Te Hiku

Wahakari (Aupouri), NRC Lake No. 35.

Wahakari. Photo Lisa Forester (NRC).

Summary	Wahakari
Surveyed:	2004, 2008, 2013, 2015 and 2021.
Overall ranking:	**Outstanding**: Well-developed and diverse emergent and submerged vegetation with some endangered biota. The pest species *Utricularia gibba* and *Gambusia affinis* were present.
Threats:	Introduction of invasive species. Harvesting of pine trees occurred in the catchment in 2005 and the next rotation of trees is now well established.
Management recommendations:	Lake native biodiversity value monitoring every 5 years. Commence annual monitoring of the Nationally Critical *Isolepis lenticularis*.

Description

Wahakari (1592960E, 6165597N) is a large (84.4 ha) lake with a maximum depth of c. 12 m. The lake is ponded between dunes to the west and weathered hill country, with heavy clay soils, to the east. The catchment is primarily plantation pine forestry, last harvested in 2005 (50%) manuka / kanuka scrub (40%) and fully fenced pasture (10%). There is an inflow at the north-western end of the lake, apparently surrounded for much of its 3 km length by wetland vegetation. The outlet at the south-eastern end passes through a raupo/flax swamp and discharges into Parengarenga Harbour via the Te Kao Stream. Access is now (2014 onwards) from Oromanga Road, off Te Ahu Road. Access is by arrangement with Te Aupōuri. The lake serves as a water supply to Te Kao.

Wetland vegetation

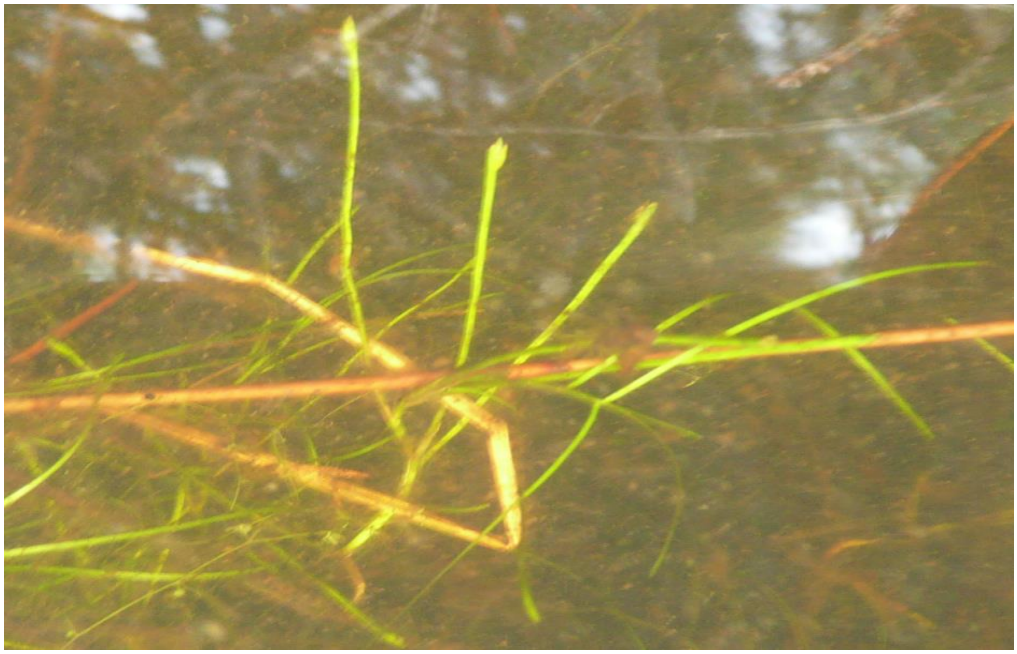
Most of the lake margins have beds of emergent species of up to 10 m wide. The dominant emergent species were *Eleocharis sphacelata, Apodasmia similis, Machaerina juncea, M. arthrophylla, M. articulata* and *Typha orientalis* growing from the lake margin to a maximum depth of 2 m in 2021. Additional emergent species recorded in 2013 included *Machaerina rubiginosa*,

Schoenoplectus tabernaemontani and *Eleocharis acuta*. The regionally uncommon *Sparganium subglobosum* was found in grazed wetland adjacent to emergent beds.

