

August 17, 2023

Julie Defilippi Simpson
Atlantic Coastal Cooperative Statistics Program
1050 N. Highland, Suite 200A-N
Arlington, VA 22201

Dear Mrs. Simpson,

The Commercial Fisheries Research Foundation (CFRF), the Rhode Island Department of Environmental Management (RI DEM), and the Martha's Vineyard Fishermen's Preservation Trust have reviewed all questions and recommendations provided by the ACCSP Operations and Advisory Committees for our proposal titled "Maintaining the Whelk Research Fleet to Improve Fishery-Dependent Data Collection for Channeled Whelk (*Busycotypus canaliculatus*) and Knobbed Whelk (*Busycon carica*).” As recommended, we have changed our proposal category from new to maintenance. We originally picked the category of new because we did not resubmit the proposal for funding last year as the project was still developing and strong justification for continuation was not apparent at that time. Moving the project to the maintenance category helps address the committee comment regarding further justification to sample whelk, as these species were a top priority species when the original grant was submitted but since then have fallen from this category. This project now represents a continuation of work that addressed a top priority species at the time of funding rather than a new project trying to address non-top priority species. The rationale to downgrade whelk as a priority species is still unclear to us and we have expanded upon the continued need for this sampling in the revised proposal. We have also clarified the budget by creating a separate table for the CFRF contract and added a proposal summary and funding transition plan.

We appreciate your consideration of this proposal. Please do not hesitate to contact us if the Operations and Advisory Committee have any further questions.

Sincerely,

M. Conor McManus, PhD
Chief, RIDEM DMF

N. David Bethoney, PhD
Executive Director, CFRF

Shelley Edmundson, PhD
Executive Director, MVFPT

Proposal for Funding made to:
Atlantic Coastal Cooperative Statistics Program
Operations and Advisory Committees
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

Maintaining the Whelk Research Fleet to Improve Fishery-Dependent Data Collection for Channeled Whelk (*Busycotypus canaliculatus*) and Knobbed Whelk (*Busycon carica*)

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Applicant Name: Rhode Island Department of Environmental Management Division of Marine Fisheries, the Commercial Fisheries Research Foundation, and the Martha's Vineyard Fishermen's Preservation Trust

Project Title: Maintaining the Whelk Research Fleet to Improve Fishery-Dependent Data Collection for Channeled Whelk (*Busycotypus canaliculatus*) and Knobbed Whelk (*Busycon carica*)

Project Type: Maintenance

Requested Award Amount: \$92,996

Requested Award Period: August 1, 2024 – July 31, 2025

Principal Investigators: M. Conor McManus, PhD, Chief, Division of Marine Fisheries, Rhode Island Department of Environmental Management

N. David Bethoney, PhD, Executive Director, Commercial Fisheries Research Foundation

Shelley Edmundson, PhD, Executive Director, Martha's Vineyard Fishermen's Preservation Trust

Date Originally Submitted: June 16, 2023

Summary:

The southern New England whelk fishery includes landings of two species, channeled whelk (*Busycotypus canaliculatus*) and knobbed whelk (*Busycon carica*), from nearshore state waters. The increase in fishery value and decline in landings has heightened the need for state management to ensure the sustainability of the fishery. However, substantial uncertainties in the assessment and management of whelk fisheries coastwide, particularly in the southern New England fisheries, have arisen due to gaps in fishery-dependent data. This proposal seeks to help fill that gap through the continuation of the Whelk Research Fleet originally funded through ACCSP in 2021. The Whelk Research Fleet is a collaborative effort in which fishermen collect information during regular fishing activity with equipment, protocols, and data management provided by scientists. In the first of its kind for this species, this research fleet model for whelk has engaged harvesters from fishing sectors that had not previously been involved in cooperative research in helping collect critical data for state scientists and managers. The original project focused on establishing a pilot Whelk Research Fleet to see if fishermen could scientifically collect management relevant information about channeled and knobbed whelk. Scientific sampling protocols in consultation with management and scientific experts were developed and a group of fishermen were recruited and trained to implement these protocols. These efforts were a success. Over 4,000 whelks were sampled by 7 commercial fishermen through 66 valid independent sampling sessions in Rhode Island and Massachusetts waters and all data has been transferred to ACCSP. Funding through this proposal will continue data collection by the Whelk Research Fleet and, with in-kind match from Vineyard Wind 1 LCC, expand the number of participants and areas sampled.

Objective:

The southern New England whelk fishery includes landings of two species, channeled whelk (*Busycotypus canaliculatus*) and knobbed whelk (*Busycon carica*), from nearshore state waters (Angell 2019, Nelson 2018). The increase in fishery value and decline in landings has increased the need for state management to ensure the sustainability of the fishery; however, fishery-dependent data to characterize the whelk fishery is limited. The Rhode Island Department of Environmental Management (RI DEM), Commercial Fisheries Research Foundation (CFRF), and Martha’s Vineyard Fishermen’s Preservation Trust (MVFPT) with support from the Massachusetts Division of Marine Fisheries (MA DMF) and Connecticut Department of Energy and Environmental Protection are proposing to continue collecting fishery-dependent data on both channeled and knobbed whelk in at least Rhode Island and Massachusetts through the Whelk Research Fleet. The Whelk Research Fleet is a collaborative effort in which fishermen collect information during regular fishing activity with equipment, protocols, and data management provided by scientists. The Whelk Research Fleet was established through ACCSP funding in 2021 and will be sustained by Vineyard Wind 1 LLC through July 2024. Continuation of the Whelk Research Fleet will sustain a cost-effective method to collect critically needed fishery-dependent (biological, catch, and effort) data from the whelk fishery in southern New England.

The proposed project will focus on providing fishery-dependent data directly for inclusion in each respective state’s assessment and management process for the whelk fishery. Fishery-dependent data will be collected from the nearshore state fisheries for whelk in Narragansett Bay, Rhode Island and the south coast of Massachusetts (Figure 1). Support from Vineyard Wind 1 LLC will start in August of 2023 with the goal to continue expand participation specifically in and around Martha’s Vineyard and Nantucket Sound and potentially include an additional vessel from Connecticut state waters or Long Island Sound. The expansion of up to three vessels will be continued through the proposed project period with support from Vineyard Wind 1 LLC.

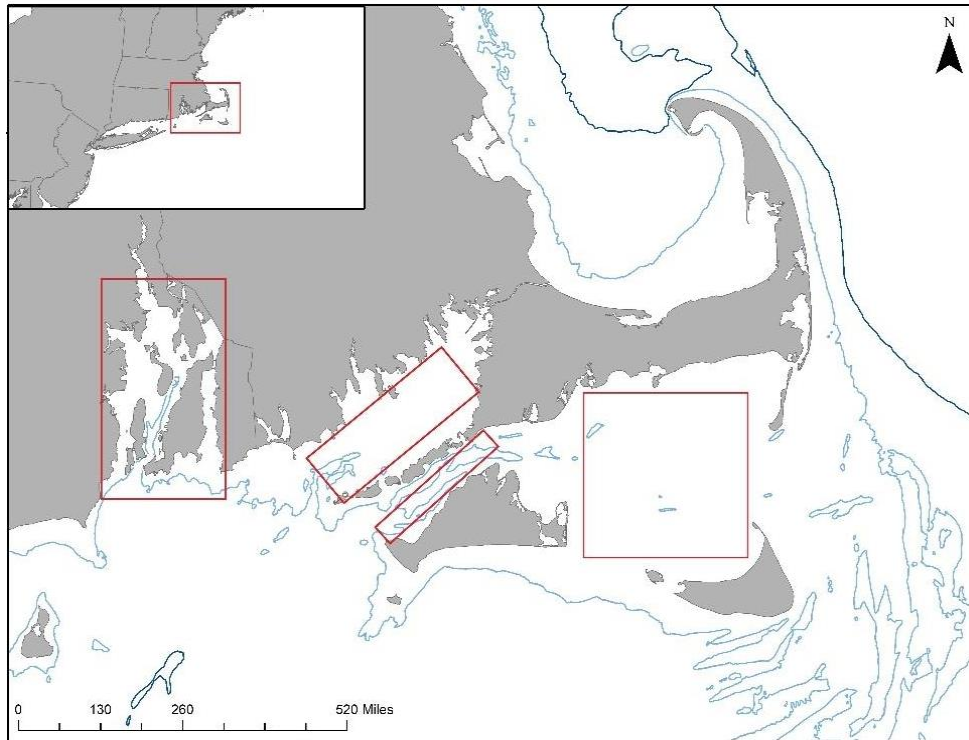


Figure 1. Map of the areas accounting for the majority of landings in the whelk fishery across Rhode Island (RI) and Massachusetts (MA). From East to West, the areas highlighted in red are Nantucket Sound (MA), Vineyard Sound (MA), Buzzards Bay (MA), and Narragansett Bay (RI). 20- and 50-meter bathymetry lines are displayed for reference.

The of goals for the project are:

1. Collect and communicate critically needed whelk data (catch, effort, and biological) in a cost-effective way using modern electronic technology and fishermen's time on the water;
2. Contribute to the improvement of whelk science and fisheries management in southern New England;
3. Continue an approach for fishery-dependent data collection that involves the commercial whelk industry through collaborative research.

Specific objectives of the project include:

- Support commercial fishermen participating in the Whelk Research Fleet and train additional fishermen as needed;
- Maintain and evolve the On Deck Data application to meet the data needs of scientists and the logistical needs of participant fishermen;
- Collect fishery-dependent data from commercial whelk vessels throughout the southern New England region to characterize the catch, effort, and spatial and temporal trends of the fishery;
- Communicate whelk biosample data to ACCSP every six months;
- Demonstrate a model for fishery-dependent data collection, management, analysis, and utilization that can be duplicated in a cost-effective way in other regions and in other fisheries;
- Conduct internal analyses of the project database to assess spatial and temporal trends in species' catch and bycatch composition and fishery characteristics;

- Communicate to a broad audience the benefits and value inherent in this type of collaborative data collection program.

