TIME TO PLAN FOR THE FUTURE OF GBYP

ICCAT GBYP Steering Committee

SUMMARY

The ICCAT GBYP is now in its fifth year of activity. While the GBYP has yielded several significant achievements and demonstrated the value and need for a large scale, international and coordinated research program, there is still a large amount of work that is required to achieve its primary objectives which were identified by the Commission, the SCRS and, more recently, by the Mid-Term Review. This is in part due to a combination of factors that include the shortage in the resources made available to the program, the complexity of the issues being addressed, the needed for extended and/or on-going time series of data for many of the objectives to be realized (e.g. index of abundance from aerial surveys, which need at least 7/8 years before providing a trend) and political/external factors which constrained some of the activities. It is time to plan for the long term future of the GBYP both to capitalize on the work already done and to ensure continuity in the data and activities requiring a long term time series of data. The stock assessment and provision of management advice for the Atlantic Bluefin is challenging and difficult because of the long-lived nature of the species, not well elucidated stock and sub-stock structure and dynamics, poor understanding of its life history (e.g. reproductive biology and natural mortality) and a complex mixture of fisheries targeting different components of the stocks. Some of these difficulties require targeted medium-term research program (e.g. improved understanding of reproductive biology, spatial stock dynamics) while others require an ongoing commitment to the collection of relevant data for input into the stock assessment (e.g. length-age keys, fishery independent indices of abundance). The Steering Committee believes that the future GBYP needs to be conceived and designed to accommodate both the on-going and medium-term component of the stock assessment research undertaken by ICCAT. This document includes all detailed research proposals made by the Steering Committee for biological studies, reproductive biology, fishery-independent indices of abundance, stock structure and spatial dynamics, analyses and modelling and for the long-term multi-year funding and management of this important and complex programme. According to these needs, the Steering Committee is proposing an extended programme and recommends the adoption of a scientific quota, as it was proposed in 2013 by the SCRS Chair.

RÉSUMÉ

L'ICCAT-GBYP est désormais dans sa cinquième année d'activité. Même si le GBYP a obtenu des succès remarquables et a démontré la valeur et la nécessité d'un programme de recherche international et coordonné à grande échelle, il reste encore beaucoup de travail à réaliser pour atteindre ses principaux objectifs qui avaient été identifiés par la Commission, le SCRS et plus récemment par l'examen à mi-parcours. Ceci est dû en partie à une combinaison de facteurs : la pénurie de ressources dont disposait le programme, la complexité des questions à traiter, la nécessité de séries de données élargies et/ou continues pour nombre d'objectifs à atteindre (p.ex. indice d'abondance des prospections aériennes qui ont besoin d'au moins sept à huit ans avant de fournir une tendance) et facteurs politiques/externes qui ont limité quelques-unes des activités. Le moment est venu de planifier le futur à long terme du GBYP afin de tirer profit du travail déjà réalisé et de garantir la continuité des données et des activités qui nécessitent une série temporelle de données à long terme. L'évaluation des stocks et la formulation d'avis de gestion pour le thon rouge de l'Atlantique constituent un défi et une tâche difficile en raison de la grande longévité de cette espèce, de la structure et de la dynamique des stocks et des sous-stocks qui ne sont pas bien définies, de la compréhension insuffisante de son cycle vital (p.ex. biologie reproductive et mortalité naturelle) et d'un mélange complexe de pêcheries ciblant différentes composantes des stocks. Certaines des difficultés nécessitent un programme de recherche ciblé à moyen terme (p.ex. compréhension améliorée de la biologie reproductive, dynamique spatiale des stocks), tandis que d'autres nécessitent un engagement continu envers la collecte de données pertinentes aux fins de leur saisie dans l'évaluation des stocks (p.ex. clefs longueur-âge, indices d'abondance indépendants des pêcheries). Le Comité directeur est

convaincu que le futur GBYP doit être conçu et élaboré pour intégrer la composante actuelle et à moyen terme de la recherche d'évaluation des stocks entreprise par l'ICCAT. Le présent document inclut toutes les propositions détaillées de recherche formulées par le Comité directeur portant sur des études biologiques, la biologie reproductive, les indices d'abondance indépendants des pêcheries, la structure et la dynamique spatiale des stocks, les analyses et la modélisation et pour le financement et la gestion pluri-annuels à long terme de cet important programme complexe. En accord avec ces besoins, le Comité directeur propose une extension du programme et recommande l'adoption d'un quota scientifique, comme cela avait été proposé en 2013 par le Président du SCRS.

