

Tabled at Hearing 13/3/2013<sub>1</sub>

Environment Canterbury  
PO Box 345,  
Christchurch.

**Re: Proposed Canterbury Land and Water Regional Plan**

**Information for hearing on behalf of the Ohau Protection Society**

**1. Introduction:**

1.1 My name is William Patrick Chisholm. I am an Environmental Consultant residing near Omarama. I have run my own environmental consultancy business - Chisholm Associates, since April 1991.

1.2 I hold a Masters degree with Honours in Zoology from Victoria University of Wellington. I am a member of the New Zealand Ecological Society and the New Zealand Freshwater Sciences Society. I am currently registered as a Certified Environmental Practitioner (CENVP). The CENVP programme is run by the Environment Institute of Australian and New Zealand (EIANZ) and requires its members to act in a professional manner at all times.

1.3 I am currently a community member of the Upper Waitaki Zone Committee, which was formed through ECAN's Canterbury Water Management Strategy (CWMS). I am also this committee's representative on the CWMS Regional Committee, and the CWMS Water Quality Subcommittee.

1.4 I am currently a member of the Ohau Protection Society (OPS), and serve on their committee as a technical advisor.

**2. Support for the proposed Plan**

2.1 Overall, OPS supports the Policies, Objectives and Rules outlined in the Plan. It is essential that the rules governing Canterbury's water quality are workable if they

are to lead to tangible water quality improvements and not undermine the value and sustainability of Canterbury's water resources.

2.2 We support the inclusion of "sensitive lake catchments", and the rules relating to them. OPS agrees that Lake Middleton is included as a sensitive lake catchment, as it is an ecological reserve. We also agree that the Wairepo Arm of Lake Ruataniwha and Kellands Ponds are also listed as sensitive lake catchments, as these waterways are under serious threat from groundwater and surface water pollution from nearby intensified farms, and aquaculture developments. These small water bodies are significant recreational resources, especially for picnicking and trout fishing, and they warrant the highest level of protection from human use intensification that the Plan can provide.

2.3 OPS recommends that the whole of Lake Ruataniwha is included as "sensitive lake catchment". This lake is also a significant recreational resource, especially for swimming, rowing, waterskiing and other boating. The enforcement and rehabilitation of Wairepo Arm and Kellands Ponds, which are connected to the rest of Lake Ruataniwha, would be impossible unless the whole water body has the same classification. Lake Ruataniwha water quality is under threat itself from nearby land intensification; especially groundwater pollution, as well as nutrient inputs from adjacent campgrounds.

### **3. Lake Ohau as a Sensitive Lake Catchment**

3.1 OPS believes that Lake Ohau should be included as a "sensitive lake catchment". This lake is classed by Meredith & Wilks (2007)\* as "microtrophic". Microtrophic lakes are very clean, and often have snow or glacial sources. Lakes Tekapo and Pukaki are also microtrophic lakes. A description of how lakes are classed by their trophic states is provided in Appendix 1.

\*Meredith, A.; Wilks, T. 2007. *Canterbury high country lakes water quality monitoring programme: Results of the third year monitoring 2007*. ECAN Report No. U07/50

3.2 Appendix 2 (from Meredith & Wilks 2007) lists the trophic states of 22 high country lakes in Canterbury. Of these, only 6 lakes (including Lake Ohau) were classed as microtrophic or ultra-microtrophic in 2007. Microtrophic lakes are highly sensitive to nutrient enrichment.

3.3 Meredith & Wilks (2007) conclude:

*Localised impacts around the shorelines of Lakes Tekapo, Ohau and Ruataniwha are likely to occur from increased land use intensification. Proliferations of periphyton, particularly didymo and filamentous greens can be expected to occur around the shorelines where nutrient run off from land arrives at the lake*

3.4 While natural events can temporarily change the trophic status of a lake, ongoing nutrient inputs from land intensification and urban runoff will cause a permanent change, as we have seen in so many of our lowland lakes. If we are to preserve the outstanding natural feature that is the microtrophic status of these lakes, then we must conclude that there is no further “assimilative capacity” for nutrient inputs into them. Unlike Lakes Tekapo and Pukaki, Lake Ohau was not raised for hydro-electric development. This affords it an even higher degree of “naturalness” than the other two lakes, and therefore it should warrant a higher degree of protection.

