

Poutō Peninsula

Rotokawau (Poutō), NRC Lake No. 364.



Lake Rotokawau: Emergent kuta (*Eleocharis sphacelata*) on the southern shore (Mary de Winton, 2025)

Summary	Lake Rotokawau
Surveyed:	2001, 2005, 2007, 2012, 2015, 2018 and 2025.
Overall ranking:	Outstanding: Native submerged vegetation has declined significantly since 2015, but charophyte meadows have reestablished since 2018. Water quality is mesotrophic and the lake supports extensive turf communities dominated by the Nationally Critical <i>Trithuria inconspicua</i> as well as extensive beds At-Risk Declining torewai.
Threats:	Presumably eel fishing nets were the mode of introduction of egeria and nets pose a threat for future introductions of pest species. Any major decline in water quality could potentially lead to the loss of the largest known remaining population of <i>Trithuria inconspicua</i> and also lead to increased impacts of egeria on deeper water vegetation.
Management recommendations:	Management of egeria could involve bottom-lining with hessian or targeted diquat herbicide application supplemented with hand-weeding by divers. Royal fern plants should be controlled to protect rare plants in the lake marginal vegetation. Lake ecological assessment should be carried out every 5 years.

Description

This dune lake (1702929E 5976997N) is 26.4 ha in size and 13 m deep. A water sample taken from this lake in 2015 and analysed for chloride ion concentration showed a much lower value than concentrations for Kanono, Humuhumu and Mokeno. Based on this Dr Max Gibbs (NIWA) surmised the lake is likely to be perched, rather than linked to surrounding lakes by a regional aquifer. This is corroborated by an elevation assessment by Andrew Macdonald (NRC) showing this lake is an additional 10 m above Kanono and Humuhumu. The catchment is pastoral, with plantation pine and shrub land, with the lake being fenced and the riparian margin retired. Access is across private farmland, requiring a 4-WD vehicle.

Wetland vegetation

Pockets of emergent species on soft shores occupied 15% of the lake margin. Dominant species included *Schoenoplectus tabernaemontani*, *Machaerina articulata*, *M. arthropylla*, *M. juncea*, *Eleocharis acuta*, kuta (*E. sphacelata*), *Isolepis prolifera*, raupō (*Typha orientalis*) and oioi (*Apodasmia similis*), with kuta growing to a maximum depth of 1.8 m. The sheltered northeastern arm of this lake has a well-developed wetland fringe with many of these species present. Marsh fern (*Thelypteris confluentis*) was noted in the wetland as an understory in 2025.

Much of the lake margin had hard iron pan substrates and a well-developed turf was noted in places. In 2025, *Pelargonium inodorum* and *Centipeda minima* ssp. *minima* were noted for the first time, growing with the common *C. aotearoana*. Royal fern (*Osmunda regalis*) was widespread on all surveys since 2010.

Submerged vegetation

In 2025, a diver survey of five LakeSPI sites was undertaken to depths of ~10 m. Charophyte meadows extended from 2 m to between 4.7 and 7.4 m, with patchy charophyte covers in deeper water; ≥10% cover to between 5.5 to 9.4 and the deepest plants recorded to 9.6 m. Dead plants decaying on sediment surface were noted to 10 m depth in the deepest basin. Deeper plants were generally clean, but sediments were covered by a cyanobacterial crust.

The charophyte meadows were dominated by *Chara australis*, with *C. acanthopitys* and *Nitella mucosa* at lower covers in shallower water (<5 m). The pondweeds *Potamogeton ochreatus* and *P. cheesemanii* were common with scattered milfoil *Myriophyllum triphyllum* plants in this shallower vegetation. The invasive weed egeria (*Egeria densa*) was also found in three transects, with variable covers ranging from individual shoots to covers up to small beds <50% cover mostly in a band between 1.7 m (the maximum extent of torewai beds) to 3.2 m deep.

