United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
NOAA Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516 USA

August 9, 2019

Operations and Advisory Committee
Atlantic Coastal Cooperative Statistics Program
1050 N. Highland St
Suite 200A-N
Arlington, VA 22201

Dear Committee members,

Thank you for taking the time to review my proposal "Continued processing and aging of biological samples collected from U.S. South Atlantic commercial and recreational fisheries" and considering it for FY20 funding. I feel that I have addressed your comments in the proposal, but also want to take to opportunity to answer some of the comments in more detail here.

Please accept my apologies for not fully understanding the RFP and the maximum funding allowed as presented in Appendix A. I have amended the budget to meet the maximum allowed amount and provided more information in the budget narrative to address the questions regarding some of the budget items.

I appreciate the need to phase out maintenance projects and have made the leadership of the Southeast Fisheries Science Center (SEFSC) aware of the plan for the past few years. My supervisor and I have been consulting with leadership of the SEFSC regarding a transition plan. Within the priority-based resource (PBR) process, an activity plan has been submitted to the SEFSC requesting base funds to cover permanent federal employee positions and/or contract positions for fish ageing work at the Beaufort Laboratory. The activity plan is under review.

The level of samples the Beaufort Laboratory receives per year has required at least three contract staff in addition to the two federal employee positions to manage the databases and provide annual age data for stock assessments. Since the first proposal for funding for processing and ageing fish samples from the South Atlantic fisheries was submitted, the request has been made for three contract positions. Initially, the request was for one biologist and two technicians. As the government negotiated with new contract vendors, those position distinctions were changed. Starting with the FY18 funding request, the three contract positions were put under one category by the vendor. Thus the perceived change in the proposal request.

The SEFSC and I are grateful for the support of your organization over the years. The NOAA Beaufort Laboratory Life History Group has been able to produce substantial amounts of timely age data in support of SEDAR stock assessments because of the grant funding from ACCSP. I wish to thank you and the panel for reviewing my proposal.

Sincerely,

Jennifer Potts

Attachment:
 FY2020 Maintenance Project Proposal

Proposal for Funding made to:
Atlantic Coastal Cooperative Statistics Program
Operations and Advisory Committees
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22204

Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational fisheries

Submitted by:
Jennifer Potts
NOAA National Marine Fisheries Service
SEFSC/Beaufort Laboratory
101 Pivers Island Rd.
Beaufort, NC 28516
Jennifer.Potts@noaa.gov

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 1

Applicant: NOAA Fisheries Service, Southeast Fisheries Science Center, Beaufort, NC

Principal Investigator:
Jennifer C. Potts

Project Title: Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational

Project Type: Maintenance

<mark>**Requested Award Amount**: $177,861</mark>

Requested Award Period: For one year, beginning after the receipt of funds

Original Date Submitted: June 10, 2019

<mark>**Date of Revision Submitted:** August 9, 2019</mark>

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 2

Objectives:

The primary objective of the proposed work is to continue processing and ageing ACCSP-prioritized reef fish species in support of stock assessments for those species. This project aims to cover 100% of the biological module through item 1b, improvement in biological data, of the Program Goals as stated in the 2020 RFP, specifically by providing age data for 10 of the upper 25% of species in the Biological Sampling Priority matrix. The goal of this project is to process prioritized age samples as they are received annually. Focal species have been and/or will be assessed through the Southeast Data, Assessment, and Review (SEDAR) process and periodically updated in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The NOAA Beaufort Laboratory receives the majority of the fishery-dependent age samples collected within the U.S. South Atlantic. Our laboratory works closely with other regional ageing laboratories to provide age data inputs for the stock assessment models. Thus, another objective of this study is **to participate in ageing workshops and exchange reference, or calibration sets, of processed otolith samples.** These collaborations will allow us to address, collectively, issues of **consistency in processing methodology and interpretation of age structures** between laboratories, allowing data sets to be combined for stock assessments. Staff at the NOAA Beaufort Laboratory have been actively involved in the **GSMFC/ASMFC Age Manual** update. The manual will further standardize processing and age reading methodology throughout the entire Atlantic coast. Also, because the NOAA Beaufort Laboratory receives biological samples from various state agencies and federally managed fishery-dependent surveys, the data associated with each sample will be verified, standardized to ACCSP protocols, and logged into the Beaufort bio-sample inventory (BFT) or the Bio-sample Database (BSD) linked directly to the NMFS Trip Interview Program and Southeast Region Headboat Survey databases, which can be shared with ACCSP. Metadata associated with the age data from fishery-dependent sources will be provided to ACCSP in accordance with the Atlantic Coast Fisheries Data Collection Standards (http://www.accsp.org/sites/default/files/ACCSP_StandardsandAppendices2012_Final05082012.pdf). All of these objectives directly fulfill the mission statement of the ACCSP 2014 – 2018 Strategic Plan.

Need:

NOAA Fisheries Service (NMFS) in the southeast region has instituted the Southeast Data, Assessment and Review (SEDAR) process for conducting stock assessments, through which model outputs are used to inform management in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). After more than 60 SEDARs, the most cited research recommendation has been the need for more comprehensive, validated, and consistent age composition data. In concurrence with the SEDAR and ACCSP recommendations is research conducted by Yin and Sampson (2004) and Siegfried et al. (2016). Their studies looked at the many factors influencing stock assessment models (e.g., length of data series, natural mortality, fishery selectivity curve, fishing mortality, recruitment, survey biomass index, fishery and survey age composition, fishing effort, and sampling error in catch data). Of the

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 3

factors affecting estimates of ending biomass and projected catch, Yin and Sampson's study suggests improvement to the models can be made with increased age composition sampling, for the least cost. Siegfried et al. found that increased age composition data, specifically commercial age composition, had the greatest effect on the accuracy of assessments.

