

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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Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation
ACCSP Funding Proposal (New Project – Year 2): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)

Proposal components that address the ranking criteria are **bold** and a summary is provided on pages 25-26.
Changes from the initial proposal are highlighted in **yellow**.

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: New (Year 2)

Principal Investigators: Jason McNamee, Chief of Marine Fisheries, Rhode Island Department of Environmental Management; Anna Malek Mercer, PhD, Executive Director, Commercial Fisheries Research Foundation

Requested Award Amount: \$135,648

Requested Award Period: May 1, 2018 – April 30, 2019

Date Submitted: June 19, 2017

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 Year 1 funding from ACCSP, the Research Fleet sampled over 1,903 black sea bass from 93 locations between Narragansett Bay to Hudson Canyon from November 30, 2016 to June 15, 2017, and will continue data collection through April 30, 2018. **All biosamples data collected by this project were delivered to the ACCSP in June 2017.**

The goal of the proposed project is to seamlessly continue the Research Fleet's sampling efforts to develop 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 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 that is currently lacking for this data poor 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) and fishery characteristics (location, gear type, effort, habitat) for black sea bass from across the SNE/MAB region throughout the

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year; 2) Internal data analysis to address research questions about spatiotemporal patterns in black sea bass biological and fishery characteristics and gear-specific selectivities; 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 that interact with black sea bass during winter months to ensure full seasonal data coverage;
- 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) Characterize the selectivities and CPUE of five gear types the SNE/MAB region, and 2) Assess spatial and temporal trends in species' catch and bycatch composition and fishery characteristics;
- Explore the development of 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 a top priority for data collection, receiving a high ranking for inadequate biological

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sampling as well as being a high priority for managing stakeholders (ASMFC, NMFS, and state agencies) (ACCSP 2017) . 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 Hattaras 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 not been reflective of the shifting distribution and growing abundance of the species (Bell et al. 2014). 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. Ultimately, cost-effective sampling programs, such as the Black Sea Bass Research Fleet, are needed to collect these data 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, a good fishery dependent source of information is not yet available. Thus, this project seeks to bolster the fishery dependent data sources for this population in an effort to provide better information from across the temporal and spatial distribution of this species, which are poorly covered at this time.

By virtue of the species' association with rocky habitats, black sea bass are poorly sampled by standard trawl gear (DeCelles et al. 2013, Steimle et al. 1999, Drohan et al. 2007, Waltz et al. 1979). Nevertheless, the primary index of abundance for the northern Atlantic black sea bass stock is derived from the Northeast Fishery Science Center's (NEFSC) bottom trawl survey (NEFSC 2011). The limited coverage of black sea bass habitat and semi-seasonal (spring/fall) sampling schedule of the NEFSC trawl survey limit the suitability of this data for the stock assessment (ASMFC 2013). **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 2017).**

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. 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.

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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 the ACCSP program.

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 not easily sampled through trawl surveys, and 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, ACCSP, 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;

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- 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 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. **All data collected during Year 1 of this project was delivered to the ACCSP in June 2017.**

Following the routine established during Year 1 of the project, copies of the black sea bass database will be sent semi-annually (every six months) to the ACCSP, Atlantic States Marine Fisheries Commission, and Mid Atlantic Fishery Management Council semi-annually (via CFRF or Jason McNamee, member of ASMFC Black Sea Bass Stock Assessment Committee, Southern Demersal Working Group, and MAFMC Black Sea Bass Monitoring Committee or the CFRF). These data are made available in a format that is compatible with the ACCSP database so they can be readily used in the black sea bass stock assessment and other analyses. **All data provided to the ACCSP adheres to ACCSP data collection standards and is accompanied by a suite of metadata.** At the end of the project, data will also be made available to fishery scientists at the NMFS Northeast Fisheries Science Center, for further analysis. A vessel ID system will be used to maintain the confidentiality of participant fishing vessels.

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 during the first year of the project, in March 2017 and June 2017.

Completed Data Delivery to ACCSP:

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During the first 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, the black sea bass biosamples data collected during the first six months of this project (December 2016 - May 2017) were incorporated into the ACCSP database in June 2017. The project team will maintain a semi-annual data delivery schedule to ACCSP throughout the proposed project.

