Introduction & Summary of Solicitation

This document details an invitation to submit a proposal for Site Preparation Tool Development, a developmental project with end products that will enhance the ability to execute site preparation at large scale across reef sites within the Florida Keys National Marine Sanctuary (FKNMS). This project specifically seeks a contractor who is willing and able to design, trial, and develop a functional tool to increase both the efficacy and efficiency of underwater site preparation needs as part of *Mission: Iconic Reefs* coral restoration activities.

This Site Preparation Tool Development Project plays a critical role in enabling the overall success and sustainability of coral outplanting activities, ultimately allowing for realization of restoration on an ecosystem-wide scale; in so doing, this project directly contributes to coral reef restoration activities, and is made possible through strong partnership between the National Marine Sanctuary Foundation (the Foundation), National Oceanic and Atmospheric Administration (NOAA), and FKNMS.

Mission: Iconic Reefs & Project Overview

Mission: Iconic Reefs (Iconic Reefs)--a 20-year, two-phased coral reef restoration initiative within FKNMS--represents the application of current coral restoration techniques together with novel innovation and intervention activities. Iconic Reefs sites span all regions of the Florida Keys and consist of both offshore spur and groove systems and nearshore patch reefs. While much work has been completed to prepare for restoration at Iconic Reefs' extensive scale, additional development is needed for practical tool applications that help to expedite all facets of the restoration process, including site preparation activities.

As part of Iconic Reefs' novel approach to large-scale restoration, site preparation work is performed on the reef substrate to prepare a location to best receive coral outplants. Site preparation entails the removal of predatory and coral-suffocating organisms which can dominate reef substrate, thereby threatening successful coral outplanting. To date in the Florida Keys, site preparation for past and present coral restoration activities has not been completed on any scale larger than direct clearing beneath individual outplants at the time of outplanting. While this individualistic approach is well-intentioned at small scales, at some sites it is simply insufficient to address the effects of nuisance species on the coral outplants. As such, the Iconic Reefs plan incorporates wide-scale site preparation as a concrete step in the restoration process. While the techniques and best practices for executing site preparation are becoming better understood, development is still needed in terms of physical assets to meet the practical demands of site preparation at large scales.

A site preparation-focused tool would enable the above-described large-scale site preparation to be both possible and efficient, while also being somewhat less cumbersome than the current suite of tools--primarily paint scrapers, rock hammers, wire brushes, dental picks, heavy duty forceps, etc.--that are brought underwater for this type of work. The purpose of this solicitation is for a chosen contractor to

develop a functional, multi-faceted site preparation tool to replace the above-mentioned, for immediate use at Iconic Reefs sites.

Project Needs

In order to meet the upscaled needs of site preparation across all Iconic Reefs sites, the developed site preparation tool must be fine-tuned to the reef site's needs. While innovation is encouraged, the following bullets detail specifications desired for the final design and product:

- Purpose-built site preparation tool that increases both the efficiency and efficacy of underwater site preparation work at a reef scale
- Ability for tool to work in different reef habitat types of a typical Florida Keys spur and groove reef system (i.e., depths ranging from <1m to 6m, characteristic of the shallow reef crest to forereef terrace habitat types)
    - *Note: please see the Appendix for an example Iconic Reefs spur and groove reef site*
- Ability to remove the below nuisance organisms, with a particular focus on the first (palythoa), as this currently dominates much of the reef substrate in prime coral restoration areas
    - Palythoa
    - Turf Algae
    - Fleshy Algae (e.g., Dictyota, Lobophora, Peysonnellia, Halimeda)
    - *Note: please see the Appendix for example images of nuisance species to be removed*
- Ability to fully remove collected organisms completely out of the water column (i.e., no removed materials left behind, either on the substrate or floating in the water column)

Constraints & Exclusions

While the developed site preparation tool has an ultimate goal to remove nuisance organisms in preparation for coral outplanting, the tool should not harm the underlying reef substrate. Proposals should detail how the tool accomplishes this balance of removal with sensitivity to the underlying reef framework.

