

TABLE OF CONTENTS

Meeting Overview	1
The Process	4
Agenda and Reports	5
A. OCEAN QUAHOG	8
TERMS OF REFERENCE	8
EXECUTIVE SUMMARY	9
INTRODUCTION	15
FISHERY DATA	16
MidAtlantic: Landings and Fishing Effort.....	17
MidAtlantic: Landings per Unit Effort (LPUE).....	17
Maine’s Ocean Quahog Fishery.....	19
Size Composition of Landing by Region.....	19
RESEARCH SURVEYS	20
History of Changes Made to NMFS Clam Survey Gear.....	20
Sensor Data (1997, 1999, 2002)	20
Sensors for calculation of tow distance	20
Dredge Calibration.....	21
Analytical Models.....	21
2002 Calibration Experiments and Results.....	22
DE-II Resampled Stations from its Earlier Surveys	23
DE-II Dredge Efficiency Estimates	23
Empirical Relationship between Clam Density and Dredge Efficiency.....	24
SURVEY RESULTS	24
Description of Surveys.....	24
Abundance Indices and Distribution.....	25
Size Frequency Distributions.....	26
Special Survey for Ocean Quahog Recruits.....	26
STOCK SIZE MODELS.....	27
Efficiency Adjusted Swept Area Biomass (ESB) and Mortality Estimates	27
Efficiency Corrected Swept-Area Biomass (ESB)	28
Short ESB Time Series	28
Long ESB Time Series.....	29
Catch-ESB Mortality Estimates.....	30

Uncertainty in ESB and Related Mortality Estimates.....	30
Simple “VPA” Estimates	30
KLAMZ Modeling Methods.....	31
Survey Trends	32
Short ESB.....	32
LPUE.....	33
Recruitment Modeling in KLAMZ.....	32
Equilibrium Initial Biomass.....	33
“VPA”	33
Model Scenarios.....	34
KLAMZ Model Results	34
Uncertainty.....	35
SVA.....	35
DMV	35
NJ	36
LI.....	37
SNE.....	37
GBK	37
Summary of KLAMZ Results.....	38
BIOLOGICAL REFERENCE POINTS AND STOCK STATUS	38
Overfishing Status Determination.....	38
Biological Condition of the Stock.....	39
TOTAL ALLOWABLE CATCH (TAC) BASED ON STOCK SIZE AND F_{TARGET}	39
SARC DISCUSSION	40
SOURCES OF UNCERTAINTY	41
RESEARCH RECOMMENDATIONS	41
REFERENCES	43
ACKNOWLEDGEMENTS	46
TABLES A1 – A30.....	47
FIGURES A1 – A76	77
APPENDIX A Ocean Quahog KLAMZ Assessment Model – Technical Documentation.....	151

B. ATLANTIC BUTTERFISH	174
TERMS OF REFERENCE	174
INTRODUCTION	174
THE FISHERY	175
Commercial Landings.....	175
Commercial Length Composition.....	175
Commercial Fishery Discards.....	175
Size Composition of Discards.....	177
Total Catch.....	177
RESEARCH SURVEY ABUNDANCE AND BIOMASS INDICES	178
NEFSC Surveys	178
Aged NEFSC Survey Indices.....	178
Additional Survey Analyses	179
State Surveys.....	179
MADMF Survey	179
RIDFW Survey	180
CTDEP Survey.....	180
VIMS Survey	180
Survey Indices for Scale	180
BIOLOGICAL DATA AND ANALYSES	180
Growth	180
Natural Mortality	183
ESTIMATES OF MORTALITY AND STOCK SIZE.....	183
Total Instantaneous Mortality from Surveys	183
Survey Exploitation Rate Index	183
An Index Method (AIM).....	183
Forward Projection Analysis (FPA) Description.....	184
Growth	184
Maturity.....	184
Natural Mortality	184
Recruitment.....	184
Surplus Production.....	185
Catch	185
Research Surveys for Trend.....	185
Time-Series for Scale.....	185
Survey Covariates	185
FPA RESULTS.....	186
Profile and Sensitivity Analysis Results.....	186

Natural Mortality	186
Survey Survival Rates.....	186
Estimation of Catches	186
Final Model.....	187
Average Biomass	187
Spawning Biomass.....	187
Fishing Mortality	187
Stock Recruitment – Recruitment Biomass	188
Surplus Production.....	188
Loss to Natural Mortality.....	188
Precision of FPA Estimates	188
Model Diagnostics	188
 SARC COMMENTS	 189
 SOURCES OF UNCERTAINTY.....	 190
 RESEARCH RECOMMENDATIONS	 190
 REFERENCES	 191
 TABLES B1 – B21	 192
 FIGURES B1 – B45.....	 220

