

**VIRGINIA SALTWATER RECREATIONAL FISHING DEVELOPMENT  
FUND  
SUMMARY PROJECT APPLICATION\***



<p><b>NAME AND ADDRESS OF APPLICANT:</b></p> <p>Department of Fisheries Science Virginia Institute of Marine Science PO Box 1346 Gloucester Point, VA 23062-1346</p>	<p><b>PROJECT LEADER (name, phone, e-mail):</b></p> <p>Robert J. Latour (804-684-7312, <a href="mailto:latour@vims.edu">latour@vims.edu</a>)</p>						
<p><b>PRIORITY AREA OF CONCERN:</b></p> <p>Research</p>	<p><b>PROJECT LOCATION:</b></p> <p>Chesapeake Bay</p>						
<p><b>DESCRIPTIVE TITLE OF PROJECT:</b></p> <p><b>Survey design for adult Atlantic menhaden along the U.S. east coast</b></p>							
<p><b>PROJECT SUMMARY:</b></p> <p>The Atlantic menhaden (<i>Brevoortia tyrannus</i>) is a critically important ecological species that also supports large-scale commercial fisheries. Stock status determinations for Atlantic menhaden are significantly restricted by a lack of key input data, specifically relative abundance of adult fish along the Atlantic coast. Because menhaden are schooling pelagic fish, they are not adequately collected by existing fisheries sampling programs that utilize typical gear types (e.g., trawls). This proposal seeks funds to collaborate with an expert subcontractor to develop surveys designs (one aerial, one satellite) for adult menhaden along the U.S. each coast. Abundance information on adult menhaden is the most pressing research need for this resource, and development of a statistically defensible survey design represents an important first step toward improved stock status determinations and management.</p>							
<p><b>EXPECTED BENEFITS:</b></p> <p>The primary results of this proposed research are two survey designs (one aerial, one satellite based) for Atlantic menhaden along the eastern seaboard of the United States. Data on adult abundance are incredibly valuable and would greatly enhance the stock assessment for Atlantic menhaden. More accurate stock assessment results, in turn, will lead to better informed management decisions for Atlantic menhaden. Sustainability of menhaden is crucial for ecosystem functioning and the health of the gamefishes that depend on this species.</p>							
<p><b>COSTS:</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"><b>VMRC Funding:</b></td> <td style="border: 1px solid black; text-align: center;">\$55,373</td> </tr> <tr> <td><b>Recipient Funding:</b></td> <td style="border: 1px solid black; text-align: center;">\$8,127</td> </tr> <tr> <td><b>Total Costs:</b></td> <td style="border: 1px solid black; text-align: center;">\$63,500</td> </tr> </table> <p><b>Detailed budget must be included with proposal.</b></p>		<b>VMRC Funding:</b>	\$55,373	<b>Recipient Funding:</b>	\$8,127	<b>Total Costs:</b>	\$63,500
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Proposal Submitted to:

Virginia Marine Resources Commission  
Recreational Fishing Advisory Board  
2600 Washington Avenue, Third Floor  
Newport News, Virginia 23607

By

THE VIRGINIA INSTITUTE OF MARINE SCIENCE  
COLLEGE OF WILLIAM AND MARY

**Survey design for adult Atlantic menhaden along the U.S. east coast**

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Robert J. Latour  
Principal Investigator

E-mail Approval

Dr. John E. Graves  
Chair, Fisheries Science

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Jane A. Lopez  
Director, Sponsored Programs

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Dr. Roger Mann  
Director for Research and Advisory Services

April 15, 2011

## **Survey design for adult Atlantic menhaden along the U.S. east coast**

### **I.) Need**

The Atlantic menhaden (*Brevoortia tyrannus*) is an important ecological species, serving as a principle prey for a wide variety of piscivorous fishes, elasmobranchs, marine mammals, and sea birds along the Atlantic coast of the United States. Atlantic menhaden also support large-scale commercial bait and reduction fisheries that operate primarily in the estuarine and coastal waters of the mid-Atlantic. Because menhaden serve this dual role of providing forage for other marine organisms and supporting intense harvest activities, effective management of this species is critical to maintaining a sustainable balance among predation and fisheries demands.

