


NIWA
Taihoro Nukurangi

Macrophyte trial in Te Waihora

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NIWA UOC

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Lincoln University UNIVERSITY OF
CANTERBURY
Waterways
Centre for Freshwater Management

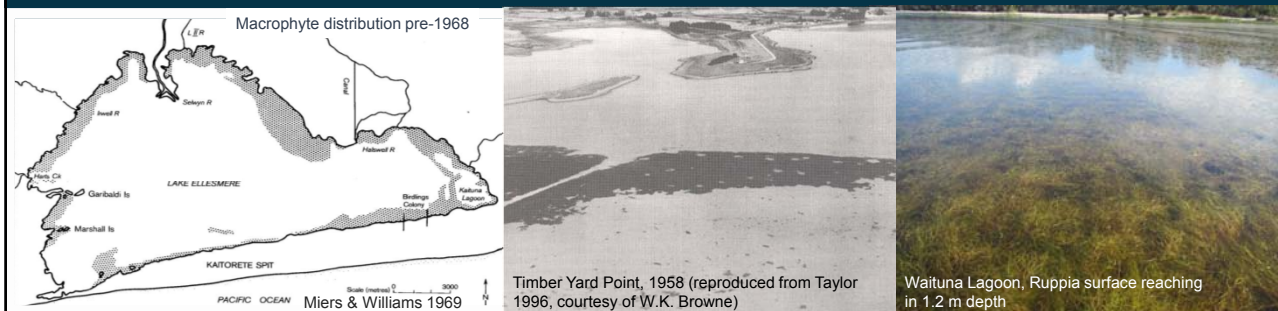
Key messages

- Submerged macrophytes benefit shallow lake ecology
- Te Waihora is a challenging site to restore macrophytes
- Overcome key challenges of wave disturbance, varial zone, lack of propagules
- Artificial habitats as a viable alternative?



Context and objectives

- Macrophytes were once major component of lake ecology
- Trial to establish restoration techniques at key sites
- Seeking long-term and significant macrophyte influence



Methods

1. Establish wave protection
2. Eco-source macrophytes
3. Culture macrophytes (first attempt at this scale)
4. Transplant to lake
5. Trial alternative artificial habitat
6. Establish benefits to ecosystem & water quality

Wave protection possible at key sites

- 2 x 100 m long floating log barriers installed
- Tested wave height reduction at one barrier
- Monitoring (7 weeks) over different wind conditions
- Wave height reduced average 20-40%, up to 60-80%



Macrophytes sourced & cultured

- Surveyed Te Waihora & tributaries for macrophytes & seed
- Found most abundant source of 2 macrophytes in Huritini Canal
- Wild collected & cultured in lake mud & river water
- Custom-built culture facility at Taumutu

Huritini (Halswell Canal)



Macrophytes sourced & cultured

- c. 3000 bio-degradable pots
- Grown in freshwater, increasing water level
- Acclimated to lake salinity levels with added salt
- Grown 0.8 to 1 m tall



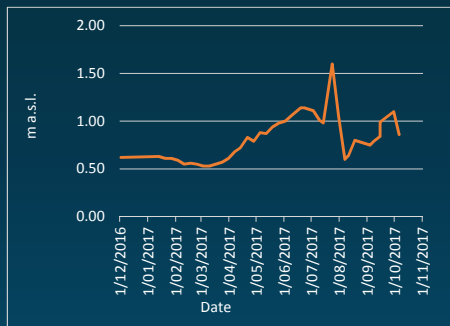
Macrophytes transplanted

- c. 900 plants transplanted to wave barrier site (30 x 30 m)
- January when lake level low (0.65 m asl) & depth c. 0.8 m
- Planting hole prepared by auger, pot secured in hole

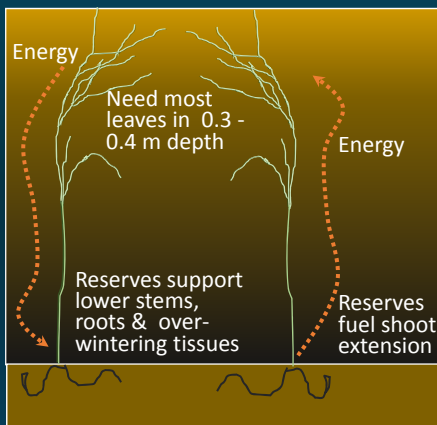


Macrophytes monitored

- Plants relocated until April (same as natural population cycles)
- Growth of plants could not keep pace with lake level increase?
- Overwintering appears unsuccessful at end of October



Photosynthesis near-surface is critical



- Plants need to get most leaves to the surface
- Protect surface leaves from disturbance
- Planting timing to build reserves
- Reserves sufficient to fuel shoot extension



Establishing artificial habitat

- 225 bracken bundles in 30 x 30 m
- Suspended from overhead lines
- 2 x Floating Treatment Wetlands (24 x 4.6 m)
- Emergent roots grow through matrix & into water



Implications:

- Wave conditions can be improved locally (achieved at 2 sites)
- Macrophyte transplants need long establishment time at low lake levels
- Still to fully assess benefits from artificial habitats
- Future macrophyte trials integrating what we have learned so far



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