NOAA Beaufort Laboratory is in a unique position of holding fishery-dependent age data for many of the most important reef fish species of the U.S. South Atlantic dating back to the 1970s. These collections have been greatly enhanced because state agency partners and NMFS Southeast Fisheries Science Center have placed greater emphasis on collecting age structures along with fish lengths from the fishery landings. Following the NMFS review of stock assessment science, a National Otolith Sample Size Working Group was formed by NMFS to explore the question of how many age structures are sampled and how many are needed for a reliable stock assessments. This group has brought a lot of attention to the need for more age structure sampling. ACCSP has also funded or is reviewing proposals for funding state agencies to collect biological samples from the commercial fishery. The Beaufort Laboratory now is receiving upwards of 25,000 age samples per year from commercial and recreational fishery landings contributed by **many agencies including the North Carolina Division of Marine Fisheries (NCDMF), South Carolina Department of Natural Resources (SCDNR), Florida Fish and Wildlife Commission (FWC), NMFS Headboat Survey, and NMFS Trip Intercept Program (TIP)**. These new samples will provide the age composition data for stock assessments, but funding is required for processing and ageing the samples.
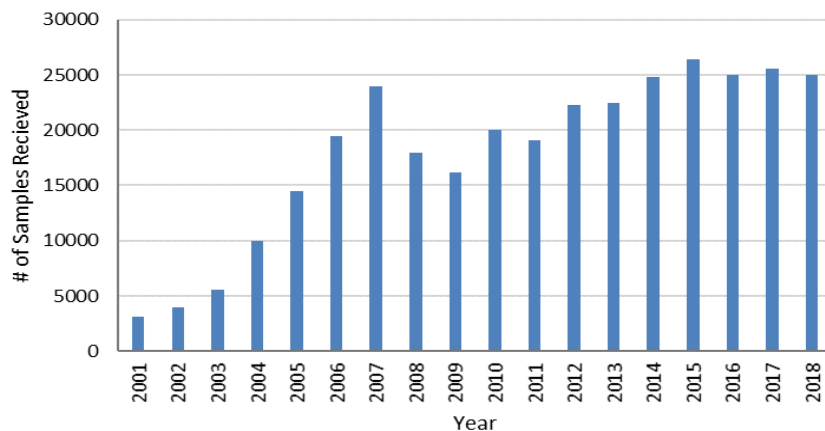
Another strong research recommendation from several SEDARs pertained to age and growth studies of the same species performed by more than one laboratory. Researchers have been asked to standardize processing techniques, be consistent in age determination analysis, and resolve ageing discrepancies between laboratories. **The NOAA Beaufort Laboratory works closely with SCDNR, NCDMF, FWC and NMFS Panama City Laboratory to exchange processed samples for age comparison studies. Recently, Virginia Marine Resources Commission (VMRC) and Old Dominion University (ODU)** have collaborated with **NOAA** Beaufort in ageing of blueline tilefish, snowy grouper and cobia. Funding is required to support workshops to discuss processing methodology and interpretation of the ageing structures. As a result of these workshops, consistency in ageing will be met and paired age readings will be used to create age error matrices that will be used as input data to stock assessment models.

Validation of ages is another critical factor in stock assessments. Consistency between age readers produces precision, but accuracy is more important. Several southeast regional laboratories are currently conducting age validation projects for reef fish species. NOAA Beaufort Laboratory has finished age validation studies on red porgy and gray triggerfish through chemical marking and rearing experiment and engaged in a similar study for vermilion snapper and black sea bass; SCDNR has conducted age validation studies on deep-water species such as blueline tilefish and wreckfish (Lytton et al, 2016) using bomb radio-carbon in otoliths; and NMFS Panama City has used bomb radio-carbon or radiometric age validation techniques on golden tilefish and speckled hind (Lombardi-Carlson and Andrew, 2015; Allen et al., 2013).

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 4

Funding will need to be sought for more in depth age validation of blueline tilefish and other deep-water species within their entire U. S. range (Atlantic and Gulf of Mexico). The regional laboratories are also collaborating with other state agencies and universities to expand the validation studies. These data will improve our between lab consistency in ageing, direct age workshops and improve stock assessments for management of the fisheries.

Ageing of reef fish species and fiscal support of that work at the Beaufort Laboratory have evolved over the years. Initially, ageing studies conducted by FTE staff of the Beaufort Laboratory were done on a species-by-species basis, but not specifically for stock assessment purposes. Those studies were also considered snap shots in time, rather than many years' worth of samples. Following the retirement of the lead scientist, leaving one FTE to carry on the work, and with the advent of the SEDAR process, a more concerted effort was needed to age fish for stock assessments. In 2003, one contract position was added to the lab funded through MARFIN funds, and the lab was able to provide a total of 4,300 ages for two species. MARFIN funded the ageing work through 2009, but then could no longer support it. Expanded annual stock assessment (EASA) funds were used to support one contract position, from 2008 - 2014. The number of assessments requested each year increased, and commensurately the number of age samples collected and sent to Beaufort increased (Figure 1). With the support for biological sampling by ACCSP, the Beaufort Laboratory turned to ACCSP for funding in 2012, 2013, 2015 - 2019, which is the primary source of funding for production ageing work at the Beaufort Laboratory. Through ACCSP funds for contracted support staff and NMFS FTE staff, the lab was able to show an increase in production processing from 5,000 to currently 24,000 age samples per year and from 4,300 to currently 18,000 actual ages per year for stock assessments. Also, the lab was able to process and age valuable samples collected prior to 1990 which included economically valuable species such as red snapper, gag, red grouper, black sea bass, gray triggerfish, and gray snapper. In addition, the Beaufort Laboratory has cleared the back-log of lane snapper age samples, which dated back to the early 1980s. These data were able to show potential shifts in age structure (e.g., age truncation), growth, and effects of minimum size limits over time. All of these elements are important indicators in stock assessments.

