

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

**FY22: DNA and Bycatch Characterization of New Jersey's  
American Shad Fishery in Delaware Bay**

Submitted by;  
Heather Corbett  
New Jersey Division of Fish and Wildlife  
P.O. Box 418  
Port Republic, NJ 08241

## **Proposal for FY2022 ACCSP Funding**

**Applicant Name:** New Jersey Division of Fish and Wildlife  
Bureau of Marine Fisheries  
P.O. Box 418  
Port Republic, NJ 08241

**Project Title:** DNA and Bycatch Characterization of New Jersey's American Shad Fishery in Delaware Bay

**Project Type:** New Project

**ACCSP Program Priorities:** 1b.) Improvements in Biological Data (80%), 2) Improvements in Releases, discards and protected species data (20%)

**Project Supervisor:** Heather Corbett, Supervising Biologist (NJDFW)

**Principal Investigator:** Brian Neilan, Senior Biologist (NJDFW)

**State Staff:** Assistant Biologist (NJDFW)

**Requested Amount:** \$88,886.00

**Requested Award Period:** September 1, 2021 to August 31, 2022

## 1. Objectives

- Determine the genetic stock composition of American shad in the directed mixed stock fishery in the lower Delaware Bay in support of understanding the effects of out of basin harvest on river specific American shad stocks through DNA analysis.
- Evaluate by-catch and discards in New Jersey's Delaware Bay gill net fisheries to supplement and verify data collected from commercial harvester reports through on-board fisheries observers.

## 2. Need

The Atlantic States Marine Fisheries Commission's (ASMFC) 2020 benchmark stock assessment for American shad found the coastwide stock to be depleted compared to historic levels. Out of this stock assessment came several research recommendations including developing an alosine genetics repository that can be used to, "define stock structure, identify stock composition from genetic sampling of American shad catch in mixed-stock fisheries, and provide information on recolonization capabilities in defunct American shad systems.": The genetic data collected through this project from commercial fishermen in Delaware Bay will help meet these research needs that the stock assessment classified as long term and high priority. One of the largest mixed stock fisheries along the coast is executed in the lower Delaware Bay. Defining genetic stock structure of the harvested fish will help to inform managers on ways to eliminate or mitigate the impacts to river specific stocks and the coastwide metapopulation of American shad which has been assessed as depleted. In conformity with the RFP, American shad are a target species in the top quartile of the "Biological Priority Matrix," and collecting biological data on this species addresses Program Goal 1b, "Improvements in biological data."

Additionally, this project will address a pressing need for bycatch and discard data from New Jersey's Delaware Bay gill net fishery. Under New Jersey's current commercial harvest reporting program discard reporting is not mandatory and is done on a voluntary basis. As such, any voluntary reports of discarded protected species such as Atlantic and shortnose sturgeon are considered an underrepresentation of the amount of these species that are actually discarded during the fishing year. On-board observer coverage, which is required as part of the shad limited entry permit, will provide a more accurate representation of the number and biological characteristics of discarded protected species and provide the necessary data for fisheries managers to most effectively managed for the recovery of these imperiled species. In conformity with the RFP, collecting biological data on this protected species addresses Program Goal 1b, "Improvements in Biological Data," and Program Goal 2., "Improvements in Releases, discards and protected species data," for important species such as Atlantic sturgeon and striped bass.

## 3. Results and Benefits

It is expected that this project will result in a significant increase in the quality and quantity of meaningful fisheries data to be collected from New Jersey's Delaware Bay gillnet fishery. The project will address multiple program priority goals including Program Goal 1b, "Improvements in Biological Data," through the collecting of biological (weight, length, sex, and age) and DNA data for the American shad directed fishery in Delaware Bay and Program Goal 2., "Improvements in Releases, Discards and Protected species data," through the collection of at sea data by on-board observers. These results not only relate directly to the RFP's program goals but have been identified in the ASMFC's 2020 Benchmark Stock Assessment for American shad and 2017 Atlantic Sturgeon Benchmark Stock Assessment as high priority needs. The data collected through this project will supplement and verify New Jersey's commercial discards in the Delaware Bay gillnet fishery that are currently reported on a voluntary basis through State reports and SAFIS eTrips. The data collected from these sampling efforts will benefit future stock assessments by directly addressing high priority research needs for several commercially, recreationally, and ecologically important species. Filling these vital data gaps is necessary to achieving the stock rebuilding goals of these data-poor species.

