



COMMERCIAL FISHERIES
RESEARCH FOUNDATION

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August 6, 2019

Michael Cahall
Atlantic Coastal Cooperative Statistics Program 1050
N. Highland, Suite 200A-N
Arlington, VA 22201

Dear Mr. Cahall,

The Commercial Fisheries Research Foundation (CFRF) and the Rhode Island Department of Environmental Management (RI DEM) have reviewed all questions and recommendations provided by the ACCSP Operations and Advisory Committees for our proposal titled "Advancing Fishery Dependent Data Collection for Black Sea Bass (*Cetropristis striata*) in the Southern New England and Mid-Atlantic Region Utilizing Modern Technology and a Vessel Research Fleet Approach." The proposal has been revised accordingly and we have also responded to each question and recommendation below.

1. Does the FY20 budget represent the likely anticipated costs to support the project long-term?
 - *The proposed FY20 budget represents the anticipated cost to continue sampling for an additional year with the Research Fleet. Project PIs are constantly seeking long-term year over year funding to continue the Research Fleet sampling beyond the proposed timeline. Depending on vessel sampling rates, Research Fleet sampling may continue beyond the proposed timeline as funds permit.*
2. How comparable is the On Deck Data collection system to the NMFS FLDRS study fleet program? Any benefit in making those consistent or integrated in any way? Maybe part of the communication plan – sharing lessons learned with this program and data collection system with the study fleet, especially now with Anna Mercer at NMFS and familiarity with both projects.
 - *The Black Sea Bass Research Fleet On Deck Data application is likely much more specialized than the Study Fleet program as we target specifically black sea bass data and basic environmental/gear data for analysis. However, the data collected by our Research Fleet is likely collected to the same standard as ultimately, we designed On Deck Data to record data to ACCSP reporting standards. We have discussed comparing Research Fleet data/methodology to that of the Study Fleet and Observer Program to further validate the methodology. This is a comparison we look to undertake in the future.*
3. Last year's proposal noted the expansion of two additional vessels, just as the FY20 proposal. It appears the project was successful in bringing on two new vessels (total vessels went from 10 to 12) – any details on these two new vessels (ie., gear type and fishing location)? Any specific needs for another two additional vessels or open to any vessel willing to participate?
 - *The CFRF and RI DEM have recently transitioned into year-3 funding from ACCSP on the project and are currently reviewing applications for the 2 additional vessels covered under the year-3 award. The two vessels being brought on under the year-3 award will be selected from the non-trawl fishery with preference given to vessels that will 1. Increase the number of replicates of existing gears types 2. Fish in areas with lower coverage from our existing Fleet Members and 3. Fish during times of year which tend to be the least sampled by our existing Fleet Members. Further justification and identified areas of need for the additional 2 vessels proposed under year-4 funding have been added to the proposal.*

4. Proposal mentions obtaining information from other fleets and lists aquaculture fisheries. Can expand or provide some detail as to what aquaculture fishery this might be and how that information may be representative of overall population?
 - *Currently there is only one Fleet Member who has collected data from aquaculture. Aquaculture was not one of the intended gear types to attempt to classify with the original proposal. However, one of the Fleet Members who was brought on to sample in the lobster and trawl fisheries also operates an oyster farm. He began noticing an influx of young of the year black sea bass coming up while tending to his oyster cages and asked if he could sample them. The Fleet Member still prioritizes sampling from his trawl and lobster gear; however, he will sample his oyster farm during the times of year he is not operating in his other gear types. Although population level conclusions will be difficult to draw with only one Fleet Member sampling from aquaculture, the data coming from aquaculture was viewed simply as an opportunity to collect a new stream of data while maintaining our sampling in the originally proposed gear types.*
5. The budget indicates there are no equipment costs – if two new vessels join the study fleet, don't they need to be equipped with the Samsung Tablets with the On Deck software?
 - *Due to the price of each piece of the sampling equipment (Samsung tablets, measuring board, etc.) being under \$5000, the equipment is technically classified as a supply. The costs to acquire the sampling equipment for the two new vessels can be found under section F, subsection e, in the budget and budget narrative.*
6. Well written. Page 9 mentions 10 boats (and lists them) and says they are adding 2 additional boats which I would think equals 12 total but on page 10 they mention 14 boats and have 14 in the budget. Not clear where the other 2 additional boats came from. Need clarification.
 - *The 10 vessels listed in the proposal are the vessels supported by the ACCSP through the year-2 of funding of the project. The CFRF and RI DEM have just begun funding year-3 of the project and are actively reviewing Research Fleet applicants for the two additional slots under the funded year-3 award which would bring the Fleet total to 12. If the proposed project is funded, the ACCSP would be supporting the 12 vessels in the Research Fleet through the year-3 award plus an additional two vessels, bringing the total of vessels supported to 14 through the proposed project.*
7. Not a fan of the milestone schedule formatting due to the text wrapping.
 - *Formatting of text was fixed in the milestone schedule table.*
8. The total In-Kind and overall total in the budget does not match the budget justification write up. Numbers are slightly different. Also, the indirect charges in the table and budget justification do not match math shown (i.e., in J - $\$12,394 \times 17.25\% = \$2,865$ but actually equals $\$2,137.97$).
 - *Budget table and budget justification have been updated accordingly to the appropriate amount and to be consistent with each other. The original calculation was correct however the change from previous years to charge indirect against salaries and fringe benefits was not included in the budget narrative.*

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,



Jason McNamee, PhD
Chief, RDEM Marine Fisheries



Christopher Glass, PhD
Executive Director, CFRF



Thomas Heimann, MsC
Research Associate, CFRF

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

**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**

Submitted by:

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Applicant Name: Rhode Island Department of Environmental Management (RI DEM) and the Commercial Fisheries Research Foundation (CFRF)

Project Title: 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

Project Type: Maintenance (Year 4)

Requested Award Amount: \$132,097

Requested Award Period: August 1, 2020 – July 31, 2021

Principal Investigators: Jason McNamee, PhD, Chief of Marine Fisheries, Rhode Island Department of Environmental Management; Christopher Glass, PhD, Executive Director, Commercial Fisheries Research Foundation; Thomas Heimann, MSc, Research Associate, Commercial Fisheries Research Foundation

Date Submitted: June 10, 2019

Objective:

This proposal is a request for financial support for an additional 12 months of biological catch, effort, and bycatch sampling by the Black Sea Bass Research Fleet, which was successfully piloted in 2016 with support from ACCSP and has been in contiguous operation since. Through the first two years of funding provided by the ACCSP, the Research Fleet sampled 13,751 black sea bass from 1,024 locations from Narragansett Bay to Hudson Canyon and east to George's Bank. The Research Fleet will continue data collection through July 31, 2020 (Year 3 of funding from ACCSP). All biosamples data collected by this project have been communicated to and accepted by ACCSP. The proposed project will continue delivering black sea bass biosamples data to ACCSP at six-month intervals through July 31, 2021.

The goal of the proposed project is to seamlessly continue the Research Fleet's sampling efforts to develop a robust year-round time series of black sea bass (*Centropristis striata*) catch, bycatch, and biological data for five different gear types (trawl, lobster/crab pot, fish pot, gillnet, rod and reel) throughout the Southern New England (SNE) and reaching into Mid-Atlantic (MAB) region. The continuation of this project is critical to the evolution of black sea bass assessment and management efforts by the Atlantic States Marine Fisheries Commission, Mid-Atlantic Fisheries Management Council, Northeast Fisheries Science Center, and Atlantic Coastal Cooperative Statistics Program as the Black Sea Bass Research Fleet produces spatially and seasonally distinct data for numerous commercial and recreational gear, which is currently lacking for this species.

Project components include: 1) Continue and expand the existing fishery dependent data collection program that utilizes fishing vessels and modern electronic technology to collect and relay catch and bycatch data (number, length, sex, disposition) and fishery characteristics (location, gear type, effort, habitat) for black sea bass from across the SNE/MAB region throughout the year; 2) Internal data analysis to address research questions about spatiotemporal patterns in black sea bass biological and fishery characteristics and gear-specific selectivity; and 3) Communication of project data and results to the Atlantic Coastal Cooperative Statistics Program (ACCSP), black sea bass stock assessment scientists, managers, and members of fishing industry.

In summary, the general goals of the proposed project are:

- 1) Collect and communicate critically needed fishery dependent black sea bass data (catch and effort, bycatch, and biological) in a cost-effective way using modern electronic technology and fishermen's time on the water;
- 2) Contribute to the evolution of the northern Atlantic black sea bass stock assessment and associated management measures;
- 3) Demonstrate a model for fishery dependent data collection, management, analysis, and utilization that can be duplicated in a cost-effective way in other regions of the black sea bass range and in other fisheries.

Specific objectives include the following:

- Continue the Black Sea Bass Research Fleet for an additional 12 months to develop seasonal characterizations of northern Atlantic black sea bass biology and distribution;
- Expand the Black Sea Bass Research Fleet to include two additional F/Vs to increase the number of replicate vessels for gear types currently represented in the Research Fleet;
- Maintain and evolve the On Deck Data app to meet the data needs of scientists and the logistical needs of participant fishermen;
- Collect fishery dependent black sea bass data from five gear types (trawl, lobster/crab pot, fish pot, gillnet, rod and reel) across the SNE/MAB region to characterize the size and sex distributions of black sea bass catch and bycatch and investigate the spatial and temporal trends of the fishery;
- Communicate black sea bass biosamples data to ACCSP every six months;
- Conduct internal analyses of the project database to: 1) Assess the selectivity and CPUE of five gear types in the SNE/MAB region and explore temporal variability, and 2) Further monitor and assess spatial and temporal trends in species' catch and bycatch composition and fishery characteristics;
- Further refine gear-specific fishery dependent indices that utilize different data error structures, standardization techniques, and Bayesian applications;

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

Need:

As asserted in the ACCSP Biological Review Panel's biological sampling priority matrix, black sea bass is identified as a top priority for data collection, receiving the highest total priority ranking for inadequate biological sampling as well as being a high priority for managing stakeholders (ASMFC, NMFS, and state agencies) (ACCSP 2019). The lack of adequate data for northern Atlantic black sea bass is an issue of regional importance, as this highly valuable stock ranges from Cape Hatteras to the Gulf of Maine (Musick & Mercer 1977, Moser & Shepherd 2009). In part due to the dearth of data throughout the black sea bass range, assessment and management efforts have been slow to react to the shifting distribution and growing abundance of the species (Bell et al. 2014, NEFSC 2017). As stated by ASMFC (2013), high priority data needs for black sea bass include: biological characterization of commercial catch and discards, and expanded sampling of all sizes across the species temporal and spatial range to develop more reliable catch-at-age and CPUE. The Black Sea Bass Research Fleet has, and will continue to with continued funding, provide exactly this type of information. Ultimately, cost-effective sampling programs, such as the Black Sea Bass Research Fleet, are needed to collect these data on regional scales and inform and evolve the stock assessment to consider the complex life history and spatial structure of black sea bass.