Every three years, a formal stock assessment is conducted to determine the status of Atlantic menhaden along the Atlantic coast. Based on the most recent assessment, which was conducted in 2009/2010, the coastwide stock appears to be experiencing overfishing. In addition, concerns persist about the notion of localized depletion and sustained low levels of recruitment (production of age-0 fish) in the Chesapeake Bay. From an analytical perspective, the assessment model can be considered modern and sophisticated, however, key input data are lacking which have raised concerns about the accuracy of model results. The most significant data type missing from the assessment is fisheries-independent information on relative abundance of adult fish. It is fair to assert that the scientific advancements necessary to more confidently understand the status of Atlantic menhaden and effectively manage this resource (particularly from an ecosystem perspective) will never be achieved unless new types of data are routinely collected.

The Atlantic menhaden is a schooling pelagic species that is often patchily distributed in the environment. Because of this aggregating behavior, menhaden are not adequately collected by existing fisheries sampling programs that utilize typical gear types (e.g., bottom trawl surveys). Non-traditional methods must be employed to determine the abundance of Atlantic menhaden, and aerial surveys can be used to effectively monitor abundance of schooling fish over large spatial areas. The use of satellite imagery as a tool for monitoring fish populations is relatively new technology that holds some promise for estimating abundance of surface-oriented schooling fishes. Development of any large-scale fisheries-independent survey (aerial or otherwise) invariably is a two stage process that first involves a design phase followed by an implementation phase. This proposal seeks funding to support the design phase of an aerial (primary) and a satellite based (secondary) survey for adult menhaden along the Atlantic coast.

### **II.) Objective**

The objectives of this proposal are to i) develop two scientifically defensible statistical survey designs (one aerial, one satellite) for adult Atlantic menhaden along the U.S. east coast, and ii) conduct a training workshop for scientists associated with the Atlantic States Marine Fisheries Commission (ASMFC) Atlantic Menhaden Technical Committee (TC) to allow them to become experts on the final survey designs. The TC is expected to take responsibility for preparing reports for independent peer-review and initiating pilot survey.

### III.) Expected Results or Benefits

The primary results of this proposed research are two survey designs (one aerial, one satellite based) for Atlantic menhaden along the eastern seaboard of the United States. Although Atlantic menhaden are not harvested recreationally, many highly prized species sought by recreational fishers in the Commonwealth rely heavily on menhaden as prey. It is therefore fair to assert that the status of menhaden directly affects the health of other valuable gamefishes, such as striped bass, weakfish, bluefish, and sandbar shark. Data on adult abundance are incredibly valuable and would greatly enhance the stock assessment for Atlantic menhaden. More accurate stock assessment results, in turn, will lead to better informed management decisions that are designed to maintain the sustainability of menhaden for ecosystem functioning and the health of the resources that depend on this species.

### IV.) Approach

Given the relatively newness of using satellite imagery to assess fish population abundance, the ASMFC has not been able to develop much technical guidance on survey design requirements. Therefore it is not possible to provide many methodological details at this time since application of this technology for monitoring fish population abundance is very much in an inquiry proof-of-concept phase. With respect to the aerial approach, considerable discussion regarding the technical details and requirements of such a survey has already taken place. Over the past several years, the ASMFC convened several workshops involving TC members, outside technical advisors, industry representatives, and Omega Protein spotter pilots to facilitate development of an aerial survey. Results from those workshops have allowed the ASMFC to compile preliminary design variables for an aerial survey. The preliminary specifications below are meant serve as guidance as to the scope of an aerial survey. These details have not been statistically evaluated and will likely be altered during the course of the project to develop the most appropriate and scientifically defensible design.

