10 March 2017 / 10 mars 2017

IOTC CIRCULAR 2017-036 / CIRCULAIRE CTOI 2017-036

Dear Sir/Madam,

SUBJECT: PROPOSAL FOR TRAINING IN DATA-LIMITED STOCK ASSESSMENT METHODS FOR TUNA AND TUNA-LIKE SPECIES *[8-10 May & 22–24 November 2017]*

Assessing the status of stocks for in cases where there is little information available is a highly pertinent issue for the IOTC and, as such, has been discussed by many of its subsidiary bodies including the Working Party on Neritic Tunas, the Working Party on Billfish and the Working Party on Ecosystems and Bycatch as well as the Scientific Committee.

I am therefore pleased to inform you that the IOTC Secretariat will be hosting a training course on stock assessment methods for fisheries for which there is limited information available, based on the Data Limited Methods Toolkit (DLMtool). This is a toolkit that has been developed to provide a scientific framework to address these challenges in a transparent and comprehensive manner (see attachment for the full concept note). The training course has been developed and funded by the FAO and the ABNJ Common Oceans Tuna Project, and will be tailored specifically for the Indian Ocean tuna fisheries. This 3-day training workshop is planned to take place from 8 – 10 May 2017 in Seychelles.

Given that there are different levels of experience and expertise in the Indian Ocean region, a second workshop will be held later in the year at a more introductory level for scientists with less experience with the tools and methods used. This workshop will be primarily aimed at improving understanding of the methods used so will provide more background and explanatory material for participants and cover some of the simpler parts of the package. This second workshop will be facilitated by the IOTC Secretariat as well as some of the participants of the FAO-ABNJ workshop and is planned to take place prior to the Working Party on Data Collection and Statistics, from 22 – 24 November 2017.

Scientists from IOTC CPCs are invited to register interest for the training by completing the short survey attached to this circular and returning it to secretariat@iot.org by 24th March 2017. This will allow sufficient time for the allocation of participants to the more relevant workshop and will assist in tailoring the courses so that the material is appropriate for participants' needs.

Funding will be made available by the FAO ABNJ Common Oceans Tuna Project to cover travel and subsistence expenses for one scientist delegates from each IOTC developing CPC. Limited funding may also be available for scientists from developed CPCs that will be able to assist with facilitating the second workshop; please contact the Secretariat with specific requests and suggestions. The requests for financial assistance to attend the meeting should be submitted to the IOTC Secretariat (secretariat@iotc.org) no later than 24th March 2017. Applications for financial assistance cannot be accepted after that date.

Applications for funding must include:

i) an official nomination letter with request of support signed by the director of fisheries or any other relevant authority;
ii) the contact details (email address, mobile phone numbers, home address) of the nominee with a copy of his/her passport.
iii) a one-page statement on the significance of this training for your local or institutional context.

This announcement will be published on the IOTC web site, and additional information on the training agenda and venue will be made available in due course (www.iotc.org/meetings).

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Madame/Monsieur,

OBJET: PROPOSITION DE FORMATION AUX MÉTHODES D'ÉVALUATION DES STOCKS À DONNÉES LIMITÉES POUR THONS ET ESPÈCES APPARENTÉES *[8-10 mai & 22-24 novembre 2017]*

L'évaluation de l'état des stocks pour les cas où l'on ne dispose que de peu d'informations est une question hautement pertinente pour la CTOI et, en tant que telle, elle a été débattue par bon nombre de ses organes subsidiaires, y compris par le Groupe de travail sur les thons néritiques, le Groupe de travail sur les écosystèmes et les prises accessoires et le Comité scientifique.

Je suis donc heureux de vous informer que le Secrétariat de la CTOI organisera une formation sur les méthodes d'évaluation des stocks pour les pêcheries pour lesquelles il existe peu d'informations disponibles, sur la base du *Data Limited Methods Toolkit* (DLMtool). Il s'agit d'une boite à outils qui a été élaborée pour fournir un cadre scientifique permettant de relever ces défis de manière transparente et exhaustive (voir la pièce-jointe pour la note de présentation complète). Le cours de formation a été élaboré et financé par la FAO et le projet thonier Océans Communs ZADJN et sera spécialement orienté vers les pêcheries thonières de l'océan Indien. Cet atelier de formation de 3 jours est prévu du 8 au 10 mai 2017, aux Seychelles.

