

Lake Karaka

14/02/2026

NRC Lake Number: 347



Ecological Condition: High

Submerged Plant Indices	Score	NPS-FM Attribute band
Native Condition Index	60%	B
Invasive Impact Index	18.5%	B

Summary

Overall Rank: Lake Karaka supports charophyte-dominated submerged vegetation, a broad and near-continuous emergent wetland fringe, and important threatened bird and fish values. However, its overall condition is increasingly constrained by hornwort, which remains present despite recent control efforts.

Threats: Hornwort expansion, eutrophication and biosecurity transfer risk from recreational hunting and fishing. Catchment-scale pressures remain linked to forestry and broader nutrient enrichment risk despite substantial native vegetation and wetland buffering.

Recommendations: Prioritise eradication of hornwort and pampas control. Water quality and biodiversity monitoring to detect recovery post hornwort control and possible transition toward a more turbid state.

General description

Lake Karaka is a small dune lake (11.74 ha) with a maximum depth of around 5.8 m, located along the southwest coast of the Pouto Peninsula (1693415E, 5980559N). The lake experiences periodic stratification while remaining susceptible to wind-driven mixing particularly given its relatively small size and exposure to the open coastline.

The lake is situated within a large catchment (956.97 ha), resulting in a very high catchment-to-lake area ratio. Land cover within the catchment is mixed but still heavily influenced by exotic vegetation, which accounts for 51.82% of the total area. Forestry is the dominant exotic land use, covering 44.83% of the catchment and occupying much of the eastern extent. This forestry block is likely to exert a strong influence on catchment hydrology, sediment generation, and nutrient export, especially during forestry operations and high rainfall events.

Pastoral land use is limited, with low-producing pasture comprising 6.88% of the catchment, concentrated mainly along the eastern lake margin and centre of the catchment. While relatively minor in extent, these pastoral areas may still contribute localised nutrient and sediment inputs where hydrological connectivity to the lake is high and/or buffering is limited. In contrast, native vegetation represents a substantial component of the catchment, accounting for 36.89% of the land cover. This native vegetation occurs as large, contiguous mānuka/kānuka blocks concentrated around the lake margins, providing important buffering functions by intercepting overland flow, stabilising soils, and reducing direct contaminant delivery to the lake.

Wetlands comprise 7.09% of the catchment and form a complex along the western catchment boundary. These wetlands are likely to play a significant role in regulating hydrological flows and processing nutrients and sediments before water reaches the lake or downstream environments. Their size and connectivity suggest they provide a meaningful contribution to water quality moderation and habitat diversity within the broader catchment.

Hydrological inputs to Lake Karaka are largely from diffuse overland flow influenced by a combination of forestry-dominated sub-catchments, limited pastoral runoff, and

substantial native vegetation and wetland buffering. This mixed land-use configuration results in spatially variable pressures on lake water quality, with forestry and pasture posing potential risks that are partially mitigated by the extent of indigenous vegetation and wetlands.

Lake Karaka occupies an intermediate position along a disturbance gradient, where significant native vegetation cover and wetland complexes enhance ecological resilience, but the large catchment size and dominance of forestry land use maintain ongoing risks of sediment and nutrient enrichment under certain hydrological and land management conditions.

Wetland vegetation

The lake is almost entirely surrounded by a wide (15 - 50 m) continuous band of tall emergent reeds that extend past the wetted edge of the lake and into the open water body. This vegetation forms a floating wetland along the perimeter of the lake with some sections having rooted emergent vegetation to 0.8 m deep.

Typha orientalis and *Machaerina articulata* are the dominant species and form wide bands that extend over ~20 m wide and grow to ~1.5 m deep. The emergent mosaic includes *Apodasmia similis*, *Carex maorica*, *Carex secta*, *Cyperus ustulatus*, *Eleocharis acuta*, *Isachne globosa*, *Isolepis prolifera*, *Juncus pallidus*, *Machaerina arthropphylla*, *Machaerina juncea*, and *Schoenoplectus tabernaemontani*, with *Phormium tenax* and *Cordyline australis* also present.

The wetland condition is high due to near-continuous coverage, substantial width, and strong zonation/diversity across reed-sedge assemblages, supporting high littoral habitat provision.

Submerged vegetation

Lake Karaka currently supports high-quality, charophyte-dominated submerged vegetation, but the lake's overall condition is being increasingly impacted by hornwort. The 2026 LakeSPI transects show a maximum vegetated depth of ~3.5 m (transect lengths ~25–100 m), with *Chara australis* forming tall, structurally robust meadows (to ~1.1 m high) and very high covers (typically 76 – 100%). Native vascular macrophytes

(*Potamogeton ochreatus* and *Myriophyllum triphyllum*) persist but contribute little to the overall macrophyte assemblage. They typically occurred in low covers (generally 1 – 25%) and occupied narrower depth ranges than the charophyte beds.

Hornwort (*Ceratophyllum demersum*) remains present despite recent control efforts. It was found at low-moderate abundances (1 – 25% cover) along the LakeSPI transects with elevated covers along the eastern lake margin (Image 1 & Video 1).



