IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of an application to amend the Water Conservation (Kawarau) Order 1997 pursuant to section 216 of the Act

BY the New Zealand and Otago Fish and Game Councils

Statement of Evidence of John Worrell Barkla
On Behalf of Director-General of Conservation

Dated: 12 February 2010

Department of Conservation
Otago Conservancy
Conservation House
Lower Stuart Street
P O Box 5244
DUNEDIN
Phone: (03) 477 0677 Fax: (03) 477 8626
Solicitor: P D Williams DDI (03) 474 6902
Email: pwilliams@doc.govt.nz

1. Introduction – Qualifications and Experience

1.1 My full name is John Worrell Barkla. I am currently employed by the Department of Conservation, Otago Conservancy, as a botanist within the Technical Support Unit. I have worked for the Department for 23 years since its inception in April 1987, the last 13 years in Otago. Prior to that I was employed for two years by the New Zealand Forest Service working on wild animal and vegetation management issues.

1.2 I have a background in ecological and botanical survey and monitoring with particular emphasis on threatened plant management. I am responsible for providing a wide range of botanical advice to staff in Otago Conservancy. This includes carrying out and reporting on botanical assessments of pastoral leases through the high country tenure review process. I have inspected and reported on parts of several pastoral leases within the Nevis valley including Glen Nevis, Ben Nevis, Carrick, Kawarau and Loch Linnhe.

1.3 I am the primary author or contributing author of four scientific papers published in peer-reviewed international scientific journals, as well as numerous popular articles and technical reports. These papers and reports describe research and assessments on plant taxonomy, plant rarity, threatened plant and vegetation distribution and monitoring, and impacts of pest animals and weeds. I am the leader of one national recovery group and a member of three other national recovery groups for threatened plants.

1.4 I am a member of the New Zealand Threat Classification System Expert Panel (Vascular Plants) which reviewed the threat status of New Zealand's vascular plants during 2008.

1.5 I am the immediate past president of the Botanical Society of Otago and a member of the New Zealand Plant Conservation Network and New Zealand Botanical Society.

1.6 I have visited the Nevis Valley on at least 12 occasions. I last visited the valley on 10 December 2009.

1.7 I have previously given expert evidence to the Environment Court in relation to vegetation clearance rules in the Central Otago District Plan.

1.8 I confirm that I have read and agree to comply with the Environment Court Code of Conduct for Expert Witnesses (Consolidated Practice Note 2006). This evidence is within my area of expertise except where I state otherwise. I have not omitted to consider material facts known to me that alter or detract from the opinions that I express.

2. Scope of Evidence

2.1 This evidence will cover the following:

a) Discussion of a threatened plant survey carried out in the Nevis Valley in 2004

b) Information on the current status and distribution of *Carex muelleri*, an endemic sedge

c) Information on the taxonomic status of *Galium* sp. unnamed.

d) Information on the threatened daisy *Leptinella* (a) (CHR 515297; Clutha River)

e) Information on the distribution of *Myosurus minimus* subsp. *novae-zelandiae* in the Nevis Valley

f) Comment on the submissions and evidence of Brian Patrick and John Douglas, Janet Ledingham, Susan Maturin, Dr Kelvin Lloyd, and Emeritus Professor Alan Mark.

3. Nevis Valley threatened plant survey 2004

3.1 During November 2004 I led a two-day threatened plant survey of the valley floor on both sides of the Nevis Valley. The search area encompassed valley floor for approximately 7 km upstream of Nevis Crossing both within and outside the footprint of potential inundation.

3.2 Six nationally threatened taxa (as defined at that time by Hitchmough [2002]) were recorded. Of these, all but two were found outside the footprint of potential inundation.

3.3 The results of that survey were reported in Barkla (2005) and were subsequently included in the submissions provided by Dr Kelvin Lloyd and Ms Susan Maturin.

4. Current status and distribution of *Carex muelleri*

4.1 *Carex muelleri* is an endemic sedge mentioned in several submissions. At the time of the Nevis Valley threatened plant survey in 2004 it was regarded as a threatened species with a status of 'At Risk - Sparse' under the threat classification system being used at that time. I did not record location details of the species during my 2004 survey as it was so widespread and locally abundant throughout the search area.

4.2 In the most recent reassessment of the threat status of New Zealand's plants (de Lange et al. 2009), for which I was a panel member, *Carex muelleri* was ranked as 'Not Threatened'. Two reasons were provided for its change in status. Firstly its ecology and distribution are better understood and secondly, it is more abundant than previously believed.

4.3 *Carex muelleri* is distributed in the east of the South Island, from Marlborough to Otago. In Otago, outside of the Nevis Valley, I have recorded populations of this plant from the upper Manuherikia Valley (four sites), Hawkdun Range (three sites), Harris Mountains (three sites) and Dunstan Creek (one site). In comparison with these populations the Nevis Valley populations are large in both geographical extent and number of plants. For these reasons I consider the Nevis to be the best site for this species in Otago.

