



Lake Rototoa in deep trouble

Kākahi populations in Lake Rototoa have drastically declined and if no interventions are taken the situation will become dire.



2,238 mussels found

1,894 dead

15% left alive

0 juveniles found



Lake Rototoa by Shaun Lee



Kākahi

Lake Rototoa (also known as Lake Warrior) is located on the west coast of Tāmaki Makaurau (Auckland), New Zealand. These lakes are known as the footsteps of kawharu the warrior. The lake is treasured by all, known as the jewel of Auckland. Lake Rototoa is a dune lake with a maximum depth of 28 metres making it the second deepest lake in Auckland. It is home to many native freshwater species such as Kākahi (freshwater mussels), Kōura (freshwater crayfish) bullies and other native fish, as time goes by these species are beginning to disappear.

The lakes water quality has been monitored since the 80's, only showing a slight decline in health, while under the surface, something far more sinister has been occurring. Aotearoa Lakes divers noticed that the water visibility was declining and although you could see large beds of Kākahi, upon closer inspection, many of them were dead. A survey technique was immediately developed. Volunteer divers counted 2,238 mussels and of those 1,894 were dead, equating to 85% of all of the mussels. Only adult mussels have been found thus far after surveying four different locations across the lake. These figures are concerning and so far show that this species is on the brink of extinction in Lake Rototoa.

Kākahi is not only a taonga (sacred) species but a bioindicator species, keystone species and the only native freshwater filter. Kākahi are biofilters and bioturbators, they filter out nutrients, algae, bacteria, and fine organic material which helps purify the water. They can filter up to one litre per hour, and if present in large enough numbers, they can filter the entire volume of a lake within a matter of days. They oxygenate the sediment by moving it around as they travel which stops oxygen void conditions and nutrient remobilisation. These species are critical to a healthy ecosystem and studies show as their populations crash the water quality decreases sometimes becoming toxic.

Very little is known about Kākahi and why this extreme die-off has happened. It is believed that pest fish and declining lake health are the biggest contributing factors. Aotearoa Lakes in collaboration with Environmental Services are researching Lake Rototoa and its biodiversity in the hopes that we can better understand the lake, its wildlife and how we can protect this treasured ecosystem.

BENEFITS

Water filtering

Kākahi suck zooplankton, microorganisms and algae through their siphon to eat, they can filter large quantities of water and even the whole volume of the lake in a short period of time if there is enough of them. This means that where mussels are alive and healthy other natives will be more likely to flourish. They are a 'keystone' species as they shape the habitat for other native organisms. They are lakes only freshwater filters.



THREATS

Pollution

Algal blooms can kill kākahi by overloading and eventually suffocating them. Sediment can clog their gills and smother them. Stormwater and wastewater can change the acidity of water causing their shells to weaken and crack.

Pest fish

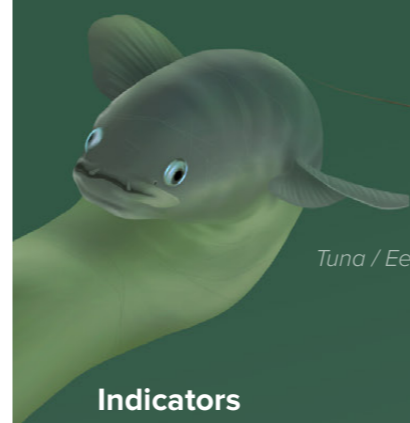
Introduced fish eat juvenile Kākahi and the native fish that transport the juvenile mussels.

Pest plants

Invasive weeds form dense beds which smother the mussels and destroy their habitat.

Climate change

Increasing temperatures could cause unsuccessful spawning. Droughts are lowering water levels and exposing more of the lake bed. Storms and floods bring loads of pollution.



Tuna / Eel



Dwarf Inanga



Perch



Kōura / Freshwater crayfish

Indicators

Juvenile kākahi are intolerant of poor water quality so if they are present at a site it is a good sign that the site is high quality.

Taonga

Mussels were considered taonga (sacred) to Māori people, they were used as food and their shells were used as tools for weaving and even as baby rattles.



Hornwort

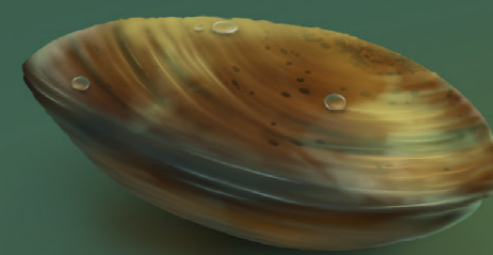


Illustration by Shaun Lee

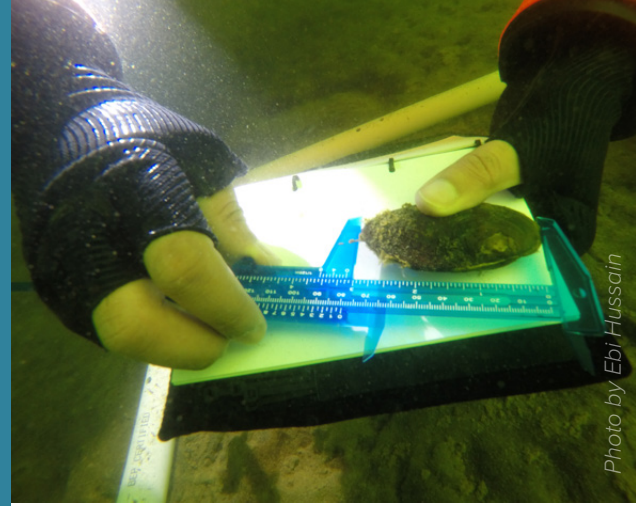
Recommendations for action:

People is power: The first and most important recommendation is to spread the word and knowledge so that this doesn't happen in other lakes across the region. Just because we can't see it doesn't mean it's not happening, talk to your local councilors and community.

Knowledge is power: We need more research to go into lake restoration techniques and pest eradication from freshwater ecosystems.

Keep it native: Even a drop of water can be enough to introduce pest species to a lake. Remember to Check, Clean, Dry.

Use it, don't abuse it: Be careful when you enter a lake, do not to destroy habitat, use eco-friendly sustainable framing practices, don't over fertilise your gardens or wash your cars before rain. Google interventions on how to protect our waterways.



Aotearoa Lakes is an environmental charity that focuses on the research and protection of lakes and wetlands. We are a collective group of scientists, technical divers and other specialists volunteering our expertise for the greater good of New Zealand's freshwater.

Eight volunteer scientists spent over 40 hours surveying Lake Rototoa's Kākahi.



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