

Science Matters

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Buoys boost ocean knowledge

New Zealand is a step closer to having a national network of coastal monitoring systems to assess the health of our ocean following the release in Hawkes Bay of a second high-tech buoy.

The HAWQI (Hawkes Bay Water Quality Information) buoy was designed and built by Cawthron Institute scientists for Hawkes Bay Regional Council and released in December 2012. It is only the second of its type in New Zealand waters, with Cawthron Institute operating the other buoy in Tasman Bay.

“Our vision is for a national network of high-tech buoys all along New Zealand’s coastline to help build an accurate picture of what’s happening in our coastal environment,” says senior marine scientist Paul Barter of Cawthron Institute.

The buoys provide long-term, real-time data on water quality, wind speed, wind direction, barometric pressure and temperature. This information is valuable for scientists, local councils and environmental management agencies for state of the environment monitoring, and is also used by the aquaculture industry, boaties and recreational fishers. Cawthron Institute designed the buoys in collaboration with California-based Monterey Bay Aquarium Research Institute.

“We need to improve the information we collect on our coastal waters, so we know to what degree things are changing, and can plan accordingly. This technology can help us do that.”



Peter Gluckman and Cawthron Institute founder Thomas Cawthron (framed photo)

Image courtesy of Nelson Mail

Scientists welcome visit from PM’s chief science advisor

The Prime Minister’s Chief Science Advisor Sir Peter Gluckman visited Cawthron Institute in February to learn about latest developments.

During his visit, Sir Peter met with senior scientists to learn more about their research, enjoyed a tour of the laboratories and visited the Cawthron Aquaculture Park.

He praised Cawthron Institute as a “confident” and “forward looking” organisation and reinforced its importance in the scientific community.

Sir Peter, whose last visit was in 2005, wrote on Twitter afterwards: “(A) very interesting day at Cawthron Institute in Nelson – progress since I was last there has been most impressive.”

Migratory birds under investigation

How bar-tailed godwits know when to migrate is the focus of a joint investigation by scientists at Cawthron Institute and Massey University.

The combined genetic and behavioural research project examines how the godwits ‘know’ when to undertake their epic annual 18,000 kilometre migration from New Zealand to their Alaskan breeding grounds. Led by Drs Andrew Fidler of Cawthron Institute and Phil Battley of Massey University, the three-year project is supported by the Marsden Fund.

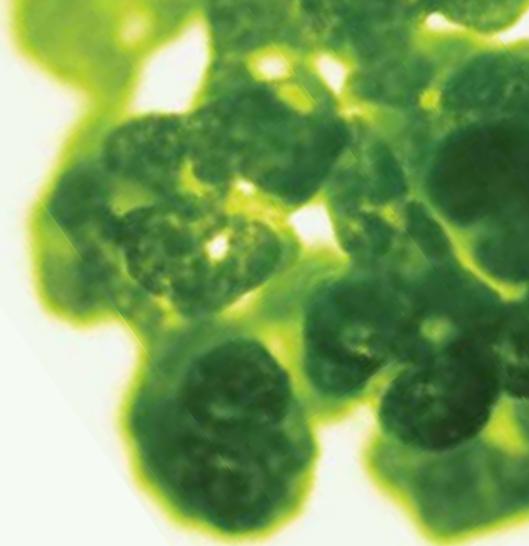
The project may provide insights into how climate change could affect the birds’

migration patterns. A concern, according to the researchers, is that if climate change leads to increasingly earlier springs in their Alaskan breeding grounds and godwits are unable to adapt their schedules to this change, then they could arrive too late to breed.

“This research may give us some idea of how rapidly godwits can evolve changes in their migratory behaviour so as to adapt to climate change,” Dr Fidler says.

Godwit migration is the focus of a three year research project funded by the Marsden Fund. Photo by Phil Battley





Breaking new ground in algae research

New research into toxic algal blooms in lakes is helping New Zealand and other countries around the world better manage the problem.

An international team of scientists, including Drs Susie Wood and Jonathan Puddick from Cawthron Institute, are investigating what triggers toxin production in planktonic cyanobacteria as part of a three-year Marsden Fund project.

Toxic algal blooms are a big problem in lakes worldwide, particularly in China and North America. The toxins they produce can have a severe impact on freshwater organisms and can be fatal to animals and humans.

“Many scientists around the world are working on predicting when these blooms will occur, but this research is unique in that it hopes to provide the most useful prediction of all - when blooms become toxic,” says Dr Wood. “One of the biggest pieces of the puzzle we’re hoping to solve is why these blooms even produce toxins.”

The team, which includes Professor David Hamilton of Waikato University and Professor Daniel Dietrich of the University of Konstanz in Germany, has already established the toxin production is linked to an increase in the cyanobacteria cell density while Dr Puddick has identified many new cyanobacteria toxins and developed methods to detect them.

Marine scientists contribute to national guidelines

A team of marine scientists at Cawthron Institute are leading the way in developing environmental monitoring procedures for New Zealand’s oil and gas industry.

The scientists are involved in ongoing work to monitor the marine environment around offshore oil and gas operations near Taranaki, on behalf of local operators.

Cawthron Institute’s offshore environmental monitoring team co-leader Olivia Johnston says while this monitoring is compulsory for the industry there are no specific protocols around it. This can lead to inconsistent and adhoc practices.

Her team worked with the oil and gas operators to develop a set of best practice guidelines called the Offshore Taranaki Environmental Monitoring Protocol. The protocol has now

been adopted by Maritime New Zealand to support new legislation on the issue.

“Being able to be part of that process is pretty exciting,” Ms Johnston says. “The level of effort, resources and cooperation that the operators have put into this has been really amazing.”

