

Poutō Peninsula

Kanono (Poutō), NRC Lake No. 377.



Kanono viewed from the south east. Photo: Rod Budd NIWA 2010.

Summary	Kanono
Surveyed:	1985, 1988, 2001, 2005, 2007, 2013, 2015 and 2021.
Overall ranking:	Outstanding: This large lake has diverse submerged and emergent vegetation with no significant weed species and provides habitat for large numbers of water birds including several endangered species.
Threats:	Access is restricted, but if invasive species were introduced, they would likely displace most of the native species and affect water quality. There are indications of nutrient enrichment and a decline in water quality although the lake is currently mesotrophic and much of the pasture margin is fenced. Inflows at the north eastern end of the lake were noted in 2015. Plantation pine harvesting could potentially have a significant effect. Forestry to the west has not been harvested yet.
Management recommendations:	Lake native biodiversity value monitoring and pest plant surveillance every 5 years. Ensure fences are adequate to prevent livestock access to the lake margin.

Description

This lake (1702592E, 5975202N) is large (74.4 ha) and 15.5 m deep. The lake is situated on sand dunes with a pastoral catchment to the east and forestry to the west. Access is across 3 km of private farmland and the lake margin is fenced. Access to shore was through a locked gate and it was possible to launch trailered boats off a firm sloping beach using 4-WD.

Wetland vegetation

Wetland vegetation was sparse on the east side, usually less than 1 m wide, but had a broad 5 to 10 m zone present on the western lake edge. *Schoenoplectus tabernaemontani* was most common with some *Typha orientalis*, *Bolboschoenus fluviatilis*, *Cyperus ustulatus* and *Eleocharis acuta*.

Submerged vegetation

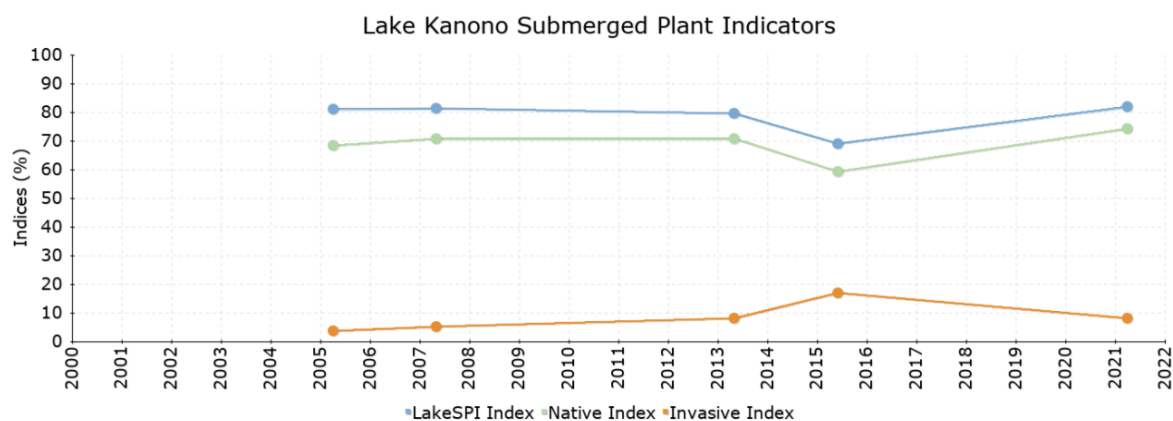
Turf species were not common but were present on the exposed sandy locations with *Lilaeopsis novae-zelandiae* and *Glossostigma elatinooides* dominant. *Elatine gratioloides* was recorded for the first time at Kanono in 2021.

In 2021, a diverse submerged vegetation was recorded, with charophyte meadows interspersed with beds of tall vascular species, especially *Potamogeton ochreatus* and *Myriophyllum triphyllum*. The introduced pondweed *Potamogeton crispus* continued to be found locally but had not significantly displaced native vegetation. The pondweed *Stuckenia pectinata* was recorded in shallow water on most profiles. The deepest charophyte was *Chara australis*, extending to a maximum depth of 9.4 m, with meadows of this and *C. globularis* present at all transects to a maximum depth of 9.2 m.

In contrast in 2015, charophyte meadows (>75% cover) were present at only one site and then to only 2.6 m deep, which was the maximum depth recorded for any charophyte species in 2015. At that time, tall-growing native vascular plants dominated, with *Potamogeton ochreatus* consistently the most abundant, growing to 6.8 m in 2015.

Utricularia gibba was not found in the submerged vegetation.

