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VIRGINIA RECREATIONAL FISHING DEVELOPMENT FUND
SUMMARY PROJECT APPLICATION*

NAME AND ADDRESS OF APPLICANT:	PROJECT LEADER (name, phone, e-mail):
Virginia Institute of Marine Science P. O. Box 1346 Gloucester Point, VA 23062-1346	Dr. Mary C. Fabrizio, 804-684-7308, mfabrizio@vims.edu Marcel Montane, 804-684-7328, marcel@vims.edu
PRIORITY AREA OF CONCERN:	**PROJECT LOCATION:**
Research	Sampling will continue in the Virginia portion of the Chesapeake Bay mainstem and the major tributaries (James, York and Rappahannock rivers, VA).

DESCRIPTIVE TITLE OF PROJECT:

Estimating Relative Juvenile Abundance of Recreationally Important Finfish in the Virginia Portion of Chesapeake Bay

PROJECT SUMMARY:

The fisheries trawl survey conducted by the Virginia Institute of Marine Science (VIMS) is the oldest continuing survey (52 years) of marine and estuarine fishes in the United States. This survey provides a monthly baseline assessment for the abundance of juvenile marine and estuarine fishes and blue crabs in the tidal and mainstem areas of the Chesapeake Bay. Annual indices of juvenile abundance are generated for key species such as spot, croaker, weakfish, summer flounder, black sea bass, striped bass, white perch, scup, northern puffer, silver perch, channel catfish, white catfish, blue catfish, bay anchovy, American eel, Atlantic menhaden and blue crabs.

EXPECTED BENEFITS:

Indices of juvenile abundance are generated from VIMS trawl survey data for key species of recreational, commercial , and ecological importance. These indices are critical to stock assessments and provide a measure of annual recruitment strength. Thus, annual surveys are necessary to effectively assess the status and condition of stocks. The VIMS trawl survey provides these crucial indices and related information to VMRC, the Atlantic States Marine Fisheries ommission, the Mid-Atlantic Fisheries Management Council, and the National Marine Fisheries Service. VIMS trawl survey juvenile indices are also essential for current Baywide multispecies modeling efforts.

COSTS:

VMRC Funding:	450,000
Recipient Funding:	152,543
Total Costs:	602,543

Detailed budget must be included with proposal.

Updated 6/1/05

***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 : Due dates are June 15 (Jul. – Nov. Cycle) and December 15 (Jan. – May Cycle)**

Estimating Relative Juvenile Abundance of Recreationally Important Finfish in the Virginia Portion of Chesapeake Bay.
(1 June 08 – 31 May 09)

Budget:

Personnel	Time	MRFAB	VIMS	TOTAL
Principal Investigator (Fabrizio)	10%	11,876		11,876
Principal Investigator (Montane)	84%	52,701		52,701
Marine Scientist (Lowery)	80%	30,731		30,731
Marine Scientist (Hewitt)	50%	16,789		16,789
Data Analyst (Bonzek)	0%			
Lab. Spec. (Brooks)	80%	30,662		30,662
Lab. Spec. (Halvorson)	80%	28,066		28,066
Lab. Spec. (tbd)	100%	25,200		25,200
Lab. Spec. (Rhea)	40%	10,080		10,080
Student workship (hourly)		10,000		10,000
Fringe (40% full time)		82,442		82,442
Graduate Student (Woodward)		17,100		17,100
Supplies				
Field and lab supplies including Gear, nets, rope, sampling bags, hardware, fuel		30,900		30,900
Travel				
Field Sites		3,000		3,000
Regional and national meeting attendance		4,500		4,500
Equipment				
LIMNOTERRA Electronic Fish Measuring Board		6,500		6,500
Laptop for boat		5,000		5,000
Vessel Rental		75,000		75,000
Vessel Communications		1,500		1,500
Final Report Printing/Poster Preparation		500		500
F&A Costs (45%)		**7,453**	**152,543**	**159,996**
Total		**450,000**	**152,543**	**602,543**

Budget Justification

Personnel
Each month, a minimum of 10-12 days of field activity (usually 60 hours per week), will be performed and the remaining 2 weeks will include archiving specimens, entering data, and managing information. Minimum crew includes a boat captain and three scientific staff.

