

ECOLOGICAL VALUE SCORE

11 /20

Overall Rank: High

Key impact

Utricularia gibba: This invasive species is displacing the critically endangered native *Utricularia australis* and is expanding across the lake.

Declining state: There are signs of declining lake health.

Management action

Attempt to control *U. gibba* before it overruns the lake. Cultivate *U. australis* in a controlled facility so that it can be re-introduced into sites where it once existed.

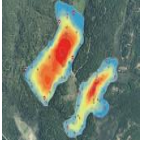
Routine monitoring including monthly water quality testing as well as 3-5 yearly ecological assessments and invasive species surveillance.



Did you know:

Tāniko is one of the last known populations of critically endangered *Utricularia australis* in Northland!

Report card glossary



Habitat size: This score is based on the size and depth of the lake. Large deep lakes are more stable because they have a greater dilution capacity and a larger area to support different habitat types.



Connectivity: This score considers the number of nearby lakes and wetlands. This connectivity is important as several threatened birds travel between waterbodies that form a network of habitats across the landscape.



Buffering: This score is based on the riparian vegetation around the lake and how much native vegetation and wetlands there are in the catchment. This vegetation filters pollutants entering the lake from the surrounding land.



Water quality: This score is based on the nutrient concentrations in the lake. Higher nutrient concentrations typically result in a poor level of ecological health and is often associated with murky water and algal blooms.



Aquatic vegetation diversity: This score is based on how many different species of aquatic plants live in the lake. Lakes with a high diversity of aquatic plants are usually in better ecological condition.



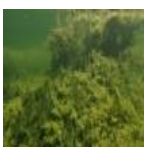
Aquatic vegetation integrity: This score is based on the extent, diversity and condition of native submerged plant. Fully vegetated lakes with a high species diversity are often in the best condition.



Endangered species: This score is based on how many endangered plants and fish live in this lake. Endangered species add value to the ecosystem and are an indicator of good ecological health.



Presence of key species: This score is based on the presence of freshwater mussels (kakahī or torewai). These mussels are important for lake health because they filter the lake and remove algae.



LakeSPI: This score is based on the health, density and extent of native and exotic submerged plants in the lake. This score also integrates the impact of invasive submerged plants.

General description

Tāniko (Te Paki Dune Lake) was assessed during the following years: 2005, 2007, 2013, 2015, 2019 and 2024.

Tāniko (34°31'52"S 172°47'36"E) is a small (2.2 ha) shallow (2.7 m) lake situated on the west coast of the far north near Kahokawa Beach. The lake is impounded by tall mobile dunes along the western end and surrounded by lacustrine wetlands along the remaining perimeter. The water is clear with a subtle brown stain from the emergent vegetation and surrounding native bush sub-catchment.



Tāniko - Southern view indicating the impounding dune to the west and the surrounding lacustrine wetland