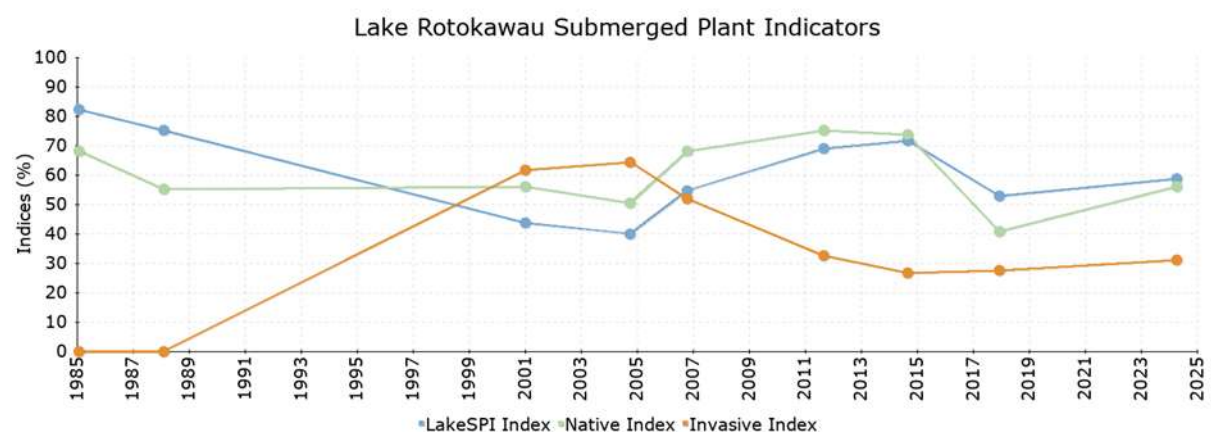


Lake Rotokawau: Charophyte meadow of *Chara australis* (left) with *C. acanthopitys* in the foreground, the largest bed of the invasive weed egeria (*Egeria densa*) seen on the survey (right) (Mary de Winton 2025).

Diverse turf communities were recorded at two sites from the lake shore to 0.6 m, with *Lilaeopsis novae-zelandiae*, *Trithuria inconspicua*, *Myriophyllum votschii* and *M. propinquum*, *Glossostigma elatinoides*, *Elatine gratioloides* and *Nitella hyalina*. Fine filamentous threads of the invasive *Utricularia gibba* was noted growing on sand in very shallow (≤ 0.2 m) water.

A similar vegetation has been recorded on all previous occasions, although charophyte meadows were not recorded in 2018. Egeria was first recorded in Lake Rotokawau in 2001 (Champion et al. 2002).

LakeSPI



Survey Date	Status	LakeSPI %		Native Condition %		Invasive Impact %	
March 2025	High	58.7%		56.0%		31.1%	
September 2018	High	52.9%		40.8%		27.4%	
May 2015	High	71.6%		73.6%		26.7%	
April 2012	High	68.9%		75.2%		32.6%	
April 2007	High	54.7%		68.0%		51.9%	
March 2005	Moderate	40.0%		50.4%		64.4%	
May 2001	Moderate	43.7%		56.0%		61.7%	
February 1988	Excellent	75.1%		55.2%		0.0%	
January 1985	Excellent	82.2%		68.0%		0.0%	

In 2025, a **high** LakeSPI Index of 58.7% was calculated for Lake Rotokawau. Native Condition Index in 2025 was significantly better than in 2018, but worse than 2015. The recent improvement is likely influenced by the reestablishment of charophyte meadows in the lake.

Water birds

Limited marginal vegetation provides restricted cover for resident water birds. Birds observed in 2025 included one Australasian bittern (*Botaurus poiciloptilus*), and four New Zealand dabchick (*Poliocephalus rufopectus*). A flock of 29 black swan (*Cygnus atratus*) were recorded flying over the lake. On previous occasions the following additional species were recorded; shoveler (*Anas rhynchos*), mallard (*A. p. platyrhynchos*), grey duck (*A. superciliosa*) and/or hybrids with mallard, paradise shelduck (*Tadorna variegata*) and little black shag (*Phalacrocorax sulcirostris*). In 2012, a pair of vagrant Cape Barren geese (*Cereopsis novaehollandiae*) were seen at Lake Rotokawau.