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 5

Figure 1. Number of age samples received at the Beaufort Laboratory 2001 – 2018.

Results/Benefits:

The NOAA Beaufort Laboratory has been collecting samples and ageing reef fish species for more than 40 years, and is able to provide those data for assessment models for species of the snapper grouper complex of the U. S. South Atlantic. Funding for this project would be directed at the processing and ageing of fish for the 2020 - 2021 proposed SEDAR species list, as well as continued processing of the highest priority species to ACCSP and in the SAFMC Snapper Grouper FMP. That work will begin during the summer of 2020, following the completion of the data input requirements for scamp, tilefish and snowy grouper. Also, ongoing efforts to stay up to date on black sea bass, vermilion snapper, gag, red snapper, red grouper, red porgy and greater amberjack will be continued. All age data provided from the Beaufort Laboratory have been included in stock assessments. The age data are broken down by year, fishery and gear, and state. For several of the species, the number of age samples has been inadequate for fully characterizing all years, fisheries and gears, and the request at the end of each SEDAR assessment has been for more comprehensive biological samples. The data provided will reduce uncertainty about the stock assessment models of important commercial and recreational species. Also, the data would be used to characterize fishery landings and provide information on year class strength, effects of fishing on age structure, and growth of fish in the population.

Ten species currently managed in the SAFMC Snapper Grouper FMP are listed in the upper 25% of the ACCSP Bio-Sampling Priority Matrix. Scamp is on a SEDAR "Research Track" schedule to start in early 2020, which includes the South Atlantic and Gulf of Mexico, with assessments to follow later in 2020. Data for snowy grouper and tilefish will be due to SEDAR in early 2020. In addition, gag will be assessed starting in mid-2020. Red snapper may start on a "Research Track" in January 2021, and gray triggerfish in June 2021. For the other species in the upper portion of the matrix, which include black sea bass and red grouper, the staff at the Beaufort Laboratory have been processing the annual age samples with a maximum lag time of one year. Past funding from ACCSP has allowed the lab to meet all of the needs of SEDAR without delays.

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 6

Along with the ten snapper-grouper species in the Priority Matrix, the Beaufort Laboratory includes seven additional species as our top priority for age processing (Table 1). Those fifteen species make greater than 75% of total samples received annually. To process and read the annual samples received would take at least 400 person days to complete. In Addition, of those species, lane snapper and white grunt have not undergone a SEDAR assessment, nor are they on the SEDAR schedule to date. The Beaufort Laboratory has inventoried over 25,000 white grunt samples dating back to the early 1980s. Over 600 days will be needed to process and read the backlog of white grunt. The estimate of time required does not include the time spent verifying all the data and updating the inventories, exchange of calibration sets with other laboratories and age workshops, data analysis and report writing.

During the past several years, there have been changes to the SEDAR schedule by the SEDAR Steering Committee that have caused the NOAA Beaufort Laboratory staff to shift their species of focus. Due to the changes, the staff has had to sub-sample the collection for particular species, namely vermilion snapper, gray triggerfish and red grouper, to meet shortened deadlines, thus possibly compromising the data for the stock assessment. The past funding from ACCSP has allowed the staff to process those samples previously excluded due to sub-sampling. Prioritized species of the SAFMC Snapper Grouper FMP are listed in Table 1 along with the number of age samples received in 2013 - 2018. The average annual cost estimate per species for processing and ageing of the samples has also been calculated and included in Table 1. The cost estimate does not include inter-laboratory calibration component of study. **Samples from yellowtail snapper, mutton snapper and black grouper are sent to Florida's FWC in cooperation with that lab to age those species.   FWC returns the age data to the Beaufort Laboratory for inclusion in the BFT and BSD.**

Table 1.   2013-2018 Fishery-dependent age samples of the top priority species received at the NOAA Beaufort Laboratory. Average annual cost to process and age each species based on average salary cost and time per sample. Estimate does not include inter-laboratory calibration, age workshops, or data analyses.

Species	2013	2014	2015	2016	2017	2018	Cost
Black Sea Bass	2289	2196	2423	1448	1685	1248	$28,241
Blueline Tilefish	811	494	262	328	458	299	$16,834
Gag	734	890	650	585	516	691	$18,177
Gray Snapper	607	1336	1238	1325	713	596	$18,166
Gray Triggerfish	1008	1112	1125	1594	1527	1759	$39,628
Lane Snapper	544	830	562	950	1309	809	$15,762
Red Grouper	448	521	230	349	318	307	$10,909
Red Porgy	868	939	673	740	693	759	$25,512
Red Snapper	700	912	64	0	856	1255	$28,229
Scamp	647	825	452	752	547	621	$22,581

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 7

Snowy Grouper	644	818	861	787	726	955	$22,468
Tilefish	1035	911	558	895	836	742	$27,341
Vermilion Snapper	4219	4121	3751	5187	4545	5508	$104,995
White Grunt	1635	2374	2415	2649	1767	1604	$42,715
TOTAL	**16189**	**18279**	**15264**	**19605**	**16496**	**19171**	**$421,559**

The total number of otoliths or spines that can be processed and read in a single year is dependent on several factors, including the number of trained personnel in the lab, the type of processing required, and the difficulty in interpretation of the structure. Processing techniques include low-speed saws that may result in higher quality sections and allow for more than one section per sample, or a high-speed saw that results in one section and is adequate for easier to age fish. The two staff hired through ACCSP funds along with two FTEs will be able to process and read ~16,000 age samples in one year, which is a reduction from past years.

