

Reports

1-1-2012

Virginia Fishery Resource Grant Program 2011

Virginia Fishery Resource Grant Program

Follow this and additional works at: <https://scholarworks.wm.edu/reports>



Part of the [Aquaculture and Fisheries Commons](#)

Recommended Citation

Virginia Fishery Resource Grant Program. (2012) Virginia Fishery Resource Grant Program 2011. Marine Resource Report No. 2012-1. Virginia Institute of Marine Science, College of William and Mary. <https://dx.doi.org/doi:10.25773/v5-bwh3-ky21>

This Report is brought to you for free and open access by W&M ScholarWorks. It has been accepted for inclusion in Reports by an authorized administrator of W&M ScholarWorks. For more information, please contact scholarworks@wm.edu.



Virginia Fishery Resource Grant Program 2011

Report of the Virginia Institute of Marine Science
To the Governor and General Assembly of Virginia
On Implementation of House Bill No. 1634 (February 6, 1999)

HOUSE DOCUMENT NO.

Commonwealth of Virginia
Richmond
2012

VIMS | WILLIAM
& MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE


Sea Grant
Virginia



Table of Contents

Executive Summary, Background, Implementation.....	1
Fiscal Statement, Summary of Reporting Period.....	2
Previous Projects.....	3
Appendices to the Annual Report of Activities	
A – VFRGP Advisory Board.....	10
B – Sample VFRGP News Release.....	11
C – VFRGP Request for Proposals and Application.....	13
D – VFRGP Principles of Operation.....	24

Executive Summary

The Virginia Fishery Resource Grant Program (VFRGP) enables members of Virginia's seafood industries to develop ideas to protect and enhance the Commonwealth's coastal and marine resources. Since its inception in 1999, the annually-funded program has supported 89 projects, four of which were approved to start in 2011. These projects enable members of seafood industries to pursue ideas for increasing efficiency and sustainability that will benefit the entire industry, without personally bearing the cost and high risk. The VFRGP is coordinated by Virginia Institute of Marine Science, Marine Advisory Services, in partnership with Virginia Sea Grant, and operates with the aid of an VFRGP Advisory Board.

Background

Since its inception, the program has funded 89 individual one-or two-year proposals.

VFRGP was initiated by the Virginia Legislature (House Bill No. 1634) during the 1999 session to "protect and enhance the Commonwealth's coastal fishery resource through the awarding of grants in four areas":

1. New fisheries equipment or gear;
2. Environmental pilot studies on issues including water quality and fisheries habitat;
3. Aquaculture or Mariculture of marine-dependent species; and
4. Seafood technology.

To be eligible for consideration, VFRGP proposals must involve Virginians who are active participants in a seafood industry. Involving the seafood industry (1) makes use of the experience and ideas of those who work closely with the Commonwealth's coastal and marine resources and (2) enables these individuals to develop and pursue improvements without personally bearing the cost and high risk to provide a shared industry benefit. Members of the seafood industry include those involved in commercial fishing activities related to coastal or offshore fishery resources, aquaculture/mariculture, or the processing or handling of fishery products.

Implementation

VFRGP is managed by an Advisory Board (See Appendix A). Funds are provided to Virginia Institute of Marine Sciences Marine Advisory Services (VIMS MAS). Availability of grant funds is advertised through press releases (See Appendix B) and a Request for Proposals (See Appendix C) that is distributed through developed list of industry members who have elected to receive updates about the VFRGP program as well as other channels. Proposals evaluated by members of the Advisory Board and outside reviewers, following the Principles of Operation (See Appendix D). At projects' end, VFRGP receives completion reports. The results of those projects are used to produce informational and educational publications for distribution to industry. Additionally, project reports and results are presented at industry meetings and trade shows when appropriate.

Program implementation is coordinated by Mr. Thomas Murray, Associate Director of VIMS MAS and Leader of the Virginia Sea Grant Marine Extension Program. Staff of VIMS MAS are responsible for day-to-day management of VFRGP. The day-to-day management requires a small portion of the appropriated funds to partially support salary and operating costs, as foreseen by the enabling legislation.

This implementation structure is in accordance with the legislation that established the VFRGP.



Program Activity and Improvement

VFRGP Advisory Board met once at Cherrystone Aquafarms during 2011. The meeting focused on the review of proposals submitted in response to public solicitations. Additionally, the Advisory Board meeting provided feedback and input with which to enhance overall program effectiveness. Improvements related to developing program informational materials, media exposure, and fishing industry outreach were and are being implemented in 2011.

The Advisory Board again endorsed holding a series of public proposal development workshops at locations throughout coastal Virginia so that all potential participants may learn about the VFRGP. Such public meetings are held between the issuance of the call for proposals and the proposal due date. Additionally, numerous individual meetings are held with industry to discuss the VFRGP and specific project ideas.

Fiscal Summary Statement

Funds appropriated by the Legislature for 2011 totaled \$159,579 for VFRGP activity in the 2010/2011-proposal cycle.

Of the \$159,579 available for new VFRGP project awards in 2011, four new projects were approved and initiated totaling \$94,459. Additionally, one project was renewed using the remaining balance of FY10 funds, totaling \$5,709. Thus, the VFRGP currently has a balance of approximately \$120,263 (\$62,120 FY11 and \$13,143 FY10) available in addition to the FY 2011/2012 appropriation of \$159,579 providing \$279,842 of total support of projects that will be approved for initiation in early 2012 as a result of the RFP issued in late 2011.

Any funds remaining after the selection of new projects in the February, 2012 proposal review will be carried forward, as called for in the enabling legislation, for use in combination with year 2012 appropriated funds, to support new projects which will be submitted in response to a Request for Proposals that is to be released in summer/fall 2012.

Summary of 2011 Funding Period

As a result of public notifications and follow-up workshops, fishing industry members submitted a total of 17 complete VFRGP proposals. The proposal topics were quite diverse, and each project was subjected to three expert reviews from outside the state. Once the expert reviews were received, a project evaluation and selection meeting was held, and the Advisory Board selected nine new projects for funding or for further development and negotiation.

Projects Approved in 2011

FRGP 2011-04. "Developing New Value-Added Products from Cownose Ray."

Meade Amory. L.D. Amory Company. (Hampton, VA)

Duration: 06/2011 – 04/2012.

Funding: \$45,000. Ongoing.

