

ROY COOPER Governor

ELIZABETH S. BISER Secretary

> KATHY B. RAWLS Director

June 16, 2023

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

To Whom it May Concern,

We are pleased to submit the proposal entitled "FY24: North Carolina biological database enhancements for the transmission of data to the ACCSP" for consideration for funding in FY2024.

This maintenance proposal is being submitted to fund an additional year of monies for a developer to continue work on NCDMF's Biological Database (BDB) upgrade. The BDB upgrade and its associated interfaces is a large modernization project that needs to handle a wide variety of sampling programs and their specific requirements as well as a variety of users which have very different use cases for the same interface. This FY2024 proposal is requesting one final year of funding after the FY2023 grant ends to ensure that all functionality that existed in the legacy system will be able to be completed in the new interface.

Information about the FY2021 grant and its challenges is provided in the attached proposal. A no-cost extension was submitted for that project which is set to end at the end of this month. A maintenance grant was approved for FY2023 which starts in July 2023 to continue development work on the BDB.

The scope of this project hasn't changed but has been narrowed to reflect design decisions that were made during the FY2021 grant work such as moving forward with a SQL Server database instead of maintaining the existing ASCII 128-byte database and switching from ASP .NET to Microsoft Blazor to facilitate faster development and utilize a newer framework. The ASCII version of the BDB has been migrated to SQL Server. The SQL Server version of the database should become the database of record by the end of 2023. Delays on the web-based interface for data entry and editing did not delay the start of the funded FY2022 grant titled "*North Carolina fishery-dependent biological data transmissions to the Atlantic Coastal Cooperative Statistics Program Data Warehouse*". Work on that project is on-going and set to be completed by the end of 2023.

Thank you for your consideration.

Sincerely,

Stephanie McInerny

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

FY24: North Carolina biological database enhancements for the transmission of data to the ACCSP

Submitted by:

Stephanie McInerny North Carolina Division of Marine Fisheries 3441 Arendell Street; P.O. Box 769 Morehead City, NC 28557 stephanie.mcinerny@ncdenr.gov

Applicant Name:	North Carolina Division of Marine Fisheries
Project Title:	FY24: North Carolina biological database enhancements for the transmission of data to the ACCSP
Project Type:	Maintenance
Principal Investigator:	Stephanie McInerny NCDMF Information Technology Section Chief
Requested Award Amount:	\$146,981
Requested Award Period:	For one year, beginning after the receipt of funds.
Original Date Submitted:	June 16, 2023

Objective

To enhance the biological database used by the North Carolina Division of Marine Fisheries (NCDMF) to ensure continued use and maintenance of the database on State authorized equipment and to facilitate transmissions of fishery-dependent biological data to the Atlantic Coastal Cooperative Statistics Program (ACCSP) Data Warehouse.

Background/Need

The development of a comprehensive database to house field sampling collections for the NCDMF was initiated in May 1980 and incorporates data from the 1960s to present. Data are collected from both fishery-dependent and fishery-independent surveys and used in stock assessments and fishery management plans (FMPs) to manage species important to the state as well as those managed by regional and federal management commissions and councils.

Biological data collected are stored in the NCDMF Biological Database (BDB) which consists of a hierarchical set of 128-byte ASCII records that detail various data collected by the sampling programs conducted by the division. The BDB currently consists of nine record types:

- Record Type 1 Environmental Data
- Record Type 8 Fishing Gear Data
- Record Type H Free Format Header Data
- Record Type 2 Replicate Data
- Record Type R Free Format Replicate Data
- Record Type 3 Species Data
- Record Type 4 Individual Fish Data
- Record Type 5 Individual Fish Age Data
- Record Type 9 Individual Fish Tag Recapture Data

For each biological program, data are typically entered onto biological program data sheets according to set protocols contained in each program's written standard operating procedures (i.e., program documentation). While the data field names on the BDB record are rigorously controlled, the type of data collected in a biological program for a given field may vary dependent upon what information the respective biologist is capturing. Data elements that are required and standard across all programs include the following: collection id (sequence number), program id, date, location, gear, replicate id, species id, species status, and the number of individuals. Specific programs may also record in addition several other data elements such as station number, duration of sample, sediment type, depth, air temperature, dissolved oxygen, pH, weather, current speed, additional data on individuals collected (weight, age, tag number, annulus measurements), etc. The BDB structure allows each program to capture the data elements needed in a flexible and organized manner with like codes and other standards, but no single program captures all the data defined in the BDB record types. Consequently, biological program data elements vary from program to program. This leads to many variations in the biological data or "coding" sheet. At this moment, there are over 125 different coding sheets defined; but, this number could change at any time dependent on new or changing program documentation requirements.

