Abstract Online MSC-MERA Workshop – 21, 22, 27 April 2021

Introduction: Data-limited fisheries and Management Strategy Evaluation

In managing fisheries, it is important to test whether harvest control rules are going to work as intended. This is especially true for fisheries that are "data-limited" (i.e., fisheries without direct measures of population biomass), because in these cases managers rely on less information to make decisions. **Management Strategy Evaluation** (MSE) allows simulation-testing of the performance of data-limited control rules – or Management Procedures – for which we cannot derive full stock assessments. However, MSE can be very complex, and can be set up, run, and documented in many ways by different users. This can make it difficult and time-consuming to communicate to other researchers, managers, or interested stakeholders. These challenges limit widespread use of MSE to support decisions, especially in data-limited fisheries where testing is most needed. The **Marine Stewardship Council (MSC)** recognises this as a key challenge for evaluating sustainability of a large set of fisheries around the world. For this reason, MSC and the 'Data-Limited Methods tool' team led by Dr Tom Carruthers joined forces to develop **MERA**. This is a rapid MSE tool, specifically designed for testing data-limited Management Procedures with a user-friendly interface, building on the existing R packages DLMtool and MSEtool (see Carruthers & Hordyk, 2018). MSC is interested in evaluating performance of fisheries against the Fisheries Standard requirements for Principle 1 (Stock Status, Harvest Control Rules and Harvest Strategies) for data-limited fisheries.

MERA links

- MERA general website: https://www.merafish.org/
- MERA tool version 1.0.0: *http://142.103.48.20:3838/MERA/*

For more background / in-depth information:

- *DLMtool paper (Carruthers & Hordyk, 2018)*
- *MERA User Guide v1.0*

MERA tool functionalities

MERA is an open access, rapid analysis tool for MSE designed to evaluate and document performance of management strategies in data-limited fisheries via **simulation testing**. The user-friendly interface is designed to support fisheries or management organisations for planning purposes within sustainability improvement projects or for meeting MSC requirements (on Stock Status, Control Rules, Harvest Strategy). The user-testing phase is currently ongoing, and this workshop is an opportunity to gain your feedback.

The MERA tool:

a) rapidly evaluates performance of a broad range of Management Procedures producing some default diagnostics, which can be useful when exploring for the first time a fishery that is not yet well studied;

b) can be parameterised through a user-friendly questionnaire, allowing to easily gather input from different experts and sources, and document justifications systematically;
c) explicitly documents inputs and operating model settings through standardised reports;
d) can be used to progress along a gradient from extremely data-poor to data-moderate, including options to input data for model conditioning and use of auxiliary indicators to test for exceptional circumstances (see Hordyk & Carruthers, 2018);
e) The default diagnostics (i.e., the 'MSC' version) help prioritise data collection and identify the most important sources of model uncertainty in order to meet the targets set out by the MSC Fishery Standard as best practice (i.e., population biomass hovering around Bmsy, control rules are part of a responsive harvest strategy that can effectively recover the stock if it happens to fall below 50% Bmsy).

WORKSHOP ATTENDEE LIST

Name	Organisation
Thomas Carruthers	Bluematterscience
Adrian Hordyk	Bluematterscience
Carlos Alvarez	Pronatura Noroeste
Juan Carlos Castro	Pronatura Noroeste
Pablo Alvarez	Pronatura Noroeste
M. en C. Carlos Torrescano Castro	Pronatura Noroeste
M. en C. Alberto Rodríguez Madrigal	Pronatura Noroeste
Alfonso Medellín Ortiz	Pronatura Noroeste
Ollin Gonzalez Cuellar	Niparaja
Salvador Rodriguez	Niparaja
Francisco Vergara	MSC
Katie Longo	MSC
Julia Stuijfzand	MSC
Ana Parma	CONICET, TNC
Dra. Viridiana Zepeda Benítez	INAPESCA
Dr. Juan Gabriel Díaz-Uribe	INAPESCA
M. en C. Marcela Zúñiga	INAPESCA
M.en C. Martha Edith Zárate Becerra	INAPESCA
M. en C. José Alberto Rodríguez Preciado	INAPESCA
M. en C. Concepción Enciso Enciso	INAPESCA

SCHEDULE DAY 1

	Day 1	Homework after Day 1
15 min	Group Introductions	Check any uncertain questions flagged during the walkthrough of the questionnaire.
30 min	Intro to MERA concepts	If there is interest, participants can explore the questionnaire that was developed and try out various planning mode runs, recording any questions they have about the results etc.
55 min	MERA questionnaire for walk-through	
5 min	Leg stretch break	
45 min	MERA questionnaire ct'd	
25 min	Planning mode run	
5 min	Homework description	

SCHEDULE DAY 2

	Day 2	Homework after Day 2
15 min	Brief recap and run down on any revisions to the questionnaire (following homework)	Participants can build MERA questionnaires for the other case studies and summarize any findings
15min	Participants' presentation on the lbSPR workshop outcomes	Tom to work with Participants to further develop input data for conditioning and / or design custom MPs for those case studies
55 min	An introduction to management procedures (MPs) and a description of various applicable or feasible MPs for the principal case study.	
5 min	Leg stretch break	
30 min	Introduction to planning mode and interpretation of planning results	
30 min	Conditioning MERA operating models on data	
30 min	Status Determination mode	
5 min	Homework description	

Expectation *(from participants) – At this point, we would like to have worked to the extent that we have some close to final alternative results regarding stock status and performance of alternative procedures for the red snapper at least. Further issues or refinements for the red snapper and working with the other stocks can be done in the homework and discussed at the third session.*

SCHEDULE DAY 3

	Day 3
50 min	Describe any updated findings for the principal case study including those relating to revised data, or custom MPs
45 min	Present findings for other case studies where applicable
40 min	Contingency time / any other business
30 min	Wrap-up