd Beach State Park (DEP, n.d.a). The park is located just south of Port Everglades. The beach associated with this state park once formed the route for the mail carriers who traveled by foot between Palm Beach and Miami before the Florida East Coast Railway Railroad connected the two in the late 19th and early 20th centuries. Later in the 20th century, the beach became a site of civil rights protests as African American residents around Florida would travel to use the beaches, only to be denied access by oceanfront property owners. Dr. Von D. Mizell, the founding president of the Broward County National Association for the Advancement of Colored People (Broward NAACP), was instrumental in pressuring local lawmakers into guaranteeing access to the beach. However, the county deliberately dragged its feet on providing an access road to the beach, culminating a decade later in “wade-in” protests organized by the NAACP Chapter President Eula Johnson and supported by Dr. Von D. Mizell. The park was renamed to honor their work for integration in 2016. The park offers kayak rentals for trips into the mangroves and has a boat ramp for access to the ocean for boats up to 36 feet long. Fishing is permitted along the beach in accordance with state laws upon the stipulation that no swimmers be in the area. The park is a popular launch point for snorkeling and scuba diving, as the reef system starts about 300 yards offshore.

Hugh Taylor Birch State Park

Hugh Taylor Birch State Park (est. 1951) is situated on a barrier island between the intracoastal and the Atlantic Ocean. The former estate of Hugh Taylor Birch was donated to the state of Florida in 1941 and maintains natural scenery in the middle of urbanized Ft. Lauderdale. Kayaking rentals are available on the lake with some access to the ocean. Fishing is allowed along the beach into KJCAP and in select locations on the intracoastal side.

Critical Wildlife Areas

The 56-acre **Deerfield Island Park Critical Wildlife Area** retains one of the last populations of gopher tortoise within Broward County. Upland areas with suitable tortoise habitat are closed to public access, while other areas of the park remain open to visitors. The Critical Wildlife Area, managed by the FWC, is only accessible by boat or shuttle

County Beach Parks

Hollywood North Beach Park (est. 1958), a 56-acre park managed by the county, provides access to both the Intracoastal and the Atlantic Ocean with its five pocket beach parks: Loggerhead, Kemp's Ridley, Leatherback, Hawksbill, and Green. The Marine Environmental Education Center (MEEC) is a unique collaboration between Broward County Parks and Nova Southeastern University located within Hollywood North Beach Park. The center was

established to educate and inspire visitors about marine education and conservation awareness, with a special focus on endangered sea turtles. Fishing is only permitted on the Intracoastal side.

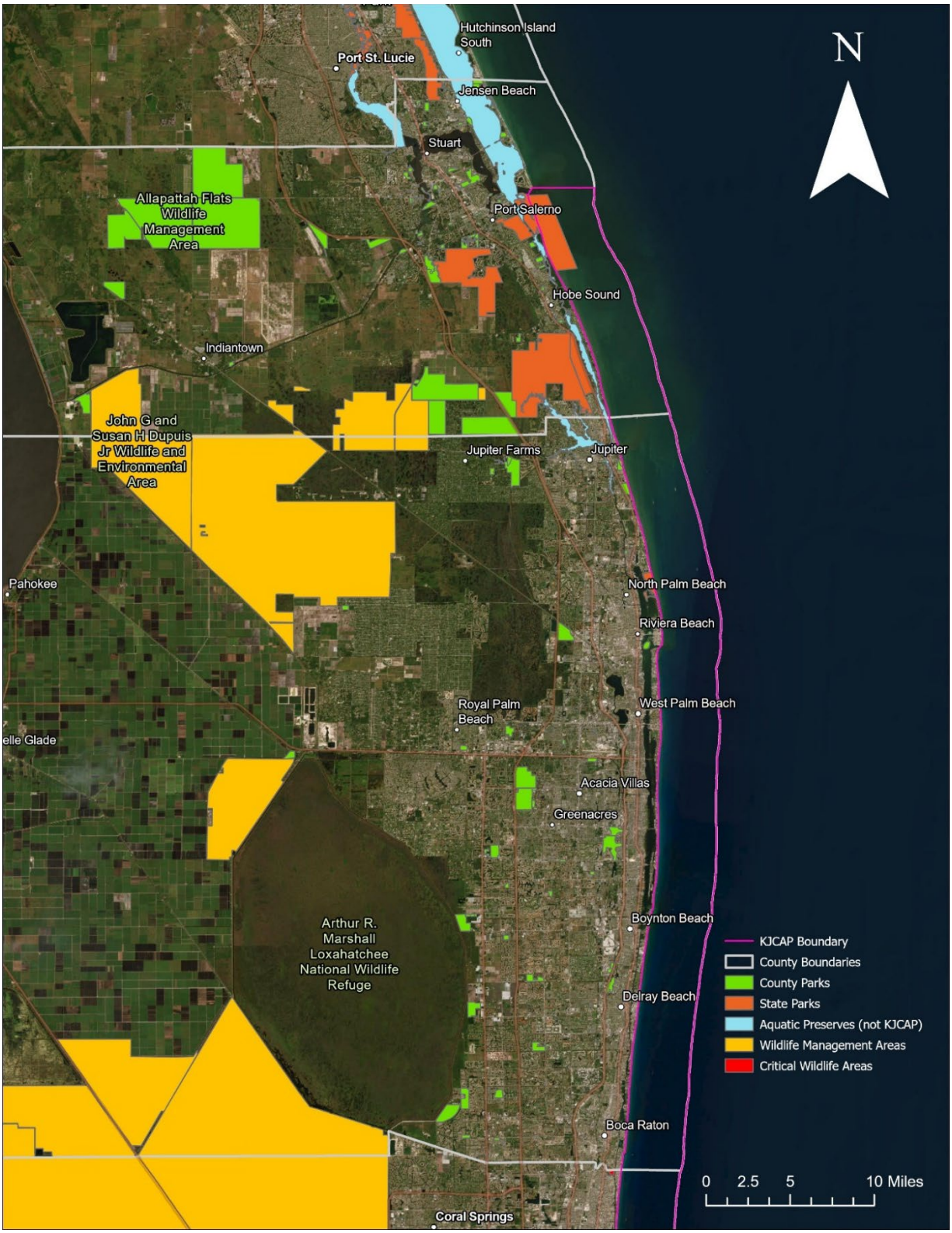
Municipal Parks
Broward County has nine municipal parks with beach access. The city of Hollywood manages four: Keating Park, Harry Berry Park, Chernow Park, and Dog Beach. Ft. Lauderdale manages the remaining five municipal parks with general waterfront access: the Fort Lauderdale Beach Park, DC Alexander Park, Earl Lifshey Park, Vista Park, and Willingham Park. The Ft. Lauderdale Beach Park also includes a boat ramp but only for non-motorized vessels. Fishing is legal on public beaches between the hours of 6 p.m. and 8 a.m.

3.6.4 / Palm Beach County

John D. MacArthur Beach State Park
The John D. MacArthur Beach State Park lies on a narrow stretch of land between Lake Worth Lagoon and the Atlantic Ocean and is home to seven plant and 22 animal species that are listed as endangered or threatened under the ESA. Kayak rentals are available, and fishing is permitted within state laws.

County Beach Parks
Palm Beach County is home to an impressive list of 12 county beach parks. Coral Cove (14.6 acres), Jupiter Beach (46.5 acres), Carlin (120.3 acres), and Ocean Cay (13.4 acres) all offer beach access to KJCAP along the Jupiter waterfront, in the northern section of Palm Beach County. Further south in the Juno Beach area, Juno Beach (5.2 acres) and Loggerhead Park (17.3 acres) offer access to KJCAP. Ocean Reef Park (12.6 acres) is located south of John D. McArthur Beach State Park and is part of a complex of inlet and oceanfront parks designated in Riviera Beach. R. G. Kreusler Park (4.2 acres), Ocean Inlet (11.4 acres), Ocean Ridge Hammock (8.5 acres), and Gulfstream Park (6.8 acres) are three other parks that offer beachfront access along the south-central part of Palm Beach County. Finally, South Inlet (11.1 acres), located off Boca Raton, provides access to KJCAP along the county's southern boundary. All county parks have similar rules and regulations, such as open beach access, fishing access outside of designated swimming areas, and a prohibition on balloons. Ocean Inlet is the only one that offers a marina, with 20 day-use wet slips.

Municipal parks
Municipal parks include the South Beach, Red Reef, Phipps Ocean, Oceanfront, and Atlantic Dunes Parks. These local parks have beach access to the Atlantic Ocean and permit fishing from shore outside of designated swimming areas and hours.



Map 10: Martin and Palm Beach publicly managed conservation lands.

This map shows the publicly managed conservation lands and designated resources adjacent to KJCAP within Martin and Palm Beach County. These lands include state parks, county parks, aquatic preserves, critical wildlife areas, and wildlife management areas.

3.6.5 / Martin County

Nathaniel P. Reed Hobe Sound National Wildlife Refuge

Martin County is home to the federally-protected Nathaniel P. Reed Hobe Sound National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service. The refuge is divided into two sections by the Indian River Lagoon. The eastern side, on Jupiter Island, maintains the largest continuous, undeveloped beach in Southeastern Florida and represents a critical sea turtle nesting habitat. Fishing is permitted from the beach with some restrictions on gear and in accordance with state limits on catch sizes and species. Nathaniel P. Reed Hobe Sound National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service. The refuge is divided into two sections by the Indian River Lagoon. The eastern side, on Jupiter Island, maintains the largest continuous, undeveloped beach in Southeastern Florida and represents a critical sea turtle nesting habitat. Fishing is permitted from the beach with some restrictions on gear and in accordance with state limits on catch sizes and species.

St. Lucie Inlet Preserve State Park

St. Lucie Inlet Preserve State Park was established in 1969 and extends its marine zone one mile into KJCAP at the northernmost point of Florida's Coral Reef. Their location in front of the inlet exposes them to high vessel traffic and fishing activities. Cleanup dives are regularly conducted to remove debris and fishing line from the reef. Fishing is allowed, if it conforms to state laws regarding seasons for certain species and size limits. Only spearfishing and shell collection are prohibited, as in all State Parks. Buoys have been installed to better delineate the park boundary and to assist law enforcement in identifying illegal spearfishing within the park. Additionally, discharge from Lake Okeechobee is directed past the park, which can contribute to turbidity issues. The beach of the park also provides sea turtle nesting habitat for federal, and state listed species. In addition to monitoring the nests to reduce predation, they have periodic beach nourishment projects and seek to restore dune vegetation to reduce erosion. The 2014 management plan guides management through the present.

Jonathan Dickinson State Park

Jonathan Dickinson State Park, previously Camp Murphy during World War II, was established in 1950. Fishing is allowed in the Loxahatchee River that winds through the park and varies from freshwater fishing in the upper river to saltwater angling further downstream. This state park includes the northern section of Loxahatchee River-Lake Worth Creek Aquatic Preserve and provides access to the aquatic preserve through use of its boat ramps. The state park has a vast diversity of natural communities including sand pine scrub, pine flatwoods, mangroves, and river swamp, and an observation tower to observe the surrounding wildlife atop the peak of Hobe Mountain, a historically significant lookout point during World War II (DEP, 2025d).

Loxahatchee River-Lake Worth Creek Aquatic Preserve
The Loxahatchee River-Lake Worth Creek Aquatic Preserve was designated in 1970 due to public concern over environmental degradation of the Loxahatchee River and surrounding basin. The aquatic preserve encompasses the Northwest Fork of the Loxahatchee River and is fed by three major tributaries: the North Fork, Northwest Fork and Southwest Fork. It includes the remains of Trapper Nelson's homestead and zoological park from the 1950s. Over the last century, heavy development has altered the natural hydrology of the area. The construction of canals and levees for drainage and flood control changed the river's natural flow and reduced its volume. The construction of the C-18 canal in 1958 and the permanent opening of the Jupiter Inlet in 1947 have significantly contributed to saltwater intrusion, shifting parts of the river to a more estuarine-dominant community (DEP, 2025f).

County Beach Parks
The **Hobe Sound Beach Park** is an open-access beach with shore fishing within KJCAP. While there are more county and municipal beach parks just north of KJCAP, it is the only county or municipal beach park within Martin County that is south of the St. Lucie Inlet.

Bathtub Beach
Bathtub Beach is a unique region due to the notable worm rock reef system found just offshore that is created by tube-building Sabellariid sea worms. This reef system helps to break waves and creates a “bathtub” effect in the calmer summer months that attracts recreational visitors. However, the reef system does not protect the shore from erosion during rougher conditions in the fall and winter seasons or during large storms (MC, 2025b).

Blowing Rocks Preserve
Blowing Rocks Preserve, established in 1969 as the result of Jupiter residents donating 73 acres to the Nature Conservancy, is a privately managed area that spans the width of Jupiter Island. It has been restored to the natural floral and beach composition that allows for native plant and animal species, some of which are endangered, to flourish. The preserve got its name for its rocky shoreline; when waves crash into the rocks, water gets forced through holes in the limestone and plumes of seawater spray into the air, putting on a spectacular show. The preserve prohibits pets, picnicking, and spearfishing in an effort to maximize public use while still preventing degradation.

Oculina Habitat Area of Particular Concern
Just north of KJCAP in Martin County is a unique deep-water coral reef populated by thickets of the ivory tree coral, *Oculina varicosa*, found at depths of 70-100 m and ranging 32-68 km offshore (Reed, 2006). This Oculina Habitat Area of Particular Concern (HAPC) was established to protect this unique habitat by the South Atlantic Fisher Management Council in 1984. During the 1970’s large populations of grouper, snapper and amberjack could be found on these reefs, however they were severely reduced by the early 1990’s due to commercial and recreational fishing pressure (Reed, 2002). To protect the *Oculina*, along with the diverse communities of finfish and invertebrates the coral structures supported, from the degradation that was occurring, bottom-tending fishing gear including bottom trawls, bottom longlines, dredges and

fish traps were prohibited. In 1994, all snapper and grouper bottom fishing was prohibited as well by the National Marine Fisheries (Reed, 2002).

3.7 / Surrounding Land Use

Effective management of KJCAP requires robust engagement across local, county, state, federal and non-governmental organizations to address threats that span administrative boundaries such as water quality, boating impacts, fisheries, and coastal development. For example, coordinated frameworks call for compatibility of jurisdictional activities and cross-agency teams to manage the entirety of Florida's Coral Reef (NOAA & FDEP, 2008). This management plan acknowledges the need for integrated and longstanding mechanisms for jurisdictional and inter-agency coordination, without which the cumulative effects of land-based sources of pollution, coastal construction, vessel grounding, and habitat loss cannot be adequately addressed in a holistic manner.

The four counties adjacent to KJCAP are largely urbanized with a mix of commercial and residential areas, with some agricultural lands primarily towards their western borders (Bean et al., 2019). The area can be further divided into inlet contributing areas (ICAs), where each area corresponds to one of the nine inlets that feed water from terrestrial sources into KJCAP (Pickering & Baker, 2015). While each ICA has mixed uses, the most heavily urbanized areas occur from Boca Raton Inlet in southern Palm Beach County to Government Cut in Miami-Dade, while the northern areas around the St. Lucie Inlet have the highest levels of agricultural land use (Pickering & Baker, 2015). Within the agricultural lands, crop agriculture is far more prevalent than animal agriculture, accounting for about 20% and 0.3% of land use within the ICAs, respectively. In addition to the freshwater runoff from the nine inlets, six domestic wastewater outfalls exist between Miami-Dade and Palm Beach counties, discharging about 300 million gallons per day of secondary-treated wastewater effluent between one and three miles offshore into KJCAP ecosystem. The ocean outfalls are in the process of being phased out as mandated by Florida Statute 403.086 (Pickering & Baker, 2015).

The **Indian River Lagoon (IRL)**, located along Florida's east coast just north of the KJCAP region, is one of the most biodiverse estuaries in North America and serves as a critical interface between terrestrial, freshwater, and marine systems (Lapointe et al., 2015). The IRL receives runoff from extensive agricultural and urban areas in St. Lucie and Martin Counties, and its waters eventually reach the nearshore environments that feed into the northern extent of KJCAP via the St. Lucie Inlet (Sime, 2005). High nutrient inputs, particularly nitrogen and phosphorus from fertilizer use and stormwater runoff, have led to chronic algal blooms and seagrass die-offs in the IRL, ultimately degrading water quality and affecting downstream coral reef ecosystems (Lapointe et al., 2015; Sigua et al., 2020). Restoration initiatives—such as stormwater treatment areas, septic-to-sewer conversions, and sediment dredging projects—are ongoing to improve water quality and reduce nutrient discharge to the coastal waters connected to KJCAP (St. Johns River Water Management District [SJRWMD], 2023).

The **St. Lucie Estuary** is situated in Martin and St. Lucie Counties, forming the outlet of the St. Lucie River. The estuary has been highly modified through drainage canals and flow alterations

which have changed the timing, volume, and quality of freshwater and nutrient inflows into the system (SFWMD, DEP, FDACS, 2009). The SFWMD has established comprehensive Watershed Protection Plans designed to improve water quality, reduce nutrient loading, and restore natural hydrology throughout key basins. For instance, the **St. Lucie Watershed Protection Plan (WPP)** which focuses on reducing nutrient inputs to the St. Lucie Estuary through the implementation of stormwater treatment areas (STAs), reservoirs, and BMPs, which address upstream sources of pollution that can affect downstream coastal and reef environments, including those within the KJCAP region.

Farther south, the **Lake Worth Lagoon (LWL)** in Palm Beach County functions as an important estuarine system directly adjacent to the KJCAP's coastal zone. The lagoon connects to the Atlantic Ocean through the Lake Worth and South Lake Worth Inlets and receives freshwater inputs from several urban canals, making it a significant source of both freshwater and nutrient loading to the nearshore reef tract (Palm Beach County ERM, 2021). Intensive coastal development, historical dredge-and-fill activities, and stormwater discharges have impaired lagoon water quality and altered hydrology (Tetra Tech, 2013). Restoration and management programs led by Palm Beach County's Department of Environmental Resources Management have focused on creating mangrove and seagrass restoration sites, controlling point-source pollution, and improving stormwater infrastructure to reduce impacts to KJCAP and nearby reef systems (Palm Beach County ERM, 2021). Together, both the IRL and LWL underscore the interconnectedness of Florida's coastal watersheds and the importance of integrated management across terrestrial, estuarine, and marine environments to protect the ecological integrity of KJCAP.

Examining the land use of each ICA is crucial for understanding the relationship of nutrient transfer between the terrestrial and marine ecosystems. Pollution from intensive land use is one of the top issues facing coral reefs (USCRTF, 2000) and varies from both point and nonpoint sources, as well as between urban and agricultural areas. Agricultural practices release high levels of nitrogen and phosphorus into the groundwater or surface water runoff to nearby canals, eventually discharging to the ocean (Pickering & Baker, 2015). Nitrogen is limited in the ocean, especially in reef environments, and its influx provides the conditions for algal blooms, leading to high levels of mortality in coral and seagrass species (Bean et al., 2019). Urban environments are also important sources of nutrient pollution; the impervious surfaces that dominate urban areas eliminate natural filtration of stormwater through the soil, allowing runoff to reach canals and be drained into the ocean much more quickly with far less filtration (Bean et al., 2019).

In 2018, NOAA CRCP and DEP CRCP funded a pilot study in the Boynton Inlet Contributing Area (Boynton ICA) to identify the optimal methods for reducing nitrogen and phosphorous pollution in the coastal waters for the protection of the offshore coral reef. This ultimately resulted in the development of the Boynton Inlet Contributing Area Watershed Management Plan. The plan describes four strategies for reducing eutrophication and their relative costs: reducing fertilizer use through local ordinances; converting septic systems to sewer, especially on the barrier islands; upgrading stormwater treatment centers; and improving monitoring of

water quality and quantity at critical sites. In 2024, NOAA CRCP funded the development of a watershed management plan for the Government Cut Inlet Contributing Area (ICA). The plan's overarching goals include identifying runoff hotspots, assessing infrastructure efficiencies, improving land-use planning, establishing baseline and long-term monitoring, supporting restoration efforts, and integrating watershed and coastal management strategies. A Government Cut Implementation Team was established to meet bi-monthly and discuss project goals, timelines, funding, and progress related to the plan. The intent is to create a similar implementation team for each watershed management plan to ensure continued coordination and tracking of progress. The recommendations from these management plans offer valuable guidance for improving water quality across the KJCAP region. Future efforts will focus on developing watershed management plans for each of the inlet contributing areas within KJCAP.

Aside from nonpoint source pollution from storm and agricultural runoff, another high priority concern in KJCAP region is the use of septic tanks. While the prevalence of septic systems is decreasing over time, there are still a significant number throughout the four counties, particularly in rural areas (Pickering & Baker, 2015). When used properly, septic systems are effective at removing bacteria and phosphorus from wastewater, but studies in Florida estuaries have shown that nitrogen loading remains an issue (Bean et al., 2019). That is even before considering the increase in compromised septic systems in South Florida. Septic systems require at least 24 inches of soil to filter the nutrients out of wastewater before that water reaches the groundwater. During the rainy season, from May to October, the water table rises, often far above the 24-inch buffer, and as sea levels continue to rise, the issue will only become more significant with higher levels of nutrient pollution (Bean et al., 2019).

Agencies at the county, state and federal levels are working to address some of these issues. DEP coordinates with local governments to create septic to sewer conversion programs in order to incentivize and provide financial assistance to eliminate obsolete septic systems in critical areas (Bean et al., 2019). Additionally, along with county land acquisition programs, Florida Forever is a statewide environmental land acquisition program that, with its predecessor, has purchased more than 2.5 million acres of land to be used for conservation (DEP, 2025c). The program nominates and selects sites through a 10-member committee consisting of state agency members and governor appointees (DEP, 2025c). There are several Florida Forever projects in South Florida with conservation goals including protecting upland hammock communities, mangroves, and coral reefs in the Florida Keys, as well as protecting rare species and preserving natural waterflow as much as possible in the Everglades system (DEP, 2025c). Federally, the Comprehensive Everglades Restoration Plan is a 35-year collaborative project between the U.S. Army Corps of Engineers and the South Florida Water Management District to restore natural freshwater flow from Lake Okeechobee through the Everglades, providing habitat for many wetland species and reducing nutrient flow into KJCAP and South Florida estuaries (NPS, 2019; SFWMD, n.d.a).

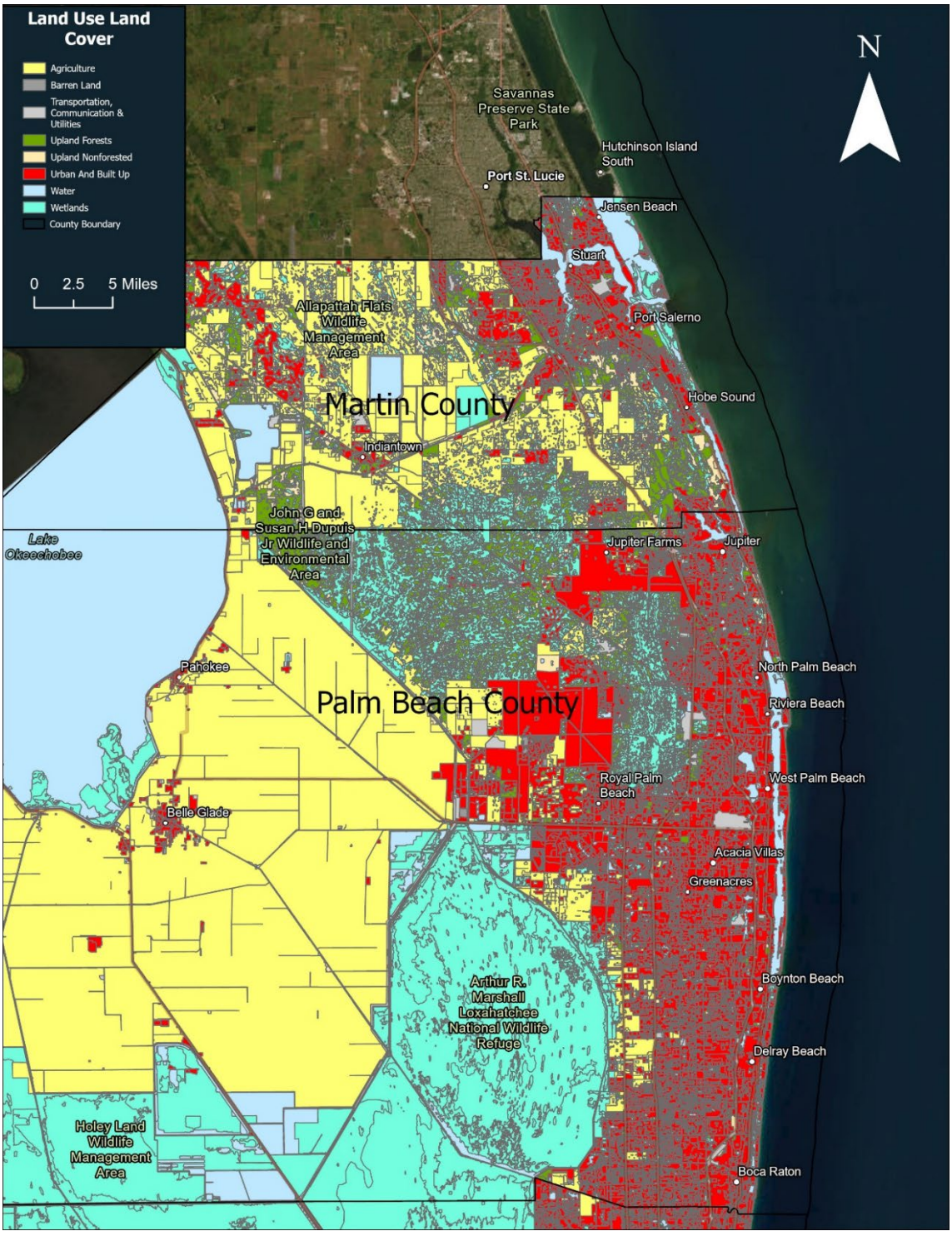
Treatment wetlands, called Stormwater Treatment Areas (STAs), were constructed in areas upstream of KJCAP in an effort to remove excess nutrients like phosphorus that had been building up in the Everglades and other natural wetlands as a result of stormwater runoff. STAs

currently cover around 57,000 acres of land south of Lake Okeechobee, including expansions completed in 2012 in the Everglades Agricultural Area (SFWMD, n.d.c). STAs use plant growth to filter agricultural and urban runoff before it flows into sensitive environments. Water quantity and quality are monitored within STAs, and those data are available as monthly and annual summaries from SFWMD at https://www.sfwmd.gov/science-data/scientific-publications-sfer. Removing excess nutrients in upstream waters before they reach Florida's Coral Reef is a more cost-effective solution than trying to address symptoms of eutrophication within KJCAP.

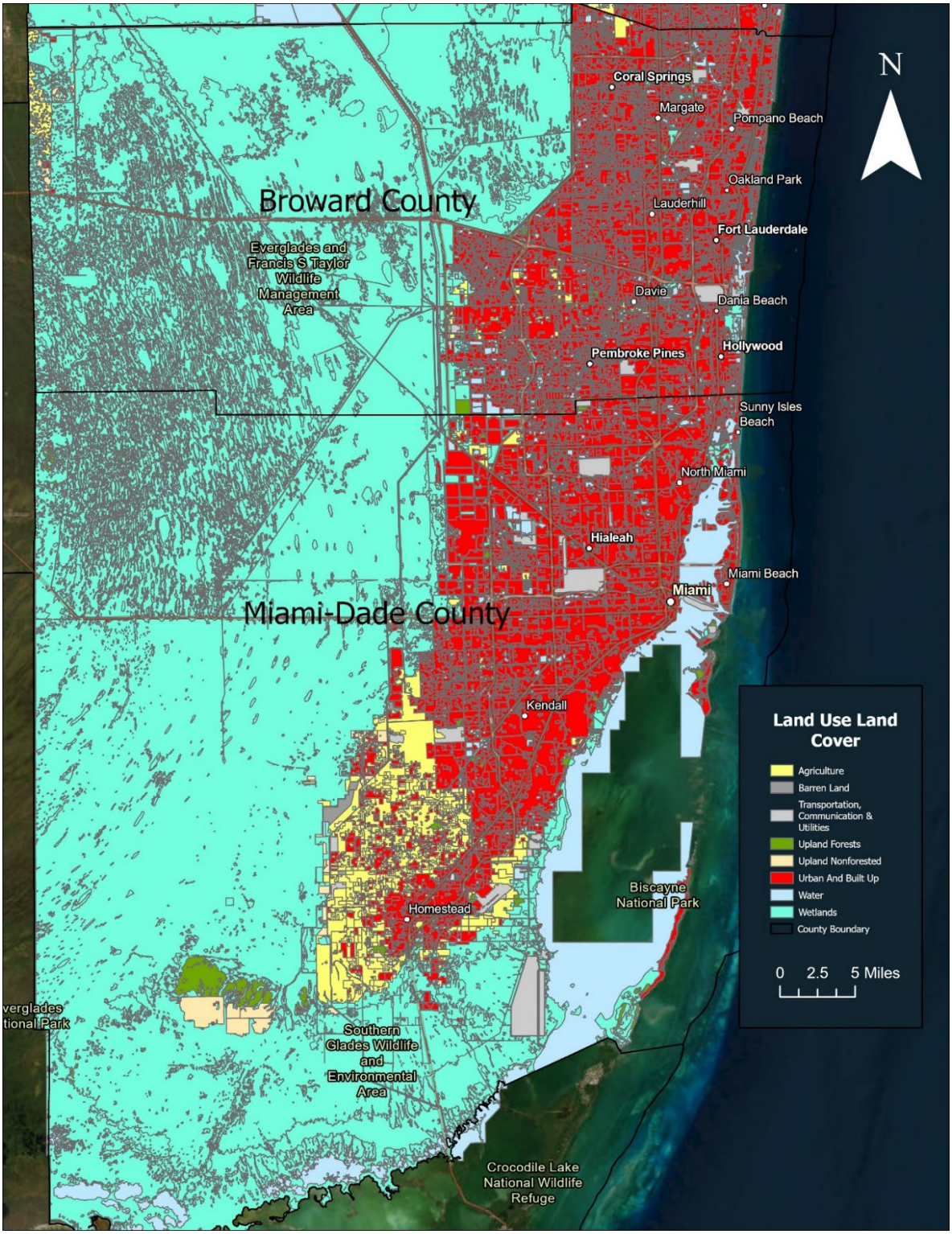
Throughout the shoreline adjacent to KJCAP, there are 113.2 miles of beaches (Office of Economic and Demographic Research, 2024), of which 91.7 miles are critically eroded (DEP, 2025b). DEP's Beaches, Inlets and Ports Program (BIPP) is responsible for updating and maintaining the Strategic Beach Management Plan and Inlet Management Plans to address critical erosion along Florida's coastline and inlet maintenance through beach nourishment and dredging projects. BIPP is also the regulatory program responsible for the evaluation, reduction, and mitigation of the environmental impacts from both beach nourishment and dredging activities, which are known to have negative effects on Florida's coral reef and hardbottom communities as well as sea turtle nesting habitats.

Both Broward County Sea Turtle Conservation Program (BCSTCP) and Palm Beach County Environmental Resources Management Sea Turtle Program run large-scale, systematic turtle-nesting monitoring programs. The BCSTCP monitors approximately 24 miles of Broward County shoreline from March 1 through October 31, conducting daily nesting surveys and contributing long-term nest-trend data (Broward County Sea Turtle Conservation Program, n.d.). In Palm Beach County, monitoring has been underway for more than 25 years, and includes data collection on nesting activity, hatchling success, in-water turtle use and the effects of coastal construction (Palm Beach County ERM, n.d.).

All Florida counties are required by the Local Government Comprehensive Planning and Land Development Regulation Act to have a comprehensive management plan with elements related to different governmental functions (e.g., housing, physical facilities, conservation, land use and coastal zone protection). One goal in having a management plan for KJCAP is to guide county governments during their planning process, or as comprehensive plans are revised, toward developing local planning criteria and standards that will be consistent with the objectives of the program. Each plan, in effect, is intended to guide the future development of each respective county. Cities and counties are to adopt land development regulations and conform to the criteria, policies, and practices of their comprehensive plans, which must be updated periodically as required by statute. In addition to land acquisition, many strategies are consistent throughout the four counties including coastal erosion control methods, septic tank conversion programs, stormwater management, light pollution limits, water quality monitoring, and artificial reef programs. For example, counties can adopt the concept of coral reefs as natural infrastructure that provide shoreline protection in their emergency management plans, which would unlock more avenues for protection and restoration.



Map 11: Land Use and Land Cover for Martin and Palm Beach Counties (data provided by the South Florida Water Management District for 2021-2023.)



Map 12: Land Use and Land Cover for Broward and Miami-Dade Counties (data provided by the South Florida Water Management District for 2021-2023.)

Photo 5: CRCP diver performing benthic surveys for disturbance response monitoring in KJCAP.

Chapter 4 / The Kristin Jacobs Coral Aquatic Preserve Management Issues

The hallmark of Florida's Aquatic Preserve Program is that each site's natural resource management efforts are in direct response to, and designed for, unique local and regional issues. Given the breadth of KJCAP, its diverse resources, and multi-scalar challenges, issue-based adaptive management represents a tested and integrated approach to target management within the region. Issues are addressed using a mechanism that incorporates goals, objectives, and strategies to assess the source of the problem, devise and implement interventions to correct it, assess the effectiveness of the interventions and educate the public on how to become better stewards of the resource. For instance, an aquatic preserve may address declines in water quality by monitoring levels of nutrients and turbidity, applying principles and best management practices to reduce nutrient loads, and creating a program that educates and engages local communities to pledge to take actions such as reduced use of fertilizers.

Issue-based management is a means through which any number of partners may become involved with an aquatic preserve in addressing an issue. Partnering is a necessity; by bringing issues into a broad public consciousness, partners are welcome to ensure that a particular issue receives input from perspectives that the aquatic preserve may not normally include. Given the distribution of authority between several local, state, and federal agencies, issue-based management allows KJCAP to focus efforts on the most critical challenges facing the region. Within the issue-based management framework, this plan seeks to incorporate elements of

resilience-based management (RBM) by considering the connections between social and ecological systems and by partnering with agencies at all levels of government to integrate the management of terrestrial resources with offshore resources. RBM is a management approach that uses knowledge of current and future drivers influencing ecosystem functions to prioritize, implement, and adapt management actions that enhance the resilience of ecosystems, communities, and social-ecological systems (Mcleod et al., 2019). RBM is unique in that it acknowledges humans as capable of driving adaptation and transformation in natural systems and attempts to manage for future changes, including uncertainty (Reef Resilience Network, 2025). Due to the complexity of relationships in an ecosystem, RBM needs to be adaptive, in that it must monitor and assess management outcomes with the understanding that changes in management may be required to achieve desired results, and management actions must be adaptive to new information and changing dynamics across the ecosystem.

This section will explore issues that impact the management of KJCAP directly or are of significant local or regional importance, for which the aquatic preserve's participation may prove beneficial. While an issue may be the same from preserve to preserve, the goals, objectives, and strategies employed to address the issue will likely vary depending on the ecological and socioeconomic conditions present within and around a particular aquatic preserve's boundary. In this management plan, KJCAP will characterize each of its issues and delineate the unique goals, objectives and strategies that will set the framework for meeting the challenges presented by the issues.

Goals are broad statements of what the organization plans to do and/or enable for the next ten years. They should address identified needs and advance the mission of the organization. Objectives are a specific statement of expected results that contribute to the associated goal, and strategies are the general means by which the associated objectives will be met. Appendix D contains a summary table of all the goals, objectives and strategies associated with each issue.

SEFCRI and CRCP are managed under six focus areas: Awareness and Appreciation; Land-Based Sources of Pollution; Maritime Industry and Coastal Construction Impacts; Fishing, Diving, and Other Uses; Reef Resilience; and Reef Injury Prevention and Response. However, for the purposes of this management plan, the issue-based adaptive management outlined in this section recognizes the strong overlap that exists between issues, meaning many management actions are applicable across multiple issues, and thus will highlight the five issues described extensively below.

In this management plan for KJCAP, some goals, objectives, and strategies have been adapted from the Our Florida Reefs (OFR) and FDOU 52 Fisheries Committee Recommended Management Actions, as well as from previously developed and ongoing SEFCRI Local Action Strategy projects. Words like 'support' and 'partner with' are used in some strategies that refer to items that still fall under the purview of CRCP, but that require partnership with other agencies/organizations to accomplish. Regular monitoring, as well as new research, provides information to adapt goals, objectives, and strategies as necessary to best accommodate the

dynamic nature of the resource over the next ten years. The development or support of a strategy by OFR and FDOU 52 is denoted next to the corresponding goal, objective, or strategy within this chapter. Appendix D.3. and D.4. provide tables of recommended management actions developed from the OFR and FDOU 52 processes, respectively.

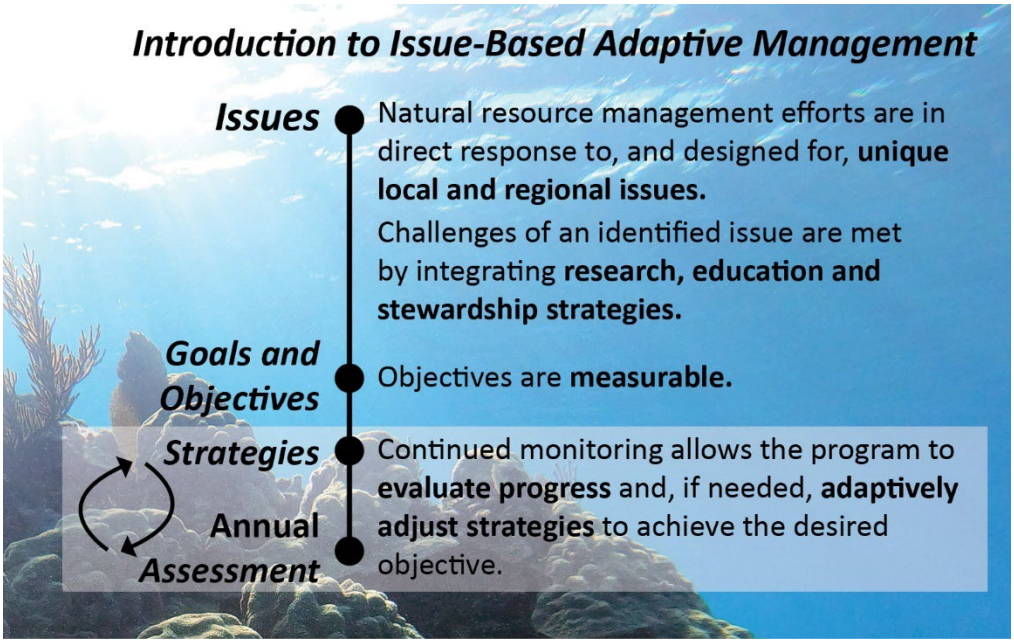


Figure 4: Issue-based adaptive management.

Along with enforcement, adequate funding is a critical piece that ensures effective management and compliance with environmental regulations (Osmond et al., 2010). With more formal management of the area and more regulations to enforce, dedicated funding streams are necessary to ensure the long-term sustainability of management efforts. Moreover, the ecological effects of protected areas take time to develop. A combined analysis of ecological, long-term, time series data showed direct effects on target species becoming apparent on average after five years of enforced protection and more than ten years for the indirect effects to other species (Babcock et al., 2010). Therefore, funding for KJCAP needs to be consistent and sustained to produce the desired ecological benefits. Lastly, coordination and communication among federal, state, and local agencies as well as other partner organizations and stakeholder groups should continue. Communication between groups should aim to identify approaches to more effectively and efficiently coordinate and communicate ongoing research, inform decisions on targeted management actions, and define disturbance response mechanisms for collaborative action. KJCAP should also collaborate with partners to update existing monitoring programs and associated data, planned conservation initiatives, and stakeholder outreach and education initiatives. Participatory management planning where stakeholders are engaged in decision-making and are more aware and knowledgeable of ongoing agency efforts increases the likelihood that implemented management actions will be successful.

4.1 / Issue A Water Quality Impacts from Land-Based Sources of Pollution, including Marine Industry and Coastal Construction Impacts

Coral reefs have evolved to thrive in clear, low-nutrient waters with ample sunlight for their photosynthetic symbionts while limiting the abundance of macroalgae that can overgrow corals (Whitall et al., 2019). Nearshore reefs are particularly susceptible to land-based sources of pollution that can increase the turbidity of the water, reduce the sunlight corals receive and deliver nutrients, including phosphorus and nitrogen, to coastal waters, creating the ideal conditions for macroalgae to thrive. Coastal development, dredging, and beach nourishment projects are some examples of common anthropogenic activities with high risk of mobilizing sediment into coastal waters. Both sediment and nutrients originate from a variety of sources on land. During rainfall, these sediments and nutrients will frequently wash into inland waterways and are then carried to the ocean through canals and inlets. Common sources of nitrogen and phosphorus include fertilizers that are used on commercial farms and residential lawns, as well as human and animal waste (Whitall et al., 2019).

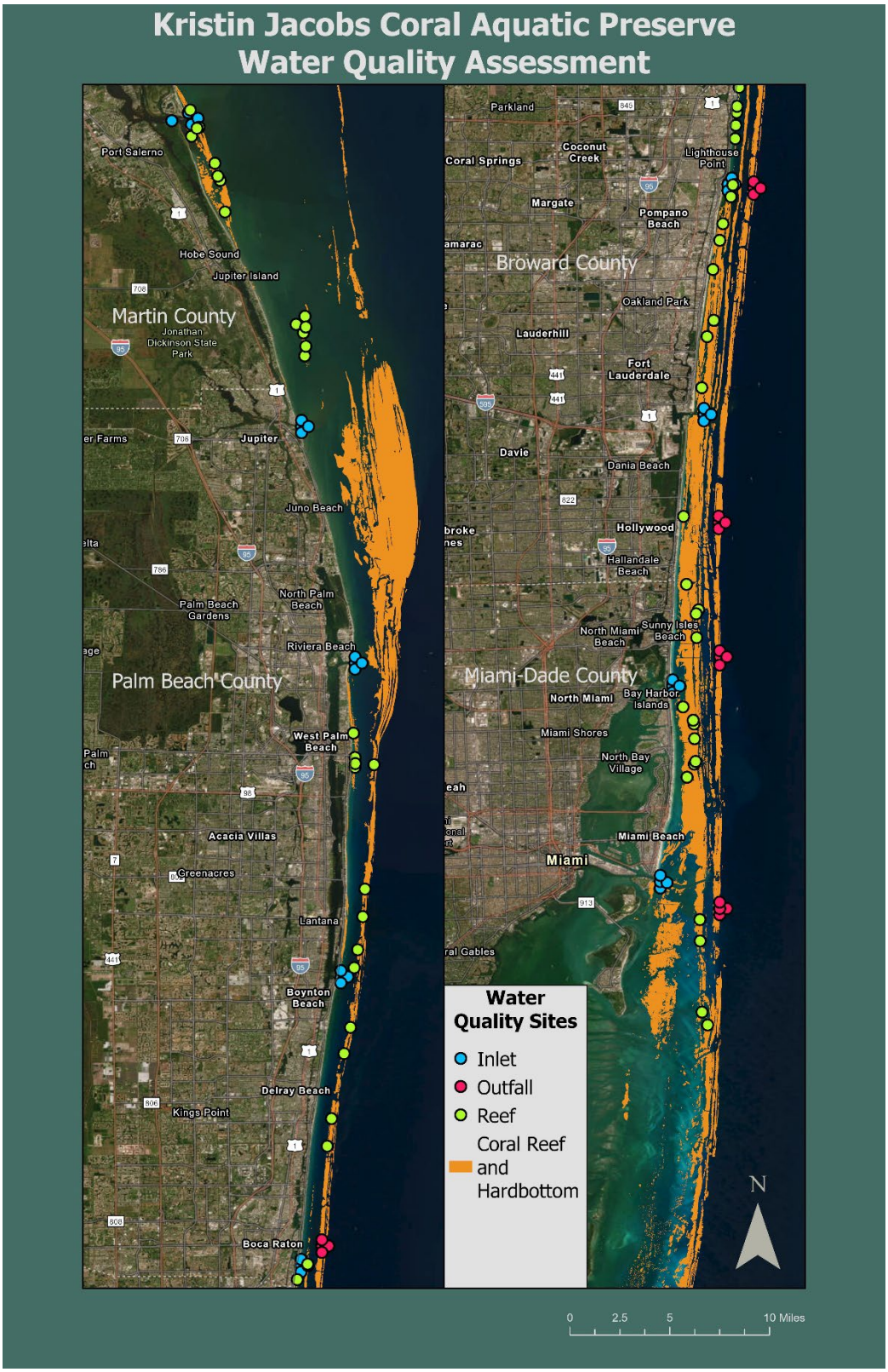
Coastal construction impacts including the creation of the inlets first occurred along the coastal fringe and ridge, followed by the alteration of inland hydrology, and dredging and filling of wetlands through land reclamation processes (Derr, 1998; Kruczynski & Fletcher, 2012). Canals were built to divert freshwater, inlets were dredged to provide vessel access, and outfalls were built to release partially treated wastewater, which have all impacted the offshore environment and its resources. Offshore water quality continued to decline as a result of coastal development impacts from coastal construction projects and nonpoint sources of pollution (Kruczynski & Fletcher, 2012). As more structures and inlets were built and excavated along the Southeast Florida coastline, beaches began experiencing extensive erosion due to changes in longshore transport and deposition (Wanless, 2009). Port development and maintenance, especially along the three main ports in Southeast Florida, affected almost 600 hectares of corals and associated hardbottom communities (Walker et al., 2012) through the early 21st century.

While the efficient flow of water through canals has allowed agriculture and development to thrive in the South Florida region, it has also reduced nutrient uptake—the mechanism by which soil and plants naturally absorb nutrients as water slowly makes its way to the coast. Nutrient uptake by soil and plants is further reduced in the five southernmost ICAs, which contain the most urbanized portions of the region. Extensive impervious surfaces exist that prevent water and nutrients from filtering through the soil into the groundwater before finding their way into inlets (Pickering & Baker, 2015). Therefore, nutrient-laden waters from point and nonpoint sources fill the water management canals and inlets and are carried directly into KJCAP with the tides (Whitall et al., 2019) or via larger pulses of freshwater released in preparation for or in response to high rainfall events. While the northern ICAs have more agricultural land and fewer impervious surfaces than the southern ICAs, the higher use of chemical fertilizers due to agriculture presents its own nutrient pollution problems (Pickering & Baker, 2015). Additional nutrient pollution sources into KJCAP include leaking septic systems, which will only increase in severity as sea level rise compromises more systems, and six wastewater treatment plant outfalls that were slated to be reduced to 5% of their full capacity by 2025 (Gregg, 2013), but many of which are behind schedule. In addition to introducing higher levels of nutrients, outfalls

have been linked to Black Band and White Pox diseases, both affecting coral species within KJCAP (Whitall et al., 2019).

The flow of nutrients from terrestrial sources into canals and inlets, and then into the offshore environment, has significant effects on KJCAP reef systems. While the phase shift to increased macroalgal cover is a multifaceted issue with many causes, including the decline of the long-spined sea urchin (*Diadema antillarum*), land-based sources of nitrogen and phosphorus have been shown to help drive conditions that promote algal blooms in Southeast Florida (Gregg, 2013). Elevated nutrient loading has intensified these conditions, leading to more frequent and severe algal blooms that deplete oxygen, block sunlight needed by corals, and disrupt overall ecosystem balance.

When water quality regulations were put in place for water bodies upstream of KJCAP, discharge permit limits were not set to protect the adjacent coral reef or submerged aquatic vegetation ecosystems. State numeric nutrient criteria are only in effect in inshore areas and do not extend to the offshore coral reef. No numeric criteria specific to sensitive KJCAP benthic resources were established through applicable federal, state, or local water quality regulations,



Map 13: Sampling locations from DEP's water quality assessment program within KJCAP.

Blue circles represent the sample locations near the inlet, red circles represent sample locations near the outfalls, and the green circles represent sample locations within reef habitat.
and prior to 2003, no long-term ecological monitoring occurred within KJCAP near outfall discharges or other point sources of pollution.

Water quality research conducted in Southeast Florida regarding pollutants entering the system from outfalls, inlets, upwelling, groundwater discharge, Everglades restoration effects, and increased carbon dioxide emissions (Trnka & Logan, 2006) has historically focused on the Intracoastal Waterway and other inland waters. In 2019, Whitall et al., under NOAA's NCCOS and National Ocean Service, collaborated with DEP to design and implement a monthly monitoring effort that collects quantifiable data to address the need to understand and characterize the state of water quality within KJCAP. Map 15 shows the distribution of sites where collection has been ongoing since 2016 due to federal and state collaborations. Analysis of these data has revealed that discharge from canals and inlets significantly affect water quality in the offshore coastal area (Walker et al., 2025).

Partners also conduct water quality monitoring with varying applicability to KJCAP. The most significant monitoring occurs in Biscayne Bay, which provides some insight into nutrients entering KJCAP. BBAP, in combination with the Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR), monitors water quality within and upstream of the Bay through seven continuous water quality stations and 23 monthly discrete grab sampling sites, measuring water conditions, nutrient levels, and trace chemicals entering the northern portion of the Bay. Miami-Dade County's Department of Environmental Resource Management (DERM), as part of their National Pollution Discharge Elimination System (NPDES) monitoring program, conducts monthly surface water sampling at more than 100 sites around the Bay and within the drainage canals that feed into it, measuring water quality parameters including phosphorus, nitrogen, chlorophyll-a, bacteria, and turbidity (MDC, 2021). Their findings are published in an annual Report Card (MDC, n.d.b).

SFWMD conducts water quality monitoring in Everglades protected areas, to evaluate long-term trends to determine progress towards nutrient reduction goals, conducts sampling to assess performance of STAs, and track nutrient inputs in various waterbodies upstream of KJCAP including the St. Lucie River in Martin County. Water quality data are stored and publicly accessible through the District's DBHYDRO database.

Palm Beach County monitors offshore water quality through several coordinated programs including sampling beach waters for Enterococci bacteria to assess public health risks. Additionally, the county participates in a regional MS4 NPDES permit program, which includes ambient water quality sampling and pollutant trend analysis at 44 sites.

Broward County's Environmental Monitoring Lab conducts an Ambient Water Quality Monitoring Program, which collects data on LBSP including agricultural and stormwater runoff, and public sewer and septic system pollution by taking measurements from 46 sites throughout the county (BC, n.d.a). They test the surface waters of the canals and ICW for total nitrogen, total

phosphorus, chlorophyll a, dissolved oxygen, specific conductance, and salinity. All four counties' Departments of Health conduct beach water sampling for bacteria as part of the State Healthy Beaches Program, but no data is collected that would provide insight into LBSP for the offshore coral reef.

Additionally, DEP's Division of Environmental Assessment and Restoration (DEAR) geographically defines Florida's waterbodies using Water Body Identification (WBID) numbers. WBIDs are polygons that roughly delineate the drainage basins surrounding the water body and are used to identify areas that are listed as Waters Not Attaining Standards, in the Total Maximum Daily Load (TMDL) program, to define Basin Management Action Plans (BMAP), as well as other applications. Current impairment information, along with TMDL and BMAP listings for the state can be viewed using the Water Quality Assessments, TMDLs, and BMAPs webmap at https://fdep.maps.arcgis.com/home/webmap/viewer.html?webmap=1b4f1bf4c9c3481fb2864a415fbeca77. Currently there are several beach WBIDs within KJCAP that are impaired for bacteria and multiple WBIDs upstream of KJCAP impaired for various other parameters such as chlorophyll, metals, phosphorus and nitrogen.

The Florida Coral Reef Coordination Team (FCRCT), developed in 2022, serves as a multi-agency advisory body that coordinates monitoring, restoration, and management efforts for Florida's Coral Reef. Its work includes developing a Unified Monitoring Framework that links land-based and estuarine water quality with offshore reef health, enabling better tracking of nutrient loads, pollution sources, and ecosystem responses.

Despite the issues from sedimentation and eutrophication that are understood, sources of these pollutants still need to be firmly established, along with understanding pollutants disperse to the offshore habitats from inlets, outfalls and through submarine groundwater discharge (Gregg, 2013; Whitall et al., 2019). Furthermore, there are additional and potentially synergistic effects of other anthropogenic pollutants that need to be identified and characterized, for instance, plastics, pesticides, herbicides, pharmaceuticals, personal care products and other pollutants of emerging concern. The effects of these nutrient inputs still require further study and monitoring (Whitall et al., 2019), as there are still gaps in long-term monitoring coverage throughout KJCAP.

Motivated by the need to easily aggregate water quality data in order to understand patterns at different spatial and temporal scales, FWC's Fish and Wildlife Institute (FWRI) started the Florida's Coral Reef Water Quality Data Compilation, Analysis and Decision Support project (FWRI, 2022). The goal of this project was to compile and historical and current water quality data sets, conduct trend analyses, visualize spatial coverage and evaluate compatibility between monitoring protocols. This project was a first step toward establishing a framework to which monitoring programs can be adapted to better inform holistic management. Within CRCP, consistent techniques are used, when applicable, to strengthen the state of Florida's ability to assess the baseline and relative conditions of coastal resources, enabling objective analysis of the changes occurring in the state's natural and cultural resources. Ensuring comparability of

monitoring programs between different agencies increases the usability of data and reduces the need for redundancies in monitoring. Similarly, ensuring comparability between inland and offshore monitoring programs would allow for a better understanding of sources and pathways of LBSP. Long-term monitoring programs that collect high quality data maintained in a way that makes them readily accessible for use by resource managers and scientists is essential to understanding the effectiveness of management actions.

Beyond monitoring and research, there is a need for BMPs that promote water storage and treatment and reduce nutrient pollutant loading in order to improve the quantity and quality of wastewater, stormwater, and groundwater reaching KJCAP. For example, DEP's Clean Marina and Clean Boating programs provide assistance in implementing Best Management Practices that address critical environmental issues such as sensitive habitat, waste management, storm water control, spill prevention and emergency preparedness. Reduction of LBSP can be done on a small scale through the use of Florida Friendly Landscaping practices or living shorelines, using more sustainable alternatives to single-use plastics, or using Green Stormwater Infrastructure in communities to capture and treat stormwater runoff at the source. It can alternatively be done on a much larger scale by promoting innovative solutions to wastewater treatment and reuse, supporting agricultural best practices, working with partners to ensure coastal development projects are planned and carried out as to reduce cumulative impacts to coral reefs, and supporting the reduction of vessel-based discharges.

Goal A1: Improve water quality both within KJCAP and in waters entering KJCAP from adjacent ICAs to meet the needs of natural resources.

Objective A1.1: Optimize and integrate water quality monitoring within KJCAP to identify sources of pollution flowing through inlets, and support data analysis to understand effects of and inform mitigation strategies for LBSP on benthic habitats (**OFR N-71)**.

