

Lake Kanono

12/02/2026

NRC Lake Number: 377



Ecological Condition: High

Submerged Plant Indices	Score	NPS-FM Attribute band
Native Condition Index	48.9%	C
Invasive Impact Index	43%	C

Summary

Overall Rank: Lake Kanono is a large, deep dune lake with high habitat value, persistent charophyte meadows, native vascular macrophytes, kākahi, and important wetland-bird values. However, it has declined from the 2021 “Outstanding” ranking. The main change is that the lake has shifted from Excellent–High macrophyte condition to a Moderate whole-lake macrophyte condition in 2026. This is driven by the expansion of invasive *Potamogeton crispus*, reduced depth extent of submerged vegetation, and stronger eutrophication symptoms.

Threats: Catchment pressure comes from surrounding pasture and forestry. Large numbers of Canada geese are also identified as a likely contributor to nutrient loading and macrophyte suppression through grazing. Additional threats include rats predating kākahi and the continued spread of invasive *Potamogeton crispus*..

Recommendations: Reduce external nutrient and sediment inputs, baseline fish survey, assess waterfowl pressure, undertake rat control to protect kākahi and survey the kākahi population.

General description

Lake Kanono is a large, deep dune lake with a surface area of approximately 74.4 ha and a maximum depth of 15.5 m, located along the southern tip of the Poutō Peninsula (1702592E, 5975202N). Its depth drives a strong stratification cycle, with the potential for prolonged hypolimnetic oxygen depletion, and internal nutrient loading.

The lake sits within a large 1,398.85 ha catchment, resulting in a high catchment-to-lake area ratio. Land cover within the catchment is predominantly exotic (78.23%), reflecting extensive pastoral and forestry land uses that exert contrasting but significant influences on hydrology and nutrient dynamics. Pastoral land comprises 28.45% of the catchment and occupies the entire eastern side, creating a direct source of diffuse nutrient, sediment, and faecal-associated contaminant runoff to the lake.

Forestry is the dominant land use, covering 49.78% of the catchment and extending across much of the western catchment area. Forestry operations influence runoff pathways, erosion potential, and sediment delivery, particularly during harvesting and roading activities. The scale and positioning of this forestry block mean it is a major determinant of catchment hydrological responses and sediment fluxes to the lake.

Native vegetation accounts for 18.70% of the catchment and is primarily concentrated within a large, contiguous mānuka/kānuka block that extends from the northern lake margin to the upper reaches of the catchment. This central native block provides an important buffering function by intercepting overland flow, stabilising soils, and reducing the direct transport of sediments and nutrients into the lake. It also enhances ecological connectivity and contributes to terrestrial and aquatic habitat values.

Wetlands are limited in extent, comprising only 0.5% of the catchment. These wetlands are concentrated at the northern end of the catchment, adjacent to the central mānuka/kānuka block. While small, they likely contribute to localised flow attenuation and nutrient processing, particularly for runoff draining from the native vegetation block, but their overall influence on lake-wide water quality is constrained by their limited area.

Hydrological inputs to Lake Kanono reflect an east–west land-use gradient, with nutrient-rich pastoral runoff from the eastern catchment, forestry-influenced flows from the west,

and moderated inputs from the centrally located native vegetation and wetland complex. Given the lake's depth, external nutrient inputs may accumulate in bottom waters during stratified periods, increasing the risk of internal loading when stratification breaks down.

The ecological condition of Lake Kanono is influenced by the interaction between its deep basin, large and intensively managed catchment, and strategically important native vegetation block. While the lake's depth and native buffering provide some resilience, the dominance of pastoral and forestry land uses within a high catchment-to-lake area ratio maintains a persistent risk of nutrient enrichment and water quality degradation under certain hydrological and land management scenarios.

Wetland vegetation

Less than 10% of the lake margin is bordered by narrow bands (~1 – 5 m wide) of emergent reeds. These reeds occur primarily as open, discrete beds rather than a continuous band around the lake edge. The south-western margin generally supports wider wetlands with average widths of ~5 – 10 m.

Schoenoplectus tabernaemontani, *Typha orientalis*, *Bolboschoenus fluviatilis*, *Cyperus ustulatus*, and *Eleocharis acuta* make up the majority of the emergent species assemblage. Kānuka (*Kunzea robusta*) formed a canopy on the south-western side with regionally uncommon shrubs (*Coprosma crassifolia*, *Corokia cotoneaster*) and the At Risk - Regionally Declining *Myrsine divaricata* amongst the understory. The At Risk – Declining and Regionally At Risk - Naturally Uncommon *Carex fascicularis* is currently abundant along sections of the wetted lake margin.

