NZASE scientist profile

Ecologist Shaun Ogilvie

Photo: University of Canterbury.

Born

On Christmas Day, 1969, in Auckland; he grew up in Waiuku.

Affiliations

Shaun's mother's dad was from Ngāti Whakahemo, a Te Arawa hapū; "our marae is Pukehina, in the Bay of Plenty". He also affiliates to his grandmother's hapū Ngāti Pūkeko, of Ngāti Awa, from Poroporo Marae. His dad is Pākehā.

Schools and subjects

"At Waiuku College I was quite interested in sciences; I did Bio, Chem, Maths, Stats, and Calculus. I wanted to take te reo Māori, but it clashed with science subjects. I didn't grow up with te reo at home; it was my mum's first language but she got punished at school for speaking it, and didn't want us to have that trauma."

How he got into science

"I was curious and really interested in the natural environment, how amazing it is."

Training and jobs

1990, BSc, and **1993 MSc Hons** in freshwater biology, both at the University of Otago.
1994-97 Research scientist, Manaaki Whenua/Landcare Research.
2000, PhD in ecology, University of Canterbury. "I was a research scientist in a NIWA project at the time until 2004, setting up their kaupapa Māori research unit, Te Kuwaha o Taihoro Nukurangi."
2004-2011, Lecturer, Senior Lecturer, and Associate Professor, Lincoln University

From **2007, Director**, Eco Research Associates; from **2008**, **Māori Business Development Consultant**, Cawthron Institute; and from **2014**, Environmental Consultant, Tonkin & Taylor. From **2021**, **Professor** of Ecology and Environment, University of Canterbury. He is also Kaihautū Ngātahi/Co-Director Māori of the National Science Challenge: NZ's Biological Heritage. "Work is more about admin now than research."

Fields of science

Ecology, marine biology.

Research examples

Mussel impact on water quality

Shaun did his Master's research on kākahi, freshwater mussels, in Lake Tuakitoto in South Otago. "It's a shallow lake in a farming area with a lot of nutrients, so it should have been

Shaun with his kids Tommy, aged two, and Tiaki, aged nine, in 2011.

green. Our hypothesis was that the mussels were keeping the water clear. I spent time at the lake, seeing what the mussels looked like when they were filtering and not, their size range. I surveyed to measure their density, then took some back to the lab, and did some experiments to measure their filtration rate.

"It turned out they filtered the water 22 hours a day. When we put that together with their density, we found they would be turning over a volume equal to the lake every 32 hours. So it was pretty good evidence that they were having a major impact.

"Knowing you could explore the system, see the components, and answer a pretty big question launched me into science as a career. The water quality science felt worthwhile and I wrote an academic paper. It was a neat feeling to discover something new that contributed to global knowledge."

Persistence of 1080 in the environment

When Shaun was at Lincoln, Tūhoe asked what the risk was that aerial drops of 1080 ended up in rongoā or food plants. "We worked directly with the iwi. Kaumātua had such an immense knowledge of the forest; we had long discussions about which plant species we should choose.

"They were part of the experiment design; they took us to the plants, set up the experiment, came to the lab and saw how it worked, and trusted the science.

"We simulated 1080 bait falling next to pikopiko (hen and chicken fern, a food plant) and kāramuramu (a rongoā plant). We had to make cages to prevent it being eaten, and sampled plants over two weeks, while monitoring temperature, rainfall, and soil moisture. We measured 1080 concentrations in those samples to assess any risk to people.

"Pikopiko didn't take up 1080 at all, but karamuramu did – it peaked after five days and was gone by 14 days. But the peak was so small, 0.001%, that it posed no risk to people.

"When the result came out, we held hui with other iwi around the country to talk about it. Having the kaumātua to explain it made a huge difference, because 1080 is a very emotive subject. I learnt a lot about partnership ways of doing science."

Shaun and a tuna (eel) in the stream near his Canterbury University office. "It is familiar with people, and has been tamed by feeding. It's a great way to connect regularly with a taonga species within minutes of the work desk."

How he finds things out

"All the science projects I've been involved in have been connected to Māori communities." Shaun surveys species in natural environments, designs behavioural experiments in the lab, and works with analytical chemists.

