



ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (ICCAT- GBYP)

PHASE 2

EC GRANT AGREEMENT SI2.585616

DELIVERABLE F1.2

UPDATING REPORT ON THE ICCAT-GBYP MODELLING APPROACHES

October 21, 2011

ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA
(ICCAT- GBYP)
PHASE 2
DELIVERABLE F1.2

October 21, 2011

UPDATING REPORT ON THE ICCAT-GBYP MODELLING APPROACHES

1.0 Background

The ICCAT-GBYP activity on Modelling Approaches in Phase 2 is strictly following the course decided by the GBYP Steering Committee, endorsed by ICCAT-SCRS and approved by the ICCAT Commission, reflected on the EC Grant Agreement SI2:585616.

After many consultations among the SCRS Chair, the BFT Rapporteurs, the WG Chair and the ICCAT Secretariat, the ICCAT Working Group on Stock Assessment Methods (WGSAM) was postponed from the original date of March 21-24, 2011 and instead held on June 27 - July 1, 2011. One day (June 28) was devoted to the bluefin tuna issues (see Deliverable F1.1, issued on July 12, 2011). The report of WGSAM is now available (Annex 1).

As a consequence, the original schedule of the meetings on modeling approaches was rearranged and the delay of this deliverable was notified to the EC by phone in August and then confirmed by mail on September 30, 2011.

The delay provided the necessary time for receiving the reports from the two contractors listed on Deliverable F1.1.

2.0 Objectives

The objectives of the comprehensive ICCAT Atlantic-Wide Research Programme on Bluefin Tuna (GBYP) are to improve data collection, knowledge of key biological and ecological processes, assessment models and management.

An important element of the programme is to develop a robust advice framework consistent with the Precautionary Approach. This requires the development of new stock assessment methods that take into account the main sources of uncertainty and utilise the new data sets and knowledge provided by the GBYP. New data sets include, for example, historic catch and effort data, aerial surveys of spawning aggregations and tagging of juveniles.

In order to evaluate the benefits of the knowledge and data gained under the GBYP and allow them to be used with a Precautionary advice framework it is intended to develop a Management Strategy Evaluation (MSE) framework. This will allow current and alternative assessment and advice frameworks to be evaluated with respect to their ability to meet multiple management objectives given uncertainty and allow management advice to be provided consistent with the Precautionary Approach.

3.0 Contracts

As it was detailed on Deliverable F1.1, the GBYP issued a Call for tenders for contracts offered this year (Call for Tenders GBYP 04/2011 on Stock Assessment Modelling, ICCAT Circular n.954/2011 issued on March 15, 2011, annex 2), to ensure that modelling work would be started this year. These were: a) one contract for a

risk analysis to identify the main perceived sources of uncertainty related to assessment and advice, and b) two contracts to help develop new assessment and advice based on various data sets being collected and the new knowledge being gained under the GBYP. The first contract was awarded to Ph.D. Justin G. Cooke (Germany) and the second contract was awarded to IC Consultant Ltd, Imperial College (UK).

Unfortunately, only one bid was received for the second theme. Therefore, it was decided to issue a second Call for completing the work to be done in Phase 2 (Call for Tenders GBYP 10/2011 on Stock Assessment Modelling, ICCAT Circular n.4363/2011 issued on October 13, 2011, annex 2).

3.1 Risk Assessment

Although several sources of uncertainty were considered when formulating the East Atlantic and Mediterranean bluefin recovery plan, not all sources of uncertainty were explicitly considered. The contract for a Risk Assessment was decided for identifying and providing a preliminary quantification of the main sources of uncertainty was offered for tender.

The final report (Annex 3) describes the work conducted by Imperial College under the Risk Assessment contract: Although the Bluefin tuna rebuilding plan uses stochastic projections these do not capture all the uncertainty associated with stock assessment/management variables. This could mean that the outcomes predicted by the projections are more optimistic than those achieved in reality. The methodology presented was an attempt to capture stakeholder perceptions of particular uncertainties that should be included in stock assessments of Bluefin tuna and then to provide preliminary quantification of their relative importance in terms of their impact on achieving management objectives. Ultimately, this will allow risk-based scenarios to be specified for the operating mode of a Management Strategy Evaluation approach, and enable SCRS and the GBYP Steering Committee to prioritize research. A spreadsheet-based questionnaire was developed to capture measures of stakeholder uncertainty for each of 37 risk-related variables, assumptions and hypotheses (identified from the literature and stakeholder consultation). Respondents were required to score each variable in each of three dimensions: importance of the variable; knowledge-based uncertainty in the variable; and the degree to which that variable was represented in the current assessment. The raw data was visualized using a novel graphical method to help ICCAT stakeholders negotiate consensus and take further steps to manage risks. A preliminary list of priorities is provided, and that may be a basis for discussions by ICCAT on how to address identified sources of uncertainty.

3.2 Alternative Advice Frameworks

These contracts were to prototype alternative assessment and advice frameworks. This required the implementation in software of algorithms to model data collection and analysis and the simulation of a harvest control rule (HCR) or management regulation based upon appropriate reference points.

SCRS/2011/199 describes the work conducted by Justin Cooke under the Alternative Advice Frameworks and outlines an example of a new assessment framework. This consisted of an assessment model designed to utilise different types of data via data-specific likelihood functions, and a simple harvest control rule that ensures that fishing mortality is reduced when the stock is reduced below an MSY-related reference point based on spawning stock biomass. The assessment model is fitted using Bayesian methods, and the posterior median of a target catch by stock is used for management purposes, via fishery-specific impact factors. The next step will be to subject this and other candidate management procedures to simulation tests involving a set of standard scenarios to be developed under the GBYP (Annex 4).

The further work to be developed in the last part of Phase II, following the last Call for tenders, concerns allowing existing assessment methods to be implemented as an R package to allow simulations of a harvest control rule (HCR) or management regulation based upon appropriate reference points within the Management Strategy Framework.

3.3 Remarks

The work being conducted under the first two contracts was preliminary presented at the ICCAT Stock Assessment Methods Working Group in order to get peer review of the work and to get input from CPC scientists (see Annex 1). In addition, an example of a management strategy evaluation (MSE) framework showing how the work under these contracts can be used to develop an alternative robust advice frameworks was provided in the same meeting (Kell *et al.* SCRS/2011/110).

This framework showed how a quantitative evaluation of the uncertainties considered in the risk analysis could be conducted. It was also discussed how the robustness of alternative advice frameworks could be evaluated and under Phase III of GBYP more work will be conducted

In summary at WGSAM it was recognised that:

1. the example assessment and management procedure present by Justin Cooke included many elements that would be important in building a robust advice framework taking advantage of new data and knowledge made available under the GBYP;
2. the risk analysis is an important tool in identifying sources of uncertainty of concern to stakeholder, and
3. MSE would be an important tool that needs to be developed and applied in later phases of GBYP.

The final reports of the work conducted under the first two contracts were then presented at the ICCAT-SCRS bluefin Species Group in September, which confirmed the opinion previously adopted by WGSAM and the opportunity to continue the work, particularly further applying the risk analysis involving a larger number and variety of stakeholders.

The work performed under contracts will be important in developing the modelling work under GBYP Phase III.