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 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 pilot 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 (December 2016), data delivery to ACCSP (June 2017), 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. The Project Steering Committee was essential in developing sampling protocols, reviewing app interfaces, and establishing data communication procedures that are scientifically sound and logistically feasible. More information about the accomplishments of the project, including a real-time count of black sea bass sampled by the Research Fleet, is available on the project website: www.cfrfoundation.org/black-sea-bass-research-fleet.

If funded, during the second year of the project, the CFRF and RI DEM will maintain the eight fishing vessels currently operating in the Research Fleet as well as seek to expand the fleet by an additional two vessels. Over the course of the first year of the project, it became apparent that in order to achieve year-round black sea bass sampling, additional Research Fleet F/Vs that

interact with black sea bass during winter months are needed. To ensure a fair and transparent fleet expansion, the CFRF and RI DEM will issue an open call for F/V applications. 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, the On Deck Data app prompts gear-specific data entry for Research Fleet participants (Table 1).

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)				

The On Deck Data app will be maintained throughout the 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 the app developer (Don Coxe Consulting) to address any issues that arise and to update the app to maintain functionality.

The Black Sea Bass Research Fleet will continue to follow the fishery-dependent sampling protocols that were successfully implemented during the first year of the project to collect

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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 through April 30, 2019. The Black Sea Bass Research Fleet currently consists of eight 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 (Charter, Rod & Reel), F/V Second Wind (Offshore Trawl), and F/V Sweet Misery (Gillnet, Lobster Pot). **The selected Research Fleet represents nearly every commercial gear type which interacts with Black sea bass as a target and bycatch species as well as incorporating the recreational sector by including a charter vessel.** Two additional commercial F/Vs that interact with black sea bass during the winter months will be added to the Research Fleet to ensure year-round data coverage. **It is anticipated that the new F/Vs will be offshore trawlers or offshore lobster/crab to ensure sampling of black sea bass from winter habitats.**

Participant fishermen will use Samsung Tab A tablets pre-programmed with On Deck Data black sea bass data collection app, described above, to efficiently and accurately record and transmit 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 30 trips per month, for a total of 360 trips over twelve months.** The realized sampling frequency, however, will be depend on a variety of factors, including weather, seasonal black sea bass distribution, and fishery closures. 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 18,000 black sea bass over the course of the year.

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At each sampling location, participant fishermen will use the On Deck Data app 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/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 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.

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. A scientific collector’s permit, issued by RI DEM, will also be required for vessels fishing within state waters. These permits were successfully acquired during the first year of the project and will be extended through subsequent years of data collection and expanded to cover new Research Fleet participants.

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 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. Beyond the general lack of biological data for black sea bass, Gary Shepard also noted the utmost need for a comprehensive discard characterization of black sea bass, which has been addressed and targeted by the Research Fleet sampling design.

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 the first year of the project, sampling over 1,903 black sea bass from 93 locations between Narragansett Bay to Hudson Canyon from November 30, 2016 to June 15, 2017. These data are summarized in the Table 2. **Ultimately, as mentioned above, this data is destined for incorporation in the black sea bass stock assessment.**

Table 2. Summary of data collected by the Black Sea Bass Research Fleet as of June 15, 2017.

Total Black Sea Bass Sampled	1,903
Percent Male	21.9%
Percent Female	52.6%
Percent Unknown	25.5%
Minimum Size (cm)	7
Maximum Size (cm)	62

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Average Size (cm)	33.8
Percent Discarded	48.9%
Percent Retained	51.1%

In addition to application to the black sea bass stock assessment, the data derived from the Black Sea Bass Research Fleet will also be used to characterize the catch, bycatch, and biological characteristics of black sea bass in the SNE/MAB region, including gear selectivities and spatiotemporal patterns in catch composition. Preliminary analyses of Research Fleet data reveal that the size spectra of discarded and retained black sea bass are unique, with discarded fish exhibiting a tri-modal distribution and a mean of 28.7 cm, and retained (landed) fish exhibiting a bi-modal distribution and a mean length of 38.8 cm (Figure 1). Interestingly, the mean size of discarded black sea bass is greater than the enforced minimum size (27.9 cm), indicating that black sea bass are being discarded primarily due to fishery closures and landing limits, rather than size limits. Further analysis indicates distinct spatial patterns in black sea bass size spectra during the winter months, suggesting size-based seasonal aggregation of the northern Atlantic black sea bass. An additional 12 months of sampling by the Research Fleet will provide a better understanding of these seasonal and spatial dynamics.