Need:

Substantial uncertainties in the assessment and management of whelk fisheries coastwide, particularly in the southern New England fisheries, have arisen due to gaps in fishery-dependent data. Lack of fishery-dependent data has hindered efforts to establish reference points and assess the status of stocks through stock assessments (Angell 2019, Nelson et al 2018, ACCSP 2019). As a result, there is growing concern from managers and industry members alike about the sustainability of the whelk fishery.

The whelk fishery represents an opportunity to diversify landings for fishing businesses. Despite the fishery being open throughout the entirety of the year in Rhode Island and most of the year in Massachusetts, there are very few vessels which only target whelk (TNC 2018). Most vessels targeting whelk only do so for a portion of the year when the species is seasonally available, and otherwise harvest a variety of other fisheries. However, due to the growth in the international market and substantial increase in ex-vessel price over the last decade, harvesters' income derived from whelk landings is significant (TNC 2018). It is suspected the increased reliance on, and importance of, the whelk fishery is directly correlated to declines in other fisheries, such as the southern New England inshore lobster fishery, and represents shifted fishing effort onto whelk. Following peaks in landings between 2009 and 2012, declines in landings in Rhode Island and Massachusetts have occurred since 2013. Despite this, the value of the fishery peaked at over \$2 million in Rhode Island in 2018 and been maintained annually around \$5 million in Massachusetts due to increasing ex-vessel prices (Angell 2019, Nelson et al 2018). In recent years, up to 106 fishing vessels reported landings of whelk annually in the State of Rhode Island in 2018 (Angell 2019). While the number of permitted vessels Massachusetts has remained relatively stable over this period, with between 130 and 140 permitted vessels, active vessels reporting landings annually has declined from about 80 in 2018 to 64 in 2020. Preliminary data show that this decline continued in 2021 and 2022 (Nelson et al 2008, MA DMF unpublished data). Even though the whelk fishery is dispersed on a broad scale between Rhode Island and Massachusetts, and whelk populations are likely segregated on a fine scale (Wilcox et al 2021), the interstate markets for whelk are highly interconnected. Massachusetts dealers often purchase whelk from the Rhode Island fishery. Despite the decline in landings, the whelk fishery still represents a large and viable opportunity for fishermen seeking to diversify their catch due to the high price. However, the combination of landings declines and anecdotal reports of localized depletion with increased or stable fishery value raises questions over the fishery's long-term sustainability.

Globally, whelk or conch fisheries are notoriously difficult to manage and are prone to overfishing and localized depletion due to their slow maturation, slow growth rate, and localized larval distribution. Coupled with the largely sedentary lifestyles, these life history parameters can often result in quick depletion of localized populations after years of high fishing pressure (Nelson et al 2018). Anecdotally, there have already been areas identified by fishermen in Massachusetts, specifically Buzzards Bay and Nantucket Sound, depleted of whelk (Nelson et al 2018). Although it has become evident from trends that the whelk fishery is overfished and overfishing is occurring in Massachusetts, and more recently in Rhode Island, there is still a question as to how widespread this may be occurring (Angell 2019, Nelson et al 2018). This is because of the difficulty of obtaining fishery-dependent data from the whelk fishery.

In both Rhode Island and Massachusetts, the primary index of abundance used in the stock assessment are the state trawl surveys. Both states also receive fishery-dependent data through mandatory trip reports submitted from harvesters. Similar data is collected in each state through the trip reports which include total whelk landed per trip, traps hauled per trip, total traps in the water, and soak time of traps in the water. Although useful for tracking trends in the fishery, this broad level of fishery-dependent data has been inadequate to construct comprehensive stock assessments, particularly in Rhode Island. In addition, the mandatory trip reports do not provide any biological data from the whelk catch nor does it provide any data on the species composition of the catch or the sublegal discards within the fishery. Rhode Island conducted cooperative fishery-dependent sampling with observed trips opportunistically in the early 2010s, but currently does not have a dedicated fishery-dependent data collection program. In a similar fashion, Massachusetts opportunistically collects cooperative fishery-dependent data from commercial whelk vessels through observed trips. Observed MA DMF trips are the only source of fine scale, pot-level, data on the whelk fishery between the two states and provide specific data on species composition of the catch as well as the sizes of all landed and discarded sublegal whelk. However, this sampling occurs on a small fraction of commercial whelk trips; between 2018 and 2022, a total of 17 whelk trips were observed by the MA DMF survey with only 1 trip in 2020 (due to COVID challenges) and 2 trips in 2022 (MA DMF unpublished data). Further, appropriate spatial representation of the fishery-dependent data collection program by MA DMF can prove to be challenging due to the distribution of the whelk fishery across the south coast of Massachusetts, Cape Cod, Martha's Vineyard, and Nantucket. As a result, there are areas of the whelk fishery in Massachusetts that are logistically too difficult to observe trips consistently from the outer Cape Cod, Martha's Vineyard, and Nantucket. In contrast, landings from Nantucket Sound make up most statewide landings and are key fishing grounds to whelk vessels from Martha's Vineyard and Nantucket, leaving a large portion of the fishing fleet and landings uncharacterized by the state survey. This problem is further exacerbated by the highly localized, and likely segregated, populations of whelk on scales potentially as fine as within Narragansett Bay.

Despite whelk being outside of the top 25% of priority species coastwide, the collection of relevant biological data on channeled and knobbed whelk is lacking and remains a major need for southern New England including Rhode Island and Massachusetts. The same needs that led to the channeled and knobbed whelk being once listed as a top priority for expanded biological sampling by ACCSP in 2019 remain. This is supported by the many of the needs and issues around channeled whelk biology and fisheries management identified by representatives from Massachusetts to Georgia in 2014 persisting into 2020 (Askin and Fisher 2021). As highlighted by Askin and Fisher (2021), state scientists and managers from Massachusetts through Georgia, and the Atlantic States Marine Fisheries Commission joined to share knowledge and management practices regarding channeled whelk. Biological sampling of catch remains a data gap for most of these states. Askin and Fisher (2021) highlight that other states' monitoring programs, such as this fleet design for Massachusetts and Rhode Island, should serve as a model for other states to adopt. The listing and the coastal expert group concerns were a result of the large uncertainty around cohesive management and identifying if fisheries are overfished and if overfishing is occurring. Further, there have recently been significant changes in landings and management schemes in the whelk fishery coastwide, in particular in Rhode Island and Massachusetts, which when coupled with the low resilience of the fishery due to the life history parameters of the species, is a cause for concern (ACCSP 2019). Regional management could provide the push needed for regulatory consistency based on life history measures, population dynamics, and fishery patterns; however, a greater effort in data collection is first needed within states to provide consistency (Askin and Fisher 2021). To the sentiments presented in Askin and Fisher (2021), since the project's inception,

additional states (such as Connecticut and New York) have inquired with the principal investigators about the program and have strong interest in either developing a similar one, or collaborating in the future to expand this program into their waters.

Compared to other commercially important species supporting fisheries of similar magnitude, little research has been conducted on even the basic biology and ecology for the two species (Edmundson 2016). Within the current literature available for both whelk species, there is discrepancy between basic biological parameters such as age at maturity, growth rates, and maximum age (Peemoeller 2013). It is currently unclear if these discrepancies are a result of fine scale population differences between various subpopulations or other factors.

Beyond biological sampling for the fishery, the data from this research fleet has the potential to inform other important surveys coastwide for the species. For example, before-after gradient and before-after control-impact surveys focused on evaluating offshore wind development impacts on channeled and knobbed whelk using industry-based whelk pots are being developed in Rhode Island. These surveys are critical in being able to assess prospective ecosystem and fishery impacts from offshore wind development. Haul and pot-level data from this project can provide valuable information for devising power analyses that can guide the surveys' sampling frequencies and understand how catch can biologically vary with gear or fishing behavior. Continued support of this program will allow for addressing both longstanding resource and catch data gaps, and prospectively others.

Results and Benefits:

The implementation of a robust multi-state, fishery-dependent data collection program could reduce data gaps resulting in improved management of the channeled and knobbed whelk fishery. With support from ACCSP this program was created 2021 in the form of the Whelk Research Fleet. The Whelk Research Fleet will persist through July 2024 with support from Vineyard Wind 1 LLC. This proposal would continue the program for another year helping to meet ACCSP's mission of improving data quality for fisheries science. In addition, this project, and its integration with the ACCSP data housing program, will lend to the other mission of the ACCSP, namely by contributing to a single data management system that will meet the needs of fishery managers, scientists, and fishermen across multiple state lines.

Past funding by ACCSP focused on establishing a pilot Whelk Research Fleet to see if fishermen could scientifically collect management relevant information about channeled and knobbed whelk. Project partners successfully developed scientific sampling protocols in consultation with management and scientific experts and recruited and trained a group of fishermen to implement these protocols. Please see the "Approach" section for further details. During this pilot phase 4,090 whelks were sampled by 7 commercial fishermen. Participants conducted 66 valid independent sampling sessions in Rhode Island and Massachusetts waters (Figure 2). In addition to receiving catch composition information from the fleet, temperature sensors were dispersed this spring to provide insight on the seasonality of kept and discarded trends throughout the fishing season. Communication with participating fishermen has provided positive feedback on sampling effort and practicality. Due to this feedback and continued interest, Vineyard Wind 1 LLC has provided bridge funding to continue the Whelk Research Fleet during this proposal review period and increase the size of the Research Fleet if this proposal is successful. These results prove the Research Fleet concept can be utilized in the whelk fishery.

