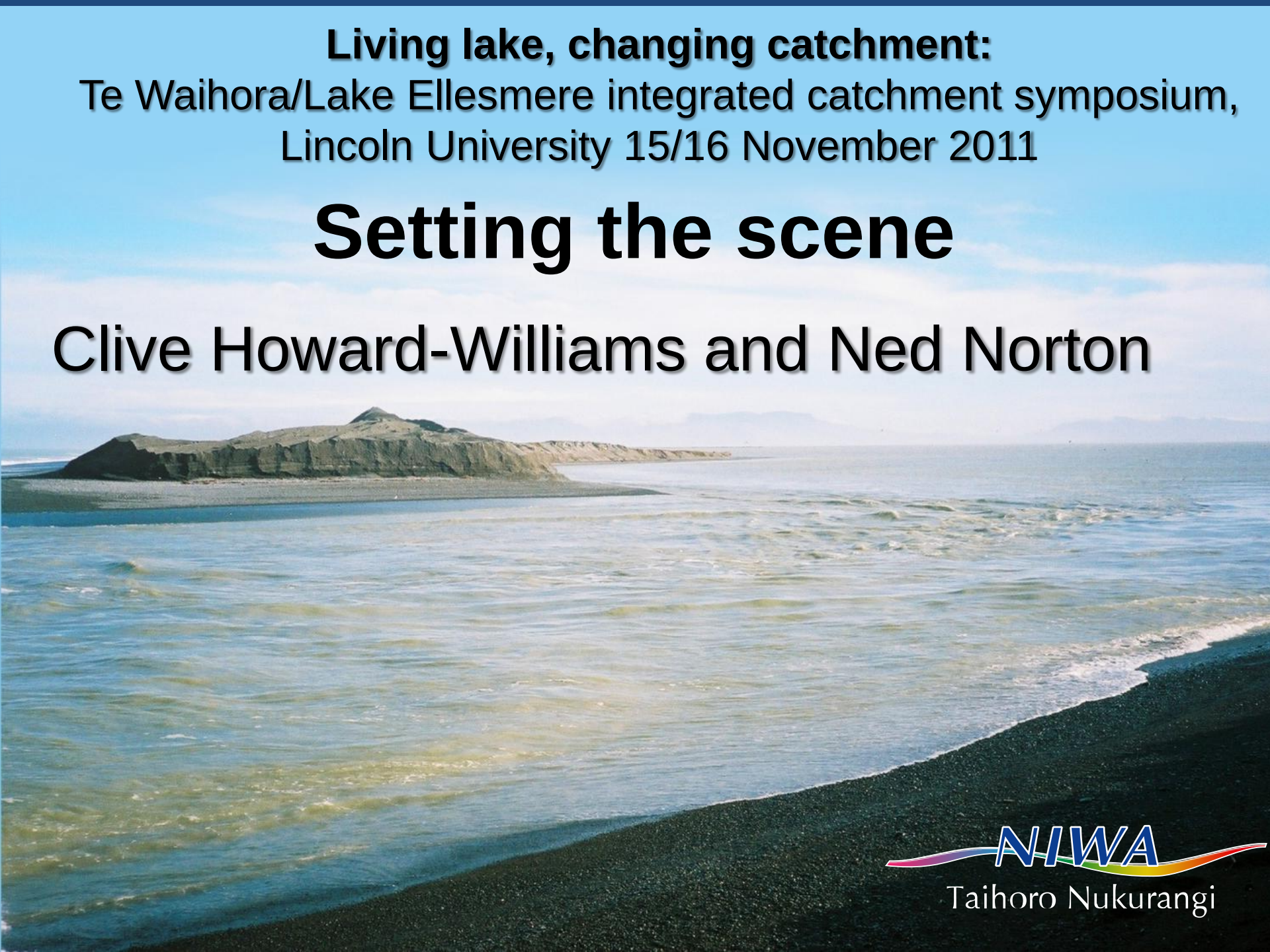
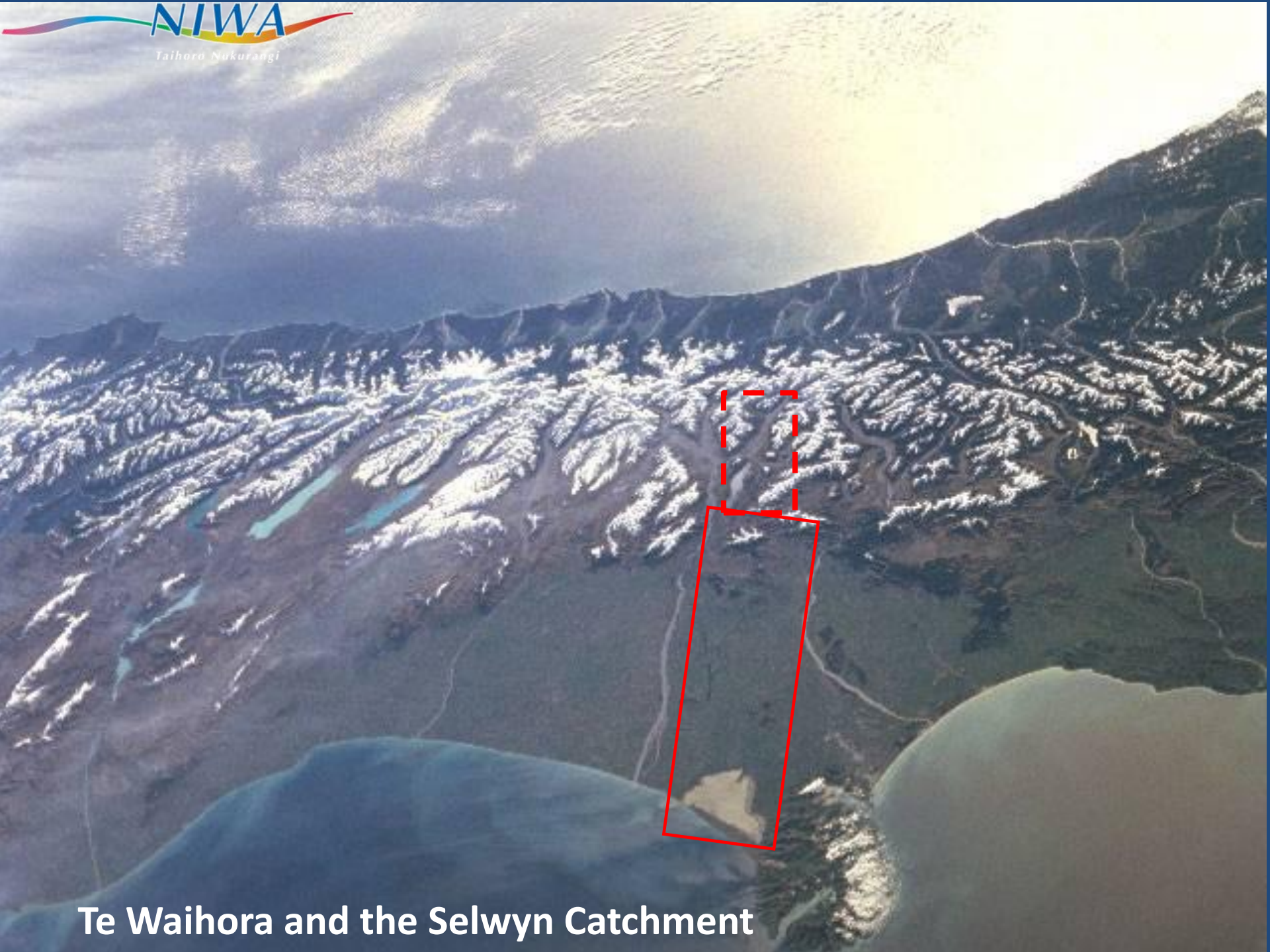
Living lake, changing catchment:
Te Waihora/Lake Ellesmere integrated catchment symposium,
Lincoln University 15/16 November 2011