<u>Currently</u>, there are data from over 120 programs within the BDB and 18 million records. This includes both fishery-dependent and fishery-independent data types. <u>These data are important to the management</u> of species in North Carolina as well as regional and federal species. The primary method for data entry into the BDB can only run on a Windows XP machine; therefore, it has been cumbersome to maintain the BDB as built since computer operating systems used by the state upgraded from Windows XP. The need to enhance the BDB and its data entry interfaces has been increasing over time but there is an immediate need to address database structure, data entry tools, and create a plan for improved user extraction tools as North Carolina State security guidelines currently prohibit PCs not using Windows 10 or newer to be on the state network. This adds an additional level of difficulty in maintaining the BDB and a strong reason for upgrading the database and input/output (I/O) interfaces. In addition, data entry and regular maintenance on the BDB cannot be done via remote access. Upgrading to a more modern web interface will allow access to the data while teleworking at home or in the field.

The NCDMF has been an active participant in transferring selected BDB program data to other regional databases. Two fishery-independent surveys are provided to the Southeast Assessment Monitoring Program (SEAMAP) which is a cooperative program to facilitate the management, and dissemination of fishery-independent data from the waters of the southeastern United States. North Carolina fishery-dependent biological data from the snapper-grouper fishery is provided to the NOAA Fisheries Southeast Fisheries Science Center's Trip Information Program (TIP) which is a major component of the ACCSP. With the upgrades outlined in this proposal, NCDMF will be prepared for future transmissions of data to the ACCSP Data Warehouse to meet the goals and standards of data sharing initiatives between North Carolina and ACCSP. Other than snapper-grouper data, biological data collected by North Carolina are not currently available in the Data Warehouse.

When the FY2021 proposal titled "North Carolina biological database enhancements to prepare for transmission of data to the ACCSP" was submitted, NCDMF was fully staffed and the BDB had 100% support of existing processes so that the contractor hired on the FY21 grant as well as the North Carolina Department of Information Technology (NCDIT) developer located at NCDMF could focus 100% on the new database and its enhancements. Just before the start of the FY21 project, the BDB Administrator that supported the existing system retired. This left a huge vacancy and caused the NCDMF IT developer to shift to supporting the existing system instead of new development. Hiring of the contractor on the FY21 grant was delayed due to the funding not being available to the NCDIT to start the hiring process; however, a contractor was finally hired in November 2021. Due to several other hiring issues, a qualified replacement BDB Administrator couldn't be hired until January 2022. These personnel changes were not expected at the time of the initial grant submission and set work on the project back considerably. A no-cost extension was filed for the FY21 grant to continue development. The grant extension is set to end on June 30, 2023, but the money was exhausted by the end of December 2022. The contractor hired from the FY21 grant was moved to internal monies to continue development.

Midway through the start of the FY21 project, NCDMF IT decided to move this project from ASP .NET to Microsoft Blazor with DevExpress add-ons to incorporate a newer framework and utilize some built in features that should speed up development in the future. This framework change, although better for future development, did require some refactoring of all the functionality that had been built prior to the start of this change. This slowed completion of the developed functionality worked on during the FY21 project; however, great progress has been made since then resulting in functionality to query, view, and export data from the BDB that went will go live to NCDMF biologists and technicians in July 2023. A standard operating procedure for the new interface is close to completion and the last step before the production environment is released to NCDMF.

ACCSP funded a maintenance proposal that starts in July 2023 to continue this work but there is still a lot of functionality left to complete. This maintenance proposal is being submitted to continue funding a developer for NCDMF's Biological Database (BDB) upgrade for one final year after the end of the FY23 grant. This is a large modernization project that needs to handle a wide variety of sampling programs and their specific requirements as well as a variety of users which have very different use cases for the same interface. Having an additional year of help with development will ensure that all functionality that existed in the legacy system will be able to be completed in the new interface. The

scope of this project hasn't changed but has been narrowed to reflect design decisions that were made during the FY21 grant work such as moving forward with a SQL Server database instead of maintaining the existing ASCII 128-byte database and moving forward with Microsoft Blazor and DevExpress. The scope of this project remains modernizing NCDMF's BDB by building web-based interfaces to replace the deprecated utilities that rely on the old ASCII database. Figure 1 shows a roadmap that outlines the phases in this project. Phase 1 should be completed by the end of this year. Phase 2 will be the focus of the FY23 project that starts in July 2023. This proposal will provide funds for Phase 3 which should complete development of the upgraded interfaces to fully replace the legacy BDB system.



