Invasive pests in the Rotorua lakes

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Climate, Freshwater & Ocean Science





Overview

- 1. Rotorua lakes pre-invasion
- 2. What are the current pests?
- 3. Where are they?
- 4. What are their impacts?
- 5. How do they spread?
- 6. Proactive management











1. Rotorua lakes: pre-invasion



Lake Tarawera – pre 1930's (based on Wells et al. 1997)



Filter dissolved inorganic N from groundwater, buffer wave action on shores

Potential high endemic diversity, 'geotextile' role

Indicate good water quality, carbon harvesting, strong influence on sediment processes

Large surface area, waterfowl food

Water 'grooming', extend vegetated zone in clear lakes, vegetation resilience via seed bank role

de Winton et al. (2017)

1. Rotorua lakes: pre-invasion



Kōaro

Kākahi





Water hyacinth (1950)

Water poppy (1976) Marshwort (1981)



Water net (*Hydrodictyon reticulatum*) (1989)



Elodea

Lagarosiphon



Egeria

Hornwort





Salmonids







Gambusia

Ear pond snail



1993 First record – DOC

2009 Okawa Bay, dead

2015 Hot pool owners report

2016 Te Weta Bay weed harvester capture

Brown bullhead catfish

3. Distribution of submerged weeds

Lake	Lagarosiphon	Egeria	Hornwort
Rotokakahi			
Ōkaro			
Rotomā	•		
Tikitapu	•		
Ōkataina	•		
Ōkāreka	•	•	•
Rerewhakaaitu	•	♦	
Rotomāhana		•	•
Rotorua	•	♦	•
Tarawera	•	♦	•
Rotoiti	•	♦	•
Rotoehu	•		•

Lake Tarawera – 1930's





Lake Tarawera – 1970's



WHAT WE WE WE

Depth



Lake Tarawera – 1990's

AT THE AREA WENT

Depth

Hornwort invaded

16m



Displaces native plant communitiesBuries native seed banks



- Restrict water movement cause flooding
- Block irrigation and drinking water pumps

- Destroy habitats for native fish and wildlife
- Degrades sediment properties (no koura or kakahi)
- Degrades water quality (DO & pH)

Interferes with recreational activities









• Predation on native fish and invertebrates

• Competition for food

• Decline in water quality/clarity



• Disturbance of sediments/plants

Champion et al. (2002)

5. Dispersal







- Natural spread seed production and adaptation for spread
- Recreational craft trailers, anchor wells, jet motors
- Fishing nets especially fyke nets, mullet nets
- Contaminated diggers and harvesters
- Coarse fishermen
- Aquarium liberation
- Deliberate spread

6. Management

- Poor dispersal between water bodies
- Spread to new sites through human activities
- Virtually no barrier to spread once introduced, spread by fragmentation
- Fish need to successfully reproduce, slower establishment
- Problem identifying new infestations early
- Few available control/eradication techniques
- Therefore good candidates for pro-active management







6. Management at the border

- Hazardous Substances and New Organisms Act (1996)
 - No new aquatic spp. imported (< 50 plant spp. in total)

- Biosecurity Act (1993)
 - Inspection at ports and soft x-ray of all mail items
 - PEQ



• Noxious Plant Act 1978

Class B species banned from sale and distribution (1982)

National Pest Plant Accord 2002 (Biosecurity Act)
~30 aquatic plants declared Unwanted Organisms and
banned from sale

6. Surveillance

Lake Ōkataina weed cordon

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Lake Rotomā weed cordon

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