MEETING OVERVIEW

The Stock Assessment Review Committee (SARC) meeting of the 38th Northeast Regional Stock Assessment Workshop (38th SAW) was held in the Aquarium Conference Room of the Northeast Fisheries Science Center's Woods Hole Laboratory, Woods Hole, MA November 17-19, 2003. The SARC Chairman was Dr. Jean-Jacques Maguire, Halieutikos Inc, Quebec, Canada (CIE). Members of the SARC included scientists from the NEFSC, the NMFS's Northeast Regional Office, the New England Fishery Management Council (NEFMC), the MidAtlantic Fishery Management Council (MAFMC), Canada's Department of Fisheries and Oceans (DFO), and the Southeast Fisheries Science Center's Pascagoula MS laboratory (Table 1). In addition, twenty other persons attended some or all of the meeting (Table 2). The meeting agenda is presented in Table 3.

Table 1. SAW-38th SARC Composition.

Jean-Jacques Maguire (Halieutikos Inc., Quebec, Canada; (CIE), **Chairman**

Northeast Fisheries Science Center:

Jon Brodziak
Steve Cadrin
Anne Richards

Regional Fishery Management Councils:

Andy Applegate, (NEFMC)
Tom Hoff, (MAFMC)

Other experts:

Joe Cafone, NMFS, Gloucester
Chris Gledhill, SEFSC, Pascagoula
Dale Roddick, DFO, Halifax
Peter Shelton, DFO, Newfoundland; (CIE)

Table 2. List of Participants.

NMFS, Northeast Fisheries Science Center

Col, Laurel
Idoine, Joseph
Jacobson, Larry
Legalt, Chris
Murawski, Steve
Nitschke, Paul
O'Brien, Loretta
Overholtz, Bill
Rago, Paul
Serchuk, Fred
Shepard, Gary
Sosebee, Katherine
Sutherland, Sandy
Terceiro, Mark
Waring, Gordon
Yoos, Patricia

Universities/Industry

Powell, Eric – Rutgers/HSRL
Wallace, Dave – Wallace Associates
Womack, John – Wallace Associates
Bence, Jim – Michigan State

Table 3. Agenda of the 38th Northeast Regional Stock Assessment Workshop (SAW-38) Stock Assessment Review Committee (SARC) Meeting

Aquarium Conference Room - NEFSC Woods Hole Laboratory
Woods Hole, Massachusetts
November 17-19, 2003

TOPIC	WORKING GROUP & PRESENTER(S)	SARC LEADER	RAPPORTEURS
MONDAY, 17 November (1:00 PM - 6:00 PM).....			
Opening			
Welcome		Gordon T. Waring, SAW Chairman	
Introduction		Jean-Jacques Maguire, SARC Chairman	
Ocean quahog (A)		SAW Invertebrate Subcommittee	
		J. Weinberg/ L. Jacobson	D. Roddick
TUESDAY, 18 November (8:30 AM - 5:30 PM).....			
Ocean quahog (A)		SAW Invertebrate Subcommittee	
		J. Weinberg/L. Jacobson	D. Roddick L. Col K. Sosebee
Atlantic butterfish (B)		SAW Pelagic/Coastal Subcommittee	
		B. Overholtz/ L. Jacobson	S. Cadrin P. Nitschke
Review Draft Advisory Reports and Consensus Summary Sections for the Ocean Quahog SARC Report			
Informal reception (6:00 PM) at SWOPE Building (Marine Biological Laboratory)			
WEDNESDAY, 19 November (8:30 AM - 6:00PM).....			
Review Draft Advisory Reports and Consensus Summary Sections for the Atlantic Butterfish SARC Report			
SARC comments, research recommendations and 2 nd drafts of Advisory Reports			
Other business		G. Waring	

The Process

The Northeast Regional Coordinating Council, which guides the SAW process, is composed of the chief executives of the five partner organizations (NMFS/NEFSC, NMFS/NER, NEFMC, MAFMC, Atlantic States Marine Fisheries Commission (ASMFC)). Working groups assemble the data for assessments, decide on methodology, and prepare documents for SARC review. The SARC members have a dual role – panelists are both reviewers of assessments and drafters of management advice. As products of the meeting, the Committee prepares two reports: a summary of the assessments with advice for fishery managers known as the *Advisory Report on Stock Status*; and a more detailed report of the assessment, results, discussions and recommendations known as the *Consensus Summary of Assessments* (this report).

Assessments for SARC review were prepared at meetings listed in Table 4.

Table 4. SAW-38 Working Group meetings and participants.