#### **4. Data Delivery Plan**

In addition to the mandatory landings reporting from this fishery, staff will augment the ACCSP's commercial reporting database with the observed discards and bycatch from this fishery. Currently, New Jersey does not require the mandatory reporting of discards and this represents a major data gap from this fishery. The observer coverage and subsequent discard reporting to the ACCSP's commercial reporting database will help to lessen this gap and provide a more accurate picture of how the fishery operates.

Staff will process all data following the completion of the spring directed gill net fishery for American shad. A mixed stock analysis will be conducted using the methods from Bartron and Prasko, 2021. Two semi-annual reports will be completed that will detail the program's progress toward achieving the stated goals. A final report will be prepared and submitted detailing the program's success focusing on the stock composition and regional contributions of the American shad harvest in the spring directed gill net fishery and a summary of the Atlantic sturgeon and striped bass by-catch discards that are observed. The data will also be submitted for consideration for management use in the next stock assessments for American shad, Atlantic sturgeon, and striped bass.

#### **5. Approach**

##### **5.A. Fisheries Dependent Sampling Program 10% Allocated Funds**

**At-Sea Observer Coverage.** At-sea observer sampling will consist of 15 planned trips during the directed spring gillnet fishery for American shad, with a minimum goal of 10 successful trips. The extra 5 trips will be planned to account for unsuccessful sampling due to foul weather days or low catch days. These 10 trips represent approximately 10% of the average number of vessels trips per year that are reported in this fishery. Staff will conduct outreach to fisherman prior to the fishing year to coordinate logistics for the planned observer trips. During each sampling effort, staff will record fork length, total length, weight, sex (when possible). Staff will collect fin clips for DNA analysis of a subset of the total amount of American shad caught with a target goal of 50 fin clips per trip. Additionally, any Atlantic sturgeon or striped bass that are incidentally caught and discarded will be recorded including disposition at the time of discard.

## **5.B. Biological Characterization**

### **82% Allocated Funds**

Biological sampling of American shad will be done during the spring 2022 directed gillnet fishery in the eastern half of the Delaware Bay. American shad sampled by NJ are ranked in the top quartile of the biological sampling priority matrix. Effort, either at-sea or dockside, is assigned in accordance with guidelines defined in ASMFC's FMPs for shad. Staff will collect DNA fin clips for analysis at the time of harvest. Fin clips will be taken from the upper lobe of the caudal fin and stored in vials of ethanol for later processing. Data collected from the subsampled shad catch will include fork length, total length, weight, and sex.

Upon completion of the spring gillnet fishery sampling the collected fin clips will be sent to the U.S. Geological Survey Eastern Ecological Center's Leetown Research Laboratory in Kearneysville, West Virginia. A mixed stock analysis will be conducted using the methods recently employed by Bartron and Prasko, 2021, at the USFWS Northeast Fishery Center. Stock origin will be determined using a microsatellite analysis approach using 15 loci. Additionally, all tissue samples will be submitted and catalogued with the Science Center's Alosine Tissue Repository to support broader efforts to assess the impacts of bycatch on coastal stocks.

Currently, a panel of single nucleotide polymorphism (SNP) markers is currently under development for American Shad, which offers the promise of significantly improved resolution for stock assignments. If available in time, we will leverage the new SNP panel in lieu of microsatellite to perform stock assignments using a reduced representation approach such as RADcapture.

## **5.C. Data Analysis and Report Preparation**

### **8% allocated funds**

Staff will process all data following the completion of the spring directed gill net fishery for American shad. Two semi-annual reports will be completed that will

detail the program's progress toward achieving the stated goals. A final report will be prepared and submitted detailing the program's success focusing on the stock composition and regional contributions of the American shad harvest in the spring directed gill net fishery and a summary of the Atlantic sturgeon and striped bass by-catch discards that are observed. The data will also be submitted for consideration for management use in the next stock assessments for American shad, Atlantic sturgeon, and striped bass.

## **6. Geographic Location**

The project will be administered from the New Jersey Department of Environmental Protection (NJDEP), Division of Fish & Wildlife's Nacote Creek Research Station in Port Republic, New Jersey. The scope of the project will cover the eastern half of the Delaware Bay where New Jersey's directed gillnet fishery for American shad takes place.



