

## North of Dargaville

Midgley's Lake (Omamari), NRC Lake No. 257



**Midgley's Lake** 2011 showing the pasture and pockets of plantation pine catchment with remnant emergent vegetation remaining after grass carp introduction in 2007. [Summary](#) 2005 and 2011

### Overall ranking

**Low:** (previously was High-Moderate): Small lake with contiguous native submerged vegetation including a large population of the nationally endangered *Utricularia australis*, but has been de-vegetated since grass carp were introduced.

### Threats

Isolated lake with access through private land would make introduction of pest species unlikely, but impact would be high. A steep catchment, but the inflow stream enters the lake through a dense wetland and provides a nutrient stripping function.

Grass carp are incompatible with native lake values. If the fish are all removed the native values might be restored. However, the nationally endangered *U. australis*, which does not appear to produce seed in New Zealand, may well be lost.

### Management recommendations

Remove the grass carp.

Lake native biodiversity value monitoring every 5 to 10 years.

## Description

A small (2 ha), shallow (3 m) dune lake (1664168E 6028159N) situated in a pasture catchment with a small wood lot of pines on the northern side. There is an inflow at the eastern end of the lake entering through a dense wetland area. The outlet on the western side flows to the Moremonui Gully on the west coast approximately 2.5 km south-west of the lake. Access is through private land across pasture, and boat access would be difficult due to the steep lake margins.

## Wetland vegetation

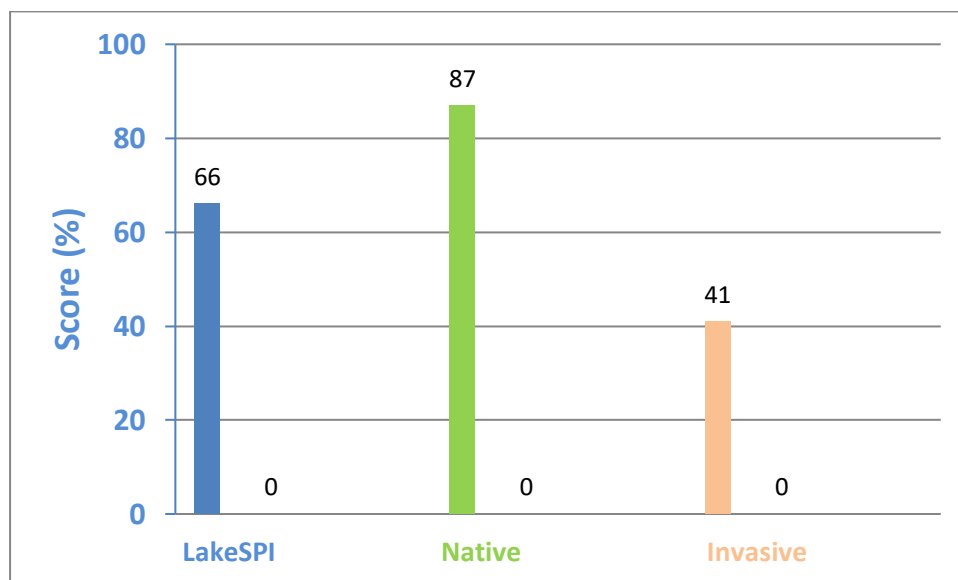
The past dominant emergent species were *Eleocharis sphacelata* and *Typha orientalis* that formed extensive beds over 30% of the lake wide zone. *E. sphacelata* grew to a maximum depth of 2 m but has been substantially reduced by introduction of high density grass carp. A zone of exposed turf plants bordered the lake, including the native *Myriophyllum propinquum* and *Glossostigma elatinoides* and the exotic *Ludwigia palustris*, was not at risk from grass carp. The invasive weed *Alternanthera philoxeroides* (alligator weed) is present on the property (landowner pers. comm.) so risk of future spread to the lake is high.

## Submerged vegetation

At the profile site, turf species extended to 0.5 m including dense areas of *J. bulbosus*. The 2005 dominant submerged vegetation was an extensive bed of *Chara australis* extending from 0.6 to 3 m, with patches of the taller (approximately 1 m tall) *Potamogeton ochreatus*. The nationally endangered *Utricularia australis* was also common in shallow water in the vicinity of the inlet, with scattered plants elsewhere in the lake.

In 2011, apart from the turf species and a few stunted *Chara australis* plants, all submerged vegetation has been removed by grass carp.

## LakeSPI



**2005 LakeSPI Index as % of potential score, Native Condition Index, and Invasive Impact Index (from left to right) in 2005 prior to grass carp introduction.**

A default score of zero was generated in 2011 as there was no submerged vegetation > 5% cover. Previously, a high LakeSPI score of 66% reflected native vegetation values, including extensive

charophyte meadows but impacted by dense stands of the invasive exotic *J. bulbosus* to depths of 1 m. In 2011, a LakeSPI score of 0% was generated as submerged vegetation cover was <10%.

### Water birds

In 2005, good aquatic habitat was provided by the emergent vegetation. Areas of dense emergent plants provide ideal habitat for crakes and rails. Common water birds were noted with 12 mallard (*Anas platyrhynchos*) and 3 black swan (*Cygnus atratus*) seen. One bittern (*Botaurus poiciloptilus*) (nationally threatened) was observed in the eastern area. OSNZ recorded regionally important dabchick (*Poliocephalus rufopectus*) in 1991. These values are at risk with continued grass carp grazing and removal of submerged and emergent vegetation.

### Fish

No fish apart from grass carp were observed in the lake. On 24 June 2011, 141 grass carp were removed from the lake using nets (J. Fulcher, NRC pers. comm.). It is not known how many remain.

### Aquatic invertebrates

The introduced *Physa acuta* snail was common amongst submerged vegetation.

### Endangered species

No threatened species were recorded in the 2011 survey.

### Lake Ecological Value

Lake Ecological Value score of 3 "Low", degraded as a result of grass carp introduction.

### Threats

Grass carp in this lake are an on-going threat to the native ecological values of the lake if insufficient numbers have been removed to allow vegetation recovery.

Access through private land, therefore risk of introductions is low but should pest species be introduced, their impact is likely to be great (when grass carp are absent). The lake is moderately enriched, and some nutrient stripping role is performed by wetland/emergent vegetation. Water quality measurements indicate nitrogen sensitivity (NRC data) so application of fertiliser to pasture in the immediate catchment could lead to increased algal blooms/decrease in water clarity. Access to the lake by livestock is also a threat to water quality and marginal emergent vegetation.

### Management recommendations

The lake is apparently being managed as a pond for duck shooting with no regard to native biodiversity values including rare plants and birds (*Utricularia australis* and bittern). There was no exotic invasive threat that would warrant use of grass carp and alternative methods are available to maintain open water areas free of emergent plants.

Lobby DOC to reconsider its position in supporting the use of grass carp in this lake or in other similar inappropriate situations.

Monitor vegetation recovery annually and if no recovery, attempt additional grass carp removal. Lake native biodiversity value monitoring every 5 to 10 years.