BDB Web Development Plan

Figure 1. BDB Web development roadmap.

The funded FY2022 grant titled "North Carolina fishery-dependent biological data transmissions to the Atlantic Coastal Cooperative Statistics Program Data Warehouse" is in progress and set to be completed by the end of 2023.

Review of Previous Results:

Scripts have been created to migrate the ASCII flat file database into a SQL Server database. The format of the SQL Server database has been finalized and is synced to the ASCII database daily to help facilitate verification of data between the two databases. Reference tables have been created and added to the SQL database to allow for additional formatting of the data. These tables can be viewed and exported via the web interface. Development on the new web-based interface has been on-going. Midway through the start of the FY21 project, DMF IT decided to move this project from ASP .NET to Microsoft Blazor with DevExpress add-ons to incorporate a newer framework and utilize some built in features that should

speed up development in the future. Role-based security using Azure Active Directory has also been worked on and is near completion.

Several pieces of functionality to allow DMF staff to retrieve data from the SQL database have been completed and moved to production. These include a utility to search records by tag number and view customized results needed for processing tag returns (i.e., Tag Search) and a utility to search using sequence number to see data collected by trip and the samples collected from those trips (i.e., Record Dump). Additionally, the development of a query builder is in progress to allow the data to be searched and returned using logic built by the user. These queries can return data using any field in the database as a search parameter and exported to Excel for analysis. Biologists continue to verify the accuracy of the data format and results from the new interface utilities.

There are several old utilities being used for data entry into the ASCII database and work has been started on checking these files against NCDMF defined business rules that govern the entire database as well as additional rules specific to each sampling program. Most overarching business rules have been developed and should be completed by the end of 2023 (i.e., end of Phase 1). Once all business rules have been defined and incorporated into the new web interface, data can start to be imported into the SQL database allowing a cutover from the ASCII database to SQL Server as the database of record (i.e., start of Phase 2). In between the end of the FY21 grant and the start of the FY23 grant, the contractor hired on the FY21 grant has been moved over to internal monies and NCDMF funded staff have continued work on the BDB web. There are now 3 full-time developers dedicated to this project.

The FY21 grant has ended and the FY23 maintenance proposal begins July 2023. A new contractor will be hired to work on the FY23 grant and hopefully extended for an additional year if this proposal is accepted.

Approach

NCDMF staff continually work with NCDIT staff on a requirements document to detail specific needs and expectations of the corresponding I/O interfaces. This document will be fluid and will be updated as decisions are made. Minor changes occur as data inconsistent with known documentation are discovered. In the final database, data will still be flagged as dependent or independent based on the biological sampling program they were collected from to differentiate between these data types so that only fishery-dependent data are transferred to ACCSP. The web-based interface development will continue under this proposed grant to facilitate data entry as well as data corrections that can be used on Windows 10 PCs. With this new modernized interface, continued maintenance of the BDB will be easier as standard upgrades to operating systems occur over time. The SOL database also offers greater flexibility to meet new data requirements that were more difficult to implement under the ASCII database format. New data verification methods will be implemented in the web-based interface with corresponding database elements to track progress through the verification process. NCDMF staff will work with NCDIT staff to complete this project. Several NCDIT staff are housed at the NCDMF Headquarters office in Morehead City, NC and will be overseeing, assisting, and facilitating this project as well as actively developing new functionality for the interface. A contractor will be hired to help complete the interface development.

The new SQL Server database and the BDB's new web-based interface will allow for frequent transfers of fishery-dependent program data from the NCDMF to the ACCSP. These transfers could also replace the need for yearly transfers of biological data from North Carolina to the TIP program by providing necessary TIP variables within the ACCSP data transmission. Those data could be retrieved by the SEFSC from the ACCSP Data Warehouse, as needed. Once the ACCSP transfer process is built and refined, the data could

be transmitted monthly which will significantly improve timeliness of NC data to TIP compared to the annual transfer that happens currently. The scope of the funded FY22 grant is specifically the portal for this data transmission and the SQL scripts to compile the data for transfer. The FY22 project is in-progress and so far has been focused on finalizing the data mappings between NCDMF and ACCSP as well as making test transmission to the temp tables at ACCSP. Work on the interface to schedule and facilitate these transfers has started. Some work to get the data into the TIP database from ACCSP may be required and is not funded under the FY22 project.