RESUMEN

El GBYP-ICCAT ha llegado a su quinto año de actividad. Aunque el GBYP ha alcanzado varios logros significativos y ha demostrado el valor y la necesidad de un programa de investigación coordinado, internacional y a gran escala, se requiere una gran cantidad de trabajo para alcanzar sus principales objetivos que fueron identificados por la Comisión, el SCRS, y más recientemente, la revisión a medio plazo. Esto se debe en parte a una combinación de factores que incluyen la escasez de recursos disponibles para el programa, la complejidad de las cuestiones abordadas, la necesidad de una series temporales ampliadas y/o continuas de datos para que se alcancen muchos de los objetivos (por ejemplo, índices de abundancia obtenidos mediante prospecciones aéreas que requieren al menos 7/8 años para poder proporcionar una tendencia) y factores políticos/externos que han restringido algunas actividades. Ha llegado el momento de planificar el futuro a largo plazo del GBYP tanto para capitalizar el trabajo ya realizado como para garantizar la continuidad en los datos y actividades que requieren series de datos a largo plazo. La evaluación de stock y la provisión de asesoramiento en materia de ordenación para el atún rojo del Atlántico son un reto y son difíciles debido a la longevidad de esta especie, a que la dinámica y estructura del stock y substock no se ha elucidado adecuadamente, a los escasos conocimientos sobre su ciclo vital (por ejemplo, biología reproductiva y mortalidad natural) y a la compleja mezcla de pesquerías dirigidas a diferentes componentes de los stocks Algunas de estas dificultades requieren un programa de investigación dirigido a medio plazo (por ejemplo, la mejora de los conocimientos sobre biología reproductiva, la dinámica espacial del stock) mientras que otros requieren un compromiso constante con la recopilación de datos pertinentes para las evaluaciones de stock (por ejemplo, claves talla-edad, índices de abundancia independientes de la pesquería). El Comité directivo cree que el futuro del GBYP tiene que concebirse y diseñarse para dar cabida tanto a los componentes en curso como a medio plazo de la investigación sobre evaluación de stock emprendida por ICCAT. Este documento incluye todas las propuestas de investigación detalladas realizadas por el Comité directivo para los estudios biológicos, sobre biología reproductiva, índices de abundancia independientes de las pesquerías, estructura del stock y dinámica espacial, análisis y modelación y para la financiación plurianual a largo plazo y para la gestión de este importante y complejo programa. En función de estas necesidades, el Comité directivo propone una ampliación del programa y recomienda la adopción de la cuota para fines científicos, tal y como fue propuesta en 2013 por el Presidente del SCRS.

KEYWORDS

GBYP, Bluefin tuna, Research programme, Multi-year planning, Multi-year funding, Stock assessment, Biological studies, Fishery independent data, Aerial survey, Tagging, Data elaboration, Modeling approaches, Scientific quota

1. Introduction

ICCAT established the GBYP, a large scale research program for the Atlantic bluefin stock in 2009. This was in response to repeated request since 1990 by the ICCAT scientific committee (SCRS) for the necessity for such a dedicated program if the stock assessment and management advice provided to the Commission by SCRS were to be improved. The Atlantic bluefin stock assessment has been affected by large uncertainties due to a lack of knowledge and reliable data on biology and fisheries of this species compounded by a shortage of fishery

independent measure of abundance. The primary objectives of the GBYP were to rectify this and to improve the underlying stock assessment models and provision of management advice taking into account advances in statistical catch-at-age modelling and management procedure evaluation (MP) methodologies.

The GBYB has already started to yield significant achievements and data that have substantially improved our understanding of the biology of the stock and the nature of the current and historical catches and fisheries (see Di Natale, 2015). This improved understanding and data collected under the GBYP are being utilized in the development of an improved stock assessment and MP modelling approaches being undertaken by GBYP in conjunction with the BFT species working group. This should result in not only improved estimates of the current stock status, but more realistic estimates of the uncertainty associated with the assessment results and a better framework for management decision making in light of the uncertainties and competing objectives.

