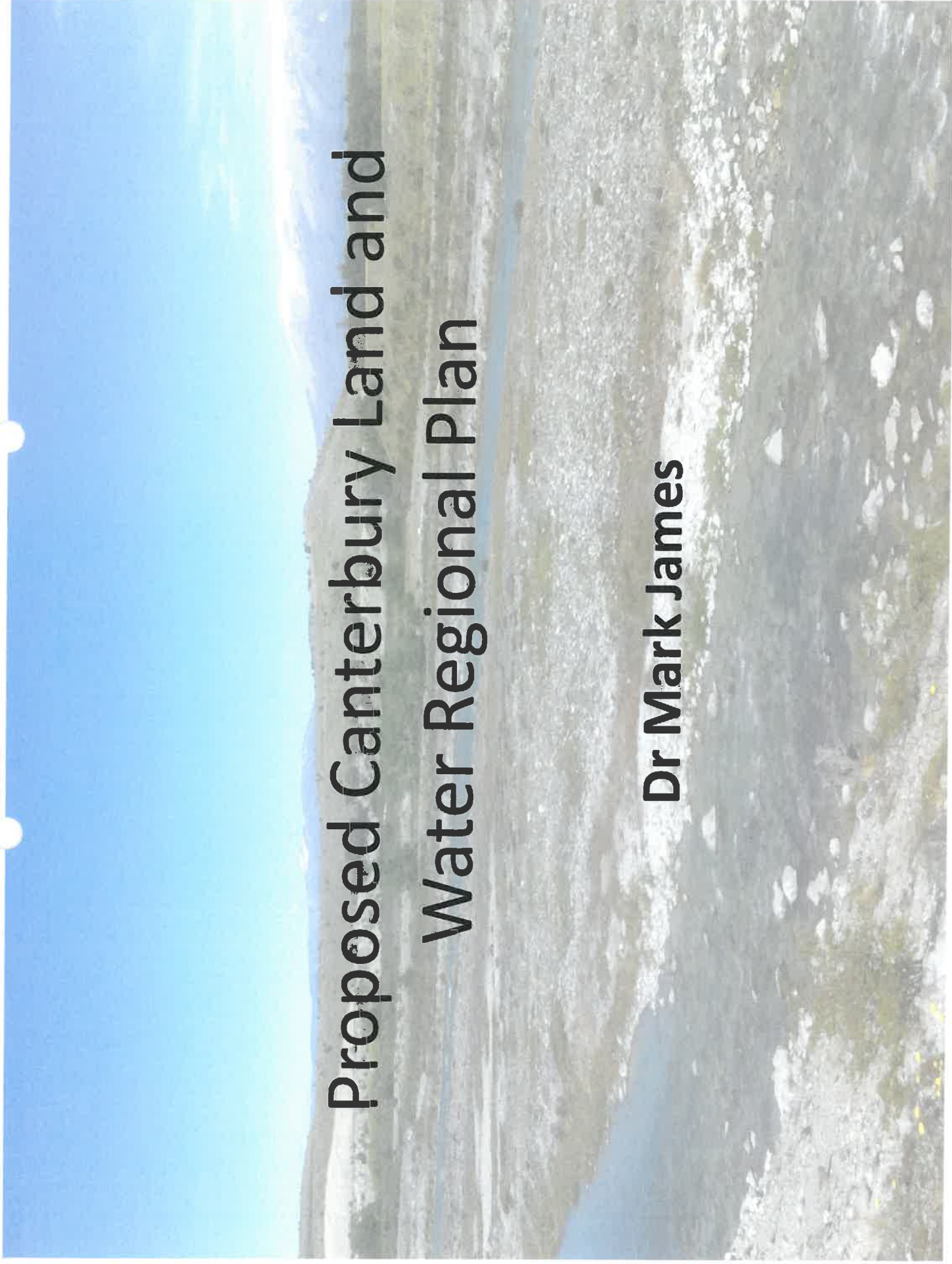


Tabled at hearing 08/02/2018

Proposed Canterbury Land and Water Regional Plan

Dr Mark James



Scope of evidence

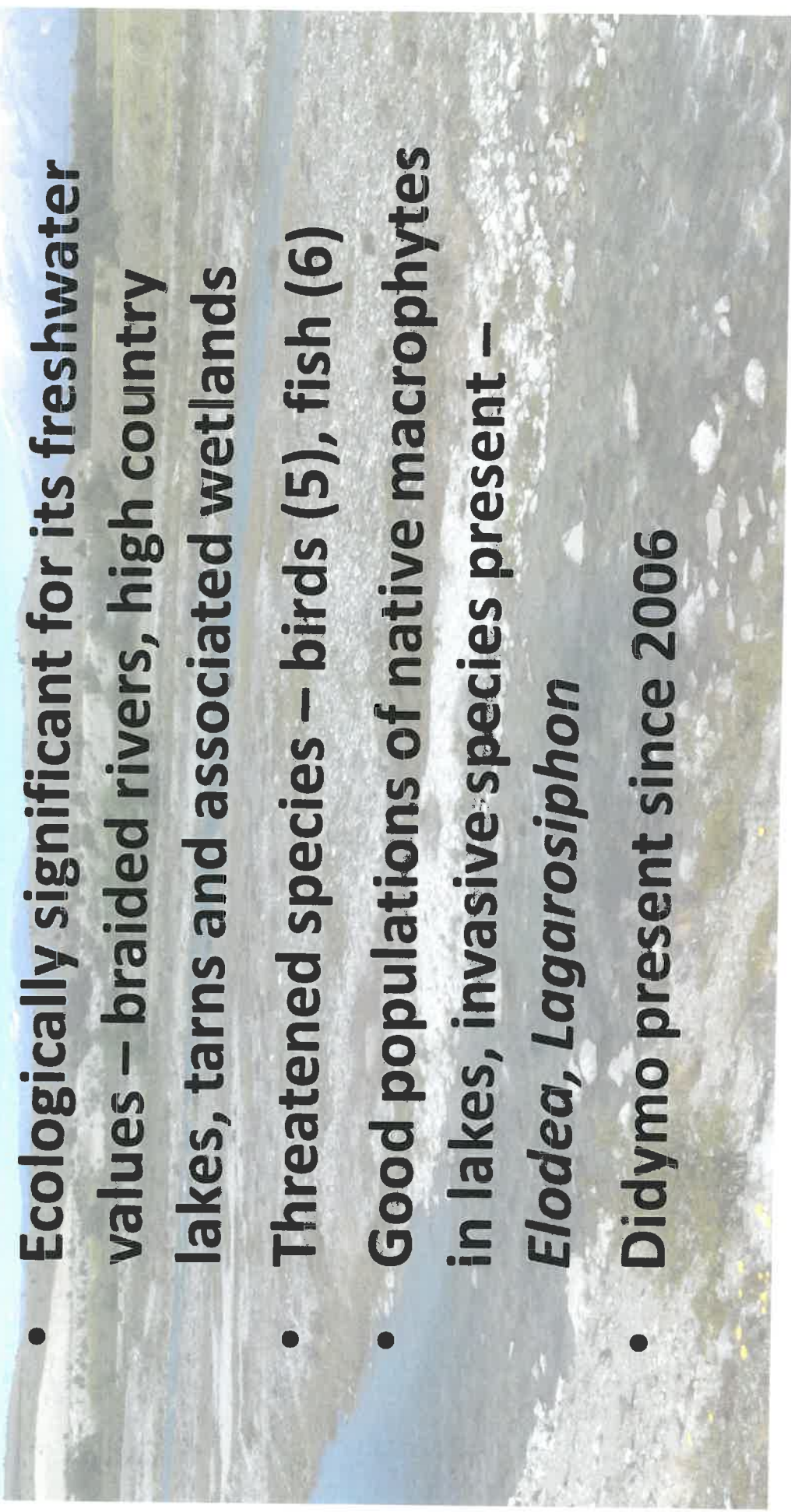
- **Overview existing environment –
water quality and existing aquatic
values in Upper Waitaki Catchment
(UWC)**
- **Key environmental changes**
- **Identified weaknesses in Proposed
Plan**



UWC existing environment



- Ecologically significant for its freshwater values – braided rivers, high country lakes, tarns and associated wetlands
- Threatened species – birds (5), fish (6)
- Good populations of native macrophytes in lakes, invasive species present – *Elodea*, *Lagarosiphon*
- *Didymo* present since 2006



UWC existing environment –

cont.