Working Group and Participants	Stock/Species	Meeting Date
<u>Invertebrate Subcommittee</u>		
	Ocean quahog	September 29-30, 2003 October 27-29, 2003
Jim Weinberg	NEFSC	
Larry Jacobson	NEFSC	
Tom Hoff	MAFMC	
Douglas Christel	NERO	
John Womack	Wallace & Associates	
Tom Alspach	Sea Watch Int., Ltd.	
Paul Rago	NEFSC	
Roger Mann	VIMS	
Dave Wallace	Wallace & Associates	
Eric Powell	Rutgers/HSRL	
Chris Picket	NEFSC	
<u>Pelagic/Coastal Subcommittee</u>		
	Atlantic butterfish	October 22, 2003; October 30, 2003 (telecom)
Bill Overholtz	NEFSC	
Mark Terciero	NEFSC	
Paul Rago	NEFSC	
Larry Jacobson	NEFSC	
Sandy Sutherland	NEFSC	
Rich Seagraves	MAFMC	
Jim Ruhle	MAFMC	

Agenda and Reports

The 38th SARC included presentations on assessments for Atlantic butterfish and ocean quahog. These species were last assessed, respectively, in 1993 (SAW-17) and 2000 (SAW-31).

Current SARC documentation includes two reports in draft form: one containing the assessments, SARC comments, and research recommendations (Draft SARC Consensus Summary – this report), and another produced in a standard format which includes standard information on stock status and management advice (Draft SARC Advisory Report). The draft reports will be given to the NEFMC, MAFMC, and ASMFC in January 2004. Presentations to the Councils will occur in January 2004 (MAFMC, 21 January, Atlantic City, NJ; NEFMC, 27 January, Newport, RI). Following review by the Councils the documents will be finalized and published in the NEFSC Reference Document series as the 38th *SARC Consensus Summary of Assessments* and the 38th *SAW Advisory Report*.

A chart of US commercial statistical areas used to report landings in the Northwest Atlantic is presented in Figure 1. A chart showing the sampling strata used in NEFSC bottom trawl surveys is presented in Figure 2.

