National Marine Sanctuary Foundation

REQUEST FOR PROPOSALS

Florida Keys National Marine Sanctuary
Mooring and Marker Buoy Anchor Installations

Introduction & Summary of Solicitation

This Request for Proposals details an invitation to submit a proposal for the installation and replacement of 134 mooring and marker buoy anchors throughout Florida Keys National Marine Sanctuary (NMS) in five phases from Key West to Key Largo over an 8-month period (May 2023 -December 2023).

Project Objectives

The Florida Keys National Marine Sanctuary (NMS) protects 2,900 square nautical miles of waters surrounding the Florida Keys, from south of Miami westward to encompass the Dry Tortugas, excluding Dry Tortugas National Park.

The Foundation in partnership with the Florida Keys NMS encourages sustainable tourism and recreation and provides the infrastructure to enjoy the sanctuary without damaging the coral reef and other habitats throughout the Keys. There are over 490 mooring buoys available for use throughout the Florida Keys NMS. These mooring buoys, along with Sanctuary Preservation Area (SPA) buoys, navigation buoys, and information buoys are installed and maintained by the Florida Keys NMS and allow for the preservation of the natural marine environment in the Florida Keys. These buoys and navigational aids endure the damaging effects of the marine environment and daily use by boaters, resulting in the need for constant maintenance and repair to ensure they are in working condition.

This project will require a skilled and knowledgeable vendor to assess and install buoy anchors, including different types of anchors depending on the locations and conditions. This vendor will work closely with the Florida Keys NMS staff and Foundation to coordinate planning and execution of work and to ensure quality of service, including regular check-ins, documentation, and compliance.

Project Description

Project Coordination

The vendor will engage in routine coordination, starting with a kickoff meeting before work begins, with the Foundation and Florida Keys NMS Technical Representative to provide updates on progress, address any technical issues that arise and identify any issues that must be addressed by the partners. The kickoff meeting shall be scheduled within one week of contract award and should also include the Florida Keys NMS Technical Representative(s) and Foundation representatives. At this meeting, the Florida Keys NMS Technical Representative(s), Foundation representatives, and contractor will confirm each of the installation locations.

Subsequent check-ins with the Foundation and Florida Keys NMS Technical Representative should begin with every other week and might adjust to monthly check-ins depending on performance.

There will not be a Florida Keys NMS representative on board daily with the dive crew for operations. The contractor's crew must operate under their own supervision. Inspections will be conducted to ensure quality of work product and compliance with permits and regulations (additional details in Inspection subsection below).

The vendor will also engage in a wrap up meeting to discuss results and lessons learned with Florida Keys NMS Technical Representative(s) and Foundation representatives.

Mooring Anchor Installations

Install and replace 134 mooring and marker buoy anchors throughout Florida Keys NMS in five phases. See Attachment A for the list of specific site coordinates and *Individual Phase Timelines and Budgets* below for completion dates by phases.

Phase I: Key West: Installation of 22 permanently affixed anchors for buoy connections on the coral reefs in State and Federal waters off Key West.

Phase II: Lower Keys: Installation of 27 permanently affixed anchors for buoy connections on the coral reefs in State and Federal waters off the Lower Keys.

Phase III: Marathon: Installation of 13 permanently affixed anchors for buoy connections on the coral reefs in State and Federal waters off Marathon.

Phase IV: Islamorada: Installation of 35 permanently affixed anchors for buoy connections off Islamorada.

Phase V: Key Largo: Installation of 37 permanently affixed anchors for buoy connections on the coral reefs in State and Federal waters off Key Largo.

Vendor Responsibilities

The vendor shall purchase all hardware needed to complete installation of these buoys. Contractor provides materials, labor, boats, fuel, tools, any and all costs associated with installation of mooring buoy anchors. The vendor must take reasonable care to avoid unnecessary impacts to coral and other benthic resources. No impacts to historical and cultural resources should occur.

Inspections

An Florida Keys NMS representative will perform at least two onsite inspections over the course of the contract (either on board the contractor vessel or from a government vessel) in addition to the kickoff meeting and regular check-ins whose regularity will be determined upon award of the contract. The inspections will occur at the beginning of the performance period in order to confirm that the work is being performed adequately and will meet the terms of the SOW, and again after most or all of the work is complete and would be a "spot check" of at least two buoy anchor installation locations. When the Foundation and NOAA are unable to perform an on-site inspection, the contractor shall substitute the use of underwater 360-degree video of an installation that the government would like to inspect for each anchor type, as well as a video of the load locker usage for the installation of one manta anchor type. The government will continue to use on-site inspections wherever possible.

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Deliverables & Requirements

Project Deliverables

Project Coordination

Preparation and engagement in kick-off meetings, regular check-ins, inspections, and wrap-up meetings with both Foundation and Florida Keys NMS representatives.

Documentation of Completed Work

Shall include the following metrics:

- GPS coordinates shall be taken directly above the anchor installation and recorded. A handheld GPS device (e.g., the accuracy from a phone) provides sufficient accuracy for this contract. Geographic positions (GPs) should be provided in the format of "degrees decimal minutes" -- the same format as those listed in Appendix A.
- Recorded depth of water.
- Two profile pictures and/or video, taken approximately level with substrate from a distance of 2', and 1 photo/video taken from directly above the anchor.
- The anchor location should be marked with a lobster float and five feet of line so that it hovers well above the seafloor. For Mantas, the float should be well-tied directly to the Manta eye. For U-bolts and Pins, the float should be well tied into the rocks as close as possible to the anchor.

