Opening Te Waihora/ Lake Ellesmere to the sea

Living Lake Symposium 2013

Daniel Harrison

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Brief history of level management

- Before human intervention - lake would have naturally opened by overtopping beach-crest (approx 4m amsl)
- Tangata whenua opened the lake for fish migration and flood control
- Use of horse drawn scoops from 1868 to 1904, 1925-1931
- 1904 Dobson's culvert
- 1907 Pannet's culvert
- 1931- Ellesmere Drainage Board purchased power scoops
- 1947- North Canterbury Catchment Board took responsibility (current levels formalised)
- Currently managed by Environment Canterbury and Te Rūnanga o Ngāi Tahu

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Figure 1.2 Historic opening 1886

(A.W. Hands, collection, Canterbury Museum)

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HIGH LAKE JUNE 2013

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LAKE OPENING PROCEDURE

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Decision for opening

- Water Conservation Order (WCO) sets minimum levels and ‘any level’ opening times
  - 1.05m masl — 1 August – 31 March
  - 1.13m masl — 1 April – 31 July
  - Any level — 1 April – 15 June & 15 Sept – 15 Oct
- Resource consent (mirrors WCO minimum levels)

- Opening decision process – Protocol Group
  - Protocol members: Lake Settlers, Taumutu Rūnanga, CCC, SDC, CRC, Ngāi Tahu, WET, DOC, F&G, Commercial Fishers
  - Aim is for group to reach consensus on decisions. Where consensus is not reached the final decision is made jointly by CRC and Ngāi Tahu (as joint consent holders)

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Ellesmere
Goulds Road
Springston South
Greenpark
Taitapu
Teddington
Selwyn River / Waikirikiri
Halswell River
Gebbies Valley
Kaituna Pass
Irwell
Selwyn Huts
Lower Selwyn Huts
Motukarara
Greenpark Huts
Doyleston
Kaituna
Ataahua
Lake Ellesmere (Te Waihora)
Nutts Cut (Manual)
Kaituna Lagoon
Lakeside
Kaitorete Spit
Fishermans Point
Taumutu
Lagoon /
Kaituna (Telemetry)
Taumutu (Telemetry)
Taumutu (Manual)

Features of the site & how opened

Mechanical Openings

- Achieved by making a temporary cut through the beach
  - 1.5 - 2.0m deep channel
  - 15m wide channel – ~75m wide at beach crest
  - up to 300m long
  - ~ 30,000m^3 material moved
  - ~ 3 - 5 days to create channel

- Using
  - D9 Bulldozer
  - D7 Bulldozers x2
  - 30t Excavator
  - (22 – 50t Dragline)