Fishery dependent data has become an important source of information that is used as a term of reference for many stock assessments, but in the case of the northern Atlantic black sea bass stock, the data generated by the Black Sea Bass Research Fleet serves as the only systematically collected fishery dependent data source with a focus on the data being used in the assessment process. Thus, this project seeks to strengthen the fishery dependent data for this population in an effort to provide better information from across the temporal and spatial distribution of this species.

The limited coverage of optimal black sea bass habitat and semi-seasonal (spring/winter) sampling schedule of the NEFSC trawl survey may limit the suitability of the survey data for the stock assessment (ASMFC 2013) and require the addition of new data streams to improve the information available to assessment. As such, the ASMFC Black Sea Bass Technical Committee and ACCSP Biological Review Panel identified expanded collection of biological data as a top priority for improving the black sea bass stock assessment (ASMFC 2013, ACCSP 2019).

Other regions have adapted sampling and analytical techniques to better fit the life history and habitat associations of the black sea bass (Southern Atlantic and Gulf of Mexico stocks). These stock assessments rely heavily on fishery-dependent indices of abundance (SEFSC 2013). Such fishery-dependent indices of abundance, however, have not yet been developed for the northern black sea bass stock due to insufficient data, but will become possible if the Black Sea Bass Research Fleet is able to amass multiple years of contiguous data. This project aims to address this need by maintaining and expanding the existing Black Sea Bass Research Fleet to

conduct year-round biological sampling of black sea bass catch and bycatch within the trawl, lobster/crab, fish pot, gillnet, and rod and reel fisheries in the SNE/MAB region.

Ultimately, the proposed project will help 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. Collecting timely scientific data across a species range is imperative for successful fisheries management, as more robust data enables fisheries science to be as comprehensive as possible, which in turn supports informed and efficient decision making by managers. Furthermore, stock assessment scientists rely on robust biological, catch and effort, and bycatch data to help improve the quality of stock assessments. In these ways, the proposed project meets all of the main elements of the mission of ACCSP.

Results and Benefits:

The results of the proposed project include:

- Improved quality, quantity, and timeliness of biological, catch and effort, and bycatch data for the northern Atlantic black sea bass, made available via the ACCSP;
- A vetted source of year-round black sea bass data that can be used to inform the stock assessment and management of this data poor species;
- Coordinated data transmission procedures with the ACCSP that build upon the CFRF's existing data communication practices with ACCSP's Senior Data Coordinator;
- A demonstrated method to cost effectively collect data for a commercially and recreationally important species from areas and times of year not accessed by existing survey programs;
- Improved collaboration and trust between fishermen, scientists, and managers;
- Improved accuracy and credibility of the stock assessment and management plan for the northern Atlantic black sea bass stock;

The benefits of the proposed project are:

- Address priorities of ACCSP, ASMFC, and MAFMC by providing critically needed black sea bass data from the SNE/MAB region to support assessment and management efforts that reflect the current state of the resource;
- Provide an efficient and constructive way for fishermen to be involved in the scientific process by using modern technology to collect quantitative black sea bass data during routine fishing practices;
- Fill black sea bass data gaps in areas, habitats, and times of year not covered by standard survey techniques;
- Evolve and improve the black sea bass stock assessment by providing expanded biological data from retained and discarded black sea bass from a variety of gear types;

- Support regional science and management agencies, including ACCSP, ASMFC, MAFMC, and state agencies in their efforts to sustainably manage the black sea bass resource;
- Support diversification and resilience of fishing communities in the many states across the Atlantic coast with a black sea bass fishery;
- Provide a model for cost-effective fishery dependent data collection efforts in other regions and fisheries.
- Build strong working partnerships between fishermen, scientists, and managers that will contribute to the sustainable management of the nation's living marine resources;
- Build confidence in the efficacy of the northern Atlantic black sea bass stock assessment and management process.

Data Delivery Plan:

An important component of the proposed project is the compilation and communication of fishery and biological data to the ACCSP, participant fishermen, stock assessment scientists, and management teams. The CFRF will maintain the black sea bass database for internal project analyses (described below) but will also regularly share the project data with other users, regardless of any internal publication endeavors.

Copies of the black sea bass database will continue to be sent semi-annually (every six months) to the ACCSP. These data will be made available in a format that is compatible with the ACCSP database to encourage data be readily used in the black sea bass stock assessment and other analyses. Data submissions to the ACCSP will build upon the established procedures from the first three years of the project. All data provided to the ACCSP will match ACCSP data collection standards and any requested and available metadata will be provided. At the end of the project, data will also be made available to fishery scientists at the NMFS Northeast Fisheries Science Center. A vessel ID system will be used to maintain the confidentiality of participant fishing vessels. The CFRF will maintain open communication with the ACCSP data coordinator and will remain available to provide any necessary metadata along with data submissions.

In an effort to provide regular feedback to fleet participants, the project team will compile and distribute individual data reports every three months (quarterly). Vessel-specific data reports will include the following summary statistics: number of catch sampling sessions, amount of effort sampled (number of trawls, hooks, traps), average depth of sampling, percentage of black sea bass catch retained for sale, percentage of black sea bass catch discarded, number of black sea bass biologically sampled, sex distribution of black sea bass sampled, minimum/maximum length of black sea bass sampled, and average length of black sea bass sampled. Additional summary statistics will be available upon request. Data reports were compiled and distributed to Research Fleet participants following the above-mentioned quarterly time frame and content guidelines throughout the entirety of past project sampling.

Completed Data Delivery to ACCSP:

Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation
ACCSP Funding Proposal (Maintenance Project – Year 4): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)
Proposal components that address the ranking criteria are underlined and a summary is provided on pages 29-31.
Changes from the original proposal are highlighted in yellow

During the first funding year of the project, the CFRF and RI DEM worked with the ACCSP Data Coordinator, Julie Defilippi Simpson, to coordinate data formats, metadata, and delivery procedures for the Research Fleet's black sea bass biosamples data. As a result of these efforts, all black sea bass biosamples data collected to date through the funded project have been incorporated into the ACCSP black sea bass biosamples database. The CFRF has maintained the semi-annual data submission to the ACCSP and submits data in June and December of each sampling year. The project team will maintain a semi-annual data delivery schedule to ACCSP throughout the proposed project following the same data formats and standards previously established.

Approach:

The proposed project seeks to collect, communicate, and analyze critically needed catch, bycatch, and biological data for incorporation into the ACCSP biosamples database and ultimate application in the northern Atlantic black sea bass stock assessment. Project components include: 1) Maintenance of the current Black Sea Bass Research Fleet and expansion to incorporate two new vessels; 2) Collection of fishery-dependent biological (catch and bycatch) black sea bass data and fishery characteristics for 12 months in the SNE/MAB region; 3) Internal data analysis to address research questions about spatiotemporal patterns in the black sea bass population and fishery; 4) Compilation and communication of project data and results to ACCSP, stock assessment scientists, and fisheries managers; and 5) Outreach and education activities to share findings. Methodological details are outlined below.

Maintenance and Expansion of Black Sea Bass Research Fleet and Data Collection App:

During the first funding year of this project, the CFRF and RI DEM were successful in developing the Black Sea Bass Research Fleet for fishery dependent data collection, including the development of a Project Steering Committee, solicitation and selection of participant fishing vessels, development of the On Deck Data app and SQL database, refinement of sampling protocols, construction of sampling equipment, training of Research Fleet participants, on-time initiation of data collection, data delivery to ACCSP and professional and industry outreach. The project was implemented by the PIs, CFRF staff, and a Project Steering Committee, which consists of members of the fishing industry as well as state and federal fisheries scientists and managers. Currently the project is run by the PIs and CFRF staff and the project steering committee serves in an advisory role and provides feedback on project progress and major milestones. More information about the accomplishments of the project is available on the project website: www.cfrfoundation.org/black-sea-bass-research-fleet.

If funded, during the fourth year of the project, the CFRF and RI DEM will maintain the twelve fishing vessels supported through year-3 funding from ACCSP as well as seek to expand the fleet by an additional two vessels. The primary goal when selecting new vessels for the Research Fleet will be; 1. Increase the number of replicate vessels of gear types currently represented in

the Research Fleet and 2. Increase the spatiotemporal coverage of the Research Fleet. Both of the previously mentioned goals will help to increase the statistical power of the fishery dependent data collected by the Research Fleet overall. Through Fleet Meetings and communication between project PIs and steering committee members, focusing the proposed Fleet expansion on the non-trawl fishery to better address limitations in the current stock assessment. This is because the current stock assessment groups all non-trawl fisheries together and assumes the same selectivity and discard structure between all non-trawl gear types. Aside from the trawl fishery, the Research Fleet currently provides data from the gillnet, lobster pot, fish pot, rod and reel, conch pot, and aquaculture fisheries. Focusing Research Fleet expansion among these identified non-trawl gear types would help reduce uncertainties and inform the current black sea bass stock assessment. To ensure a fair and transparent fleet expansion, the CFRF and RI DEM will issue an open call for F/V applications as well as reach out to strong candidates from past application calls and encourage reapplying. A Review Committee will rank applicants and select the two new F/Vs for the Black Sea Bass Research Fleet. The CFRF staff will notify the selected F/Vs and will work with them to establish work agreements, introduce them to sampling equipment, and train them on sampling protocols.

The black sea bass data collection app, On Deck Data, was developed during the first year of the project to enable Research Fleet participants to collect standardized black sea bass data as well as day-to-day observations. On Deck Data prompts participant fishermen to record a suite of session data (location, depth, habitat type, etc.), effort data (mesh size, length of trawl, hooks fished, etc.), and biological data (length, sex, disposition) while at sea. To account for the multi-gear nature of the black sea bass fishery, On Deck Data prompts gear-specific data entry for Research Fleet participants (Table 1). On Deck Data was originally launched during the first year of the project and has received various improvements and quality of life updates in each funded year since to streamline data collection.

Table 1. Summary of fishing effort data collected by the Black Sea Bass Research Fleet.

Trawl	Gillnet	Commercial Rod & Reel	Charter	Lobster/Crab Traps	Fish Pot
Mesh Size (inches)	Number of Net Panels Per String	Time Spent Fishing (hours)	Time Spent Fishing (hours)	Soak Time (days)	Soak Time (days)
Tow Time (hours.decimal)	Length of Net Panels (feet)	Number of Rods Fished	Number of Rods Fished	Number of Traps	Number of Traps
Sweep Length (feet)	Mesh Size (inches)	Number of Hooks Used	Number of Hooks Used	Escape Vent Size (inches)	Escape Vent Size (inches)
	Soak Time (days)			Escape Vent Shape	Entrance Size (inches)

	Net Height (feet)				
	Tie Downs (inches)				

On Deck Data will be maintained throughout the proposed project to allow for efficient data collection and wireless data submission by Research Fleet participants. The CFRF and RI DEM will continue to work with an application developer to address any issues that arise and to update On Deck Data to maintain functionality. Application maintenance is a constant task, as tablets regularly receive operating system updates that may impact On Deck Data functionality.