Étant donné qu'il existe différents niveaux d'expérience et d'expertise dans la région de l'océan Indien, un second atelier sera organisé plus tard dans l'année à un niveau moins avancé, pour les scientifiques ayant moins d'expérience des outils et des méthodes utilisés. Ce second atelier sera principalement destiné à améliorer la compréhension des méthodes utilisées afin d'offrir aux participants une meilleure appréciation globale des problématiques et des outils et de couvrir certaines des parties les plus simples de la boite à outils. Ce deuxième atelier sera facilité par le Secrétariat de la CTOI ainsi que par certains participants de l'atelier ZADJN et devrait avoir lieu avant le Groupe de travail sur la collecte de données et les statistiques, du 22 au 24 novembre 2017.

Les scientifiques des CPC de la CTOI sont invités à faire part de leur intérêt pour cette formation en complétant le court sondage joint à cette circulaire et le renvoyant à secretariat@iot.org au plus tard le 24 mars 2017. Cela laissera un délai suffisant pour répartir les participants entre les deux ateliers selon leur profil et aidera à adapter les formations aux besoins des participants.

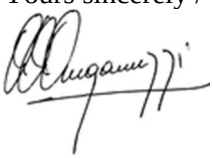
Le projet thonier Océans Communs ZADJN de la FAO mettra à disposition un financement pour couvrir les frais de voyage et de subsistance d'un délégué scientifique de chaque CPC de la CTOI en développement. Un financement limité peut également être offert aux scientifiques des CPCs développées qui pourraient aider à faciliter le deuxième atelier (veuillez contacter le Secrétariat pour toute demande ou suggestion spécifique). Les demandes d'assistance financière pour assister à la réunion doivent être soumises au secrétariat de la CTOI (secretariat@iotc.org) au plus tard le 24 mars 2017. Les demandes d'aide financière ne pourront être acceptées après cette date.

Les demandes de financement doivent inclure:

i) une lettre officielle de candidature avec demande de soutien signée par le directeur des pêches ou toute autre autorité compétente ;
ii) les coordonnées (adresse électronique, numéro de téléphone portable, adresse de domicile) du candidat avec une copie de son passeport ;
iii) une lettre d'une page expliquant l'importance de cette formation pour votre contexte local ou institutionnel.

Cette annonce sera publiée sur le site Web de la CTOI et des informations supplémentaires sur le programme et le lieu des formations seront disponibles en temps voulu (www.iotc.org/fr/reunions).

Yours sincerely / Cordialement



Alejandro Anganuzzi (Dr.)
Executive Secretary (*a. i.*) / Secrétaire exécutif (*a. i.*)

Attachments / Pièces jointes:

- DLM Training concept/ Disponible uniquement en anglais

Training on Data-Limited Assessments for Tuna and Tuna-like Species

Nicolas L Gutierrez (FAO)
Tom Carruthers (UBC)
David Newman (NRDC)

1. Background

The lack of adequate scientific knowledge threatens the health of marine ecosystems and the sustainable management of the world's fisheries. When managers use a science-based approach that engages fishermen and the public, fisheries are more likely to be sustainable and meet the needs of healthy oceans and coastal economies over time. It is estimated that 80% of global catch comes from fisheries with little or no scientific information to guide management decisions. This leaves them vulnerable to overexploitation and collapse, especially in the face of climate change, ocean acidification, and other escalating environmental stressors.

Scombrids (tunas, bonitos, Spanish mackerels and mackerels) support important fisheries in tropical, subtropical and temperate waters around the world, being one of the most economically- and socially-important marine species. Their sustainable exploitation, management and conservation depend on appropriate information for the development of quantitative fisheries stock assessments, semi-quantitative approaches and in many cases for the identification of vulnerable species. Although main commercial species and stocks (e.g., Southern Bluefin tuna, Albacore tuna, etc.) are subject to intense data collection, many other tuna and tuna-like species remain data-limited, particularly small and neritic species.

Of the many data-limited assessment approaches being developed or implemented globally, the Data-Limited Methods Toolkit (DLMtool) provides a scientific framework to address these challenges in a transparent and comprehensive manner (see Annex 1). The Toolkit is an open-source software package that is used to implement a standardized process to gather available information, define management objectives, evaluate feasible management strategies, and implement the best available scientific methods for obtaining practical management recommendations. It is designed for fisheries of all sizes across a range of governance and management systems, from capacity-poor fisheries in developing countries to resource-rich, sophisticated fisheries programs in the developed world. The DLM toolkit is considered suitable for tuna stocks since it covers a wide range of methods, from data-moderate, quantitative assessments (e.g. surplus production) to data-poor management procedures. In addition, the Toolkit includes a comprehensive and user-friendly simulation testing framework that can be used both as training material and for management purposes in real world scenarios.