The people hired into these contract positions would be required to participate in SEDAR Life History Groups. They would become intimately knowledgeable of the data associated with the age samples and with the methodology to age the fish. They would contribute to discussion of each species as an expert. They would be required to contribute to analysis of the life history data inputs for the SEDAR assessment and contribute to the report writing.

Various state and federal laboratories each house their own collections of age samples, such as fishery-independent survey samples or special project samples. They will be working independently to process and read samples of many marine fish species. They will then work collaboratively by combining data with the other laboratories to give more complete life history information to assessment biologists. The funding of this proposal will ensure greater coordination between laboratories for exchanging processed samples and ensuring reader precision between laboratories.

Approach/Procedures:

Biological samples collected by port agents at various locations from North Carolina through the east coast of Florida will be shipped to the Beaufort Laboratory. Once received, staff will review the electronic and hard copy data for each sample, ensure the samples are properly labeled, sort the samples by species and store them for future processing. All sample data collected by port samplers will be entered into a searchable database that will be updated and maintained. This information can be shared with ACCSP and NMFS SEFSC bio-sample databases. Staff will also respond to requests for samples from other regional ageing facilities, thus creating greater cooperation with those facilities.

Staff of the NOAA Beaufort Laboratory will be responsible for processing the fishery-dependent age structures of species needed for SEDAR stock assessments. The samples will be sectioned

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.
Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 8

and aged following the methods of Potts and Manooch (1999) and Cowan et al. (1995) in concurrence with other fish ageing laboratories and the GSMFC/ASMFC Age Manual. Existing sectioning equipment will be provided by NMFS. The age data will be recorded for each sample and provided to assessment biologists. After the data have been vetted through the SEDAR process or published, they will be made available to ACCSP and the NMFS Bio-sample databases.

All staff involved with these studies will be trained by the principal investigator, who has 29 years of experience ageing marine fish. Also, they will be required to read reference collections and meet acceptable standards of between reader consistency with no bias. Image analysis software will be used to take pictures of the age samples, apply measurements to them and annotate the images for training purposes. NMFS is updating image analysis systems and computers in FY19 to keep abreast of technological changes. This equipment is required to perform the work and is being provided at no cost to ACCSP funds. The staff will cross train with researchers at other laboratories. Age workshops will be held to standardize sample processing methodology and interpretation of the age structures, followed by exchanges of each lab's calibration sets. Many of the ageing laboratories in the Southeast region have worked together and exchanged information in the past, making cooperation between these facilities easier.

NOAA Beaufort Laboratory will provide to ACCSP metadata for all age samples in accordance with ACCSP's standards included in Atlantic Coast Fisheries Data collection Standards part 3
(http://www.accsp.org/sites/default/files/ACCSP_StandardsandAppendices2012_Final05082012.pdf). "Other Biological Standards: Until these documents are completed and the methodologies approved as standard partners are encouraged to submit metadata on any biological data submitted to the ACCSP. These metadata parameters should include the following by species, for each data type (e.g., otoliths, fecundity, etc.): 1. Agency submitting data 2. Name of principle investigator 3. Description of interpretation methodologies used."

Geographic locations:

Biological samples for ageing will be collected from **commercial and recreational fishery landings from North Carolina through the east coast of Florida and the Florida Keys through routine, on-going sampling activities.** Recently, samples of deep-water reef fish species (e.g., blueline tilefish and snowy grouper) caught off Virginia and Maryland have been included in the stocks from the U.S. South Atlantic. Funding for this proposal will result in contract research support personnel to be located at NMFS/SEFSC, Beaufort, NC.

Consequences of Reduced Funding and Transition Plan :

With the requirement to cut maintenance projects entering year-5 of funding, a transition plan is being considered by the Southeast Fisheries Science Center (SEFSC). Managers at the Beaufort

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 9

Laboratory and the P.I. have been consulting with leadership of the SEFSC. Within the priority-based resource (PBR) process, an activity plan has been submitted to the SEFSC requesting base funds to cover permanent federal employee positions and/or contract positions for fish ageing work at the Beaufort Laboratory. The activity plan is under review.

The allowed request for funds for this proposal will result in the loss of some of the work we will be able to accomplish, if the SEFSC cannot provide support. The largest impact will be the loss of one contract staff. Not only will we loose that person's expertise, but we will not be able to process and age all annual samples for the priority species. One option may be to select to provide age data for every other year or every third year. This decision will be made with the input from stock assessment biologists. A consequence to that strategy will be the loss of tracking strong year classes. The funds will not allow for travel for the contract staff, which will limit their ability to participate in age workshops or other offsite training opportunities. The funds will not cover the supplies needed for the contract staff, which may have an additional effect of limiting the number of samples that can be processed. All of these concerns and impacts have been raised with SEFSC leadership and stock assessment staff.

LITERATURE CITED:

Allen, A. H., B. K. Barnett, R. J. Allman, R. P. Moyer, and H. D. Trowbridge. 2013. Great longevity of speckled hind (*Epinephelus drummondhayi*), a deep water grouper, with novel use of postbomb radiocarbon dating in the Gulf of Mexico. Canadian Journal of Fisheries and Aquatic Sciences. 70(8): 1131 – 1140.

Cowan, J. H., Jr., R. L. Shipp, H. K. Bailey, IV, and D. W. Haywick. 1995. Procedure for rapid processing of large otoliths. Transactions of the American Fisheries Society 124:280-282.