Setting the scene

Clive Howard-Williams and Ned Norton



NIWA
Taihoro Nukurangi



Te Waihora and the Selwyn Catchment

The “community” will face some challenging decisions around Te Waihora in the near future.

With formation of Selwyn Waihora Zone and Zone Committee, preparation is under way for catchment and regional level plans, that over the next 12 months, will set objectives for Te Waihora and associated limits to catchment land and water resource use.

These plans will need to reflect the multiple targets of the CWMS and multiple values for the lake, but identify where the attainable balance of these targets lies for the catchment.

2007 Symposium addressed the question: "Is the lake dead, and if not how alive is it?" (state of the lake)

'Value'	Range of states
Catchment Hydrology	Upper: 'very good' Lower: 'very bad'
Water quality of tributaries	'good' to 'very bad'
Water quality of lake	'fair' to 'bad'
Vegetation	Vegetation (incl. macrophytes): 'very good' to 'poor' Rare plants: 'very good' to 'very bad' Woody weeds: 'very bad'
Brown trout fishery	'very bad'
Commercial fisheries	'good' to 'bad'
Wildlife	'very good' to 'bad'
Recreation	'very good' to 'very bad'
The Ngai Tahu Values	'bad'

Overall: ? Bad

2007 Symposium implications

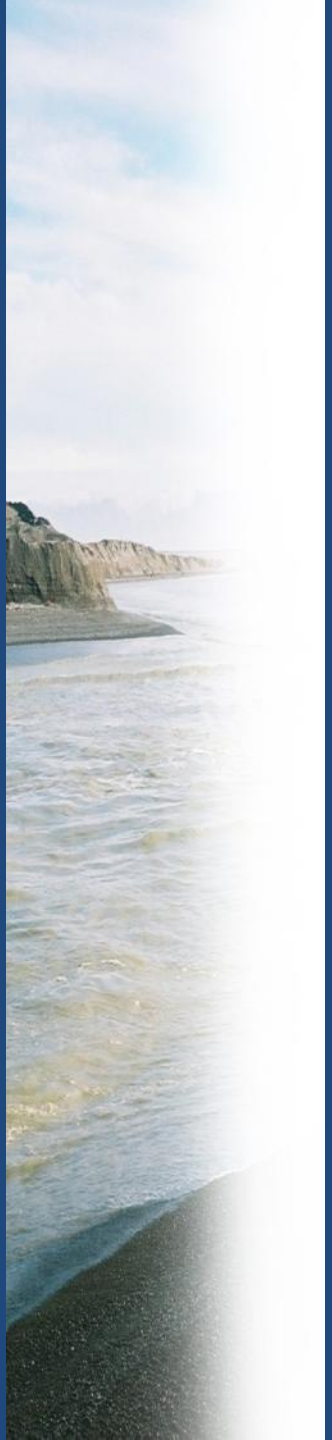
- Led to more informed debates around the state and future of the lake which in turn:
  - Fed into 2010 water conservation order on importance of a range of values
  - Fed into CWMS targets

2009 Symposium – focus on lake opening

Range of potential future lake level management scenarios considered. Key issues debated and clarified some potential ways forward, e.g.:

- higher lake opening trigger levels come with costs but few obvious gains;
- higher average lake level can occur without raising the trigger level, but by incorporating other decision criteria;
- targeted openings around September and/or October have potentially great benefits for fisheries management; and,

Future debate around these options now much better informed by the modelling and by discussions which occurred at the symposium.



Implications from 2009 symposium:

- Lake's future tied to more than the lake level management regime. Riparian management (willow control, stream edge planting, and stream side fencing) clearly necessary and now underway.
- Fed into 2010 water conservation order on actual timings of openings related to desired outcomes
- Fed into CWMS implementation

This 2011 Symposium: looking at the future from an integrated catchment perspective, but still with central focus on the lake

- Desired outcomes:
  - Good decision making informed by good science (day 1)
  - Collaborative processes (including co-governance) and general discussion about short and long term futures for the lake and catchment (day 2)

What does ‘integrated catchment perspective’ mean?

Processes needed to deal with integration

- Get outcomes desired by the community
- Determine appropriate limits to achieve these outcomes
  - Develop scenarios
  - Analyse impacts and risks of these scenarios
- Evaluate and develop policy

Appropriate CWMS 2020 targets for Selwyn catchment

- 2. Irrigated land area ***Reliability of supply has improved for 50% of irrigated land (Significant expansion of land use)***
- 4. Ecosystem health/biodiversity ***50% of lowland streams have good ecosystem health; 90% of other river types and of lakes have good ecosystem health***
- 5. Water use efficiency ***Production from irrigated land is 20% greater than in 2010***
- 6. Kaitiakitanga ***all degraded wahi taonga and mahinga kai waterways nominated by Ngai Tahu have active restoration projects***

Appropriate CWMS 2020 targets for Selwyn catchment (cont.)

