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Australia
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Ms Julia Morris
Secretary of the Committee
House of Representatives Inquiry into Australia's biodiversity in a changing climate
GPO Box 6021
Parliament House
Canberra, 2600

Dear Ms Morris

It is my pleasure to provide the following submission to the "Inquiry into Australia's biodiversity in a changing climate". My submission specifically relates to the Australian Alps catchments; the high quality water yields of high economic value they deliver to the Murray-Darling Basin; the forecast climate change drying impacts for Southeastern Australia and the identified high mountain management adaptation responses that will help maintain water yields.

My credentials to prepare this submission are based on my 38 years of protected area practical management, policy development and research experience. These credentials include work in Kosciuszko National Park as a professional national park staff member and many other mountain protected areas of the world as IUCN's World Commission on Protected Areas *Vice Chair for Mountains and Connectivity Conservation.* I currently work as a park management specialist consultant, as an IUCN World Heritage evaluator, a co-author of national and international protected area management texts and as a University guest lecturer. Most importantly, this submission reflects my role as lead author of a 2011 report on climate change adaptation responses for the Australian Alps catchments. This was prepared for the Australian Alps Liaison Committee and the Department of Climate Change and Energy Efficiency (Worboys and Good 2011). Some extracts from this report are included in this submission. The submission has been prepared in the order of the Terms of Reference provided.

Yours faithfully

Dr Graeme L. Worboys
21st August 2011

The Australian Alps

The Australian Alps encompass the upper catchments of the Snowy, Murray and Murrumbidgee Rivers that deliver water directly and indirectly (through the Snowy Mountains Scheme) to the Murray-Darling Basin and easterly flowing streams. These high Alps catchments fall within the Australian Alps national parks which span 1.64 million hectares and include the nationally recognised Namadgi National Park (Australian Capital Territory), Kosciuszko National Park (New South Wales) and the Alpine National Park (Victoria). The protected areas are actively managed for their natural condition.

Alps natural heritage and biodiversity

The Australian Alps help conserve one of the richest biodiversity areas on the mainland, including more than 300 vertebrate species comprising at least 15 amphibians, 196 birds, 41 reptiles, 41 mammals, and 11 fish species as well as over 970 invertebrates. Many of these species are found nowhere else in Australia and on Earth and many are threatened or endangered including the Mountain Pygmy Possum and the strikingly coloured Corroboree Frog. The Alps flora includes 850 vascular plants which include the massed summer wildflower areas of the alpine herbfields; the ancient gnarled snowgums at the snowline; grand and tall wet eucalypt and rainforest communities; and dry native pine woodlands in the rainshadow areas of the mountains. Glacial landscapes; limestone cave systems; deep gorges; plunging waterfalls; broad river valleys and the highest and very rugged winter snow covered mountains of the Australian mainland add to diversity, scenic appeal and importance of this area. The Alps parks are National Heritage listed, they are recognised as a National Landscape and two sites within the Alps are recognised as international Ramsar wetlands. They help protect 70% of the Australian Alps Bioregion. They are important for international, national and regional migratory species and the high mountain catchments are destinations for birds that are the subject of international migratory bird agreements.

Connectivity between ecosystems and across landscapes that may contribute to biodiversity conservation

The Australian Alps are a core part of one of the great connectivity conservation corridors of Australia (Worboys and Pulsford 2011). This large-scale connectivity corridor is known as the Great Eastern Ranges (GER) Corridor and its continuum of natural lands has been extant for 80 million years (Pulsford et al, 2010). It extends from north of Melbourne near Walhalla in Victoria to the Atherton Tablelands and beyond in Queensland (Figure One). It currently helps conserve the greatest diversity and concentration of native species for our country, both within and outside of protected areas (Mackey et al, 2010).

The connectivity corridor includes a range of different tenures and embeds an archipelago of protected areas including World Heritage Areas and a World Biosphere Reserve along its 2800 kilometre length (Pulsford et al, 2010). It is considered essential for keeping Australia's common species common (AALC 2009); it is a refugia for dispersive species in the driest of times; its sheer size helps species to respond to catastrophic events and biome shifts (Olsen

2007 p2); and its healthy ecosystems help maintain healthy people since it is the source of water supplies for 94% of Australians living on the east coast (Pulsford et al, 2010). It is also a fundamental insurance policy for helping to manage the rapidity of change and unforecast catastrophic events. At the southern end of the GER corridor, the Victorian Alps section of the Alps catchments have been recognised by Government as a "Flagship Area", and one of 13 such areas for the State (Vic DSE 2009 p12). These are special areas recognised for their special environmental, social and economic values, and especially for the importance of their ecosystem service values. Victoria has also identified the importance of "Biolinks" and connectivity conservation areas which interconnect natural areas of the State to the Alps "Flagship" area (Vic DSE 2009 p14). NSW has done the same with its Kosciuszko to Coast and Slopes to Summit connectivity corridor initiatives (Pulsford et al, 2010).

