Te Hiku

Lake Ngakapua, NRC Lake No. 115 (South Basin) and 117 (North Basin)

Lake Ngakapua South Basin: looking towards the southern shoreline (Svenja David, 2025).

Summary	Lake Ngakapua
Surveyed:	2005, 2010, 2014, 2015, 2016, 2017, 2018, 2020 and 2025.
Overall ranking:	**High:** Predominantly native vegetation (including regionally rare and At-Risk species) with decreasing impact by *Utricularia gibba* over time. Fencing has reduced livestock impacts and increased marginal emergent vegetation.
Threats:	A decline in submerged vegetation and loss of charophyte meadows indicate decline in water quality and possible evidence of pest fish browsing. Although lagarosiphon has been eradicated, pest plant introduction is still a major threat to Lake Ngakapua.
Management recommendations:	Undertake a fish survey over the next summer to identify the presence of pest fish. Secure fencing excluding cattle access is likely to improve water quality. Lake ecological monitoring should be undertaken every five years, including a survey for torewai and turf species in the northeastern bay in the South Basin.

Description

This dune lake (North Basin; 1617479E, 6124818N, South Basin; 1617755E 6124790N) is comprised of three lake basins separated by shallow areas of dense kuta (*Eleocharis sphacelata*) and a mānuka /harakeke island. The North Basin has 2.2 ha of open water, is 8.3 m deep and has a pastoral and planted forest catchment. The South Basin is 6.7 ha (or 10 ha including the kuta dominated area), is 6.1 m deep. There is also an East Basin that was not surveyed. The catchment is predominantly pastoral with plantation pine forestry to the west and some scrub on the southern side. There are no inflow or outflow streams. Much of the lake has been fenced to exclude livestock. Access is via well-formed forestry roads then a short distance across farm land.

Wetland vegetation

Emergent vegetation of both basins was dominated by kuta (*Eleocharis sphacelata*) extending from the lake edge to a maximum depth of 2.1 m. This bed varied from 5 to 20 m wide and formed an almost complete zone apart from parts of the South Basin. *Machaerina arthrophylla, M. articulata* and raupō (*Typha orientalis*) were locally present.

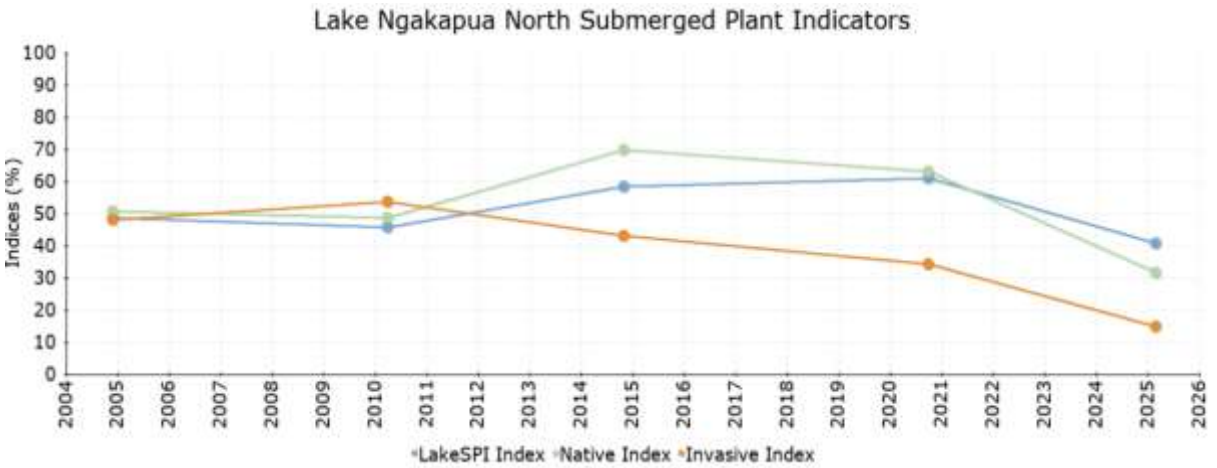
Submerged vegetation

In 2025, a diver survey of five LakeSPI sites on the South Basin and three sites on the North Basin were undertaken to depths of 4.4 m and 7.2 m respectively. They reported a loss of previously recorded charophyte meadows, with *Chara australis* and *Nitella* sp. aff. *cristata* distributed at low cover (≤ 5%) to a maximum depth of between 3.3 and 4.3 m. Some small denser patches of *Nitella* sp. aff. *cristata* occurred in deeper water. Low covers of the charophytes *Nitella leonhardii* and *N. mucosa* were recorded at one site in the South Basin. *Potamogeton cheesemanii* commonly formed a band between 2.0 and 2.2 m depth with a moderate cover (≤50%), and on occasion, combined covers of this pondweed and charophytes exceeded 10% cover from between 2.2 to 4.3 m depth. All plants were heavily silted and the bottom sediments looked disturbed, especially at depths of 2.2 to 2.5 m, with pock marks and hollows indicative of fish browsing. The invasive *Utricularia gibba* was restricted to the emergent kuta beds. Submerged plants of *Myriophyllum robustum* were locally common amongst kuta in the North Basin, the first record of this plant in Lake Ngakapua.

