Invasive Lionfish Management and Continued Population Monitoring

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Executive Summary and Budget

The occurrence and proliferation of non-native aquatic organisms is of concern as the ecological impacts on native aquatic organisms are usually negative. Thirty-three species of marine fish have been detected in United States waters. Of those, only lionfish (*Pterois* sp.) have established and are classified as invasive. The first documented capture of a lionfish in the western North Atlantic was in 1985 off of Dania Beach, Florida. Lionfish initially spread from southeast Florida into Bahamian waters. Today, lionfish can be found from Massachusetts to the Florida Keys, the Bahamas and Caribbean Sea, although thermal tolerance prevents lionfish from overwintering in the northern reaches of their range. Since 2010, lionfish have become established in the northern Gulf of Mexico (nGOM) and can now be found in higher densities than anywhere else in their invaded range. The nGOM is an ideal location to conduct population-level monitoring due to relatively easy access to large number of samples both spatially and temporally. Numerous studies have investigated population structure as a method of assessing the efficacy of removal and control strategies. The importance of both opportunistic and organized (tournament) removal efforts should not be understated. While the number of lionfish removed during these efforts is important, the outreach and data collected may be of greater value. Outreach activities can result in increased awareness and even spur participation in subsequent events. It can also result in the increase in demand for lionfish as a food fish. This increase in commercial demand results in a more consistent and sustained harvest outside of sporadic removal efforts, and may result in a greater impact to the lionfish population on a regional scale. One of the greatest challenges associated with invasive lionfish removal is identifying priority sites and recruiting enough participants to remove lionfish. The purpose of this study is to bolster and incentivize current invasive lionfish management and population monitoring to maximize its benefit to the ecosystem, economy and scientific community.

Utilizing connections made during the past ten years of lionfish research and tapping in to established invasive lionfish programs, this proposed project is set up for success. Additionally, this project will prove to be a model for similar efforts in other parts of the invaded range. The first phase of this project will be to conduct surveys to identify invasive lionfish habitat (reefs). The majority of the seafloor in the nGOM is void of reef habitat and thus removal locations are limited. Identifying additional habitat is important to maximize lionfish removals and also ensure adequate coverage and thus impact. Utilizing side scan sonar technologies is the most efficient method for identifying sites to conduct lionfish removals. This technology has been used in the past and the primary investigator is capable of operating the equipment and processing the data. The second phase of this project is to conduct removal activities at sites identified in phase one as well as other known reef sites. Divers on multiple vessels will conduct removal dives during specific times each month. Additionally, providing support to new and established tournaments

and events will result in maximum lionfish removal and exposure. Following collection, each lionfish will be processed to collect samples and assess population structure. The lionfish will then be provided to the market to be used to create lionfish specific food items. Outreach and education is an important part of this project therefore results will be presented on a local scale through normal media outlets, social media as well as through larger scientific and technical meetings and expos that will benefit from the topic.

Overall this proposed project will bolster current control, management and scientific efforts. We hope that this executive summary is sufficient and that a more detailed and all-inclusive proposal can be provided.

Proposed Budget:

Phase one: Invasive lionfish habitat identification

Item	Cost
Side Scan Sonar Unit and software	$[redacted]
Associated equipment	$[redacted]
20 survey trips	$[redacted]
Sub Total	$[redacted]

Phase Two: Invasive lionfish removal activities

Item	Cost
Equipment	$[redacted]
50 Removal trips	$[redacted]
Lionfish Tournament support	$[redacted]
Sub Total	$[redacted]

Total proposed cost	**$[redacted]**

This proposal is approved for submission . [redacted]

Date: May 19, 2020 Jo[redacted] Administrator