



# MAFRI Research & Education

## School and gummy sharks in the spotlight

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*MAFRI scientists are validating their methods of ageing school and gummy sharks in a bid to better monitor 'flake' stocks being caught for the local fish and chip market, which is presently valued at \$16 million to fishers.*

School and gummy sharks are target species of Australia's Southern Shark Fishery, which operates in coastal waters off Victoria, Tasmania and South Australia.

The study's principal investigator, Terry Walker, said "This school and gummy shark research is important to the stock assessments, which underpin the management of the fishery in a sustainable manner".

To manage a fishery sustainably, it is necessary to know the age structure of the stocks being targeted. In scale fish, the growth rings on ear bones are used to determine age. These rings result from differential growth patterns over one year. Sharks, however, do not possess ear bones. Their skeletons are composed of cartilage, similar to the material that provides the structure of the human ear.

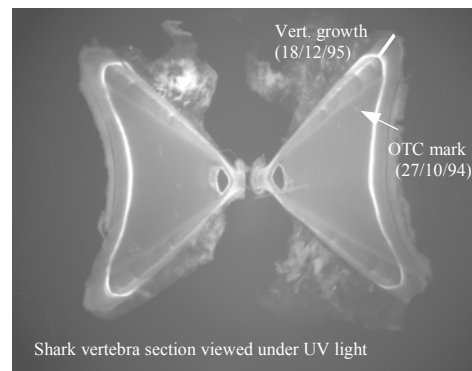
Previous studies indicated that the structure of the cartilaginous material laid down in the vertebrae of sharks varied with season. During winter, cartilage is deposited, which has a high mineral concentration. In contrast the cartilage laid down over summer is characterised by a lower mineral content. This differential mineral deposition provides the annual periodicity required for ageing sharks. To view these zones, scientists prepare thin slices of the vertebrae, which are specially stained to highlight these highly mineralised zones. The vertebrae sections and whole vertebrae are then viewed under a microscope and the number of zones counted by an experienced reader.

To validate this ageing technique MAFRI's scientists undertook a tag and release study of gummy and school sharks. Sharks, with the help of commercial fishers, were captured, tagged, and injected with a fluorescent dye before being released. The dye is incorporated into the structure of vertebrae at the time of tagging.

When tagged sharks were subsequently recaptured, the number of annual growth zones formed outside the dye mark in the vertebrae was compared with the number of years the shark was known to be at liberty (see below).

### OTC marked shark vertebrae for age validation purposes

(Gummy Shark: Male, E0942, 1.1 yrs at liberty, TL at release 1060 mm, TL at recapture 1190 mm)



Terry Walker said "Of more than 10,000 school and gummy sharks tagged and released by MAFRI scientists during the 1990s; 2790 were injected with the special dye. The results of the study confirmed that the bands were deposited annually."

Commercial fishermen again helped MAFRI scientists by reporting recaptured tagged sharks and forwarding part of their vertebral columns to the researchers.

Vertebrae were recovered from 253 sharks and of 94 sharks that had spent at least one year at liberty, vertebrae from 86 could be 'read'.



“There are important economic benefits in rebuilding numbers of school sharks and this research provides some of the necessary information to do that,” Mr Walker said.

“It’s about managing catches in a sustainable way, so the fishery can continue operating to provide highly favoured food to the Australian domestic market.”

Mr Walker is continuing to encourage fishers to return vertebrae from tagged sharks.

“We expect the vertebrae from marked, tagged sharks will continue to be returned over the next 10 years for gummy sharks and possibly 40 years for school sharks,” Mr Walker said.

“The data gained from these sharks will be particularly important, given the long periods the sharks will have been at liberty.”

The results of this study will be used by Australian Fisheries Management Authority (AFMA) to manage sustainably the stocks of school and gummy shark in Southern Australian waters.

This project was funded by AFMA and the Fisheries Research and Development Corporation.

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