## 8. Project Accomplishment Measurements

| <b>Project Component</b>                    | <b>Goal</b>   | <b>Measurement</b>   |
|---|---|--|
| Project Outreach                            | Contact active commercially permitted shad fisherman to explain the project and develop logistics for successfully planning at-sea observer trips during the spring directed gillnet fishery for American shad. | Fishermen contacted and preparations made for at-sea observer trips in the spring directed gillnet fishery for American shad |
| Fisheries Dependent At-Sea Observer Program | Conduct the target minimum of 10 successful at-sea observer trip with a maximum goal for 15   | Number of successful at-sea observer trips   |
| Biological Characterization                 | Collect the target number of American shad fin clip samples and record bycatch in the spring directed gillnet fishery for American shad   | Number of samples successfully collected   |
| Sample Processing                           | Process shad fin clips for DNA analysis to determine stock structure in the mixed stock fishery   | Number of samples successfully processed   |
| Data Analysis and Report Preparation        | Interpret and report on results from DNA analysis   | Is stock structure in the in the mixed stock fishery able to be determined to a level useful for management?                 |



**9. FY2022 Budget** (Letters in parenthesis pertain to Federal Grant Object Codes)

| <b>Item</b>  |               |                            | <b>Total NJ DFW in-kind support</b> |
|--|---------------|----------------------------|-------------------------------------|
| <b>Salaries (NJDFW)</b>  |               |                            |                                     |
|  | <b>Cost</b>   | <b>Amount</b>              | <b>Total</b>                        |
| Supervising Biologist 5% in-kind (current FTE) (Heather)         | \$ 102,317.02 | 5%                         | \$5,116.00                          |
| Senior Biologist 5% (current FTE)                                | \$ 70,464.99  | 5%                         | \$3,523.00                          |
| Wildlife Worker 2% (Current FTE)                                 | \$ 37,251.71  | 2%                         | \$745.00                            |
| Clerical 1% (current FTE)  | \$ 56,215.45  | 1%                         | \$562.00                            |
|  |               | <i>salaries subtotal</i>   | <i>\$9,946.00</i>                   |
| Fringe Benefits  | 53.25%        |                            | \$5,296.00                          |
|  |               | <i>Salary &amp; Fringe</i> | <i>\$15,242.00</i>                  |
| <b>Supplies and Materials</b>                                    |               |                            |                                     |
|  | <b>Cost</b>   | <b>Amount</b>              | <b>Total</b>                        |
| Scientific Equipment (Measuring boards, scales, dissecting kits) |               |                            | \$300.00                            |
| Marterials for collection and storing of biological samples      |               |                            | \$300.00                            |
|  |               | <i>subtotal</i>            | <i>\$600.00</i>                     |
| <b>Other</b>   |               |                            |                                     |
|  | <b>Cost</b>   | <b>Amount</b>              | <b>Total</b>                        |
| NJDFW indirect costs   | 22.2%         |                            | \$3,384.00                          |
| <b>Subtotal NJ Funds</b>   |               |                            | <b>\$19,226.00</b>                  |
| <b>Append to ACCSP Adminstrative Grant</b>                       |               |                            |                                     |
| <b>Salaries (NJDFW)</b>  |               |                            |                                     |
|  | <b>Cost</b>   | <b>Amount</b>              | <b>Total</b>                        |
| Assitant Biologist 30% (Current FTE)                             | \$ 56,855.44  | 30%                        | \$17,057.00                         |
| Fringe Benefits  | 53.25%        |                            | \$9,083.00                          |
|  |               | <i>Salary &amp; Fringe</i> | <i>\$26,140.00</i>                  |
| <b>Supplies and Materials</b>                                    |               |                            |                                     |
|  | <b>Cost</b>   | <b>Amount</b>              | <b>Total</b>                        |
| Travel (mileage and tolls)                                       |               |                            | \$400.00                            |
| DNA Sample Processing  |               |                            | \$50,000.00                         |
|  |               | <i>subtotal</i>            | <i>\$50,400.00</i>                  |
| <b>Other</b>   |               |                            |                                     |
|  | <b>Cost</b>   | <b>Amount</b>              | <b>Total</b>                        |
| ASMFC Overhead (16.13%)  | 16%           |                            | \$12,346.00                         |
| <b>ACCSP Admin Grant Project Costs Total</b>                     |               |                            | <b>\$88,886.00</b>                  |
| <b>Total Project Costs (includes in-kind)</b>                    |               |                            | <b>\$108,112.00</b>                 |

## **Budget Narrative**

**(a). Salaries; Assistant Biologist:**

(1) Assistant Biologist, NJDFW FTE.