The Black Sea Bass Research Fleet will continue to follow the fishery-dependent sampling protocols implemented during the first year of the project to collect catch and effort, biological, and bycatch data from the SNE/MAB region. The percentage of project effort devoted to each of these modules is as follows: Catch and Effort 30%, Biological 40%, Bycatch 30%. The estimated effort devoted to the catch and effort module is based upon sampling during the roughly 154 days of open black sea bass fishing season in Rhode Island in 2016 (42% of the year). The estimated project effort devoted to biological sampling reflects the collection of black sea bass length and sex data by participant vessels during three trips per month for 12 months. Finally, the project effort allocated to the bycatch module reflects sampling efforts conducted while the commercial black sea bass fishing season is closed and while participant vessels are targeting other species.

Fishery-Dependent Data Collection:

The Black Sea Bass Research Fleet started collecting data on November 30, 2016 and, if this proposal is funded, will continue to do so, utilizing the established sampling protocols and procedures, through at least July 31, 2021. The Black Sea Bass Research Fleet currently consists of ten fishermen based in Rhode Island, chosen strategically to provide data coverage from across the SNE/MAB region, throughout the year, from a variety of gear types: F/V Excalibur (Offshore Trawl), F/V Johnny B (Fish Pot, Rod & Reel, Lobster Pot), F/V Laura Lynn (Fish Pot, Rod & Reel, Lobster Pot), F/V Matrix (Lobster/Crab Pot), F/V Nancy Beth (Gillnet), F/V Priority Too (Rod & Reel, Charter), F/V Second Wind (Offshore Trawl), and F/V Sweet Misery (Gillnet, Lobster Pot), F/V Lady Clare (Lobster Pot), and F/V Debbie Sue (Trawl). The majority of samples have originated from statistical areas 537 and 539 as these two statistical areas exclusively cover the fishing grounds of the F/V Johnny B, F/V Laura Lynn, F/V Matrix, and F/V Priority Too, all of which are either seasonal fishing vessels or do not interact with black sea bass in the winter. The majority of inshore lobster, fish pot, rod and reel and gillnet samples come from the end of spring through the end of the fall when black sea bass are in highest abundances inshore in statistical areas 537 and 539. The F/V Second Wind and the F/V Excalibur fish further south than the above-mentioned vessels and interact with black sea bass year-round but primarily during the winter, however various vessel repairs and unrelated injuries have reduced the

amount of data collected by these two vessels. The F/V Lady Clare fishes offshore and interacts with black sea bass heavily in the winter and spring months, however encounters them less frequently through the summer and fall. The newest vessel added to the Research Fleet, F/V Debbie Sue, fishes the further south of all Research Fleet Members and consistently completes trips into the MAB region south of Hudson Canyon. In total, the Black Sea Bass Research Fleet has sampled black sea bass from 9 distinct statistical areas, 537, 539, 616, 613, 611, 615, 533, 525, and 622. Two additional F/Vs will be brought on with currently awarded funds from ACCSP. The proposed project seeks to add an additional two F/Vs that interact with black sea bass to increase the gear-type specific statistical power of the non-trawl collected data and to increase the spatiotemporal coverage of Research Fleet data collection.

Due to the high number of gear types currently represented in the Research Fleet, it was identified that increasing the number of replicates of each gear type within the Fleet would strengthen the conclusions of the proposed discard characterization for each gear type. If funded, the CFRF and RI DEM will open an application period for the Research Fleet slots as done in the previous years of the project. Any vessel will be able to apply for consideration however preference will be given to vessels which fish in gear types currently represented within the Research Fleet and fish in the non-trawl fisheries of; gillnet, lobster pot, commercial rod and reel, and fish pot. Although conch pot and oyster aquaculture are currently represented within the Research Fleet, these two gear types will not be targeted for expansion like the previously mentioned gears. Conch pot and oyster aquaculture were not initially intended to be gear types covered by the Research Fleet sampling however, a couple Fleet Members brought on to sample from other gears types also operate in the conch and aquaculture fisheries. The CFRF and RI DEM will not target conch pot and oyster aquaculture for expansion in the Research Fleet as neither gear type actively targets black sea bass or interacts with the species on a level similar to the other, targeted gears. However, sample collection will continue through existing Fleet Members opportunistically as it provides a novel source of data on black sea bass. Further, vessels from the above-mentioned gear types which operate and interact with black sea bass in areas and times of year under-represented by our current Research Fleet will be further prioritized, specifically through the winter months of January-April and south of Hudson Canyon. If the proposed work is funded, ACCSP funding would allow for the inclusion of at least 14 total F/Vs in the Research Fleet.

Participant fishermen will use Samsung Tab A tablets pre-programmed with On Deck, described above, to efficiently and accurately record and transmit fishery dependent data. As such, the proposed project will advance the use of electronic technology in at sea biological data collection, management, and analysis efforts.

The goal for each participant is to conduct at-sea catch sampling sessions during three fishing trips each month (Nelson 2014). Thus, the black sea bass research fleet will aim to sample 42 trips per month, for a total of 504 trips over twelve months. Given the population inferences implied in the project objectives and the aggregating nature of black sea bass, a biological

sampling (length/sex) minimum of 50 black sea bass per location will be the required (Zhang & Cadrin 2012). With a goal of sampling three locations per month, the Research Fleet may sample up to 21,600 black sea bass over the course of the year.

The realized sampling frequency, however, will be dependent on a variety of factors, including weather, seasonal black sea bass distribution, and fishery closures. Further, due to the high seasonality of a large portion of the Black Sea Bass Research Fleet and fishery sampling frequency exhibits high seasonal fluctuations. Due to the multi-gear nature of the Research Fleet, the proposed sampling targets do not adequately represent the fishing schedules for each gear type. For example, due to the low daily catch limit (50 pounds per day per vessel for most of the year) in Rhode Island for black sea bass if a fishing vessel is only targeting black sea bass on a day trip and the limit is caught, all fishing ceases. This leads to instances where sampling 50 black sea bass per location becomes unfeasible as fishing may have already stopped prior to landing 50 black sea bass. Further, many of the larger trip vessels are mainly retaining their daily or trip limits of black sea bass from bycatch while targeting other species, which again leads to instances of fishing ceasing prior to 50 black sea bass have been caught. However, the goal of sampling 150 black sea bass per month remains to ensure statistical power. Vessels may sample fewer fish from more than three locations to reach the 150 fish per month target. Further, the same scenario occurs in highly mobile fishing gears, such as charter and commercial rod and reel, which will often change locations prior to catching 50 black sea bass. Both instances may lead to the potential for more numerous sampling locations with fewer fish from each location. Finally, the maximum target of 21,600 black sea bass would only be achievable if all Research Fleet participants operated year-round. Since many of the gear types represented within the Research Fleet stop fishing for the winter months, the realized sampling numbers are lower. However, this proposal's goal of adding two new F/Vs to the Research Fleet will seek to, first, increase the number of replicates in the non-trawl fishery and, second, to target areas and times of year under-sampled by the current Research Fleet members.

At each sampling location, participant fishermen will use On Deck Data to record the date, time, location, statistical area, depth, habitat type, target species, gear type, effort deployed (see Table 1), total number/pounds of black sea bass retained and discarded, and length, sex, and disposition of at least 50 black sea bass. Sampling date, time, and location will be automatically recorded by the internal tablet GPS. Standardized fish measuring boards will be used across the Research Fleet to ensure a consistent measure of fish length to the nearest centimeter. Data will be wirelessly uploaded to a MySQL database once a vessel returns to port and continually monitored by the project team. This data communication, review, management, and storage process was established and vetted during the first year of the project and has been implemented in each year since.

As outlined above, all participant fishermen will aim to sample black sea bass during three fishing trips per month regardless of black sea bass fishery closures. Thus, each fishing vessel

will need an exempted fishing permit to retain black sea bass on deck for biological sampling when the commercial fishing season is closed and operating in Federal water. Scientific collector's permit, issued by RI DEM, will also be required for vessels fishing within state waters. These permits were successfully acquired multiple times during the first funding year of the project and will be extended through subsequent years of data collection and expanded to cover new Research Fleet participants.

Internal Data Analysis:

As described above, the Black Sea Bass Research Fleet was able to operate effectively and deliver data in an efficient manner during first two years of data collection, sampling over 13,850 black sea bass from 1025 locations between Narragansett Bay to the northern end of the MAB and east to George's Bank from November 30, 2016 to June 1, 2019. These data are summarized in the Table 2. The ultimate application of these data will be the black sea bass stock assessment. To achieve this goal, the project team has worked directly with steering committee members and black sea bass stock assessment scientists (Gary Shephard, NEFSC; Steve Cadrin, SMAST) since the beginning of the project to ensure that Research Fleet data is of the necessary quality and structure for utilization in the stock assessment. Communication with the above listed stock assessment scientists will continue with the proposed project. Work with the stock assessment scientists will be focused on directly incorporating the Research Fleet data into the stock assessment, creating in depth gear selectivity models for the gear types represented within the Research Fleet and exploring the creation and incorporation of CPUE indices of abundance (including gear specific indices), both of which could be directly utilized in the stock assessment. Further, the proposed work will include gear specific discard characterizations describing the length frequencies of discarded black sea bass from each gear type through both time and space, with the intention of providing a more accurate black sea bass discard rate for the stock assessment.

Table 2. Summary of data collected by the Black Sea Bass Research Fleet as of June 1, 2019.

Total Black Sea Bass Sampled	13,850
Percent Male	26%
Percent Female	43%
Percent Unknown	31%
Minimum Size (cm)	3
Maximum Size (cm)	63
Average Size (cm)	32.2
Percent Discarded	68%
Percent Retained	32%

In addition to the application of biological black sea bass data to the stock assessment, the data derived from the Black Sea Bass Research Fleet could also be used to characterize the catch, bycatch, and other characteristics of black sea bass in the SNE/MAB region, including gear selectivity and spatiotemporal patterns in catch composition. An additional 12 months of sampling by the Research Fleet, as well as increasing the number of gear-type replicates, will provide a better understanding of these seasonal and spatial dynamics as the data will now become the first multi-gear, multi-year, time series for the species.

The data collected during the previous funding years of the project exhibit interesting biological and fishery trends that will continue to be monitored in subsequent years of sampling for the proposed project. The high frequency of legal-sized, discarded, black sea bass suggests the black sea bass are primarily being discarded due to seasonal closures and/or low daily limits and not due to the minimum size limit (Figure 1). The range of the discarded length data further supports this, showing that even the largest of sampled black sea bass (receiving the highest market value) are often discarded.

