

SCAPMSNEWS



“Weeds of Down Under: A glimpse at New Zealand’s Aquatic Pest Plant Management”

Andrew Howell—Graduate Student
North Carolina State University
awhowell@ncsu.edu

Often when people imagine New Zealand, they recall scenes from Peter Jackson’s *The Lord of the Rings* film

set. Others may envision the stunning views which feature lush green bush, volcanic landscapes, or the glacially formed crystal-blue waterbodies. However, the water resource managers likely have a different perspective, because amongst the spectacular settings and dynamic scenery reside a host of invasive species issues, several of which directly affect aquatic environments.



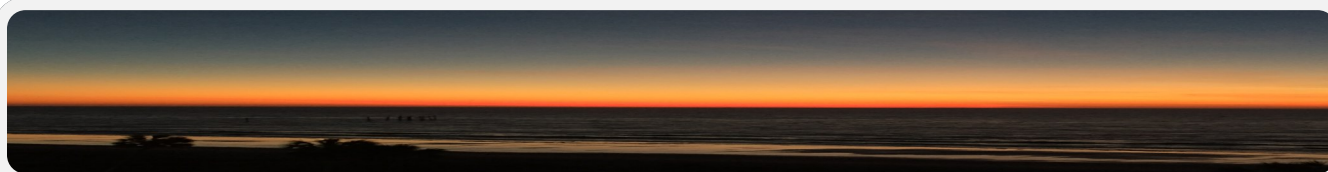
Snorkeling for submerged plants at Lake Wakatipu to provide material for a plant display during the 15th International Symposium of the Aquatic Plants in Queenstown. Here Andrew is searching for one of the several native pondweeds *Potamogeton cheesemanii* which is growing within a bed dominated by *Isoetes alpinus*

Although New Zealand is a distant island in the South Pacific, it has not remained exempt from the invasion of exotic species, particularly aquatic pest plants. Unfortunately, New Zealand has been gifted a plethora of exotic macrophytes since the early 1900’s—many species of which were introduced as nursery stock or established through the aquarium trade. Several endemic submerged plants often found across the US, have now become recognized invasive species in New Zealand, North American plants, elodea (*Elodea canadensis*) and coontail (*Ceratophyllum demersum*) can be found obstructing waterways and drainages in both the North and South Islands.

Coontail, commonly referred to as ‘hornwort’ in the southern hemisphere, is a significant weed for water resource managers, as free-moving “rafts” regularly hinder New Zealand’s number one utility resource, hydropower. Still the US and New Zealand share several macrophytes which require management in both countries, such as Brazilian elodea (*Egeria densa*). However, one pest plant in particular which is absent in North America has become one of the most environmentally devastating oxygen weeds in New Zealand, lagarosiphon (*Lagarosiphon major*).

Continued-

Volume 36, Number 2 - Sept, 2018



SCAPMSNEWS



Like many invaded reservoirs and waterbodies found amongst the mid-south and southeast regions of the US, the *Hydrocharitaceae* family plagues the similarly featured waterways in New Zealand. Why hydrilla (*Hydrilla verticillata*) has existed within four North island lakes in the past, management programs implementing herbicide and grass carp have led to successfully eradicating of hydrilla in one lake, with solid progress towards eradication (zero hydrilla over the last 2 years) in the remaining three lakes. However, lagarosiphon (South African oxygen weed) and Brazilian elodea remain significant weeds with wider national distributions. Both lagarosiphon and Brazilian elodea can be found in recreational or utilitarian waterbodies, as well as flowing water systems containing interationally prized trout fisheries. Often displacing native submersed species, pest plants like lagarosiphon form dense columnar beds which shade out native pondweeds and the revered charophyte meadows. Non-native emergent vegetation, such as common reed (*Phragmites australis*), alligatorweed (*Alternanthera philoxeroides*), and parrotfeather (*Myriophyllum aquaticum*) are also notable pest plants in New Zealand. While exotic floating species, such as giant salvinia (*Salvinia molesta*) and water hyacinth (*Eichhornia crassipes*) are documented, these populations are eradicated when found. In general, free floating and floating-leaved pest plants account for only a small portion of aquatic plant control when compared to the US.