Additional constraints and exclusions are listed below:

- If tool components require vessel deck space, they must be able to fit within the uncovered deck space/bow of ~26' vessels, characteristic of FKNMS vessels
    - *Note that vessels will not always be tied up to a mooring buoy during fieldwork activities but may instead be anchored in the sand*
- If applicable, tool must operate independently of vessel power (e.g., through its own power source or portable generator)
- Tool must be tested/trialed in the environment of its final use

- To the above point, FKNMS will provide multiple test plot locations at a reef site within the Florida Keys for tool trialing
- FKNMS staff may also make themselves available to assist with trials
  - *Note that FKNMS vessels may not be provided for tool trials; proposals should detail how in-situ trials will be accomplished using vessels from non-FKNMS sources*
- The total number of in-situ tool trial events is contingent upon the chosen contractor's expertise and suggestions and should be detailed within the proposal
- Travel costs should be included within the proposed budgets
- *Note that any tool testing within artificial pools or laboratory settings will not replace in-situ trialing at an FKNMS reef site*

Note: Apart from trialing the developed tool, this solicitation is not for actual execution of site preparation fieldwork activities.

Additional Note: Palythoa is a potential marine toxin and could possibly present a health risk to those who come in contact with the organism (either above or below water); sensitive individuals should not work with Palythoa. As part of the in-situ trialing, the chosen contractor should provide all PPE necessary when demonstrating removal of palythoa.

Deliverables & Requirements

Based on the aforementioned project needs and objectives, the following information details both the deliverables and requirements necessitated of the chosen contractor:

A) Deliverables
   a) Purpose built tool that complies with all of the above-mentioned specifications, based on Project Needs and Constraints/Exclusions
   b) Instructions For Use guide in PDF format, inclusive of the following:
      i) Tool operation
         (1) Where possible/applicable, include diagrams and/or images
      ii) Troubleshooting and repair
         (1) Where possible/applicable, include diagrams and/or images
      iii) Any/all applicable warnings
      iv) Recommended care and maintenance, inclusive of a spare parts list
      v) Warranty

B) Requirements
   a) Coordination with the Foundation, NOAA FKNMS and the Iconic Reefs Implementation Manager for Pre-Execution Planning and regular communications (see below section on Communication Needs)
   b) FKNMS-approved permits to trial the tool within FKNMS waters
      i) Note that FKNMS will work with the chosen contractor to obtain necessary permits

Communication Needs

The novelty of the desired product necessitates regular communications between the chosen contractor, the Foundation, and FKNMS staff. Monthly meetings will be used to align all parties on the developmental progression of the tool and to plan any/all in-situ tool trials.

Additionally, and prior to work commencing, at least one Pre-Execution Planning meeting will be used to finalize the proposal and scope of work, with all parties present.

Proposed Project Budget & Timeline

The Foundation will accept proposals ranging from US$30,000 and up to a maximum of US$50,000 for the entire developed product, inclusive of design process and travel needed for in-situ tool trialing.

This Site Preparation Tool Development Project will follow the below timeline:

Proposals Due	October 25th 2021
Pre-Execution Planning	Early November 2021
Tool Development *Tool Revision Meetings*	3-4 Months *Monthly*
Deliverables Received	By March 1st 2022