Wetland buffering capacity and littoral habitat extent are comparatively limited due to the discontinuous and narrow emergent fringe. Ecological value is strengthened by the locally abundant *Carex fascicularis* and the diversity of uncommon shrubland elements adjacent to the wet margin, indicating an intact terrestrial–wetland gradient in places.

Submerged vegetation

Lake Kanono has shifted from a long period of Excellent–High macrophyte condition to a Moderate whole-lake condition in 2026. The 2026 survey still recorded areas of high macrophyte condition with diverse species assemblages. However, lake-wide LakeSPI

scores were constrained by the expansion of invasive *Potamogeton crispus* as well as discontinuous native vegetation development and reduced depth extent relative to previous conditions. Additional impacts observed during the 2026 survey include high epiphyton cover on vascular macrophytes, benthic algal mats along the deeper contours, and high covers of filamentous algae in the upper littoral zone (Video 1). These factors contribute to the limitation of macrophyte growth and are indicative of a nutrient enriched system.



Video 1: *Myriophyllum triphyllum* stands covered with a layer of epiphyton.

The 2026 macrophyte assemblage remains charophyte-dominated with high covers (75 – 100%) of *Chara globularis*, *Chara australis* and *Nitella hyalina* (Video 2). These species formed tall canopies in several locations with maximum heights of ~0.8 – 1.2 m (Video 2 & Video 3).



Video 2: Tall charophyte meadows along the upper and mid littoral zone.

Native vascular macrophytes (*Myriophyllum triphyllum* and *Potamogeton ochreatus*) formed tall stands with a charophyte understory along large sections of the littoral zone however, they did not attain lake-wide average covers as high as the charophytes (Video 3). *Potamogeton cheesemanii* was recorded along only one survey transect but was seen in several locations outside of the survey areas.



Video 3: Native Pondweed bed with charophyte meadow understory.

Shallow-margin turf species (*Glossostigma elatinoides* and *Lilaeopsis novae-zelandiae*) formed isolated dense patches (75 – 90% cover) along the edge of the emergent reeds and the exposed sandy shallows. These species were a minor component of the overall macrophyte assemblage with lake-wide average covers of 1 – 5%. Large sections of the

turf zone were occupied by tall dense *Nitella hyalina* beds which created a monoculture (Video 4).



Video 4: Large *Nitella hyalina* bed in the upper littoral zone.

The vegetated depth extent spans from ~0.2 m at the reed edge to a maximum recorded depth of ~5.7 m. Charophytes occupied the entire vegetated depth extent whereas the milfoils tended to concentrate along the upper littoral zone. Native pondweeds were seen throughout the vegetated depth, but the distribution was variable across the lake.

A key driver of the reduced 2026 LakeSPI score is the expansion of invasive *Potamogeton crispus* (Figure 1). It occurs across a broad depth range and attains moderate to high covers (76 – 95%) in places with local average cover reaching 26 – 50%. This increased distribution creates a consistent invasive impact across the lake and presents a significant risk to native bed integrity if it continues to expand.

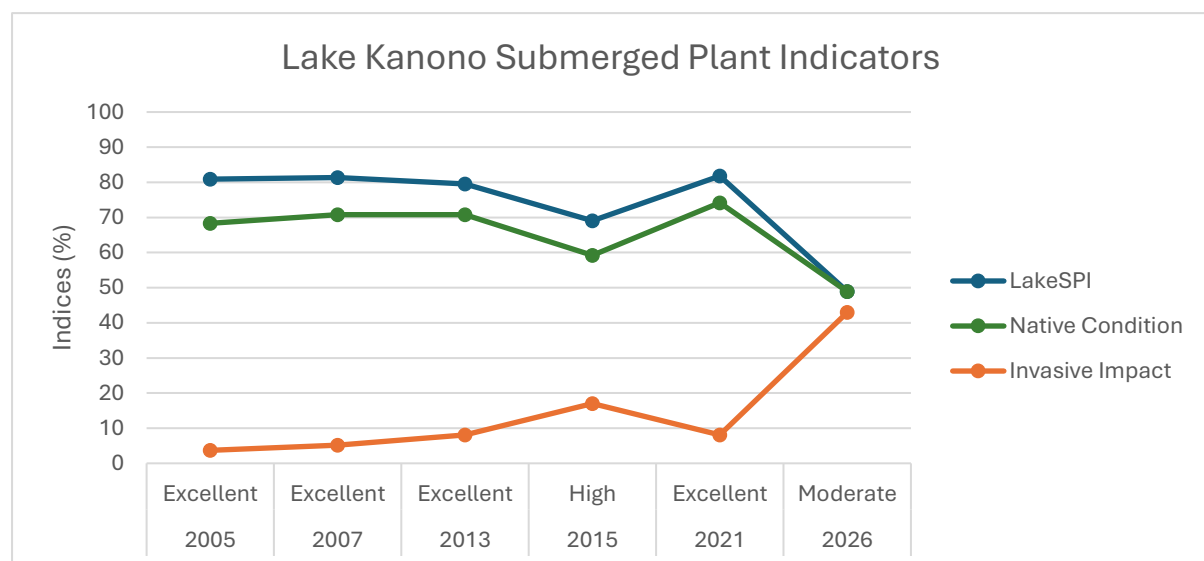
In 2021, Kanono supported an intact high-diversity submerged macrophyte assemblage with charophyte meadows interspersed with tall native vascular beds and only localised occurrences of *Potamogeton crispus*. *Stuckenia pectinata* was also previously recorded in shallow water on most profiles. The high species diversity, low invasive impact and maximum vegetated depth extent of 9.4 m resulted in an Excellent LakeSPI status in 2021 (Figure 1).

