

VIRGINIA SALTWATER RECREATIONAL FISHING DEVELOPMENT FUND SUMMARY PROJECT APPLICATION*

J

NAME AND ADDRESS OF APPLICANT: Virginia Institute of Marine Science P.O. Box 1346 Gloucester Pt., VA 23062	PROJECT LEADER (name, phone, e-mail): Susanna Musick, VIMS, Marine Advisory Program 804-684-7166, susanna@vims.edu Lewis Gillingham, VMRC, VA Saltwater Fishing Tournament, 757-247-8013, Lewis.Gillingham@mrc.virginia.gov									
PRIORITY AREA OF CONCERN: Recreational Fisheries Research and Education	PROJECT LOCATION: VIMS and VSFT; lower Chesapeake Bay and VA offer waters									
DESCRIPTIVE TITLE OF PROJECT: Virginia Game Fish Tagging Program 2012 (Year 18)										
PROJECT SUMMARY: This project is a cooperative program of the Virginia Saltwater Fishing Tournament (Marine Resources Commission) and VIMS Marine Advisory Program. Initiated in 1995, it has been funded primarily by Saltwater Recreational Fishing License Funds and matching VIMS funds. This program provides annual training and enables a corps of ~200 experienced anglers to direct tagging effort on select target species important to VA's marine recreational fisheries. Through 2011, this program's database (used by researchers, fishery managers, anglers, etc.) includes over 171,000 records for fish tagged and over 19,000 fish recapture records (an overall >10% recapture rate). There are ten target species: black and red drum, black sea bass, cobia, flounder, gray triggerfish, sheepshead, spadefish, speckled trout, and tautog. During 2010 trained anglers tagged and released approximately 16,484 fish resulting in just over 1,431 recaptures. Tagging continues at two power plant areas during winter in cooperation with Dominion Power because the areas serve as "warm-water havens" for red drum and speckled trout. Staff and fishery technical committees with VMRC, North Carolina Division of Marine Fisheries, other fishery management groups, and VIMS Fisheries Department use the program database. Specific program results are presented periodically at scientific meetings, angling clubs and other civic meetings. Data from the VGFTP show that target species spawn either in the lower Bay, or in offshore-nearshore waters of VA-NC, using Virginia waters as nursery/feeding grounds. Specifically, tag-recapture data for cobia show sexually mature fish returning regularly to the bay over periods of 1-5 years post tagging. Flounder results are indicating strong site fidelity to bay and inlet fishing sites throughout the fishing season. During 2008-2010, program data have been used to enhance management for speckled trout, red drum, and flounder. North Carolina DMF issued a Draft NC FMP for Speckled Trout with included Virginia comprehensive catch data as a result of 15% of VA-tagged trout being recaptured in NC waters from 1995-2006.										
EXPECTED BENEFITS: Provide previously unavailable data on local fish movement and seasonal migrations on tagging program target species, all of which are important to VA's marine recreational fisheries. Tagged fish length data document fish year classes supporting VA fisheries and the data collected by anglers includes species not readily sampled by existing VIMS monitoring surveys. Data document over wintering of large numbers of speckled trout and red drum in select lower Bay power plant discharge areas. Tag-recapture data enhance other data sources by documenting numbers and sizes of undersized finfish released under fishery regulations in VA waters. Results will continue to be disseminated to the angling community. Annual Reports for the program are available the VIMS website, but more importantly through trained angler taggers spreading results across the angling community. This program also provides the angling community with hands-on participation in a fisheries research and conservation project; this directly benefits Virginia's marine recreational fisheries. Program results demonstrate to the angling community that significant numbers of released, sub-legal fish survive, as well as becoming available again to anglers for better fishing experiences.										
COSTS: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">VMRC Funding:</td> <td style="width: 15%; border: 1px solid black; text-align: right;">\$42,475</td> <td style="width: 65%; border: 1px solid red; padding: 2px;">(VIMS) + \$27,738 (VMRC) = \$70,213</td> </tr> <tr> <td>Recipient Funding:</td> <td style="border: 1px solid black; text-align: right;">\$23,270</td> <td></td> </tr> <tr> <td>Total Costs:</td> <td style="border: 1px solid black; text-align: right;">\$65,745</td> <td style="border: 1px solid red; padding: 2px;">+ \$27,738 = \$70,213</td> </tr> </table>		VMRC Funding:	\$42,475	(VIMS) + \$27,738 (VMRC) = \$70,213	Recipient Funding:	\$23,270		Total Costs:	\$65,745	+ \$27,738 = \$70,213
VMRC Funding:	\$42,475	(VIMS) + \$27,738 (VMRC) = \$70,213								
Recipient Funding:	\$23,270									
Total Costs:	\$65,745	+ \$27,738 = \$70,213								
Detailed budget must be included with proposal.										

Updated 11/12/08

*This form alone does not constitute a complete application, see application instructions or contact Sonya Davis at 757-247-8155 or sonya.davis@mrc.virginia.gov

Virginia Game Fish Tagging Program

Budget – 2012

VMRC Portion

The majority of the VMRC portion of the budget is returned to the angling public in the form of tagging awards and information, delivery charges (UPS and USPS) and shipping supplies (96%).

Tagging awards consist primarily of rewards sent to the general public for reporting tag recapture information but also include costs for data sheets, Conservation Certificates and Plaques that are provided to the volunteer taggers. The number of reported recaptured fish in any given year correlates to the number of fish tagged in that year but is also influenced by the number of fish tagged in recent prior years. For the first time in any year, in 2008 the number of active volunteer taggers reached roughly 200 (the carrying capacity of the program) and remained at that number through 2011. To cover the expected increase in recaptures, the number of certain reward items was increased in the 2011 budget request. Additionally UPS postage and shipping costs, plus the related mailing supplies, were increased to reflect both increases in cost per item and increases due to the number of items shipped. We believe the funding amount in the 2011 budget is sufficient for 2012. Therefore our request for funding in 2012 includes no increases from the budget submitted for 2011 of \$27,738. Below is the breakdown by category and item.

Tagging Awards

720 Hats @ \$6.50 each	4680
720 T-Shirts @ \$6.50 each	4680
250 Pewter Fish Pins @3.00 each	750
1200 Decals @ .85 each	1020
600 Digital Stickers @ 1.75 each	1050
500 Tackle Organizers @ 3.00	1500
12 Tag Plaques @ \$14 each	168
Conservation Certificates	500
Data Sheets and Cards	<u>600</u>
Total	14948*

*Continued next page

Postage and Shipping

U. S. Postage	1560
UPS Shipping	<u>8970</u>
Total	10530
Supplies (Paper, Envelopes, Mailers, Tape, Bubble Wrap etc.)	1060
Travel	<u>1200</u>
Total	2260
<u>Grand Total</u>	27,738

**Virginia Game Fish Tagging Program
Year 18 Proposal (2012)**

January 1, 2012 to December 31, 2012

Proposal Submitted to:

**Virginia Recreational Fishing Development Fund
Virginia Marine Resources Commission
2600 Washington Avenue, Third Floor
Newport News, Virginia 23607**

Proposal Submitted by:

**Virginia Sea Grant Marine Extension Program
Virginia Institute of Marine Science
College of William and Mary
Gloucester Point, Virginia 23062**



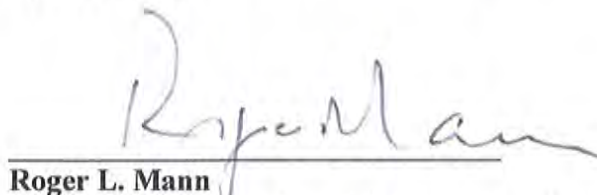
**Susanna Musick
Principal Investigator
804-684-7166**



**Thomas J. Murray
Associate Director for Advisory Services
804-684-7190**



**Jane A. Lopez
Director of Sponsored Programs
804-684-7029**



**Roger L. Mann
Director for Research and Advisory Services
804-684-7108**

April 11, 2011

VIRGINIA GAME FISH TAGGING PROPOSAL FOR 2012

Overview

Since 1995, the Virginia Game Fish Tagging Program (VGFTP) has coordinated a fish tagging and recapture program and database created from data collected by a dedicated corps of trained marine anglers. The program was coordinated from 1995 to 2007 by Claude Bain (VMRC) and Jon Lucy (VIMS). Currently, the program is under the direction of Lewis Gillingham (VMRC, Virginia Saltwater Fishing Tournament (VSFT) Director) and Susanna Musick (VIMS, Marine Advisory Program).