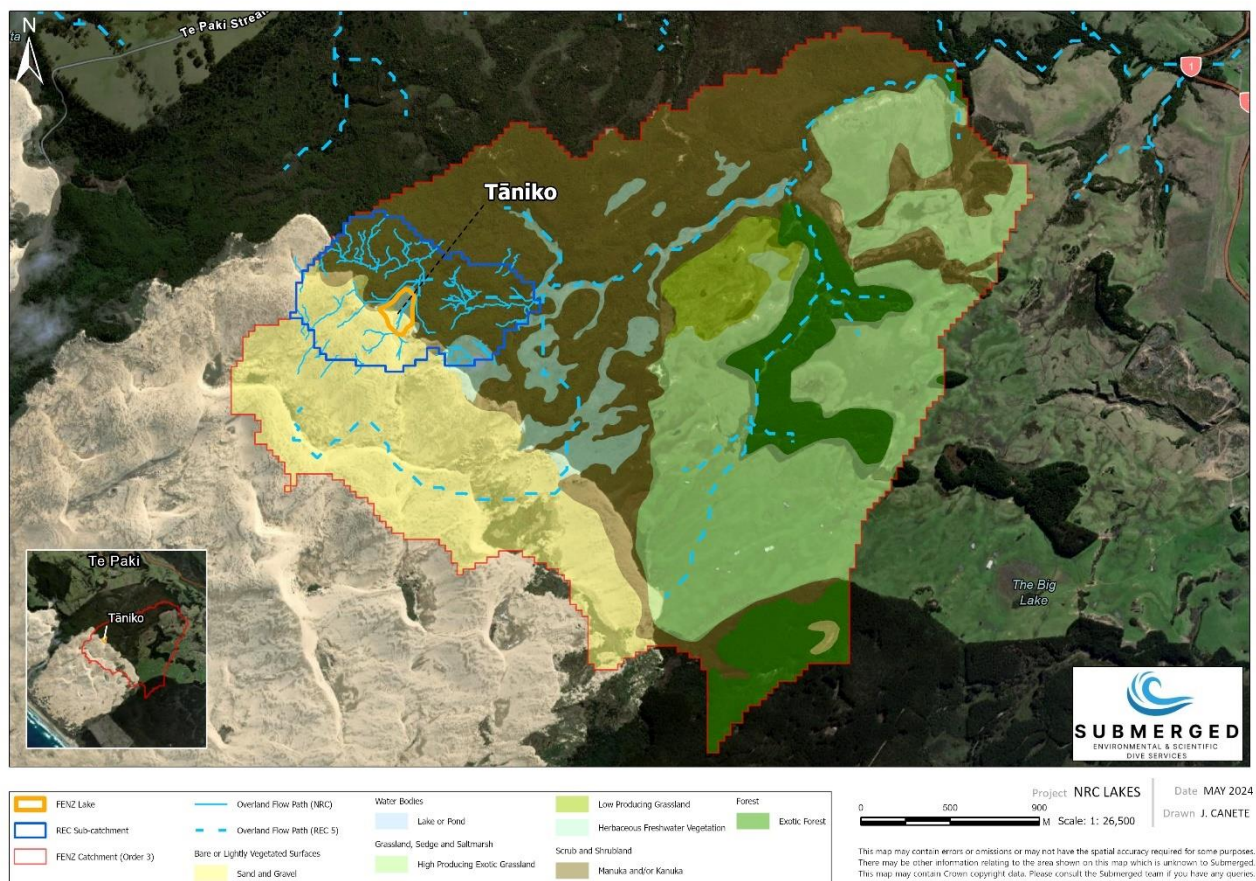
Catchment & sub-catchment description

The catchment is 810.26 hectares and is almost evenly split between native and exotic vegetation cover. Native vegetation accounts for 41% of the catchment and 5% of that is classified as wetlands. Exotic vegetation makes up 44% of the catchment, 30% of this is pasture and the remaining 13% is production forestry.

The surrounding sub-catchment is 64.92 hectares and is divided into sand dunes to the southwest and native bush (68% manuka/kanuka scrub) to the northeast, 7% of which is classed as wetlands.

Despite the amount of pasture and forestry in the wider catchment, the impact of the surrounding land use on this lake is likely to be low. This is because the lake is at the headwaters of the catchment and the stream network that drains the sub-catchment is fully contained within the native vegetation that surrounds the northern aspect of the lake.

The impacts of incoming overland flow are buffered by the extensive lacustrine wetland features that surround the lake.



Tāniko catchment land cover and overland flow path network

In-lake description

The water clarity was good, considering the rainfall preceding the survey, and the underwater visibility was estimated at 3 m.

The lake was isothermal and had no signs of persistent thermal stratification or anoxia. There was very little benthic algal growth and low concentrations of suspended organic matter. An area of dense green filamentous algae was seen at the base of the emergent vegetation along the southeastern end of the lake and thin mats of periphyton were also observed in the exposed shallows near the dune face.

The face of the dune appears to have encroached further into the lake and there was an approximately 1.5 m band of buried macrophytes at the base of the dune face. This could have been a result of recent extreme weather events. The remainder of the lake was fully vegetated.

