Te Hiku

Lake Morehurehu, NRC Lake No. 32

Lake Morehurehu: (Katrina Hansen, 2025).

Summary	Lake Morehurehu
Surveyed:	2006, 2009, 2013, 2014, 2016 and 2025
Overall ranking:	Outstanding: Remote lake with diverse native submerged and emergent vegetation including endangered species, good water quality. Improvement from High score reported from 2013 to 2016, as submerged vegetation recovers following pine forestry harvesting.
Threats:	Introduction of invasive submerged and emergent pest plants could occur as there is access to the lake on forestry tracks. Pine forest harvesting in the future may lead to a degradation of submerged vegetation.
Management recommendations:	Carry out ecological condition monitoring on a five yearly basis.

Description

Lake Morehurehu is a dune lake situated 1599711E, 6166691N and is 36.3 ha in area. Depth is 14.1 m. It is situated on Lower Quaternary sand dunes, formed by a stream system impounded by dunes. The catchment is all plantation pine trees, with a zone of mānuka / hakea scrub between the lake and pines. Mature pines were harvested in 2012 and a second crop planted. There are three inlet streams entering the south-west, north-west and south-eastern arms of this lake, with the outlet flowing through a wetland at the south-eastern end of the lake into Great Exhibition Bay (East Coast). Wetlands are also associated with the inflow streams. Access is through private forestry roads (4-WD), is steep and the track is loose sand and overgrown, making trailered boat access very difficult.

Wetland vegetation

There is an almost complete fringe of emergent vegetation, from 10 to 30 m across, around the lake. No NRC shore-based vegetation survey was undertaken in 2025. On previous visits, kuta (*Eleocharis sphacelata*) was present all around the lake with a wide diversity of other emergent species, including *E. acuta,* raupō (*Typha orientalis*)*, Machaerina articulata, M. teretifolia, M. juncea, M. arthrophylla, M. rubiginosa* and *Isachne globosa*. Wetlands were also common on the lake margins, containing the emergent species mentioned above, but also harakeke (*Phormium tenax*), swamp coprosma (*Coprosma tenuicaulis*), mānuka (*Leptospermum hoipolloi*) and swamp kiokio (*Blechnum novaezelandiae*). Areas of bog vegetation were dominated by wire rush (*Empodisma robustum*) and umbrella fern (*Gleichenia dicarpa*).

Submerged vegetation

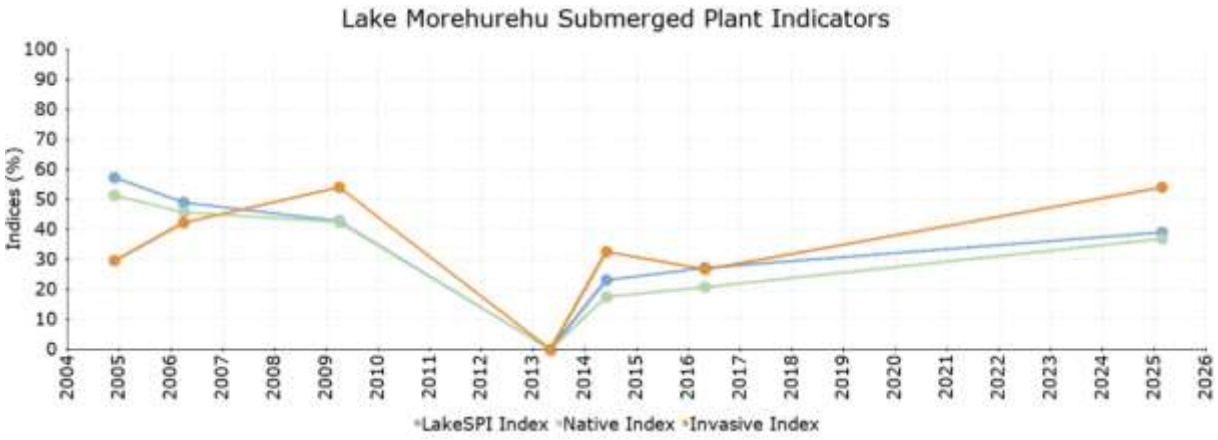
In 2025, a diver survey of five LakeSPI sites was undertaken to depths of 4 to 5 m. Lake water was humic stained.

Lake Morehurehu: Submerged vegetation growing in humic stained water; *Chara australis* (left), *Myriophyllum propinquum, Potamogeton cheesemanii* and *Utricularia gibba* (right) (Mary de Winton 2025).

Charophytes dominated the vegetation to depths between 2.2 to 3.2 m and charophyte meadows (cover >75%) were present to between 1.7 to 2.2 m. The dominant species was *Chara australis* with some areas of *Nitella* sp. aff. *cristata* and lesser amounts of *Chara acanthopitys, Nitella leonhardi* and *N. mucosa*. Pondweeds (*Potamogeton cheesemanii* and *P. ochreatus*) were common to 1.8 m depth. *Myriophyllum propinquum* was only present in shallow water to 1.2 m depth. The invasive bladderwort (*Utricularia gibba*) formed some high cover patches in shallow water, extending to 2.2 to 2.9 m depth. In shallow water, filamentous green algae intermingled with bladderwort. A dense cyanobacterial cover (rubbery jelly coating on sediment) was noted below the submerged macrophyte cover to 3.5 to 4 m depth.