FRGP 2011-09. "Raised Foot-lines in Virginia's Striped Bass Gill Net Fishery; A Gear Based Method of Reducing Sturgeon Interactions."

George Trice, Commercial Fisherman (Poquoson, VA)

Duration: 03/2011 – 05/2011.

Funding: \$30,899. Completed.

FRGP 2011-16. "Dock Long Lining for Oyster Culture."

Ronald. T. Sopko, Sea Farms, Inc. (Hudgens, VA)

Duration: 04/2011-3/2012.

Funding: \$8,650. Ongoing.

FRGP 2011-18. "Stake In the Bay."

Michael J. Gadwill, Bonum Point Fishery. (Kinsale, VA)

Duration: 04/2011- 11/2012.

Funding: \$12,910. Ongoing.



Previous Projects, 1999-2010

FRGP 2010-01. "Influence of Planting Density and Salinity on QPX Disease in *Mercenaria mercenaria* in Virginia."

Tara Riley, Ballard Fish and Oyster Company (Cheriton, VA)

Duration: 04/2010-02/2011.

Funding: \$39,026. Completed.

FRGP 2010-02. "Investigation of the Beneficial Effects of Intentionally Exposing Oysters to Air During Their Normal Growing Season."

Dennis Gryder, Briar Patch Oysters (Hudgins, VA)

Duration: 04/2010-12/2010.

Funding: \$4,350. Completed.

FRGP 2010-04. "Improving Gillnet Selectivity by Altering Mesh Characteristics 2010."

Robert Weagley, Commercial Fisherman (Providence Forge, VA)

Duration: 03/2010-06/2010.

Funding: \$ 16,088. Completed.

FRGP 2010-05. "Method and Concept Evaluation of Relaying Oysters from the Chesapeake Bay to High Salinity Water as a Post-Harvest Process to Reduce *Virbio vulnificus* to Undetectable Levels."

Thomas Gallivan, Shooting Point Oysters, LLC (Franktown, VA)

Duration: 03/2010-12/2010.

Funding: \$29,148. Completed.

FRGP 2010-08. "Analysis of Tie Downs on Gillnet CPUE, Selectivity, and Bycatch Composition."

George Trice, Commercial Fisherman (Poquoson, VA)

Duration: 03/2010-05/2010.

Funding: \$29,026. Completed.

FRGP 2010-12. "Development of Preventive Measures to Reduce Mortalities for Holding Live Wild-Caught Flounder in Re-Circulating Aquaculture Systems"

Clarke Morton, Mid-Atlantic Aquatic Technology (Quinby, VA)

Duration: 04/2010-12/2010.

Funding: \$8,266. Completed.

FRGP 2010-13. "Hybrid Fish Capturing Device ("FCD") for Capturing Live Flounder."

Jeffery Hammer, Accomac Aqua Farms (Accomac, VA)

Duration: 04/2010-07/2010.

Funding: \$9,497. Completed.

FRGP 2010-14. "Create New Gear to Increase the Efficiency of Commercial Cat Fishing."

James A. Bristow, Commercial Fisherman (Hayes, VA)

Duration: 03/2010-12/2010.

Funding: \$11,273. Completed.

FRGP 2010-15. "Developing New Value-Added Products from Cownose Ray."

Meade Amory, L.D. Amory Company (Hampton, VA)

Duration: 07/2010-06/2011.

Funding: \$37,000. Completed.

FRGP 2009-06. "Developing New Value-Added Products from Cownose Ray."

L.D. Amory Seafood Company. (Hampton, VA)

Duration: 04/2009-04/2010

Funding: \$74,640. Completed.

FRGP 2009-07. "Characterization of By-catch in Virginia's Spring Striped Bass and Analysis of Gear Alterations on CPUE and Bycatch Composition."

George Earl Trice (Poquoson, VA)

Duration: 03/2009-06/2009

Funding: \$29,696. Completed.

FRGP 2009-10. "Feasibility of Producing Triploid *C. virginica* Larvae Via Thermal Heat Shock: Experimental protocol development and assessment."

A.J. Erskine, Cowart Seafood Corp. (Hampton, VA)

Duration: 6/2009-06/2010.

Funding: \$13,401. Completed.

FRGP 2009-12. "Channeled Whelk Assessment."

Richard B. Robins, Jr., Bernies Conchs. (Suffolk, VA)

Duration: 02/2009-06/2010.

Funding: \$21,758. Completed.

FRGP 2008-03. "Hedingless Pound Net."

William Haynie. (Reedville, VA)

Duration: 03/2008-10/2009.

Funding: \$19,459. Completed.

FRGP 2008-04. "Commercialization Spat-on-Shell Production in Virginia."

Thomas E. Kellum, Virginia Shellfish Growers Associa-

Virginia Fishery Resource Grant Program

tion. (Weems, VA)
Duration: 05/2008-05/2009.
Funding: \$50,300. Completed.

FRGP 2008-05. "Alternative Bait Holding Devices."
Scott Troy Hainley. (Wake, VA)
Duration: 08/2008-12/2009.
Funding: \$12,040. Completed.

FRGP 2008-08. "Characterization of By-catch and Potential Reduction in Virginia's Spring Striped Bass and other Gillnet Fisheries."
George Earl Trice. (Poquoson, VA)
Duration: 03/2008-04/2009.
Funding: \$49,329. Completed.

FRGP 2008-10. "Feasibility Study on Grow-Out of One-year market size triploid *C. ariakensis*."
Frances Porter, Virginia Seafood Council. (Newport News, VA)
Duration: 07/2008-07/2009.
Funding: \$26,530. Completed.

FRGP 2008-13. "Developing Both Commodity and Niche Markets for Cownose Ray." Year II.
Meade Amory, L.D. Amory Seafood Company. (Hampton, VA)
Duration: 03/2008-02/2009.
Funding: \$50,000. Completed.

FRGP 2008-14. "Improving Gillnet Selectivity by Altering Mesh Characteristics." Year II.
Robert Weagley. (Providence Forge, VA)
Duration: 10/2008-05/2009.
Funding: \$17,188. Completed.

FRGP 2008-15. "Feasibility Study for a Commercial Blue Catfish Fishery."
Kenneth G. Smith, Virginia Waterman's Association. (Heathsville, VA)
Duration: 05/2008-09/2009.
Funding: \$4,055. Completed.

