MARINE BIOSECURITY PORTHOLE: https://www.marinebiosecurity.org.nz/protecting-our-waters-scientists-plan-to-use-novel-technology-to-help-detect-marine-pests-2/

Scientists plan to use novel technology to help detect marine pests

Some of New Zealand's international marine biosecurity partners recently visited the country to workshop the development of exciting new molecular (DNA/RNA) technologies that will enhance our ability to rapidly detect marine pests. The expert group spent two days with New Zealand scientists in Nelson, sharing their knowledge of molecular tools that will strengthen invasive species surveillance in the marine environment.

As an island nation, New Zealand's native coastal ecosystems and our marine-based industries are particularly vulnerable to impacts from foreign invasive species, many of which reach our shores with international shipping.

We're a global leader in terms of marine biosecurity management, taking a proactive approach toward minimising the risks posed by invasive marine species. For example, the Ministry for Primary Industries (MPI), who leads the national biosecurity system, funds a nationwide active marine surveillance programme. There are also several regional initiatives funded by local governments.

Cawthron biosecurity team leader Dr Oliver Floerl explained how new technology might complement current practise. "At the moment, marine surveillance involves the use of divers, traps or seabed sleds to find high-risk target species."

"While these methods have proven to be effective, they have limitations" in particular the resources required to cover large search areas and the diversity of species that can be targeted at any one time.

"Several recent molecular techniques look set to improve our current surveillance toolbox."• said Dr Floerl.

These molecular technologies work by recognising DNA or RNA signatures in water or other environmental samples, and can be generally described as 'high-throughput sequencing (HTS) metabarcoding'. However, before this technology can effectively complement existing surveillance methods, experts need to overcome

a number of barriers.

Cawthron marine phylogeneticist and workshop Chair Dr Xavier Pochon said, â€œThe HTS approaches have the potential to revolutionise surveillance; but first we must optimise protocols for effective sample collection, DNA/RNA extraction and analysis, and the development and sharing of reliable international DNA/RNA sequence libraries.

"This week's workshop is addressing these barriers by bringing together leading scientists from Canada, USA, Australia, and New Zealand," said Dr Pochon.

The workshop is funded through the Ministry of Business, Innovation and Employment's (MBIE) Catalyst Fund (awarded to NIWA, Cawthron Institute and the University of Waikato) whose objective is to leverage international collaborations for New Zealand's benefit.

Dr Graeme Inglis, Principal Scientist at NIWA and Science Leader of the MBIE-funded project, is pleased by the outcomes from the workshop. "All of the partner nations share similar biosecurity challenges, often from the same pest species. It is important that we coordinate our research efforts and information exchange internationally so that more efficient tools, like HTS, can be applied to marine surveillance sooner," said Dr Inglis.

MPI's Team Manager for Aquatic & Environment Health (Biosecurity Surveillance & Incursion Investigation) Dr Michael Taylor said, "Ultimately the work of this group will lead to improved detection and monitoring of unwanted marine pests, giving us better opportunities for control or eradication."

This MBIE-funded programme has received additional funding from the Canadian and Australian governments, NIWA, Cawthron Institute, the biotech companies QiaGen and Illumina, and the Canadian Journal Genome.

The outcomes of the workshop and experiments will be published in international scientific journals, and reviewed and optimised during a follow-up meeting at the 10th International Conference on Marine Bioinvasions to be held in Argentina in October 2018.

Hear more about the potential of molecular technologies for marine pest surveillance in this short video.