This proposal seeks to continue funding for the project from the Saltwater Recreational Fishing Development Fund during 2012 (Year 18). In complement to the VMRC funds requested in this proposal, the Virginia Institute of Marine Science of the College of William and Mary will provide matching funds. Additional communication and administrative support is provided by the Virginia Sea Grant Program at VIMS, a federal funding source (National Oceanographic and Atmospheric Administration-NOAA) of special significance to VIMS as part of the broader Virginia Sea Grant Marine Extension Program.

VIMS and the VMRC share program responsibilities to take advantage of the respective organizations' communication links with the marine recreational angling community, strengths in data analysis and production of publications. The tagging program's database is housed and maintained at the VMRC. The VSFT has a close association with the Hampton Roads community having been in Virginia Beach from 1995-2008 and now in Newport News. Since 1958, the VSFT has monitored and awarded trophy catches and releases of marine fish in state waters. This mechanism provides regular and trusted contact with anglers, tackle shops and marinas. The mailing protocol used by the VSFT for the trophy catch awards translates well to recapture awards distribution for the tagging program. The VSFT handles tagging and recapture data entry in addition to the awards.

Like the VSFT, VIMS enters tagging and recapture data for the VGFTP. VIMS also conducts regular data analysis for the program and flags questionable data for the program. VIMS provides data summaries and figures for training workshops, annual reports, researchers, fishery managers, anglers and presentations to angling clubs, civic groups and scientific meetings. VIMS is also responsible for ordering, distributing and maintaining tagging equipment for the program including tags, tagging needles and tag applicators.

Overall Objectives

The following basic objectives guide program activities:

- (1) Develop and maintain a quality tagging program using a corps of trained angler taggers and direct the tagging effort on select target species to take advantage of significant numbers of non-legal, released fish.
- (2) Direct program tagging effort toward opportunistic occurrences of strong year classes of fish in Virginia's waters when appropriate-especially species not already subject to scientific tagging studies in these waters (such as red drum, black drum, speckled trout, tautog, sheepshead, spadefish, etc.). The program avoids species (e.g. striped bass) currently monitored in state waters by research-based tagging studies coordinated by fishery research agencies and institutions.
- (3) Maintain a database of tagged and recaptured fish records accessible to the angling community, but also of use to fishery researchers and managers. Make summaries and reports of data available to the angling community through annual reports, websites, presentations, children's fishing clinics, etc. and provide requested data to researchers and fishery managers.
- (4) Use the tagging program to increase education of marine anglers regarding the importance of reporting tagged fish to enhance the understanding and management of key stocks important to Virginia's marine recreational fisheries.
- (5) Use program results to educate the angling community about fishery conservation and management benefits directly connected with proper handling and releasing of undersized fish. Tag-recapture data

show that anglers who consistently use proper catch and release fishing practices have better angling catches.

The program maintains a group of experienced, trained, angler-taggers who can capitalize on opportunities to tag key species that often exhibit high abundance levels during a given fishing season. These events contribute to rebuilding and sustaining specific fisheries in Virginia's one billion dollar recreational fishery and take on even greater value when this program documents sizes and abundance of recreationally-targeted fish and the habitats they utilize.

Program Structure

Participation during any one year is limited to approximately 200 trained taggers to keep the program manageable and to promote quality tagging and data collection. Under this participation level, the need for tags, equipment and the handling of tag-recapture data have been manageable. This number of taggers has worked well to produce useful data on the number and size distribution of tagged fish and a valuable time-series of tag-recapture data for the targeted species. Since 2009, there is one, centrally-located, annual training workshop.

Annually, in December, taggers are requested to renew their active status in the program for the coming year. Due to a range of circumstances (moving out of the area, selling their boat, etc.) about 10-30% of participants may become inactive at the end of the year. This change opens up new "slots" for anglers on the waiting list to join the program. The spring tagging training workshop fills these open positions with new taggers.

Just over 30 new taggers were trained in 2010 and approximately 30 more new taggers joined the program in April 2011. The training workshop focuses on program objectives, data recording needs, fish handling and tagging techniques, and hands-on tagging practice with fresh fish. After practicing tagging to the satisfaction of program staff, new taggers are provided tags and tagging equipment (including waterproof data sheets, tagging protocol handouts and fish measuring boards). Bass Pro Shop in Hampton regularly cooperates with the program by allowing the workshop to be held in the store's community training room.

Details of Program Responsibilities

In addition to handling the majority of data entry, the VA Saltwater Fishing Tournament office distributes tags, needles, etc. These items are regularly mailed to taggers and records are maintained regarding tag-number series assigned to the participants. This information is important for tracking down late tagged fish data reports for reported recaptures. Similarly, "Fish Recapture Reports" generated from the database are mailed to both the tagger and the angler reporting the recapture (along with the available reward item). This timely feedback loop is critical to the success of the tagging program.

Every tag clearly states that a "REWARD" is offered for reporting recaptures of tagged fish. Appropriate reward items (program caps, sun visors, T-shirts, fish pins, etc.) are mailed to anglers (and commercial fishers and fish dealers reporting tags) by the VSFT office along with fish Recapture Reports. The most popular reward item is the t-shirt, which must be printed in limited numbers each year to stay within budget. Typically, late in the fishing year the T-shirt supply becomes exhausted. Then other reward items are substituted for it (most reporters of recaptured fish understand such issues).

The majority of data for both tagged and recaptured fish are entered into the database at the VSFT office; the data go directly into the database maintained on a server at the VMRC. The VMRC database manager is proactive in contributing to the improvement of tagged and recaptured fish data and outputs. Current options include setting up various reports that provide "single-click" data summaries for review and tracking program results.

VIMS continues to serve as a remote site for entering tagged and recaptured fish data for selected program participants. To relieve some of the workload from the VSFT office, VIMS (Dianne Roberts) now enters all data for the program's most productive tagger, Mr. Ed Shepherd. From 2007-2010, Mr. Shepherd has tagged 2,000-4,000 fish annually (2221 in 2010, Table 1) which resulted in 550-900+ recapture reports each year. Ms. Roberts also provides critical feedback to the program regarding data organization, tagging inventory, workshop materials and dissemination preparation.

At VIMS, tagged fish and recapture data records are also checked for possible inconsistencies and errors; the corrected data then are analyzed and formatted for various presentations and reports. Figures demonstrating fish movement and habitat use patterns are also developed for a variety of educational programs (VIMS Marine Science Day, kids fishing clinics, science teachers and public presentations). Data and graphics also are developed in different formats for various program dissemination needs, i.e. VIMS website pages, annual tagging training workshops, posters, annual reports and presentations (angling clubs, civic groups and scientific meetings). Tag and program equipment orders including the construction of fish measuring boards are handled by VIMS.

The Institute also periodically conducts tag retention field trials to evaluate whether changes might be warranted regarding the type of tag used for a specific species. Depending on the size range of fish, certain tags are more appropriate for small fish specimens (like the 2.5 in T-bar tag) versus large fish (plastic and stainless steel dart tags). For target species larger than 26-28 inches total length, the program recommends using a 6.25 in. stainless steel dart tag with wire core sheath. (Figure 1).

In 2008, select taggers were provided dogleg dart tags (DD tags) and wide-anchor dart tags (DW tags) to trial in speckled trout and red drum. Tag retention studies continued under the guidance of Mr. Jon Lucy and Ms. Susanna Musick in 2010 for these plastic dart tags to examine patterns of times at large (versus T-bar tags). Recapture rates and times at large are being examined to determine if distinctive patterns result from the DD and DW tags.

Target Species: 2000-2010

Target species for 2010 are listed below (unchanged since 2000).

Black Drum	<i>Pogonias cromis</i>
Black Sea Bass	<i>Centropristis striata</i>
Cobia	<i>Rachycentron canadum</i>
Summer Flounder	<i>Paralichthys dentatus</i>
Gray Triggerfish	<i>Balistes capriscus</i>
Red Drum	<i>Sciaenops ocellatus</i>
Sheepshead	<i>Archosargus probatocephalus</i>
Spadefish	<i>Chaetodipterus faber</i>
Speckled Trout	<i>Cynoscion nebulosus</i>
Tautog	<i>Tautoga onitis</i>

Background and Overall Accomplishments-2010

The tagging program documents annual and year-to-year movement and habitat utilization patterns of selected finfish species in Virginia waters. For certain species, the program documents significant coastwise migrations. Many of these species spawn in the lower Bay or nearshore waters of Virginia and use Virginia estuarine and coastal waters as nursery and feeding grounds.

The program's results are of interest to the angling community and to fishery researchers and managers. The number and size distribution of fish tagged each year compliment other research-based data sets and can help

fishery managers gain a more comprehensive picture of sizes of fish released in the state's marine recreational fishery.