In order to facilitate the introduction of data poor methods training to the individuals and groups that are likely to derive the most benefit from it, both the FAO and the tuna ABNJ Common Oceans project and their partner organizations are offering to conduct four-day courses in the use of the DLM toolkit. These workshops will provide an opportunity for individual tuna-RFMOs to expand their assessment options, increase their capacity to conduct assessments as well as provide the guidance necessary to design harvest control rules. In the initial phase of training, the focus will be on the theory and operationalization of data-limited stock assessment methods and simulation-testing frameworks.

2. Objectives

To support and promote the development of stock assessment, harvest control rules and simulation testing for tuna and tuna-like species, with particular emphasis on data limited situations.

Specifically, this proposal aims at developing a training workshop on data-limited stock assessment methodologies and simulation testing tailored to each tRFMO needs.

3. Tasks/Activities

A three or four day train-the-trainee curricula suitable for tuna and tuna-like fishery contexts will be developed by using the DLMtool as a platform. The course will contain the following general modules:

a. Introduction to data-limited stock assessment methodologies.

b. Introduction to simulation testing concepts such as operational modeling, observation error models, closed-loop testing, performance metrics, trade-offs and value of information analysis.

c. Implementation of data-limited assessment methods for real data-limited fisheries (to be defined by each t-RFMO and their working groups), diagnostics, graphing outputs, management procedures selection.

d. Introduction to simulation testing procedures of alternative harvesting options.

Potential structure:

Day 1: Data-limited stock assessment and simulation testing procedures. Concepts and terminology

Day 2: Simulation testing for data-limited fisheries using DLMtool

Day 3: Advanced DLMtool functionality

Day 4: Practical application of DLMtool to real fishery data (attendees may use their own data if they wish) with simulation testing of harvesting options

The **curricula, specific content, format and length will be tailored to tRFMOs' specific needs**. For this purpose, tRFMOs Secretariats and Chairs from the relevant working groups will be contacted beforehand (see examples in Annex 2). Dr. Gutierrez (FAO – tuna ABNJ LTO) will act as liaison between interested tRFMO, the tuna ABNJ PMU and Dr. Carruthers (UBC – DLMtool creator).

4. Project Impact

- Better understanding by scientists working with t-RFMOs on data-limited methodologies will promote stock assessment for current unassessed tuna and tuna-like stocks. It is expected that this train-the trainee curricula can be replicated by individual scientist in their own environments, increasing the breadth and impact of the project.
- Better understanding of simulation testing will allow greater use and uptake of this approach to test harvest strategies and Harvest Control Rules (HCR) within tRFMOs.
- Implementation of HCR and simulation testing will allow more informed management decisions as well as move fisheries closer to MSC certification.

Annex 1. Data-Limited Methods Toolkit (DLMtool)

The Origins of DLMtool

DLMtool is a collaboration between the University of British Columbia's (UBC) Institute for Oceans and Fisheries and the Natural Resources Defense Council (NRDC). The idea of the Toolkit emerged from research examining the diversity of methods used for managing data-limited fisheries in the United States and simulation testing across a range of fisheries. In early 2014, a conceptual version of the Toolkit was presented at a workshop of experts from the National Marine Fisheries Service, state agencies, academic institutions, and non-governmental organizations to determine its utility and to refine its functionality. Since then, the Toolkit has been refined and expanded, in large part through testing and evaluation by independent scientists applying it to the fisheries they manage.

How the Toolkit Works

The Data-Limited Methods Toolkit helps scientists and managers with three common objectives:

1. Identifying the most effective management methods given the uncertainties associated with data-limited fisheries
2. Computing explicit management guidance based on the best-available data
3. Prioritizing future data collection programs

The Toolkit contains an integrated management simulation testing function to identify acceptable harvest control rules based on user-specified stock type, fishing fleet, management type, and performance criteria. Simulation testing provides a quantitative framework to evaluate the performance of alternative management strategies, which in this case are comprised of management procedures for data-limited fisheries. Real world experiments in fisheries management are extremely difficult, primarily because two of the most important components of an experiment, replication and control groups, are usually not possible. For this reason, comparison and evaluation of the performance of alternative fisheries management procedures are conducted with computer simulation, with models that are conditioned on the existing knowledge of the target stock dynamics, the characteristics of the fishing fleet, and the existing management framework. With the aid of computer simulation, it is possible to run many hundreds of simulation runs – each representing a different possible "reality" – and to take into account the uncertainty in knowledge of the stock and fishery (i.e., errors in observation) as well as the uncertainty in future environmental and ecological conditions that are likely to affect the stock dynamics. Through these simulations, DLMtool users can see the relative impacts of specified management approaches to their fishery decades into the future and choose the approach that best achieves their management objectives.

