

# Getting to grips with risk

More commitment is needed in assessing and responding to climate-related risk.

Conservation biologists are concerned about the potential impacts of climate change on biodiversity and the functioning of ecosystems. Based on their studies of pathogen-associated frog declines in Latin America, for example, Thomas Raffel and colleagues (page 146) present a framework that predicts how patterns of temperature variation influence relationships between pathogens, parasites and their hosts (see also page 101).

Frogs tend not to hop too far away from home, but migratory animals that have more than one home, so to speak, may be particularly vulnerable to the effects of changing climate. Stacey Small-Lorenz and colleagues (page 91) have reviewed multispecies frameworks used to assess climate change vulnerability in North America. It would seem blindingly obvious that any assessment of vulnerability would consider the ecological requirements of species over their whole life cycle. Disturbingly, the researchers find that

existing frameworks are often deficient in this regard. This is particularly the case for long-distance migrants, the breeding and non-breeding grounds of which can be thousands of miles apart. As a result, the risk posed by climate change to such migrants can easily be underestimated or missed entirely, suggesting the need to overhaul the methods used in assessing vulnerability.

It's not only migratory species that get a raw deal from existing approaches to counter the risks posed by climate change — so do women. On page 96, Anna Petherick warns that climate finance could increase gender inequality unless the voices of women, especially in developing countries, are heard. She notes that extreme weather events such as cyclones often impact women disproportionately, highlighting the need to anticipate gender implications when formulating policies. And yet women have constituted a minority of delegates and delegation heads at all international climate change conferences during the past five years.

The figures suggest that a new mind set, along with a concerted and determined drive to create gender balance, is sorely needed.

More broadly, Neil Adger and colleagues (page 112) consider how climate change impacts, and is impacted by, culture — which they take to mean “the symbols that express meaning...and from which strategies to respond to problems are devised and implemented.” In reviewing social science research, they reveal shortcomings in current thinking about climate change adaptation. They posit that most contemporary responses to climate change fail to address the cultural dimensions of climate risk, and even threaten non-material — but equally essential — elements of social life, such as identity, community cohesion and sense of place. These aspects have until recently been widely neglected in dialogues about climate change and in planning adaptation measures. The Review Article should make fascinating reading, especially, we suspect, for those unfamiliar with the social sciences. □

## California dreaming

California's newly inaugurated carbon-trading scheme should contribute to a cleaner, greener future.

California has the highest total emissions of any US state bar Texas. It should be welcomed, therefore, that as of 1 January this year, it now has a legally binding, state-wide emissions cap-and-trade scheme. Depending on its success — and assuming the necessary political will — similar schemes could to be introduced by other US states, although any nationwide carbon-trading scheme still seems a distant prospect.

California has a reputation for clean technology innovation and implementation. Despite outright hostility from some quarters, the state has unilaterally forged ahead with strong environmental policies aimed at reducing emissions.

Much of this activity, especially in the legislative arena, can be credited to former state governor Arnold Schwarzenegger, a man who continues to flex his political muscles when confronted with opposition to environmental initiatives from vested interests. The Global Warming Solutions

Act that he signed into law in 2006 got the ball rolling by setting challenging emissions targets for key economic sectors. The most ambitious commitment is to reduce California's emissions to 1990 levels by 2020, with an ultimate goal of an 80% reduction from those historical levels by 2050.

It was clear from the start that success would require the development of stringent emissions regulations, including some mandatory caps, and market mechanisms conducive to compliance.

California's carbon-trading scheme is similar to the European Union Emissions Trading Scheme (EU ETS). Administered by the California Air Resources Board, it is a central plank of environmental policy. With the immediate aim of limiting total annual emissions to around 162 million tons, the underpinning legislation imposes strict emission allowances on the dirtiest companies. However, firms will be able to trade permits, thereby offsetting their own emissions.

Schwarzenegger envisaged the cap-and-trade scheme as a model for other state programs in the US. California is a participant in the Western Climate Initiative, through which it, other western states and some Canadian provinces aim to harmonize their carbon-trading policies. Quebec's scheme also kicked off at the beginning of the year, but California is the only US state to take the plunge so far.

Even setting aside legal challenges — the lawyers are already rubbing their hands with glee — the road ahead will not be easy. Emissions trading schemes have many critics, some of whom point at the teething problems experienced by the EU ETS. Will it really reduce emissions, they ask, or simply cause emissions to ‘migrate’ across state lines? And will carbon prices be high enough to incentivize investment in more energy-efficient technologies and lead to the creation of ‘green jobs’ as intended? We and no doubt others will be watching with interest and expectation, and wondering if and when other US states will follow suit. □