Example of the pest plant lagarosiphon which is found throughout New Zealand's North and is in several South Island lakes. At first glance lagarosiphon mimics monoecious hydrilla, but after quick inspection the recognizable recurved leaves and closely packed apical shoots reveal the true classification.

New Zealand's unique waterbodies include Coastal dunes, glacier melts, calderas, landslide-formed and peat lakes as well as manmade reservoirs. Unlike the typically turbid waters found amongst the southern regions of the US, Secchi depths of 6-10 m are not uncommon in New Zealand's waterbodies are generally mesotrophic or oligotrophic although in the past few decades, eutrophic waterbodies have been present nearby heavily grazed paddocks or highly productive agricultural land. However, these point-source issues are being addressed through fencing, riparian plantings and best management incentives. Continued...

SCAPMSNEWS



Volume 36, Number 2 - Sept, 2018

While the US aquatic plant industry may seem to have a limited portfolio of registered herbicides, New Zealand regulations currently limit managers to a selection of just two labeled chemistries, endothall and diquat for aquatic use. While a 'restricted use' category controls the application of other chemistries (imazapyr, metsulfuron methyl, triclopyr triethyl amine, haloxyfop) for national or regionally significant weeds around water (e.g. alligator weed, *Xixania latifolia*, (Manchurian, wild rice) or *Lythrum salicaria* (Purple loosestrife)). Aquatic plant management often occurs as an integrated approach of chemical, biological, and physical control methods. By and large, management and survey programs often parallel North American tactics, still there are several distinct strategies. One of the more obvious is the use of manned diving surveys to monitor and map incursions. For those further interested in mapping with divers in New Zealand, check out the National Institute of Water and Atmospheric Research (NIWA) lake SPI Submerged Plant diver scheme (<https://lakespi.niwa.co.nz>).

New Zealand has been an eye-opening experience. Not only because of the exceptional landscapes and lingering views which would make any outdoorsman jealous, but also the opportunity to step away from the accustomed pest plants and survey techniques commonly found in the States. Since arriving in New Zealand in early January, I've recognized the importance of continually developing management strategies, both domestic and abroad, to meet the challenges of aquatic pest plants. Likewise, New Zealand has been an empowering experience, highlighting the critical importance of biosecurity, native habitat preservation, and the effectiveness of early detection, rapid response. Much like the US, it is public outreach systems, such as "Check, Clean, Dry", that lend a hand in the success of reducing the spread of invasive weeds among the waterways. Continued...



SCAPMSNEWS



Interesting New Zealand Facts

- When you land for the first time in Auckland International airport, you instantly realize that New Zealand's unique biodiversity has ministry officials and non-governmental organizations taking biosecurity risk seriously. Prompt and efficient luggage checks for those traveling with outdoor and recreational equipment occurs consistently, as the concern for introducing pest plants and unpleasant diatoms like didymo (*Didymosphenia geminata*) is high.
- Unlike many areas in the US, the temperate zones of New Zealand do not witness annual senescence of submersed vegetation. Therefore, management efforts occur throughout the year.
- As far as diversity of the waterbodies is concerned, New Zealand definitely has greater species richness amongst the aquatic plant assemblages than most people in the mid-south and southeast are accustomed to viewing. Some communities of native SAV can be found co-occurring at 15+ species!
- Perhaps the most "precious" resource in New Zealand is not the ring forged at Mt. Doom (Mt. Ngauruhoe), but rather the preservation of the native waterways and the essential element of life-water.



Left: An example of a New Zealand spring fed river.

Above: A couple of Australian black swans fragmenting lagarosiphon