NCDIT at NCDMF has been using the Agile SCRUM methodology for software development over the last 8-10 years. Development of the BDB web-based application will also be conducted using Agile development and 3-week development Sprints. User stories to define "bite-sized" pieces of functionality from the requirements document will be created to guide the development process.

Results and Benefits

Successful fulfillment of this project will provide:

- Enhanced data entry and verification functionality for North Carolina biological program data
- Increased timeliness and cleanliness of North Carolina's biological data
- Remote access to the BDB by staff that maintain the database, as well as biologists
- The ability for the BDB to meet State security requirements
- Data that can be easily formatted to facilitate <u>transmissions of fishery-dependent biological data</u> from North Carolina to the ACCSP Data Warehouse which will be accessible by regional partners including SEFSC TIP staff, as needed

Geographic Location

The NCDMF Headquarters are located in Morehead City, North Carolina. This project may be performed remotely and does not require the position to be located in Morehead City. Other NCDIT contractors working for the division are located in Raleigh, North Carolina.

Data Delivery Plan

Documentation of the enhanced data entry and editing process as well as any metadata and database schema changes will be provided to ACCSP as part of the annual report. The NCDMF BDB has extensive documentation for each of the sampling programs that are stored in the database. New documentation on the enhanced database will include data mapping tables that provide a definition of each variable with respect to the old database to ensure data migration is successful and accurate. Any new stored procedures created during this project will include documentation on primary function, data tables being accessed, and corresponding variables within the procedure's SQL code.

Biological data will be submitted to ACCSP through the data transmission portal outlined in the FY2022 grant titled "North Carolina biological data transmissions to the Atlantic Coastal Cooperative Statistics Program Data Warehouse" that which began in July 2022 and should be completed by the end of 2023.

Completed Data Delivery to ACCSP

The FY2021 project will be officially wrapping up on June 30, 2023 and performance reports have been submitted as required. The annual report for FY21 will be completed by the due date. The FY23 project is set to start July 2023 and performance reports will be submitted as required.

						N	lont	1				
Task	1	2	3	4	5	6	7	8	9	10	11	12
Hire Contractor	X	Х										
Develop requirements document	X	X	X	X	X	X	X	X	X	X	X	X
Create user stories	X	X	X	X	X	X	X	X	X	X	X	X
Interfaces for data entry and verification will be built and tested.	x	x	X	x	x	x	X	X	x	X	X	X
Finalize documentation											X	X

Milestone Schedule (start date depending on time of grant award):

The contractor hired under this grant is expected to work 40 hours a week on this project. Report writing will follow the requirements of two semi-annual status reports and a final report due at the end of the grant award.

Project Accomplishments Measurement (Metrics and Achieved Goals)

Projects	Accomplishments
Update requirements document, as needed throughout project	• Document is completed and describes functionality that needs to be completed in new application
User stories are created for Agile Development	• User stories are written and document small tasks for developers to complete requirements within Sprints
Create interface for data entry	Process completed and fully documentedData are able to be entered into biological database
Create interface for data verification/editing	 Process completed and fully documented QA/QC tests can be run on data Data are able to be viewed and edited
Finalize documentation	• Documentation reflects new enhanced process and data structure

Project Personnel

Stephanie McInerny—Section Chief, NCDMF IT Section (NCDIT) Casey Knight—Biological User Group (BUG) Chair, NCDMF Stephen Johnson—BUG Co-Chair, NCDMF Chris Capoccia—Applications Systems Analyst II, NCDMF IT Section (NCDIT) Scott Smith—Biological Database Administrator, NCDMF IT Section (NCDIT) Ashutosh Soni—.NET Developer (Contractor) Phyllis Howard—Biological Database Clerk, NCDMF IT Section (NCDIT) Leslie Hester— Biological Database Clerk, NCDMF IT Section (NCDIT)

Funding Transition Plan

This project should be completed within the proposed 1-year grant period. NCDIT and NCDMF staff can maintain the systems developed from this grant; therefore, subsequent years of funding are not needed. This will be the last year of maintenance requested.