Vessel Rental
$70/hr X 1071 hours = $75,000

Supplies
Field and laboratory supplies including:
Misc gear (hardware, shackles, sample bags, foul weather gear, gloves, etc.)= $2200
Trawl doors (1 pair)=$2000
Cable for trawl (1 spool)=$1100
Trawl Nets (2 @ $800)=$1600
Vessel Fuel ($3.00/gal. X 8000 gals)=$24,000

Equipment
LIMNOTERRA Electronic Fish Measuring Board (1@$6500)= $6500
Boat navigation laptop computer (Panasonic Toughbook, 1@$5000)=$5000

Travel
To field sites where boat is berthed: ($0.58/mi X 5172 mi) = $3000
To local and regional meetings (2 people at $750 ea.)=$1500
To national meetings (2 people @$1500)=$3000

Facilities and Administrative Costs

F & A costs are normally assessed at 25% for funds provided by Marine Recreational Advisory Board. Due to the critical nature of funding shortfall, VIMS will provide nearly all F & A costs (45%) associated with this project.

Estimating Relative Juvenile Abundance of Recreationally Important Finfish in the Virginia Portion of Chesapeake Bay

Proposal Submitted to:

Virginia Marine Resources Commission
Marine Recreational Fishing Advisory Board

1 June 08 – 31 May 09

Principal Investigators

Dr. Mary C. Fabrizio
Marcel Montane

Dr. Mary C. Fabrizio
Principal Investigator
Department of Fisheries Science

Mr. Marcel Montane
Co-Principal Investigator
Department of Fisheries Science

Dr. John Olney
Chair
Department of Fisheries Science

Dr. Roger Mann
Director for Research and
Advisory Services

Ms. Jane Lopez
Director of Sponsored Programs

4 December 2007

Foreword:

The Virginia Institute of Marine Science (VIMS) Trawl Survey is the oldest continuous survey (52 years) of marine and estuarine fishes and blue crabs in the United States. The program represents one of only a few surveys that target juvenile recruitment of species in the Mid-Atlantic region. Over the years, this work has been supported by a combination of institutional and external funds. From 1991-2001, external support was obtained from U.S. Fish and Wildlife Service Wallop-Breaux (USFWSW-B) apportionments. When a sudden reduction in available W-B funds occurred, the trawl survey was supported by the Virginia Marine Resources Commission's Marine Recreational Fishing Advisory Board (VMRC MRFAB). Funding by VMRC occurred from June 2001 through May 2003 and then again from June 2005 through May 2006. When not funded by VMRC MRFAB, the survey was funded by the NOAA Chesapeake Bay Office. Currently, the survey is partially funded by USFWS W-B funds (1 June 2007 through 31 May 2008); these funds covered about 75% of the costs of the survey.

During the last two decades, VIMS has submitted a number of requests to the Virginia General Assembly seeking state appropriations for the trawl survey. Unfortunately, these applications have not been funded. To maintain program continuity, this proposal is being submitted to the VMRC MRFAB to request emergency funding to continue this critically important finfish and blue crab monitoring program for an additional year. Should USFWS W-B funding be received after the initiation of this segment, the unused funds would be returned to VMRC. Similarly, if the Commonwealth of Virginia appropriates funds for this project in 2008, we will return unused funds to VMRC.

Need:

Measures of juvenile abundance are necessary as a key element in the management of many Atlantic states coastal fishery resources. Estimates of the fluctuations in relative abundance of early juveniles (age 0) generated from fishery independent surveys provide a reliable and early estimator of future year-class strength (Goodyear,1985; Lipcius and Van Engel, 1990). For example, the current Interstate Fisheries Management Plan for striped bass relies heavily on estimates of juvenile abundance, both as 'action levels' for the intensification and relaxation of restrictions and as a measure of year-class strength in population models (USDOI and USDOC, 1989). In addition to providing management plan input, juvenile indices can be an "early warning" of year class failure. Evidence of a very poor year class of summer flounder in 1988 was first noted in scientific collecting programs and these data were instrumental in shaping more protective regulations for summer flounder in Virginia (Austin, 1994). Later, poor year classes were monitored by the VIMS Trawl Survey and these data were reported to the MAFMC for use in establishing realistic recreational quotas for 1994 and 1995 (Austin, 1994).