Tagging effort for flounder, red and black drum, speckled trout, cobia, spadefish, triggerfish and sheepshead primarily occurs in Bay and nearshore coastal waters. However, tagging of tautog, black sea bass, spadefish and gray triggerfish occurs over much broader areas of the Bay and inshore-offshore waters. Tagging for structure-oriented species occurs on sites such as fishing piers, artificial reefs, the Chesapeake Bay Bridge Tunnel complex, shipwrecks and other bottom sites occurring from the lower Bay to sites offshore of Virginia.

Special tagging continues at warm water discharge sites through cooperation with Virginia Dominion Power. Past tagging results at the Yorktown Power Station (York River) and the Center for Energy Conservation Power Station (Elizabeth River) have helped to document these areas as important over-wintering sites for various species, especially speckled trout and red drum.

Through 2010, the program's database included over 171,000 tagged fish records and approximately 19,467 recapture records (Table 2). (*Note: VGFTP data referenced here include summaries of fish tagged and recaptured in terms of the number of *fish* recaptured (Table 2) and the *cumulative* number of *recaptures*, including multiple recaptures of the same fish (Table 3).) During 2007-2009, there was good consistency among top ranked species by number of fish tagged per year. Summer flounder traditionally accounted for the most tagged fish each year with red drum, speckled trout and black sea bass each account for >3,000 fish tagged (2007-2009). Cumulative recapture rates during 2010 (Table 3) were approximately 11.4% and 18% for tautog and gray triggerfish, respectively. During the year cumulative recapture rates of 14-37% occurred for spadefish, red drum, cobia and black sea bass. Recapture rates were between 3-9% for sheepshead and flounder. The lowest recapture rates occurred for speckled trout and red drum (2.4%).

During 2010 angler participation remained around the 200 person cap. In March, "Top Tagger" awards were presented in Hampton at Bass Pro Shops' "Spring Fishing Classic" seminar series. The Tagging Program is fortunate to have a consistent group of anglers dedicating volunteer effort into tagging considerable numbers of fish that result in useful recapture data. The 2010 top taggers are responsible for a major portion of tagged and recaptured fish data each year. The good-natured competition for the annual awards encourages taggers to work at becoming more consistent in their tagging. By doing so, they have a chance at making the list of annual award winners for any given year. Trained anglers' tagging accomplishments appear in Table 1 by number of tagged fish. Seventy-eight (78) anglers tagged 25 or more fish during 2010, which accounted for about 95 percent of all fish tagged in the year. This participation level was similar to that in 2009. These anglers' consistent efforts produce the majority of data on local and regional habitat use and movement patterns of target species.

Top ranking anglers by total recaptures during 2010 appear in Table 4. The majority (90%) of recaptures reported during the year were accounted for by the 42 taggers listed. As expected, anglers tagging the most fish often have the highest number of recaptures per year. Higher numbers of recaptures are associated with a number of variables including fishing (and tagging) frequently, organizing one's tags and data sheets to enhance tagging efficiency, and tagging at locations which hold individual fish for significant periods and which are fished frequently by other anglers.

Long-term trends and Select 2010 Results

Black sea bass: Just over 1000 fish were tagged in 2010. In the past, many of the tagged sea bass were 5-6 inches (total length) with over 2,100 tagged at Fort Monroe Fishing Pier in 2009. A number of multiple recaptures occurred among the small fish, especially at the Fort Monroe Pier. Previous data have shown minimal movement away from tagging sites. To manage program resources better, a minimum tagging size limit of 6.5 inches was implemented in 2010. Even with this size limit in place, black sea bass had the highest recapture rate in 2010 at ~37%.

Flounder: VGFTP flounder show consistent patterns of recruitment within the Chesapeake Bay. From 2007-2010, the majority of flounder were tagged and recaptured in Virginia waters. Minimum tagging size limit restrictions were set in 2010 to better manage program activities (data entry and rewards). This decision helped to verify that the majority of single and multiple recaptures at piers and other structure sites were composed of primarily smaller fish (<12 in.). The Gloucester Point Fishing Pier was the top tagging site for the program (2007-2010) and similar site fidelity patterns for recaptures have been seen at the Hampton Roads Bridge Tunnel complex, Ocean View Fishing Pier, Fort Monroe Fishing Pier and Rudee Inlet waters. The pattern of VGFTP recaptures is similar to that of previous studies (Desfosse (1995), Kraus and Musick (2001)) with the majority of recaptures in the general tagging area. Likewise, the northern and southern range for recaptures (Rhode Island and South Carolina), followed that of Desfosse (1995). *Overall, the tagging program data have shown similar results to earlier flounder datasets from Virginia, providing further support for the angler-assisted tagging methodology.* In 2010, approximately 5238 flounder were tagged and 431 were recaptured. This change in numbers is a reflection of the minimum size limits in addition to other factors such as an overall reduction in effort (fewer anglers and taggers went fishing in Virginia in 2010).

Red drum: From 1998-2010, >500 red drum have been tagged each year in Virginia. During recent years, Rudee Inlet and the “Hot Ditch” area of the Elizabeth River have held over-wintering populations of sub-adult drum. Every winter since 1998, good numbers of red drum have been tagged at the Elizabeth River Hot Ditch, and several fish were also tagged at the York River “Hot Ditch.” However, tagging at the York River site was limited in 2010 and 2011, due to limited warm water outflow. In 2010, 1866 red drum were tagged and 274 were recaptured (Table 2).

Speckled trout: Strong year classes of speckled trout in the recreational fishery were documented by tagging efforts in 1995, 1999, 2002, 2004- 2010. Like sub-adult drum, speckled trout overwinter in lower Bay power plants during the winter. From November 2009-March 2010 and November 2010-March 2011, good numbers of 13-24 inch speckled trout (including several citations in early 2011) were tagged at the Elizabeth River Hot Ditch. For the first time, speckled trout led the program in numbers of tagged fish (7,270), though the recapture rate was still low (2.4%) compared to the overall program average (>10%).

Tautog: Through 2010, tagging effort on tautog in Virginia waters has resulted in >14,848 fish tagged. From this effort, there have been >2,380 recaptures reported (Table 3). Tag-recapture data for tautog continue to document that the species does not undergo regular seasonal movements offshore during the fall or inshore during the winter. Tautog tagged in Virginia Bay and offshore waters show no distinctive northward migration over time.

Proposed 2012 Activities

1. Tags and tagging equipment will be provided to the program’s participants with the primary emphasis of collecting and recording quality data on tagged fish.
2. The VGFTP database will be maintained on the VMRC server and improvements (where necessary) will be addressed such as data sorting and retrieving, automatic report generation and access, and online reporting and tagger record access (making participant’s tag and recapture records more accessible to them through a secure process).
3. Continue working with taggers to trial various types of tags that may increase retention (and thereby recapture rates) in species such as speckled trout, red drum, etc.
4. Produce updated materials and results for the program website and create the 2012 Tagging Program Annual Report. Explore preferred methods of dissemination for program participants.
5. Conduct tagging training workshop(s) to bring new anglers into the program (as space permits). Continue updating and improving instructional handouts and presentations to improve training and provide continuing education for existing taggers.

Expected Benefits

The VGFTP data will continue to provide anglers, researchers and fishery managers with historic and recent data describing fish habitat use and seasonal movement patterns for key recreational species. The data may also highlight significant pattern shifts for fish that may warrant special research projects to ascertain whether such changes are significant.

The program will provide the opportunity to tag large numbers of fish on relatively short notice with an experienced group of trained angler-taggers. This situation has taken place in the past, especially in regard to juvenile and adult red drum, cobia, summer flounder, speckled trout, spadefish, sheepshead and tautog.

The program will provide improved communication, understanding and cooperation among scientists, managers and anglers regarding tagging programs and the benefits of good reporting rates of recaptured fish. The program delivers relevant information to the angling community and the public about the importance of Virginia's marine recreational fisheries, including the benefits of proper fish handling techniques and effective catch and release fishing on fish resources.

Annual tagging program reports will continue to offer program results readily accessible to anglers and others interested in tracking marine recreational fisheries in state waters. Accessibility to annual reports will be primarily through the VIMS website (and library) with links to the site from VMRC webpages and other related fisheries management groups. The VIMS website will be updated in 2011 and 2012 to make it more user-friendly for the taggers and other recreational community members.

The VGFTP database will continue to document changes in relative abundance of various year classes of recreationally-targeted fish in Virginia. It also provides data on the size distribution of sub-legal fish released in Virginia's recreational fishery, patterns of seasonal migrations and habitat use of key fish, including over-wintering areas used by key target species.

Location

The project is located in Virginia and the taggers are Virginia recreational fishermen. All species of fish targeted by the program are recreationally important and found seasonally in the Chesapeake Bay. Tagging efforts will occur in Virginia waters including the Chesapeake Bay and adjacent nearshore and offshore waters.