FRGP 2007-01. "Feasibility of Converting Crab Shedding Tanks to Effectively Set Single Oyster Seed for Aquaculture and Comparison of Technique to Traditional Remote Setting Practices."
A.J. Erskine Bevens Oyster Company & Cowart Seafood Corporation. (Kinsale, VA)

Duration: 03/2007-06/2012.
Funding: \$19,000. Extended.

FRGP 2007-02. "Development of Efficient Cow Nose Ray Harvesting Technology and Associated Data Collection." Frank James West. (Hayes, VA)
Duration: 02/2007-12/2007.
Funding: \$12,146. Cancelled.

FRGP 2007-03. "Improving Gillnet Selectivity by Altering Mesh Characteristics."
Robert Weagley. (Providence Forge, VA)
Duration: 02/2007-05/2007.
Funding: \$13,916. Completed.

FRGP 2007-04. "Characterization of Sturgeon and Other Regulatory Discards in Virginia's Spring Striped Bass and Other Gillnet Fisheries."
George Earl Trice. (Poquoson, VA)
Duration: 02/2007-05/2007.
Funding: \$33,031. Completed.

FRGP 2007-05. "Feasibility Study on Grow-Out of One-year market size triploid *C. ariakensis*." Year II.
Frances Porter, Virginia Seafood Council. (Newport News, VA)
Duration: 06/2007-07/2008.
Funding: \$24,064. Completed.

FRGP 2007-06. "Developing Both Commodity and Niche Markets for Cownose Ray."
Meade Amory, L.D. Amory Company. (Hampton, VA)
Duration: 03/2007-02/2008.
Funding: \$57,000. Completed.

FRGP 2007-07. "Cownose Ray Product Development."
Ronald L. Jett, Smith Point Seafood. (Reedville, VA)
Duration: 05/2007-12/2007.
Funding: \$40,500. Completed.

FRGP 2006-04. "Aquaculture Training Program Needs Assessment."
S. Stickler Rappahannock Community College. (Warsaw, VA)
Duration: 05/2006-03/2007.
Funding: \$6,700. Completed.

FRGP 2006-06. "Developing an Alternative Fishery for Virginia Waterman."

Report of Activities during 2011

Casey's Seafood, Inc. (Newport News, VA)
Duration: 05/2006-05/2007.
Funding: \$17,732. Completed.

FRGP 2006-07. "Alternative Bait for Crab Pots."
L. Haynie (Reedville, VA)
Duration: 05/2006-05/2008.
Funding: \$27,000. Completed.

FRGP 2006-08. "Project Management: Economic Analysis of *C. ariakensis*."
Frances Porter, Virginia Seafood Council (Newport News, VA)
Duration: 05/2006-07/2007.
Funding: \$50,435. Completed.

FRGP 2006-09. "Assessment of Sturgeon Bycatch, Bycatch Mortality and Other Regulatory Discard Mortality in Virginia Winter/Spring Gillnet Fisheries." Year II.
Kelly Place (Williamsburg, VA)
Duration: 09/2005-08/2006.
Funding: \$52,039. Completed.

FRGP 2005-01. "Floating Hedging."
William Haynie (Reedville, VA)
Duration: 04/2005-09-2006.
Funding: \$19,995. Completed.

FRGP 2005-03. "Feasibility Study on One-Year Grow-Out of Triploid *Crassostrea ariakensis*."
Frances Porter, Virginia Seafood Council (Newport News, VA)
Duration: 05/2005-06/2006.
Funding: \$50,435. Completed.

FRGP 2005-07. "Value of Cownose Ray: Population Size, Harvesting, Processing and Market Acceptance."
Margaret Ransone (Kinsale, VA)
Duration: 04/2005-12/2006.
Funding: \$21,250. Completed.

FRGP 2005-09. "Assessment of Sturgeon Bycatch, Bycatch Mortality and Other Regulatory Discard Mortality in Virginia Winter/Spring Gill Net Fisheries." Year I.
Kelly Place (Williamsburg, VA)
Duration: 03/2005-08/2005.
Funding: \$39,444. Completed.

FRGP 2004-02. "Whale Safe Gillnets."

David C. Walker, FV Nelson Seafood (Chincoteague, VA)
Duration: 06/2004-06/2005.
Funding: \$8,300. Completed.

FRGP 2004-03. "Intensive Culture of the Mudminnow (*Fundulus heteroclitus*) as Live Bait for Recreational Angling."
Rudy Cashwell (Eastville, VA)
Duration: 04/2004-11/2006.
Funding: \$32,935. Terminated.

FRGP 2004-07. "Sea Turtle Friendly Fish Trap."
Emory Lewis, Jr. (Fleeton, VA)
Duration: 06/2004-12/2005.
Funding: \$21,900. Completed.

FRGP 2004-14. "To Develop More Efficient Mechanisms to Harvest, Handle, and Transport Catch."
Wec Terry, Terry Brothers, Inc. (Willis Wharf, VA)
Duration: 06/2004-06/2005.
Funding: \$30,380. Cancelled as a result of Tropical Storm Ernesto damage to facilities.

FRGP 2004-10. "Alternate Methods for Haul Seine Fishery to Reduce Possible Impact on SAV Beds."
Matthew Bloxom (Poquoson, VA)
Duration: 03/2005-12/2006.
Funding: \$4,901. Completed.

FRGP 2003-01. "Validation of IQF Freezing Process to Reduce *Vibrio vulnificus* to Non-detectable Levels in Raw Oysters."
Ron Bevins & Lake Cowart (Kinsale, VA)
Duration: 08/2003-12/2003.
Funding: \$12,000. Completed.

FRGP 2003-03. "Oyster Farming Cooperative Program."
Shawn Stickler (Wake, VA)
Duration: 01/2004-08/2004.
Funding: \$24,500. Completed.

FRGP 2003-06. "Identifying the Catch Efficiency and Incidental Marine Bird Entanglements Associated with Internally Floated and Weighted Lines on Gillnets."
Millard Bryant (Montross, VA)
Duration: 06/2003-06/2004.
Funding \$490. Not initiated at request of applicant.

Virginia Fishery Resource Grant Program

FRGP 2003-07. "Project Management for Virginia Seafood Council's Economic Analysis of Triploid *C. ariakensis* Aquaculture."

Frances Porter & Tom Kellum (Newport News, VA)

Duration: 07-2003-07/2004.

Funding: \$57,976. Completed.

