

## Central and East Northland

### Lake Waro (near Whangarei) Lake No. 199A



**Figure 3-3: Lake Waro.** A lake frequently used for contact recreation, particularly swimming. (Photo: Aleki Taumoepeau 30 April 2018)

#### Summary

Surveyed 2006, 2011 and 2018.

#### Overall ranking

**Moderate to low:** A flooded quarry severely impacted by the pest plant *Egeria densa*. Water quality is poor, but provides valuable habitat for endangered water birds.

#### Threats

Popular recreational lake, with potential for further pest plant and fish liberations and continued nutrient enrichment from the catchment.

#### Management recommendations

No regular ecological monitoring. Management of submerged weeds, giant reed and water quality and *E. coli* level monitoring are required for continued recreational use of the lake.

## Description

This lake (2627470E 6623010N) is a 4 ha lake, 6.4 m deep. The surrounding catchment is reserve with a refuse dump, some pasture and residential development, currently dominated by kikuyu and scrub weeds. Access is by road, but no power boating is permitted and currently, boat access is difficult. It is used for contact recreation with distance swimming popular.

## Wetland vegetation

There were two wetland areas at each end of the lake and a narrow emergent zone around most of the lake margin. The main species were *Typha orientalis* and *Eleocharis sphacelata*. There were several small patches of the invasive giant reed *Arundo donax*.

## Submerged vegetation

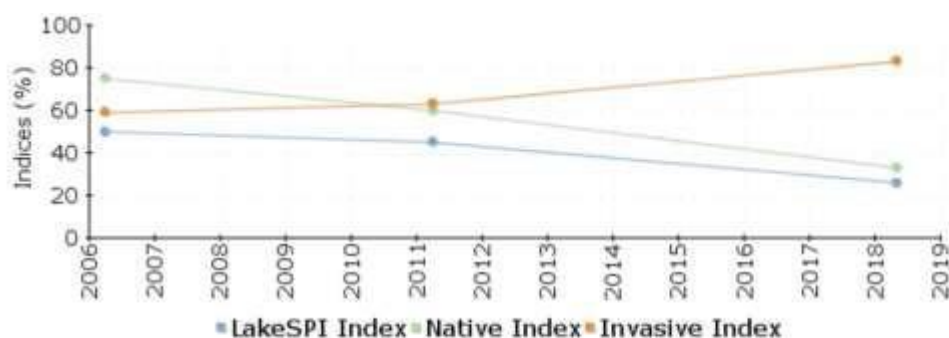
In 2006, the lake was clear and fully vegetated, with charophyte meadows of *Chara fibrosa* and *Nitella* sp. aff. *cristata*, with *Potamogeton cheesemanii* and *Myriophyllum propinquum* and some *Potamogeton ochreatus* present. There was also a blanket of the invasive *Utricularia gibba* to 3 m water depth and significant growths of the oxygen weed *Egeria densa* through the lake.

In 2011, the whole lake floor was vegetated to 5 m deep but below this the water was dark with putrefying plant material to the maximum lake depth of 6.4 m. Both egeria and *Utricularia gibba* had increased in abundance.

In 2018, vegetation had recolonised to 6.4 m at one transect and over 5 m in the others. *Egeria densa* dominated throughout the depth range, with *Potamogeton cheesemanii* and *Myriophyllum propinquum* at each profile, with scattered *Potamogeton ochreatus* and a deepwater bed of *Nitella* sp. aff. *cristata*, at one site. *Utricularia gibba* had declined in range and abundance and was only noted at one transect with low covers from the emergent zone to 3.1 m deep.

## LakeSPI

Waro Quarry Lake Submerged Plant Indicators



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
April 2018	Moderate	26%	33%	83%
March 2011	Moderate	45%	60%	63%
March 2006	Moderate	50%	75%	59%

The LakeSPI score from Lake Waro has steadily declined in this lake over time, declining from the boundary between high and moderate in 2006 to just above the boundary between moderate and poor status (20%) at 26% in 2018. The decline reflects the increasing extent of the invasive exotic species *Egeria densa* and loss of extensive charophyte beds before 2011, likely due to anoxia.

### Water birds

Spotless crane, geese, domestic ducks have been noted during surveys.

### Fish

A silver (migratory) shortfin eel and abundant gambusia were seen in 2011.

### Aquatic invertebrates

Ramshorn snail and mollusc-feeding leeches were abundant in 2011.

### Endangered species

No threatened species have been observed in and around Lake Waro.

### Lake Ecological Value

Lake Waro ecological value rating is assessed as “5 – moderate to low”, a small artificial water body, dominated by invasive submerged plants and deteriorating water quality.

### Threats

Water quality is threatened by stratification and anoxic bottom waters releasing nutrients from sediments. Dense growths of egeria will add more organic matter to the lake increasing BOD. There may also be other significant catchment sources of nutrients to the lake that require investigation.

The ease of access to this lake gives it a relatively high likelihood of additional submerged weed transfer. Species such as hornwort would drastically impact the lake. Alligator weed would also spread and dominate marginal vegetation. Further nutrient enrichment could render the lake a health hazard to swimmers and dense beds of egeria pose a drowning risk.

### Management recommendations

This lake has moderate to low ecological value and is not recommended for regular ecological health monitoring. However, the lake is becoming more degraded and may require management if the lake is still to be recommended for recreational uses. Perhaps control of submerged weeds could be contemplated using grass carp and water quality and *E. coli* level monitoring continued to assess potential human health hazards.

Remove the *Arundo donax* before it dominates the riparian margins of this lake.