FY24 Budget Narrative

The cost summary table below shows an explanation for each budget item for a one-year period. NCDIT will not charge an indirect fee for the Contractor. The cost for the developer in the summary below is based on an expert level .NET developer from NCDIT's convenience contracts.

In-kind amounts in this proposal have increased from the previous proposal. The hours represent time dedicated to this project from the NCDIT developer and BDB Administrator, who are are still responsible for maintaining the existing system until the upgrade is completed; therefore, only 8 months of their time is dedicated to new development. In addition, the contractor that was hired on the FY21 grant has been moved over to internal monies and is still 100% dedicated to this project. A new contractor will be hired to supplement this staff from the proposed grant.

				ACCSP	State	
Category	Expense	Units	Cost	Request	In-Kind	Explanation
Personnel	Contractor	1	\$141,981	\$141,981		One Analyst @ \$68.26/hr for 2,080 hrs (1 year)
	IT Section Chief	1			\$37,876	\$9,469/month for 4 months
	NCDIT Application Systems Analyst	1			\$56,440 \$7,055/month for 8 months	
	NCDMF BUG Chairs	2			\$19,744 Average salary of \$4,936/month for 4 months (2 months each)	

FY24 Cost Summary

	NCDMF BDB Administrator	1			\$48,064	\$6,008/month for 8 months
	NCDMF BDB clerk	2			\$12,296	\$3,074/month for 4 months (2 months each)
	NCDIT Contractor	1			\$141,981	\$68.26/hr for 2,080 hrs (1 year)
Subtotal				\$141,981	\$316,401	
Fringe	Retirement, Social Security, Health Insurance				\$59,440	Fringe=24.19% of salary (\$42,192) plus \$7,397/year for health insurance (1 month insurance = \$616*28 months combined work=\$17,248)
Indirect						No indirect needed for NCDIT contractors
Subtotal				\$0	<u>\$59,440</u>	
Travel				\$3,500		Travel for PI to present upgraded interface and functionality at conference
Subtotal				\$3,500	\$0	
Supplies	Computer	1	\$1,500	\$1,500		Replacement laptop for contractor, if needed
Subtotal				\$1,500	\$0	
	Column Totals			\$146,981	\$375,841	Total project cost = \$522,822
	Total Request					
	Percent			28%	72%	Percentage calculated from total cost

Attachment 1: Budget Narrative and Cost Summary for previously funded projects (FY2021 and FY2023)

FY21 Budget Narrative

The cost summary table below shows an explanation for each budget item for a one-year period. NCDIT will not charge an indirect fee for the Contractor.

NCDIT has convenience contracts in place that can be used to fill the budgeted position in this proposal; therefore, if money is awarded, a job posting will be sent to the temporary agencies used by NCDIT to solicit for applicants. Qualified individuals will be interviewed to select the best candidate for the position. A formal RFP will not be needed to hire a contractor for this project.

The cost for the developer in the summary below is based on the standard rate for a developer that specializes in Microsoft Dynamics CRM which is a customer relationship management software package that NCDIT has been using to replace other legacy systems within the state. If CRM is not the chosen solution for this project, the cost for the developer may be less.

FY21 Cost Summary

Catagory	Evnansa	Unite	Cost	ACCSP Bequest	State In-Kind	Explanation
Personnel	Contractor	1	\$150,000	\$150,000	m-Kinu	One Analyst @ \$100.00/hr for 1,500 hrs (9 months)
	IT Section Chief	1			\$26,250	\$8,750/month for 3 months
	NCDIT Application Systems Analyst	1			\$22,800	\$5,700/month for 4 months
	NCDMF District Manager	2			\$24,000	Average salary of \$6,000/month for 4 months (2 months each)
	NCDMF BDB Administrator	1			\$20,772	\$5,193/month for 4 months
	NCDMF BDB clerk	2			\$11,364	\$2,841/month for 4 months (2 months each)
Subtotal				\$150,000	<u>\$105,186</u>	
Fringe	Retirement, Social Security, Health Insurance				\$41,125	Fringe=29.09% of salary (\$30,599) plus \$6,647/year for health insurance (1 month insurance = \$554*19 months combined work=\$10,526)
Indirect						No indirect needed
Subtotal				\$0	<u>\$41,125</u>	
Travel				\$1,000		Travel for contractor between work location and Morehead City HQ office for in-person meetings, as needed
Subtotal				\$1,000	\$0	
Supplies	Computer	1	\$2,500	\$2,500		
	External Hard Drive	1	\$100	\$100		
Subtotal				\$2,600	\$0	
	Column Totals			\$153,600	<u>\$146,311</u>	Total project cost = \$299,911
	Total Request					
	Percent			51%	49%	Percentage calculated from total cost