Video 1: Low abundance of hornwort amongst the charophyte beds.



Image 1: Representative condition of hornwort along the eastern lake margin.

The lake-wide hornwort is assumed to have spread from several larger beds found in the small embayment in the southeastern corner of the lake. The average cover across the embayment was estimated at 6 – 25% with maximum covers of 51 – 75% recorded in

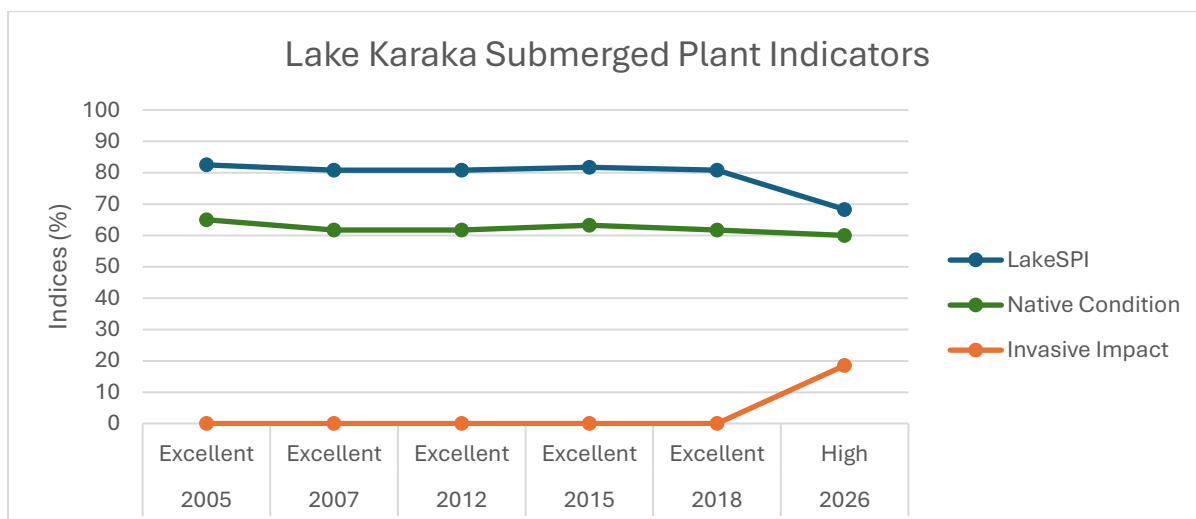
areas where large surface reaching beds were seen (Video 2). The poor water clarity during the 2026 survey limited the ability to accurately assess average hornwort covers and delimit the current extent.



Video 2: Large surface reaching hornwort beds in the southeastern embayment.

Prior to the July 2021 assessment, surveys recorded only native submerged vegetation, and Lake Karaka was categorised as being in excellent ecological condition with a LakeSPI Index of 81%. From 2021 onward, dense hornwort patches were detected in the southeastern section of the lake with scattered fragments recorded elsewhere. The 2022 survey recorded a higher species diversity (*Potamogeton cheesemanii*, *Chara australis*, *Potamogeton ochreatus*, *Myriophyllum triphyllum* and *Myriophyllum propinquum*) compared to the 2026 assessment where only three native species were recorded (*Chara australis*, *Potamogeton ochreatus*, *Myriophyllum triphyllum*). The 2022 assessment also recorded a higher abundance of vascular species whereas the vegetation assemblage recorded in 2026 was dominated by *Chara australis*.

The overall 2026 survey results indicate a declining trend from the 2018 LakeSPI score of 81% to a current score of 68.3% (Figure 1). This downward trend is directly attributed to the hornwort incursion and the resulting increase in the Invasive Impact score. Despite the decline in LakeSPI score, there appears to be a reduction in the hornwort extent and abundance compared to the rake throw survey done in 2022.



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
February 2026	High	68.3	60	18.5
September 2018	Excellent	80.8	61.7	0
May 2015	Excellent	81.7	63.3	0
April 2012	Excellent	80.8	61.7	0
April 2007	Excellent	80.8	61.7	0
March 2005	Excellent	82.5	65	0

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

The general macrophyte condition was good considering the poor water quality and persistent seasonal algal blooms. The charophyte growth in the upper littoral zone was healthy with low covers of epiphyton (Video 1), the charophyte beds exhibited less dense growth and a significant deterioration in condition toward the maximum vegetated depth extent (~2.6 – 3.5 m) (Video 3).

Lake Karaka’s current state is at risk of worsening if sustained hornwort control is not actioned. The persistence of hornwort along the eastern margin and within the assumed source embayment indicates an ongoing propagule reservoir, and the stated difficulty in accurately mapping the extent increases the likelihood that hornwort is more widespread than observed. *Chara australis* currently occupies the entire photic depth range and the dense growth is suppressing widespread hornwort expansion. If active hornwort control is done, it is likely that the lake will retain high condition charophyte meadows.



