



Position Statement by
The Ecological Society of Australia

Climate Change

The Ecological Society of Australia and Position Statements

Occasionally there are broad issues of public interest in relation to which most ESA members have formed a similar view, based on their professional expertise. In these cases the Society may formulate and endorse a Position Statement which is intended to inform public debate and policy action. While there may be minor variation of members' opinion in relation to technical details encompassed within a Position Statement, there is widespread general agreement concerning both the importance of the issue and the major points raised within the Statement.

Climate Change

Position statement by the Ecological Society of Australia

Summary

Climate change is likely to have significant impacts on Australia's biota and society in the next century. The Intergovernmental Panel on Climate Change recently concluded that there is sufficient evidence to support these predictions. Alterations in soil characteristics, water and nutrient cycling, plant productivity, species interactions (competition, predation, parasitism, etc.) and the composition and function of ecosystems were identified as highly likely responses to the predicted increases in atmospheric CO₂ concentration and temperature, and shifts in rainfall regimes. In addition, impacts on biodiversity are likely to be exacerbated by changes in the occurrence of disturbances such as wildfire and insect outbreaks.

The Ecological Society of Australia (ESA) believes that a focused program of climatic and ecological research, prediction and monitoring is required to address the needs of maintaining the diversity and integrity of terrestrial and aquatic ecosystems under a changing climate. The primary goals of these activities would be to better understand and forecast the consequences of global environmental change for biological diversity and to form a more certain basis for Australia's response by way of mitigation and adaptation. The ESA emphasises the importance of all environmental change, since it will be the direct and indirect cumulative effects of all changes, including human-induced climate change, which ultimately decides the fate of ecosystems and their biota.

The Ecological Society of Australia believes that a strong but precautionary commitment is required from government, industry and the community to mitigate and adapt to the predicted impacts of climate change on Australia's unique native biota. Alternative measures should be subject to risk assessment to determine their benefits relative to their costs, both in monetary terms as well as other potentially adverse ecological impacts.

Is our climate changing?

There is now strong scientific consensus that the world's atmosphere and climate are changing. The carbon dioxide concentration has increased 25% above pre-industrial levels and continues to rise at 0.4% per year. Global mean temperature has risen by 0.5°C this century and mean night temperatures have risen by an even greater amount. In the northern hemisphere, three of the last eight years have been hotter than any year since, at least, 1400 AD.

What kinds of climate changes are predicted?

Recent models of climate change suggest the following scenarios for Australia:

- temperature rises for a doubling of CO₂ are around 1-2°C for the southern coast of Australia, and 2-3°C for the rest of Australia.

- precipitation increases of up to 0.5mm per day are expected over much of the region, rising to 2 mm per day in northern Australia and Queensland in summer.
- extreme weather, including intense rainfall and severe drought, is predicted to occur more frequently over different parts of the continent.
- sea level is projected to rise about 50 cm above current levels by the year 2100, although the actual rates of rise in specific regions and localities will vary substantially.

While a number of uncertainties surround these predictions, they give an indication of potential changes and demonstrate that patterns of climate change will be complex and vary from place to place.

What are the projected ecological impacts?

Changes in temperature, water availability and atmospheric composition will affect most plants, animals and micro-organisms in some way. Any increase in climate variability, especially in extreme events, would have greater ecological effects than a change in mean conditions. A diverse range of ecological impacts have been predicted, although the magnitude and rate of changes remain uncertain. Some examples are listed below:

- changes in patterns of land use as land suitability alters with changing climate, potentially leading to increased rates of habitat loss
- changed distributions of bioclimatic habitats: some species may be unable to persist at their present locations due to diminution of suitable habitat (e.g. alpine habitats, coral reefs)
- increased plant growth rates due to elevated temperatures and atmospheric CO₂, although these effects will vary among species and between sites
- changed competitive and predatory interactions between co-occurring species that may result in elimination of some species.
- changes in the thermal and chemical structure of rivers and lakes from increased water temperatures, increased evaporation, and changes in inflows and flooding that will directly affect the nutrient status of aquatic ecosystems, the distribution and diversity of species, and the overall ecosystem productivity.
- contraction of coral reefs and estuarine wetlands due to the rate of rising sea levels.
- localised terrestrial extinctions associated with changes in fire regimes resulting from altered frequency of high fire-danger weather in different regions.

Responding to climate change

The ESA recognises that costs and benefits fall differently on different ecosystems and different sectors of society. It believes Australia's response should be an appropriate mix of research, mitigation and adaptation and strongly supports action in the following priority areas.

Research

Research into climate change and variability and their impacts on ecological systems

ESA supports sound scientific research that aims to:

- refine climatic modelling to develop more accurate and finer scale predictions of climate change;
- identify organisms and habitats most threatened by predicted climate changes;
- predict changes in the structure, suitability and distribution of habitats of native and introduced species;
- predict changes in populations of plants and animals as a consequence of changes in habitats, species interactions and disturbance regimes;
- improve understanding of mechanisms and capabilities of dispersal and migration in a wide range of species and the interaction between landscape fragmentation and the mobility and dynamics of plant and animal populations;
- evaluate suggested management interventions both in terms of ecological viability and likely costs and benefits.
- develop new and more effective mitigation and adaptation measures.

Mitigation

ESA supports the implementation of the following measures to mitigate changes in global climate:

- reduce the rate of greenhouse gas emissions in agricultural and industrial sectors by
 - i) fostering replacement of fossil-fuel energy systems by non-polluting energy systems
 - ii) drastically reducing the rate of native vegetation clearance
- restore vegetation cover to enhance fixation of atmospheric carbon. Planting programs should be designed to be compatible with conservation of locally indigenous biota.

Adaptation

ESA supports the following strategies to assist native biota to adapt to changing climatic regimes:

- retention of native vegetation and design of conservation reserves to foster representation, persistence and migration of native flora and fauna
- precautionary management of disturbance regimes (including fire)
- consideration of climate change impacts in recovery plans
- ex situ conservation and, if appropriate, translocation or assisted migration of key species threatened by climate change.