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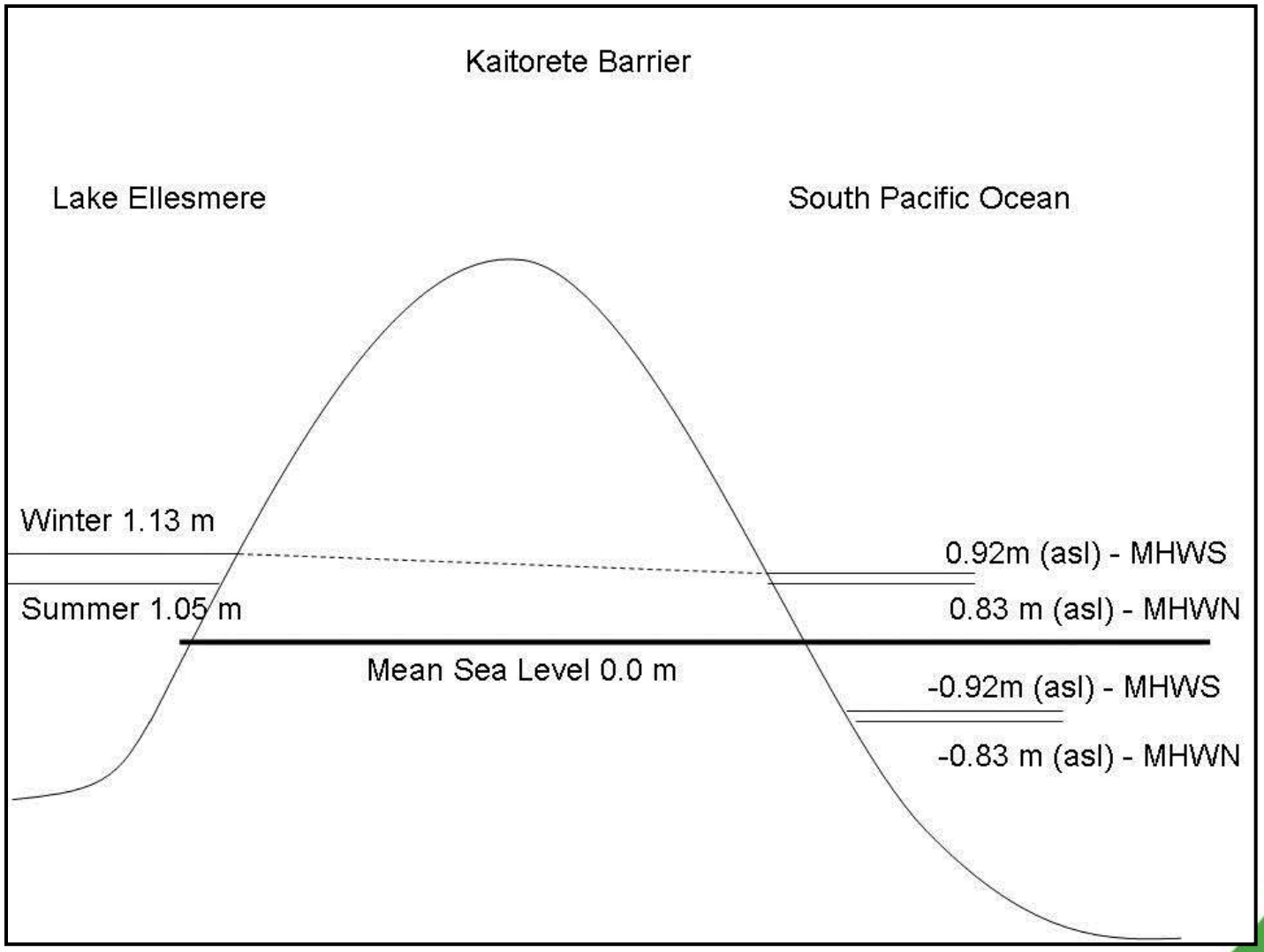

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BURNSIDE
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BURNSIDE
330


9 JUL 2007

4 AUG 2006

Costs

- The long-term average **annual cost** to open the lake is ~ $200,000 (range from $35,000 to in excess of $100,000 per opening; $8,000-$10,000/day just for plant).

- The cost of the work is funded through **targeted rates** collected from direct beneficiaries; and from **general rates** and **works & services rates**, which reflect the broader benefits of lake openings.

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Factors affecting openings

- **Swells and wave action**
  - *Swells can create 10m waves at the opening site*
  - *Need to be less than 2m to survive*
- **Tides and hydraulic gradients**
  - *Lake level vs sea level*
- **Wind**
  - *Can affect level by as much as 0.6m*

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Opening stats at a glance

Number of openings per year

- The number of lake openings per year varies depending on climatic conditions and sea conditions following an opening. Since records began in 1901 the lake has been opened 300 times in total – an average of 2.7 times/year (3.3 since 1947).
  - Ave days open = 24.72
  - Highest level opened = 2.16m (Sept 29, 1941)
  - Lowest level opened = 0.85m (Dec 21, 1948)
  - Average level opened = 1.27m (1.18m since 1947)
  - Average closing level = 0.62m