The substrate was sandy and coarse in the shallows against the dune face. A thin surficial layer of fine silt coated the deeper sections of the lake under the dense macrophyte beds. The substrate transitioned into a finer loose composition within the surrounding lacustrine wetland areas. There was an accumulation of decomposing organic debris and fine silt in these areas.

Tāniko appeared to be in good ecological health with a fully vegetated depth extent, good water clarity and extensive lacustrine wetlands.

Wetland vegetation

Approximately 60% of the lake was covered with emergent vegetation, dominated by *Machaerina articulata* and *Eleocharis sphacelata* growing to depths of 1.8 m. There was no emergent vegetation along the majority of the dune face. Other emergents recorded along the shallow margin include *Machaerina juncea*, *Eleocharis acuta*, *Typha orientalis*, *Isolepis prolifera* and *Persicaria decipiens* and the regionally uncommon *Sparganium subglobosum*.

Submerged vegetation

The general submerged vegetation establishment pattern consisted of *Utricularia gibba* dominating the shallow areas at the base of the emergent vegetation with stands of *Potamogeton cheesemanii* and dense clumps of charophytes, *Chara australis* and *Nitella* sp. aff. *crinata* dominated the mid to deep sections of the profile. There was no emergent vegetation along the face of the dune and the macrophytes started at the base of the dune (1.9 m). The encroaching dune had buried an approximately 1.5 m wide band of charophytes at the base of the slope.

Nitella sp. aff. *crinata* was the dominant macrophyte species and formed high covers (> 95%) across the vegetated depth extent from 0.2 – 2.7 m. The average lake-wide cover was estimated at 51 – 75%. It was also the tallest charophyte species with some of the deeper beds reaching heights of 88 cm. The growth was consistent across the lake and the average bed height was 80 cm tall. *Chara australis* also formed dense beds with covers reaching 76 – 95% but was not as abundant across the lake with a lower average lake-wide cover of 6 – 25%.

Utricularia gibba was abundant but largely confined to the shallow margin and amongst the emergent vegetation. It formed high covers exceeding 95% and had an average lake-wide cover of 51 – 75%. Where present it smothered the native macrophyte assemblages and has almost completely displaced the Nationally Critical *Utricularia australis*.

Potamogeton cheesemanii was the dominant vascular macrophyte and formed tall (>1 m) stands that reached covers of 26 – 50%. These stands were concentrated along the eastern portion of the lake and as a result, the lake-wide cover was estimated at only 1 – 5%. A single patch of short (10 – 13 cm) *Myriophyllum propinquum* was seen against the emergent vegetation at the start of transect B where it formed 75% cover. A few smaller clumps of this species were seen elsewhere amongst the shallow lacustrine wetland, but the overall lake-wide cover is estimated at less than 5%.

Only 10 stems of the Nationally Critical *Utricularia australis* were observed during the 2024 survey. One stem was seen in the shallows near the dune face and the other 9 were located in a small shallow area along the eastern end of the lake near transect A. The stems were sparsely spaced, forming covers of less than 5%, the tallest stem was 23 cm, and the average height was 16 cm. This is concerning considering the previous 2019 survey noted lake-wide covers of up to 50%. The invasive *Utricularia gibba* is a significant contributor to this decline and it has overrun the majority of the available habitat.

Overall, the macrophyte condition was good with limited epiphytic growth and dense covers across the lake; however, the increasing abundance of *Utricularia gibba* is a major detriment to Tāniko.

LakeSPI

Tāniko is categorised as being in high condition with a LakeSPI Index of 54%. The 2024 survey results portray the same condition as the previous two surveys (2019 & 2013) however the individual metric scores are closer to the 2019 assessment.

