

Including Mātauranga Māori: Sampling kōura

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resource

For another in our series about science teachers in English-language schools including Mātauranga Māori, NZASE Science Communicator Mike Stone spoke with Johnny Fraser, HoS at Nelson College.

Johnny Fraser likes to make the science program relevant to his boys and make use of the local environment. Building on past river studies of macro-invertebrates, he found a new context for his year 12 biology investigation (AS 91153), using kōura in the local stream.

The kōura in this region are North Island freshwater crayfish, *Paraneohpops planifrons*. They are found in native and exotic forest, and pastoral waterways, but very rarely in urban streams because of they are very sensitive to chemical pollution, increased flood flows from stormwater, and degradation of habitat.

Little Go stream runs through the school grounds but is prone to flooding. The council built a concrete culvert to prevent flooding by trapping sediment and debris. However, a digger needs to clear the debris regularly.

A pool 3 x 4m across and 1m deep formed in front of the culvert. The boarders who played in the area, catching kōura in fluff on the end of a line, noticed that after the digger had been through there were far fewer kōura. The year 12 Biology class wondered if they could find evidence of this and do something about it.

The students' investigation

They decided to find the size of the kōura population before and after the digger visits, with two Biology classes a week apart using a mark and recapture method. Catching the kōura proved tricky.

After the boys did some research, they found [a NIWA article about a traditional Māori](#)

[method](#), using whakaweku (bracken) and kōrapa (a Y-shaped branch with shade cloth in between). Whakaweku fronds are tied together to form bundles, which are anchored by rope to the stream bed where kōura get caught in the branches.

To sample kōura, the whakaweku is lifted out and shaken to dislodge the crustaceans into the kōrapa (a whitebait net worked better the second time), and then the bracken bunches are returned to the water.

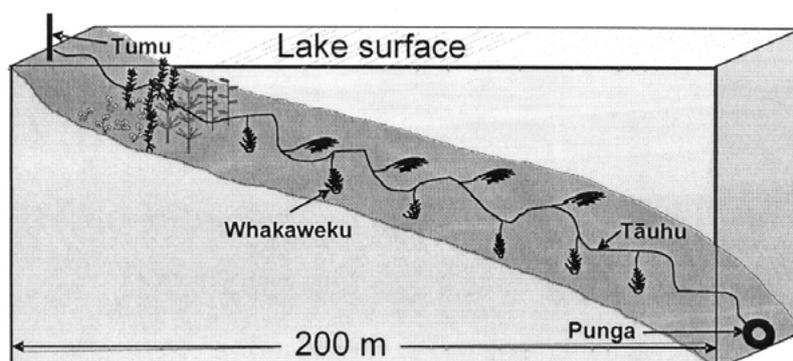
The boys collected the bracken and made the whakaweku, mostly too loosely tied, until Johnny found one student who had made a solid one.

The boy told Johnny that he had learnt how to make whakaweku at a two-week wānanga with his uncle. So he became the recognised expert, teaching the others how to make the bracken bundles.

In the first week the Biology students marked the kōura caught by snipping a bit out of the end of their tails. The next week they counted the marked kōura collected and estimated the number in the pool using

Kōura. From This NZ Life.

A diagram of a tau kōura (whakaweku) system from Lake Rotoiti, showing how the whakaweku can be arranged underwater; by Ian Kusabs, John Quinn and Willie Emery (Ngāti Pikiao).



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A one-, two- and three-year-old kōura. From AgriHQ.

a formula: Total number in the population = the number originally marked times the total number recaptured divided by the number of marked ones recaptured ($N = MC/R$).

They also used callipers to measure the length of the invertebrate's carapace. These crustaceans moult and grow while their skin is soft, before the shell forms. When carapace length is graphed, distinct size groupings indicate age.

From an estimate of age the students could construct an age pyramid. They also recorded the sex of each individual sampled – males have bumps on the base of the hind legs.

The students' results

Students wrote up their findings, explaining the method they used and making a judgement on the health of the population based on their evidence. They estimated that the pool had an unusually large, healthy population of about 150 kōura, including six large kōura that were over 10 years old.

They wrote to council with their findings and recommending that the school be informed just before the culvert was to be dug out, so that the kōura could be removed beforehand and returned afterwards.

Johnny enjoyed investigating a local, real-world issue. The students also enjoyed the project, with more boys than usual engaging with their learning.

Year 12 Biology will continue with this investigation to build a picture of the kōura population over time. Johnny plans to investigate another real-world study with juniors, about the size of moth populations in the school grounds.

Sources

Science Learning Hub, 2020, [Building a tau kōura](#).

Ian Kusabs & John Quinn, 2009, [Use of a traditional Maori harvesting method, the tau kōura, for monitoring kōura in Lake Rotoiti, North Island, New Zealand](#). *NZ Journal of Marine & Freshwater Research*.

Ian Kusabs, Willie Emery & John Quinn, [Tau kōura sample collection and processing protocol](#), NIWA.

A 43mm male kōura from Lake Rotoiti. (Kōura are measured from behind the eye to the beginning of the tail.) Photo: Ian Kusabs, NIWA.



Ngā Kupu

Karawata – Culvert

Kōrapa – Y-shaped branch with cloth

Kōura – Freshwater crayfish

Parahanga – Pollution, rubbish dump

Tau kōura – Kōura trap (Te Arawa)

Taupori – Population

Tipako – Sample

Whakatau tata – Estimate

Whakaweku – Bracken, kōura trap.

Te Aka Maori Dictionary and Paekupu



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