Integrated Strategy A1.1.1: Maintain existing long-term water quality monitoring across KJCAP including identifying continued funding and investigating opportunities to optimize and/or expand (e.g., adding new analytes, continuous monitoring via sondes).
Integrated Strategy A1.1.2: Develop circulation models to characterize both naturally occurring and event-driven movements of nutrients, sediments and other circulating pollutants from ICAs to KJCAP benthic habitats.
Integrated Strategy A1.1.3: Pair water quality sampling sites with biological monitoring (e.g., SECREMP, Biological Condition Gradient assessments) to better understand links between LBSP sources and KJCAP ecosystem biological trends.
Integrated Strategy A1.1.4: Support and integrate research into the cycling of pollutants and toxins through flora, fauna and microbes, including macroalgae and cyanobacteria.
Integrated Strategy A1.1.5: Support and integrate research into contaminants and pathogens introduced from dredging and other coastal construction projects, and their effects on the reef.
Integrated Strategy A1.1.6: Building off of existing work (FWRI, 2022), continue to encourage the use of DEP water quality SOP's, uniform naming conventions, standardized collection and

analysis methods and existing databases, such as WIN and SEACAR, wherever possible for monitoring programs both within KJCAP and in the adjacent ICAs **(FDOU 52).**
Integrated Strategy A1.1.7: Continue to support water quality (e.g., turbidity, nutrients and sediment) research in KJCAP and upstream water bodies and synthesize data to determine naturally occurring baseline conditions and organismal thresholds specific to KJCAP benthic resources, with the goal of informing and improving resource management (e.g., construction, dredging, wastewater treatment plants, ocean outfalls, septic to sewer conversions and the Comprehensive Everglades Restoration Plan).
Integrated Strategy A1.1.8: Support and integrate research on emerging and unregulated contaminants or toxins of concern (e.g., heavy metals, pharmaceuticals, pesticides, herbicides, microplastics and organic compounds) and their effect on KJCAP benthic resources.
Integrated Strategy A1.1.9: Regularly evaluate existing programs and incorporate new and emerging data and technology to ensure water quality monitoring in KJCAP is effectively meeting management needs and integrated with monitoring of adjacent ecosystems.

Performance Measures A1.1

1. Water quality data is uploaded into WIN and other pertinent databases quarterly, as well as synthesized in an annual report.
2. Circulation models, research, and data are synthesized and associated recommendations for actions to improve water quality are summarized in an annual report and shared with SEFCRI, DEP DEAR, Biscayne Bay Commission and other pertinent partners.
3. Document participation in local and regional water quality related meetings and events, as well as FCRRP and USCRTF working groups, including discussions on emerging data products and technology as well as efforts to integrate water quality programs throughout KJCAP.
4. Water quality monitoring programs are reviewed annually and optimized for management decisions as necessary, including exploring opportunities to pair sites with biological monitoring and/or incorporate emerging contaminant data. Proposed changes are summarized in an annual report.

Objective A1.2: Engage intra-agency programs, local water management entities, local governments and federal partners to reduce point and non-point land-based sources of pollution including wastewater, stormwater and groundwater that enter KJCAP and associated watersheds to improve water quality and benthic habitat condition through management actions (**OFR N-78 and FDOU 52)**.

Integrated Strategy A1.2.1: Engage municipalities and local governments through their respective Regional Planning Councils to promote best management practices to residential and community facilities to improve water quality and reduce nutrient and pollutant loading, such as the use of Florida-Friendly Landscaping practices, regenerative gardening/landscaping and permaculture, and promotion of education on fertilizer ordinances (**OFR N-68, OFR N-8 and FDOU 52)**.

Integrated Strategy A1.2.2: Support septic to sewer conversions in the ICAs that contribute to water flow into KJCAP and evaluate current impacts and potential improvements to offshore ecosystems from the conversions.
Integrated Strategy A1.2.3: Engage local water management districts to implement existing or create new innovative solutions at all scales that increase stormwater storage, reduce stormwater runoff, enhance treatment, increase reuse, enhance biosolids management and reduce nutrients, turbidity and other contaminants to the watershed (**OFR N-82 and FDOU 52)**.
Integrated Strategy A1.2.4: Support continuous closure of all treated wastewater outfall pipes as established in existing sewage treatment outfall legislation (Section 403.086, F.S.) and upgrades to infrastructure for advanced water treatment and reuse capacity to improve ocean water quality and recharge local aquifers to maintain current sources of potable water (**OFR S-25 and FDOU 52)**.
Integrated Strategy A1.2.5: Engage with the development and implementation, via both regulatory and non-regulatory processes, of turbidity and nutrient limits applicable to KJCAP organisms throughout their life stages.
Integrated Strategy A1.2.6: Support ongoing research to understand and identify sources of groundwater effects on water quality in KJCAP and based on findings, recommend inclusion of strategies to reduce aquifer and offshore pollution via groundwater to complement Inlet Contributing Area watershed management plans.
Integrated Strategy A1.2.7: Engage with counties, municipalities and through review of global innovations to implement innovative wastewater and stormwater treatment options to address contaminants of emerging concern, such as pharmaceuticals **(FDOU 52)**.
Integrated Strategy A1.2.8: Engage with counties and municipalities to implement and evaluate the effectiveness of using natural/green/alternative infrastructure to treat and/or reduce volume of wastewater and stormwater **(FDOU 52)**.
Integrated Strategy A1.2.9: Engage county, municipality and federal partners to develop and implement recommendations from local watershed management plans where appropriate.
Integrated Strategy A1.2.10: Partner with shipping companies and port authorities to raise awareness about nutrient pollution, invasive species, and coral reef protection. Update materials that promote best practices for waste management, ballast water treatment, and environmentally responsible operations.
Integrated Strategy A1.2.11: Investigate options for additional protections for KJCAP and implement as appropriate (e.g., OFW designation).

Performance Measures A1.2

1. Maintain an inventory of materials and events that are created and used by KJCAP and partners to promote best practices to improve water quality and quantity entering KJCAP, including products shared with shipping companies.
2. Document engagement with local water management districts, counties, regulatory agencies and other partners to discuss and integrate innovative solutions relating to improving quality and quantity of storm and wastewater.
3. Create a roadmap to incorporate water quality data into organismal thresholds for regulatory and nonregulatory management of KJCAP. Share with partners and other coral reef jurisdictions.

4. Document management actions completed in KJCAP to improve water quantity and quality entering KJCAP (e.g., wastewater treatment plant ocean outfall closures, septic to sewer conversions and stormwater treatment enhancements, implementation of projects from watershed management plans). Synthesize monitoring data related to these actions and provide recommendations to regulatory agencies.
5. Nutrient and turbidity data collected by KJCAP and partners is synthesized, and recommendations are shared with DEP DEAR in an annual report.
6. Strategies to reduce aquifer and offshore pollution via groundwater are merged with Inlet Contributing Area management plans.
7. Summarize investigations into additional protections for KJCAP and document intra-agency discussions and meetings with partners to discuss feasibility of implementation.

Goal A2: Increase public and industry engagement in actions to improve water quality in KJCAP.

Objective A2.1: Work with the local community, visitors and agency partners to assess perceptions of and increase engagement in actions to reduce land-based sources of pollutants entering storm drains and waterways (**N-1)**.

Integrated Strategy A2.1.1: Engage DEP's Resilient Florida Living Shorelines Program to promote coastal and inland "living shoreline" objectives to increase the use and protection of natural infrastructure with the agreement of property owners (e.g., coral reefs, native vegetation and mangrove wetlands) to improve water quality and maintain coastal biodiversity (**N-116 and FDOU 52)**.
Integrated Strategy A2.1.2: Work with partners (e.g. University of Florida Institute of Food and Agricultural Sciences) to engage golf courses, businesses and communities in training and certification programs promoting best management practices to protect coastal environments and watersheds (**N-94)**.
Integrated Strategy A2.1.3: In collaboration with county and municipality partners, continue existing and implement new marine debris and plastic waste reduction projects, including education and outreach to promote more sustainable alternatives to single-use plastics.
Integrated Strategy A2.1.4: Apply social science to assess local awareness and perception of KJCAP water quality issues and identify barriers to sustainable practices.
Integrated Strategy A2.1.5: Using knowledge gathered from A2.1.3, update existing outreach messaging and engagement strategies to increase local engagement in healthy water quality practices.
Integrated Strategy A2.1.6: Conduct standardized studies or other methods to evaluate success of public engagement initiatives in Objective A2.1 in changing behaviors of different communities. Use results from standardized evaluation and other studies to revise engagement strategies, as needed.
Integrated Strategy A2.1.7: Engage partners at local/state/federal agency levels to increase information sharing related to efforts to improve water quality in KJCAP (e.g., Miami Dade County's reasonable assurance plan, Florida's Coral Reef Resilience Program, FKNMS, FCRCT, state and federal working groups).

Performance Measures A2.1

1. Provide information to DEP's Resilient Florida Program to update their inventory of living shorelines as activities occur within KJCAP.
2. Maintain an inventory of training courses, outreach programs and educational materials that exist and are created and used by KJCAP and partners to promote best management practices and reduce marine debris.
3. Results of and recommendations from social science studies are shared with SEFCRI team and TAC. Engagement strategies are updated based on recommendations.
4. Document participation in quarterly meetings with the counties adjacent to KJCAP, regional partner meetings and working groups (e.g., FCRRP, USCRTF and FCRCT) to facilitate information sharing and discussion on efforts to improve water quality.

Objective A2.2: Coordinate the reduction of vessel-based discharges.

Integrated Strategy A2.2.1: Apply for an EPA No Discharge Zone into KJCAP, similar to the Florida Keys.
Integrated Strategy A2.2.2: Engage existing programs, including Clean Boating and Clean Marinas, to promote free pump out stations to improve water quality and allow vessels a better option than dumping three nautical miles offshore **(OFR N-75 and FDOU 52)**.
Integrated Strategy A2.2.3: Support the U.S. Coast Guard's enforcement of ballast water regulations within state waters by informing them of ongoing research and updated discharge laws.

Performance Measures A2.2

1. Document application process for an EPA No Discharge Zone into KJCAP.
2. Track outreach events where messaging that promotes best practices to reduce pollution from vessel-based discharges, as well as related resources and programs, is shared.
3. Track the number of pump out stations available to the public within KJCAP, and meet with the Southeast Clean Boating Coordinator to collaborate on outreach messaging.
4. Share, as appropriate, emergent studies and recommendations on ballast water effects on KJCAP resources with the U.S. Coast Guard as appropriate.
5. Report suspected or identified instances of vessel-based discharge violations to appropriate regulatory and enforcement agencies.

4.2 / Issue B Sustainable Economic and Recreational Fishing, Diving, and Other Uses

The benthic communities found within KJCAP are intricately balanced ecosystems where everything has an important role to play. Coral reefs and submerged aquatic vegetation have complex trophic roles, acting as productive ecosystems with producers like algae and consumers at multiple levels, from small zooplankton to large predators. Their roles include providing food for diverse species, facilitating energy transfer through interconnected food webs, and maintaining the health of the wider marine environment. These roles are essential for the ecosystems' own stability and for the survival of many species that depend on them for food,

habitat, and nursery grounds. If key roles are missing due to consumptive commercial or recreational uses, there can be significant and long-lasting impacts on KJCAP resources. At the same time, positive opportunities exist when motivated stakeholders and community members are engaged in collectively stewarding reef ecosystems. Promoting targeted efforts to diminish human impacts and cultivate ecosystem-friendly behaviors among audiences who work and recreate in KJCAP will go a long way towards ensuring the sustainable future use and enjoyment of these unique ecosystems.

As previously discussed in Chapter 3, KJCAP provides a wide array of ecosystem services to coastal communities and to the influx of tourists who visit Southeast Florida every year, many of whom use KJCAP in various ways. For example, the region supports a robust blue economy, comprised of extensive ocean commerce, and an ever-expanding cruise and maritime leisure industry. Likewise, the region supports a diverse fisheries resource base, attracting commercial fishers, charter fishing operations, recreational anglers, and spearfishers year-round. Similarly, the clear waters and wide variety of dive environments – from easily accessible shore dives to more advanced drift dives aided by the close proximity of the Gulf Stream current – makes KJCAP a world-renowned destination for recreational scuba divers and snorkelers alike. However, when left unchecked, the uses associated with these ecosystem services can cause pressure on KJCAP's resources that present a direct threat to the region and its socioeconomic and environmental well-being. For example, commercial shipping can lead to large-scale changes to sensitive coral habitats, either directly through vessel-based damage (e.g., anchoring, vessel pollution, and groundings) or indirectly via the creation of coastal infrastructure, channel dredging, and port expansion. Additionally, fishing gear such as derelict lobster traps and monofilament entanglement can cause harm to coral reef habitat and associated species (Chiappone et al., 2005). Even seemingly less consumptive activities such as recreational scuba diving and snorkeling, if practiced without adhering to conservation best practices, can permanently alter coral reefs and other sensitive aquatic habitats (Thurstan et al., 2012).

In KJCAP, submerged habitats and associated water quality are mainly managed by DEP, while marine invertebrates, fishes, and other marine organisms are mainly managed by FWC. However, in the case of management of stony, reef-building (scleractinian) corals, there is overlap between the two agencies as they are both habitat and species. Enforcement in KJCAP, for both fisheries and non-fisheries laws, is predominantly managed by FWC. Adequate enforcement and compliance are defining features of successful protected areas (Agardy et al., 2011). Therefore, it is imperative that strong cooperation exists between DEP and FWC in the management of the region, supported by a well-defined process for constructively resolving any differences that may arise. Cooperation between other partner agencies that would regulate activities within KJCAP is also necessary, for example both USACE and some counties issue permits for mooring buoys, artificial reefs, and certain beach projects.

Although commercial and recreational fisheries are an emblematic and lucrative part of KJCAP, many reef-dependent and associated species remain heavily fished in Florida (Ault et al., 2020; Ault & Franklin, 2011). FWC conducts stock assessments for several commercially and

recreationally important finfish species found in KJCAP; however, regional fisheries stock assessment boundaries are much larger than KJCAP. Therefore, decision-making involving fishery species tends to occur at larger, less locally informative spatial scales.

In the 1980s, fisheries independent and dependent monitoring programs were established in Florida to assess fish stocks (McRae, 2010). Fisheries-independent data is collected through inshore and offshore scientific surveys which target juvenile and sub-adult fishes that have not been subjected to fishing pressure. These data can be used to monitor species abundance over time which helps to develop a better understanding of seasonal and spatial trends. Some fisheries assessment data were collected and analyzed as a part of LAS FDOU Project 18 & 20, but the SEFCRI Team recognized the need for additional fisheries independent data collected within KJCAP beyond existing snapshot data. In response, a five-year fishery-independent study from 2012 to 2016 was conducted to establish better insights into reef fish conditions (Kilfoyle et al., 2018). Since 2014, the National Coral Reef Monitoring Program (NCRMP) has collected fisheries-independent data through fish monitoring surveys in Florida every other year to detect temporal changes in fish community composition (both target and non-target species), abundance, size structure, and diversity. Although fisheries independent monitoring data were historically absent in the KJCAP region, monitoring has since been established and continues through programs such as NCRMP to provide critical long-term data. By contrast, state and federal partners have consistently collected valuable fisheries dependent data throughout Florida's waters.

Fisheries-dependent data are collected directly from fishing activities and are used to monitor catch rates and assess the health of exploited fish populations. FWC (state level) and NOAA (federal level) monitor fisheries using fisheries-dependent approaches that collect valuable information from commercial, recreational, and for-hire fishers (e.g., headboats, charter vessels and guide boats) to understand trends in landings, catches, fishing effort and catch-per-unit-effort. These data are important for conducting stock assessments. Originally called the Gulf Reef Fish Survey, FWC expanded and renamed the survey to the current State Reef Fish Survey in July 2020 to provide more timely and precise data to better manage and assess important reef fish stocks throughout Florida. The program consists of two components: a mail survey and dockside interviews. Combined, these two components are used to provide precise estimates of the number of recreational fishing trips taken and the total numbers of reef fishes that are harvested and released each month from Florida. In addition, NOAA Fisheries collects recreational fishing information on catch and effort, frequency of fishing trips per year, fishing location, and type of fishing by conducting recreational angler surveys via the Marine Recreational Information Program. Johnson et al. (2007) completed a ten-year (1990-2000) analysis of commercial, headboat, charter, and recreational fisheries for KJCAP region, specifically. This study determined that half of the fisheries harvested over the decade were caught in coastal and reef zones, showing the importance of KJCAP to the region's fisheries sectors. While no trends were found in the amount of reef fish caught by recreational fishers, the study did find significant declines in headboat and commercial reef fish harvests. While both state and federal efforts have obtained invaluable information on fisheries trends that are used in fisheries management and other measures, the data do not easily translate to a map of

fishing pressure. Nevertheless, given that there are several target species that are reef-dependent or have been identified via fisheries-independent surveys in KJCAP (as shown by Kilfoyle et al., 2018), harvest and effort statistics provide important insights into coral reef species populations in the region.

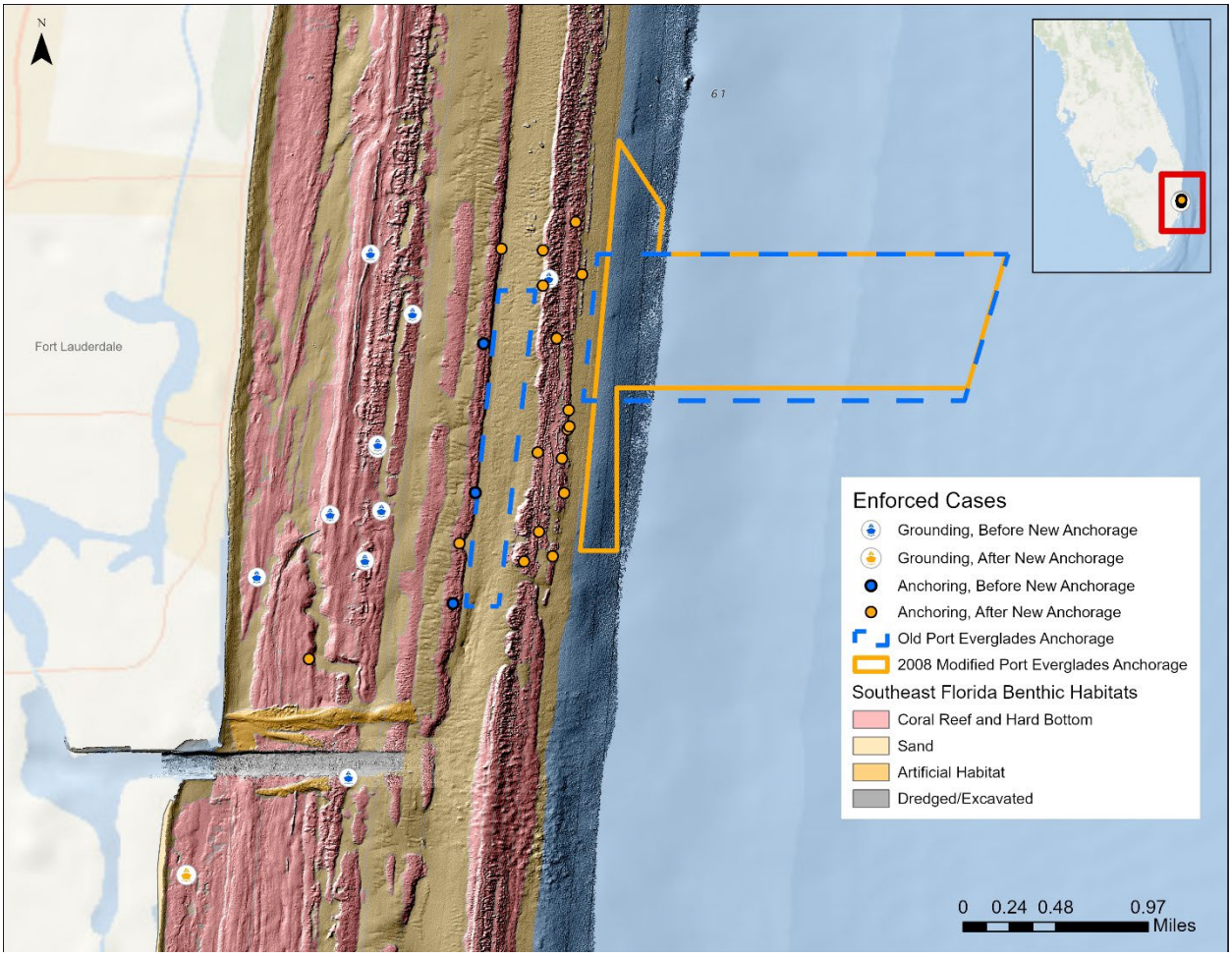
According to NOAA Fisheries data, recreational fishing in southeast Florida has increased over time, surpassing commercial fishing (NOAA Fisheries, n.d.c). In 2016, an estimated 3.91 million anglers fished from the shore, 2.29 million from a private or rented vessel, and over 108,000 from a charter fishing vessel in the four counties adjacent to KJCAP (Wallmo et al., 2021a). Over one year, reef-related recreational angling generated an estimated economic output of $43.8, $43.8, $79.7, and $28.4 million in Miami-Dade, Broward, Palm Beach, and Martin counties, respectively; supporting 440, 442, 803, and 286 jobs in the respective counties as well (Wallmo et al., 2021a). Given how popular fishing in and adjacent to KJCAP is to anglers and the considerable economic impact generated by the activity, these fisheries merit continued conservation to ensure their continued sustainable use into the future. Conservation measures must also prioritize ecosystem function, without which fisheries could further decline, leading to the imbalance and eventual collapse of broader reef ecosystems.

Studies reviewing historic and recent port development and dredging projects (Miller et al., 2016; Walker et al., 2012) have shown how project-specific and maintenance-related activities can affect KJCAP resources, including federally and state protected corals and other benthic communities in KJCAP. Additionally, the placement of shipping lanes for the three major KJCAP ports brings vessels close to shore and nearshore reefs, whereas in the Florida Keys, for example, the reef carries the designation of a Particularly Sensitive Sea Area and an Area To Be Avoided, which pushes commercial shipping activity farther offshore and away from nearby coral reef (NOAA, 2007a). Similarly, large vessels that anchor along the reef line adjacent to major ports have been shown to create chronic impacts (Walker et al., 2012; Waters, 2015) (Map 16). However, it should be noted that anchorage relocations have led to a decrease in direct impacts. After numerous vessel groundings and anchoring incidents, the Port Everglades and Port of Miami anchorages were relocated in 2008 and 2017, respectively, resulting in a reduction of major grounding incidents (Map 16).

Recognizing the importance of Florida's Coral Reef and to prevent grounding and anchoring impacts from recreational and commercial vessels, the state enacted the Florida Coral Reef Protection Act (CRPA), *§403.93345 F.S*., in 2009. The CRPA protects corals from damage due to direct impacts including ship anchoring and grounding incidents in the Southeast five-county region, from Martin through Monroe counties. The CRPA authorizes DEP to pursue enforcement action against the responsible parties for civil penalties and damages. DEP's Reef Injury Prevention and Response (RIPR) Program conducts site investigations and pursues CRPA violations within state waters. RIPR holds an annual "Crime Scene Investigation for Coral Reefs" training specifically for resource trustees that aid RIPR in performing site checks and damage assessments. In the past, the RIPR Program relied solely on partnerships with multiple agencies and stakeholders to receive reports. With continuous advances in technology to monitor commercial vessel traffic, it is easier to receive injury reports and be more vigilant

against threats to KJCAP's benthic resources. Therefore, while reconfiguring the commercial anchorages has led to a decrease in major incidents, specifically groundings, it is not necessarily reflected in the number of enforced CRPA cases (Map 16). The majority of CRPA cases involve larger commercial vessels with AIS tracking capabilities, but unfortunately many potential impacts from smaller recreational vessels often go unreported, and therefore unenforced. There is still a need for better methods to address impacts from recreational boat anchoring, as these vessels are harder to monitor. Additionally, there are other ways to incorporate the CRPA as an enforcement tool into KJCAP management that warrant further exploration (e.g., offshore permit conditions, marine event planning and mooring buoy promotion to reduce anchoring).

Florida's Coral Reef provides a unique opportunity for recreational boaters, snorkelers, and divers to experience the only barrier coral reef ecosystem in the continental United States. Recreational vessel registrations have grown steadily in each of the four counties adjacent to KJCAP, and in 2024, there were 178,092 registered vessels in the region (FLHSMV, 2024). As pointed out by past SEFCRI studies (Behringer & Swett, 2011; Shivlani & Estevanez, 2011), recreational vessels tend to cluster at certain locations based on the time of the week and



Map 14: Enforced vessel groundings and anchoring incidents.

This map shows all enforced vessel groundings and anchoring incidents at Port Everglades before (blue dots) and after (yellow dots) the 2008 reconfiguration of the Port Everglades Commercial Vessel Anchorage.

activities undertaken, which is why many community members and visitors who use KJCAP perceive high levels of user conflict on the water. According to the U.S. Census (2020), the population in Martin, Palm Beach, Broward, and Miami-Dade counties increased by 10.3% from 2010 to 2020. As the region's population continues to grow, it is expected that the number of residents recreating in KJCAP will increase, exacerbating the already crowded conditions experienced by many boaters and other users. One approach to alleviate use conflict has been to separate incompatible or competing uses for conflict resolution and safety purposes. User conflicts have also been addressed by the Florida Keys National Marine Sanctuary through the development of Sanctuary Preservation Areas, which only allow non-consumptive activities like snorkeling and diving (NOAA, 1996). FWC has also worked to reduce user conflict by prohibiting marine life collection in the Blue Heron Bridge/Phil Foster Park in Palm Beach County to maintain a high-quality snorkeling and diving experience (FWC, 2019; see Ch. 68B-42 F.A.C., for definitions of "marine life" and areas closed to collection).

Snorkeling, diving, and eco-tour boating are economically and culturally important activities in KJCAP. Wallmo et al. (2021b) found that the reef-related snorkel and dive industry based and operating in the four counties bordering KJCAP and the Florida Keys generated $902 million in total economic output and supported 8,668 jobs. This significant economic output demonstrates the socioeconomic importance of KJCAP, and the inseparable link between the region's economy and healthy marine ecosystems. KJCAP's appeal to visitors is rooted in its ecological integrity, making vibrant, healthy coral reefs and seagrass beds not only a conservation priority but also an economic necessity. Conserving KJCAP and its resources ensures long-term economic viability and continues to distinguish the region as a unique destination and place to grow the blue economy.

Under the FDOU focus area, mapping projects were funded to evaluate use and damage patterns of marine vessels. FDOU LAS Project 10, conducted by Shivlani and Villanueva (2007), used stakeholder surveys to determine areas of use based on activity type, which indicated that fishery stakeholder use varied based on target species and dive operator use occurred throughout KJCAP, basing site selection on a combination of proximity to shore and the type of dive activity. Two LAS Projects (33A and 33B), conducted by Behringer and Swett (2011) and Behringer et al. (2011), combine to map vessel use patterns within KJCAP and the reef degradation associated with that activity. The study found that almost all vessels were either fishing or diving and snorkeling, and that most of them were recreational. Furthermore, recreational boaters were significantly more likely to anchor – thus, it may be possible to effectively target anchoring management strategies based on boat size and class. The study also found that while Miami-Dade County has the highest cumulative level of degradation, benthic habitats throughout KJCAP are likely experiencing higher levels of use than are sustainable; therefore, active management, especially around anchoring, could significantly reduce physical impacts. CRCP, in collaboration with partners, has developed tools to increase

public awareness of alternatives to anchoring on the reef, including maps of mooring buoy locations within KJCAP and the Florida's Coral Reef Locator map on the ESRI Field Maps application, which displays your location in real time against FWC's Unified Reef Map created from 2013 to 2016.

Additionally, KJCAP's cultural significance is equally important in imbuing a unique sense of place. In a 2019 socioeconomics survey conducted as part of NOAA's National Coral Reef Monitoring Program, more than three-quarters of South Florida residents believed that coral reefs were important or very important to their family's cultural beliefs and practices (Allen et al., 2021).

The continued assessment and characterization of the different uses discussed above, use trends and patterns, and the management of user concerns and perceptions all provide important information to resource management decision-making processes. This information can provide insights into areas of high use, intra- (between members of the same user groups) and inter- (between members of different user groups) group conflicts, the importance of specific areas to certain user groups, and topics of concern for those who use KJCAP. Previous assessments have been conducted to better understand and characterize existing user groups, use types and patterns, existing user conflicts, and user perceptions of resource condition and management options (Shivlani & Villanueva, 2007); however, updated information is needed for more accurate and informed resource management decision-making.

Goal B1: Characterize user groups and analyze patterns of use within KJCAP and compare them with related datasets to identify trends.

Objective B1.1: Update studies on user groups, use patterns, crowding (i.e., social acceptance of other activities and user groups), areas of use conflicts, and impacts on KJCAP resources by various resource users.

Integrated Strategy B1.1.1: Partner with local and federal agencies and/or secure funding aimed at different user studies such as user demographics, and surveys of use patterns, preferences, and perceptions.
Integrated Strategy B1.1.2: Partner with local and federal agencies and/or secure funding aimed at high-resolution aerial photography images, or other innovative technologies (e.g., drones, radar programs and AIS) to determine types of use, high-use areas, and areas of high impact in portions of KJCAP.
Integrated Strategy B1.1.3: Partner with local and indigenous communities to understanding and model long-term use changes in KJCAP as gleaned from local ecological knowledge.
Integrated Strategy B1.1.4: Continue working with and evolving the SEFCRI Team to regularly exchange information between local, regional, and federal partners on resource use changes, conditions and impacts in KJCAP.
Integrated Strategy B1.1.5: Coordinate with appropriate partners (e.g., charter operations, local inlet districts, indigenous communities, surfers) to facilitate information sharing, and identification of changes in use and use patterns (e.g., recreational fishing licenses, commercial

fishing licenses, registered vessels, coastal zip code population, visitor numbers) to support adaptive management.

Performance Measures B1.1

1. Results from use studies are synthesized and shared with relevant partner agencies, SEFCRI team and TAC, and the public.
2. Updated use study data are integrated into the existing decision support tool for the KJCAP region and NOAA's Digital Coast data repository.
3. Coordinate and facilitate annual SEFCRI Team and TAC meetings.
4. Update user data at minimum every five years, thereby ensuring that DEP's CRCP staff are using current statistics to guide their decision making and outreach efforts.
5. Update repository of economic studies every five years, thereby ensuring that DEP's CRCP staff are using current statistics to guide their decision making and outreach efforts.

Objective B1.2: Support continuation of and explore options for expansion of fisheries monitoring programs and protocols to gain a better understanding of the state of fisheries compared to use trends and impacts in KJCAP.

Integrated Strategy B1.2.1: Promote holistic fisheries management in KJCAP by facilitating continued monitoring and information sharing of commercial fishery-dependent data between FWC and NOAA Fisheries.
Integrated Strategy B1.2.2: Promote holistic fisheries management in KJCAP by facilitating continued monitoring and information sharing of recreational fishery-dependent data from NOAA Fisheries Marine Recreational Information Program and FWC's State Reef Fish Survey.
Integrated Strategy B1.2.3: Support continued (RVC) and increased (e.g., annually or seasonally) monitoring of fishery-independent data in KJCAP, as generated by FWC and NOAA Fisheries.

Performance Measures B1.2

1. Fisheries data from KJCAP are incorporated into the decision support tool as they become available.
2. Coordinate and document a minimum of one meeting annually with fisheries managers to discuss how KJCAP can support fisheries monitoring.

Goal B2: Evaluate and implement management approaches to reduce impacts from fishing, diving, and other uses (recreational and commercial) in KJCAP to support ecosystem integrity and function.

Objective B2.1: Coordinate research and work with partners to synthesize recommendations to reduce impacts from fishery use pressure on benthic habitats in KJCAP.

Integrated Strategy B2.1.1: Use data obtained through studies in goal B1.1 (a study of use patterns and impacts), and work with recreational fishing industry in KJCAP to draft updated fishing guidance for improved conservation practices to alleviate user impacts.
Integrated Strategy B2.1.2: Partner with FWC, NOAA, and other local agencies to support research efforts to conduct a KJCAP-specific fisheries analysis using NCRMP data.
Integrated Strategy B2.1.3 Support continued research by FWC and NOAA and engagement with fishery stakeholder groups to identify critical areas that support biodiversity within KJCAP, such as fish spawning aggregations and larval sources based on partner agency methodologies **(FDOU 52)**.
Integrated Strategy B2.1.4: Support FWC evaluation of fishing gear (including hook, line, spearfishing, and lobster traps) impacts on natural coral reef habitats and effectiveness of current management options for reducing impacts **(FDOU 52)**.

Performance Measures B2.1

1. Data on and locations of critical areas supporting biodiversity that warrant increased protection are incorporated into the decision support system as they become available.
2. Recommendations on ways to reduce impacts from fishery use pressure on benthic habitats are summarized in an annual report and shared with FWC, SEFCRI Fishing Vice Chair, and fishing organizations for wider dissemination.

Objective B2.2: Coordinate research and work with partners to synthesize recommendations to reduce impacts from diving use pressure on affected resources.

Integrated Strategy B2.2.1: Use data obtained through studies in goal B1.1 (a study of use patterns and impacts), and work with recreational diving industry in KJCAP to draft updated industry guidance for improved conservation practices to alleviate user impacts.
Integrated Strategy B2.2.2: Develop a communication network between resource managers, researcher and dive operators so managers can effectively communicate to operators specific areas of concern to avoid.

Performance Measures B2.2

1. Recommendations on ways to reduce impacts from diving use pressure on benthic habitat are summarized in an annual report and shared with FWC, SEFCRI, Diving Vice Chair, and dive shops for wider dissemination.
2. With diving community representatives and researchers, develop a framework for establishing a communication network.

Objective B2.3: Evaluate and recommend approaches to minimize impacts from pressure at high-use areas and intra- and/or inter-group conflicts over resources.

Integrated Strategy B2.3.1: Conduct a literature review to understand how intra- and inter-group conflicts have been addressed in other marine regions around the world.

Integrated Strategy B2.3.2: Using findings from Strategy B2.3.1, and data collected from Objective B1.1, work with user groups to identify areas of overlapping use and find areas of consensus, and work toward solutions to minimize conflict.
Integrated Strategy B2.3.3: Compare areas of high ecological integrity against highly visited areas identified in Objective B1.1 to establish recommended management activities to protect biodiversity hotspots based on overlap.
Integrated Strategy B2.3.4: Use present and (modeled) future use patterns to investigate the use of different mooring buoy strategies (e.g., rotating dive sites, increasing locations and reducing density of mooring buoys) to reduce pressure at high-use sites. These techniques may have to vary based on location and user demographics.
Integrated Strategy B2.3.5: Use data obtained through studies in objective B1.1 and results from literature review in strategy B2.3.1 to evaluate use patterns between natural and artificial sites, then work with FWC to investigate the potential efficacy of artificial reefs in alleviating crowding and reducing user conflicts, if appropriate **(FDOU 52)**.
Integrated Strategy B2.3.6: Coordinate with the counties and FWC to communicate how proposed artificial reefs relate to existing and upcoming natural reef restoration efforts.
Integrated Strategy B2.3.7: Evaluate barriers to education, outreach, and enforcement of the CRPA, continue to educate users on the importance of using mooring buoys and not anchoring on natural reef or hardbottom (e.g., by using signage at boat ramps and marinas) and create other effective communication channels and technologies (e.g., social media) through agency collaborations **(FDOU 52)**.

Performance Measures B2.3

1. Findings from literature review, use studies and educational barriers are summarized in an annual report and shared with SEFCRI, FWC and counties.
2. Coordinate and document meetings with FWC and Southeast District as needed to discuss implementing strategies based on use studies and coordination of artificial reef proposals.
3. Facilitate at least one diving and one fishing SEFCRI project team meeting annually to discuss implementation and effectiveness strategies to alleviate use pressure. Strategies may have to vary based on location and user demographics.

Goal B3: Comprehensively assess and increase awareness of unsustainable resource use and engage communities in protecting KJCAP ecosystems through best practices.

Objective B3.1: Assess current levels of public awareness of the wide-ranging impacts sustained by marine resources through unsustainable use and of best practices to utilize and appreciate marine resources that minimize negative impacts.

Integrated Strategy B3.1.1: Conduct studies to evaluate current level of awareness of practices that reduce impacts on marine resources due to unsustainable resource use.
Integrated Strategy B3.1.2: Engage partners, indigenous communities and local stakeholders to understand currently accepted sustainable practices within their respective groups.

Integrated Strategy B3.1.3: Conduct studies to assess barriers to sustainable practices across different stakeholder groups in KJCAP.

Performance Measure B3.1

1. Findings from assessments are summarized in an annual report and shared with SEFCRI and other pertinent partners.

Objective B3.2: Develop and implement strategies to increase awareness of unsustainable resource use and increase engagement in best practices to minimize negative impacts on marine resources.

Integrated Strategy B3.2.1: Develop a tailored approach to increase awareness of impacts from unsustainable use of marine ecosystems targeting distinct user groups (e.g., recreational fishers, commercial operators, coastal residents) and including social media and related tools.
Integrated Strategy B3.2.2: Work with FWC, stakeholder/industry groups, and local agencies to create and implement a certification program (e.g., Blue Star or Green Fins Programs) for fishing charters and guides, diving/snorkeling charters, and other marine charters working within KJCAP. Incorporate local programs (e.g. Sea Grant's Florida Friendly Fishing Guide certification program) into the framework as applicable **(N-23)**.
Integrated Strategy B3.2.3: Support FWC and other local partner organizations (e.g., UF Sea Grant, NOAA and the South Atlantic Fisheries Management Council) to increase user awareness and knowledge of reef fishing best management practices (e.g., venting and descending devices) to reduce post-release mortality, bycatch, and any other unintended impacts.
Integrated Strategy B3.2.4: Work with diving industry, partners, and other organizations to increase user awareness and knowledge of snorkeling and diving impacts and best practices to reduce harm to benthic communities, by decreasing behaviors like touching, standing, or bumping fragile resources, especially corals.
Integrated Strategy B3.2.5: Working with FWC, encourage methods to prevent, track, and reduce impacts to coral reef habitat from lost gear (e.g., reporting lost gear to SEAFAN and coordinating with dive shops and fishermen for retrieval on an as-needed basis) (**N-64)**.
Integrated Strategy B3.2.6: Assess the effectiveness of stakeholder and public awareness strategies, as related to building awareness on human use impacts sustained by marine resources and promoting engagement in best practices to utilize and appreciate marine resources that minimize negative impacts.

Performance Measures B3.2

1. In conjunction with FOFR and other partners, debut one new physical or virtual KJCAP resource related to promoting sustainable use of KJCAP per year.
2. Updated strategies and resulting outreach materials are shared with FWC and SEFCRI and at two outreach events annually.
3. Social media posts are submitted to FOFR a minimum of six times annually to be posted on FOFR's accounts.

4. Working with partners, develop a plan to identify funding for and implement in a conservation certification program in KJCAP.
5. Awareness strategies relating to unsustainable use impacts are updated based on assessment results and shared with SEFCRI, FWC and the counties.

Objective B3.3: Continue to support partner agencies in the enforcement of marine regulations and promotion of best use practices.

Integrated Strategy B3.3.1: Partner with industries and agencies (e.g., boating and salvage industries, FWC, county governments and local municipalities) to build awareness on and develop best practices for the response to anchorings, groundings, collisions, and vessel-based pollution.
Integrated Strategy B3.3.2: Update existing KJCAP-specific boating regulation and safety educational materials, where feasible, and implement or incorporate into existing programs as appropriate.
Integrated Strategy B3.3.3: Ensure digital resources demarcating the locations of benthic natural resource coverage in KJCAP region are widely available and accessible to boaters, divers, recreational and commercial fishers, and other stakeholders, distributing these resources via existing popularized navigation tools where possible **(N-19)**.
Integrated Strategy B3.3.4: Collaborate and support the update of existing cross-training program(s), where appropriate, for local marine units to improve recognition of conservation regulations, support increased law enforcement presence on the water and encourage the use of additional enforcement for peak periods to decrease reef damage due to marine-related violations **(N-35)**.
Integrated Strategy B3.3.5: Support state and local agency penalties and offer online education for marine-related violations **(N-44)**.
Integrated Strategy B3.3.6: Improve on-water enforcement of the CRPA with partners and resource trustees (F.S. 403.93345), including exploring new partnership opportunities with FWC, county government, and local municipalities for interlocal agreements for enforcement and updating response protocols as necessary **(S-125)**.
Integrated Strategy B3.3.7: Ensure resource trustees are aware of current management strategies, including injury assessment protocols, to assist in the enforcement process of the CRPA.
Integrated Strategy B3.3.8: Propose idea to USCRTF that collectively all U.S. coral reef boundaries be submitted to the IMO's Marine Environment Protection Committee for inclusion on IMO maps.

Performance Measures B3.3

1. Distribute digital resources created as part of B3.3.3 to festival organizers to share on their event's website with increased attention during highly attended beach and coastal events (e.g., festivals and air shows) Updated educational materials that include best management practices are shared with SEFCRI, FWC, county government and local municipalities.

2. Crime Scene Investigation for Coral Reefs refresher training is conducted annually by RIPR program with resource trustees on enforcement and injury site assessment protocols related to enforcement of the CRPA.
3. Hold one meeting annually with FWC to discuss education and enforcement of the CRPA and to discuss potential inclusion of KJCAP related educational materials into boating regulation and safety programs.

4.3 / Issue C Ecosystem Disturbance Response and Recovery

A healthy and functioning ecosystem provides services to both the natural and human communities that depend on and use its resources. Ecosystem services can be broadly separated into supporting, regulating, provisioning, and cultural, each of which is an invaluable component of KJCAP (Woodhead et al., 2019). The coral reef and submerged aquatic vegetation ecosystems with KJCAP support high levels of biodiversity, contain critical habitat for various species over their life stages, and interact with other nearshore and deeper marine ecosystems. Corals, seagrass and associated benthic communities regulate the environment by creating a coastal buffer that provides coastal protection, reduces storm damage, and assists in the cycling of nutrients and other materials. These ecosystems are also rich in fishery resources, which provide a source of income and recreation for the region. Additionally, coastal tourism is part of an ever-expanding sector, which accounts for income and jobs across Southeast Florida. Furthermore, this diversity may yield biotechnological benefits, as certain coral reef ecosystem species are used for medications, such as the Caribbean sea whip, which is used to produce anti-inflammatory compounds. However, disturbances such as disease or impacts from anthropogenic activities can alter an ecosystem's structure and function.

The northernmost extent of the contiguous habitat range for stony coral species is the northern boundary of KJCAP, which is largely a result of the location of the Gulf Stream in relation to the Southeast Florida coast (Banks et al., 2008). Compared to the Florida Keys National Marine Sanctuary and Dry Tortugas National Park, the stony coral, hardbottom, and other related communities within KJCAP persist in more variable conditions, forming the basis for a highly diverse ecosystem. To understand how disturbances affect an ecosystem, we need to understand how the ecosystem functions, as well as the roles of the individual components that comprise the ecosystem. The ecosystem is not solely comprised of stony corals but is a combination of different benthic communities that *include* stony corals. Thus, in the management of KJCAP, the whole ecosystem must be considered with the diversity and resilience of benthic communities extending along the various substrates in the region. Conserving the long-term, sustainable functionality of these various and interacting communities in KJCAP is critical to maintaining the ecosystem services the reef provides.

Live coral and seagrass cover in and around KJCAP has declined significantly over recent decades (DEP, 2025a; Gilliam et al., 2021). Stony corals, considered natural infrastructure and the framework builders of the reef, provide many ecosystem services including fish and invertebrate habitat and storm surge and flood protection. Seagrass serves as nursery and feeding grounds for fish and invertebrates, sequesters large amounts of organic carbon, and helps to stabilize sediments (Fourqurean et al., 2012). However, warming events and disease

outbreaks have resulted in lower ecosystem function and diminished ecosystem services (Gilliam et al., 2019; Perry et al., 2013). Losses of stony corals, seagrass beds and hardbottom habitat have implications for the health of the ecosystem and the safety of coastal residents (Yates et al., 2017).

In recent years, a major contributor to the loss of stony corals has been the emergence of the Stony Coral Tissue Loss Disease (SCTLD), which was first documented off Miami-Dade County in 2014 (DEP, 2021c; Gilliam et al., 2019). From 2015 to 2018, live tissue area within KJCAP, which is a measurement of all coral tissue, declined by 40%, and stony coral cover decreased by 57% (Gilliam et al., 2019). Recent monitoring shows improvements in stony coral density and a reduction in SCTLD prevalence. However, as the recovery of the reef has progressed, the composition of stony corals has changed; recruitment has been limited to just a few species (Leinbach et al., 2025) and typified by pioneer/weedy species in a secondary succession.

To promote reef recovery from SCTLD, DEP and numerous partners from federal, state and local agencies, non-governmental organizations, universities, and members of the community collaborated on a multifaceted response effort from 2014-2023. After this time the framework of this multi-partner group was kept but expanded to address additional threats. The SCTLD response leadership was structured as an executive coordination team and steering committee with leadership representatives from DEP, FWC, NOAA and NPS, and eight teams that aided in coordinating the greater response effort including research and epidemiology, reconnaissance and intervention, rescue, propagation, restoration trials, data management, regulatory, communications and outreach, and Caribbean cooperation. Continued management and interventions are needed to restore ecosystem functions and should focus on increasing coral cover to improve reef structural complexity and prevent erosion of reef substrate. Furthermore, the impact of SCTLD illustrated the need for an established a more robust disturbance response program including partners from across the state to manage bleaching events, storm impacts, and future emergent diseases.

Florida’s Coral Reef Resilience Program (FCRRP) originated in 2023 from discussions among reef managers who recognized the need to extend the collaboration established in response to SCTLD to address additional threats facing Florida’s coral reef ecosystems. The former Florida Reef Resilience Program had provided a forum for reef managers to address coral reef issues since 2004, with a focus on building the long-term resilience of this critically important ecosystem. Merging the two initiatives, Florida Reef Resilience Program (established in 2005) and the SCTLD response structure, into FCRRP enhanced advancements in coral reef conservation and restoration. This merger enabled the community to continue to study SCTLD and track its movement within FCR, but also to tackle a wider range of ecological disturbances such as other diseases, thermal stress, bleaching, anthropogenic impacts, and water quality, ensuring sustained progress in safeguarding this vital ecosystem. Considering the role other chronic and acute stressors have on ecosystem health will be an important factor when supporting the recovery of Florida’s Coral Reef to a resilient, self-sustaining ecosystem.

Another major contributor to the loss of coral reef and submerged aquatic vegetation habitat is impacts from coastal construction, which represent a significant source of ecological disturbance affecting KJCAP ecosystem. Beach nourishment and dredging projects have resulted in excess sediment on corals along Florida's Coral Reef (Gregg, 2013; Miller et al., 2016). In addition to the potentially lethal effects of smothering corals and seagrass, sediment interrupts respiration and other biological processes, causing negative effects for the surviving organisms of the benthic community (Gregg, 2013). Reef sediment has also been shown to transmit Stony Coral Tissue Loss Disease (SCTLD) (Studivan et al., 2022). Reduction of light penetration due to particles in the water column is another factor leading to a higher proportion of macroalgae and cyanobacteria, as they are more tolerant of lower light levels and may gain a competitive advantage over corals and seagrass (Gregg, 2013). Sediment has also been shown to inhibit coral larval settlement (Birrell et al., 2005; Goh & Lee, 2008).

While sedimentation from coastal construction represents one major anthropogenic stressor, other human interventions have similarly resulted in unintended ecological consequences for Florida's Coral Reef. In the early 1970s, one to two million tires were deployed off the coast of Broward County for fishery enhancement purposes. This artificial reef composed of tires is commonly known as the Osborne Tire Reef. It was quickly determined that the tires did not make suitable artificial reef habitat due to their highly unstable nature. Since deployment, natural currents and high-energy wave action during storm events have scattered the tires across all four reef complexes (Morley et al., 2008). DEP has been managing the tire removal and restoration efforts since 2015, though numerous tires remain on reef and sand habitat. Additional restoration efforts include removing 1,400 corals from tires, donating corals to researchers and outplanting corals to reef habitat. In 2023, the Florida Legislature enacted the Restoration of Osborne Reef Act (Chapter No. 2023-126 [HB641/SB546]) requiring DEP to develop a plan to remove all remaining tires. In June 2024, KJCAP submitted the Osborne Tire Reef Restoration Plan, which provides a plan to salvage coral colonies growing on tires prior to their removal, remove tires from hardbottom and sand habitats, outplant corals to restore reef potentially damaged by the tire installation, and continue to supplement the ongoing tire removal and coral salvaging projects.

Increases in shipping activity and recreational boater use in KJCAP is another issue that has let to direct impacts that alter the structure and function of benthic resources found within KJCAP. Damage from anchoring, ship groundings, and increase marine debris can damage coral reefs and submerged aquatic vegetation.

Monitoring of benthic resources allows managers to track the severity and extent of seasonal stressors and monitor the long-term status and trends in the benthic communities found in KJCAP. Early resource monitoring efforts in KJCAP began in the 1970s as Florida increased its oversight of fisheries, protected species, and vulnerable habitats. Project-specific monitoring associated with coastal construction projects and dredging is also important to minimize impacts to adjacent coral reef communities. State agencies initiated benthic monitoring and assessment requirements in association with state-permitted coastal construction projects related to dredging, beach nourishment, as well as marina, seawall, and dock construction (e.g., coastal

construction control line permits, environmental resource permits and joint coastal permits) (Banks et al., 2008). However, these monitoring efforts were limited in scope, short-term, and largely occurred within nearshore areas and the intracoastal waterway. Environmental assessments and environmental impact statements required by NEPA for major federal projects, such as the dredging of the ports in KJCAP, mandated increased monitoring to assess project impacts. However, these data sets are rarely collected in a uniform way or provided in a useable format to resource managers.

Extensive monitoring of the benthic resources is part of what helped to establish KJCAP and continues to be a major factor in its management. Ongoing benthic monitoring has occurred since 2003 under the Southeast Florida Coral Reef Evaluation and Monitoring Project (SECREMP), which was identified as a local action strategy need by the SEFCRI Team. SECREMP includes annual monitoring at fixed sites within KJCAP, collecting data on coral reef benthic community composition; stony coral abundance, diversity, and condition; and more recently, added assessments of juvenile abundance and impacts to the reef from SCTLD (Gilliam et al., 2021). More information about SECREMP can be found at https://myfwc.com/research/habitat/coral/cremp/overview/secremp/. In 2005, Disturbance Response Monitoring (DRM) was established to annually assess reef condition, including coral bleaching and disease severity, during the months of peak thermal stress (Florida Reef Resilience Program, 2016). More information about the DRM program can be found at https://myfwc.com/research/habitat/coral/drm/. Another monitoring program, the National Coral Reef Monitoring Program (NCRMP), which compliments both DRM and SECREMP, was developed by NOAA CRCP in 2010. The program monitors benthic, fish, climate, and socioeconomic indicators in shallow water (0-30 m) tropical coral reef ecosystems in NOAA CRCP's priority geographic areas (Miller et al., 2011). Results show that the mean density of corals in Southeast Florida has significantly declined since 2014 and is dominated by a few species including *Siderastrea siderea*, *Stephanocoenia intersepta*, *Montastrea cavernosa*, and *Porites astreoides*.

In addition to benthic monitoring, NCRMP established a recurring socioeconomic monitoring component, which was implemented in 2014 and reoccurs every five years to obtain human dimension information relevant to the region's coral reef ecosystem and associated resources. Survey results indicate that KJCAP residents find coral reefs important culturally and economically; however, they also show that most residents in the region have limited awareness of the threats facing coral reef ecosystems. The survey also assessed public support by KJCAP residents for specific management needs and efforts which include coral restoration, water quality improvements through stricter regulations on land-based sources of pollution, and public outreach on sea level rise and environmental change (Allen et al., 2021). In addition to NCRMP's long-term socioeconomic monitoring, several snapshot social science studies have also been conducted to examine stakeholder uses and perceptions of coral reefs within the KJCAP region. (Behringer et al., 2011; Behringer & Swett, 2011; Shivlani, 2006; Shivlani & Villanueva, 2007). More information about NCRMP can be found at https://www.aoml.noaa.gov/ncrmp/.

Engaging partners and local communities through the use of reporting networks and community science can help reduce habitat loss from anthropogenic activities by building response partnerships and reducing response times. For example, the Southeast Florida Action Network (SEAFAN) is a community reporting and response system managed by DEP and designed to allow KJCAP visitors to report unusual sightings related to groundings, anchor damage, and marine debris, among other disturbance events. SEAFAN also includes the BleachWatch Program, which trains recreational, commercial, and scientific divers to collect coral bleaching and disease data. The BleachWatch Observer Network contributes to the monitoring of current conditions during the warmest summer months, as well as stormy winter months when state and federal monitoring efforts occur less frequently (DEP, 2021b). Engaging the community in monitoring and disturbance response efforts can be an effective way to improve public involvement in resource protection.

Goal C1: Continue, expand and optimize regular monitoring of corals, submerged aquatic vegetation and other KJCAP benthic resources to inform management of KJCAP.

Objective C1.1: Continue, expand and optimize benthic monitoring to inform the management of KJCAP.

Integrated Strategy C1.1.1: Collaborate with partners to continue and optimize DRM, SECREMP and NCRMP benthic monitoring and investigate the expansion of monitoring programs as appropriate to address needs for management of KJCAP.
Integrated Strategy C1.1.2: Assess current state of seagrass monitoring in KJCAP and establish a comprehensive, long-term seagrass monitoring and management framework for offshore Key Biscayne, integrated with regional monitoring practices, to fill critical data gaps, inform management decisions and support coastal resilience.
Integrated Strategy C1.1.3: Assess spatial sampling gaps within KJCAP regions lacking live coral cover (e.g., benthic algal assemblages, submerged aquatic vegetation, worm rock reef structures, cyanobacterial mats) to enhance understanding of benthic community composition and inform adaptive management decisions.
Integrated Strategy C1.1.4: Work with regional monitoring entities to review data from KJCAP benthic resource monitoring so that results are useful for management priorities.

Performance Measures C1.1

1. Participate annually in DRM, as capacity allows.
2. Participate in NCRMP benthic surveys when they are conducted in Florida every other year, with a focus on expanding sites to fill in spatial gaps across KJCAP.
3. Identify funding to support continuance of annual SECREMP monitoring and data synthesis.
4. With help from BBAP staff, design a seagrass monitoring program for offshore Key Biscayne, train KJCAP staff in methods and relevant identification needed to perform monitoring, and implement monitoring when appropriate.
5. A central data repository is created or identified to house data from seagrass monitoring and sampling gaps analysis, and all data is summarized in an annual report.

6. Coordinate or participate in annual meetings with monitoring entities to discuss monitoring results as they relate to KJCAP management priorities.

Objective C1.2: Optimize and integrate monitoring related to coastal construction within and adjacent to KJCAP to inform management processes aimed at reducing impacts to benthic resources.

Integrated Strategy C1.2.1: Engage DEP regulatory programs to update and streamline statewide monitoring protocols to improve quality of turbidity and sedimentation data that are used to evaluate project-related impacts to KJCAP resources.
Integrated Strategy C1.2.2: Provide guidance and educational training to ensure compliance for coastal development projects so that monitoring is comparable between projects in KJCAP whenever possible.
Integrated Strategy C1.2.3: Develop a public data repository of coastal construction-related turbidity, sedimentation, and biological monitoring datasets from county, state, federal and private sources (e.g., state issued biological monitoring plans conducted in accordance with DEP SOPs [Kosmynin et al., 2016]) to make data more accessible to managers for establishing reference conditions and comparing post-construction impacts.

Performance Measures C1.2

1. Document meetings with DEP BIPP, ERP and DEAR to discuss optimizing permit requirements related to turbidity monitoring during coastal construction projects as relevant data is created and/or synthesized.
2. MICCI Coordinator, with guidance from DEP BIPP, ERP and DEAR staff, conducts one meeting or training annually with contractors conducting coastal development projects to review turbidity monitoring requirements.
3. Develop a single, accessible repository that consolidates turbidity, sedimentation, and related benthic monitoring datasets from county, state, federal, and private sources. Data is summarized in an annual report.
4. Data repository is integrated into permitting and/or regulatory internal SOPs.