Most recently, trawl data have been used to describe baywide recruitment patterns reflective of climate variability (Wood, 2000). Blue crab indices generated by the VIMS Trawl Survey have been instrumental in recent blue crab stock assessments (Miller et al., 2005) and menhaden data from the trawl survey were recently used to tune a stock assessment by NOAA scientists using virtual population analyses (D. Vaughn and others). The present survey data collection is recognized as essential, and often mandated, by several fishery management councils (Table 1). The ASMFC recognizes the VIMS Trawl Survey as essential for such species as weakfish, croaker, spot, summer flounder, scup, and American eel (see recent ASMFC Update of the American eel stock assessment report, ASMFC, 2006). The Mid-Atlantic Fisheries Management Council (MAFMC) recognizes the VIMS Trawl Survey as the only available predictor of recruitment of summer flounder consistent with past virtual population analysis (VPA) estimates. Additionally, there are many bi-state fishery management plans utilizing these data, and it has been the pillar of the CBSAC effort to understand blue crab population dynamics. Further, the trawl survey was the sole basis for the blue crab sanctuary/corridor recommendations. These juvenile indices of abundance are critical to stock assessments and provide a measure of annual recruitment strength. Thus, annual surveys are necessary to effectively assess the status and condition of stocks.

Objectives:

1. to produce annual estimates of recruitment for important recreational finfish species for the major Virginia nursery areas of the Chesapeake Bay, and

2. to provide distribution information on various life stages (juveniles and adults) of ecologically important species including information describing essential fish habitat.

Expected Results or Benefits:

The VIMS Trawl Survey has been identified as a key element for the future management of fisheries resources using the Chesapeake Bay as spawning and nursery grounds. A primary benefit will be to insure that recruitment is properly monitored in all the major spawning and/or nursery areas of the Chesapeake Bay. Because the Chesapeake Bay also constitutes a major nursery area for important coastal migratory fish species, monitoring annual recruitment in this region constitutes a key element in multi-state efforts to manage the Atlantic coastal fisheries of the United States (Austin 1994; Bonzek et. al. 1995; see Table 1). This need was further emphasized by the Atlantic Coastal Cooperative Fishery Management Act (PL-103-206) which requires Maryland and Virginia to provide estimates of juvenile abundance indices for the Chesapeake Bay. The NMFS Marine Recreational Fisheries Statistics Survey (or NMFS MRFSS, DOC, 2006) indicates that Virginia marine recreational catches are dominated by seven species (Atlantic croaker, spot, summer flounder, striped bass, black sea bass and bluefish) which constitute over 86% of the total estimated catch by numbers and 90% by weight (Table 2). These species also constitute a major portion of the VIMS Trawl Survey catch, though fewer bluefish are caught than the other species (Table 3).

Project results will provide resource managers with a valuable tool for assessing the success of present management strategies. By assuring continuity with past and present trawl data, evaluation of historical trends of relative recruitment are possible as well as analyses of environmental (e.g. Norcross, 1983; Luo, 1991; Bodolus, 1994; Austin and Bonzek, 1996; Wood, 2000; Austin, 2002; Montane and Austin, 2005) and anthropogenic influences (Hargis et. al., 1984) on recruitment. The survey will also serve as a valuable tool for the determination of stock/recruitment relationships (through comparison with the results of egg/larval and adult spawning stock assessments), as a primary source of data and specimens for concurrent investigations of the early life history of the species, and will provide an extensive body of information on habitat utilization by juveniles and young adults of these species. Additionally, information collected from these surveys can provide information on species distribution and abundance of both juveniles and adults.

