



After the marine reserve was fenced off, the return of snapper and other fish reduced overgrazing of kelp forests by prey species such as sea urchins. Leigh Marine Laboratory

Marine reserves bring NZ waters back to life

One of the world's first marine reserves – Goat Island Reserve at the northern end of the Hauraki Gulf of New Zealand – turned 30 this year, and is proving the value of the marine reserve system in maintaining biodiversity.

The Hauraki Gulf area has always been a mecca for fishermen, as the combination of shelter and warm, clear water brought down by the Auckland current and unique topography supports a diversity of species. But its proximity to Auckland – less than two hours drive from the city – inevitably led to overfishing.

The reserve was the brainchild of Bill Ballantine, who first proposed a 'no catch' area in 1964 when he became director of Auckland University's Leigh Marine Laboratory, which overlooks the island.

Throughout the 1960s the laboratory recorded a drastic decline in the numbers and size of crayfish, snapper and other predators while prey, such as the sea urchin, mushroomed. The kelp forests that had once supported abundant marine life were grazed to stubble, leaving underwater deserts in their place.

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Research evidence from the laboratory was crucial in supporting Ballantine's bid to fence off five square kilometres of reef habitat, which in June 1977 became Goat Island – the first of 31 marine reserves since established in New Zealand.

The Goat Island results have been astonishing. Each year 300 000 visitors can testify to the startling abundance of marine life in the reserve's rock pools, sponge gardens, mussel banks, urchin barrens, kelp forests, reefs and underwater caves, which teem with crayfish, snapper, blue maomao, red moki, silver drummer, marblefish, eels and stingrays. Kids can once again spend hours paddling in the shallows, spotting shrimp and popping bladderweed.

The fishermen's mecca has also become a paradise for divers, and glass-bottomed

boats make the island's extraordinary marine life and underwater caves accessible to all.

'It's pretty amazing,' says Professor John Montgomery, current director of Leigh Marine Laboratory. 'The restoration of fish stocks occurred very quickly and, as they took out the sea urchins, the kelp forest recovered.'

'The reserve has had a huge beneficial impact in terms of biodiversity, ecotourism, research and education, but the question is where to from here?'

Montgomery thinks marine reserves could become much more than 'wet libraries' and points to the wider potential of marine research.

'A lot of original neuroscience was done with marine animals and that's being extended to the field of sensory ecology. We've developed drugs based on marine toxins and new technologies around remote sensing and tagging.'

'We've even used sound technology [a ghetto-blast in a waterproof container playing a sea-urchin "dawn chorus"] to double the rate of larval settlement on reefs!'

But most of Leigh Marine Laboratory's fisheries research revolves around stock assessment of commercial species and Montgomery says there are huge gaps in our understanding of the life histories of important species. 'In many cases we don't know where juvenile animals go – we don't even know where kingfish spawn.'

Similarly, the researchers don't fully understand how the reserve impacts on surrounding areas.

'We can see the density and recovery of the normal size range in the reserve, but outside, fish are taken once they mature,' says Montgomery.

'Minimum levels are set to allow fish to spawn once, but first year spawners are very ineffective – they need practise! The worry is that, over time, fishing pressure will cause animals to mature earlier and be smaller. Reserves may act as a mitigation of that evolutionary effect.'

'We live on planet Ocean rather than planet Earth. New Zealand has a large exclusive economic zone (EEZ) and a strong tradition of marine biology. We should use science to husband those resources and exploit them sustainably.'

● Marilyn Head

More information:
New Zealand 'No-Take' Marine Reserves:
www.marine-reserves.org.nz/