FRGP 2003-07-2. "Project Management for Virginia Seafood Council's Economic Analysis of Triploid *C. ariakensis* Aquaculture." Year II.

Frances Porter & Tom Kellum (Newport News, VA)

Duration: 07/2004-07/2005.

Funding: \$53,649 Completed.

FRGP 2002-01. "By-catch and Discard Reduction Concerning Selectivity and Overall Design in the Black Sea Bass Trap Fishery."

James E. Dawson (Chincoteague, VA)

Duration: 04/2002-04/2003.

Funding: \$16,100. Completed.

FRGP 2002-02. "Growing Oysters in Suspended Bags Using Ropes, Anchors, and Buoys."

Curtis B. Jenkins (Warsaw, VA)

Duration: 05/2002-12/2003.

Funding: \$4,445. Completed.

FRGP 2002-04. "Virginia Oyster Replenishment Via Seed Growing Operation."

Robert W. Shanley (Cape Charles, VA)

Duration: 04/2002-04/2003.

Funding: \$38,400. Completed.

FRGP 2002-07. "Development of Grow Out Techniques Utilizing the Water Column in Growing a Non-Native Oyster (*Crassostea ariakensis*)."

Andy Drewer (Saxis, VA)

Duration: 04/2002-06/2003.

Funding: \$22,008. Completed.

FRGP 2002-09. "Tenderizing Illex Squid So It Can Be Marketed as Food Rather Than Bait."

Sam Daniels, Wanchese Fish Co. (Suffolk, VA)

Approved for funding but withdrawn at Applicant's Request.

FRGP 2002-20. "Growth Rate of *Ariakensis* Oysters in Different Environments."

Richard Wade Harding, Purcell's Seafood Inc. (Burgess,

VA)

Duration: 04/2004-08/2004.

Funding: \$10,854. Completed.

FRGP 2002-22. "Development of Clear Plastic Containers for Pasteurizing Crab Meat."

Johnny Graham, Graham & Rollins Inc. (Hampton, VA)

Duration: 10/2002-11/2004.

Funding: \$29,770. Completed.

FRGP 2002-24. "Grow-Out and Marketability Evaluation of Triploid DEBY Oysters."

Gustavo Calvo, Sweet Amalia Oyster Farm (Hayes, VA)

Duration: 10/2002-05/2004.

Funding: \$4,650. Completed.

FRGP 2002-27. "Juvenile protection."

Willie Andrew Offield – West Point, Virginia.

Duration:

Funding: Not initiated.

FRGP 2002-28. "Growing of the Native and Non-Native Oyster Utilizing a Long Line System."

Tripp Smith, Shores and Ruark Seafood Co. (Sharps, VA)

Duration: 10/2002-09/2004.

Funding: \$34,810. Completed.

FRGP 2002-29. "Modular Oil Absorbent Bilge Pump."

Darryl Lilliston, Darryl Lilliston Seafood (Wachapreague, VA)

Duration: 11/2002-12/2003.

Funding: \$13,117. Completed.

FRGP 2001-04. "Hydrostatic Oyster Processing Demonstration."

Lake Cowart, Cowart Seafood (Lottsburg, VA)

Duration: 10/2001-11/2003.

Funding: \$34,600. Completed.

FRGP 2001-12. "Floating Cultivation of Sea-Side Oyster."

Jeff Hammer (Accomac, VA)

Duration: 03/2002-02/2004.

Funding: \$18,575 Completed.

FRGP 2001-13. "Fluke Holding Tank and Live Market Assessment."

Wec Terry, Terry Brothers, Inc. (Willis Wharf, VA)

Duration: 10/2002-04/2004.

Funding: \$17,919. Completed.

Report of Activities during 2011

FRGP 2001-14. "Marketing Virginia Croaker."
Stuart O'bier, O'bier Seafood. (Callao, VA)
Duration: 10/2001-10/2003.
Funding: \$43,500. Completed.

FRGP 2000-01. "Enhancement of Seed Oyster Recovery and Redeployment."
W.S. Magann (Chesapeake, VA)
Duration: 03/2001-05/2002.
Funding: \$17,125. Completed.

FRGP 2000-03. "Raising Spot (*Leiostomus xanthurus*) Commercially for Sale as Live Bait in the Commonwealth of Virginia."
John Vigliotta (Gloucester, VA)
Duration: 02/2001-11/2001.
Funding: \$19,827. Completed.

FRGP 2000-05. "Control of Mud Blister Formation in Oysters."
Dennis Gryder (Hampton, VA)
Duration: 04/2001-11/2002.
Funding: \$1,338. Completed.

FRGP 2000-06. "Efficiency of Haul-Seine Cull Panels: A Comparison of Size Selectivity and Relative Release (Second Season)."
Christian Hager (Hayes, VA)
Duration: 02/2001-11/2001.
Funding: \$16,496. Completed.

FRGP 2000-08. "Comparative Study of Four Popular Grow-Out Methods."
Jack White (New Point, VA)
Duration: 02/2001-12/2002.
Funding: \$27,340. Completed.

FRGP 2000-10. "Portable Anchor Trap Net Designed with Large Mesh to Harvest Cownose Rays."
Douglas F. Jenkins, Sr. (Warsaw, VA)
Duration: 03/2001-12/2004.
Funding: \$9,883. Completed.
FRGP 2000-12. "Taylor Float Tidal Flow Increaser."
Bradley M. Knight (Saxis, VA)
Duration: 04/2001-09/2003.
Funding: \$3,622. Cancelled, incomplete due to damage from Hurricane Isabel.

FRGP 2000-15. "Scallop Trawl Improvement Program."
Timothy B. Daniels (Newport News, VA)
Duration: 02/2001-12/2003.
Funding: \$44,900. Completed.

FRGP 2000-18. "Crab-Pot Buoy Marking Tags."
Diana Gadwill (Kinsale, VA)
Duration: 04/2001-11/2001.
Funding: \$820. Completed.

FRGP 1999-02. "Peeler Pot By-catch Reduction."
B. Knight (Saxis, VA)
Duration: 04/2000-09/2000.
Funding: \$1,527. Completed.

FRGP 1999-07. "Enhancement of Seed Oyster Recovery and Redeployment."
W.S. Magann (Chesapeake, VA)
Duration: 01/2000-02/2001.
Funding: \$15,000. Completed.