Annual Report

The annual report for 2009 was completed and submitted to the Recreational Fishing Advisory Board and VMRC staff in May 2010. Limited hard copies are available of the report, though online access is encouraged to reduce printing and paper wastage. Annual reports through 2009 are available on the VIMS VGFTP website:

www.vims.edu/vgftp/ .

References:

- Desfosse, J. 1995. Movements and ecology of summer flounder, *Paralichthys dentatus*, tagged in the southern Mid-Atlantic Bight. College of William & Mary, Williamsburg, VA, PhD Dissertation, 187 pp.
- Kraus, R. T. 1998. Tagging and habitat utilization of juvenile summer flounder, *Paralichthys dentatus*. College of William & Mary, Williamsburg, VA, M.S. Thesis, 148 pp.
- Kraus, R.T. and J.A. Musick. 2001. A brief interpretation of summer flounder, *Paralichthys dentatus*, movements and stock structure with new tagging data on juveniles. Mar. Fish. Rev. 63 (3):1-6.

Table 1. VGFTP 2010 Top Taggers: Anglers Tagging >25 Fish



Game Fish Tagging Program
 Virginia Marine Resources Commission
 Virginia Institute of Marine Science

Anglers Tagging 25 or More Fish During 2010

Print Date: April 12, 2011, 11:37 am



Tagger	Black Drum	Black Sea Bass	Cobia	Flounder	Red Drum	Sheeps Head	Spade Fish	Speckled Trout	Tautog	Tripper Fish	Total
ED SHEPHERD	3	599	0	1232	37	0	0	346	4	0	2221
SHELDON AREY	0	0	1	93	92	0	0	1748	0	0	1934
JIM ROBINSON	1	7	2	157	381	3	1	1237	10	0	1799
JAY DUELL	1	0	0	273	124	0	0	291	5	0	694
ROB COLLINS	3	63	1	137	14	2	12	36	145	79	492
JOHN DUNN	0	0	0	87	109	0	0	293	0	0	489
GEORGE WOJCIK	2	12	0	189	4	0	0	264	0	0	471
JON LUCY	2	0	0	10	129	0	0	283	0	0	424
BILL KNAPP	7	20	1	12	61	3	8	176	121	0	409
CARL STOVER	3	29	0	198	23	0	34	81	4	1	373
JOHN ZARELLA	2	5	0	92	0	0	0	261	8	0	368
DONNIE SMITH	2	0	0	5	35	0	0	260	0	0	302
JIM DUELL	1	3	0	139	41	0	0	104	0	0	288
ED LAWRENCE	0	0	0	25	78	0	0	164	0	0	267
MARK SPENCER	0	0	0	19	29	0	0	216	0	0	264
RORY GOGGIN	0	9	0	66	2	0	0	139	0	0	216
JOHN TAYLOR	0	2	0	162	11	0	0	31	0	0	206
DAVID GRIFFITH	11	3	0	35	23	0	0	124	0	0	196
MIKE RUSS	1	51	0	1	75	0	0	43	0	0	171
SUSAN HARRELL	0	122	0	36	0	0	0	3	0	0	161
KEVIN WHITLEY	1	0	0	49	18	10	6	17	50	0	151
RICK YAVNER	0	0	0	18	1	0	0	122	0	0	141
WILL DAMERON	0	0	0	31	100	0	0	0	3	0	134
DANNY TAYLOR	0	0	0	131	0	0	0	0	0	0	131
FRANK OSBORN	0	0	0	124	0	0	0	0	0	0	124
MARVIN HARDISTY	0	0	0	3	64	0	0	57	0	0	124
MIKE PERRON	3	0	0	29	20	1	0	21	50	0	124
RICK GUYOT	4	6	1	18	53	0	4	21	7	5	119
HUGH GREEN	0	0	0	58	5	0	0	54	0	0	117
THOMAS EMBRY	0	8	0	71	12	0	0	24	0	0	115
DAVID COHN	0	2	0	14	24	2	0	23	49	1	115
DOROTHY ELLIOTT	0	0	0	114	0	0	0	0	0	0	114
JASON WALTON	0	0	0	108	0	0	0	0	0	0	108
MIKE HANDFORTH	0	1	0	105	0	0	0	0	0	0	106
JIM CARPENTER	0	0	0	103	0	0	0	1	0	0	104
JOE SIMONS JR	0	0	0	31	2	0	0	69	0	0	102
JARED SEELOFF	4	0	0	0	94	0	0	4	0	0	102
DAVID AGEE	0	0	0	43	0	0	0	0	57	0	100
LANCE STITCHER	0	2	0	42	0	0	0	0	42	9	95
KEN NEILL	4	22	2	0	4	0	0	0	60	0	92
SCOTT VINSON	0	0	0	90	0	0	0	0	0	0	90

Game Fish Tagging Program

Virginia Marine Resources Commission
Virginia Institute of Marine Science

Anglers Tagging 25 or More Fish During 2010

Print Date: April 12, 2011, 11:37 am

Tagger	Black Drum	Black Sea Bass	Cobia	Flounder	Red Drum	Sheeps Head	Spade Fish	Speckled Trout	Tautog	Trigger Fish	Total
CHRIS WILLIAMS	0	0	0	84	1	0	0	0	0	0	85
JORJ HEAD	0	0	82	0	0	0	0	0	0	0	82
ANDREW KUMJIAN	1	0	0	30	9	0	0	39	0	0	79
CHARLIE JOHNSC	0	0	0	26	0	0	0	49	0	0	75
TIMOTHY WATERS	0	0	0	29	2	0	1	33	6	0	71
BRANDON POULT	2	0	0	54	7	0	0	0	4	0	67
JOHN HUME	0	0	0	0	0	0	0	64	0	0	64
BEN CAPPS	1	1	0	0	0	0	0	49	11	0	62
TOMMY HEINZ	0	0	0	54	0	0	0	7	0	0	61
WILLIAM DAVID	0	0	0	59	1	0	0	1	0	0	61
AL BUNNELL	0	0	0	0	4	0	0	55	0	0	59
DONALD LEVINER	0	0	0	58	0	0	1	0	0	0	59
BILL FOGLE	0	0	1	29	2	0	0	23	0	0	55
NATHAN JONES	0	0	0	0	39	0	0	16	0	0	55
DOUG WEHNER	8	1	0	12	0	0	0	32	0	0	53
RYAN LINDQUIST	0	0	0	52	0	0	0	0	0	0	52
DOUG CASADY	2	0	0	21	1	0	0	26	0	0	50
ROY MCCAUSEY	0	1	0	15	1	0	0	27	4	0	48
CHARLES DONNELL	0	1	0	45	0	0	0	0	0	0	46
WAYNE COLLINS	0	0	0	45	1	0	0	0	0	0	46
KENNETH GARTHE	0	0	0	41	0	0	0	5	0	0	46
DOUG PURCELL	0	0	1	14	2	0	0	27	0	0	44
LEE IRWIN	0	0	0	43	0	0	0	0	0	0	43
MATTHEW BALAZ	0	0	0	2	0	0	0	40	0	0	42
STEVE CIBIK	0	0	0	2	0	0	0	40	0	0	42
LESTER BERRY	0	6	0	33	0	0	0	2	0	0	41
LEE HUGHES	0	0	0	40	0	0	0	0	0	0	40
DON MILLER	0	0	0	1	28	0	0	8	0	0	37
RICK WINEMAN	4	2	6	0	15	0	0	0	10	0	37
ASHLEY MCCALL	0	0	0	37	0	0	0	0	0	0	37
RENSHAW FORTIER	0	0	0	0	0	0	0	36	0	0	36
KENDALL OSBOR	0	0	0	0	7	0	0	29	0	0	36
WILLIAM SPRUILL	0	0	0	36	0	0	0	0	0	0	36
RON DUKE	0	0	0	0	0	0	0	34	0	0	34
JOE BESSLER	0	0	0	3	1	0	0	28	0	0	32
SCOTT MEREDITH	0	0	0	0	28	0	0	3	0	0	31
JIMMY ROBINSON	0	0	0	0	8	0	0	0	19	0	27
STEVE WALKER	5	0	0	20	1	0	0	1	0	0	27
DAVID BARNHART	0	0	0	0	5	0	0	21	0	0	26
JEFF HOTTENSTE	0	0	0	25	0	0	0	1	0	0	26
MARY GOGGIN	0	3	0	16	0	0	0	7	0	0	26
PARKS ROUNTRE	0	0	0	0	0	0	0	25	0	0	25

Figure 1. VGFTP Tags and Applicators

Tagging Gun and T-Bar Tags (top photo); Stainless Steel Dart Tag and Applicator (bottom photo)
(Note: coin for scale – 0.75 inches diameter)