Goal C2: Continue to improve management and maintenance activities related to coastal construction by working with intra-agency programs to reduce impacts to benthic resources (including nearshore reefs), create more sustainable beaches, and minimize impacts from nourishment projects **(S-120)**.

Objective C2.1: Evaluate and reduce habitat loss from physical and coastal development impacts on benthic resources in KJCAP.

Integrated Strategy C2.1.1: Analyze data from Integrated Strategy C1.2.3 and existing literature to improve understanding of turbidity and sedimentation impacts to offshore habitat and biological communities within KJCAP related to coastal construction activities.
Integrated Strategy C2.1.2: Synthesize data from Integrated Strategy C1.2.3 and results from Integrated Strategy C2.1.1 related to developing appropriate turbidity and sedimentation

thresholds for beach maintenance projects, marine construction and dredging that are designed to specifically protect KJCAP benthic resources and share recommendations with DEP BIPP and DEAR. **(S-104)**.

Integrated Strategy C2.1.3: Update nearshore benthic habitat maps as new information becomes available and cross-reference with Florida Seafloor Mapping Initiative data, including anchorage zones, to quantify changes and identify areas of habitat degradation and growth within KJCAP.

Performance Measures C2.1

1. Summarize turbidity and sediment data as well as recommendations related to turbidity and sedimentation thresholds in an annual report and share with DEP BIPP and DEAR.
2. Updated benthic habitat maps are shared with partners. Results from quantification of habitat degradation and growth are summarized in an annual report, shared with partners, and integrated with other management tools (i.e. FCR decision support system, Biological Condition Gradient assessments and ecosystems modelling).

Objective C2.2: Support improvement of minimization and mitigation activities for unavoidable impacts to resources to reduce and offset lost ecosystem functions in KJCAP **(OFR N-117 and FDOU 52)**.

Integrated Strategy C2.2.1: Support DEP's regulatory programs through permit and project review as appropriate and assist with improving efficiencies and compliance through integration of best management practices to minimize impacts to KJCAP benthic resources from coastal construction projects.

Integrated Strategy C2.2.2: Assist with in-water site and compliance checks to ensure impacts to coral reefs are within permitted project scope, identify unpermitted secondary impacts, and support applicable enforcement procedures as needed.

Integrated Strategy C2.2.3: Support DEP regulatory programs efforts to evaluate the applicability of the Uniform Mitigation Assessment Method (UMAM) and other mitigation scoring methods, such as the Habitat Equivalency Analysis (HEA), for benthic habitats in KJCAP. This evaluation aims to improve consistency and accuracy in mitigation calculations and ensure the maintenance of ecological functions **(S-108).**

Integrated Strategy C2.2.4: Engage regulatory agencies to investigate options to revise the coastal permitting process to ensure reasonable assurance that development and coastal construction projects are minimized during periods when corals are more susceptible to impacts (e.g., bleaching, spawning, or other disturbance events) to reduce cumulative impacts to reefs. **(Southeast Florida Coastal Ocean Task Force RMAs; FDOU 52)**.

Integrated Strategy C2.2.5: Using MICCI LAS Project 6 and global examples of effective minimization and mitigation practices as a reference, continue, update, and promote a training program based on existing best management practices that will be required for on-site coastal construction project contractors, as referenced in coastal construction permits **(S-101)**.

Integrated Strategy C2.2.6: Develop and implement a structured process that enables permitting agencies to integrate lessons learned from past projects into future planning. This will

focus on minimizing resource impacts and enhancing the effectiveness of mitigation strategies **(S-114)**.
Integrated Strategy C2.2.7: Evaluate effectiveness of previous USCRTF and SEFCRI-developed MICCI related tools and documents and update as appropriate to ensure tools are useful for management priorities.
Integrated Strategy C2.2.8: Work more closely with DEP's regulatory programs to ensure in-kind mitigation to offset lost ecosystem functions within KJCAP.

Performance Measures C2.2

1. MICCI Coordinator continues to meet with DEP BIPP and ERP staff as permit applications occur to provide and optimize guidance on KJCAP benthic resources.
2. CRCP staff participate with regulatory staff in in-water site and compliance checks when needed to provide field support and coral identification experts.
3. Document meetings with DEP regulatory staff to discuss applicability of mitigation scoring methods, options to review coastal permitting processes to minimize exacerbating stressors to benthic resources, effectiveness of USCRTF and MICCI tools to aid management priorities, and developing in-kind mitigation options for coastal construction projects.
4. MICCI Coordinator, with guidance from DEP BIPP, ERP and DEAR staff, conducts one meeting or training annually with contractors conducting coastal development projects to review best management practices.
5. Lessons learned related to permitting processes are integrated into permitting and/or regulatory internal SOPs.

Objective C2.3: Identify and reduce other physical impacts in KJCAP.

Integrated Strategy C2.3.1: Continue supporting the removal of tires and debris from sand and reef habitat to eliminate future damage to natural reef caused by the Osborne Tire Reef **(S-1)**.
Integrated Strategy C2.3.2: Continue removing and relocating corals from tires to reef and temporary nursery sites to facilitate tire removal in support of the Osborne Tire Reef Restoration Plan.
Integrated Strategy C2.3.3: Continue to coordinate with U.S. Coast Guard and local agencies/organizations to protect reefs from anchor damage, optimize reporting for partners and recreational boaters (e.g., SEAFAN and FWC reporting forms), and reduce impacts to KJCAP benthic resources, with increased attention during beach and coastal events (e.g., festivals and air shows) **(S-92)**.
Integrated Strategy C2.3.4: Work with partners and stakeholders to strengthen marine debris removal networks and events.
Integrated Strategy C2.3.5: Work with marine navigation companies to include sensitive habitat features such as coral reef and hardbottom in electronic maps.

Performance Measures C2.3

1. Track corals removed from tires and tires removed from hard bottom or sand. Progress updates are included in an annual report and shared with partners.

2. Document participation in and presentations given by the RIPR team at U.S. Coast Guard meetings and local law enforcement trainings.
3. Update SEAFAN response manual with new partnerships and avenues for removal of marine debris.
4. Coral reef and other sensitive habitat features within KJCAP are included in electronic maps.

Goal C3: Strengthen public and partner engagement in resource protection and collaborative decision-making for effective disturbance response.

Objective C3.1: Promote and optimize community engagement in reporting disturbance events and foster interagency data sharing to support informed disturbance response in KJCAP.

Integrated Strategy C3.1.1: Continue to enhance community science efforts by optimizing SEAFAN and BleachWatch programs to increase public reporting of marine incidents such as coral bleaching and disease.
Integrated Strategy C3.1.2: Continue to share SEAFAN and BleachWatch report data between appropriate agencies and organizations to inform and expedite relevant decision making and disturbance response.
Integrated Strategy C3.1.3: Continue to promote the incorporation of SEAFAN and SEAFAN BleachWatch in partners' public engagement/community science opportunities for coral health monitoring within restoration programs (e.g., University of Miami's Rescue-A-Reef program and Iconic Reef Guardians).

Performance Measures C3.1
1. Document outreach events and products used by KJCAP and partners to promote SEAFAN and BleachWatch events.
2. Document the number of BleachWatch classes given by KJCAP staff and trained instructors.
3. All SEAFAN and BleachWatch reports are disseminated to the appropriate agency or organization with capacity to respond.
4. Participate in bimonthly meetings with Keys AP and MOTE Marine staff to discuss opportunities to expand SEAFAN and BleachWatch networks or to incorporate their messaging into other public engagement programs.

Goal C4: Improve ecosystem understanding to facilitate decision-making that accounts for ecosystem-scale processes.

Objective C4.1: Engage other FCR resource managers and researchers to develop a deeper understanding of ecosystem function in KJCAP and adjacent managed areas, guiding coordinated and holistic management across FCR.

Integrated Strategy C4.1.1: Evaluate the need for and work with partners to update existing KJCAP ecosystem conceptual models (e.g., MARES).

Integrated Strategy C4.1.2: Work with partners and stakeholders to continue identifying key ecosystem components, data sources, data gaps, and research needs to increase ecosystem understanding and integrate findings into existing decision support frameworks when appropriate.
Integrated Strategy C4.1.3: Explore different ecosystem-based modeling tools/software that can be applied to undertake scenario analyses (e.g., Atlantis and Ecopath with Ecosim) to facilitate management decisions.
Integrated Strategy C4.1.4: Continue to support and expand transparent data visualization and decision support tools for managers and the public.
Integrated Strategy C4.1.5: Continue working with local, state, and federal regulatory agencies to improve agency coordination and enforcement of, as well as stakeholder compliance with, existing laws (e.g., Clean Water Act, fisheries regulations, Endangered Species Act listings and associated rules, Coral Reef Protection Act).
Integrated Strategy C4.1.6: Continue to engage in public-private agency collaborations and initiatives such as FCRRP, FCRCT and USCRTF.

Performance Measures C4.1

1. Findings on ecosystem function and conceptual models are incorporated into FCR decision support system.
2. Findings related to current ecosystem function in KJCAP are summarized in an annual report and shared with SEFCRI.
3. Maintain engagement in FCRRP and USCRTF working groups and other related collaborations.

4.4 / Issue D Community Education, Engagement, and Access

For the purpose of this management plan, access is defined as both first-hand modes of access through physically visiting and spending time in KJCAP, and second-hand means of access including educational experiences that showcase KJCAP's ecosystems. Both forms of access offer valuable opportunities to experience KJCAP and to garner greater appreciation and stewardship of the unique ecosystems found there. Second-hand access should be prioritized for user groups who face barriers to direct access, such as older adults or individuals with physical disabilities. Equity of access refers to the right of everyone, regardless of circumstance, should have an equal opportunity to access KJCAP resources, information, and experience KJCAP's ecosystem services they depend on. DEP's role in promoting access and equity of access to KJCAP focuses on working with partners to distribute and update outreach messaging and materials, coordinating studies to understand barriers to access and equity of access and developing strategies to address those barriers. KJCAP staff work with FOFR and other partners to ensure they are equipped with tools and messaging to expand access to KJCAP.

The entirety of KJCAP lies offshore of Southeast Florida's coast, and thus is most easily accessed via piers, boat ramps, docks, marinas, beaches and inlets. As past SEFCRI research (Shivlani, 2006) has shown, most residents and visitors have historically been unaware that corals and associated communities exist off Southeast Florida. However, while CRCP has made

considerable progress in increasing public awareness of KJCAP's resources, it is unclear how much the knowledge base has grown, compared to how much of an information gap remains. Furthermore, inequities in access for low-income residents of Florida are often experienced through minimal public transit options, parking fees, price of boat/kayak rentals or trip fees, and a lack of affordable lodging in coastal communities. Although the four counties adjacent to KJCAP boast over 178,000 registered vessels, the majority of which are recreational privately-owned vessels (FLHSMV, 2024), and have some of the most expensive real estate in the country, there exist vast income disparities within the region. For example, Greater Miami is second only to New York City in terms of income inequality within the nation, and African American and Hispanic residents are two and a half times and twice as likely, respectively, to live in poverty compared to white residents (Florida & Pedigo, 2019). Higher levels of income inequality can be found among the coastal municipalities and neighborhoods, as compared to areas more inland, in Miami-Dade and Palm Beach counties. In addition to socioeconomic restrictions, access to beaches and KJCAP for people with mobility impairments is an important aspect of social inclusion and can impede the ability for these stakeholders to build familiarity with the resource (Darcy et al., 2023). This is especially important in Florida as, according to the 2020 U.S. Census, Florida has an elderly population of over 4.5 million adults aged 65 and older. The Florida State Plan on Aging (Department of Elder Affairs, 2022) estimates that by 2045, more than 30% of the state's population will be aged 60 and older. Many parks within KJCAP offer beach wheelchairs, accessible restrooms and other accommodations such as synthetic mats for wheelchairs to pass on the sand. If access is not facilitated for all residents in the region, KJCAP, its resources, and its heritage will be enjoyed by only the select few who can afford access. This disparity has long-term, even intergenerational, impacts, in that those residents who do not have access to experience or appreciate KJCAP will likely be the least equipped and willing to take action to protect it in the future.

Language can be another barrier for access and education. For example, 75.1% of Miami-Dade County residents speak a language other than English, with the next most common languages spoken being Spanish (66.3% of residents) and other Indo-European languages including Creole (7.2% of residents) (U.S. Census American Community Survey, 2023). In Broward County, more than 44% of the population speaks a language other than English with the most widely spoken languages being Spanish (29%) followed by Haitian Creole (6%) (Broward County Urban Planning Division, 2024). While most of these residents are bilingual, using their preferred language can be helpful in building trust and avoiding misperceptions on terms (Valdes-Pizzini, 1990).

Over the past 20 years, CRCP has strived to develop a comprehensive outreach and education program. These projects include the development and distribution of public service announcements, educational resources, brochures and posters. The creation and distribution of Coral Reef Teaching Trunks provide teachers in the four counties adjacent to KJCAP with curricula, lesson plans and customized learning materials for grades K-12, helping students learn about local coral reef biology, conservation and stewardship. Additionally, SEFCRI and CRCP have utilized existing organizations for disseminating information, such as having RIPR staff include KJCAP information in presentations to local law enforcement (e.g., FWC and U.S.

Coast Guard) and by distributing informational materials about KJCAP to the U.S. Coast Guard Auxiliary and Power Squadrons for use in their boater safety classes. In 2010, SEFCRI completed the Wayside Exhibit project, installing large signs at 20 high-use docks, marinas and parks throughout the area. In 2022, the signs were updated and over 50 were installed at parks, marinas, education centers and boat ramps – now displaying information on the ecosystem and the diversity of species that live there, legal protections for corals, and how reef users can help the resource both on the water and in their daily lives. These signs, as well as the online content they link to, will be updated to reflect new management measures imposed in this plan, as well as Spanish-language content to increase accessibility of information. CRCP's Marine Debris Program combines outreach and education with community engagement through the execution of events like the Annual Southeast Florida Reef Cleanup that rely on community participation to clean the reef while KJCAP staff in attendance speak on the value of FCR and how residents and visitors to Florida can protect it. Many initial projects are still ongoing, including the production of public service announcements that are distributed digitally and participation in community events. Since 2017, numerous new SEFCRI projects have been underway and involve: translating online resources to be accessible to the entire South Florida community, updating the original inventory of regional educational programs, improving stakeholder education with regards to water quality as well as the connection of water quality with better environmental and economic outcomes, and incorporating KJCAP information more permanently into curricula of local schools.

Moreover, CRCP has partnered with Friends of Our Florida Reefs (FOFR), a citizen support organization that seeks to enhance the efforts to conserve KJCAP by filling in budget gaps, disseminating information to the community with reduced response times, initiating self-directed action, and providing education and outreach. For example, FOFR often supports CRCP's Southeast Florida Annual Reef Cleanup, but in 2025 they were able to increase their support to fundraise for the event and provide a discount to participants who wanted to help pull marine debris off of local reefs. Regional and community partners have also enhanced capacity for outreach, education, and access-building among stakeholders for the KJCAP region. The four counties adjacent to KJCAP have stated their intent through their comprehensive development plans to increase public waterfront access by limiting coastal public land sales and converting those lands instead to marinas and other access points. Regional science museums, such as Frost Science in Miami-Dade County, have built exhibits and hosted programming that highlights Florida's Coral Reef. Another example is the Blue Scholars Initiative, which hosts youth from underserved communities at hands-on marine conservation opportunities. Additionally, Miami's Community Resilient Sea project is a new program at University of Miami (UM) Rosenstiel School of Marine, Atmospheric & Earth Science that unites science, education and grassroots action to advance resilience efforts, including coral reef restoration through citizen science activities with their Rescue a Reef program.

However, despite KJCAP and partners' existing initiatives, many stakeholders remain unaware of the existence of the resources that can be found within the aquatic preserve, the issues the preserve faces, and what sustainable use looks like. Since KJCAP is the newest aquatic

preserve, many Southeast Florida residents visit the preserve regularly without realizing they are within its designated boundaries, or what the related policies are.

One of KJCAP's critical management challenges during the next 10 years will be balancing anticipated increases in public use with the need to ensure conservation of site resources for future generations. Managing of KJCAP seeks to enhance equitable access to the resource while making the current recreational and economic uses sustainable. It is essential for staff to analyze existing public uses and define management strategies that balance these activities in a manner that protects natural, cultural, and aesthetic resources, and broadens access to underserved communities – both as a moral imperative and to broaden the local emotional investment in the health of the resource. Supporting sustainable public access requires gathering information on existing access, needs and opportunities, while also coordinating sustainable visitor program planning and education that uses social science research to ensure equitable and effective opportunities and experiences. While existing access points to KJCAP are maintained and improved, additional access points are needed, created with equity of access in mind. However, weighing the benefits of additional access against resource impacts should be part of the consideration. Apart from physically experiencing KJCAP, educational facilities can introduce the public to the aquatic preserve through alternative means that do not require a first-hand immersive experience, which may not be suitable or appropriate for all stakeholders.

Building and maintaining relationships, conveying knowledge to the community and engaging individuals in active stewardship of KJCAP resources are invaluable components in successful management. The likelihood of success of outreach, education, and community engagement increases when it is coordinated, expanded, and tailored to the desired audience. The value of reaching out to, informing, and building trust among stakeholders and the public when implementing the strategies in this plan cannot be understated. Tailored materials are needed for targeted audiences that include all ages and walks of life from elementary school children to governmental agencies. Social media plays a significant role in modern communication and offers a free, widely accessible platform for reaching large segments of the population. However, further research is needed to understand how to tailor social media messaging to different audiences, including their preferred platforms, communication styles, and other demographic or behavioral characteristics. Similarly, outreach and education materials developed in the preferred languages of the region can expand the target audience. Community engagement is more effective if implemented early in the management process, as has been the case with SEFCRI, to achieve two purposes: (1) to promote informed stewardship of KJCAP within local communities by providing information and promoting participation; and (2) to curtail the spread of misinformation that might otherwise fill the vacuum if participation and information are not available (Suman et al., 1999). Additionally, formalizing stakeholder engagement via representation on a council or advisory body, similar to SEFCRI, can increase the connections and information sharing between management entities and stakeholders.

KJCAP relies on partners to assist with coordination and distribution of educational messaging and outreach products across multiple channels. Current outreach efforts within KJCAP need to

be extended beyond just the diving, snorkeling and boating communities to include other recreational users such as surfers, wind sport communities, educators, local artisans, and others. KJCAP's educational messaging also needs to be expanded beyond coral reef information to include related ecosystems and species such as seagrass and turtles. Partnering with trusted (often differentiated) sources to disseminate information throughout KJCAP would expand the impact of outreach and educational materials beyond the capacity of KJCAP staff. CRCP has relied on SEFCRI to serve as stakeholder representatives and act as ambassadors to various industries and regions, however this type of partnership can be expanded to include county and municipality partners, regional planning councils, tribal leaders and local Non-Governmental Organizations.

Going forward, it is incumbent on KJCAP to work with partners to ensure that expanded access, education and engagement open new opportunities for more diverse communities to experience and enjoy KJCAP's resources. More information is needed, however, on existing distribution of access and equity of access to understand where combined approaches to expand both first- and second-hand modes of access should be concentrated. Additionally, there is a need to study areas where access is already widespread and equitable that can act as a model for effective access expansion and inform outreach and community engagement strategies. Such an expansion in equitable community access can be developed with respect to the carrying capacity of the ecosystem for human activities.

Finally, building awareness via outreach and education cannot be viewed as a static exercise. Awareness changes over time and across stakeholder groups. Any KJCAP outreach and education program should aim to inform and engage stakeholders, but also routinely gauge their understanding of issues, such that management can pivot to modify approaches and quickly dispel misinformation as required (Giakoumi et al., 2018).

Goal D1: Comprehensively evaluate and improve access (virtual, physical, educational) to KJCAP for all communities.

Objective D1.1: Identify existing forms of access and equity of access to KJCAP.

I**ntegrated Strategy D1.1.1**: Conduct studies to determine existing modes and equity of access, aligned with data from other aquatic preserves.
Integrated Strategy D1.1.2: Using data from Integrated Strategy D1.1.1, identify communities with the least access to KJCAP due to limited sites, inadequate amenities, or low participation. These communities will be targeted for outreach and engagement strategies.
Integrated Strategy D1.1.3: Using data from Integrated Strategy D1.1.1, identify communities with high levels of access to KJCAP that can act as models for designing outreach and engagement strategies.

Performance Measure D1.1

1. Results from access studies are summarized in an annual report and shared with SEFCRI Team, FOFR and other pertinent partners.

Objective D1.2: Develop and implement tailored approaches to improve modes and equity of access to KJCAP, targeting underserved communities identified in Objective D1.1.

Integrated Strategy D1.2.1: Synthesize results from Objective D1.1 into recommendations on locations and strategies to increase modes of access and improve amenities that facilitate equitable access to KJCAP, tailored to both KJCAP managers and county/municipality partners.
Integrated Strategy D1.2.2: Offer opportunities for K-12 school programs to expand educational programs about KJCAP resources (e.g., travelling educational trunks, online curriculum, teacher workshops) to increase modes of access to underserved communities **(N-5)**.
Integrated Strategy D1.2.3: Partner with FOFR, industry or other stakeholder groups to organize KJCAP tours and engagement opportunities (e.g., eco-tours, planting living shorelines and marine debris cleanups) in each county, targeting school programs.
Integrated Strategy D1.2.4: Partner with FOFR and other institutions to incorporate information on KJCAP ecosystems into fixed and mobile exhibits (e.g., Frost Florida's Coral Reef exhibit).
Integrated Strategy D2.2.5: Support partners in the development of live underwater webcams in strategic locations (e.g., restoration areas, artificial reefs and hardbottom communities) to showcase KJCAP online.
Integrated Strategy D1.2.6: Create and promote modes of access (e.g., educational programs, tours and exhibits) in Spanish, American Sign Language, Haitian Creole and other target languages to increase access among KJCAP residents and visitors.
Integrated Strategy D1.2.7: Create a tri-lingual (English, Spanish and Haitian-Creole) online hub showcasing physical (e.g., points of interest, beaches, boat ramps and transit) and virtual (e.g., videos, images and activities) access to enhance appreciation of KJCAP.

Performance Measures D1.2

1. Recommendations on locations and strategies to increase modes of access and improve amenities are summarized in an annual report and shared with SEFCRI and pertinent partners.
2. In conjunction with FOFR and other partners, debut one new physical or virtual KJCAP resource or exhibit per year.
3. Document participation in and effectiveness of school programs through continuance of pre/post surveys.
4. Document educational tours and engagement opportunities that occur in or around KJCAP as a direct result of KJCAP staff and partner efforts. Numbers are summarized in an annual report.
5. Create a distribution plan for dissemination of new online resources across the Florida's Coral Reef website, FOFR social media, and other partner web sites.

Objective D1.3: Assess the effectiveness of access approaches implemented in Objective D1.2 within KJCAP.

Integrated Strategy D1.3.1: Conduct standardized studies or other methods (e.g., questionnaires and exit surveys) to evaluate changes in and levels of satisfaction concerning access opportunities by different communities.
Integrated Strategy D1.3.2: Continue to evaluate effectiveness of school programs by levels of participation, follow-up surveys, and other monitoring tools.
Integrated Strategy D1.3.3: Using results from standardized evaluations, revise implementation strategies, as needed.

Performance Measures D1.3

1. Conduct studies at the mid-way and end of the term of this management plan (every 5 years) to evaluate changes levels of satisfaction concerning modes and equity of access to KJCAP. Summarize study results in an annual report and share with SEFCRI, FOFR and other pertinent partners.
2. With input from partners, update implementation strategies based on results from surveys or studies.

Goal D2: Evaluate and build awareness of how KJCAP resources and conservation goals are directly connected to communities via education and outreach.

Objective D2.1: Establish a baseline to measure and monitor the level of awareness among stakeholders and the general public and identify existing outreach strategies and gaps concerning KJCAP resources and conservation goals.

Integrated Strategy: D2.1.1: Conduct studies to establish a baseline of current awareness of KJCAP resources and conservation goals, and determine how awareness varies across socioeconomic, sociodemographic and regional lines.
Integrated Strategy D2.1.2: Engage partners, indigenous communities and local stakeholders to understand how education and outreach is currently disseminated within and by members of their respective groups.
Integrated Strategy D2.1.3: Review existing education and outreach materials used in local, state, and federal agencies, NGOs, and other groups concerning coastal and marine areas for KJCAP messaging to better understand knowledge gaps in outreach messaging used by regional partners.

Performance Measures D2.1

1. Awareness survey results are summarized in an annual report and shared with SEFCRI, FOFR and other pertinent partners.
2. Create a centralized location to house information on dissemination modes and gaps in outreach and educational materials.

Objective D2.2: Develop and implement strategies based on results from Objective D2.1 to increase awareness and foster stewardship of KJCAP and its conservation goals and ecosystem attributes across all communities associated with KJCAP.

Integrated Strategy D2.2.1: Expand existing SEFCRI AA strategies to promote KJCAP via PSAs, videos, media kits, signs, exhibits and maps.
Integrated Strategy D2.2.2: Tailor outreach material based on local and intergenerational preferences for media types, ways of engaging with KJCAP, and levels of awareness, to ensure they can be provided in preferred languages, messaging, and media types.
Integrated Strategy D2.2.3: Partner with FOFR to connect to local industries including dive shops, bait and tackle stores, recreational fishing charters, eco-tour operations and public transit to disseminate KJCAP outreach materials (e.g., PSAs, videos and informational brochures) that promote sustainable use practices and to promote engagement opportunities in KJCAP (i.e. marine debris cleanups).
Integrated Strategy D2.2.4: Partner with local agencies, non-governmental organizations, aquatic preserves, state parks, indigenous communities and educational facilities to disseminate KJCAP outreach materials (e.g., PSAs, videos and informational brochures) that promote sustainable use practices and to promote engagement opportunities in KJCAP (i.e. marine debris cleanups).
Integrated Strategy D2.2.5: Collaborate with indigenous communities and other partners to engage underrepresented subsistence and multi-cultural fishers through outreach that promotes responsible fishing practices and raises awareness of KJCAP resources and water quality status **(N-18)**.
Integrated Strategy D2.2.6: Sustain relationship with and promote the citizen support organization, Friends of Our Florida Reefs, to extend the reach of KJCAP's community awareness and engagement strategies called out in Objective D2.2 and target funding for conservation activities more effectively and efficiently **(N-15)**.
Integrated Strategy D2.2.7: Support and partner with the Florida state, county and local municipality tourism boards or councils and visitor centers to develop and incorporate welcome information into digital video or image packages for new Florida residents and visitors with a focus on the four counties adjacent to KJCAP. Resources should focus on influencing behavior change by providing information on how sustainable practices can improve ecosystem services provided by KJCAP resources **(N-21)**.
Integrated Strategy D2.2.8: Increase awareness of KJCAP resources and sustainable uses via updated signage and other materials at access points (e.g., marinas and boat ramps).
Integrated Strategy D2.2.9: Update outreach and educational messaging and materials to highlight the economic, cultural and recreational values of Florida's Coral Reef to educate residents, elected officials and visitors **(N-14)**.
Integrated Strategy D2.2.10: Expand existing outreach and educational materials to include KJCAP related information beyond corals, including but not limited to seagrass systems, turtles and shark migration**.**
Integrated Strategy D2.2.11: Expand target audiences of KJCAP outreach and engagement strategies beyond fishing and diving sectors to include educators, local artisans, surfers, wind sport communities, other resource managers, indigenous communites and regional planning councils.
Integrated Strategy D2.2.12: Enhance outreach and education efforts to go beyond awareness, targeting behavioral change by highlighting the vital connections between KJCAP resources and surrounding communities.

Performance Measures D2.2

1. In conjunction with FOFR and other partners, implement one new or improved strategy to promote KJCAP per year.
2. Create a distribution plan for dissemination of new or improved outreach materials across modes of engagement (e.g., media types, languages) and with different partners (e.g., local industries, agencies, other resources managers, indigenous communities).
3. In partnership with FOFR, create a long-term business plan for the CSO that details operational, outreach, and fundraising goals.
4. Update existing Coral ECA signage to mention KJCAP.
5. Document the distribution of outreach materials by KJCAP staff and partners, including notes on successes, lesson learned, and recommendations on updating materials and engagement strategies.

Objective D2.3: Develop and implement strategies to increase awareness of ongoing stressors and ecosystem pressures in KJCAP.

Integrated Strategy D2.3.1: Incorporate new and emerging information about impacts from environmental change on KJCAP ecosystems into guided tours, signage, staff training, and promotional materials.
Integrated Strategy D2.3.2: Work with local diving/snorkeling and fishing operators to educate their customers on the effects of environmental change and actions they can take to reduce impacts on KJCAP, similar to the FKNMS Blue Star Program.
Integrated Strategy D2.3.3: Continue to educate the public, local stakeholders and partner organizations about direct impacts to coral reef resources and promote awareness of the CRPA.

Performance Measure D2.3

1. In conjunction with FOFR and other partners, debut one physical or virtual KJCAP resource per year that has been updated with information about environmental changes.

Objective D2.4 Evaluate the effectiveness of outreach and education programs.

Integrated Strategy D2.4.1: Conduct standardized studies or other methods (e.g., questionnaires and exit surveys) to evaluate changes in the level of awareness of KJCAP and its goals and attributes.
Integrated Strategy D2.4.2: Work with law enforcement and other agencies to determine changes in behavior on/in the water, as related to fisheries infractions, groundings, anchoring impacts, etc., following outreach and education efforts.
Integrated Strategy D2.4.3: Coordinate with partners to review outreach and educational materials on a periodic basis to ensure messaging is accurate, addresses prevailing issues, and is effectively reaching target audiences. Update outreach materials and dissemination strategies based on emerging information and findings from studies to evaluate changes in level of awareness in Integrated Strategy D2.4.1.

Performance Measures D2.4

1. Conduct studies at the mid-way and end of the term of this management plan (every 5 years) to evaluate changes in awareness and behavior. Summarize study results in an annual report and share with SEFCRI, FOFR and other pertinent partners.
2. With input from partners, update outreach and education materials and strategies based on results from surveys or studies.

4.5 / Issue E Building Ecosystem Resilience

Anthropogenic impacts are leading to more severe and frequent disturbance events affecting coral reefs (Hughes et al., 2017). Stressors of anthropogenic origin that impact coral reefs include rising sea temperatures, ocean acidification, extreme weather events and changes in ocean circulation patterns. These stressors contribute to environmental change and promote increased frequency of coral diseases, shifts in species distribution, and loss of biodiversity.

Environmental changes, such as ocean acidification and thermal stress, can lead to the loss of coral reef habitat. Ocean acidification is defined as a reduction in the pH of the ocean over an extended period caused primarily by uptake of carbon dioxide from the atmosphere. This makes it harder for corals to build and maintain their skeletons, inhibiting coral growth and the formation of new reef structure. Thermal stress can cause corals to lose their algal symbionts, which produce their primary food source, in a process known as coral bleaching. When increased water temperatures are sustained and corals do not have the chance for recovery, bleaching can lead to coral death and loss of coral reef habitat (Hughes et al., 2017; Poloczanska et al., 2016). Even moderate bleaching can cause prolonged individual colony and community-wide effects by reducing coral growth rates and reproductive capacity and increasing vulnerability to disease (Doney et al., 2012).

Thermal stress also affects submerged aquatic vegetation communities, and has been linked with mass seagrass mortality (Campbell & Le, 2025). Increased temperatures can promote seagrass growth, reproduction and respiration, but only up to a threshold. When that temperature threshold is exceeded, growth and photosynthesis rates decline and mortality rates increase (Campbell & Le, 2025).

While some mobile fish may migrate poleward with rising temperatures, this option is severely limited for corals due to their sunlight requirements and light penetration constraints during winter at higher latitudes (Muir et al., 2015; Poloczanska et al., 2016). Warming trends are unlikely to assist in the northward migration of stony coral species in KJCAP; instead, associated extreme weather events may lead to a prolonged decline (Toth et al., 2021). In addition, frequent upwelling events that cause fluctuating temperatures off the Martin County coast have likely inhibited the northern expansion of corals beyond St. Lucie Inlet due to long-duration cold spells that prove unfavorable for tropical coral reef development (Walker and Gilliam, 2013). Even under suitable temperature regimes, coastal development would hinder poleward migration of corals by impeding the generation of suitable habitat for coral recruitment and colonization (Walker, 2012).

Over 40% of all coral species are at risk of extinction, posing a threat to marine species reliant on coral reefs such as lobsters, tropical reef fish, and marine megafauna (IUCN, 2024). Without significant reductions in global carbon emissions, the average maximum summertime temperature will exceed the average maximum temperature threshold of all species in tropical and subtropical communities between 2050 and 2100 (Bruno et al., 2018). Although reducing global carbon emissions is a vital step in curbing the effects of environmental change, resource managers can also enhance ecosystem resilience by mitigating local stressors from human activities, enabling ecosystems to better withstand climate-related disturbances and maintain ecosystem functions (Maynard et al., 2017; Worm et al., 2006). Ecosystem function refers to the dynamic and integrated processes that occur within an ecosystem, such as a coral reef or seagrass bed, that contribute to overall health, stability and productivity. Key aspects of ecosystem function in KJCAP include biodiversity support, primary production, nutrient cycling, fisheries habitat, coastal protection, carbon storage, ecosystem connectivity, as well as tourism and recreation.

Ecosystem resilience is defined as the ability of a system to resist and recover from a disturbance event (Bruno et al., 2019). Numerous factors have been shown to affect the resiliency of a system, and managed resilience focuses on reducing background pressures that make it harder for a system to remain resilient. Indicators of reef and submerged aquatic vegetation resilience include coral and seagrass cover, macroalgae cover, species diversity, coral disease, coral bleaching resistance, herbivore biomass and temperature variability. In coral reefs, high resilience has been found to be most closely associated with high levels of coral cover, bleaching resistance and herbivore biomass, and low levels of disease. Across the various strata of Florida's Coral Reef, relatively high resilience was found in the Florida Keys and Dry Tortugas, whereas relatively low resilience was found in KJCAP (Maynard et al., 2017). Thus, there is a need in KJCAP to evaluate and implement adaptation measures that promote coral reef recovery and resilience.

Reef managers worldwide are working towards identifying and managing resilience drivers, such as connectivity and biodiversity, by using a resilience-based management (RBM) approach that focuses on enhancing the resilience of ecosystems, communities, and socio-ecological systems (Mcleod et al., 2019). Globally and locally, marine management strategies are emphasizing the need for integrating RBM and prioritizing management strategies that increase the resilience of the social-ecological system.

The Florida Reef Resilience Program (2021) released a Resilience Action Plan for Florida's Coral Reef, which calls for around 200 actions to maintain or improve reef resilience including reducing greenhouse gas emissions, reducing direct threats and increasing coral restoration efforts. Management agencies continue to implement these actions and identify new resilience strategies to increase the ability of KJCAP to resist and recover from the effects of environmental change. The Resilience Action Plan for Florida's Coral Reef highlighted that although government, private, and nonprofit entities continue to address environmental stressors impacting the reef, Florida's coral species are unable to recover without assistance.

Without continued bold and aggressive action, we will lose critical functions and benefits of the reef.

In 2023, Executive Order 23-06 established the Florida's Coral Reef Restoration and Recovery (FCR3) Initiative, which aims to support the long-term recovery of at least 25% of Florida's Coral Reef by 2050. The FCR3 initiative supports the development of infrastructure, technology, skilled workforce, and logistics necessary to achieve restoration objectives in three phases. Utilizing funding from DEP and FWC, the initiative supports evidence-based propagation and outplanting programs to repopulate Florida's Coral Reef to re-establish and strengthen natural reproduction, dispersal, and recruitment patterns while prioritizing enhanced flood protection.

In conjunction with FCR3, a tiered approach to coral reef restoration planning in Florida is being implemented to inform where reef restoration can most effectively contribute to the overall recovery of the entirety of Florida's Coral Reef. Tier 1, outlined in the *Ecological Restoration of Florida's Coral Reef: Tier 1 Strategy* (FCRRP, 2024), provides high level guidance for all of Florida's Coral Reef, using maps developed through data and modeling to define broad restoration goals, focal areas (up to 24 hectares or 60 acres), and principles for success, while informing planning at subsequent tiers. Tier 2 consists of place-based or jurisdictional plans, such as the *Restoration of the Kristin Jacobs Coral Aquatic Preserve: Tier 2 Plan* (FCRRP, 2025), which builds on Tier 1 by advancing both ecological and socioeconomic goals, prioritizing focal areas for ground truthing, and describing the restoration activities that will be used to achieve those goals. In the KJCAP Tier 2 Plan, enhancing ecosystem services such as coastal protection, fish production, and tourism and recreation was identified as a priority alongside Tier 1 ecological goals, with related datasets incorporated to further refine the Tier 1 focal areas. Tier 3 plans, like the *Mission: Iconic Reefs Carysfort Reef* plan (NOAA, n.d.), are site specific (up to 12 hectares or 31 acres), detailing exact locations, restoration activities, and monitoring and adaptive management strategies; Tier 3 plans for KJCAP are currently in development. Together, these three tiers ensure coordinated planning and implementation across scales from state level strategy to regional prioritization to local site action, helping maximize the resilience and recovery of Florida's Coral Reef.

In-water and land-based coral nurseries play a pivotal role in increasing ecosystem resilience. Nurseries serve as temporary homes for coral fragments and adult colonies, fostering growth and maintaining key genetic diversity. Restoration initiatives, such as coral spawning hubs, contribute to population replenishment and genetic resilience. Integrating these practices into comprehensive management strategies enhances ecosystem resilience, contributing to the long-term sustainability of coral reefs in the face of environmental change and other stressors.

Both biological restoration and engineered reefs are key components in preserving the ecosystem benefits that local stakeholders gain from Florida's Coral Reef but represent distinct approaches to coral reef restoration. Biological restoration leverages natural processes such as coral propagation, and efforts focus on cultivating and reintroducing corals to enhance the reef's inherent recovery capabilities. This method relies on the resilience of native ecosystems to restore biodiversity and ecological balance in a natural way. Alternatively, hybrid reefs involve

the deployment of specially designed artificial structures or technologies to create habitats conducive to coral growth. These man-made structures have the potential to increase shoreline stabilization, reduce coastal erosion, and mitigate flooding through wave attenuation. While KJCAP management priorities focus on biological restoration, both approaches aim to enhance ecological and economic benefits, although they differ in their reliance on either natural processes or human-designed interventions.

Another type of reef restoration includes physical restoration, which focuses on the repair, stabilization, and recovery of reefs from physical damage including from anchors, vessel groundings, and hurricanes. In 2012, CRCP initiated a project to restore two previous vessel grounding sites, those of the M/V Spar Orion and the M/V Clipper Lasco, both of which ran aground in 2006 on the middle reef west of the Port Everglades anchorage in Broward County. This was CRCP's first management-led restoration project of this scale. Construction was completed in December 2015, and CRCP has been monitoring the project's success and site recovery ever since. After reviewing Nova Southeastern University's five-year monitoring report, CRCP continued restoration of the M/V Clipper Lasco site by conducting additional biological enhancement through coral relocation with corals of opportunity from Osborne Tire Reef.

Regional seagrass restoration efforts include more than just actively planting seagrass to offset habitat loss or repair damage from disturbances like propeller scarring. Broader efforts to restore habitats such as water quality improvements and stabilizing sediments can increase success of restoration efforts. Although seagrass restoration is sometimes viewed as unpredictable or having low success rates, recent literature reviews have shown that while loss of seagrass in the early stages of restoration projects can be common, once established seagrass beds often exhibit long-term persistence (Rezek et al., 2019). Successful seagrass restoration is dependent upon sufficient planting efforts, appropriate site selection, and/or the use of adaptive management practices (van Katwijk et al., 2016).

Given the highly localized nature of resilience due to the complex interactions in KJCAP, the goals in this section are sequential and cyclical, in that they build off each other and work as an adaptive loop. The first goal acknowledges the need for further research to better identify the specific needs, stressors, vulnerabilities, and strengths of KJCAP ecosystems and resources. The second goal proposes management interventions that can be implemented to aid in building or reinforcing resilience. Since the goals incorporate adaptive management, interventions will be monitored and evaluated when new information is acquired, and management strategies can be modified based on what has been learned.

Goal E1: Identify and evaluate the effects and impacts of environmental change on KJCAP resources.

Objective E1.1: Conduct an ecosystem resilience evaluation and develop an adaptive framework to assist managers in monitoring, assessing and responding to effects from environmental change on ecosystem function (e.g. productivity) within KJCAP over time.

Integrated Strategy E1.1.1: Building off of existing methods, conduct an ecosystem resilience evaluation which will aid in management decisions and may include climate vulnerability assessments, predictive analyses of threats, identification of management priorities and scenario planning for KJCAP resources that include risk, exposure, sensitivity, adaptive capacity, and synergistic effects among stressors.
Integrated Strategy E1.1.2: Based off of ecosystem resilience evaluations, work with partners to identify and prioritize manageable emerging threats from environmental change and associated indicators to detect changes in ecosystem health.
Integrated Strategy E1.1.3: Collaborate with local and federal agencies and NGOs to develop a standardized monitoring framework with clear protocols that incorporates resources and infrastructure to support long-term monitoring, forecasting and early detection of stressors that affect ecosystem function over time.
Integrated Strategy E1.1.4: Develop adaptive management strategies designed to respond to environmental change impacts identified through the ecosystem resilience evaluation and assessed through the standardized monitoring framework.

Performance Measures E1.1

1. Summarize findings from ecosystem resilience evaluations in an annual report and share with partners across disciplines as progress occurs.
2. Design and implement a standardized monitoring framework, with the help of partners, to monitor prioritized threats and detect early changes in ecosystem condition.

Goal E2: Evaluate and implement adaptive management measures that promote KJCAP ecosystem recovery and resilience.

Objective E2.1: Evaluate and implement the use of ecosystem restoration and propagation techniques for KJCAP benthic species.

Integrated Strategy E2.1.1: Continue to support research on larval connectivity for reef species and identify source locations as candidates for spawning hubs.
Integrated Strategy E2.1.2: Support the maintenance and expansion of coral spawning hubs that would source larva throughout KJCAP and adjacent managed areas.
Integrated Strategy E2.1.3: Collaborate with organizations and universities to designate offshore nurseries and support the implementation of standardized protocols by agencies to optimize outplanting and monitoring and maximize survival and reproduction.
Integrated Strategy E2.1.4: Support the implementation of the KJCAP Tier 2 Restoration Plan and development of Tier 3 restoration plans that support Florida's Coral Reef Restoration Program priorities.
Integrated Strategy E2.1.5: Research/test novel interventions to promote resilience in KJCAP benthic resources (e.g. National Academy of Sciences, Engineering and Medicine study report: A Research Review of Interventions to Increase the Persistence and Resilience of Coral Reefs [2019]) and support implementation where appropriate.

Integrated Strategy E2.1.6: Continue to work with DEP programs to support local organizations by establishing, expanding, and optimizing land-based and in-water coral nurseries to scale-up propagation (both corals and herbivores) and restoration within KJCAP.
Integrated Strategy E2.1.7: Using resources such as the KJCAP Tier 2 Restoration Plan as guidance, establish coral reef restoration sites which are areas for the recovery, restoration, and recruitment of corals and fish, and monitor for effectiveness **(S-8)**.
Integrated Strategy E2.1.8: Work with partners to support research on ecosystem restoration including KJCAP benthic species such as sponges, seagrass and octocorals.
Integrated Strategy E2.1.9: Evaluate the efficacy of seagrass restoration techniques implemented in adjacent ecosystems and develop evidence-based strategies to restore seagrass habitat within KJCAP.
Integrated Strategy E2.1.10: Regularly review existing restoration efforts and incorporate new and emerging information and technology to ensure current efforts in KJCAP are effectively meeting management needs, while also coordinating restoration planning and implementation with managers of adjacent ecosystems to promote ecological connectivity.

Performance Measures E2.1

1. Meet with partners and practitioners as projects are proposed to ensure alignment of ongoing and potential restoration activities with the KJCAP Restoration strategies.
2. RR Coordinator attends two regional restoration meetings annually to support restoration efforts in KJCAP.
3. Seagrass restoration strategy is designed and implemented.

Objective E2.2: Provide guidance and consultation on science-based criteria for local adaptation measures (e.g., engineered structures, nature-based solutions and restoration) to promote resilience and recovery of KJCAP resources.

Integrated Strategy E2.2.1: Encourage the development and experimentation of innovative, engineered hybrid reef designs both nearshore and offshore, using approved materials that improve wave attenuation and increase the likelihood of coral recruitment **(FDOU 52)**.
Integrated Strategy E2.2.2: Support state and local efforts to encourage the use of green infrastructure solutions to increased sea levels, tidal flooding, and storm surge, such as using living shorelines and coastal zone green spaces to avoid further development of, and retrofit existing, armored shorelines and impervious surfaces when possible.
Integrated Strategy E2.2.3: Evaluate the efficacy of management intervention techniques implemented in adjacent ecosystems (e.g., FKNMS) to determine if they are needed to minimize the effects of disturbances at active restoration sites.
Integrated Strategy E2.2.4: Develop a dynamic, data-informed strategy to improve artificial reef stability models by re-evaluating existing frameworks, expanding input parameters, and validating performance through post-storm ground-truthing.

Performance Measures E2.2

1. Attend and document two meetings annually with local, state, and federal agencies to discuss applicability and feasibility of innovative engineered hybrid reef designs and green infrastructure solutions within KJCAP.
2. Review of regional management intervention techniques and their success rates is summarized in an annual report.
3. Updated stability models are shared with county and other pertinent partners.

Objective E2.3: Identify and implement measures to reduce the impact of invasive or problematic species on native KJCAP ecosystems, preserving biodiversity and ecosystem resilience

Integrated Strategy E2.3.1: Investigate the cause and effects of environmental and anthropogenic factors that promote and lead to an increase in the abundance of invasive or problematic species *(*e.g. *Caulerpa brachypus* and *Lyngbya spp*.) and incorporate results into mitigation strategies (e.g. water quality improvement plans).
Integrated Strategy E2.3.2: Collaborate with FWC and other agencies to prevent and reduce invasive marine species present in KJCAP, such as removal of invasive lionfish (**S-67**).
Integrated Strategy E2.3.3: Continue to collaborate with agency partners (e.g., USGS, NOAA and FWC) to rapidly detect potential novel invasive species and develop plans to prevent and/or rapidly respond to novel invasive species that threaten the health of KJCAP benthic communities.
Integrated Strategy E2.3.4: Evaluate monitoring data to understand how increasing temperatures and ocean acidification impact the presence of invasive or problematic species within KJCAP.

Performance Measures E2.3

1. Maintain engagement in FCRRP and USCRTF Working Groups, including supporting research on what environmental factors promote the proliferation of invasive species.
2. Document promotion of SEAFAN at outreach events as a mechanism for reporting invasive species.
3. Promote FWC Lionfish Derbies via FOFR and SEFCRI team to the public.
4. Data assessments are summarized in an annual report and shared with SEFCRI and pertinent partners.

Goal E3: Build programmatic resilience by ensuring the long-term fiscal viability of KJCAP management.

Objective E3.1: Develop and implement a sustainable finance plan to support KJCAP conservation efforts and maintain operational capacity **(N-123)**.

Integrated Strategy E3.1.1: Continue to build programmatic resilience by applying for federal and state funding to support KJCAP operations and projects.

Integrated Strategy E3.1.2: Identify and apply for external funding strategies and opportunities, including potential collaborations with Friends of Our Florida Reefs and other funding sources supported by non-governmental organizations and relevant stakeholders, as appropriate.
Integrated Strategy E3.1.3: Support Friends of Our Florida Reefs in initiating additional fundraising strategies, such as the creation of a “KJCAP” Florida license plate or the creation of a voluntary donation program for KJCAP resource users via licensed dive boats or fishing boats/charters. Donations would support habitat conservation programs or projects **(S-75)**.
Integrated Strategy E3.1.4: Work to restructure KJCAP to bring more programs and projects in-house instead of contracting work out.
Integrated Strategy E3.1.5: Continue to strengthen relationships with county programs and municipalities to convey the importance of KJCAP and to collaborate on joint efforts when appropriate.

Performance Measures E3.1

1. In partnership with FOFR, at least one new fundraising strategy is identified and implemented.
2. CRCP continues to identify and apply to grants as appropriate to maintain and/or expand capacity.

Photo 6: Dive flag with CRCP scientists performing work below in KJCAP.

Chapter 5 / Administrative Plans

5.1 / Staffing

Successful implementation of Kristin Jacobs Coral Aquatic Preserve projects/initiatives and the goals outlined in this management plan are dependent upon adequate staffing, facilities, and funding. Community support and the cooperation of partnering agencies, non-governmental organizations, and other groups are also critical. Staff leverage grant funding and state dollars to advance KJCAP's mission, along with support from federal, state and local partners, and non-governmental organizations, including other Offices and Divisions within the Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, National Oceanic and Atmospheric Administration, Florida Sea Grant, universities, and KJCAP's four adjacent Southeast Florida counties (Miami-Dade, Broward, Palm Beach, and Martin).

Regional Office

Each of the state's 43 aquatic preserves is supervised by one of the Office of Resilience and Coastal Protection's (ORCP) four regional headquarters that are separated geographically into Northwest, Northeast, Southwest, and Southeast. The Southeast Regional Program

Administrator supervises three field offices (West Palm Beach, Miami and Marathon) that house staff representing the Biscayne Bay Aquatic Preserve (BBAP), Florida Keys National Marine Sanctuary and Florida Keys Aquatic Preserves (FKAP), in addition to KJCAP and CFAP.

- *Southeast Regional Administrator* - The administrator oversees the management and maintenance of KJCAP facilities and staff based in Marathon, Miami, and West Palm Beach, including coral reef and seagrass resource management, monitoring, enforcement, research, threat reduction, restoration, public education and outreach programs and activities, partnership building, permit review and compliance, policy development, and administrative responsibilities including supervision of staff in Southeast Florida. Within KJCAP, the Administrator directly supervises the Office Manager and the Manager. To improve the holistic management of Florida's Coral Reef, the administrator encourages consistency, collaboration and capacity building across the region's programs. The Administrator also oversees the BBAP Manager and the FKNMS Liaison and FKAP Manager and their associated programs and responsibilities (e.g., natural resource management, monitoring, enforcement, research, threat reduction, restoration, public education and outreach programs, partnership building, permit review and compliance, policy development and administrative responsibilities including supervision of staff). The Administrator oversees direction of DEP's responsibilities under the Memorandum of Understanding (MOU) with the FKNMS. The primary reason for this involvement and oversight is to increase the coordination and communication between Florida's coral and aquatic preserve programs, resulting in direct benefits to CRCP and Southeast Florida Coral Reef Initiative (SEFCRI). Also within the Southeast Region, the Administrator oversees the Coral Protection and Restoration Administrator and program. This position directly supervises four Full Time Equivalent (FTE) positions (State-funded FTE).

Local Offices

The KJCAP and BBAP headquarters are located at the Biscayne Bay Environmental Center (BBEC) in Miami. However, some KJCAP staff work out of a satellite office in West Palm Beach in the South Florida Water Management District facility. KJCAP personnel include the following managers, supervisors, and staff who perform resource management, local action strategy (LAS) project development, as well as administrative and facilities-related tasks:

- *Operations Manager* (FTE) - The Operations Manager oversees daily KJCAP, BBAP and FKAP business operations and provides administrative tasks and guidance. The Operations Manager's key responsibilities include overseeing personnel forms and procedures; preparing, processing and approving purchase requisitions and reviewing procurement by the Administrative Assistant; obtaining competitive bids from authorized vendors for goods and services; budget preparation and tracking; preparing, reviewing, and tracking invoices; timesheets; reviewing and processing travel authorizations; contract and grant review and routing; and supervising one FTE position, the Facilities Coordinator, and one Other Personal Services (OPS) position, the Administrative Program Assistant. The Operations Manager also provides support for community-based

and field-based Local Action Strategy (LAS) projects, staff health and safety training, and is the Miami Unit Diving Safety Officer for the DEP Diving Program.

- *Administrative Program Assistant* (OPS) - This position provides administrative support to all staff, but especially the Operations Manager, assisting with accounts payable and procurement as well as other tasks, such as providing field support.

- *Facilities Coordinator* (FTE) - Administers the maintenance services for all vehicles, vessels, grounds and facilities at the Biscayne Bay Environmental Center or provides these services personally, as appropriate. This position also provides boating training, field support, and representation at community events, as needed.

- *KJCAP Manager* (FTE) - Plans, directs, and coordinates the implementation of KJCAP, CRCP and SEFCRI LAS. The manager serves as SEFCRI Team Chair and supervises the CRCP Assistant Manager, as well as the Land-based Sources of Pollution (LBSP), Fishing, Diving, and Other Uses (FDOU), Reef Injury Prevention and Response (RIPR), Maritime Industry and Coastal Construction Impacts (MICCI), Awareness and Appreciation (AA), and Reef Resilience (RR) Coordinators.

- *KJCAP Assistant Manager* (FTE) - Assists the KJCAP Manager in planning, directing, and coordinating the implementation of KJCAP, CRCP and SEFCRI. This position is typically held in concert with one of the other FTE Coordinator positions described below. This position also typically oversees one OPS position, the Associate Coordinator.

- *Land-Based Sources of Pollution Coordinator* (FTE) - Provides technical assistance and leads the coordination and implementation of LBSP related projects identified in the KJCAP management plan, SEFCRI LAS and related CRCP resource management activities including coordinating the SEFCRI Technical Advisory Committee (TAC).

- *Awareness and Appreciation Coordinator* (FTE) - Provides technical assistance and leads the coordination and implementation of AA related projects identified in the KJCAP management plan, SEFCRI LAS and related CRCP resource management activities including coordinating KJCAP communications efforts and education and outreach activities.

- *Maritime Industry and Coastal Construction Impacts Coordinator* (FTE) - Provides technical assistance and leads the coordination and implementation of MICCI related projects identified in the KJCAP management plan, SEFCRI LAS and related CRCP resource management activities including coordinating with internal and external regulatory staff and reviewing permit applications for work proposed in KJCAP.

- *Fishing, Diving, and Other Uses Coordinator* (FTE) - Provides technical assistance and leads the coordination and implementation of FDOU related projects identified in the

KJCAP management plan, SEFCRI LAS and related CRCP resource management activities including assisting the KJCAP Manager in the development, implementation and tracking of the KJCAP management plan.

- *Reef Resilience Coordinator* (FTE) - Provides technical assistance and leads the coordination and implementation of RR-related projects identified in the KJCAP management plan, SEFCRI LAS and related CRCP resource management activities. Coordinates the development and implementation of activities to identify and respond to marine biological incidents, and better understand the resilience of reef resources in Southeast Florida including assisting the KJCAP Manager in the coordination and implementation of KJCAP Restoration Strategy and associated projects.

- *Reef Injury Prevention and Response Coordinator* (FTE) - Provides technical assistance and leads the coordination and implementation of RIPR-related projects identified in the KJCAP management plan, SEFCRI LAS and related CRCP resource management activities. *C*oordinates development of management options and activities to respond to and prevent damage to reef resources from anchoring and groundings, including implementation of the recommendations for reef injury response preparation and coordination priorities identified in the SEFCRI "Rapid Response and Restoration for Coral Reef Injuries in Southeast Florida" document. Additionally, leads the biological monitoring of the recently completed Grounding Restoration Project, and leads the development and implementation of the Coral Reef Protection Act (CRPA) educational campaign. Oversees two OPS positions, the RIPR Technician and RIPR Specialist.

- *Reef Injury Prevention and Response Technician* (OPS) - Supports the Assistant Manager/RIPR Coordinator in the development of management options and activities to respond to and prevent damage to reef resources from anchoring and groundings, co-leads the biological monitoring of the recently completed Grounding Restoration Project, and assists with CRPA enforcement cases.