FRGP 1999-12. "Growing Soft Clams (*Mya arenaria*) Commercially in the Commonwealth of Virginia."
Ward Oyster Company (Ware Neck, VA)
Duration: 02/2000-06/001.
Funding: \$19,827. Completed.

FRGP 1999-14. "Efficiency of Haul-Seine Cull Panels-A Comparison of Size Selectivity and Relative Release."
C.H. Hager (Hayes, VA)
Duration: 02/2000-11/2000.
Funding: \$10,315. Completed.

FRGP 1999-20. "Comparing Oyster Seed Growth Rates Using a Floating Upweller System ("FLUPSY") vs. Traditional Taylor Floats."
R. Bloxom and J.T. Gardner (Wachapreague, VA)
Duration: 04/2000-06/2001.
Funding: \$12,700. Completed.

FRGP 1999-23. "Comparative Growth Rates of Four Strains of the American Oyster Using Two Grow-Out Methods."
A.T. Leggett (Wicomico, VA)
Duration: 03/2000-09/2001.
Funding: \$21,851. Completed.

FRGP 1999-24. "Feasibility of Using Croakers to Make

Virginia Fishery Resource Grant Program

Large Fillets or Fish Squares.”

Wanchese Fish Company (Hampton, VA)

Duration: 02/2000-12/2001.

Funding: \$19,500. Completed.

FRGP 1999-29. “Development of Live Fish Markets
Through the Use of New Live Holding Gear.”

W. Cosby (New Kent, VA)

Duration: 02/2000-11/2001.

Funding: \$18,470. Completed.

FRGP 1999-30. “Comparisons of Hard Clam Culture
Using ‘Fenced In’ Method vs. Under Nets.”

L. Crewe (Newport News, VA)

Duration: 02/2000-02/2002.

Funding: \$7,400. Completed.

FRGP 1999-34. “Artificial Reef Oyster Grow-Out.”

J. Hammer (Accomac, VA)

Duration: 03/2000-12/2001.

Funding: \$29,700. Completed.

FRGP 1999-37. “Comparative Study of Oyster Seed
from Northern and Southern Hatcheries.”

J.W. Merritt (Chincoteague, VA)

Duration: 03/2000-03/2002.

Funding: \$25,026. Completed.

**Appendices to the Annual
Report of Activities 2011**

Appendix A

Virginia Fishery Resource Grant Program Advisory Board

Program Manager
Mr. Thomas Murray
Associate Director, VIMS Advisory Services
Leader, Virginia Sea Grant Marine Extension Program
P.O. Box 1346
Gloucester Point, VA 23062

Dr. James Wesson
Virginia Marine Resources Commission
P.O. Box 756
Newport News, VA 23607-0756

Dr. Roger Mann
Director, Research & Advisory Services at VIMS
P.O. Box 1346
Gloucester Point, VA 23062

Dr. Troy Hartley
Director, Virginia Sea Grant
P.O. Box 1346
Gloucester Point, VA 230262

Mike Peirson
Retired President, Cherrystone Aqua-Farms
(Aquaculture Organization Rep)
P.O. Box 347
Cheriton, VA 23316

Marshall Cox
(Watermen Organization Rep)
Box 254
Cape Charles, VA 23310

Pete Nixon
(Watermen Organization Rep)
664 Ingleside Rd/
Norfolk, VA 23502

Appendix B

Sample VFRGP News Release

For More Information, Contact:

Dianne Roberts
Virginia Institute of Marine Science
Virginia Sea Grant Marine Advisory Program
P.O. Box 1346
Gloucester Point, VA 23062
Phone (804) 684-7173
Fax (804) 684-7161
<http://www.vims.edu/adv/frg/>

N E W S R E L E A S E

December 5, 2011

MEETINGS FOR VIRGINIA WATERMEN TO LEARN ABOUT GRANTS AVAILABLE

The Virginia Sea Grant Program is accepting applications to compete for approximately \$200,000 as part of the Virginia Fishery Resource Grant Program (VFRGP). The Virginia Legislature created the Fishery Resource Grant Program to “protect and enhance the Commonwealth’s coastal fishery resource through the awarding of grants.”

Basic to the program is the belief that people in the commercial fishing industry often have valid ideas to enhance and protect fisheries, but may lack the financial resources to experiment with innovations. The Fishery Resource Grant Program invests in such ideas generated by the fishing public through fair and competitive methods.

The legislation established four priority areas for funding as follows:

- New Fisheries Equipment and Gear - focus on the development of less environmentally destructive gear, by-catch reduction, and more effective ways to handle catch.
- Environmental Pilot Studies - focus on ways to restore damaged habitat, create new habitat, prevent habitat impairment, or reduce impact from fishing or aquaculture activities.
- Aquaculture/Mariculture - focus on ways to develop criteria and assessment for permits, increase return from investment in culture activities, or introduce new species to the existing aquaculture list to broaden participation in commercial aquaculture.
- Seafood Technology and Utilization - develop value added products from existing production, the utilization of underused or new fishery resources, develop models for total quality system management programs, or increase returns in the seafood industry by improving packaging and handling.

Eligibility - To be eligible for funding under the Fishery Resource Grant Program, each proposal must substantially involve Virginians who are actively involved in a fishing industry (which is defined as persons involved

Virginia Fishery Resource Grant Program

in commercial activities relating to fishery resources, aquaculture/mariculture, or the processing or handling of fishery products). Proposals submitted by persons not involved in a fishing industry must have 1) substantial involvement of Virginia fishers as defined above, and 2) include written endorsements from persons or organizations representing fishing industries supporting the project. The work can involve both inshore and offshore fisheries. All proposals submitted within the limits of the Guidelines for Submission will be accepted and reviewed for technical merit and the ability to address one or more of the specific priorities listed above.

Proposal Submission - To be considered for funding in this solicitation, a signed application must be postmarked no later than 5:00 p.m., January 14, 2011. Mailed copies should be sent to: VFRGP - Attention Dianne Roberts, Virginia Sea Grant Program, Virginia Institute of Marine Science, P.O. Box 1346 Gloucester Point, Virginia 23062. Faxed or electronic proposals will not be considered.

A series of workshops will be held to explain the grants program, including eligibility and funding priorities, how to complete the application form, and where to go for more help when developing a grant proposal package. The time and location of these workshops are listed below:

Wednesday, December 14, 2011 from 6:00 p.m. to 8:00 p.m.
Director's Conference Room, VIMS, Gloucester Point, VA

Thursday, December 15, 2011 from 6:00 p.m. to 8:00 p.m.
Classroom 150, Eastern Shore Community College, Melfa, VA

For more information or to receive a copy of the RFP and application forms, contact Dianne Roberts at the Virginia Sea Grant Program, VIMS, 804-684-7173.