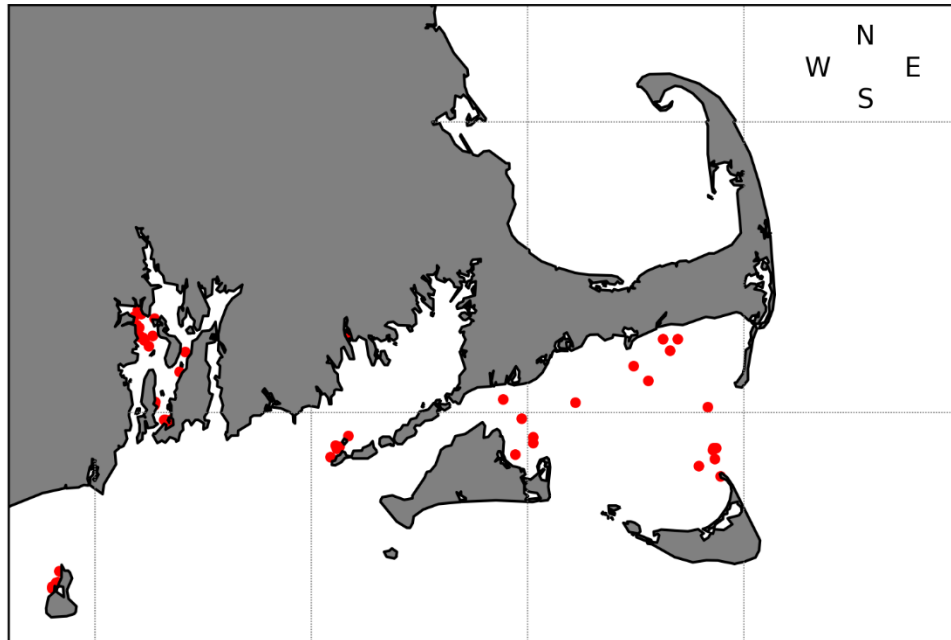


Figure 2. Sampling locations for the Whelk Research Fleet in 2021 and 2022. At each station location, depth, soak time, and bait type are recorded as well as measurements and disposition of individual whelks.

The accomplishments of the project include:

- A database of whelk biological, catch, and effort data, that can be made accessible, within confidentiality guidelines, to many end users, including industry members, stock assessment scientists, and fishery managers;
- **Coordinated data transmission** to the ACCSP building off existing data communication practices employed by the CFRF Black Sea Bass and Lobster and Jonah Crab Research Fleets;
- A cost-effective way to collect fishery-dependent data for a commercially important species which is currently listed as data poor;
- A constructive way for members of commercial fisheries to contribute to the assessment and management of whelk.

Though analysis of the pilot data has not been fully conducted, preliminary exploration has already yielded informative results. Of the individuals caught by fleet participants, 98% were channeled whelk while knobbed whelk accounted for only 2% of the catch. Approximately 75% of whelks caught were discarded due to being undersized. Continued collection of data by the Whelk Research Fleet will be of benefit to the whelk fisheries of southern New England. The ACCSP Biological Review Panel identified channeled and knobbed whelk as a top priority due to inadequate biological sampling (ACCSP 2019). Further, both managing agencies in Massachusetts and Rhode Island acknowledge the need for expanded fishery-dependent data collection in support of management and assessment efforts. The proposed project addresses the identified needs of both the ACCSP as well as multiple state management agencies (TNC 2018, Askin and Fisher 2021). The results of the proposed project are expected to have broader regional impacts across the Atlantic coast, particularly other southern New England states with developing whelk fisheries such as Connecticut and New York. This project builds

upon previous efforts between Rhode Island and Massachusetts of increased coordination and collaboration towards improving fisheries science and management (TNC 2018). The project will specifically have impacts in other states with whelk fisheries as the Research Fleet will serve as a model to further expand and adapt fishery-dependent surveys for whelk to improve data sources used in assessment and management efforts. This is already happening with interest and intent to expand the Whelk Research Fleet into Connecticut state waters. Due to the unique life history traits of whelk, which result in challenging fishery management scenarios, cost-effective collaborative research efforts may prove to be the best suited for providing timely data used in assessments and management for the species.

The underlying benefit of the proposed project will be more robust fishery-dependent biological, catch and effort data available via the ACCSP and provided to MA DMF and RI DEM, on which to base the whelk stock assessment and management. The fishery-dependent data collected by the proposed project would be collected through the existing state channels of Rhode Island and Massachusetts to feed back into the ACCSP biosamples database for use in state and federal management. The collaborative design of the project, which utilized inter-state relationships to design at-sea sampling protocols, provides high resolution, pot-level catch, effort, and biosamples data. The data will be collected at-sea by fishermen in a format directly applicable to Rhode Island, Massachusetts and ACCSP data formatting standards and will pass directly to all three parties. Whether this will result in different harvest levels than are currently being realized is difficult to predict, but better informing future stock assessments will surely be a positive outcome, providing a more scientifically-sound basis on which to manage fishing effort. Furthermore, the data collected by the proposed project will also be essential in improving predictive capabilities and finding the right balance between fishing pressure and resource availability. Finally, the long-term impact of the project is to improve the sustainability of the whelk fishery by filling data gaps resulting in the current data poor listing of the fishery.

Data Delivery Plan

To provide regular feedback biannual data reports will be sent to Research Fleet participants. Vessel-specific data reports will include all raw data collected by the participant and summary statistics. All data reports will be confidential within the Fleet, unless participants consent to share amongst other Fleet members, and will only include the data collected by each report recipient. The additional summary Fleet wide statistics and more frequent individual reports can be sent upon request by each individual Fleet participant.

Data delivery to managing end users is a primary objective of the proposed project. The CFRF has worked with project partners to agree on specific data formats to be collected. The CFRF has been in communication with data coordinators at the ACCSP to agree upon desired formatting of all data submissions to the ACCSP of collected whelk biosamples and fishery data. The first delivery of Whelk Research Fleet data to ACCSP **occurred August 3, 2023.** This follows the data delivery timing currently followed by the CFRF Black Sea Bass and Lobster and Crab Research Fleets to deliver data.

Approach:

The project seeks to continue to collect critically needed biological, catch, and effort fishery-dependent data for incorporation into the ACCSP database. Further analysis and communication will be conducted to help with that application of data to state whelk stock assessments. Project components include: 1)

Continued support and function of the Whelk Research Fleet; 2) Collection of biological, effort, and environmental data and fishery characteristics; 3) Internal data analysis to investigate trends in whelk catch and discards; 4) Compilation and communication of project data and results to ACCSP, RI DEM, and MA DMF for application by stock assessment scientists and fisheries managers; and 5) Outreach and education activities to share findings. Methodological details are outlined below.

Continuation of Whelk Research Fleet

A key component of the Whelk Research Fleet is the steering committee, which will be maintained for this proposal. The steering committee designed sampling protocols, is provided with project updates, and helps guide results towards management use. All project team members are part of the committee. The other members of the steering committee were recruited based on their expertise in regional whelk management. Dr. Richard Bell from The Nature Conservancy (TNC) previously worked with the whelk industry and managers in Rhode Island and Massachusetts to investigate assessment and management of the channeled whelk. Steven Wilcox is the project lead for the MA DMF Resource Assessment bottom trawl survey, has served as the primary whelk biologist for MADMF and completed his master’s work on whelk population dynamics in southern Massachusetts. Dr. Justin Davis is the Assistant Director of the Connecticut Department of Energy and Environmental Protection and provides a key link to expanding this approach more regionally.

The Whelk Research Fleet consists of seven fishing vessels, chosen strategically to cover existing spatial data gaps in whelk fishery-dependent data across the Massachusetts and Rhode Island fishery (Table 1). Applicants were chosen after consulting the steering committee and CFRF board of directors to identify overlap of area fished by each applicant and fishery-dependent data gaps. Priority was given to vessels which cover areas identified as lacking current sources of data. One of the original eight Research Fleet members chose not to continue. A replacement participant and three additional participants will be added over the coming year. It is expected the Whelk Research Fleet will consist of 11 vessels when this project period begins.

Table 1. Current Whelk Research Fleet members.

| Fleet Member | Vessel | Home Port |
|---------------------|------------------|------------------|
| Mohawk Bolin | F/V Rock & Roll | Edgartown, MA |
| Ronald Brown | F/V Peggy B II | Harwich Port, MA |
| Henry Borges | F/V Bad Habit | New Bedford, MA |
| Gerry Schey | F/V Yes I Am | Warwick, RI |
| Derek Pascale | F/V Ragged Edge | Point Judith, RI |
| Russell Sylvestre | F/V Little Tater | Newport, RI |
| Ken Murgio | F/V Johnny B | Newport, RI |

Fishery-dependent Data Collection

The Research Fleet participants will continue collecting fishery-dependent data as established during the pilot phase. The monthly target is three sampling sessions from their commercial whelk trips. Ideally, each sampling session occurs on three separate trips per month. During each sampling session, Research Fleet members will randomly sample three pots for the entirety of the whelk catch. The tablet

application On Deck Data instructs Research Fleet members to sample whelk from three pots randomly selected based on the total number of pots expected to be hauled during the sampling session. Prior to sampling the whelk catch, effort and location data is collected. From the three randomly selected pots, Research Fleet members sample every single whelk for shell height and shell width down to the nearest millimeter, disposition of the whelk (retained/discarded), and the species of whelk.

An important component of On Deck Data is the wireless transfer of data to the project database as all data collected by Research Fleet members during their routine fishing practices and uploaded to the CFRF database upon return to port. The project team will continue to work with ACCSP, RI DEM, and MA DMF staff to ensure the data formats used in the project database are compatible with the ACCSP biosamples database and relevant state databases. This will ensure efficient data transfer, both among state partner agencies and the ACCSP, throughout the course of the project. Participant fishermen have tested the whelk data collection app and successfully completed a wireless transfer routine for functionality at-sea and on land.

