

North of Dargaville

Shag Lake (Kai Iwi), NRC Lake No. 221.



Shag Lake. Photo taken from the south end of the lake showing the pastoral catchment, with Maunganui Bluff in the distance. (Photo: Tracey Burton 17 September 2018).

Summary	Lake name
Surveyed:	2001, 2010 and 2018.
Overall ranking:	High to Moderate: A nutrient enriched lake with no significant invasive aquatic plants and submerged vegetation present at low covers to 7.4 m. Cattle have access to 85% of the lake margin and have either excluded or displaced emergent vegetation to deep water. Bullies, eels and <i>Gambusia affinis</i> present.
Threats:	Poor water quality with cattle access to most of the lake. Susceptible to submerged vegetation loss. Although accessed through private land, the lake is threatened by liberation of pest fish and plants.
Management recommendations:	Fencing the lake will encourage emergent species establishment, increase the biodiversity values of the lake and potentially improve water quality. Undertake 5 yearly ecological monitoring.

Description

A 15 ha dune lake (1654908E 6039010N) with a maximum depth of 12 m, situated in a pasture catchment. Only ~15% of the lake margin is fenced. There was a small inflow at the south-eastern end of the lake but no outlet. Access is through private land via paddocks, boat access requires a 4-WD.

Wetland vegetation

The dominant emergent species occupying <20% of the shoreline was kuta (*Eleocharis sphacelata*), which formed up to a 15 m wide band in the fenced part of the lake, but either a narrow band or absent elsewhere. In areas with cattle access, these emergent beds extended to depths of 2 m but were excluded from depths less than 1 m by cattle grazing/trampling.

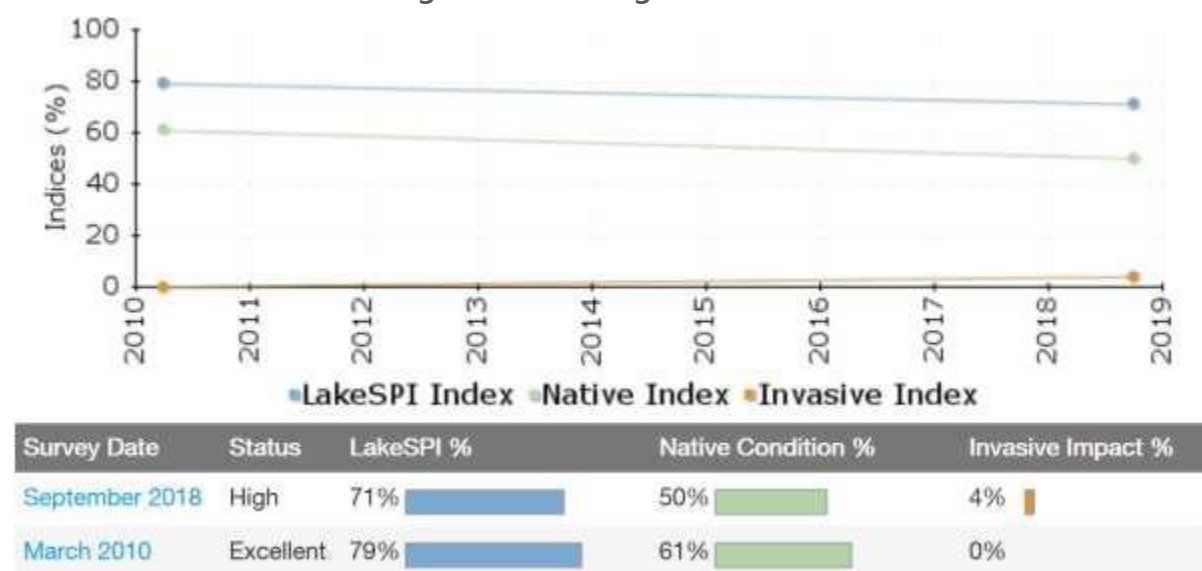
Submerged vegetation

The turf species *Glossostigma elatinoides*, *Limosella lineata* and *Myriophyllum votschii* were present in depths less than 0.7 m depth. *Chara australis*, *Nitella* sp. aff. *crustata* *Potamogeton cheesemanii* and *P. ochreatus* were the most common submerged species with maximum depth of vegetation extended to 7.4 m at one site, but no species had median average covers exceeding 5%.

Maximum depth of colonisation appears to be increasing from 4.5 m in 2001, 6.7 m in 2010 and 7.4 m in 2018, however the overall extent of submerged vegetation had declined since 2010. Low covers of submerged species were also reported in 2001, but in 2010 median overall covers of about 50% were recorded.

LakeSPI

Shag Lake Submerged Plant Indicators



LakeSPI results for Shag Lake. LakeSPI Indices expressed as a percentage of lake maximum potential.

Shag Lake is categorised as being in high ecological condition with a LakeSPI Index of 71%. This has reduced slightly from 2010, a result of the minor invasive *Juncus bulbosus* being recorded at one site and a loss of charophyte meadows, previously found at two of the five transects in 2010. No species had median average covers exceeding 5% in the 2018 survey.

Water birds

Poor aquatic habitat with mostly disturbed, grazed lake margins, limited emergent vegetation. The 2018 survey reported 55 black swans (*Cygnus atratus*) and 14 paradise shelduck (*Tadorna variegata*). The nationally threatened bittern (*Botaurus poiciloptilus*) and regionally important dabchick (*Poliocephalus rufopectus*) and Australasian little grebe (*Tachybaptus novaehollandiae*) were recorded in the late 1970's-1991. The lake was then regarded as an important refuge for birds disturbed from the Kai Iwi lakes when used for water skiing.

Fish

Bullies (*Gobiomorphus cotidianus*) were observed on all sampling occasions. Eels were noted in previous surveys and NIWA FBIS reports both longfin and shortfin eels (*Anguilla dieffenbachii* and *A. australis*), bullies and the exotic *Gambusia affinis*, as present in Shag Lake.

Aquatic invertebrates

Pea mussels (*Sphaerium novaezelandiae*) and backswimmers (*Sigara arguta*) have been recorded on all sampling occasions. Freshwater sponges were noted on submerged vegetation in 2018.

Endangered species

Longfin eels (*Anguilla dieffenbachii*) were previously reported and are likely to still be present in the lake. This species is assessed as At-Risk Declining.

Lake Ecological Value

An ecological value rating of “8-high to moderate” was assigned to Shag Lake based on the predominantly native submerged vegetation meadows and species diversity.

Threats

The current lake condition is marginal for good submerged plant growth and potentially could become devegetated should water quality continue to decline. The lake is prone to nutrient enrichment and could also be threatened by liberation of pest fish and plants. The pest fish *G. affinis* is established in the lake. Access is through private land so recreational boating is not a strong pressure on this lake; introductions would be more like to come from eel fishers with contaminated nets or deliberate introduction of pest species.

Management recommendations

Fencing off the entire lake and enhancing riparian vegetation will encourage emergent species establishment, increase the biodiversity values of the lake and potentially improve water quality. With this management, this lake could potentially improve in the short to medium term as no major weed species are present.