

Archival tagging of the starfish *Coscinasterias muricata* with Star-Oddi Temperature/Depth tags in Fiordland, New Zealand.

Miles Lamare

Tracy Channon

Department of Marine Science, University of Otago, Dunedin, NEW ZEALAND

Chris Cornelisen

Cawthron Institute, Nelson, NEW ZEALAND

Fiordland, New Zealand is one of the wettest locations in the world, receiving over 7 m of rainfall per annum, with rainfall exceeding 350 mm over a 24 h period on occasions. One of the fiords, Doubtful Sound (Fig. 1), receives an additional input of freshwater ($300\text{-}400\text{ m}^3\text{ s}^{-1}$) from a hydroelectric power station. The result of the climate is that the fiords in the region have a semi-permanent freshwater layer overlying the seawater. This layer is typically 1-2 m in depth but can exceed 12 m during high rainfall. Lowered salinities are harmful to marine species, so the freshwater layer largely controls the spatial distribution of marine species living in the fiord. The effects of freshwater input from the power station also requires understanding to minimise any detrimental effects of this activity.

One of the most important species inhabiting the fiords is the eleven-arm starfish *Coscinasterias muricata* (Fig. 2), which is a voracious predator and can control the distribution of other important organisms such as shellfish. We are interested in the starfish's feeding ecology and movement, and specifically how the freshwater layer influences their behaviour. An integral part of this investigation includes tagging the starfish with Star-Oddi temperature/depth/time DST-milli tags. The tags will provide information on how the starfish's behaviour is altered over time scales of weeks as a function of changes in the freshwater depth. Temperatures recorded by the starfish will indicate the salinity that they experience as there is a very close relationship between temperature and salinity in the fiords.

We have already completed successful tagging trials on the starfish and will be expanding the research in the coming months to explore starfish behaviour over longer time periods and at different locations in the fiord. Star-Oddi tags are proving to be an exciting and valuable research tool, and as far as we know, are allowing us to conduct the first known archival tagging of predatory starfish for the purpose of understanding their behaviours.

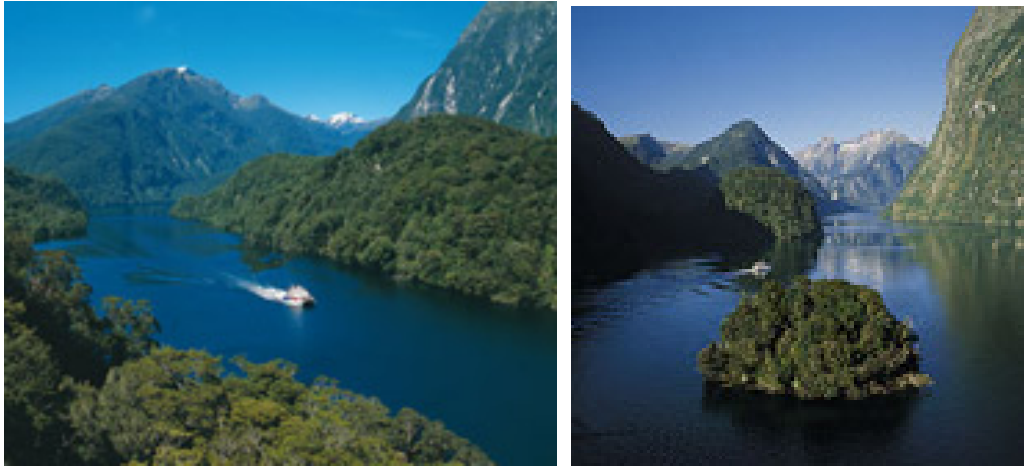


Fig. 1. Doubtful Sound, Fiordland where a permanent freshwater layer occurs on the sea surface. The sunny days shown in the photographs are a rarity, as the area is one of the wettest locations on the planet



Fig. 2. *Coscinasterias muricata* in Doubtful Sound tagged with a Star-Oddi temperature/depth/time DST-milli tag. The starfish are approximately 15 to 20 cm in size.