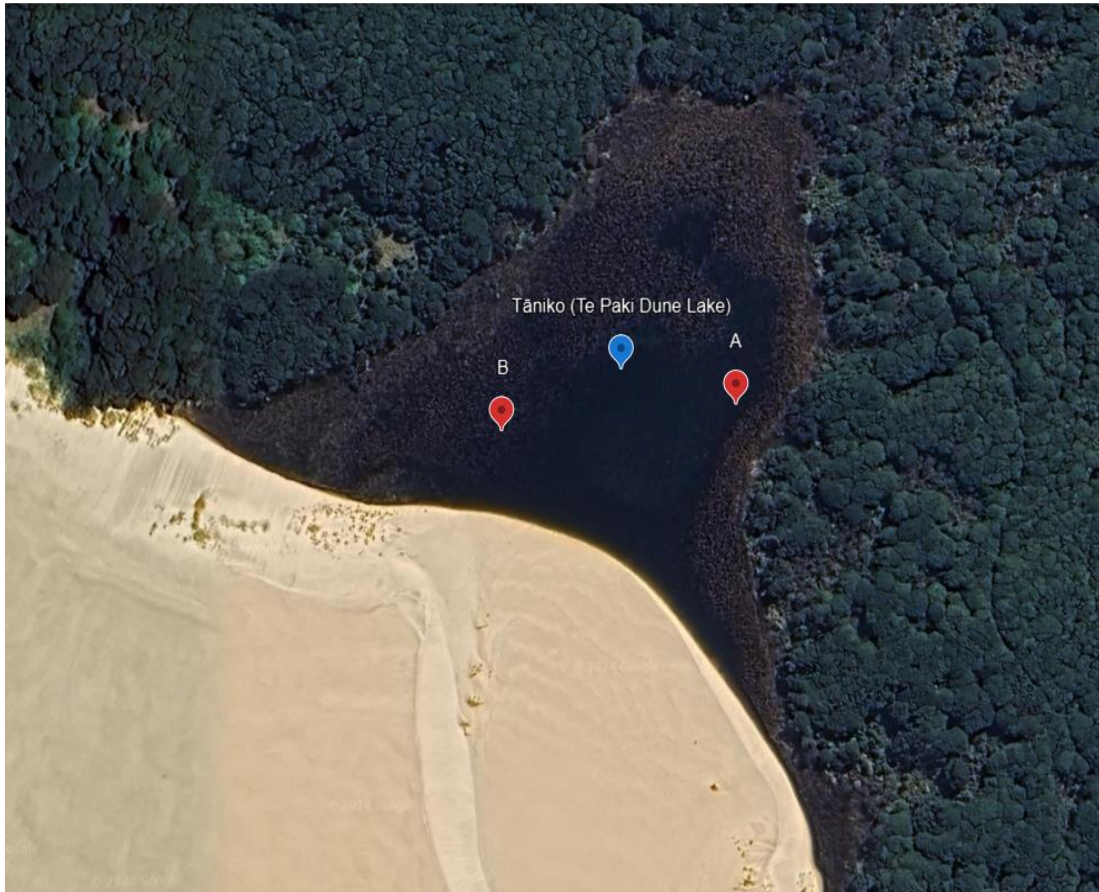
The maximum Potential Native Condition Score for this lake is 14 and the current assessment score is 10.5 (Native Condition Score of 75%). This score is reflective of the largely native vegetation assemblage and fully vegetated depth extent. The 2024 survey had the lowest Native Condition score out of all previous assessments. This is a direct result of a lower species diversity and distribution. Previous assessments noted high covers of *Chara fibrosa*, *Myriophyllum propinquum*, and *Utricularia australis* whereas, the 2024 survey found no *Chara fibrosa* and very limited numbers of *Myriophyllum propinquum* and *Utricularia australis*.

The maximum Potential Invasive Condition Score is 27 with a current assessment score of 14 (Invasive Condition Score of 51.85%). This is largely due to the widespread establishment of *Utricularia gibba* across the lake.

The maximum Potential LakeSPI Score is 34 and the current score is 18.5 (total LakeSPI Score of 54.41%). This is the lowest LakeSPI score recorded for this lake and reflects the increasing impacts of invasive *Utricularia gibba* and the gradual shift from a diverse native macrophyte assemblage towards a low diversity nutrient tolerant assemblage.