Armed with this understanding of what methods perform best, the user then enters all available data for a particular stock through a simple spreadsheet interface. The Toolkit recognizes which of the acceptable methods can be applied with the data for that stock and then applies them, generating explicit guidance for fisheries managers.

Diagnostic tools show what data inputs a particular method is sensitive to, allowing closer scrutiny of the quality of those inputs. The Toolkit also informs future data collection priorities by analyzing what additional data are needed to run better performing, but currently unavailable methods.

Features & Benefits of the Toolkit

- *Over 85 Data-Limited Methods:* dozens output controls (e.g., total allowable catch) and input controls (e.g., spatial, effort, size), ranging from simple, data-poor management procedures to data-rich assessment models
- *Robust Testing of Data-Limited Methods:* Quantify and compare the performance of a broad and extensible range of alternative management methods (e.g., probability of meeting limit/target reference points, long- and short-term yield, stability in yield, etc.) using simulation testing.
- *Application of the Best Available Methods:* Input real data from your fishery and obtain real management recommendations that are calculated using the same management procedures that were identified in the simulation testing approach.
- *Powerful and Rapid Execution:* Pre-tested code and parallel processing for speed and efficiency; can be linked to online supercomputer services to make large simulations accessible
- *Improves Data Collection:* Prioritizes the most valuable data to collect, ensuring the biggest bang for the management buck
- *Open Access:* Free R software package enables users to share code for easy collaboration
- *Saves Time & Money:* Improve the power, precision, and efficiency of scientific throughput (requiring a day or two to complete analyses that would normally take weeks), use pre-tested computer code (avoiding duplicative effort writing code) and enhance reliability (avoiding review time wasted on bugs)
- *Prefab Operating Models:* Includes a range of pre-build stock (12), fleet (13), and observation objects (6) for constructing and adapting operating models
- *Customizable:* Quickly add new management procedures, performance metrics, and fishery operating models that represent the real fishery system and accommodate an ever-expanding universe of fishery management problems
- *Clarity & Transparency:* Provides clarity in decision-making and promote transparency, credibility, and increased buy-in from stakeholders; includes functions for graphing and presenting results (e.g., trade-off plots, rebuilding worm plots, value of information plots, convergence diagnostics)

Where the Toolkit is Being Used

The Toolkit has been developed in collaboration with real-world fisheries scientists around the globe. New features and functions have been added to the software package to meet the needs or the particular fisheries and management contexts where it has been applied. To date, the Toolkit has been used for management or academic research in over 25 fisheries and the software package has been downloaded nearly 10,000 times. Two examples of where the Toolkit is being used for management include the National Marine Fisheries Service and the California Department of Fish & Wildlife.

The National Marine Fisheries Service's Southeast Fisheries Science Center is using DLMtool to review data-limited methods and their application to tropical reef fish in the U.S. Caribbean, while the Mid-Atlantic Fishery Management Council is using the Toolkit to inform management of black sea bass, blueline tilefish, and mackerel. For more information on NMFS using the Toolkit, click here.

NRDC and UBC are working with the California Department of Fish & Wildlife to customize DLMtool for California state-managed marine fisheries. The goal is to demonstrate the Toolkit's utility through application to four fisheries: barred sand bass, CA halibut, sea cucumber, and red sea urchin, with the prospect of broad adoption to other state-managed fisheries in the years to come. For more information on CDFW using the Toolkit, click here

Annex 2. Background information pre-training.

ID	Status	Organization	Region/Country	Contact	Email	Main interest (DLM, MSE or DLM+MSE)	Stocks	Performance metrics (LRP, TRP, others?	Data/Assessment available ahead of the training?	Audience (assessment scientists, managers,etc).	Objectives	Tentative schedule	Some funds available?
1	Interested	ICCAT	Atlantic	Alex Hanke (Chair Ecosystems)	Alex.Hanke@dfo-mpo.gc.ca					Stock assessment scientists (train-the-trainer)	To use data-limited assessment methods, including management procedures, to assess status and/or inform management advice. To improve understanding and use of MSE. Explore potential use of DLMtool to define stock status/reference points for ecosystem components (e.g. sharks, non-target species).		
1	Interested	ICCAT	Atlantic	Noureddine Abid (Chair Small Tunas)	noureddine.abid65@gmail.com					Stock assessment scientists (train-the-trainer)	To use data-limited assessment methods, including management procedures, to assess status and/or inform management advice. To improve understanding and use of MSE. Explore potential use of DLMtool to define stock status/reference points for data limited tuna and tuna like species		