Fish

The divers recorded a shortfin eel (*Anguilla australis*), with previous records of common bully (*Gobiomorphus cotidianus*) and īnanga (*Galaxias maculatus*).

Aquatic invertebrates

Torewai or freshwater mussels (*Echyridella menziesii*) were abundant in shallow water (0.8 to 1.7 m deep) in the 2025 survey. Leeches (*Richardsonianus mauianus*), and *Potamopyrgus antipodarum* snails were previously noted in Lake Rotokawau.



Lake Rotokawau: A dense shallow-water bed of torewai (*Echyridella menziesii*) (Tracey Burton, 2018).

Endangered species

Lake Rotokawau supports possibly the last population of the Nationally Critical *Trithuria inconspicua* on the Poutō Peninsula and is potentially the largest global population of this species.

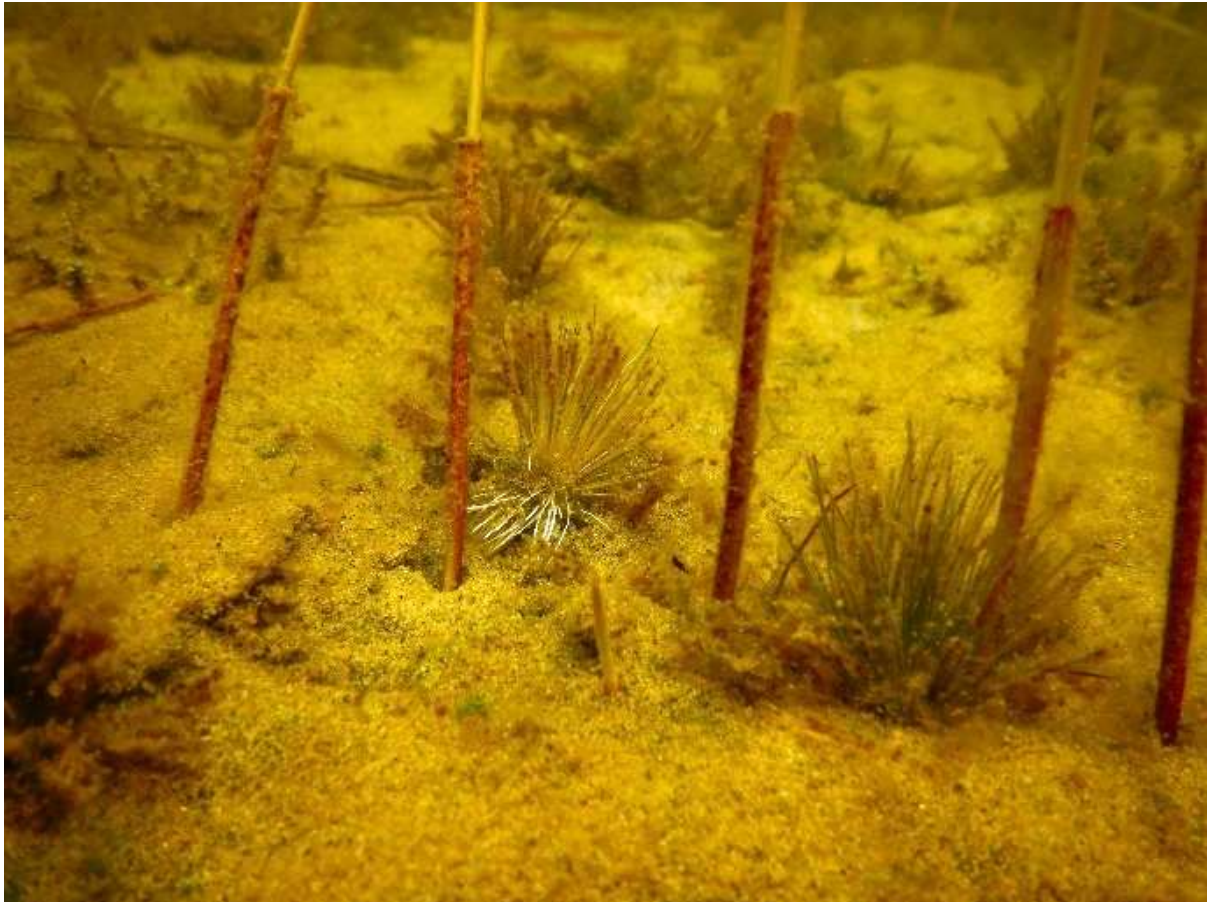
A patch of the At Risk – Declining marsh fern *Thelypteris confluens* was noted in a marginal wetland. Additional threatened or at-risk plants seen in the lake surrounds in 2025 included the Nationally Endangered moss, *Archidium elatum*. Currently, it is known from only four extant populations, including this one. It was locally common, terricolous patch under shaded mānuka fen on the lake margin. A large population of the Threatened – Nationally Vulnerable orchid *Spiranthes australis* was confirmed as it was in flower in March 2025.