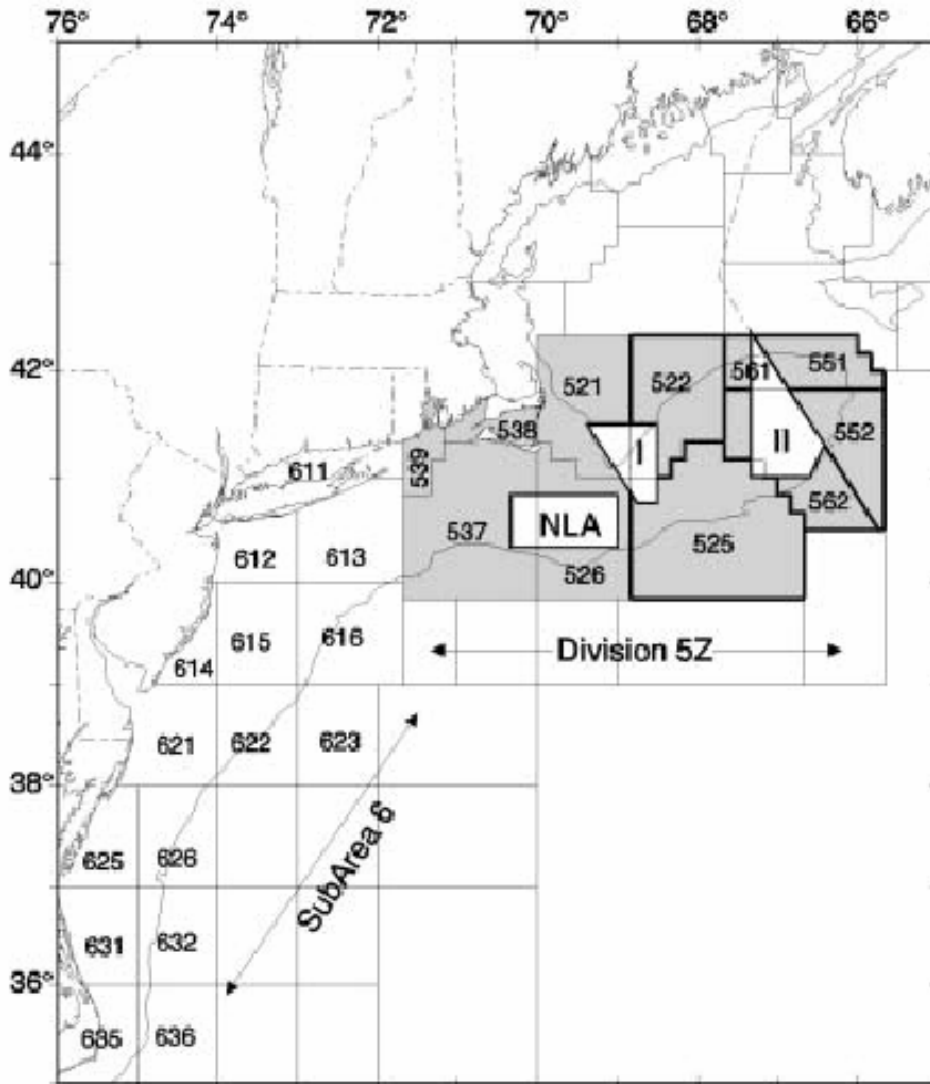


Figure 1. Statistical areas used for catch monitoring in offshore fisheries in the Northeast United States.

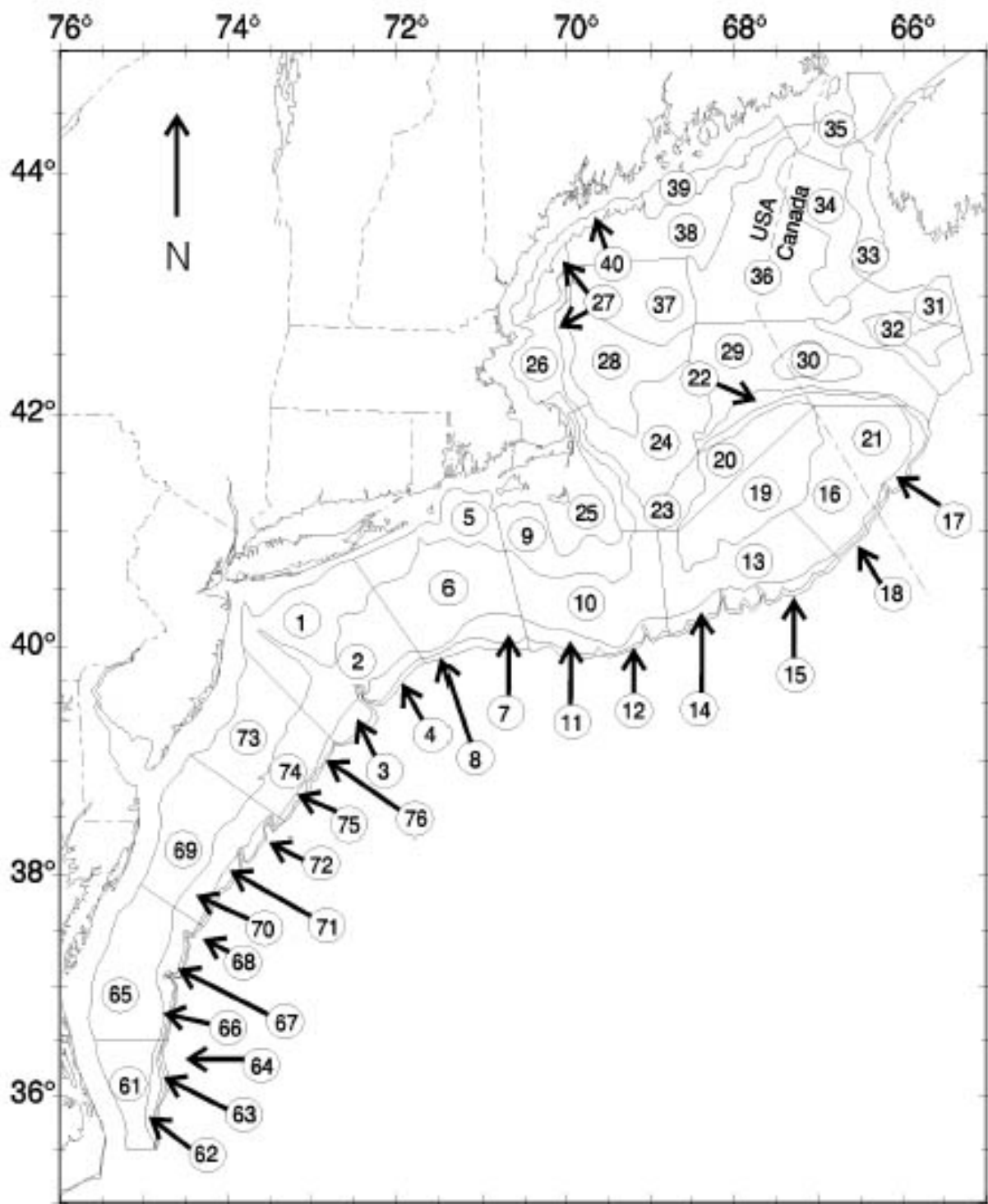


Figure 2. Offshore sampling strata used in NEFSC bottom trawl surveys.