Partners Newsletter

Keeping you informed

Winter 2018

New technologies for marine biosecurity

New science and technology was on display at the TOS Marine Biosecurity Partnership meeting in July. Twice as many attended as previously, taking advantage of the extended full-day format.

Locally available tools included a wave powered hull cleaner for moored boats invented in Marlborough, a remotely controlled cleaner that crawls around hulls, and a ROV (remotely operated submersible), also built in Marlborough.

Science presentations highlighted upgrades to existing programmes. These included the six-monthly port surveillance, and the TOS diver hull inspections, which now reach around 1,000 recreational boats annually in the region.

DNA analyses featured in many talks. Trials are proceeding on applying this to detection of the Mediterranean fanworm.

Current NIWA and Cawthron research include: predictive models for marine pests, pathway risks, bilge water threat evaluation, eDNA/RNA methods for surveillance and compliance monitoring, international review of incursion response programmes and tools, new technologies for control and eradication, and integrating Mātauranga Māori into pest assessment and management.

MBIE funded research included: risk assessment (full article in this newsletter), impacts on biodiversity and ecosystem function, forecasting future range distributions, evaluating the costs and benefits of intervention, accelerated development of molecular tools and capability for marine surveillance, innovative technologies for control and eradication, and methods for evaluating impacts of invasive species on indigenous cultures and society.

Cawthron reported on its shellfish aquaculture research platform (until 2024) including: predictors of biofouling, impacts and mitigation, pathway management tools, surveillance; and its aquatic health and disease research (until 2022); stock health assessment and diagnostic tools for disease (shellfish and salmon), aquaculture-environment interactions, risk assessment, and novel surveillance tools, and management and decision-support.

All presentations can be found at: TOS/NIWA/Cawthron Joint Workshop

Marine biosecurity surveillance

Mike Taylor, Biosecurity NZ

Surveillance is an essential element of biosecurity defences. Its functions are: early detection, evidence demonstrating areas are free of risk organisms, identifying new threats, describing pest distribution in New Zealand, and measuring the success of interventions.

Targeted surveillance undertaken by NIWA is funded by Biosecurity NZ. There are two parts: baseline surveys and long-term monitoring. The marine high-risk site surveillance surveys the 11 highest risk ports twice a year, including Nelson and Picton. There are five days sampling at each location. Scientists record primary and secondary target species and any unusual finds at each location. Finds are sent to the Marine Invasives Taxonomic Service (MITS) for identification.

Targeted surveillance uses a range of techniques including benthic sleds, divers, shore searches, and traps for crabs and starfish. These are needed to cover the full range of risk organisms. Primary targets are species not yet known in New Zealand: North Pacific seastar, European shore crab, aquarium *Caulerpa*, and Asian clam. The secondary target species are troublesome organisms already in New Zealand: Australian droplet tunicate, Asian date mussel, Mediterranean fanworm and the clubbed tunicate. The programme is also designed to detect new to New Zealand organisms.

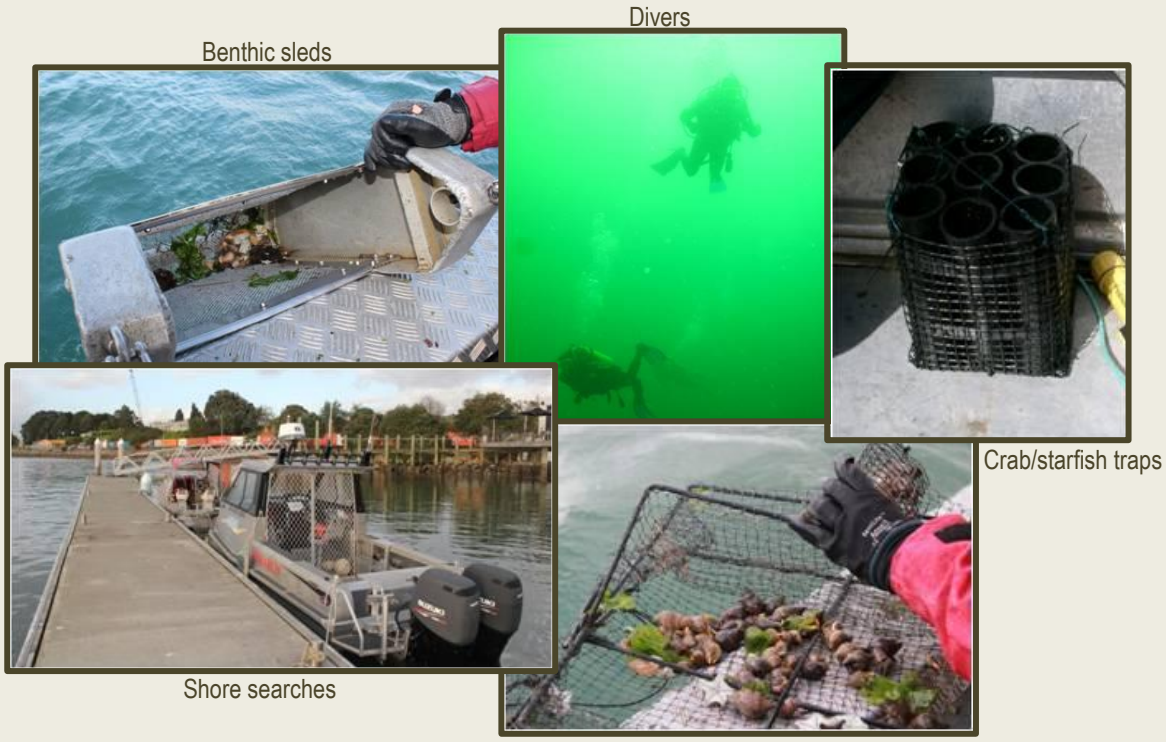
MITS is a taxonomic clearing house accessing national and international expertise. It keeps a specimen reference library in Wellington and an associated database.

