waihora ellesmere trust

Macrophyte beds – Don J

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A review of the potential to re-establish macrophyte beds in Te Waihora (Lake Ellesmere)

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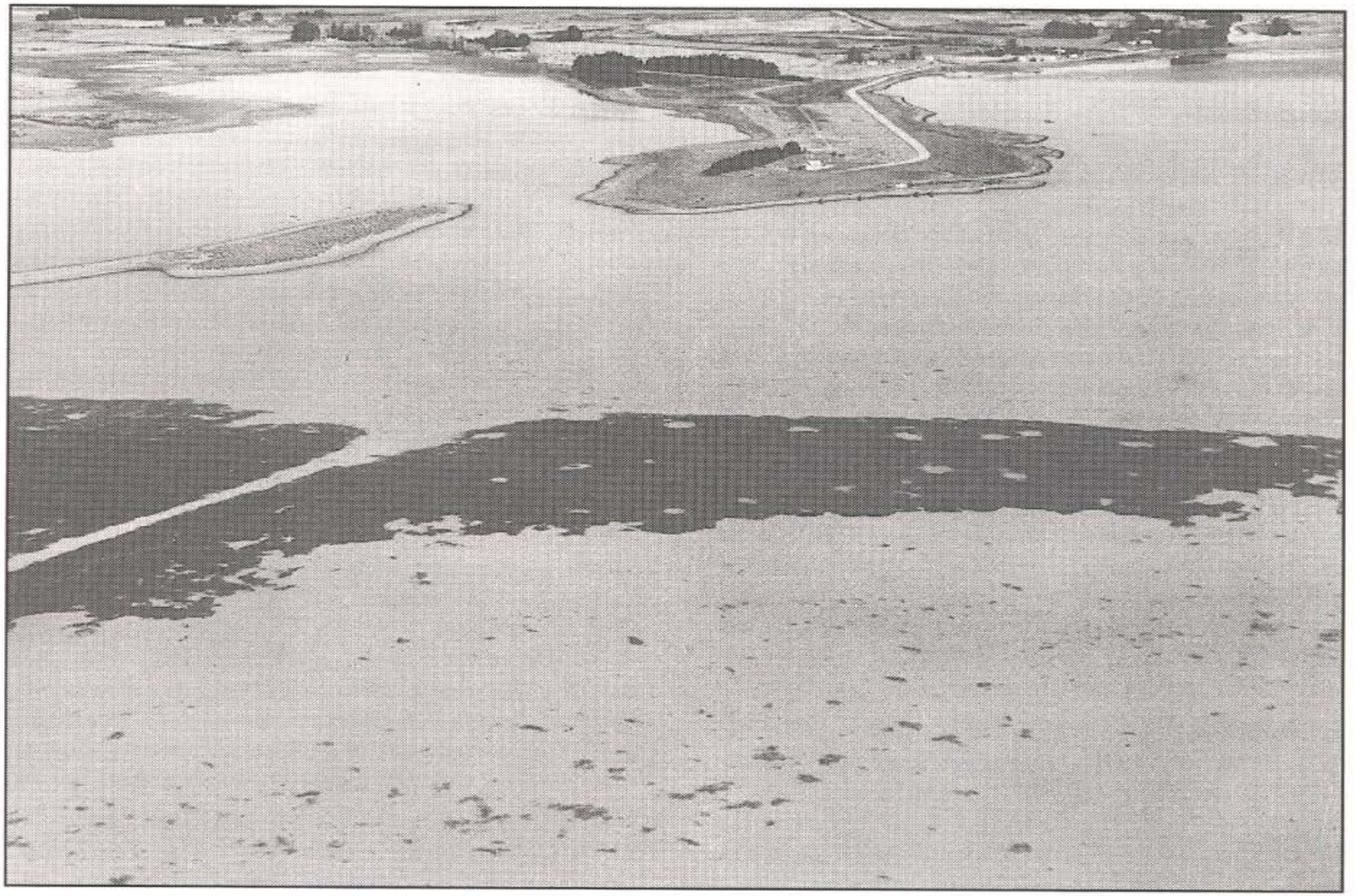

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Acknowledegments

- ECan (Ken Taylor, Shirley Hayward)
- NIWA colleagues (Brian Sorrell, Graeme Horrell)