The GBYP was initially approved as a six year program, which is being funded on an annual basis and is now approaching the end of its fifth year of operation. Since the beginning, funding was provided by Phase and not by year and 4 Phases have been carried oud so far. However, funding for the first four phases of the program has been only 42% of what was proposed by the SCRS and endorsed by the Commission. Moreover, because of funding and administrative issues, funding for the fifth phase of the program from the major contributor to the program (the EU) was delayed by one year and funding for Phase IV was extended over a two year period. This resulted in only a very limited set of the activities intended to be carried out during the fifth year actually being conducted. The bulk of the activities that were intended to be conducted in the fifth year will be conducted in 2015 as Phase V and there is a possibility that the intended funding for Phase VI from the EU will be made available for 2016.

While the GBYP has yielded several significant achievements and demonstrated the value and need for a large scale, international and coordinated research program, there is still a large amount of work that is required to achieve its primary objectives. This is in part due to a combination of factors that include the shortage in the resources made available to the program, the complexity of the issues being addressed, the needed for extended and/or on-going time series of data for many of the objectives to be realized (e.g. index of abundance from aerial surveys) and political/external factors which constrained some of the activities. It is time to plan for the long term future of the GBYP both to capitalize on the work already done and to ensure continuity in the data and activities requiring a long term time series of data. This paper, prepared by the Steering Committee of the GBYP suggests components and funding for the future of the GBYP and is intended as a proposal for discussion by the SCRS and Commission.

2. Components of a Future GBYP

The stock assessment and provision of management advice for the Atlantic Bluefin is challenging and difficult because of the long-lived nature of the species, not well elucidated stock and sub-stock structure and dynamics, poor understanding of its life history (e.g. reproductive biology and natural mortality) and a complex mixture of fisheries targeting different components of the stocks. Some of these difficulties require targeted medium-term research program (e.g. improved understanding of reproductive biology, spatial stock dynamics) while others require an ongoing commitment to the collection of relevant data for input into the stock assessment (e.g. length-age keys, fishery independent indices of abundance)[1]. The Steering Committee believes that the future GBYP needs to be conceived and designed to accommodate both the on-going and medium-term component of the stock assessment research undertaken by ICCAT.

Taking into account the assessments needs, the progress to date from the GBYP and the recommendations from External Review of the GBYP (Fonteneau *et al.*, 2014), Steering Committee recommends that the next stage f the GBYP contains the following elements:

2.1 Collection and Analyses of Biological Sampling for Ageing and Determination of the Origin of the Catch

The Atlantic Bluefin assessment is based on estimates of the age structure of the catch. Historically, the estimation of age distribution of the catch has been based on the conversion of estimates of the length and weight distribution of the catch based on an estimated growth curve using cohort slicing. This approach tends to lose much of the information contained in the age distributional data, particularly with respect to cohort strengths and recruitment variability. Large uncertainty and inaccuracies are inherent in this approach due to large overlap in

[1] Fishery-related data were always considered unreliable and the effects of strict management measures are further limiting their use for stock assessment.

size among individuals of different ages and variability/changes in growth overtime. For Atlantic Bluefin, the problem of estimating aging from size is further compound by the fact that a large fraction of the catch is current held in farms and there will be a differences in the weight (and also in size) of an individual between the time of capture and the time of harvests.

The GBYP has initiated the annual collection of otoliths and the direct aging of the individuals from whom these were collected in order to construct age-length keys for estimation of the age distribution of the catch. It has demonstrated that this is viable and feasible. However, for the benefit of such length-age keys to be realized, this needs to be done for each year's catch. As such, the collection and analyses of otoliths for aging needs to be seen as a component of the on-going data collection process for the bluefin stock assessment. A very first ageing calibration was tentatively done in 2014. A future GBYP provides an appropriate structure for ensuring that such data are collected and available.

Traditionally, the Atlantic Bluefin Stock assessments have been based on the assumption of stocks with no or very limited mixing of the catch between the eastern and western components. Genetic and micro-chemistry analyses (but also tagging) have shown that this is not the case. For example, there can be substantial catches of eastern stock animals in the north-western Atlantic waters. Furthermore, information from central-southern Atlantic does not exist. This can have significant impact on the assessments. As the mixture of stocks in the catch will vary overtime, particularly with changes in the relative abundance of the stocks (e.g. recovery of the western component), it is critical to have reliable, on-going estimates of the fraction of the catch originating from different stock components from areas where stocks are mixed. This will require the collection of biological samples (e.g. small tissue samples) and their analyses from the catches in these areas.