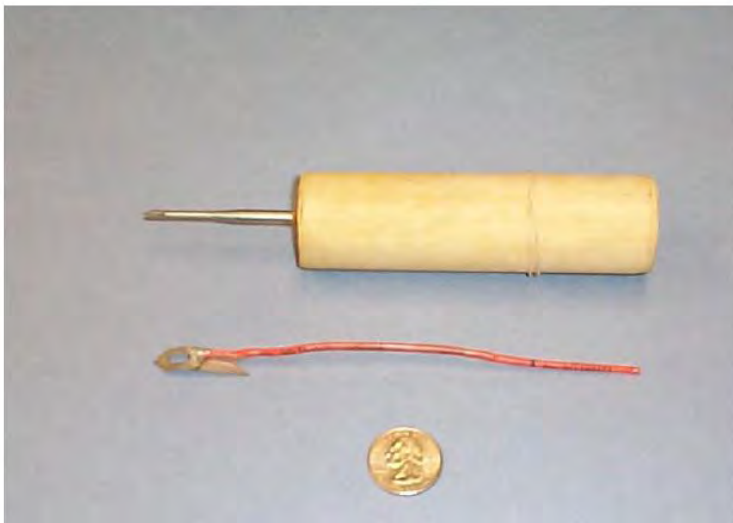


Table 2. VGFTP Numbers of Fish Tagged and Recaptured, 1995-2011



Game Fish Tagging Program
 Virginia Marine Resources Commission
 Virginia Institute of Marine Science
Recaptures / Tagged by Year and Species Report
Based on Number of Fish



Print Date: April 11, 2011, 8:42 am

Year	Black Drum	Black Sea Bass	Cobia	Flounder	Red Drum	Sheeps Head	Spade Fish	Speckled Trout	Tautog	Trigger Fish	Total
2011	0 / 5	0 / 0	0 / 0	0 / 0	159 / 738	0 / 0	0 / 0	96 / 1,866	10 / 165	0 / 0	265 / 2,774
2010	2 / 84	237 / 1,003	15 / 108	431 / 5,238	274 / 1,866	1 / 19	11 / 87	163 / 7,270	77 / 682	17 / 95	1228 / 16,451
2009	5 / 169	656 / 3,272	8 / 36	1097 / 9,328	506 / 3,110	8 / 225	20 / 390	97 / 3,194	108 / 540	38 / 133	2537 / 20,395
2008	6 / 186	294 / 2,684	7 / 64	769 / 7,874	456 / 4,504	2 / 40	36 / 300	183 / 3,275	139 / 745	69 / 211	1959 / 19,883
2007	33 / 546	252 / 1,875	13 / 71	947 / 8,615	483 / 3,353	28 / 229	69 / 433	59 / 2,880	227 / 954	37 / 262	2148 / 19,219

This report accounts for double tagging and counts the number of fish that were tagged and not the number of tags. Double Tag info is valid for 2008 and after. For recaptures, this report counts the number of fish recaptured and does not count multiple recaptures of the same fish.

Table 3. VGFTP Cumulative Numbers of Fish Tagged and Recaptured, 1995-2011



Game Fish Tagging Program
 Virginia Marine Resources Commission
 Virginia Institute of Marine Sciences
Recaptures / Tagged by Year and Species Report
Based on Number of Tags



Print Date: April 11, 2011, 8:41 am

Year	Black Drum	Black Sea Bass	Cobia	Flounder	Red Drum	Sheeps Head	Spade Fish	Speckled Trout	Tautog	Trigger Fish	Total
2011	0 / 5	0 / 0	0 / 0	0 / 0	166 / 743	0 / 0	0 / 0	96 / 1868	10 / 165	0 / 0	272 / 2781
2010	2 / 85	374 / 1003	15 / 108	461 / 5242	294 / 1885	1 / 21	12 / 87	177 / 7276	78 / 682	17 / 95	1431 / 16484
2009	5 / 172	1012 / 3274	8 / 36	1264 / 9348	544 / 3133	8 / 225	20 / 391	99 / 3203	110 / 541	39 / 176	3109 / 20499
2008	6 / 192	332 / 2687	8 / 66	866 / 7896	509 / 4925	2 / 40	41 / 300	215 / 3520	145 / 745	76 / 212	2200 / 20583
2007	36 / 546	292 / 1875	13 / 71	1060 / 8615	511 / 3364	41 / 229	73 / 433	60 / 2929	238 / 955	47 / 262	2371 / 19280
2006	28 / 288	260 / 1268	26 / 187	792 / 6218	361 / 4153	0 / 176	28 / 221	51 / 1952	309 / 2081	32 / 79	1925 / 16626
2005	4 / 205	107 / 686	4 / 98	621 / 6123	42 / 794	3 / 185	21 / 173	29 / 1149	133 / 822	4 / 23	973 / 10258
2004	5 / 232	70 / 1012	5 / 184	648 / 7286	23 / 503	27 / 274	43 / 299	26 / 990	119 / 1221	41 / 193	1016 / 12194
2003	5 / 176	88 / 922	11 / 14	397 / 3704	339 / 2270	0 / 6	26 / 236	8 / 361	59 / 497	12 / 31	963 / 8219
2002	15 / 188	231 / 1732	15 / 63	317 / 3566	193 / 2752	1 / 10	55 / 470	23 / 1247	129 / 653	23 / 56	1053 / 10741
2001	4 / 395	280 / 1913	19 / 87	636 / 6880	27 / 295	1 / 7	49 / 553	13 / 486	149 / 951	2 / 14	1215 / 11599
2000	5 / 109	294 / 2008	10 / 65	161 / 2603	173 / 1124	1 / 12	60 / 523	11 / 362	156 / 713	0 / 0	912 / 7519
1999	7 / 90	384 / 2139	16 / 59	4 / 4	135 / 1073	0 / 0	25 / 233	16 / 521	356 / 1923	0 / 0	973 / 6049
1998	8 / 196	455 / 2655	13 / 73	3 / 28	92 / 551	0 / 0	38 / 476	29 / 495	226 / 1347	0 / 0	881 / 5824
1997	2 / 72	48 / 592	9 / 108	2 / 38	44 / 438	0 / 0	36 / 547	12 / 440	77 / 914	0 / 0	233 / 3150
1996	3 / 85	0 / 0	9 / 75	0 / 6	4 / 92	0 / 0	8 / 189	4 / 409	74 / 543	0 / 0	102 / 1400
1995	37 / 200	0 / 0	2 / 50	0 / 3	2 / 66	0 / 0	25 / 193	14 / 601	30 / 260	0 / 0	110 / 1374

For recaptures, this report counts the number recaptures including recaptures of the same fish.

Table 4. VGFTP 2010 Top Taggers: Anglers Who Had >5 of their Tagged Fish Recaptured



Game Fish Tagging Program
 Virginia Marine Resources Commission
 Virginia Institute of Marine Sciences
Anglers Having 5 or More Fish Recaptured During 2010



Print Date: April 12, 2011, 11:38 am

Tagger	Black Drum	Black Sea Bass	Cobia	Flounder	Red Drum	Sheeps Head	Spade Fish	Speckled Trout	Tautog	Trigger Fish	Total
ED SHEPHERD	0	350	0	153	9	0	0	40	1	0	553
JIM ROBINSON	0	0	0	16	64	0	0	13	1	0	94
JOHN DUNN	0	0	0	22	30	0	0	12	0	0	64
SHELDON AREY	0	0	0	3	15	0	0	38	0	0	56
CARL STOVER	0	1	0	18	10	0	5	13	1	1	49
ROB COLLINS	0	3	0	2	3	0	1	1	18	10	38
JON LUCY	0	0	0	0	29	0	0	6	0	0	35
BILL KNAPP	0	6	1	0	9	0	0	3	12	0	31
JAY DUELL	0	0	0	16	10	0	0	3	0	0	29
GEORGE WOJCIK	0	1	0	8	4	0	0	10	0	0	23
JOHN TAYLOR	0	0	0	11	3	0	0	7	0	0	21
SCOTT VINSON	0	0	0	21	0	0	0	0	0	0	21
WILL DAMERON	0	0	0	2	15	0	0	0	0	0	17
KEVIN WHITLEY	0	0	0	3	2	1	0	1	10	0	17
JIM DUELL	0	1	0	8	7	0	0	0	0	0	16
MARK SPENCER	0	0	0	6	4	0	0	6	0	0	16
MIKE HANDFORTH	0	0	0	14	0	0	0	0	0	0	14
MIKE RUSS	1	0	0	0	12	0	0	1	0	0	14
NATHAN JONES	0	0	0	0	12	0	0	1	0	0	13
JOHN ZARELLA	0	1	0	4	0	0	0	5	1	0	11
RORY GOGGIN	0	0	0	10	0	0	0	1	0	0	11

