

Kākahi Monitoring Report

Kākahi monitoring for the Wairarapa Moana Wetlands Project

February 2016



Figure 1: Collecting kākahi on the western shore of Lake Wairarapa

Ngā mihi/greetings

This is the second report for the Wairarapa Moana community kākahi monitoring programme. The first monitoring event took place at Lake Domain Reserve at the north end of the lake in 2015 (see www.waiwetlands.org.nz for the 2015 monitoring report). This year's event was carried out along the western shore of the lake.

This kākahi/freshwater mussel monitoring programme was initiated to contribute to a wider programme of monitoring to inform the Wairarapa Moana Wetlands Project about the health of Lake Wairarapa.

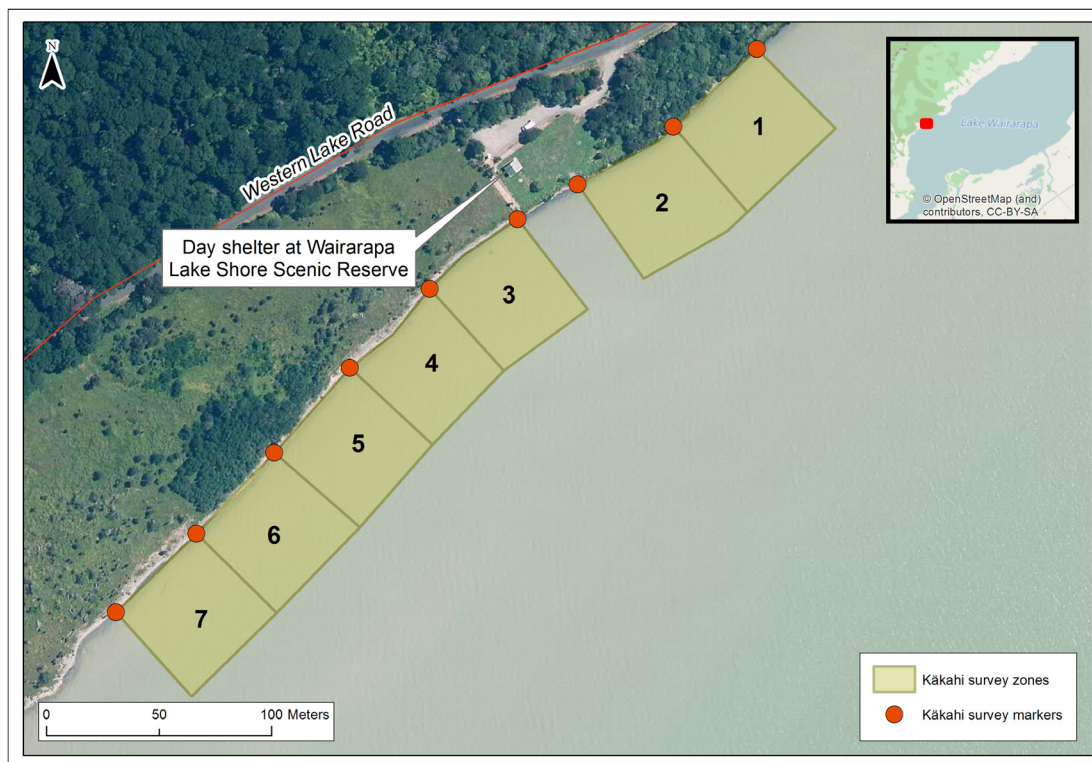


Figure 2: Map of the western shore kākahi monitoring area, Lake Wairarapa.

Kākahi are filter feeding animals and help to improve water quality by reducing algae and sediment in the water. Lake Wairarapa has two of the three species that are known to live in New Zealand. Populations of kākahi are in decline throughout New Zealand, and throughout the world. In New Zealand this decline is linked to the deterioration of the water quality in lakes and rivers. So, the health of a kākahi population helps to gauge ecosystem health of a lake or wetland.