- *Reef Injury Prevention and Response Specialist* (OPS) - Supports the Assistant Manager/RIPR Coordinator and RIPR Technician in the development of management options and activities to respond to and prevent damage to reef resources from anchoring and groundings, and leads the development of the CRPA educational campaign, focusing on the northern portion of Florida's Coral Reef.

- *Associate Coordinator* (OPS) - This position is responsible for providing administrative and research support to the KJCAP coordinators, with an emphasis on community science and marine debris programs (e.g., SEAFAN, BleachWatch and the Marine Debris Program) and assisting with public education and outreach efforts.

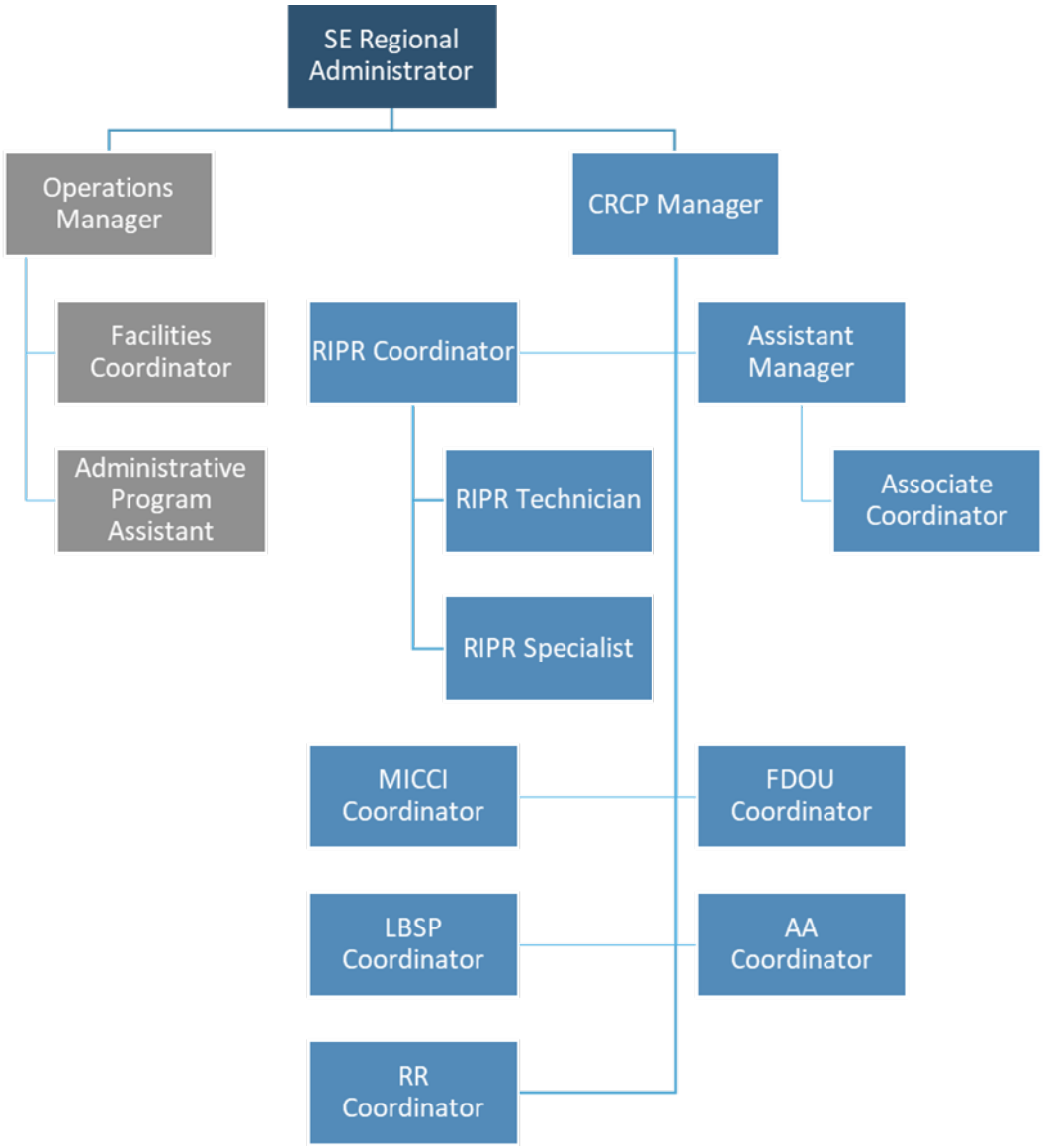


Figure 5: CRCP and supporting staff structure.

5.2 / Staffing Needs

Many of the strategies identified in this plan will be implemented using existing staff and funding. However, several objectives, and the strategies necessary to accomplish them, cannot be completed during the life of this plan without additional resources. The plan's recommended actions, time frames, and cost estimates will guide the DEP Office of Resilience and Coastal Protection's (ORCP) planning and budgeting activities over the period of this plan. These recommendations are based on the information that existed at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that ORCP can adjust to changes in the availability of funds, unexpected events such as hurricanes, and changes in statewide issues, priorities and policies. Also, maintenance of staff qualifications for required job duties should be considered for KJCAP including capacity to continue to qualify

KJCAP staff as DEP SCUBA divers, First Aid and Emergency Oxygen certifications, and acquiring, maintaining, or replacing SCUBA and field equipment, as needed.

Statewide priorities for management and restoration of submerged and coastal resources are evaluated each year as part of the process for planning ORCP's annual budget. When preparing ORCP's budget, it considers the needs and priorities of the entire aquatic preserve program, other programs within ORCP, and the projected availability of funding from all sources during the upcoming fiscal year. ORCP pursues supplemental sources of funds and staff resources whenever possible, including grants, volunteers, and partnerships with other entities. ORCP's ability to accomplish the specific actions identified in the plan will be determined largely by the availability of resources, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Appendix D may need to be adjusted during the ten-year management planning cycle.

Photo 7: Two French angelfish in KJCAP. (photo: Joe Marino

Chapter 6 / Facilities Plans

6.1 / Buildings & Infrastructure

Kristin Jacobs Coral Aquatic Preserve main office is housed within the Biscayne Bay Environmental Center (BBEC) at Pelican Harbor Island in the City of Miami, and a satellite office is leased in West Palm Beach at a building owned by South Florida Water Management District.

Pelican Harbor Island was created from dredged material associated with Atlantic Intracoastal Waterway construction in 1928. Throughout the decades, dredged material was added on both the north and south side of the causeway, creating the island, owned by Miami-Dade County (MDC), with boat slips to the north and boat ramps and a parking area to the south; riprap has been placed to allow for shoreline stabilization. The 0.73 acre of land on which the BBEC is located was submerged land deeded to MDC by the Board of Trustees of the Internal Improvement Fund of the State of Florida in 1934. DEP occupies the land through a 99-year lease agreement with MDC signed in 1976, and subsequently, the state constructed the approximately 3,500 sq. foot BBEC office building.

The property also includes a sub-leased parcel with a 300-foot-tall tower and 800 MHz trunked radio system used by state agencies for law enforcement communications, as well as a building containing a propane-fueled generator to support the tower operations in case of power failure. These facilities are managed by contractors hired by the Florida Department of Management Services.

The State also owns a 700 sq. foot wood-framed storage garage. All property maintenance tools and equipment, some field equipment, hurricane shutters for BBEC, and kayaks are stored in this building. The 220 sq. foot dive shed is used for storing SCUBA diving gear and some field equipment.

These outbuildings are enclosed within an eight-foot, protective fence with three locked access gates. Inside is a cement and asphalt lot where the vessels and trailers are stored when they are not in use or secured at the dock. The state also owns an L-shaped aluminum floating dock with a ramp securing it to the land. A mangrove shoreline protects the eastern 200 feet of the property, of which 80 feet was restored with riprap in 2015 to prevent further erosion. The parking lot was re-paved and striped in 2019 in compliance with the Americans with Disabilities Act (ADA). Other infrastructure improvements include additional and upgraded parking lot and entrance lighting that were added in 2018 to comply with MDC requirements for certification of 40-year-old buildings.

The financial responsibility of running BBEC is shared between BBAP and KJCAP program budgets, including the cost of a new roof in 2014 and a new air conditioning unit in 2020. The BBEC has been subdivided into eleven office spaces and three storage closets which are shared between BBAP and CRCP staff, and a water quality lab which includes a bench table and refrigerator exclusively for BBAP that has recently been carved out of some of the storage. BBEC indoor space includes a break room, library, restrooms, and educational support closets. ADA upgrades were made, including the renovation of one unisex restroom in 2017, and replacement of the entrance ramp with an appropriate slope and handrails in 2020. BBEC equipment includes a leased copier/fax machine/printer, plotter (drivers are no longer supported), tv for conducting outreach, giving presentations, and conducting working meetings, and WIFI available to DEP staff.

The available space has been maximized and no practical further expansion is possible to the existing building. Although Florida Marine Patrol used an office trailer on the north side of the leased property for overflow when they occupied the BBEC prior to BBAP and CRCP, Miami-Dade County has suggested that it would not approve a replacement trailer as an expansion option now. The option of adding a second floor onto BBEC was explored, but it was determined to be cost-prohibitive as the architectural plan rough quote was upwards of $1.3M in 2012.

Following a theft on BBEC property in 2010, a security system and video recording devices were installed. In case of an emergency, the buildings, vehicles, and vessels are secured according to the BBEC Emergency Action Plan (EAP) which is updated annually by the Facilities Coordinator. The EAP includes the hurricane plan for the office and defines necessary

preparations for other potential disasters. A copy of this plan is stored in the Facilities Coordinator's office and emailed to each staff member as it is updated. An annual safety review meeting is scheduled in advance of the hurricane season for all staff to attend.

A desire to have representation in the northern part of the KJCAP, and a lack of office space at the BBEC as CRCP capacity expanded, spurred the establishment of a satellite office in West Palm Beach. KJCAP partnered with DEP's Southeast Regulatory District (SED) to lease space in the South Florida Water Management District (SFWMD) facility to house staff, as needed. Amenities include dive lockers, access to conference rooms, break rooms, desks, phone/internet, parking and security, etc. Proximity to SED and SFWMD staff make this an ideal location for coordination on permitting and related projects.

6.2 / Vehicles and Vessels

The vehicles and vessels identified in the strategic plan as necessary to accomplish program goals have been acquired, but replacements are needed as this equipment ages. Use of KJCAP and BBAP programs' vessels and vehicles are shared, depending on staff and project needs. As part of the programs' strategic planning cycle, all vehicles and vessels undergo a monthly inspection, cleaning, and scheduled maintenance by the Facilities Coordinator. The average annual cost for fuel and maintenance is approximately $3,500 for the KJCAP vessel and $4,500 for KJCAP vehicles. These numbers are expected to increase with the changing cost of fuel and as the vessel and vehicles age. Each staff member who has access to vehicles and vessels is granted a personal identification number to use in tandem with the Florida State Fuel Card Program for security and to properly allocate the cost to the program.

6.2.1 Vehicles

- **2020 Chevrolet Traverse Sport Utility Vehicle with Towing Package** (located in West Palm Beach): Purchased new in 2020 through a Legislative Budget Request for state funding, the vehicle battery has already required replacement. Staff typically utilize this vehicle for travel to off-site meetings, trainings, field work, and community outreach events. When not in use by KJCAP staff, it is available for the use of DEP's Restoration Planning and Project Management Section that provided the surplus vehicle in exchange for making the purchase possible.
- **2017 GMC Terrain Sport Utility Vehicle with Towing Package** (located in Miami): Purchased new in 2017 through a Legislative Budget Request for state funding, staff typically use this vehicle for travel to off-site meetings, trainings, field work, and community outreach events. It replaced the 2005 Ford Escape which was transferred to the Florida Keys for the use of Southeast region staff there, then to Central Office staff based in West Palm Beach.
- **2007 Dodge 3/4-ton 4WD Pick-up Truck with Towing Package** (located in Miami): Purchased new in 2007 with federal grant funding from the National Oceanic and Atmospheric Administration (NOAA), this quad-cab vehicle is typically used for towing the

vessels or transporting large items (SCUBA tanks, boxes, furniture, kayaks, etc.) and occasionally for staff travel to off-site meetings, trainings, field work, and community outreach events.

6.2.2 Vessels

- **2007 26-foot Twin Vee Catamaran with one 2007 and one 2017 Yamaha 150 HP Four-stroke Outboard Engine and Trailer** (located in Miami): Purchased new in 2007 with federal grant funding from NOAA, this vessel is legally rated for a maximum of 12 persons, but when outfitted with additional gear needed for SCUBA diving and research, it can accommodate five to six persons safely. Despite regular maintenance, major mechanical repairs or replacements in the last 13 years have included: replacement engine, replacement lower units, and repeated hydraulic system issues. The Twin Vee is typically used to SCUBA or snorkel for coral monitoring, injury investigation, water quality sample collection, training, and occasionally VIP familiarization tours. All staff are expected to train for qualification for vessel operation, as defined in position descriptions.

6.2.3 Additional vehicles and vessels available for the use of KJCAP, as needed:

The following vehicles and vessels are maintained by BBAP or the Clean Boating Program.

Vehicles

- 2023 Ford Explorer with Towing Capacity
- 2019 Ford Fusion Passenger Vehicle

Vessels

- 3 Single & 3 Double Person Ocean Kayaks
- 2005 20-foot Pathfinder vessel
- 2023 27-foot Defense Marine Catamaran vessel

6.3 / Future facilities, construction and maintenance needs

Future facilities, construction and maintenance needs include, but are not limited to:

- Obtaining office space necessary to house additional staff, possibly in conjunction with laboratory space for BBAP.
- Replacing office furniture, flooring, and equipment (e.g., plotter), as necessary.
- Acquiring a larger vessel in Miami, replacing as needed.

- Acquiring a vessel in West Palm Beach to conduct field work in the northern part of the KJCAP.
- Replacing the 2007 Dodge truck when necessary (based on age or odometer), for safely towing vessels.
- Upgrading technological tools (such as digital whiteboard, tech platform customized to our outreach) as the technology becomes available.

List of Appendices

Appendix A / Legal Documents

A.1 / Aquatic Preserve Resolution

WHEREAS, the State of Florida, by virtue of its sovereignty, is the owner of the beds of all navigable waters, salt and fresh, lying within its territory, with certain minor exceptions, and is also the owner of certain other lands derived from various sources; and

WHEREAS, title to these sovereignty and certain other lands has been vested by the Florida Legislature in the State of Florida Board of Trustees of the Internal Improvement Trust Fund, to be held, protected and managed for the long range benefit of the people of Florida; and

WHEREAS, the State of Florida Board of Trustees of the Internal Improvement Trust Fund, as a part of its overall management program for Florida's state-owned lands, does desire to insure the perpetual protection, preservation and public enjoyment of certain specific areas of exceptional quality and value by setting aside forever these certain areas as aquatic preserves or sanctuaries; and

WHEREAS, the ad hoc Florida Inter-Agency Advisory Committee on Submerged Land Management has selected through careful study and deliberation a number of specific areas of state—owned land having exceptional biological, aesthetic and scientific value, and has recommended to the State of Florida Board of Trustees of the Internal Improvement Trust Fund that these selected areas be officially recognized and established as the initial elements of a statewide system of aquatic preserves for Florida;

NOW, THEREFORE, BE IT RESOLVED by the State of Florida Board of Trustees of the Internal Improvement Trust Fund:

THAT it does hereby establish a statewide system of aquatic preserves as a means of protecting and preserving in perpetuity certain specially selected areas of state-owned land: and

THAT specifically described, individual areas of state-owned land may from time to time be established as aquatic preserves and included in the statewide system of aquatic preserves by separate resolution of the State of Florida Board of Trustees of the Internal Improvement Trust Fund; and

THAT the statewide system of aquatic preserves and all individual aquatic preserves established thereunder shall be administered and managed, either by the said State of Florida Board of Trustees of the Internal Improvement Trust Fund or its designee as may be specifically provided for in the establishing resolution for each individual aquatic preserve, in accordance with the following management policies and criteria:

(1) An aquatic preserve is intended to set aside an exceptional area of state-owned land and its associated waters for preservation essentially in their natural or existing condition by reasonable regulation of all human activity which might have an effect on the area.

(2) An aquatic preserve shall include only lands or water bottoms owned by the State of Florida, and such private lands or water bottoms as may be specifically authorized for inclusion by appropriate instrument from the owner. Any included lands or water bottoms to which a private ownership claim might subsequently be proved shall upon adjudication of private ownership be automatically excluded from the preserve, although such exclusion shall not preclude the State from attempting to negotiate an arrangement with the owner by which such lands or water bottoms might be again included within the preserve.

(3) No alteration of physical conditions within an aquatic preserve shall be permitted except: (a) minimum dredging and spoiling for authorized public navigation projects, or (b) other approved activity designed to enhance the quality or utility of the preserve itself. It is inherent in the concept of the aquatic preserve that, other than as contemplated above, there be: no dredging and filling to create land, no drilling of oil wells or excavation for shell or minerals, and no erection of structures on stilts or otherwise unless associated with authorized activity, within the confines of a preserve - to the extent these activities can be lawfully prevented.

(4) Specifically, there shall be no bulkhead lines set within an aquatic preserve. When the boundary of a 126 preserve is intended to be the line of mean high water along a particular shoreline, any bulkhead line subsequently set for that shoreline will also be at the line of mean high water.

(5) All human activity within an aquatic preserve shall be subject to reasonable rules and regulations promulgated and enforced by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and/or any other specifically designated managing agency Such rules and regulations shall not interfere unduly with lawful and traditional public uses of the area, such as fishing (both sport and commercial), hunting, boating, swimming and the like.

(6) Neither the establishment nor the management of an aquatic preserve shall infringe upon the lawful and traditional riparian rights o private property owners adjacent to a preserve. In furtherance of these rights, reasonable improvement for ingress and egress, mosquito control, shore protection and similar purposes may be permitted by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and other jurisdictional agencies, after review and formal concurrence by any specifically designated managing agency for the preserve in question.

(7) Other uses of an aquatic preserve, or human activity within a preserve, although not originally contemplated, may be permitted by the State of Florida Board of Trustees of the Internal improvement Trust Fund and other jurisdictional agencies, but only after a formal finding of compatibility made by the said Trustees on the advice of any specifically designated managing agency for the preserve in question.

IN TESTIMONY WHEREOF, the Trustees for and on behalf of the State of Florida Board of Trustees of the Internal Improvement Trust Fund have hereunto subscribed their names and have caused the official seal of said State of Florida Board of Trustees of the Internal Improvement Trust Fund to be hereunto affixed, in the City of Tallahassee, Florida, on this the 24th day of November A. D. 1969.

CLAUDE R. KIRK, JR, Governor
EARL FAIRCLOTH, Attorney General
BROWARD WILLIAMS, Treasurer
DOYLE CONNER, Comm. of Agriculture

TOM ADAMS, Secretary of State
FRED O. DICKINSON, JR., Comptroller
FLOYD T. CHRISTIAN, Comm. of Education

As and Constituting the State of Florida Board of Trustees of the Internal Improvement Trust Fund

A.2 / Florida Statutes

All the statutes can be found according to number at:

http://www.leg.state.fl.us/Statutes

- Florida Statutes, Chapter 253: State Lands
- Florida Statutes, Chapter 258: State Parks and Preserves 6. Part II (Aquatic Preserves)
- Florida Statutes, Chapter 267: Historical Resources
- Florida Statutes, Chapter 370: Saltwater Fisheries
- Florida Statutes, Chapter 372: Wildlife
- Florida Statutes, Chapter 403: Environmental Control
  (Statute authorizing the Florida Department of Environmental Protection (DEP) to create Outstanding Florida Waters is at 403.061(27))
- Florida Statutes, Chapter 597: Aquaculture

A.3 / Florida Administrative Code (F.A.C.)

All rules can be found according to number at:

https://www.flrules.org/Default.asp

- Florida Administrative Code, Chapter 18-20: Florida Aquatic Preserves https://www.flrules.org/gateway/ChapterHome.asp?Chapter=18-20
- Florida Administrative Code, Chapter 18-21: Sovereignty Submerged Lands Management https://www.flrules.org/gateway/ChapterHome.asp?Chapter=18-21
- Florida Administrative Code, Chapter 62-302: Surface Water Quality Standards (Rule designating Outstanding Florida Waters is at 62-302.700) https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-302

Appendix B / Resource Data

B.1 / Glossary of Terms

access – includes both "first-hand" styles of access "through the physical "method[s] or possibility of getting near to a place..." and the "second-hand" styles of access including "the right or opportunity to use or look at something" (Cambridge Dictionary, 2019).
algal bloom – an explosive increase in the density of phytoplankton (microscopic, single-celled plants).
alternative – a reasonable way to fix the identified problem or satisfy the stated need, a choice between things.
ambient – of, or related to surrounding environmental conditions. (Calow, 2009)
Anastasia formation – underlies Miami in places, outcrops and forms the Atlantic coastal ridge from Palm Beach County north. Ranges in composition from shelly sandstone to coquina limestone.
aquaculture – the cultivation of aquatic organisms. (Lincoln et al., 2003)
aquatic – living in or near water; used of plants adapted for a partially or completely submerged life.
aquifer – permeable underground rock strata that holds water.
archaeology – the scientific study of ancient cultures through the examination of their material remains such as buildings, graves, tools, and other artifacts. (Encarta)
archaic – belonging or relating to a much earlier period. (Encarta)
Atlantic Intracoastal Waterway (AIWW) – a system of inland and coastal waterways along the Atlantic coast of the U.S. from Cape Cod to Florida Bay.
aquatic preserve (or preserve) – any and all of those areas which are exceptional areas of sovereignty lands and the associated water body so designated in Part II of Chapter 258, F.S., including all sovereignty lands, title to which is vested in the Board, and such other lands as the Board may acquire or approve for inclusion by the Legislature. These areas also include the water column over such lands, which have been set aside to be maintained in an essentially natural or existing condition of indigenous flora and fauna and their supporting habitat and the natural scenic qualities and amenities thereof. (Section 18-20.003, F.A.C.)
awareness - refers to the process of informing and educateing people about a topic or issue with the intention of influencing their attitudes, behaviors and beliefs towards the achievement of a defined purpose or goal. (Cardinal et al., 2015)
baseline data – data describing some original or 'normal' state of the system. (Calow, 2009)

basin/sub-basin – the entire tract of land drained by a river and its tributaries; smaller portion of a larger tract of land drained by a river and its tributaries.
benthic – of, related to, or occurring at the bottom of a body of water.
benthic community – organisms that live on the sea floor.
benthos – organisms that dwell on the unconsolidated bottoms of marine and freshwater systems (e.g., worms and zooplankton).
biocide – a genetic term for anything that kills (or inhibits) organisms. (Calow, 2009)
biodiversity – the existence of a wide variety of species of plants, animals and microorganisms in a natural community or habitat or of communities within a particular environment; genetic variation within a species.
biodiversity hotpot- Area with high concentration of endemic species and with high habitat loss; can be applied at any geographical scale and both in terrestrial and marine environments (Marchese, 2015)
biogeography – the science that studies the geographic distribution of organisms; the study of the geographical distributions of organisms, their habitats and the historical and biological factors which produced them.
biota – all the organisms living in a particular region, including plants, animals and microorganisms.
biotic community – biological community or association, ecological community; an assemblage of species living in a prescribed area or physical habitat; a group of interacting species coexisting in a particular habitat.
bivalve – any mollusk, as the oyster, clam, scallop or mussel of the class Bivalvia, having two shells hinged together, a soft body and lamellate gills.
brackish – applied to water that is saline, but less so than sea water. (Oxford Dictionary of Ecology)
breeding habitat – habitat used by migratory birds or other animals during the breeding season.
brood – to incubate eggs.
buffer – to protect a system from change by external factors; anything that reduces an impact.
calcareous – applied to areas containing calcium carbonate. (Allaby, 1998)
climate – average weather conditions in a location over many years.
community – a grouping of populations of different organisms found living together in a particular environment.
community type – a particular assemblage of plants and animals, named for the characteristic plants.
Comprehensive Everglades Restoration Plan (CERP) – a comprehensive plan for the water resources of central and southern Florida authorized in the Water Resources Development Act of 2000. The overarching objectives of this CERP are the restoration, preservation, and protection of the South Florida ecosystem while providing for the other water-related needs of the region.
conservation – the management of natural resources to prevent loss or waste; the planned management of natural resources; the retention of natural balance, diversity and evolutionary change in the environment; preservation.
consolidated substrate – a compacted mass of sediment, typically stratified.

contamination – release of a byproduct of human activity, chemical or physical. (Calow, 1999)
convective – to transfer (heat or a fluid) by convection.
cultural resource – evidence of historic or prehistoric human activity, such as buildings, artifacts, archaeological sites, documents, oral or written history. Cultural resources include historical, archaeological and/or architecturally significant resources.
cyanobacteria – the blue-green bacteria or chloroxybacteria. Both groups obtain their food by photosynthesis in a manner very similar to that of green plants and true algae, producing oxygen in the process. They occur in all aquatic habitats.
database – a mass of data in a computer, arranged for rapid expansion, updating, and retrieval.
data sonde – an automated electronic instrument for measuring and recording water quality parameters.
degradation – breakdown into smaller or simpler parts; reduction of complexity.
derelict – deserted by the owner; abandoned.
detritus – non-living particulate organic material. It includes the bodies of dead organisms colonized by microorganisms that decompose the material. Together with plankton are components of the estuarine food chain.
disease – disorder of function or order in an organism that usually is symptomatic.
dispersal – the movement of organisms away from a location, such as point of origin.
disseminate – to scatter widely or disperse.
disturbance – any process that destroys plant or animal biomass. (Calow, 1999)
diversity – a measure of the number of species and their relative abundance in a community.
drainage basin – the total land area that drains into a body of water.
dredge – an apparatus for scooping up mud, for deepening channels.
dredge spoil – material or soil taken out of an area mechanically and stored in a pile or ridge or graded evenly.
easement – a right that one may have in another's land. (Neufeldt & Sparks, 1990)
ecological integrity – the ability of an ecological system to support and maintain a community of organisms that has species composition, diversity, and functional organization comparable to those of natural habitats within a region. An ecological system or species has integrity or is viable when its dominant ecological characteristics (e.g., elements of composition, structure, function, and ecological processes) occur within their natural ranges of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human disruptions. (Parrish et al., 2003)
ecology – the branch of science that studies the distribution and abundance of organisms and the relationship between organisms and their environment, the study of the inter-relationships between living organisms and their environment.
ecosystem – a community of organisms and their physical environment interacting as an ecological unit. (Lincoln et al., 2003)
ecosystem-based management – a management approach that uses ecological criteria and human uses to identify ecosystem level interactions and prioritize conservation measures, including tradeoffs to protect the ecosystem.
effluent – wastewater that flows into a receiving stream by way of a domestic or industrial point source.
encroachment – influencing strongly; impact.

endangered species – an animal or plant species in danger of extinction throughout all or a significant portion of its range. (USFWS, 2015)
endemic – native to, and restricted to, a particular geographical region. (Lincoln et al., 2003)
environment – the physical, chemical and biological surroundings of an organism at any given time.
environmental change - a long-term change in the average weather patterns that have come to define Earth's local, regional, and global climates marked by observed effects. (https://climate.nasa.gov/resources/global-warming-vs-climate-change/)
epibenthic – living on the surface of (usually) the sea bottom. (Calow, 1999)
epifauna – the animal life inhabiting a sediment surface or water surface.
epiphyte – a plant that usually lives on other plants without damaging them.
equilibrium – a state of balance between opposing forces.
established – introduced from another region and persisting.
estuary – 1) A coastal embayment where there is freshwater input that is influenced by tides. 2) The part of a river that is affected by tides. 3) The region near a river mouth in which the fresh water of the river mixes with the salt water of the sea.
exotic – an introduced nonnative species. (Allaby, 1998)
extinction – the disappearance of a species from a given habitat; dying out, usually global, of a species for extinction throughout all or a significant portion of its range.
fauna – the animal life of a given region, habitat or geological stratum. (Lincoln et al., 2003)
Fish spawning aggregation (FSA)- characterized as a notable increase in fish density at a given location followed by verification of spawning, which typically takes place at a very specific time of year, with aggregations persisting for a period of days to weeks (Ault et al., 2025)
flora – the plant life of a given region, habitat or geological stratum. (Lincoln et al., 2003)
Geographic Information System (GIS) – computer system supporting the collection, storage, manipulation and query of spatially referred data, typically including an interface for displaying geographical maps. (Lincoln et al., 2003)
geology – the structure of a specific region of the earth's crust.
geomorphology – the study of form, nature, and evolution of the earth's surface.
georeferencing – providing geographic location coordinates for data or images.
Glade's culture – an archaeological culture in southernmost Florida that lasted from about 500 BCE until shortly after European contact.
Global Positioning System (GPS) - a navigational system involving satellites and computers that can determine the latitude and longitude of a receiver on Earth by computing the time difference for signals from different satellites to reach the receiver.
gray infrastructure – traditional, human-engineered systems designed to manage stormwater and wastewater by moving it away from built environments, often resulting in untreated water discharging into a local waterbody.
greater everglades ecosystem – an area consisting of the lands and waters within the boundary of South Florida.
green infrastructure – the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters.

green stormwater infrastructure – a specific type of green infrastructure that is designed to mimic nature and focuses on managing stormwater runoff using natural or engineered systems to treat stormwater at its source.
groundwater – water that occurs below the earth's surface, contained in pore spaces within regolith and bedrock. (Allaby, 1998)
habitat – the living place of an organism or community, characterized by its physical or biotic properties.
habitat conservation – the protection of an animal or plant's habitat to ensure that the use of that habitat by the animal or plant.
habitat degradation – the process of transitioning from a higher quality to a lower quality wildlife habitat.
habitat fragmentation – breaking up of a specific habitat into smaller unconnected areas.
hardbottom communities – a classification of coral communities that occur in temperate, subtropical, and tropical regions that lack the coral diversity, density, and reef development of other types of coral communities.
harmful algal bloom (HAB) – a dense concentration (bloom) of a single-celled, plant like marine organism.
hazardous waste – by-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.
headwaters – the place from which the water in the river or stream originates.
herbaceous – characteristic of a nonwoody herb or plant part.
hydrocarbons – a naturally occurring compound that contains carbon and hydrogen. (Allaby, 1998)
hydrodynamic – the branch of science that deals with the dynamics of fluids, especially incompressible fluids, in motion.
hydrologic – dealing with the properties, distribution, and circulation of water.
hydrology – the study of the hydrologic cycle. (Allaby, 1998)
indigenous – native to a particular area; an organism or species occurring naturally in an environment or region.
infauna – the animal life within a sediment; epifauna. (Lincoln et al., 2003)
inlet – a narrow channel that connects the open sea with a lagoon or bay. (Allaby, 1998)
intertidal zone – the shore zone between the highest and lowest tides; littoral.
introduction – a plant or animal moved from one place to another by man.
invasive exotic species – non-native species that have been introduced into an ecosystem and, because of their aggressive growth habits and lack of natural predators, displace native species.
listed species – a species, subspecies, or distinct population segment that has been added to a federal or state list of endangered and threatened wildlife and plants. (USFWS, 2015)
local community – the area or locality in which a group of people resides and shares the same government.
longshore transport – a wave and/or tide-generated movement of shallow-water coastal sediments parallel to the shoreline.

low energy environments – coastlines where wave and tidal forces are typically relatively small.
macroalgae – algae large enough to be detected with the naked eye. Often used as a synonym of seaweeds. (Levinton, 2008)
management alternative – a set of objectives and the strategies needed to accomplish each objective.
mandate - an order or command; the will of constituents expressed to their representative, legislature, etc. (Neufeldt & Sparks, 1990)
marsh – an area of soft, wet, or periodically inundated land, generally treeless and characterized by grasses.
mean high water –the intersection of the tidal plane of mean high water with the shore as determined in accordance with Chapter 177, Part II, F.S., and Chapter 18-11, F.A.C. (Section 18-20.003, F.A.C.)
migratory – referring to a movement in an organism that could be seasonal or permanent for a variety of life history purposes.
mitigation – an action, series of actions, or activity that will offset adverse impacts to sovereign submerged lands. Cash payments shall not be considered mitigation unless payments are specified for use in a previously identified, Department endorsed, environmental or restoration project and the payments initiate a restoration project or supplement an ongoing restoration project (Section 18-20.003, F.A.C.).
modeling – designing and analyzing a mathematical representation of an economic system to study the effect of changes to system variables.
monitoring – measurement of environmental characteristics over an extended period of time.
moorings – 1.) The act or an instance of making fast a vessel, as by a cable or anchor. 2.) A place or structure to which a vessel can be moored. 3.) Equipment, such as anchors or chains, for holding fast a vessel.
native – the plant and animal species, habitats or communities that originated in a particular region or area.
natural condition – the condition of resources that would occur in the absence of human dominance over the landscape. (NPS, 2025)
nearshore – in beach terminology, an indefinite zone extending seaward from the shoreline well beyond the breaker zone. Used in this management plan to differentiate KJCAP habitat specifically being called out as close to the shoreline, e.g., seagrass beds or shallow coral reef ecosystems.
nonpoint sources – diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground waters. They include atmospheric deposition and runoff or leaching from agricultural lands, urban areas, unvegetated lands, onsite sewage treatment and disposal systems, and construction sites.
nutrients – substances that provide enrichment to organisms and allow for growth (enrichment can lead to overgrowth of algae, for example).
octocorals – water-based organisms related to sea anemones and stony corals found in coral reef communities in Florida's Coral Reef.
offshore – referring to being located within the marine habitat east of Florida's eastern shoreline.

parameters – a measurable property whose value is a determinant of the characteristics of a system (i.e., temperature, pressure and density are parameters of the atmosphere).
particulate – 1.) Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions. 2.) Very small solids suspended in water; they can vary in size, shape, density and electrical charge and can be gathered together by coagulation and flocculation.
patch reefs – a small, irregular organic reef with a flat top forming a part of a reef complex.
pelagic – relating to, living, or occurring in the open sea.
peripheral – organisms on or near the edge of their geographical ranges.
permeable – a substance, substrate, membrane or material that absorbs or allows the passage of water.
pesticide – a chemical agent that kills insects and other animal pests.
photosynthesis – the manufacture by plants of carbohydrates and oxygen from carbon dioxide mediated by chlorophyll in the presence of sunlight.
phytoplankton – microscopic, single-celled plants that live in the sea.
pollutant – generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
pollution – the contamination of a natural ecosystem.
population – all individuals of one or more species within a prescribed area. A group of organisms of one species, occupying a defined area and usually isolated to some degree from other similar groups. (Lincoln et al., 2003)
potable water – water that is palatable and safe for human consumption.
public interest – demonstrable environmental, social, and economic benefits which would accrue to the public at large as a result of a proposed action, and which would clearly exceed all demonstrable environmental, social, and economic costs of the proposed action. (Section 10-20.003, F.A.C.)
refugium/refugia – an isolated habitat that retains the environmental conditions that were once widespread.
regime – a regular pattern of occurrence, action, or conditions (as of seasonal rainfall).
reservoir – any natural or artificial holding area used to store, regulate, or control water.
residence time – the duration of persistence of a mass or substance in a medium or place.
resource management – managing human impact on the environment in a way that is sustainable.
resource protection area 1 – areas within the aquatic preserves which have resources of the highest quality and condition for that area. These resources may include, but are not limited to corals; marine grassbeds; mangrove swamps; salt-water marsh; oyster bars; archaeological and historical sites; endangered or threatened species habitat; and, colonial water bird nesting sites. (Section 10-20.003, F.A.C.)
resource protection area 2 – areas within the aquatic preserves which are in transition with either declining resource protection area 1 resources or new pioneering resources within resource protection area 3. (Section 10-20.003, F.A.C.)
resource protection area 3 – areas within the aquatic preserve that are characterized by the absence of any significant natural resource attributes. (Section 10-20.003, F.A.C.)
restoration – management actions that aid in returning an ecosystem to a stable state with a higher level of ecosystem function and structure.

riparian – related to, living, or occurring on the bank of a natural watercourse.
runoff – part of precipitation that is not held in the soil but drains freely away. (Lincoln et al., 2003)
saline – consisting of or containing salt.
salinity - a measure of the total concentration of dissolved salts in seawater. (Lincoln et al., 2003)
saltwater intrusion – the invasion of fresh surface or ground water by salt water. If it comes from the ocean, it may be called seawater intrusion.
sea level rise – increase in the world's ocean level as a result of environmental change, caused by glacier melt and expanding water due to heating.
sediment – material derived from preexisting rock deposited at or near the Earth's surface.
sediment core – a hollow tube is driven into the sediment and taken up to obtain a continuous, undisturbed cross-section of the seafloor.
(www.csc.noaa.gov/benthic/mapping/techniques/sensors/cores.htm)
sedimentation – the action or process of forming or depositing sediments.
sediment – material derived from preexisting rock deposited at or near the Earth's surface.
septic leachate – forms in landfills (even those that are closed or abandoned) when water from rain, sleet, or snow soaks through and becomes polluted after coming into contact with the decaying waste, (www.csc.noaa.gov/magazine/2002/01/ncarolina.html)
sessile – non-motile; permanently attached at the base. (Lincoln et al., 2003)
shapefile – computerized maps and images depicting different natural features created with geographic information.
sheet flow – the flow of water across a given surface area such as a field, parking lot, or road during a rain event without a formal conveyance system (e.g., pipe, swale).
shoal – a shallow place in a river, sea etc.; a sand bar forming a shallow place.
shoreline stabilization - measures to retard erosion to protect upland property.
silt – sedimentary materials composed of fine or intermediate-sized mineral particles.
sovereignty of lands – supreme and independent power or authority in government as possessed or claimed by a state or community.
spatial data - data pertaining to the location and spatial dimensions of geographical entities.
species - a group of organisms, minerals or other entities formally recognized as distinct from other groups, the basic unit of biological classification. (Lincoln et al., 2003)
species abundance – the relative distribution of the number of individuals of each species in a community.
species diversity – either the absolute number of species or a measure of both the number of species and their relative abundance.
spoil material – sediment that results from an excavation, and discarded off site on spoil heaps.
stakeholder – individual or organization that stand to gain or lose from the success or failure of a system or program.
stormwater – diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground waters.
stratification – separating into layers.
submerged – occurring below the surface of the water; completely underwater.

submerged aquatic vegetation (SAV) – aquatic plants, also called hydrophytic plants or hydrophytes, are plants that have adapted to living in or on aquatic environments, seagrasses.
subsidence – a lowering of land elevation often caused by underground processes like groundwater removal.
subsistence fishing – the practice of catching fish primarily for personal or family consumption, rather than for sport or commercial sale or trade.
substrate – the soils and sediments that comprise the ground. (Allaby, 1998)
subtidal – environment which lies below the mean low water level. (Allaby, 2005)
supratidal – the zone on the shore above mean high tide level. (Lincoln et al., 2003)
subtropical – relating to areas or latitudes located next to the tropics.
Surface Water Quality Standards – state-adopted and EPA approved ambient standards for water bodies.
sustainability - of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged. (Johnston et al., 2007)
synoptic – affording or taking a general view of the principal parts of a subject.
take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or attempt to collect or to engage an organism or resources.
temperate – free from extremes; mild; or characteristic of such weather or climate.
threatened species – an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. (USFWS, 2015)
tidal flat – unvegetated sandy or muddy land area that is covered and uncovered by the rise and fall of the tide.
topography – the surface features of a place or region.
trawl or trawl net – a net in the form of an elongated bag with the mouth kept open by various means and fished by being towed or dragged on the bottom. (68B-31.002(2), F.A.C.)
tributaries – a stream or river that flows into a main stem (or parent) river.
trophic – pertaining to nutrition, food or feeding.
turbid – cloudy; opaque with suspended matter. (Lincoln et al., 2003)
unavoidable impacts – negative impacts to the environment or other aspects of a project area that are expected occur despite all reasonable efforts to mitigate or avoid them.
unconsolidated substrate – loose, un-compacted and un-stratified sediment.
underrepresented – provided with insufficient or inadequate representation or inclusion due to various factors like race, ethnicity, disability, or socioeconomic status.
upland – land elevated above other land. (Neufeldt & Sparks, 1990)
vector – any agency responsible for the introduction or dispersal of an animal or plant species.
vegetation – plant life or cover in an area; also used as a general term for plant life.
vegetation type – a plant community with distinguishable characteristics. (Lincoln et al., 2003)
water column – the vertical column of water in a sea or lake extending from the surface to the bottom. (Lincoln et al., 2003)
watershed – an elevated boundary area separating tributaries draining into different river systems; drainage basin. (Lincoln et al., 2003)
wetland – an area of low-lying land, submerged or inundated periodically by fresh or saline water. (Lincoln et al., 2003)

B.2 / References

Adame, M. F., Santini, N. S., Tovilla, C., Vázquez-Lule, A., Castro, L., & Guevara, M. (2015). Carbon stocks and soil sequestration rates of tropical riverine wetlands. *Biogeosciences*, *12*(12), 3805–3818. https://doi.org/10.5194/bg-12-3805-2015

Agardy, T., di Sciara, G. N., & Christie, P. (2011). Mind the gap: Addressing the shortcomings of marine protected areas through large scale marine spatial planning. *Marine Policy*, *35*(2), 226–232. https://doi.org/10.1016/j.marpol.2010.10.006

Ali, J., Wahl, T., Enriquez, A. R., Rashid, M. M., Morim, J., Gall, M., & Emrich, C. T. (2023). The role of compound climate and weather extreme events in creating socio-economic impacts in South Florida. *Weather and Climate Extremes*, *42*. https://doi.org/10.1016/j.wace.2023.100625

Allaby, M. (Ed.). (1998). Oxford dictionary of ecology. (2nd ed.). Oxford, UK: Oxford University Press.

Allaby, M. (Ed.). (2005). Oxford dictionary of ecology. (3rd ed.). Oxford, UK: Oxford University Press.

Allen, M. E., Fleming, C. S., Zito, B. M., Gonyo, S. B., Regan, S. D., & Towle, E. K. (2021). *National Coral Reef Monitoring Program Socioeconomic Monitoring Component: Summary Findings for South Florida, 2019*. NOAA technical memorandum. https://doi.org/10.25923/w6pa-hv50

Altmann, K. H. (2017). Drugs from the oceans: Marine natural products as leads for drug discovery. *Chimia*, *71*(10), 646-646.

Andrews, R. N. (2006). *Managing the environment, managing ourselves: A history of American environmental policy*. Yale University Press. https://books.google.com/books?hl=en&lr=&id=ZqRjI6JcgrMC&oi=fnd&pg=PP2&dq=US+marine+environmental+policy+and+permitting+1970s&ots=Mcvmy5hG3x&sig=cMDyf4nrcj5r6QmSBbu0HkEcdwM#v=onepage&q&f=false

Arthur, K., Paul, V., Paerl, H., O'Neil, J., Joyner, J., & Meickle, T. (2009). Effects of nutrient enrichment of the cyanobacterium Lyngbya sp. On growth, secondary metabolite concentration and feeding by the specialist grazer Stylocheilus striatus. *Marine Ecology Progress Series*, *394*, 101–110. https://doi.org/10.3354/meps08311

Ault, J. S., Abdo, M. E., & McLaughlin, C. (2020). *Biscayne National Park fishery management plan reef fishery regulations and science plan analysis*. National Parks Conservation Association. www.nationalparkstraveler.org/sites/default/files/attachments/bnp_fisheries_analyses-ault_npca_06feb20.pdf

Ault, J.S., and Franklin, E.C. (2011) Fisheries Resource Status and Management Alternatives for the Southeast Florida Region. Report to Florida DEP. Miami Beach, FL. Pp 105.

Babcock, R. C., Shears, N. T., Alcala, A. C., Barrett, N. S., Edgar, G. J., Lafferty, K. D., McClanahan, T. R., & Russ, G. R. (2010). Decadal trends in marine reserves reveal differential rates of change in direct and indirect effects. *Proceedings of the National Academy of Sciences*, *107*(43), 18256–18261.

Banks, K. W., Riegl, B. M., Richards, V. P., Walker, B. K., Helmle, K. P., Jordan, L. K., Phipps, J., Shivji, M. S., Spieler, R. E., & Dodge, R. E. (2008). The reef tract of continental Southeast Florida (Miami-Dade, Broward and Palm Beach counties, USA). In *Coral Reefs of the USA* (175-220). Springer, Dordrecht.

Barnette, Michael. (2017). Potential Impacts of Artificial Reef Development on Sea Turtle Conservation in Florida. NOAA Technical Memorandum NMFS-SER-5, 36 pp. doi: 10.7289/V5/TM-NMFS-SER-5

Bean, E., Jarrett, L., Searcy, J. K., & Szoka, M. (2019). *Low-Impact Development & Green Infrastructure: Pollution Reduction Guidance for Water Quality in Southeast Florida* (Projects 20 & 23, Land-Based Sources of Pollution, p. 177). Southeast Florida Coral Reef Initiative.

Beck, M., Losada, I., Menéndez Fernández, P., Reguero, B., Diaz-Simal, P., & Fernández, F. (2018). The global flood protection savings provided by coral reefs. *Nature Communications*, *9*. https://doi.org/10.1038/s41467-018-04568-z

Behringer, D. C., & Swett, R. A. (2011). *Determining Vessel Use Patterns in the Southeast Florida Region* (Project 33A; Fishing, Diving, and Other Uses, p. 98). Southeast Florida Coral Reef Initiative.

Behringer, D. C., Swett, R. A., & Frazer, T. K. (2011). *Determining Coral Reef Impacts Associated with Boat Anchoring and User Activity in Southeast Florida* (Project 33B; Fishing, Diving, and Other Uses, p. 81). Southeast Florida Coral Reef Initiative.

Benevolenza, M. A., & DeRigne, L. (2019). The impact of climate change and natural disasters on vulnerable populations: A systematic review of literature. *Journal of Human Behavior in the Social Environment, 29*(2), 266-281. https://doi.org/10.1080/10911359.2018.1527739

Birrell, C. L., McCook, L. J., & Willis, B. L. (2005). Effects of algal turfs and sediment on coral settlement. *Marine pollution bulletin*, *51*(1-4), 408-414. https://doi.org/10.1016/j.marpolbul.2004.10.022

Bloetscher, F., & Gokgoz, S. (2001). Comparison of water quality parameters from south Florida wastewater treatment plants versus potential receiving waters. *Florida Water Resources Journal,* 37-39.

Bramson, S. (2007). *Miami: The Magic City*. Arcadia Publishing. https://books.google.com/books?hl=en&lr=&id=8H-RVTjot-

QC&oi=fnd&pg=PA6&dq=Miami:+The+Magic+City&ots=UOqfUyu50s&sig=jBqb-gkWIY-cZND4rchNNrfJ31E#v=onepage&q=Miami%3A%20The%20Magic%20City&f=false

Brevard, C.M. (1919). *A History of Florida*. American Book Company. https://books.google.com/books?hl=en&lr=&id=OEkzAQAAMAAJ&oi=fnd&pg=PA11&dq=A+History+of+Florida+&ots=_uY6ZK_xqY&sig=q-Wr7XlUMpctFJ8fj_pAJPr_hLw#v=onepage&q=A%20History%20of%20Florida&f=false

Broward County (BC). (n.d.). *Broward County's Ambient Water Quality Program*. https://www.broward.org:443/NaturalResources/Lab/AboutUs/Pages/canalwaterquality.aspx

Broward County (BC). (2022). *Artificial Reef Program*. https://www.broward.org/NaturalResources/BeachAndMarine/Pages/ArtificialReefProgram.aspx#History

Broward County Urban Planning Division. (2024). *Broward by the Numbers, English Fluency*. https://www.broward.org/Planning/Demographics/Documents/BBTN_EnglishFluency_No_20240 2ADA_V2.pdf

Broward County Environmental Planning and Community Resilience Division. (n.d.). *Kristin Jacobs Coral Aquatic Preserve*. Broward.org.

Broward County Sea Turtle Conservation Program. (n.d.). *Sea turtles – conservation program*. Broward County Natural Resources Division. https://www.broward.org/NaturalResources/BeachAndMarine/SeaTurtles/Pages/ConservationProgram.aspx

Browder, J. A., & Tschirky, J. J. (2019). *Integrated coastal and marine planning in South Florida: Lessons for regional ecosystem management.* Ocean & Coastal Management, 182, 104945. https://doi.org/10.1016/j.ocecoaman.2019.104945

Bruno, J. F., Bates, A. E., Cacciapaglia, C., Pike, E. P., Amstrup, S. C., van Hooidonk, R., Henson, S. A., & Aronson, R. B. (2018). Climate change threatens the world's marine protected areas. *Nature Climate Change*, *8*(6), 499–503. https://doi.org/10.1038/s41558-018-0149-2

Bruno, J. F., Côté, I. M., & Toth, L. T. (2019). Climate Change, Coral Loss, and the Curious Case of the Parrotfish Paradigm: Why Don't Marine Protected Areas Improve Reef Resilience? *Annual Review of Marine Science*, *11*(1), 307–334. https://doi.org/10.1146/annurev-marine-010318-095300

Calow, P (Ed). (1999). The Blackwell's Concise Encyclopedia of Ecology. Wiley.

Calow, P (Ed). (2009). The Blackwell's Concise Encyclopedia of Ecology. 11th ed. Wiley.

Cambridge English Dictionary. (2019). Cambridge.org. https://dictionary.cambridge.org/dictionary/english/access

Cambridge English Dictionary. (2023, October 25). Cambridge.org. https://dictionary.cambridge.org/dictionary/english/awareness#google_vignette

Campbell, M. L., & Le, C. T. (2025). Varying vulnerabilities: Seagrass species under threat from prolonged ocean warming. *Limnology and Oceanography*.

Cardinal, N., Romano, J., Sweeney, Elle. (2015). SGD Accountability Handbook A Practical Guide for Civil Society.

Carper, N.G. (1976). Slavery Revisited: Peonage in the South. *Phylon (1960-), 37(1),* 85-99. https://doi.org/10.2307/274733

Carr, R. (2012). *Digging Miami*. University Press of Florida.

Carsey, T., Casanova, H., Drayer, C., Featherstone, C., Fischer, C.J., Goodwin, K., Proni, J., Saied, A., Sinigalliano, C., Stamates, S.J., Swart, P., & Zhang, J. (2010). *FACE outfalls survey cruise, October 6-19, 2006.* NOAA Technical Report. OAR AOML-38. NOAA-AOML.

Chandler, W. J., & Gillelan, H. (2004). The history and evolution of the National Marine Sanctuaries Act. *Envtl. L. Rep. News & Analysis*, *34*, 10505.

Chapman, Arthur. (1993). Watch the Port of Miami. *Tequesta, 53*(11), 7-30.

Chiappone, M., Dienes, H., Swanson, D. W., & Miller, S. L. (2005). Impacts of lost fishing gear on coral reef invertebrates in the Florida Keys National Marine Sanctuary. *Biological Conservation*, *121*(2), 221-230. https://doi.org/10.1016/j.biocon.2004.04.023

Christianen, M. J., van Belzen, J., Herman, P. M., van Katwijk, M. M., Lamers, L. P., van Leent, P. J., & Bouma, T. J. (2013). Low-canopy seagrass beds still provide important coastal protection services. *PloS one*, *8*(5), e62413.

Clark, J. C. (2014). *A Concise History of Florida*. History Press.

Collier, C., Ruzicka, R., Banks, K., Barbieri, L., Beal, J., Bingham, D., Bohnsack, J., Brooke, S., Craig, N., Dodge, R., Fisher, L., Gadbois, N., Gilliam, D., Gregg, L., Kellison, T., Kosmynin, V., Lapoint, B., McDevitt, E., Phipps, J., & Warrick, D. (2008). *The state of coral reef ecosystems of Southeast Florida.* NOAA technical memorandum.

Cooper, E. L., Hirabayashi, K., Strychar, K. B., & Sammarco, P. W. (2014). Corals and their potential applications to integrative medicine. *Evidence-Based Complementary and Alternative Medicine*, *2014*(1), 184959.

Côté, I. M., Green, S. J., & Hixon, M. A. (2013). Predatory fish invaders: Insights from Indo-Pacific lionfish in the western Atlantic and Caribbean. *Biological Conservation*, *164*, 50-61. https://doi.org/10.1016/j.biocon.2013.04.014

Cox, J. (1988). The influence of forest size on transient and resident bird species occupying maritime hammocks of northeastern Florida. Florida Field Naturalist, 16, 25-34.

Craig, R. K. (2000). The coral reef task force: protecting the environment through executive order. *Envtl. L. Rep. News & Analysis*, *30*, 10343.

Cramer, K., Bernard, M., Bernat, I., Gutierrez, L., Murphy, E., Sangolquí, P., Surrey, K., & Gerber, L. (2022). The Present and Future Status of Ecosystem Services for Coral Reefs. *In Imperiled: The Encyclopedia of Conservation: Volume 1-3 (pp. 46-54). Elsevier.* https://doi.org/10.1016/B978-0-12-821139-7.00177-X

CSA International, Inc. 2009. *Ecological functions of nearshore hardbottom habitat in east Florida: A literature synthesis.* Prepared for the Florida Department of Environmental Protection Bureau of Beaches and Coastal Systems, Tallahassee, FL. 186 pp + apps.

Darcy, S., Maxwell, H., Edwards, M., & Almond, B. (2023). Disability inclusion in beach precincts: beach for all abilities–a community development approach through a social relational model of disability lens. *Sport Management Review*, *26*(1), 1-23. https://doi.org/10.1080/14413523.2022.2059998

Davis, K. J., Vianna, G. M., Meeuwig, J. J., Meekan, M. G., & Pannell, D. J. (2019). Estimating the economic benefits and costs of highly-protected marine protected areas. *Ecosphere*, *10*(10), e02879.

Dawson, N. M., Coolsaet, B., Sterling, E. J., Loveridge, R., Gross-Camp, N. D., Wongbusarakum, S., ... & Rosado-May, F. J. (2021). The role of Indigenous peoples and local communities in effective and equitable conservation. *Ecology and society*, *26*(3), 19.

Department of Elder Affairs. (2022). *Florida State Plan on Aging 2022-2025*. https://elderaffairs.org/wp-content/uploads/FINAL-Florida-State-Plan-on-Aging-2022-2025-10182021.pdf

Department of Parks and Recreation/Florida Department of Environmental Protection (DRP/DEP). (2018). *John Pennekamp Coral Reef State Park: Advisory group draft unit management plan*. https://floridadep.gov/sites/default/files/JPCR_WS_AG%20Draft.pdf.

Derr, M. (1998). Some kind of paradise: A chronicle of man and the land in Florida. University Press of Florida.

Dobbelaere T., Hanert E., Williams G.J., Whitall D., Aeby G.S., Maynard J.A., and Walker B.K. (2024). Hydrographic connections of inland water to diseased corals and water quality sites in SE FL. Final Report. Florida DEP. Miami, FL., 26 p. https://floridadep.gov/rcp/coral-protection-restoration/documents/hydrographic-connections-inland-water-diseased-corals

Doney, S. C., Ruckelshaus, M., Emmett Duffy, J., Barry, J. P., Chan, F., English, C. A., Galindo, H. M., Grebmeier, J. M., Hollowed, A. B., Knowlton, N., Polovina, J., Rabalais, N. N., Sydeman, W. J., & Talley, L. D. (2012). Climate Change Impacts on Marine Ecosystems. *Annual Review of Marine Science*, *4*(1), 11–37. https://doi.org/10.1146/annurev-marine-041911-111611

El-Seedi, H. R., Refaey, M. S., Elias, N., El-Mallah, M. F., Albaqami, F. M., Dergaa, I., ... & Khalifa, S. A. (2025). Marine natural products as a source of novel anticancer drugs: an updated review (2019–2023). *Natural Products and Bioprospecting*, *15*(1), 13.