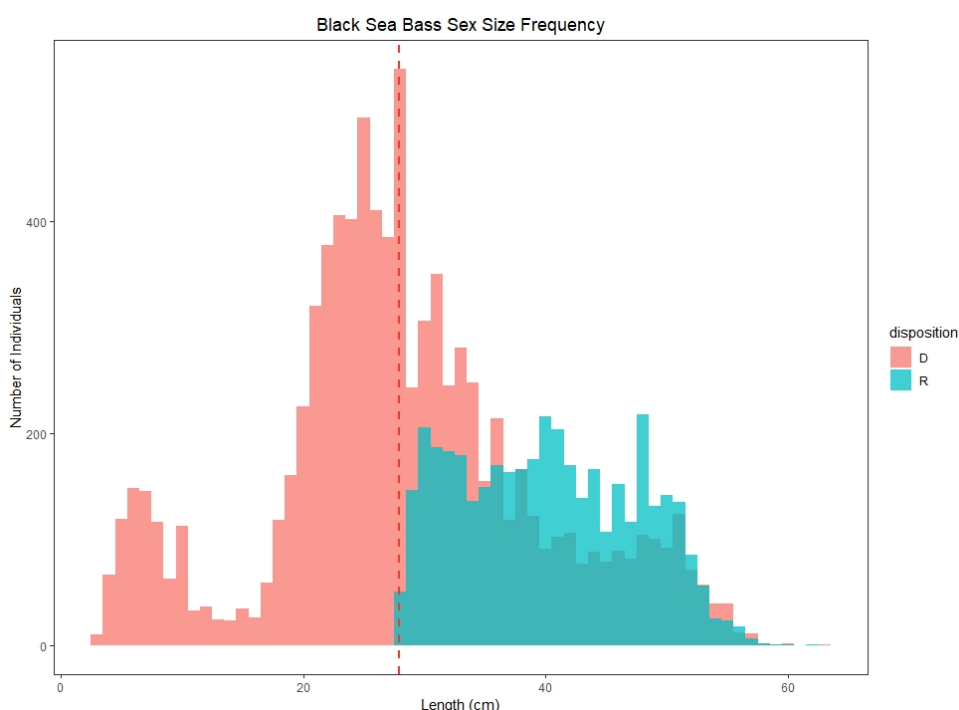


Figure 1. Size spectra of black sea bass sampled by the Research Fleet from November 30, 2016 to June 1, 2019. Red bars indicate discarded (D) fish. Blue bars indicate retained (R) fish. Red-dashed line represents the Rhode Island minimum legal size of 11 inches (27.94 cm).

When comparing gear selectivity between the different gear types represented within the Research Fleet, trends between discarded and retained black sea bass sizes are apparent (Figure 2 and 3). Trawl, lobster pot, and fish pot generally exhibited similarly, highly variable,

size selectivity and accounted for the largest ranges of size interaction with black sea bass. Commercial rod and reel and charter vessels exhibited nearly as wide a range of size interaction with black sea bass as the previously mentioned three gear types, however did not interact with the smallest of size classes of black sea bass. Gillnet appears to be in a distinct grouping of its own and exhibits the highest selectivity amongst all represented gear types as well as interacting with the largest size classes of black sea bass exclusively. These trends which have become apparent from just the first funding year of sampling suggest there are gear specific size selectivity occurring in the black sea bass fisheries in the SNE/MAB regions. Further, the apparent trends between gear types support the decision to focus Research Fleet expansion on the non-trawl fishery as non-trawl gear types have already begun to show distinct selectivity trends from one another. The proposed project will continue to track these trends as the time series builds with subsequent years of sampling. This type of information could have important ramifications to the stock assessment as it could help inform the selection of fleets modeled within the assessment.

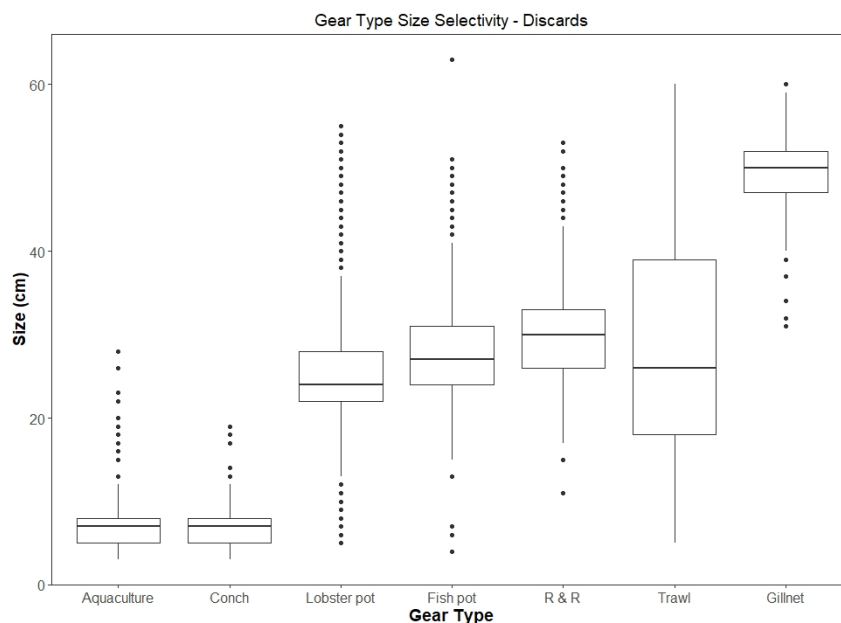


Figure 2. Size selectivity of discarded black sea bass sampled by each gear type represented within the research fleet. From left to right, gear types are as follow; oyster aquaculture, conch pot, lobster pot, fish pot, rod and reel (commercial and charter), trawl, and gillnet.

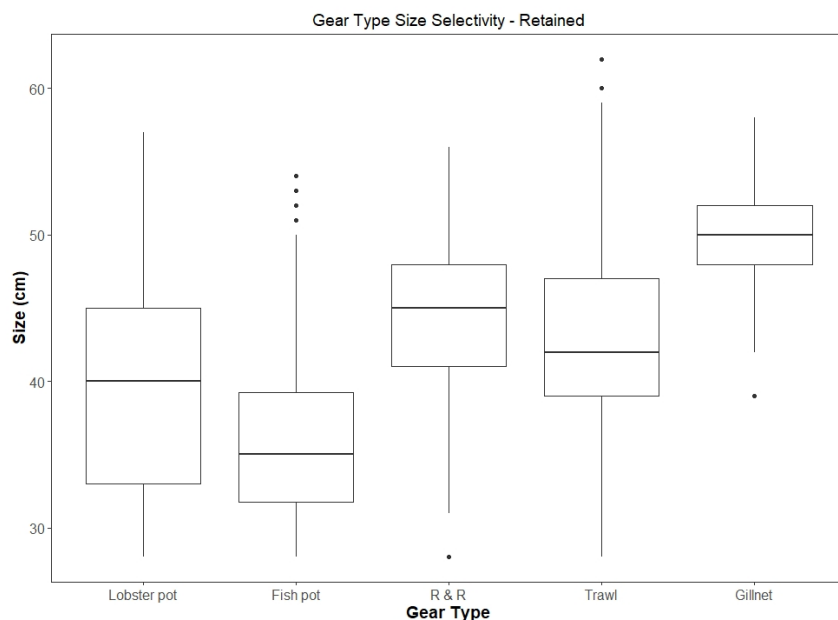


Figure 3. Size range of retained black sea bass sampled by each gear type represented within the research fleet. From left to right, gear types are as follow; lobster pot, fish pot, rod and reel (commercial and charter), trawl, and gillnet. Note, aquaculture and conch pot gear types are absent from this graph because no black sea bass have been retained from either of those two gear types.

During the fourth year of the project, the project team will focus primarily on the refinement of analyses previously established for application to the stock assessment including: size spectra, sex ratios, catch per unit effort (CPUE), black sea bass retention and discard structure, seasonal activity of Research Fleet, and gear selectivity. Specifically, internal data analysis questions proposed during the past funded year of the project were: 1) Are there spatial (latitudinal) patterns in the length frequency or sex ratio of black sea bass?, 2) Are there seasonal differences in black sea bass catch composition (length frequency and sex ratio)?, 3) Are different life stages of black sea bass apparent in commercial fisheries catch in specific areas or at different times of year?, and 4) What is the selectivity (min, max, mean length) of different gear types (trawl, fish pots, gillnet, lobster/crab pot, rod and reel) that harvest black sea bass? Year-4 analyses will build upon the initial results from exploration of these questions. The establishment of gear type selectivity regressions comparing different gear types as well as multiple years of Research Fleet data will serve as the primary and direct input to the next black sea bass stock assessment.

The open-source statistical software package R will be used for data analysis. Length frequencies, black sea bass length gear selectivity, spatial and seasonal sex ratio regression models, and catch rate patterns will all be updated based on the protocols established in prior years of the project to further analyze seasonal trends as well as compare data from year to year.

In addition to further addressing the aforementioned research questions, the project team will also explore novel fishery dependent indices for the black sea bass stock assessment, as time permits. Building upon the analytical techniques established in prior years, data will continue to be standardized from the disparate gear types represented within the Research Fleet through generalized linear modeling approaches and/or hierarchical modeling techniques to allow for more direct communication into the black sea bass stock assessment.

Outreach and Education

Education, outreach, and ongoing communication are considered to be 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 the fine-tuning of sampling strategies through the analysis and sharing of data and results.

The primary outreach/education goal of the proposed project is to share and disseminate information on two topics: 1) the lessons learned from the collaborative Research Fleet approach for fishery dependent data collection; and 2) the findings from analysis of the black sea bass catch, bycatch, and biological databases derived from this project.

A secondary goal is to share and disseminate project information to a variety of interest groups including: 1) commercial fishing industry members; 2) fisheries scientists and managers based in various state, regional, and federal agencies; 3) outside researchers who will utilize this information to inform their own research efforts in the region; and 4) other interested parties who are seeking information on new data collection/ocean monitoring techniques and approaches, and/or trends in black sea bass abundance and distribution in the SNE/MAB region.

There are a number of 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 Black Sea Bass Research Fleet through personal meetings, group meetings, e-mail briefings, and phone conversations. Through prior funding years, annual Research Fleet meetings were held. The CFRF hosts all Research Fleet members, PIs, project staff, and steering committee members to receive feedback on the data collection process and present trends and analyses of the past years' worth of data. These Fleet meetings have been invaluable for receiving project feedback and as well as forming relationships between the fishing industry, managers, and scientists. The same annual Fleet meetings held through previous years of funding will be continued during the proposed project.
2. Periodic project briefings to key individuals outside the project team, including ASMFC, MAFMC, NMFS NEFSC, and NMFS GARFO staff, members of the black sea bass fishing fleet, and interested others through direct e-mail/mail correspondence, including periodic newsletters describing the project progress.

3. Regular postings of project information on the CFRF website, including descriptions of the fishermen involved, the equipment being used, the type of data being collected, and findings, as this information becomes available over the course of the project (www.cfrfoundation.org/black-sea-bass-research-fleet).
4. Organization of a research session at the end of the project involving managers, scientists, and members of the commercial and recreational 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 will be conducted within the northern Atlantic black sea bass stock area (SNE/MAB region), potentially including statistical areas 521 to 631. The final distribution of at-sea data collection will depend on the commercial fishing locations selected by participant fishermen. Project administration, and data management and analyses will be conducted at the Commercial Fisheries Research Foundation office in Kingston, Rhode Island and the RI DEM marine laboratory in Jamestown, Rhode Island.