In addition to the fishery-dependent data, Research Fleet members were given tidbit temperature loggers to record bottom water temperature. Temperature loggers will remain fixed on a specific string of whelk pots during the fishing season. At the conclusion of each fishing season, project staff will pick up and offload all temperature data and return them to Research Fleet Members prior to the start of the next season.

Internal Data Analysis

The main goal of data collection is to bolster fishery-dependent data sources available for use by state agencies for fisheries management and assessment needs. As a result, the effort will primarily be expended to ensure applicability of collected data across state lines. However, data collected by the Research Fleet will also be investigated internally by project staff. Specifically, internal data analyses will seek to answer questions about trends within the fishery. Specific research questions will be further developed during the project and after the initial phase of sampling but may include: Are there spatial patterns in the size frequency or species composition in the whelk fishery? Is catch (mean size, ratio of target species to each other) influenced by type of bait, soak time, or pot fished? How does bottom temperature impact whelk catch characteristics throughout the year? Research questions will evolve throughout the sampling period of the project and data will constantly be explored through the open-source statistical software R. Generalized Linear Models will be used to explore patterns of variation in catch rates and derive standardized CPUE following (Maunder and Punt 2004).

Outreach and Education

Education, outreach, and ongoing communication are an integral part of the overall work plan for the proposed project. These components of the proposed project support the goal of fostering collaborative working partnerships among scientists, managers, and members of the fishing industry through all phases of research, from sampling strategies through the analysis and sharing of data and results. There are several work elements embedded in the project work plan that are aimed at specifically addressing outreach and education goals, including:

1. Ongoing communication with project team members including the members of the Whelk Research Fleet through personal meetings, group meetings, e-mail briefings, and phone conversations.
2. Periodic project briefings to the steering committee and key individuals outside the project.
3. Continual postings of project information on the CFRF website, newsletter, and social media which include descriptions of the Research Fleet, the equipment being used, the type of data being collected, and findings, as this information evolves over the course of the project.
4. Organization of at least one Fleet meeting involving managers, scientists, and members of the commercial fishing industries to share project findings and discuss experiences and results.
5. Issuance and distribution of a written summary report.
6. Participation in professional conference(s) to share project methods, findings, and conclusions.

Geographic Location

At-sea sampling by the Research Fleet has been conducted within Massachusetts and Rhode Island state water (Figure 2). The exact location of sampling is decided by selected Research Fleet members as all sampling occurs during normal commercial fishing operations. As mentioned previously, Research Fleet members have been selected to cover spatial gaps in existing fishery-dependent data sources. Pictured below is an updated map of the geographic areas that have been sampled by the current Whelk Research Fleet.

Milestone Schedule:

| Month 1 | Month 2 | Month 3 | Month 4 | Month 5 | Month 6 | Month 7 | Month 8 | Month 9 | Month 10 | Month 11 | Month 12 |
|---|---|---|---|---|--|---|---|---|---|---|--|
| Research Fleet data collection and support | Research Fleet data collection and support | Research Fleet data collection and support | Research Fleet data collection and support | Research Fleet data collection and support | Research Fleet data collection and support | | | | Research Fleet data collection and support | Research Fleet data collection and support | Research Fleet data collection and support |
| Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website | Maintain ODD, server, database, and project website |
| Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis | Data QA/QC, review, and analysis |
| | | | | | Submit data to ACCSP, Semi-annual reports to Fleet Members | | | | | | Submit data to ACCSP, Semi-annual reports to Fleet Members |
| General outreach | General outreach | General outreach | General outreach | General outreach | General outreach | Outreach; Fleet Meeting/Conference | Outreach; Fleet Meeting/Conference | Outreach; Fleet Meeting/Conference | General outreach | General outreach | General outreach |

Project History Table:

| <u>Funding Source & Year</u> | <u>Title</u> | <u>Original Project Dates</u> | <u>Funded Amount</u> | <u>Total Project Cost</u> | <u>Description</u> |
|----------------------------------|--|--------------------------------|----------------------|---------------------------|---|
| New ACCSP 2021 | Implementing the Research Fleet approach to Improve Fishery-Dependent Data Collection for Channeled Whelk (<i>Busycotypus canaliculatus</i>) and Knobbed Whelk (<i>Busycon carica</i>) in Southern New England | August 1, 2021 – July 31, 2023 | \$115,149 | \$118,805 | Piloted the research fleet technique for collection of fishery dependent effort, biological, and discard data in the MA and RI whelk fishery. |
| Vineyard Wind 1 LLC 2023 | Whelk Research funding in cooperation with Martha’s Vineyard Fishermen’s Preservation Trust | August 1, 2023 – July 31, 2024 | \$150,000 | \$150,000 | Maintain the Whelk Research Fleet and expand it to include additional vessels from Martha’s Vineyard. Support for other whelk research as possible. |
| New ACCSP 2024 | Maintaining the Whelk Research Fleet to Improve Fishery-Dependent Data Collection for Channeled Whelk (<i>Busycotypus canaliculatus</i>) and Knobbed Whelk (<i>Busycon carica</i>) | August 1, 2024 – July 31, 2025 | \$132,749.00 | \$169,033.00 | Will maintain the Whelk Research Fleet for collection of fishery dependent effort, biological, and discard data in the MA and RI whelk fishery. |

Project Accomplishments Measurement:

| Project Goal | Metric 1 | Metric 2 | Metric 3 | Metric 4 | Metric 5 | Metric 6 |
|--|---|---|---|---|---|---|
| Collect and distribute whelk data in a cost-effective way | Upkeep of Whelk ODD, CFRF server, and database | Support of 11-vessel Whelk Research Fleet | 8 months of data collection by Fleet | Transfer of collected data into database | Submission of all data reports to Fleet Members | Submission of biological and fishery data to ACCSP and other managers |
| Contribute to the improvement of whelk fishery management | Expanded sources of fishery-dependent data in RI and MA | Provide whelk data from areas and times of year currently under sampled | Distribution of project data to managing stakeholders | Utilization of Research Fleet data in state whelk stock assessments | | |
| Demonstrate model approach for cost efficient fishery-dependent data collection | Usage of collaborative approach established in previous years | Presentations of Fleet design and data at scientific conferences | | | | |

Cost Summary:

Funding Transition Plan:

This proposal represents year 2 of ACCSP funding. Therefore, this project would be eligible for five more years of ACCSP funding after this year. We plan to continue to reapply as a maintenance proposal during these years to build the time-series and credibility of the Whelk Research Fleet. This will then open other potential avenues of funding. For example, the Lobster-Crab Research Fleet (not ACCSP funded) built a similar history through annual grants which was used to justify annual federally appropriated funding. The ACCSP funded Black sea bass Research Fleet is following a similar path. The data is being used in the current black sea bass stock assessment and 5-years of funding to continue the Black sea bass Research Fleet has been included as a Congressionally Directed Spending project in the Commerce-Justice-Science subcommittee’s spending bill package. In addition, as demonstrated by the investment in the Whelk Research Fleet by Vineyard Wind 1, there is interest by developers in supporting this work as a way to positively contribute to the whelk fishery with anticipated impacts primarily related to cable routes.

Budget Table:

Overall

| TOTAL | Maintenance Proposal | | |
|----------------------------------|----------------------|-----------|------------|
| | Proposal | In-Kind | Total |
| | \$ 92,996 | \$ 13,065 | \$ 106,061 |
| % Contribution by Funding Source | 88% | 12% | 100% |
| Object Class Category | Proposal | In-Kind | Total |
| A Personnel | | | |
| - RI DEM - Conor McManus | \$ 3,652 | \$ 1,826 | \$ 5,478 |
| Total RI DEM Personnel Costs | \$ 3,652 | \$ 1,826 | \$ 5,478 |
| B Fringe Benefits | \$ 2,480 | \$ 1,240 | \$ 3,720 |
| C Travel | \$ 500 | \$ - | \$ 500 |
| D Equipment | \$ - | \$ - | \$ - |
| E Supplies | \$ 100 | \$ - | \$ 100 |
| F Contractual - CFRF | \$ 85,084 | \$ 9,409 | \$ 94,493 |
| G Construction | \$ - | \$ - | \$ - |
| H Other Costs | \$ - | \$ - | \$ - |
| I Total Direct Costs | \$ 91,816 | \$ 12,475 | \$ 104,291 |
| J Indirect Charges | \$ 1,180 | \$ 590 | \$ 1,770 |
| K Total Proposal Costs | \$ 92,996 | \$ 13,065 | \$ 106,061 |

CFRF Contractual Detail

| F Contractual - CFRF | Proposal | In-Kind | Total |
|--|-----------|----------|------------|
| a. Personnel | | | |
| - Executive Director | \$ 7,000 | | \$ 7,000 |
| - Research Biologist | \$ 22,500 | | \$ 22,500 |
| - Data Manager | \$ 6,615 | | \$ 6,615 |
| - Business Manager | \$ 2,517 | | \$ 2,517 |
| Total CFRF Personnel Costs | \$ 38,632 | \$ - | \$ 38,632 |
| b. Fringe Benefits | \$ 3,863 | \$ - | \$ 3,863 |
| c. Travel | \$ 1,500 | \$ - | \$ 1,500 |
| d. Equipment | \$ - | \$ - | \$ - |
| e. Supplies | | | |
| - Research Supplies | \$ 1,238 | | \$ 1,238 |
| - Office Supplies | \$ 500 | | \$ 500 |
| Total Supplies | \$ 1,738 | \$ - | \$ 1,738 |
| f. Contractual | | | |
| - Programmer for On-Deck Data database | \$ 1,000 | | \$ 10,000 |
| - Martha's Vineyard Fishermen's Preservation Trust | \$ 3,000 | \$ - | \$ 3,000 |
| Total Contractual | \$ 4,000 | \$ - | \$ 13,000 |
| g. Construction | \$ - | \$ - | \$ - |
| h. Other Costs | | | |
| - Fishing Vessel Stipends | \$ 20,800 | \$ 7,800 | \$ 28,600 |
| Total Other Costs | \$ 20,800 | \$ 7,800 | \$ 28,600 |
| i. Total Direct Charges | \$ 70,533 | \$ 7,800 | \$ 87,333 |
| j. Indirect Charges | | | |
| - Proposed at 20.63% of CFRF Direct Charges | \$ 14,551 | \$ 1,609 | \$ 16,160 |
| Total Indirect Charges | \$ 14,551 | \$ 1,609 | \$ 16,160 |
| k. Total CFRF Costs | \$ 85,084 | \$ 9,409 | \$ 103,493 |

FY2024 Budget Justification:

The total proposed federal budget requested by the Rhode Island Department of Environmental Management (RI DEM) and the Commercial Fisheries Research Foundation (CFRF) for all components of the work is \$92,996 for 12 months. The voluntary non-federal match funds provided by the RI DEM and CFRF are \$13,065. The total proposal value is \$106,061. The proposed timeframe is August 1, 2024 to July 31, 2025.