Monitoring methods

This kākahi community monitoring was carried out at Wairarapa Lake Shore Scenic Reserve on the 13th February 2016 by a party of 21 volunteer helpers.

A 350 metre stretch of shoreline was sectioned off into 50 metre intervals to create seven survey zones (called “replicates”; see Figure 2). After we recorded our measurements, the kākahi were returned to the zone in which they were collected.

Collecting the kākahi

Each of the seven replicate zones was surveyed by a team of three people, with two people collecting kākahi and the third working as a timekeeper and communicator. In order to minimise disturbance, a maximum of 50 kākahi were collected from each replicate zone. Each pair of collectors waded, feeling through the substrate (of mud, sand and gravel) for kākahi with their feet and hands.

Measuring the kākahi population density

Kākahi were collected either for 30 minutes or until 50 samples had been collected, whichever occurred first. This allowed us to standardise our results per unit time¹. If 50 kākahi were collected in less than 30 minutes, then we recorded the amount of time it took to collect them. For example, if it took 15 minutes to collect 50, then it was assumed that 200 would be collected in an hour. Dividing this by the two team members gave us a density of 100 kākahi per hour.



Recording species type

Kākahi were identified by species, as either the ‘common’ kākahi (*Echyridella menziesii*) or the ‘Auckland’ kākahi (*E. aucklandica*). As well as allowing us to keep track of both species separately, this will allow us to monitor species ratios, and detect, for example, if one species is outcompeting the other.

Measuring shell length

Shell lengths were measured to the nearest millimetre using Vernier callipers (Figure 3 image). By measuring the shells, we will be able to keep an eye on the size distribution of the population, and detect whether sufficient juveniles are present to achieve ongoing population renewal.



Figure 3. Measuring kakahi using callipers

Classifying shell erosion

Each kākahi collected was also classified according to the amount of erosion present on the shell. If no erosion was present this was classed as zero, very little erosion classed as “one” and most of the top layer eroded classed as “four”. Recording shell erosion was a simple addition to the other parameters we collected and has the potential to provide information in the future regarding environmental changes such as wave action, substrate composition and water chemistry.



Figure 4. Kakahi showing different degrees of erosion

The monitoring programme

The site will be surveyed in a similar fashion every two years, alternating with the northern lake shore site at Lake Domain Reserve. Our methods can accommodate and benefit from as many participants as possible - the more replicates we complete, the better our data will be.



¹ Ecological data is commonly standardised per unit area in order to be compared to future data and/or data from other areas. Kākahi in lake Wairarapa are too sparse and patchily distributed for quadrats (for example) to return useful data, and large areas would be needed in order to collect enough kākahi to draw valid conclusions. Because achieving complete coverage of large areas would necessitate spending long periods of time in cold water, this option presents a health and safety issue. For these reasons the use of time as a quantifying unit was considered the most suitable option (this method is also used elsewhere for kākahi surveying).

Results and discussion

Population density

A total of 348 kākahi were collected during the survey (Table 1). All specimens were identified as belonging to the ‘common’ species (*E. menziesii*).

The average density of kākahi in the replicate zones was 194 ± 30 per hour. The lowest density (88 per hour) was found in replicate 1, and the highest (300 per hour) was found in replicate 4 (Figure 2, Map of western shore kākahi monitoring area).

Replicate zone	Number of kākahi found*	Collection time (minutes)	Kākahi density (number of kākahi collected per person, per hour)
1	50	17	88
2	50	9	167
3	48	6	240
4	50	5	300
5	50	15	100
6	50	7	214
7	50	6	250
Total:348			Average: 194 ± 30

*Total kākahi collected by two people working together in one zone

Table 1. Numbers of kākahi collected from the western shore community monitoring site in 2016.

Population size distribution

The size of kākahi (represented by their shell length) is related to their age, although the relationship between shell length and age varies with location and species. Further work is needed to quantify the particular relationship between shell length and age at this site. We can however, assume that similar sized kākahi at the same site are ageing at similar rates, so by tracking size, we can track the rate of ageing.