- **UWC above lakes (Tekapo, Pukaki, Ohau) largely still unmodified**
- **UWC below lakes modified by hydro and farming – loss of braided river and wetland habitat, water quality declining**
- **Lake Benmore - oligotrophic (TLI 2.5-2.9) but close to mesotrophic**
- **Wairepo Arm – mesotrophic (TLI 3.7) close to eutrophic**

Lake Benmore – Trophic Lake Index 2008-09, 2011-12

Haldon Arm

08-09 = 2.65

11-12 = 2.51

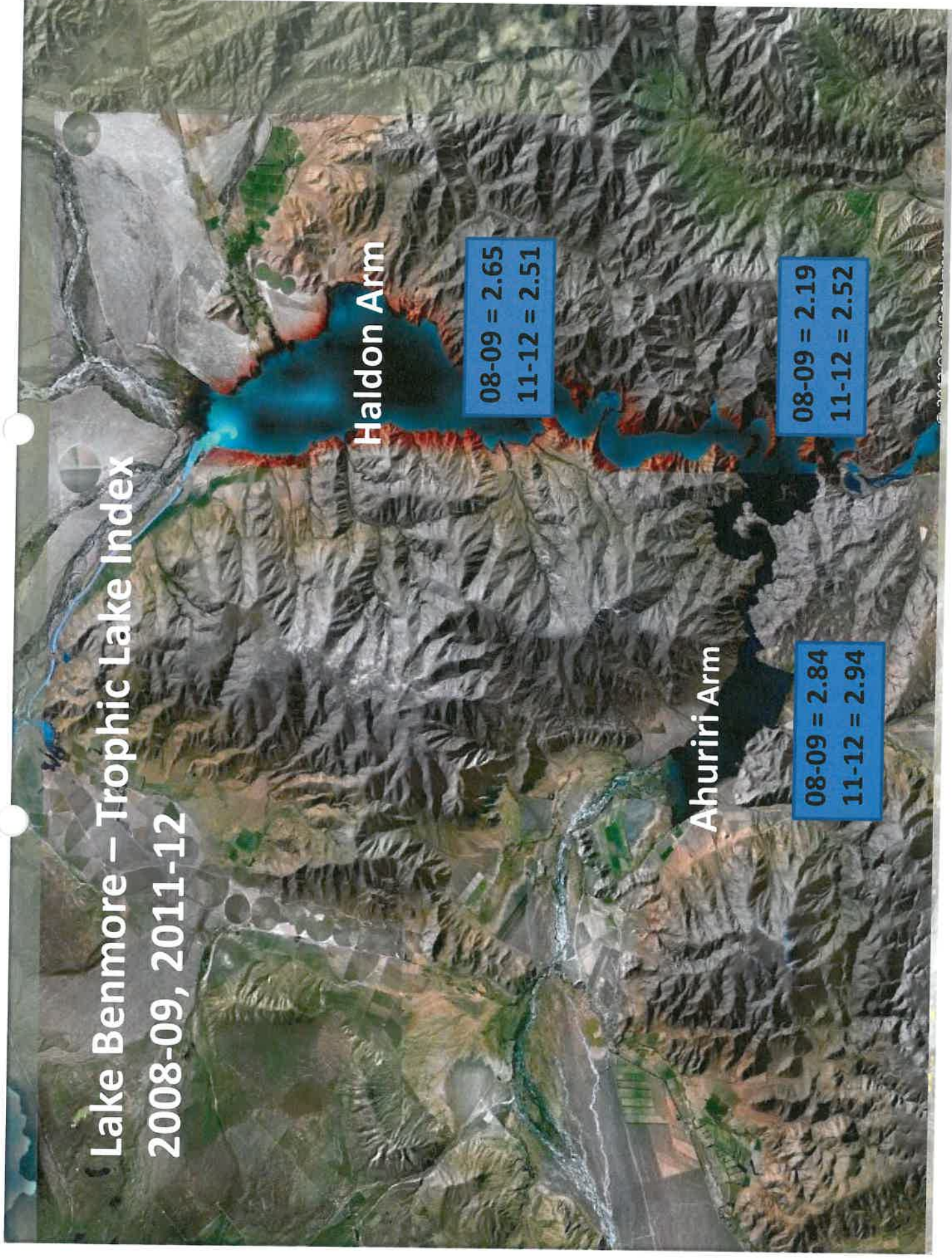
08-09 = 2.19

11-12 = 2.52

Ahuriri Arm

08-09 = 2.84

11-12 = 2.94



Key environmental changes

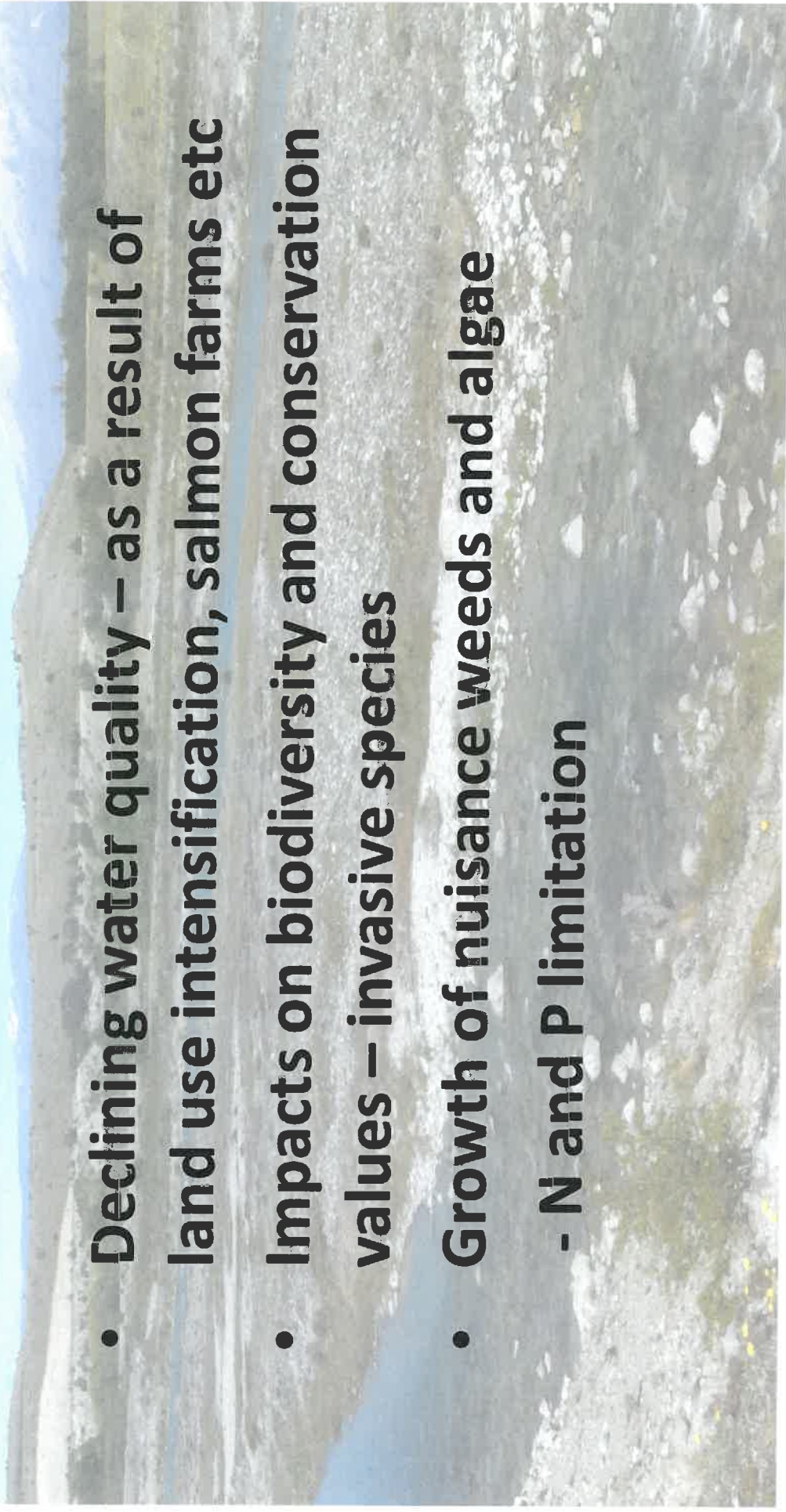


Lagarosiphon



Didymo

- Declining water quality – as a result of land use intensification, salmon farms etc
- Impacts on biodiversity and conservation values – invasive species
- Growth of nuisance weeds and algae
 - N and P limitation