#### **4. Conclusion**

4.1 While it is currently not under threat, we would like to see Lake Ohau given the highest level of protection from future land intensification, and hence included as a “sensitive lake catchment” in the Plan. We suggest that Council considers including Lake Ruataniwha as a “sensitive lake catchment” because of its interconnectedness with Wairepo Arm and Kellands Ponds, and its high recreational value. In addition, we suggest that Council considers including lakes Tekapo and Pukaki as “sensitive lake catchments”, because of their microtrophic status.



William Patrick Chisholm, 12<sup>th</sup> March, 2013.

## Appendix 1

### Trophic states

Trophic states as determined by the four key variables are grouped from microtrophic to hypertrophic as shown below:

- **Microtrophic lakes** are very clean, and often have snow or glacial sources. Lake Sumner in North Canterbury is a microtrophic lake.
- **Oligotrophic lakes** are clear and blue, with low levels of nutrients and algae. Lake Rotoma is an oligotrophic lake.
- **Mesotrophic lakes** have moderate levels of nutrients and algae. Lake Rerewhakaaitu is a mesotrophic lake.
- **Eutrophic lakes** are green and murky, with higher amounts of nutrients and algae. Lakes Rotorua and Rotoiti are now both eutrophic lakes.
- **Hypertrophic lakes** (sometimes referred to as supertrophic) are fertile and have extremely high levels of phosphorus and nitrogen. They are rarely suitable for recreation and habitat for desirable aquatic species is limited. Many lakes in the Waikato are hypertrophic, including Lakes Hakanoa, Ngaroto, Mangahia, Waahi and Waikare, while Lake Okaro one of the Rotorua lakes, is hypertrophic.

## Appendix 2

Table 3.1: Trophic Level Indices (TLI) and categories for twenty-one Canterbury high country lakes, as from pre-2004 data, and calculated from summer 2004/05 data, summer 2006, summer 2007 and from 2004-2007 data combined (according to methods of Burns *et al.*, 2000).

Lake	Pre 2004	TLI 04-05	TLI 2006	TLI 2007	TLI 04-07
Loch Katrine	2.75	2.2	1.98	2.6	2.1
Lake Sumner	2	1.3	1.4	1.6	1.4
Lake Taylor	3.0	1.99	2.1	2.3	2.2
Lake Sarah	3.0	2.3	2.7	2.8	2.6
Lake Grasmere	3.5	1.99	2.3	2.8	2.3
Lake Pearson-N	2.5	1.6	2.3	3.0	2.3
Lake Pearson-S		1.7	2.2	3.1	2.3
Lake Hawdon		2.3	2.6	2.9	2.7
Lake Lyndon		1.87	2.6	2.4	2.3
Lake Georgina	2.5	2.3	2.96	4.6	2.9
Lake Ida	3.0	2.2	1.9	2.3	2.1
Lake Selfe	2.75	1.9	2.2	2.3	2.1
Lake Coleridge		0.8	1.1	1.0	1.1
Lake Heron	3.0	1.9	2.2	2.3	2.1
Lake Emma	4.0	3.8	3.8	4.6	4.0
Lake Camp	3.0	2.5	2.7	3.2	2.6
Lake Clearwater	3.25	2.7	3.3	3.6	3.2
Lake Alexandrina	3.25	2.6	2.6	3.2	2.8
Lake Tekapo		1.1	1.4	1.5	1.1
Lake Pukaki		n/s	1.4	1.6	1.4
Lake Ohau		n/s	1.4	1.9	1.8
Lake Benmore		n/s	1.1	1.5	1.4

KEY:	TLI Grade
	Ultra-microtrophic (0.0-1.0)
	Microtrophic (1.0-2.0)
	Oligotrophic (2.0-3.0)
	Mesotrophic (3.0-4.0)
	Eutrophic (4.0-5.0)
n/s	not sampled

SUMMARY 2004-2007		2005*	2006*	2007	2004-07
Ultra-microtrophic	(# lakes)	1	0	1	0
Microtrophic	(# lakes)	9	5	5	6
Oligotrophic	(# lakes)	8	12	9	14
Mesotrophic	(# lakes)	1	2	5	2
Eutrophic	(# lakes)	0	0	2	0

\* not including lakes Pukaki, Ohau and Benmore