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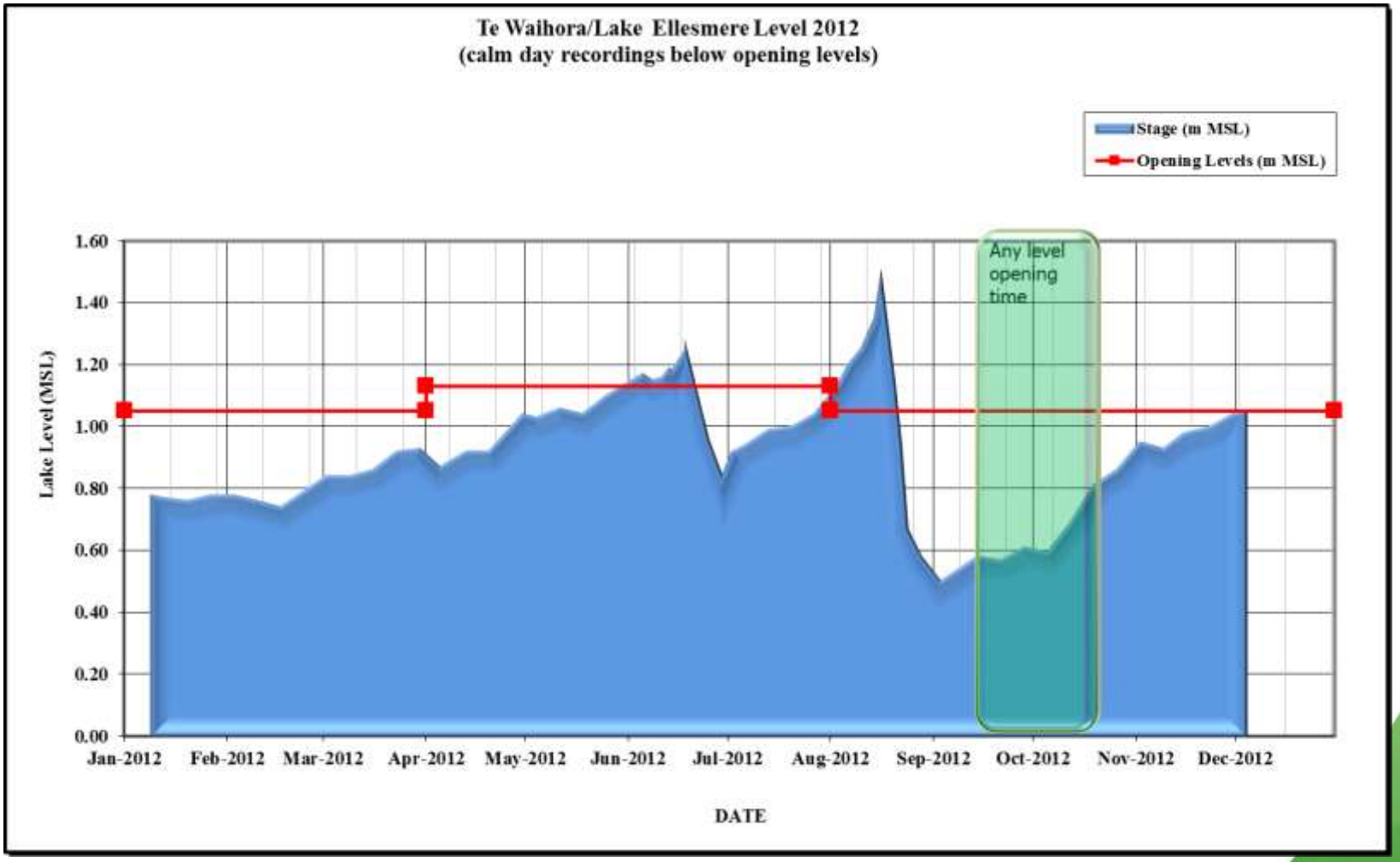

LEVEL GRAPH (2012)

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Assisting

EEL/TUNA MIGRATION

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QUESTIONS?

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Thanks to:

- Mike Hyett
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- Ross Vesey

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