KEN NEILL	0	0	1	0	0	0	0	0	10	0	11
LANCE STITCHER	0	0	0	2	0	0	1	0	4	4	11
LEE HUGHES	0	0	0	10	0	0	0	0	0	0	10
MIKE PERRON	0	0	0	3	3	0	0	0	4	0	10
JIM CARPENTER	0	0	0	9	0	0	0	0	0	0	9
RYAN LINDQUIST	0	0	0	9	0	0	0	0	0	0	9
DOUG CASADY	0	0	1	6	1	0	0	0	0	0	8
DAVID BARNHART	0	0	1	0	4	0	0	2	1	0	8
ED LAWRENCE	0	0	0	0	6	0	0	2	0	0	8
RICK GUYOT	0	0	0	1	5	0	1	0	1	0	8
BRANDON POULTER	0	0	0	6	1	0	0	0	0	0	7
THOMAS EMBRY	0	1	0	3	2	0	0	1	0	0	7
DONALD LEVINER	0	0	0	6	0	0	0	0	0	0	6
TIMOTHY WATER	0	0	0	5	0	0	0	1	0	0	6
DOUG PURCELL	0	0	0	1	4	0	0	1	0	0	6
SUSAN HARRELL	0	5	0	0	0	0	0	1	0	0	6
JOE SIMONS JR	0	0	0	4	1	0	0	0	0	0	5
ANDREW KUMJIA	0	0	0	5	0	0	0	0	0	0	5
JORJ HEAD	0	0	5	0	0	0	0	0	0	0	5
MARVIN HARDIST	0	0	0	0	2	0	0	3	0	0	5

HUGH GREEN	0	0	0	4	1	0	0	0	0	0	5
DON MILLER	0	0	0	0	5	0	0	0	0	0	5

**Virginia Game Fish Tagging Program
Virginia Institute of Marine Science
Proposed Budget for January 1, 2012 to December 31, 2012**

<u>BUDGET CATEGORY</u>	<u>DIRECT</u>	<u>MATCH</u>
I. Salaries		
a. Marine Recreation Specialist 1.5 mm/1 mm	\$ 6,875	\$ 4,583
\$55,000 Per Year		
\$4,583 Per Month		
b. Data Technician, TBN 1 mm/1 mm	\$ 2,875	\$ 2,875
\$34,503 Per Year		
\$2,875 Per Month		
Subtotal	\$ 9,750	\$ 7,459
II. Fringe Benefits (40%; 7.65% Hourly)	<u>\$ 3,900</u>	<u>\$ 2,983</u>
Total Salaries and Fringe Benefits	\$ 13,650	\$ 10,442
III. Publications (Annual Report, Website/Recapture Updates)	\$ 1,000	
IV. Travel (Local travel for field work, Tagging work group meetings, presentations at scientific meetings and association clubs.)	\$ 2,000	
V. Supplies	\$ 17,330	
20,000 T-Bar Tags @\$630/1,000*	\$ 12,600	
1,000 Plastic Dart Tags @0.80	\$ 800	
1,000 Steel Dart Tags @\$2.40	\$ 2,400	
15 Steel Tagging Needles @\$15	\$ 225	
40 Tagging Guns @\$30	\$ 1,200	
35 Tagging Needles @\$3	\$ 105	
Subtotal	<u>\$ 17,330</u>	
VI. Total Direct Costs	\$ 33,980	\$ 10,442
VII. Indirect Costs - 25% VMRC	\$ 8,495	
Indirect Costs - 48% on Match		\$ 5,012
Indirect Costs - 23% from Direct		7,815
VIII. TOTAL PROJECT COSTS	\$ 42,475	\$ 23,270
		\$65,745

SUSANNA MUSICK

susanna@vims.edu phone: 804.815.6231

EDUCATION:

M.Sc., Biodiversity and Conservation, 2006

University of Exeter in Cornwall, Centre for Ecology and Conservation; Tremough, Cornwall, England

Master's thesis topic: *Spatiotemporal patterns of marine turtle bycatch in the U.S.A. Atlantic longline fishery.*

Major Professor: Brendan Godley

B.S. Biology, 1999

College of William & Mary; Williamsburg, Virginia, USA

Undergraduate research topic: *Juvenile hawksbill distribution at Buck Island, St. Croix, U.S.V.I.*

Major Advisor: S. Laurie Sanderson

EXPERIENCE:

Marine Recreation Specialist, Marine Advisory Program, Virginia Institute of Marine Science, October 2010-current.

Manage the cooperative Virginia Game Fish Tagging Program to investigate marine finfish habitat use and movement. Review tag, recapture, size and distribution data for tagging program and address public queries from local, regional and state anglers and management officials. Implement annual training workshop for tagging program and manage equipment orders, inventory and distribution. Prepare and publish interim and annual reports and dissemination materials for the tagging program. Promote the tagging program and marine recreation program at scientific meetings, marine fishing expos, fishing clinics and other educational events. Investigate marine recreation program needs through communication with VA Marine Resources Commission, charter boat industry and public angling community.

Research Consultant, Terramare Partners, May 2010-October 2010.

Examined more than 20 years of data from the Food and Agriculture Organization Fisheries Global Capture Production database to determine patterns of global shark captures. Prepared bibliography and figures; assisted with report writing and preparation. Part-time.

Head of Conservation Department, Ascension Island Government. March 2007-November 2008.

Managed Green Mountain National Park and proposed Protected Areas. Administered and coordinated multi-species management programs for the island including seabirds, endemic plants, invasive species, feral livestock, sea turtles, marine mammals and land crabs. Trained and supervised Assistant Conservation Officer, Seabird Restoration Project Fieldworkers, Conservation Assistant, Conservation Youth Worker and all Conservation volunteers. Directed Conservation Visitor Center and Sales. Developed field trips and yearly education programs for Two Boats School. Advertised, coordinated and guided interpretive ecotours for small groups and large cruise ships. Liaised with all agencies on the island to ensure compliance with environmental regulations; introduced new environmental legislation. Administered and enforced commercial and sport fishing license programs. Managed governmental Conservation Department funds, external project funds, and finances generated from merchandise sales and tours. Created, managed and maintained wildlife databases and GIS infrastructure. Developed proposals for conservation programs. Obtained over \$200,000 of external grant funding in first year. Produced risk assessments for all proposals, research programs, and staff. Coordinated cooperative research programs and associated memorandums of understanding and protocols. Ensured implementation of international multilateral environmental agreements. Assessed fish mortality and performed histological dissections. Provided environmental recommendations for fuel containment and waste facilities. Panel member for review of regional climate change materials. Wrote, designed, edited and produced quarterly newsletter and weekly newspaper features. Full-time + : 50 hrs./week

Scientist II, Virginia Sea Grant Marine Advisory Program, Virginia Institute of Marine Science, November

2006-March 2007.

Updated, revised and rewrote more than 50 Data Activity Lesson Plans (DATAs). Conducted research online to provide most recent data and communicated with research specialists to ensure quality and timeliness of datasets. Developed original data activities into full lesson plans by integrating full teaching components (including objectives, grade level, vocabulary, standards, materials, time). Organized Spanish language materials and translated navigation elements. (Supervisor's Name: Lee Larkin, larkin@vims.edu) Part-time: 15 hrs./week

Marine Education Specialist, Virginia Sea Grant Marine Advisory Program, Virginia Institute of Marine Science, January 2001-September 2005.

Collaborated with international conservation organizations to develop and distribute bilingual sea turtle curriculum. Web Editor and TROLL (Teacher Reviewer of On-Line Learning) Project Manager for the BRIDGE, www.marine-ed.org/bridge , an online international marine education resource center. Supervised a team of more than 17 teachers who reviewed websites for the BRIDGE webcenter. Facilitated small competitive grant funding. Created and maintained webpages and project databases using HTML coding and Arachnophilia, Dreamweaver, Paint Shop Pro, Excel, and Access software. Selected and reviewed content for webpages, conducted presentations, wrote quarterly and monthly submissions for marine education journals, and prepared and disseminated information. Instructor for the Oysters, Blue Crabs, Sharks of the Chesapeake Bay and Sea Turtle Biology Workshops for Teachers. Assisted with the organization, preparation, and facilitation of workshops. Produced original curriculum and activities for workshop participants. COSEE Blackboard Site Manager. Provided outreach and feedback services to community members and website users. Created original illustrations and artwork for websites and the *Virginia Marine Resource Bulletin*. (Supervisor's Name: Lee Larkin, larkin@vims.edu) Full-time: 40 hrs./week

Teaching Assistant, Marine Biology, Biology Department, Old Dominion University, January 2001-September 2001.