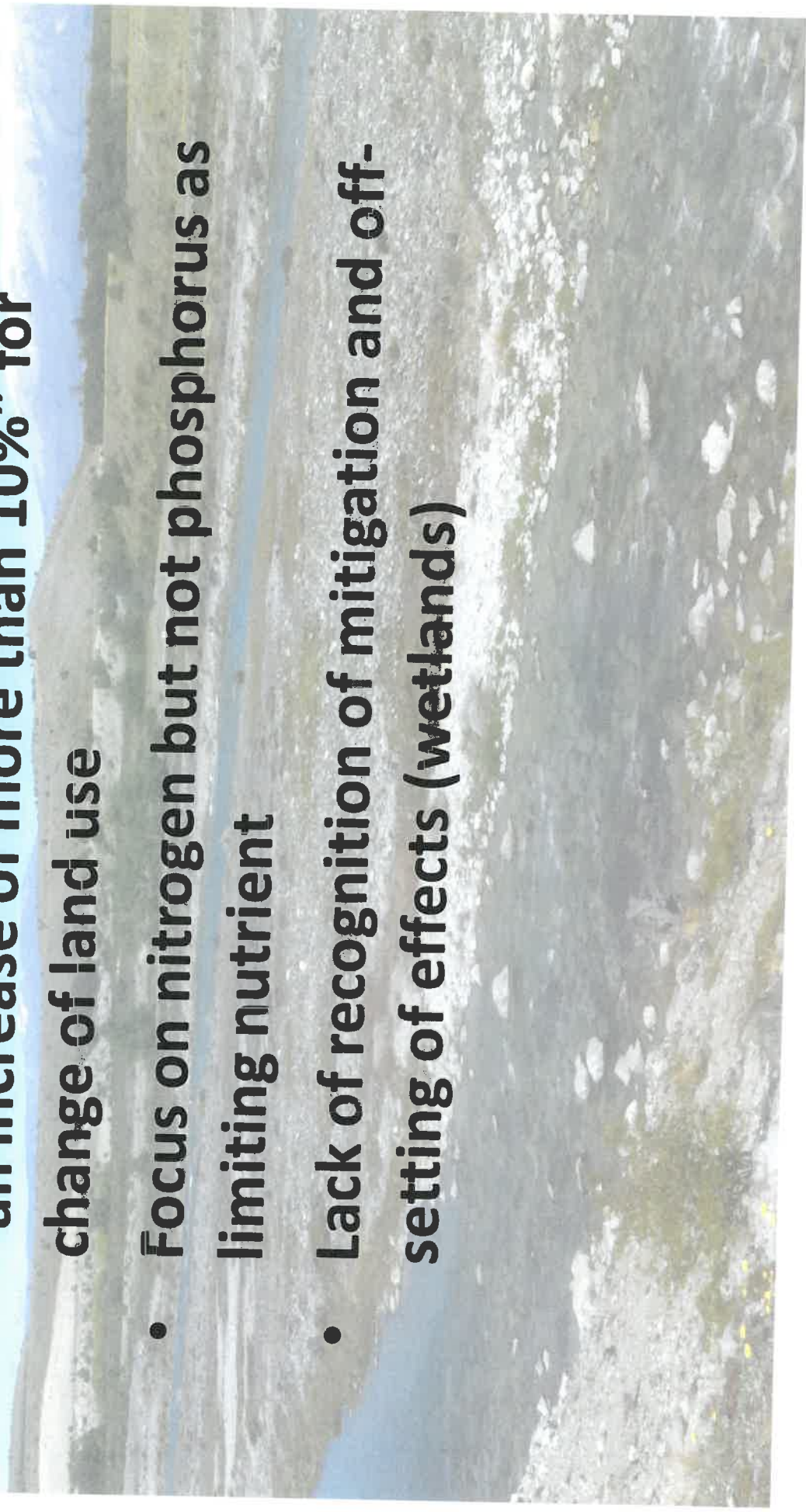


Identified weaknesses in Proposed Plan

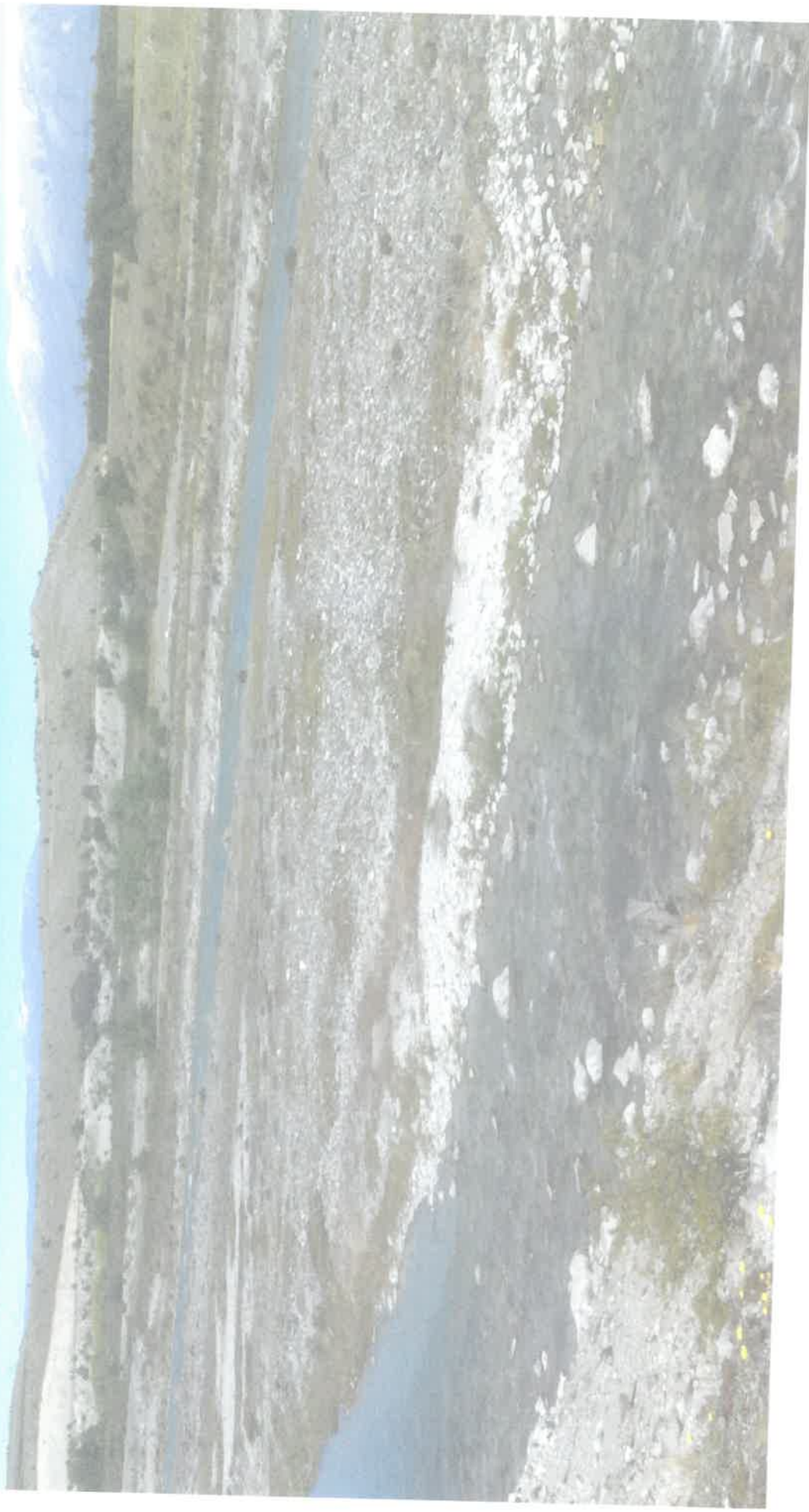
- Outcomes regarded as critical limits, compliance (Strategic Policy 4.1, Table 1a, 1b)
 - 100% compliance for outcomes – unrealistic eg temperature, water colour, periphyton
- TLI levels for lakes not clear
 - TLI of 3 for Lake Benmore, 4 for Wairepo Arm – continuum, lags
- Obj 3.10 -Natural processes and continuity of rivers
 - Existing not historic natural processes
 - Natural flows, fish passage, lake shore erosion

Identified weaknesses in Proposed Plan- cont.