The 2015 assessment provides a useful “stress-state” comparison. Charophyte meadows were present at only one site and extended to a maximum depth of 2.6 m. Tall

vascular plants dominated the assemblage and extended to ~6.8 m. The 2015 LakeSPI score (69.1) improved markedly by 2021 which indicates that this lake is prone to state swapping (Figure 1).

The 2026 assessment confirmed that charophyte meadows are still a persistent feature of the lake however, the increased invasive species impact, reduced macrophyte extent, and eutrophication associated impacts have caused a drop in the overall macrophyte state.

If conditions persist (eutrophication and invasive species impacts) Lake Kanono is likely to remain in a Moderate state with a possible trend toward further decline. Despite this, Lake Kanono still retains important charophyte meadows, which can support recovery if invasive pressure is reduced and water quality is improved. Management and monitoring priorities should therefore focus on *Potamogeton crispus* control and assessing the drivers of eutrophication.



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
February 2026	Moderate	48.9	48.9	43
March 2021	Excellent	81.8	74.2	8.1
May 2015	High	69.1	59.2	17
April 2013	Excellent	79.5	70.8	8.1
April 2007	Excellent	81.4	70.8	5.2
March 2005	Excellent	80.9	68.3	3.7

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

Wetland birds

A relatively diverse species assemblage, dominated by open-water waterfowl, was recorded at Lake Kanono in 2026. Large flocks of mallard (*Anas platyrhynchos*) and mallard-hybrids, black swan (*Cygnus atratus*), Canada goose (*Branta canadensis maxima*), and New Zealand scaup (*Aythya novaeseelandiae*) were common, with smaller numbers of paradise shelduck (*Tadorna variegata*), dabchick (*Poliocephalus rufopectus*), red-billed gull (*Chroicocephalus novaehollandiae scopulinus*; At Risk – Declining), and sacred kingfisher (*Todiramphus sanctus*). This pattern is consistent with Kanono’s extensive open water and localised emergent habitat patches that provide shelter and feeding opportunities.

Previous assessments recorded rare matuku hūrepo - Australasian bittern (*Botaurus poiciloptilus*) and spotless crake (*Zapornia tabuensis*), indicating that the fragmented riparian vegetation can still support cryptic wetland species. With only ~10% of the shoreline currently occupied by emergent reedbeds, habitat quality is high for open-water waterfowl and moderate for emergent-margin specialists. Fragmented wetland margins likely constrain wide scale breeding and refuge for bittern, rails and other cryptic species. Kanono currently functions as a stepping-stone linking coastal Poutō wetlands with larger inland lakes used by mobile waterfowl and occasional coastal visitors.

Management priorities that would improve avifauna outcomes include maintaining and enhancing riparian cover, widening emergent margins in key bays where feasible, maintaining stock exclusion, and improving nutrient management to avoid eutrophication-driven habitat changes that could reduce suitability for diving ducks and wetland specialists.

Fish & invertebrates

Kanono retains both native fish and freshwater mussel values, but the 2026 survey also indicates potential loss of biodiversity. Dwarf inanga (*Galaxias gracilis*) were last recorded in 2017 and schools of inanga (*Galaxias maculatus*) had been observed during earlier surveys, but neither taxon was recorded in 2026. Common bullies (*Gobiomorphus*

cotidianus) were abundant during the 2026 assessment, although dead individuals were common along the lower macrophyte extent.