The proposed budget justification for object class category items includes the following:

- A. Personnel: Deputy Chief – approximately 4% of annual salary = \$5,478
 - C. McManus, Deputy Chief, RIDEM Division of Marine fisheries will serve as a co-advisor and manager to the proposed project, providing guidance on research protocols, assisting with statistical analyses, participating in Research Fleet meetings, developing a data management plan for the Fleet data, assisting in all technical writing and presentations, coordinating with neighboring states with whelk fisheries to inform them of this approach, and conveying project results to fishery governance to inform future stock assessments and fishery management decisions.

- B. Fringe Benefits: RIDEM Annual Fringe benefit rates are:

| | |
|---------------------------|----------------------------|
| Retirement 24% | Deferred Compensation 0.4% |
| FICA 6.2% | Medicare 1.45% |
| Health care \$21,937/year | Dental \$1,132/year |
| Vision Mercer \$165/year | Assessed Fringe 4.25% |
| Retiree Health 6.75% | |

- C. Travel: \$500 is requested for travel to project meetings with the team, scientific and management outreach events, and visiting Research Fleet participants in the project.

- D. Equipment: There are no direct equipment charges.

- E. Supplies: \$100 is requested in supplies to build standardized gauges that the Research Fleet participants will be using. These gauges will be instrumental and ensuring the same tools are being used by industry and scientists in whelk data collection. They will also be used to inform enforcement on alternative measuring tools when inspecting whelk sizes.

- F. Contractual: The CFRF will conduct most of the work involved in this project, with administrative and technical assistance provided by RI DEM. These services will be charged to the grant as contractual costs and are outlined below to provide more detail as to how the federal funding will be used:
 - 1. Personnel: \$38,632 federal. This includes the wages for the following CFRF personnel for time spent working directly on the project:
 - 1. Executive Director – Proposed at 5% of time for 12 months = \$7,000
 - D. Bethoney, CFRF Executive Director, will oversee the administration, team communication/coordination, field research, and outreach aspects of the project. He will also assist with data analysis, report and outreach material development, and communication of project progress to the client, fishing industry and management communities.
 - 2. Research Biologist – Proposed at 40% of time for 12 months = \$22,500

- A CFRF Research Biologist will be the primary individual responsible for fleet organization, maintenance, and support, as well as project outreach
3. Data Manager – Proposed at 10% of time for 12 months = \$6,615
L. Stoltz, CFRF Data Manager, will maintain the data collected from the vessels at sea sampling in the CFRF data base and lead any data analysis
 4. Business Manager – Proposed at 5% of time for 12 months = \$2,517
T. Winneg, CFRF Business Manager, will carry out all the finance related aspects of the project including research budget tracking, invoice processing, and administrative support tasks, including purchasing supplies.
2. Fringe Benefits: \$3,863 federal. This includes a percentage for payroll taxes and worker's compensation insurance prorated in accordance with % of salary paid from program. Benefits proposed at 10% of personnel costs based on 2022 benefits and historical analysis.
 3. Travel: \$1,500 federal. Travel costs include travel support (mileage) for project staff to provide support at docks to Research Fleet participants, to participate in meetings with the Research Fleet, stock assessment scientists, and managers, and to participate in one industry/professional conference for one personnel to share and disseminate project methods, findings, and conclusions.
 4. Equipment: \$0. There will be no equipment costs on this project.
 5. Supplies: \$1,738 federal. This category includes research supplies and project office supplies.
 1. Research Supplies: \$1,238 - Costs of tablets, waterproof cases, Tidbit temperature logger with base & fish measuring board. Proposed at \$619 per set x 2 vessels for the duration of the project. The two sets of sampling equipment for existing Research Fleet vessels are replacements for equipment that is damaged or lost.
 2. Office Supplies: \$500 – Costs to cover database storage and website fees (\$25/month), project office and meeting supplies, outreach materials, etc.
 6. Contractual: \$4,000 federal. This includes costs associated with:
 1. Programmer (\$1,000) - CFRF hires an outside computer programmer to maintain the On Deck Data application and database coding for data relay and storage, to address any issues that arise, and to update the app to maintain functionality.
 2. Martha's Vineyard Fishermen's Preservation Trust (\$3,000) to assist with fleet support and data gathering. This includes S. Edmundson's time for organizing and informing the Martha's Vineyard whelk fleet and aid related to data collection and training.
 7. Construction: There are no construction costs.
 8. Other Costs: \$20,800 federal + \$7,800 match = \$28,600. This includes:
 1. Fishing vessel stipends (\$20,800 federal + \$7,800 match = \$28,600) for 11 vessels for 8 months at \$500 per month. A fleet of 11 (8 federal + 3 match) vessels will be utilized each month to obtain the proposed biological samples. The total stipend is computed at 65% due to fluctuations in vessel sampling associated with weather, vessel maintenance, and seasonal whelk distribution. CFRF will pay for stipends from the three match vessels with funding provided by Vineyard Wind 1.

9. Total Direct Charges: \$70,533 federal + \$7,800 match = \$87,333. This is the total direct charges for cost items a-h.
10. Indirect Charges: \$14,551 federal + \$1,609 match = \$16,160. Indirect general and administrative costs are calculated as 20.63% of federally requested Total Direct Charges. Indirect general and administrative costs are used to cover costs associated with the general operations of the CFRF including accounting services, legal services, maintenance of office space, liability insurance, payroll fees, phone/fax lines, internet service, board member participation, etc. The CFRF's FY2023 Indirect Cost Rate Proposal dated 4/6/23 is for 20.63% based on FY2022 actual costs.
11. Total Proposal Costs: \$85,084 federal + \$9,409 match = \$103,493.
- G. Construction. There are no construction costs on this grant
- H. Other Costs. There are no other costs associated with this grant.
- I. Total Direct Charges: \$113,969 Federal + \$3,066 In-Kind = \$117,035 total. This is the total direct charges for cost items A-H.
- J. Indirect Charges: \$1,180 Federal + \$590 In-Kind = \$1,770. Proposed at 19.25% of RIDEM Direct Charges
- K. Total Proposal Costs: \$115,149 Federal + \$3,656 In-Kind = \$118,805 Total.

Previous ACCSP Budget Narrative – Year 1 (New, Funded FY21):

Budget Table:

| TOTAL | New Proposal | | |
|--|--------------|----------|------------|
| | Proposal | In-Kind | Total |
| | \$ 115,149 | \$ 3,656 | \$ 118,805 |
| % Contribution by Funding Source | 97% | 3% | 100% |
| Object Class Category | Proposal | In-Kind | Total |
| A Personnel | | | |
| - RI DEM - Conor McManus | \$ 3,652 | \$ 1,826 | \$ 5,478 |
| Total RI DEM Personnel Costs | \$ 3,652 | \$ 1,826 | \$ 5,478 |
| B Fringe Benefits | \$ 2,480 | \$ 1,240 | \$ 3,720 |
| C Travel | \$ 500 | \$ - | \$ 500 |
| D Equipment | \$ - | \$ - | \$ - |
| E Supplies | \$ 100 | \$ - | \$ 100 |
| F Contractual - CFRF | | | |
| a. Personnel | | | |
| - Executive Director - David Bethoney | \$ 11,440 | | \$ 11,440 |
| - Research Biologist - Thomas Heimann | \$ 28,125 | | \$ 28,125 |
| - Business Manager | \$ 4,576 | | \$ 4,576 |
| Total CFRF Personnel Costs | \$ 44,141 | \$ - | \$ 44,141 |
| b. Fringe Benefits | \$ 3,973 | \$ - | \$ 3,973 |
| c. Travel | \$ 1,500 | \$ - | \$ 1,500 |
| d. Equipment | \$ - | \$ - | \$ - |
| e. Supplies | | | |
| - Research Supplies | \$ 4,950 | | \$ 4,950 |
| - Office Supplies | \$ 1,000 | | \$ 1,000 |
| Total Supplies | \$ 5,950 | \$ - | \$ 5,950 |
| f. Contractual | | | |
| - Programmer for On-Deck Data database | \$ 10,000 | | \$ 10,000 |
| - Martha's Vineyard Fishermen's Preservation Trust | \$ 3,000 | \$ - | \$ 3,000 |
| Total Contractual | \$ 13,000 | \$ - | \$ 13,000 |
| g. Construction | \$ - | \$ - | \$ - |
| h. Other Costs | | | |
| - Fishing Vessel Stipends | \$ 20,800 | \$ - | \$ 20,800 |
| Total Other Costs | \$ 20,800 | \$ - | \$ 20,800 |
| i. Total Direct Charges | \$ 89,364 | \$ - | \$ 89,364 |
| j. Indirect Charges | | | |
| - Proposed at 20% of CFRF Direct Charges | \$ 17,873 | \$ - | \$ 17,873 |
| Total Indirect Charges | \$ 17,873 | \$ - | \$ 17,873 |
| k. Total CFRF Costs | \$ 107,237 | \$ - | \$ 107,237 |
| G Construction | \$ - | \$ - | \$ - |
| H Other Costs | \$ - | \$ - | \$ - |
| I Total Direct Costs | \$ 113,969 | \$ 3,066 | \$ 117,035 |
| J Indirect Charges | \$ 1,180 | \$ 590 | \$ 1,770 |
| K Total Proposal Costs | \$ 115,149 | \$ 3,656 | \$ 118,805 |

FY2021 Budget Justification Budget Justification:

The total proposed federal budget requested by the Rhode Island Department of Environmental Management (RI DEM) and the Commercial Fisheries Research Foundation (CFRF) for all components of

the work is \$115,149 for 12 months. The voluntary non-federal match funds provided by the RI DEM is \$3,656. The total proposal value is \$118,805. The proposed timeframe is August 1, 2021 to July 31, 2022.

