

Communicating climate information for adaptation through familiar frames

V Round^a, S Brooks^c, R Doble^a, M Dunlop^c, S Gao^a, M Gibbs^a, J Melbourne-Thomas^d,
H Mullis^f, J O'Sullivan^c, J Pritchard^a, A Sengupta^b

^a CSIRO Environment, Waite Campus, Adelaide, ^b CSIRO Environment, Dutton Park, Brisbane, ^c CSIRO Environment, Black Mountain, Canberra, ^d CSIRO Environment, Battery Point, Hobart, ^e Brooks Ecology and Technology, Victoria, ^f Australian Wildlife Conservancy, Queensland
Email: vanessa.round@csiro.au

Abstract: Climate models are invaluable tools for informing our understanding of climate evolution under scenarios of future greenhouse gas emissions, however turning complex model output into tangible and actionable information is a constant challenge. Providing locally relevant context for climate projections information can be key to helping an audience understand the scope, scale and potential impacts of projected climate changes. For example, placing future modelled projected changes in the context of recently experienced extreme events invites the audience to draw on lived experience and provides a frame of reference for developing potential impact pathways. Identifying locations which already experience a climate analogous to the expected future climate at a site of interest (spatial analogues) provides a physical basis for imagining what may change or persist in the changed future climate.

We explore a series of examples of simple and accessible ways in which complex climate model output has been presented, communicated and applied in adaptation planning for various environmental assets and systems. These include:

- Use of spatial analogue methodology to identify wetland areas which already experience temperature and rainfall regimes similar to the climate expected for three Ramsar wetlands of interest within the Murray Darling Basin (MDB) in the future. Such spatial analogues were used to compare existing ecosystem types in the wetlands of interest and wetlands in the analogue climate, however note that differences in non-climate factors like geomorphology or hydrology are clear limitations to finding effective analogues.
- Use of temporal analogues, such as historical extreme events, to understand potential impact pathways of extreme future drought events for three MDB Ramsar sites. Temporal analogues can also highlight where projected changes deviate significantly beyond any extremes experienced in the past, prompting adaptation managers to think beyond prior lived experience and anticipate the unprecedented.
- Use of climate envelope mapping to identify locations at risk of entering climate conditions beyond those historically tolerated by threatened species of interest. Such methods are informing threatened species relocation programs across Australia.
- Mapping of future changes to seasonality, for example to highlight changes in season length or the emergence of new seasons. Simple visualisations of seasonal shifts in the Kakadu National Park's seasonal calendar prompted managers to think about shifting and shrinking windows for management activities.

Experience with tools such as temporal and spatial climate analogues, as well as spatial or seasonal shift mapping of climate projections has shown that contextualising climate projections with lived experience can help adaptation managers to imagine the scope and scale of impending future change and possible adaptation measures more tangibly. These tools are a valuable complement to more complex climate model data and outputs and should be further developed and applied to enhance climate literacy and engagement.

Keywords: Climate change, communication, adaptation, conservation management