Lombardi-Carlson, L., and A. H. Andrews. 2015. Age estimation and lead-radium dating of golden tilefish, *Lopholatilus chamaeleonticeps*. Environmental Biology of Fish 98:1787 – 1801.

Lytton, A. R., J. C. Ballenger, M. J. M. Reichert, and T. I Smart. 2016. Age validation of the North Atlantic stock of wreckfish (*Polyprion americanus*), based on bomb radiocarbon (^{14}C), and new estimates of life history parameters.   Fishery Bulletin 114(1):77 – 88.

Potts, J. C., and C. S. Manooch, III. 1999. Observations on the age and growth of graysby and coney from the southeastern United States. Transactions of the American Fisheries Society 128:751-757.

SEDAR. 2007. Consolidated SEDAR workshop recommendations for research, monitoring, and SEDAR procedures. Report from SEDAR, One Southpark Circle #306, Charleston, SC 29407. April 2007. 80p.

Siegfried, K. I., E. H. Williams, K. W. Shertzer, and L. G. Coggins. 2016. Improving stock assessments through data prioritization. Canadian Journal of Fisheries and Aquatic Science 73:1 – 9.

Yin, Y., and D. B. Sampson. 2004. Bias and precision of estimates from an age-structured stock assessment program in relation to stock and data characteristics. North American Journal of Fisheries Management 24(3):865-879.

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 10

Milestone Schedule:

TASKS	J	J	A	S	O	N	D	J	F	M	A	M
Receiving and storing hard parts	X	X	X	X	X	X	X	X	X	X	X	X
Processing hard parts	X	X	X	X	X	X	X	X	X	X	X	X
Ageing hard parts			X	X	X	X	X	X	X	X	X	X
Provide hard parts to cooperative institutions		X	X	X	X	X	X	X	X	X	X	X
Provide samples for reference collections		X	X	X	X	X	X					
Quarterly progress reports				X			X			X		
Final Report												X

Project Accomplishments Measurement:

The ultimate accomplishment measurement of this project will be the successful completion of all age data for SEDAR scheduled species in FY2020-2021. Five species are currently on the schedule for 2020– 2021 which include Scamp, snowy grouper, tilefish, gag, red snapper, and gray triggerfish. The work will have been begun prior to the funding of this project. Some processing has already been done on those species, but the high volume of snowy grouper, gag, red snapper, and gray triggerfish will take most of the staff's time to complete in time to meet the SEDAR schedule. Also, the lab intends to continue the ageing of samples collected in 2019 for the species listed in Table 1. As a result of age validation projects, gray triggerfish samples previously aged may need to be re-aged, creating a heavy workload on the staff.

NOAA National Marine Fisheries Service ACCSP
Funding Proposal: Continue ageing of US South Atlantic reef fish species.

Sections of the proposal identified to help with the ranking process are highlighted in green with a summary on page20-21.   Page 11

Cost Summary:

	ACCSP	NMFS In-Kind	Total
Personnel Services/Salaries			
P.I. Salary		$94,400	$94,400
FTE Biologist salary		$64,000	$64,000
Contract staff (2)	$174,374		$174,374
Subtotal	**$174,374**	**$158,400**	**$332,774**
Fringe Benefits			
$158,500 *36%		$57,060	$57,060
Equipment		$49,100	$49,100
AGO Fee	$3,487		$3,487
TOTAL	**$177,861**	**$264,560**	**$442,421**

BUDGET NARRATIVE for REQUESTED FUNDING
July 1, 2020 – June 30, 2021

Category	Cost	Justification
Personnel	$174,374	Contract staff positions are negotiated pricing through the federal government. (1920 hrs x $45.41/hr x 2 staff).
AGO fee	$3,487	NOAA's Acquisitions and Grants Office charges a 2% fee to process contract services. The SEFSC has required all proposals that include contract services to include this fee.
Total Request	$177,861	

BUDGET NARRATIVE for NMFS IN-KIND FUNDING
July 1, 2020 – June 30, 2021

Category	Cost	Justification
Personnel	$158,400	Includes salary for PI and FTE biologist. The personnel are directly involved with the day to day processing and ageing of samples, laboratory management and data analyses.
Fringe Benefits	$57,060	Fringe benefits of the two FTE positions listed. The rate for calculating benefits is 36-38% per OPM website.

Equipment	$49,100	This proposal is not requesting any equipment to be purchased to accomplish the work. The equipment has been provided by NOAA and includes computers, saws and image analysis systems needed for two (2) staff to perform the work as laid out in this proposal. Cost basis is computed from current market value and depreciation. Image analysis systems required complete upgrades in FY19 due to technological advances that rendered older systems to become obsolete.
Total	$264,560	

Maintenance Project:

Table 2. History of related projects funded by ACCSP.

Funding Year	Project Title	ACCSP Funds	In-Kind Funds
2019	Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational fisheries	$300,550	$426,872 (NMFS had to cover cost not covered by award amount
2018	Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational fisheries	$251,600	$248,400
2017	Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational fisheries in response to ACCSP bio-sample targets	$256,038	$232,809
2016	Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational fisheries in response to ACCSP bio-sample targets	$254,706	$266,306
2015	Continued processing and ageing of biological samples collected from U.S. South Atlantic commercial and recreational fisheries in response to ACCSP bio-sample targets	250,831	$264,601
2013	Processing and ageing biological samples collected from U.S. South Atlantic commercial and recreational fisheries in response to ACCSP bio-sample targets	$205,636 (partially funded; requested amount $249,946)	$98,800
2012	Processing and ageing biological samples collected from U.S. South Atlantic commercial and recreational fisheries in response to ACCSP bio-sample targets	$236,440	$74,915

Table 3. Budget Narrative from FY 2019 (A), FY 2018 (B), FY 2017 (C), FY2016 (D), FY 2015 (E), FY 2013 (F), and 2012 (G) funding.