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	Month 13-15
Research Fleet data collection & open call and select 2 new F/Vs	Research Fleet data collection & training of new F/Vs	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Research Fleet data collection and Fleet support	Final report writing and submission of report and all project data to ACCSP
Send extended EFP to Fleet	Revise EFP for added F/Vs			Apply for RI DEM Permits								
Maintain sampling gear and buy new sets	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear	Maintain sampling gear & collect after sampling	
Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	Maintain ODD, server, and database	
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	
		Quarterly reports to Fleet Members			Quarterly reports to Fleet Members			Quarterly reports to Fleet Members			Quarterly reports to Fleet Members	
				Submit data to ACCSP		Write progress report and submit to ACCSP				Submit data to ACCSP		
Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	Maintain project website and project outreach	

Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation
ACCSP Funding Proposal (Maintenance Project – Year 4): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)
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Project History Table:

<u>Funding Year</u>	<u>Title</u>	<u>Original Project Dates</u>	<u>Funded Amount</u>	<u>Total Project Cost</u>	<u>Description</u>
2016	Advancing Fishery Dependent Data Collection for Black Sea Bass (<i>Centropristis striata</i>) in the Southern New England and Mid-Atlantic Region Utilizing Modern Technology and a Fishing Vessel Research Fleet Approach	September 1, 2016 – August 31, 2018	\$137,827.00	\$203,072.00	Piloted the research fleet technique for collection of fishery dependent catch, effort, bycatch, and biological data in the multi-gear black sea bass fishery
2018	Advancing Fishery Dependent Data Collection for Black Sea Bass (<i>Centropristis striata</i>) in the Southern New England and Mid-Atlantic Region Utilizing Modern Technology and a Fishing Vessel Research Fleet Approach	May 1, 2018 – May 31, 2019	\$135,648.00	\$187,949.00	Maintained the research fleet fishery dependent data collection of catch, effort, bycatch, and biological data in black sea bass fishery and expanded Research Fleet by two fishing vessels
2019	Advancing Fishery Dependent Data Collection for Black Sea Bass (<i>Centropristis striata</i>) in the Southern New England and Mid-Atlantic Region Utilizing Modern Technology and a Fishing Vessel Research Fleet Approach	June 1, 2019 – May 31, 2020	\$132,749.00	\$169,033.00	Maintained the Research Fleet data collection of catch, effort, bycatch, and biological data in the black sea bass fishery in the SNE/MAB region and expanded the Research Fleet by two fishing vessels

Project Accomplishment Measurement (Metrics and Achieved Goals):

Project Goal		Metric 1	Metric 2	Metric 3	Metric 4	Metric 5	Metric 6	Metric 7	Metric 8	Metric 9	Metric 10
Collection & communication of biological and fishery data for BSB	<i>Year 4 Proposal Metrics</i>	Upkeep of ODD, CFRF server, and MySQL database	Use of ODD by Research Fleet Members	Support of 12 Research Fleet Members and addition of two new Members	Twelve months of biological BSB and fishery data collection by Fleet	Collection of up to 25,200 BSB records by Research Fleet	Collection of 504 records of BSB catch and discard rates over 12 months	Collection of 504 records of BSB fishing location, depth, habitat, gear type, effort, and catch over 12 months	Transfer of collected BSB biological and fishery data into MySQL database	Compilation of and distribution of all quarterly reports on a three-month basis to Fleet Members	Auditing, formatting, and submission of BSB biosamples and fishery data to ACCSP and other managers
	<i>Year 3 Proposal Metrics</i>	Maintenance of BSB data collection app, wireless data transfer, and SQL database	Use of BSB data collection app by participant fishermen	Maintenance of ten existing Research Fleet participants and addition of two new participants	Twelve months of biological fishery data collection for BSB	Collection of 21,600 measurements of BSB sex and length over twelve months	Collection of 432 records of BSB catch and discard rates over 12 months	Collection of 432 records of BSB fishing location, depth, habitat, gear type, effort, and catch over 12 months	Compilation of BSB biological and fishery data into SQL database	Compilation and distribution of quarterly data reports to Research Fleet participants	Formatting and distribution of BSB biosamples data to ACCSP, ASMFC, and MAFMC
	<i>Year 2 Proposal Metrics</i>	Maintenance of BSB data collection app, wireless data transfer, and SQL database	Use of BSB data collection app by participant fishermen	Maintenance of eight existing Research Fleet participants and addition of two new participants	Twelve months of biological fishery data collection for BSB	Collection of 18,000 measurements of BSB sex and length over twelve months	Collection of 360 records of BSB catch and discard rates over 12 months	Collection of 360 records of BSB fishing location, depth, habitat, gear type, effort, and catch over 12 months	Compilation of BSB biological and fishery data into SQL database	Compilation and distribution of quarterly data reports to Research Fleet participants	Formatting and distribution of BSB biosamples data to ACCSP, ASMFC, and MAFMC
	<i>Year 1 Achievement</i>	Development of the On Deck Data app for BSB data collection. Server processes, and SQL database	Piloting of the BSB data collection app by participant fishermen	Solicitation, selection, and training of eight BSB Research Fleet participants	17 months of biological and fishery data collection for BSB (as of June 2018)	Collection of 8,439 measurements of BSB length and sex over the 17 months	Collection of 643 records of BSB catch and discard rates	Collection of 643 records of BSB fishing location, depth, habitat type, gear type, effort, and catch	Compilation of all BSB data into SQL database (bsb_fleet, bsb_session, bsb_sample, bsb_random tables)	Compilation and distribution if quarterly data reports to Research Fleet participants	Formatting and distribution of BSB biosamples data to ACCSP in June and December 2017
Reduce uncertainties in BSB stock assessment	<i>Year 4 Proposal Metrics</i>	Increase number of gear replicates in non-trawl fishery	Provide BSB data from areas and times of year currently under sampled	Distribution of project data to managing stakeholders at federal, region, and local level	Utilization of data by BSB stock assessment working group	Explore fishery dependent index of abundance for BSB using Fleet data					
	<i>Year 3 Proposal Metrics</i>	Provide BSB data from areas, habitats, and times of year not covered by standard survey techniques	Distribution of BSB data to ACCSP, ASMFC, MAFMC, and NEFSC	Distribution of data and updated project findings to BSB stock assessment working group	Utilization of data by BSB stock assessment working group	Exploration of fishery dependent indices of abundance for BSB					
	<i>Year 2 Proposal Metrics</i>	Provide BSB data from areas, habitats, and times of year not covered by standard survey techniques	Distribution of BSB data to ACCSP, ASMFC, MAFMC, and NEFSC	Distribution of data and project findings to BSB stock assessment working group	Utilization of data by BSB stock assessment working group	Exploration of fishery dependent indices of abundance for BSB					

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	Year 1 Achievement	Provided BSB data from months, areas, and habitats not sampled by existing surveys	Distributions of BSB data to ACCSP in June 2017 and December 2017	Contact with BSB assessment scientists (Gary Shepard NEFSC and Steve Cadrin SMAST)							
Asses spatial & temporal patterns in BSB fishery and catch	Year 4 Proposal Metrics	Analyze catch trends between years, gear types, and locations of Fleet sampling	Monitor discard structure between years within Fleet sampling	Monitor size and sex structure of retained BSB between sampling years	Monitor trends in length frequencies within gear types, locations and times of year	Add additional years of data to explore inter annual differences in length frequency	Update of BSB sex ratio logistic regression models from prior years	Develop manuscript for publication utilizing biological or fishery data from Fleet			
	Year 3 Proposal Metrics	Analyze trends in CPUE between years for gear types and locations	Analyze trends in discard rates between years based on gear types and locations	Monitor size and sex distributions of retained BSB catches between years	Update of BSB length frequencies by gear type, month, and location	Compare inter annual differences in Kolmogorov-Smirnov tests of BSB length frequency by gear type, month, and location	Update of BSB sex ratio logistic regression models from Year 2	Update of BSB catch rates and standardized CPUE GLMs established during Year 2	Publication of peer reviewed paper		
	Year 2 Proposal Metrics	Calculation of CPUE for different gear types, times of year, and locations	Calculation of discard rates for different gear types, times of year, and locations	Calculation of size and sex distributions of retained BSB catch	Construction of BSB length frequency by gear type, month, and location	Completion of Kolmogorov-Smirnov tests of BSB length frequency by gear type, month, and location	Completion of logistic regression models of BSB sex ratios by gear type, time of year, and location	Developments of GLMs of BSB catch rates and standardized CPUE	Publication of peer reviewed paper		
	Year 1 Achievement	Preliminary data analysis of BSB length and sex data	Development of size spectra for discarded and retained BSB	Creation Research Fleet sampling coverage maps	Preliminary exploration of spatial and temporal trends in BSB size spectra						
Demonstrate model approach for cost efficient fishery dependent data collection	Year 4 Proposal Metrics	Usage of collaborative approach established in previous years	Presentations of Fleet design at scientific conferences	Develop manuscript to validate Fleet design through peer review							
	Year 3 Proposal Metrics	Utilization of modern technology to collect biological data during routine fishing practices	Approval of project approach, protocols, and outcomes by BSB scientists, managers, and fishermen	Application of data to stock assessment and resource management	Maintenance of contact between all project partners, participants, and end users	Development of working partnerships between participating fishermen, scientists, and managers	Completion of projects tasks within project budget	Approval of project progress from steering committee members			
	Year 2 Proposal Metrics	Utilization of modern technology to collect biological data during routine fishing practices	Approval of project approach, protocols, and outcomes by BSB scientists, managers, and fishermen	Application of data to stock assessment and resource management	Maintenance of contact between all project partners, participants, and end users	Development of working partnerships between participating fishermen, scientists, and managers	Completion of projects tasks within project budget	Approval of project progress from steering committee members			
	Year 1 Achievement	Successful utilization of modern technology to collect biological BSB data during routine fishing practices	Approval of project approach and protocols by BSB scientists, managers, and industry (Project Steering Committee)	Contact with BSB stock assessment scientists (Gary Shepard NEFSC, Steve Cadrin SMAST)	Maintenance of contact between all project partners, participants, and end users	Development of working partnerships between participating fishermen, scientists, and managers	On track to complete projects tasks within project budget	Establishment of a project steering committee consisting of state and federal fisheries scientists and managers and members of the fishing industry	Development of project website, media articles, and outreach materials		

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Cost Summary and Funding Transition Plan:

This proposal represents a 0.5% (\$652) cost reduction from Year 3's proposal of a similar scope. The drop is due primarily to a reduction in the fishing vessel sampling costs associated with weather, vessel maintenance, and seasonal black sea bass distribution. CFRF personnel and Fringe Benefits have been updated to current staff expenses. These changes are reflected in the CFRF sub-contract (section F of the Budget Table).

The CFRF and RI DEM have pursued funding from a variety of sources for the Black Sea Bass Research Fleet and will continue to do so to ensure the longevity and utility of the data collected to the management of this data poor species. Presently, the CFRF has secured partial funding from the Sarah K. de Coizart Tenth Perpetual Charitable Trust to partially support additional fishing vessels operating in the Research Fleet as well as to undertake laboratory sampling of black sea bass from the federal water, winter fishery. These recently awarded funds represent a willingness for the CFRF and RI DEM to search for external sources of funds to support the Research Fleet as well as an agreement by the management representatives on the steering committee and the industry collaborators that the project addresses important issues.

The CFRF no longer has internal funds to cover research projects or issue RFPs, as the multi-year NOAA awards that enabled the CFRF to operate such programs expired in December 2015. Since then, the CFRF has relied exclusively on competitive research awards to support all of its operations, collaborations, and research projects.