We will produce annual estimates of recruitment for important finfish species, particularly spot, croaker, weakfish, summer flounder, black sea bass, striped bass, white perch, scup, northern puffer, silver perch, channel catfish, white catfish, blue catfish, bay anchovy, American eel, Atlantic menhaden and blue crabs for the major Virginia nursery areas of the Chesapeake Bay. In addition, indices for emerging species of interest can be produced as necessary. These findings provide the basis for current baywide multispecies modeling efforts. Quarterly progress reports will be generated as per MRFAB timelines and a detailed final report will be produced. For each species, distribution and abundance plots will be created (e.g., Appendix Figure 1). Survey results are also being used to address other aspects of the population biology of these species, such as habitat utilization, early growth and survival, and climate and pollutant interactions.

Results will be used by various fisheries management agencies to aid in stock assessments and fisheries ecosystem modelling. Research findings will be presented at meetings and submitted for peer-reviewed publication. We also continue to collaborate with the VIMS ChesMMAP Program to validate survey indices and to answer additional multispecies interaction questions within the Bay. Numerous advisory data requests are routinely answered during the course of the study (Appendix Table A-1).

Approach:

VIMS has sustained the monthly trawl survey in the tributaries since 1955 and the Virginia portion of the Chesapeake Bay since 1988. Analyses of studies in Virginia indicate that the sampling design is effective for developing annual indices of abundance (Chittenden, 1991).

Virginia marine recreational catches are dominated by seven species (croaker, spot, summer flounder, striped bass, black sea bass and bluefish; see Table 2). All of these species occupy nursery grounds in the lower Chesapeake Bay and tributaries, and are highly vulnerable to bottom trawls. Juvenile spot and croaker were a dominant component of the trawl catches during earlier studies (Chittenden, 1989; Land et al., 1994). Both species are primarily estuarine-dependent as early juveniles, and the Chesapeake Bay is a major nursery ground for each. From 1988-2006, croaker and spot dominated the VIMS Trawl Survey catch (Table 3). Other important recreational species such as black sea bass and summer flounder are generally less abundant in the catches but are regularly taken and are often locally abundant on a seasonal basis. Neither of these species are restricted to estuarine waters as early juveniles, as black sea bass young-of-year also use nearshore continental shelf waters (Musick and Mercer, 1977). Juvenile summer flounder also frequent shallow, high salinity coastal lagoons on the eastern shore (Wyanski, 1989), but both species use the lower Chesapeake Bay as a significant and regular nursery zone; annual abundances in the Bay may reflect overall reproductive success of summer flounder.

In addition to the species mentioned above, other species of recreational interest, such as striped bass, white perch, white catfish, channel catfish, blue catfish, northern puffer and silver perch are taken with sufficient regularity during trawling operations to provide datasets suitable for the generation of useful indices of juvenile abundance. During the winter, adult catfish are vulnerable to capture by even small bottom trawls. Additionally, catch rates of blue catfish, which was introduced in the 1970s and 1980s into the James, York and Rappahannock rivers, have increased since 1991, while those of channel and white catfish have declined (Connelly, 2001; Montane and Fabrizio, 2006). The bay anchovy, an important forage fish for several recreationally valued species such as bluefish, weakfish, summer flounder and striped bass, is the most abundant species captured on a year-round basis (Table 3). Of 18 species managed by the Interstate Marine Fisheries Management Program (via Atlantic States Marine Fisheries Commission), 10 are common components of the VIMS trawl survey catch (Table 3).

A brief description of the sampling protocol follows (for further details see Montane and Fabrizio, 2006). The gear is a lined 30' (9.14 m) semi-balloon otter trawl, with 1.5" (38.1 mm) stretched mesh, and a 0.25" (6.35 mm) cod-end liner. The trawl is towed on the bottom for five minutes during daylight hours. Beginning in May 1998, data on habitat or substrate type collected in the trawl have been recorded. Fish distribution and abundance may be influenced by various substrates, such as shell, sponge, hydroids, or sea squirts. The three-dimensional structure of these substrates may be used by fish for shelter, spawning, or feeding. Categories of substrates are measured at each station based on the quantity (volume in a standard container) observed in the net. Maps of substrate distribution can be developed and compared to catch rates and distribution of various fish species to determine whether any habitat/abundance relationships exist.

