

Collaboration of recreational fishers and scientists results in significant data collection

By Jonah Yick and Naomi Clear



In early September 2022, 17 year old Ryan Gazzola managed to land the fish of his lifetime, a 135.4kg southern bluefin tuna (SBT). What made this catch even more incredible was the fact it had a tag in it. Catching a tagged tuna is already a great achievement, given the odds of recapture are generally low. However, the recapture of this fish was much more significant than Ryan could ever have imagined.

The tuna was tagged and released on the 24 February 1993 off Esperance, WA, as part of a large-scale tagging program run by the CSIRO. It was 52cm long and probably weighed less than 5kg, with an estimated age of 1 year. Fast forward to 3 September 2022, and Ryan recaptured this fish while trolling wide off Gunnamatta Beach, VIC, where it measured 195cm and weighed 134.5kg. This tuna was in the wild for 10783 days or 29.5 years since it was tagged and released, making it a record for the longest time at liberty for a tuna tagged by CSIRO.





The tag which managed to last 29.5 years, with "REWARD CSIRO, HOBART, AUSTRALIA NO. 73198" clearly printed on it. A testament to the CSIRO tagger Anthony deFries, as well as the tag company Hallprint!

You would think that this capture alone is an incredible story, however the events which occurred after the tuna was caught were just as astonishing. A day after recapturing the tuna, Ryan decided to message the hosts of a local Victorian fishing podcast "Wind Against Tide", as he was aware that they were friends with a Tasmanian fisheries scientist. This was after he noticed "CSIRO, HOBART, AUSTRALIA" printed on the tag. Adrian Lieutier and Dave Standing are two fanatical recreational fishers and, after receiving the message early Sunday morning, wasted no time in contacting their Tasmanian associate. Jonah Yick, a fisheries scientist and Scientific Ambassador for the Tuna Champions Program was excited to hear the news of this tag, and promptly called his friend Dr. Peter Grewe, Head Geneticist at the CSIRO Oceans and Atmosphere. Ironically, while these calls were being made, Jonah and his partner Helen O'Neill (who also works at the CSIRO) were packing their trailer boat to fish for SBT that day!

Despite being a Sunday, Dr. Grewe was more than happy to follow up the details of this tag and made another call to his colleague Naomi Clear, a fisheries scientist at CSIRO. The excitement began to build as the tag number was checked in the database and confirmed that this was indeed a very old fish. In addition to the age, this tagged fish was even more significant, as it had received further treatment. It had been injected with a strontium chloride solution at the time it was tagged and released. Strontium chloride is a non-toxic salt that occurs naturally in seawater and results in a "mark" being laid down on the otoliths, or ear bones, of the fish, which is visible as a thin line in the otoliths when they are sectioned (cut in half) and viewed under a powerful electron microscope.



The initial text message sent from Ryan to the Victorian fishing podcast "Wind Against Tide"

The otoliths continued to grow after the fish was tagged and released and if 29 bands are counted after the strontium mark, the scientists know their method for ageing SBT is correct.

