

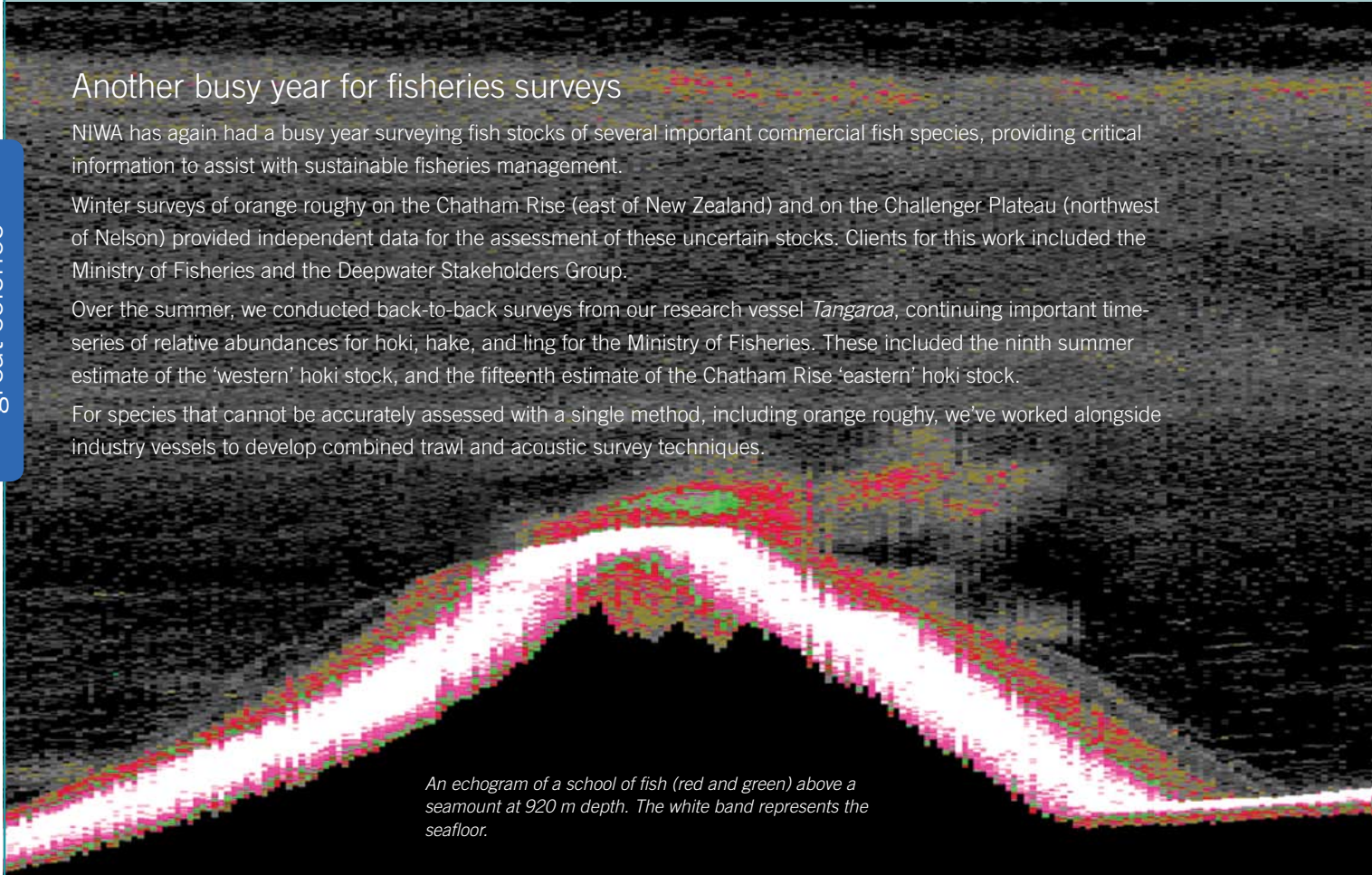
## Another busy year for fisheries surveys

NIWA has again had a busy year surveying fish stocks of several important commercial fish species, providing critical information to assist with sustainable fisheries management.

Winter surveys of orange roughy on the Chatham Rise (east of New Zealand) and on the Challenger Plateau (northwest of Nelson) provided independent data for the assessment of these uncertain stocks. Clients for this work included the Ministry of Fisheries and the Deepwater Stakeholders Group.

Over the summer, we conducted back-to-back surveys from our research vessel *Tangaroa*, continuing important time-series of relative abundances for hoki, hake, and ling for the Ministry of Fisheries. These included the ninth summer estimate of the 'western' hoki stock, and the fifteenth estimate of the Chatham Rise 'eastern' hoki stock.

For species that cannot be accurately assessed with a single method, including orange roughy, we've worked alongside industry vessels to develop combined trawl and acoustic survey techniques.



*An echogram of a school of fish (red and green) above a seamount at 920 m depth. The white band represents the seafloor.*

## Sounding out Cook Strait hoki

The results of NIWA's acoustic surveys are vital to establish the status of the Cook Strait hoki fishery, in one of the two main hoki spawning grounds. Hoki form New Zealand's largest fishery, but quotas have been greatly reduced in recent years to protect declining stocks.

This year, we completed the twelfth in a time-series of acoustic estimates of hoki abundance in Cook Strait for the Ministry of Fisheries.

The six-week survey involved nine 'snapshots' of the main Cook Strait spawning ground, using sophisticated echosounding equipment on our research vessel *Kaharoa*.

Catch rates in the Cook Strait fishery have not declined as they have in other areas, but our estimates of hoki abundance suggest a different picture. In 2005, we estimated that there were fewer hoki in Cook Strait than any time since acoustic surveys began in 1991, down 40% on the previous estimate in 2003.



*NIWA fisheries scientist Richard O'Driscoll explains survey procedures to MFish Chief Executive John Glaister onboard RV Kaharoa.*



## Keeping a watchful eye on toheroa

NIWA, in conjunction with local iwi, has been active in monitoring toheroa populations in their last remaining strongholds, in Northland and Southland, for the Ministry of Fisheries. Population declines of toheroa in the 1960s resulted in the prohibition of harvesting in 1981, except for Māori customary take and occasional one-day recreational seasons.

Our surveys at Oreti and Bluecliffs Beaches in Southland have shown a steady decline of toheroa over the last 20 years, particularly at Bluecliffs, with numbers only a small fraction of those in the 1960s. Populations fluctuate greatly because of variable recruitment and mass mortality events, but the sustained low abundance is puzzling.

Studies of beach profile and substrate at Bluecliffs, commissioned by Meridian Energy, pinpointed erosion of fine sand substrates as the likeliest cause of declining toheroa populations there.

Further north, densities of toheroa on Ninety Mile Beach remain low.



## Untangling Antarctic ecosystems

NIWA scientists are working out the relationships among marine organisms in the Ross Sea shelf and slope ecosystems. Our aim is to provide robust scientific advice on the likely response of these unique ecosystems to impacts such as climate change and fishing, particularly for the toothfish fishery.

This year, we constructed a preliminary food web that shows the feeding relationships among all the Ross Sea organisms, from phytoplankton and bacteria to penguins and whales. We are now working out how much carbon flows through each part of the food web to get a better idea of inter-relationships and abundances.

Development of the food web model is continuing under a four-year Foundation for Research, Science & Technology-funded project. We are also analysing the ratio of carbon and nitrogen isotopes in samples of fish collected by industry vessels this season, funded by the Ministry of Fisheries. This helps to show where a particular species sits in the food chain, complementing ongoing feeding studies.