Sampling in the Bay occurs monthly except during January and March, when few target species are available to the gear. Sampling in the tributaries also occurs monthly, with both the random stratified stations as well as the historical fixed stations located in the channel. The survey stratification system is based on depth and latitudinal regions in the Bay, and on depth and longitudinal regions in the rivers. Each Bay region is 15 latitudinal miles and consists of 6 strata; western shore and eastern shore shallow (4-12 ft), western and eastern shoal (12-30 ft), central plain (30-42 ft), and deep channel (> 42 ft). Each tributary is divided into four regions of approximately ten longitudinal miles, with four depth strata in each; (4-12 ft, 12-30 ft, 30-42 ft, and > 42 ft). Strata are collapsed in areas where certain depths are limited. The fixed stations have been assigned to a stratum according to their location and depth.

Juvenile index calculation uses the following approach: a standard monthly cutoff value is applied to the length frequency data collected for each target species to separate cohorts into either young-of-year or older components. Cutoff values vary among months for each species and are based on modal analyses of historical composite monthly length frequency data and reviews of ageing studies for each species (Colvocoresses and Geer, 1991). For the earlier months of the biological year, cutoff values fall within discrete modal size ranges. In the latter part of the biological year, when early spawned, rapidly growing individuals of the most recent year

class may overtake late spawned, slow growing individuals of the previous year class, cutoff values are selected so as to preserve the correct numeric proportionality between year classes despite possible misclassification of individuals. The extent of the zone of overlapping lengths and the proportion within that range attributable to each year class is estimated based on the shapes of each modal curve during the months prior to the occurrence of overlap. A length value is then selected from within that range which will result in the appropriate proportional separation.

After removing non-young-of-year individuals from consideration, monthly catch rates of the target species are used to calculate stratum-specific abundances. Numbers of individuals caught are logarithmically transformed (ln[n+1]) prior to abundance calculations (Chittenden, 1991). Average catch rates (and the 95% confidence intervals as estimated by $\pm$ 2 standard errors) are then back-transformed to geometric means. Coefficient of variation is expressed as the standard deviation divided by the log transformed mean catch (Cochran, 1977). The area-time combinations which consistently include the highest abundance of the target species are used to define the index period.

After area-time combinations are determined, annual juvenile indices are calculated as the weighted geometric mean catch per tow. Stratum-specific means and variances are calculated and then combined, weighted by stratum (Cochran, 1977). Because strata are quite variable, use of a weighted mean provides an index that more closely mirrors actual abundance of juvenile fishes.

Extensive gear comparisons were performed in the early 1990s to standardize the various configurations of fishing gear used throughout the history of the program. Nearly 1000 alternate paired samples were performed. In addition, historical gear comparison data (1969 - 1985) were examined. These data were thoroughly analyzed, with the goal of size-specific efficiency ratios for historical gears (and/or vessels, see Hata, 1997). These analyses provide a standard fishing effort for comparing juvenile abundance estimates as far back as 1955.

To maintain consistency over the years, three indices are produced for each species: the original index, based on the present bay strata and the fixed tributary stations (Bay & River Index - BRI, 1979 to present); a post-stratified gear and/or vessel converted index using all spatially appropriate data (Random Stratified Converted Index - RSCI, 1955 to present); and an unconverted post-stratified index, also based on all spatially appropriate data (Random Stratified Index - RSI, 1955 to present). Results from the longer time series must be considered provisional, because concerns about missing data and conversion factors are still being addressed. Distribution and abundance plots for each species are also generated (see Figure 1).

Target dates:
Fieldwork will be performed from June 2008 through May 2009. Progress reports will be completed during the course of the study and a final report will be prepared by August 2009.