Large numbers of snails were also observed across the lake. Kākahi (*Echyridella menziesii*) occurred below the lower vegetation limit, at approximately 4.1 – 4.7 m deep, across most parts of the lake (Video 5). The size class distribution was skewed toward mature adults, predominantly 50 – 60 mm, with only a small proportion of individuals in the 20 – 40 mm range (Image 1). Average densities were 3 – 8 individuals/m² (Video 5). The skewed size class distribution and low densities are possible indications of population decline and recruitment failure. Numerous dead shells in varying states of degradation indicate both recent and persistent kākahi mortality within the lake.



Image 1: Representative kākahi size classes.



Video 5: Kākahi bed along the lower macrophyte extent.

Endangered species

Previous surveys have recorded dwarf inanga (*Galaxias gracilis*) and common inanga (*Galaxias maculatus*) in Lake Kanono, indicating ongoing connectivity and suitable littoral habitats for galaxiids.

During the 2026 survey, kākahi (*Echyridella menziesii*; At Risk – Declining) were widespread below the lower limit of macrophyte vegetation (c. 4.1 – 4.7 m).

Threatened avifauna recorded in 2026 included New Zealand dabchick (*Poliocephalus rufopectus*; Nationally Increasing) and red-billed gull (*Chroicocephalus novaehollandiae scopulinus*; At Risk – Declining).

On the south-western margins, regionally uncommon woody and sedge taxa were present, including *Coprosma crassifolia* and *Corokia cotoneaster* (Regionally At Risk - Naturally Uncommon), *Myrsine divaricata* (Regionally At Risk - Declining), and locally abundant *Carex fascicularis* (Nationally At Risk – Declining; Regionally At Risk - Naturally Uncommon), highlighting the conservation value of wet margin ecotones.

Lake ecological value

Lake Kanono is currently classed as High value, with an Ecological Value Score of 11/20. The habitat size remains relatively high because of the lake's large area and 15.5 m maximum depth. However, buffering is only low-moderate, as emergent vegetation is

sparse and discontinuous over most of the shoreline. Wetlands are very limited and native vegetation cover in the catchment is not extensive enough to offset the large amount of surrounding pasture and forestry.

Water quality value is poor and consistent with current in-lake observations of persistent algal pressure and high epiphyton loads. Aquatic vegetation diversity remains high, reflecting the continued presence of extensive charophyte meadows, native vascular macrophytes and shallow turf species. Vegetation integrity has declined to low-moderate because the overall LakeSPI condition has fallen and invasive *Potamogeton crispus* has expanded.

Endangered-species and key-species values remain important, with threatened taxa and live kākahi present. Connectivity within the Poutō lake complex adds a further point.

Relative to the 2021 assessment, the 2026 results represent a decline in ecological value. The 2021 report ranked Kanono as Outstanding with an ecological value score of 14/20, supported by excellent LakeSPI condition (81.8%), charophyte meadows extending to 9.4 m, and only localised *P. crispus*. The lower 2026 ecological value rating is attributed to a lower LakeSPI condition, receding maximum vegetated depth and invasive and eutrophication-related pressures.

Threats

Kanono is primarily affected by poor water quality, high-impact land use and increased bio-loading from large populations of waterfowl. Persistent algal blooms, benthic algal mats and high epiphyton cover on macrophytes indicate nutrient enrichment and reduced resilience of submerged vegetation.

The surrounding pasture and forestry land uses are likely major drivers of this pressure. Large numbers of Canada geese are also likely adding to the nutrient load and limiting macrophyte recovery through grazing.

Signs of pest ungulates and lagomorphs were noted and likely contribute to the degradation of riparian habitat. Rats pose a direct threat to kākahi. Shell caches along the lake edge show evidence of regular predation. The expansion of the invasive

macrophyte *Potamogeton crispus* poses a potential risk to the native dominated macrophyte assemblage.

Management recommendations

Management should focus on reducing external nutrient and sediment inputs through maintained stock exclusion, infill planting along the upper riparian zone and implementation of best practice land management for the surrounding high impact land use.

Waterfowl pressure should be assessed within the context of the wider lake nutrient budget to determine the true nature of their impact on this large waterbody. Pest control is recommended, particularly rat control to protect kākahi and ungulate/lagomorph control to reduce shoreline disturbance. A baseline kākahi population and fish survey would aid in future management plans and should be done as Lake Kanono is one of the few lakes that still support reasonable numbers of live kākahi.

Continued monitoring should track algal pressure, macrophyte response and the effectiveness of both catchment and pest management actions. Management of *Potamogeton crispus* is challenging and does not currently warrant the costs associated with controlling this species.