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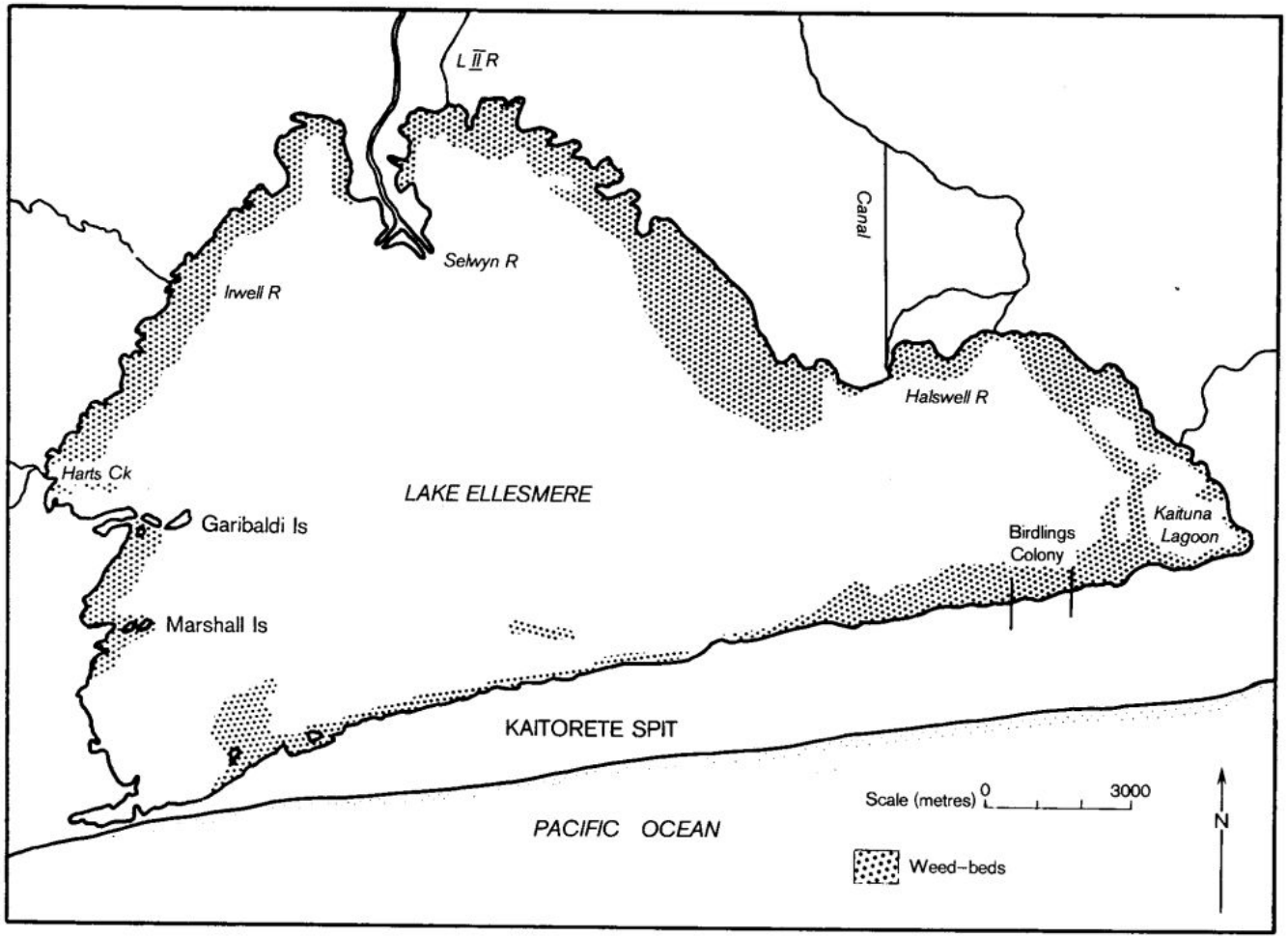
The distribution of aquatic macrophytes in Te Waihora, 1960 (from Hughes et al. 1974).



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Objectives

- Review of national and international experiences with macrophyte restoration projects and their applicability to Lake Ellesmere/Te Waihora
- Assess the conditions required for macrophyte rehabilitation in the lake
- Identify any critical gaps in information that are needed to determine suitable restoration conditions
- Assess the benefits, or otherwise, of macrophytes for the lake ecosystem
- Assess the risks of side-effects such as increases in marginal phytoplankton populations during re-establishment, effects on lake users, nuisance bird populations etc.

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The fishery yields (kg/ha) from Te Waihora and a selection of temperate lakes (a) = eutrophic lakes, (b) = oligotrophic lakes

Lake	Eel yield (kg/ha)	All fish yield (kg/ha)
Te Waihora	6.3	11.2
Lough Neagh, Ireland	17	
Lake Constance	3-6	
Small German lakes (a)	9-20	21-51
Small German lakes (b)	2-6	13-26
Large German stocked lakes	2.6	
Polish lakes	5.2	
Commachio Lagoon, Italy	5-7	
Ijsselmeer, Holland	10	
Coastal Baltic lakes	3	15
Central Baltic lakes	4.2	13

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The benefits and concerns associated with possible restoration of macrophytes in Te Waihora

- Benefits
  - restoration to ‘as it was”
  - macrophytes act as a sediment trap and nutrient sinks (increased inshore water clarity, and reduction of areas where sediment becomes re-suspended and nutrients mobilised)
  - reduce shoreline erosion
  - increased dissolved oxygen
  - produce shading and water temperature gradients
  - greater fish and bird habitat diversity

