AWMS POSITION STATEMENT
Climate Change and Wildlife

Background

Evidence of the recent warming of Earth's climate is 'unequivocal', with data showing increases in global average air / sea surface temperatures and ocean heat content, widespread melting of snow and ice and a rising global mean sea level[1]. These changes in the Earth's climate have been concomitant with an accelerating increase in anthropogenic greenhouse gas (GHG) emissions, and GHG atmospheric concentrations are now greater than any time in the last 800,000 years. Changes in the atmospheric concentrations of GHGs and tropospheric aerosols, land cover and solar radiation are the main drivers of recent climate change, with the most recent Assessment of the Intergovernmental Panel on Climate Change (a comprehensive review of the peer reviewed scientific literature) concluding that it was 'very likely' that most of the observed increase in global average temperature since the 1950s was due to the observed increase in anthropogenic GHG concentrations[1].

Recent Earth system observations and palaeoevidence on climate sensitivity, and predictions from climate models, indicate a high probability that the climates of New Zealand, Australia, Papua New Guinea and neighbouring Pacific islands will continue to change as a result of anthropogenic activity. Projections for Australia[2] relative to 1990 include temperature increases of between 0.6°C and 1.5°C by 2030 and between 1.0°C and 5.0°C by 2070, depending on the global emissions scenario. Rainfall is projected to change little in the far north but elsewhere decrease by between 5% and 10% by 2030, with drought frequency and severity increasing over most of Australia but particularly in south-western Australia. Snow cover, average snow season lengths and peak snow depths are projected to decline or be eliminated in Australian alpine regions. There is a projected decrease in the annual number of tropical cyclones but an increase in the proportion of the more intense cyclones – a prediction supported by historical storm intensity records.

Projections for New Zealand[3] relative to 1990 include temperature increases of between 0.2°C and 2°C by 2040 and between 0.7°C and 5.1°C by 2090. Rainfall is projected to generally increase in the west, but to decrease in the east and north, of the North and South islands. Other projected changes include decreased frost risk, increased frequency of both high temperatures and extreme rainfall events, and decreased seasonal snow cover.

The global sea level is projected to increase by at least 18-59 cm by 2100[1], causing inundation and erosion in coastal areas and more frequent flooding and saltwater intrusion into freshwater systems. Multi-metre scale sea level rise by 2100 cannot be ruled out, but such predictions are highly uncertain due to incomplete knowledge of ice sheet dynamics. Small Pacific islands are likely to be particularly strongly affected by sea-level rises. Mangroves, which are particularly important ecosystems for wildlife, are unlikely to persist in many areas under these projected rates of sea level rise[4].

Climate change is likely to impact on wildlife and the ecosystems that support them in eight main ways[5,6]: (i) there will be a greater frequency of more extreme climatic events (e.g. heatwaves, droughts, wildfire, intense storms) that will increase the probability of extinction, particularly for species with small ranges and / or population sizes; (ii) some climatic environments will disappear or no longer overlap with current distributions, reducing habitat area, quality and connectivity and hence the ranges and abundances of many species, particularly alpine and polar species; (iii) reduced synchrony between a

species and the life cycle of its food and habitat resources; (iv) changes in primary productivity and nutrient cycling that alter an ecosystem's ability to sustain populations; (v) disruption of freshwater ecosystems through altered flows, increased evaporation, warming of water and saltwater inundation; (vi) range expansions and / or changes in abundance and competitive ability of invasive species, including pathogens; (vii) disruption of evolutionary trajectories, and (viii) synergistic amplification of other ecological stressors via positive feedbacks. Published case studies highlight the dramatic likely consequences of climate change on native wildlife in Australasia[7,8].

There are several possible approaches to minimising the harmful effects of climate change on wildlife. Reducing atmospheric GHG concentrations will be of significant global benefit to wildlife[9]. Projects that sequester carbon in organic material (e.g. in grasslands, shrublands, forests and agricultural soils) could provide important habitats for wildlife or enhance the supply of critical ecosystem services. Other actions, such as assisted migration (i.e. deliberately moving individuals to a new location with the intent of establishing a population), could also help wildlife adapt to climate change.

Based on the above, THE AUSTRALASIAN WILDLIFE MANAGEMENT SOCIETY:

RECOGNISES that although there is much uncertainty about the extent to which Earth's climate will change this century, the current and projected speeds of climate change are unheralded in ecological history and the net effects are predicted to be detrimental to most species.

RECOGNISES that without intervention, mutually-reinforcing interactions between climate change and other factors (including habitat destruction, over-harvesting, negative interactions with non-native species and loss of keystone species) and non-human impacts (including natural catastrophes) are likely to cause major declines in the distributions and abundances (including extinctions) of many Australasian wildlife species this century.

RECOGNISES that carbon sequestration in grasslands, shrublands, forests and other habitats may be an important tool in mitigating climate change that could have substantial benefits for Australasian wildlife.

ACKNOWLEDGES that the current and predicted declines in the distributions and abundances of many native wildlife species due to climate change and its interactions with other factors are recognised as a clear and severe threatening process.

Accordingly, AWMS recommends that:

1. Landscape management actions to reduce the atmospheric concentrations of greenhouse gases be implemented immediately on a large scale.

2. Greenhouse gas emissions and future climate change scenarios are considered in the evaluation of the costs and benefits of wildlife management actions.
3. Wildlife are explicitly considered in the planning of carbon sequestration projects.
4. Connectivity across landscapes be maintained or enhanced to maximise the ability of wildlife and the ecosystems that they inhabit to move as climate changes.
5. Research into the effects of climate change on both native and non-native wildlife, interspecific interactions, and functioning of ecosystems they inhabit, be given a high priority.

Further reading and references used in this statement:

[1]Intergovernmental Panel on Climate Change. 2007. Intergovernmental Panel on Climate Change: fourth assessment report (AR4). Available online at http://www.ipcc.ch (Accessed 28 September 2008)

[2]CSIRO, Australian Bureau of Meteorology. 2007. Climate change in Australia: technical report 2007. CSIRO. Available online at http://www.csiro.au/resources/ps3j6.html (Accessed 29 September 2008)

[3]Ministry for the Environment. 2008. Climate change effects and impacts assessment: a guidance manual for local government in New Zealand. 2nd edition. Ministry for the Environment, Wellington. Available online at http://www.mfe.govt.nz/publications/climate/climate-change-effect-impacts-assessments-may08/index.html (Accessed 29 September 2008)

[4]Ellison, J.C.; Stoddart, D.R. 1991. Mangrove ecosystem collapse during predicted sea-level rise: Holocene analogues and implications. Journal of Coastal Research 7: 151-165.

[5]McGlone, M. 2001. Linkages between climate change and biodiversity in New Zealand. Landcare Research Contract Report LC0102/014. Landcare Research, Lincoln.

[6]Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. Annual Review of Ecology, Evolution and Systematics 37:637-669.

[7]Williams, S.E.; Bolitho, E.E.; Fox, S. 2003. Climate change in Australian tropical rainforests: an impending environmental catastrophe. Proceedings of the Royal Society of London B 270: 1887-1892.

[8]Dunlop, M.; Brown, P.R. 2008. Implications of climate change for Australia's National Reserve System: A preliminary assessment. Report to the Department of Climate Change, February 2008. Department of Climate Change, Canberra, Australia.

[9]Thomas, C.D. et al. 2004. Extinction risk from climate change. Nature 427:145-148.

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