Instructions for Proposal Submissions

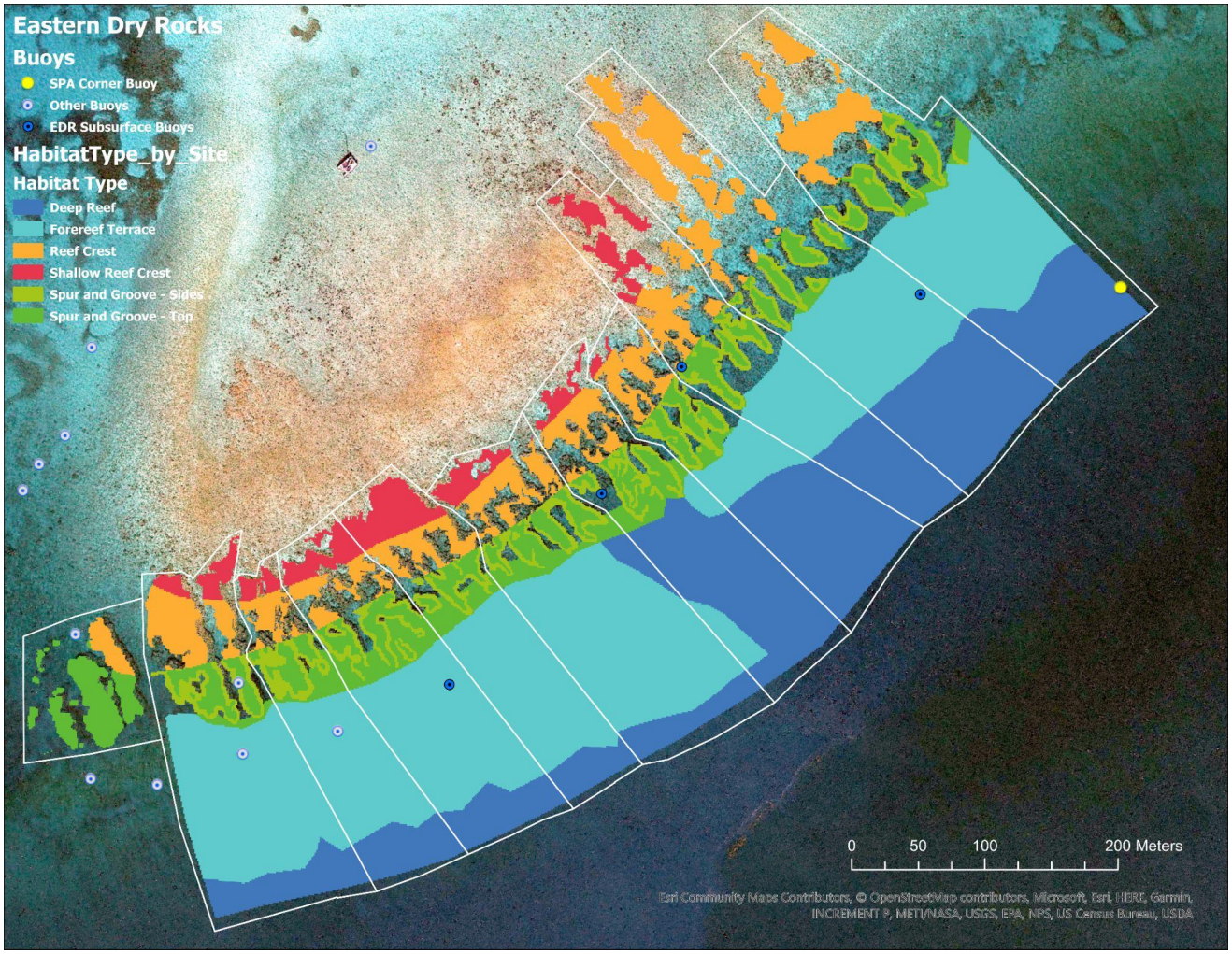
In addition to clearly addressing how the above-referenced Deliverables and Requirements will be included in the project design, interested contractors should provide the following within their proposals:

- The proposed tool concept with conceptual design
    - *Note that all diagrams and illustrations should be clearly labeled to indicate tool components and functionality*
- Description of development team personnel who will design, trial, and develop tool
- Summary of relevant work expertise as it pertains to engineering functional tools/products within the marine environment
- Detailed project budget, including expenses summary, with cost breakdown
    - Cost for design and engineering, inclusive of materials/parts and labor
    - Cost for tool prototype development
    - Estimated cost for 2nd and 3rd generation tools
    - Travel costs for in-situ tool trials within FKNMS