Applicant Requirements

Pre-award Criteria

The Contractor must provide:

- A list of the qualifications and experience for key individuals involved in the operations to include, but not limited to, divers, tenders, designated persons in charge, and vessel captains.
- A preliminary dive safety plan that includes potential risks involved in the operation, a mitigation plan to address the risks, and emergency contacts and evacuation plan.
- Disclosure of any serious or repeat federal or state dive-related OSHA safety violations within the past 12 months preceding the proposal due date.
- The contractor shall provide NOAA with a hurricane safety plan that addresses mobilization and demobilization. It is unlikely that vessels will be allowed to be secured at either NOAA facility during a hurricane. The contractor should plan accordingly. As a firm-fixed-price contract, typical non-evacuation "weather days" should be incorporated into the price and proposal for the work and will not be reimbursed to the contractor after the award.
- Should the contractor see any potential historic and cultural resources at the location of the anchor site, work will cease immediately and the Technical Representative will be notified. Work may not recommence at the site until the FKNMS archaeologist has been consulted.

Post-award Requirements

Within 5 days after the contract award, the Contractor must:

- Submit a written proposal plan which must include an analysis of the significant hazards to life, limb, and property inherent in contract work performance and a plan for controlling these hazards; a hazard mitigation plan and the safety and training plan for the divers, incident reporting plan, decompression plan, equipment inspection plan, and subcontractor plan to ensure the safety of divers.

- The contractor will meet with the COR to discuss and develop a mutual understanding relativethe to administration of the Contractor's overall safety program.
- The contractor, including all personnel engaged in the project, will attend at least one pre-mobilization "kickoff" meeting with the FKNMS Technical Representative and COR for a review of installation methods and to review the quality of the Mantas, T pins and U-Bolts.
- The contractor will establish a routine weekly communication schedule (e.g., 30-min weekly conference call, written updates of completed work) in order to confirm the priority and locations of anchor installations and to reach a mutual understanding of problems that may need addressing. Daily site reps from field activities should be sent to both the Technical Representative and the COR.
- Any installation challenges should be discussed at the weekly meetings. Any material changes to the contract must be reviewed by the Contracting Officer prior to implementation.

Insurance and Liabilities

Contractors will, at their own expense, provide and maintain during the entire performance of the dive contract a minimum of the following kinds of insurance:

- Workmen's Compensation and Employer's Liability Insurance. The Contractor is required to comply with applicable Federal and state workers' compensation and occupational disease statutes. If the employer's liability section of the insurance policy, except when contract operations are so commingled with a Contractor's commercial operations that it would not be practical to require this coverage. Employers liability coverage of at least $100,000 is required, except in states with exclusive or monopolistic funds that do not permit workers' compensation to be written by private carriers.
- General Liability. The Contractor must have bodily injury liability insurance coverage written on the comprehensive form a policy of at least $500,000 per occurrence.
- Automobile Liability. The Contractor must have automobile liability insurance written on the comprehensive form of policy. The policy must provide for bodily injury and property damage liability covering the operation of all automobiles used in connection with performing the contract. Policies covering automobiles operated in the United States will provide coverage of at least $200,000 per person and$500,000 per occurrence for bodily injury and $20,000 per occurrence for property damage.
- Aircraft Public and Passenger Liability. When aircraft are used in connection with performing the contract, the Contractor must have aircraft public and passenger liability insurance.
- Liability Coverage. Coverage will be at least $200,000 per person and $500,000 per occurrence for bodily injury, other than passenger liability, and $200,000 per occurrence for property damage. Coverage for passenger liability bodily injury must be at least $200,000 multiplied by the number of seats or passengers, whichever is greater.
- Vessel Liability. When contract performance involves use of vessels, the Contracting Officer will require, as determined by the agency, vessel collision liability and protection and indemnity liability insurance.

Equipment

Below is a list of minimum required equipment needed to install buoy hardware. Alternatives to cement may be discussed and utilized upon agreement between both parties, depending upon the type of substrate in which the pin is being installed.

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Required Equipment

Anchors will be matched to substrate type and use. Manta anchors will be used in sand and rubble substrates and pins and U-bolts will be used in hard bottom and coral substrates. The recommended anchor type for each site location is listed in Appendix A.

Anchor Types:

1. Manta Anchor

MR 1 or MR-SR Manta Ray Anchors with a 1" shaft consist of either a 3 ½' or a 7' galvanized rod with a fixed eye at one end and a large holding anchor plate on the other. The anchor plate hinges from vertical to horizontal. Assembly of the Mantas should be done with 3M 5200 or an equivalent on all threaded parts.

Manta installation areas should be probed to approximately 8' to determine whether installation is possible at the intended location.

Mantas should be installed with a jackhammer until the eye is ~12" below the surface. A tag line should be attached to the eye prior to driving it below the surface. Pea gravel is used to fill the void left around the manta anchor rod after it has been driven into the bottom. It normally takes ½ to ¾ of a 5-gallon bucket to properly backfill the void. Softer bottom composition may require more fill while more firm bottom composition may require less fill. Pack as necessary while backfilling. Pour the gravel into the hole and shake the manta anchor rod back and forth to vibrate the gravel down into the hole. Continue to do this and pack the gravel by hand until the hole is filled. Load locker shall be used to a pressure of 18,000 lbs to ensure Manta base/foot has properly seated in horizontal. The eye should be no more than 4-5" proud of the surface. Align the eye with prevailing wind directions.