Project management and personnel required:
Principal Investigator: Mary C. Fabrizio, Associate Professor of Marine Science
Co-Principal Investigator: Marcel Montane, Marine Scientist Supervisor and Project Manager
Mary Fabrizio and Marcel Montane will coordinate all aspects of the project with Marcel Montane taking the lead in the management, analysis and report writing.
Boat Captains: Wendy Lowery and Hank Brooks;
Field and Laboratory Support: Wendy Lowery, Hank Brooks, Aimee Halvorson, Laboratory Specialist (tbd), Amanda Hewitt (half-time), Ashleigh Rhea (half-time), Justine Woodward (student) and student workship (hourly).
Data Analyst: Chris Bonzek

Location:

Sampling will continue monthly in the Virginia portion of the Chesapeake Bay mainstem and in the major tributaries (James, York and Rappahannock rivers).

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Table 1. Management agencies using VIMS trawl survey data in fisheries management plans.

Input to Fishery Management Plans			
Species	Atlantic States Marine Fisheries Commission	Mid-Atlantic Fisheries Management Council	Virginia Marine Resources Commission
American eel	M		P
Atlantic croaker	M		P
Atlantic menhaden	P		
Atlantic sturgeon	P		P
Bay anchovy			P
Black sea bass	M	M	P
Blue crabs			P
Butterfish		M	P
Catfish species			P
Horseshoe crab	M		P
Scup	M	M	P
Spot	M		P
Striped bass	P		P
Summer flounder	M	M	P
Tautog	P		P
Weakfish	M		P
White perch			P

M-Mandated P-Provided

Table 2. National Marine Fisheries Service's Marine Recreational Fisheries Statistic Survey for Virginia Waters for 2006.

SPECIES	Total Number of Fish (A + B1 + B2)	Rank by Number Caught	Number of Harvested Fish (A + B1)	Weight in Kilograms (A + B1)	Rank by Weight
ATLANTIC CROAKER	11,671,779	1	7,072,623	2,931,228	1
SPOT	4,431,384	2	3,510,253	663,638	4
SUMMER FLOUNDER	3,142,993	3	865,024	1,009,798	3
STRIPED BASS	2,224,154	4	528,190	1,885,487	2
BLACK SEA BASS	1,102,428	5	115,849	71,661	8
BLUEFISH	1,012,918	6	441,595	400,888	5
TOADFISHES	753,359	7	-	-	
WEAKFISH	515,032	8	58,797	23,469	15
TAUTOG	371,263	9	141,715	243,146	7
OTHER FISHES	363,296	10	160,077	264,528	6
SKATES/RAYS	335,515	11	5,787	-	
FRESHWATER CATFISHES	200,670	12	21,206	20,710	17
WHITE PERCH	191,379	13	23,050	3,559	20
SPOTTED SEATROUT	181,610	14	56,475	60,160	9
RED DRUM	174,236	15	15,058	8,177	19
OTHER SHARKS	173,032	16	7,726	-	
KINGFISHES	127,911	17	79,460	26,150	12
DOGFISH SHARKS	73,309	18	463	1,116	22
HERRINGS	61,436	19	14,233	660	24
BLACK DRUM	41,138	20	3,508	25,217	13
FLORIDA POMPANO	41,051	21	41,051	-	
PUFFERS	38,451	22	1,819	268	26
SCUP	31,158	23	-	-	
SPANISH MACKEREL	30,550	24	21,303	21,243	16
SEAROBINS	30,275	25	-	-	
DOLPHINS	29,697	26	16,951	34,724	10
PIGFISH	28,779	27	1,857	274	25
OTHER FLOUNDERS	27,174	28	-	-	
LITTLE TUNNY/ATLANTIC BONITO	23,172	29	-	-	
MULLETS	19,291	30	-	-	
SOUTHERN FLOUNDER	14,244	31	14,242	12,594	18
OTHER TUNAS/MACKERELS	10,926	32	1,451	24,045	14
OTHER DRUM	9,694	33	-	-	
TRIGGERFISHES/FILEFISHES	7,849	34	3,600	3,096	21
SHEEPSHEAD	7,081	35	7,081	33,635	11
SILVER PERCH	5,318	36	5,104	754	23
EELS	5,182	37	514	-	
RED HAKE	2,732	38	-	-	
OTHER WRASSES	1,939	39	-	-	
KING MACKEREL	345	40	345	-	
OTHER CODS/HAKES	272	41	196	49	27
CUNNER	40	42	-	-	
Total	27,514,062		13,236,603	7,770,274	