- 7. Contribution to regional & national economies ***The value added per unit of water is increasing (more intensive land use)***
- 8. Natural Character of braided rivers ***The habitats in wetlands, springs and lagoons associated with braided rivers are protected***
- 9. Recreational & amenity opportunities ***All lake and river sites used for contact recreation meet recreational water quality guidelines.***

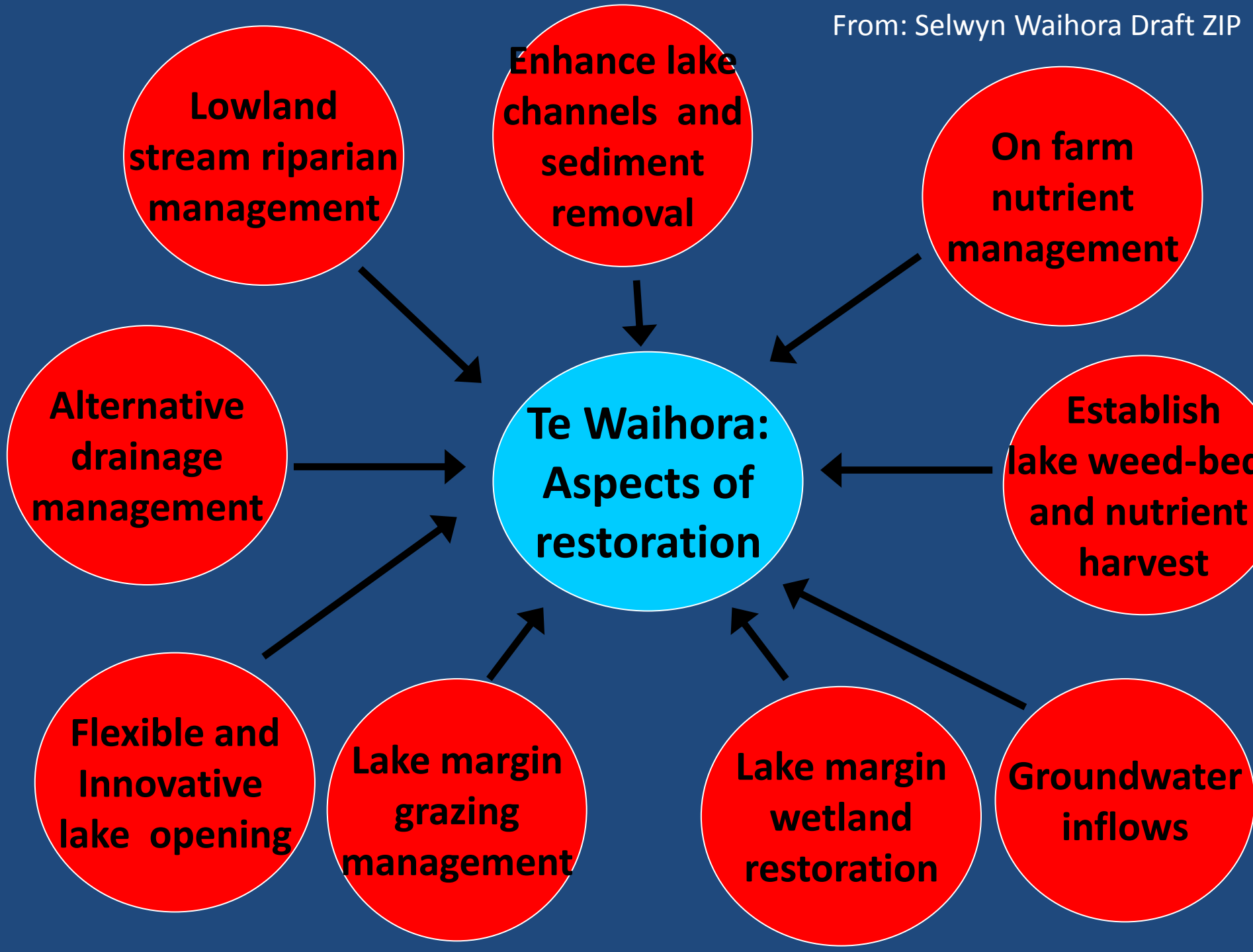
Draft Selwyn Waihora ZIP Priority Outcomes

