

# Examining spearfisher datasets for evidence of change in coastal fishes

The Underwater Skindivers & Fishermen's Association (USFA, NSW) and Southern Freedivers (SFD, Vic) along with the Australian Underwater Federation (AUF) partnered with researchers at CSIRO's Climate Adaptation Flagship and James Cook University to examine historic spearfisher competition records to better understand change in coastal waters over recent decades.

The USFA and SFD worked closely with the research team, some of whom are also spearfishers, to ensure the project was sensitive to spearfisher concerns and that spearfishers retain ownership of the data. All data, including a database of records entered, are being returned to spearfishers for long-term storage.

Key results are summarised below

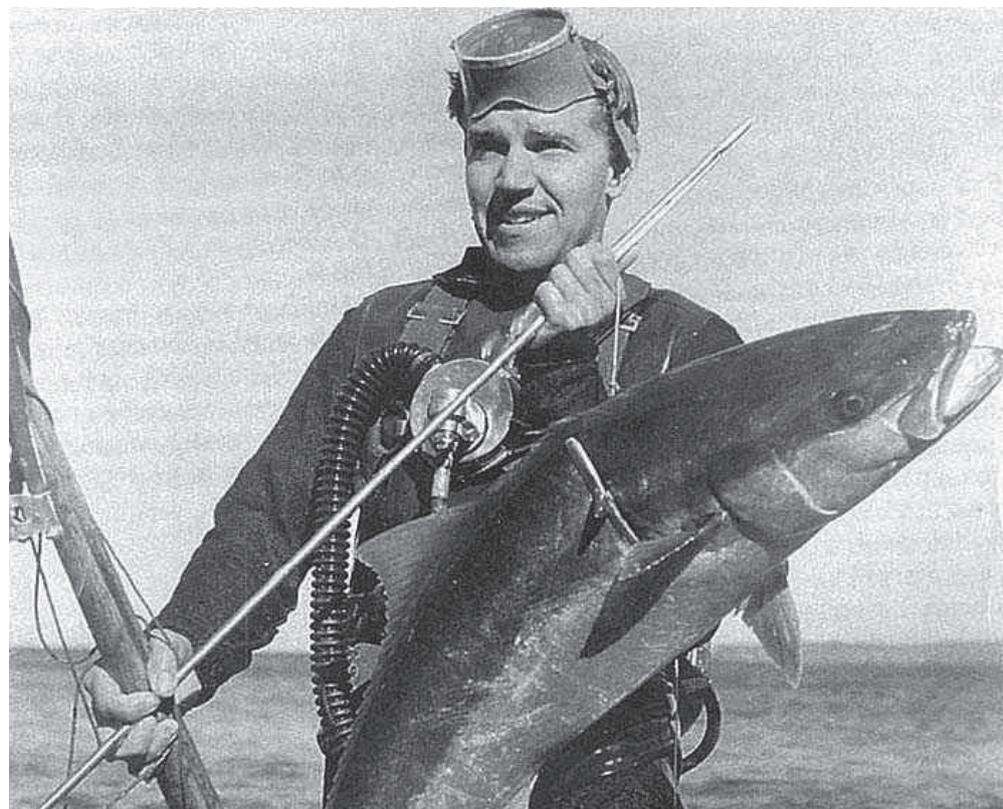
## Member survey

About 150 spearfishers responded to the survey, providing a record of diver experience, interactions with management, and their observations regarding change in their fishery and potential impacts on the marine environment. Most respondents:

- ◆ Were keen to see their knowledge and data valued and used by scientists and managers.
- ◆ Agreed that spearfishers, scientists and resource managers have common goals concerning the management and conservation of marine resources.
- ◆ Felt scientists and managers don't have a good understanding of spearfishers and spearfishing and few have high levels of trust in resource managers to consider the concerns of spearfishers in decision-making.
- ◆ Believe there has been substantial change to earth's climate over the past 25 years and that humans are partially or largely responsible for those changes.
- ◆ Are moderately, or very concerned about the potential negative effects of climate change on the fisheries resources that they use.
- ◆ Believe it to be necessary to take steps to reduce greenhouse gas emissions that are thought to cause climate change.

## Historical data

- ◆ The earliest competition score sheets located were from NSW in 1961.
- ◆ Consistent data were available from the late 1960s until 2011.
- ◆ >90% of Victorian data and >75% of NSW data located have been digitised.
- ◆ Data were entered for 267 Victorian and 335 NSW competitions from 43 and 50 dive sites respectively. Competitions ranged from Coffs Harbour in NSW to near Portland in western Victoria.
- ◆ These represent >19,000 'diver days', nearly 130,000 individual fish and >150 species.
- ◆ These data are the most comprehensive, multi-decadal digitised records based on recreational fisher activities in Australian waters.



# Change in fish communities

- ◆ Analyses demonstrate a ‘tropicalisation’ effect (increasing percentage of tropical species) in NSW waters. Victorian data are undergoing further analyses for subtle changes.
- ◆ Changes in trophic (feeding) level were also detected in each state.
- ◆ Data show some species appearing to extend their ranges southwards, while others appear to have increased in abundance within the southern limits of their previously recorded range.
- ◆ These data demonstrate the complexity of changes occurring in natural communities, providing new understanding of ranges, range shifts, and movement.



## > Next steps

All hard copy records are being returned to clubs along with a database of all digitised records for each state. Clubs can choose to continue entering data directly to the database, or download these data into their own systems.

Scientists and spearfisher representatives are working on a range of scientific papers discussing these results and promoting the project.



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FOR MORE INFORMATION, DOWNLOAD THE FULL REPORT FROM <https://publications.csiro.au/rpr/pub?pid=csiro:EP138831> OR CONTACT THE FOLLOWING RESEARCHERS:

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Photos: provided by David Welch, Garry Russ and the AUF