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Proposal Submission to

Virginia Marine Resources Commission, Recreational Fishing Advisory Board

By

THE VIRGINIA INSTITUTE OF MARINE SCIENCE
COLLEGE OF WILLIAM AND MARY

A Brief Guide to the Ecology and Management of Striped Bass

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VIRGINIA SALTWATER RECREATIONAL FISHING DEVELOPMENT FUND
SUMMARY PROJECT APPLICATION
Please complete all fields. This page should be used as a coversheet for a detailed application.

NAME AND ADDRESS OF APPLICANT:	PROJECT LEADER (name, phone, email):
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DESCRIPTIVE TITLE OF EVENT:	PROJECT LOCATION:
A Brief Guide to the Ecology and Management of Striped Bass	Virginia (Chesapeake Bay)

BRIEF PROJECT SUMMARY: (include a detailed description of activity as an attachment)

We propose to develop a guide to the ecology and management of Striped Bass by synthesizing and interpreting research results and reviewing the effects of management measures on the fishery in Virginia. The ultimate goal is to produce a document that can inform recreational anglers and other interested parties about the current state of knowledge. As such, this guide may be used to evaluate and prioritize proposed RFAB projects; the guide may also aid in understanding the long-term research needs for managing Striped Bass stocks along the Atlantic coast.

EXPECTED BENEFITS: (Describe how your project directly benefits the average Virginia recreational angler)

Recreational anglers will benefit from this study as it will provide a review of the scientific knowledge and management history of the Striped Bass fishery in Virginia that can be used to inform decisions of the RFAB. This guide will provide a foundation from which interested parties (RFAB and recreational anglers) can evaluate proposed research projects, as well as management measures considered in future years. The document will provide a basic understanding of what we know and how that information is used to manage the Striped Bass fishery in Virginia.

SUMMARY COSTS: (Please attach a detailed budget including all sources of recipient funding)

SUMMARY COSTS

Requested VMRC Funding:	$ 39,060
Recipient Funding:	$ 6,468
Total Costs:	$ 45,528

A Brief Guide to the Ecology and Management of Striped Bass

Problem Statement & Background

The iconic Striped Bass is highly valued as a sportfish by recreational anglers along the Atlantic coast. Although most of the coastal harvest of Striped Bass is taken by recreational anglers, this species supports commercial fisheries that operate in state waters. The Striped Bass also provides an example of the efficacy of responsive management plans and prudent regulations: following the collapse of the fishery in the mid-1970s, Striped Bass populations were successfully rebuilt and declared recovered in 1995. Since then, catches have increased, and although the population is not overfished and overfishing is not occurring, contemporary populations may not be as robust as expected (ASMFC 2013). Changes in the size structure of the adults, declining abundance during the most recent decade, and increasing prevalence of disease among Chesapeake Bay Striped Bass are potential warning signs that this rebuilt population may need further attention. Do we know enough about Striped Bass to recommend actions to sustain the fishery, or do significant gaps remain in our knowledge? Here, we propose to address these questions by reviewing the scientific literature and examining the response of Striped Bass populations to regulations in the Interstate Fishery Management Plan for Atlantic Striped Bass. The guide aims to provide an improved understanding of what scientists know (and don't know), and to clarify how scientific information is used to manage the Striped Bass fishery in Virginia.

In addition to reviewing the scientific knowledge base and management history of Striped Bass, this guide will provide a foundation from which the Recreational Fishing Advisory Board [RFAB] can evaluate proposed research projects concerning Striped Bass. Since its inception, the RFAB has recommended to fund many research proposals and consistently emphasized the importance of studies that benefit recreational anglers in Virginia. Although research findings cannot guarantee additional fish in the creel or additional fishing opportunities for a given community, researchers seeking funding from RFAB strive to conduct investigations relevant to recreational fishing. Oftentimes, findings from proposed research investigations will be relevant to management of recreational fisheries. For example, stock identification studies that discover the existence of two or more stocks where a single stock was previously recognized may affect the manner in which stock assessments are performed and how catch is allocated to the recreational sector. Because multiple research proposals are presented to the RFAB for consideration each year, the Board may benefit from a review of the scientific information that is needed to make decisions about research priorities. In this manner, the RFAB will maximize the opportunity to recommend studies that have the potential to significantly alter our understanding of the status of fishery resources. We recognize that the proposed guide focuses on a single species; if the guide proves useful, similar documents could be prepared for other species of primary interest to recreational anglers in Virginia such as Spotted Sea Trout, Red Drum, Summer Flounder, and Weakfish. We note that the proposed guide will also benefit recreational anglers in Virginia who wish to better understand the management measures in place today or measures considered for implementation in future years. Members of the RFAB are well connected with the recreational fishery sector in Virginia and can identify recreational anglers and clubs who wish to better comprehend the scientific basis for managing recreational fisheries.

Fisheries management is best accomplished using information from scientifically guided evaluations of the stock. Indeed, fishery managers develop management plans using outputs and recommendations from stock assessments, which are rigorous, quantitative analyses of the status of fish stocks. In addition to the current status of the stock, assessments consider trends in abundance and include an evaluation of the predicted response of fish stocks to future changes in harvests. A comprehensive review and explanation of the stock assessment process and its application to management can be found in Methot (2009). In addition, NOAA Fisheries produced a four-part series titled 'Fish Stock Assessment 101' which provides an overview of key components of an assessment including the data required for analyses and descriptions of specific assessment models; the series also explains how assessment outputs are used to develop recommendations for management (http://www.nmfs.noaa.gov/stories/2012/05/05_23_12stock_assessment_101_part1.html). Our proposed guide will include a brief overview and explanation of the assessment approach used to evaluate the status of Atlantic coast Striped Bass.