Most valuable results

Pots for scampi

The whānau-owned Waikawa Fishing Company (WFC), based in Picton, was concerned about the environmental damage from trawling for scampi, a deep-water crayfish, and approached the Cawthron Institute about using pots based on mātauranga Māori to capture scampi and other species.

"Pots use way less fuel," says Shaun, "cause hardly any seafloor damage, trap way less unwanted sea life, and the catch is much better quality, not smashed about in the nets.

"Scampi were fine back in the lab – they could handle the low pressure – allowing us to trial their behaviour and the type and size of pot they were most likely to enter. We also trialled scampi aquaculture as well, discovering new knowledge about their life cycle.

"But we found that scampi behaviour in the lab was different to in the field, which is common. We found we'd chosen the trickiest species possible – scampi in the sea don't enter pots!

"But in research you often get spin-off results. WFC also trialled pots for other species, including ling. Ling grow up to two metres, and are a top-order predator; ling pots are the size of a car. Ling travel a lot and find pots easily. Only another ling will get in once a pot is occupied, so the bycatch was next to nothing. It's a good way to catch them – the quality of the fish was amazing compared with trawled ling."

Natural alternatives to 1080

Tuhoe wanted to investigate naturally occurring toxins as an alternative to 1080. "Kaumātua identified a list of potential toxic species, and we whittled it down to the tutu plant. At the Cawthron lab, our analytical chemists isolated one gram of tutin, the toxic component. Then we trialled the toxicity and humaneness of it as a poison – how quickly rats died and how that compared with other toxins.

"It was more humane than anything apart from cyanide. That took two years of work, but we estimate it will take another eight years to develop a commercial bait. We've tried but we haven't yet got funding for that."

Unexpected dog deaths on beaches

Dogs were dying on Hauraki Gulf beaches; "it was a big mystery, and dog owners were worried," says Shaun. "We sampled everything on beaches that would be interesting to dogs, and did a series of toxicity trials in the lab. Sea slugs contained tetrodotoxin (Ttx), the same neurotoxin found in pufferfish, and the dogs were dying from eating sea slugs washed up on beaches.

"Then the Hauraki Māori Trust Board wanted to know whether the toxin was in shellfish. We surveyed the kaimoana species the iwi selected and were able to model the risks. We held a hui, and told them there was a risk to people only if they ate 5 kg of pipi meat in one sitting, and everyone laughed.

"Ttx is in a large range of species; the ecological element was that the introduced Asian date mussel had become a new food source for the slugs, increasing their density and the numbers endangering dogs on beaches. It was a neat project – we went from what was killing the dogs to environmental safety."

Mātauranga Māori

"I see science as a tool that you can use to support mātauranga Māori; I don't see the two knowledge systems as competing. Good science helps Māori fulfil their kaitiakitanga responsibilities. Mātauranga Māori includes science elements, and is a body of knowledge about ways of living and being."

What he likes about science

"Discovering something new is pretty cool. You have to do your undergraduate degree as an apprenticeship first, then you get to the research. Stick with that and you get to the fun bits. The world is calling out for young people who understand te ao Māori as well as science. Indigenous ways of living, where people are strongly connected to the natural world, have more of a future; climate change is a result of being disconnected from nature."

Links

Ellen R., 2021, Potting as an alternative to trawling, Office of the PM's Chief Science Advisor.

Science Learning Hub, Solving the dog death mystery; Dr Shaun Ogilvie; and Kaimoana in the Hauraki Gulf.

Toxic sea slug, Auckland Museum.

Shaun Ogilvie and others, 2004, *Uptake and persistence of 1080 in plants of cultural importance*, Lincoln University.

Ngā Kupu

Apiapi – Dense, density
Apiapi taupori – Population density
Hauropi – Ecology
Kōura rangi – Scampi, shrimp
Kounga (o te) wai – Water quality
Poa – Bait
Poraka – Crayfish pot
Rori – Black sea slug
Tāoke – Toxic, toxin
Tīpako (~na) – Sample, sampling
Wai māori – Fresh water.

From Paekupu and Te Aka Maori Dictionary