

Editorial

NIWA's aquatic biodiversity and biosecurity research

New Zealand's seas are rich in numbers of species of plants and animals, our fresh waters much less so. The ecosystems and the diversity in these environments are valued and vulnerable to many threats. Some of these threats are natural (floods, eruptions, undersea mudslides) and, while we need to understand their effects biodiversity, we wouldn't try to do anything about them. On the other hand, there are myriad human-induced threats to biodiversity and, as we begin to better understand their nature and extent, we try to manage the worst of them – those that significantly reduce populations, change the species mix or reduce the number of species.

Before we can manage impacts on aquatic biodiversity we need to understand who's who in the plant and animal communities we are concerned about. And we need to understand such things as the natural variability of populations, of their numbers and species mix, their contributions to ecosystem function, as well as the threats and stressors and how the aquatic species are responding to them.

In some instances resource managers will be able to reduce or remove the risks or reverse declines by stopping the threats at source (for example, improving sewage treatment), by changing behaviours (e.g., using selective fishing techniques), or by closing off areas. However, even a network of protected areas may not be safe from one of the largest risks to our aquatic flora and fauna – the impact of invasive non-indigenous species, especially along our coastline and in our lakes and rivers. Perhaps the greatest threat is our ignorance of these species and how they compete with native species.

To effectively avoid this threat requires significant scientific expertise in marine and freshwater taxonomy, and long-term fundamental and targeted research to ensure that we steadily improve our understanding of both our native aquatic biodiversity and the alien invaders that threaten it. NIWA research is advancing that critical knowledge.

For many areas, we don't know is what is out there

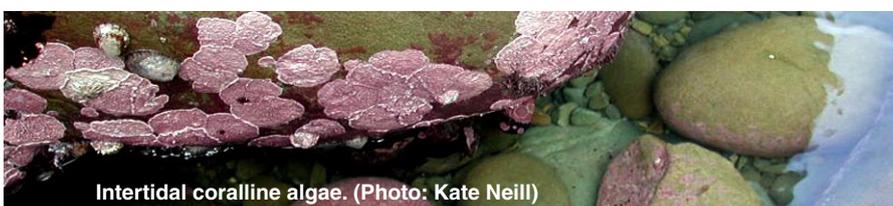
and what damage it may be doing to our aquatic environments. A recent NIWA survey of major aquarium plant growers and traders found that there were at least 65 freshwater plant species being imported for aquariums and ponds. All of these are introduced and have the potential to become major pests.

Although there are relatively few marine aquarium keepers in New Zealand, more than 117 species of fish and 69 species of invertebrates are approved for importation under the current Import Health Standard for aquarium species. We don't know how many of these are already in New Zealand, whether they could survive in local environments, or what consequences they might have for our indigenous flora and fauna, but there is often only a short distance from the aquarium to the nearest stream, so for many of these species it is only a matter of time before they are given the opportunity to test our local environments and how well they might compete with our natives.

We know that already there are at least 150 non-indigenous marine species in our coastal waters and others arriving at a rate of at least 1 every 9 months, most of them on the hulls of visiting ships. The potential for economic and environmental damage is very real. What would we find if we search systematically for alien species? NIWA is currently working with the Ministry of Fisheries to develop a national surveillance network to detect marine pest incursions into New Zealand waters as soon as possible after arrival. The network will cover areas of our coast most at risk, including ports, marine reserves and areas designated for aquaculture. This research is yielding new and interesting information but the results are not yet ready for publication so will not be covered in this special issue of *Water & Atmosphere*.

Given the size of our EEZ and the significance of our freshwater ecosystems, there is not a large amount of research under way. However, the core of New Zealand's marine and freshwater biodiversity and biosecurity research is being carried out by NIWA scientists, often in conjunction with experts from local

Don Robertson
NIWA General Manager
Biodiversity, Biosecurity and
Information Systems



Intertidal coralline algae. (Photo: Kate Neill)