When a risk is identified an MPI response team swings in to action. They assess the problem and take any urgent measures immediately and make recommendations for longer term actions if a biosecurity risk remains. A decision is made on whether to mount a response and who to involve. Biosecurity NZ holds funds and delegations to act straight away. This includes diseases as well as invasive organisms. Our isolation in New Zealand, and effective biosecurity system, means that many diseases found elsewhere are absent here. This makes aquaculture more viable, but also means our species can be naive and highly impacted by new diseases.

All this has to be reported internationally to our trading partners. We have reciprocal obligations to inform others of emerging risks associated with our products and environment.

If you identify a risk organism or potential disease do not hesitate to ring 0800 80 99 66 to report it. You are an essential part of New Zealand's biosecurity surveillance system.

Targeted surveillance



MPI Exotic Pest and Disease Hotline 0800 80 99 66

Prioritising marine pests by traits


Sabella spallanzanii

What makes new marine species a problem and which ones should we respond to as a priority? (Leigh Tait)

These are the questions a new study is seeking to resolve.

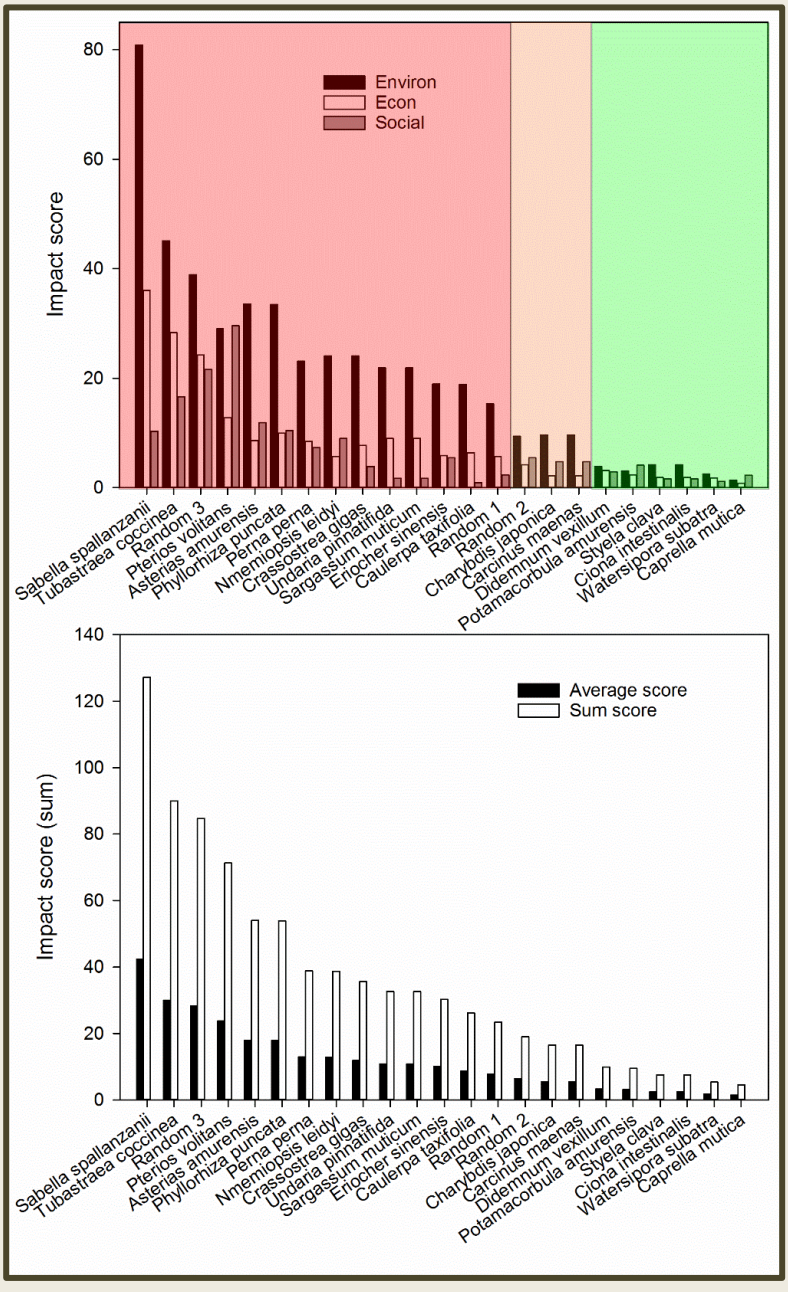
At the Partnership meeting in July, Leigh Tait of NIWA said "The current situation in marine biosecurity means that we concentrate our detection methods on several high-risk organisms, although across multiple agencies we do a pretty good job of picking up many interlopers big and small. There is, however, an immense global pool of potential invaders and a high proportion of newly discovered invasive species have no prior history of invasion, making predictions difficult. So, what do we need in a framework to manage new arrivals? For a framework to be effective at the management of an exotic arrival it must: use traits that are easily identified, allow comparisons against known species and enable quick assessments."