Submerged vegetation had collapsed prior to a 2013 assessment, with almost no submerged vegetation present with only three submerged species recorded and none exceeding 5% maximum cover. This was associated with the water becoming highly coloured red/brown. In 2014 and 2016, the macrophytes had recovered slightly, growing at low covers to similar depths as the 2025 assessment. In 2009, the aquatic vegetation was similar to 2025, but more abundant and extending to 5.5 m deep. A 1988 vegetation survey (NIWA unpublished records) described a similar submerged vegetation to the 2009 description although *Chara australis* was more abundant and extended to a maximum depth of 9.5 m and *U. gibba* was not recorded.

LakeSPI



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
February 2025	Moderate	39.1%	36.8%	54.1%
April 2016	Moderate	27.1%	20.8%	26.7%
May 2014	Moderate	23.1%	17.6%	32.6%
April 2013	Non-vegetated	0.0%	0.0%	0.0%
March 2009	Moderate	42.7%	42.4%	54.1%
March 2006	Moderate	48.9%	45.6%	42.2%
November 2004	High	57.3%	51.2%	29.6%

In 2025, a **moderate** LakeSPI Index of 39.1% was calculated, reflecting slight but not significant increase in lake condition over the previous two sampling occasions. All LakeSPI Indices calculated for 2025, 2016 and 2014, were significantly improved compared to 2013, when the lake was non-

vegetated. Prior to the 2013 vegetation loss, the LakeSPI Index had declined from 57.3% in 2004 to 42.7% in 2009, with increasing cover of the invasive bladderwort (as indicated by the Invasive Impact Index) over that time. The Invasive Impact Index was identical in 2009 and 2025.

Water birds

A remote, large lake with scrub and wetland margins and extensive emergent beds would make this a good habitat for wetland birds. Observations in 2025 recorded Canada geese (*Branta canadensis*), mallard (*Anas platyrhynchus*) and a black shag (*Phalacrocorax carbo novaehollandiae*). Australasian bittern (*Botaurus poiciloptilus*) and fernbird (*Poodytes punctata vealeae*) were noted on previous surveys, with fernbird noted at the nearby Lake Te Kahika in 2025.

Fish

A fish survey undertaken in 2025 recorded 462 īnanga (*Galaxias maculatus*) ranging in length between 20-95 mm, 1190 common bully (*Gobiomorphus cotidianus*) ranging in length between 22-66 mm and 17 shortfin eel (*Anguilla australis*) ranging in length between 240-570 mm.

Aquatic invertebrates

In 2025, torewai (*Echyridella menziesii*) were recorded for the first time in this lake. Divers recorded these molluscs at two of the LakeSPI sites, and a juvenile 4.3 mm long at the boat access point.

Divers reported sponge gardens as very common throughout surveyed depths on wood, plants, mussel shells and bare sediment.

Lake Morehurehu: Sponges colonising submerged tree branches (Mary de Winton 2025).

Ball et al. (2015) record a total of 16 invertebrate taxa, with five different Diptera (flies) and four Hemiptera (bugs), the most numerous taxon was the water boatman *Diaprepocoris zealandiae.*

Endangered species

Several plants of Nationally Endangered fern *Todea barbara* were found on lake shore banks, as were the At Risk - Naturally Uncommon sundew with *Drosera pygmaea* noted in a lakeshore turf. The Nationally Critical bladderwort *Utricularia australis* has not been seen since 2009 and is apparently now extinct in this lake.

At-Risk Declining īnanga (*Galaxias maculatus*) were very common in this lake. Torewai (*Echyridella menziesii*), another At-Risk Declining species, reported for the first time in 2025, were present in several sites. A juvenile At-Risk Declining New Zealand praying mantis (*Orthodera novaesealandiae*) (Buckley et al. 2012) was found in marginal vegetation.

Lake Morehurehu: An At-Risk Declining New Zealand praying mantis (*Orthodera novaesealandiae*) (Jacki Byrd, 2025).

The At-Risk Relict black shag (*Phalacrocorax carbo novaehollandiae*) was recorded in 2025.

Lake Ecological Value

In 2025, an Ecological Value rating of **Outstanding** was calculated for Lake Morehurehu, with a score of 13. On the last three previous occasions the Ecological Value was **High** (12), with an improved indigenous species count that elevated the score. Improved trends in aquatic vegetation integrity were not sufficient to increase the score of this metric. The divers noted a thick cyanobacterial mat growing deeper than submerged macrophytes and consider that the light climate in the lake should be sufficient for plants to grow deeper than observed. Thus, the algal mat may be retarding macrophyte establishment in deeper water. Water quality monitoring records show this lake is mesotrophic (Five-year median TLI of 3.2).

Threats

The main risks for the introduction of invasive species come from the use of diggers in the catchment, or pine plantation harvesting gear that may be contaminated with invasive weeds such as alligator weed, (*Alternanthera philoxeroides*), or eel fishers using nets contaminated with submerged weeds. Introduced invasive species would establish and displace much of the indigenous vegetation. Although on private property, forestry roads provide access, albeit difficult, to Lake Morehurehu.

Water quality is good and submerged vegetation appears to be re-establishing, some 12 years after its collapse following pine harvesting in the catchment. Removal of the pine canopy likely allowed rain direct access to a broken soil layer. Quartz sands in the catchment have little or no ionic binding capacity (M. Gibbs, NIWA, pers. comm.), which may have led to leaching of tannic substances through the sands. Further harvesting operations threaten a similar degradation of the submerged vegetation. The lake is probably N limited (Gibbs et al. 2014) and thus sensitive to urea fertiliser addition in forestry or harvesting activities. Continued cultivation of pine plantations within the lake catchment is thus likely to lead to further deterioration of this lake, with little or no mitigation actions available.

Management recommendations

Lake ecological monitoring every five years will enable impacts to be documented and potential recovery rates tracked.

References

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