

SEDAR 14

Stock Assessment Report 1

Caribbean Yellowfin Grouper

SECTION III. Assessment Workshop

SEDAR

4055 Faber Place #201

Charleston, SC 29405

SEDAR 14 Assessment Workshop Report

SPECIES

Table of Contents

1.	Workshop Proceedings	4
1.1.	Introduction.....	4
1.1.1.	Workshop Time and Place	4
1.1.2.	Terms of Reference.....	4
1.1.3.	Workshop Participants	5
1.1.4.	Workshop Documents.....	5
2.	Panel Recommendations and Comment	9
2.1.	Discussion and Critique of Each Model Considered	9
2.2.	Discussion of YPR, SPR, Stock-Recruitment.....	9
2.3.	Recommended SFA parameters and Management Criteria.....	9
2.4.	Status of Stock Declarations	9
2.5.	Recommended ABC	9
2.6.	Discussion of Stock Projections.....	9
2.7.	Management Evaluation	9
2.8.	Research Recommendations	9
3.	Data Review and Update	10
4.	Stock Assessment Models and Results	11

1. Workshop Proceedings

1.1. Introduction

1.1.1. Workshop Time and Place

The SEDAR 14 Assessment Workshop was held June 4 - 8, 2007 in St. Thomas, USVI.

1.1.2. Terms of Reference

1. Review any changes in data following the data workshop and any analysis suggested by the data workshop. Summarize data as used in each assessment model. Provide justification for any deviations from Data Workshop recommendations.
2. Develop population assessment models that are compatible with available data and recommend which model and configuration is considered most reliable or useful for providing advice. Document all input data, assumptions, and equations.
3. Provide estimates of stock population parameters (fishing mortality, abundance, biomass, selectivity, stock-recruitment relationship, etc); include appropriate and representative measures of precision for parameter estimates.
4. Characterize uncertainty in the assessment and estimated values, considering components such as input data, modeling approach, and model configuration. Provide appropriate measures of model performance, reliability, and 'goodness of fit'.
5. Provide yield-per-recruit, spawner-per-recruit, and stock-recruitment evaluations, values, and figures.
6. Provide estimates for SFA criteria. This may include evaluating existing SFA benchmarks or estimating alternative SFA benchmarks (SFA benchmarks include MSY , F_{msy} , B_{msy} , $MSST$, and $MFMT$); recommend proxy values where necessary.
7. Provide declarations of stock status relative to SFA benchmarks.
8. Estimate an Allowable Biological Catch (ABC) range.
9. Project future stock conditions (biomass, abundance, and exploitation) and develop rebuilding schedules if warranted; include estimated generation time. Stock projections shall be developed in accordance with the following guidelines.
 - A) If stock is overfished:
 $F=0$, $F=current$, $F=F_{msy}$, F_{target} (OY),
 $F=F_{rebuild}$ (max that rebuild in allowed time)
 - B) If stock is overfishing:
 $F=F_{current}$, $F=F_{msy}$, $F=F_{target}$ (OY)
 - C) If stock is neither overfished nor overfishing:
 $F=F_{current}$, $F=F_{msy}$, $F=F_{target}$ (OY)
10. Evaluate the results of past management actions and, if appropriate, probable impacts of current management actions with emphasis on determining progress toward stated management goals.

11. Provide recommendations for future research and data collection (field and assessment); be as specific as practicable in describing sampling design and sampling intensity.
12. Complete the Assessment Workshop Report (Section III of the SEDAR Stock Assessment Report) and prepare a first draft of the Assessment Advisory Report.

1.1.3. Workshop Participants

NAME **Affiliation**

Workshop Panel

Richard Appeldoorn..... CFMC SSC/UPRM
 Daniel Matos-Cayaballo PR DNER
 Nancie Cummings..... NMFS SEFSC
 Guillermo Diaz..... NMFS SEFSC
 Ron Hill..... NMFS SEFSC
 Joe Kimmel NMFS SERO
 Andy Maldonado CFMC AP
 Kevin J. McCarthy NMFS SEFSC

Council Representative

David Olsen CFMC/VI DWF

Staff

John Carmichael..... SEDAR
 Graciela Garcia-Moliner CFMC
 Patrick Gilles..... NMFS SEFSC
 Rachael Lindsay..... SEDAR

1.1.4. Workshop Documents

Working Papers

SEDAR14-AW1	An Examination of the Mutton snapper, Lutjanus analis, Commercial Catch per Unit of Effort Data in Puerto Rico from 1983-2005 Available for Use in Developing Estimates of Abundance	Cummings, N
SEDAR14-AW2	Habitat based analysis Mutton	Jeffries, C.
SEDAR14-AW3	Habitat based analysis conch	Jeffries, C.
SEDAR14-AW4	On diver catch-per-unit-effort series as measures of relative abundance of queen conch and their use in stock assessments for the islands of Puerto Rico and Saint Croix	Diaz, G.
SEDAR14-AW5	Estimation of mutton snapper total mortality rate from length observations.	Gedamke
SEDAR14-AW6	Revised queen conch (Strombus gigas) standardized catch rates for Puerto Rico and U.S. Virgin Islands commercial fisheries	McCarthy, K. J.
SEDAR14-AW7	Comments on Puerto Rico landings and biostatistical sampling	Matos, D.