FY23 Budget Narrative

The cost summary table below shows an explanation for each budget item for a one-year period. NCDIT will not charge an indirect fee for the Contractor. The cost for the developer in the summary below is

based on an expert level .NET developer from NCDIT's convenience contracts. This rate is what the current contractor is making and is largely different from the rate estimated in last year's proposal which was the standard rate for a developer that specializes in Microsoft Dynamics CRM (a customer relationship management software package that NCDIT has been using to replace other legacy systems within the state). CRM was not chosen as the solution for the Biological Database upgrade; therefore, the developer costs have been reduced from \$100 per hour to \$68.26 per hour.

In-kind amounts have increased compared to the previous year's proposal as the NCDIT developer and BDB Administrator have been committed to completing this upgrade and new interface; however, they are still responsible for maintaining the existing system until the upgrade is completed so only 8 months of their time is dedicated to new development.

~			~	ACCSP	State	
Category	Expense	Units	Cost	Request	In-Kind	Explanation
Personnel	Contractor	1	\$141,981	\$141,981		One Analyst @ \$68.26/hr for 2,080 hrs (1 year)
	IT Section Chief	1			\$37,876	\$9,469/month for 4 months
	NCDIT Application Systems Analyst	1			\$56,440	\$7,055/month for 8 months
	NCDMF BUG Chairs	2			\$19,744	Average salary of \$4,936/month for 4 months (2 months each)
	NCDMF BDB Administrator	1			\$48,064	\$6,008/month for 8 months
	NCDMF BDB clerk	2			\$12,296	\$3,074/month for 4 months (2 months each)
Subtotal				\$141,981	<u>\$174,420</u>	
Fringe	Retirement, Social Security, Health Insurance				\$59,440	Fringe=24.19% of salary (\$42,192) plus \$7,397/year for health insurance (1 month insurance = \$616*28 months combined work=\$17,248)
Indirect						No indirect needed for NCDIT contractors
Subtotal				\$0	<u>\$59,440</u>	
Travel				\$3,500		Travel for PI to present upgraded interface and functionality at conference
Subtotal				\$3,500	\$0	
Supplies	Computer	1	\$1,500	\$1,500		Replacement laptop for contractor, if needed
Subtotal				\$1,500	\$0	
	Column Totals			\$146,981	<u>\$233,860</u>	Total project cost = \$380,841

FY23 Cost Summary

Total Request			
Percent	39%	61%	Percentage calculated from total cost

Attachment 2: Project History and Total Project Cost by Year

YEAR	TITLE	COST	RESULTS
2021	North Carolina biological	\$153,600	Project currently underway; SQL database
	database enhancements to		created, design decisions made for web-based
	prepare for transmission of data		interface, development started on web-based
	to the ACCSP		interface for viewing and editing data
2023	North Carolina biological	\$146,981	Project starts in July 2023
	database enhancements to		
	prepare for transmission of data		
	to the ACCSP		

Summary of Proposal for Ranking Purposes

Proposal Type: Maintenance

Program Priority

Catch and Effort: 0%

Biological Sampling: 100%

The North Carolina Biological Database (BDB) was developed in 1980 to house field sampling data from fishery-dependent and fishery-independent sampling programs. The database contains data from the 1960s to present. There are data from over 120 programs within the BDB and 18 million records. These data are used in stock assessments and fishery management plans to manage species important to the North Carolina as well as those managed by regional and federal management commissions and councils. (see pages 3, 4)

Bycatch/Species Interactions: 0%

Social and Economic: 0%

Metadata:

The NCDMF BDB has extensive documentation for each of the sampling programs that are stored in the database. New documentation on the enhanced database will include data mapping tables that provide a definition of each variable with respect to the old database to ensure data migration is successful and accurate. Any new stored procedures created during this project will include documentation on primary function, data tables being accessed, and corresponding variables within the procedure's SQL code. Documentation will be provided as part of the grant completion report. (see pages 3-6)