Overall, a very small range of shell lengths was recorded, with most kākahi falling within a narrow range representing older adults (Table 2). The shells collected ranged from 39 mm to 72 mm in length, with 94% of these measuring between 50 and 70 mm. The average shell length was 59 ± 0.3 mm. No ‘juvenile’² kākahi were recorded.

The size distribution of kākahi collected during this survey was strongly unimodal (Figure 5), with few small animals. Therefore, we can assume that the age distribution is similarly unimodal, with very few juveniles present.

Size class (mm)	Number of kākahi
0-10	0
11-20	0
21-30	0
31-40	1
41-50	20
51-60	205
61-70	121
71-80	1
81-90	0
91-100	0
Total	348

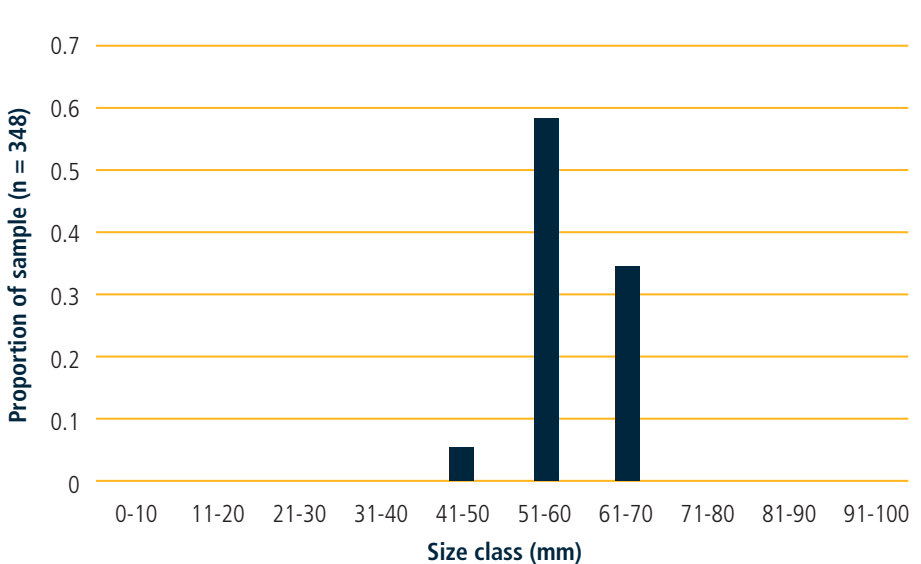


Table 2. Shell length of kākahi collected from the western shore community monitoring site in 2016.

Figure 5. Size distribution of kākahi collected from the western shore community monitoring site in 2016.

² Shell length less than 38 mm (or less than approximately 5 years old) has been used in the past to represent juvenile kākahi e.g. James MR (1985). Distribution, biomass, and production of the fresh-water mussel, *Hyridella-menziesi* (Gray) in Lake Taupo, New Zealand. *Freshwater Biology* 15: 307–314.

Erosion class	Number of kākahi
0	5
1	151
2	146
3	37
4	9
Total:	348v

Table 3. Shell erosion class of kākahi collected from the western shore community monitoring site in 2016.