Fundamental elements of a stock assessment are the model and the data considered by the model. Fishery-dependent data comprised of annual harvest estimates from recreational and commercial fisheries are primary inputs to a stock assessment; however, the assessment model and the fishery-independent data used by the model are derived from research and monitoring endeavors. For example, assessment models typically consider basic processes that contribute to changes in population size and production and thus include rates describing removals (natural mortality and fishing mortality rates), increases in biomass (growth rate of fish), and new production (annual recruitment). Research investigations also provide insight on the manner in which the fishery-dependent and fishery-independent data are treated in the stock assessment model; for instance, the development and use of standardized abundance indices allow consideration of indices from multiple jurisdictions or fishing fleets. Other aspects of the stock assessment, such as assumptions concerning the constancy of the distribution and availability of fish, are also informed by research. Thus, scientific investigations are necessary to guide the assessment process and to quantify the amount of variation in the processes affecting production. Two examples of important research questions that may ultimately affect how Striped Bass stock assessments are conducted are: (1) does mycobacteriosis affect mortality of Striped Bass and if so, does disease-related mortality vary across age classes? and (2) does the nutritional condition of young-of-the-year Striped Bass influence the effective recruitment to the adult stock?

Objective

The objective of this study is to prepare a layperson's guide that contains an up-to-date synthesis of the current state of knowledge concerning Striped Bass ecology and management. The guide can be used by the RFAB and recreational anglers to better understand and evaluate science-based fisheries management for Striped Bass.

Expected Results or Benefits

As described above, the proposed guide will be a brief synthesis of information from research investigations representing the current scientific state of knowledge on Striped Bass. As such, the guide may be used to evaluate and prioritize Striped Bass research projects proposed to the RFAB and aid in

understanding long-term research needs for managing Striped Bass stocks. The guide may also be used by recreational anglers who wish to better comprehend the scientific basis for managing fisheries. To promote widespread readership and use, the guide will be short (less than 10 pages) and written for a public audience.

Approach

No new research will be conducted to prepare the proposed guide – instead, the guide will be based on the current scientific literature and on information available from recent stock assessment reports (e.g., NEFSC 2013). Preparation and development of the guide comprises two activities: (1) synthesis and interpretation of research studies published in the scientific literature, and (2) review of the effects of management measures on Striped Bass populations in Virginia. Our plan is to review key scientific publications, focusing on publications appearing after 1999, when the most recent literature review on Striped Bass management and ecology was published by Richards and Rago (1999). A recent query on the *Web of Science* database indicates that 548 scientific publications have been produced since that time; this represents a substantial amount of knowledge and we propose to select 'key' publications from this list for consideration in the preparation of the guide. Key publications are those that address population-level effects, particularly growth (e.g., Rutherford and Houde 1995), recruitment (e.g., Martino and Houde 2012), mortality (e.g., Gauthier et al. 2008), habitat use (e.g., Kraus et al. 2015), and stock delineation (e.g., Gauthier et al. 2013). For example, a study of gut parasites will not be considered a key publication for the purposes of this guide unless the study also addresses parasite-related mortality or growth effects. Other key publications include stock assessments and their updates (e.g., ASMFC 2013), management plan reviews (e.g., Godwin et al. 2012), and synthesis papers such as the manuscript prepared by principal investigator M. Fabrizio and 12 others on ecosystem considerations for management of Striped Bass in Chesapeake Bay (Fabrizio et al., *in press*).

The guide, although brief, will be organized into meaningful sections that explain what we know and where data gaps exist in our knowledge of Striped Bass. We envision sections on recruitment, growth (trophic ecology), mortality, and management with applicable (but brief) descriptions, synthesis, and identification of knowledge gaps. We will work with a VIMS recreational fisheries specialist who regularly produces dissemination materials for angling stakeholders. This will help ensure the guide's structure and content are targeted for its intended audience.

References

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Title: A brief guide to the ecology & management of striped bass

Personnel	Time	Monthly	Agency	VIMS	Total
Faculty and Staff					
F0050V	1.20	$14,254	$17,105	$0	$17,105
FP065V	0.60	$6,320	$3,792	$0	$3,792
FP044V	0.25	$5,692	$1,423	$0	$1,423
	-	$0	$0	$0	$0
	-	$0	$0	$0	$0
	-	$0	$0	$0	$0
	-	$0	$0	$0	$0
Hourly					
	-	$0	$0	$0	$0
	-	$0	$0	$0	$0
Graduate Research Assistant					
	-	$0	$0	$0	$0
	-	$0	$0	$0	$0
Personnel, salaried			$22,320	$0	$22,320
Personnel, hourly			$0	$0	$0
Personnel, grad assist			$0	$0	$0
Fringe, 40% salaries;			$8,928	$0	$8,928
7.65% hourly			$0	$0	$0
Total Personnel			$31,248	$0	$31,248
Communications/Printing			$0	$0	$0
Supplies			$0	$0	$0
Consultant/Skilled Services			$0	$0	$0
Travel			$0	$0	$0
Subaward Agreements					
Name of Subaward Agency			$0	$0	$0
Name of Subaward Agency			$0	$0	$0
Tuition			$0	$0	$0
Vessels			$0	$0	$0
VIMS Communications/Publication Center			$0	$0	$0
Nutrient Analysis			$0	$0	$0
Seawater Research Lab			$0	$0	$0
Equipment			$0	$0	$0
SUBTOTAL: Direct Costs			$31,248	$0	$31,248
Facilities & Administrative Costs		**25.0%**	$7,812	$6,468	$14,280
TOTAL			**$39,060**	**$6,468**	**$45,528**