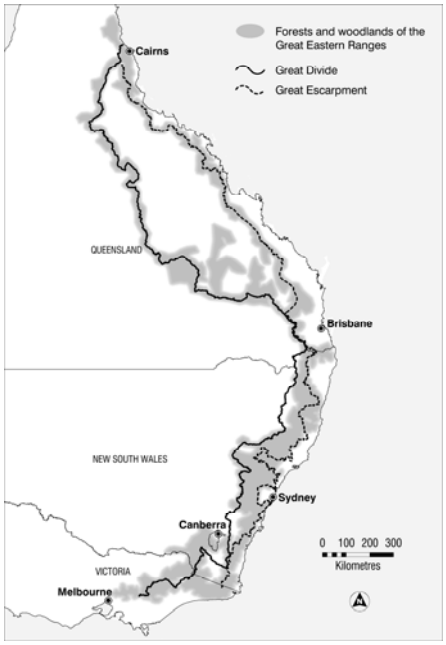

Figure One: The Great Eastern Ranges Connectivity Conservation Corridor

How climate change impacts on the Australian Alps biodiversity may flow on to affect human communities and the economy

The Australian Alps catchments deliver on average about 9600 Gigalitres of high quality water annually to the Murray-Darling Basin. This about 29% of the total water inputs to the Basin and it is a reliable ecosystem service of national economic, social and environmental importance. This water could be worth as much as $9.6 billion per year to the Australian economy through its contributions to town water supplies, agricultural production and other industries in the Basin; through electricity generation and through recreation and tourism to the region. The pure, potable water helps support many of the 2.1 million people living in the Basin as well as people in Adelaide and many towns of South Australia. Waters flowing east from the Alps are also of great economic importance.

Projected climate changes for 2050 identify harsher conditions for the Australian Alps catchments. This includes up to 24% reduction in precipitation; an average temperature rise potentially to 2.9°C; a substantial reduction in snow covered area; more droughts; more frequent severe fire events and more severe storms. Climate change for the greater south-eastern Australia is also predicted to be drier in 2050. The Alps water is precious in 2010, but every Gigalitre flowing from the Alps catchments to the Murray-Darling Basin in the future will become more important. The high quality water yield of the Alps is directly linked to natural (good) catchment condition. The water is a significant ecosystem service of benefit to people and the catchments need active management to maintain their natural condition in the face of threats and to be resilient to climate change effects.

In 2010, a second catchment condition assessment of the Australian Alps was undertaken to determine how resilient the Alps catchments were. The first was completed by the Australian Academy of Science in 1957. The assessment identified that the effects of climate change in 2010 and serious threats of soil erosion, pest animals and weeds were impacting the natural condition of the catchments and were impacting water quality, water yield and water flow regimes. This was despite active and very professional management of the catchments and where important conservation gains had been achieved.

The catchments were found to be highly vulnerable to the projected climate change impacts and the potential for future severe erosion was of special concern. It identified that 60% of 235 sub-catchments across 1.64 million hectares of Alps parks were in a poor or moderate (natural) condition and 76% were in a declining or no-trend-change condition. There were also very serious and immediate whole-of-Alps catchment threats including soil erosion, feral horse impacts and weed invasions. The Alps catchments assessment found that without substantial management interventions to deal with these threats, the delivery of high quality water was likely to be impacted, with the Alps catchments providing water of poorer quality and often in large sudden flows rather than gradual releases. The catchments would be less able to deal with severe storm events, resulting in extreme water runoff and flash floods. Degradation of the natural condition of the catchments would have major national economic impacts as well as implications for the safety of people. There was a need for greater adaptive management intervention.

Strategies to enhance climate change adaptation

Management interventions were identified and six whole-of-Alps catchment *Priority Actions* were recommended. These climate change adaptation responses targeted key pest animal threats; invested in climate change resilience including soil erosion and weed control; invested in improved management systems and catchment management research; invested in water yield enhancement; and, persisted for 15 years (to be effective with the difficult threats). The *Actions* were costed at about $7 million per annum (this was in addition to the approximately $52 million per annum committed by the three protected area management

agencies) and this additional investment was small relative to the estimated annual economic value of the water yield.

The management responses were considered urgent given the serious nature of some immediate threats and the increasing effects of predicted hotter and drier conditions forecast. The investments were in the national economic interest and would generate major long term social and environmental benefits.

Promoting sustainable use of ecosystem services in a changing climate

Water yields at the very headwaters of the Murray, Murrumbidgee and Snowy Rivers are proposed to be monitored, sub-catchment by sub-catchment for the highest water yielding areas. Reporting of these source flows and their quality would provide important information to assist the sustainable use of water downstream in forecast drier conditions.

Australian Alps national parks governance arrangements

The 11 Alps national park and protected areas were reserved at different times between 1944 and 1996 and are managed by ACT Parks, Conservation and Lands, the NSW National Parks and Wildlife Service and Parks Victoria. An integrated, cooperative and transboundary management approach for the Alps parks is achieved through a Memorandum of Understanding (MOU) which includes the three agencies and the Commonwealth Government. The MOU is managed by the Australian Alps Liaison Committee (AALC). The combined annual investment by the three agencies in 2009-10 for all aspects of management of the Alps parks was $52.69 million. The process of formal reservation of the protected areas does not mean that these lands always possess a near-pristine condition status; rather, much of the land had a previous land use history and requires some form of rehabilitation and continued active management to restore its full suite of conservation values. This prior landuse of parks and new threats in a dynamic environment are the principle determinants of a catchment's natural condition status. Constant threat management (and often restoration work) is needed for all catchments, with some areas needing considerable more (long-term) work than others.

Supported by science, well trained professionals and co-operative trans-Alps management, the current Alps governance arrangements are the optimum arrangement for the conservation management of the Alps catchments. A key issue is that there are too few management resources available to adequately respond to Alps catchments threats adequately.

Community engagement

One of the six Priority Actions identified by the Alps Catchments Report identifies mechanisms for the involvement of the community with the climate change adaptation responses.

Conclusion

Climate change adaptation responses identified in a 2011 report (Worboys and Good 2011) to the Australian Alps Liaison Committee and the Department of Climate Change are important for the Australian Alps Catchments to help maintain their resilience, to minimise catchment threats and to minimise impacts to water yield, water flow regime and water quality. These adaptation investments are of national economic importance with the value of the 9,600 gigalitres of water delivered annually being estimated to be as much as $9.6 billion.

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