Elsner, J. B., Kossin, J. P., & Jagger, T. H. (2008). The increasing intensity of the strongest tropical cyclones. *Nature*, *455*(7209), 92–95. https://doi.org/10.1038/nature07234

Erftemeijer, P, Bernhard, R, Hoeksema, B, Todd, P. (2012). Environmental impacts of dredging and other sediment disturbances on corals: A review. *Marine Pollution Bulletin 64*:1737-1765. https://doi.org/10.1016/j.marpolbul.2012.05.008

Farmer, N. A., Heyman, W. D., Karnauskas, M., Kobara, S., Smart, T. I., Ballenger, J. C., Reichert, J. M., Wyanski, D. M., Tishler, M. S., Lindeman, K. C., Lowerre-Barbieri, S. K., Switzer, T. S., Solomon, J. J., McCain, K., Marhefka, M., & Sedberry, G. R. (2017). Timing and locations of reef fish spawning off the southeastern United States. *PLoS One*, *12*(3), e0172968. https://doi.org/10.1371/journal.pone.0172968

Feely, R. A., Doney, S. C., & Cooley, S. R. (2009). *Ocean acidification: Present conditions and future changes in a high-CO_2 world. Oceanography, 22*(4), 36–47. https://doi.org/10.5670/oceanog.2009.95

Fenner, D., & Banks, K. (2004). Orange Cup Coral Tubastraea coccinea invades Florida and the Flower Garden Banks, Northwestern Gulf of Mexico. *Coral Reefs*, *23*, 505–507. https://doi.org/10.1007/s00338-004-0422-x

Fish and Wildlife Research Institute (FWRI). (2022). *Florida's Coral Reef Water Quality Data Compilation, Analysis, and Decision Support Year 2. Report for DEP Coral Protection and Restoration Program*. https://floridadep.gov/sites/default/files/7.%20Florida%E2%80%99s%20Coral%20Reef%20Water%20Quality%20Data%20Compilation%2C%20Analysis%2C%20and%20Decision%20Support%20Year%202_0.pdf

Flinn, A. (2014). *The socioeconomic importance of fishing in Port Salerno, Florida.* MAF Master of Professional Sciences Internship Report.

Florida Atlantic University (2025, January 6). *Ready for Action: Educating the Community about King Tides.* https://www.fau.edu/science/news/educating-the-community-about-king-tides/

Florida Department of Environmental Protection (DEP). (n.d.). *Our Lands. Our Legacy.* https://www.arcgis.com/apps/Cascade/index.html?appid=455fac62c3bc49bc82df3433f3b27458

Florida Department of Environmental Protection (DEP). (n.d.a). *History of Dr. Von D. Mizell-Eula Johnson State Park*. Florida Department of Environmental Protection. https://www.floridastateparks.org/parks-and-trails/dr-von-d-mizell-eula-johnson-state-park/history

Florida Department of Environmental Protection (DEP). (n.d.b). *History of John Pennekamp Coral Reef State Park*. Florida Department of Environmental Protection. https://www.floridastateparks.org/parks-and-trails/john-pennekamp-coral-reef-state-park/history

Florida Department of Environmental Protection (DEP). (n.d.c). *Wild and Scenic Loxahatchee River*. Florida Department of Environmental Protection. https://www.floridastateparks.org/learn/wild-and-scenic-loxahatchee-river

Florida Department of Environmental Protection (DEP). (1996a). *Lake Worth Inlet Management Implementation Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/lake-worth-inlet-management-implementation-plan

Florida Department of Environmental Protection (DEP). (1996b). *Outstanding Florida Waters*. https://geodata.dep.state.fl.us/datasets/FDEP::outstanding-florida-waters/explore

Florida Department of Environmental Protection (DEP). (1997a). *Boca Raton Inlet Management Implementation Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/boca-raton-inlet-management-implementation-plan

Florida Department of Environmental Protection (DEP). (1997b). *Hillsboro Inlet Management Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/hillsboro-inlet-management-implementation-plan

Florida Department of Environmental Protection (DEP). (2004). *Southeast Florida Coral Reef Initiative: A Local Action Strategy*. SEFCRI. https://floridadep.gov/sites/default/files/SEFCRI_LAS_FINAL_20May05.pdf

Florida Department of Environmental Protection (DEP). (2010). *Implementation of Chapter 2008-232, Laws of Florida Domestic Wastewater Ocean Outfalls 2010 Annual Report.* https://floridadep.gov/sites/default/files/ocean-outfall-2010_0.pdf

Florida Department of Environmental Protection (DEP). (2012). Bill Baggs Cape Florida State Park Land Management Plan. Florida Department of Environmental Protection, Division of Recreation and Parks.

Florida Department of Environmental Protection (DEP). (2019). *Final integrated water quality assessment for Florida: 2018 Sections 303(d), 305(b), and 314 report and listing update*. https://floridadep.gov/sites/default/files/2018_integrated_report_master%20final_revised_3-12-19.pdf

Florida Department of Environmental Protection (DEP). (2020). Florida Keys National Marine Sanctuary management review and coordinated policy guidance report. Florida DEP.

Florida Department of Environmental Protection (DEP). (2021a). *Bakers Haulover Inlet Management Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/bakers-haulover-inlet-management-plan

Florida Department of Environmental Protection (DEP). (2021b). *SEAFAN - The Southeast Florida Action Network | Florida Department of Environmental Protection*. https://floridadep.gov/ORCP/coral/content/seafan-Southeast-florida-action-network

Florida Department of Environmental Protection (DEP). (2021c). *Stony Coral Tissue Loss Disease Response*. https://floridadep.gov/ORCP/coral/content/stony-coral-tissue-loss-disease-response

Florida Department of Environmental Protection (DEP). (2022). *South Lake Worth Inlet Management Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/south-lake-worth-inlet-management-plan

Florida Department of Environmental Protection (DEP). (2023). St. Lucie Inlet Management Plan. https://floridadep.gov/rcp/beaches-inlets-ports/documents/st-lucie-inlet-management-plan

Florida Department of Environmental Protection (DEP). (2024a). Citizen Support Organization Agreement

Florida Department of Environmental Protection (DEP). (2024b). *Seagrass Restoration Efforts*. https://floridadep.gov/rcp/rcp/content/seagrass-restoration-efforts

Florida Department of Environmental Protection (DEP). (2025a). Biscayne Bay Aquatic Preserve Management Plan.

Florida Department of Environmental Protection (DEP). (2025a). *Critically Eroded Beaches in Florida*. https://floridadep.gov/sites/default/files/FDEP_Critically%20Eroded%20Beaches_08-2025_FINAL_0.pdf

Florida Department of Environmental Protection (DEP). (2025b). *Florida Forever*. https://floridadep.gov/lands/environmental-services/content/florida-forever

Florida Department of Environmental Protection (DEP). (2025c). *Jonathan Dickinson State Park*. https://www.floridastateparks.org/parks-and-trails/jonathan-dickinson-state-park

Florida Department of Environmental Protection (DEP). (2025d). *Jupiter Inlet Management Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/jupiter-inlet-management-plan

Florida Department of Environmental Protection (DEP). (2025e). *Loxahatchee River-Lake Worth Creek*. https://floridaaquaticpreserves.org/managed-areas/aquatic-preserves/loxahatchee-river-lake-worth-creek

Florida Department of Environmental Protection (DEP). (2025g). *Oleta River State Park*. https://www.floridastateparks.org/OletaRiver

Florida Department of Environmental Protection (DEP). Office of Resilience and Coastal Protection (ORCP). (2021). *Bakers Haulover Inlet Management Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/bakers-haulover-inlet-management-plan

Florida Department of Environmental Protection (DEP). Office of Resilience and Coastal Protection (ORCP). (1997). *Boca Raton Inlet Management Implementation Plan.* https://floridadep.gov/rcp/beaches-inlets-ports/documents/boca-raton-inlet-management-implementation-plan

Florida Fish and Wildlife Conservation Commission (FWC). (n.d.a). *Artificial Reefs*. https://myfwc.com/fishing/saltwater/artificial-reefs/

Florida Fish and Wildlife Conservation Commission (FWC). (n.d.b). *Closed Manatee Mortality Event Along The East Coast.* https://myfwc.com/research/manatee/rescue-mortality-response/ume/

Florida Fish and Wildlife Conservation Commission (FWC). (n.d.c). *Florida Public Boat Ramp Finder*. https://gis.myfwc.com/BoatRampFinder/

Florida Fish and Wildlife Conservation Commission (FWC). (n.d.d). *Lionfish*. https://myfwc.com/fishing/saltwater/recreational/lionfish/

Florida Fish and Wildlife Conservation Commission (FWC). (1999a). *FAQs: Nuisance Wildlife*. https://myfwc.com/conservation/you-conserve/wildlife/faqs/

Florida Fish and Wildlife Conservation Commission (FWC). (1999b). *Profiles*. https://myfwc.com/wildlifehabitats/profiles/

Florida Fish and Wildlife Conservation Commission (FWC). (2009). *Worm Reef Habitats Florida East Coast*. https://geodata.myfwc.com/datasets/myfwc::worm-reef-habitats-florida-east-coast/explore?location=25.614308%2C-79.938503%2C9.79

Florida Fish and Wildlife Conservation Commission (FWC). (2016). *Users Guide to the Unified Florida Reef Tract Map Version 2 (p. 14*). https://myfwc.com/media/20088/unifiedreefmap-usersguide-version20.pdf

Florida Fish and Wildlife Conservation Commission (FWC). (2019, February 2019). FWC News: FWC Commission approves changes to maintain high-quality snorkeling and diving opportunities at Blue Heron Bridge dive site. https://myfwc.com/news/all-news/blue-heron-dive/

Florida Fish and Wildlife Conservation Commission (FWC). (2021a). *2021 preliminary manatee mortality table*. https://myfwc.com/research/manatee/rescue-mortality-response/statistics/mortality/

Florida Fish and Wildlife Conservation Commission (FWC). (2021b). *Mangrove Habitat in Florida*. FWC. https://geodata.myfwc.com/datasets/a78a27e02f9d4a71a3c3357aefc35baf_4

Florida Fish and Wildlife Conservation Commission (FWC). (2021c). *Seagrass Habitat in Florida*. https://geodata.myfwc.com/datasets/seagrass-habitat-in-florida

Fish and Wildlife Research Institute (FWRI). (2022). Florida's Coral Reef Water Quality Data Compilation, Analysis, and Decision Support Year 2. Report for DEP Coral Protection and Restoration Program. https://floridadep.gov/sites/default/files/7.%20Florida%E2%80%99s%20Coral%20Reef%20Water%20Quality%20Data%20Compilation%2C%20Analysis%2C%20and%20Decision%20Support%20Year%202_0.pdf

Florida Highway Safety and Motor Vehicles (FLHSMV). (2024). *2019 Alphabetical Vessel Statistics by County*. https://www.flhsmv.gov/motor-vehicles-tags-titles/vessels/vessel-owner-statistics /

Florida Natural Areas Inventory (FNAI). (2010). *Guide to the Natural Communities of Florida* (p. 276). https://www.fnai.org/PDFs/Full_FNAI-Natural-Community-Classification-Guide-2010_20150218.pdf

Florida Reef Resilience Program. (2016). *Disturbance Response Monitoring Quick Look report* (p. 9). https://ocean.floridamarine.org/FRRP/TrainingDocs/2016%20Summer%20DRM%20Quick%20Look%20Report.pdf

Florida Reef Resilience Program. (2021). *Resilience Action Plan for Florida's Coral Reef (2021-2026)*. https://www.nature.org/content/dam/tnc/nature/en/documents/Resilience-Action-Plan-for-Floridas-Coral-Reef-2021-2026.pdf

Florida's Coral Reef Resilience Program. (2024). *Ecological Restoration of Florida's Coral Reef: Tier 1 Strategy*. https://www.nature.org/content/dam/tnc/nature/en/photos/e/c/Ecological-Restoration-Floridas-Coral-Reef.pdf

Florida's Coral Reef Resilience Program. (2025). Restoration of the Kristin Jacobs Coral Aquatic Preserve: Tier 2 Plan.

Florida Seaport Transportation and Economic Development Council. (2019). *Port Profiles: 2019-2023 Five Year Florida Seaport Mission Plan* (p. 21). Florida Department of Transportation. https://smhttp-ssl-63157.nexcesscdn.net/wp-content/uploads/2019_FLPorts_PortProfiles-web.pdf

Florida Silver Jackets. (2025). Navigating Hybrid Reef for Coral Reef Restoration and Coastal Protection in Florida: Project Guidance Using Hazard Mitigation Grant Program. Flood Risk Management Program.

Florida, R., & Pedigo, S. (2019). *Toward a more inclusive region: Inequality and poverty in Greater Miami.* Miami Urban Future Initiative, Florida International University. https://digitalcommons.fiu.edu/cgi/viewcontent.cgi?article=1002&context=mufi-reports

Forrester, J., Leonardi, N., Cooper, J., Kumar, P. (2024). Seagrass as a nature-based solution for coastal protection. *Ecological Engineering*, *206*.

Fourqurean, J. W., Duarte, C. M., Kennedy, H., Marbà, N., Holmer, M., Mateo, M. A., Apostolaki, E. T., Kendrick, G. A., Krause-Jensen, D., McGlathery, K. J., & Serrano, O. (2012). Seagrass ecosystems as a globally significant carbon stock. *Nature Geoscience*, *5*(7), 505–509. https://doi.org/10.1038/ngeo1477

Fuentes, M. M. P. B., Gredzens, C., Jones, T. T., & Witherington, B. (2023). Assessing the influence of water quality on sea turtle health and nesting success in Florida. NOAA Technical Memorandum NMFS-SEFSC-765. U.S. Department of Commerce. https://repository.library.noaa.gov/

Galloway, J. N., Aber, J. D., Erisman, J. W., Seitzinger, S. P., Howarth, R. W., Cowling, E. B., & Cosby, B. J. (2003). The nitrogen cascade. *Bioscience*, *53*(4), 341-356. https://doi.org/10.1641/0006-3568(2003)053[0341:TNC]2.0.CO;2

Giakoumi, S., McGowan, J., Mills, M., Beger, M., Bustamante, R. H., Charles, A., Christie, P., Fox, M., Garcia-Borboroglu, P., Gelcich, S., Guidetti, P., Mackelworth, P., Maina, J. M., McCook, L., Micheli, F., Morgan, L. E., Mumby, P. J., Teyes, L. M., White, A., Grorud-Colver, K., & Possingham, H. P. (2018). Revisiting "success" and "failure" of marine protected areas: a conservation scientist perspective. *Frontiers in Marine Science*, *5*, 223.

Giarikos, D., White, L., Daniels, A., Santos, R., Baldauf, P., & Hirons, A. (2023). Assessing the ecological risk of heavy metal sediment contamination from Port Everglades Florida USA. *PeerJ*, *11*, e16152.

Gilliam, D.S. (2012). *A Study to Evaluate Reef Recovery Following Injury and Mitigation Structures Offshore Southeast Florida: Phase II*. (Projects 14-16; Maritime Industry and Coastal Construction Impacts). Southeast Florida Coral Reef Initiative. https://floridadep.gov/sites/default/files/MICCI-14-15-16-Phase2.pdf

Gilliam, D. S., Hayes, N. K., Ruzicka, R., & Colella, M. (2020). Southeast Florida Coral Reef Evaluation and Monitoring Project Year 17 Executive Summary 2019 (p. 17).

Gilliam, D. S., Hayes, N. K., Ruzicka, R., & Colella, M. (2021). Southeast Florida Coral Reef Evaluation and Monitoring Project 2020 Year 18 Final Report (p. 81).

Gilliam, D. S., Hayes, N. K., Ruzicka, R., Hayes, N. K., Ruzicka, R., & Colella, M. (2019). *Southeast Florida Coral Reef Evaluation and Monitoring Project 2018 Year 16 Final Report* (p. 85).

Gilliam, D. S., & Moulding, A. L. (2012). *A Study to Evaluate Reef Recovery Following Injury and Mitigation Structures Offshore Southeast Florida: Phase I* (Projects 14-16; Maritime Industry and Coastal Construction Impacts). Southeast Florida Coral Reef Initiative. https://www.ncei.noaa.gov/data/oceans/coris/library/NOAA/CRCP/other/other_crcp_publications/SEFCRI/MICCI_Project/MICCI_14_15_16_Phase_I.pdf

Godfrey, M. C., & Catton, T. (2011). *River of Interests: water management in South Florida and the Everglades, 1948-2010*. Historical Research Associates, Inc. U.S. Army Corps of Engineers.

Goh, B. P. L., & Lee, C. S. (2008, July). A study of the effect of sediment accumulation on the settlement of coral larvae using conditioned tiles. In *Proceedings Eleventh International Coral Reef Symposium, Ft. Lauderdale, Florida* (pp. 7-11).

Good, A. M., & Bahr, K. D. (2021). The coral conservation crisis: interacting local and global stressors reduce reef resiliency and create challenges for conservation solutions. SN applied sciences, 3(3), 312. https://doi.org/10.1007/s42452-021-04319-8

Greater Miami Convention and Visitors Bureau (GMCVB). (2020). *2019 Visitor Industry Overview* (p. 99). https://www.miamiandbeaches.com/getmedia/414b53a1-6b69-4eae-91f2-ed4585389a58/2019_Visitor_Industry_Overview_051320.aspx?ext=.pdf

Gregg, K. (2013). Literature Review and Synthesis of Land-Based Sources of Pollution Affecting Essential Fish Habitats in Southeast Florida (p. 55). NOAA Fisheries Southeast Region.

Gregg, K. (2013). *Management considerations for the Southeast Florida coral reef ecosystem*. NOAA Fisheries Southeast Region Habitat Conservation Division.

https://www.dep.state.fl.us/coastal/programs/coral/reports/FDOU/FDOU_Management_Considerations.pdf

Griffin, D. W., Benzel, W. M., Fisher, S. C., Focazio, M. J., Iwanowicz, L. R., Loftin, K. A., Reilly, T. J., & Jones, D. K. (2019). The presence of antibiotic resistance genes in coastal soil and sediment samples from the eastern seaboard of the USA. *Environmental monitoring and assessment*, *191*(2), 1-17.

Griffin, D. W., Banks, K., Gregg, K., Shedler, S., & Walker, B. K. (2020). Antibiotic Resistance in Marine Microbial Communities Proximal to a Florida Sewage Outfall System. *Antibiotics*, *9*(3), 118.

Gulf Council/South Atlantic Fishery Management Council (GC/SAFMC). (1982). *Fishery management plan for coral and corals reefs of the Gulf of Mexico and South Atlantic.* http://cdn1.safmc.net/Library/pdf/RevCoralFMP1982.pdf

Harvell, C., Kim, K., Burkholder, J., Colwell, R, Epstein, P., Grimes, D., Hofmann, E., Lipp, E., Osterhaus, A., Overstreet, R., Porter, J., Smith, G., & Vasta, G. (1999). Emerging marine diseases--climate links and anthropogenic factors. *Science*, *285*(5433), 1505-1510.

Hauer, M. E., Evans, J. M., & Mishra, D. R. (2016). Millions projected to be at risk from sea-level rise in the continental United States. *Nature Climate Change*, *6*(7), 691–695. https://doi.org/10.1038/nclimate2961

Henderson, A. L., Mormino, G. R., Cano, C. J. (2014). Spanish Pathways in Florida, 1492-1992: Caminos Españoles en La Florida, 1492-1992. Pineapple Press.

Heron, S. F., Maynard, J. A., van Hooidonk, R., & Eakin, C. M. (2016). Warming Trends and Bleaching Stress of the World's Coral Reefs 1985–2012. *Scientific Reports*, *6*(1), 38402. https://doi.org/10.1038/srep38402

Hughes, T., Kerry, J., Álvarez-Noriega. M., Álvarez-Romero, J., Anderson, K., Baird, A., Babcock, R., Beger, M., Bellwood, D., Berkelmans, R., Bridge, T., Butler, I., Byrne, M., Cantin, N., Comeau, S., Connolly, S., Cumming, G., Dalton, S., Diaz-Pulido, G., Eakin, C., Figueira, W., Gilmour, J., Harrison, H., Heron, S., Hoey, A., Hobbs, J., Hoogenboom, M., Kennedy, E., Kuo, C., Lough, J., Lowe, R., Liu, G., McCulloch, M., Malcom, H., McWilliam, M., Pandolfi, J., Pears, R., Pratchett, M., Schoepf, V., Simpson, T., Skirving, W., Sommer, B., Torda, G., Wachenfeld, D., Willis, B., & Wilson, S. (2017). Global warming and recurrent mass bleaching of corals. *Nature*, *543*(7645), 373–377. https://doi.org/10.1038/nature21707

International Maritime Organization. (2005). Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas.

International Union for Conservation of Nature (IUCN). (2024, November 14). *Over 40% of coral species face extinction – IUCN Red List*. IUCN. https://iucn.org/press-release/202411/over-40-coral-species-face-extinction-iucn-red-list

Jaap, W.C. & Hallock, P. (1990) Coral Reefs, in R. L. Myers & J. J. Ewel (Eds.), *Ecosystems of Florida*, University Press of Florida, p. 574-616.

Jacoby, C., Walters, L., Baker, S., Blyler, K. (2005). A primer on invasive species in coastal and marine waters. Florida Sea Grant. National Oceanic and Atmospheric Administration (NOAA) under NOAA Grant No. NA16RG-2195. https://repository.library.noaa.gov/view/noaa/45694/noaa_45694_DS1.pdf

Jimenez, P. C., Wilke, D. V., & Costa-Lotufo, L. V. (2018). Marine drugs for cancer: Surfacing biotechnological innovations from the oceans. *Clinics*, *73*(suppl 1), e482s.

Johns, G. (2004). *Socioeconomic study of reefs in Martin County, Florida*. Report prepared for Martin County, Florida by Hazen and Sawyer P.C.

Johns, G., Leeworthy, V., Bell, F., & Bonn, M. (2001). *Socioeconomic Study of Reefs in Southeast Florida* (p. 348). NOAA and Florida Fish and Wildlife Conservation Commission.

Johnson, D. R., Harper, D. E., Kellison, G. T., & Bohnsack, J. A. (2007). *Description and discussion of Southeast Florida fishery landings, 1990-2000*. NOAA Technical Memorandum NMFS-SEFSC-550.

Johnston, P., Everard, M., Santillo, D., & Robèrt, K. (2007). Reclaiming the definition of sustainability. *Environmental science and pollution research international*, *14*(1), 60-66. https://doi.org/10.1065/espr2007.01.375

Jupiter Inlet District (JID). (2021). *History*. https://www.jupiterinletdistrict.org/history

Kajiura, S. M., & Tellman, S. L. (2016). Quantification of massive seasonal aggregations of blacktip sharks (Carcharhinus limbatus) in Southeast Florida. *PLoS One*, *11*(3), e0150911.

Kaye, K. (2015, August 23). Sailing back in history: A look at South Florida's ports. *South Florida Sun Sentinel*.

Kilfoyle, K., Walker, B. K., Gregg, K., Fisco, D. P., & Spieler, R. E. (2018). *Southeast Florida Coral Reef Fishery-Independent Baseline Assessment: 2012-2016 Summary Report* (p. 121). NOAA CRCP.

Kleinberg, E. (2006). Palm Beach Past: The Best of Post Time. Arcadia.

Koopman, B., Heaney, J. P., Cakir, F. Y., Rembold, M., Indeglia, P., & Kini, G. (2006). *Ocean outfall study*. Report for Florida Department of Environmental Protection.

Kosmynin, V., Edwards, L., Peterson, J., & Biggs, B. (2016). *Standard operation procedures for nearshore hardbottom monitoring of beach nourishment projects*. Florida Dept. of Environmental Protection, Division of Water Resource Management (p. 75).

Kraft, M. E. (2000). U.S. Environmental Policy and Politics: From the 1960s to the 1990s. *Journal of Policy History*, *12*(1), 17-42.

Krausfeldt, L. E., Lopez, J. V., Bilodeau, C. M., Lee, H. W., & Casali, S. L. (2023). Change and stasis of distinct sediment microbiomes across Port Everglades Inlet (PEI) and the adjacent coral reefs. *PeerJ*, *11*, e14288.

Kruczynski, W.L. and P.J. Fletcher (eds.). (2012). *Tropical Connections: South Florida's marine environment*. IAN Press, University of Maryland Center for Environmental Science.

Kuffner, I., & Paul, V. (2004). Effects of the benthic cyanobacterium Lyngbya majuscula on larval recruitment of the reef corals Acropora surculosa and Pocillopora damicornis. *Coral Reefs*, *23*, 455–458. https://doi.org/10.1007/s00338-004-0416-8

Kulp, S., & Strauss, B. H. (2017). Rapid escalation of coastal flood exposure in US municipalities from sea level rise. *Climatic Change*, *142*(3), 477–489. https://doi.org/10.1007/s10584-017-1963-7

Lapointe, B. E., Barile, P. J., Littler, M. M., & Littler, D. S. (2005). Macroalgal blooms on southeast Florida coral reefs: II. Cross-shelf discrimination of nitrogen sources indicates widespread assimilation of sewage nitrogen. *Harmful Algae*, *4*(6), 1106-1122.

Lapointe, B. E., & Bedford, B. J. (2010). Ecology and nutrition of invasive Caulerpa brachypus f. Parvifolia blooms on coral reefs off Southeast Florida, U.S.A. *Harmful Algae*, *9*(1), 1–12. https://doi.org/10.1016/j.hal.2009.06.001

Lapointe, B. E., Brewton, R. A., Herren, L. W., Porter, J. W., & Hu, C. (2019). Nitrogen enrichment, altered stoichiometry, and coral reef decline at Looe Key, Florida Keys, USA: a 3-decade study. *Marine Biology*, *166*(8), 1-31.

Lapointe, B. E., Herren, L. W., & Bedford, B. J. (2015). Effects of hurricanes, land use, and water management on nutrient and microbial pollution: St. Lucie Estuary, southeast Florida. *Journal of Coastal Research, 31*(1), 159–172. https://doi.org/10.2112/JCOASTRES-D-14-00038.1

Leatherman, S., Leatherman, S., & Duke, M. (2022). Haulover sandbar dredging controversy. *Shore & Beach*, 44–49. https://doi.org/10.34237/1009035

Leinbach SE, Gilliam DS, Ruzicka R, Colella M. (2025). Southeast Florida Coral Reef Evaluation and Monitoring Project 2024 Year 22 Final Report (p. 95).

Lenz, E. A., Kaufman, L., Kramer, P., & Walter, C. S. (2025). Environmental predictors for the restoration of a critically endangered coral, Acropora palmata, along the Florida Reef Tract. Mission: Iconic Reefs / NOAA Coral Restoration Consortium. https://missioniconicreefs.org/wp-content/uploads/2024/01/Environmental-predictors-for-the-restoration-of-a-critically-endangered-coral-Acropora-palmata-along-the-Florida-reef-tractpdf.pdf

Levinton, J. (2008). *Marine Biology: Function, Biodiversity, Ecology*. (3rd ed.). Oxford University Press.

Li, Y., Schichtel, B., Walker, J., Schwede, D., Chen, X., Lehmann, C., Puchalski, M., Gay, D., & Collett Jr, J. (2016). Increasing importance of deposition of reduced nitrogen in the United States. *Proceedings of the National Academy of Sciences*, *113*(21), 5874-5879.

Lincoln, R.J., Boxshall, G.A., & Clark, P.F. (2003). *A dictionary of ecology, evolution and systematics*. Cambridge University Press.

Lindberg, W.J. (Ed.) & W. Seaman (Ed.). (2011). *Guidelines and Management Practices for Artificial Reef Siting, Use, Construction, and Anchoring in Southeast Florida*. (Project 18 & 19, Maritime Industry and Coastal Construction Impacts, p. 207). Southeast Florida Coral Reef Initiative.

Lindeman, K., & Ruppert, T. (2011). Policy Recommendations and Training to Improve Agency Permitting, Compliance, and Enforcement for Coral Resource Conservation in Southeast Florida (Project 4, 21, 23 & 24, Maritime Industry and Coastal Construction Impacts, p. 207). Southeast Florida Coral Reef Initiative.

Lirman, D., Schopmeyer, S., Manzello, D., Gramer, L. J., Precht, W. F., Muller-Karger, F., Banks, K., Barnes, B., Bartels, E., Bourque, A., Byrne, J., Donahue, S., Duquesnel, J., Fisher, L., Gilliam, D., Hendee, J., Johnson, M., Maxwell, K., McDevitt, E., Monty, J., Rueda, D., Ruzicka, R., Thanner, S. (2011). Severe 2010 Cold-Water Event Caused Unprecedented Mortality to Corals of the Florida Reef Tract and Reversed Previous Survivorship Patterns. *PLOS ONE*, *6*(8). https://doi.org/10.1371/journal.pone.0023047

Loggerhead Marinelife Center. (n.d.). *Sea Turtle Protection Zone.* https://marinelife.org/conservation/sea-turtle-protection-zone/

Loxahatchee River District. (n.d.). *About the Loxahatchee River*. https://loxahatcheeriver.org/river/about-river/

Lukens, R. R., & Selberg, C. (2004). *Guidelines for marine artificial reef materials* (2nd ed.). Artificial Reef Subcommittees of the Atlantic and Gulf States Marine Fisheries Commissions.

Manzello, D. P., Kleypas, J. A., Budd, D. A., Eakin, C. M., Glynn, P. W., & Langdon, C. (2012). *Ocean acidification refugia of the Florida Reef Tract. PLoS ONE, 7*(7), e41715. https://doi.org/10.1371/journal.pone.0041715

Martin County (MC). (2025). *Artificial Reefs*. https://www.martin.fl.us/Artificial-Reefs

Martin County (MC). (2025b). *Bathtub Beach*. https://www.martin.fl.us/BathtubBeach

Martin County (MC). (2025c). *St. Lucie Inlet*. https://www.martin.fl.us/st-lucie-inlet

Martins, A., Vieira, H., Gaspar, H., & Santos, S. (2014). Marketed marine natural products in the pharmaceutical and cosmeceutical industries: Tips for success. *Marine drugs*, *12*(2), 1066-1101.

Maynard, J., Byrne, J., Kerrigan, K., Tracey, D., Pagan, F., Walczak, J., & Williams, G. J. (2017). *Coral reef resilience to climate change in the Florida Reef Tract* (pp. 30). Report to Florida Department of Environmental Protection (p. 30).

McGoun, W. E. (1978). A History of Broward County. *Broward Legacy*, *2*(3–4), 15–22.

McGoun, W. E. (1998). Southeast Florida Pioneers: The Palm and Treasure Coasts. Pineapple Press.

McIver, S. B. (1976). Yesterday's Palm Beach, Including Palm Beach County. E. A. Seemann Publishing.

Mcleod, E., Anthony, K., Mumby, P., Maynard, J., Beeden, R., Graham, N., Heron, S., Hoegh-Guldberg, O., Jupiter, S., MacGowan, P., Mangubhai, S., Marshall, N., Marshall, P.,

McClanahan, T., Mcleod, K., Nystrom, M., Obura, D., Parker, B., Possingham, H., Salm, R., & Tamelander, J. (2019). The future of resilience-based management in coral reef ecosystems. *Journal of environmental management*, *233*, 291-301.

McRae, G. (2010). A History of Florida's Fish and Wildlife Research Institute. *Gulf of Mexico Science*, *28*(1), 19.

McVoy, C., W. Park Said, J. Obeysekera, J. VanArman, and T. Dreschel. (2011). *Landscapes and Hydrology of the Predrainage Everglades*. University Press of Florida.

Miami-Dade County (MDC). (n.d.a). *About Miami-Dade County*. https://www.miamidade.gov/global/disclaimer/about-miami-dade-county.page

Miami-Dade County (MDC). (n.d.b). *Biscayne Bay*. https://www.miamidade.gov/global/environment/biscayne-bay/home.page

Miami-Dade County (MDC). (2021). *Biscayne Bay Report Card 2021*. https://mdc.maps.arcgis.com/apps/MapSeries/index.html?appid=bea607f9b3ed40bc88e51807a4c544a5

Miami-Dade County (MDC). (2023, October 9). *Miami-Dade County Celebrates Inaugural Miccosukee Day* [Press Release]. https://www.miamidade.gov/global/release.page?Mduid_release=rel1696884243553l6

Miami-Dade County (MDC). (2025). Artificial Reef Program. https://www.miamidade.gov/environment/reefs-artificial.asp

Miami Waterkeeper, (2019, September 18). King Tides. *Sea Level Rise.* https://www.miamiwaterkeeper.org/king_tides

Miccosukee Tribe of Indians of Florida. (n.d.) *History of the Miccosukee Tribe.* https://miccosukee.com/miccosukee-tribe-history/

Miller, J., Battista, T., Pritchett, A., Rohmann, S., & Rooney, J. (2011). *Coral Reef Conservation Program Mapping Achievements and Unmet Needs*. NOAA Coral Reef Conservation Program.

Miller, M. W., Karazsia, J., Groves, C. E., Griffin, S., Moore, T., Wilber, P., & Gregg, K. (2016). Detecting sedimentation impacts to coral reefs resulting from dredging the Port of Miami, Florida USA. *PeerJ*, *4*. https://doi.org/10.7717/peerj.2711

Monaco, Mark E. (2007). Classification scheme for mapping the shallow-water coral ecosystems of southern Florida Version 2.1. NOAA Coral Reef Conservation Program.

Morley, D. M., Sherman, R. L., Jordan, L. K., Banks, K. W., Quinn, T. P., & Spieler, R. E. (2008). Environmental enhancement gone awry: characterization of an artificial reef constructed from waste vehicle tires. *Environmental Problems in Coastal Regions*, *7*, 73-87.

Morris, J.A., & Whitfield, P. E. (2009). Biology, ecology, control and management of the invasive Indo-Pacific lionfish: An updated integrated assessment. NOAA Technical Memorandum NOS NCCOS 99.

Muir, P. R., Wallace, C. C., Done, T., & Aguirre, J. D. (2015). Limited scope for latitudinal extension of reef corals. *Science*, *314*(5800), 787–790. https://doi.org/10.1126/science.1259911

Nagarajan, T., Veilumuthu, P., Srinithan, T., Christopher, J.G. (2025). An Introduction to Mangrove Ecosystem and Their Associated Microorganisms. In: Muthusamy, S., Manikkam, R., Venugopal, G. (eds) Mangrove Microbiome. Springer, Singapore. https://doi.org/10.1007/978-981-96-2602-1_1

National Academies of Sciences, Engineering, and Medicine. (2019). *A Research Review of Interventions to Increase the Persistence and Resilience of Coral Reefs*. The National Academies Press. https://doi.org/10.17226/25279

National Parks Service (NPS). (n.d.). *Everglades National Park – Fact Sheets*. https://www.nps.gov/ever/learn/nature/sfnrcfactsheets.htm

National Park Service (NPS). (2018, February 13). *Everglades National Park – Geology*. https://www.nps.gov/ever/learn/nature/evergeology.htm

National Park Service (NPS). (2025, February 11). *Chapter 4: Natural Resource Management*. https://www.nps.gov/subjects/policy/mp-4-natural.htm

National Oceanic and Atmospheric Administration (NOAA). (n.d.). *Coral Reefs and Coastal Communities.* https://oceanservice.noaa.gov/news/aug21/florida-coral-trends.html

National Oceanic and Atmospheric Administration (NOAA). (n.d.). *Mission: Iconic Reefs Carysfort Reef*. https://media.fisheries.noaa.gov/dam-migration/carysfort_reef_v3.pdf

National Oceanic and Atmospheric Administration (NOAA). (1996). Florida Keys National Marine Sanctuary Final Management Plan/Environmental Impact Statement: Volume I of III, Management Plan. OCRM/NOS/NOAA.

National Oceanic and Atmospheric Administration (NOAA). (2007a). *Florida Keys National Marine Sanctuary revised management plan.*

National Oceanic and Atmospheric Administration (NOAA). (2007b). National Artificial Reef Plan (as Amended): Guidelines for siting, construction, development, and assessment of artificial reefs

National Oceanic and Atmospheric Administration Atlantic Oceanographic & Meteorological Laboratory (NOAA AOML). (2016, December 3). *Study Focuses on Contaminants Lurking in Urban Tidal Flooding.* AOML Communications. https://www.aoml.noaa.gov/contaminants-tidal-flooding/

National Oceanic and Atmospheric Administration. (2018). Strategic management of coral reef ecosystems: A national framework for regional action. NOAA Coral Reef Conservation Program

National Oceanic and Atmospheric Administration (NOAA). (2024). Florida Keys National Marine Sanctuary Restoration Blueprint: Revised Draft Management Plan.

Neufeldt, V., & Sparks, A.N. (1990). Webster's new world dictionary (3rd ed.). Warner Books.

NOAA Fisheries. (n.d.a). *Atlantic Goliath Grouper*. https://www.fisheries.noaa.gov/species/atlantic-goliath-grouper

NOAA Fisheries. (n.d.b). *Invasive and Exotic Marine Species*. https://www.fisheries.noaa.gov/insight/invasive-and-exotic-marine-species

NOAA Fisheries. (n.d.c). Landings data. Fisheries One Stop Shop. https://www.fisheries.noaa.gov/foss

NOAA Fisheries. (2019, July 3). *Critical Habitat for Elkhorn and Staghorn Corals*. https://www.fisheries.noaa.gov/action/critical-habitat-elkhorn-and-staghorn-corals

NOAA Fisheries. (2021). *Fisheries Economics of the United States, 2016*. https://www.fisheries.noaa.gov/content/fisheries-economics-united-states-2016

NOAA Fisheries. (2024, March 19). *Final Rule to Designate Critical Habitat for the Threatened Caribbean Corals*. https://www.fisheries.noaa.gov/action/final-rule-designate-critical-habitat-threatened-caribbean-corals

NOAA Fisheries. (2025). *Threatened and Endangered Species List Florida Atlantic Coast.* https://www.fisheries.noaa.gov/southeast/consultations/threatened-and-endangered-species-list-florida-atlantic-coast

NOAA, & Florida Department of Environmental Protection. (2008). *Florida's coral reef management priorities*. NOAA Coral Reef Conservation Program. https://www.coris.noaa.gov/activities/management_priorities/florida_mngmnt.pdf

Obeysekera, J., Browder, J., Hornugn, L., & Harwell, M. 1999. The natural South Florida system I: Climate, geology, and hydrology. *Urban Ecosystems*, 3, 223-244.

Obeysekera, J., Irizarry, M., Park, J. et al. (2011). Climate change and its implications for water resources management in south Florida. *Stoch Environ Res Risk Assess 25,* 495–516.

Office of Economic and Demographic Research. (2019). *Population and Demographic Data – Florida Products*. http://edr.state.fl.us/Content/population-demographics/data/index-floridaproducts.cfm

Office of Economic and Demographic Research. (2024). *Annual Assessment of Florida's Beaches*. https://edr.state.fl.us/content/natural-resources/2024_AnnualAssessmentBeaches_Chapter2.pdf

Office of National Marine Sanctuaries (ONMS). (2011). *Florida Keys National Marine Sanctuary Condition Report 2011* (p. 105). Florida Keys National Marine Sanctuaries.

Olsen Associates Inc., 1990, *South Lake Worth Inlet Sand Management Plan,* Technical Report, submitted to Palm Beach County.

Osmond, M., Airame, S., Caldwell, M., & Day, J. (2010). Lessons for marine conservation planning: A comparison of three marine protected area planning processes. *Ocean & Coastal Management*, *53*, 41–51. https://doi.org/10.1016/j.ocecoaman.2010.01.002

Page, G. G., & Swanenberg, A. (2014). *An analysis of issues affecting the management of coral reefs and the associated capacity building needs in Florida*. Prepared for Coral Reef Managers in Florida & National Oceanic and Atmospheric Administration's Coral Reef Conservation Program.

Palm Beach County (PBC). (2008). *Lake Worth Lagoon Management Plan.* Department of Environmental Resources Management.

Palm Beach County (PBC). (2025). *Reefs*. https://discover.pbcgov.org/erm/Pages/Reefs.aspx

Palm Beach County Environmental Resources Management. (n.d.). *Sea turtle program*. Palm Beach County. https://discover.pbc.gov/erm/pages/Sea-Turtle.aspx

Parrish, J. D., Braun, D. P., & Unnasch, R. S. (2003). Are we conserving what we say we are? Measuring ecological integrity within protected areas. *BioScience*, *53*(9), 851-860. https://doi.org/10.1641/0006-3568(2003)053[0851:AWCWWS]2.0.CO;2

Paul, V. J., Thacker, R. W., Banks, K. & Golubic, S. (2005). Benthic cyanobacterial bloom impacts the reefs of South Florida (Broward County, USA). *Coral Reefs*, *24*(4), 693–697. https://doi.org/10.1007/s00338-005-0061-x

Perry, C. T., Murphy, G. N., Kench, P. S., Smithers, S. G., Edinger, E. N., Steneck, R. S., & Mumby, P. J. (2013). Caribbean-wide decline in carbonate production threatens coral reef growth. *Nature Communications*, *4*(1), 1402. https://doi.org/10.1038/ncomms2409

Peters, J. R., Yeager, L. A., & Layman, C. A. (2015). Comparison of fish assemblages in restored and natural mangrove habitats along an urban shoreline. Bulletin of Marine Science, 91(2), 125-139.

Pickering, N., & Baker, E. S. (2015). Watershed Scale Planning to Reduce Land-Based Sources of Pollution (LBSP) for the Protection of Coral Reefs in Southeast Florida (p. 121). NOAA.

Poloczanska, E. S., Burrows, M. T., Brown, C. J., García Molinos, J., Halpern, B. S., Hoegh-Guldberg, O., Kappel, C. V., Moore, P. J., Richardson, A. J., Schoeman, D. S., & Sydeman, W. J. (2016). Responses of Marine Organisms to Climate Change across Oceans. *Frontiers in Marine Science*, *3*. https://doi.org/10.3389/fmars.2016.00062

Putman, N. F., Mansfield, K. L., Garrison, L. P., & Haas, H. L. (2023). Quantifying fisheries bycatch risk for sea turtles in the southeastern United States. Frontiers in Marine Science, 10, 1123456. https://doi.org/10.3389/fmars.2023.1123456

Pybas, D. W. (1997). *A history of artificial reef development and management in Florida*. Florida Department of Environmental Protection.

Raymond, W. F. (1972). A geologic investigation of the offshore sands and reefs of Broward County, Florida. Doctoral dissertation, Florida State University.

Reed, John. (2002). Deep-Water *Oculina* Coral Reefs of Florida: Biology, Impacts and Management. *Hydrobiologia,* 471:43-55. DOI: 10.1023/A:101658890155. Florida Atlantic University. Harbor Branch Oceanographic Institute contribution #1408.

Reed, John. (2006). Deep-Water Oculina Reefs of Florida: Summary of the State of Knowledge of the Habitat, Fauna, Geology, and Physical Processes of the Ecosystem. A Report to the South Atlantic Fishery Management Council.

Reef Resilience Network. (2025). *Resilience-Based Management (RBM)*. https://reefresilience.org/resilience/resilience-based-management/

Reguero, B.G., Storlazzi, C.D., Gibbs, A.E., Shope, J., Cole, A., Cumming, K., & Beck, M. (2021). The value of U.S. coral reefs for flood risk reduction. *Nature Sustainability 4*, 688–698. https://doi.org/10.1038/s41893-021-00706-6

Rezek, R. J., Furman, B. T., Jung, R. P., Hall, M. O., & Bell, S. S. (2019). Long-term performance of seagrass restoration projects in Florida, USA. *Scientific reports*, *9*(1), 15514.

Riegl, B., Walker, B., Foster, G., & Foster, K. (2007). *Development of GIS maps for Southeast Florida Coral Reefs* (Project 7; Land Based Sources of Pollution, p. 69). Southeast Florida Coral Reef Initiative.

Riegl, B., Walker, B., Moyer, R., Hernandez-Cruz, L., Foster, J., & Foster, C. (2004). *Development of GIS Maps for Southeast Florida Coral Reefs* (Project 6; Land Based Sources of Pollution, p. 71). Southeast Florida Coral Reef Initiative.

Rockport Analytics. (2021). *Florida's Tourism Economy Experiences Another Record Year in 2019 But Shifts into a Lower Gear of Growth* (p. 36). Visit Florida. https://www.visitflorida.org/media/30679/florida-visitor-economic-large-impact-study.pd f

Rogers, C. S. (1990). Responses of coral reefs and reef organisms to sedimentation. *Marine ecology progress series. Oldendorf*, *62*(1), 185-202.

Sánchez-Núñez, D. A., Pineda, J. E. M., & Osorio, A. F. (2020). From local-to global-scale control factors of wave attenuation in mangrove environments and the role of indirect mangrove wave attenuation. *Estuarine, Coastal and Shelf Science*, *245*, 106926. https://doi.org/10.1016/j.ecss.2020.106926

Schlenker, L. S., Faillettaz, R., Stieglitz, J. D., Lam, C. H., Hoenig, R. H., Cox, G. K., ... & Grosell, M. (2021). Remote Predictions of Mahi-Mahi (*Coryphaena hippurus*) Spawning in the Open Ocean Using Summarized Accelerometry Data. *Frontiers in Marine Science*, *8*, 626082.

Schill, S. R., Raber, G. T., Roberts, J. J., Treml, E. A., Brenner, J., Halpin, P. N., & Semmens, B. (2017). Conservation planning and achievements in the Caribbean: 20 years of coral reef ecosystem management. *Coastal Management, 45*(1), 1–22. https://doi.org/10.1080/08920753.2017.1252621

Seaman, W., & Jensen, A. C. (2000). Purposes and practices of artificial reef evaluation. In W. Seaman (Ed.), Artificial reef evaluation: With application to natural marine habitats (pp. 3–19). CRC Press.

Sheng, Y. P., & Zou, R. (2017). Assessing the role of mangrove forest in reducing coastal inundation during major hurricanes. Hydrobiologia, 803 (1), 87-103.

Shinn, E. A., Smith, G. W., Prospero, J. M., Betzer, P., Hayes, M. L., Garrison, V., & Barber, R. T. (2001). *African dust and the demise of Caribbean coral reefs. Geophysical Research Letters, 27*(19), 3029–3032. https://doi.org/10.1029/2000GL011599

Shivlani, M. (2006). *South Florida Coral Reef Initiative (SEFCRI) coral reef needs assessment study*. (Project 6; Awareness and Appreciation, p. 94). Southeast Florida Coral Reef Initiative.

Shivlani, M., & Estevanez, M. (2011). *Development of management alternatives for the Southeast Florida region according to stakeholder working panels.* (Project 10; Fishing Diving, and Other Uses, p. 200). Southeast Florida Coral Reef Initiative.

Shivlani, M., & Villanueva, M. (2007). *A compilation and comparison of social perceptions on reef conditions and use in Southeast Florida*. (Project 18 & 20B; Fishing Diving, and Other Uses, p. 210). Southeast Florida Coral Reef Initiative.

Sigua, G. C., Coleman, S. W., & Tweedale, W. A. (2020). Watershed management for nutrient reduction and water quality improvement in the Indian River Lagoon, Florida. *Water, 12*(3), 783. https://doi.org/10.3390/w12030783

Sime, P. (2005). *St. Lucie Estuary and Indian River Lagoon conceptual ecological model.* U.S. Department of the Interior, National Park Service, and South Florida Water Management District

Simberloff, D. (1994). Why is Florida being invaded. An assessment of invasive non-indigenous species in Florida's public lands. Florida Department of Environmental Protection Technical Report No. TSS-94–100.

Sloan, N. J. B., & Irlandi, E. A. (2008). Burial tolerances of reef-building Sabellariid worms from the east coast of Florida. *Estuarine, Coastal and Shelf Science*, *77*(3), 337-344.

Smithers, G. D. (2019). Native Southerners: Indigenous History from Origins to Removal. University of Oklahoma Press.

South Atlantic Fisheries Management Council (SAFMC). (n.d.). *Managing federal fisheries from North Carolina to Florida*. https://safmc.net/

South Florida Water Management District (SFWMD). (n.d.a). *CERP Project Planning*. Retrieved May 26, 2021, from https://www.sfwmd.gov/our-work/cerp-project-planning

South Florida Water Management District (SFWMD). (n.d.b). *History*. Retrieved June 2, 2021, from https://www.sfwmd.gov/who-we-are/history

South Florida Water Management District (SFWMD). (n.d.c). *Water Quality Improvement.* https://www.sfwmd.gov/our-work/wq-stas

South Florida Water Management District (SFWMD). (2008). Lake Worth Lagoon Watershed and Stormwater Loading Analysis.

South Florida Water Management District (SFWMD). (2020). *2020 South Florida Environmental Report.* https://www.sfwmd.gov/science-data/scientific-publications-sfer

South Florida Water Management District (SFWMD). (2024). Environmental Resource Permit Applicant's Handbook (General and Environmental) Vol 1.

South Florida Water Management District (SFWMD), Florida Department of Environmental Protection (DEP) & Florida Department of Agriculture and Consumer Services (FDACS). (2009). *St. Lucie River Watershed Protection Plan.* https://www.sfwmd.gov/sites/default/files/documents/ne_slrwpp_main_123108.pdf

Southeast Florida Coral Reef Initiative (SEFCRI). (2011). *Guidelines and management practices for artificial reefs* (Chapter 2). Florida Department of Environmental Protection

Spalding, M., Burke, L., Wood, S. A., Ashpole, J., Hutchison, J., & Zu Ermgassen, P. (2017). Mapping the global value and distribution of coral reef tourism. *Marine Policy, 82,* 104-113.

St. Johns River Water Management District (SJRWMD). (2023). *Indian River Lagoon protection and restoration projects.* https://www.sjrwmd.com/

Storlazzi, D., Reguero, B., Cole, A., Lowe, E., Shope, J., Gibbs, A., Nickel, B., McCall, R., Dongeren, A., & Beck, M. (2019). Rigorously valuing the role of U.S. coral reefs in coastal hazard risk reduction. U.S. Geological Survey Open-File Report 2019–1027, p. 42. https://doi.org/10.3133/ofr20191027

Storlazzi, C. D., Reguero, B. G., Alkins, K. C., Shope, J. B., Gaido-Lassarre, C., Viehman, T. S., & Beck, M. W. (2025). Hybrid coral reef restoration can be a cost-effective nature-based solution to provide protection to vulnerable coastal populations. *Science Advances*, *11*(3).

Strowd, T., Kivett, J., Gassman, N., Cunningham, B., Bregman, J., & Smith, E. (2017). *Regional impacts of climate change and issues for stormwater management. Southeast Florida Regional Climate Change Compac*t. http://www.Southeastfloridaclimatecompact.org/wp-content/uploads/2015/11/Stormwater-Guide.pdf

Studivan, M. S., Rossin, A. M., Rubin, E., Soderberg, N., Holstein, D. M., & Enochs, I. C. (2022). Reef Sediments Can Act as a Stony Coral Tissue Loss Disease Vector. *Frontiers in Marine Science*, 2046.

Sutton-Grier, A. E., Wowk, K., & Bamford, H. (2015). Future of our coasts: The potential for natural and hybrid infrastructure to enhance the resilience of our coastal communities, economies and ecosystems. *Environmental Science & Policy, 51*, 137-148. https://doi.org/10.1016/j.envsci.2015.04.006

Suman, D., Shivlani, M., & Milon, J. W. (1999). Perceptions and attitudes regarding marine reserves: a comparison of stakeholder groups in the Florida Keys National Marine Sanctuary. *Ocean & Coastal Management*, *42*(12), 1019-1040.

Swarzenski, P. W., Martin, J., & Bowker, R. (2001). Groundwater-surface-water exchange in Tampa Bay; results from a preliminary geochemical and geophysical survey. In *Geological Society of America Abstracts with Programs,* 33(6).

Tetra Tech, Inc. (2013). *Lake Worth Lagoon restoration and management plan: Technical report.* Prepared for Palm Beach County Department of Environmental Resources Management.

Thurstan, R. H., Hawkins, J. P., Neves, L., & Roberts, C. M. (2012). Are marine reserves and non-consumptive activities compatible? A global analysis of marine reserve regulations. *Marine Policy*, *36*(5), 1096-1104.

Tillman, M. C. (2024). Effects of substrate type, depth, hurricanes, and proximity to the Caloosahatchee River plume on epibenthic community structure in the Southwest Florida Shelf. Master Thesis: Florida Gulf Coast University.

Toth, L. T., Courtney, T. A., Colella, M. A., Kupfner Johnson, S. A., & Ruzicka, R. R. (2022). The past, present, and future of coral reef growth in the Florida Keys. *Global Change Biology*, *28*(17), 5294-5309.

Toth, L. T., Precht, W. F., Modys, A. B., Stathakopoulos, A., Robbart, M. L., Hudson, J. H., Oleinik, A. E., Riegl, B. M., Shinn, E. A., & Aronson, R. B. (2021). Climate and the latitudinal limits of subtropical reef development. *Scientific Reports*, *11*(1), 13044. https://doi.org/10.1038/s41598-021-87883-8

Trnka, M., Logan, K., & Krauss, P. (2006*). Land-based sources of pollution Local Action Strategy Combined Projects 1 & 2*. Southeast Florida Coral Reef Initiative.

United State Army Corps of Engineers (USACE). (2017). Jacksonville District's Programmatic Biological Opinion (JAXBO).

United States Census Bureau (U.S. Census). (2023). American Community Survey 1-Year Estimates Miami-Dade County, Florida. https://data.census.gov/profile/Miami-Dade_County,_Florida?g=050XX00US12086

United States Census Bureau (U.S. Census). (2020). *Florida*. https://data.census.gov/profile?g=040XX00US12

United States Census Bureau (U.S. Census). (2024). *U.S. Census Bureau QuickFacts: Florida*. https://www.census.gov/quickfacts/fact/table/FL/PST040224

United States Geological Survey (USGS). (n.d.). *Turbidity and water*. https://www.usgs.gov/special-topic/water-science-school/science/turbidity-and-water?qt-science_center_objects=0#qt-science_center_objects

United States Coral Reef Task Force (USCRTF). (2016). *Handbook on Coral Reef Impacts: Avoidance, Minimization, Compensatory Mitigation, and Restoration*. (p. 151). https://taskforce.coralreef.noaa.gov/assets/meeting36/pdf/mitigation_handbook_final_122216.pdf

United States Coral Reef Task Force (USCRTF). (2000). *The National Action Plan to Conserve Coral Reefs* (p. 41). https://www.coralreef.gov/assets/about/CRTFAxnPlan9.pdf

United States Coral Reef Task Force (USCRTF). (2023). Resolution 47.2 Coral Reefs as National Natural Infrastructure. https://taskforce.coralreef.noaa.gov/assets/meeting47/pdf/Resolution47.2_Coral-Reefs-As-Natural-Coastal-Infrastructure_10-20-23.pdf

United States Army Corps of Engineers (USACE), 1946. *Beach Erosion Study of Bakers Haulover Inlet, FL*, House Document No. 527, 19th Congress, 2nd Session.