Tāniko LakeSPI scores as a percentage of the maximum Potential LakeSPI score, Native Condition Index, and Invasive Impact Index

Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
May 2024	High	54	75	52
May 2019	High	71	86	33
April 2013	High	57	79	49
April 2007	Excellent	88	91	11



Tāniko LakeSPI survey transects

Wetland birds

Two black swans (*Cygnus atratus*) and a single threatened weweia (dabchick) (*Poliocephalus rufopectus*) were seen on the lake during the 2024 survey. At Risk – Declining mātātā (fernbird) (*Poodytes punctata vealeae*) were heard along the riparian margin. Several common welcome swallows (*Hirundo neoxena neoxena*) were observed amongst the marginal vegetation.

The following priority conservation species have been sighted near the lake: weweia (dabchick) (*Poliocephalus rufopectus*), matuku (Australasian bittern) (*Botaurus poiciloptilus*), grey duck (*Anas superciliosa superciliosa*), black shag (*Phalacrocorax carbo novaehollandiae*), white heron (*Ardea alba*), mātātā (fernbird) (*Poodytes punctatus*) and brown teal (*Anas chlorotis*).

Matuku (bittern) were observed on the 15 of September 2018 14 km southeast of the lake. Grey duck, black shag and mātātā (fernbird) have been regularly sighted across the northern tip of the region since 2014 and weweia (dabchick) were sighted at Lake

Ngakeketo and the surroundings in 2023. White heron have been sighted between 2013- 2021 near Spirits Bay and Rangaunu Bay estuary so it is possible that they use wetlands/lakes across the northern portion of the region. Black shags and pied shags are also commonly sighted species in northern parts of the region. There was a single brown teal sighting in 2017 on the northern tip of Cape Reinga and it is plausible that this species inhabits other waterbodies in the far north.

Fish

No fish were seen during the 2024 survey however, several large shortfin eels (*Anguilla australis*) were noted during the 2007 assessment, and a single eel was seen in 2019. The presence of shortfin eels was confirmed in 2024 using eDNA analysis.

Fish records from the wider catchment between 1999 - 2019 include banded kokopu (*Galaxias fasciatus*), inanga (*Galaxias maculatus*), shortfin eels (*Anguilla australis*) and redfin bullies (*Gobiomorphus huttoni*). It is possible that these species could have occupied this lake at some point considering its proximity to the stream network.

Aquatic invertebrates

A variety of common aquatic invertebrates were sighted amongst the emergent vegetation including representatives from the following key orders: Ephemeroptera, Plecoptera and Trichoptera. Water boatmen (*Sigara arguta*) were abundant and formed large swarms amongst the emergent reeds. eDNA analysis revealed low detection of New Zealand freshwater clams (*Sphaerium novaezelandiae*).

No freshwater mussels were found during the 2024 survey and there is no record of them in this lake. The substrate and water quality are suitable however, the entire lakebed is vegetated and there is insufficient host fish so it is unlikely that this key species would establish in the lake.

Endangered species

Small numbers of the Threatened - Nationally Critical *Utricularia australis* were sighted in two discrete locations across the lake. This species used to thrive in this lake and was once the largest known lake population of this plant in Northland. Weweia (dabchick) and māātā (fernbird) were also found during the survey.

Lake ecological value

Tāniko was assessed as having “High” ecological value with a score of 11 out of 20. This score was based on the extent of the predominantly native submerged vegetation, intact riparian margins, and high native land cover in the sub-catchment.

Tāniko is a small (2.2 ha) shallow (2.7 m) lake, so it scores a 1 out of 3 for the Habitat Size metric. There are several large waterbodies and wetland complexes north of the lake, including the extensive Te Ketekete system, so Tāniko gets an additional point for connectivity to other waterbodies.

