



Ecological Condition: Moderate-low

Submerged Plant Indices	Score	NPS-FM Attribute band
Native Condition Index	0%	D
Invasive Impact Index	N/A	N/A

Summary

Overall condition: Lake Egg is a small but relatively deep dune lake with important wetland-fringe habitat, but it is now in a degraded, devegetated, eutrophic state. A key change from 2021 is that hornwort has been successfully eradicated, but the lake has not recovered to a desirable native submerged plant community. Ecological value is now constrained by post-eradication collapse of submerged vegetation and ongoing eutrophication.

Threats: Eutrophication, internal nutrient loading, loss of submerged vegetation, and continued pastoral catchment pressure. The catchment is strongly dominated by pasture, with a high catchment-to-lake area ratio, making the lake highly sensitive to nutrient, sediment, and faecal-associated contaminant inputs during runoff events.

Recommendations: Reduce external nutrient and sediment inputs. Monitor water quality and periodic macrophyte surveys to detect natural re-establishment or invasive recolonisation.

General description

Lake Egg is a very small freshwater lake (1.92 ha) with a maximum depth of 7 m, located along the southeast coast of the Poutō Peninsula (1702415E, 5978174N). Despite its small size, the lake stratifies seasonally and is prone to internal nutrient loading. The limited lake volume and close coupling with the surrounding catchment makes Lake Egg highly sensitive to external nutrient and sediment inputs.

The lake lies within a 239.66 ha catchment, resulting in a very high catchment-to-lake area ratio. Land cover within the catchment is dominated by exotic vegetation (95.07%), with pastoral land use accounting for 90.22% of the total area. Pasture surrounds the lake and extends across most of the wider catchment, representing the principal influence on lake water quality through diffuse nutrient runoff, sediment mobilisation, and faecal-associated contaminant inputs during rainfall events.

Forestry occupies a small proportion of the catchment (3.18%) and occurs as scattered blocks around nearby Lake Roto-otuauro. These forestry blocks are not hydrologically connected to the lake so are unlikely to exert a significant influence on the water quality. Native vegetation is sparse, comprising only 4.93% of the catchment, and occurs as a small section of mānuka/kānuka that is part of a larger block along the western catchment boundary. As a result, this land cover provides limited direct benefits to the lake and is considered insufficient in scale to offset catchment-wide pastoral pressures.

Wetlands make up 4.11% of the catchment and are largely associated with Lake Rotootuauro and its surrounding low-lying areas rather than directly buffering Lake Egg. As a result, their capacity to intercept and process nutrients and sediments entering Lake Egg is limited, particularly for runoff originating from the pastoral land immediately surrounding the lake.

Hydrological inputs to Lake Egg are therefore dominated by diffuse overland flow from adjacent pasture, with minimal interception by native vegetation or wetlands. The close proximity of pastoral land to the lake margins further increases the likelihood of direct contaminant delivery, especially during high rainfall events.

The general condition of Lake Egg is strongly constrained by its small size, high catchment-to-lake area ratio, and dominance of intensive pastoral land use. While its depth may provide some resistance to rapid mixing, the lack of effective buffering and the prevalence of pasture-driven runoff elevate the risk of nutrient enrichment, reduced water quality resilience, and ongoing eutrophication pressure.

Wetland vegetation

Extensive emergent vegetation surrounds the entire lake and forms ~20 – 40 m wide beds that transition into floating wetlands with deep undercuts.

The species assemblage was dominated by *Typha orientalis*, *Machaerina articulata*, *Sparganium subglobosum*, *Carex fascicularis*, *Carex maorica*, and *Persicaria decipiens*. Previous surveys recorded additional aquatic/emergent species including *Ludwigia palustris*, *Myriophyllum propinquum*, *Isachne globosa*, *Hydrocotyle pterocarpa*, *Isolepis prolifera*, and the introduced *Callitriche stagnalis*, as well as *Persicaria hydropiper*, *Juncus effusus*, *Cenchrus clandestinus*, and *Paspalum distichum*.

The wetland condition is high based on the extent and diverse sedge–reed assemblage, providing substantial littoral habitat and shoreline buffering. The presence of introduced and pasture-associated taxa in historical records indicates some weed influence within the wetland flora and warrants continued surveillance for expansion.

