

# The **20** federal electorates **most at risk** from **climate change**

Summary of climate modeling data analysis  
by the Australian National University for the  
Australian Conservation Foundation



**AUSTRALIAN  
CONSERVATION  
FOUNDATION**



# Climate change is already here, now

When politicians are occasionally pressed about the causes of worsening extreme weather events in our country, they often revert to clichés about Australia having always been a land of drought and flooding rain.

Australia's climate has never been a picnic, but decades of observed verified data makes it clear climate change damage is happening in our communities – and it's getting worse. For example, the 2018 State of the Climate report from the Bureau of Meteorology and CSIRO found:

- Australia has warmed by a little over one degree since 1910, leading to an increase in the frequency of extreme heat events.
- Our oceans have warmed to a similar amount, again resulting in more frequent marine heatwaves.
- Sea levels are rising around Australia, while oceans are also becoming more acidic.
- There has been a significant decline in rainfall in south-west and south-east Australia, resulting in decreased streamflow. In northern Australia rainfall has increased.
- There has been a long-term increase in extreme fire weather and the length of the fire season in many parts of the country.<sup>1</sup>

This is what has happened already – the 2018 State of the Climate report makes clear these trends are projected to worsen as atmospheric concentrations of greenhouse gases increase.

How much more damage will occur depends on whether the global community meets the obligations of the Paris Accord and rapidly ends climate pollution from burning fossil fuels, razing forests and driving dirty cars, among other things.

Australia will need to do its fair share. And this year's federal election will be critical for accelerating Australia's transition to a zero-pollution society in line with the pace of action needed to halt global warming at the relatively safe level of 1.5 degrees, as outlined by the UN's Intergovernmental Panel on Climate Change.<sup>2</sup>

In this context, the Australian Conservation Foundation (ACF) believes it is critical people have clear information about the projected impacts of worsening climate change for their communities as they decide with their votes who is best to represent their local region. ACF has commissioned design and data experts from the Australian National University (ANU) to break down existing climate modeling projections across Australia's 151 lower house federal electorates. The same ANU team previously developed the 'climate coasters' series, highlighting already rising temperatures across Australia.<sup>3</sup>

## Methodology

The ANU design team used climate model data from the LongPaddock project, operated by the Science Division of the Queensland Department of Environment and Science (DES).<sup>4</sup> The data presented here is drawn from the high global emissions pathway, which represents projections for a world where global climate pollution grows strongly. This is the worst-case scenario modeled by scientists and can be avoided with sharp cuts to climate pollution. The latest observations suggest that after a two-year pause, global emissions from burning fossil fuels and industrial production rose again in 2018, taking them to their highest levels on record.<sup>5</sup> The results of the ANU project compares the long-term 1960-1990 historical average to the projections for 2050 under this emissions pathway. It compares only temperature and rainfall data, not the full range of climate change impacts, including sea-level rise.

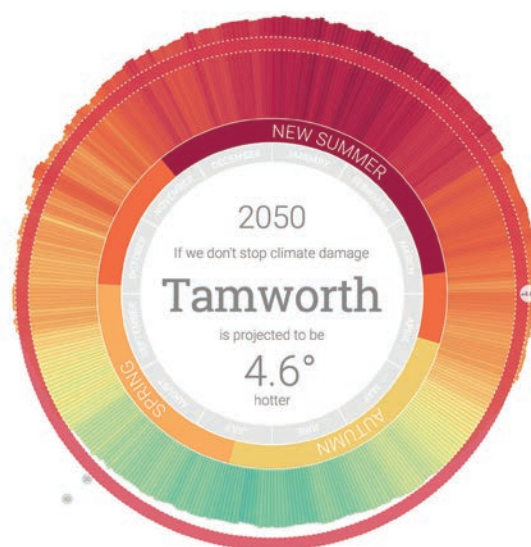
A word of caution. Climate models are not perfect and are ultimately sophisticated computer simulations.<sup>6</sup> Reviews of historic modeling exercises reaching back to the 1970s have found projections of climate change have been quite accurate when matched with later observational data.<sup>7</sup> Climate models generally perform better at global and regional scales. More localised results, such as those presented in this project, come with higher uncertainty. The Long Paddock SILO data used here applies established climate change models to historical observed data for each site to generate localised projections. While there is some uncertainty in any climate model projections, overall trends are consistent: Australia will be significantly hotter and face more frequent and intense extreme weather because of worsening climate change.<sup>8</sup>

### Disappearing winter, longer and hotter summers

The complete ANU findings for each electorate can be found at [myclimate.acf.org.au](http://myclimate.acf.org.au) as part of a special interactive search tool. But there are general trends that can be inferred across all the electorates analysed by the ANU team. These include:

- A general warming trend, with average maximum temperatures rising significantly.
- More extreme heat, with numerous additional days over 30-, 35- and 40-degrees.
- A radical reordering of seasonal patterns, with historic winter conditions largely disappearing, and summer conditions dominating more of the year and being joined by dangerous 'new summer' conditions, which are more extreme than the summers we have historically experienced.

