

Te Hiku

Te Ketekete (formerly Te Werahi Lagoon) NRC Lake No. 6.



Te Ketekete Lagoon. showing the pasture, protective fencing, mobile sand dune catchment and extensive beds of raupo (*Typha orientalis*).

Summary	Te Ketekete Lagoon
Surveyed:	2004 and 2013
Overall ranking:	Moderate: heavily impacted by invasive submerged species including hornwort and egeria. The first record of the invasive marginal species gypsywort (<i>Lycopus europaeus</i>) in Northland was discovered at this water body. Good in-water visibility of around 4 m.
Threats:	Already impacted by problem submerged weeds <i>Ceratophyllum demersum</i> , <i>Egeria densa</i> and <i>Potamogeton crispus</i> . The lagoon is surrounded by pasture, with little marginal buffer. and the surrounding indigenous vegetation indicates little immediate threat to this site.
Management recommendations:	No monitoring is recommended. A more comprehensive survey of the wetlands surrounding the Te Werahi Stream is recommended to delimit the gypsywort incursion. Eradication of gypsywort is advocated if deemed feasible following the wetland survey.

Description

This lagoon (1573420E, 6184962N) is an 11 ha water body with a maximum recorded depth of 4 m. It is situated on sand dunes, formed by a stream system impounded by dunes. The catchment is pasture (cattle grazed) apart from mobile dunes to the west and a few wetlands associated with inflow streams. The lagoon is the largest impounded water body on the Te Werahi Stream which flows from the south, draining land from Scott's Point and discharging to the north in Te Werahi Bay (West Coast). Access was through private farmland (4-WD) with no formed tracks leading to the lagoon edge and no boat access other than over a fence.

Wetland vegetation

A lot of the lake was fringed with pasture, however sections of wetland vegetation dominated by *Typha orientalis* with *Machaerina articulata*, *Eleocharis sphacelata*, *Carex maorica* and *Phormium tenax* were noted. The nationally threatened herb *Mazus novae-zeelandiae* ssp. *impolitus* was collected from this area in 1966 but has not been recorded since.

The first record of the invasive marginal species gypsywort (*Lycopus europaeus*) in Northland was discovered at this water body (**Error! Reference source not found.**).



Gypsywort (*Lycopus europaeus*) at Te Ketekete Lagoon The first record of this invasive marginal species in Northland was discovered at Te Ketekete Lagoon in 2013.

This species is widespread and has a major impact on many lowland wetlands in Waikato and is spreading in Bay of Plenty and Auckland. It is of limited distribution at the Te Ketekete Lagoon site and efforts should be made to eradicate it.

Submerged vegetation

There were high covers of the tall exotic weeds hornwort (*Ceratophyllum demersum*) and egeria (*Egeria densa*) and also the native pondweed *Potamogeton ochreatus*. Lower covers of the exotic

Potamogeton crispus and the native charophytes *Chara australis*, *Nitella* sp. aff. *cristata*, and *N. leonhardtii* were noted.

LakeSPI

LakeSPI Index as % of potential score, Native Condition Index, and Invasive Impact Index (from left to right).

Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
April 2013	Poor	20%	33%	93%
November 2004	Moderate	34%	67%	78%

The low LakeSPI score of 20% reflects the impact of invasion by hornwort and egeria.

Water birds

The large areas of wetland may provide good habitat for many aquatic birds, although grazing access may disturb some species. Hundreds of black swans (*Cygnus atratus*) and a flock of Canada geese (*Branta canadensis*) were noted in 2004. No endangered birds were recorded.

Fish

Grey mullet (*Mugil cephalus*) were observed in 2004. Bullies were present in 2013.

Aquatic invertebrates

No aquatic invertebrates were noted.

Endangered species

Mazus novae-zeelandiae ssp. *impolitus* was assessed as Nationally Endangered (de Lange et al. 2018), with a total global area of occupancy ≤ 10 ha (0.1 km²) and a predicted decline of 10–50%. It was collected from this area in 1966, but no more recent records are known.

Lake Ecological Value

Based on the 2013 survey, a Lake Ecological Value rating of 7 (Moderate) was calculated based on limited native submerged vegetation and no rare species found. The submerged vegetation is dominated by invasive non-native plants. Although there are large emergent beds, there is little buffering between pasture and the lagoon.

Threats

Although situated in farmland, the lagoon is easily observed from State Highway 1 and access is relatively easy.

The highest ranked submerged weed species, hornwort, is already present in the lagoon. This lagoon may provide the local source of this species and also egeria, both are also located in the lakes near Te Pahi (Ngakeketo and Wairaupe respectively). Transfer could be from fishing nets, so local fishers should be informed of the risks.

Gypsywort (*Lycopus europaeus*) is apparently restricted to this site in Northland. It is likely to have been introduced on the waders of duck shooters or fishermen from the Waikato and poses a major threat to similar wetland margins throughout Northland.

The lagoon is poorly buffered, bounded by pasture and could be in danger of becoming a flipping lake. It is common for shallow lakes with dense weed beds to change rapidly losing plants and shifting to a turbid algal dominated state.

Management recommendations

No monitoring is recommended.

A more comprehensive survey of the wetlands surrounding the Te Werahi Stream is recommended to delimit the gypsywort incursion. Management for eradication of gypsywort is advocated if deemed feasible following the wetland survey.

Control of submerged weeds is not recommended, as only short-term reduction in abundance would be achieved at this site.