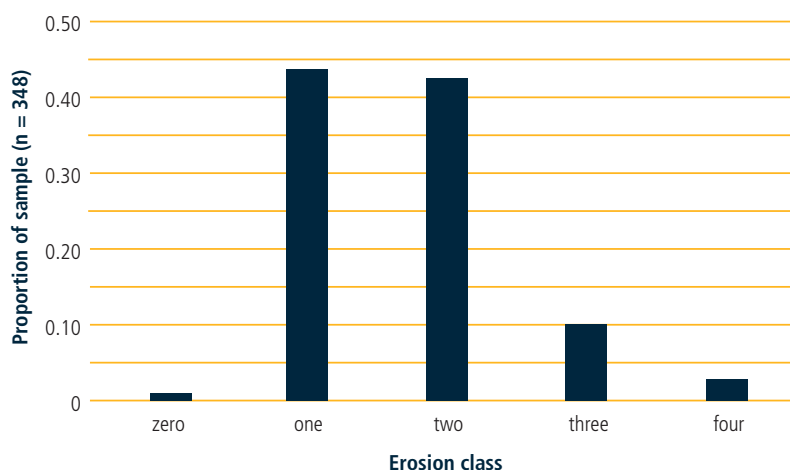
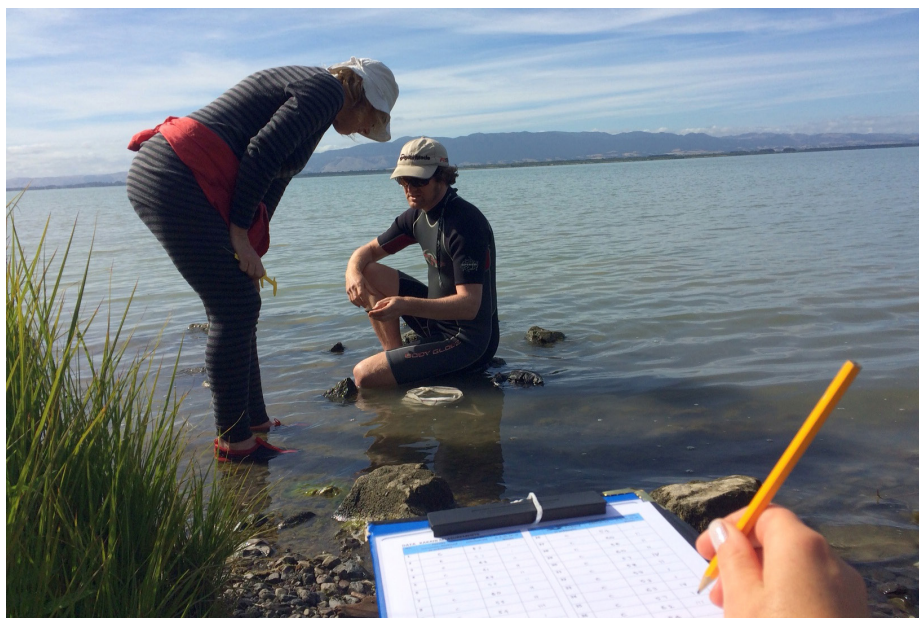


Figure 6. Shell erosion class distribution of kākahi collected from the western shore community monitoring site in 2016.

Summary

The results of this survey show that the kākahi population at the western shore of Lake Wairarapa consists mostly of adults, with no juveniles present in our sample. We are relying on future years of monitoring to inform us about whether the population is being sustained.

The kākahi communities at the western and northern shore are similar in terms of size distribution and shell erosion, however kākahi at the western shore are present in higher densities compared to the northern shore. In addition, the 'Auckland' kākahi has not been found at the western shore site, whereas it is present in reasonable numbers at the northern site.



The early stages of monitoring at Lake Wairarapa show the presence of very few juvenile kākahi. If sufficient juveniles aren't surviving then the future of the kākahi population looks bleak. However, knowledge about this stage of the kākahi life cycle is limited. Juvenile mussels are sensitive to contaminants such as ammonia, heavy metals and excess sediment. These enter the waterways in a catchment through various uses of land and activities in urban areas. Also, kākahi larvae depend on host fish during their development and these native fish are in decline.

Pollutants (including sediment) need to be prevented from entering our waterways and wetlands to protect and improve the habitat for kākahi and other freshwater animals. We can do this by fencing off streams and replanting trees to reduce erosion. We also need to ensure the careful use, containment or disposal of pesticides, fertilisers, other chemicals and waste products.

If you'd like to get involved in future surveys please get in touch:

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