Submerged vegetation

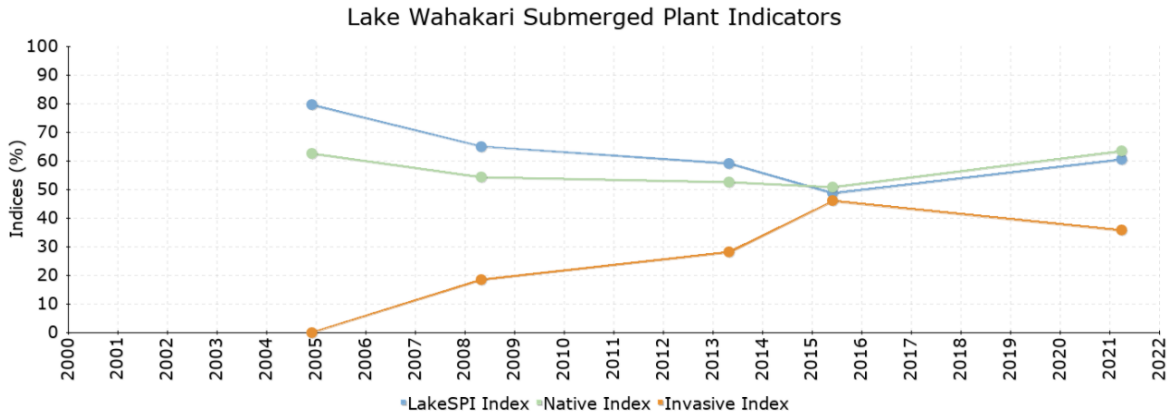
Turf communities were sparse due to extensive and dense emergent beds. *Isolepis lenticularis* was found adjacent to the boat access point in 2015 but was not searched for in 2021. *Utricularia australis* was located at one site in 2008 but not seen since. In 2021, charophytes (mostly *Nitella* sp. aff. *cristata*, *N. pseudoflabellata, Chara australis,* and *C. fibrosa*) were found from the edge of emergent communities with meadows to a maximum depth of 6.6 m and individual plants to 7.0 m. The pondweed, *Potamogeton ochreatus* formed scattered low density growths (c. 1 m tall) to 6.3 m deep. *Utricularia gibba* spread to this lake after 2004 but has not become a dominant feature, probably because this lake is relatively exposed. It was mostly restricted to the emergent vegetation zone but sometimes to a depth of c. 5 m, and occasionally with high covers.

In 2015, charophyte meadows were found at a maximum depth of 4.7 m, with the deepest vegetation at 4.8 m deep.



Wahakari, *Isolepis lenticularis* in flower.

LakeSPI



Survey Date	Status	LakeSPI %	Native Condition %	Invasive Impact %
March 2021	High	60.5%	63.3%	35.6%
May 2015	Moderate	48.6%	50.8%	45.9%
April 2013	High	59.1%	52.5%	28.1%
April 2008	High	65.0%	54.2%	18.5%
November 2004	Excellent	79.5%	62.5%	0.0%

LakeSPI for Ngatu. Five LakeSPI surveys are recorded between 2004 and 2021.

Wahakari has been categorised as being in high condition with a LakeSPI score of 61%. This is an increase of 12% from 2015. Prior to this assessment, a declining LakeSPI score was reported, presumed to reflect the impact of *U. gibba* and reductions in native submerged plant abundance and depth limits, presumably due to declining water quality. The recent improvement, with increased plant depth limits, is likely to reflect the fully fenced perimeter and improved water clarity.

Water birds

Extensive emergent vegetation and a relatively isolated lake provides good habitat for water birds. New Zealand dabchick (*Poliocephalus rufopectus*) and fernbird (*Bowdleria punctata vealeae*) were observed or heard in 2015 along with the not threatened scaup (*Aythya novaeseelandiae*) with c 130 seen, Paradise shelduck (*Tadorna variegata*) and black swan (*Cygnus atratus*). The introduced Canada goose (*Branta canadensis*) and mallard duck (*Anas platyrhnchos*) were also noted during the 2015 and 2021 surveys, with pied shag (*Phalacrocorax varius*) also seen in 2021.

Fish

Common bullies (*Gobiomorphus cotidianus*), eels (*Anguilla* spp.) and the exotic pest gambusia (*Gambusia affinis*) were observed during vegetation surveys. NIWA FBIS also records smelt (*Retropinna retropinna*) in this lake.

The Golden Bell frog (*Litoria aurea*) was common in the lake margins.

Aquatic invertebrates

Torowai / freshwater mussels (*Echyridella menziesi*) were abundant throughout the lake including below the vegetated zone. Kewai / freshwater crayfish (*Paranephrops planifrons*) were recorded on two of the five vegetation profiles in 2015 but not seen in 2021. The snail *Potamopyrgus antipodarum* and freshwater sponges were commonly seen.

Torewai at Wahakari. [Susie Elcock, 2021]

Endangered species

This lake contains the only known regional population of the Nationally Critical *Isolepis lenticularis*. It was noted as locally abundant near the boat access point in 2015 but this area was not surveyed in 2021. The At-risk: Declining torowai (*Echyridella menziesii*) were abundant on four of the five vegetation profiles. The Nationally Critical *Utricularia australis* has not been seen since 2008 and is apparently now extinct in this lake. The At Risk Recovering dabchick and pied shag and At-Risk Declining fernbird were seen or heard in 2021.

Lake Ecological Value

The Ecological Value Score of Wahakari had shown an improving trend since 2013 due to improving TLI, Native Condition Index and species richness over that time, with a score of 15 (Outstanding). Recent improved water quality has led to increased submerged species depth ranges.

Threats

Previously, declining water quality was identified and an initiative to fully fence the lake was undertaken in 2019, with a consequent improved water clarity.

Although roadside access to the lake is possible, access is by arrangement with Te Aupōuri who are aware of the risks posed from introduced weeds and pests.

Management recommendations

It is recommended that lake native biodiversity value monitoring undertaken every five years. Monitoring of the critically threatened sedge *Isolepis lenticularis* populations should be undertaken annually.