This notice is also available at: <<http://www.vims.edu/adv/frg>>.

###

Appendix C

VFRGP Request for Proposals and Application

**Virginia Fishery Resource Grant Program
Request for Proposals (RFP) November 2011
<http://www.vims.edu/adv/frg/index.html>**

Proposals will be accepted from November 30, 2011 – January 13, 2012

The Marine Advisory Program at the Virginia Institute of Marine Science (VIMS) is accepting applications to compete for funding as part of the Virginia Fishery Resource Grant Program (VFRGP). The Virginia Legislature created the Fishery Resource Grant Program to “protect and enhance the Commonwealth’s coastal fishery resource through the awarding of grants” in four areas: 1) new marine fisheries equipment or gear; 2) environmental pilot studies on issues including water quality and fisheries habitat; 3) aquaculture or mariculture of marine-dependent species; and 4) seafood technology.

A basic principle of the program is that people in the industry often have valid ideas for enhancing and protecting fisheries, but they lack the financial resources to experiment with innovations. The Fishery Resource Grant Program invests in ideas generated by the fishing public through fair and competitive methods.

The legislation established the four priority areas noted above. Specific priorities within the four topic areas have been approved by the Fishery Resource Grant Program Advisory Board and are noted below. All proposals submitted within the limits of the Guidelines for Submission will be accepted and reviewed for technical merit and the ability to address one or more of the specific priorities listed.

New Fisheries Equipment and Gear – This priority area seeks proposals that focus on the development of less environmentally destructive gear, bycatch reduction, improvements in gear selectivity, more effective ways to handle catch and the development of information leading to fishery management plans for key species and groups.

Environmental Pilot Studies – This priority area seeks proposals that focus on ways to restore damaged habitat, create new habitat, prevent habitat impairment or reduce impact from fishing or aquaculture activities.

Aquaculture/Mariculture – This priority area seeks proposals that focus on ways to develop criteria and assessment for permits, increase return from investment in culture activities or introduce new species to the existing aquaculture list to broaden the participation in commercial aquaculture.

Seafood Technology and Utilization – This priority area seeks proposals that develop value-added products from existing production, the utilization of underused or new fishery resources, develop models for total quality system management programs or increase returns in the seafood industry by improving packaging and handling.

Eligibility

To be eligible for funding under the Fishery Resource Grant Program, each proposal must substantially involve Virginians who are actively involved in a fishing industry (defined as persons involved in commercial activities relating to fishery resources, aquaculture/mariculture or the processing or handling fishery products). Proposals submitted by persons not involved in a fishing industry must have 1) substantial involvement of Virginia fishers as defined (above) and 2) written endorsements from persons or organizations representing fishing industries supporting the project.

Proposal Development

Competitive proposals are developed through discussions of ideas and partnering with interested groups and experts. Every applicant should consult with experts in the targeted priority area(s) and, where appropriate, develop a team of fishers and scientists to conduct the work. Sea Grant Marine Advisory agents and specialists can help assemble a team. Non-fishers could improve chances of funding by collaborating with persons in a fishing industry for proposal development and design and by involving fishers in the execution of the study. The Virginia Sea Grant Marine Extension Program will be responsible for determining the eligibility of each proposal.

Application Forms

The application form at the end of this notice provides an outline for the proposal and additional pages should be used for providing information in the sections listed. Applicants should pay particular attention to items 12-17. These sections should describe the problem and rationale for proposing the research project (12), present the goals and objectives and the proposed work (13) and describe the work that is to be performed to meet the objectives (14). The next three sections should explain how the information gained from the work will help resolve the problem described (15), how the information developed will be transferred to others (16-Note: It is not enough to say the data will be given to VMRC or another agency.) and who will be responsible for doing the work (17-Letters confirming participation should be obtained from all cooperators, including VMRC and/or Sea Grant Marine Advisory staff.).

A series of workshops will be held to explain the grant program, including eligibility and funding priorities, how to complete the application form and where to go for more help when developing a grant proposal package. The time and location of these workshops will be announced through press releases to the media and in selected newsletters. The workshop schedule is also included in this announcement.

Proposal Submission

To be considered for funding in this solicitation, a signed application must be delivered or postmarked no later than 5:00 pm, January 13, 2012. Mailed copies should be sent to: VFRGP Manager, Marine Advisory Program, Virginia Institute of Marine Science, P.O. Box 1346, Gloucester Point, VA 23062. **No applicant may submit more than 2 proposals for this cycle.** Faxed or electronic proposals will not be accepted.

To ensure competitive project selections, VFRGP will subject all proposals to a series of reviews by a panel of experts from outside of Virginia. The FRGP Advisory Board (see appended list of Advisory Board members) will also provide proposal evaluations to the selection process. VFRGP will make proposal selection decisions and funding agreements will generally be effective during the second calendar quarter of 2012.

Funding Priorities

The following list of potential research ideas has been reviewed and approved by the FRGP Advisory Board and is provided as **suggestions** of the types of subjects that could be appropriate for proposals to the FRGP. These are not intended as a complete listing of all possible projects; nor are the topics listed in order of importance. All proposals received by the submission deadline will receive equal treatment during the review process.

Potential research topics or issues include but are not limited to the following:

I. Inshore and Offshore Harvesting Sector Studies

1. Reduce bycatch by technology development and education.
2. Develop “environmentally friendly” gear.
3. Develop more effective/efficient mechanisms for handling catch.
4. Develop and evaluate mechanisms to release fish to increase their survival.
5. Determine amounts of hook-and-release mortality for important recreational species.
6. Increase efficiency/economic return of fishing.
7. Develop bait and bait substitutes.
8. Develop species-specific gear.
9. Develop information leading to Fishery Management Plans for key species and groups.
10. Develop new gear and/or improve current gear and/or document catch per unit effort (“CPUE”).
11. Develop gear to improve selectivity of target species.