Budget Table:

TOTAL	Year 4 (Maintenance)		
	Proposal	In-Kind	Total
	\$ 132,097	\$ 25,638	\$ 157,735
% Contribution by Funding Source	84%	16%	100%
Object Class Category	Proposal	In-Kind	Total
A Personnel			
- RI DEM - Jason McNamee		\$ 5,347	\$ 5,347
- RI DEM - Contractor		\$ 4,547	\$ 4,547
- RI Dem - Intern		\$ 2,500	\$ 2,500
Total RI DEM Personnel Costs	\$ -	\$ 12,394	\$ 12,394
B Fringe Benefits	\$ -	\$ 4,214	\$ 4,214
C Travel	\$ -	\$ -	\$ -
D Equipment	\$ -	\$ -	\$ -
E Supplies	\$ -	\$ -	\$ -
F Contractual - CFRF			
a. Personnel			
- Executive Director - Anna Mercer	\$ 9,350		\$ 9,350
- Research Scientist - Thomas Heimann	\$ 28,600		\$ 28,600
- Business Manager	\$ 4,840		\$ 4,840
Total CFRF Personnel Costs	\$ 42,790	\$ -	\$ 42,790
b. Fringe Benefits	\$ 3,851	\$ -	\$ 3,851
c. Travel	\$ 3,000	\$ -	\$ 3,000
d. Equipment	\$ -	\$ -	\$ -
e. Supplies			
- Research Supplies	\$ 2,000		\$ 2,000
- Office Supplies	\$ 1,000		\$ 1,000
Total Supplies	\$ 3,000	\$ -	\$ 3,000
f. Contractual			
- Programmer for On-Deck Data database	\$ 2,000	\$ -	\$ 2,000
Total Contractual	\$ 2,000	\$ -	\$ 2,000
g. Construction	\$ -	\$ -	\$ -
h. Other Costs			
- Fishing Vessel Stipends	\$ 55,440	\$ -	\$ 55,440
- Executive Assistance	\$ -	\$ 5,000	\$ 5,000
Total Other Costs	\$ 55,440	\$ 5,000	\$ 60,440
i. Total Direct Charges	\$ 110,081	\$ 5,000	\$ 115,081
j. Indirect Charges			
- Proposed at 20% of CFRF Direct Charges	\$ 22,016	\$ 1,000	\$ 23,016
- Approved Rate Differential proposed as In-Kind	\$ -	\$ 165	\$ 165
Total Indirect Charges	\$ 22,016	\$ 1,165	\$ 23,181
k. Total CFRF Costs	\$ 132,097	\$ 6,165	\$ 138,262
G Construction	\$ -	\$ -	\$ -
H Other Costs	\$ -	\$ -	\$ -
I Total Direct Costs	\$ 132,097	\$ 22,773	\$ 154,870
J Indirect Charges	\$ -	\$ 2,865	\$ 2,865
K Total Proposal Costs	\$ 132,097	\$ 25,638	\$ 157,735

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Budget Justification – Year 4 (Maintenance Project, Proposed):

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 \$132,097 for 12 months. The voluntary non-federal match funds provided by the RI DEM and CFRF is \$25,638. The total proposal value is \$157,735. The proposed timeframe is August 1, 2020 to July 31, 2021.

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

- A. Personnel: \$12,394 In-Kind (RI DEM). RI DEM staff will play an advisory/support role in the proposed project, providing guidance on research protocols, assisting with statistical analyses as needed, exploring gear-specific indices of abundance and alternative modeling approaches as time permits, support in the procurement and storage of samples, and communicating project results to fishery governance system via existing participation in technical committees and working groups.
- B. Fringe Benefits: \$4,214 In-Kind (RI DEM). Fringe costs are charged on RI DEM FTEs only. 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: There are no direct travel charges.
- D. Equipment: There are no direct equipment charges.
- E. Supplies: There are no direct supplies charges.
- 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 funding will be used:
 - a) Personnel: \$42,790 federal. 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 = \$9,350
 - 2. Research Scientist – Proposed at 50% of time for 12 months = \$28,600.The CFRF Research Scientist is 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 = \$4,840
- b) Fringe Benefits: \$3,851 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 9% of personnel costs based on 2019 benefits and historical analysis.
- c) Travel: \$3,000 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 two personnel to share and disseminate project methods, findings, and conclusions.
- d) Equipment: \$0. There will be no equipment costs on this project.
- e) Supplies: \$3,000 federal. This category includes research supplies and project office supplies.
1. Research Supplies: \$2,000 - Costs of tablets, waterproof cases, stylus & fish measuring board. Proposed at \$500 per set x 4 vessels (2 new vessels and 2 existing fleet 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.
 2. Office Supplies: \$1,000 – Costs to cover database storage and website fees (\$35/month), project office and meeting supplies, etc.
- f) Contractual: \$2,000 federal. This includes costs associated with:
1. Programmer (\$2,000 - federal) - CFRF hiring 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.
- g) Construction: There are no construction costs.
- h) Other Costs: \$55,440 federal + \$5,000 match = \$60,440. This includes:
1. Fishing vessel stipends (\$55,440 - federal) for 14 vessels for 12 months at \$600 per month. A fleet of 14 vessels will be utilized each month to obtain the proposed biological samples. The total stipend is computed at 55% due to fluctuations in vessel sampling associated with weather, vessel maintenance, and seasonal black sea bass distribution.
 2. Executive Assistance (\$5,000 - in-kind match) covers the administration assistance for the project (including, review of fleet applications and invoices, work agreements, progress/final reports) by the CFRF President and Vice President, who provide these services at no cost. Costs proposed at \$250 per day for 10 days for 2 people over the duration of the project.

- i) Total Direct Charges: \$110,081 federal + \$5,000 in-kind = \$115,081 total. This is the total direct charges for cost items a-h.
- j) Indirect Charges: \$22,016 federal + \$1,165 in-kind = \$23,181 total. Indirect general and administrative costs are calculated as 20.0% of federally requested Total Direct Charges (\$110,081). 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 12/21/18 is for 20.15% based on FY2018 actual costs. The 0.15% indirect cost rate differential is a voluntary nonfederal match by CFRF. CFRF has historically averaged around 20% of Indirect G&A which is proposed for this project.
- k) Total Proposal Costs: \$132,097 Federal + \$6,165 In-Kind = \$138,262 Total.

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: \$132,097 Federal + \$22,773 In-Kind = \$154,870 total. This is the total direct charges for cost items A-H.

J. Indirect Charges: \$2,865 In-Kind (RIDEM). Indirect charges are charged on RIDEM Salaries and Fringe Benefits. The Negotiated Indirect Cost Rate for FY2018 is 17.25%. (Total personnel and fringe is \$16,608 x 17.25% = \$2,865.)

K. Total Proposal Costs: \$132,097 Federal + \$25,638 In-Kind = \$157,735 Total.

Budget Justification – Year 3 (Maintenance Project, Funded):

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 \$132,749 for 12 months. The voluntary non-federal match funds provided by the RI DEM and CFRF is \$36,284. The total proposal value is \$169,033. The proposed timeframe is June 1, 2019 to May 31, 2020.

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

L. Personnel: \$12,394 In-Kind (RI DEM). RI DEM staff will play an advisory/support role in the proposed project, providing guidance on research protocols, assisting with statistical analyses as needed, exploring gear-specific indices of abundance and alternative modeling approaches as time permits, support in the procurement and storage of samples, and communicating project results to fishery governance system via existing participation in technical committees and working groups.

M. Fringe Benefits: \$4,214 In-Kind (RI DEM). Fringe costs are charged on RI DEM FTEs only.

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%	

N. Travel: There are no direct travel charges.

O. Equipment: There are no direct equipment charges.

P. Supplies: There are no direct supplies charges.

Q. 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 funding will be used:

l) Personnel: \$42,240 federal. 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 = \$9,240

2. Research Scientist – Proposed at 50% of time for 12 months = \$28,600.

The CFRF Research Scientist is 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 = \$4,400

m) Fringe Benefits: \$4,224 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 historical analysis.

n) Travel: \$3,000 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 two personnel to share and disseminate project methods, findings, and conclusions.

o) Equipment: \$0. There will be no equipment costs on this project.

p) Supplies: \$3,000 federal. This category includes research supplies and project office supplies.

1. Research Supplies: \$2,000 - Costs of tablets, waterproof cases, stylus & fish measuring board. Proposed at \$500 per set x 4 vessels (2 new vessels and 2 existing fleet 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.
2. Office Supplies: \$1,000 – Costs to cover database storage and website fees (\$25/month), project office and meeting supplies, etc.

q) Contractual: \$2,000 federal. This includes costs associated with:

1. Programmer (\$2,000 - federal) - CFRF hiring 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.

r) Construction: There are no construction costs.

s) Other Costs: \$56,160 federal + \$5,000 match = \$61,160. This includes:

1. Fishing vessel stipends (federal) for 12 vessels for 12 months at \$600 per month. A fleet of 12 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 black sea bass distribution.
2. Executive Assistance (in-kind match) covers the administration assistance for the project (including, review of fleet applications and invoices, work agreements, progress/final reports) by the CFRF President and Vice President, who provide these services at no cost. Costs proposed at \$250 per day for 10 days for 2 people over the duration of the project.

t) Total Direct Charges: \$110,624 federal + \$5,000 in-kind = \$115,624 total. This is the total direct charges for cost items a-h.

u) Indirect Charges: \$22,125 federal + \$11,577 in-kind = \$33,702 total. Indirect general and administrative costs are calculated as 20.0% of federally requested Total Direct Charges (\$110,624). 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 FY2018 Indirect Cost Rate Agreement dated 1/18/2018 is for 29.32% based on FY2017 actual costs. The 9.32% indirect cost rate differential is a voluntary nonfederal match by CFRF. CFRF has historically averaged around 20% of Indirect G&A which is proposed for this project.

v) Total Proposal Costs: \$132,749 Federal + \$16,577 In-Kind = \$149,326 Total.

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

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

- T. Total Direct Charges: \$132,749 Federal + \$49,202 In-Kind = \$184,850 total. This is the total direct charges for cost items A-H.
- U. Indirect Charges: \$3,099 In-Kind (RIDEM). Indirect charges are charged on RIDEM Salaries only. The Negotiated Indirect Cost Rate for FY2017 is 25%. (Total personnel is \$12,394 x 25% = \$3,099.)
- V. Total Proposal Costs: \$132,749 Federal + \$36,284 In-Kind = \$169,033 Total.

Summary of Proposal for Ranking Purposes

Type: Maintenance (Year 4)

Primary Program Priorities:

This project follows fishery-dependent sampling protocols to collect black sea bass catch and effort, biological, and bycatch data from the SNE/MAB region. The percentage of project effort devoted to each of these modules is as follows: 40% Biological, 30% Catch and Effort, 30% Bycatch. Thus, Biological sampling is the primary program priority. The estimated project effort devoted to biological sampling reflects the collection of black sea bass length and sex data by participant vessels during three trips per month for twelve months (approximately 504 trips and 25,200 black sea bass total).