Video 3: Poor macrophyte condition along the maximum vegetated depth extent.

Lake-wide surveillance combined with targeted herbicide applications focused on the eastern margin and southeast embayment is recommended. Routine monitoring of water quality and clarity can also help identify early signs of a shift toward a sustained turbid state, which has historically driven macrophyte collapses.

Wetland birds

Lake Karaka is a small dune lake with a wide, near-continuous emergent wetland fringe. The 2026 survey recorded eight species and ~52 individuals. Paradise shelduck (*Tadorna variegata*) were most abundant (30), with New Zealand dabchick (*Poliocephalus rufopectus*, 8; including one leucistic bird), mallard/mallard-hybrids (*Anas platyrhynchos*, 4), and smaller numbers of black swan (*Cygnus atratus*, 3) and Canada goose (*Branta canadensis*, 3). Single observations were made of spotless crake (*Zapornia tabuensis*) and pied shag (*Phalacrocorax varius*). North Island fernbird (*Poodytes punctatus*, 2) was also detected which highlights the value of dense wetland margins for threatened passerines.

The recorded species assemblage suggests the lake is favoured by emergent-margin species rather than large open-water flocks. Previous assessments report additional wetland specialists including Australasian bittern (*Botaurus poiciloptilus*) and banded rail (*Hypotaenidia philippensis*).

The extensive 15 – 50 m wide emergent reedbeds with good zonation provide high value refuge, nesting and buffering habitat. The main risk is hornwort (*Ceratophyllum demersum*), which could rapidly reduce open-water quality and prey availability in this small lake. Management priorities should focus on protecting reedbeds, maintaining stock exclusion, hornwort surveillance and eradication, pest plant and animal control as well as targeted dusk rail/bittern monitoring.

Fish & invertebrates

Historic records from Karaka include longfin eels (*Anguilla dieffenbachii*), giant kōkopu (*Galaxias argenteus*) and common bullies (*Gobiomorphus cotidianus*) which represents a high conservation value native fish assemblage. No fish or invertebrates were observed during the 2026 survey due to poor underwater visibility. Accordingly, the current assessment provides no new confirmation of species presence, and the historical records remain the primary basis for describing the lake's fish community. The lack of 2026 observations should not be interpreted as evidence of absence.

Endangered species

Lake Karaka supports multiple threatened diadromous and lacustrine fish species, including longfin eel (*Anguilla dieffenbachii*; At Risk – Declining), inanga (*Galaxias maculatus*), and giant kōkopu (*Galaxias argenteus*), indicating high conservation value for native fish assemblages. Threatened birds recorded during the 2026 survey included New Zealand dabchick (*Poliocephalus rufopectus*; Nationally Increasing), spotless crake (*Zapornia tabuensis tabuensis*; At Risk – Declining), pied shag (*Phalacrocorax varius varius*; At Risk – Recovering), and North Island fernbird (*Poodytes punctatus vealeae*; At Risk – Declining). The co-occurrence of cryptic marsh birds and piscivores implies that retaining structurally complex littoral vegetation and minimising disturbance to wetland margins remain key management priorities.

Lake ecological value

Lake Karaka is classed as a High value lake, with an Ecological Value Score of 11/20. The habitat size is low-moderate, reflecting a small lake area (11.74 ha) and moderate maximum depth (5.8 m). Buffering remains relatively strong because the lake is almost

entirely encircled by a wide emergent fringe and catchment contains substantial native vegetation and wetland cover. Connectivity within the Poutō dune-lake complex adds 1 point to the overall score.

Water quality value is low, which is supported by observations of poor clarity and recurrent algal-bloom symptoms. Aquatic vegetation diversity remains high, but vegetation integrity is only low-moderate due to hornwort expansion.

Endangered-species value remains moderate however, no key-species were detected in 2026.

The previous assessments resulted in similar ecological value score, and the lake has retained the same classification. Historically Karaka had been classified as Outstanding however, this state is unlikely to be achieved again due to persistence of hornwort, lower aquatic vegetation integrity and continuing poor water quality.

Threats

Lake Karaka is threatened by ongoing eutrophication (likely from legacy in-lake sources and seasonal algal blooms), hornwort expansion and repeated biosecurity risks associated with duck hunting and eel fishing. Chronic nutrient stress and degraded water quality are evident through persistent algal blooms, high suspended algal biovolume and accumulations of dead algal material on the lakebed. Hornwort has already spread along the eastern part of the lake and could overrun the system if left unmanaged. Evidence of regular duck hunting highlights an ongoing biosecurity pathway, and the lake could serve as a source population for hornwort spread to other waterbodies on the Pouto Peninsula through hunting and fishing activities.

Management recommendations

Management should prioritise eradication of hornwort, supported by strong biosecurity messaging for lake users to reduce transfer to and from the site. Catchment and in-lake nutrient management remains important to address eutrophic conditions and improve ecological resilience. Ongoing pest control around the margins would provide additional biodiversity and habitat benefits to the many threatened species who call the lake home.