In addition, to separation of the eastern and western component of the stock, genetic data collected by the GBYP suggests that there may be significant stock or sub-stock structure within the eastern stock with little mixing in the breeding components in the eastern and western Mediterranean. While the on-going work of the current GBYP is anticipated to clarify this, it seems likely that there will be a need to take into account this stock-structuring within the Mediterranean both in the stock assessment and management of the resources. As such, collection of biological samples and their analyses from the catches will be required to determine the stock or sub-stock origin of fish caught from the eastern Atlantic. The western stock also needs more studies about its components.

Fishery Independent Indices of Abundance

All stock assessment methods require some estimate of relative abundance of the stock or of fishing intensity (e.g. fishing effort). The Atlantic Bluefin Stock has traditionally relied primarily on CPUE (catch per unit effort) indices of abundance. The problems with CPUE indices are well know and documented. Too often they do not provide a reliable measure of changes in abundance (e.g. stocks have collapsed although the CPUE indices showed relatively little or no decline). The problems with CPUE are compounded when the catches are taken by numerous fisheries using different gear and spatially fragments, as is the case with the Atlantic Bluefin. The problem with relying on CPUE indices for the Atlantic Bluefin assessment has been fully recognized by SCRS and the Commission, and they became even worst in the last decade due to the strict management rules. The production of fishery independent indices of abundance and/or fishing mortality rates was one of the primary objectives in the creation of the GBYP.

The fishery independent estimates of abundance and fishing mortality rates are a difficult and challenging research problem. Also, ideally, it is most informative for the stock assessment if there are separate indices for the adult and juvenile components of the stock. The current GBYP has taken two approaches to this: aerial surveys (for adults) and conventional tagging experiments (for adults and juveniles). Substantial progress has been made in the development of both approaches and that either approach has the potential to produce the required information. However, both approaches have run into logistic, resource and political issues that need to be overcome before either approach could be considered to be fully functional and operational.

For the aerial survey, the major difficulty has been restrictions on areas where surveys can be conducted, in particular in areas of the southern and eastern Mediterranean where it has not been possible to obtain flight permits. In addition, the potentially large geographic extent of the survey and lack of full knowledge on the spatial and temporal distribution of spawners (and the inter-annual variability in these) presents a large logistic challenge to designing an efficient and reliable long term survey even if there were no access issues. Even if the major spawning areas in the Mediterranean are well identified, the Steering Committee proposed to extend the survey to larger areas at least in some years for assessing the presence of spawners in other parts. Additional data and analyses are required to determine the most appropriate spatial design and to assess whether a reliable index can be achieved given the current and likely future access restriction.

An additional complication with the aerial survey is that the large area needed to be surveyed necessitates the use of various planes and different spotters. Detectability will vary among spotter and planes and more importantly estimates of school size. In order to have a reliable and consistent index across space and years, it is essential to develop methods for calibrating estimates across planes and spotters. The GBYP has not been able to carry out such calibration. While there are some logistic complications in doing the calibration, limitation on available resources and time have been the primary reasons that no work on this has been done to date. However, an approach for calibrating estimates across spotter needs to be instituted before any aerial survey design could be considered fully operational. Long pauses between surveys often imply changes among the crew and observers. It should be emphasized that aerial surveys require a long time series of estimates to be informative (e.g. a minimum of at least 6-7 and probably 10 or more provide statistically detectable trends).

Tagging experiments have also run into logistic and political problems. Tagging experiments can yield estimates of abundance and/or fishing mortality rates depending upon their design and implementation. However, fundamental requirement is that estimates of reporting rates of recaptured tagged fish are available. The GBYP originally planned to deploy PIT tags for this purpose. However, after purchasing the PIT readers (PITs were stopped just in time) for this, the GBYP was thwarted in the deployment of these tags due to the objection of one CP. The Steering Committee strongly thinks that this is the best approach for estimating reporting rates and use of PIT tags should be a fundamental component of any conventional tagging program. An alternative approach for estimating reporting rates is seeding of tags in farm cages. This approach has been used successful in tagging experiment for SBT in Australia. However, permission for undertaking such experiments has not been obtained so far and costs might be high. Further, such an approach only provides reporting rate estimates for one component of the fishery and is less informative than the potential provided by PIT tagging.