Cawthron Institute has been doing this monitoring work for almost two years now and has developed unique expertise in the area, says fellow team leader Deanna Elvines. “It’s exciting to be involved in this work because it’s a really important part of environmental monitoring and it’s growing rapidly.”

Household cleaners under the microscope

What happens when our shampoos, antibacterial soaps and foaming face washes go down the drain?

That’s exactly what a team of scientists is aiming to find out as part of an 18-month research project led by Cawthron Institute.

The ‘Up-the-Pipe Solutions’ project examines the potential environmental impact of active ingredients found in commonly used household cleaning products.

Lead researcher and environmental toxicologist Dr Louis Tremblay says the active ingredients flow out of homes through wastewater and eventually enter the natural environment.

The chemicals are also present in the nutrient rich sludge that remains after sewerage treatment so the sludge cannot be recycled and has to be added to landfill.

“The choices we are making have consequences,” Dr Tremblay says. “It’s easy to blame others for environmental damage. But, if you gather all the cleaning and body care products together in your home, you’ll see it’s a surprising amount and sooner or later that reaches our natural environment.”

Social scientists, toxicologists and chemists from Cawthron Institute and the Crown Research Institutes of ESR and Scion are all working on the project which started in June 2012. New Zealand company Ecostore is also supporting the research which is funded by the Ministry for the Environment’s Waste Minimisation Fund.



Charlie's corner



As Cawthron Institute turns 92 this year, it just keeps going from strength to strength.

We have made significant gains in research across a range of specialist areas including selective breeding in aquaculture, developing internationally-recognised testing methods and new methods to extract high value compounds from algae.

Exciting research is also happening in the area of environmental monitoring where we are adapting cutting-edge DNA testing to help us better protect our marine and freshwater environments.

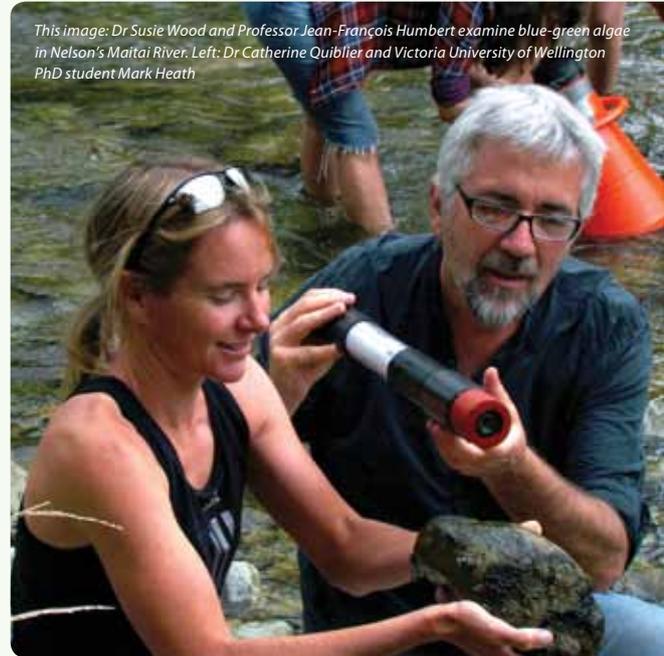
New infrastructure and technology investments include the expansion of the Cawthron Aquaculture Park and construction of a \$5 million high-tech laboratory building to enhance our analytical testing capabilities.

At the same time, we are developing science leaders dedicated to finding ways to make our science work for others by ensuring their research is focused on delivering tangible outcomes.

All of this helps reinforce our goal of taking our scientific expertise and applying it to research that supports environmental protection and sustainable development of our primary industries.

Professor Charles Eason

CHIEF EXECUTIVE CAWTHRON INSTITUTE



This image: Dr Susie Wood and Professor Jean-François Humbert examine blue-green algae in Nelson's Maitai River. Left: Dr Catherine Quiblier and Victoria University of Wellington PhD student Mark Heath

French visit boosts algae knowledge

A recent visit by a team of French scientists has boosted Cawthron Institute's research into toxic river cyanobacteria.

The visit was part of a Royal Society Dumont D'Urville-funded exchange to share knowledge and improve understanding of benthic cyanobacteria or blue-green algae, which is an increasing problem in both New Zealand and France.

Benthic cyanobacteria produce a deadly natural toxin that poses a serious health risk to people and animals that use the rivers, killing over 60 dogs throughout New Zealand in the last five years.

Cawthron Institute scientists are currently

conducting ground-breaking research to determine optimal conditions for growth and toxin production for these algae. This knowledge will help river managers predict when and where problems might occur.

Cawthron Institute scientist Dr Susie Wood, a world expert on cyanobacteria, says the collaboration with her French counterparts from the National Institute for Agricultural Research and University of Paris VII, provided valuable insights which will help in future research, risk assessment and management of the algae.

New investment in aquaculture

One of New Zealand's largest fishing companies now has a stake in Cawthron Institute's aquaculture research and development centre in Nelson.

In March, Aotearoa Fisheries Limited (AFL) took over the operation of Cawthron Institute's commercial oyster nursery at its aquaculture park. AFL plans to significantly expand the operation and has already employed additional staff to support its goals. Aquaculture companies SpatNZ and Kono already have operations at the park.

"This new investment supports our vision for the Cawthron Aquaculture Park as a centre of excellence for aquaculture, and as a place where scientific research and development from our breeding and spat production programmes flows directly through to industry partners," says Cawthron Institute Chief Executive Charles Eason.

Science Matters is a quarterly magazine by Cawthron Institute, New Zealand's largest independent science organisation. To subscribe by email contact info@cawthron.org.nz

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