Project Quality Factors:

Multi-Partner/Regional impact including broad applications:

The results of the proposed project have regional impacts and broad applications, as black sea bass are expanding to inhabit, and potentially be harvested from, the majority of the US east coast. Furthermore, the social and economic implications of this work could be extensive, as project data contributes to the improvement of the northern Atlantic black sea bass stock assessment and potentially the creation of new economic opportunities. From a collaboration perspective, this project provides a unique opportunity for the RI DEM and CFRF to maintain a fisherman-based research fleet to address ACCSP priorities, drawing upon networks of partners in industry, fisheries research, and management. This project will help RI DEM and CFRF demonstrate that, with support from ACCSP, they have the ability to bring stakeholders together, outside of a contentious management environment, to collect, communicate, and analyze critically needed data to address the data needs of the data poor northern Atlantic black sea bass.

Greater than year 2 contains funding transition plan and justification for continuance:

This proposal is for a one-year study to continue an industry-based research fleet approach to biological, catch, and bycatch sampling for northern Atlantic black sea bass. The project has been successful through the first two years of funded work and has sampled over 14,000 black sea bass. Year 3 funding is expected to result in increased sampling rates and coverage as the Research Fleet will expand by two vessels while reducing overall costs. An additional year of funding would bolster the first year-round, multi-year database for this biologically data poor species. Ultimately, long term maintenance of this project will provide invaluable data to the ACCSP, ASMFC, and MAFMC, and improve the assessment and management of the northern Atlantic black sea bass resource. The CFRF and RI DEM have continued to apply for funding for this project through external sources and have already secured supplemental funding to partially support the Research Fleet as described above. Obtaining long-term funding for the Research Fleet is a top and ongoing priority for project PIs and staff.

In-kind contribution: The total project cost is \$157,735. In-kind contributions provided by RI DEM and CFRF total \$25,638. Thus, RI DEM and CFRF will provide 16% of total project costs.

Improvement in data quality/quantity/timeliness:

The proposed project addresses the critical need to improve the quality, quantity, and timeliness of biological, catch and effort, and bycatch data for the northern Atlantic black sea bass, which the ACCSP Biological Review Panel identified as having inadequate biological sampling and high stakeholder priority, resulting in the highest-ranking priority score. Ultimately, the proposed project will help to meet ACCSP's mission of improving data quality for fisheries science by contributing to a single data management system that will meet the needs of fishery managers, scientists, and fishermen.

Potential secondary modules as by-products:

The potential secondary modules are catch and effort (30%) and bycatch sampling (30%). The estimated effort devoted to the catch and effort module is based upon sampling during the roughly 156 days of open black sea bass fishing season in Rhode Island in 2016 (42% of the year). The project effort allocated to the bycatch module reflects sampling efforts conducted while the commercial black sea bass fishing season is closed and while participant vessels are targeting other species but still interacting with black sea bass as bycatch.

Impact on stock assessment:

The northern Atlantic black sea bass stock assessment was recently approved for management (December 2016), but the new model requires spatially and temporally comprehensive data that is currently lacking. Thus, the proposed project aims to provide critically needed biological data from retained and discarded black sea bass, and fishery

data from a variety of gear types to continue to evolve and improve the black sea bass stock assessment. The project team will also explore novel fishery dependent indices for the black sea bass stock assessment, as time permits.

The Research Fleet collected data has the potential to directly improve the federal stock assessment in a number of ways including reducing the uncertainty in recruitment rates, gear type specific selectivity, and gear (and location) specific discard structure.

Currently, the indices of abundance relied upon in the black sea bass stock assessment come primarily from the NEFSC winter and spring trawl survey, Northeast Area Monitoring and Assessment Program (NEAMAP) survey trawls, recreational catch per effort, and is supplemented with various state trawl survey indices of abundance (NEFSC 2017). The utility of the Research Fleet data in this respect is to inform the management about catch and discard structure from a variety of gear types. Whereas the stock assessment currently only delineates between trawl and non-trawl gear types, after building a multiple-year time-series the Research Fleet data could potentially be utilized to create a variety of CPUE indices of abundance (trawl, gillnet, lobster pot, rod & reel, fish pot, and multigear). Further, the Research Fleet data has the potential to be directly used to create a discard characterization for the northern stock sub-unit and reduce uncertainties in the annual total fishery removals. Finally, due to the nature of the Research Fleet being comprised entirely of commercial and recreational fishing vessels, from a variety of gear types, the data collected is spatially and temporally expansive across the northern black sea bass sub unit in locations and times of year not covered by any of the federal or state survey programs utilized in the stock assessment. Therefore, there is the potential to reduce the uncertainties in recruitment rates within the northern sub unit as the Research Fleet is able to record presence and absences of juvenile and young of the year black sea bass in entirely unsampled locations and times of year.

Innovative:

The innovative and cost-effective nature of the proposed project, which relies upon collaboration between a Program partner and the fishing industry, can provide an opportunity for fishermen to constructively engage in the data collection process for black sea bass and provide a model for future data collection efforts in other regions and fisheries. In addition to demonstrating a novel sampling approach, the proposed project also leverages modern technology to improve the efficiency of data collection and communication.

Properly Prepared:

This proposal follows the guidelines provided in the ACCSP Funding Decision Document.

Principal Investigators:

The co-Principal Investigators of the proposed project are: Jason McNamee (Chief, RI DEM Marine Fisheries), Christopher Glass (Executive Director, CFRF), and Thomas Heimann (Research Associate, CFRF). Curriculum vitae are provided in the following pages.

Jason McNamee will play an advisory/support role in this project, given his existing commitments at the RI DEM Division of Marine Fisheries. More specifically, Jason will provide advice for sampling protocols, act as a liaison to the existing black sea bass assessment/management infrastructure and assist with data analysis as his time permits (data review/analysis will primarily be the role of the CFRF Research Associate). In his role as both a technical committee member, and having been a member of the contracted stock assessment team for the MAFMC, Jason McNamee will be able to help the project with capturing the correct information and making sure this information is formatted appropriately for inclusion in future northern Atlantic black sea bass stock assessment projects.

Christopher Glass, a specialist in the study of fish behavior in relation to fishing gears, Chris Glass has a long record of conservation gear research in New England's Fisheries and fisheries worldwide. Chris has recently been appointed Executive Director of the Commercial Fisheries Research Foundation.

Prior to joining CFRF Chris served for 14 years as Director of The Northeast Consortium based at the University of New Hampshire. Prior to that he worked as Director of Marine Conservation at Manomet Center for Conservation Sciences developing innovative and selective fishing gears in collaboration with commercial fishermen with the goal of expanding fishermen's involvement in scientific data collection and application. Previously Chris worked for 14 years at The Marine Laboratory in Aberdeen, Scotland and has worked extensively on conservation engineering programs throughout Europe and North America. Chris has been a featured lecturer on sustainable fisheries topics at numerous international conferences and has published extensively in scientific journals. His education includes a B.Sc. in Marine Biology and Animal Behavior from The Queens University, Belfast and a Ph.D. from The University of Glasgow, Scotland.

Thomas Heimann, CFRF, serves as the primary individual responsible for Research Fleet maintenance and support, as well as data management, communication, and analysis. Heimann has been the primary Research Administrator for the Black Sea Bass Research Fleet since its first year of funding starting in September 2016. Heimann has gained extensive experience with the work involved in initiating and supporting an industry-based research fleet and has formed a relationship with the current Fleet Members.

Jason Earl McNamee, PhD
519 Congdon Hill Rd
Saunderstown, RI 02874
Day Phone: 401-423-1943
Email: jason.mcnamee@dem.ri.gov

WORK EXPERIENCE

RI Department of Environmental Management 12/2002 - Present
Jamestown, RI US

Chief, Marine Resource Management

Duties:

- Management of the Marine Fisheries program for the RI Dept. of Environmental Management
- Management of a staff of 20 professionals in the field of marine fisheries
- Manage operating budgets for multiple federal grants and state accounts
- Creation of grant proposals for marine fisheries projects
- Management of the Ft Wetherill Marine Laboratory building and research vessels
- Membership on several technical panels: the New England Council Science and Statistics Committee (Chair), Atlantic States Marine Fisheries Commission Menhaden (chair), Tautog (chair), and Summer Flounder/Scup/Black Sea Bass technical and stock assessment committees, Biological and Ecological Reference Point committee
- Support to the RI Marine Fisheries Council
- Creation and administration of the RI Marine Fisheries Institute
- Principal investigator (PI) on the Narragansett Bay juvenile seine survey
- PI for the Narragansett Bay Menhaden monitoring program
- Small vessel operation
- Production and review of multiple annual technical and grant completion reports
- Perform stock assessment analyses

Skills developed: Personnel and budget management experience; Supervisory experience; Good statistical and computer skills (ADMB, R, Microsoft software, ADAPT, JMP, ASAP, Oracle Discoverer, web design); Species identification experience; Experience using water quality instrumentation (DO meter, pH meter, Gas Chromatograph, Conductivity meter, flow meter); GIS Experience (Arcview and R); Field work experience; Experience in the construction and maintenance of technical research equipment; Seine, fyke net, trawl net, gillnet, fish pot, and electroshock surveying; Small boat handling (State of Rhode Island and Coast Guard certified)

Supervisor's Name: Janet Coit

Supervisor's Phone: 401-222-4700 ext. 2409

RI Department of Environmental Management 4/2000 - 12/2002
Providence US

Senior Natural Resource Specialist

Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation
ACCSP Funding Proposal (Maintenance Project – Year 4): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)
Proposal components that address the ranking criteria are underlined and a summary is provided on pages 29-31.

Changes from the original proposal are highlighted in yellow

Duties: My duties were to perform all tasks necessary to conduct and complete a Total Maximum Daily Load reports including field work, data collection and processing, and writing of the report. I also participated with other staff to help in the completion of their reports.

Skills developed: Good statistical and computer background (Microsoft software), Experience designing and implementing a personal research project, Experience preparing a federally approved Quality Assurance Protection Plan, Experience using water quality instrumentation (DO meter, pH meter, Conductivity meter), Experience in the collection of water samples for testing (biological and metals), GIS Experience (Arcview) Field work experience, Small boat handling (State of Rhode Island and Coast Guard certified), Experience in the preparation of a federally approved Total Maximum Daily Load report, Experience disseminating information to the public

Supervisor's Name: Christian Turner

Supervisor's Phone: unsure, no longer employed at RIDEM

EDUCATION

University of Rhode Island – Graduate School of Oceanography

Narragansett, RI US

PhD – 8/2018

Major: Biological Oceanography

Doctoral Dissertation Topic: Multispecies Statistical Catch-At-Age Model for a Mid Atlantic Species Complex

University of Connecticut

Groton, CT US

Masters of Science Degree - 6/2006

38 Semester Hours

Major: Biological Oceanography

University of Rhode Island

Kingston, RI US

Bachelor's Degree - 5/1996

136 Semester Hours

Major: Zoology

PROFESSIONAL PUBLICATIONS

- ASMFC Lobster stock assessment (2015), ASMFC Menhaden stock assessment (2004, 2012, 2015), ASMFC Tautog stock assessment (2006, 2011, 2015), NEFSC Summer flounder stock assessment (2011, 2013), NEFSC Scup stock assessment (2011, 2015), NEFSC Black sea bass stock assessment (2004, 2016), Interactions between the introduced Asian shore crab, *Hemigrapsus sanguineus*, and three common rocky intertidal littorine gastropods in Southern New England (MS Thesis).
- Taylor, DL, J McNamee, J Lake, CL Gervasi , and DG Palance. 2016. Juvenile winter flounder (*Pseudopleuronectes americanus*) and summer flounder (*Paralichthys dentatus*) utilization of Southern New England nurseries: Comparisons among estuarine, tidal river, and coastal lagoon shallow-water habitats. *Estuaries and Coasts*. 39:1505-1525.

