CSIRO
MARINE RESEARCH

Results of the second year of a pilot program to examine the feasibility of tagging mature SBT in the western Tasman Sea

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Summary

As part of CCSBT SRP conventional tagging efforts, Australia conducted a second pilot longline tagging program in the Western Tasman Sea from June-September 2003, using chartered domestic Australian longliners. In the three months to 9 August 2003, the program tagged and released 210 SBT with conventional tags, and a further 9 SBT with Pop-Up Archival Satellite tags. As was the case in 2002, the vast majority of the tagged fish were large (130-210 cm fork length). Mortality associated with capture (98 fish – 32% mortality) was lower in 2003 than in 2002 (123 fish - 43% mortality). Due to favourable oceanographic conditions, SBT have remained resident in the western Tasman Sea throughout August in 2003 and more tag releases are expected before the end of the season.

The success of the pilot tagging in 2002 and 2003 in tagging significant numbers of large SBT, and reductions in mortalities associated with tagging, suggest that ongoing tag releases of large SBT in the Tasmna Sea are feasible and cost effective. Thus, Australia proposes to continue the tagging program, and requests the Commission allocate 15 tonnes of Research Mortality Allowance (RMA) in 2004 to cover mortalities associated with this program. Australia requests a further 6 tonnes of RMA to cover mortalities associated with archival tagging activities on juveniles SBT (CCSBT-ESC/0309/Info4).

Introduction.

At CCSBT8 the Commission agreed to proceed with a tagging program as part of a Scientific Research Program. The structure agreed for the tagging program reflected the recommendations of a Tagging Program Workshop convened in early October 2001. There are three components to the program:-

1. Tagging 1-4 year olds in the waters off the South and Western Australia, to be managed by the CCSBT Secretariat
2. A pilot program to be conducted by Japan in the longline fishery in the western Indian Ocean,
3. A pilot program to be conducted by Australia in the western Tasman Sea.

This reports covers activities of the third component of the program.

Since the 1960's 133,525 SBT have been tagged as part of scientific tagging programs. The overwhelming majority of these releases have been made by CSIRO, in Western and South Australian coastal waters. Fish tagged have ranged in age from1-4 years old.

The data from 19,832 reported recaptures from these programs, along with recent data collected by archival tags on similar sized fish, have provided a comprehensive description of the spatial dynamics of juvenile fish that use southern Australian coastal waters as summer feeding grounds, and the interactions between surface and longline fisheries targeting these fish. However, we know virtually nothing of the spatial dynamics (movements, mixing rates, residency) of mature fish throughout the broad range of the species in the southern Pacific, Indian and Atlantic Oceans. It is assumed on the basis of our inability to reject the null hypothesis in mitochondrial DNA genetic studies that SBT belong to a single genetic stock. However, over the last two decades there has been a contraction in the spatial extent of the SBT longline fisheries to the current situation where adults are caught only at a few spatially discrete fishing grounds. There are no data to examine whether these represent aggregations of fish that may show fidelity to these grounds, a situation that would require considerable review of current population models for the species.

The primary reasons behind the lack of movement data for adult fish are:

- they do not form large surface schools that would allow surface fishing to efficiently capture and tag large numbers of fish ,
- they tend to aggregate in remote areas, making tagging logistically difficult and expensive,
- their value to commercial fishermen mean that voluntary release of live fish from commercial vessels is not practical, and the purchase of fish to tag (a practise used in many scientific tagging studies) is not viable.
- they are difficult to handle and tag.

The Tasman Sea pilot study was proposed because in the western Tasman Sea each winter large SBT aggregate along frontal systems close to the Australian coast. In this area it is possible to use small domestic longliners to catch mature SBT to deploy tags.

Our objectives in the pilot study were:

1. develop tagging methods suitable for mature fish caught on longlines,
2. determine the incidental mortality associated with long line fishing for tagging operations,
3. tag, mark with strontium chloride and release 250-500 SBT with conventional tags and a small number with pop-up satellite archival tags,
4. determine the feasibility and cost parameters of a scaled-up program.

Tagging logistics and methods.

Four Australian longliners were chartered for the tagging program in 2003.

- The vessels were 18-25 m long;
- used monofilament longline gears,
- combinations of live and dead bait;
- fished primarily at night
- Soak times ranged from 4-12 hours and numbers of hooks ranged from 400-1000.

Live fish were brought on board the vessels via a catch door (in the case of two vessels with the aid of a specialised tagging chute/cradle), the hook was removed, they were then double tagged with CCSBT conventional tags, injected with strontium chloride (an otolith marking agent) and returned to the water within 90 seconds. Nine fish were also tagged with Wildlife Computers Inc. pop-up tags.

The tagging operations went smoothly in all but a few cases, and the introduction of the tagging chute assisted greatly the difficult manoeuvre of bringing sometimes 200+ kg fish on board the small vessels. The fish remained in the tagging chute during tagging, after which the chute was turned around by 180° and fish easily swept out the catch door.

