

## Determining climate change impacts on Victoria's greater gliders



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Greater gliders are a vulnerable species, under threat from habitat loss and fragmentation. The changing climate is likely to add to the pressures on this species.

The ESCC Hub provided researchers in the Threatened Species Recovery (TSR) Hub with climate change projections data that will improve modelling of abundance of greater gliders in the Victorian Central Highlands.

More accurate modelling will improve the quality of information available to conservation managers tasked with managing this vulnerable species.

### A vulnerable species

The greater glider (*Petauroides volans*) is the largest gliding possum in Australia. It lives in tree hollows in eucalypt forest and woodland in eastern Australia, from tropical Queensland to central Victoria.

Declining numbers, due to habitat loss, fragmentation, extensive fire and land clearing, have resulted in the greater glider being listed as vulnerable by the International Union for Conservation of Nature (IUCN).

Climate change is likely to exacerbate this decline but more research is necessary to understand probable impacts on the species.

### Predicting numbers of greater gliders

Researchers from the TSR Hub have modelled and projected greater glider abundances 50 years into the future in the Victorian Central Highlands. Their STEPS model uses predictions from a forest change model (LANDIS-II), predictions from a habitat suitability model (Boosted Regression Trees), predicted vital rates (survival and fecundity) from a biophysical model, and several known characteristics of the species to simulate population changes through space and time.



A logging coupe being burnt after harvest in the Victorian Central Highlands. Photo: David Blair, ANU

### Future climate conditions

ESCC Hub researchers worked with TSR Hub researchers to determine the appropriate climate change data for use in the biophysical model, and provided climate change projection data sets for temperature (maximum, minimum and mean), rainfall, humidity, wind and solar radiation under both moderate (RCP4.5) and high emissions (RCP8.5) scenarios for three time periods: 2030 (2016–2045), 2050 (2036–2065) and 2070 (2056–2085).

Daily and monthly data sets were provided for all climate variables

except wind speed, where only monthly data was provided.

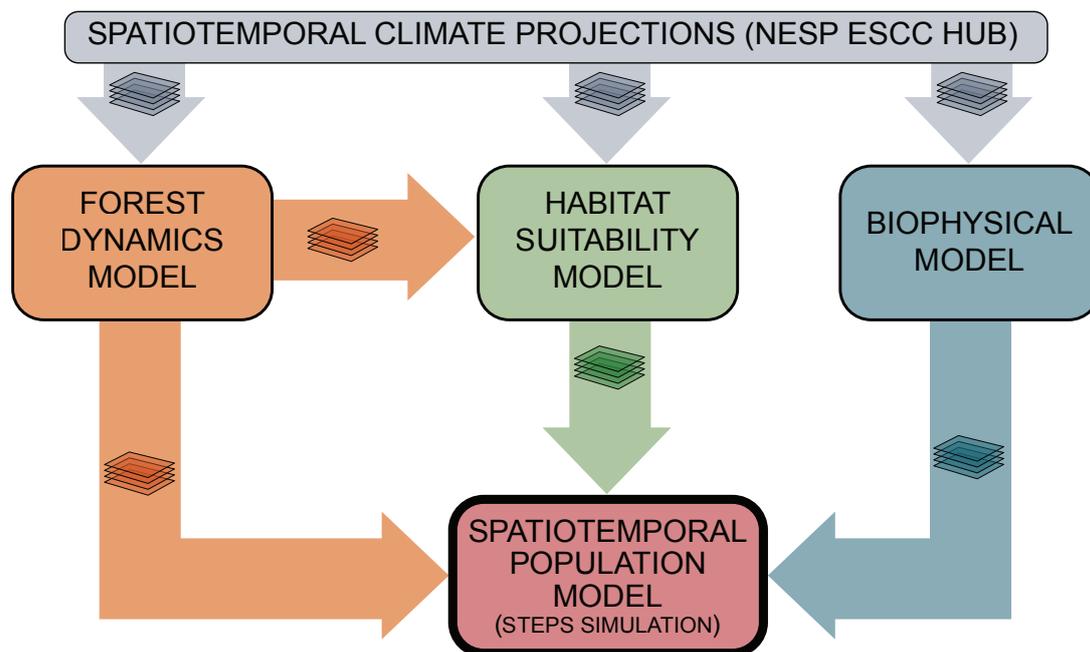
### Applying climate change data

The daily climate projection data from the ESCC Hub is used as an input to the biophysical model and allows researchers to calculate how many gliders will be produced (fecundity), and the proportion expected to remain alive (survival), in each year across the landscape.

The climate data also feeds into the LANDIS model of forest change, so researchers can capture the indirect effects of climate changes on forest

dynamics as well as related physiological consequences (via altered survival and/or fecundity of gliders).

This new climate change data allows TSR Hub researchers to extend previous analyses, and improve the accuracy of model predictions about the likely impact of climate change on greater gliders. As a result, conservation managers will be able to make better informed management decisions.



*Model framework for predicting greater glider population change in space and time. ESCC Hub climate projections are input into habitat suitability, forest dynamics, and biophysical models. The outputs from all three models are input into a spatiotemporal population model – specified and simulated in STEPS software.*

This work was carried out under *Case study 4.4: Climate change impacts on threatened species and ecosystems*. Case studies are activities undertaken by the Hub to facilitate the path-to-impact of the Hub’s research, in this case from *Project 2.6: Regional climate projections science, information and services*.

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