CURRICULUM VITAE

CHRISTOPHER W. GLASS Ph.D.

Commercial Fisheries Research Foundation

P.O. Box 278

Saunderstown, Rhode Island 02874

Phone: (401) 515-4662

Fax: (401) 515-3537

E-mail: cglass@cfrfoundation.org

Website: www.cfrfoundation.org

Education

B.Sc. (Hons.) First Class, (Zoology) 1979 The Queens University of Belfast, Belfast N.I.

Ph.D. 1984 (Zoology) The University of Glasgow, Glasgow, Scotland

Current Positions

- Executive Director, Commercial Fisheries Research Foundation
- Research Professor (Affiliate), Institute for the Study of Earth, Oceans and Space, Ocean Process Analysis Laboratory, University of New Hampshire, Durham NH, (2005 – present)
- Associate Director, Institute for the Study of Earth, Oceans and Space (2013 – 2016)
- Chair, EOS Promotion and Tenure Committee, (2013 – 2015)
- Director, Northeast Consortium, University of New Hampshire (2005 – 2018)
- Director, Ocean Process Analysis Laboratory (OPAL) UNH (2009 – 2013)
- Executive Committee, School of Marine Science and Ocean Engineering, University of New Hampshire (2013 – 2016)

Professional Experience

- 1998 – 2005, Director, Marine Conservation, Manomet Center for Conservation Sciences
- 1996 – 1998, Senior Fisheries Scientist, Manomet Center for Conservation Sciences
- 1993 – 1996, Senior Scientific Officer, Scottish Office, Agriculture and Fisheries Department, Aberdeen, Scotland
- 1988 – 1993, Higher Scientific Officer, Scottish Office, Agriculture and Fisheries Department, Aberdeen, Scotland
- 1984 – 1988, Scientific Officer, Scottish Office, Agriculture and Fisheries Department, Aberdeen, Scotland
- 1983 – 1984 Biological demonstrator, University of Glasgow, Medical School
- 1983 – 1983 Scientific Research Assistant, on expedition to collect and catalogue the shore fishes of Saint Helena Island, South Atlantic Ocean. Funded by National Geographic and The Royal Society.
- 1982 – 1983 Biological demonstrator, University of Glasgow, Medical School
- 1982 – 1982 Research diver, University of West Indies, Discovery Bay Marine Laboratory Jamaica

Honors and Awards

Foundation Scholarship for study in Science 1979, Queens University Belfast.

International Council for Exploration of the Sea (ICES) Service Award, 2006

Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation

ACCSP Funding Proposal (Maintenance Project – Year 4): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)

Proposal components that address the ranking criteria are underlined and a summary is provided on pages 29-31.

Changes from the original proposal are highlighted in yellow

Thomas E. Heimann

114 Olney Street Unit 1
Providence, RI 02906
(508)728 3401
theimann@cfrfoundation.org

EDUCATION

NORTHEASTERN UNIVERSITY

Boston, MA

Master's: Marine Biology, Jan 2016

PRESCOTT COLLEGE

Prescott, AZ

B.A. Marine Science, May 2013

RELATED WORK EXPERIENCE

Commercial Fisheries Research Foundation

South Kingston, RI

Research Associate

Sep 2016 – Present

- Research project management position working collaboratively with the Rhode Island fishing industry as well as state and federal fisheries management bodies. Responsible for management of both Black sea bass Research Fleet and Quahog Research Fleet as well as lead at-sea sampler for the Southern New England Cooperative Ventless Trap Survey. Duties include Fleet support and training, sampling protocol development, database management, data manipulation and statistical analysis, report writing, at-sea sampling on lobster vessels, grant writing, and outreach.

Northeastern University

Nahant, MA

Diving Research Methods Teaching Assistant

Sep 2015 – Oct 2015

- Employed by Northeastern University to be a teacher's assistant for an intensive American Academy of Underwater Sciences diving research methods course. Duties included demonstrating underwater research and diving skills, minor SCUBA gear maintenance and repair, and supervision of student divers.

Mote Marine Laboratory

Sarasota, FL

Research Experience for Undergrads, National Science Foundation Intern

May 2012 – Jul 2012

- Highly competitive National Science Foundation funded internship at Mote Marine Laboratory in Florida. Worked closely with a postdoctoral fellow on an independent research project in sensory biology and behavior of the common snook, a local sportfish. Project dealt specifically with the impacts of the hatchery rearing environment on the survival of released fish in the wild. Worked extensively with Microsoft Excel for data analysis.

Sheriff's Meadow Foundation

Vineyard Haven, MA

Ecological Stewardship Intern

May 2010 – Aug 2010

- Summer Intern position on Martha's Vineyard. Responsibilities included property management, boundary mapping, invasive species control, vegetation identification, and tour guide.

SCIENTIFIC PUBLICATIONS

Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation
ACCSP Funding Proposal (Maintenance Project – Year 4): Fishery Dependent Sampling for Black Sea Bass (*Centropomus striatus*)
Proposal components that address the ranking criteria are underlined and a summary is provided on pages 29-31.
Changes from the original proposal are highlighted in yellow

Malek Mercer, A.J., Ellertson, A., Spencer, D., and **Heimann, T.** 2018. Fishermen fill data gaps for American lobster (*Homarus americanus*) and Jonah crab (*Cancer borealis*) in the Northeast USA. Bulletin of Marine Science, 94:3, pp 1121-1135.

SELECTED PRESENTATIONS

Heimann, T., McManus, C., Leavitt, D., Malek Mercer, A.J. 2018. Methods for Establishing a Quahog (*Mercenaria mercenaria*) Industry-Based Research Fleet for expansion of Fishery Dependent Data Sources. National Shellfisheries Association Annual Meeting. Seattle, Washington.

Heimann, T., McManus, C., Leavitt, D., Malek Mercer, A.J. 2018. Engaging Fishermen to Address Data Gaps and Evolve Management of the Quahog in Narragansett Bay. Southern New England Chapter of the American Fisheries Society Winter Meeting. New Bedford, MA.

Heimann, T., Malek Mercer, A.J., and McNamee, J. 2018. Advancing Fishery Dependent Data Collection for Black Sea Bass (*Centropristis striata*) in Southern New England and Mid-Atlantic Region Using a Fishing Vessel Research Fleet Approach. American Fisheries Society 148th Annual Meeting. Atlantic City, New Jersey.*

Heimann, T., Malek Mercer, A.J., and McNamee, J. 2019. Using Fishermen-Collected Data to Explore the Black Sea Bass (*Centropristis striata*) Population and Construct Gear-Specific Discard Characterizations. Southern New England Chapter of the American Fisheries Society Winter Meeting. Storrs, Connecticut.

Heimann, T., McManus, C., Leavitt, D., Malek Mercer, A.J. 2019. Quantifying Quahogs (*Mercenaria mercenaria*) in Narragansett Bay: Insights from a Collaborative Sampling Program. Southern New England Chapter of the American Fishery Society Winter Meeting. Storrs, Connecticut.

Heimann, T., Malek Mercer, A.J., and McNamee, J. 2019. Using Industry Collaboration to Improve Black Sea Bass Management. Wakefield Fisheries Symposium. Anchorage, Alaska.

CERTIFICATIONS AND SKILLS

- Statistical Language R (Commonly used packages; ggplot, shiny, sp)
- MySQL
- ArcGIS
- American Academy of Underwater Sciences Scientific Diver Certificate
- PADI Rescue Diver Certificate
- At-Sea Safety Training Certificate
- Experienced in Small Boat Operations

References:

- Atlantic Coastal Cooperative Statistics Program (ACCSP). 2018. Biological Sampling Priority Matrix. 4 p.
- Atlantic States Marine Fisheries Commission (ASMFC). 2013. Research Priorities and Recommendations to Support Interjurisdictional Fisheries Management. Special Report # 89. ASMFC, Arlington, VA. 58pp.
- Bell, R. J., Richardson, D.E., Hare, J.A., Lynch, P.D., and Fratantoni, P.S. 2014. Disentangling the effects of climate, abundance, and size on the distribution of marine fish: an example based on four stocks from the Northeast US shelf. ICES Journal of Marine Science: fsu217.
- Drohan, A. F., J. P. Manderson, and D. B. Packer. 2007. Essential fish habitat source document: Black sea bass, *Centropristis striata*, life history and habitat characteristics. 2nd Edition. NOAA Technical Memo. NMFS-NE-200, 78 p.
- Moser, J., and G. R. Shepherd. 2009. Seasonal distribution and movement of black sea bass (*Centropristis striata*) in the Northwest Atlantic as determined from a mark-recapture experiment. Journal of Northwest Atlantic Fishery Science 40: 17-28.
- Nelson, G.A. 2014. Cluster Sampling: A Pervasive, Yet Little Recognized Survey Design in Fisheries Research. Transactions of the American Fisheries Society 143 (4): 926-938.
- Northeast Fisheries Science Center (NEFSC). 2011. 53rd Northeast Regional Stock Assessment Workshop (53rd SAW) Assessment Report. US Department of Commerce, Northeast Fish Science Center Reference Document 12-05; 559 p.
- Northeast Fisheries Science Center (NEFSC). 2017. 62nd Northeast Regional Stock Assessment Workshop (62nd SAW). Assessment Summary Report. US Department of Commerce, Northeast Fish Science Center Reference Document 17-01; 37 p.
- Musick, J. A., and L. P. Mercer. 1977. Seasonal distribution of black sea bass, *Centropristis striata*, in the Mid-Atlantic Bight with comments on the ecology of fisheries of the species. Transactions of the American Fisheries Society. 106: 12-25.
- Southeast Fisheries Science Center (SEFSC). 2013. Stock Assessment of Black Sea Bass off the Southeastern United States: SEDAR Update Assessment. 102 p.
- Steimle, F. W., C. A. Zetlin, P. L. Berrien, and S. Chang. 1999. Essential fish habitat source document: Black sea bass, *Centropristis striata*, life history and habitat characters. NOAA Technical Memorandum NMFS-NE-143: 1-42.
- Waltz, W., Roumillat, W.A., and P. K. Ashe. 1979. Distribution, age structure, and sex composition of the black sea bass, *Centropristis striata*, sampled along the southeastern coast of the United States. Marine Resources Research Institute, South Carolina Wildlife and Marine Resources Department. Technical Report Number 43, December 1979.
- Zhang, Y. and S.X. Cadrin .2013. Estimating Effective Sample Size for Monitoring Length Distributions: A Comparative Study of Georges Bank Groundfish, Transactions of the American Fisheries Society 142 (1): 59-67.