A. Thriving communities and sustainable economies
B. High quality and secure supplies of drinking water
C. Best practise nutrient and water management
D. Kaitiakitanga is integrated into water management
E. Healthy lowland streams
F. **Te Waihora is a healthy ecosystem**
G. Hill-fed waterways support aquatic life and recreation
H. Alpine rivers and high country values are protected
I. Enhanced indigenous biodiversity

Multiple issues affecting the complex system

- Water allocation regimes
- Irrigation use
- Land use intensification
- Lake level opening regimes
- Restoration initiatives
- Ramsar site
- Lake fishery
- Lake wetlands
- Mahinga kai – food harvest
- Climate change
- Water Conservation Order

From: Selwyn Waihora Draft ZIP

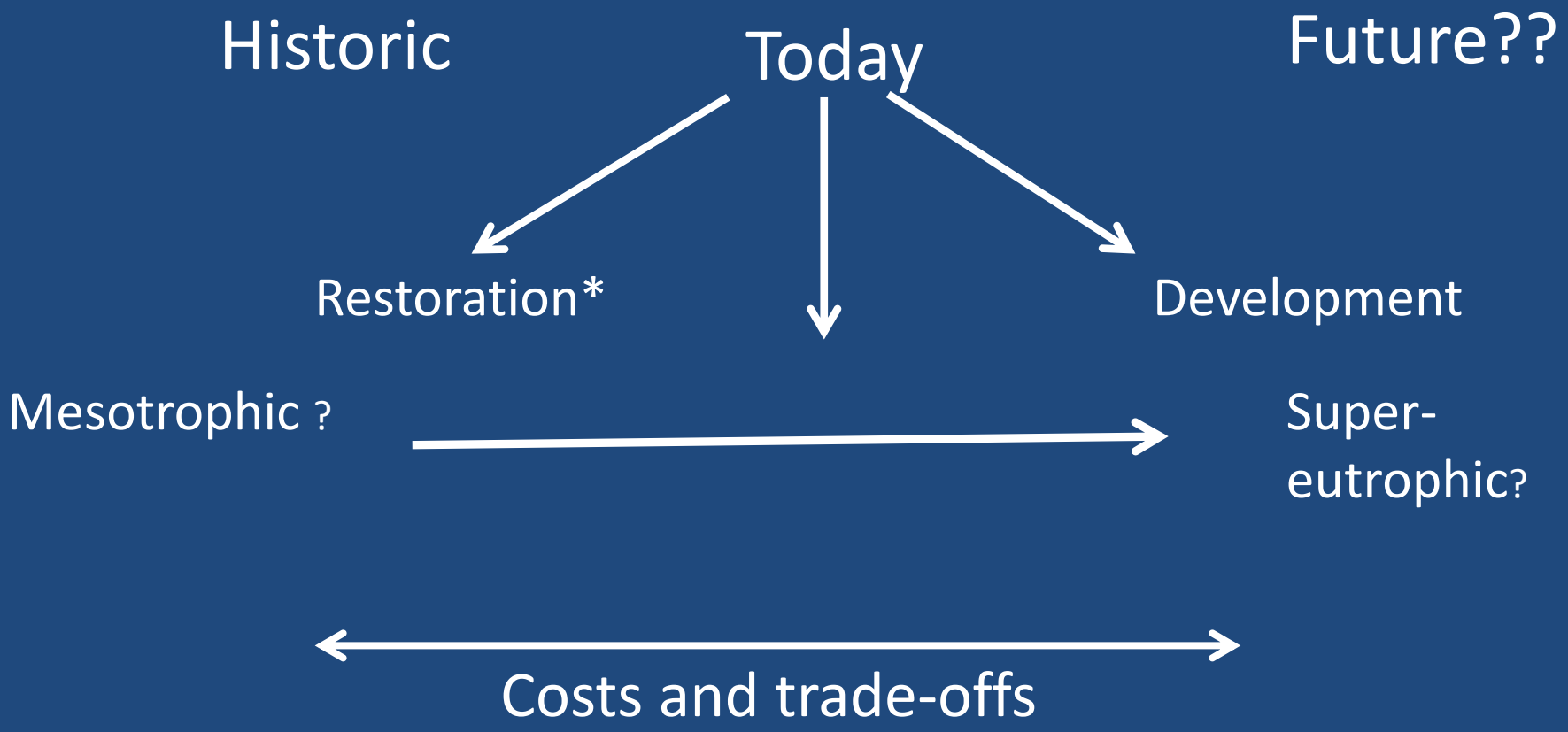


Key knowledge gaps for 2011 *(that we hope will be addressed at this Symposium)*

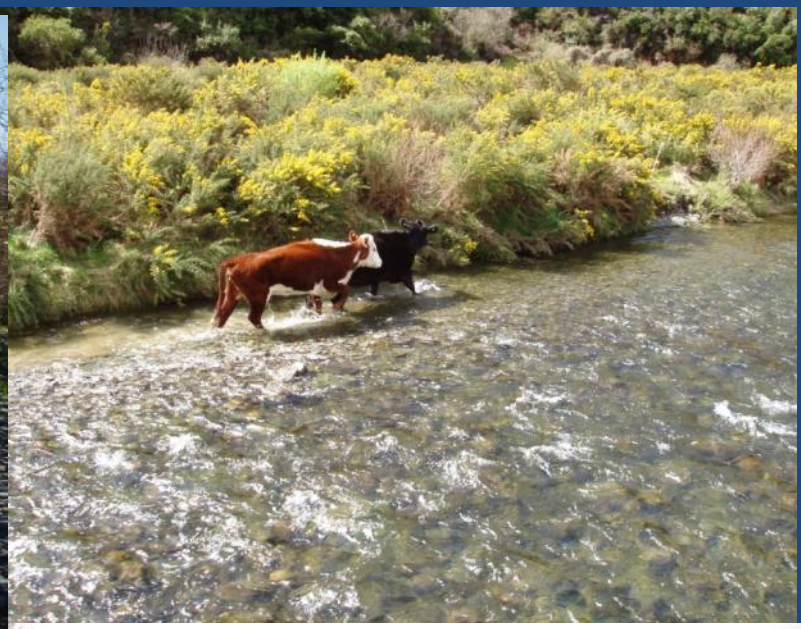
Better predictions of lake health in a changing catchment need:

- Flow related nutrient loads (lake nutrient balance): (How important are nutrients in the total picture of the healthy lake?).
- Detailed water balance that improves salinity models and addresses spatial issues for nutrients and salinity.
- Influence of the lake opening regime on the lake's phytoplankton.
- Macrophyte restoration techniques for a large lake.
- Linked groundwater-surface water systems: Spring-fed tributaries: Values and what do we manage these for? Community decision making will be important.

Scenarios: Range of possible states



* cf. Prof Hamilton's talk



Te Waihora challenges

(1) Scientists and other technical people

- will need to describe the possible future states, the multiple influences on state (e.g., water allocation and lake level regimes, land use, restoration initiatives and climate change), the way these interact, and the costs and trade-offs involved.

Te Waihora challenges

(2) Planners

- will need to integrate the technical knowledge, inform and engage the community to help make informed choices, and to reflect decisions in measurable terms within planning documents.

Te Waihora challenges

(3) The community as a whole

- will need to make the tough choices, to accept decisions made and to work together to implement plans for the catchment once made.
- The uncertainties involved mean that we are unlikely to get plans absolutely right first time, but we need to get it "near to right", ……..
  and then be
  prepared to
  monitor, review and
  adapt accordingly.

How does the community get involved?

Predictions for the future?

Increase in intensity of land use

vs.

Increase in mitigation and improved farming practices and increase in conservation

Will they balance to allow a healthy lake???

Lake Ellesmere outlet24 June 2008

Linked groundwater-surface water systems in Te Waihora catchment and intermittent flows