Attach a FKNMS provided line and small marker float and 12" of pink flagging tape to Manta eye. Locations greater than 40' are identified for immediate installation of a FKNMS provided shackle, bottom line and mid water float set. If the site is noted to get a future replacement near an existing anchor, the new site should be less than 4' away from the current anchor. If it is difficult to identify a suitable substrate, please discuss with the Technical Representative.

2. Stainless Steel Pin Anchor

Stainless steel T pins are used for hard bottom and coral reef locations. T pin eyes must be aligned with prevailing wind direction.

A 21" long, ⅝ - ¾" diameter 316 stainless steel rod with a reinforced welded eye at one end and a 1 ¾" "T" on the other end. This "T" is created by welding a ⅝ - ¾" diameter 316 piece of stainless steel at the base of the pin. This "T" locks into cement used to anchor it in the hole and prevents it from being pulled out.The hole for the T pins shall be 3" in diameter and drilled to the depth of 20". Only 2" of the pin should be proud of the surface. If any cement was displaced during the installation, replace and pack the cement down firmly.

Attach a FKNMS provided line and small marker float nearby with 12" of pink flagging tape to an appropriate structure in the immediate location. Down line sets for the locations that require installation of a FKNMS provided shackle, bottom line and mid-water float set, should not be attached until the pin has cured for at least 96 hours. If the site is noted to get a future replacement near an existing pin, the new site should be less than 4' away from the current pin in hard substrate but NOT living coral. If it is difficult to identify a suitable substrate, please discuss it with the Technical Representative.

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3. U-bolt Anchor
U Bolts are a specialized application for large commercial vessels. U-bolts must be aligned with prevailing wind direction.

A U-shaped 24” long, ⅝ - ¾” 316 stainless steel rod with 1 ¾” “T”on each leg. This “T” is created by welding a ⅝ - ¾” diameter 316 piece of stainless steel at the base of the pin. This “T” locks into cement used to anchor it in the hole and prevents it from being pulled out. The width of the U-Bolt should be approximately 13 1/2 “ center to center. Holes for the U-bolts shall be 3-4" in diameter and at a depth of 22". U-bolt should be cemented in place.

Only 3" of the U- bolt should be proud of the substrate. If any cement was displaced during the installation, replace and pack the cement down firmly. If the site is noted to get a future replacement near an existing U Bolt, the new site should be less than 4’ away from the current pin in hard substrate but NOT living coral. If it is difficult to identify a suitable substrate, please discuss with the Technical Representative. Attach a FKNMS provided line and small marker float nearby with 12" of pink flagging tape to an appropriate structure in the immediate location. Downline sets for the locations that require installation of a FKNMS provided shackle, bottom line and mid-water float set, should not be attached until the U Bolt has cured for at least 96 hours.

Rotary Drill with Core Bit:
Tools for assembling anchors are the responsibility of the contractor; however, one specific tool is required for use by the contractor: a rotary drill with a core bit for drilling holes in the substrate. No hammer drills are allowed under this contract.

Other equipment:
Load Locker and Locking Rod with Cone, and Load Locker Base
Note: a vendor must provide their own load locker. A load locker is a proprietary tool that allows the foot of the manta anchor to be moved from the vertical position to the horizontal position. The load locker and locking rod with cone tool is used in conjunction with the load locker base, referred to as “Table and Chair.” Approximate weight is 40lbs. Load Locker base is a two-piece unit (“Table and Chair”) that rests on the substrate and supports the load locker while setting the base of the manta anchor.Approximate weight is 60 lbs. Load Locker must be able to provide greater than an 18,000lb load. Use of a Load Locker is required to set Mantas to 18,000lb.

Marker Float
A small float on a five foot piece of line. This marker is normally attached to the head of a manta anchor so that the location of the manta will not be lost once it is driven into the substrate. In the case of a pin or u-bolt anchor installation, the small float and five feet of line should be attached to an appropriate structure in the immediate location of the new installation.

Backfill
Pea gravel is used to fill the void left around the manta anchor rod after it has been driven into the bottom. It normally takes ½ to ¾ of a 5 gallon bucket to properly backfill the void. Softer bottom composition may require more fill while more firm bottom composition may require less fill. The contractor is responsible for supplying the pea gravel.

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Cement and Cement Bag/Fill Tubes

Portland Type 2 cement should be used. The contractor may propose an alternative to Portland Type 2 cement with information regarding holding power and toxicity; however, if the government determines that the alternative would not be sufficient, it reserves the right to require the contractor to use Portland Type 2 cement. Cement should be applied via either a cement back or fill tube to the T pin and U-Bolt holes with minimum overage on the surrounding substrate.

Compliance

The Contractor will comply with all applicable Federal and state safety and health standards and regulations applicable to this work, including but not limited to the Occupational Safety and Health (OSHA) Act, 29 U.S.C. 651§ et seq. To the extent the Contractor relies on sub-contractors in executing this work, the Contractor will have sole responsibility for ensuring the sub-contractors are qualified, appropriately trained and outfitted, and comply with all applicable safety and health standards and regulations.