The proposed budget justification for object class category items include the following:

- A. Personnel: Deputy Chief – approximately 4% of annual salary = \$5,478
C. McManus, Chief, RIDEM Division of Marine fisheries will serve as a co-advisor and manager to the proposed project, providing guidance on research protocols, assisting with statistical analyses, participating in Research Fleet meetings, developing a data management plan for the Fleet data, assisting in all technical writing and presentations, coordinating with neighboring states with whelk fisheries to inform them of this approach, and conveying project results to fishery governance to inform future stock assessments and fishery management decisions.

- B. Fringe Benefits: RIDEM Annual Fringe benefit rates are:

| | |
|---------------------------|----------------------------|
| Retirement 24% | Deferred Compensation 0.4% |
| FICA 6.2% | Medicare 1.45% |
| Health care \$21,937/year | Dental \$1,132/year |
| Vision Mercer \$165/year | Assessed Fringe 4.25% |
| Retiree Health 6.75% | |

- C. Travel: \$500 is requested for travel to project meetings with the team, scientific and management outreach events, and visiting Research Fleet participants in the project.

- D. Equipment: There are no direct equipment charges.

- E. Supplies: \$100 is requested in supplies to build standardized gauges that the Research Fleet participants will be using. These gauges will be instrumental and ensuring the same tools are being used by industry and scientists in whelk data collection. They will also be used to inform enforcement on alternative measuring tools when inspecting whelk sizes.

- F. Contractual: The CFRF will conduct most of the work involved in this project, with administrative and technical assistance provided by RI DEM as In-Kind. These services will be charged to the grant as contractual costs and are outlined below to provide more detail as to how the federal funding will be used:
 - a) Personnel: \$44,141. This includes the wages for the following CFRF personnel for time spent working directly on the project:
 1. Executive Director – Proposed at 10% of time for 12 months = \$11,440
D. Bethoney, CFRF Executive Director, will oversee the administration, team communication/coordination, field research, and outreach aspects of the project. He will also assist with data analysis, report and outreach material development, and communication of project progress to the client, fishing industry and management communities.
 2. Research Biologist – Proposed at 50% of time for 12 months = \$28,125
A CFRF Research Biologist will be the primary individual responsible for fleet organization, maintenance, and support, as well as data management, communication, and analysis.
 3. Business Manager – Proposed at 10% of time for 12 months = \$4,576

- T. Winneg, CFRF Business Manager, will carry out all the finance-related aspects of the project including research budget tracking, invoice processing, and administrative support tasks, including purchasing supplies.
- b) Fringe Benefits: \$3,973. This includes a percentage for payroll taxes and worker's compensation insurance prorated in accordance with % of salary paid from program. Benefits proposed at 9% of personnel costs based on 2019 benefits and historical analysis.
 - c) Travel: \$1,500. Travel costs include travel support (mileage) for project staff to provide support at docks to Research Fleet participants, to participate in meetings with the Research Fleet, stock assessment scientists, and managers, and to participate in one industry/professional conference for one personnel to share and disseminate project methods, findings, and conclusions.
 - d) Equipment: \$0. There will be no equipment costs on this project.
 - e) Supplies: \$5,950. This category includes research supplies and project office supplies.
 - 1. Research Supplies: \$4,950 - Costs of tablets, waterproof cases, Tidbit temperature logger with base & fish measuring board. Proposed at \$618.75 per set x 8 vessels for the duration of the project.
 - 2. Office Supplies: \$1,000 – Costs to cover database storage and website fees (\$25/month), project office and meeting supplies, outreach materials, etc.
 - f) Contractual: \$13,000. This includes costs associated with:
 - 1. Programmer (\$10,000) - CFRF hiring an outside computer programmer to develop the On Deck Data application for whelk data collection, setup wireless data transfer to and storage in a SQL database, and assist with beta testing to address any issues that arise, and to update the app to maintain functionality. This cost estimate is based on the CFRF's past experience programming a tablet application for black sea bass data collection (On Deck Data) and developing reliable wireless data transfer and storage. The whelk data collection app developed for this project will be an autonomous sampling platform, separate from the other On Deck Data sampling apps.
 - 2. Martha's Vineyard Fishermen's Preservation Trust (\$3,000) to assist with fleet support and data gathering. This includes S. Edmundson's time for organizing and informing the Martha's Vineyard whelk fleet and aid related to data collection and training. -
 - g) Construction: There are no construction costs.
 - h) Other Costs: \$20,800. This includes:
 - 1. Fishing vessel stipends (\$20,800) for 8 vessels for 8 months at \$500 per month. A fleet of 8 vessels will be utilized each month to obtain the proposed biological samples. The total stipend is computed at 65% due to fluctuations in vessel sampling associated with weather, vessel maintenance, and seasonal whelk distribution.
 - i) Total Direct Charges: \$89,364. This is the total direct charges for cost items a-h.
 - j) Indirect Charges: \$17,873. Indirect general and administrative costs are calculated as 20.0% of federally requested Total Direct Charges. Indirect general and administrative costs are used to

cover costs associated with the general operations of the CFRF including accounting services, legal services, maintenance of office space, liability insurance, payroll fees, phone/fax lines, internet service, board member participation, etc. The CFRF's FY2019 Indirect Cost Rate Proposal dated 12/30/19 is for 20.01% based on FY2019 actual costs.

k) Total Proposal Costs: \$107,237.

G. Construction. There are no construction costs on this grant

H. Other Costs. There are no other costs associated with this grant.

I. Total Direct Charges: \$113,969 Federal + \$3,066 In-Kind = \$117,035 total. This is the total direct charges for cost items A-H.

J. Indirect Charges: \$1,180 Federal + \$590 In-Kind = \$1,770. Proposed at 19.25% of RIDEM Direct Charges

K. Total Proposal Costs: \$115,149 Federal + \$3,656 In-Kind = \$118,805 Total.

Principle Investigators:

The co-Principal Investigators of this proposed project are: M. Conor McManus (Chief, RI DEM Division of Marine Fisheries), N. David Bethoney (Executive Director, CFRF), and Shelley Edmundson (Executive Director, MVFPT).

M. Conor McManus will serve in an advisory and support role for the proposed project. McManus will provide advice throughout the project on development of sampling protocols and specific data fields and formats to collect through the Research Fleet. Further, McManus will advise on the necessary minimum sampling targets to achieve appropriate statistical power to describe catch and begin constructing stock assessment reference points with Fleet data. McManus will meet with fishers to both aid in tablet utilization as well as learn how the data collection process worked for them. He will assist with analyzing data from the Research Fleet for progress and scientific reports and presentations. Finally, McManus will be crucial in the application of Research Fleet collected data to whelk assessment and management efforts, will coordinate with MA DMF to establish best practices for inclusion, and help recruiting vessels.

N. David Bethoney, Executive Director of the CFRF, will serve as the lead Co-PI for the proposed project. Bethoney will be responsible for overall projection direction and progress towards completing proposed objectives. Bethoney will be primarily responsible for overseeing proposed data analysis as well as dissemination of project results to the ACCSP and state agencies.

Shelley Edmundson, Executive Director of the MVFPT, will serve in an advisory role for the proposed project. Edmundson has worked with the whelk fishery for years and is an expert on whelk ecology in the project area (Edmundson 2016). Edmundson will provide advice during the planning stages of the project from sampling design to vessel selection. Further, Edmundson will be available throughout the data collection period of the project to troubleshoot and serve as a liaison for vessels on Martha's Vineyard with the CFRF.