A = Caught and Landed
B1 = Caught by Anglers and filleted or released dead
B2 = Caught and released alive

Table 3. VIMS TRAWL SURVEY CATCH SUMMARY JANUARY 1988 TO OCTOBER 2007

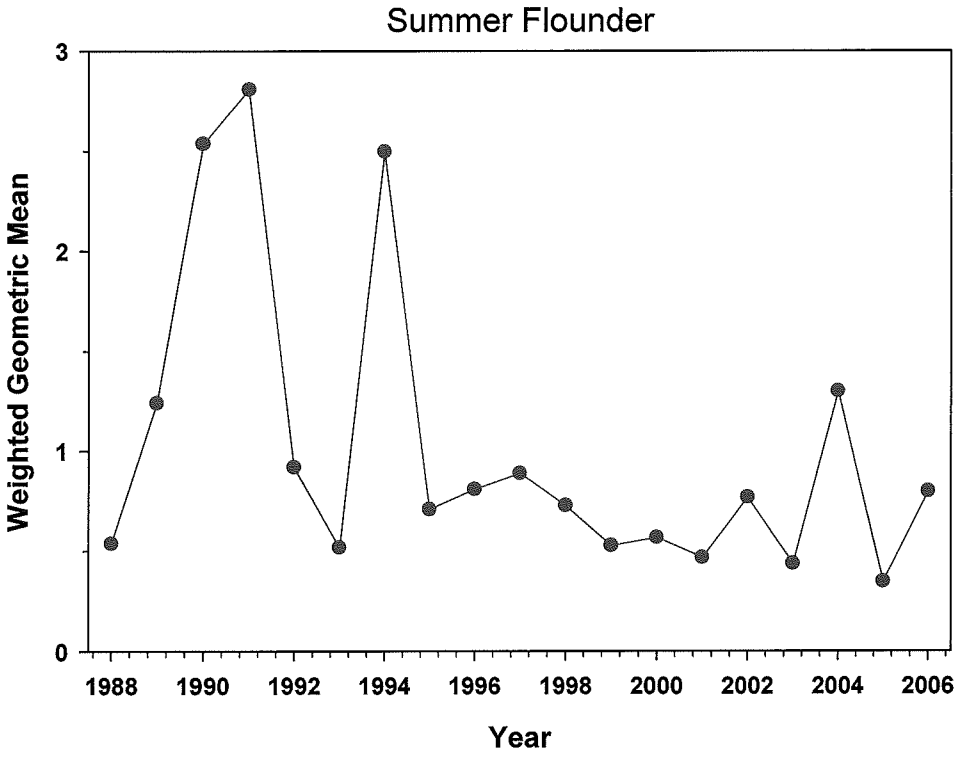
No. of tows = 21709 Status: R=Recreational C=Commercial F= Forage P=Protected