- The Contractor must immediately notify the Federal Government of any incident within 8 hours of occurrence followed by written correspondence within 24 hours detailing the problem, what corrective action was taken, and how the contractor plans to medicate the recurrence of future problems. Failing to report any breach of safety could be a reason for immediate termination.
- Should the Contracting Officer become aware of any non-reported non-compliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Federal Government personnel, the Contracting Officer must immediately notify the contractor orally and with written confirmation on your quest immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's Representative at the worksite, will be deemed sufficient notice of the non-compliance and that corrective action must be required. After receiving the notice, the contractor must immediately take corrective action. If the Contractor fails or refuses to properly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory correction action has been taken. The Contractor will not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.
- The Contracting Officer must inform the OSHA, or other cognizant federal, state, or local officials, of instances where the Contractor has been notified to take immediate action to correct Serious or imminent dangers.
- If at any time the Contracting Officer or the Contracting Officer's Representative has questions or concerns and is unsure of the applicable laws governing work to be conducted under the contract diver, the Contracting Officer may seek guidance through their NOAA Line or Staff Office Unit Dive Supervisor, the NOAA Diving Program Safety Officer, or the NOAA Diving Program Manager. (NOTE: This will not be included in the contract; the NOAA Diving Program's expertise is relied upon to identify any violation.)

Permitting

The selected contractor will be given a letter of authorization (LOA) under the "Superintendent's permit" and will not require any other environmental permits. The LOA will identify FKNMS oversight requirements that pertain to the work under this SOW and would not result in additional fees beyond those required for state licensure, which is a prerequisite for this contract.

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The proposed work performing the work solicited under this contract will trigger FKNMS regulations, and the contractor will be responsible for ensuring that all rules under the Superintendent's permit are followed. The selected contractor will be given a letter of authorization (LOA) under the Superintendent's permit and will not require any other environmental permits. The LOA will identify FKNMS oversight requirements that pertain to the work under the SOW. No additional environmental permits are required.

Although this activity will take place under an FKNMS Superintendent's permit, if the contractor injures live corals during the course of this work by not following the guidance provided in the SOW and during the kickoff meeting and any subsequent check-ins, the contractor could be charged with injury to Sanctuary resources under Section 312 of the National Marine Sanctuaries Act.

Additionally, no historical and cultural artifacts should be disturbed or removed during the operations. A map of historical and cultural artifact locations near the installation areas will be provided to the contractor at the kickoff meeting. The kickoff meeting will include a briefing on endangered coral identification, as well as locations to be avoided and any other special considerations for the areas of operation.

Timeline & Funding Availability

Overall Period of Performance: May 1, 2023 - December 30, 2023

Current funding is available in the amount of $681,875. The Foundation expects to issue the award in April 2023. The project will be carried out in phases across 8 months and should be completed by December 30, 2023. Payment shall be made progressively by phase upon submission of signed invoices and deliverables. Invoices must be submitted within thirty (30) days of phase completion.

Individual Phase Timelines and Budgets

Phase	Location	Commencement Date	Completion Date	Budget
Phase I	Key West	On or after 5/1/2023	7/31/2023	***$ 115,232***
Phase II	Lower Keys	On or after 5/1/2023	7/31/2023	***$ 137,512***
Phase III	Marathon	On or after 7/1/2023	12/30/2023	***$ 73,899***
Phase IV	Islamorada	On or after 7/1/2023	12/30/2023	***$ 173,160***
Phase V	Key Largo	On or after 7/1/2023	12/30/2023	***$ 182,072***

Funding is not flexible between phases.

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Eligibility

- The applicant has buoy installation experience in the Florida Keys.
- The applicant is a formal or informal education institution, small business, non-profit, or a Tribal, state, or local government.
- The applicant does not have a paid staff member serving on the Foundation's Board of Trustees.
- The applicant is not a federal government agency, a foreign entity, or an individual.
- Project work is conducted by a U.S. organization in the United States or territories.
- The applicant can provide a federal tax id #.

How to Apply:

Proposals should be submitted by 11:59 pm EST on April 16, 2023. Email proposals to RFP@marinesanctuary.org. Send your email, with the subject line: **Florida Keys Buoy Anchor Installation 2023 Application: [Name of Organization].**

Proposals shall include:

1. Submitting organization, office address, principal investigator/staff, phone number, and email address.
2. Evidence of experience that addresses all required qualifications listed herein, including curriculum vitae or resumes for all members of the core team.
3. Clear and concise work plan description that includes the Scope of Work, deliverables, and timelines.
4. Budget and budget narrative by phase.
5. References.

Additional Information:

For questions and additional information, please email Erin Jaszczak, Program Operations Manager at ejaszczak@marinesanctuary.org.

About the National Marine Sanctuary Foundation:

The National Marine Sanctuary Foundation, founded in 2000 by America's most influential ocean conservation leaders, works with communities and NOAA to conserve and expand these special places for a healthy ocean, coasts, and Great Lakes. Sanctuaries and monuments are our essential network of protected waters, owned by every American and championed by us. Connected by currents, they sustain miraculous species, coastal communities, and our shared heritage. The Foundation is a leading voice for U.S. protected waters, and our work extends from the ocean floor to the classroom to Capitol Hill. The Foundation supports a growing portfolio of Community Stewardship, Outreach, and Education

programs aimed at providing students, educators, and lifelong learners with opportunities to explore and discover connections to the natural world, no matter where they live.