LakeSPI



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
March 2021	Excellent	81.8%	74.2%	8.1%
May 2015	High	69.1%	59.2%	17.0%
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%

LakeSPI for Kanono. Five LakeSPI surveys are recorded between 2005 and 2021.

Kanono is categorised as being in Excellent condition in 2021 with a LakeSPI index of 82%. It was categorised as being in High ecological condition with a LakeSPI Index of 69% in 2015. The improved score reflects a significantly improved (>15%) Native Condition Index and a lack of invasive species (most notably *Utricularia gibba*, a species common in adjacent lakes), apart from a few plants of *P. crispus* at one profile.

Water birds

A large isolated lake with retired margins and extensive areas of emergent vegetation makes it a good habitat for water birds. Pukeko (*Porphyrio melanotus*), three shag species (*Phalacrocorax* spp.), dabchick (*Poliiocephalus rufopectus*), white-faced heron (*Egretta novaehollandiae*), grey duck (*Anas superciliosa*), Australasian shoveler (*Anas rhynchos*), scaup (*Aythya novaeseelandiae*), paradise shelduck (*Tadorna variegata*), Canada goose (*Branta canadensis*), black swan (*Cygnus atratus*), red-billed gull (*Larus novaehollandiae scopulinus*) and kingfisher (*Todiramphus sanctus*) were seen in 2015, with more than 50 swan, Canada geese, Paradise shelduck and scaup observed on the lake. The migrant Eastern little tern (*Sternula albifrons sinensis*) was noted in 2007. DOC SSBI reports these species and also bittern (*Botaurus poiciloptilus*), and spotless crane (*Porzana tabuensis*).

Fish

The extensive aquatic vegetation provides good habitat for fish, with schools of īnanga (*Galaxias maculatus*) and also common bullies (*Gobiomorphus cotidianus*) observed during submerged vegetation surveys. The headless skeletons of two fish (approximately 20 cm long) were found on the lake shore in 2015. These were identified as most likely goldfish (*Carassius auratus*), or potentially another species in the carp family, by Dr Jacques Boubee (NIWA, Hamilton).

Aquatic invertebrates

The indigenous kawai / freshwater crayfish (*Paranephrops planifrons*) and *Glyptophysa variabilis* snails have been recorded previously but were not seen in 2021. Large torowai / freshwater mussels (*Echyridella menziesii*) were present in 2021 but large area of dead torowai were recorded at depths up to 8.8 m. However, there was evidence of recruitment with juvenile torowai recorded.

Endangered species

The At Risk – Declining torowai (*Echyridella menziesii*) and īnanga (*Galaxias maculatus*) were both commonly found in Kanono along with the Naturally Uncommon *Stuckenia pectinata* and Data Deficient *Glyptophysa variabilis*. Threatened birds noted in 2015 included the Nationally Critical grey duck and Australasian bittern, the At Risk Declining red-billed gull and fernbird, Naturally Uncommon little black and black shags and Recovering dabchick.

Lake Ecological Value

Kanono has a Lake Ecological Value score of 14 (Outstanding), reflecting an increase in buffering score and increases in both aquatic vegetation diversity and integrity scores. Previously, Kanono showed indicators of nutrient enrichment with extensive cyanobacterial mats, receding macrophyte bottom limits, change in charophyte species dominance and declining charophyte cover occurring. These trends have apparently reversed, with a 2021 condition similar to that in 2005, but with cyanobacterial mats still evident. Water quality trends showed improvement in TLI indicating eutrophic status (10-year median of 4.09) in 2019, likely to improve to mesotrophic should improvements continue.

Threats

Currently the submerged vegetation is comprised of native submerged plants except for *P. crispus*, which is having almost no impact on native species. The isolated nature of the lake and lack of easy access reduce the threat of introduction, but if introduced, pest species are likely to grow well and threaten indigenous lake values.

The lake has been undergoing periodic nutrient enrichment that could contribute to further decline in water clarity. The heavy seasonal growths of filamentous algae are a good indicator of enrichment. Nutrients from the catchment and those generated from lake stratification are still impacting on the lake.

It was noted that parts of the lake were inadequately fenced and livestock access to the lake at the north eastern edge was evident. However, emergent vegetation is re-establishing in areas where fencing has occurred.

Forest harvesting may have a major impact on this lake.

Management recommendations

Lake native biodiversity value monitoring and pest plant surveillance are recommended every 5 years.

Fencing of remaining areas, and riparian planting is advocated where possible, especially at the north eastern end of the lake, where a network of drains discharge into the lake. These drains should also be fenced. A consideration of nutrient sources and mitigation measures is required to rectify the ongoing decline in water quality.