U.S. Army Corps of Engineers (USACE), 1975. Dade County Beaches, Florida: General Design Memoranda, Jacksonville District.U.S. Fish and Wildlife Service (USFWS). (n.d.a). *Queen Conch*. Retrieved June 28, 2021, from https://www.fws.gov/international/animals/queen-conch.html

U.S. Department of Interior (DOI). Indian Affairs. (1964, December 12). *Florida's Miccosukees Break Tradition, Start Tribal Enterprise* [Press Release]. https://www.bia.gov/as-ia/opa/online-press-release/floridas-miccosukees-break-tradition-start-tribal-enterprise

U.S. Fish and Wildlife Service (USFWS). (n.d.b). *Invasive Species*. https://www.fws.gov/program/invasive-species

U.S. Fish and Wildlife Service (USFWS). (2015). *Endangered Species Glossary*. www.fws.gov/endangered/about/glossary.htm l

U.S. Geological Survey. (2010). African dust carries microbes across the ocean: Dust from Africa may be impacting coral reefs in the Caribbean. U.S. Department of the Interior. Retrieved from https://www.usgs.gov/news

U.S. Geological Survey. (1982). McPherson, B. F., Sabanskas, M., & Long, W. F. *Physical, hydrological, and biological characteristics of the Loxahatchee River estuary, Florida* (Water-Resources Investigations Report 82-350). https://doi.org/10.3133/wri82350

Valdés-Pizzini, M. (1990). Fishermen associations in Puerto Rico: praxis and discourse in the politics of fishing. *Human Organization*, 164-173.

van Katwijk, M. M., Thorhaug, A., Marbà, N., Orth, R. J., Duarte, C. M., Kendrick, G. A., ... & Verduin, J. J. (2016). Global analysis of seagrass restoration: the importance of large-scale planting. *Journal of Applied Ecology*, *53*(2), 567-578.

Walker, B. K. (2009). *Benthic Habitat Mapping of Miami-Dade County: Visual Interpretation of LADS Bathymetry and Aerial Photography* (Project 8; Land Based Sources of Pollution, p. 47). Southeast Florida Coral Reef Initiative.

Walker, B. (2010). A Study to Minimize or Eliminate Hardbottom and Reef Impacts from Anchoring Activities in Designated Anchorages at the Ports of Miami and Palm Beach (Project 8; Maritime Industry and Coastal Construction Impacts, p. 63). Southeast Florida Coral Reef Initiative.

Walker, B. (2012). Spatial analyses of benthic habitats to define coral reef ecosystem regions and potential biogeographic boundaries along a latitudinal gradient. *PloS one*, *7*(1). https://doi.org/10.1371/journal.pone.0030466

Walker, B. (2017). Characterize the Condition of Previously Known and Newly Identified Large Dense Acropora cervicornis Patches in Southeast Florida. (p. 76). https://nsuworks.nova.edu/occ_facreports/126

Walker, B. K., & Gilliam, D. S. (2013). Determining the extent and characterizing coral reef habitats of the northern latitudes of the Florida Reef Tract (Martin County). PloS one, 8(11), e80439.

Walker, B., Gilliam, D., Dodge, R., & Walczak, J. *Dredging and Shipping Impacts on Southeast Florida Coral Reefs*. (2012). Marine & Environmental Sciences Faculty Proceedings, Presentations, Speeches, Lectures. (p. 45).

Walker, B.,& Gilliam, D. 2013. Determining the Extent and Characterizing Coral Reef Habitats of the Northern Latitudes of the Florida Reef Tract (Martin County).PLoS One, (11 e80439): 1 -16. https://nsuworks.nova.edu/occ_facarticles/130

Walker, B.K. & Klug, K. (2014). *Southeast Florida shallow-water habitat mapping & coral reef community characterization*. (p. 83). https://repository.library.noaa.gov/view/noaa/11377

Walker, B. K., & Klug, K. (2015). *Southeast Florida Large Coral Assessment 2015*. (p.151). https://nsuworks.nova.edu/occ_facreports/125

Wallmo, K., & Allen, M. E. (2024). Economic Values for Coral Reef Conservation and Restoration in Florida. *Environments*, *11*(11), 261.

Walker, B., Williams, G., Hanert, E., Dobbelaere, T., Whitall, D., Maynard, J., Aeby, G. (2025). Defining water quality seascapes in the KJCAP, their relationships to hydrographic modeling connectivity, the 2023 coral bleaching, and SCTLD. Final Report. Florida DEP. 68p.

Wallmo, K., Lovell,S., Gregg, K., and Allen, M. (2021a). *Economic Impact Analysis of Recreational Fishing on Florida Reefs*. NOAA National Ocean Service, National Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 41. (p. 11) https://doi.org/10.25923/rsqj-ta64

Wallmo, K., Edwards, P., Steinback, S., Wusinich-Mendez, D., and Allen, M. (2021b). *Economic Impact Analysis of Snorkeling and SCUBA Diving on Florida Reefs*. NOAA National Ocean Service, National Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 42. (p. 48). https://doi.org/10.25923/g8ex-r982

Wanless, H. R. (2009). A history of poor economic and environmental renourishment decisions in Broward County, Florida. *America's most vulnerable coastal communities* (pp. 111-119). Geological Society of America. https://doi.org/10.1130/SPE460

Waters, L. (2015). Acute and chronic effects of large-vessel anchoring on coral reef communities inside a designated commercial anchorage. Master's thesis. Nova Southeastern University. (40). https://nsuworks.nova.edu/occ_stuetd/40

Whitall, D., Bricker, S., Cox, D., Baez, J., Stamates, J., Gregg, K., & Pagan, F. (2019). *Southeast Florida Reef Tract Water Quality Assessment*. NOAA Technical Memorandum NOS NCCOS 271. https://doi.org/10.25923/kyft-ja41

Williams, M.J. (2007). Native Plants for Coastal Restoration: What, When, and How for Florida. USDA, NRCS, Brooksville Plant Materials Center. http://www.fl.nrcs.usda.gov/programs/pmc/flplantmaterials.html

Woesik, R. van, Ross, M. E., & Miller, M. W. (2025). Heat stress and recovery trajectories of Acropora cervicornis in Southeast Florida. Frontiers in Marine Science, 12, 1641098. https://doi.org/10.3389/fmars.2025.1641098

Woodhead, A. J., Hicks, C. C., Norström, A. V., Williams, G. J., & Graham, N. A. (2019). Coral reef ecosystem services in the Anthropocene. *Functional Ecology*, *33*(6), 1023-1034.

Worm, B., Barbier, E. B., Beaumont, N., Duffy, J. E., Folke, C., Halpern, B. S., Jackson, J. B. C., Lotze, H. K., Micheli, F., Palumbi, S. R., Sala, E., Selkoe, K. A., Stachowicz, J. J., & Watson, R. (2006). Impacts of biodiversity loss on ocean ecosystem services. *Science*, *314*(5800), 787–790. https://doi.org/10.1126/science.1132294

Yarbro, L.A., Carlson Jr., P.R. (2016). Seagrass Integrated Mapping and Monitoring Program Mapping and Monitoring Report Version 2.0 FWRI Technical Report TR-17. Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute.

B.3.1 / Native Species List

Legend: FT = Federally- and State-Designated Threatened • FE = Federally-and State-Designated Endangered • ST = State-Designated Threatened • SE = State-Designated Endangered

Common Name	Species Name	Status
PROTISTS - PROTISTA		
Macroalgae and Cyanobacteria		
Coralline Alga spp.	*Amphiroa spp.*	
Alga	*Bryopsis pennata f. secunda*	
Red Alga	*Bryothamnion triquetrum*	
Alga	*Caulerpa mexicana*	
Green Grape Alga	*Caulerpa racemosa*	
Alga	*Caulerpa racemosa f. macrophysa*	
Feather Alga	*Caulerpa sertularioides*	
Alga	*Caulerpa verticillata*	
Alga spp.	*Codium spp.*	
Y-Branched Alga	*Dictyota menstrualis*	
Y-Branched Alga	*Dictyota pulchella*	
Red Tube Alga	*Galaxaura marginata*	
Red Algae	*Galaxaura obtusata*	
Large disk Alga	*Halimeda discoidea*	
Watercress Algae	*Halimeda opuntia*	
Alga	*Halimeda tuna*	
Scalloped Disk Alga	*Halimeda tuna f. platydisca*	
Alga	*Halymenia echinophysa*	
Alga	*Halymenia floresii*	
Pink Segmented Algae	*Jania adhaerens*	
Red Bush Alga	*Laurencia poiteaui*	
Cyanobacteria	*Lyngbya confervoides*	
Cyanobacteria	*Lyngbya polychroa*	
Alga	*Padina perindusiata*	
Scroll Alga	*Padina sanctae-crucis*	
Blade Alga spp.	*Udotea spp.*	
PLANTS - PLANTAE		
Seagrass		
Paddle Grass	*Halophila decipiens*	
Star Grass	*Halophila engelmannii*	
Johnson’s Seagrass	*Halophila johnsonii*	

Common Name	Species Name	Status
Shoal Grass	*Halodule wrightii*	
Manatee Grass	*Syringodium filiforme*	
Turtle Grass	*Thalassia testudinum*	
ANIMALS - METAZOA		
Stony Corals		
Staghorn Coral	*Acropora cervicornis*	FT
Elkhorn Coral	*Acropora palmata*	FT
Lettuce Coral	*Agaricia agaricites*	
Fragile Saucer Coral	*Agaricia fragilis*	
Graham's Sheet Coral	*Agaricia grahamae*	
Low-relief Lettuce Coral	*Agaricia humilis*	
Lamarck's Sheet Coral	*Agaricia lamarcki*	
Tube Coral	*Cladocora arbuscula*	
Boulder Brain Coral	*Colpophyllia natans*	
Pillar Coral	*Dendrogyra cylindrus*	FE
Elliptical Star Coral	*Dichocoenia stokesii*	
Grooved Brain Coral	*Diploria labyrinthiformis*	
Smooth Flower Coral	*Eusmilia fastigiata*	
Golfball Coral	*Favia fragum*	
Sunray Lettuce Coral	*Helioseris cucullata*	
Sinuous Cactus Coral	*Isophylla sinuosa*	
Ten-Rayed Star Coral	*Madracis decactis*	
Eight-ray Finger Coral	*Madracis formosa*	
Yellow Pencil Coral	*Madracis mirabilis*	
Encrusting Star Coral	*Madracis pharensis*	
Rose Coral	*Manicina areolata*	
Maze Coral	*Meandrina meandrites*	
Great Star Coral	*Montastraea cavernosa*	
Spiny Flower Coral	*Mussa angulosa*	
Knobby Cactus Coral	*Mycetophyllia aliciae*	
Rough Cactus Coral	*Mycetophyllia ferox*	FT
Ridged Cactus Coral	*Mycetophyllia lamarckiana*	
Diffuse Ivory Bush Coral	*Oculina diffusa*	
Robust Ivory Tree Coral	*Oculina robusta*	
Delicate Ivory Bush Coral	*Oculina tenella*	
Large Ivory Coral	*Oculina varicosa*	
Lobed Star Coral	*Orbicella annularis*	FT
Mountainous Star Coral	*Orbicella faveolata*	FT
Boulder Star Coral	*Orbicella franksi*	FT

Common Name	Species Name	Status
Hidden Cup Coral	*Phyllangia americana*	
Mustard Hill Coral	*Porites astreoides*	
Finger Coral	*Porites porites*	
Knobby Brain Coral	*Pseudodiploria clivosa*	
Symmetrical Brain Coral	*Pseudodiploria strigosa*	
Artichoke Coral	*Scolymia cubensis*	
Fleshy Disk Coral	*Scolymia lacera*	
Lesser Starlet Coral	*Siderastrea radians*	
Massive Starlet Coral	*Siderastrea siderea*	
Smooth Star Coral	*Solenastrea bournoni*	
Knobby Star Coral	*Solenastrea hyades*	
Blushing Star Coral	*Stephanocoenia intersepta*	
Rose Lace Coral	*Stylaster roseus*	
Soft Corals		
Common Sea Plume	*Antillogorgia acerosa*	
Slimy Sea Plume	*Antillogorgia americana*	
Deichmann's Sea Plume	*Antillogorgia elisabethae*	
Corky Sea Finger	*Briareum asbestinum*	
White Telesto	*Carijoa riisei*	
Colorful Sea Rod	*Diodogorgia nodulifera*	
Devil's Sea Whip	*Ellisella barbadensis*	
Encrusting Gorgonian	*Erythropodium caribaeorum*	
Knobby Sea Rod	*Eunicea calyculata*	
Knobby Candelabra Coral	*Eunicea clavigera*	
Bent Sea Rod	*Eunicea flexuosa*	
Doughnut Sea Rod	*Eunicea fusca*	
Black Sausage Coral	*Eunicea laciniata*	
Tube-Knob Candelabrum Coral	*Eunicea laxispica*	
Palmer's Eunicea	*Eunicea palmeri*	
Knight's Flexible Sea Rod	*Eunicea pinta*	
Shelf-Knob Sea Rod	*Eunicea succinea*	
Knobby Candelabra Coral	*Eunicea tourneforti*	
Common Sea Fan	*Gorgonia ventalina*	
Black Sea Fan	*Iciligorgia schrammi*	
Regal Sea Fan	*Leptogorgia hebes*	
Colorful Sea Whip	*Leptogorgia virgulata*	
Red Gorgonian	*Lophogorgia cardinalis*	
Delicate Spiny Sea Rod	*Muricea laxa*	
Spiny Sea Fan	*Muricea muricata*	

Common Name	Species Name	Status
Pinnate Spiny Sea Fan	*Muricea pendula*	
Spiny Candelabra Coral	*Muriceopsis petila*	
Bushy Sea Whip	*Nicella schmitti*	
Double-Forked Sea Rod	*Plexaurella dichotoma*	
Spindled Sea Rod	*Plexaurella fusifera*	
Gray Sea Rod	*Plexaurella grisea*	
Dwarf Sea Rod	*Plexaurella pumila*	
False Cross Plexaura	*Pseudoplexaura crucis*	
Slimy Sea Plume	*Pseudopterogorgia navia*	
Slimy Sea Plume	*Pseudopterogorgia rigida*	
Yellow Sea Whip	*Pterogorgia citrina*	
Grooved-Blade Sea Whip	*Pterogorgia guadalupensis*	
Red Polyp Octocoral	*Swiftia exserta*	
Sponges		
Orange Elephant Ear Sponge	*Agelas clathrodes*	
Brown Tube Sponge	*Agelas conifera*	
Brown Clustered Tube Sponge	*Agelas wiedermyeri*	
Erect Rope Sponge	*Amphimedon compressa*	
Brown Variable Sponge	*Anthosigmella varians*	
Row Pore Rope Sponge	*Aplysina cauliformis*	
Yellow Tube Sponge	*Aplysina fistularis*	
Scattered Pore Rope Sponge	*Aplysina fulva*	
Giant Tube Sponge	*Aplysina lacunosa*	
Azure Vase Sponge	*Callyspongia plicifera*	
Branching Vase Sponge	*Callyspongia vaginalis*	
Chicken-liver Sponge	*Chondrilla nucula*	
Orange Ball Sponge	*Cinachyra sp.*	
Yellow Boring Sponge	*Cliona celata*	
Red Boring Sponge	*Cliona deletrix*	
Lumpy Overgrowing Sponge	*Desmapsamma anchorata*	
Orange Sieve Encrusting Sponge	*Diplastrella sp.*	
Red-Orange Encrusting Sponge	*Diplastrella megastellata*	
Ethereal Sponge	*Dysidea sp.*	
Brown Encrusting Octopus Sponge	*Ectyoplasia ferox*	
Leathery Barrel Sponge	*Geodia sp.*	
Tubular Sponge	*Haliclona sp.*	
Red Sponge	*Haliclona rubens*	
Green Sponge	*Haliclona viridis*	
Green Finger Sponge	*Iotrochota birotulata*	

Common Name	Species Name	Status
Vase Sponge	*Ircinia campana*	
Sponge	*Ircinia fasciculata*	
Stinker Sponge	*Ircinia felix*	
Black Ball Sponge	*Ircinia strobolina*	
Variable Loggerhead Sponge	*Ircinia variabilis*	
Sponge	*Microciona juniperina*	
Red Encrusting Sponge	*Monanchora arbuscula*	
Pink Lumpy Sponge	*Monachora sp.*	
Pink Vase Sponge	*Niphates digitalis*	
Lavender Rope Sponge	*Niphates erecta*	
Rope Sponge	*Niphates sp.*	
Sponge	*Pellina carbonaria*	
Boring Sponge	*Pione lampa*	
Sponge spp.	*Poecilosclerida spp.*	
Sticky Orange Sponge	*Pseudaxinella lunaecharta*	
Branching Tube Sponge	*Pseudoceratina crassa*	
Tree Sponge	*Ptilocaulis sp.*	
Orange Lumpy Encrusting Sponge	*Scopalina ruetzleri*	
Blue Caribbean Sponge	*Sigmadocia caerulea*	
Loggerhead Sponge	*Spheciospongia vesparium*	
Maui Sponge	*Strongylacidon sp.*	
Fire Sponge	*Tedania ignis*	
Orange Sponge	*Ulosa sp.*	
Pitted Sponge	*Verongula rigida*	
Giant Barrel Sponge	*Xestospongia muta*	
Zoanthids		
White Encrusting Zoanthid	*Palythoa caribaeorum*	
Sun Zoanthid	*Palythoa grandis*	
Maroon Sponge Zoanthid	*Parazoanthus puertoricense*	
Zoanthid spp.	*Zoantharia spp.*	
Mat Zoanthid	*Zoanthus pulchellus*	
Hydroids		
Feather Plume Hydroid	*Aglaophenia latecarinata*	
Branching Fire Coral	*Millepora alcicornis*	
Blade Fire Coral	*Millepora complanata*	
Portuguese Man-of-War	*Physalia physalis*	
Yellow Branch Hydroid	*Sertularella arbuscula*	
Branching Hydroid	*Sertularella speciosa*	

Common Name	Species Name	Status
By-the-Wind Sailor	*Velella velella*	
Comb Jellies		
Sea Walnut	*Mnemiopsis mccradyi*	
True Jellyfish		
Moon Jellyfish	*Aurelia aurita*	
Polychaetes		
Split-Crown Feather Duster	*Anamobaea orstedii*	
Black Spotted Feather Duster	*Branchiomma nigromaculata*	
Parchment Tube Worm	*Chaetopterus variopedatus*	
Spaghetti Worm	*Eupolymnia crassicornis*	
Bearded Fireworm	*Hermodice carunculata*	
Medusa Worm	*Loimia medusa*	
Worm Rock	*Phragmatopoma caudata*	
Magnificent Feather Duster	*Sabellastarte magnifica*	
Christmas Tree Tube Worm	*Spirobranchus giganteus*	
Crustaceans		
Ivory Barnacle	*Balanus eburneus*	
Boxed Blue Crab	*Calappa sp.*	
Orange Claw Hermit Crab	*Calcinus tibicen*	
Blue Crab	*Callinectes sapidus*	
Lesser Blue Crab	*Callinectes similis*	
Land Crab	*Cardisoma guanhumi*	
Batwing Coral Crab	*Carpilius corallinus*	
Say's Mud Crab	*Dyspanopeus sayi*	
Mangrove Crab	*Goniopsis cruentata*	
Calico Crab	*Hepatus epheliticus*	
Spider Crab	*Libinia dubia*	
Horseshoe Crab	*Limulus polyphemus*	
Reef Mantis	*Lysiosquilla glabriuscula*	
Stone Crab	*Mennipe mercenaria*	
Channel Clinging Crab	*Mithrax spinosissimus*	
Ghost Crab	*Ocypode quadrata*	
Florida Spiny Lobster	*Panulirus argus*	
Spotted Spiny Lobster	*Panulirus guttatus*	
Pink Shrimp	*Penaeus duorarum*	
Nimble Spray Crab	*Percnon gibbesi*	

Common Name	Species Name	Status
Pederson Cleaner Shrimp	*Perichlimenes pedersoni*	
Giant Hermit Crab	*Petrochirus diogenes*	
Slipper Lobster	*Scyllarides aequinoctialis*	
Marsh Crab	*Sesarma cinereum*	
Banded Coral Shrimp	*Stenopus hispidus*	
Arrow Crab	*Stenorhynchus seticornis*	
Fiddler Crab	*Uca mordax*	
Atlantic Sand Fiddler	*Uca pugilator*	
Mudflat Fiddler	*Uca rapax*	
Mollusks		
Queen Conch	*Aliger gigas*	FT
Spotted Sea Hare	*Aplysia dactylomela*	
Star Snail spp.	*Astrea spp.*	
Lightning Whelk	*Busycon contrarium*	
Common Atlantic Bubble	*Bulla striata*	
Flyspeck Cerith	*Cerithium muscarum*	
Apple Murex	*Chicoreus pomum*	
Flamingo Tongue	*Cyphoma gibbosum*	
Cayenne Keyhole Limpet	*Diodora cayenensis*	
Atlantic Yellow Cowry	*Erosaria acicularis*	
Banded Tulip Conch	*Fasciolaria hunteria*	
True Tulip Conch	*Fasciolaria tulipa*	
Regal Sea Goddess	*Hypselodoris edenticulata*	
Purple Sea Snail	*Janthina janthina*	
Mangrove Periwinkle	*Littorina angulifera*	
Long-Spined Star Snail	*Lithopoma phoebium*	
Atlantic Deer Cowry	*Macrocypraea cervus*	
Measled Cowry	*Macrocypraea zebra*	
Crown Conch	*Melongena corona*	
Buttonsnail	*Modulus modulus*	
Lace Murex	*Murex florifer*	
Colorful Moonsnail	*Naticarius canrena*	
Netted Olive	*Oliva reticularis*	
Florida Horse Conch	*Pleuroploca gigantea*	
Shark's Eye	*Polinices duplicatus*	
Coffee Bean Trivia	*Pusula pediculus*	
Brown Baby Ear	*Sinum maculatum*	
Florida Fighting Conch	*Strombus alatus*	
Hawk-Wing Conch	*Strombus raninus*	

Common Name	Species Name	Status
Florida Rock Snail	*Stramonita haemastoma floridana*	
Bivalves		
Stiff Pen Shell	*Atrina rigida*	
Half-Naked Pen Shell	*Atrina seminuda*	
Transverse Ark	*Anadara transversa*	
Scorched Mussel	*Brachidontes exustus*	
Scaly Scallop	*Caribachlamys sentis*	
Cross-Barred Venus	*Chione cancellata*	
Eastern Oyster	*Crassostrea virginica*	
Atlantic Giant Cockle	*Dinocardium robustum*	
Disk Dosinia	*Dosinia discus*	
Elegant Dosinia	*Dosinia elegans*	
Variable Coquina Clam	*Donax variabilis*	
Ribbed Mussel	*Geukensia demissa*	
Flat Tree Oyster	*Isognomon alatus*	
Purse-Oyster spp.	*Isognomon spp.*	
File Clam	*Lima sp.*	
Sunray Venus	*Macrocallista nimbosa*	
Southern Quahog	*Mercenaria campechiensis*	
Pen Shell	*Pinna carnea*	
Atlantic Thorny Oyster	*Spondylus americanus*	
Favored Tellin	*Tellina fausta*	
Cephalopods		
Atlantic Pygmy Octopus	*Octopus joubini*	
Common Octopus	*Octopus vulgaris*	
Caribbean Reef Squid	*Sepioteuthis sepiodea*	
Echinoderms		
Sea Urchins		
Common Arbacia Urchin	*Arbacia punctulata*	
Long-Spined Sea	*Diadema antillarum*	
Rock-Boring Urchin	*Echinometra lucunter*	
Reef Urchin	*Echinometra viridis*	
Slate-Pencil Sea Urchin	*Eucidaris tribuloides*	
Variegated Urchin	*Lytechinus variegatus*	
Five-Keyhole Sand Dollar	*Mellita quinquiesperforata*	
Heart Urchin	*Moira atropos*	

Common Name	Species Name	Status
West Indian Sea Egg	*Tripnuestes ventricosus*	
Sea Stars		
Gray Sea Star	*Luidia clathrata*	
Blunt-Spined Brittle Star	*Opheocoma echinata*	
Cushion Sea Star	*Oreaster reticulatus*	
Crinoids		
Golden Crinoid	*Davidaster rubiginosa*	
Black And White Crinoid	*Nemaster grandis*	
Sea Cucumbers		
Five Toothed Sea Cucumber	*Actinopygia agassizii*	
Florida Sea Cucumber	*Holothuria floridana*	
Three-Rowed Sea Cucumber	*Isostichopus badionotus*	
Hidden Sea Cucumber	*Pseudothyone belli*	
Tunicates		
Black Tunicate	*Ascidia nigra*	
Painted Tunicate	*Clavelina picta*	
Black Condominium Tunicate	*Eudistoma obscuratum*	
Hard Purple/Brown Tunicate	*Eudistoma sp.*	
Purple Berry Compound	*Eudistoma sp.*	
White Condominium Tunicate	*Eudistoma sp.*	
Giant Tunicate	*Polycarpa spongiabilis*	
Pleated Sea Squirt	*Styela plicata*	
Cartilaginous Fishes		
Spotted Eagle Ray	*Aetobatus narinari*	
Bull Shark	*Carcharhinus leucas*	
Blacktip Shark	*Carcharhinus limbatus*	
Oceanic Whitetip Shark	*Carcharhinus longimanus*	FT
Southern Stingray	*Dasyatis americana*	
Atlantic Stingray	*Dasyatis sabina*	
Bluntnose Stingray	*Dasyatis say*	
Tiger Shark	*Galeocerdo cuvier*	
Nurse Shark	*Ginglymostoma cirratum*	
Spiny Butterfly Ray	*Gymnura altavela*	
Smooth Butterfly Ray	*Gymnura micrura*	
Giant Manta Ray	*Mobula birostris*	FT

Common Name	Species Name	Status
Lemon Shark	*Negaprion brevirostris*	
Smalltooth Sawfish	*Pristis pectinata*	FE
Scalloped Hammerhead Shark	*Sphyrna lewini*	
Great Hammerhead Shark	*Sphyrna mokarran*	
Bonnethead Shark	*Sphyrna tiburo*	
Yellow Stingray	*Urolophus jamaicensis*	
Bony Fishes		
Sergeant Major	*Abudefduf saxatilis*	
Honeycomb Cowfish	*Acanthostracion polygonia*	
Ocean Surgeonfish	*Acanthurus bahianus*	
Doctorfish	*Acanthurus chirurgus*	
Blue Tang	*Acanthurus coeruleus*	
Key Worm Eel	*Ahlia egmontis*	
Orange Filefish	*Aluterus schoepfi*	
Scrawled Filefish	*Aluterus scriptus*	
Redspotted Hawkfish	*Amblycirrhitus pinos*	
Black Margate	*Anisotremus surinamensis*	
Porkfish	*Anisotremus virginicus*	
Barred Cardinalfish	*Apogon binotatus*	
Flamefish	*Apogon maculatus*	
Two-Spot Cardinalfish	*Apogon pseudomaculatus*	
Belted Cardinalfish	*Apogon townsendi*	
Sheepshead	*Archosargus probatocephalus*	
Sea Bream	*Archosargus rhomboidalis*	
Hardhead Catfish	*Arius felis*	
Blackfin Cardinalfish	*Astropogon puncticulatus*	
Trumpetfish	*Aulostomus maculatus*	
Gafftopsail Catfish	*Bagre marinus*	
Striped Croaker	*Bairdiella sanctaeluciae*	
Gray Triggerfish	*Balistes carolinensis*	
Queen Triggerfish	*Balistes vetula*	
Spotfin Hogfish	*Bodianus pulchellus*	
Spanish Hogfish	*Bodianus rufus*	
Peacock Flounder	*Bothus lunatus*	
Atlantic Menhaden	*Brevoortia tyrannus*	
Jolthead Porgy	*Calamus bajonado*	
Saucereye Porgy	*Calamus calamus*	
Sheepshead Porgy	*Calamus penna*	
Whitespotted Filefish	*Cantherhines macrocerus*	

Common Name	Species Name	Status
Orangespotted Filefish	*Cantherhines pullus*	
Ocean Triggerfish	*Canthidermis sufflamen*	
Sharpnose Puffer	*Canthigaster rostrata*	
Yellow Jack	*Caranx bartholomaei*	
Blue Runner	*Caranx crysos*	
Jack Crevalle	*Caranx hippos*	
Horse-Eye Jack	*Caranx latus*	
Black Jack	*Caranx lugubris*	
Bar Jack	*Caranx ruber*	
Fat Snook	*Centropomus parallelus*	
Common Snook	*Centropomus undecimalis*	
Black Sea Bass	*Centropristes striata*	
Cherubfish	*Centropyge argi*	
Graysby	*Cephalopholis cruentata*	
Coney	*Cephalopholis fulva*	
Yellowface Pikeblenny	*Chaenopsis limbaughi*	
Atlantic Spadefish	*Chaetodipterus faber*	
Longnose Butterflyfish	*Chaetodon aculeatus*	
Four-Eye Butterflyfish	*Chaetodon capistratus*	
Spotfin Butterflyfish	*Chaetodon ocellatus*	
Reef Butterflyfish	*Chaetodon sedentarius*	
Banded Butterflyfish	*Chaetodon striatus*	
Spotted Burrfish	*Chilomycterus atinga*	
Striped Burrfish	*Chilomycterus schoepfii*	
Atlantic Bumper	*Chloroscombrus chrysurus*	
Blue Chromis	*Chromis cyanea*	
Yellowtail Reeffish	*Chromis enchrysura*	
Sunshinefish	*Chromis insolata*	
Brown Chromis	*Chromis multilineata*	
Purple Reeffish	*Chromis scotti*	
Creole Wrasse	*Clepticus parrae*	
Colon Goby	*Coryphopterus dicrus*	
Bridled Goby	*Coryphopterus glaucofraenum*	
Masked Goby	*Coryphopterus personatus*	
Bluelip Parrotfish	*Cryptotomus roseus*	
Atlantic Flying Fish	*Cypselurus heterurus*	
Siver Seatrout	*Cynoscion nothus*	
Flying Gurnard	*Dactylopterus volitans*	
Mackerel Scad	*Decapterus macarellus*	
Round Scad	*Decapterus punctatus*	

Common Name	Species Name	Status
Irish Mojarra	*Diapterus auratus*	
Striped Mojarra	*Diapterus plumieri*	
Balloonfish	*Diodon holocanthus*	
Sand Perch	*Diplectrum formosum*	
Silver Porgy	*Diplodus argenteus*	
Spottail Pinfish	*Diplodus holbrooki*	
Porcupinefish	*Diodon hystrix*	
Sharksucker	*Echeneis naucrates*	
Chain Moray	*Echidna catenata*	
Neon Goby	*Elacatinus oceanops*	
Rainbow Runner	*Elagatis bipinnulata*	
Lady Fish	*Elops saurus*	
Sailfin Blenny	*Emblemaria pandionis*	
Rock Hind	*Epinephelus adscensionis*	
Red Hind	*Epinephelus guttatus*	
Goliath Grouper	*Epinephelus itajara*	
Red Grouper	*Epinephelus morio*	
Nassau Grouper	*Epinephelus striatus*	FT
Jackknife Fish	*Equetus lanceolatus*	
Jackknife Fish	*Equetus lanceolatus*	
Spotted Drum	*Equetus punctatus*	
Silver Jenny	*Eucinostomus gula*	
Mottled Mojarra	*Eucinostomus lefroyi*	
Flagfin Mojarra	*Eucinostomus melanopterus*	
Little Tunny	*Euthynnus alletteratus*	
Golden Topminnow	*Fundulus chrysotus*	
Marsh Killifish	*Fundulus confluentis*	
Gulf Killifish	*Fundulus grandis*	
Yellowfin Mojarra	*Gerres cinereus*	
Goldspot Goby	*Gnatholepis thompsoni*	
Orangesided Goby	*Gobiosoma dilepsis*	
Spotlight Goby	*Gobiosoma louisae*	
Green Moray	*Gymnothorax funebris*	
Goldentail Moray	*Gymnothorax miliaris*	
Spotted Moray	*Gymnothorax moringa*	
Purplemouth Moray	*Gymnothorax vicinus*	
White Margate	*Haemulon album*	
Tomtate	*Haemulon aurolineatum*	
Caesar Grunt	*Haemulon carbonarium*	
Smallmouth Grunt	*Haemulon chrysargyreum*	

Common Name	Species Name	Status
French Grunt	*Haemulon flavolineatum*	
Spanish Grunt	*Haemulon macrostomum*	
Cottonwick	*Haemulon melanurum*	
Sailors Choice	*Haemulon parra*	
White Grunt	*Haemulon plumieri*	
Bluestriped Grunt	*Haemulon sciurus*	
Striped Grunt	*Haemulon striatum*	
Slippery Dick	*Halichoeres bivittatus*	
Yellowhead Wrasse	*Halichoeres garnoti*	
Clown Wrasse	*Halichoeres maculipinna*	
Rainbow Wrasse	*Halichoeres pictus*	
Blackear Wrasse	*Halichoeres poeyi*	
Puddingwife	*Halichoeres radiatus*	
Scaled Sardine	*Harengula jaguana*	
Balao	*Hemiramphus balao*	
Ballyhoo	*Hemiramphus brasiliensis*	
Garden Eel	*Heteroconger sp.*	
Glasseye Snapper	*Heteropriacanthus cruentatus*	
Blue Angelfish	*Holacanthus bermudensis*	
Queen Angelfish	*Holacanthus ciliarus*	
Rock Beauty	*Holacanthus tricolor*	
Townsend Angelfish	*Holocanthus sp.*	
Squirrelfish	*Holocentrus ascensionsis*	
Longspine Squirrelfish	*Holocentrus rufus*	
Barred Blenny	*Hypleurochilus bermudensis*	
Yellowtail Hamlet	*Hypoplectrus chlorurus*	
Blue Hamlet	*Hypoplectrus gemma*	
Black Hamlet	*Hypoplectrus nigricans*	
Barred Hamlet	*Hypoplectrus puella*	
Butter Hamlet	*Hypoplectrus unicolor*	
Bermuda Chub	*Kyphosus sectatrix*	
Palehead Blenny	*Labrisomus gobio*	
Downy Blenny	*Labrisomus kalisherae*	
Hairy Blenny	*Labrisomus nuchipinnis*	
Hogfish	*Lachnolaimus maximus*	
Spotted Trunkfish	*Lactophrys bicaudalis*	
Smooth Trunkfish	*Lactophrys triqueter*	
Scrawled Cowfish	*Lactophrys quadricornis*	
Pinfish	*Lagodon rhomboids*	
Spot Croaker	*Leiostomus xanthurus*	

Common Name	Species Name	Status
Wrasse Bass	*Liopropoma eukrines*	
Mutton Snapper	*Lutjanus analis*	
Schoolmaster Snapper	*Lutjanus apodus*	
Blackfin Snapper	*Lutjanus buccanella*	
Gray Snapper	*Lutjanus griseus*	
Dog Snapper	*Lutjanus jocu*	
Mahogany Snapper	*Lutjanus mahogoni*	
Lane Snapper	*Lutjanus synagris*	
Sand Tilefish	*Malacanthus plumieri*	
Rosy Blenny	*Malacoctenus macropus*	
Saddled Blenny	*Malacoctenus triangulatus*	
Tarpon	*Megalops atlanticus*	
Black Durgon	*Melichthys niger*	
Whiting	*Merlangius merlangus*	
Harlequin Pipefish	*Micrognathus ensenadae*	
Atlantic Croaker	*Micropogon undalatus*	
Yellowtail Damselfish	*Microspathodon chrysurus*	
Fringed Filefish	*Monocanthus ciliatus*	
Slender Filefish	*Monocanthus tuckeri*	
Black Mullet	*Mugil cephalus*	
Silver Mullet	*Mugil curema*	
Yellow Goatfish	*Mulloidichthys martinicus*	
Goldentail Moray	*Muraena miliaris*	
Black Grouper	*Mycteroperca bonaci*	
Yellowmouth Grouper	*Mycteroperca interstitialis*	
Gag Grouper	*Mycteroperca microlepis*	
Scamp	*Mycteroperca phenax*	
Sharptail Snake Eel	*Myrichthys breviceps*	
Blackbar Soldierfish	*Myripristis jacobus*	
Yellowtail Snapper	*Ocyurus chrysurus*	
Reef Croaker	*Odontoscion dentex*	
Atlantic Leatherjacket	*Oligoplites saurus*	
Redlip Blenny	*Ophioblennius atlanticus*	
Yellowhead Jawfish	*Opistognathus aurifrons*	
Banded Jawfish	*Opistognathus macrognathus*	
Spotfin Jawfish	*Opistognathus robinsi*	
Threadfin Herring	*Opistonema oglinum*	
Seaweed Blenny	*Parablennius marmoreus*	
Banded Blenny	*Paraclinus fasciatus*	
Lancer Dragonet	*Paradiplogrammus bairdi*	

Common Name	Species Name	Status
Gulf Flounder	*Paralichthys albigutta*	
Southern Flounder	*Paralichthys lethostigma*	
Cubbyu	*Pareques umbrosus*	
Highhat	*Pareques acuminatus*	
Glassy Sweeper	*Pempheris schomburgkii*	
Dusky Cardinalfish	*Phaeoptyx pigmentaria*	
Black Drum	*Pogonias cromis*	
Barbu	*Polydactylus virginicus*	
Gray Angelfish	*Pomacanthus arcuatus*	
French Angelfish	*Pomacanthus paru*	
Bluefish	*Pomatomus saltatrix*	
Bigeye	*Priacanthus arenatus*	
Spotted Goatfish	*Pseudupeneus maculatus*	
Blue Goby	*Ptereleotris calliurus*	
Hovering Goby	*Ptereleotris helenae*	
Cobia	*Rachycentron canadum*	
Atlantic Guitarfish	*Rhinobatos lentiginosus*	
Mangrove Rivulus	*Rivulus marmoratus*	
Whitespotted Soapfish	*Rypticus maculatus*	
Greater Soapfish	*Rypticus saponaceus*	
Spotted Soapfish	*Rypticus subbifrenatus*	
Cigar Minnow	*Sardinella anchovia*	
Spanish Sardine	*Sardinella aurita*	
Molly Miller	*Scartella cristata*	
Midnight Parrotfish	*Scarus coelestinus*	
Blue Parrotfish	*Scarus coeruleus*	
Rainbow Parrotfish	*Scarus guacamaia*	
Striped Parrotfish	*Scarus iseri*	
Princess Parrotfish	*Scarus taeniopterus*	
Queen Parrotfish	*Scarus vetula*	
Red Drum	*Sciaenops ocellatus*	
King Mackerel	*Scomberomorus cavalla*	
Spanish Mackerel	*Scomberomorus maculates*	
Cero Mackerel	*Scomberomorus regalis*	
Spotted Scorpionfish	*Scorpaena plumieri*	
Bigeye Scad	*Selar crumenophthalmus*	
Lookdown	*Selene vomer*	
Greater Amberjack	*Seriola dumerili*	
Pygmy Sea Bass	*Serraniculus pumilio*	
Lantern Bass	*Serranus baldwini*	

Common Name	Species Name	Status
Twinspot Bass	*Serranus flaviventrus*	
Belted Sandfish	*Serranus subligarius*	
Tobaccofish	*Serranus tabacarius*	
Harlequin Bass	*Serranus tigrinus*	
Greenblotch Parrotfish	*Sparisoma atomarium*	
Redband Parrotfish	*Sparisoma aurofrenatum*	
Redtail Parrotfish	*Sparisoma chrysopterum*	
Yellowtail (Redfin) Parrotfish	*Sparisoma rubripinne*	
Stoplight Parrotfish	*Sparisoma viride*	
Southern Puffer	*Sphoeroides nephelus*	
Bandtail Puffer	*Sphoeroides splengleri*	
Checkered Puffer	*Sphoeroides testudineus*	
Great Barracuda	*Sphyraena barracuda*	
Guachanche Barracuda	*Sphyraena guachancho*	
Southern Sennet	*Sphyraena picudilla*	
Checkered Blenny	*Starksia ocellata*	
Dusky Damselfish	*Stegastes adustus*	
Longfin Damselfish	*Stegastes diencaeus*	
Scarlet Damselfish	*Stegastes dorsopunicans*	
Beaugregory	*Stegastes leucostictus*	
Bicolor Damselfish	*Stegastes partitus*	
Threespot Damselfish	*Stegastes planifrons*	
Cocoa Damselfish	*Stegastes variabilis*	
Planehead Filefish	*Stephanolepis hispidus*	
Atlantic Needlefish	*Strongylura marina*	
Redfin Needlefish	*Strongylura notata*	
Channel Flounder	*Syacium micrurum*	
Inshore Lizardfish	*Synodus foetens*	
Sand Diver	*Synodus intermedius*	
Bluehead Wrasse	*Thalassoma bifasciatum*	
Pompano	*Trachinotus carolinus*	
Permit	*Trachinotus falcatus*	
Palometa	*Trachinotus goodie*	
Hogchoker	*Trinectes maculates*	
Rosy Razorfish	*Xyrichtys martinicensis*	
Pearly Razorfish	*Xyrichtys novacula*	
Green Razorfish	*Xyrichtys splendens*	
Anemones		
Corkscrew Anemone	*Bartholomea annulata*	

Common Name	Species Name	Status
Giant Anemone	*Condylactis gigantea*	
Reptiles		
Crocodiles		
American Crocodile	*Crocodylus acutus*	
Sea Turtles		
Loggerhead Sea Turtle	*Caretta caretta*	FT
Green Sea Turtle	*Chelonia mydas*	FT
Leatherback Sea Turtle	*Dermochelys coriacea*	FE
Hawksbill Sea Turtle	*Eretmochelys imbricata*	FE
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	FE
Birds		
Loons		
Common Loon	*Gavia immer*	
Swimming Birds		
Anhinga	*Anhinga anhinga*	
Magnificent Frigate Bird	*Fregata magnificens*	
Northern Gannet	*Morus bassanus*	
American White Pelican	*Pelecanus erythrorhynchos*	
Brown Pelican	*Pelecanus occidentalis*	
Double-Crested Cormorant	*Phalacrocorax auritus*	
Wading Birds		
Great Egret	*Ardea alba*	
Great Blue Heron	*Ardea herodias*	
Cattle Egret	*Bubulcus ibis*	
Green Heron	*Butorides virescens*	
Little Blue Heron	*Egretta caerulea*	ST
Reddish Egret	*Egretta rufescens*	ST
Snowy Egret	*Egretta thula*	
Tricolored Heron	*Egretta tricolor*	ST
White Ibis	*Eudocimus albus*	
Wood Stork	*Mycteria americana*	FT
Black-Crowned Night Heron	*Nycticorax nycticorax*	
Yellow-Crowned Night Heron	*Nyctanassa violacea*	
Roseate Spoonbill	*Platalea ajaja*	ST

Common Name	Species Name	Status
Shorebirds		
Spotted Sandpiper	*Actitis macularia*	
Ruddy Turnstone	*Arenaria interpres*	
Sanderling	*Calidris alba*	
Dunlin	*Calidris alpine*	
Rufa Red Knot	*Calidris canutus rufa*	FT
Least Sandpiper	*Calidris minutilla*	
Semipalmated Sandpiper	*Calidris pusilla*	
Willet	*Catoptrophorus semipalmatus*	
Piping Plover	*Charadrius melodus*	
Semipalmated Plover	*Charadrius semipalmatus*	
Wilson's Plover	*Charadrius wilsonia*	
Killdeer	*Charadrius vociferous*	
American Oystercatcher	*Haematopus palliatus*	
Short-Billed Dowitcher	*Limnodromus griseus*	
Long-Billed Dowitcher	*Limnodromus scolopaceus*	
Marbled Godwit	*Limosa fedoa*	
Black-Bellied Plover	*Pluvialis squatarola*	
Gulls & Terns		
Belted Kingfisher	*Ceryle alcyon*	
Black Tern	*Chlidonias niger*	
Herring Gull	*Larus argentatus*	
Laughing Gull	*Larus atricilla*	
Ring-Billed Gull	*Larus delawarensis*	
Lesser Black-Backed Gull	*Larus fuscus*	
Great Black-Backed Gull	*Larus marinus*	
Bonaparte's Gull	*Larus philadelphia*	
Osprey	*Pandion haliaetus*	
Black Skimmer	*Rynchops niger*	ST
Least Tern	*Sterna antillarum*	ST
Caspian Tern	*Sterna caspia*	
Forster's Tern	*Sterna forsteri*	
Common Tern	*Sterna hirundo*	
Royal Tern	*Sterna maxima*	
Gull-Billed Tern	*Sterna nilotica*	
Sandwich Tern	*Sterna sandvicensis*	
Lesser Yellowlegs	*Tringa flavipes*	
Greater Yellowlegs	*Tringa melanoleuca*	

Common Name	Species Name	Status
Mammals		
North Atlantic Right Whale	*Eubalaena glacialis*	FE
Pygmy Sperm Whale	*Kogia breviceps*	
Atlantic Spotted Dolphin	*Stenella frontalis*	
Florida Manatee	*Trichechus manatus*	FT
Bottlenose Dolphin	*Tursiops truncatus*	

B.3.2 / Listed Species

Common Name	Species Name	Protected Status
Stony Corals		
Staghorn Coral	*Acropora cervicornis*	FT
Elkhorn Coral	*Acropora palmata*	FT
Pillar Coral	*Dendrogyra cylindrus*	FE
Rough Cactus Coral	*Mycetophyllia ferox*	FT
Lobed Star Coral	*Orbicella annularis*	FT
Mountainous Star Coral	*Orbicella faveolata*	FT
Boulder Star Coral	*Orbicella franksi*	FT
Mollusks		
Queen Conch	*Aliger gigas*	FT
Cartilaginous Fishes		
Oceanic Whitetip Shark	*Carcharhinus longimanus*	FT
Giant Manta Ray	*Mobula birostris*	FT
Smalltooth Sawfish	*Pristis pectinata*	FE
Bony Fishes		
Nassau Grouper	*Epinephelus striatus*	FT
Sea Turtles		
Loggerhead Sea Turtle	*Caretta caretta*	FT
Green Sea Turtle	*Chelonia mydas*	FT
Leatherback Sea Turtle	*Dermochelys coriacea*	FE
Hawksbill Sea Turtle	*Eretmochelys imbricata*	FE
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	FE
Wading Birds		
Little Blue Heron	*Egretta caerulea*	ST
Reddish Egret	*Egretta rufescens*	ST
Tricolored Heron	*Egretta tricolor*	ST

Common Name	Species Name	Protected Status
Wood Stork	*Mycteria americana*	FT
Roseate Spoonbill	*Platalea ajaja*	ST
Shorebirds		
Rufa Red Knot	*Calidris canutus rufa*	FT
Gulls & Terns		
Black Skimmer	*Rynchops niger*	ST
Least Tern	*Sterna antillarum*	ST
Mammals		
North Atlantic Right Whale	*Eubalaena glacialis*	FE
Florida Manatee	*Trichechus manatus latirostris*	FT

B.3.3 / Invasive, Non-Native and/or Problem Species List

Common Name	**Species Name**
PROTISTS - PROTISTA	
Macroalgae and Cyanobacteria	
Invasive Alga	*Caulerpa brachypus*
Benthic Cyanobacteria spp.	*Lyngbya spp.*
PLANTS - PLANTAE	
Seagrass	
Johnson's Seagrass	*Halophila johnsonii*
ANIMALS - ANIMALIA	
Soft Corals	
Orange Cup Coral	*Tubastraea coccinea*
Crustaceans	
Bocourt Swimming Crab	*Callinectes bocourti*
Mollusks	
Red-rimmed Melania	*Melanoides tuberculata*
Bony Fishes	
Devil Firefish	*Pterois miles*
Red Lionfish	*Pterois volitans*

B.4 / Archaeological Sites Associated with Kristin Jacobs Coral Aquatic Preserve

Site Name	Site Type	Year	D_NR Listed
Half Moon	Shipwreck	1930	5/23/2001
Lofthus	Shipwreck	1898	1/6/2004
SS Copenhagen	Shipwreck	1900	5/31/2001

Appendix C / Public Involvement

C.1 / Meeting Schedule

Meeting	Date
Advisory Committee Meeting 1	September 3, 2025
Advisory Committee Meeting 2	October 14, 2025
Public Meeting North	TBD
Public Meeting South	TBD
Public Meeting Virtual	TBD

C.2 / Advisory Committee

List of Invitees and their affiliations.
Note: Committee members may have had 'stand in' representation at Management Advisory Committee Meetings. Attendance at meetings is noted in meeting summaries below.

First Name	Last Name	Role	Affiliation
Katelyn	Armstrong	Committee Member	Palm Beach County
Cassondra	Armstrong	Committee Member	South Florida Water Management District
Amy	Castaneda	Committee Member	Miccosukee Tribe
Kevin	Cunniff	Committee Member	Miccosukee Tribe
Angela	Delaney	Committee Member	Broward County
Mike	Dixon	Committee Member	Fishing Community Representative
Beam	Furr	Committee Member	Mayor, Broward County
Jessica	Garland	Committee Member	Martin County
Justin	Grubich	Committee Member	Pew Charitable Trust
Sarah	Heard	Committee Member	Commissioner, Martin County
Carrie	Jones	Committee Member	Florida Department of Agriculture and Consumer Services
Shana	Phelan	Committee Member	Diving Community Representative
Sara	Rahmankhan	Committee Member	Broward County Soil and Water Conservation District
Tom	Reinert	Committee Member	Florida Fish and Wildlife Conservation Commission

First Name	Last Name	Role	Affiliation
Rob	Ruzicka	Committee Member	Florida Fish and Wildlife Conservation Commission – Fish and Wildlife Research Institute
Melissa	Sathe	Committee Member	Friends of Our Florida Reefs
Rachel	Silverstein	Committee Member	Miami Waterkeeper
Sara	Thanner	Committee Member	Miami-Dade County
Josh	Voss	Committee Member	Florida Atlantic University - Harbor Branch Oceanographic Institute
Joanna	Walczak	Committee Member	Loggerhead Marinelife Center
Eva	Webb	Committee Member	Palm Beach County Soil and Water Conservation District
Dana	Wusinich-Mendez	Committee Member	National Oceanographic and Atmospheric Administration
Salena	Alberti	Subject Matter Expert	Florida Department of Environmental Protection
Griffin	Alexander	Subject Matter Expert	Florida Department of Environmental Protection
Irene	Arpayoglou	Subject Matter Expert	Florida Department of Environmental Protection
Christopher	Camargo	Subject Matter Expert	Florida Department of Environmental Protection
Lainie	Edwards	Subject Matter Expert	Florida Department of Environmental Protection
Greg	Garis	Subject Matter Expert	Florida Department of Environmental Protection
Mark	Hendrixson	Subject Matter Expert	Florida Department of Environmental Protection
Maria	Maffei	Subject Matter Expert	Florida Department of Environmental Protection
Maurizio	Martinelli	Subject Matter Expert	Florida Department of Environmental Protection
Nick	Parr	Subject Matter Expert	Florida Department of Environmental Protection
Earl	Pearson	Subject Matter Expert	Florida Department of Environmental Protection
Alex	Reed	Subject Matter Expert	Florida Department of Environmental Protection
John	Tracey	Subject Matter Expert	Florida Department of Environmental Protection
Nia	Wellendorf	Subject Matter Expert	Florida Department of Environmental Protection
Sam	Cook	Facilitator	Nova Southeastern University - National Coral Reef Institute

Advisory Committee Invitation:

Florida Department of Environmental Protection (DEP)

Coral Reef Conservation Program

Invitation to Serve on Kristin Jacobs Coral Aquatic Preserve Advisory Committee

Background on Kristin Jacobs Coral Aquatic Preserve (KJCAP):

Excitingly, in 2024 the Florida Legislature passed a bill that included approving an Aquatic Preserve (AP) designation for the portion of Florida's Coral Reef that lies offshore from St. Lucie Inlet in Martin County, through Palm Beach and Broward Counties, to the northern border of Biscayne National Park in Miami-Dade County. The newly designated Kristin Jacobs Coral Aquatic Preserve (KJCAP), named in honor of the late Broward County state representative, is the state of Florida's 43rd Aquatic Preserve. This recent designation formalizes the managing relationship between the northern portion of Florida's Coral Reef and DEP's Coral Reef Conservation Program, as well as providing additional biological, aesthetic, and scientific protections. The AP designation also ensures holistic management of the area by improving coordination of coral reef restoration and shoreline stabilization projects, streamlining water quality monitoring efforts, and solidifying Florida's commitment to protecting its coral reef habitat and resources.

Chapter 18-20, Florida Administrative Code (F.A.C.), entitled Florida Aquatic Preserves, mandates the creation of a management plan that would provide an overview of the aquatic preserve and programs, and detail goals, objectives, and strategies for long term conservation.

DEP's Coral Reef Conservation Program (CRCP) initially contracted the University of Miami several years prior to draft an Action Plan comprised of Southeast Florida Coral Reef Initiative Local Action Strategy projects, Our Florida Reefs recommendations, Fisheries Working Group recommendations, and CRCP projects. The Action Plan was modelled after the AP management plan structure, with the hope of one day forming the basis of an AP management for the region. For more information about the Our Florida Reefs process,

please go to: https://ourfloridareefs.org/. Likewise, the final report for the Fisheries Working Group can be viewed here: https://floridadep.gov/rcp/coral/documents/fdou-52-final-report.

Chapter 259.032, Florida Statute (F.S.) stipulates that management plans shall be developed with input from an advisory group, that public hearings should be conducted, and describes the requirements of both. Thus, a series of Advisory Committee and public meetings will be held so that relevant parties can become familiar with and provide comment on the KJCAP management plan. CRCP is beginning this process with the formation of the KJCAP Advisory Committee. CRCP seeks engaged stakeholders who are willing to provide feedback on the KJCAP management plan and who are committed to the shared goal of conserving the unique ecosystem that is the Kristin Jacobs Coral Aquatic Preserve.

Advisory Committee Objectives:

- To provide feedback on the KJCAP draft management plan, especially any feedback related to the goals, objectives, strategies, and performance measures that intersect and leverage your particular subject matter expertise.
- To promote the subsequent three KJCAP draft management plan public meetings among your networks to facilitate robust community involvement across all regional partner groups.
- To enhance public awareness regarding KJCAP's recent Aquatic Preserve designation by the State of Florida.

Roles and Responsibilities:

- Attend both Advisory Committee Meetings (one virtually and one in-person).
- Complete pre-work in advance of the second Advisory Committee meeting, where members will be asked to review the KJCAP draft management plan before the meeting.
- Assist DEP CRCP with circulation of public meeting announcement among your specialized relevant networks.
- Act with integrity, professionalism, and respect towards fellow Advisory Committee members.
- Demonstrate commitment to the shared goal of conserving the unique ecosystem that is the Kristin Jacobs Coral Aquatic Preserve.

Please note that the commitment to serve on the KJCAP Advisory Committee concludes at the end of 2025, following the completion of the regional public meetings. Should you wish to continue your support of the Kristin Jacobs Coral Aquatic Preserve, please learn more about serving on the Southeast Florida Coral Reef Initiative (SEFCRI) Team at https://southeastfloridareefs.net/

Please contact the Kristin Jacobs Coral Aquatic Preserve Manager, Alycia Shatters, at Alycia.Shatters@FloridaDEP.gov or the Fishing, Diving, and Other Uses Coordinator, Stephanie Stinson, at Stephanie.Stinson@FloridaDEP.gov with any questions about the Advisory Committee.

Figure caption: Map of the KJCAP in relation to other managed areas in Florida.

C.3.1 / Florida Administrative Register Posting

Panel; September 10, 2025, 8:30 a.m. or as soon thereafter as can be heard, Teacher Hearing Panel; September 10, 2025, 1:30 p.m. or as soon thereafter as can be heard, Administrator Hearing Panel; September 11, 2025, 9:00 a.m. or as soon thereafter, Business Meeting; September 11, 2025, 1:30 p.m. or as soon thereafter, All-Member Workshop; September 12, 2025, 8:00 a.m. or as soon thereafter as can be heard, Teacher Hearing Panel

PLACE: Embassy Suites Orlando Airport, 5835 T. G. Lee Boulevard, Orlando, Florida 32822, (407)888-9339.