Submerged vegetation

The 2026 survey indicates Lake Egg is currently devegetated (Video 1), with no submerged macrophyte beds and only occasional small strands of *Utricularia gibba* and clumps of *Azolla pinnata* amongst the emergent reeds. This represents a major structural change from the 2021 assessment where the lake supported a near-continuous surface reaching biomass of hornwort (*Ceratophyllum demersum*).

Hornwort control undertaken by the Northland Regional Council in 2021/2022 has successfully eliminated this invasive species with no fragments or re-establishment detected in 2026. However, the lake has not transitioned into a desirable native macrophyte dominated community.

The decomposing hornwort post herbicide application combined with a high suspended algal biomass has created a thick layer (~0.8 m) of organic floc on the lakebed. This layer of unconsolidated organic material is actively inhibiting macrophyte establishment by creating poor rooting conditions (Video 1).



Video 1: Devegetated lakebed with a thick layer of organic floc.

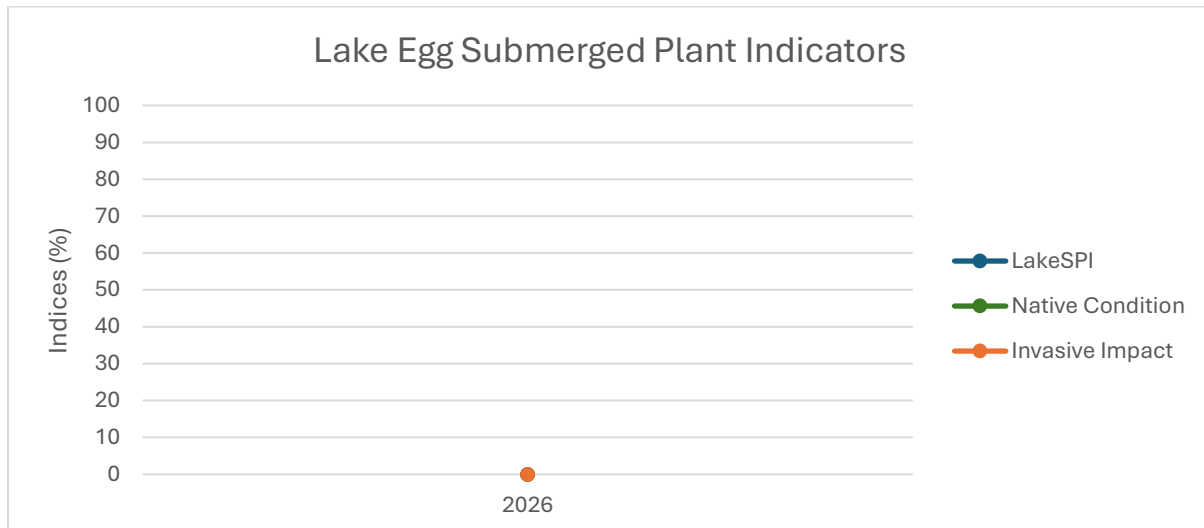
In addition to the impacted substrate, the encroaching emergent reeds and floating wetlands shade out the littoral zone. These structures extend beyond the photic depth along the entire lake margin and as a result displace submerged macrophytes.

The current eutrophic state has resulted in the formation of distinct midwater sulphide layer above the thermocline, which effectively excludes light from reaching the lakebed (Video 2). This adds persistent macrophyte limiting pressure to the system.



Video 2: Diver ascending through midwater sulphide layer.

The 2026 assessment resulted in a default LakeSPI score of 0, reflecting the absence of submerged vegetation and therefore the loss of macrophyte-driven ecological functions (Figure 1). A formal LakeSPI assessment has not been completed previously but given the prior dominance of hornwort it would have been expected that the lake would be in the poor category.



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
February 2026	Non-vegetated	0	0	0

Figure 1: Lake Egg LakeSPI scores as a percentage of the maximum Potential LakeSPI score, Native Condition Index, and Invasive Impact Index.

The likely future condition depends on whether Lake Egg can shift from an algal/turbid state into a clearer-water regime that allows submerged plants to re-establish. Under current conditions (high suspended algae, poor substrate, and littoral displacement), the most plausible near-term trajectory is a continued stable devegetated state. If water clarity and substrate conditions improve, the first colonists are likely to be opportunistic, low-anchorage species such as *Utricularia gibba* followed by patchy establishment of charophytes from existing seed banks. As a result, ongoing surveillance is recommended to ensure invasive species do not recolonise the lake.

Wetland birds

Lake Egg is a very small but relatively deep dune lake surrounded by extensive emergent and floating wetlands. A formal waterbird count was not done in 2026, but the wetland observations confirmed the abundance of high-quality habitat for wetland specialists.