Lake Rotokawau: The Nationally Vulnerable orchid *Spiranthes australis* (Lisa Forester, 2025).

A new population of the At Risk Declining mint, *Mentha cunninghamii* was discovered under the scrub of the lake shore on the Northern margin. Two At-Risk Naturally Uncommon plants *Centipeda minima* ssp. *minima* and *Pelargonium inodorum* were also recorded.

The At-Risk Declining torewai (*Echyriddella menziesii*) were abundant in shallow water and īnanga (*Galaxias maculatus*) are still likely to occur in Lake Rotokawau. Threatened birds seen in 2025 included the Nationally Critical Australasian bittern (*Botaurus poiciloptilus*) and Nationally Increasing New Zealand dabchick (*Poliocephalus rufopectus*).



Lake Rotokawau: Large plants of a population of the Nationally Critical *Trithuria inconspicua* in 0.5 m deep water (Mary de Winton, 2025).

Lake Ecological Value

In 2025, an Ecological Value rating of **Outstanding** was calculated for Lake Rotokawau, with a score of 16. Lake Rotokawau is currently mesotrophic, with a median TLI of 3.1 over the past 5 years.

Threats

Egeria is currently having a limited impact on Lake Rotokawau, likely due to the current water quality, with a TLI of 3.1, close to the oligotrophic state. Any deterioration of water quality could result in proliferation of this plant, with major impact on lake values. Presumably eel fishing nets were the mode of introduction of egeria and pose a threat for future introductions of pest species. Other weeds such as hornwort (*Ceratophyllum demersum*) are present in several Poutō lakes,

although all are currently managed for this pest and significantly reducing the likelihood of its introduction.

Nutrient enrichment likely relates to farming activities in the catchment.

Management recommendations

Difficult access to the lake across farmland (and requiring permission) reduces the risk of weed incursions so annual weed surveillance monitoring has been suspended. However, eel fishing poses a real threat of reintroduction of this and other submerged weeds. It would be worth discussing this risk with the landowner.

Management recommendations for control of *egeria* (de Winton 2025) are as follows:

- Initially treat larger weed bed patches by bottom lining or using the herbicide diquat by diver injection.
- Systematically hand remove plants around the perimeter of the lake using divers.
- Undertake ongoing surveillance and hand weeding twice a year (suggesting October and March) until no plants are located.
- Undertake further surveillance once a year for two years without detection, before eradication is declared.

Livestock access has been prevented by fencing and a thick riparian sward of kikuyu (*Cenchrus clandestinus*) has developed. Although this species is invasive, it can intercept and absorb nutrient-rich surface flows partially mitigating lake eutrophication¹. Establishment of native riparian species will require kikuyu control in the future².

Lake ecological assessment should be carried out every 5 years.

References

Champion, P.D., Dugdale, T.M., Taumoepeau, A.T. (2002) The aquatic vegetation of 33 Northland lakes. NIWA Client Report NRC01203, Hamilton: 76.

de Winton, M.D. (2025) Control of *Egeria densa* in Lake Rotokawau, Poutō Peninsula. NIWA memo to Jacki Byrd, NRC. 5.

¹ <https://www.envirolink.govt.nz/assets/Envirolink/Guidelines-for-artificial-lakes.pdf>

² <https://www.dairynz.co.nz/media/afult54h/riparian-mgmt-northland.pdf>