**(b). Benefits of above employees**

53.25% of the annual salary for the one Assistant Biologist.

**(c). ASMFC Overhead:**

16.13% of the sum of budget items a and b.

**(d). ACCSP Administrative Grant Project Costs:**

Total of (a) through (c) does not include in-kind support. No funds are being directly received by the State of NJ.

The FY2022 budget is in two parts, the first part details the amount that is being provided as in-kind match by NJDFW, while the second part is the amount to requested from the ACCSP Grant.

The in-kind funding provided by NJDFW includes salaries for NJDFW full time employees under the titles of supervising biologist, senior biologist, wildlife worker, and clerical staff. Additional in-kind funds include staff time for at sea sampling, supplies for at sea sampling, vehicle maintenance, data preparation report preparation. Sources of in-kind funding come from the annual state appropriation for the NJ Marine Fisheries Administration (MFA) and from the Atlantic Coastal Grant.

The \$88,886.00 covers the processing of American shad fin clips DNA and subsequent stock composition in the mixed stock fishery analysis and the salary for one NJDFW Assistant Biologist position that works out of the NJDFW's field office in Port Republic, NJ. This Assistant Biologist position will be responsible for outreach to the commercially permitted shad fishermen, scheduling and completing at-sea observing trips, data management, and biological sample management. This covers travel, fringe, indirect, and ASMFC's overhead. All other funding for the project will be covered by NJDFW.

## **Proposal Summary for Ranking Criteria**

**PROPOSAL TYPE:** *New Project*

### **PRIMARY PROGRAM PRIORITY:**

**1b. Biological Data:** This project will provide biological data that has been determined to be a long term, high priority need for American shad, striped bass, and Atlantic sturgeon. The increase in quality and quantity of data collected through this project will help to improve the stock assessment process.

### **PROJECT QUALITY FACTORS (Partners, Funding, and Data):**

#### **Partners-**

##### **Multi-Partner/Regional impact including broad application:**

Although this project focuses on the activities of NJ permitted fishermen, it includes the data collection of species managed regionally American shad, striped bass, and Atlantic sturgeon. Thus, ASMFC will benefit from the biological data collected from this project.

#### **Funding-**

##### **Requested Funds:**

The funds being requested will be used the processing of American shad fin clips DNA and subsequent stock composition in the mixed stock fishery and the salary for one NJDFW Assistant Biologist position that works out of the NJDFW's field office in Port Republic. This Assistant Biologist position will be responsible for outreach to the commercially permitted shad fishermen, scheduling and completing at-sea observing trips, collecting biological data and samples, data management, and biological sample management.

##### **In-kind Contribution:**

NJDFW is providing 17% of the project cost (see section 9).

#### **Data:**

##### **Improvement in data quality/quantity:**

All biological data collected by NJDFW staff are available for coast-wide stock assessment. The data collected through the execution of this project has been determined by the ASMFC as long term, high priority needs for American shad, striped bass, and Atlantic sturgeon.

## **SECONDARY PROGRAM PRIORITY:**

### **2. Releases, discards, and protected species data:**

## **PROJECT QUALITY FACTORS (Partners, Funding, and Data):**

### **Partners-**

Although this project focuses on the activities of NJ permitted fishermen, it includes the data collection of species managed regionally American shad, striped bass, and Atlantic sturgeon. Thus, ASMFC will benefit from the biological data collected from this project.

### **Funding-**

#### **Requested Funds:**

The funds being requested will be used for the salary of an NJDFW Assistant Biologist to perform at-sea observer trips to record the by-catch of striped bass and Atlantic sturgeon in the spring directed gillnet fishery for American Shad in the Delaware Bay. This Assistant Biologist position will be responsible for outreach to the commercially permitted shad fishermen, scheduling and completing at-sea observing trips, recording bycatch data, data management, and biological sample management.

#### **In-kind Contribution:**

NJDFW is providing 17% of the project cost (see section 9).