Created test questions and prepared all exams. Attended all class lectures. Coordinated test dispersal to various off-site classes. Provided assistance to students and facilitated communication between students and professor. Maintained website for course. (Supervisor's Name: Kent Carpenter, kcarpent@odu.edu) Part-time: 10 hrs./week

Coastal Resource Management Volunteer, La Union Department of Agriculture, Philippines, U.S. Peace Corps, March 2000-November 2000

Trained fellow volunteers in the manta towing and transect field survey technique. Surveyed coral reefs using scuba. Organized and facilitated community cleanup and education campaign. Initiated cooperative community recycling projects including composting and recycled plastic stuffing. Designed coastal resource management proposals for Municipal Agricultural Officers. Served as a resource speaker for the Provincial Fisheries Department and presented scientific lectures on the ecology of mangroves. Coordinated the regional, provincial, and municipal offices for Agriculture to facilitate Participatory Coastal Resource Assessment (PCRA). PCRA enabled the Province to collect baseline coastal resource data and directly involve community members in identifying coastal resources and creating conservation action plans. Coordinated and facilitated the Coral Reef Education for Students and Teachers workshop in partnership with the International Marinelifelife Alliance, the Department of Education, Culture and Sports, the Department of Environment and Natural Resources, the Bureau of Fisheries and Aquatic Resources, and the Provincial Office of La Union. The workshop provided marine education training and educational materials to offices and 17 schools in the Province. Created a Coastal Resource Management Habitat Conservation Plan for the Province of La Union. Formulated and described the values of coastal resources, habitats, and various industries of the Province of La Union. Outlined conservation and management strategies including alternative livelihood projects. (Supervisors' Names: Stella Gandionko, Governor Justo Orros) Full-time: 40 hrs./week

Office Services Specialist, Virginia Sea Grant Marine Advisory Program, Virginia Institute of Marine Science, July 1999-March 2000

Contributed to the design and content of online educational community resources using HTML and PDF

programming. Designed and maintained the Seafood Education and Catch and Release Symposium websites. Photographed field and educational events using Olympus digital camera and published on the web using Paint Shop Pro and Arachnophilia programs. Created scientific illustrations for websites and the *Virginia Marine Resource Bulletin*. Assisted in the planning, preparation, and facilitation of marine science workshops and provided outreach services to community members and website users. (Supervisor's Name: Lee Larkin, larkin@vims.edu) Part-time: 30 hrs./week

Volunteer Resource Assistant, Buck Island Reef National Monument, National Park Service, May 1998-March 1999

For the summer of 1998, January and March of 1999, conducted intensive field research on the distribution, behavior, and foraging ecology of juvenile hawksbill sea turtles, *Eretmochelys imbricata*, at Buck Island Reef National Monument, St.Croix. Provided data to establish natural resource management projects. Collected and organized field data, ensured quality control of data and provided preliminary assessment and classification of data. Made field observations of natural resource conditions and provided results to specialists for analyses. Prepared reports and plans in relation to research conducted. Provided logistical support, training, and area orientation to visiting scientists and volunteers. Operated and maintained resource management equipment including 17' Mariner watercraft and 25 hp outboard motor as well as the following telemetry equipment: Yagi radio antenna, directional hydrophone, Lotek SRX 400 datalogger and receiver, and Garmin 12XL global positioning system unit. Utilized FoxPro software to compile, store, and analyze sea turtle data. Identified micro and macrofauna by sight, including reef fish, seagrass, coral and turtle species. Surveyed over 704 acres of water and reef recording benthic habitat characteristics and sea turtle data using snorkel and snorkel/manta tow methodology. Developed snorkel methodology protocol for sea turtle surveys. Discovered new benthic characteristics and growth of *Acropora palmata* in park boundaries. Assisted with sonic and radio telemetry, and tagging of sonic and radio tagged juvenile sea turtles. Developed underwater sea turtle hand capturing skills. (Supervisor's Name: Roy Pemberton, rap@vims.edu) Full-time/Seasonal: 40 hrs./week

Research Assistant, Fisheries Department, Virginia Institute of Marine Science, August 1997-May 1998

Conducted master's level lab research, categorized and tested egg samples and provided data on the fecundity of silversides, *Menidia menidia*, in the Chesapeake Bay. (Supervisor's Name: Herb Austin) Part-time: 10 hrs./week

Summer Aide, Fisheries Department, Virginia Institute of Marine Science, June 1997-August 1997

Dissected various species of Chesapeake Bay fishes while compiling life history data. Performed second reads on sectioned otoliths, identified stomach contents of marine fish species, mounted scales and otoliths. Participated in the Striped Bass Seine Survey-hauling nets, identifying fishes, recording data. Attended regional fishing tournaments to collect fish specimens and record data. Took measurements and data on rehabilitated sea turtles. Assisted in the satellite tagging and release of rehabilitated sea turtle. Examined Guinea marshland to record effects of fire on habitat. (Supervisor's Name: Herb Austin.) Part-time: 30 hrs./week

PUBLICATIONS:

- Musick, S. in prep. Spatiotemporal patterns of marine turtle bycatch in the U.S.A. Atlantic longline fishery.
- Musick, S. and L. Gillingham. In prep. Virginia Game Fish Tagging Program (2010) Annual Report. Recreational Fishing Advisory Board.
- Musick, J. and S. Musick. In press. Status of global shark populations. Food and Agricultural Organization.
- Musick, S. and L. Gillingham. Virginia Game Fish Tagging Program (2010) Interim Report. Recreational Fishing Advisory Board. February 2011.
- Hartnoll, R., Broderick, A., Godley, B., Musick, S., Pearson, M., Stroud, S. and K. Saunders. 2010. Reproduction in the land crab *Johngarthia lagostoma* on Ascension Island. *Journal of Crustacean Biology*. 30 (1) 83:92.

- Musick, S. 2008. Green Mountain National Park Endemic Plants Project Report. Department for International Development. United Kingdom.
- Musick, S. 2008. Ascension Seabird Restoration Project Report. Royal Society for the Protection of Birds. United Kingdom.
- Musick, S. ed. 2008. *Conservation Quarterly Newsletter*. Issues 21, 22, 23, 24.
- Musick, S. 2008. *Conservation Weekly, Islander Newspaper*. January-November editions.
- Musick, S. and B. Godley. 2008. Changes in Latitudes... spatiotemporal patterns of observed sea turtle bycatch in the U.S.A. Atlantic longline fishery. In Proceedings of the Twenty-Seventh Annual Symposium on Sea Turtle Biology and Conservation. Rees, A.F., M. Frick, a. Panagopoulou and K. Williams, compilers. NOAA Technical Memorandum NMFS-SEFSC-569, 262 p.
- Musick, S. 2007. Ascension Seabird Restoration Project Report. Royal Society for the Protection of Birds. United Kingdom.
- Musick, S. 2007. *Conservation Weekly, Islander Newspaper*. March-December.
- Musick, S. ed. 2007. *Conservation Quarterly Newsletter*. Issues 18, 19, 20.
- Hathaway, K. and S. Musick. 2005. Cold One Day, Warm Another? *Current* 21(5).
- Musick, S. Changes this season for the BRIDGE! *NMEA News*. 21(3) Fall 2005.
- Musick, S. Message from the Bridge: Upcoming Bridge Changes. *Information Exchange for Marine Educators*. October 2005.
- Musick, S. Message from the Bridge: Bridge Hurricane Resources. *Information Exchange for Marine Educators*. September 2005.
- Musick, S. Message from the Bridge: Scuttlebutt. *Information Exchange for Marine Educators*. August 2005.
- Musick, S. Message from the Bridge: MBARI Collaboration. *Information Exchange for Marine Educators*. July 2005.
- Musick, S. Message from the Bridge. *Information Exchange for Marine Educators*. June 2005.
- Musick, S. Message from the Bridge. *Information Exchange for Marine Educators*. May 2005.
- Musick, S. The Bridge Looks Forward to NMEA. *NMEA News*. 21(2) Summer 2005.
- Musick, S. 2005. Summer Opportunities: TROLLs at NMEA. *NMEA News* 21(1) 3.
- Musick, S. 2005. Tsunami. *Gulfstream*. Spring edition.
- Musick, S. 2005. Tsunami. Bridge Data Tip. <http://www.vims.edu/bridge/archive0105.html>
- Musick, S. 2004. Off the Hook. *Current* 20(2).
- Musick, S. 2004. Off the Hook. Bridge Data Tip. <http://www.vims.edu/bridge/archive0404.html>
- Musick, S. 2004. La Vida de la Tortuga- A Research-Based Elementary Classroom Resource. 1-12.
- Musick, S. 2004. La Vida de la Tortuga- Una Actividad para el Salón de Clases, Basada en Investigaciones Científicas Sobre las Tortugas Marinas. 1-12.
- K. Williams, and M. Cook and S. Musick. Fall 2003. Bridge TROLLs Take Marine Education by Storm! *Virginia Marine Resource Bulletin* 35(2)18.
- Lawrence, L. and S. Musick. 2003. Hold the Anchovies. *Current* 19(3).
- K. Williams, and M. Cook and S. Musick. Fall 2003. Bridge TROLLs Take Marine Education by Storm! *NMEA News* 19(3).
- Rose, L. and S. Musick. 2003. The Tip of the Iceberg. *Current* 19(2).
- Lisa Lawrence, V. Clark, J. von Montfrans, and S. Musick. July 2003. Blue Crabs in the Chesapeake- An Introduction to the Blue Crab. 25.
- Musick, S. 2003. Have You Seen ChesSIE Lately? *MAMEA Masthead*. Spring edition, 11.
- Musick, S. 2003. Have You Seen ChesSIE Lately? *TASE News*. May edition, 10.
- Musick, S., J.A. Musick, and L. Lawrence. 2003. Sea Turtle Science. 1-22.
- Rose, L. and S. Musick. 2003. The Long Journey. *Current* 19(1).
- Lawrence, L. and S. Musick. 2003. More Than Mud. *Current* 18(4).
- Musick, S. 2002. Eyes Wide Open: Virtual Exploration of the Ocean. *Current* 18(3).
- Musick, S. 2002. Scuttlebutt-ChesSIE. *MAMEA Masthead*. Summer edition, 2.
- Musick, S. 2002. Sharks of the Chesapeake Bay-Species Investigation Activity and Resource