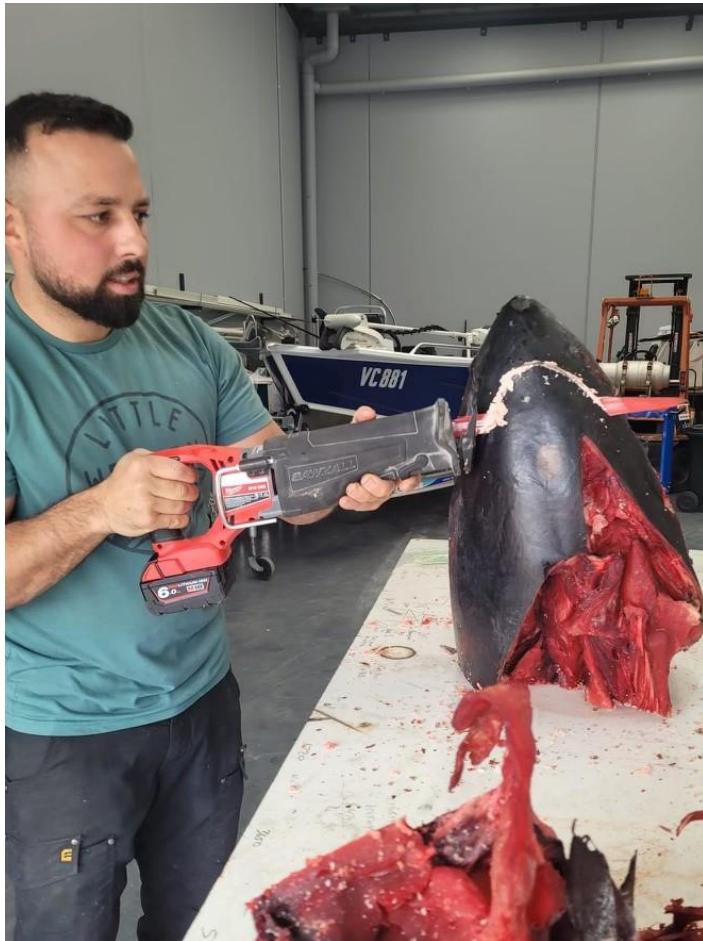
There was now an amazing opportunity to validate the otolith ageing method for this species, which has never been done before in a fish of this age. This information is used to calculate how fast the fish grow, i.e. how big they are at different ages, when they mature, and what their rate of mortality is. The only problem was that after the CSIRO scientists stressed the importance of retaining the head of the tuna, it was found that the head has already been disposed of! Multiple frantic phone calls and texts were made between Jonah, the Wind Against Tide team, the CSIRO scientists, and Ryan to work out whether it was possible to salvage the head. Given it had been disposed of the previous evening at a boat ramp bin, there was still a high chance it would be there. Ryan was unable to make it back to the bin that morning, so instead Adrian decided to drive 40 minutes to attempt to retrieve it. While travelling to the boat ramp, Adrian called Dave who lived closer to the boat ramp, to attempt to find and secure the tuna head first.



The tuna head and the waste collection truck. A few seconds later and the opportunity to validate the age of this record fish would have been lost!

Despite being at a Father's Day brunch, Dave left his family and drove down to the boat ramp. As he arrived, he was shocked to see the waste collection truck parked at the bins! With Adrian still 20 minutes away, Dave had arrived with just seconds to spare. The waste collection staff waited while Dave sifted through the rubbish to determine which head/carcass matched the tuna that Ryan had caught. After further phone calls, Dave was able to find the important tuna, and safely removed it.

Once Adrian arrived, further calls were made to Jonah in Tasmania, who at that point was about to launch his boat to start tuna fishing! Adrian carefully packed the fish frame on ice in an esky bag, then transported it back to a cool room in his factory (he fittingly owns a refrigeration business!). Three days later, Naomi Clear flew to Victoria and met Adrian at his factory to remove the important otoliths. Adrian not only graciously donated his workspace for the dissection but also his power tools! Both otoliths were removed carefully, while Ryan, his friends and family also came to meet and talk to Naomi.



Adrian Lieutier Latrobe Valley Game Fishing Club member and fishing podcast presenter for "Wind Against Tide", removing a portion of the tuna's skull to access the otoliths.



Fisheries Scientist Naomi Clear from CSIRO Oceans and Atmosphere removing the otoliths from the tuna head



The otoliths or ear bones of the tuna

The otoliths of this tuna are now awaiting to be processed and read, which will then reveal whether the strontium chloride marking was successful, and whether validation of the ageing method has been extended to 30 year old fish. This success story highlights the importance and power of recreational fishers (citizen scientists) and fisheries scientists working together. Without the swift action and effective networking between these groups of people, the opportunity to collect important data would have been lost.

The release and recapture points of this tagged fish were both in Australian waters but the fish probably spent time in the Indian Ocean. Information from electronic tags deployed by

CSIRO shows SBT migrate annually across the southern Indian Ocean to feed, while adults migrate from southern foraging areas (such as around SE Australia) into tropical spawning areas south of Indonesia. Together the tagging data and information about age and movements are used in population models to estimate how many SBT there are and determine sustainable catch levels, to ensure this valuable and important resource will continue to improve for many years to come.



Helen O'Neill holding a beautiful juvenile SBT, which was caught in Tasmania the day after Ryan's capture. While this fishing trip was underway, Jonah Yick, CSIRO scientists, and rec fishers in Victoria were collaborating to determine the significance of Ryan's tagged SBT