This is a Request for Proposals only. Issuance of this RFP does not in any way obligate the Foundation to make an award or pay for costs incurred by potential offerors in the preparation and submission of an offer. In addition:
(a) The Foundation may cancel RFP and not award;
(b) The Foundation may reject any or all responses received;
(c) Issuance of RFP does not constitute award commitment by The Foundation;
(d) The Foundation reserves the right to disqualify any offer based on offeror failure to follow RFP instructions;
(e) The Foundation will not compensate offerors for a response to RFP;
(f) The Foundation reserves the right to issue an award based on an initial evaluation of offers without further discussion;
(g) The Foundation may negotiate with short-listed offerors for their best and final offer;
(h) The Foundation reserves the right to order additional quantities or units with the selected offer or;
(i) The Foundation may reissue the solicitation or issue formal amendments revising the original RFP specifications and evaluation criteria before or after receipt of proposals;
(j) The Foundation may modify the specifications without issuing a formal notice to all offerors when the revisions are immaterial to the scope of the RFP;
(k) The Foundation may choose to award only part of the activities in the RFP or issue multiple awards based on multiple RFP activities; and
(l) The Foundation reserves the right to waive minor proposal deficiencies that can be corrected prior to award determination to promote competition.

Attachment A

District	Mooring number	Reef Site	Position	Habitat	Lat decimal minutes	long decimal minutes	Anchor Type	estimated depth (feet)	Bottom type	Activity	Practitioner	Notes
1	1	Eastern Dry Rocks	Fore reef	deep reef	N 24° 27.519054'	W 81° 50.604414'	Pin	30-35	hb	Restoration site	Mote	small sand channel 20 m east
1	2	Eastern Dry Rocks	Fore reef	deep reef	N 24° 27.59073'	W 81° 50.479566'	Pin	30-35	hb	Restoration site	CRF	
1	3	Eastern Dry Rocks	Fore reef	fore reef terrace	N 24° 27.594'	W 81° 50.5674'	Pin	22-25	hb	Restoration site	Mote	small sand patch adjacent to point
1	4	Eastern Dry Rocks	Fore reef	fore reef terrace	N 24° 27.6162'	W 81° 50.532'	Pin	22-25	hb	Restoration site	CRF	
1	5	Eastern Dry Rocks	Fore reef	deep reef, drowned spurs	N 24° 27.67221'	W 81° 50.442138'	Pin	25-30	hb	Restoration site	RR	small adjacent sand channel
1	7	Eastern Dry Rocks	Fore reef	adjacent to spur	N 24° 27.73056'	W 81° 50.466'	Pin	15	sand/rubble	Restoration site	RR	spur top would be hb; side sand/rubble difficult to
1	8	M32	Back Reef	lagoon	N 24° 28.764'	W 81° 46.53'	Manta		sand	Coral Nursery	CRF	landward of reef system near marker
1	WD 6	Western Dry	fore reef		24°26.741'N	81° 55.689'W	Manta			Preventative		
1	S 2	Sand Key	fore reef		24° 27.208'N	81° 52.429'W	U-bolt			Preventative		
1	S 5	Sand Key	fore reef		24° 27.174'N	81° 52.457'W	U-bolt			Preventative		
1	S 14	Sand Key	fore reef		24° 27.111'N	81° 52.713'W	U-bolt			Preventative		
1	S 17	Sand Key	fore reef		24° 27.083'N	81° 52.784'W	U-bolt			Preventative		
1	S 18	Sand Key	fore reef		24° 27.102'N	81° 52.782'W	U-bolt			Preventative		
1	S 20	Sand Key	fore reef		24° 27.136'N	81° 52.813'W	U-bolt			Preventative		
1	R 2	Rock Key	fore reef		24° 27.294'N	81° 51.381'W	U-bolt			Preventative		
1	R 7	Rock Key	fore reef		24° 27.273'N	81° 51.556'W	U-bolt			Preventative		
1	R 8	Rock Key	fore reef		24° 27.289'N	81° 51.577'W	U-bolt			Preventative		
1	ED 5	Eastern Dry	fore reef		24° 27.569'N	81° 50.758'W	Manta			Preventative		
1	ED 7	Eastern Dry	fore reef		24° 27.600'N	81° 50.781'W	Manta			Preventative		
1	ED 9	Eastern Dry Rocks	fore reef		24° 27.647'N	81° 50.764'W	Pin			Preventative		
1	3	Toppinos	fore reef		24° 28.429'N	81° 44.657'W	Manta			Preventative		
1	P 3	Pelican Shoal	fore reef		24° 29.987'N	81° 37.884'W	Manta			Preventative		
