NZASE scientist profile

Kimberley Maxwell

Photo: Moana Project.

Birth and affiliations

Wellington, 1982; Kimberley grew up in Ōpōtiki, where her grandmother and father both spoke Te Reo. Maunga - Makeo, Awa - Waiaua, Marae - Waiaua, Iwi - Te Whakatōhea; also Te Whānau-a-Apanui, Ngāitai, Ngāti Porou, and Ngāti Tūwharetoa.

Schools and subjects

Ōpōtiki Primary and Ōmarumutu School, Ōpōtiki College, Diocesan School for Girls in Auckland - Te Reo Māori, Statistics, Biology, Physics, and Chemistry.

How she got into science

"I'm very inquisitive, I ask a lot of questions. I grew up on the coast, where we spent most of our spare time beachcombing, diving and fishing, and gathering kaimoana. That instilled my passion for the ocean and everything in it."

Training and jobs

BSc in Zoology, University of Otago; **MSc** in Marine Biology, Victoria University (VUW); **PhD**, VUW (during which she gave birth to her daughter Hinemoana).
Qualified **Scientific diver** and **boat master** with a VHF radio certificate.
Hatchery technician, NIWA
Senior marine science technician, Kono Seafoods, Wellington, developing sea cucumber aquaculture
Research Fellow, Research Fellow, VUW on the Mauri Moana, Mauri Tangata, Mauri Ora Project, documenting Māori marine values, developed the Waka-Taurua framework for marine co-management.
Post-doctorate, Waikato University, on the Moana Project, where she is helping develop a Moana plan for Ngā Hapu o Te Whakatōhea alongside an Iwi Impact Assessment Framework.

Field of science

Marine research across different science fields and knowledge systems for Māori communities.

Research topics

- Growing sea cucumber with pāua, mussels and seaweed at Hongoeka Marae in Plimmerton (Masters).
- Advising managers of kahawai fisheries using ecosystem models that include Māori perspectives (PhD); this included developing a hapū plan for the Mōtū kahawai fishery in the Bay of Plenty.
- Culturing hāpuku, kingfish, and pāua.
- Surveying toheroa beds in Northland and Southland.
- Surveying surf clams in the sub-tidal zone where waves break on beaches.
- Working with other researchers and community members for the Moana Project, studying our oceans to support our marine economy.

How she finds things out

Surveying surf zone kaimoana

Towing a dredge in a line parallel to the shore for 50 m, fluidising the sand and collecting all the organisms into a net, recording the depth

and tide. They count and measure surf clams and other species with calipers, to assess their distribution, size range and abundance.

Aquaculture

They review the research about the species life cycle, induce the parents to reproduce, collect the fertilised eggs, and keep them in optimal conditions. They need to work out what temperature, light, oxygen and pH conditions most suit the species. They feed the larvae algae or rotifers (tiny crustaceans), filter the water and monitor its quality and flow. They create surfaces for shellfish to settle on, which may need to be prepared with an algal film. They change fish diets from rotifers to fish meal as they mature, and ensure that the tanks contain the right numbers so fish are not competing.

Creating a hapū fisheries plan

The team starts with a hui of hapū experts, recording and analysing the kōrero to set priorities and concerns. They review existing research to help answer those questions, assess existing policies, and get constant hapū feedback to keep the plan on track.

Understanding the kahawai fishery

It is unclear where kahawai spawn; Kimberley examined sample kahawai from the sea and in the estuary, and found they likely spawn in multiple areas.

"Kahawai caught at sea had higher fat content all through spawning, but fish in the estuaries lost that. We found kahawai in estuaries with hydrolysed (full of water) eggs which happens only just before they are released."

Most valuable results

1 Enabling brown sea cucumbers to spawn in captivity, so eight million larvae grew into juveniles in our first sea cucumber nursery.
2 Surveying fisheries of mussels, pāua, kina and kōura; "in some areas, such as Taranaki, pāua growth is limited by temperature and therefore oxygen, so pāua don't reach 125 mm. Often pāua in the south are bigger than those in the north."
3 For the Toheroa survey on Ripiro Beach north of Dargaville, "we had the local community sampling with us - it was really rewarding to work with them studying their taonga."

Rawaru (blue cod) fishing with the whānau. Photo: AD Velenski.

Mātauranga Māori

"It's the foundation of my science - it drives what and how I investigate, who I work with and for, and the outcomes." With this approach, local communities decide the research directions.

"We're trying to create a critical mass of Indigenous scientists, we've often been the only one on a project. That's a lot of responsibility, and it's a challenge getting people to realise that yours is only one Indigenous perspective."

We're developing Te Ahu o Rehua: A network for cross-cultural ocean knowledge, to help Māori ocean experts and students, support one another and grow the team together."

Kimberley is also a member of the Traditional and Indigenous Working Group of the international Future Seas 2030 project; this group understands oceans as

living entities connected across the planet. They identified colonisation, repression of Indigenous languages, and repression of Indigenous guardianship as barriers keeping these groups from contributing to ocean management. “It was tough to talk about, but these issues need to be addressed.”

Kimberley says that if we want to manage fisheries in Aotearoa with the best information, ““we have to include Mātauranga Māori as well as economic and social knowledge, because Māori experiential and observational knowledge is the longest information record we have.”

What Kim likes about science

“It’s impossible to be bored, and there’s so much flexibility about where and how I work - being a solo mum that’s pretty important. I also work with amazing people in amazing places. There’s so much wonder to behold in the world and I get to see that every day.”

Links

- Science Learning Hub, 2016, Investigating the native sea cucumber for export. Video © Scottie Productions.
- Project Mātauranga, 2013, Sea cucumber: Innovation in iwi exports.
- NIWA, 2008, Gathering fishers’ stories.
- NIWA, 2008, Surf clam research: Coming soon to a beach near you!
- Kimberley Maxwell, 2007, “We don’t catch ‘em like we used to ...” Using traditional ecological knowledge in fisheries research. *Water & Atmosphere 15*(4), NIWA.

Ngā Kupu

Āwhata pH – pH scale
Hāora – Oxygen
Hurihanga ora – Life cycle
Kōrero – Conversation, story
Mahanatanga – Warmth, temperature
Paratau – Spawn
Rori whiore – Tailed sea cucumber
Torongū – Larva.

From Paekupu and Te Aka Maori Dictionary

Studying kahawai at the Motu River mouth for her PhD.