5. Taxonomic status of *Galium* sp. unnamed

5.1 During the 2004 survey of threatened plants in the Nevis Valley I recorded the locations of a taxon referred to in Barkla (2005) as *Galium* sp. unnamed. At that time I was of the view, as were some other botanists familiar with the plant, that it had characteristics that differentiated it from the more widespread and not threatened *Galium perpusillum*, and that it may have been an undescribed species.

5.2 Subsequently the taxon has been critically evaluated by Dr Peter Heenan, a highly respected biosystematics researcher at Landcare Research in Lincoln, who, after growing it alongside *G. perpusillum* in identical conditions, concluded it did not differ significantly from that species (Dr. Peter Heenan pers. comm. June 2009). I am persuaded by Dr Heenan's assessment of the taxonomic status of this species and therefore do not consider it an unnamed taxon of conservation concern.

6. Threatened daisy Leptinella (a) (CHR 515297; Clutha River)

6.1 During the 2004 survey of threatened plants in the Nevis valley I recorded at one location only, a small population of an undescribed herbaceous daisy known at the time as *Leptinella* (a) (CHR 515297; Clutha River). It was located on the edge of Schoolhouse Flat terrace outside the footprint of potential inundation.

6.2 In 2009 *Leptinella* (a) (CHR 515297; Clutha River) was formally named and described as a new species, *Leptinella conjuncta* (Heenan 2009). Heenan noted that it is currently known from only one locality in the Mackenzie Basin (southern Canterbury) and four sites in Central Otago (Fiddlers Flat, Schoolhouse Flat, Pisa Flat, and Lindis Crossing). Each population comprises very few plants and the conservation status of Threatened, Nationally Critical, ascribed to it in de Lange et al. (2009), is upheld. Heenan (2009) described the size of the Nevis Valley population at Schoolhouse Flat as $1m^2$.

7. *Myosurus minimus* subsp. *novae-zelandiae*

7.1 During the 2004 survey of the threatened plants in the Nevis Valley I recorded at one location only, a population of mousetail (*Myosurus minimus* subsp. *novae-zelandiae*) a small herb with the current threat classification of Threatened, Nationally Critical. It was found in a shallow depression near Nevis Crossing within the footprint of potential inundation. At the time, it was apparently the first record of this species for the Nevis Valley. In October 2005 I recorded a further population of this species in the valley, in the catchment of the Nevis Burn. This second site is outside the footprint of potential inundation. The distribution of mousetail elsewhere in Otago and the rest of New Zealand is accurately described in paragraph 28 of Ms Maturin's evidence.

8. Comment on submission of Brian Patrick and John Douglas

8.1 I have read the submission made by Brian Patrick and John Douglas who provide a list of flora including some they have indicated are local, rare or threatened.

8.2 In their submission (Appendix A) they describe *Carex kaloides* as "uncommon species nationally". This species is not regarded as uncommon

(sensu Townsend et al. 2008) by the New Zealand Threat Classification System Expert Panel (Vascular Plants) who assigned it the status of Not Threatened in their 2008 revision (de Lange et al. 2009).

8.3 In their submission (Appendix A) they describe *Carex muelleri* as "a nationally rare sedge". As outlined in paragraph 4.2 above this species is assigned the status 'Not Threatened' in the 2008 reassessment of the threat status of New Zealand plants (de Lange et al. 2009).

8.4 In their submission (Appendix A) they describe *Galium* new species as being found "only here and on the Pisa Flats". As explained in paragraph 5.2 of my evidence above, I now do not accept this entity as an unnamed taxon of conservation concern.

8.5 In their submission (Appendix A) they describe *Leptinella* new species as being found "only here and on the Pisa Flats". As explained in paragraph 6.2 of my evidence this taxon has now been described and named as *Leptinella conjuncta* and is present at five sites spanning South Canterbury and Otago.

9. Comment on submission of Janet Ledingham

9.1 I have read the submission made by Janet Ledingham who comments on the botanical values of the Nevis Valley lowlands.

9.2 In paragraph 26 of her submission she lists *Glyceria declinata* and *Glyceria fluitans* among a list of plants purported to be botanical values of tailing and mine pond areas in the valley. *Glyceria declinata* and *Glyceria fluitans* are exotic plants of wetlands often considered as weeds. In my view they are undesirable species that compete with native freshwater species.

9.3 In paragraphs 27 and 28 of her submission she refers to the "acutely threatened *Ranunculus ternatifolius*" and indicates it has been found in wetlands "subject to inundation from a dam". The status 'acutely threatened' relates to terminology used in an earlier 2004 threat classification (de Lange et al 2004). Paragraph 45 of Dr Lloyd's evidence explains the concordance between the terminology used in the earlier classification and the most recent classification. In the 2008 reassessment of the threat status of New Zealand plants (de Lange et al. 2009) *Ranunculus ternatifolius* is listed as 'At Risk – Naturally Uncommon' indicating the species is considered less threatened than it was in 2004. Although I have observed and recorded

Ranunculus ternatifolius at several sites in the Nevis Valley I am not aware of any locations for this species in the area "subject to inundation from a dam". I did not record this species in the 2004 threatened plant survey of the Nevis Valley (Barkla 2005).