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- Concerns
  - aesthetics (shoreline rotting macrophytes and reduced dissolved oxygen)
  - fisher access and net fouling
  - other recreational users e.g. power boats and wind surfers etc
  - overall stability-could the lake flip again?
  - viability of existing seed bank
  - salinity changes and macrophyte species
  - local de-oxygenation at night
  - the risks of side-effects (phytoplankton blooms, especially blue-green algae, possible nuisance numbers of swans)
  - control of swan browsing
  - practicality and cost

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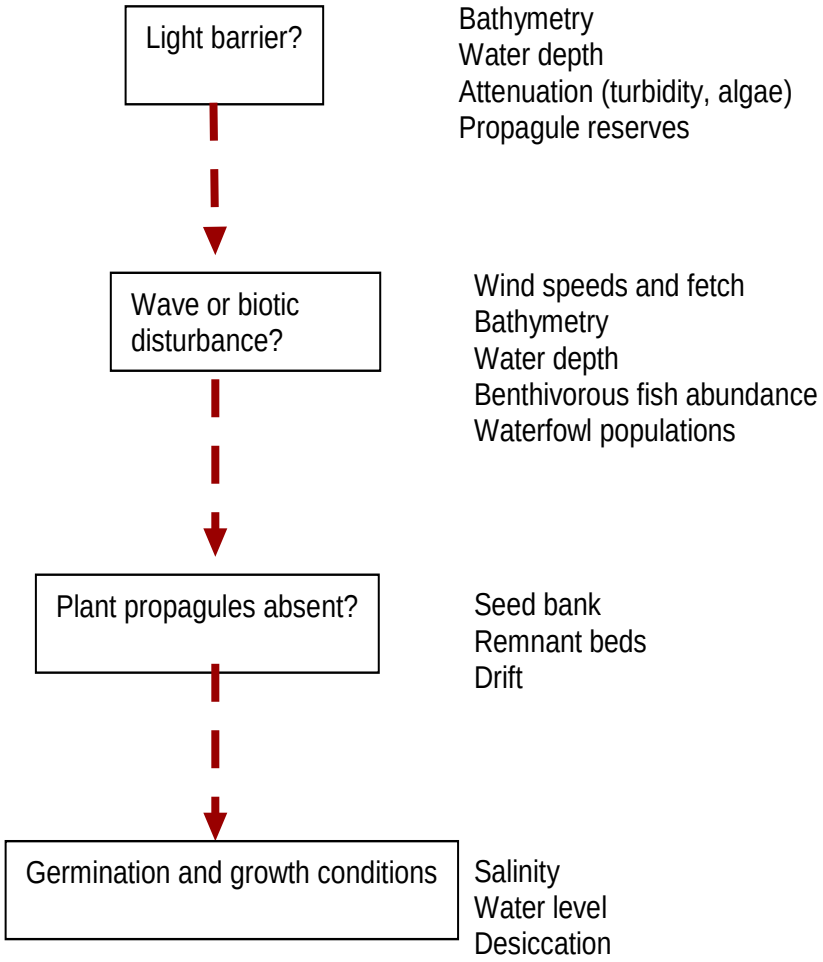
Potential barriers to macrophyte recolonisation in Te Waihora



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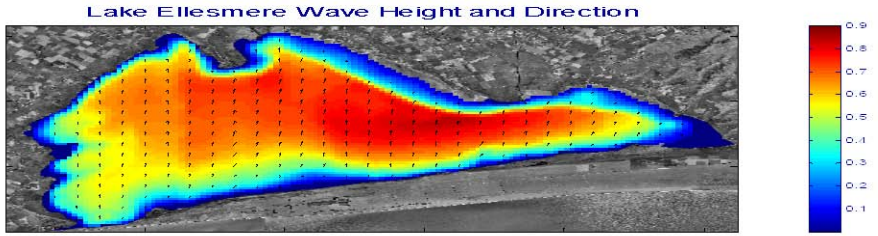
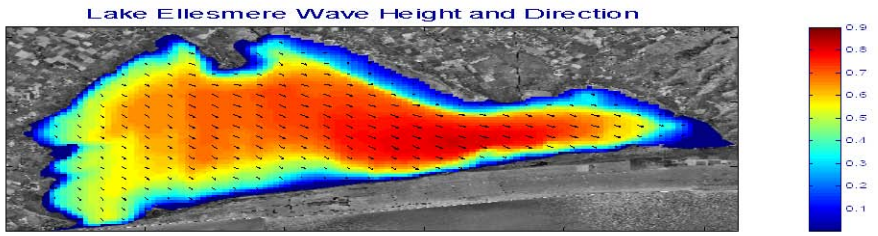
Mean wave height and direction

25 m/s southerly wind



25 m/s north-west wind



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Summary

- Some potential in selected reaches
- Decision to proceed involves perceived benefits *vs* likelihood of success and costs
- A staged approach could be considered

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