Reference Documents

SEDAR14 RD09 NMFS-SEFSC-304 1992	Shallow water reef fish stock assessment for the U.S. Caribbean.	Appeldoorn, R. et al.
SEDAR14-RD10	Coral reef fisheries uses in Puerto Rico and USVI.	anon.
SEDAR14-RD11 SFD-02/03-184 2002	Standardized catch rates and preliminary assessment scenarios for queen conch (<i>Strombus gigas</i>) in the U.S. Caribbean	Valle-Esquivel, M.
SEDAR14-RD12 SFD-01/02-169 2002	U.S. Caribbean queen conch (<i>Strombus gigas</i>) data update with emphasis on the commercial landings statistics.	Valle-Esquivel, M.
SEDAR14-RD13 NMFS-Pro. Paper 5	Detecting fish aggregations from reef habitats mapped with high resolution side scan sonar imagery.	Rivera, J. A. et al.
SEDAR14-RD14 Bull Mar Sci 62(2) 1998	VARIATION IN NATURAL MORTALITY. IMPLICATIONS FOR QUEEN CONCH STOCK ENHANCEMENT	Stoner, A. & R. A. Glazer
SEDAR14-RD15 Fish Bull 96:885-899 1998	Settlement and recruitment of queen conch, <i>Strombus gigas</i> , in seagrass meadows: associations with habitat and micropredators	Stoner, A. W., M. Ray-Culp, S. M. O'Connell
SEDAR14-RD16 Mar Ecol Prog Ser 202:297-302 2000	Evidence for Allee effects in an over-harvested marine gastropod: density-dependent mating and egg production	Stoner, A. W. and M. Ray-Culp
SEDAR14-RD17 ICES Mar. Sci Symp 199:247-258 1995	Stock assessment of a large marine gastropod (<i>Strombus gigas</i>) using randomized and stratified towed diver censusing.	Berg, C. J. Jr., and R. A. Glazer
SEDAR14-RD18 Sociedad de Cinecias Naturales La Salle. Tomo XLVIII. Supl No. 3 1988	COMMERCIAL CATCH LENGTH-FREQUENCY DATA AS A TOOL FOR FISHERIES MANAGEMENT WITH AN APPLICATION TO THE PUERTO RICO TRAP FISHERY	Dennis, G.
SEDAR14-RD19 Mar Ecol Prog Ser 257:275-289 2003	What constitutes essential nursery habitat for a marine species? A case study of habitat form and function for queen conch	Stoner, A. W.
SEDAR14-RD20 Jou. Shellfish Res 15(2) 407-420 1996	LARVAL SUPPLY TO QUEEN CONCH NURSERIES: RELATIONSHIPS WITH RECRUITMENT PROCESS AND POPULATION SIZE IN FLORIDA AND THE BAHAMAS	Stoner, A. W., R. A. Glazer, P. J. Barile
SEDAR14-RD21 Mar Ecol Prog Ser 106:73-84 1994	High-density aggregation in queen conch <i>Strombus gigas</i> : formation, patterns, and ecological significance	Stoner, A. W. and J. Lally
SEDAR14-RD22 J. Shellfish Res. 17(4) 955-969 1998	MESOSCALE DISTRIBUTION PATTERNS OF QUEEN CONCH (<i>STROMBUS GZGAS LINNE</i>) IN EXUMA SOUND, BAHAMAS: LINKS IN RECRUITMENT FROM LARVAE TO FISHERY YIELDS	Stoner, A. W., N. Mehta, and M. Ray-Culp.