Project Quality Factors

Multi-Partner/Regional impact including broad applications:

Although this project only covers data for North Carolina, future transmissions of biological data to the ACCSP will benefit other partners as the data will be more readily available for data requests and stock assessments. Many species within North Carolina are managed regionally. Regional management agencies such as the Atlantic States Marine Fisheries Commission (ASMFC) and Mid-Atlantic Fishery Management Council (MAFMC) would benefit from having more access to these fishery-dependent data. (see pages 3, 4)

Contains funding transition plan and/or justification for continuance:

The goals defined in this project should be completed within the grant cycle. (see page 9)

In-kind contribution:

72% (see cost table on page 10)

Improvement in data quality/quantity/timeliness:

The project identified in this proposal will greatly improve data quality and timeliness by providing a more modernized format for the data with enhanced data entry/verification screens and workflows that will prepare North Carolina for transmitting data to the Data Warehouse. (see page 5)

Potential secondary module as a by-product:

None

Impact on stock assessment:

Although this project only covers data for North Carolina, future transmissions of biological data to the ACCSP will benefit other partners as the data will be more readily available for data requests and stock assessments. Many species within North Carolina are managed regionally. Regional management agencies such as the Atlantic States Marine Fisheries Commission (ASMFC) and Mid-Atlantic Fishery Management Council (MAFMC) would benefit from having more access to these fishery-dependent data. (see pages 3, 4)

Properly Prepared:

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

Merit:

Modernizing NCDMF's Biological Database and the front-end interfaces that allow data entry clerks, technicians, biologists, and analysts to interact with the database is crucial to the success of biological data sampling programs in North Carolina. Failures to the interfaces that interact with the ASCII database are regularly occurring which result in excessive IT time to fix and excessive wait times for biologists and technicians that need to use the data for stock assessments and fishery management plans.

Stephanie McInerny

North Carolina Division of Marine Fisheries/North Carolina Department of Information Technology 3441 Arendell Street / P.O. Box 769 Morehead City, NC 28557 (252) 808-8117 stephanie.mcinerny@ncdenr.gov

EXPERIENCE

Information Technology Section Chief (Applications Systems Manager I) March 2020–Current North Carolina Department of Information Technology (NCDIT), Morehead City, NC

Supervisory and Management

- Manage 15 technical staff members of IT Section at NCDMF through the North Carolina Department of Information Technology.
 - Directly supervise seven employees to include assigning and reviewing tasks, coaching, mentoring, performance reviews, encouraging enhancement of skills, time management, and hiring.
- Manage six different budgets including budgets that fund NCDMF biological staff
- Currently, overseeing several IT projects occurring simultaneously requiring daily multi-tasking, prioritization of staff and resources, planning, meetings, and organization.
- Oversee and manage applications development, biological database, and GIS staff and activities

License and Statistics Section Chief (Environmental Program Manager I) North Carolina Division of Marine Fisheries (NCDMF), Morehead City, NC

2016-2020

Supervisory and Management

- Manage around 60 staff members of the License and Statistics Section including office and field staff located in five different offices throughout NC. Had roles in time management, coaching, mentoring, hiring, firing, disciplinary action, performance reviews, encouragement of skills, and training.
- Directly supervise seven employees to include assigning and reviewing tasks, coaching, mentoring, performance reviews, encouraging enhancement of skills, time management, and hiring.
- Manage 20 different budgets including budgets that fund Information Technology (IT) staff and projects. Monies consist of appropriations, receipts, and federal grants totaling over \$3 million.
- Responsible for presenting at quarterly Marine Fisheries Commission meetings on license, commercial, and recreational data issues requiring effective communication of complex statistics and data collection programs.
- Currently, overseeing several IT projects occurring simultaneously requiring daily multi-tasking, prioritization of staff and resources, planning, meetings, and organization. Current projects using either Waterfall or Agile application development are listed below:

Agile development projects:

- NCDMF Fisheries Information Network (FIN) replacement project using Agile SCRUM
- NCDMF FIN-GIS for shellfish leases and pound nets (2 similar projects)

Waterfall development projects:

- NCDMF-ACCSP upload portal interface upgrade and improvement project
- NCDMF Coastal Angling Program Catch U Later project (i.e., mobile discard reporting for recreational fishermen focused on flounder)
- o NCDMF Trip Ticket Program VESL project (web software for seafood dealer reporting)