The lake scores a 2 out of 3 for the Buffering Metric. Majority (75%) of the lake perimeter consists of lacustrine wetlands and mature emergent vegetation. Five percent of the wider catchment is considered as wetland environments and 41% of the total catchment area is native manuka/kanuka scrub which raises the overall buffer score.

No water quality data is available for the lake, so it is automatically assigned a 0 out of 3. This is done to ensure a standardised approach when scoring unmonitored lakes and is representative of the worst-case scenario. In-lake observations indicate that the lake is likely mesotrophic. However, the loss of native macrophyte diversity and the dominance of nutrient tolerant macrophytes (*Nitella* sp. aff. *cristata* & *Chara australis*) indicate a possible trend towards a high trophic state.

The lake scores a 3 out of 3 for the Aquatic Vegetation Diversity Metric because 21 indigenous emergent, free-floating, and submerged vegetation species were recorded during the survey. The lake supports a rich diversity of wetland plants, and the intact riparian margins have a variety of emergent reeds.

The Aquatic Vegetation Integrity metric is taken from the LakeSPI Native Condition and the resulting score is a 2 out of 3. This score is reflective of the largely native vegetation assemblage and fully vegetated depth extent. However, the 2024 survey noted a loss of species diversity and increased pressure from invasive *Utricularia gibba*.

Ten stems of the Threatened - Nationally Critical *Utricularia australis* were recorded during the 2024 survey. The presence of this incredibly rare species gives the lake a score of 2 out of 3 for the Endangered Species Metric. No endangered fish were seen

during the survey, but matuku (bittern), weweia (dabchick), and mātātā (fernbird) have been regularly reported from waterbodies across the far north of the region. Considering the number of wetlands and waterbodies in the wider catchment, it is likely the lake is used by a variety of threatened wetland bird species.

No freshwater mussels were seen during the 2024 survey and the current in-lake conditions are unlikely to be able to support this species.

Threats

Tāniko sits in a native forest sub-catchment boarded by regenerating native scrub and light forestry. The static, low-impact catchment land use poses little threat to lake health. The wide, densely vegetated riparian margins offer good buffering for any incoming contaminant loads. That being said, aeolian inputs from the dune face could be increasing in-lake nutrient concentrations. This nutrient enrichment could be related to the loss of *Utricularia australis*.

The increasing cover of *Utricularia gibba* is the highest threat to the lake and has contributed to the significant decline in the Nationally Critical *Utricularia australis*. The difficult access and isolated location mean the likelihood of additional invasive introductions is very low.

Management recommendations

The primary threats to Tāniko are the increasing covers of *Utricularia gibba* and possible long-term impacts from forestry activities in the wider catchment. The following management actions are recommended:

***Utricularia gibba* control**

Utricularia gibba currently occurs in moderate covers and has not fully overrun the lake as seen in other Northland waterbodies. This species is notoriously difficult to control however, regularly removing large clumps of it by hand could free up habitat and release the native charophytes. This sustained control could limit the expansion and allow native species to re-establish. The focus should be on maintaining clear areas around the known *Utricularia australis* locations to facilitate the outward expansion of this critically endangered species. An initial small-scale trail should be done to assess the effectiveness and viability of this type of control.

***Utricularia australis* conservation**

Small amounts of *Utricularia australis* currently occur in discrete locations across the lake. There is a high chance that this species will be lost if no interventions are done. Cultivating this species in a controlled facility should be considered. If successful, the newly grown *Utricularia australis* could be re-introduced into the lake to bolster the population. This can be done in tandem with controlling the invasive *Utricularia gibba*. The *U. gibba* control will free up relocation habitat and allow *U. australis* to expand its cover across the lake.

Routine monitoring

Tāniko has undergone ecologically significant changes through time and routine monitoring is recommended to ensure management interventions can be implemented as soon as new impacts are recorded. A 3 yearly ecological assessment is recommended if no additional interventions are implemented. If *Utricularia australis* conservation efforts are carried out, an appropriate effectiveness monitoring plan will be required.