Below is an example of the visualisation of this data that can be found using the online search tool. This example compares long-term historic average conditions to 2050 climate projections for Tamworth in the Federal Electorate of New England.



Source: ANU School of Art and Design; visualising data from Queensland Government's LongPaddock project.

## The 20 hardest hit electorates

While all regions of Australia have reasons for concern about the damage runaway climate change would cause, as part of this project ANU also assessed which federal electorates would

be most affected. These electorates are those with the largest relative average maximum temperature change from the historical baseline of 1960-1990 to the 2050 projections.

Electorate	MP	Party	Projected increase in average max. temperature (°C)
Groom	John McVeigh	LIB	4.77
Maranoa	David Littleproud	NAT	4.64
New England	Barnaby Joyce	NAT	4.51
Parkes	Mark Coulton	NAT	4.32
Calare	Andrew Gee	NAT	4.30
Flynn	Ken O'Dowd	NAT	4.26
Blair	Shayne Neumann	ALP	4.13
Wright	Scott Buchholz	LIB	4.09
Riverina	Michael McCormack	NAT	4.06
Lingiari	Warren Snowdon	ALP	4.04
Macquarie	Susan Templeman	ALP	4.00
Fenner	Andrew Leigh	ALP	3.90
Capricornia	Michelle Landry	NAT	3.88
Wide Bay	Llew O'Brien	NAT	3.85
Hunter	Joel Fitzgibbon	ALP	3.84
Dickson	Peter Dutton	LIB	3.83
Canberra	Not held*	NEW	3.83
Kennedy	Bob Katter	KAP	3.83
Durack	Melissa Price	LIB	3.82
Hume	Angus Taylor	LIB	3.81

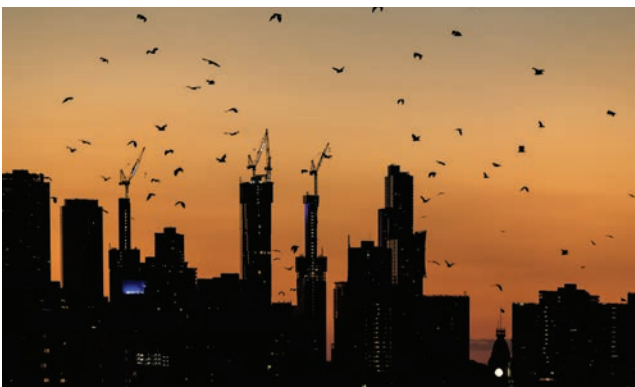
\*This analysis relates to the new Division of Canberra, which the Australian Electoral Commission redrew ahead of the 2019 election. The existing seat of Canberra, which predominantly overlaps with the newly created Division of Bean, is held by outgoing ALP MP Gai Brodtmann. Given the significant geographic differences between the old and new divisions of Canberra this analysis has chosen to deem the seat as not currently held by any party.

Below. Grey-headed flying foxes, Melbourne, VIC.  
Photo. Doug Gimesy

Eight of the top 20 electorates are held by National Party MPs, including five of the top six. The ALP and Liberal Party have the equal next largest representation with five each, followed by Katter's Australian Party with one, and one new electorate without a sitting MP.



ACF urges all community members to ask their sitting MP and candidates in their electorate about their attitudes and track record on climate change, and plans to implement policies to cut climate pollution and help the communities they would represent to deal with the changes already in the system.



## The risks

The impact of climate change is not academic or limited to numbers on a page. It has real world implications for the people we love in our communities, especially the most vulnerable.

Hotter conditions pose significant challenges for human health. Temperatures over 35 degrees are particularly difficult as they limit the human body's ability to cool itself.<sup>9</sup> This can be fatal when the effects are left unattended and the body is not given time to cool down during extended hot periods, such as heatwaves.