Materials. 1-12.

- Musick, S. 2002. Estuarine Exploration. *Current* 18(2).
- Musick, S. 2002. Distant Shores and Dwindling Seas. *Current* 18(1) 31-32.
- Musick, S. 2002. ChesSIE lives! *Virginia Marine Resource Bulletin* 33(3) 18.
- Musick, S., J.A. Musick, and L. Ayers Lawrence. 2001 (revised 2002). Survivor! Loggerhead Hatching Activity. 1-12.
- Musick, S. 2000. Coastal Resource Management Plan for the Province of La Union.

PRESENTATIONS:

- Musick, S. Virginia Game Fish Tagging Program: 16 Years of Angling, Tagging & Research Success. VAGFTP 2011 Training Workshop. (April 5, 2011). Hampton, VA.
- Musick, S. Virginia Game Fish Tagging Program: 16 Years of Angling, Tagging & Research in Virginia's Waters. Marine Trades Workshop. (March 30, 2011). Gloucester Pt., VA.
- Musick, S. and L. Gillingham. Virginia Game Fish Tagging Program: 16 Years of Fisheries Data and Angler Involvement in Management. Tidewater Chapter Meeting American Fisheries Society-Poster. (March 10, 2011). Gloucester Pt., VA.
- Exhibit: Virginia Game Fish Tagging Program and VIMS Juvenile Abundance Trawl Survey. Bass Pro Shops Spring Fishing Classic. (February 26-27, 2011). Hampton, VA.
- Musick, S. Selling science on the rock: communication strategies for diverse audiences. Outlook on Ocean Science Seminar Series. (December 10, 2010). Gloucester Point, VA.
- Musick, S, Lucy, J. and L. Gillingham. Temporal-spatial patterns of tagged summer flounder (*Paralichthys dentatus*) in Virginia waters and migration to mid-Atlantic waters (2007-2010). 12th Flatfish Biology Conference-Poster. NOAA/NMFS Milford Laboratory. (December 2010). Westbrook, CT.
- Ascension Island Government Conservation Department. Ascension Island Council. (November 2008). Ascension Island.
- Ascension: small island conservation in context. World Conservation Congress. (October 2008). Barcelona, Spain.
- Ascension wildlife. TC Walker Elementary School. (April 2008). Gloucester, VA.
- Changes in Latitudes... spatiotemporal patterns of observed sea turtle bycatch in the U.S.A. Atlantic longline fishery. International Sea Turtle Symposium Poster Session. (February 2007). Myrtle Beach, S.C.
- Spatiotemporal patterns of marine turtle bycatch in the U.S.A. Atlantic longline fishery. University of Exeter in Cornwall. (February 2006). Tremough, Cornwall, UK.
- More Than Meets the Eye: Vision in Large Pelagic Hawaiian Fishes. National Marine Educators Association Meeting. (July 2005). Maui, HI.
- Exhibit on Bridge; National Marine Educators Association Meeting. (July 2005). Maui, HI.
- The Dead Zone. Bridge Data Tip Session. (June 2005). Gloucester Point, VA.
- La Vida de la Tortuga: Bringing Life History Data into the Spanish and English Speaking Classroom. International Sea Turtle Symposium Poster Session. (January 2005). Savannah, Georgia.
- It's a Hard Knock Life: Sea Turtle Life History Data in the Classroom Activity Session. National Marine Educators Association Meeting. (July 2004). St. Petersburg, FL.
- Exhibit on Bridge; National Marine Educators Association Meeting. (July 2004). St. Petersburg, FL.
- La Vida de la Tortuga: Educational Activity Session. Grupo Tortuguero Annual Meeting. (January 2004). San Jose del Cabo, Mexico.
- BRIDGE: Integrating Ocean Science Data in the Classroom. American Geophysical Union Fall Meeting Poster Session. (December 2003). San Francisco, CA.
- ChesSIE Exhibit Booth. Mid-Atlantic Marine Education Association meeting. (October 2003). Chincoteague, VA.
- Exhibit on Bridge; National Marine Educators Association Meeting. (July 2003) Wilmington, N.C.
- Conference Session Presider. National Marine Education Association Conference. (July 2003)

Wilmington, NC.

- Flourishing Phytoplankton: Bridge Data Tip Session. EARTH Workshop. (June 2003). MBARI, Moss Landing, CA.
- Hold the Anchovies!: Bridge Data Tip Session. EARTH Workshop. (June 2003). MBARI, Moss Landing, CA.
- ChesSIE: Chesapeake Science on the Internet for Educators Exhibit Session. Maryland Association of Environmental and Outdoor Educators Conference. (February 2003). Ocean City, MD.
- ChesSIE project update. Chesapeake Bay Program Education Subcommittee. (February 2003). Annapolis, MD.
- Explore ChesSIE: Exhibit and Poster Session. Chesapeake Bay Meaningful Watershed Experience Symposium. (October 2002). Glenss, VA.
- Explore ChesSIE: Computer Lab Session. Mid-Atlantic Marine Education Association Conference. (October 2002). Gloucester Point, VA.
- More than Mud: Bridge Data Tip Session. National Marine Education Association Conference. (July 2002). New London, CT.
- Sharks of the Chesapeake Bay: Species Investigation. Sharks of the Chesapeake Bay Workshop. (June 2002). Gloucester Point, VA.
- ChesSIE project update. Chesapeake Bay Program Education Subcommittee. (June 2002). Leesburg, VA.
- Survivor! Loggerhead Hatching Activity. South Carolina Marine Educators Association (March 2002) St. Helena Island, SC.
- ChesSIE Scavenger Hunt. Maryland Association of Environmental and Outdoor Educators Conference. (February 2002) Ocean City, MD.
- Survivor! Loggerhead Hatching Activity. Mid-Atlantic Marine Educators Association Conference. (October 2001) Lewes, DE.
- Survivor! Loggerhead Hatching Activity. Sea Turtle Biology Workshop. (June 2001) Gloucester Point, VA.

TRAINING & CERTIFICATIONS:

National Safety Council Standard First Aid Certification, American Heart Association AED and CPR Certification, Fall 2010

IUCN Red List Training, Fall 2008

BSAC Ocean Diver Certification, 2007

Field First Aid and Safety (U.K.), 2006

American Red Cross Disaster Operations and Shelter Operations, January 2005

U.S. Coast Guard Auxiliary Boating Safety and Seamanship Course, Spring 2003

Driver's License, Commonwealth of Virginia, exp. 2012

NAUI Open-Water Scuba Diving Certification, 1998

JOB-RELATED SKILLS:

- Familiar with operating small outboard watercraft and navigating through coral reefs
- Knowledge of driving Honda 350 Rancher All Terrain Vehicle in off road habitats in pre and post hurricane conditions
- Experience with radio and sonic telemetry and global positioning units
- Proficient in graphic, presentation and word processing applications
- Ability to swim, snorkel, canoe and hike
- Familiar with Spanish