2	9	Looe Key	Fore reef	deep reef	N 24° 32.604516'	W 81° 24.6075'	Pin or Manta	30-35	hb, sand patch	Restoration site		
2	10	Looe Key	Fore reef	low relief spur, e end	N 24° 32.800962'	W 81° 24.022638'	Pin or Manta	18-20	hb/sand	Restoration site		low relief spur, sand patcvhes in surrounding area
2	11	Looe Key	Fore reef	low relief spur, e end	N 24° 32.82'	W 81° 23.994'	Pin or Manta	18-20	hb/sand	Restoration site		low relief spur, sand patcvhes in surrounding area
2	12	Looe Key	Fore reef	shallow spur	N 24° 32.82558'	W 81° 24.09'	Pin or Manta	10-12	hb	Restoration site		shallow spur top
2	13	Looe Key	Back reef	lagoon	N 24° 32.9539998'	W 81° 24.8179998'	Manta		sand	Coral Nursery	RR	sandy area shoreward of SPA
2	9b	Looe Key	Fore reef	deep reef	N 24° 32.6982'	W 81° 243360'	Pin or Manta	25-30	hb	Restoration site		drowned spur deep reef, midway along reef
2	14	Looe Key	Back reef	lagoon	N 24° 33.0834'	W 81° 24.8292'	Manta		sand	Coral Nursery	CRF	Sandy area shoreward of SPA
2	15	Newfound Harbor	Nearshore Patch reef	deep reef edge	N 24° 36.771954'	W 81° 23.604792'	Pin or Manta		sand/hb	Restoration site		
2	16	Newfound Harbor	Nearshore Patch reef	mid depth hb	N 24° 36.780972'	W 81° 23.716734'	Pin or Manta		hb	Restoration site		
2	17	Newfound Harbor	Nearshore Patch reef	deep reef ridge	N 24° 36.868242'	W 81° 22.878744'	Pin or Manta		sand/hb	Restoration site		
2	18	Newfound Harbor	Nearshore Patch reef	deep reef ridge	N 24° 36.87756'	W 81° 22.81932'	Pin or Manta		sand/hb	Restoration site		
2	19	Newfound Harbor	Nearshore Patch reef	adj to shallow oann	N 24° 36.8838'	W 81° 23.565'	Pin or Manta	10	hb	Restoration site		
2	20	Newfound Harbor	Nearshore Patch reef	adj to shallow oann	N 24° 36.957'	W 81° 23.43'	Pin		hb	Restoration site		
2	21	Newfound Harbor	Nearshore Patch reef	mid depth hb	N 24° 36.970158'	W 81° 22.84287'	Pin		hb	Restoration site		
2	22	Newfound Harbor	Nearshore Patch reef	adj to shallow oann	N 24° 37.1178'	W 81° 22.8216'	Pin		hb	Restoration site		
2	23	Newfound Harbor	Nearshore Patch reef	adj to shallow oann	N 24° 37.146'	W 81° 22.857'	Pin		hb	Restoration site		
2	WS 0	Western Sambo	fore reef		24° 29.007'N	81° 42.225'W	Pin			Preventative		
2	WS 7	Western Sambo	fore reef		24° 28.840'N	81° 42.630'W	Pin			Preventative		
2	WS 20	Western Sambo	fore reef		24° 29.010'N	81° 42.915'W	Manta			Missing		
2	WS 22	Western Sambo	fore reef		24° 29.050'N	81 42 741	Manta			Missing		
2	NFH B	Newfound	nearshore reef system		24° 36.850'N	81° 23.285'W	Manta			Preventative		
2	NFH C	Newfound	nearshore reef system		24° 36.745'N	81° 23.790'W	Manta			Preventative		
2	L A	Looe Key SPA	fore reef		24° 33.239'N	81° 24.031'W	Manta			Preventative		
2	L B	Looe Key SPA	fore reef		24° 32.695'N	81° 23.852'W	Manta			Preventative		
2	L D	Looe Key	fore reef		24° 33.116'N	81° 24.807'W	Manta			Preventative		
2	LK RR C	Looe Key	offshore patch reef		24° 33.844'N	81° 23.602'W	Manta			Preventative		
2	L 25	Looe Key	fore reef		24° 32.689'N	81° 24.609'W	U bolt			Preventative		
3	24	Sombrero Reef	Fore reef	deep reef	N 24° 37.50027'	W 81° 6.63876'	Pin or Manta	30-35	hb/sand	Restoration site	CRF	drowned spur with a lot of sand adjacent to hb
3	26a	Marathon	Mid-channel	lagoon	N 24° 39.96'	W 81° 1.5'	Manta	24-26	sand	Coral Nursery	FWC	FWC midchannel nursery
3	26	Marathon	Offshore	lagoon	N 24° 39.3619998'	W 81° 1.1149998'	Manta	27-28	sand	Coral Nursery	RR/FWC	
3	26b	Marathon	Offshore	lagoon	N 24° 39.96'	W 81° 1.5'	Manta	27-28	sand	Coral Nursery	RR/FWC	
3	SO 0	Sombrero Reef	fore reef		24° 37.628'N	81° 06.501'W	Manta			Preventative		
3	SO 4	Sombrero Reef	fore reef		24° 37.585'N	81° 06.530'W	Manta			Preventative		
3	SO 5	Sombrero Reef	fore reef		24° 37.582'N	81° 06.564'W	Manta			Preventative		
3	SO 7	Sombrero Reef	fore reef		24° 37.556'N	81° 06.578'W	Manta			Preventative		
3	SO 13	Sombrero Reef	fore reef		24° 37.525'N	81° 06.674'W	Manta			Preventative		