On previous monitoring occasions, the submerged vegetation was dominated by charophyte meadows of *Nitella* sp. aff. *cristata* with lesser amounts of *N. leonhardii* to a maximum depth of 5.7 m in the North Basin and 4.9 m in the South Basin, with some *Chara australis* on two profiles to about 3 m deep. The charophytes were usually accompanied by tall *Potamogeton cheesemanii* to 4.2 m in the north basin and 3.8 m in the south basin. A low cover band of the exotic *Utricularia gibba* extended from within the emergent to 2.5 m in the North Basin and to 3.0 m in the South Basin.

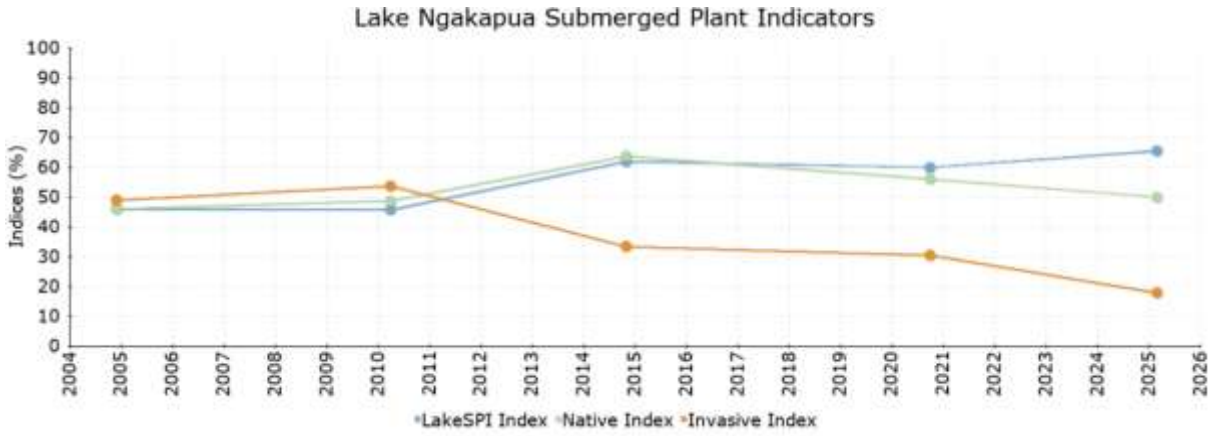
LakeSPI

North Basin



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
February 2025	Moderate	40.7%	31.7%	14.8%
September 2020	High	61.0%	63.1%	34.3%
October 2014	High	58.5%	69.8%	43.2%
March 2010	Moderate	45.7%	48.8%	53.7%
November 2004	Moderate	48.8%	50.8%	48.1%

South Basin



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
February 2025	High	65.5%	50.0%	17.8%
September 2020	High	60.0%	56.0%	30.4%
October 2014	High	61.9%	63.8%	33.3%
March 2010	Moderate	45.6%	48.8%	53.7%
November 2004	Moderate	46.0%	46.0%	48.9%

In 2025, a **moderate** LakeSPI Index of 40.7% was calculated for the North Basin with a **high** (65.5%) Index score for the South Basin. The dive survey showed some moderate covers of charophytes in the deeper basins, so the scores generated do not adequately reflect the reduction of plant covers over much of the profile. Additionally, the reduction in Invasive Impact Index due to reduced extent of invasive bladderwort (*Utricularia gibba*) cover over the past three monitoring occasions has

positively influenced LakeSPI scores, balancing declines in Native Condition Index likely related to declining water quality and potentially by pest fish browsing.