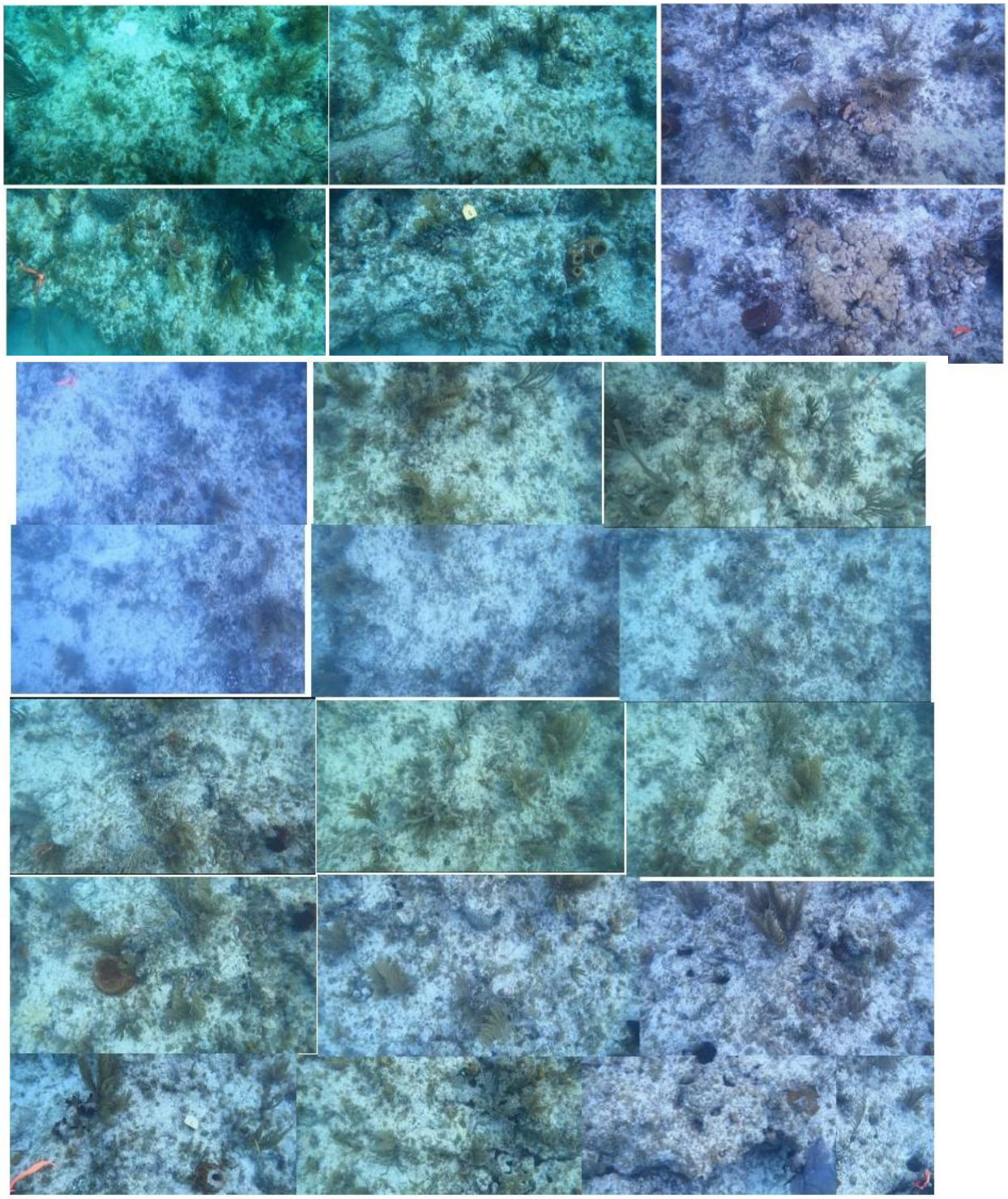
Proposals should be in PDF form and **will be accepted no later than 11:59 pm ET on Monday, October 25th, 2021 to RFP@marinesanctuary.org with the subject line: 'Iconic Reefs Site Preparation Tool Development Project'.** Any questions should be directed to Shannon Colbert, Policy and Conservation Director, at Shannon@marinesanctuary.org. We are happy to arrange conference calls to discuss this RFP, provide additional information, and address questions.

Appendix

A) Example Iconic Reefs Site, Eastern Dry Rocks Sanctuary Preservation Area -- a spur and groove reef system



B) Example images of nuisance species/organisms to be cleared at Eastern Dry Rocks reef



Collection of images showcasing nuisance spp at Eastern Dry Rocks. PC: Callaway Marine Technologies, Inc

Palythoa close up. PC: A. Bruckner, FKNMS