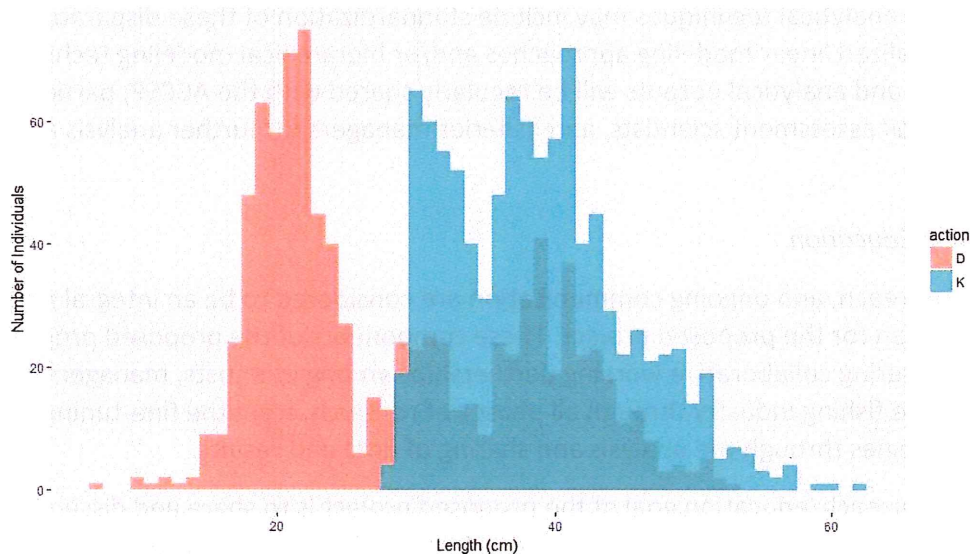


Figure 1. Size spectra of black sea bass sampled by the Research Fleet between November 30, 2016 and June 5, 2017. Red bars indicate discarded fish. Blue bars indicate retained (kept) fish.

During the second year of the project, the project team will thoroughly explore and analyze the data collected by Research Fleet, including: size spectra, sex ratios, catch per unit effort (CPUE), black sea bass retention and discard rates, and seasonal activity of Research Fleet. All metrics will be explored by gear type, space, and time, as the data permits. Specifically, internal data

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 ACCSP Funding Proposal (New Project – Year 2): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)

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analyses will seek to answer the following research questions: 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 are the selectivities (min, max, mean length) of different gear types (trawl, fish pots, gillnet, lobster/crab pot, rod and reel) that harvest black sea bass?

The open-source statistical software package R will be used for data analysis. Length frequencies will be generated by plotting logarithmic frequency against geometric length class (Warwick 1984, White et al. 2007) and Kolmogorov-Smirnov tests will be used to assess differences in black sea bass length frequency distributions between gear types, seasons, and latitude. A logistic regression model will be used to assess the sex ratio of the black sea bass population as a function of length. Spatial and seasonal differences in black sea bass sex ratio will be assessed using a series of parallel logistic regression models. Generalized Linear Models will be used to explore patterns of variation in catch rates and derive standardized CPUE following Maunder and Punt (2004).

In addition to 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. These analytical techniques may include standardization of these disparate gear types through generalized linear modeling approaches and/or hierarchical modeling techniques. Resultant data and analytical outputs will be regularly shared with the ACCSP, participant fishermen, stock assessment scientists, and fisheries managers for further analysis and application.

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 utilizing modern technology and the participation of fishermen in a research fleet approach to collect and relay much needed data to inform stock assessments and ultimately management measures for the sustainability of economically important species; 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 state/regional/federal agencies; 3) outside researchers who will utilize this information to inform their own research efforts in the region; and 4) interested others 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.
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 fishing locations of 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.

Project History Table:

<u>Funding Year</u>	<u>Title</u>	<u>Original Project Dates</u>	<u>Extension Through</u>	<u>Funded Amount</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*	N/A	\$137,827.00	Piloted the research fleet technique for collection of fishery dependent catch, effort, bycatch, and biological data in the multi-gear black sea bass fishery

**Note: The original project included eight months of sampling by the Black Sea Bass Research Fleet (December 2016 to July 2017), but sampling has been extended to March 2018 due to reduced Research Fleet interaction with black sea bass during winter months. This proposal requests a start date of May 1, 2018 to enable continuous sampling by the Research Fleet.*

Milestone Schedule:

MONTH 1 May	MONTH 2 June	MONTH 3 July	MONTH 4 August	MONTH 5 September	MONTH 6 October	MONTH 7 November	MONTH 8 December	MONTH 9 January	MONTH 10 February	MONTH 11 March	MONTH 12 April
Research Fleet data collection	Research Fleet data collection	Research Flet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection	Research Fleet data collection
Renew permits	Renew permits						RI DEM Permit Reporting				
Purchase & prepare sampling equipment for new F/Vs	Distribute sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment	Maintan sampling equipment
Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, server, and database	Maintain data collection app, 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
	Data Reports to Fleet Participants			Data Reports to Fleet Participants			Data Reports to Fleet Participants			Data Reports to Fleet Participants	
	Share data with ACCSP, ASMFC, MAFMC					Share data with ACCSP, ASMFC, MAFMC				Share data with ACCSP, ASMFC, MAFMC	
						Write progress report			Write final report	write final report	Write final report
Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach	Maintain project website; Outreach

Rhode Island Department of Environmental Management & Commercial Fisheries Research Foundation
ACCSP Funding Proposal (New Project – Year 2): Fishery Dependent Sampling for Black Sea Bass (*Centropristis striata*)

Proposal components that address the ranking criteria are **bold** and a summary is provided on pages 25-26.
Changes from the initial proposal are highlighted in **yellow**.

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 black seabass (BSB)	Year 2 Proposal Metrics	Maintenance of BSB data collection app, wireless data transfer, and SQL database	Use of BSB data collection app (On Deck Data) by participant fishermen	Maintenance of eight existing BSB Research Fleet participants and addition of two new participants	Twelve months of biological and fishery data collection for BSB	Collection of ~18,000 measurements of BSB length and sex 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, 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, MAFMC
	Year 1 Achievements	Development of the On Deck Data app for black sea bass data collection, server processes, and SQL database	Piloting of the BSB data collection app (On Deck Data) by participant fishermen	Solicitation, selection, and training of eight BSB Research Fleet participants	Six months of biological and fishery data collection for BSB (as of June 2017)	Collection of 1,903 measurements of BSB length and sex over six months (as of June 2017)	Collection of 93 records of BSB catch and discard rates over six months (as of June 2017)	Collection of 93 records of BSB fishing location, depth, habitat, gear type, effort, catch over 12 months	Compilation of BSB data into SQL database (bsb_fleet, bsb_session, bsb_sample, bsb_random tables)	Compilation and distribution of quarterly data reports to Research Fleet participants in March 2017 and June 2017	Formatting and distribution of BSB biosamples data to ACCSP in June 2017
Reduce uncertainties in BSB stock assessment	Year 2 Proposal Metrics	Provide BSB data from areas, habitats, and times of year not covered by standard survey techniques	Distribution of BSB data to ACCSP, ASMFC, MAFMC, NEFSC	Communication of data and project findings to BSB stock assessment scientists	Utilization of data by BSB stock assessment scientists	Exploration of fishery dependent indices of abundance for BSB					
	Year 1 Achievements	Provided BSB data from months, areas, and habitats not sampled by existing surveys	Distribution of BSB data to ACCSP in June 2017	Communication with BSB stock assessment scientists (Gary Shephard, NEFSC, Steve Cadrin, SMAST)							
Assess spatial & temporal patterns in BSB fishery & catch	Maintenance Proposal Goals	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 frequencies by gear type, time of year, 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 ratio as a function of length	Comparison of logistic regression models of BSB sex ratios by gear type, time of year, and location	Development of GLMs of BSB catch rates and standardized CPUE	Publication of peer-reviewed paper	
	Year 1 Achievements	Preliminary data analysis of BSB length and sex data	Development of size spectra for discarded and retained BSB	Creation of maps Research Fleet sampling coverage	Preliminary exploration of spatial and temporal trends in BSB size spectra						
Demonstrate model approach for cost efficient fishery dependent data collection	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 communication between all project partners, participants, and end users	Development of working partnerships between participating fishermen, scientists, and managers	Completion of tasks within project budget				
	Year 1 Achievements	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 fishermen (Project Steering Committee)	Communication with BSB stock assessment scientists (Gary Shephard, NEFSC, Steve Cadrin, SMAST)	Maintenance of communication between all project partners, participants, and end users	Development of working partnerships between participating fishermen, scientists, and managers	On track to complete 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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