II. Environmental Pilot Studies

1. Develop mechanisms to restore damaged habitat or create new habitat.
2. Develop mechanisms to prevent habitat impairment.
3. Reduce habitat impact from fishing activities.
4. Develop recycling and collection programs for used fishing or aquaculture gear.
5. Develop ways to monitor and evaluate habitat alterations or the impacts of aquaculture practices such as moving of seaside shellfish to the bayside.
6. Determine environmental impact of fishing and processing activities.
7. Assess effects of water quality and habitat alteration on fisheries production.

III. Aquaculture/Mariculture

1. Increase return from investment in culture activities including the development of mechanical planting and harvesting technologies.

2. Examine the potential for culture of new species and/or deep-water culture techniques for existing species such as clams and oysters.
3. Determine environmental impacts of aquaculture operations.
4. Improve the efficiency of growth, feeding and nutrition.
5. Demonstrate the best husbandry practices for potential growers.
6. Develop mechanisms for a network for technical monitoring of waters for levels of spat fall, food, predators, etc.
7. Market research for aquaculture products.
8. Develop parameters for apprentice program and training for career aquaculturists.
9. Assess feasibility of augmenting commercially and recreationally important species through hatchery release.
10. Assess regulations that impact aquaculture/mariculture such as submerged aquatic vegetation protection.
11. Assess the potential of shellfish aquaculture to enhance wild populations.
12. Provide the opportunity for watermen, including minorities, to diversify their businesses through aquaculture.

IV. Seafood Technology particularly as it provides value added to the Commercial Blue Crab Fishery

1. Develop value-added products from existing or potential production.
2. Increase returns in the seafood industry by improving packaging and handling.
3. Develop models for total quality system management programs.
4. Develop improvements in product quality.
5. Develop mechanisms for reducing effluents and the environmental impacts.
6. Develop alternative uses for processing byproducts.

Contacts

If you have an idea for a project, you may contact the following Virginia Sea Grant Marine Extension representatives for assistance in writing your proposal or to request additional information. These people can also direct you to a research scientist who has expertise related to your project topic. *Sea Grant Marine Extension Program contacts include:*

Vicki Clark	804-684-7169	Marine Education
Bob Fisher	804-684-7168	Commercial Fisheries/Seafood Technology
Karen Hudson	804-684-7742	Commercial Shellfish Aquaculture Specialist
Mike Jahncke	757-727-4861	Seafood Technology
Dan Kaufman	757-727-4861	Seafood Business Management
Bob Lane	757-727-4861	Processing Engineering
Tom Murray	804-684-7190	MAS Coordinator, Marine Business
Mike Schwarz	757-727-4861	Finfish Aquaculture

2011 Fishery Resource Grant Application Workshops

Two workshops will be held to explain the grant program, including eligibility and funding priorities, how to complete the application form and where to go for more help when developing a grant proposal package. The time and location of these workshops is listed below:

Wednesday, December 14, 2011 from 6:00 to 8:00 pm
Director's Conference Room, VIMS, Gloucester Point, VA

Thursday, December 15, 2011 from 6:00 to 8:00 pm
Classroom 150, Eastern Shore Community College, Melfa, VA

Appendix

Virginia Fishery Resource Grant Program – Advisory Board

Program Manager

Tom Murray, Associate Director
For Advisory Services
Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, VA 23062

phone: 804-684-7190
fax: 804-684-7161
email: tjm@vims.edu

For Virginia Sea Grant Program

Dr. Troy Hartley, Sea Grant Director
Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, VA 23062

phone: 804-684-7248
fax: 804-684-7269
email: thartley@vims.edu

For Virginia Marine Resources Commission

Dr. James Wesson
Virginia Marine Resources Commission
2600 Washington Avenue, Third Floor
Newport News, VA 23607

phone: 757-247-2200
fax:
email: jwesson@mrc.state.va.us

For Virginia Institute of Marine Science

Dr. Roger Mann
Research & Advisory Services
Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, VA 23062

phone: 804-684-7108
fax: 804-684-7097
email: rmann@vims.edu

For the Aquaculture Industry

Mike Pierson, Retired President
Cherrystone Aqua-Farms
P.O. Box 347
Cheriton, VA 23316

phone: 757-331-2622
fax: 757-331-4366
email:

For the Watermen's Associations

Marshall Cox
Box 245
Cape Charles, VA 23310

phone: 757-678-5941
fax:
email: mrscox@intercom.net

Pete Nixon
664 Ingleside Road
Norfolk, VA 23502

phone: 804-466-8940
fax:
email:

**Fishery Resource Grant Program
Application**

1. Project title: _____
2. Name of applicant: _____
3. Company (if applicable): _____
4. Telephone: _____
5. Address: _____

6. Priority addressed by project (see list): _____
7. Fishing license/permit number(s): _____
8. Social security or federal tax ID number: _____
9. Funding requested: _____
10. Project dates: beginning _____ completion _____
11. Other project participant(s), affiliation, address and phone:

[Note: Use additional pages as needed to respond to the items below.]

12. Give a brief summary of the situation or problem to be addressed.

Report of Activities during 2011

19. Provide project budget and cost justification.

ITEM/CATEGORY	AMOUNT
a. Personnel Costs (time x unit cost)	
b. Travel (trip or mileage x unit cost)	
c. Supplies	
d. Equipment (items more than \$500)	
e. Contractual Services (itemize)	
f. Other Costs (itemize)	
g. Total Project Costs	

20. Provide budget item justification and/or explanations.

Applicant Signature: _____

Date: _____

**Fishery Resource Grant Program
Application Guidelines**

1. Provide a title that summarizes the project.
2. Give the full name of the applicant; it will be used to issue payments for the project.
3. Give the name of your company or corporation if applicable, or the institution of your employment. If self-employed, say so.
4. Applicant's complete telephone number including area code.
5. Mailing address for correspondence and mailing payments, etc.
6. Which priority are you addressing? The attached listing gives this year's priorities under the four-program areas equipment/gear, environment, aquaculture and seafood.
7. Give fishing license or permit number(s), if applicable.
8. Social security or federal ID number is required for grant payments.
9. Total amount of funding requested (see budget section).
10. Give the date that you plan to begin work and the date that we can expect a completion report.
11. List all other personnel involved in the project and their affiliation. This includes all those who have a major responsibility for some aspect of the work.

****Use additional pages as needed to fully answer items 12 through 18****

12. Describe the nature of the situation or problem that your proposed work will address.
13. What is the purpose of your proposed work?
14. **This section is very important!** Please explain how, where and when you will conduct each work task. Explain how tests will be run and how the data will be analyzed. Describe the tests you plan to conduct, the surveys you will make and/or plans for making something. Your methodology must withstand questions about its validity and/or potential to yield the results you need to solve the purpose of your work (described in number 13 above).
15. Describe how the outcome of your proposed work will help address the problem described in number 12 above.