M. CONOR MCMANUS

Rhode Island Department of Environmental Management
Division of Marine Fisheries, Fort Wetherill Marine Laboratory
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Jamestown, Rhode Island, 02835

Tel: (401) 423-1941
Fax: (401) 423-1925
email: conor.mcmanus@dem.ri.gov

PROFESSIONAL PREPARATION

University of Rhode Island, Narragansett, RI
University of Rhode Island, Narragansett, RI
Boston University, Boston, MA

Ph.D., Oceanography, 2014-2017
M.S., Oceanography, 2010-2012
B.A., Marine Science, *cum laude*, 2006-2010

APPOINTMENTS

2021 – present Chief, RI DEM Division of Marine Fisheries
2021 – present Adjunct Professor, SMAST, University of Massachusetts Dartmouth
2018 – present Adjunct Professor, GSO, University of Rhode Island
2018 – 2021 Deputy Chief, RI DEM Division of Marine Fisheries
2016 – 2018 Principal Marine Fisheries Biologist, RI DEM Division of Marine Fisheries
2012 – 2016 Fisheries Scientist, Applied Science Associates (dba RPS)
2013 – 2014 Marine Biologist, Integrated Statistics under contract with NOAA-NMFS-NEFSC
2010 – 2012 Graduate Research Assistant, University of Rhode Island

RESEARCH INTERESTS

Fisheries oceanography • Fisheries ecology • Survey design • Population dynamics • Stock assessment science • Fish early-life history • Ecosystem modeling • Estuarine ecology • Fisheries management

SELECTED PEER-REVIEWED PUBLICATIONS (TOTAL = 33)

- Humphries, A., Gorospe, K.D., Innes-Gold, A., McNamee, J.E., **McManus, M.C.**, Oviatt, C.A., and Collie, J.S. 2022. In pursuit of ecosystem-based management for Narragansett Bay: an overview of previous ecosystem models and roadmap for future research. *Coastal Management* 50(3): 262–28.
- Heinichen, M., **McManus, M.C.**, Lucey, S., Aydin, K., Humphries, A., Innes-Gold, A., and Collie, J. 2022. Incorporating temperature-dependent fish bioenergetics into a Narragansett Bay food web model. *Ecological Modelling* 466: 109911
- McManus, M.C.**, Kipp, J., Shank, B., Carloni, J., Pugh, T., Reardon, K., and McKown, K. 2021. A model-based approach to standardizing American lobster (*Homarus americanus*) ventless trap survey abundance indices. *Fisheries Research* 238: 1-10.
- McManus, M.C.**, Langan, J.A., Bell, R.J., Collie, J.S., Klein-MacPhee, G., Scherer, M., and Balouskus, R. 2021. Spatiotemporal patterns in early life stage winter flounder (*Pseudopleuronectes americanus*) highlight phenology changes and habitat dependencies. *Marine Ecology Progress Series* 677: 161-175.
- McManus, M.C.**, Ullman, D.S., Rutherford, S.D., and Kincaid, C. 2020. Northern quahog (*Mercenaria mercenaria*) larval transport and settlement modeled for a southern New England estuary. *Limnology and Oceanography* 65(2): 289-303.
- Langan, J., **McManus M.C.**, Schonfeld, A., Truesdale, C., and J. Collie. 2019. Nearshore sex-specific dynamics of the summer flounder (*Paralichthys dentatus*) in Rhode Island waters. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 11(1): 76-85.
- Friedland, K.D., **McManus, M.C.**, Morse, R.E., and Link, J.S. 2019. Event scale and persistent drivers of fish and invertebrate distributions on the US Northeast Shelf. *ICES Journal of Marine Science* 76(5): 1316-1334.
- McManus, M.C.**, Hare, J.A., Richardson, D.E., and Collie, J.S. 2018. Tracking shifts in Atlantic mackerel (*Scomber scombrus*) larval habitat suitability on the Northeast U.S. Continental Shelf. *Fisheries Oceanography* 27(1): 49-62.
- Hare, J., Morrison, W., Nelson, M., Stachura, M., Teeters, E., Griffis, R., Alexander, M., Scott, J.,... **McManus, M.C.**, Marancik, K., and Griswold, C. 2016. A vulnerability assessment of fish and invertebrates to climate change on the Northeast U.S. Continental Shelf. *PLoS ONE* 11(2): e0146756.

SCIENTIFIC PRESENTATIONS

Given 16 scientific presentations (15 oral, 1 poster) as lead author, and 36 (27 oral, 9 poster) as coauthor.

SELECTED SYNERGISTIC ACTIVITIES

Stellwagen Bank National Marine Sanctuary Advisory Council; Research Primary Member (2023-present). Narragansett Bay Estuary Program Steering Committee; Member (2021-present). New England Fisheries Management Council Scientific and Statistical Committee; Member (2021-present). Northeast Fisheries Science Center Spiny Dogfish Research Track Stock Assessment; Co-chair (2021-present). Northeast White Shark Research Consortium; Member Organization Representative (2021-present).

University of Rhode Island Coastal Institute; Senior Fellow (2021-present).

Responsible Offshore Science Alliance Advisory Council; Alternate Member (2020-present).

Northeast Regional Sea Grant Lobster Extension Program Steering Committee; Member (2020-present). ASMFC Spiny Dogfish Technical Committee; Member (2019-present).

ASMFC Coastal Sharks Technical Committee; Member (2019-present). ASMFC Management and Science Committee; Member (2019-present). Rhode Island Marine Fisheries Institute; Commissioner (2019-present).

Mid-Atlantic Fisheries Management Council Spiny Dogfish Monitoring Committee; Member (2019-present).

(2017-2020). ASMFC American Lobster Technical Committee; Member (2016-present).

Scientific journal reviewer: *Bulletin of Marine Science*; *Canadian Journal of Fisheries and Aquatic Sciences*; *Fisheries Research*; *Fisheries Oceanography*; *Frontiers in Marine Science*; *Hydrobiologia*; *ICES Journal of Marine Science*; *Journal of Marine Systems*; *Journal of Sea Research*; *PeerJ*.

Proposal reviewer: *NOAA Saltonstall-Kennedy Program*; *NH Sea Grant Program*; *OR Sea Grant Program*; *MA Clean Energy Center*; *ME Agricultural and Forest Experiment Station*;

SELECTED HONORS AND AWARDS

2021 Annual Award of Excellence for Scientific and Technical Contributions,

ASMFC 2017 Certificate of Appreciation, RIDEM

2017 Bronze Medal Award*, NOAA

**Formally awarded to 14 federal employees, 9 contract employees received contribution acknowledgement*

2016 William E. Simmons Memorial Scholarship in Oceanography,

URI-GSO 2016 Best Student Paper Award, American Academy of

Underwater Sciences 2015 Davis Family Scholarship for Fisheries in Oceanography, URI-GSO

2015 Global Marine Initiative Student Research Award, The Nature

Conservancy 2012 Henry S. Farmer Award in Biological Oceanography,

URI-GSO

2011 Fillmore Memorial Scholarship Award, URI-GSO

2010 College Prize for Excellence in Marine Science, College of Arts and Sciences, Boston

SELECTED AWARDED COMPETITIVE GRANTS (TOTAL = 17)

2021 Atlantic Coastal Cooperative Statistics Program, PI,

\$115,149 2020 National Sea Grant, Co-PI, \$529,258

2020 National Sea Grant, Co-PI,

\$265,304 2020 Rhode Island Sea

Grant, Co-PI, \$217,928 2020 Rhode

Island Sea Grant, Co-PI, \$249,155

2017 Rhode Island Sea Grant, Co-

PI, \$137,765

Dr. NAIFF DAVID BETHONEY
Executive Director Commercial Fisheries Research Foundation
P.O. Box 278 Saunderstown, RI
401-515-4662, dbethoney@cfrfoundation.org

EDUCATION:

University of Massachusetts at Dartmouth School for Marine Science and Technology

PhD Dissertation: Understanding and avoiding River herring and American shad bycatch in the Atlantic herring and mackerel mid-water trawl fisheries.

Cum. GPA: 3.92 PhD Received 2013

MA Thesis: Association between diet and epizootic shell disease in the American lobster (*Homarus americanus*) around Martha's Vineyard

Cum. GPA: 3.93 M.S. Received 2010

Colby College - Waterville, ME

Major: Biology with Concentration in Environmental Science

Cum. GPA: 3.41, Cum Laude B.A. Received 2008

SEA Education Association of Woods Hole, MA

Study Abroad: Fall 2006

Documenting Change in the Caribbean: Designed and implemented an original biological research project with practical application while at-sea. Studied at Woods Hole, and sailed from St. Croix, USVI to Key West, Florida with research stops at Montserrat, Dominican Republic, and Jamaica.

WORK EXPERIENCE:

- Commercial Fisheries Research Foundation Spring 2020-Present

Executive Director: Responsible for overseeing foundation business manager, scientific staff, interns, and consultants to carry out all tasks associated with ongoing projects and general administration. In addition, responsible for pursuing new partnerships and projects, including proposal development and submission, under the advisement of the foundation Board of Directors.

- UMASS-Dartmouth School for Marine Science and Technology Fall 2008-Spring 2020

Research Assistant Professor, Fall 2014-Present: All responsibilities of research associate position related to drop camera and herring work with the ability to be lead principle investigator on research proposals and serve on student committees.

Research Associate, Summer 2013-Summer 2014: All responsibilities of research assistant position described below with management and development responsibilities for scallop drop camera and groundfish video surveys. Management responsibilities include equipment purchasing and maintenance and oversight of all technical operations and student involvement.

Research Assistant, Summer 2010- Spring 2013: Major responsibilities included coordinating River Herring bycatch avoidance program, assisting the Massachusetts Division of Marine Fisheries port side sampling program, and scallop drop camera survey at-sea data collection and analysis.

Graduate Research Assistant, Fall 2008-2010: Assisted with American lobster research including lobster husbandry, measuring and photographing lobsters, collecting larvae, and setting up housing apparatuses.

SCIENTIFIC JOURNAL PUBLICATIONS (LAST 3 YEARS):

1. Heimann T, Verkamp HJ, McNamee J, Bethoney ND. 2023 Mobilizing the fishing industry to address data gaps created by shifting species distribution. *Frontiers in Marine Science*. 10:1043676.
2. Verkamp HJ, Nooj J, Helt W, Ruddick K, Gerber-Williams A, McManus MC, Bethoney ND.