Previous assessment recorded black swans (*Cygnus atratus*), dabchick (*Poliocephalus rufopectus*), mallard (*Anas platyrhynchos*), paradise shelduck (*Tadorna variegata*), fernbird (*Poodytes punctatus*) and spotless crake (*Zapornia tabuensis*).

The implied current assemblage is therefore wetland-specialist-led, with low-to-moderate numbers of common waterfowl. Dabchick presence indicates sheltered water and adequate prey, but also sensitivity to predation and disturbance. Fernbird and spotless crake are strong indicators of structurally complex, well-buffered reed-sedge margins that provide refuge and breeding habitat.

Lake Egg likely functions as a stepping-stone within the southern Poutō dune-lake network for dispersing rails, fernbird and dabchick. Management priorities should focus on biosecurity, protecting the emergent fringe, targeted acoustic surveys for cryptic species, predator control, catchment nutrient management and submerged macrophyte restoration.

Fish & invertebrates

In 2026, divers recorded large numbers of common bullies (*Gobiomorphus cotidianus*) within undercut margins and beneath the floating wetland. No eels were observed during the survey however, landowner observations suggest that large eels are still present in the lake. No key invertebrate species were recorded in 2026.

Endangered species

No threatened bird species were recorded during the 2026 survey. However, this should be treated as a non-detection rather than confirmed absence, because At Risk – Declining fernbird (*Poodytes punctatus vealeae*) and spotless crake (*Zapornia tabuensis tabuensis*) have been recorded previously. Both taxa can be missed in single visit counts due to cryptic behaviour and detection dependence on season, weather, and survey effort.

Accordingly, threatened-species conclusions for Lake Egg should be framed cautiously and, where management decisions depend on presence/absence, supplemented with repeat avifauna surveys and/or targeted call-playback/overnight acoustic approaches.

Lake ecological value

Lake Egg is currently classified as Moderate-Low, with an Ecological Value Score of 4/20.

Habitat size is low, reflecting the very small lake area (1.92 ha), although maximum depth of 7 m provides slightly greater physical stability than is typical of very shallow dune lakes. Buffering attributes are modest, the lake is encircled by extensive emergent vegetation, but native vegetation cover in the catchment is very low (4.93%) and most mapped wetland area is associated with adjacent low-lying areas rather than functioning as an effective treatment buffer for runoff entering Lake Egg.

The water quality value is low and consistent with the current eutrophic to supereutrophic state, seasonal stratification, internal nutrient loading, elevated algal biomass, sulphide development and poor resilience to pastoral nutrient inputs.

Aquatic vegetation diversity remains low, while aquatic vegetation integrity was scored as 0 because the lake is currently unvegetated. No threatened plants or fish, or live freshwater mussels, were recorded during the current assessment. Connectivity is a significant feature, reflecting the lake's position within the southern Poutō dune-lake network.

Overall, Lake Egg retains local ecological importance as a small reed-fringed dune lake with wetland bird habitat, but its current ecological value is substantially constrained by eutrophication and loss of submerged vegetation.

Threats

Lake Egg is in poor ecological condition due to eutrophication, loss of macrophytes and catchment pressures. Signs of persistent algal blooms, complete loss of submerged vegetation and a thick layer of decomposing organic floc across the lakebed indicate that the system has shifted to a degraded steady state. Dense sulphide precipitate throughout the lake further points to high organic decomposition and poor sediment conditions.

The lake is surrounded by steep pasture and erosion-prone slopes that likely contribute notable nutrient, and sediment loads to the lake.

Management recommendations

Management should focus first on reducing external stressors, especially sediment and nutrient runoff from the surrounding slopes, through sustained stock exclusion, extension of the planted margin to the top of the ridgeline, erosion control and improved pasture management through targeted best practice management plans.

Given the scale of degradation and complete loss of vegetation, recovery is likely to require a long-term restoration approach rather than short-term intervention alone. A long-term restoration plan could involve the use of flocculants and phosphorus sequestration to clarify the lake and stabilise the trophic state. This would create a period where the photic depth would extend to the lakebed. The increased photic depth would provide a suitable light climate for the re-introduction of native macrophytes. Tall fast growing vascular species (native pondweeds) are recommended as the colonisers followed by native charophytes.

Monitoring should focus on water quality as well as periodic macrophyte surveys to assess natural re-establishment of submerged vegetation.