GENERAL SUBJECT MATTER TO BE CONSIDERED: The Hearing Panels of the Education Practices Commission will consider final agency action in matters dealing with the disciplining of certified educators. The Business Meeting is being held to discuss the business of the Commission. The All-Member Workshop is being held to train members of the Commission.

A copy of the agenda may be obtained by contacting: Lisa Forbess at (850)245-0455.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Lisa Forbess at (850)245-0455. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

If any person decides to appeal any decision made by the Board with respect to any matter considered at this meeting or hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.

For more information, you may contact: Lisa Forbess at (850)245-0455.

DEPARTMENT OF LAW ENFORCEMENT

Criminal Justice Standards and Training Commission

The Criminal Justice Standards and Training Commission announces a public meeting to which all persons are invited.

DATE AND TIME: September 16, 2025, 10:00 a.m., EDT

PLACE: CJSTC Probable Cause Determination Hearings will be held at Polk State College Kenneth Thompson Institute of Public Safety, 1251 Jim Keene Boulevard, Winter Haven, Florida 32408.

GENERAL SUBJECT MATTER TO BE CONSIDERED: The above meeting will be held to determine whether or not probable cause exists to pursue disciplinary action against the certification of sworn correctional, law enforcement, or correctional probation officers.

A copy of the agenda may be obtained by contacting: Kamal Meshedi at (850)410-8632 or by e-mail at KamalMeshedi@fdle.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Erica Gaines at (850)410-8645 or by e-mail at EricaGaines@fdle.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Erica Gaines at (850)410-8645 or by e-mail at EricaGaines@fdle.state.fl.us.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection (DEP), Office of Resilience and Coastal Protection's Coral Reef Conservation Program announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, September 3, 2025, 10:00 a.m. – 2:00 p.m.

PLACE: Virtually, via Zoom

Meeting ID: 812 9534 5262

Passcode: 933219

https://us06web.zoom.us/j/81295345262?pwd=iRi3L3kbil6MT0CibmWbQcsyZzf5pz.1

GENERAL SUBJECT MATTER TO BE CONSIDERED: DEP's Coral Reef Conservation Program is holding a meeting of the Kristin Jacobs Coral Aquatic Preserve Advisory Committee to advance the approval and adoption of the Kristin Jacobs Coral Aquatic Preserve Management Plan, Florida's most recently designated aquatic preserve.

The objectives of this initial advisory committee meeting are to:

• Provide historical context on the formation of the Kristin Jacobs Coral Aquatic Preserve.

• Provide background on Chapter 259.032, Florida Statute, which stipulates that aquatic preserve management plans shall be developed with input from an advisory group and from the public, and outline the timeline for the subsequent steps of this process.

• Outline work completed to date during the drafting of the Kristin Jacobs Coral Aquatic Preserve management plan.

• Introduce the advisory committee members to one another.

• Expand on the roles and responsibilities expected of advisory committee members.

While public comments are welcome, please note that a subsequent advisory committee meeting will be held in mid-October with the explicit purpose of addressing any public comments once the advisory committee members have had time to review the draft plan.

A copy of the agenda may be obtained by contacting: Stephanie Stinson by email: Stephanie.Stinson@FloridaDEP.gov; phone: (561)681-6630; mail: 3301 Gun Club Road, B-2, West Palm Beach, FL, 33406

Public participation is solicited without regard to race, color, religion, sex, pregnancy, national origin, age, handicap, or marital status. Persons who require special accommodations under the American with Disabilities Act (ADA) or persons who require translation services (free of charge) are asked to contact DEP's Limited English Proficiency Coordinator at (850)245-2118 or LEP@FloridaDEP.gov at least forty-eight (48) hours before the meeting. If you have a hearing or speech impairment, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (voice).

collaborative sessions aimed at advancing best practices and fostering innovation across the field.

A copy of the agenda may be obtained by contacting: renee.senn@flhealth.gov

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 7 days before the workshop/meeting by contacting: renee.senn@flhealth.gov. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: renee.senn@flhealth.gov

C.3.2 / Meeting Summary

Kristin Jacobs Coral Aquatic Preserve Advisory Committee Meeting 1
Wednesday, September 3rd, 2025
10 am – 2 pm EST Via Zoom

Background:
The purpose of this limited-term Advisory Committee (AC) is to ensure that the resulting Kristin Jacobs Coral Aquatic Preserve (KJCAP) management plan is a robust document that is representative of our broader community and will provide the necessary guidance to thoughtfully manage the unique ecosystem that is the Kristin Jacobs Coral Aquatic Preserve.

Meeting Objectives:
Goal 1: Convene the KJCAP Advisory Committee.
Objective 1.1: Build the foundation for a collaborative environment that allows KJCAP Advisory Committee members to engage in productive discussions and provide meaningful feedback on the Kristin Jacobs Coral Aquatic Preserve's management plan prior to its finalization in early 2026.

Goal 2: Review all necessary background information for the KJCAP Advisory Committee to be equipped to provide meaningful feedback to the Kristin Jacobs Coral Aquatic Preserve's management plan.
Objective 2.1: Present background information on the history of KJCAP and the management plan in a consumable and clear manner.

Objective 2.2: Provide ample time for questions and answers to ensure all KJCAP Advisory Committee members feel comfortable with the management plan background to provide meaningful feedback at Advisory Committee Meeting #2.

Goal 3: Introduce KJCAP management plan review process and set clear expectations for pre-work to be completed before Meeting #2.

Attendees:
Facilitator: Sam Cook

KJCAP Affiliated and Staff: Alycia Shatters, Stephanie Stinson, Taylor Tucker, Elena Kampian, Lara Bracci, Maya Bhalla-Ladd, Megan Miller, Kimberly Platt, Amanda Lewan, Mollie Cordo

Advisory Committee Members: Katelyn Armstrong, Cassondra Armstrong, Kevin Cunniff, Mike Dixon, Mayor Beam Furr, Jessica Garland, Justin Grubich, Commissioner Sarah Heard, Carrie Jones, Shana Phelan, Sara Rahmankhan, Tom Reinert, Rob Ruzika, Melissa Sathe, Rachel Silverstein, Sara Thanner, Josh Voss, Joanna Walczak, Eva Webb, Dana Wusinich-Mendez, Salena Alberti, Griffin Alexander, Irene Arpayoglou, Christopher Camargo, Lainie Edwards, Greg Garis, Mark Hendrixson, Maria Maffei, Maurizio Martinelli, Nick Parr, Earl Pearson, Alex Reed, John Tracey, Nia Wellendorf

Public Observers: The Florida Channel, Clay Miller, Aliza Karim – Miami Waterkeeper, Penny Cutt, Jessica Clawson – FWC

Meeting Summary:
Welcome and Introductions
Sam Cook welcomed everyone to the first meeting of the KJCAP Advisory Committee. She introduced herself as the facilitator for the process and explained that her primary role is to guide the management plan process, keep the meeting on track, ensure everyone has a chance to contribute, and keep the group on time and productive.

Alycia Shatters then welcomed the group and introduced herself as the Coral Reef Conservation Program (CRCP) and KJCAP Manager. Taylor Tucker followed by introducing herself as the Assistant Manager and Reef Resilience Coordinator based in West Palm Beach. Stephanie then introduced herself as the Fishing, Diving, and Other Uses Coordinator also based in West Palm Beach.

Sam provided background information on the Advisory Committee and explained the distinction between this group and the Southeast Florida Coral Reef Initiative (SEFCRI). The Advisory Committee is a limited-term group specifically established for the development of the management plan, whereas SEFCRI is a longstanding group with defined priorities and responsibilities.

Sam reviewed the three primary goals and objectives for the meeting: to build the team, provide background information, and review the management plan process along with next steps. She walked through the agenda items and outlined the plan for the day.

She also reviewed Zoom meeting logistics, including how to raise hands, get techFnical help, use microphones and cameras appropriately, and use the chat function. In terms of public comment, Sam noted that public observers are not permitted to speak during the meeting but that there will be designated time at the end for public comment.

She then asks the Advisory Committee to do round-robin introductions with their name, affiliation, and expertise. She also asked the Committee to share their relationship currently with KJCAP or favorite memory of the area.

Advisory Committee Introductions:

1. Alex Reed, Director of DEP's Office of Resilience and Coastal Protection (ORCP), brings expertise in logistics and a memory of working with this team in the Southeast East (SE) region.
2. Lainie Edwards, Deputy Director of DEP ORCP, brings expertise in beaches and recalled scuba diving near Port Everglades.
3. Earl Pearson from ORCP DEP provides guidance on the plan and remembered a snorkeling trip.
4. Mollie Cordo, ORCP DEP SE Regional Administrator, has been with DEP for 11 years and shared a memory of scuba diving offshore.
5. Maurizio Martinelli from the DEP Restoration Program emphasized his experience in building partnerships and recalled meeting a goliath grouper for the first time.
6. Nia Wellendorf from DEP Division of Environmental Assessment and Restoration (DEAR) Water Quality Program specializes in surface water quality and freshwater bioassessment and ecology.
7. Greg Garis, Admin for DEP Beaches, Inlets and Ports Program in ORCP, brings expertise in planning and permitting coastal construction and remembered spending time in Biscayne National Park enjoying the water.
8. John Tracey from DEP Southeast District (SED), who works in permitting and wetlands regulation, shared a memory of seeing a manatee for the first time.
9. Maria Maffei, District 5 Biologist specializing in submerged land resources, expressed her enjoyment of being on the water.
10. Irene Arpayoglou, Northeast (NE) Region AP Manager with 16 years at DEP, remembered the startup of SEFCRI at Nova Southeastern University (NSU) and diving on Osborne Tire Reef.
11. Griffin Alexander, Manager of Biscayne Bay Aquatic Preserve, shared his expertise in Biscayne Bay management and the connection between Biscayne Bay and reef health.
12. Nick Parr, Environmental Manager for the Florida Keys National Marine Sanctuary (FKNMS) and SE Aquatic Preserve, discussed his background in reef management and shared that he grew up diving and learned to spearfish in the KJCAP region.
13. Thomas Reinert, Regional Director for Florida Fish and Wildlife Conservation Commission (FWC), specializes in fisheries and shared a memory of encountering a goliath grouper and shooting lionfish.

14. Rob Ruzicka from Florida and Wildlife Research Institute (FWRI) and Principal Investigator (PI) for the Coral Reef Evaluation and Monitoring Project (CREMP) spoke about diving at the SE CREMP sites over the past 15–20 years.
15. Dana Wusinich-Mendez from National Oceanic and Atmospheric Administration (NOAA) CRCP has over two decades of coral reef management experience and shared a memory of scuba diving at Blue Heron Bridge with her 13-year-old son.
16. Jessica Garland, Coastal Program Manager for Martin County, grew up near Florida's Coral Reef in Palm Beach County and has worked with SEFCRI for the past 10 years.
17. Katelyn Armstrong, who manages artificial reefs in Palm Beach County, has worked with the reefs in Miami, Broward, and now Palm Beach.
18. Sara Thanner from Miami-Dade County Environmental Resources Management (ERM) has been involved in offshore programs and interagency collaboration for 25 years and recalled the *Acropora cervicornis* patch in the northern part of the county.
19. Cassandra Armstrong, Bureau Chief at South Florida Water Management District, specializes in coastal science. She shared a memory of touring the Guy Harvey Oceanographic Research Center.
20. Shana Phelan, Co-owner of Pura Vida Divers and a SEFCRI member, shared a memory of getting her daughter certified and snorkeling with whale sharks.
21. Eva Webb from the Florida Farm Bureau brings expertise in Best Management Practices for farms and urban areas and recalled snorkeling with her husband.
22. Sara Rahmankha from Broward Soil and Water shared her connection to the reef through spending time on the water.
23. Melissa Sathe, President of Friends of Our Florida Reefs, brings a background with SEFCRI, NSU, DEP, and now Coastal Eco Group. She recalled working on restoring ship grounding sites.
24. Joanna Walczak, now Vice President (VP) of Conservation at Loggerhead and formerly with DEP for 18 years, shared that many people she's met through this work have become close friends and family.
25. Rachel Silverstein from Miami Waterkeeper has a PhD in coral reef ecology and shared a memory of witnessing coral spawning.
26. Justin Grubich from Pew Charitable Trusts focuses on fisheries and resilience planning. He is a native of Broward County and remembered fishing, diving, and meeting his wife while surfing in Martin County.
27. Commissioner Sarah Heard from Martin County contributed her expertise in water quality.
28. Mayor Beam Furr noted his political background and shared a memory of snorkeling off Hollywood, spearfishing, and seeing turtles.
29. Carrie Jones, who manages submerged lands across the state, shared her work on citing leases for aquatic preserves.
30. Mike Dixon, VP and President of Engel Coolers and Vice Chair of SEFCRI, is a Steering Committee member and helps orient fishermen to federal regulations. He recalled participating in anchor patrol during the Tortuga Music Festival.
31. Kevin Cuniff, Chief Sustainability Officer of the Miccosukee Tribe of Indians of Florida, has completed thousands of dives offshore and emphasized the tribe's understanding of

the link between water quality and reef health. He remembered diving in vibrant nearshore habitats off Deerfield Beach.

32. Josh Voss from Florida Atlantic University's Harbor Branch Oceanographic Institute has been there since 2007 and has a PhD in coral health. He is director of NOAA research and discovery and has served on the SEFCRI TAC for 10 years. He shared memories of submersible dives on the Oculina reef and being surrounded by 70 goliath groupers on the St. Lucie reef.

Thomas Reinert requested that a list of names and affiliations for all Advisory Committee members be shared. Sam Cook confirmed that this would be done.

KJCAP Advisory Committee Group Norms Setting

Sam Cook introduces the KJCAP Advisory Committee Norms Setting activity focused on setting ground rules. She explained that participants would draw from their past experiences to contribute to the creation of shared meeting expectations. Sam then demonstrated how to use the shared MURAL page, describing it as an interactive whiteboard space where participants could drag and drop sticky notes to collaborate.

Sam began the activity by prompting the group to respond to the initial question: *"What makes a meeting effective and productive?"* Participants were asked to add their thoughts to the MURAL board using sticky notes, or to add a thumbs up to a suggestion already made that they want to emphasize. Group responses entered into the shared Mural page are pictured below:

Photo: Image from the Advisory Committee interactive whiteboard exercise showing Committee members' answers to the question, "What makes a meeting effective and productive?".

After reviewing the group's responses, Sam introduced a second prompt: "What norms should we agree on to support a positive and purposeful KJCAP Advisory Committee experience?"

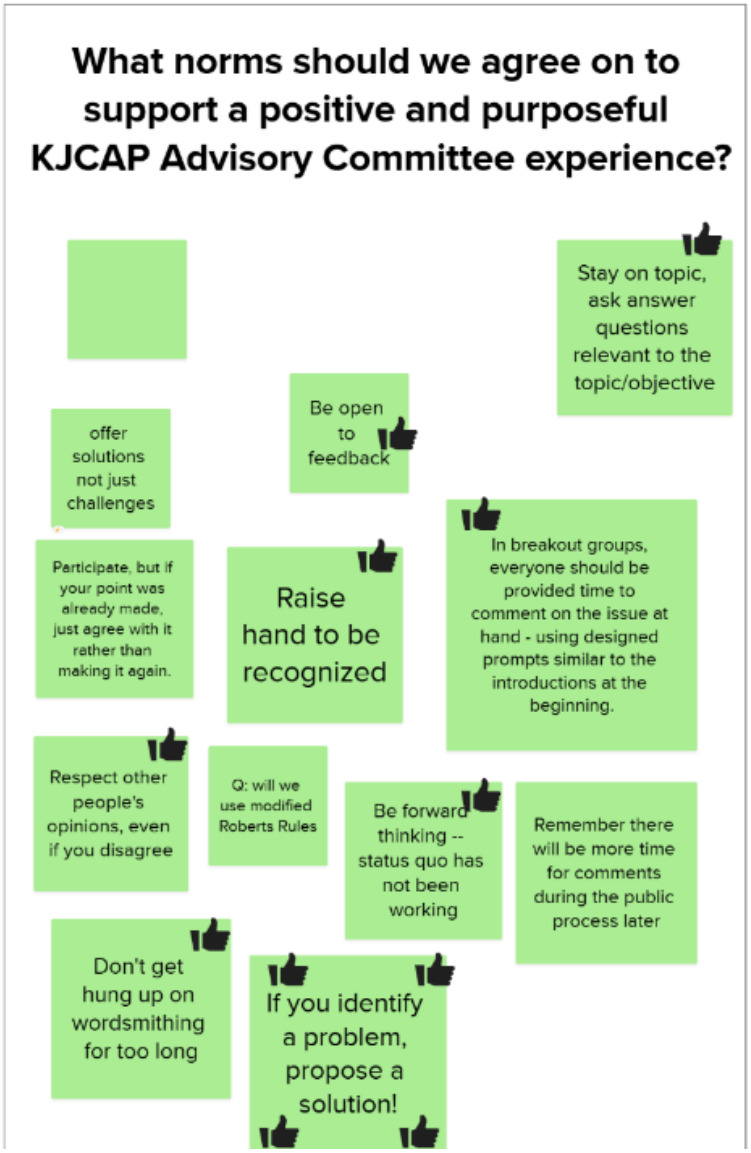


Photo: Image from the Advisory Committee interactive whiteboard exercise showing Committee members' answers to the question, "What norms should we agree on to support a positive and purposeful KJCAP Advisory Committee experience?".

Sam reviewed and summarized participants comments for the group. She then presented a third and final prompt: *"What actions or habits should we be mindful of because they could disrupt progress or collaboration?"*

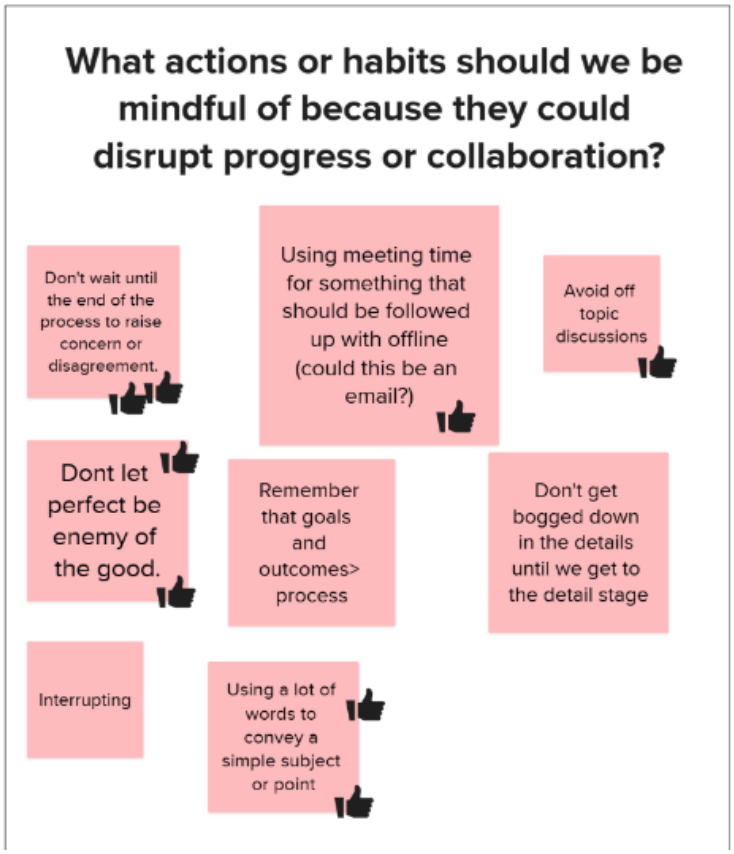


Photo: Image from the Advisory Committee interactive whiteboard exercise showing Committee members' answers to the question, "What actions or habits should we be mindful of because they could disrupt progress or collaboration?".

Sam then facilitated a conversation on communication expectations, emphasizing the importance of turn-taking in discussions. While participants raised their hands to speak in this virtual meeting, the group was encouraged to think about how they might manage respectful dialogue and avoid interruptions during future in-person sessions.

Time management strategies were also discussed. Sam asked how the group could stay on track during meetings—whether through group-agreed time checks or by encouraging one another to refocus when the agenda slips. She underscored that everyone deserves a chance to speak and to be heard.

Sam noted that the ground rules generated during this activity would help guide both participants and KJCAP staff. She reminded the group that the meeting space is intended to be a safe and respectful environment where all participants are encouraged to share their ideas openly. She facilitated the creation of the final set of group norms, pictured below, by starting with common themes from the exercises above, and working with participants to refine and fill in gaps. Participants were given time to agree on the final set of group norms.

Photo: Image from the Advisory Committee interactive whiteboard exercise showing the final agreed upon Ground Rules.

History of the Kristin Jacobs Coral Aquatic Preserve
Alycia reintroduced herself as the Coral AP Manager and noted that this was the first Advisory Committee meeting. She stated that the purpose of the meeting was to introduce the region and ensure that all Advisory Committee members have the same knowledge base.

Alycia gave a brief history of the region to orient everyone, beginning with maps focusing on Florida Coral Reef (FCR) and the northern section also known as the Coral AP. She explained that the aquatic preserve encompasses state waters from St. Lucie Inlet to Biscayne National Park. She walked Advisory Committee members through different time points of action in the Coral AP, beginning with the period before any designation of the area.

In 1998, the US Coral Reef Task Force (USCRTF) was established to preserve and protect coral reef resources and to help build strategies for conservation action. In 2002, the Puerto Rico Resolution was passed for Local Action Strategies (LAS), including Florida. In 2003, DEP coordinated a team of resource professionals called the Southeast Florida Coral Reef Initiative (SEFCRI), which was the first group to develop the LAS to reduce threats to coral reefs, focusing on the area north of Miami, which became known as the SEFCRI region.

At that time, the area lacked a coordinated management plan. In 2004, the Coral Reef Conservation Program (CRCP) was created to manage the SEFCRI region. Originally, the CRCP had a single coordinator tasked with managing SEFCRI and its projects; however, one person was insufficient, so several LAS projects included hiring additional coordinators. The SEFCRI mission initially focused on four areas emphasizing balance between resource use and protection with involvement from all interested parties. These four areas were: Fishing Diving and Other Uses (FDOU), Maritime Industry and Coastal Construction Impacts (MICCI), Awareness and Appreciation (AA), Land-based Sources of Pollution (LBSP).

In 2009, the Reef Injury Prevention and Response (RIPR) program was developed to lead state responses to coral reef injuries from incidents such as groundings and anchoring. Also in 2009, the Coral Reef Protection Act (CRPA) was passed, which was updated in 2020 and included increased civil penalties in aquatic preserves.

The region then underwent a community planning process, called Our Florida Reefs (OFR) which was an original 2004 LAS project. SEFCRI helped conduct this public process from 2013 to 2016 during which SEFCRI Team members were recruited to serve on recommended management actions based on the knowledge gathered from the original LAS. This process helped define actions in the management plan. OFR did not limit feedback so these recommendations could apply to multiple agencies authorized to address them.

In 2017, the Reef Resilience focus area in addition to the previous four focus areas and RIPR was developed.

The Coral AP management plan is broken down by focus area, but some focus areas are combined because of overlap. In 2018 the region was officially established by the Florida legislature from Martin to Miami-Dade counties and in 2021 the region was re-named as the Kristin Jacobs Coral Ecosystem Conservation Area. This designation recognized the area but did not provide authority for management.

In 2023, the Fisheries Stakeholder Committee was formed to gather more input from fisheries stakeholders, which led to the development of 54 Recommended Management Actions (RMAs) in the management plan.

Then, in 2024, the Florida legislature designated the area as an aquatic preserve, ensuring holistic management of the Florida Coral Reef. This designation maintains a similar boundary with some changes; the Division of State Lands now includes the St. Lucie Inlet and provides clearer lines along the mouths of the inlets. It also encompasses the Cape Florida Aquatic Preserve, which will now be included under this management with stricter standards applied. The Coral AP is the 43rd aquatic preserve (AP) designated in Florida.

Alycia explained that this year marks the 50th anniversary of the Florida AP Act of 1975 and that Florida Administrative Code 18-20 applies to all aquatic preserves except for the Biscayne Bay Aquatic Preserve (BBAP), which has additional protections. The original bill lacked management authority, but the AP designation now ensures holistic management of the area by improving overall management of the region.

She then discussed impacts of the designation. Port expansion will not be affected. Fishing regulations remain under the Florida Fish and Wildlife Conservation Commission (FWC). Artificial reefs may not be impacted depending on their intended purpose, and the rule will not apply to already permitted activities. Aquaculture activities will continue to require approval through DEP permitting. Activities may be evaluated for public interest. Docks and seawalls are uncommon on the oceanside, but impacts may apply to public docks. Dredging and beach

nourishment are reviewed against existing permits. Oil and gas exploration is not currently occurring, and no new proposals for such activities would be permitted in an aquatic preserve.

Alycia then introduced the Action Plan, explaining that it was originally developed to build knowledge of research in the region. Alycia explains that CRCP was at a point where many LAS projects were now completed or ongoing. Rather than rescoping the LAS, a team was contracted to compile all RMAs, LAS, and CRCP priorities. Since the area was not yet designated as an aquatic preserve at that time, the document was referred to as an Action Plan rather than a management plan.

Currently, CRCP is the midst of the management plan process. The Advisory Committee will provide feedback first, followed by a public review period during which more feedback can be provided. The Advisory Committee will disband after the second meeting but can continue to provide input during the public process. Afterward, the plan will be submitted to the Aquatic Preserve Review Committee (ARC) and updated every ten years before being translated into projects.

Community and partner participation have been key throughout the process. The plan was led and built upon community recommendations, including those from SEFCRI LAS, OFR RMAs, Fisheries Committee recommendations, and CRCP projects, focusing on what DEP can implement.

At the end of the process, the goal is to have an effective management plan that balances use and conservation. The plan is intended to be supported and endorsed by resource users and to result in robust and thoughtful planning with community involvement.

Presentation Q&A:
Joanna Walczak [chat]: Aren't all APs automatically designated as OFWs?

Nia Wellendorf [chat]: No. The legislature did not designate KJCAP as an OFW. Either they must designate, or DEP would have to add to 62-302.700, F.A.C., through rulemaking.

Justin Grubich: Great presentation Alycia, thank you for that history and context of where the plan is. Quick question that I may have missed during your presentation: was there an OFW for KJCAP?

Melissa Sathe [chat]: In addition to Cape Florida OFW, the northern end is an OFW at the St. Lucie Inlet and Park Preserve. There are very small VERY nearshore portions at the other coastal State Parks — MacArthur, Mizell, and Birch.

Joshua Voss [chat]: Any info about AP and wind or other energy sector activities or infrastructure? You mentioned oil and gas in your presentation, and I wonder if that extends to other energy resources.

Mollie Cordo: In the rule 18-20 there are restrictions like no drilling for oil and gas, but if it is a public utility, I didn't see anything about wind. Any sort of utility would have to demonstrate public interest, but if it were a private installation, it would require approval from the board. It depends on whether the proposal fits the rules and statutes and aligns with what is defined as public interest.

Joshua V.: Thank you, Mollie, super helpful.

Maurizio Martinelli: Channeling my inner Brian Walker, but considering OFR was quite an intensive process to help with all of this and there were lessons learned from that process, are there specific lessons from OFR with this group to avoid pitfalls?

Alycia S.: We reviewed those past processes and tried to incorporate those lessons learned. One reason we asked Sam to be a neutral facilitator is to ensure someone can step in, so everyone is heard equally at the table. We also have an unusually large Advisory Committee group because we want to include all community representatives. While a few of you represent one organization, we need a manageable group but still maintain all representatives at the table. Anyone who is not part of the group can still provide comments, and others from organizations can provide public comment during the three public meetings, which can be spread throughout the region.

Joshua V. [chat]: Great point Maurizio. It's not just feeling included, but documenting that inclusivity and widely promoting opportunities for engagement. Even though in our view they were included, we couldn't always document that inclusivity, so it led to redoing work and needing to be defensible that people are included.

Alycia S.: Part of the documentation is all the work that community groups have put into these representations that create the strategies in the management plan, and that itself is a form of documentation.

Sam C.: If you have any recommendations, we will follow up with you separately. We want to include everyone and want everyone to be heard.

Alycia S.: Documenting the entire public process is very important. This is a formal process which may be slightly different. This whole process will be recorded and transcribed in the management plan.

Mollie C.: There is a big difference between this process and OFR and the management plan process. Those were much more open and facilitated information on a wide range of topics. This process is much more targeted, and we are pulling things that DEP can support. Another agency can have a hands-on role in the process, but it is meant to be implemented by Alycia and the team at DEP. We tried to keep it achievable for DEP. Those previous processes were meant for other agencies and were much larger management efforts in this area.

Chris Camargo [chat]: Is there a reason why the KJCAP isn't broken down into smaller parts that might be easier to manage?

Alycia S.: The history of the region and how it has been historically managed together; SEFCRI was the first established region and from there it continued to be the aquatic preserve.

Draft Management Plan Overview
Alycia – Draft Management Plan Overview; Goal is to briefly go into what has been put into the management plan thus far.
Chapter 1: Introduction
Chapter 2: DEP's Office of Resilience and Coastal Protection
Chapter 3: Kristin Jacobs Coral Aquatic Preserve
Chapter 4: Kristin Jacobs Coral Aquatic Preserve Management Issues
Chapter 5: Administrative Plan
Chapter 6: Facilities Plan

Chapters 1 begins with a description of aquatic preserves as a managed area
Briefly describes the mandate and intent behind the creation of a management plan that will identify unique local and regional issues and contain the goals, objectives, integrated strategies, and performance measures to address those issues.
The last section on public involvement is currently a place holder, but this will be fleshed out after the AC and public meetings have taken place and will describe those.

Chapter 2 describes how KJCAP is connected to an existing network of programs and managed areas within DEP's ORCP that includes 43 Aquatic Preserves, three National Estuarine Research Reserves (NERRs), co-management of the National Marine Sanctuary with NOAA, the Coral Reef Conservation Program (CRCP), Florida Coastal Management Program, Outer Continental Shelf Program, the Clean Boating Programs, the Resilient Florida program, beaches programs, and Coral Protection and Restoration Program
The management authority sections recognizes the complexity in governance and the need for a multi-agency coordinated management effort within KJCAP due to delegation of management authorities including FWC, NOAA, and adjacent counties
It discusses permitting and enforcement as well as mitigation within KJCAP, and describes how restoration will be most effectively applied within KJCAP
Discusses the statutory language and administrative rules governing KJCAP

Chapter 3 is the largest, as it gives context on the history and resources that exist within the area. It describes the state of our knowledge of the system thus far and provides more context with regards to KJCAP's surrounding land use and adjacent public lands and designated resources
It walks through early development of the land including building of major cities, creation of a highly managed system of canals and dredging that dramatically altered the watershed, and management policy and permitting requirement changes over the years

It also walks through what I shared with you earlier today – the history of resource management and community involvement
It describes the resource in detail, including hydrology and climate, natural communities, native/protected/invasive species, archeological and historical resources, and economic values

It also touches on the Citizen Support Org that has a special interest in supporting the region and programs.
And a description of adjacent public lands and land use surrounding KJCAP

Chapter 4 contains descriptions of issues within KJCAP. Each issue has goals, objectives and integrated strategies. Alycia describes the difference between goals, objectives and strategies and notes that individual projects can be created from the strategies.
Some goals and objectives have been adapted from SEFCRI LAS.
Chapter 4 is the part of plan where stakeholder input has been implemented the most.
Ch. 4 is the real substantive part of the plan.
Contains a description of the Issues that management of KJCAP is focused on
The issue-based management that is outlined in this chapter still highlights the 6 focus areas of SEFCRI and CRCP, however it also recognizes the strong overlap that exists between focus areas

Each issue will have associated goals, objectives, and integrated strategies. Goals are broad statements of what the organization plans to do and/or enable for the next 10 years. They should address identified needs and advance the mission of the organization. Objectives are a specific statement of expected results that contribute to the associated goal, and strategies are the general means by which the associated objectives will be met.
Strategies are not meant to be project-level specific. They are meant to allow for a more adaptive framework of management, where individual projects can be created from the strategies. Some will be able to be completed through the implementation of a single project, however some are designed to be either ongoing or will require a series of projects to complete.

In this management plan for KJCAP, some goals, objectives, and strategies have been adapted from the Our Florida Reefs (OFR) and FDOU 52 Fisheries Committee Recommended Management Actions, as well as from previously developed and ongoing SEFCRI Local Action Strategy projects and CRCP priorities. Less actionable words like ‘support’ and ‘partner with’ are used in some strategies that refer to items that have been identified as strong priorities by partners and stakeholders.
The development or support of a strategy by OFR and the Fisheries Committee is denoted next to the corresponding goal, objective, or strategy within this chapter.
Appendix D.3. and D.4. provide tables of developed recommended management actions from the OFR and Fisheries Committee processes, respectively, for reference.
This is the part of the plan where stakeholder and partner input has focused most heavily thus far.

Chapter 5 describes the existing staffing structure within CRCP including an organizational chart.
Chapter 5 also describes additional capacity that would aid the implementation of the management plan within the allotted 10 year time frame.

Chapter 6 describes the existing buildings and infrastructure, vehicles and vessels that support and are available to allow CRCP to implement the goals and objectives described in the management plan, as well as future facilities, construction and maintenance needs to allow the program and it's infrastructure to continue functioning.

There are several Appendices:
Appendix A showcases the aquatic preserve resolution, and applicable FL statutes and FL administrative Code.
Appendix B contains a glossary of terms, the references, native/listed/invasive species lists, and a list of archeological sites associated with KJCAP.
Appendix C will not be written until after the public process, as it will contain all of the details of the AC and public meetings and feedback.
App D contains budget tables, a prioritized list of all OFR recommendations, and a list of all Fisheries Stakeholder Committee recommendations for reference.
Appendix E contains the required plan checklist from ARC, management procedures for archeological and historical sites, and the last two sections will be completed after the plan has been fully accepted by ARC.
Alycia wraps up the presentation and asks if anyone has questions.

Presentation Q&A
Sam takes over to moderate questions on the plan itself, how it's formatted, or if anyone would like guidance on how to review/provide feedback on the plan.

Maurizio M.: National Park Service mission: has mission underlying what they do and how they write their plans. Is there similar language for the AP statute that we should keep in mind while doing this review?

Alycia S.: Yes, there is a statement for aquatic preserves about preserving it for the people, offered to share it with everyone to keep in mind.

Justin G.: Last slide – within appendices what to focus on for objectives?

Alycia S.: The actual goals objectives and strategies are listed in Chapter 4, not in the appendices, but yes the appendices are linked to budget and actionable items for objectives.

Rob Ruzicka [chat]: Are there any specialized provisions for threatened or endangered species that would occur within the AP? Not just this one but other examples.

Alycia S.: Do you mean specialized protections? Can you clarify?

Rob Ruzicka: If there are, would there be notable provisions for endangered or rare species or specific known problems?

Alycia S.: Nothing additional added because any actions within the AP would still have to be compared against existing protections.

Mollie C.: The plan focuses on ecosystem as a whole, not specific to individual species. Threatened species are taken into higher consideration.
Mollie C. [chat]: Chapter 18-20. First part is the Intent of the AP rule. 18-20 : FLORIDA AQUATIC PRESERVES - Florida Administrative Rules, Law, Code, Register - FAC, FAR, eRulemaking

Earl Pearson: Have been working with FWC for bird rookeries and nesting areas, not prohibiting entrance but can notify people and recommend to stay further away. Species protections included through recommendations. It also touches on the Citizen Support Org that has a special interest in supporting the region and programs. And a description of adjacent public lands and land use surrounding KJCAP.

Maurizio M.: Should the management plan consider any new or updated rule-making processes? Is there anything to include or highlight about informing rule-making or evaluating existing criteria and whether or not they're protective.

Alycia S.: Yes, there are some existing strategies for making sure that when we're creating projects that it's to inform an information gap and to make sure results are being shared with other agencies.

Next Steps: Advisory Committee Review of Draft Management Plan
Shows timetable from first presentation of process. Highlights step we're currently in: establish advisory committee and review draft management plan.
Alycia states after this meeting, all the AC members will receive an email from us that will contain the instructions on how to access the posted draft management plan for your review
The email will also contain a link to a Doodle Poll to give us your availability for the next meeting of the AC – right now we are looking at the weeks of October 13th and 20th.
Alycia reminds attendees of the following:
PLEASE make sure to answer the doodle poll by the end of the week if you want your availability considered for planning the next meeting date!!!!!!
This second meeting will be in-person. I know that travel isn't always easy, but we will do our best to find a location that is central based on where all of the AC members are travelling from.
The second meeting will be more dynamic than this one, now that you are equipped with all of the background information, we will be having you broken out into smaller groups and interacting with each other more in a process designed to gather feedback equally from everyone in the room. This type of discussion is not easily facilitated over virtual platforms.
You will have approximately 30 days before the next meeting to read through the plan

As you do so, we ask you to please keep in mind this plan focuses on objectives and goals that DEP can have a hand in the implementation of.
Please come prepared to the next meeting, we will not have a lot of time to gather feedback so won't really have time to walk you through what is included in the plan. It is your job between now and then to familiarize yourself with the plan and be prepared to discuss and provide comments.
If you have any questions you can reach out to myself or Stephanie, both of our contact information will be provided in the email you receive after this meeting as well.
After the second meeting, the Advisory Committee will disband. We will continue to update you on the dates of the public process so if you have a desire to continue to be involved and provide further feedback, we encourage you to participate.
The public process will consist of 3 meetings – one virtual and two in person to reach a wider part of the community, since the community adjacent to KJCAP is large both geographically and population-wise.

Presentation Q&A
Mayor Beam Furr: Are you going to be sharing with both treasure coast and south Florida regional? Those are the two planning counsels that have been urging the creation of the plan for the past several years and I don't see them included.

Alycia S.: Yes, we have representatives from each of the counties included in AC and one elected official from each county. Keeping a list of members to add.

Justin G.: How do you want those comments brought to the second meeting? Written or bringing them up in the discussion at the meeting?

Sam C.: You can also give written feedback after the next meeting. And add comments to the plan itself for consideration.

Mayor Beam Furr: Would be good to be able to see everyone's comments ahead of time before the meeting.

Alycia S.: Will look into it to see if we're able to do that.

Tom Reinert [chat]: Does that create a Sunshine conflict?

Alycia S.: Will check on that.

Joanna W.: Check if partners can host a shared document if DEP cannot.

Sam C.: Noted that the doodle poll is in the chat

Josh V.: Will there be an online option for in-person meeting?

Alycia S.: Wasn't planning on having online option but will do our best to include majority of people. If you can't make it, you can still provide written comments or attend public process as well.

Chris C. [chat]: It would be easier for me to determine availability if I knew where the meeting was going to be taking place. Any idea how soon we will know where that meeting will take place?

Alycia S.: Can include general area in follow-up email.

Sara Thanner [chat]: Just FYI, Monday 10/13 is a federal holiday. Miami-Dade County has off.

Josh V. [chat]: Apologies if this was covered early in the meeting, is the draft plan a public doc, or restricted to this advisory group?

Earl P.: It is a public document that will be posted on our DEP website so everyone will be able to review it.

Sara Rahmankhan [chat]: Will we get the slides from today?

Alycia S.: I can share the slides with the Advisory Committee if it will help.

Public Comment Period
Sam opens the floor for any member of the public who wish to speak. Nobody indicates a wish to speak after a few moments of silence so public comment is closed.

Meeting Conclusion
Sam does overview of meeting.
Reminds everyone to please read Chapter 4.
Reminds everyone to fill out doodle poll sent in chat.
Alycia/Stephanie will follow up with link to plan, meeting location and details within the next week.

Plan for meeting is to have smaller breakout sessions and reminds everyone to come prepared to discuss.
Can reach out to Alycia/Stephanie with questions while reviewing management plan.

Meeting Adjourn

C.4.1 / Florida Administrative Register Posting

Florida Administrative Register *Volume 51, Number 178, September 12, 2025*

For more information, you may contact: Khara Fleming at (850)245-6302 or Khara.Fleming@dos.fl.gov

DEPARTMENT OF EDUCATION
The Florida Department of Education announces a public meeting to which all persons are invited.
DATE AND TIME: September 19, 2025, 1:00 p.m. – 3:00 p.m. ET; meeting may end early if business is concluded.
PLACE: https://events.teams.microsoft.com/event/4784f1ab-a616-442c-ab32-cdfee5967931@63bf107b-cb6f-4173-8c1c-1406bb5cb794
GENERAL SUBJECT MATTER TO BE CONSIDERED: Meeting of the Florida Institute of School Safety Workgroup
A copy of the agenda may be obtained by contacting: Julie.Collins@fldoe.org.
Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Julie.Collins@fldoe.org. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).
For more information, you may contact: Julie.Collins@fldoe.org.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
The Florida Department of Environmental Protection (DEP), Office of Resilience and Coastal Protection's Coral Reef Conservation Program announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, October 14, 2025, 9:00 a.m. – 4:00 p.m.
PLACE: South Florida Water Management District, B-1 Building Auditorium, 3301 Gun Club Road, West Palm Beach, FL 33400
GENERAL SUBJECT MATTER TO BE CONSIDERED: DEP's Coral Reef Conservation Program is holding a second meeting of the Kristin Jacobs Coral Aquatic Preserve Advisory Committee to advance the approval and adoption of the Kristin Jacobs Coral Aquatic Preserve Management Plan, Florida's most recently designated aquatic preserve.
The objective of this subsequent advisory committee meeting is to reconvene the Kristin Jacobs Coral Aquatic Preserve Advisory Committee in-person following members' 30-day review period of the draft management plan to allow for discussion and collect feedback from Advisory Committee members. The draft plan can be viewed here: https://FloridaDEP.gov/rcp/aquatic-preserve/documents/kristin-jacobs-coral-aquatic-preserve-draft-management-plan.
A copy of the agenda may be obtained by contacting: Stephanie Stinson by email: Stephanie.Stinson@FloridaDEP.gov; phone: (561)681-6630; mail: 3301 Gun Club Road, B-2, West Palm Beach, FL, 33406.
Public participation is solicited without regard to race, color, religion, sex, pregnancy, national origin, age, handicap, or marital status. Persons who require special accommodations under the American with Disabilities Act (ADA) or persons who require translation services (free of charge) are asked to contact DEP's Limited English Proficiency Coordinator at (850)245-2118 or LEP@FloridaDEP.gov at least ten (10) days before the meeting. If you have a hearing or speech impairment, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (voice).

PUBLIC SERVICE COMMISSION
The Florida Public Service Commission announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, October 7, 2025, 9:30 a.m.
PLACE: Room 148, Betty Easley Conference Center, 4075 Esplanade Way, Tallahassee, Florida.
GENERAL SUBJECT MATTER TO BE CONSIDERED: To consider those matters ready for decision.
LEGAL AUTHORITY AND JURISDICTION: Chapters 120, 350, 364, 366, 367, and 368, F.S. Persons who may be affected by Commission action on certain items on the Conference agenda may be allowed to address the Commission, either informally or by oral argument, when those items are taken up for discussion, pursuant to Rules 25-22.0021 and 25-22.0022, F.A.C. The Commission Conference Notice, Agenda, related documents, and FPSC contact information are available at www.floridapsc.com.
ADA: In accordance with the Americans with Disabilities Act, persons needing a special accommodation to participate at this proceeding should contact the Office of Commission Clerk no later than five days prior to the conference at 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850 or (850)413-6770 (Florida Relay Service, 1(800)955-8770 Voice or 1(800)955-8771 TDD). Assistive Listening Devices are available upon request from the Office of Commission Clerk, Gerald L. Gunter Building, Room 152.
EMERGENCY CANCELLATION OF CONFERENCE: If a named storm or other disaster requires cancellation of the Conference, Commission staff will attempt to give timely notice. Notice of cancellation will be provided on the Commission's website (www.floridapsc.com) under the Hot Topics link on the home page. Cancellation can also be confirmed by calling the Office of Commission Clerk at (850)413-6770.
A copy of the agenda may be obtained by contacting: Office of Commission Clerk at (850)413-6770.

C.4.2 / Meeting Summary

Kristin Jacobs Coral Aquatic Preserve Advisory Committee Meeting 2
Tuesday, October 14th, 2025
9 am – 4 pm EST
South Florida Water Management District Headquarters
3301 Gun Club Rd, West Palm Beach, FL 33406
1st Floor Auditorium

Background:
The purpose of this limited-term Advisory Committee (AC) is to ensure that the resulting Kristin Jacobs Coral Aquatic Preserve (KJCAP) management plan is a robust document that is representative of our broader community and will provide the necessary guidance to thoughtfully manage the unique ecosystem that is the Kristin Jacobs Coral Aquatic Preserve.

Meeting Objectives:
Goal 1: Reconvene the KJCAP Advisory Committee in-person following members' review of the draft management plan.
Objective 1.1: Maintain a collaborative environment by adhering to the group norms established during AC Meeting #1, enabling KJCAP Advisory Committee members to engage in productive discussions and provide meaningful feedback on the Kristin Jacobs Coral Aquatic Preserve's management plan prior to its finalization in early 2026.
Goal 2: Create a forum that enables fruitful discussions amongst Advisory Committee members in order to collect feedback in a variety of formats.
Objective 2.1: Use small group discussion and dynamic forms of engagement to ensure Advisory Committee members have multiple avenues to provide thoughtful feedback.

Objective 2.2: Build upon the distinct subject matter expertise convened in the room (i.e., the diversity of composition represented across our Advisory Committee members' respective fields and industries) to ensure that the resulting AP management plan is comprehensive and robust.

Attendees:
Facilitator: Sam Cook

DEP CRCP Staff: Alycia Shatters, Stephanie Stinson, Taylor Tucker, Elena Kampian, Lara Bracci, Maya Bhalla-Ladd, Megan Miller, Kimberly Platt, Amanda Lewan, Mo Morrow, Sajida Malik, Mollie Cordo

Advisory Committee Members: Katelyn Armstrong, Cassondra Armstrong, Angela Delaney, Mike Dixon, Mayor Beam Furr, Jessica Garland, Justin Grubich, Carrie Jones, Shana Phelan, Tom Reinert, Rob Ruzika, Melissa Sathe, Rachel Silverstein, Sara Thanner, Josh Voss, Joanna Walczak, Griffin Alexander, Irene Arpayoglou, Greg Garis, Maurizio Martinelli, Nick Parr, Earl Pearson, John Tracey, Nia Wellendorf

Public Observers: April Price, Jessica Ganim – Miami Waterkeeper, Jessie Bastos, Derek Cox - SFWMD

Meeting Summary:
Welcome and Introductions
Sam Cook opened the meeting and introduced herself as the facilitator. She provided an overview of the meeting and highlighted the difference between the Advisory Committee and the Southeast Florida Coral Reef Initiative. She reminded the Advisory Committee this is their opportunity to provide feedback on the management plan - we want honesty - if you see an issue let us know. If you like something, let us know! We are not wordsmithing today - you will have an opportunity to provide written feedback post meeting. If you are unsure about something – ask.

Sam provided an overview of the meeting agenda:

- Series of roving flipcharts - designed for participants to be able to provide feedback in multiple ways
- Session I: Review Issues A - E as outlined in Chapter 4 of the plan
    - Includes facilitated conversation with opportunity to provide individual comments
- Session II: Review sections included in chapter 3
    - Includes facilitated conversation with opportunity to provide individual comments
- Session III: Review all sections included thus far + appendices
    - roving comments - time for individual feedback provided via sticky notes
- Next Steps

Sam also reviewed the Advisory Committee group norms that they created during the first meeting:

- Clearly identify all meeting goals & objectives
- Stay on time
- Be present - no multi-tasking
- Follow the agenda - not necessarily the time
- Listen with the intent to understand
- Interrupt prudently
- Stay on topic
- Be concise - use your words thoughtfully
- Be respectful of each other
- If you identify a problem, propose a solution

The rest of the meeting was spent in rotating small groups designed to gather feedback on the different parts of the Kristin Jacobs Coral Aquatic Preserve draft management plan. Small groups were facilitated by two KJCAP staff – one to take notes and another to facilitate the process. Advisory Committee members were provided with large, printed versions of the sections from the plan as well as printed hand-outs of the issues, goals, objectives, and

strategies in Chapter 4. They were also provided pens/pencils, markers, sticky notes, and paper to provide multiple ways to provide feedback in their own words. Green and red dot stickers were available to add emphasis to existing feedback. Facilitators and note takers were there to capture verbal discussions. The feedback listed below includes comments KJCAP received from verbal and written communications during the Advisory Committee meeting, as well as written feedback emailed to KJCAP staff before and after the Advisory Committee meeting.

Feedback provided on the KJCAP draft management plan

Overall Plan

- Include a map or link to aquaculture projects in KJCAP.
- Include a map to boat ramps.
- More discreet performance measures with numeric goals to track.
- Expand strategies to include other ecosystems like seagrass or submerged aquatic vegetation.
- More direct action by DEP staff and less partnering or support of other agencies.
- Include a list of Advisory Committee recommendations that are outside of the AP mandate/purview (maybe in the meeting minutes posted in the plan?). Shows other organizations how they can help support the AP.
- Review all of chapter 4 to ensure everything is looked a through a local, regional, and national scale. Global should be included where relevant.

Executive Summary

- Comment addressing the need for updated references and data sets.
- Inclusion of septic systems in sources of pollution that affects water quality.
- Replacement of terms to accurately address target areas of the management plan.
- Distinguish the management plan Advisory Committee from the Technical Advisory Committee.

Chapter 1

- Strategies need to include community partnerships.

Chapter 2

- Question about specific nomenclature use.
- Question and suggestion regarding bodies of water included in projects requiring Environmental Resource Permits.
- Update on environmental permitting authority to remain with the Department of Regulatory and Economic Resources.
- Add Joint Coastal Permits (JCP) applicants to mitigation of coastal construction.
- Comment addressing the inaccuracy of renourishment project statement
- Attached site reference for U.S. Coral Reef Task Force mitigation actions
- Comment speaking to reference missing from rest of document.
- Comment cautioning language about conservation goals of artistic artificial reefs.
- Comment questioning regulatory standards for artificial reefs in the context of "100-year storm".
- A need for stakeholder use to be factored into future artificial reefs.
- Suggestion to state where current 'Outstanding Florida Waters' exist within KJCAP.

Chapter 3

- Comment addressing the term(s) used when writing about indigenous communities of Florida as well as the addition of the Miccosukee tribe into the plan.
- Comment addressing the omission of the Loxahatchee River history.
- Comment calling for the addition of the formation and history of inlets.
- Comment to create an index of coral research and restoration pre-1990.
- Comment to list monitoring programs of benthic, fish and coral communities.

- Comment to mention history of artificial reef programs.
- Request to name refuge designations to detail the history of management of Florida's Coral Reef.
- Caution about the use of the word "baseline".
- Recommendation to include map showing historical boundary of Cape Florida Aquatic Preserve.
- Recommendation to spell out KJCAP when first mentioned in the chapter.
- Question about accuracy of wording when contextualizing federal involvement in management history.
- Question about the delineation between SE Florida and Florida Keys.
- Request to add Key Biscayne special management zone established in 1990.
- Comment asking to give recognition to the NOAA Coral Reef Conservation Program for its role in funding the DEP CRCP and formation of the Task Force.
- Suggestion to include that Florida's Coral Reef was previously called Florida Reef Tract.
- Comment suggesting inclusion of the Coral Reef Conservation Act, its function and to add it to the acronym list.
- Suggestion to clarify to which section of the reef was being referred.
- Comments pointing out redundancies and giving revision suggestions for better word flow.
- Correction given about Kristin Jacobs' political roles.
- Suggestions to revise word "flow", re-order paragraphs and restructure information within designated sections.
- Recommendation to address engagement in regional issues and coordination across jurisdictional boundaries.
- Comment addressing the length of Florida's Coral Reef.
- Question about relevancy of Florida East Coast Railway to management plan and recommendation to remove if not relevant.
- Comment asking to define a "landlord port".
- Request to expand the cultural importance section.
- Recommendation to simplify and emphasize the boundary of the KJCAP as it relates to standing on the beach.
- Comment questioning the relevancy of a section about ports.
- Specific word recommendations for a section on vessel traffic.
- Comment pointing out the need for a map showing accurate KJCAP boundary.
- Suggestion to use "preserve" instead of "resource".
- Recommendation to expand, move, or remove section 3.3.3 Soils.
- Recommendation to cite a "Coral ECA Hydrographic Modeling" report from 2024.
- Recommendation to add the impacts African Dust has on the reef.
- Question about the relationship between ICAs and WBIDs.
- Recommendation to add county names into Table 1.
- Recommendation to add the cold upwelling brought by The Gulf Stream.
- Comment noting that there is no mention of ocean acidification.
- Recommendation to add that KJCAP has wild Acroporid populations.

- Recommendation to add information about King Tides and relation to water quality issues.
- Comment to add all species of seagrasses and the difference between "patches" and "beds".
- Comment to add pillar coral to species affected by SCTLD.
- Recommendation to change species of algae referred to due to prevalence in Miami-Dade county.
- Comment noting species in paper not listed in Appendix B.3. Species List.
- Request to add adjacent natural communities i.e. mangroves, dunes, etc.
- Suggestion to remove Buttonwood from listed protected mangroves.
- Comment sharing updated website url.
- Recommendation to add/remove fish species to/from commercially important and highly migratory categories.
- Question about incorporating game fish statistics and categorizing them as “reef dependent”.
- Comment suggesting an update of the protection status of Goliath Grouper.
- Comment asking to include the amplitude of turtle nesting, mating and feeding that takes place within the KJCAP as well as highlight the dangers of marine debris as it pertains to sea turtles.
- Suggestion to bring attention to manatees by including Unusual Mortality Events from 2020-2023 and their transit within the KJCAP.
- Suggestion to add Right Whale and Giant Manta Rays to listed species.
- Comment sharing the name of invasive species of seagrass- Halophila stipulacea.
- Warning about the species Calurpa microphysa being a nuisance and one to keep an eye on while it’s being actively studied by various stakeholders.
- Comment stating that there are more than three archaeological resources in the KJCAP.
- Suggestion to add economic value of other benthic communities.
- Recommendation to collate economic value into one section instead of being dispersed throughout the document.
- Suggestion to add the dollar value in shoreline protection particularly during extreme weather events.
- Suggestion to reorganize Economic Values, update metrics and include biomedical stats.
- Request to add/ include more diverse user groups such as surfers, kite boarders, etc.
- Recommendation for updated statistics by going to ENOW NOAA website.
- Suggestion to add stone crab statistics in the section that contains lobster statistics.
- Comment addressing the lack of Boat rental and liveries statistics.
- Suggestion to add and update the location of the CPR program.
- FOFR representatives asked to be named where their services are being requested so that they can use the management plan in Board of Directors meetings. They also provided corrections on supply locations, land-based and in-water support history and capacities.

- Suggestion to define ‘access’ or reference where it is defined to distinguish it from ‘awareness’.
- Suggestion to mention the Aquatic Preserve Society.
- Recommendation to clarify and specify resources in relation to their proximity to KJCAP.
- Suggestion to add in the original names of parks and to have large parks labelled on a map.
- Comment stating that Monroe County does not have a map.
- Recommendation to add into a map, the Key Biscayne Special Management Zone.
- Recommendation to add municipal parks.
- Recommendation to change language about Lake Okeechobee from “drainage” to “discharge”.
- Recommendation to add basin runoff as cause to St. Lucie Inlet Preserve State Park turbidity.
- Recommendation to add context to the name of Blowing Rocks Preserve in Martin County.
- Recommendation to add specific locations into maps and paragraphs.
- Suggestion to add paragraphs on Indian River Lagoon and Lake Worth Lagoon.
- Recommendation to state the completion of Government Cut watershed management plan.