### **Data:**

All discard and by-catch data collected by NJDFW staff are available for coast-wide stock assessment. The data collected through the execution of this project has been determined by the ASMFC as long term, high priority needs for American shad, striped bass, and Atlantic sturgeon.

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## Brian Neilan

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### Senior Fisheries Biologist

New Jersey Division of Fish and Wildlife

### Education

- Professional Environmental Science Master, Stockton University, 2019
- Bachelor of Science in Marine Science, Richard Stockton College of New Jersey, 2010
  - Concentration in Marine Biology

### Employment History

- **New Jersey Division of Fish and Wildlife, Bureau of Marine Fisheries**
  - **Senior Biologist, Fisheries**, March 2017 to present
    - Primary Investigator, River Herring Assessment and Restoration Program
    - State representative for the Delaware River Basin Fish and Wildlife Management Cooperative, ASMFC's Sturgeon Technical Committee, and current Chair of the ASMFC's Shad & River Herring Technical Committee
    - Conducts all field surveys, laboratory analyses, and administrative work involved with maintaining New Jersey's compliance with federal and regional fishery management plans and achieving all program goals for both commercial and recreational fisheries
    - Regional Biologist, all marine and estuarine waters in the Delaware Bay and River
      - Submits official comments regarding development proposals and permit applications in accordance with program goals and protocols
    - Assists in coordinating, developing, and implementing commercial and recreational marine fisheries rules and regulations
    - Grant reviewer and state representative on the Delaware Watershed Conservation Fund Advisory Team
    - Assigns work to and supervises part time employees to achieve program goals
  - **Assistant Biologist, Fisheries**, December 2013 to March 2017
    - Organized assigned fisheries management work and developed effective work methods for the laboratory and the field.
    - Conducted surveys of estuaries and coastal/offshore waters and sampled their fish populations using various gear types
    - Developed and implemented management programs and regulations for the state's fisheries resources.
- **New Jersey Division of Fish and Wildlife, Bureau of Freshwater Fisheries**
  - **Hourly Fisheries Technician**, April 2011 to December 2013
    - Assisted fisheries biologists in completing all field and laboratory program goals
    - Coordinated a federally funded fish ladder project with the goal of monitoring and restoring the American shad population in the Raritan River

### Field Work Skills

- Conducts federally-funded fishery dependent and independent surveys of coastal waters
  - Trailers and pilot boats up to 25 feet in length
  - Utilizes gill nets, seine nets, otter trawls, fish pots, etc.
- Organizes and instructs staff to ensure employee safety and survey completion
- Identifies marine and freshwater fish and invertebrates to the lowest taxonomic level
- Performed electrofishing surveys and fish salvages using backpack, streamside, barge, and boat electrofishing equipment

### **Laboratory Skills**

- Processes and ages biological samples to develop population structure and characteristics as part of several regional and federal fishery management plan requirements
- Preserves histological specimens and DNA samples for analysis and for inclusion in reference collections
- Processes and preserves gut samples of marine fish species for diet analysis

### **Computing Skills**

- Microsoft Office suite of programs including Outlook and Access
- Familiar with various database related software (ex., ArcGIS and R statistical software)
- Input large volumes of information, maintain files, and analyze those records to produce summaries, charts, and graphs for writing technical and non-technical reports and articles

### **Certifications**

- ASMFC Introduction to Stock Assessment Training
- ASMFC Intermediate Stock Assessment Training Program
- ASMFC Introduction to R for Fisheries Biologists
- ASMFC Access Point Angler Intercept Survey Training Program
- New Jersey Boating Safety Certificate
- U.S. Department of the Interior Electrofishing Safety Course

### **References**

- Gregory Hinks (Current Supervisor)  
Principal Biologist, Bureau of Marine Fisheries  
New Jersey Division of Fish and Wildlife  
Gregory.Hinks@dep.nj.gov  
609-748-2020
- Brandon Muffley  
Fishery Management Specialist  
Mid-Atlantic Fishery Management Council  
bmuffley@mefmc.org

(302)-674-2331, ext. 260

- Shawn Crouse  
Supervising Biologist, Bureau of Freshwater Fisheries  
New Jersey Division of Fish and Wildlife  
Shawn.Crouse@dep.nj.gov  
908-236-2118