Water birds

The extensive emergent vegetation provided suitable habitat for many waterbirds. In 2025, one grey duck (*Anas superciliosa*), three black swan (*Cygnus atratus*), two paradise shelduck (*Tadorna variegata*), 24 Canada geese (*Branta canadensis*), two Caspian tern (*Hydropogne caspia*) and one pied shag (*Phalacrocorax v. varius*) were recorded. Previous bird surveys have also reported Australasian bittern (*Botaurus poiciloptilus*) New Zealand dabchick (*Poliocephalus rufopectus*) and Australasian little grebe (*Tachybaptus n. novaehollandiae*) from this lake.

Fish

In 2025, divers recorded an unidentified eel (*Anguilla*) species, a dead goldfish (*Carassius auratus*) and fish excavation holes at depths of 2.2 to 2.5 m. Large fish were observed in the lake but no identification was possible. On previous occasions, common bullies (*Gobiomorphus cotidianus*) and *Gambusia affinis* were recorded during vegetation surveys.

Aquatic invertebrates

Torewai / freshwater mussels (*Echyridella menziesii*) were not observed in 2025. On previous occasions, they were common amongst the turf community at the northeastern end of the South Basin, but not in other areas.

Ball et al. (2015) record a total of 30 invertebrate taxa, with seven different Diptera (flies) and six different dragonflies; the most numerous taxon being the water boatman *Sigara* sp. Additionally, previous diver records included the introduced ramshorn snail *Planorbarius corneus* and the indigenous leech *Richardsonianus mauianus.*

Endangered species

In 2025, new threatened species records included the At-Risk Naturally Uncommon Declining *Myriophyllum robustum*.

In 2010, the Nationally Critical *Utricularia australis* was recorded as being relatively abundant at three of the five profiles in the southern basin. However, no plants of this species were recorded in 2014, perhaps due to the timing of the survey. *Utricularia australis* was found in the northern basin in March 2015 but has not been seen since.

At-Risk Declining torewai / freshwater mussels (*Echyridella menziesii*) were previously recorded as common amongst the turf community at east end of the South Basin.

Nationally Vulnerable birds grey duck (*Anas superciliosa*) and Caspian tern (*Hydroprogyne caspia*) were recorded in 2025, along with At-Risk Recovering pied shag (*Phalacrocorax v. varius*).

Lake Ecological Value

In 2025, an Ecological Value rating of **High** was calculated for Lake Ngakapua, with a score of 10. This represents a decline from an **Outstanding** score of 13 calculated in 2020, with a decline in water quality to eutrophic in 2021 and reduction in Native Condition Index and apparent loss of torewai (*Echyridella menziesii*) in 2025.

Submerged vegetation decline was documented in 2025, possibly indicating pest fish browsing.

Threats

An incursion of the pest plant lagarosiphon (*Lagarosiphon major*) was detected in the South Basin of Ngakapua for the first time in 2014. After delimitation of the incursion, the herbicide endothall dipotassium was applied in 2015, with no further plants found after that. Lagarosiphon is now considered eradicated from Lake Ngakapua. This illustrates the importance of regular dive surveys, allowing for an effective incursion response.

Lake Ngakapua: *Lagarosiphon major* rooted shoot adjacent to emergent kuta (Rohan Wells, 2014).

Invasive pest plants still pose a significant threat to Lake Ngakapua. Egeria (*Egeria densa*) was recorded as a new introduction to the adjacent Lake Carrot in 2010, indicating a common vector could be spreading the weeds (possibly via duck shooting or eel fishing activities). The ramshorn snail noted in this water body is also an introduced pond and aquarium species.

There is evidence of pest fish browsing on the submerged vegetation of Lake Ngakapua. This combined with likely water quality decline has led to the loss of charophyte meadows and low covers of remaining submerged plants. The predominantly pastoral catchment is a likely source of nutrients, with cattle allowed periodic access to much of the shoreline (inside the fence) impacting those emergent plants in shallow water susceptible to grazing and trampling.

Management recommendations

A fish survey is recommended over the next summer, to attempt to identify the large fish seen at distance by the diver team. Likely pest fish species feeding on submerged plants would be rudd

(*Scardinius erythrophthalmus*) or koi carp (*Cyprinus rubrofuscus*). eDNA sampling and analysis may also be a useful tool to detect these species.

Retirement of the lake margins and prevention of cattle access will encourage vegetation development around the margins and some interception of diffuse nutrient-runoff.

A thorough survey of the shallow bay at the northeastern margin of the South Basin for torewai and also turf species should be undertaken, and included in the five yearly assessment of lake ecological condition.

References

Ball, OJ-P, Pohe, S.R., Winterbourn, M.J. (2015) Littoral macroinvertebrate communities of dune lakes in the far north of New Zealand. *New Zealand Journal of Marine and Freshwater Research* 49: 192–204.