9.4 In paragraph 31 of her submission she refers to an "unnamed *Leptinella* and *Galium*, both only found elsewhere in Otago on the Pisa Flats". As explained in paragraph 6.2 of my evidence above, the "unnamed *Leptinella*" has now been described and named as *Leptinella conjuncta* and is present at five sites spanning South Canterbury and Otago. In relation to the "unnamed *Galium*", I do not now accept this entity as an unnamed taxon of conservation concern as explained in paragraph 5.2 of my evidence.

10. Comment on submission of Susan Maturin

10.1 I have read the submission made by Susan Maturin who comments on the botanical values and threatened plants of the Nevis Valley.

10.2 Ms Maturin sought advice from me during the preparation of her evidence. I concur with her submission points that relate to the presence, distribution and significance of threatened plants with the exception of the following points.

10.3 Table One of Ms Maturin's evidence purports to be a list of threatened species recorded from the Nevis Valley during the 2004 threatened plant survey that I led (Barkla 2005). I note however that two species in that table, *Carex uncifolia* and *Ranunculus ternatifolius*, were not recorded in my survey, but are species that I have recorded outside of the survey area at other times.

10.4 In paragraph 41 of her evidence there is reference to *Leptinella* (a) having the status of Nationally Endangered. This is incorrect as the entity previously known as *Leptinella* (a), now *Leptinella conjuncta*, has the status of Nationally Critical (de Lange et al. 2009).

11. Comment on submission of Dr Kelvin Lloyd

11.1 I have read the submission made by Dr Kelvin Lloyd who comments on the botanical characteristics of the Nevis Valley floor, distinctive features of the valley floor plant species and species assemblages, ecological significance

of the botanical features values and potential effects of inundation on botanical values.

11.2 Dr Lloyd sought advice from me prior to his undertaking a threatened plant survey in the valley and incorporated the data from my 2004 survey into his evidence. I concur with his botanical submission points with the exception of the following point.

11.3 In paragraph 30 of his evidence, Dr Lloyd refers to "the only population of *Myosurus minimus*" which suggests that just one population of this species is present in the Nevis Valley. As explained in paragraph 7.1 of my evidence, a second *Myosurus minimus* population occurs outside of the footprint of potential inundation.

12. Comment on submission of Emeritus Professor Alan Mark

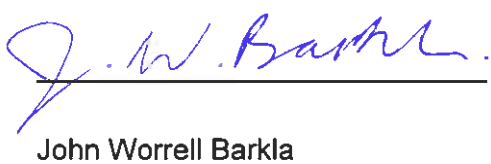
12.1 I have read the submission made by Professor Alan Mark who comments on the scientific values of the Nevis catchment including the ecological values of the dryland outwash terraces and the presence of "some nationally threatened plant species", in particular *Acaena buchananii, Myosurus minimus* ssp. *novae-zelandiae* and "an as yet unnamed species of *Galium*".

12.2 I agree with Professor Mark's description of the special environmental conditions that prevail on the out-wash terraces, their limited distribution in New Zealand, and the desirability of protecting them for their ecological values.

12.3 *Acaena buchananii* is no longer classified as being threatened or at risk (de Lange et al. 2009) although as Dr. Lloyd points out in paragraph 20 of his evidence, the Nevis Valley population represents the southwestern limit of its known range.

12.4 Professor Mark lists *Myosurus minimus* ssp. *novae-zelandiae* as Nationally Endangered. As discussed in paragraph 7.1 of my evidence, *Myosurus* has a current threat classification of Threatened, Nationally Critical, following the reassessment of its status in 2008 (de Lange et al. 2009).

12.5 Pofessor Mark refers to "an as yet unnamed species of *Galium*". For reasons outlined in paragraph 5.2 of my evidence I do not consider this entity an unnamed taxon of conservation concern.



John Worrell Barkla

Dated 12 February 2010

References

Barkla, J. 2005: Nevis Valley threatened plant survey: 25-26 November 2004. Unpublished Department of Conservation report. 3 pp.

de Lange, P. J.; Norton, D. A.; Heenan, P. B.; Courtney, S. P.; Molloy, B. P. J.; Ogle, C. C.; Rance, B. D.; Johnston, P. N.; Hitchmough, R. 2004: Threatened and uncommon plants of New Zealand. *New Zealand Journal of Botany Vol. 42*: 45-76.

de Lange, P.J; Norton, D.A; Courtney, S.P; Heenan, P.B; Barkla, J.W; Cameron, E.K; Hitchmough, R; Townsend, A.J. 2009. Threatened and uncommon plants of New Zealand (2008 revision). *New Zealand Journal of Botany 47: 61-96.*

Heenan, P. B. 2009: *Leptinella conjuncta* (Asteraceae), a diminutive new species from arid habitats in the South Island, New Zealand. *New Zealand Journal of Botany 47: 127-132.*

Hitchmough, R. (compiler), 2002: New Zealand Threat Classification System lists 2002.*Threatened Species Occasional Publication 23*, 210 p.

Townsend, AJ; de Lange, PJ; Duffy, CAJ; Miskelly, CM; Molloy, J;Norton, DA 2008: New Zealand Threat Classification System manual. Science & Technical Publishing, Department of Conservation, Wellington.