Incidental mortality associated with tagging operations.
In both 2002 and 2003 the vessels used in the program were dedicated to targeting and catch SBT for tagging (ie were not fishing commercially). Thus, we have been able to conduct some basic experiments on the relationship the number of hooks deployed, soak time, catch and mortality levels within the catch. Soak time and the number of hooks deployed in a shot were strongly and positively correlated with mortality levels in SBT (CSIRO Unpublished data). Interestingly, size of fish was also positively correlated with mortality rates. In 2003, soak times and numbers of hooks set were constrained to be lower than in 2002, and over the first three months of the 2003 program 98 fish (32% of all SBT caught) were dead on hauling, or too badly injured to tag. This was an 11% reduction in mortality rates over those achieved in 2002.

In this program, the fish killed were retained on board the vessel, processed as they would be on commercial operations, and sold on the Japanese market as product of the CCSBT. The weight of fish were decremented against the CCSBT Tagging Mortality Allowance. Proceeds from the

sale of these fish over and above the costs associated with handling, freight and sales were retained by the CCSBT Secretariat.

Tag Releases.

To 9 August 2003, 210 fish had been tagged with conventional tags, marked with a strontium chloride injection, and released by the pilot program. Figure 1 provides the length distribution of the fish tagged and the incidental mortalities for 2002 and 2003. The SBT tagged and killed in 2003 were generally smaller on average than in 2002. PAT tags were deployed on nine fish. These were programmed to pop-up at dates staggered between 1 August 2003 and 1 July 2004.

Logistics involved in tagging large SBT from longliners in the western Tasman Sea.

The pilot program demonstrated that reasonably large numbers of mature SBT can be tagged from longliners in the Tasman Sea. As in 2002, our operations were hampered to some extent by bad weather, and although SBT aggregate along thermal fronts of the south east coast of Australia, catch rates vary considerably from shot to shot. Tagging adult SBT from longline catches, even where fishing operations are restricted to short soak times and small numbers of hooks, involves incidental mortality. On the basis of our data and observations over the last two years, we conclude that a mortality level of 30% is likely over the range of conditions experienced.

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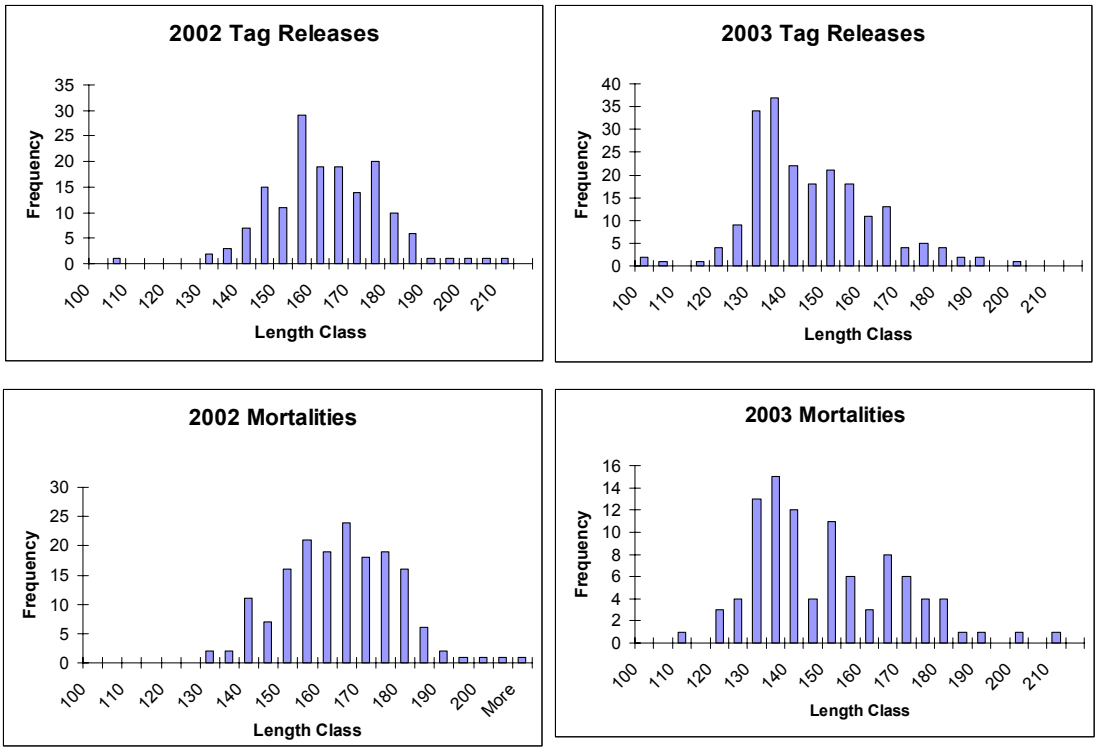

Figure 1. Size frequency of SBT tagged in the western Tasman Sea June-August 2002 and 2003, and SBT killed during tagging operations.