A. 2019

Category	Cost	Justification
Personnel	$285,000	Contract staff positions are negotiated pricing through the federal government. (2080 hrs x $45.67/hr x 3 staff). The purchase agreement with one vendor, whom we have used in the past, expired, and the new vendor cost was considerably higher. We anticipate an additional increase in the fee schedule, thus the higher hourly rate calculated in this request.
Travel	$2,000	Travel for 3 contract personnel to age workshop for 3 days ($2,000).
Supplies	$5,000	Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide storage, saw blades, etc.
AGO fee	$8,550	As of July 2016 NOAA's Acquisitions and Grants Office charges a 3% fee to process contract services. The SEFSC has required all proposals that include contract services to include this fee.
Total Request	$300,550	Received $203,028

B. 2018

Category	Cost	Justification
Personnel	$245,000	Contract staff positions are negotiated pricing through the federal government. (2080 hrs x $39.26/hr x 3 staff).
Travel	$1,600	Travel for 3 contract personnel to age workshop for 3 days ($1,600).
Supplies	$5,000	Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide storage, saw blades, etc.
Total Request	$251,600	

C. FY2017

Category	Cost	Justification
Personnel	$249,438	Contract Biologist position to take lead on project (2080 hrs x $43.10); Two contract technician positions to process age samples and assist in ageing (2 x 2080 hrs x $37.69). These labor costs are negotiated pricing through the federal government.
Travel	$1,600	Travel for 3 contract personnel to age workshop for 3 days ($1,600).
Supplies	$5,000	Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide storage, saw blades, etc.
Total Request	$258,038	

D. FY2016

Category	Cost	Justification
Personnel	$252,480	Contract Biologist position to take lead on project (2080 hrs x $43.10); Two contract technician positions to process age samples and assist in ageing (2 x 2080 hrs x $39.14). These labor costs are negotiated pricing through the federal government.
Travel	$1,500	Travel for 3 contract personnel to age workshop for 3 days ($1,500).
Supplies	$3,726	Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide storage, saw blades, etc.
Total Request	$254,706	

E. FY2015

Category	Cost	Justification
Personnel	$244,531	Contract Biologist position to take lead on project (2080 hrs x $42.25); Two contract technician positions to process age samples and assist in ageing (2 x 2080 hrs x $37.68). These labor costs are negotiated pricing through the federal government.
Travel	$1,300	Travel for 3 contract personnel to age workshop for 3 days ($1,300).
Supplies	$5,000	Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide storage, saw blades, etc.
Total Request	$250,831	

F.FY2013

Category	Cost	Actual	Justification
Personnel	$218,828	$205,636 Note: All money went to contract labor cost. Supplies and travel were paid by other projects.	Contract Biologist position to take lead on project (1928 hrs x $41.50); Two contract technician positions to process age samples and assist in ageing (2 x 1928 hrs x $36.00). These labor costs are negotiated pricing through the federal government.
Travel	$6,600.00		Travel for 3 contract personnel to age workshop for 5 days ($3,600). Travel for two contract personnel to SEDAR Data Workshops for 7 days ($3,000). These personnel will be required to participate in SEDAR Life History groups in order to represent data they have recorded.
Vehicle	$616.00		Cost to use government vehicle for travel to Charleston, SC for age workshops and SEDAR meetings ($0.55/mi).
Supplies	$12,000		Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide boxes, saw blades, etc. Required upgrade of image analysis software used in training and creating digital reference.
Total Request	$249,946		

G. FY2012

Category	Cost	Justification
Personnel	$213,565	Contract Biologist position to take lead on project (1928 hrs x $40.77); Two contract technician positions to process age samples and assist in ageing (2 x 1928 hrs x $35.00). These labor costs are negotiated pricing through the federal government.
Travel	$6,000.00	Travel for 3 contract personnel to age workshop for 5 days ($3,000) – Age workshop for Blueline tilefish, gray triggerfish and snowy grouper; Travel for two contract personnel to SEDAR Data Workshops for 7 days ($3,000) – Participant in Life History group for SEDAR32 (blueline tilefish and gray triggerfish).
Vehicle	$616.00	Cost to use government vehicle for travel to Charleston, SC for age workshops and SEDAR meetings ($0.55/mi).
Supplies	$5,000	Estimated cost of supplies to process 20,000 age samples in one year. Supplies include embedding materials, slides, slide boxes, saw blades, etc.
Overhead	$11,259	Allowable NOAA overhead charge of 5% of total request ($225,181). Used for administrative costs and IT equipment for new contract personnel.
Total Request	$236,440	

Table 4. Accomplishments from the 2012 (A), 2013 (B), 2015 (C), 2016 (D), and 2017 (E) funding year cycles. Number of samples that have been sectioned and number of samples aged by species.