In the development of tagging experiments, the GBYP encountered unexpected problems with methods for deploying large number of tags on juvenile fish with in the Mediterranean and lack of any method for deploying tags on adult fish. The GBYP has been successful in developing approaches for both of these which would appear to be feasible, but further work on this is necessary. In addition, logistical and political issues exist with ability to deploy tags in the southern and more eastern areas of the Mediterranean. As such, for tagging experiments, there is still work required before this approach can be considered fully operational.

The Steering Committee thinks that in the next phase of the GBYP a primary objective should be to refine both the aerial survey and tagging approaches and then conduct an evaluation of the most viable and effective approach utilize in the longer term for providing fishery independent inputs into the stock assessment.

The Steering Committee notes that political constraints may mean that aerial surveys and conventional tagging program may be compromised in their ability to yield fully reliable fishery independent indices, but at least trends might be detectable anyway. It also notes that there have been two recently developed alternative approaches that should also be evaluated. These are close kin genetic tagging and genetic mark-recapture approaches. The advantage of both of these tagging approaches is that neither requires independent estimates of reporting rates. The disadvantage is the large area, the extremely high number of landing ports and probably the high costs associated. As such the Steering Committee would recommend that these two approach also be evaluated for the potential to be applied to Atlantic Bluefin as part of the next stage of the GBYP in addition to the aerial survey and conventional tagging programs that were specified as part of the original GBYP.

Stock Structure and Spatial Dynamics

As noted above the assumption that there is no substantive mixing in the catches between the eastern and western Atlantic bluefin stock is not correct. There is a need to account for such mixing both in assessment and management of these two stock components. Moreover, there is increasing evidence (much of it produced by the GBYP) that of complex spatial dynamics and sub-stock or stock structure within the eastern stock (e.g. none of the bluefin that have been satellite tags in the eastern Atlantic or western Mediterranean have travelled into the eastern Mediterranean), while it is possible that a similar situation exists within the western stock.

There is a need for substantially more information and understanding about both the large scale spatial movements of individuals within the Atlantic and smaller scale movements within the Mediterranean. In particular, there is a paucity of information about the spatial and stock dynamics for the eastern Mediterranean. Sampling and tagging in areas of the eastern Med have been very limited or non-existent at least in some areas.

While uncertainly exists, nevertheless, it would seem that there will be a need for more spatially explicit assessment and management of the bluefin resource. As such the Steering Committee recommends that the next stage of the GBYP included a focus on elaborating the stock structure and spatial dynamics. This should include deployment of electronic tags over as wide an area as possible and the collection of biological samples for

genetic and micro-chemistry analyses focussed on areas from where recent samples do not exist. This will likely require dedicate tagging and sampling cruises in the eastern Mediterranean. It also recommends that all existing relevant data be complied and made available and that integrated and comprehensive statistical modelling of the spatial and stock structure dynamics is undertaken.

Reproductive Biology

Reproductive parameters are an essential component of a stock assessment and in the provision of management advice as estimates of spawning stock biomass and its relative depletion are dependent upon these. For Atlantic Bluefin, substantial uncertainties are still associated with these. There is a surprising disparity between the estimated age of maturity between the eastern and western stock with the estimated for the western stock being unexpectedly higher (the expectation would be if any difference for age of maturity to be lower for the more depleted population). The age of maturity for the eastern stock is based largely on analyses of gonads collected from the Mediterranean. While a high percentage of the younger ages sampled (e.g. four-five) are found to be mature, what is uncertain is whether most of the individuals in these younger ages classes return to the Mediterranean to spawn or whether the mature individuals within these age classes are found in the Mediterranean. There is also evidence from the satellite tagging of large individuals caught in the Moroccan traps suggesting that not all mature individuals migrate to the known spawning areas in the Mediterranean every year and it is not clear if they spawn every year (skipped spawning his has been shown to occur in Southern Bluefin tuna). In addition, the relative spawning contribution of individual of different age/size is unkown. Currently, it is assumed that this is a simply proportional to weight, but increasing evidence from a number of species indicates that larger and older individuals make a disprotionally larger reproductive contribution.

All of these uncertainties about the reproductive biology have important implications for the estimation of the spawning stock within the stock assessments and potentially for the conservation of the relevant components of the stock. As such, the Steering Committee recommends that the next stage of the GBYP includes a component dedicated to the improve understanding of the reproductive biology and estimation of the relevant parameters for the stock assessment. This should include integrated analyses of all existing data (including all published data which are not always easily available) and, where the information is insufficient, a range of plausible hypotheses should be developed consistent with the existing data. It should be noted that there is a synergy between the research on reproductive biology and the proposed work above on spatial dynamics. The later can provide important insights for into the reproductive biology.