Chapter 4

- Comment stating that language used suggests that less actionable terms are being used to describe strategies that stakeholders identified as important.
- Recommendations for sentence revision for clarification and integration into other sections.
- Recommendation to add resource citation, information and language about Biscayne Bay Aquatic Preserve monitoring projects and other efforts.
- Recommendation to use language that is more engaging and make performance measures more actionable.
- Suggestion to include other benthic communities, seagrasses, for example.
- Suggestion to add a plan of recommendation for Outstanding Florida Waters.
- Question about standardization of water quality monitoring.
- Suggestion to refer to the FWRI Water Quality project for a synthesis of data and communications to stakeholders.
- Question about location of habitat mapping within the document.
- Suggestion to combine strategies A1.1.1 and A 1.1.2.
- Recommendation to reference the Biological Condition Gradient (BCG) in issue A.
- Recommendation to add the effects of temperature and pH versus nutrients or turbidity.
- Suggestion to add and cite work already done by FWRI project.
- Suggestion to add a “roadmap” for how to go from research to rulemaking.
- Suggestion to add microplastics and organic compounds to A 1.1.8.
- Recommendation to mention ongoing efforts related to strategy A 1.1.9.
- Suggestion to add Biscayne Bay Commission to PM A1.1 #3.

- Suggestions for word changes, rewrites and grammatical adjustments.
- Question if there is coordination with other Aquatic Preserves and use of their water quality data.
- Recommendation to add a strategy to address and actively reduce biosolids.
- Recommendation to integrate local, regional, national, global issues and efforts to make sure all scales are captured.
- Suggestion to track what KJCAP and partners are doing for outreach and what resources they are using.
- Suggestion to include stormwater management system rulemaking and to support research in innovative technologies and solutions.
- Question about infrastructure upgrades and how to respond to increasing amounts of effluent.
- Suggestion to mention deep injection wells and Advances Wastewater Treatment.
- Suggestion to add implementation by both regulatory and non -regulatory processes.
- Suggestion to expand water quality monitoring throughout the reef.
- Suggestion to cite and reference Brian Walker's recent report and acknowledge ongoing work.
- Recommendation to include shorebird nesting rules.
- Provide recommendations from research based on knowledge of corals. and synthesize data into recommendations.
- Increase number of meetings in performance measures.
- Comment that Objective A1.3 fits better in Goal A2.
- Engage shipping industry and cruise companies in education.
- Double check that new discharge laws are incorporated in education and outreach for the shipping industry.
- Change language to "apply for an EPA No Discharge Zone".
- Incorporate a strategy for education on boating regulations.
- Recommendation to reorganize performance measures.
- Add strategy: evaluate and apply for OFW status.
- Use DEP program that's already in use for living shorelines.
- Add a measurable performance measure for living shorelines.
- Comment addressing the existing actions of DEP in relation to A2.1.2.
- Add FKNMS to A2.1.5.
- Describe what FCRCT is and what they are doing.
- Question about the impacts messaging and awareness programs have had on residential use of fertilizers, pesticides and commercial use.
- Define "attend a majority of…".
- Suggestion to create a performance measure that accounts for future conflicts not accounted for.
- Comment that commends the language used in Issue B for its specificity and use of actionable verbs.
- Have municipalities and counties share data with NOAA's Digital Coast data repository.

- Recommendation to share data using existing popular private industry tools like Navionics and Garmin.
- Where does considering the protection of historic surf breaks fall best into the management plan.
- Use ROVs in place of divers for fish surveys.
- Incorporate Objective 3.4 elsewhere.
- Before collecting new user conflict data, we need to think about what we want to do with it and apply that to management goals.
- Can we use data to show correlation between coral cover and fish biomass and have a baseline for the KJCAP?
- Comment about educating the public about fauna seasons and migrations during outreach efforts.
- Question about FWC methodologies in comparison to NOAA methodologies to identify and ascribe an FSA location.
- Comment addressing standardizing maps based on federal maps.
- Comment about what types of requirements NOAA has for using maps.
- Recommendation to formalize county CRPA enforcement.
- Comment commending Issue B for being well-balanced.
- There should be compulsory education when purchasing saltwater licenses as there is for boating.
- Performance measures are more tactics than metrics.
- There is disconnect in KJCAP consumptive and non-consumptive users.
- If money is put into restoration, those sites should temporarily be closed to help success rates. But this closure would be challenging in Palm Beach County due to the nature of drift diving.
- Broward county ensures that restoration and coral nurseries are marked off and protected during air and sea shows.
- Framing corals as natural infrastructure could help USCRTF unlock additional funding from FEMA regulations. KJCAP counties should do so at their next opportunity.
- Find a place to include the delicate balance of trophic roles on coral reefs and why an intact food web is so important.
- Correction that Palm Beach County does not issue permits.
- Question to define “degradation”.
- Is it possible to measure when people are on the water with a guide or on their own?
- A good example of incentivizing good diving behaviors is the SE FL Reef Cleanup where FOFR subsidized participant fees to make it easier for dive shops to participate.
- Add a strategy mandating economic studies are updated every “x” number of years.
- Form a CRCP data arm so site use can influence restoration efforts.
- 3.3 needs a strategy about placement for “no anchor zone” mooring buoy placement.
- Disseminate annual reports directly to dive shops.
- Objective B1.1. seems like a bit of a waste if agencies aren’t setting up more rigorous protections.

- Identify and add “user groups” into Objective B1.1.
- Regular summaries on user data once every 5 years.
- Add surfers to list in Integrated Strategy B1.1.5.
- Why aren’t we using drones to monitor 9 inlets in KJCAP? We require more refined data collection.
- Isn’t KJCAP fisheries analysis happening via RVC?
- Fisheries monitoring isn’t taking place on artificial reefs as it should be.
- Most strategies aren’t targeted management options.
- Where and how will annual report information be stored and disseminated?
- None of the strategies seem to be focused on implementation.
- Language in the objective makes it seem conflicts are being addressed and thus some strategies are already complete and it’s time for implementation.
- Add “hotspots” and “ecological integrity” to the list of definitions.
- Comment stating that vague language is troublesome and sections need more clarity or to be reworded.
- Counties are limited with Morring Buoy funding.
- Evaluate technologies from other fisheries that could support recovery of traps.
- Remove “labeling line for all cast nets”.
- Increase number of submissions to Friends Group to six annually.
- Work through the USCRTF to propose to the IMO that all US coral reefs get marked on their maps.
- Don’t waste time printing and disseminating paper charts, people don’t use them.
- There is so much monitoring data associated with coastal construction that in underutilized.
- Incorporate language about protecting and monitoring seagrasses.
- Work with partners to monitor adjacent federal waters.
- Promote community engagement and the citizen science side.
- Add non coral cover reef cover such as benthic algae, worm rock, cyanobacteria to monitoring.
- We can’t set standards if we have no background data on existing levels of turbidity.
- Craft more specific criteria for corals (like BBAP).
- Objective C1.1 seems identical to the goal.
- Expand number of data monitoring sites, stations and sondes into northern counties.
- Strategies for monitoring and restoring seagrasses should be included for various Issues, in particular for the region off of Key Biscayne.
- Request to add specific counties to strategies.
- Add meeting with contractors/consultants who do the work.
- Revise and standardize requirements for monitoring.
- Add back DEP SOP mention.
- Incorporate long term biological program monitoring data into digestible annual reports and add this as a performance measure.
- Add state issued Biological Monitoring Plans.
- Need addition about cultural resources and tribal consultants, especially in Miami.
- Check for monitoring gaps based on location.

- USACE requires two years' biological monitoring.
- Periodically update nearshore habitat maps to evaluate habitat loss and compare with Florida Seafloor Mapping.
- Include secondary impacts and state that we could use CRPA enforcement of impacts outside of permit.
- Monitor hybrid reefs.
- Compile baseline measurements and background monitoring of turbidity and sedimentation to compare with post-construction monitoring data.
- Does integrated Strategy 2.1.1 tie to beach renourishment and burial?
- Revise mitigation assessment methodology not specific to UNAM.
- Share construction monitoring data with general public and counties.
- There is a lot more data associated with these projects that can be synthesized.
- Performance Measures lacking timeline or frequency.
- Detail who is the marine debris removal team.
- Partner or conduct artificial reef monitoring in the AP.
- One SEFRCI marine debris meeting per year is not enough. Suggest one North and one South.
- Missing support for FCR wide management including FCRRP.
- What are we asking public to do about ongoing stressors in the KJCAP?
- Suggestion to develop and maintain new tools (e.g. decision support systems) to allow for C4 goals to happen.
- Revamp goal C4 to be broader.
- Expand to include "research partners" in addition to partner agencies.
- Performance Measure meetings need a tangible deliverable.
- Objective C4.1 should be FCRRP related and better called out as cross-reef management.
- Fellowship to students.
- FWRI is creating and FCR wide decision support system funded by CPR. Don't replicate what has already been done.
- Working group opportunity between FWC law enforcement and Aps.
- Call out FWC decision support system.
- Missing goal of engaging with other reef managers to ensure consistent communication about resources across FCR including FCRCT.
- Missing engagement of partners focused on non-coral animals.
- Could CRCP have a dashboard for metrics?
- Name SEFCRI.
- Question about the accuracy in the number of boat ramps listed.
- Comment asking about accuracy of statement regarding Youth Services Team involvement.
- Social science study needs to include cost analysis. Can this be combined with equity study?
- Share recommendations in addition to survey results.
- Add volunteer opportunities.

- Add social media as a distribution channel and a pre-approved toolkit for partners to share.
- Key to surveys are high response numbers.
- Suggestion to combine two strategies.
- Issue D is very important and understudied.
- Goal D needs to identify, implement and evaluate.
- Need to fund/conduct visitor use surveys using methods from other APs.
- Include online curriculum.
- FOFR needs money to complete D1.2.3.
- We need public facing facility(ies) like a visitor center.
- Measure multi-lingual outreach via brochures.
- How are we sharing this one-stop-shop online resource?
- Issue D needs more than just teaching trunks.
- Need to focus on building awareness of the direct and indirect connections of the reef and human community.
- Comments about teacher availability to submit surveys.
- Can kids make PSAs to contribute to awareness campaigns?
- Multi-cultural groups need to be better defined and the effect of targeting these groups.
- Swimming is a big barrier to access. IS there a way to make this a partner project?
- Look into partnerships for outreach and education.
- Clarify DEP's role in providing access.
- Make outreach materials available publicly and for partners.
- Counties have visitor councils and tourism boards that can be educated and then educate local organizations and community members.
- Specify which Creole resources will be translated into.
- Objectives with multiple strategies need more performance measures.
- Involve social media influencers and explore non traditional avenues for communication and engagement.
- How are we going to track tours?
- Have updated economic studies and facility studies available for outreach.
- Distinguish between access and awareness.
- How accessible are our beaches?
- Define access as educational and less physical in DEP's capabilities/role.
- Can a FOFR employee be funded to facilitate strategies?
- Outreach materials need to be expanded to include other benthic communities and non-coral topics.
- Boat ramps and liveries need to be included in access.
- Specifically call out where FOFR's help is needed, and add a goal about sustaining the relationship with FOFR.
- Strategies should build off of existing work and then be expanded for broader needs.
- Refine strategies to clarify they are for management purposes.
- Ensure monitoring for positive trends is monitored along with degradation.

- Some conflicting advice if organisms like sponges and octocorals should be a focus in strategies relating to coral reef restoration.
- Ensure strategies use active language like “conduct” instead of more passive language like “support”.
- Call out synergistic effects of stressors.
- Include heat and disease tolerance when discussing intervention strategies.
- Don’t assume restoration efforts are working, add language regarding evaluation for adaptive management.
- Consider low-cost water temperature monitoring buoys for restoration sites.
- Ensure performance measures define frequency of actions.
- Objective E3.1 is more of a statement, needs to be made more performance based. Could include applying for grants or expanding interactions with county and municipal bodies to convey the value of KJCAP.
- Include modeling future conditions and scenario monitoring, expanding on Storlazzi work.
- Remove jargon like the word “tropicalization”.
- Need to continue to identify data gaps.
- Ecosystem resilience evaluation should include climate vulnerability assessments, scenario planning, predictive modeling, and management prioritization.
- Conduct ecosystem resilience evaluation workshops.
- Organize/facilitate regular meetings or workshops with relevant restoration partners.
- Strategies about invasive species could also include species with abundance higher than historic norms that are causing problems (e.g., Caulerpa).
- Expand strategies about algal blooms to include environmental and anthropogenic driver of invasive and nuisance species.
- In Objective E3.1 also include maintaining operational support.
- Cite Walker’s paper about upwelling being a limiting factor to northern migration beyond St. Lucie Inlet.
- Update older references.
- Some conflicting advice on proposing temporary closures for coral nurseries and restoration sites as has been successful in the Keys, stressing “temporary”. Some thought this would be good to protect restoration areas that funding is being funneled into, and other thought it would be hard to comply with in areas where drift diving is common.
- Mark off restoration and coral nurseries during events like air and sea shows.
- Include monitoring in Objective E1.1.
- Call out support to restoration activities that are being done by partners in coastal bay areas adjacent to KJCAP.

Chapters 5 and 6

- Add a description of the Marine Debris Program before being listed in Chapter 5.

Species List

- All species should be spell-checked, and check for updates to species names and listed status.
- Alphabetize list

C.5 / Formal Public Meeting

The following Appendices contain information about the Formal Public Meetings which were held in order to obtain input from the public about the Kristin Jacobs Coral Aquatic Preserve Draft Management Plan.

C.5.1 / Florida Administrative Register Posting

This will be added after the public process.

C.5.2 / Advertisement Flyer

This will be added after the public process.

C.5.3 / Newspaper Advertisement

This will be added after the public process.

C.5.4 / Summary of the Formal Public Meetings

This will be added after the public process.

Appendix D / Goals and Objectives

D.1 / Current Goals and Objectives Budget Table

The following table provides a cost estimate for conducting the management activities identified in this plan. The table does not account for inflation over the next ten years. The data is organized by year and Management Program with subtotals for each program and year. The following represents the proposed budgetary needs for managing the resources of the aquatic preserve. This budget was developed using data from the Office of Resilience and Coastal Protection (ORCP) and other cooperating entities, and is based on actual costs for management activities, equipment purchases and maintenance, and for development of fixed capital facilities. This budget assumes optimal staffing levels to accomplish these strategies, and includes the costs associated with staffing such as salary or benefits. Please note, this budget does not include staffing costs, as they are currently received through an annual NOAA Block Grant.

Goals, Objectives & Integrated Strategies	Duration	10 Year Total
Issue A: Water Quality Impacts from Land-Based Sources of Pollution including Maritime Industry and Coastal Construction Impacts		
Goal A.1: Improve water quality both within KJCAP and in waters entering KJCAP from adjacent ICAs to meet the needs of natural resources.		
Objective A1.1: Optimize and integrate water quality monitoring within KJCAP to identify sources of pollution flowing through inlets, and support data analysis to understand effects of and inform mitigation strategies for LBSP on benthic habitats.	Ongoing	$9,420,000
Objective A1.2: Engage intra-agency programs, local water management entities, local governments and federal partners to reduce point and non-point land-based sources of pollution including wastewater, stormwater and groundwater that enter KJCAP and associated watersheds to improve water quality and benthic habitat condition through management actions.	Ongoing	$1,295,000
Goal A2: Increase public and industry engagement in actions to improve water quality in KJCAP.		
Objective A2.1: Work with the local community, visitors and agency partners to assess perceptions of and increase engagement in actions to reduce land-based sources of pollutants entering storm drains and waterways.	Ongoing	$97,500
Objective A2.2: Coordinate the reduction of vessel-based discharges.	Ongoing	$2,500

Issue B: Sustainable Economic and Recreational Fishing, Diving, and other Uses		
Goal B1: Characterize user groups and analyze patterns of use within KJCAP and compare them with related datasets to identify trends.		
Objective B1.1: Update studies on user groups, use patterns, crowding (i.e., social acceptance of other activities and user groups), areas of use conflicts, and impacts on KJCAP resources by various resource users.	Ongoing	$425,000
Objective B1.2: Support continuation of and explore options for expansion of fisheries monitoring programs and protocols to gain a better understanding of the state of fisheries compared to use trends and impacts in KJCAP.	Ongoing	$1,000,000
Goal B2: Evaluate and implement management approaches to reduce impacts from fishing, diving, and other uses (recreational and commercial) in KJCAP to support ecosystem integrity and function.		
Objective B2.1: Coordinate research and work with partners to synthesize recommendations to reduce impacts from fishery use pressure on benthic habitats in KJCAP.	Ongoing	$120,000
Objective B2.2: Coordinate research and work with partners to synthesize recommendations to reduce impacts from diving use pressure on affected resources.	Ongoing	$5,000
Objective B2.3: Evaluate and recommend approaches to minimize impacts from pressure at high-use areas and intra- and/or inter-group conflicts over resources.	Ongoing	$290,000
Goal B3: Comprehensively assess and increase awareness of unsustainable resource use and engage communities in protecting KJCAP ecosystems through best practices.		
Objective B3.1: Assess current levels of public awareness of the wide-ranging impacts sustained by marine resources through unsustainable use and of best practices to utilize and appreciate marine resources that minimize negative impacts.	Ongoing	$90,000
Objective B3.2: Develop and implement strategies to increase awareness of unsustainable resource use and increase engagement in best practices to minimize negative impacts on marine resources.	Ongoing	$602,500
Objective B3.3: Continue to support partner agencies in the enforcement of marine regulations and promotion of best use practices.	Ongoing	$30,000
Issue C: Ecosystem Disturbance Response and Recovery		
Goal C1: Continue, expand and optimize regular monitoring of corals, submerged aquatic vegetation and other KJCAP benthic resources to inform management of KJCAP.		
Objective C1.1: Continue, expand and optimize benthic monitoring to inform the management of KJCAP.	Ongoing	$2,000,000

Objective C1.2: Optimize and integrate monitoring related to coastal construction within and adjacent to KJCAP to inform management processes aimed at reducing impacts to benthic resources.	Ongoing	$70,000
Goal C2: Continue to improve management and maintenance activities related to coastal construction by working with intra-agency programs to reduce impacts to benthic resources (including nearshore reefs), create more sustainable beaches, and minimize impacts from nourishment projects		
Objective C2.1: Evaluate and reduce habitat loss from physical and coastal development impacts on benthic resources in KJCAP.	Ongoing	$150,000
Objective C2.2: Support improvement of minimization and mitigation activities for unavoidable impacts to resources to reduce and offset lost ecosystem functions in KJCAP	Ongoing	$10,000
Objective C2.3: Identify and reduce other physical impacts in KJCAP.	Ongoing	$2,500
Goal C3: Strengthen public and partner engagement in resource protection and collaborative decision-making for effective disturbance response.		
Objective C3.1: Promote and optimize community engagement in reporting disturbance events and foster interagency data sharing to support informed disturbance response in KJCAP.	Ongoing	$5,000
Goal C4: Improve ecosystem understanding to facilitate decision-making that accounts for ecosystem-scale processes.		
Objective C4.1: Engage other FCR resource managers and researchers to develop a deeper understanding of ecosystem function in KJCAP and adjacent managed areas, guiding coordinated and holistic management across FCR.	Ongoing	$100,000
Issue D: Community Education, Engagement, and Access		
Goal D1: Comprehensively evaluate and improve access (virtual, physical, educational) to KJCAP for all communities.		
Objective D1.1: Identify existing forms of access and equity of access to KJCAP.	Ongoing	$90,000
Objective D1.2: Develop and implement tailored approaches to improve modes and equity of access to KJCAP, targeting underserved communities identified in Objective D1.1.	Ongoing	$205,000
Objective D1.3: Assess the effectiveness of access approaches implemented in Objective D1.2 within KJCAP.	Ongoing	$140,000
Goal D2: Evaluate and build awareness of how KJCAP resources and conservation goals are directly connected to communities via education and outreach.		
Objective D2.1: Establish a baseline to measure and monitor the level of awareness among stakeholders and the general public and identify existing outreach strategies and gaps concerning KJCAP resources and conservation goals.	Ongoing	$90,000

Objective D2.2: Develop and implement strategies based on results from Objective D2.1 to increase awareness and foster stewardship of KJCAP and its conservation goals and ecosystem attributes across all communities associated with KJCAP.	Ongoing	$285,000
Objective D2.3: Develop and implement strategies to increase awareness of ongoing stressors and ecosystem pressures in KJCAP.	Ongoing	$5,000
Objective D2.4: Evaluate the effectiveness of outreach and education programs.	Ongoing	$120,000
Issue E: Building Ecosystem Resilience		
Goal E1: Identify and evaluate the effects and impacts of environmental change on KJCAP resources.		
Objective E1.1: Conduct an ecosystem resilience evaluation and develop an adaptive framework to assist managers in monitoring, assessing and responding to effects from environmental change on ecosystem function (e.g. productivity) within KJCAP over time.	Ongoing	$160,000
Goal E2: Evaluate and implement adaptive management measures that promote KJCAP ecosystem recovery and resilience.		
Objective E2.1: Evaluate and implement the use of ecosystem restoration and propagation techniques for KJCAP benthic species.	Ongoing	$85,000
Objective E2.2: Provide guidance and consultation on science-based criteria for local adaptation measures (e.g., engineered structures, nature-based solutions and restoration) to promote resilience and recovery of KJCAP resources.	Ongoing	$85,000
Objective E2.3: Identify and implement measures to reduce the impact of invasive or problematic species on native KJCAP ecosystems, preserving biodiversity and ecosystem resilience	Ongoing	$100,000
Goal E3: Build programmatic resilience by ensuring the long-term fiscal viability of KJCAP management.		
Objective E3.1: Develop and implement a sustainable finance plan to support KJCAP conservation efforts and maintain operational capacity	Ongoing	$10,000
Other Budgetary Items		
Building, vehicle, and vessel maintenance; dive program maintenance	Ongoing	$775,880

D.2 / Prioritized List of Our Florida Reefs Recommended Management Actions

Priority 1

Action ID	Description
N-70	Protect and restore mangroves, seagrass beds, oyster reefs and other estuarine habitats.
N-146	Establish and implement a Marine Protected Area (MPA) zoning framework for areas of special interest within the OFR region to enable sustainable use, reduce user conflict, and improve coral reef ecosystem conditions. Tools that could be used to improve coral reef habitat may include no-take reserves, no anchor areas, restoration areas, and seasonal protection for spawning aggregations.
S-99	Increase number of FWC enforcement officers; funding for enforcement; recruitment and retention of on water officers to improve enforcement for better protection of resources.
N-68	Reduce and regulate fertilizers, herbicides, fungicides, and pesticides and promote BMPs to reduce nutrient and pollutant loading to improve water quality and provide protection to the reefs and promote the use of Florida friendly herbicides and pesticides to eliminate adverse impacts to the coastal environment and its watershed.
N-82	Support and promote existing and create innovative new initiatives that increase storm water storage, and reduce stormwater runoff, enhance treatment, increase reuse, and reduce nutrients and other contaminants to the watershed, especially from surface water, to restore healthy estuaries.
N-78	Reduce ground water pollution from sources such as septic and storage tank infrastructure to watersheds associated with priority reef areas to improve water quality and reef health.
S-104	Set new and appropriate water turbidity standards and support the efforts to improve turbidity monitoring methods for marine construction to limit damage from coastal constructions to reefs and associated habitats.
N-69	Support and provide money incentives and initiatives to restore and preserve wetlands north of Lake Okeechobee to stop discharges to coastal estuaries to protect estuaries and reefs.
S-28	Support Everglades flow restoration to reduce LBSP and improve water quality in estuaries and inlet contributing areas connected to the coral reef ecosystems of SE Florida.
S-65	Nominate the Southeast Florida Coral Reef Initiative region for consideration as a National Marine Sanctuary to be co-managed with the state of Florida to engender protection and benefits, a legal forum, discussion, understanding and collaboration, and balance uses towards sustainable resources.
N-71	Maintain and coordinate a unified monitoring program to detect, identify, and eliminate sources of pollution flowing through inlets to improve water quality and protection to reef.
N-97	Target, prioritize, and implement LBSP reduction activities at identified pollution hotspots within SEFCRI watersheds to improve coastal water quality.

Action ID	Description
S-92	Protect reefs from anchor damage during beach and coastal events (i.e. festivals, air shows, etc.).
S-120	Improve management and maintenance activities of beaches to reduce impacts to coral reefs (including nearshore reefs), make beaches more sustainable, and minimize need for future renourishment projects.
N-35	Develop and implement a cross-training program for local marine units and beach patrol officers, to improve recognition of conservation regulations, increase law enforcement presence on the water and provide additional enforcement for peak periods to build relationships between agencies and decrease marine-related violations.
N-137	Designate the entire SEFCRI region as a particularly sensitive sea areas (PSSA) and/or area to be avoided (ATBA).
S-8	Establish coral reef gardens, which are areas for the recovery, restoration, and recruitment of corals and fish, created under strong guidance from scientists and monitored by the community through an educational campaign.

Priority 2

Action ID	Description
N-5	Enhance the SEFCRI Florida reefs and ecosystems curriculum, including educating educators on available resources, and mandate that it be taught once in elementary school, once in middle school and once in high school (every school year) to provide science-based foundation for making future decisions to protect coral reefs.
S-25	Strongly encourage elected and regulatory officials to oppose extensions to dates established in existing sewage treatment outfalls legislation to ensure the timely closure (prior to 2025) of all treated wastewater outfall pipes and build/upgrade infrastructure for advanced water treatment and reuse capacity to improve ocean water quality.
N-113	Eliminate Lake Worth inlet port expansion project to reduce siltation on coral reefs and keep coastal communities and habitat in balance.
N-114	Reinstate funding for regulatory agencies (reinstate SED DEP Dive Teams) to provide in water permit compliance monitoring as needed for reef related projects, and assist other agencies with monitoring (fish/coral surveys).
N-116	Coordinate and implement regional "living shoreline" objectives to increase the use and protection of natural infrastructure (e.g., coral reefs, native vegetation, mangrove wetlands) to provide natural barriers to storm surge and maintain coastal biodiversity with the agreement of property owners.
N-1	Educate the public on the effects of land-based sources of pollution to reduce the amount of pollutants entering storm drains and waterways.
S-1	Remove tires and debris from failed Broward County (Ft. Lauderdale and Deerfield Beach) (a.k.a. Osborne tire reef) artificial tire reef projects and the reef tract to eliminate damage to existing corals.

Action ID	Description
S-100	Support redefining the Port of Miami anchorage zone to remove four areas with reported coral from the existing anchor zone, reduce anchor damage currently being caused by ships anchoring zone which includes some coral reef.
S-102	Develop and integrate more effective quality control procedures in the regulatory framework, and triggers within permits for corrective action during coastal development projects to ensure protection of marine habitat and species.
N-44	Educate relevant judges and prosecuting attorneys on the importance of imposing penalties for environmental violations that are severe enough to prevent future violations.
N-15	Promote citizen supported organization (CSO) Friends of Our Florida Reefs to enable better community engagement in coral reef efforts and target funding for conservation activities more effectively and efficiently.
S-108	Revise/create UMAM (Uniform Mitigation Assessment Method) for coral reef environments to improve application of this rule to coastal ecosystems, to provide more consistent/accurate calculations, and to ensure ecological functions are maintained.
S-103	Incorporate existing, and adaptively integrate, Best Management Practices into project design and construction practices to avoid and minimize impacts to coral reefs from coastal construction projects.
S-97	In order to reduce habitat damage that occurs during lobster mini season, maintain lobster mini season but reduce the bag limit to six lobsters per person per day to be consistent reef-tract wide, and require the review of educational materials and completion of an educational quiz in order to receive an annual spiny lobster permit.
S-2	educational materials and completion of an educational quiz in order to receive an annual spiny lobster permit. S-2 Create and fund one SEFCRI-wide mooring buoy program as a more coordinated and cost effective way of protecting reefs from anchor damage.
N-25	Strengthen penalties and fines for non-compliance of reef- related regulations, to include civil penalties, to discourage illegal activities, and to express that violations will not be tolerated.
S-54	Apply for United Nations Educational Scientific and Cultural Organization (UNESCO) world heritage site status for entire Florida Reef Tract to increase awareness and appreciation of the ecological and cultural significance of Florida’s coral reef ecosystem.

Priority 3

Action ID	Description
S-114	Create and implement a mechanism that allows permitting agencies to apply lessons learned from past projects to future projects to minimize impacts to resources and improve success of mitigation activities.

Action ID	Description
S-124	Facilitate the creation of regional (inlet-to-inlet) beach management strategies, such as can be achieved through a beach management agreement (BMA), which take an ecosystem approach to projects such as beach nourishment and storm-water pipe removal to maintain beaches and protect resources.
N-59	Establish maximum size limits to complement existing regulations for ecologically significant reef-associated fish species (including but not limited to grouper and snapper species and hogfish) to increase numbers of the larger, more fecund individuals within the southeast Florida assemblage.
N-8	Promote public education programs like “be Floridian”, “rain gardens”, “nature scape”, and “Florida Yards and Neighborhoods” to encourage eco-friendly yard and garden maintenance to help reduce the amount of nutrients and other pollutants reaching the reefs through residential run-off.
N-120	Encourage influential entities to lobby for legislation to overturn current legislation restricting bans on plastic bags to protect marine habitats and wildlife.
N-75	Promote/offer free pump out stations to better water quality and allow boats a better option than dumping off shore.
S-125	Request FWC to make a rule change in the marine life rule to better define the word “take” (take, touch, anchor on, or damage in any way) to improve enforcement of Coral Reef Protection Act.
S-107	Encourage region-wide biological monitoring (e.g. via BMAs) to document condition of resources that may be impacted by nourishment projects and inform regulatory decisions to ensure ecological functions are maintained.
S-101	Create a training program based on existing Best Management Practices (BMPs) that will be required for coastal construction on-site project contractors to be implemented by January 1, 2020, as required in a coastal construction permit.
S-67	Provide incentives to divers and fishermen to eradicate invasive species of marine organisms proliferating the SEFCRI coral reef system to provide a natural ecological balance of marine and plant life for the coral reef system.
N-117	Improve impact minimization and mitigation activities for unavoidable impacts to resources to reduce and offset lost ecosystem function; including the use of non-traditional mitigation strategies.
S-95	Perform comprehensive study to determine how to improve law enforcement management to match assets and personnel to public needs to increase efficiency and improve employee retention.
S-116	Maintain the ecological function of the wrackline by reducing beach raking practices.
N-23	Following the example and spirit of successful “Blue Star” programs in Florida other develop areas of the world, create a voluntary marine industry education/certification program in the SEFCRI region to increase professional and consumer user awareness, responsibility, and personal pride, leading to voluntary reduction of typical user reef damage and negative impacts.

Action ID	Description
S-87	Modify or enhance existing regulations to increase protection for parrotfish and other important herbivores for coral ecosystem protection.
N-19	Make nautical charts featuring reef benthic natural resource coverage in the SEFCRI region widely available and accessible to boaters.
S-106	Establish an educational turbidity monitoring certification program to improve the quality of turbidity data that are used to evaluate project-related threats to resources.

Priority 4

Action ID	Description
S-110	Eliminate over beach discharge of water to eliminate those sources of beach erosion reducing the amount of beach fill needed which may improve near shore water quality.
N-123	Develop and implement a sustainable finance plan to support coral reef conservation efforts in the SEFCRI Region.
S-86	Ban live mounts of all shark species (catch for the sole purpose of taxidermy/mounting or marketing with no intention to retain) in order to reduce shark mortality due to charter fishing practices that ensure mount sales and dockside marketing and promote proper handling and release techniques for shark species to reduce mortality in catch & release scenarios.
N-94	Create, support and promote a certification program and adaptive Best Management Practices for all golf courses (similar to Blue Star for dive industry and clean marina programs) to provide an incentive mechanism for golf courses to eliminate adverse impacts on the coastal environment and its watershed.
S-98	Simplify FWC rules and regulations to reduce complexity (fish sizes fork length versus overall - snapper one size, grouper one size, and pelagic) to make rules simpler and standardize catch size limits for important species with similar life histories and appearance to make it easier to enforce regulations and catch within limits.
N-64	Encourage voluntary labeling of lead line for all cast nets over six feet, as well as reporting the day, time and coordinates of any lost nets to St. Lucie Inlet Preserve State Park staff, SEAFAN, or participating local dive shops for retrieval on an as needed basis, for commercial and recreational fisherman, within the preserve to prevent and track lost gear (ghost nets).
N-37	Continue to improve existing Florida Fish and Wildlife Conservation Commission hotline and significantly increase (at least double existing investment in) marketing about the hotline to more efficiently report emergencies or violations, send pictures, and be able to report a problem to assist agencies to enforce the regulations that protect our coral reefs.
N-36	Develop a stakeholder initiative to raise the cost of recreational lobster stamps statewide and dedicate the additional funds for improved species enforcement in the southeast Florida region (including Monroe County).
N-7	Offer an online exam to receive a discount on fishing licenses (create an incentive-based program).

Action ID	Description
N-14	Enhance distribution of materials (continue current activities) highlighting the economic and recreational values of southeast Florida reefs to enhance awareness by residents, elected officials, and visitors.
N-18	Augment existing fishery and coral reef education programs to incorporate multi-cultural fishing practices including addressing environmental ethics.
S-91	Develop a telephone app to allow the public to photograph violations and document time, boat numbers, GIS coordinates, and violation to state FWC and federal enforcement personnel to improve regulatory compliance and enforcement and improve public involvement, outreach and education concerning coastal protection in Florida.
N-21	Develop and distribute welcome information digital video or image packages for new Florida residents and visitors that provide information on impacts to reef systems and how they can be addressed to raise awareness and influence behavior change to reduce impacts to reefs.
N-27	Establish co-management agreements with capable and responsible local communities and NGOs to address staff capacity gaps at FWC and DEP.
S-75	Initiate voluntary donation program from all reef users via licensed dive boats or fishing boats/charters. This donation would support reef conservation programs or projects.
N-41	Develop a voluntary “Florida Reef Tract Stewardship and Job Creation fund” fee to fund education and conservation programs.
S-52	Create an effective reef protection mascot/logo campaign to increase awareness for protection.

D.3 / FDOU 52 Fisheries Committee Recommended Management Actions Table

Recommended Management Actions (RMAs) from the **FDOU52 Fisheries Stakeholder Committee**, sorted by theme and topic. The originating committee meeting is indicated for each RMA in parentheses. During the development process of the KJCAP management plan staff identified RMAs that were outside of the purview of DEP and would be more relevant for other agencies and organizations, and thus were not included in the strategies in this management plan. Those RMAs are denoted in the table below by an asterisk (*).

Water (22)

Category	Strategy
Herbicides	• W.H.1. Encourage the state and municipalities to continue their exploration of alternative methods of herbicide use in state managed waterbodies. (meeting 10.1) • *W.H.2. Encourage state to lead by example by reducing herbicide use and adopting best practices. (meeting 10.1) • *W.H.3. Encourage agencies to transition to mechanical harvest of nuisance vegetation and find uses for the harvested materials. (meeting 10.2) • *W.H.4. Contracts for sprayers must include the installation of a GPS system on the guns that tracks and records herbicide use to create an interactive map with herbicide type and acreage. (meeting 12.2)
Fertilizers	• W.F.5. Encourage local governments and municipalities to create or enforce rules that will decrease amount of fertilizer being utilized that ends up in canals and waterways. (meeting 12.1/12.2) • W.F.6. Encourage regenerative gardening/landscaping and permaculture to lower fertilizer and pesticide use (meeting 14.1/PM2)
Agricultural BMPs	• W.A.7. Improve monitoring and enforcement of agricultural industry best management practices. (meeting 10.2)
Septic Sewer	• W.S.8. Prioritize and incentivize septic to sewer conversion in areas close to water systems, e.g. tax rebate, funding, community efforts (meeting 10.1) • *W.S.9. Find government financial assistance and/or creative marketing (e.g. lottery) where local municipalities/counties could match the funding for septic to sewer conversion. (meeting 10.2) • W.S.10. Encourage municipalities with aging sewer systems to upgrade infrastructure. (meeting 10.2) • W.S.11. Compile a database of septic to sewer conversion incentive programs. (meeting 10.2) • W.S.12. Encourage full implementation of the Clean Waterways Act. (meeting 12.2)
Water Treatment	• W.W.13. Explore proven ways of treating wastewater naturally where feasible, e.g. use of wetlands (meeting 10.2) • *W.W.14 Recycle wastewater for irrigation. (meeting 12.1) • *W.W.15. Bivalve and seagrass restoration in estuaries for water filtration. (meeting 12.1) • W.W.16. Support existing ocean outfall legislation to cease using the southeast Florida outfalls with water discharges (meeting 14.1/PM2)
Pharmaceuticals	• W.P.17. Continue to explore and prioritize innovative additional wastewater treatment options to address pharmaceuticals and other contaminants of emerging concern. (meeting 12.2)
Boat waste disposal	• W.B.18. Increase opportunities for boats to dispose of their waste and increase enforcement for ones who don't. (meeting 12.1)
Runoff	• W.R.19. Improve run off filtration from roads. (meeting 10.1)

Category	Strategy
Canals	• *W.C.20. Consider use of triploid carp for vegetation control in canals. (meeting 10.2/12.2) • Encourage municipalities to mitigate pollution from canals. (meeting 12.1)
Lake Okeechobee	• *W.L.21. Prioritize cleaning up Lake Okeechobee. (meeting 10.1)
Sedimentation	• W.S.22. Prioritize methodologies that minimize impacts from activities that increase sedimentation, including but not limited to dredging.

Fishing and Boating (13)

Category	Strategy
Lobster Traps	• F.L.6. Shift from longlines to single lines for lobster/crab traps. (meeting 11.1)
Anchoring	• F.L.7. Help find ways to provide additional funding to coastal counties that will support the installation and ongoing maintenance of day use mooring buoys. (meeting 11.2) • *F.L.8. Encourage the establishment of mooring fields and the development of additional pump out stations. (meeting 12.2)
Spawning Aggregations	• F.S.9. Research - find out what reef species are aggregating where on the reef (meeting 13.1) • F.S.10. Evaluate biological, ecological, oceanographic, and other scientific data to determine potential contributions to conservation that seasonal area protections for spawning aggregations would provide. Identify areas and species to be protected based on stock assessments and best available science (meeting 13.1/14.2) • F.S.11. If seasonal area protections for spawning aggregations are warranted for consideration as part of a sound conservation strategy with measurable benefits, while also accounting for social and economic factors, consider creating spatial area regulations to protect spawning aggregations. In such areas, restrict fishing, diving and other uses and activities targeting reef fish species but allow pelagic fishing if scientifically appropriate. A research plan to evaluate the benefits of such regulations should also be implemented. (meeting 13.1/14.2)
Shark Depredation	• *F.S.12. Explore and research shark depredation and develop strategies to address it. (meeting 13.2/PM2)

Category	Strategy
Marine Reserves	• *F.M.13. Consider spatial fishing, diving and other use restrictions (e.g. marine reserves) only when there is credible scientific evidence supporting a need to protect an area, habitat, species, or spawning aggregation. Require public engagement in zoning and rule-making. Where possible use temporary measures rather than permanent (year-round) restrictions. Mandate periodic reviews (e.g. every 5 years) of spatial management measures and a sunset provision to take effect unless measures are extended. Consider effects of fishing effort displacement from restricted areas and opportunities for enhancing fishing opportunities in open areas (e.g. new artificial reefs). (meeting 13.2/14.2)

Habitat (7)

Category	Strategy
Living Shorelines	• *H.L.1. Use flood plain predictions to determine where we use living shorelines. (meeting 11.1) • H.L.2. Replace seawalls with living seawalls/living shorelines as appropriate and add this to the new sea level rise resilience Florida law. (meeting 11.1) • H.L.3. Encourage and incentivize property owners to incorporate living wall/reef on all new and repaired seawalls and docks (e.g. grants, break on permit fee, tax break). (meeting 11.1)
Habitat Restoration	• *H.H.4. Promote environmental policies that will promote the regrowth of seagrass in the Bay and in the flats. (meeting 11) • *H.H.5. Encourage continued use of creative mitigation strategies to protect and restore seagrass. (meeting 11.1) • H.H.6. Also encourage use of creative mitigation strategies to protect and restore corals. (meeting 11.1)
Pole and Troll	• *H.P.7. Explore creation of pole and troll areas to reduce damage from boats in sensitive seagrass areas. (meeting 13.2)

Agency and Processes (5)

Category	Strategy
Communication	• A.C.1. Promote communication and collaboration across agencies to reduce bureaucracy and encourage agencies to periodically review together process efficiency. (meeting 11.1) • *A.C.2. Develop a communication network of key groups, such as fishing clubs, commercial and charter groups, tropical fish collectors, CCA, ASA, IGFA, captains for clean water, and recreational and commercial diving groups, (but not limited to these) to standardize and/or synthesize a process of reporting fishing information and trends to be managed by FWC. (meeting 10.2) • *A.C.3. Standardize names and definitions for spatial management. (meeting 10.2)
Compile and synthesize information	• A.C.4. Compile information on all projects from different agencies relating to water quality under one same database. (meeting 11.1) • *A.C.5. Create a primary clearing house that synthesizes existing fisheries data collection efforts from various research agencies, government entities, NGO's, etc. that will help identify trends and will give resource managers more complete information to make future policy. (meeting 11.2)

Education (8)

Category	Strategy
Herbicides	• E.H.1. Create an education program led by municipalities for homeowners and homeowner association to reduce herbicide use and adopt herbicide best practices. (meeting 10.1)
Fertilizers	• E.F.2. Educate homeowners and commercial companies to reduce use of fertilizers, pesticides and herbicides (meeting 10.1/14.1/PM2) • E.F.3. Ensure that municipalities and state use education campaigns for fertilizer regulation updates. (meeting 12.1)
Pharmaceuticals	• *E.P.4. Develop a system - involving education and enforcement - for municipalities to implement to avoid medications from being disposed through the sewage system. (meeting 12.2)
Anchoring	• E.A.5. Continue to educate users with the importance of using mooring buoys and not anchoring adjacent to the buoys by using signage at boat ramps and marinas and creating other effective communication channels and technologies (e.g. social media) through agency collaborations. (meeting 10.2)
Living Shorelines	• *E.L.6. Also educate on environmental benefits and advantages to the longevity of the structure. (meeting 11.1)
Climate change	• E.C.7. Create outreach opportunities to educate the public about effect of climate change on our oceans and nearshore waters, including our coral reefs. (meeting 14.2/PM2)

Category	Strategy
Plastic pollution	• E.P.8. Educate citizens and the private sector on the effects of plastic pollution on reef ecosystems and provide guidance on how to reduce use and mitigate impacts. (meeting 14.2/PM2)

Appendix E / Other Requirements

E.1 / Acquisition and Restoration Council Management Plan Compliance Checklist

Land management Plan Compliance Checklist: Required for State-owned conservation lands over 160 acres

Section A: Acquisition Information Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
1	The common name of the property.	18-2.018 & 18-2.021	Executive Summary
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	p. 1-2
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	p. 1-2, 8-9
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	Executive Summary
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	p. 30
6	An **assessment** as to whether the property, or any portion, should be declared surplus. Provide Information regarding **assessment and analysis** in the plan, and provide **corresponding map**.	18-2.021	N/A
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. *Please clearly indicate parcels on a map.*	18-2.021	N/A
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	p. 18-20
9	A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses.	259.032(10)	p. 8-9, 13-14
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	p. 57-66

Section B: Use Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	p. 14-15
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	p. 16-27
13	A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted.	18-2.018	N/A
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	p. 6-8, 9-13, 71-110
15	Include a provision that requires that the managing agency consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archeological or historical resources.	18-2.021	p. 51
16	Analysis/description of other managing agencies and private land managers, if any, which could facilitate the restoration or management of the land.	18-2.021	p. 6-8, 9-13
17	A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired.	259.032(10)	p. 71-110
18	A finding regarding whether each planned use complies with the 1981 State Lands Management Plan, particularly whether such uses represent "balanced public utilization," specific agency statutory authority and any other legislative or executive directives that constrain the use of such property.	18-2.021	p. 8-11
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	TBA App. E3

20	An assessment of the impact of planned uses on the renewable and non-renewable resources of the property, including soil and water resources, and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to compensate/mitigate damage caused by such uses, including a description of how the manager plans to control and prevent soil erosion and soil or water contamination.	18-2.018 & 18-2.021	p. 71-110
21	*For managed areas larger than 1,000 acres, an analysis of the multiple-use potential of the property which shall include the potential of the property to generate revenues to enhance the management of the property provided that no lease, easement, or license for such revenue-generating use shall be entered into if the granting of such lease, easement or license would adversely affect the tax exemption of the interest on any revenue bonds issued to fund the acquisition of the affected lands from gross income for federal income tax purposes, pursuant to Internal Revenue Service regulations.	18-2.021 & 253.036	N/A
22	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-021	N/A
23	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	N/A

*The following taken from 253.034(10) is not a land management plan requirement; however, it should be considered when developing a land management plan: The following additional uses of conservation lands acquired pursuant to the Florida Forever program and other state-funded conservation land purchase programs shall be authorized, upon a finding by the Board of Trustees, if they meet the criteria specified in paragraphs (a)-(e): water resource development projects, water supply development projects, storm-water management projects, linear facilities and sustainable agriculture and forestry. Such additional uses are authorized where: (a) Not inconsistent with the management plan for such lands; (b) Compatible with the natural ecosystem and resource values of such lands; (c) The proposed use is appropriately located on

such lands and where due consideration is given to the use of other available lands; (d) The using entity reasonably compensates the titleholder for such use based upon an appropriate measure of value; and (e) The use is consistent with the public interest.

Section C: Public Involvement Items

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
24	A statement concerning the extent of public involvement and local government participation in the development of the plan, if any.	18-2.021	TBA Section 1.2, App. C
25	The management prospectus required pursuant to paragraph (9)(d) shall be available to the public for a period of 30 days prior to the public hearing.	259.032(10)	TBA App. C
26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. *Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.*	259.032(10)	TBA App. C
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	TBA App. C
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. *Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.*	253.034(5) & 259.032(10)	TBA App. C
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. *Include manager's replies to the team's findings and recommendations.*	259.036	N/A

30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	N/A
31	If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations.	259.036	N/A

Section D: Natural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. *Use brief descriptions and include USDA maps when available.*	18-2.021	p. 31-33
33	Insert FNAI based natural community maps when available.	ARC consensus	p. 40, 47
34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	N/A
35	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding unique natural features and/or resources including but not limited to virgin timber stands, scenic vistas, natural rivers and streams, coral reefs, natural springs, caverns and large sinkholes.	18-2.018 & 18-2.021	p. 31-32
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	N/A

37	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc.	18-2.018 & 18-2.021	N/A
38	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding fish and wildlife, both game and non-game, and their habitat.	18-2.018 & 18-2.021	p. 48-50, App. B.3
39	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding State and Federally listed endangered or threatened species and their habitat.	18-2.021	p. 49, App. B.3.2
40	The identification or resources on the property that are listed in the Natural Areas Inventory. *Include letter from FNAI or consultant where appropriate.*	18-2.021	N/A
41	Specific description of how the managing agency plans to identify, locate, protect and preserve or otherwise use fragile, nonrenewable natural and cultural resources.	259.032(10)	p. 9-13, 49, 51-54
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	259.032(10) & 253.034(5)	p. 71-110
42-B.	Provide a detailed description of both short (2-year planning period) and long-term (10-year planning period) management goals, and a priority schedule based on the purposes for which the lands were acquired and include a timeline for completion.	259.032(10) & 253.034(5)	App. D.1
42-C.	The associated measurable objectives to achieve the goals.	259.032(10) & 253.034(5)	p. 79-110

42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. *Include fire management plans - they can be in plan body or an appendix.*	259.032(10) & 253.034(5)	p. 71-110
42-E.	A detailed expense and manpower budget in order to provide a management tool that facilitates development of performance measures, including recommendations for cost-effective methods of accomplishing those activities.	259.032(10) & 253.034(5)	App. D.1
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	Executive Summary, p. 42
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10)	
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-C.	Measurable objectives (see requirement for #42-C).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-D.	Related activities (see requirement for #42-D).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-E.	Budgets (see requirement for #42-E).	18-2.021, 253.034(5) & 259.032(10)	N/A
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 71-110
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 71-110, App. D.1
45-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 79-110

45-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 71-110
45-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	p. 50, App. B.3.3
47	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	N/A
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 50, p. 109, App. B3.3.3
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 109
48-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 109
48-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 104-110
48-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

Section E: Water Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. *If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.*	18-2.018 & 18-2.021	p. 8-9, TBA App. C

50	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	Executive Summary, p. 10, 27, 77
51	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding swamps, marshes and other wetlands.	18-2.021	N/A
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	p. 40-47
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 18-20, 74-81, 104-110
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 18-20, 74-81, 104-110
53-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 78-81, 107-110
53-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 18-20, 74-81, 104-110
53-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

Section F: Historical Archaeological and Cultural Resources

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. *Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.*	18-2.018, 18-2.021 & per DHR's request	p. 51-54, App. B.4

55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	p. 51-54, App. B.4
56	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	18-2.021	p. 51
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 82-98
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 82-98
57-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 87-92
57-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 82-98
57-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

Section G: Facilities (Infrastructure, Access, Recreation)

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. *See footnote.*	253.034(5)	p. 116-119
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 109, 116-119, App. D.1
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 109, 116-119, App. D.1
59-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 109, 116-119
59-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 109, 116-119
59-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	p. 116-119
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 82-92, 98-104
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	p. 82-92, 98-104, App. D.1
61-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	p. 87-92, 101-104
61-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	p. 82-92, 98-104,
61-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

Section H: Other/Managing Agency Tools

Item #	Requirement	Statute/Rule	Page Numbers and/or Appendix
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and managing agency consensus	TBA Front and App. E.1
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	Executive Summary
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	N/A

65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	p. 71-110
66	Summary budget for the scheduled land management activities of the LMP including any potential fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitat, which fees shall be used to restore, manage, enhance, repopulate, or acquire imperiled species habitat for lands that have or are anticipated to have imperiled species or such habitat onsite. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3) which are resource management, administration, support, capital improvements, recreation visitor services, law enforcement activities.	253.034(5)	App. D.1
67	Cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired, include recommendations for cost-effective methods in accomplishing those activities.	259.032(10)	App. D.1
68	A statement of gross income generated, net income and expenses.	18-2.018	N/A

*** = The referenced inventories shall be of such detail that objective measures and benchmarks can be established for each tract of land and monitored during the lifetime of the plan. All quantitative data collected shall be aggregated, standardized, collected, and presented in an electronic format to allow for uniform management reporting and analysis. The information collected by the DEP pursuant to s. 253.0325(2) shall be available to the land manager and his or her assignee.

E.2 / Management Procedures for Archaeological and Historical Sites on State-Owned or Controlled Lands

(revised June 2021)
These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. Historic Property Definition

Historic properties include archaeological sites and historic structures as well as other types of resources. Chapter 267, Florida Statutes states: " 'Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."

B. Agency Responsibilities

Per Chapter 267, F.S. and state policy related to historic properties, state agencies of the executive branch must provide the Division of Historical Resources (Division) the opportunity to comment on any undertakings with the potential to affect historic properties that are listed, or eligible for listing, in the National Register of Historic Places, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the undertaking. (267.061(2)(a)) State agencies must consult with the Division when, as a result of state action or assistance, a historic property will be demolished or substantially altered in a way that will adversely affect the property. State agencies must take timely steps to consider feasible and prudent alternatives to the adverse effect. If no feasible or prudent alternatives exist, the state agency must take timely steps to avoid or mitigate the adverse effect. (267.061(2)(b)) State agencies must consult with Division to establish a program to locate, inventory and evaluate all historic properties under ownership or controlled by the agency. (267.061(2)(c)) State agencies are responsible for preserving historic properties under their control. State agencies are directed to use historic properties available to the agency when that use is consistent with the historic property and the agency's mission. State agencies are also directed to pursue preservation of historic properties to support their continued use. (267.061(2)(d))

C. Statutory Authority

The full text of Chapter 267, F.S. and additional information related to the treatment of historic properties is available at: https://dos.myflorida.com/historical/preservation/compliance-and-review/regulations-guidelines/

D. Management Implementation

Although the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual and do not include detailed project information. Specific information for individual projects must be submitted to the Division for review and comment. 214 Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. The Division's recommendations may include, but are not limited to: approval of the project as submitted, recommendation for a cultural resource assessment survey by a qualified professional archaeologist, and modifications to the proposed project to avoid or mitigate potential adverse effects. Projects such as additions or alterations to historic structures as well as new construction must also be submitted to the Division for review. Projects involving structures fifty years of age or older must be submitted to the Division for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. Adverse effects to historic properties must be avoided when possible, and if avoidance is not possible, additional consultation with the Division is necessary to develop a mitigation plan. Furthermore, managers of state property should make preparations for locating and evaluating historic properties, both archaeological sites and historic structures.

E. Archaeological Resource Management (ARM) Training

The ARM Training Course introduces state land managers to the nature of archaeological resources, Florida archaeology, and the role of the Division in managing state-owned archaeological resources. Participants gain a better understanding of the requirements of state and federal laws with regard to protecting and managing archaeological sites on state managed lands. Participants also receive a certificate recognizing their ability to conduct limited monitoring activities in accordance with the Division's Review Procedure, thereby reducing the time and money spent to comply with state regulations. Additional information regarding the ARM Training Course is available at:
https://dos.myflorida.com/historical/archaeology/education/arm-training-courses/

F. Matrix for Ground Disturbance on State Lands

The matrix is a tool designed to help streamline the Division's Review Procedure. The matrix allows state land managers to make decisions about balancing ground disturbance and stewardship of historic resources. The matrix establishes types of undertakings that are either minor or major disturbances and then guides the land manager to consult the Division, conduct ARM-trained project monitoring, or proceed with the project.

Additional information regarding the matrix is available at:
https://dos.myflorida.com/historical/archaeology/education/dhr-matrix-for-ground-disturbance-on-statelands/

G. Human Remains Treatment

Chapter 872, Florida Statutes makes it illegal to willfully and knowingly disturb human remains. In the event human remains are discovered, cease all activity in the area that may disturb the remains. Leave the bones and nearby items in place. Immediately notify law enforcement or the local district medical examiner of the discovery and follow the provisions of Chapter 872, FS. Additional information regarding the treatment of human remains and cemeteries is available at:

https://dos.myflorida.com/historical/archaeology/human-remains/
https://dos.myflorida.com/historical/archaeology/human-remains/abandoned-cemeteries/what-are-theapplicable-laws-and-regulations/

H. Division of Historical Resources Review Procedure

Projects on state owned or controlled properties may submit projects to the Division for review using the streamlined State Lands Consultation Form. The form provides instructions to submit projects for review 215 and outlines the necessary information for the Division to complete the review process. The State Lands Consultation Form and additional information about the Division's review process is available at:

https://dos.myflorida.com/historical/preservation/compliance-and-review/state-lands-review/

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Compliance and Review Section
Bureau of Historic Preservation Division of Historical Resources
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

StateLandsCompliance@dos.myflorida.com
Phone: (850) 245-6333
Toll Free: (800) 847-7278
Fax: (850) 245-6435

E.3 / Letters of Compliance with County Comprehensive Plans

This will be added after the final draft.

E.4 / Division of State Lands Management Plan Approval Letter

This will be added after the final draft.

Kristin Jacobs Coral Aquatic Preserve Management Plan
Florida Department of Environmental Protection
Office of Resilience and Coastal Protection
2600 Blair Stone Road, MS #235
Tallahassee, FL 32399
www.floridacoasts.org