A. 2012

Species	# of Samples Sectioned	# of Samples Aged	Sampling Years
Black Sea Bass	1,000	3,300	2011 - 2012
Blueline Tilefish	800	3,117	2003 - 2012
Gray Triggerfish	700	6,240	1990 - 2012
Snowy Grouper	2,400		2010 - 2012
Red Porgy	1,300		2012
Red Snapper	300		2012
Gag	6,000		2005 - 2012
Vermilion Snapper	3,120		2012

B. 2013

Species	# of Samples Sectioned	# of Samples Aged	Sampling Years
Gag Grouper		6,551	2007 - 2012
Red Snapper		1,210	2010 - 2013
Gray Triggerfish		2,457	2012 - 2013
Gray Triggerfish from SCDNR collection		8,471	1991 - 2013
Blueline Tilefish		1,851	2012 - 2013
Black Sea Bass		1,935	2012 - 2013
Red Porgy	3,600		2012 - 2013
Tilefish	2,340		2011 - 2013
Vermilion Snapper	3,000		2012 - 2013
Scamp	1,200	300	1983 - 2013

C. 2015

Species	# of Samples Sectioned	# of Samples Aged	Sampling Years
Tilefish		4,297	2011 - 2014
Blueline Tilefish	1,566	1,566	2014 - 2015
Red Grouper	742	742	2014 - 2015
Black Sea Bass		2,395	2012 - 2013
Vermilion Snapper	5,670	11,759	2012 - 2015
Gag Grouper		1,182	2014 - 2015
Scamp	5,913		1983 - 2015
Gray Snapper	4,448		2006 - 2014
Greater Amberjack	428		2006 - 2014

D. 2016

Species	# of Samples Sectioned	# of Samples Aged	SEDAR
Black Sea Bass		9,037	SEDAR 56
Vermilion Snapper	7,400	13,676	SEDAR 55
Gray Snapper	4,725	7,945	SEDAR 51
Greater Amberjack	687	131	Due 2018
Red Porgy	1635		Due 2018
Scamp	1,300	10,055	Due 2018
Lane Snapper	3971	1735	

E. 2017

Species	# of Samples Sectioned	# of Samples Aged	SEDAR
Cobia	242	242	SEDAR58
Greater Amberjack	120	2000	SEDAR59
Red Porgy	2043	4620	SEDAR60
Scamp	800	3600	Due 12/2018
Tilefish	1000	985	Due 6/2019
Snowy Grouper	1440		Due 6/2019
Gag		1200	
Red Grouper		420	
Vermilion Snapper	2812	742	
Lane Snapper	810	371	

F. 2018

Species	# of Samples Sectioned	# of Samples Aged	SEDAR Assessment Schedule (Est. start date)
Black Sea Bass	2	319	
Gag	286	614	Operational Assessment (June 2020)
Gray Snapper	991	219	
Graysby	173	173	Ecosystem species
Lane Snapper	212	500	
Red Grouper	1788		
Red Hind	932		Ecosystem species
Red Porgy	1232	8945	SEDAR 60
Scamp	1319		Research Track Assessment (Jan 2020)
Snowy Grouper	1988		Operational Assessment (Jan 2020)
Tilefish	1263	1219	Operational Assessment (June 2020)
Vermilion Snapper	4729	3199	

Summary of Proposal for Ranking Purposes

Proposal Type: *Maintenance*

Primary Program Priority:

> *Biological Sampling*: **100%** of age samples collected from the ten SAFMC Snapper Grouper FMP species within the top 25% priority matrix will be processed and aged. The age data will be loaded into Bio-Sample Database housed at the NMFS SEFSC and made available for the SEDAR process. After the age data are vetted through the SEDAR process, those data will be made available to the ACCSP database. Until the module for biological data is developed within ACCSP Data Warehouse, metadata for age data will be provided to ACCSP.

Project Quality Factors:

Multi-Partner/Regional Impact Including Broad Impact:

> Age samples from species managed through the SAFMC Snapper Grouper FMP will be collected and shipped to the NOAA Beaufort Laboratory for processing and ageing for stock assessment purposes.   These age samples will be representative of the commercial and recreational fisheries operating from Virginia and North Carolina through the east coast of Florida. The samples will be collected by various state agencies and NMFS sampling programs. In cooperation with these programs, the Beaufort Lab will standardize data, inventory, and process the samples.
>
> The Beaufort Laboratory will work collaboratively with several state and federal laboratories and universities through age workshops and exchanges of reference collections to ensure consistency in age data for input to SEDAR assessments. The partners include NCDMF, SCDNR, FWC, VMRC, ODU, NMFS Panama City.

Contains funding transition plan/Defined end point:

> Once the lab has cleared the back-log of samples dating back to the 1970s, less staff would be needed to process the annual age samples at the current rate of accrual. Samples from most of the priority species have had the back-log cleared. All new samples received from those species are processed annually. The back-log from one other primary species remains to be processed –White Grunt (n > 25,000). The Beaufort Lab will be requesting funding assistance to accomplish that work and then start to reduce the amount of contract labor required to keep abreast of the annual samples. Also, funding through federal congressional budgets to enhance stock assessment data inputs would allow the Beaufort Laboratory to hire permanent federal employees and not have to rely on funding from ACCSP. The SEFSC has established a Priority Based Resource (PBR) process, and leadership is reviewing activity plans for all work done with in the center. The Beaufort Laboratory has requested base funding for fish age and growth work for the past three years.

In-kind Contributions:

22

NMFS is providing 60% of the total project cost.

Improvement in data quality/quantity/timeliness:
Continued funding of this project would allow the Beaufort Laboratory to approach a level of processing of all age samples received from the South Atlantic Snapper Grouper fishery on an annual basis. When this level of processing is reached, the lab will be able to provide up-to-date age composition data for stock assessment purposes. The age samples would not need to be sub-sampled to meet schedule changes to SEDAR.

Potential secondary module as a by-product:
Other South Atlantic snapper grouper species in the SAFMC Research Prioritization Plan, but not in the current priority matrix will also be aged and data made ready for SEDAR assessments in the future.