#### *Spatial and temporal coverage*

- Ideal spatial coverage: Portland ME to Cape Hatteras, NC
- Most ‘bang for the buck’: Long Island Sound, NY to Cape Hatteras, NC
- Include coverage in Chesapeake and Narragansett Bays
- Divide survey into two seasons:
  - Before fishing season (late April/early May)
  - During/post-season (late November/early December)

#### *Aerial Transects*

- Northern and southern sections of transects
  - Two pilots dedicated to each the northern and southern sections
- 15 miles long from coast to offshore, east to west
- 15 miles apart, north and south
- ~1000 miles of coastline

### *Sampling Frequency*

- 6 sampling days per season

### *Flight Detail*

- 4000 feet altitude
- 100 mph

### *Camera/Data Recording Equipment*

- Advised and will be procured

### *At-Sea Point Set*

- Conduct directly after aerial survey (within days ideally)
- Hire same pilots conducting aerial survey
- Contract purse seine vessels to catch schools identified by spotter planes

In addition to providing design details and supporting statistical analyses, project reports will also outline data collection and analysis needs associated with the surveys once fully implemented. The report will also include a general sense of the technical expertise, number of individuals, and time investment needed to compile and analyze data collected through the aerial survey.

VIMS will oversee all aspects of the project, development of reports, and execution of the training workshop(s). VIMS will subcontract with a recognized that has extensive experience designing aerial and satellite surveys and has done so for the Pacific sardine fishery of the west coast of the United States. He continues to coordinate the aerial survey implementation and will use lessons learned to design defensible menhaden surveys.

## **V.) Location**

The project will be administered by VIMS, which is located in Gloucester Point, VA. The subcontractor is based in Seattle, WA, so technical analyses and draft project reports will be developed on the west coast. The training workshop will be carried out in conjunction with an ASMFC Menhaden TC meeting at a location along the Atlantic coast.

## **VI.) Estimated Cost**

Requested funds will go primarily to support the salary and travel of the subcontractor responsible for design of the surveys. Salary and travel support is also request for PI Latour, who is a member of the ASMFC Menhaden Technical Committee (former chairman) and will be responsible for overall project management and liaisioning between the subcontractor and the Technical Committee.

**Title: Survey design for adult Atlantic menhaden along the U.S. east coast**

<b>Personnel</b>	<b>Time</b>	<b>Monthly</b>	<b>Agency</b>	<b>VIMS</b>	<b>Total</b>
Rob Latour	1.00	\$6,670	\$6,670	\$0	\$6,670
Personnel, salaried			\$6,670	\$0	\$6,670
Fringe, 40% salaries			\$2,668	\$0	\$2,668
<b>Total Personnel</b>			\$9,338	\$0	\$9,338
<b>Travel; PI working meetings and training workshop</b>			\$1,000	\$0	\$1,000
<b>Contractual Services</b>					
Expert subcontractor (4 mo/yr) & Travel for working meetings and training workshop			\$36,200	\$0	\$36,200
<b>SUBTOTAL: Direct Costs</b>			\$46,538	\$0	\$46,538
<b>Facilities &amp; Administrative Costs</b>		<u>25%</u>	\$8,835	\$8,127	\$16,962
<b>TOTAL</b>			<b>\$55,373</b>	<b>\$8,127</b>	<b>\$63,500</b>

*Notes on Budget Items:*

- The current federally negotiated F&A rate is 48%
- Fringes are based on average costs: 40%
- F&A calculated on MTDC (modified total direct cost): personnel, supplies, travel, and first \$25,000 of each subcontract, etc.; excludes service centers, tuition and equipment.

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360.791.9089

June 4<sup>th</sup>, 2010

Sustainable Fisheries Partnership

Attn: Braddock Spear  
1626 Clarkson Street  
Baltimore, MD 21230

RE: RFP for Designing a Scientifically Defensible Aerial Survey to Monitor Atlantic Menhaden Abundance

Please allow me to introduce myself: my name is Tom Jagielo; I am a quantitative fisheries science consultant with over 30 years of professional experience in the field of fisheries stock assessment and survey design. I currently sit on the Pacific Fishery Management Council (PFMC) Scientific and Statistical Committee, where I often have the opportunity to review the latest innovations in fisheries science used for management, including surveys to inform the management of West coast salmon, groundfish, coastal pelagic, and highly migratory species.