Analyses and Modelling

The GBYP is currently supporting the development of revised assessment methods, the development of an operating model and management procedure evaluations of potential alternative decision rules. It is critical that this support continues until these processes have been completed. Once completed, there will be a need, at a reduced level, to ensure that new information (particularly that generated by the GBYP) is integrated into the on-going assessment and management procedure work. In addition to the modelling work, there will be an on-going need for analytical and statistical analyses and support for the results being generated by the GBYP, including integration of data from different components (e.g. estimation of growth).

3. Long-Term and Multi-Year Funding

If the original objectives of the GBYP are achieved and sustained, it is imperative that the GBYP be seen as a long-term commitment. The questions being addressed by the program are complex and multi-year time series of data are required. Some of the objectives require an on-going commitment so that the relevant information is available (e.g. updating of fishery independent indices, age-length keys, etc). According to these needs, the Steering Committee is proposing an extended programme, according to the attached table (**Appendix 1**).

It should be emphasized that the planning and implementation of the current GBYP have been consistently hampered by uncertainties regarding funding levels and the timeframe for availability of funds and within which they needed to be spent. It has been impossible so far to make multi-year commitment for work requiring continuity and long timeframes. Contracting and implementation often needed to be carried out within very short time periods, which limited and constrained the work that could be undertaken, as well as the efficiency of the implementation and the availability of appropriate experts. There is an urgent need to improve the funding situation of the GBYP. The solution needs to include the level of funding, the timeframe in which funds are made available and a firm commitment to a multi-year timeframe. These are essential to ensure that the goals of the program are achievable and that there is sufficient scope to ensure appropriate and efficient planning and implementation of the research and utilization of the funds.

The SCRS and the ICCAT Secretariat presented a proposal to establish a scientific quota for funding the GBYP at the 2012 Commission meeting (see **Appendix 2**) and the same proposal was recommended in 2013. The Steering Committee notes that such a scheme would provide long-term and multi-year funding and allow for a coherent approach for structuring and managing the work and its financing (including the funding and carry-over of funds across financial years). It also constitutes an equitable sharing of the research costs across the fisheries. As such, the Steering Committee recommends that the Commission adopts this approach. Such a scientific quota would appear to be the most feasible and viable approach for the efficient and long-term funding for the required data collection and research needs of the bluefin stock. The funding from the scientific quota would provide a stable, minimum underpinning for the work but would not prevent any additional voluntary contribution by the CPCs or public or private entities.

The proposal presented to the Commission was for a scientific quota of 300 tons. Based on the current prices of bluefin tuna on the international market and the forecasted ones for the coming year, it is clear that 300 tons of scientific quota will not be sufficient in some years for the GBYP to fulfill the Commission´s objectives in terms of research on bluefin tuna within the current specified timeframe. As such, it would likely be necessary to have some additional voluntary contributions from the CPCs participating to the bluefin tuna fishery for reaching the funding level necessary to cover the full range of research activities planned for the GBYP in the years when the Commission will approve a budget higher than the possible funds obtained by the scientific quota.

4. Operation, Administration and Coordination of the Program

In approving of the GBYP, the Commission established an advisory Steering Committee to provide an oversight role to the work. A coordinator was appointed to implement the actual work. The Steering Committee considers that this approach has been effective and should be maintained. However, it considers that there is a need to more fully clarify roles and responsibilities and some modification to the current approach and structure are warranted.

The process for defining and approving the work plan for the program needs to be better defined. Currently, the coordinator in conjunction with advice from Steering Committee drafts a proposed general work plan for the upcoming year for approval by the SCRS and Commission. However, this has to be done before there is any definitive budget for the program and also before some important results from the current years research with implications for future year work are available. Inevitably due to funding constraints and logistic/timing problems, major modifications are required. In addition, the general plan does not include many of the basic design and operational decision required. The Coordinator and Secretariat have sought the advice of the Steering Committee and have acted in accordance with this advice. The Steering Committee considers that it would be worthwhile clarifying the roles and decision making process for the program. It would suggest the following hierarchical structure (considering a stable funding as proposed in the above section):