He explained "Five traits of marine organisms were selected as important in determining the potential level of impact: trophic feeding level, habit, toxicity, size, and fecundity. These five traits were extracted from a greater number of traits as being the most important in decisions about impacts. Such traits also had to be relatively easily identified based on typical representatives of taxonomic groups. Experts were asked to evaluate effects of hypothetical pest species on environmental, economic, social and cultural values. There were 77 responses, from eight countries, and five respondents had 20+ years' experience (15 with 10-20 years). The experts had to make a decision on which of two species has the greater impacts to the three different value sets. Each trait had four levels randomly generated for each hypothetical species."

Applying the results to known species showed the Mediterranean fanworm, *Sabella spallanzanii*, scored highest as a potential invader while the clubbed tunicate, *Styela clava*, had a lower impact rating (see the graph below). However, we stress that further validation and calibration of the framework is required, including a better understanding of the biases associated with decision making.


Marine ecosystem

Photos: Leigh Tait



Nelson marina

Nelson Marina is working hard to reduce biosecurity risks from vessels resident in their facility (Bruce Thompson)

Berth-holders are required to keep hulls clean of designated marine pests and free of conspicuous bio-fouling, and to undertake regular cleaning and antifouling. Designated marine pests mean legally declared unwanted organisms, of which there are currently 11. Conspicuous bio-fouling means more than 16% of the hull surface below the waterline covered in macro-fouling organisms (does not include slime). If vessels do not keep to these standards the vessel may be removed from the water until the vessel complies with the requirements.

This time last year Nelmac staff, who manage the marina for the Council, inspected 495 vessels occupying berths. Of these, 45 Vessels identified as conspicuously fouled (9% of the fleet). A further 24 were identified as just under the 16% threshold at time of inspection. 'Make plans to clean' letters were sent to the owners of 45 fouled vessels. Friendly letters were sent to the other 24 reminding them of their obligations as part of their berth licence.

A year on, of the 45 conspicuously fouled vessels, 33 vessels had been cleaned. This was a 73% cleaning success rate, and implies potentially 96% of all vessels clean voluntarily. Eight berth holders did not respond and 12 notices to remedy this were issued early July 2018 with four positive responses in July. Of the 24 lightly fouled vessels, 14 have been cleaned, a 58% success rate.

The 2018 preliminary inspection of all 530 vessels revealed 60 more fouled vessels, 11 of these were on pile berths that were not inspected in 2017 (11% of the marina fleet). Nelmac staff think that the increased percentage of fouled boats found in 2018 could imply that a higher frequency of inspections is required, or that warmer sea water from global warming is working against them.

TOS Committee member profile

Ken Wright, Biosecurity Officer Tasman District Council

Ken Wright has been a biosecurity officer at the Tasman District Council for 11 years. His terrestrial responsibilities are for pest plants and animals in Golden Bay, around the coast to Mapua, inland to Upper Moutere, then down to Motueka and Riwaka. Since 2012, Ken's biosecurity duties have also included working with marine pests.

Ken joined the Forest Service and gained a NZCF qualification specializing in environmental forestry. He then worked for; the Department of Conservation in its formative years, then animal pest work for Greater Wellington Regional Council, before coming to Tasman District Council.

His interests include game bird hunting, photography, botany and regional history. In 1990 Ken published a history paper on, "Nelson and Marlborough Oyster History", now available online.