3	SO 14	Sombrero Reef	fore reef		24° 37.536'N	81° 06.655'W	Manta			Preventative		
3	SO LV-E	Sombrero Reef	fore reef		24° 37.606'N	81° 06.455'W	Manta			Preventative		
3	CP C	Coffins Patch	middle channel patch reef		24° 40.752'N	80° 58.333'W	Manta			Preventative		
3	TBD	Coffins Patch	middle channel patch reef		24° 41.127'N	80° 57.762'W	Manta			Preventative		Out in Sandy area possible previous anchor
4	27a	Captain Arnos	michannel PR	patch reef	N 24° 52.7172'	W 80° 34.212'	Pin	28	hb	Restoration site	ICARE	
4	27	Runway	michannel PR	patch reef	N 24° 53.184'	W 80° 33.2080002'	Pin	30	hb	Restoration site	ICARE	spur and groove
4	28	Victory	fore reef	spur and groove	N 24° 53.2992'	W 80° 32.958'	Manta	45	sand	Restoration site	ICARE	spur and groove
4	29	Maze	michannel PR	patch reef	N 24° 53.877'	W 80° 39.53202'	Manta	25	sand	Restoration site	ICARE	adjacent to coral nursery
4	30	Morada	michannel PR	patch reef	N 24° 53.6140002'	W 80° 34.6639998'	Manta	15	sand	Restoration site	ICARE	
4	30a	Alligator deep	fore reef	spur and groove	N 24° 50.58'	W 80° 37.14402'	Manta	55	sand	Restoration site	ICARE	spur and groove
4	30b	KW splendor	fore reef	spur and groove	N 24° 50.406'	W 80° 37.881'	Pin	28	hb	Restoration site	ICARE	spur and groove
4	31	Cheeca Rocks	Nearshore Patch reef	hardbottom/seagrass	N 24° 53.82534'	W 80° 36.98988'	Pin	12-15	hb	Restoration site	CRF	may be sand patch adjacent
4	32	Cheeca Rocks	Nearshore Patch reef	hardbottom/seagrass	N 24° 53.82996'	W 80° 37.1286'	Manta	12-16	sand	Restoration site	CRF	
4	33	Cheeca Rocks	nearshore Patch reef	hardbottom/seagrass	N 24° 54.21186'	W 80° 37.112568'	Pin	12-17	hb	Restoration site	Mote	may be sand patch adjacent
4	TBD	Snapper Ledge	offshore patch reef		24° 58.870'N	80° 25.350'W	Pin			Missing		New pin for popular dive site
4	HC2	Hens & Chickens	middle channel patch reef		24° 56.039'N	80° 32.988'W	Pin			Missing		
4	TBD	Hens & Chickens	middle channel patch reef		24° 56.048'N	80° 33.085'W	Pin			Missing		New pin for popular dive site
4	CH 8	Cheeca Rocks	nearshore patch reef		24° 54.212'N	80° 36.641'W	Manta			Missing		
4	TBD	Cheeca Rocks	nearshore patch reef		24° 54.276'N	80° 36.624'W	Manta			Missing		this anchor is close to a historical broken
4	CN C	Conch Reef	offshore patch reef		24° 57.124'N	80° 26.927'W	Manta			Missing		Install FKNMS provided bottom
4	CN D	Conch Reef	offshore patch reef		24° 56.828'N	80° 27.244'W	Pin			Missing		Install FKNMS provided bottom
4	CN B	Conch Reef	offshore patch reef		24° 57.339'N	80° 27.263'W	Pin			Preventative		
4	CN E	Conch Reef	offshore patch reef		24° 56.990'N	80° 27.421'W	Manta			Preventative		
4	COA	Conch	fore reef		24° 57.476'N	80° 27.467'W	Manta			Preventative		Duplicate
4	CW 2	Conch Wall	fore reef		24° 56.798'N	80° 27.369'W	Pin			Preventative		
4	TBD	Crocker Reef	fore reef		24° 54.819'N	80° 30.990'W	Pin			Missing		New pin for popular dive site
4	TBD Vic2	Victory Reef	offshore patch reef		TBD	TBD	Manta					Additional moorings aside from ICARE primary
4	TBD Mz S	Maze South1	offshore patch reef		24° 53.492'N	80° 33.831'W	Pin					
4	TBD Mz S2	Maze South2	offshore patch reef		24°	80° 33.968'W	Manta					
4	TBD Ar2	Cpt Arnos	offshore patch reef		TBD	TBD	Pin					Additional moorings aside from ICARE primary
4	TBD JM	Jumping Mac	offshore patch reef		24° 52.582'N	80° 34.106'W	Pin					
4	TBD CTR	Crater	offshore patch reef		24° 52.452'N	80° 34.321'W	Pin					
4	A 5	Alligator Reef	fore reef		24° 50.465'N	80° 37.355'W	Pin			Missing		
4	A D	Alligator Reef	fore reef		24° 50.814'N	80° 37.632'W	Manta			Preventative		
4	A	Tennessee Reef	fore reef		24° 46.202'N	80° 45.069'W	Pin			Preventative		
4	B	Tennessee Reef	fore reef		24° 45.983'N	80° 44.902'W	Manta			Preventative		
4	C	Tennessee Reef	fore reef		24° 45.695'N	80° 45.448'W	Manta			Preventative		
4	D	Tennessee Reef	fore reef		24° 45.897'N	80° 45.573'W	Manta			Preventative		
4	TBD											
5	34	Tavernier	midchannel	lagoon	N 24° 58.839'	W 80° 26.3299998'	Manta	25-28	sand	Coral Nursery	CRF	
5	35	Tavernier	midchannel	lagoon	N 24° 58.98'	W 80° 26.13'	Manta	25-28	sand	Coral Nursery	RR	
5	56	Molasses	Fore reef	spur and groove	N 25° 0.73446'	W 80° 22.26234'	Pin	25	hardbottom	Restoration site	RR	
5	36	Horseshoe Reef	Offshore Patch Reef	hard bottom with sand patche	N 25° 8.31855'	W 80° 17.737704'	Pin or Manta	12-16	rubble/hb	Restoration site	RR	sand patches adjacent to reef framework
5	37	Horseshoe Reef	Offshore Patch Reef	hard bottom with sand patche	N 25° 8.37828'	W 80° 17.7432'	Pin or Manta	15-20	rubble/hb	Restoration site	CRF	sand patches adjacent to reef framework
5	38	Carysfort South	Fore reef	FR terrace	N 25° 12.364596'	W 80° 13.274706'	Pin or Manta	20-25	hb/rubble/sand	Restoration site		high relief hard bottom with sand adjacent to point, s
5	39	Carysfort South	Fore reef	Spur and groove	N 25° 12.471906'	W 80° 13.217514'	Pinor Manta	12-20	hb/sand	Restoration site		hb spurs with sand channels; manta possible in chanr
5	40	Carysfort South	Back Reef	acropora framework	N 25° 12.53538'	W 80° 13.299402'	Pin or Manta	8-10	hb/sand	Restoration site		could put in manta if slightly landward; patch is in hb
5	42	Carysfort South	Fore reef	PR adjacent (east) of CS	N 25° 12.86814'	W 80° 12.98886'	Pin or Manta	15-25	hb/sand	Restoration site		patch reef with patches of sand
5	43	Carysfort PR	Back Reef	between CN and CS	N 25° 13.05396'	W 80° 12.8346'	Pin or Manta	15-25	hb/sand	Restoration site		base of pr has a sand apron, may be able to install ma
5	44	Carysfort North	Fore reef	fore reef terrace	N 25° 13.24524'	W 80° 12.641142'	Pin or Manta	15-20	hb/sand	Restoration site	H	sand patches in vicinity; could [ut manta in
5	45	Carysfort North	Back Reef	consolidated apal framework	N 25° 13.283922'	W 80° 12.712812'	Pin	8-12	hb	Restoration site		in amond dead Apal colonies, some sand/rubble
5	46	Carysfort North	Fore reef	shallow S & G	N 25° 13.37454'	W 80° 12.621384'	Pin or Manta	10-12	hb/sand	Restoration site	TBD	may be able to put into sand channel next to spur
5	47	Carysfort North	Fore reef	reef crest/shallow S &G	N 25° 13.434'	W 80° 12.5652'	Pin	10-12	hb	Restoration site	TBD	
5	48	Carysfort North	Fore reef	reef crest	N 25° 13.4634'	W 80° 12.54942'	Pin	10-12	hb	Restoration site	TBD	
5	49	Carysfort North	Fore reef	fore reef terrace	N 25° 13.51248'	W 80° 12.49134'	Pin	20-25	hb/sand	Restoration site	TBD	
5	50	Carysfort North	back reef	sand and rubble	N 25° 13.573692'	W 80° 12.64458'	Pin	12-15	sand	Restoration site	TBD	
5	51	Carysfort North	Fore reef	Spur and groove	N 25° 13.5753'	W 80° 12.49638'	Pin or Manta	10-15	hb/sand	Restoration site	TBD	fused dead apal framework
5	52	Carysfort North	fore reef	Lower S &G FR Terrace	N 25° 13.65'	W 80° 12.395964'	Pin or Manta	10-15	hb/sand	Restoration site	TBD	fused dead apal framework
5	53	Carysfort North	fore reef	Lower S &G FR Terrace	N 25° 13.68627'	W 80° 12.386202'	Pin or Manta	10-15	hb/sand	Restoration site	TBD	fused dead apal framework
5	54	Carysfort North	Fore reef	Lower S &G FR Terrace	N 25° 13.75746'	W 80° 12.33894'	Pin or Manta	10-15	hb/sand	Restoration site	TBD	fused dead apal framework
5	55	Carysfort North	Back Reef	lagoon	N 25° 14.112'	W 80° 12.828'	Manta	27	sand	Coral Nursery	CRF	
5	NE2	North East Patch	offshore patch reef		25° 18.434'N	80° 12.051'W	Pin					
5	T3	Turtle Rocks	offshore patch reef		25° 16.824'N	80° 12.419'W	Pin					