Report of Activities during 2011

16. Describe how you plan to get the results of your work to other members of the fishing industry for their use. It is not enough to just discover something. It must also be usable. If you are going to rely on someone else to extend the results, be sure to have an agreement and arrange to cover those expenses.
17. Who is going to be responsible for what? Each participant (including the applicant) must be responsible for some part of the work. You must have letters of endorsement from other participants to confirm their participation in the project. For example, if personnel from VIMS will conduct the statistical analysis, then an agreement letter from VIMS is required.
18. Give a brief statement describing the experience of each participant and the applicant that qualifies them to do the tasks outlined above.
19. Carefully compute the funds needed (rounded to the nearest dollar) for all of the work described in the proposal. Be sure to include any subcontractors (budget item e.) for lab work, consultants, extension, services, etc. The funding for these grants does not permit indirect costs (overhead). Be sure to check your budget total figure.
20. Please justify the budget figures. For example: "We will need a deckhand for 150 hours @ \$7/hour," or "We will need to design and build a trawl that requires \$1,200 for materials," etc.
 - **Be sure to sign the application!** Applications without a dated signature will be rejected as incomplete.
 - **Mail the signed original to:** Tom Murray, VFRGP Manager, Advisory Services, Virginia Institute of Marine Science, P.O. Box 1346, Gloucester Point, VA 23062.
 - Applications must be postmarked no later than January 13, 2012. Applications may be delivered to the Advisory Services office in Gloucester Point only until 5:00 pm on January 13, 2012. **Late proposals will be returned to the applicant without being considered.**
 - If you need assistance completing the grant application, a resource list is available from Mrs. Dianne Roberts at the Virginia Fishery Resource Grants Program (phone: 804-684-7173). This notice and application form is available at the website below:
<http://www.vims.edu/adv/frg/index.html>

Appendix D

VFRGP Principles of Operation

Authority: The Virginia Legislature ratified House Bill 1634 in 1999 providing funding to “protect and enhance the state’s coastal fishery resources through the awarding of grants.”

Administration: The program is administered by the Advisory Services Program at the Virginia Institute of Marine Science with input from an appointed Advisory Board. The Board, based upon rankings from reviews and consistent with priorities, will determine the grants to be awarded.

Priorities: The Advisory Board, with input from members of the fishing industry, develops priorities for each year in the following areas:

1. New fisheries equipment and gear;
2. Environmental pilot studies, including water quality and fisheries habitat;
3. Aquaculture/mariculture; and
4. Seafood technology.

Eligibility: Each proposal shall include substantial involvement of active Virginia persons involved in a fishing industry. The term “fishing industry” includes persons involved in commercial activities related to inshore and offshore fishery resources, aquaculture/mariculture, or handling of fishery products (i.e. seafood dealers and processors). A proposal generated by a person not involved in a fishing industry must have substantial involvement of Virginia fishers (as defined above) as well as written endorsements from persons or organizations representing fishing industries in support of the project.

Technical Assistance: Following the establishment of priorities by the Advisory Board, VIMS Advisory Services shall hold workshops at coastal locations to solicit applications and to assist persons involved in fishing industries in writing proposals. A list of technical advisors will be available throughout the proposal writing process for assistance and participation.

Application: Applications must be completed based on the format provided for that purpose. Additional pages or supplemental materials (diagrams, photos, etc.) are acceptable if they better explain the project. Applications may include technical assistance as part of the project and funds may be budgeted to pay for this. Incomplete applications will not be accepted for consideration. Application forms listing information needed for a proposal are available from VIMS (see listing below for contact details).

Project Duration: Projects must reach conclusion within two years or less.

Geographic Distribution: To the extent practicable, grant funding will be distributed to applicants within Virginia counties that border the Atlantic Ocean or Chesapeake Bay and its tributaries to the extent of tidal influence.

Review Procedures: An anonymous outside peer review will be conducted for all applications. At least one of the reviewers shall be a person involved in a fishing industry. Applications shall be confidential until after funding decisions are made.

Project quality will be assessed on the following criteria:

1. Addresses a priority,
2. Ability to protect or enhance fishery resources;
3. Organization of a work plan leading to conclusions,
4. Plan to extend findings to the fishing industry;
5. Availability of expertise and its application;
6. Familiarity and experience with the problem addressed;
7. Innovation of approach and/or potential findings;
8. Cost-effectiveness of implementation of results; and
9. Reasonableness of budget for work proposed.

Based upon panel reviews and Advisory Board input, proposals will be recommended to the Marine Science Consortium. The Consortium will make all final decisions on grants, including the level of funding for each project.

Restrictions: No member of the Fishery Resource Grant Program staff or the Advisory Board or members of his/her immediate family may benefit financially from a grant. If a grant recipient from a prior year has failed to perform a grant project to the satisfaction of the Consortium, the principal applicant may be denied funding for a new application.

Grant recipients shall provide quarterly progress reports to the VFRGP and shall submit invoices describing expenditures for each quarter. Twenty-five percent (25 %) of the total grant award shall be awarded on the start date and certified upon verification of expenditures. The final 25% of the total grant award shall be held until the recipient has completed and submitted a satisfactory final written report. The remainder of the grant award shall be distributed upon approval of quarterly reports, verification of expenditures and receipt of an invoice.

Questions concerning the Virginia Fishery Resource Grant Program may be directed to the following:

Tom Murray,
Associate Director Advisory Services
VIMS
P.O. Box 1346
Gloucester Point, VA 23062
Phone 804-684-7190
Fax 804-684-7161
E-mail: tjm@vims.edu



This is a report to the Governor and General Assembly of Virginia on Implementation of House Bill No. 1634 (February 6, 1999) - "The Fishery Resource Grant Fund". Funds are administered by Virginia Institute of Marine Science Marine Advisory Services in partnership with Virginia Sea Grant.

January 2012

VIMS Marine Resource Report No. 2012-1

Photos © Virginia Sea Grant/VIMS

Copies of this report are available from
Virginia Sea Grant Communications Center
Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, VA 23062
e-mail vsgpubs@vims.edu

VIMS | WILLIAM
& MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE

**Sea Grant**
Virginia