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# Proposed use of CCSBT research mortality allowance

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# Summary

Australia requests research mortality allowances (RMA) for four projects on southern bluefin tuna (SBT). Most of the projects aim to avoid SBT mortality and are requesting RMA to cover any incidental mortalities. The RMA amounts requested are relatively small and appropriate for the individual projects. There are four projects requesting RMA that are described in this paper:

1. A 3 t RMA is requested to continue initiatives focused on investigating: (a) the spatial dynamics and mortality rates of SBT utilising electronic tagging techniques; (b) the impacts of noise associated with oil and gas exploration on SBT in the Great Australian Bight. Note that RMA for the electronic tagging project (a) was granted in 2012, is to cover incidental mortalities only and no RMA for this project has been used in recent years.
2. A 1.25 t RMA is requested for a project examining iconic and apex predator species in the Great Australian Bight as part of a larger ecosystem project. This project will involve some research fishing activities that may incidentally capture SBT.
3. An RMA of 1.2 t is requested for a project examining the health of wild southern bluefin tuna.
4. Finally, 0.5 t of RMA is requested for a study examining the post-release survival of SBT from recreational fishing. This small amount of RMA is requested for incidental mortality only.

The overall RMA requested by Australia is small (5.95 t) and is for projects that will enhance our understanding of the biology and ecology of SBT.

# 1 Proposals

## 1) Electronic tagging and effect of seismic exploration

The major aim of this project is to continue previous tagging initiatives aimed at examining spatial dynamics (movements, mixing, residency, regional fidelity and spawning frequency) of wild SBT. This study involves the tagging of SBT across a range of sizes (25–100 kg) with archival and pop-up satellite archival tags throughout the south-eastern Australian region in 2013–14 and 2014–15 as well as conducting controlled exposure experiments investigating the impacts of seismic exploration on SBT behaviour and anatomy.

Tagging efforts to date have been critical in improving our understanding of the spatial dynamics and habitat use of SBT and are fundamental to the ongoing spatial management of the domestic fishery. Use of similar, and newer technology (mini-PATs) in this next phase of research to that used previously will allow us to add to current understanding of the spatial dynamics of juvenile and adult SBT and better understand the spatial dynamics of medium size ranges of SBT (30+ kg), data for which are currently lacking. Continued tagging of larger size classes will allow for better understanding and characterization of spawning migrations, data which is relevant to the parameterisation of spawning stock biomass (SSB) in the operating model. Success of tagging initiatives to date suggests that releases of electronic tags on SBT are feasible and cost effective.

The aim of this project, undertaken by scientists at the Commonwealth Scientific and Industrial Research Organisation, is to continue tagging initiatives. This study is proposing to release in the order of 100-200 tags on SBT ranging in size from 20 kg to 100+ kg. The majority of fish are planned to be tagged in 2013–14, with any tags not deployed in 2013–14, deployed the following year 2014–15. Approval for 2013–14 was applied for under CCSBT-ESC-1208/26 and approved (CCSBT 2012).

A further study will be investigating the impacts of noise associated with oil and gas exploration on SBT in the Great Australian Bight (GAB). The GAB is particularly important for young SBT (1–4 years), with large numbers migrating into the warm, shelf waters each summer to feed on abundant prey species. Scientific aerial surveys for juvenile SBT in the GAB collect data on surface schools of SBT observed from light planes that fly designated line transects according to established and consistent protocols. These data are used to estimate an annual index of relative abundance of 2–4 year olds in the GAB between December and March (Eveson et al. 2012). This index forms one of two relative abundance series used directly as an input data series for the MP used by the CCSBT to set the global TAC (Anon. 2012).

There is concern that activities associated with oil and gas exploration, specifically seismic surveys and noise associated with exploratory drilling activities, may impact on the migration and behaviour of SBT in the GAB. A pilot controlled exposure experiment developed in consultation with industry in Port Lincoln, and done in collaboration with Curtin University and research staff of the Australian Southern Bluefin Tuna Industry Association is proposed. A small number of juvenile SBT in experimental cages will be exposed to a range of levels of seismic noise representative of that used in oil and gas exploration in the GAB and compared with SBT in "control" cages (i.e. not exposed to direct seismic noise). A range of technologies including stomach temperature sensors and acoustic tags will be used to monitor the feeding and swimming behaviour of individuals. Weights and lengths of individuals, along with amount of feed provided will be monitored, to determine if growth rates and feed conversion ratios at the

end of the trial deviated from expected rates of growth. Necropsies of caged fish will be conducted to assess any immediate post-exposure organ damage and also later in the trial to examine rates of recovery.