2022. Scoping bay scallop restoration in Rhode Island: a synthesis of knowledge and recommendations for future efforts. *Journal of Shellfish Research* 41(2):153–171

3. Ellertson AE, Waller JD, Pugh TL, Bethoney ND. Differences in the size at maturity of female American lobsters (*Homarus americanus*) from offshore Southern New England and eastern Georges Bank, USA. 2022. *Fisheries Research*. DOI: 106276
4. Chen C, Zhao L, Gallager S, Ji R, He P, Davis C, Beardsley RC, Hart D, Gentleman WC, Wang L, Li S, Lin H, Stokesbury KDE, Bethoney ND. 2021 Impact of larval behaviors on dispersal and connectivity of sea scallop larvae over the northeast U.S. shelf. *Progress in Oceanography*. DOI: 102604

GRANTS RECEIVED AS A PRINCIPAL INVESTIGATOR (LAST 2 YEARS):

1. “Training and Education Services” (Whelk research) March 2023
Awarded from: Vineyard Wind I LLC
Value: \$150,000
2. “FY 2023: Advancing Fishery Dependent Data Collection for Black Sea Bass (*Centropristis striata*) in the Southern New England and Mid-Atlantic Region Utilizing Modern Technology and a Fishing Vessel Research Fleet Approach” February 2023
Awarded from: Rhode Island Department of Environmental Management
Value: \$88,152
3. “Cooperative Marine Research Project” January 2023
Awarded from: The Campbell Foundation
Value: \$60,000
4. “Engaging the Fishing Community to Understand Disease and Reproductive Dynamics of Atlantic Sea Scallop” December 2022
Awarded from: Atlantic States Marine Fisheries Commission
Value: \$109,571
5. “Cooperative Marine Research Project” November 2022
Awarded from: The Campbell Foundation
Value: \$70,000
6. “SFW01 Construction and Post-Construction Fisheries Monitoring” October 2022
Awarded from: South Fork Wind LLC
Value: \$6,605,913
7. “Initiating the removal of ghost gear from Rhode Island waters” September 2022
Awarded from: 11th Hour Racing/The Schmidt Family Foundation
Value: \$110,410
8. “The WHOI/CFRF Shelf Research Fleet - Community Science in a Rapidly Changing Ocean” May 2022
Awarded from: Woods Hole Oceanographic Institution
Value: \$42,486
9. “Establishing standard methods to assess the biological condition of sea scallops before and after offshore wind farm development” April 2022
Awarded from: National Oceanic and Atmospheric Administration
Value: \$38,706

Shelley A. Edmundson
Executive Director, Martha's Vineyard Fishermen's Preservation Trust
P.O. BOX 1274 VINEYARD HAVEN, MA 02568
Ph: (407) 414-5387 Shelley.Edmundson@gmail.com

Academic Background:

Ph.D., Zoology, 2016, *Summa cum laude* University of NH, Durham,
NH M.S., Environmental Science, 2008, *Summa cum laude* University of MA, Boston,
MA B.A., Biology, 2003, *Magna cum laude* Wheaton College, Norton, MA

Employment:

- **Martha's Vineyard Fishermen's Preservation Trust**, Menemsha, MA
Executive Director, 2016 - Present
Administrator/Treasurer, 2011- 2016
Co-founder of non-profit group created to preserve, promote, and sustain the Vineyard's commercial fishing heritage through the acquisition and distribution of fishing permits.
- **Vineyard Wild Caught**, Menemsha, MA
Co-Founder, 2009 - Present
Founded an initiative supporting local fisheries by identifying locally caught seafood through a labeling system that links Vineyard-harvested fish, lobster, and shellfish to the individual Vineyard fishing vessels and captains. Developed, organized, and continuously promote and sustain the initiative.

Scientific and Professional Organizations:

- Vineyard Vision Advisory Council (2018 - Present)
- Vineyard Conservation Society Board Member (2018 - Present)
- American Institute of Fishery Research Biologists (2014 - Present)
- American Fisheries Society, Estuaries and Marine Fisheries Sections (2013 - 2016)
- World Aquaculture Society, US Aquaculture Society Chapter (2013 - 2016)

Research Experience:

- **University of New Hampshire**, Durham, NH, 2011- 2016, *Ph.D. Candidate*
Researched channeled whelk biology including early life history, fecundity, growth rates, movements, and feeding activity. Organized and led collaborative research with local whelk fishermen on Martha's Vineyard, MA.
- **University of New Hampshire**, Durham, NH, 2011- 2012, *Ph.D. Student*
Assisted with research project involving winter flounder stock enhancement in coastal ponds in Massachusetts and New York.
- **University of Massachusetts**, Boston, MA, 2005 - 2008, *Master's Student*
Researched site suitability analysis for offshore sea scallop aquaculture in waters near Martha's Vineyard, MA.
- **Wallace Laboratory**, Boston, MA, 2005 - 2006, *Research Assistant*
Analyzed, reduced data, and assisted with research in a trace-metal laboratory study investigating the transport and distribution of metals in coastal ecosystems.

Fellowships/Awards:

- UNH Dissertation Year Fellowship, 2015 - 2016, *Fellow*
- UNH School of Marine Science and Ocean Engineering Research Development and Travel Support Program, December 2014, *Awardee*

- American Fisheries Society, Estuaries Section Travel Award, September 2013, Awardee
- UNH School of Marine Science and Ocean Engineering Research Development and Travel, Support Program, February 2013, Awardee
- Martha's Vineyard Vision Fellowship, 2011 - 2015, Fellow
- National Science Foundation, Watershed Integrated Science Partnership, 2006 - 2007, Fellow
- Balfour Scholar, Wheaton College, 1999 - 2003, Scholar

Publications:

Edmundson, S. 2016. Channeled whelk (*Busycotypus canaliculatus*) ecology in relation to the fishery in Vineyard and Nantucket Sounds, MA. Fall 2016. Doctorate dissertation. University of New Hampshire.

Edmundson, S. 2014. Effects of temperature on incubation period, survival, and growth of juvenile channeled whelk (*Busycotypus canaliculatus*). *Newsletter of the American Fisheries Society*, Estuaries Section. Spring 2014.

Selected Presentations:

National:

Edmundson, S. and E.A Fairchild. 2015. Channeled whelk research. Mote Marine Laboratory and Aquarium. Sarasota, FL, June 11, 2015. (Guest lecturer)

Edmundson, S. and E. A. Fairchild. 2015. Channeled whelk research. Key West Community College, Key West, FL, April 6, 2015. (Guest lecturer)

Edmundson, S. and E. A. Fairchild. 2014. Channeled whelk growth rates in Nantucket Sound, MA. 16th International Conference for Shellfish Restoration. Charleston, SC, December 12, 2014. (Poster)

Edmundson, S. and E. A. Fairchild. 2013. Using hatcheries to answer early life history questions: A case study of channeled whelk. 143rd American Fisheries Conference. Little Rock, AR, September 11, 2013.

Edmundson, S. and E.A. Fairchild. 2013. Effects of temperature on incubation period, survival, and growth of juvenile channeled whelk (*Busycotypus canaliculatus*). The annual meeting of the World Aquaculture Society. February 21-25, 2013, Nashville, TN. (Poster)

Regional:

Edmundson, S. and E. A. Fairchild. 2016. Channeled whelk movements and behavior in Vineyard Sound. Cape Cod Natural History Conference. West Barnstable, MA, March 5, 2016.

Edmundson, S. and E. A Fairchild. 2015. Conch growth rates project update. Cape Cod Commercial Fishermen's Alliance. Chatham, MA, May 4, 2015.

Edmundson, S. and E. A. Fairchild. 2013. Researching channeled whelk growth rates in Nantucket and Vineyard Sounds. Permanent Endowment for Martha's Vineyard Board Meeting. West Tisbury, MA, July 23, 2013.

Edmundson, S. and E. A. Fairchild. 2013. Channeled whelk research at UNH. MA Division of Marine Fisheries. Boston, MA, May 13, 2013.

References:

- ACCSP Biological Review Panel. 2019. Biological Sampling Priority Matrix.
- Angell, T.E. 2019. 2006-2018 Catch, Effort, and Fishery Trends in the Rhode Island Whelk Fishery and Recent Stock Status. RI Division of Marine Fisheries Research Reference Document.
- Askin, S.E., and R.A. Fisher. 2021 A Summary of Collaborative Discussions on Existing Management within the Channeled Whelk. Virginia Institute of Marine Science.
- Edmundson, S. E. 2016. Channeled Whelk (*Busycotypus Canaliculatus*) Ecology in Relation to the Fishery in Vineyard and Nantucket Sounds, Massachusetts. Doctoral Dissertation. University of New Hampshire. 178p.
- Fisher, R. A. 2015a. Channeled whelk (*Busycotypus canaliculatus*) in the mid-Atlantic region. Coherent approach to Busycon/Busycotypus fishery management along the US Atlantic seaboard.16th International Conference on Shellfish Restoration. Charleston, South Carolina
- Gawarkiewicz, G. and A. Mercer. 2019 Partnering with Fishing Fleets to Monitor Ocean Conditions. Annual Review of Marine Science 11: 391-411.
- Maunder, M.N. and A.E. Punt. 2004. Standardizing catch and effort data: a review of recent approaches. Fisheries Research 70: 141-159.
- Nelson, G.A., S.H. Wilcox, R.P. Glenn, and T.L. Pugh. 2018. A Stock Assessment of Channeled Whelk (*Busycotypus canaliculatus*) in Nantucket Sound, Massachusetts. Massachusetts Division of Marine Fisheries Technical Report.
- Peemoeller, B.J., and B.G. Stevens. 2013. Age, size, and sexual maturity of channeled whelk (*Busycotypus canaliculatus*) in Buzzards Bay, Massachusetts. Fishery Bulletin 111(3): 265-278
- The Nature Conservancy. 2018. FishPath Workshop Report: Rhode Island Channeled Whelk. The Nature Conservancy, Arlington, Virginia, USA.
- Wilcox, S.H., T.L. Pugh, R.P. Glenn, K. Olivera. 2021. Spatial variation in size and age at maturation and growth of the channeled whelk (*Busycotypus canaliculatus*) in Southern Massachusetts. Fisheries Research 239: 105926