WEATHER CONDITIONS INFLUENCE CONSERVATION SUCCESS

CLIMATE-EFFECTIVE MANAGEMENT FOR THREATENED SPECIES AND PROTECTED PLACES

Climate change adaptation is the process of adjusting to current or expected effects of climate change. When adaptation of species or habitats are assisted by humans, this is called directed adaptation, or climate adaptation interventions.

Between 30% and 80% of these threat management operations are currently impacted by weather[1]. Increasing impacts can be expected under a changing climate.

Climate change is already impacting the distribution and abundance of many animal and plant species in Australia.

Conservation management is undergoing a shift from considering intervention and management in a static climate to considering adapting to long-term climate change. The change in climate will not be smooth. Extreme events and seasonal conditions must be considered in planning. Understanding the current and projected impacts of these conditions will help select likely options for long-term adaptation.

This project will improve conservation success for Australian species, ecological communities, and protected places threatened by climate change and climate-related extreme events.

Our project aims to support conservation managers to improve the effectiveness of on-ground interventions by negotiating short and medium-term climate challenges. Through testing and co-developing with stakeholders, we will produce regionally-specific situational reports to provide climate information at different time scales.

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Drought and dry conditions impacted 28% of terrestrial management activities reviewed by Tulloch et al. (2020). The most affected actions were translocations and reintroductions, fire management, disease control, and habitat restoration. Drought and dry conditions can decrease the survival and recruitment of translocated individuals, reduce disease treatment efficacy, and hinder the success of ecological restoration through the mortality or damage of seedlings[2].

Fires can affect access to sites and damage infrastructure, which impedes conservation feasibility and success[5]. Fire can be hugely destructive to restoration activities and outcomes and can interfere with invasive species control measures such as aerial baiting[1].

Wind, storms and cyclones can have variable impacts on grazing exclusion or destocking regimes, can negatively impact aerial baiting for invasive predator control, damage habitat restoration efforts and hamper the survival and recruitment of translocated individuals[1]. Similarly, flooding can have variable impacts on the recovery and growth of destocked management areas and weed management activities. Storms and flooding can impact access to management sites and damage infrastructure[5].

High rainfall was a reported impact of a quarter of studies reviewed by Tulloch et al. (2020). The most affected actions were grazing management, feral herbivore control and invasive predator control. High rainfall can positively impact conservation actions such as increased recruitment and biomass at destocked grazing management sites[1] or by improving seedling establishment and survival for ecological restoration activities[2]. Rainfall can interfere both positively and negatively with the efficacy of disease treatment and of invasive species control measures. Rainfall can also influence the outcomes of fire management regimes[1] dependent on context and management objectives.

Frost events that are untimely or severe can negatively impact ecological restoration efforts[2], cause thermal stress for translocated individuals and decrease vegetation growth and biomass at management sites[1].

Temperature, especially extreme events[3], can have variable, context-specific impacts on conservation activities including for seedling germination, establishment and survival in restoration activities, disease treatment efficacy such as for fungal pathogens *Bd* and *Phytophthora*, and for the distribution, recruitment and survival of invasive species and subsequent performance of control measures. Temperature can directly impact the success of translocation or reintroduction actions, and of growing concern is heatwave-driven mortality events[4] in wildlife populations.