SEDAR14-RD23 Mar Bio 116:571-582 1993	Aggregation dynamics in juvenile queen conch (<i>Strombus gigas</i>) : population structure, mortality, growth, and migration	Stoner, A. W., R. Ray
SEDAR14-RD24 Fish Bull 94:551-565 1996	Queen conch, <i>Strombus gigas</i> , in fished and unfished locations of the Bahamas: effects of a marine fishery reserve on adults, juveniles, and larval production	Stoner, A. W.
SEDAR14-RD25 Fish Bull 92:171-179 1994	Queen conch, <i>Strombus gigas</i> , reproductive stocks in the central Bahamas: distribution and probable sources	Stoner, A. W., K. C. Schwarte
SEDAR14-RD26 Mar. Fish. Rev. 59(3) 1997	The status of queen conch research in the Caribbean	Stoner, A. W.
SEDAR14-RD27 TAFS 135:476-487 2006	Estimating Mortality from Mean Length Data in Nonequilibrium Situations, with Application to the Assessment of Goosefish	Gedamke, T., Hoenig, J. M.
SEDAR14-RD28 Fed-State Proj. No. NA77F0087 2000	Puerto Rico/NMFS Cooperative Fisheries Statistics Program 1997-2000	Matos, D.
SEDAR14-RD29 PR DNER 2004	Comprehensive Census of the Marine Fishery of Puerto Rico, 2002	Matos, D.
SEDAR14-RD30 CMFC Report 1984	Report on the reef fish size frequency survey July - September 1983	Morales-Santana, I.
SEDAR14-RD31 CFMC 1997	International queen conch conference proceedings, San Juan, PR, July 1996	Posada, J. M. and G. Garcia, eds.
SEDAR14-RD32 NOAA/NOS undated NA03NOS426024	Marine resource conditions for reef fishes and seagrass around St. John, USVI: Historical to present	Beets, J. and L. Muehlstein.
SEDAR14-RD33 SEFSC undated manu.	Queen conch CPUE assessment in PR & USVI's : Preliminary report.	Rivera, J. A.
SEDAR14-RD34 UPR/SEAMAP-C 2005	St. Croix and St. Thomas/St. John fisheries independent trap and line survey, 1992-2002.	Whiteman, E. A.
SEDAR14-RD35 PR Dept. of Agr., Agr. and Fish. Contr. IV(4) 1972	A report on fisheries statistics program in Puerto Rico from 1967 to 1972	Juhl, R. & J. A. Suarez Caabro
SEDAR14-RD36 PR Dept. of Agr., Agr. and Fish. Contr. III(1) 1975	La Pesca en Puerto Rico, 1970	Juhl, R. & J. A. Suarez Caabro
SEDAR14-RD37 Comm Fish. Rev. USFWS Reprint 866 1970	Puerto Rico's commercial fisheries. A statistical review.	Suarez-Caabro, J. A.
SEDAR14-RD38 PR Dept. of Agr., Agr. and Fish. Contr. II(1) 1975	Puerto Rico commercial fisheries, 1968-1969	Suarez-Caabro, J. A.

SEDAR14-RD39 PR Dept. of Agr., Agr. and Fish. Contr. IV(1) 1972	Status of fisheries in Puerto Rico, 1971.	Juhl, R. & J. A. Suarez Caabro
SEDAR14-RD40 PR Dept. of Agr., Agr. and Fish. Contr. V(3) 1973	Status of fisheries in Puerto Rico, 1972.	Suarez-Caabro, J. A.
SEDAR14-RD41 PR Dept. Nat. Res; Fish. Res. Lab. Tech. Rpt. 1(1) 1986.	Overview of Puerto Rico's small scale fisheries statistics, 1972 - 1978	Weller, D. & J. A Suarez-Caabro.
SEDAR14-RD42 PR Dept. of Agr., Agr. and Fish. Contr. VII(1) 1975	Status of fisheries in Puerto Rico, 1974.	Rolon, M.
SEDAR14-RD43 PR Dept. of Agr., Agr. and Fish. Contr. VIII(4) 1976	Status of fisheries in Puerto Rico, 1975.	Suarez-Caabro, J. A. & M.A. Abreu Volmar
SEDAR14-RD44 PR Dept. of Agr., Agr. and Fish. Contr. IX(1) 1978	Status of fisheries in Puerto Rico, 1976.	Abreu Volmar, M. A.
SEDAR14-RD45 CODREMAR, Fish. Res. Lab. Tech. Rpt. 1(2) 1987-1988	Status of fisheries in Puerto Rico, 1979-1982	Collazo, J. & J. A. Calderon
SEDAR14-RD46 NMFS/SERO State-Fed Proj. SF23 1986	CODREMAR/NMFS Cooperative statistics program. Completion report.	Garcia-Moliner, G. & J. Kimmel
SEDAR14-RD47 Comm. Fish. Res. and Dev. Act Pgm. 2-395-R 1986	Puerto Rico commercial fisheries statistics for 1983 - 1986.	Garcia-Moliner, G. & J. Kimmel
SEDAR14-RD48 PR Dept. Nat. Res; Fish. Res. Lab. Tech. Rpt. 1(1) 1994	Overview of Puerto Rico's small scale fisheries statistics, 1983 - 1987	Matos, D. and C. R. Alvarez

1.2. Panel Recommendations and Comment

1.2.1. Discussion and Critique of Each Model Considered

No assessment models were presented to the AWP and the AWP did not recommend development of any assessment models. The Data Workshop Panel did not recommend development of any specific assessment models and the AWP agreed that available data are not adequate to support either catch or survey based quantitative population assessments.