5	T 6	Turtle Rocks	offshore patch reef		25° 17.105'N	80° 12.378'W	Pin			Preventative		
5	C 5	Carysfort Reef	fore reef		25° 13.321'N	80° 12.589'W	Pin			Missing		
5	C 7	Carysfort Reef	fore reef		25° 13.488'N	80° 12.679'W	Manta			Preventative		
5	C 8	Carysfort Reef	fore reef		25° 13.468'N	80° 12.697'W	Manta			Preventative		
5	CA D1	Carysfort Reef	fore reef		25° 12.722'N	80° 13.521'W	Manta			Preventative		
5	E A	Elbow Reef	fore reef		25° 08.966'N	80° 15.626'W	Manta					
5	NNDR1	North North Dry	fore reef		25° 08.170'N	80° 17.392'W	Pin					
5	NDR1	North Dry Rocks	fore reef		25° 07.755'N	80° 17.613'W	Pin			Missing		
5	KLDRC	Key Largo Dry	fore reef		25° 07.248'N	80° 17.822'W	Manta			Missing		
5	BW 4	Benwood Wreck			25° 03.166'N	80° 19.950'W	Pin					
5	G 7	Grecian Rocks	fore reef		25° 06.687'N	80° 18.324'W	Manta			Preventative		
5	WB 4	White Banks	offshore patch reef		25° 02.584'N	80° 22.158'W	Manta			Preventative		
5	TBD	Molasses	fore reef		25° 0.639'N	80° 22.310'W	Pin			Missing		Data Collection instruments FIU