



Proposed use of CCSBT Research Mortality Allowance to facilitate electronic and genetic tagging of SBT as part of Australia's contributions to the CCSBT SRP in 2008-09

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**Prepared for the CCSBT 5th Management Procedure Workshop 2-7 September and the 13th Meeting of the Extended Scientific Committee 8-12 September 2008
Rotorua, New Zealand**

Abstract

A total of 10 tonnes of research mortality allowance is requested to continue initiatives focused on investigating the spatial dynamics, population size, mortality rates and spawning stock size of southern bluefin tuna as part of the CCSBT Scientific Research Program.

Proposal

As part of the CCSBT Scientific Research Program, Australia is proposing to continue a significant tagging initiative in 2008-09 aimed at the examining the spatial dynamics (movements, mixing, residency, regional fidelity and frequency of spawning migrations) of adult southern bluefin tuna (SBT). This study involves the tagging of adult SBT with pop-up satellite archival tags in the Tasman Sea region during the austral winter. Results of the progress to date are provided in Gunn and Patterson (2003); Patterson et al. (2005); Gunn et al. (2006); Evans and Patterson (2007) and Patterson et al (2008). The results provide the first records of inter-oceanic migration (both Pacific-Indian and Indian-Atlantic) and spawning in adult SBT and extensive usage of the Tasman Sea region. Collaborative efforts with NZ resulting in deployments of PSATs in the eastern Tasman Sea support similar demonstrated movements. The success of both projects in tagging significant numbers of large SBT, and reductions in mortalities associated with tagging, suggest that ongoing tag releases of large SBT in the Tasman Sea are feasible and cost effective. Thus, Australia proposes to continue the tagging to address these questions. This study is proposing to release in the order of 20 tags on adult SBT and therefore the CCSBT is requested to allocate 5 tonnes of Research Mortality Allowance for this purpose.

In addition, it is proposed that the resumption of conventional tagging of juvenile SBT, trial release of passive integrated responders (in association with the conventional tagging program) and collection of genetic material for the purposes of a pilot of gene tagging be supported under the CCSBT Scientific Research Program. The aim is to provide for improved estimates of fishing mortality rates and movement as outlined by Everson and Polacheck (2008) and Basson and Davies (2008) and provide additional samples for close-kin spawning stock abundance estimation. Results from conventional tag releases on juvenile SBT have been presented extensively in working papers to the CCSBT-SC (e.g. Polacheck et al. 1998; Eveson and Polacheck 2005 2008; Hearn et al. 2007 Polacheck and Eveson 2007) and also in Polacheck et al. (2002); Pollock et al. (2002); Hearn and Polacheck (2003); Eveson et al (2004); Polacheck et al. (2004); Polacheck et al. (2006). Details of the passive integrated responder project can be referred to in Harley et al. (2008). Details of the close kin genetics project can be referred to in Bravington and Grewe (2007) and Bravington and Grew (2008) and details of the gene-tagging project in Davies et al. (2008). This group of projects is proposing to biopsy, tag and release the equivalent of 5 tonnes of juvenile SBT and so therefore requests 5 tonnes of Research Mortality.

Literature Cited

- Basson, M and and C. Davies 2008. The potential use of indicators as a basis for management advice in the short term. CCSBT-ESC/0809/30.
- Bravington M and Grewe P. 2007. A method for estimating the absolute spawning stock size of SBT, using close-kin genetics. CCSBT-ESC/0709/18.
- Bravington M and Grewe P. 2008. Update on SBT close-kin abundance estimation, 2008. CCSBT-ESC/0809/29.

- Davies C, Moore A, Grewe P and Bradford R. 2008. Report on the potential and feasibility of genetic tagging of SBT. CCSBT-ESC/0809/13.
- Evans K and Patterson T. 2007. Movements and behaviour of large SBT in the Australian region determined using pop-up archival satellite tags: a summary of results for 2006-07. CCSBT-ESC/0709/Info 01
- Eveson JP, Laslett GM, and Polacheck T. 2004. An integrated model for growth incorporating tag-recapture, length-frequency, and direct aging data. Canadian Journal of Fisheries and Aquatic Science 61: 292-306.
- Eveson JP and Polacheck T. 2005. Updated estimates of tag reporting rates for the 1990s southern bluefin tuna tagging experiments. CCSBT-MPTM/0502/05.
- Eveson JP and Polacheck T. 2008. Analysis of tag return data from the CCSBT SRP tagging program - 2008. CCSBT-ESC/0809/22
- Gunn J, Evans K, Patterson T and Carter T. 2006. Examining the movement and residency of adult SBT in the Tasman Sea and on their spawning grounds south of Indonesia using pop-up archival tags. CCSBT-ESC/0609/Info 01.
- Gunn J and Patterson T. 2003. A pilot study to examine the potential for using pop-up satellite transmitting archival tags (PATs) to examine the migrations and behavior of adult Southern Bluefin Tuna (SBT). CCSBT-ESC/0309/Info 2.
- Harley S, Bradford R and Davies C. 2008. Using passive integrated transponder (PIT) technology to improve performance of CCSBT's conventional tagging programme. CCSBT-ESC/0809/14.
- Hearn W, Polacheck T and Stanley S. 2007. Estimates of reporting rate from the Australian surface fishery based on previous tag seeding experiments and tag seeding activities in 2006/2007: CCSBT-ESC/0709/21.
- Hearn WB and Polacheck T. 2003. Estimating long-term growth-rate changes of southern bluefin tuna (*Thunnus maccoyii*) from two periods of tag-return data. Fishery Bulletin 101: 58-74.
- Patterson TA, Evans K, Carter TI and Gunn JS. 2008. Movement and behaviour of large southern bluefin tuna (*Thunnus maccoyii*) in the Australian region determined using pop-up satellite archival tags. Fisheries Oceanography: TBA
- Patterson, T., J. Gunn, K. Evans, T. Carter. 2005. Movement and residency of adult SBT in the Tasman Sea and on their spawning grounds south of Indonesia using pop-up archival tags: a summary of results for 2004. CCSBT-ESC/0409/29.
- Polacheck T and Eveson P. 2007. Updated analyses of tag return data from the CCSBT SRP tagging program. CCSBT-ESC/0709/19
- Polacheck T, Hearn W, Millar C, Whitelaw W and Stanley C. 1998. Updated estimates of mortality rates for juvenile southern bluefin tuna from multi-year tagging of cohorts 1998. CCSBT/SC/9807/20.
- Polacheck T, Eveson JP, and Laslett GM. 2002. Estimation of mortality rates from tagging data for pelagic fisheries: analysis and experimental design. FRDC Final Report 2002/015.
- Polacheck T, Eveson JP, and Laslett GM. 2004. Increase in growth rates of southern bluefintuna (*Thunnus maccoyii*) over four decades: 1960 to 2000. Canadian Journal of Fisheries and Aquatic Science 61: 307-322.
- Polacheck T, Eveson JP, Laslett GM, Pollock KH and Hearn WS. 2006. Integrating catch-at-age and multiyear tagging data: a combined Brownie and Petersen estimation

approach in a fishery context. *Canadian Journal of Fisheries and Aquatic Science* 63: 534-548.

Pollock K, Hearn WS and Polacheck T. 2002. A general model for tagging on multiple component fisheries: an integration of age-dependent reporting rates and mortality estimation. *Environmental and Ecological Statistics* 9: 57-69.