The AWP acknowledged that yellowfin grouper do appear in various short-term, limited-coverage fishery independent surveys, but the lack of consistent methods and adequate time series greatly limit the use of such efforts in stock assessment.

1.2.2. Discussion of YPR, SPR, Stock-Recruitment

The AWP discussed the feasibility of preparing yield-per-recruit analyses for yellowfin grouper, but such efforts were determined to be not feasible and unlikely to provide informative results due to a lack of information on length and weight at age, natural mortality, and fishery selectivity.

1.2.3. Recommended SFA parameters and Management Criteria

The AWP was unable to recommend SFA parameters and management criteria.

1.2.4. Status of Stock Declarations

The AWP was unable to evaluate stock status.

1.2.5. Recommended ABC

The AWP was unable to recommend ABC values.

1.2.6. Discussion of Stock Projections

It was not possible to prepare projections for this stock.

1.2.7. Management Evaluation

The AWP acknowledged that the Grammanik Bank seasonal closure in the US Virgin Islands, intended to protect a known spawning aggregation, closed one of the primary known fishing areas for yellowfin grouper off St. Thomas, USVI.

A spawning season closure in the Exclusive Economic Zone (EEZ) provides additional protection to potential spawning aggregations.

1.2.8. Research Recommendations

The AWP recommends collecting species level information on commercial and recreational harvest in the US Virgin Islands.

The AWP recommends collecting biological samples to characterize commercial and recreational catches in the US Virgin Islands and Puerto Rico.

The AWP recommends continuation of the survey efforts directed at the Grammanik Bank spawning aggregation as a potential source of yellowfin grouper trends that reflect a potentially important population component.

The AWP recommends developing specific surveys to evaluate species such as yellowfin grouper which rarely occur in general surveys but are known to seasonally aggregate.

The AWP recommends developing research and monitoring programs that enable quantitatively evaluating management actions such as seasonal and area closures, especially as such actions can significantly alter fishery operations and limit traditional data collection approaches.

The AWP recommends pursuing alternative assessment methods for evaluating the status of stocks such as yellowfin grouper that are not commonly encountered by either fishery-dependent or fishery-independent sampling and monitoring programs.

The AWP recommends devoting effort to characterizing basic catch, biological, and survey data availability before recommending SEDAR assessments of stocks that have never been quantitatively assessed. Such work should be considered between scheduled SEDAR assessment projects or perhaps in lieu of a project dedicated to a particular species.

The AWP recommends a complete review of the potential data collection programs, including commercial and recreational catch, biostatistical sampling and fishery-independent surveys for Puerto Rico and US Virgin Islands with the purpose of identifying what relevant information could be obtained and modifying sampling procedures accordingly, including the identification of key economic and ecological indicator species.

The efforts to analyze the available data were greatly enhanced by the presence of local fishers and agency representatives. However, there was no local representative from the USVI Division of Fish and Wildlife assigned to the AWP and the sole Puerto Rico representative could not attend the full term of the meeting. There must be greater buy-in from the local agencies such that knowledgeable representatives are present for the full term of the meeting. Furthermore, greater efforts should be made to attract and secure participation of local fishers.

2. Data Review and Update

There were no yellowfin grouper data revisions presented for consideration by the assessment workshop panel.

3. Stock Assessment Models and Results

No assessments were prepared for yellowfin grouper due to a lack of adequate data. Data deficiencies include a lack of recreational catch statistics, scant occurrence in commercial landings records, very rare occurrences in available fishery dependent information, and a lack of biological sampling records. In addition, no age or life history information is available.

Table 1. Data availability summary for Caribbean yellowfin grouper.

	Yellowfin Grouper		
	Puerto Rico	St. Thomas, USVI	St. Croix, USVI
Commercial Landings	Low values, uncommon occurrence	No Information	No Information
Commercial Lengths	Uncommon; annual N often <10 with a max of 40	No Information	No Information
Commercial Discard	No Information	No Information	No Information
Recreational Landings	available since 2000 infrequent in survey	No Information	No Information
Recreational Lengths	essentially none reported	No Information	No Information
Recreational Discard	None reported.	No Information	No Information
Age Samples	None Available	None Available	None Available
Fishery Independent Indices and Surveys	Rarely occur in available general surveys.	Rarely occur in available general surveys. Survey on Grammanik Bank (2001-2004)	Rarely occur in available general surveys.
Fishery Dependent Indices (CPUE)	No Information	No Information	No Information
Life History	scant, small samples and incomplete hampered by lack of age info	No Information	No Information
Stock ID	No Information	No Information	No Information