- The Commission should establish the primary objectives and budget for the Program taking into account recommendations from the SCRS and GBYP Steering Committee. The objectives need to be seen as long term and with an appropriate commitment to funding.
- The SCRS in collaboration with the species group should be responsible for the defining the main work components and their relative priority in order to meet the Commissions objectives.
- The Steering Committee should be responsible for defining on an annual basis the basic activities to be undertaken under each of the work components and basic funding allocations to these.
- The Commission should be responsible for adopting the annual budget when the proposed activities will imply costs over the possible income of the scientific quota, establishing the level of any additional voluntary funding.
- The GBYP Coordinator should be responsible for the detailed scientific implementation of the work program including design and logistics. These need to done in accordance with the administrative and budget rules of ICCAT. He should seek the advice of the Steering Committee on any decisions which potentially have major implications for the work plan or meeting the objectives.
- The Secretariat should be responsible for ensuring that all work and contracts undertaken are in accordance with ICCAT rules and regulations and is also responsible for the financial auditing of the program. The Secretariat should endeavour to provide the required administrative assistance and advice for implementing the program.

Review Process

It is critical for any large scale research program on the scale of the GBYP to be appropriately reviewed. It has been the Steering Committee responsibility to undertake this role providing annual reports to the SCRS. In addition, a mid-term external review was contracted after three and a half years based on the recommendation for such a review from the Steering Committee, the SCRS and the Commission. The Steering Committee would recommend that this same process of annual reviews by the Steering Committee and an external review approximately every four years be incorporated as part of the future GBPY.

Steering Committee

Based on the experience to date, an annual meeting of at least two and half days should be planned for the Steering Committee in order to fulfil its review and planning role (one day for review, one day for planning and a half day for completion of a report). It is important that this meeting is scheduled sufficiently far in advance so that all members of the Steering Committee are able to attend. In addition to the annual meeting, the Steering Committee should be actively engaged with the coordinator in the more general issues and problems that arise in the implementation of the work and an on-going review of the progress. Currently, the Coordinator provides a monthly worksheet summary summarized the progress to data in implementing the workplan. This has proved highly valuable and such monthly reports should be maintained.

Currently the Steering Committee is composed of the SCRS Chair, the two bluefin rapporteurs, the ICCAT Executive Secretary and one external, independent scientist. The Steering Committee recommended in the past that an additional external scientist be added to it in order to provide additional expertise and independent input and perspective in to it works. The Steering Committee still thinks that an additional member would be worthwhile and recommends that this be incorporated into the future GBYP.

Coordination staff

The administrative and logistic work in implementing the work of the GBYP to date has been tremendous. This stems from the complexity and diversity of task being undertaken; the large geographical range and number of political entities in which the work needs to be conducted; and reporting and accounting requirements imposed by funding sources. The Steering Committee acknowledges and thanks the Coordinator and his staff for the huge effort and continual support. The number of staff involved in the coordination role of the program has varied from a single individual to three. The Steering Committee thinks that the workload in implementing and coordination the GBYP is too large for a single individual and that support for the Coordinator is essential. In addition, there is a need for an on-going data validation, liason, evaluation and analysis work as new data are being collected (this is particularly true for tagging activities). Appropriate support staffs are required for this work. The Steering Committee recommends that adequate staff be incorporated into the structure of a future GBYP to assist the coordinator and ensure efficient implementation of the work plan.

In the implementation of the GBYP is that almost all of the work is done under contract. One concern in the larger scale components (e.g. tagging and aerial survey) is that the design, implementation and analyses have been conducted under separated contracts and the implementation has required numerous separate contracts. As such, there is no dedicated single person with the relevant expertise and professional interest and investment implementing and coordinating the work. The Steering Committee thinks that consideration should be given to appointing dedicated coordinators for the larger work components of the GBYP – particularly for the tagging component.

Referenced

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Appendix 1

Table 1. Revised time table for an extended and revised ICCAT GBYP programme, according to the research needs identified by the Steering Committee, the minimum number of years needed for obtain trends for fishery independent data and the calendar adopted by the SCRS for the new Modelling approaches. The first year of the programme (2009) was not included, due to the lack of activity. The fishery independent data shall be collected continuously also in future years, while tagging can be done periodically.

ICCAT GBYP REVISED RESEARCH PROGRAMME												
ACTIVITY	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Coordination												
Data mining and recovery												
Biological studies												
Aerial survey*												
Tagging activities*												
Fishery independent indices*												
Modelling												
ABFT GBYP Conference												
* Aerial survey and tagging activities have been included under the item "Fishery independent indices" for the next years.												