Impact on stock assessments:
Funding of this project will address one of the top research recommendations coming from SEDAR and recent publications on improving the accuracy of stock assessments - more comprehensive, validated and consistent age composition data. Age workshops and reference collections will enhance consistency in methodology and age data between partner laboratories.

CURRICULUM VITAE

Jennifer Chrestensen Potts
Research Fishery Biologist
NOAA/NMFS/SEFSC
101 Pivers Island Road
Beaufort, NC 28516-9722

EDUCATION

North Carolina State University   B. S.   12/1988   Fisheries &Wildlife Sciences
East Carolina University   M. S.   5/1997   Biology (Ecology)

PROFESSIONAL EMPLOYMENT

6/97 - present
Position: Research Fisheries Biologist.
NOAA/NMFS/SEFSC, Beaufort Laboratory, 101 Pivers Island Road, Beaufort, NC 28516-9722.

Responsibilities include Investigation Leader of Life History Team; collecting, cataloging, preparation and analysis of age samples; preparing manuscripts for peer review publication; Participation in SEDAR process – Life History Group Leader for South Atlantic assessments; training staff in ageing laboratory; reviewing proposals for federal government funding (i.e., MARFIN and S-K); reviewing manuscripts for peer review journals.

2/90 - 6/97
Position: Biological Technician (Fisheries).
NOAA/NMFS, Beaufort Laboratory, 101 Pivers Island Road, Beaufort, NC 28516-9722.

PUBLICATIONS

Peer Reviewed Publications (Selected)

Burton, M. L., J. C. Potts, A. Poholek, A. Ostrowski, and J. Page.   2019 Age, growth, natural mortality and reproductive seasonality of knobbed porgy from southeastern United States waters.   Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science, 11:231 – 245.

Eddy, C., Pitt, J., Oliveira, K., Morris, J. A., Jr., Potts, J., and Bernal, D. 2019. The life history characteristics of invasive lionfish (*Pterois volitans* and *P. miles*) in Bermuda. Envionmental Biology of Fishes, https://doi.org/10.1007/s10641-019-00877-4.

Potts, J. C., and M. L. Burton. 2017. Preliminary observations on the age and growth of dog snapper (*Lutjanus jocu*) and mahogany snapper (*Lutjanus mahogoni*) from the Southeastern U.S.   PeerJ 5:e3167; DOI 10.7717/peerj.3167

Burton, M. L., J. C. Potts, J. Page, and A. Poholek. 2017. Age, growth, natural mortality and

reproductive seasonality of jolthead porgy, *Calamus bajanado,* from Florida waters. PeerJ 5:e3774; DOI 10.7717/peerj.3774.

Burton, ML, Potts JC. 2017. Age, growth and natural mortality of cubera snapper *Lutjanus cyanopterus* from the southeastern United States. Bulletin of Marine Science, 93(3):815 – 828 DOI 10.5343/bms.2016.1116.

Shertzer, K. W., J. Fieberg, J. C. Potts, and M.L. Burton. 2017. Identifying growth morphs from mixtures of size-at-age data. Fisheries Research, 185:83 – 89. DOI 10.1016/j.fishres.2016.09.032.

Burton, M. L., J. C. Potts and D. R. Carr. 2016. Age, growth and natural mortality of blackfin snapper *Lutjanus buccanella* from the southeastern United States and U.S. Caribbean. Gulf and Caribbean Research, 27:66-73. DOI: 10.18785/gcr.2701.10.

Potts, J. C., M. L.Burton, and A. R. Myers. 2016. Age, growth, and natural mortality of schoolmaster (*Lutjanus apodus*) from the southeastern United States. PeerJ 4:e2543; DOI 10.7717/peerj.2543

Burton, M. L., J. C. Potts and D. R. Carr. 2015. Age, growth, and natural mortality of yellowfin grouper (Mycteroperca venenosa) from the southeastern United States. PeerJ 3:e1099; DOI 10.7717/peerj.1099

Burton, M. L., J. C. Potts and D. R. Carr. 2015. Age, growth and natural mortality of coney, (*Cephalophilis fulva*) from the southeastern United States. PeerJ 3:e825;DOI 10.7717/peerj.825.

Burton, M. L., J. C. Potts, D. R. Carr, M. Cooper, and J. Lewis. 2015. Age, growth and mortality of gray triggerfish (*Balistes capriscus*) from the southeastern United States. Fishery Bulletin 113:27–39.

Burton, M. L., J. C. Potts, and D. R. Carr. 2014. Age, growth, and mortality of Yellowmouth Grouper from the southeastern United States. Marine and Coastal Fisheries: Dynamics, Management and Ecosystem Science 6:33-42.

Potts, J. C., and C. S. Manooch, III. 2002. Estimated ages of red porgy (*Pagrus pagrus)* from fishery-dependent and fishery-independent samples and comparison of growth parameters. Fishery Bulletin 100:81-89.

Potts, J. C., and C. S. Manooch, III**.** 2001. Differences in the age and growth of white grunt from North Carolina and South Carolina versus southern Florida. Bulletin of Marine Science 68:1-12.

Potts, J. C., C. S. Manooch, III, and D. S. Vaughan. 1998. Age and growth of vermilion snapper, *Rhomboplites aurorubens*, from the southeastern United States. Transactions of the American Fisheries Society 127:787-795.

Manooch, C. S., III, and J. C. Potts. 1997. Age and growth of red snapper, *Lutjanus campechanus*, collected from North Carolina through east coast of Florida. Journal of the Elisha Mitchell Society 113(3):111-122.

Manooch, C.S., III, and J.C. Potts. 1997. Age, growth, and mortality of greater amberjack from the southeastern U.S. Fisheries Research 30:229-240.