Heatwaves are Australia's deadliest natural disasters, with more than 500 people dying from heatwaves between 2000 and 2009.<sup>10</sup> The elderly, sick and young are considered most at risk.<sup>11</sup> The 2016 Australian Census indicates there were more than 1.6 million people in Australia aged 75 or older, including almost 500,000 people older than 85 years.<sup>12</sup> There is also emerging evidence that rising temperatures could cause problems for pregnant women and that hotter conditions could be linked to a greater risk of premature births, stillbirths, or other negative pregnancy outcomes.<sup>13</sup>

The National Climate Change Adaptation Research Facility has also shown climate change damage, like greater extreme heat and coastal erosion, presents severe challenges to urban and industrial infrastructure critical to the functioning of our country and the wellbeing of our people. Infrastructure such as ports, farming equipment, public transport, water supply, energy generation and coastal properties are at particular risk.<sup>14</sup>

In our natural world, climate change is already pushing ecosystems to the brink. Scientists have identified underwater kelp forests, ancient tropical forests, forests along the Murray River, alpine forests and mangroves as having already deteriorated from climate change.<sup>15</sup>

## References

- <sup>1</sup> <http://www.bom.gov.au/state-of-the-climate/State-of-the-Climate-2018.pdf>
- <sup>2</sup> <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/>
- <sup>3</sup> <https://gravitron.com.au/climatecoaster/>
- <sup>4</sup> Queensland Government LongPaddock project, which uses the SILO database (<http://www.longpaddock.qld.gov.au/silo>) and is operated by DES. The climate 'change factors' used to calculate consistent climate scenarios data have been estimated using: Coupled Model Intercomparison Research Program 3 (CMIP3) patterns of change data (projected changes per degree of 21st Century global warming) supplied by the CSIRO and the UK Met Office/Hadley Centre; and data from AR4 SRES scenario temperature response curves (projected amounts of global warming) supplied by the CSIRO. These data sources are available in the following locations:
  - The CMIP3 global model database: [http://www.pcmdi.llnl.gov/ipcc/about\\_ipcc.php](http://www.pcmdi.llnl.gov/ipcc/about_ipcc.php)
  - OzClim: <http://www.csiro.au/ozclim>
  - UK Met Office/Hadley Centre: <http://www.metoffice.gov.uk/climate-change/resources/hadley>Data modeling:
  - Perturbation method: Linear Mixed Effect State Space (LMESS) - Q5
  - Global warming sensitivity: High
  - IPCC assessment report: AR5
  - Emission scenario: RCP8.5Climate model: ACCESS 1.3
- <sup>5</sup> <https://theconversation.com/carbon-emissions-will-reach-37-billion-tonnes-in-2018-a-record-high-108041>
- <sup>6</sup> <https://www.climatechangeinaustralia.gov.au/en/climate-campus/modelling-and-projections/climate-models/>
- <sup>7</sup> <https://www.carbonbrief.org/analysis-how-well-have-climate-models-projected-global-warming>
- <sup>8</sup> <http://www.bom.gov.au/state-of-the-climate/State-of-the-Climate-2018.pdf>
- <sup>9</sup> <https://academic.oup.com/heapro/article/30/2/239/561863>
- <sup>10</sup> <http://www.abc.net.au/news/2018-01-18/heatwaves-australias-deadliest-hazard-why-you-need-plan/9338918>
- <sup>11</sup> [https://www.dea.org.au/wp-content/uploads/2017/02/DEA\\_Heatwaves\\_Health\\_Fact\\_Sheet\\_06.pdf](https://www.dea.org.au/wp-content/uploads/2017/02/DEA_Heatwaves_Health_Fact_Sheet_06.pdf)
- <sup>12</sup> [http://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/036?opendocument](http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/036?opendocument)
- <sup>13</sup> <https://www.theatlantic.com/health/archive/2017/11/pregnancy-heat-outcomes/546362/>
- <sup>14</sup> [https://www.nccarf.edu.au/sites/default/files/attached\\_files\\_publications/INFRASTRUCTURE\\_A4-Webview.pdf](https://www.nccarf.edu.au/sites/default/files/attached_files_publications/INFRASTRUCTURE_A4-Webview.pdf)
- <sup>15</sup> <https://theconversation.com/ecosystems-across-australia-are-collapsing-under-climate-change-99367>

### Australian Conservation Foundation

Level 1, 60 Leicester Street  
Carlton VIC 3053  
ABN 22 007 498 482

**Telephone** 1800 223 669

**Website** [acf.org.au](http://acf.org.au)

**Email** [acf@acf.org.au](mailto:acf@acf.org.au)

**Twitter** @AusConservation

### About ACF

ACF is Australia's national environment organisation. We speak out, show up and act for a world where forests, rivers, people and wildlife thrive. We are proudly independent and funded by donations from our community.



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