- “an increase of more than 10%” for change of land use
- Focus on nitrogen but not phosphorus as limiting nutrient
- Lack of recognition of mitigation and offsetting of effects (wetlands)



Extra slides



Lake Benmore - Chlorophyll *a*

2008-09, 2011-12

08-09 = 0.86
11-12 = 1.6

08-09 = 0.87
11-12 = 1.6

08-09 = 1.3
11-12 = 2.24



Lake Benmore - Total Nitrogen 2008-09, 2011-12

08-09 = 77

11-12 = 134

08-09 = 64

11-12 = 83

08-09 = 100

11-12 = 109

08-09 = 71

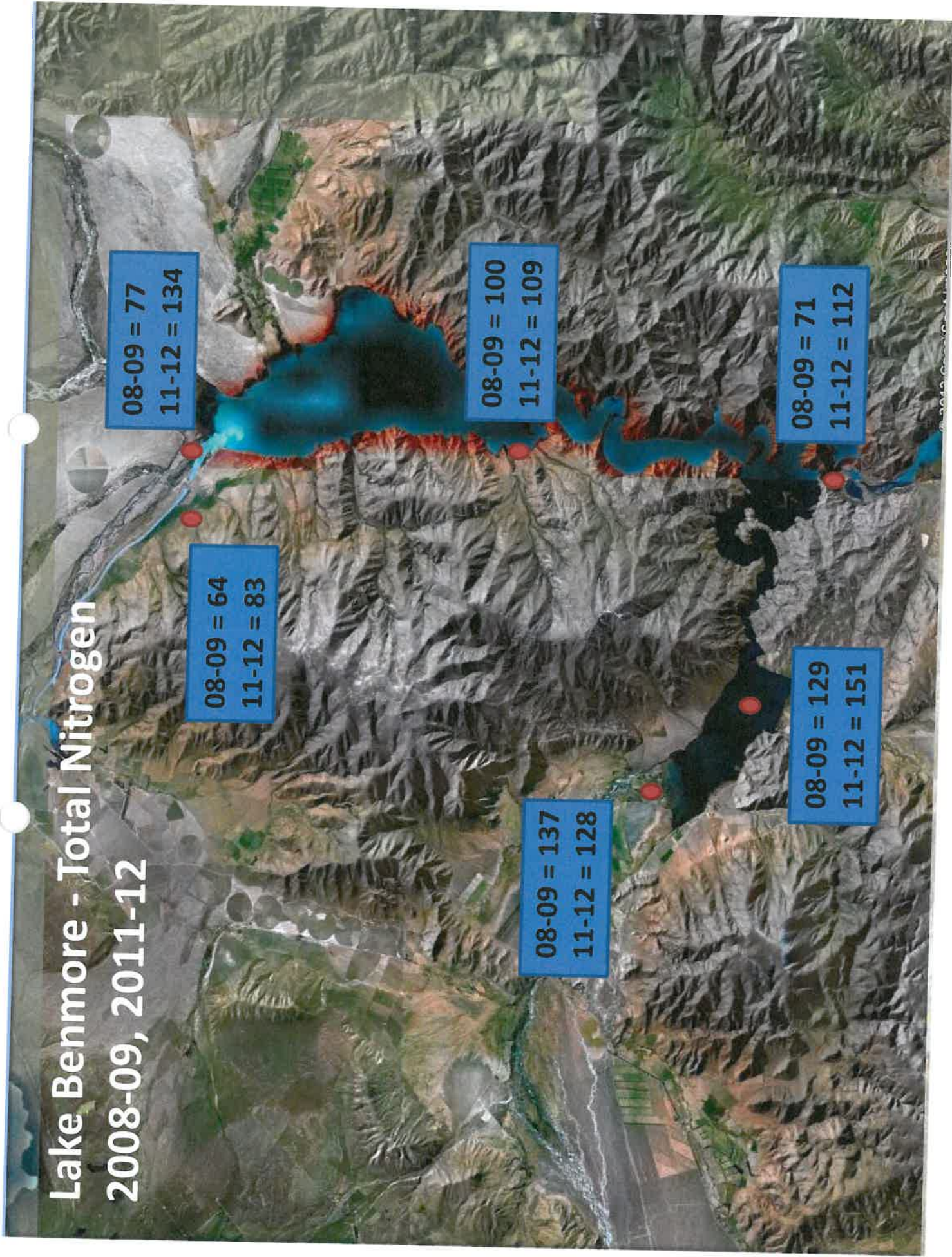
11-12 = 112

08-09 = 137

11-12 = 128

08-09 = 129

11-12 = 151



Lake Benmore - Total Phosphorus

2008-09, 2011-12

08-09 = 7.9
11-12 = 6

08-09 = 6.3
11-12 = 8

08-09 = 13.2
11-12 = 5

08-09 = 6.3
11-12 = 5

08-09 = 17
11-12 = 17

08-09 = 11
11-12 = 7.5