This proposal extends the RMA request granted in 2012, to cover SBT tagging in 2014–15, as well as SBT included in the proposed controlled exposure experiments scheduled to occur in 2014–15, noting that none of the RMA requested in 2012 (for the years 2012–13 and 2013–14) has been used as yet, due to delays in commencing the research.

## 2) Status, distribution and abundance of iconic species and apex predators in the Great Australian Bight

The project, undertaken by researchers at the South Australian Research and Development Institute, is part of a larger project investigating aspects of the ecosystem of the GAB. The aims of this portion of the project are to provide background information on the relative distributions and abundances of key iconic and apex predator species in the GAB. It has four main tasks including:

- i) assessing the occurrence and distribution of pygmy blue whales and other cetaceans using offshore habitats of the GAB;
- ii) assessing the occurrence and distribution of southern right whales and other cetaceans using inshore habitats of the GAB;
- iii) obtaining abundance indices of key pinniped and seabird populations in the GAB; and
- iv) characterising the spatial and temporal distribution of pelagic sharks and large teleosts in the GAB.

As part of task IV of this study, the project will be sampling with pelagic longlines in the eastern GAB and may therefore catch some SBT. These longlines may result in some SBT mortalities. Therefore, the proposal requests 1.25 t of RMA for 2013–14 based on a maximum estimate of 50 SBT with an average weight of 25 kg each.

## 3) Health assessment of wild southern bluefin tuna

The major aim of this project is to assess the health of wild SBT. As well as traditional health assessments including histology, microbiology, immunology and haematology, this project will aim to further develop and apply new molecular methods, including those for pathogen detection and associated pathology in wild SBT. New molecular methods will be developed which could help to identify specific blood borne biomarkers for various pathogens (disease agents) and ultimately could lead to non lethal health assessment for these animals.

This project, undertaken by researchers from the University of Tasmania, will have significant scientific and ethical benefits. The results of this project will greatly contribute to the current lack of knowledge of the health of wild southern bluefin tuna populations including pathogen prevalence and/or intensities. Identification of suitable health biomarkers could also negate the

need for destructive sampling of animals. This project could therefore have implications for future SBT research.

Most health assessments for SBT have been conducted using ranched animals. Comparatively, the health status of non-ranched wild SBT has received little attention. Some wild SBT sampling has previously been conducted with participation of SBT industry as part of Aquafin Cooperative Research Centre and Fisheries Research and Development Corporation projects. This research was based on frozen and formalin fixed samples that were collected by the industry from tuna schools captured for ranching so for example the samples for pathogen detection (particularly some species of parasites) were limited. All SBT were from GAB, further limiting interpretation of the results. Some of the results from this work with wild tuna have been published (please see Rough et al. 2005, Aiken et al. 2007, Aiken et al. 2008, Aiken et al. 2009) and one manuscript has been recently submitted to a Journal and is currently under consideration for publication (please see Kirchhoff et al. 2013 submitted).

This proposal requests 1.2 t RMA for 2013–14. This request is based on an estimate of 20 SBT with a maximum weight of 60 kg each.

#### 4) Post-release survival of southern bluefin tuna from recreational fishing

Estimates of post-release survival of SBT from the recreational sector are unknown. As a gamefish species, a catch and release ethic is associated with the fishery where a proportion of fishers target SBT purely for sport with most fish released. In addition, management strategies for recreational fishing of SBT are aimed at limiting individual harvest (e.g. bag, possession or boat limits) creating a legislative requirement to release fish.

It is therefore increasingly important to quantify post-release survival of SBT and ensure that survival is maximised by identifying factors that disproportionately contribute to mortality. Communicating an effective code of practice for the release of tuna to the recreational game fishing sector will also be important.

This project, as part of a portfolio of projects carried out within Victoria and Tasmania (as well as FRDC project 2012/022: Development of methods for obtaining national estimates of the recreational catch of SBT), will contribute to quantifying fishing induced mortality of SBT from the recreational sector and provide a mechanism to assess the appropriateness of current recreational management regulations in Australia.

##### Objectives

1. Quantify post-release survival rates for SBT caught by recreational fishing.
2. Determine key factors affecting post release survival of SBT from recreational fishing.
3. Develop a 'Code of practice' identifying strategies that have the potential to minimise sub-lethal impacts and increase post release survival of SBT.

The proposal requests 0.5 t of RMA for 2013–14 to account for any incidental mortality that may occur when tagging the recreationally caught fish.

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