Species		Number of Fish (All)	Percent of Catch	Catch Per Trawl	Number of Fish YOY	Average Length (mm)	Standard Error (length)	Minimum Length (mm)	Maximum Length (mm)
Atlantic croaker	R & C	967,335	8.39	45.92	826,055	107	0.14	3	555
spot	R & C	599,274	5.2	28.45	553,559	124	0.06	10	332
weakfish	R & C	305,564	2.65	14.5	271,436	109	0.14	5	608
white perch	R & C	283,108	2.45	13.44	87,738	125	0.13	11	373
blue crab	R & C	247,591	2.15	11.4	.	73	0.1	0	220
catfish species	R & C	127,764	1.11	6.06	41,319	205	0.3	15	1000
spotted hake	R & C	62,166	0.54	2.95	60,423	120	0.2	21	360
kingfish species	R & C	38,485	0.33	1.83	35,971	86	0.27	6	352
silver perch	R & C	36,214	0.31	1.72	30,141	129	0.18	18	262
summer flounder	R & C	22,573	0.2	1.07	14,377	235	0.6	12	723
scup	R & C	19,390	0.17	0.92	17,789	96	0.25	21	351
striped bass	R & C	19,193	0.17	0.91	16,033	127	0.71	13	880
American eel	R & C	9,500	0.08	0.45	.	266	0.8	39	870
black seabass	R & C	8,960	0.08	0.43	6,425	109	0.43	20	354
bluefish	R & C	831	0.01	0.04	.	189	2.52	22	820
Spanish mackerel	R & C	241	0	0.01	.	91	4	21	384
spotted seatrout	R & C	233	0	0.01	.	143	4.91	21	287
tautog	R & C	196	0	0.01	.	293	8.13	70	562
red drum	R & C	163	0	0.01	.	98	6.62	26	399
spiny dogfish	R & C	155	0	0.01	.	793	8.37	77	1004
smooth dogfish	R & C	79	0	0	.	495	14.75	225	830
Other selected species:									
bay anchovy	F	7,017,253	60.84	333.09	6,146,696	53	0.02	8	132
river herring species	C	33,589	0.29	1.59	32,409	91	0.16	32	396
squid species*	C	33,076	0.29	1.57	.	32	0.12	5	265
Atlantic menhaden	C	13,493	0.12	0.64	5,863	105	0.47	17	344
northern puffer	R & C	3,434	0.03	0.16	2,635	101	0.75	11	280
Atlantic spadefish	R & C	2,121	0.02	0.1	.	83	1.02	13	535
clearnose skate	R	1,906	0.02	0.09	.	383	1.61	79	541
pigfish	R	1,423	0.01	0.07	.	150	0.82	26	236
black drum	R & C	302	0	0.01	.	209	5.13	61	1240
Atlantic sturgeon	P	23	0	0	.	487	35.36	161	810

* measured since 1993

Appendix Table A-1. VIMS Trawl Survey Advisory requests since 2006.

Agency	Nature of Request
Canadian Journalist/VIMS	American eel information
Chair, SARC Southern Demersal Working Group	Summer flounder indices through 2006
Ecology and Environment, Inc.	Trawl species data from Hampton Roads
Ecology and Environment, Inc.	Station data from Hampton Roads question
James River Association	James River YOY striper index
James River Association	James River YOY striper index questions
MAFMC/NMFS NE Fisheries Sci. Center	2004 Scup index
Malcolm Pirnie, Inc.	Silver hake data
MD Sea Grant	Survey blue crab information and 2005 adult female index
NJ Marine Resources/ASMFC	Eel data inquiries
NOAA CBO	2006 Striped bass seine index
US EPA	Nov-Apr 1999-2005 station hydro data
VIMS	2005 flounder index, size freq and distribution
VIMS	York 105 station data, May-Sept 2005
VIMS	Atlantic sturgeon data
VIMS	Ctenophore data and historical station query
VIMS	2002-2005 Striped bass YOY data
VIMS	Summer flounder catch/station 2002-2006
VIMS	Benthic fish data from stations near Gloucester Point, May-Sept. 2005-06
VIMS	Stations where menhaden were collected, Sept. 2006-January 2007
VIMS graduate student	Station hydro data, July-Aug. 2003/04
VIMS/ASMFC Spot FMP Review	2005 spot index
Virginia Aquarium	Mantis shrimp
Virginia DEQ	Station locations outside CBBT, 2000-2006
VMRC	2005 Horseshoe crab Index
VMRC	2005 flounder index
VMRC	2005 flounder index clarification
VMRC	YOY Weakfish index for 2005
VMRC	YOY Weakfish index Question
VMRC	2005 American eel index
VMRC	2006 Horseshoe crab data
VMRC	VIMS Trawl croaker indices (Fall and Spring) thru 2006
VMRC	2006 Summer flounder YOY index
VMRC	Lower bay blue crab abundance estimates
VMRC (for South Atlantic Fisheries Mgmt. Council)	Spring croaker indices for 2004/2005



Appendix Figure 1. YOY summer flounder random stratified indices (**top**), and distribution of YOY summer flounder from June 2006 through May 2007 (**bottom**).