Data, Statistics, and Committees

- SQL Server Database Schema Design actively review and comment on schema changes to the FIN Database proposed by developers to improve and simplify data capture and in particular, data analysis by analysts at DMF
- Perform daily data queries of FIN using SAS and SQL (through SQL Management Studio)
- Frequently querying FIN for data related to section programs, license sales, and commercial trip ticket data using SAS, SQL, R, and Crystal Reports
- Serve on the DMF Management Review Team (MRT)
- Serve on Atlantic Coastal Cooperative Statistics Program (ACCSP) Operations Committee
- Serve on ACCSP Commercial Technical committee and ACCSP Information Systems committee
- Serve as Chair of the FIN Software Change Control Board and member of IT Steering Committee.
- Serve on Coastal Recreational Fishing License (CRFL) Joint Review Team

 Serve on Rules Advisory Team (RAT) as well as several RAT subcommittees (Permit NOV subcommittee, Periodic Review Subcommittee, Shellfish Workgroup)

Trip Ticket Data Analyst (Marine Fisheries Biologist II)

North Carolina Division of Marine Fisheries (NCDMF), Morehead City, NC

2008-2016

IT Project Management and Documentation

- Created, led, and managed multiple IT software development projects using Waterfall. Was responsible for drafting scopes of work, database schema review, drafting data specification documents, requirements gathering, review of architectural solutions suggested by DMF IT, communication between IT and business users, prioritizing projects and budget, coordinating resources, and testing. Projects are listed below:
 - Trip Ticket Data Upload Interface
 - ACCSP Automated Update
 - Simplification of E-Dealer data importing
 - Electronic Import of Quota Monitoring Data
 - ACCSP Upload Interface Principal Investigator
- Acted as Business Architect and Product Owner for NCDMF during Pega FIN replacement project
- Served as Chair of the FIN Software Change Control Board and member of IT Steering Committee.
- Wrote and/or compiled standard operating procedures and policies for the NCDMF eel monitoring program, NCDMF Biological Database extraction and analysis, and ACCSP data transmission process as well as FIN data entry procedures for Marine Patrol violation data and several Habitat and Enhancement section permits.

Data Analysis, Statistics, and Committees

- Was the primary data analyst for the NCDMF Trip Ticket Program. Performed daily commercial fishery data queries
 and statistical analyses using programming languages such as SAS, SQL, Microsoft Office Products (e.g., Excel and
 Access), and R (statistical analysis software) including weight-length regressions, nonlinear growth models, length and
 age compositions, CV, natural mortality, and landings trends.
- Analyzed data from the DMF Biological Database, when needed and trained staff on extraction and analysis.
- Participated as a member of plan development teams that facilitate fishery management plans for species important to North Carolina.
- Provided commercial data, analyzed life history data, wrote technical reports, and give presentations at data workshops for Southeast Data Assessment and Review (SEDAR) stock assessments for NOAA Fisheries and the Atlantic States Marine Fisheries Commission (ASMFC) as part of the life history and commercial workgroups.
- Accessed, verified, and performed quality control on ACCSP, NOAA, and NCDMF fisheries data for NC using SAS, SQL, Oracle SQL Developer, Microsoft SQL Management Studio, Crystal Reports, and R.
- Involved in training, coaching, and mentoring new and existing employees on procedures and policies of the Trip Ticket
 Program and SAS programming as well as counseling and mediating conflicts between staff to maintain a team
 environment.
- Served on the NCDMF Biological Review Team (BRT), BRT Technical Committee, BRT Biological User Group, BRT Life History Subcommittee, and BRT Editorial Subcommittee.
- Served on CRFL Joint Review Team
- Served on ACCSP Committees including Commercial Technical, Information Systems, Outreach, and Conversion Factor Subcommittee.
- Involved in interviewing over 30 applicants for a variety of NCDMF positions as well as evaluating, recruiting, selecting candidates, and hiring for positions within License and Statistics Section, Fisheries Management Section, and Protected Resources Section.

EDUCATION

July 2007 Uni M.S., Marine Biolo	versity of North Carolina Wilmington gy with Applied Statistics Certificate	Wilmington, NC
Fall 2006 Nor Post Baccalaureat	rth Carolina State University e Studies – Quantitative Fisheries Management	Raleigh, NC
December 2002 B.S., Biology/Mari	East Carolina University ne Biology	Greenville, NC