Appendix 2

DRAFT RECOMMENDATION BY ICCAT ESTABLISHING A SCIENTIFIC QUOTA FOR THE FUNDING OF THE ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (GBYP)[2]

SCRS Chair

RECALLING the Commission decision in 2008 to adopt the Atlantic-wide Research Programme for the Bluefin Tuna (GBYP), endorsing the proposal made by the Standing Committee on Research and Statistics (SCRS).

RECALLING the Commission decision in 2009 to initiate the GBYP, endorsing the reviewed and updated SCRS proposal.

RECALLING also the *Resolution by ICCAT Concerning Atlantic Bluefin Tuna Scientific Research on Stock Origin and Mixing* (Res. 08-06).

RECOGNIZING that the research results obtained by GBYP in the initial three phases of the programme, in particular fishery independent data by aerial surveys and/or tagging activities need to be continued for a medium/long period.

FURTHER RECOGNIZING that the Recommendation 11-06 provides the framework to facilitate the practical execution of diverse research activities, including the allowance of some Bluefin tuna mortality with research purposes.

CONSIDERING that the GBYP Research Program is a multiyear program, and that it is essential to conduct research over several consecutive years so as to get the expected results.

FURTHER CONSIDERING that the current funding mechanism of the GBYP Research Program does not guarantee multiyear funding at the level required by the programmed research plan.

RECOGNIZING that the SCRS, in 2012, has investigated alternative funding mechanisms of similar Research Programs, and requests the Commission to adopt a Scientific Quota eastern Atlantic bluefin tuna, to cover the GBYP research activities in 2013 and in following years.

ACKNOWLEDGING the importance of conducting the GBYP research as it was requested by the Commission under a clear economic framework.

TAKING INTO ACCOUNT the provisions of paragraph 27 of the *ICCAT Criteria for the Allocation of Fishing Possibilities* [Ref. 01-25] and considering that the GBYP is not defined as a qualifying participant under the terms of the Criteria;

THE INTERNATIONAL COMMISSION FOR
THE CONSERVATION OF ATLANTIC TUNAS (ICCAT) RECOMMENDS THAT:

1. In order to secure multiyear funding for the GBYP Research activities, a multiannual constant Scientific Quota be set at 300 t per year, for the period 2015-2021. This scientific quota, set over and outside the total quota shared by CPCs, will not affect the quota sharing even in the future.

2. This quota be sold according to the "Management of the Scientific Quota" (paragraph 3), and the funds generated be used to fund the ICCAT GBYP Research activities.

3. The Secretariat shall elaborate the terms of reference for the call for bids. The terms of reference shall clearly state the requirements for the bidder and circulated to all CPCs.
4. Management of the scientific quota:

[2] Updated Recommendation for GBYP Scientific Quota (previously presented to the 2013 Commission Meeting).

4.1. Each year, before 15th January, the ICCAT Secretariat shall announce the public auction of the Scientific Quota, and the deadlines for receiving bids. The interested public and private entities belonging to CPCs that are members of ICCAT Panel 2 shall bid for a fraction or for the entire Scientific Quota. The minimum quantity for submitting partial bids is set at 50 tons.

4.2. The day after the deadline, the ICCAT Secretariat shall communicate to all concerned CPCs the detailed of the interested entities together with the corresponding bids.

4.3. Immediately after the consultation with the concerned CPCs, the ICCAT Secretariat shall communicate to all CPCs the details of the selected bids (bidders and amount bided).

4.4. Each entity awarded for any BFT Scientific quota level shall follow the normal fishing, monitoring and compliance procedures established by ICCAT, and particularly those established within the Multi-annual Recovery Plan for Bluefin Tuna in the Eastern Atlantic and the Mediterranean Sea (ICCAT Rec. 06-07, 07-04, 09-06, 10-04, 12-03, 13-08 and any future amendment) and any other applicable ICCAT and/or domestic rules.

4.5. The selected entities shall make the corresponding payment to ICCAT Secretariat within 15 days after the adjudication.

4.6. These funds shall become automatically available for the activities of the GBYP Research Program.

4.7. The funds available through the Scientific Quota shall provide a basic funding level to GBYP, without preventing any additional voluntary contribution by the CPCs or public or private entities, for ensuring the necessary level of funding for carrying on the GBYP activities decided by the Commission.