*Experience in Aerial Survey Design for Fisheries Management*

I am currently working as a science advisor to the West coast sardine industry. In that capacity, I have recently designed (and helped implement) an annual coastwide aerial sardine survey conducted off the coasts of Washington, Oregon, and California. This survey methodology was first tested on a pilot scale in 2008, and was then implemented on a coastwide scale in 2009. The survey has been peer reviewed with positive results and has been adopted by the PFMC for ongoing use in stock assessments conducted to guide management decisions for Pacific sardine. A brief description of this survey, prepared for a recent workshop on “Enhancing Stock Assessments of Pacific Sardine in the California Current through Cooperative Surveys” is attached. (References: Jerry Thon, Northwest Sardine Survey (360.201.8449); Diane Pleschner-Steele, California Wetfish Producers Association (805.350.3231), and Mike Okoniewski, Pacific Seafoods (360.619.2019).

Also, In the course of my career with the Washington Department of Fish and Wildlife, I have designed a number of other surveys for use in fisheries management, including: 1) several open-population mark-recapture studies for lingcod and black rockfish, 2) quantitative undersea video submersible research (in collaboration with engineers from Harbor Branch Oceanographic Institute), and 3) other projects while serving as a biometric consultant to staff biologists. Please see my Curriculum Vitae, attached.

*Components of a Scientifically Defensible Survey*

Should my bid be accepted, components of the survey design will include provisions to ensure: 1) the results are reproducible, 2) the design is statistically sound (e.g. employs random sampling

principals), 3) the survey provides synoptic coverage, 4) the survey timing accounts for the behavior and biology of Atlantic menhaden, and 5) the CV on the estimate of biomass is likely to be within an acceptable range for stock assessment purposes. Additional practical considerations include: 1) getting the most “bang for the buck”: for example, the survey design should be simple, efficient, and should make appropriate use of existing data (e.g. logbook surveys) to aid in pre-stratification, and 2) the survey should make productive use of the human resources available (e.g. spotter pilots and fishermen with “on the grounds” expertise). Additionally, the final survey design report will include a summary of the: 1) technical expertise, 2) number of individuals, 3) time investment, and 4) other factors, that will be required for planning data collection and analysis.

*Approach to developing the survey design*

Considerable discussion about the technical details and requirements of the survey has already taken place. Should my bid be accepted, I will work with the principals (including ASMFC, technical advisors, industry representatives, menhaden spotter pilots, and others) to review and build on the existing conceptual framework. The goal will be to inform a small group of scientists to become experts on the final survey design; this group will then be in a good position to take responsibility for initiating a pilot survey. Phases of the survey design process will include: 1) a literature survey of Atlantic menhaden, 2) consultation with principals to evaluate the optimal survey timing and spatial scope, 3) preparation of a draft survey design for review, 4) modification of the survey design based on the review, 5) preparation of the final report, and 5) presentation of the completed survey design to the individuals that will be involved in its implementation.

*Price quote and time frame for completing the survey design*

The price quote for completing the survey design and final report is \$24,000.00, plus actual travel and incidental expenses, not to exceed \$3,000.00. The price quote for one day of compensation to present the completed design is \$1,200.00, plus actual travel and incidental expenses. The time frame for completing the survey design is negotiable, and will depend largely on the requirements of the client.

In conclusion, I would welcome the opportunity to design a scientifically defensible survey for Atlantic menhaden. I believe the project could benefit substantially from what I have learned in the course of designing and implementing the West coast Pacific sardine aerial survey. Thank you for the opportunity to bid on this RFP. Please feel free to call me with any questions.

Sincerely,

  
Tom Jagielo