Australia's Environment in 2017

While rainfall conditions were generally good across Australia in 2017, high temperatures stressed our terrestrial and marine ecosystems. This fact sheet summarises indicators of Australia's environment. Full details are available on the website (*www.ausenv.online/2017*)

Global context

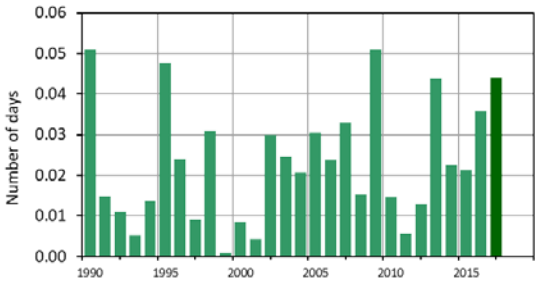
- The ozone hole was the smallest since 1988, responding to global reductions in halocarbon gases (NASA).
- Atmospheric CO^2 concentrations increased by 1.95 ppm to reach 407 ppm; a 28% increase from 1960 (NOAA).
- Global average temperatures were the second highest in the historical record (WMO).
- Sea ice extent was the least since measurements started in 1979 (NSIDC).

Oceans

- Global ocean temperature reached the highest level on record (IAP).
- After stagnating in 2016, global sea level rose by 6.4 mm - twice the average rate since 1993 (NASA).
- Although average sea surface temperature (SST) around Australia was the lowest since 2012, record high temperatures occurred off the East Coast during several months (NOAA/BoM).
- After 2016, another mass bleaching occurred in the Great Barrier Reef, which was also impacted in direct and indirect ways by cyclone Debbie (GBRMPA).

Weather

- Australian average temperature was the 3rd highest, and mean maximum temperature the 2nd highest on record (BoM).
- Mean maximum winter temperature was the highest on record (BoM).
- NSW and Qld experienced record mean and maximum temperatures (BoM).
- Largest number of temperature records broken since 2009 – mostly in the Eastern states in February and September (BoM).



Average number of maximum temperature records

- Cyclone Debbie and associated flooding in March was the most deadly and expensive since cyclone Tracy in 1974.
- National average rainfall was 7% above the long-term average, but less than 2016 rainfall.
- Rainfall was above average in WA but below average in the Eastern states.

Soil Moisture

- Soil moisture status in the top 6m improved further across most of Australia, and in parts of WA and SA reached the highest values since at least 1999.
- Soil moisture declined to average or below-average levels in parts of interior Queensland and NSW and Eastern Victoria.

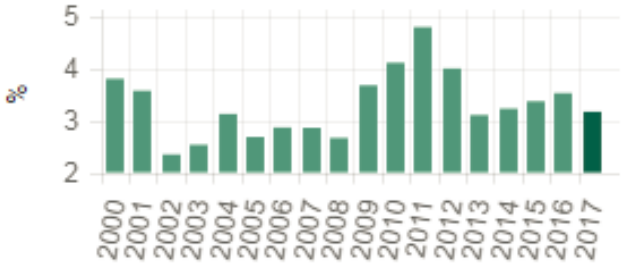
Rivers and Wetlands

- Total runoff into waterways was greater in 2017 than in 2016, mainly due to wetter conditions in the Top End.
- Major flood events occurred in several inland drainage systems in WA in January and February,

Australia's Environment in 2017

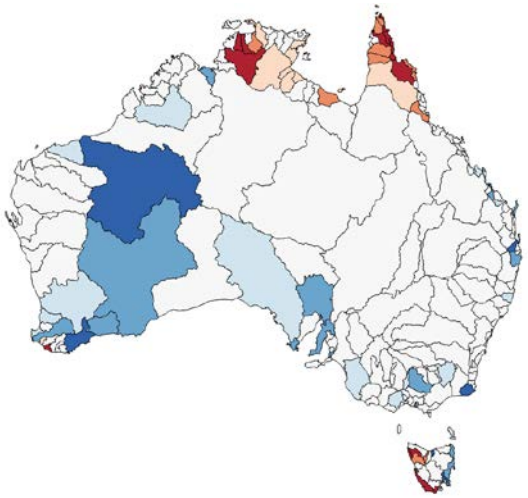
and after cyclone Debbie in several Central East coast catchments.

- The total area inundated was 28,000 km^2 less than in 2016 and slightly below the annual average for 2000 onwards.



National percentage area inundated for at least some time during the year.

- Water extent was well below average along the Carpentaria coast, and there was less inundation in the Murray-Darling and Lake Eyre Basins than in 2016.



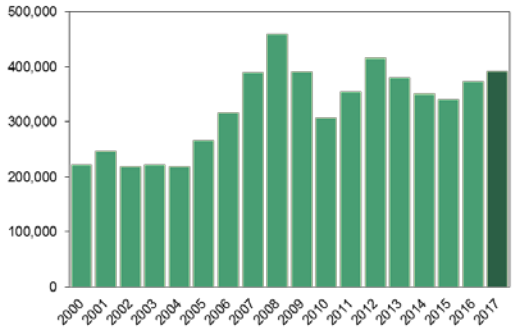
Very high (blue) and low (red) inundation levels in 2017. Darkest colours represent record levels for 2000–2017.

Fire

- Fires incidence increased slightly from 2016 due to greater fire activity in inland Australia. There were fewer forest fires than in previous years.
- Several isolated fires occurred in NSW in February, together burning more than 64,000 ha and destroying 53 houses. There were no fatalities.

Human pressure

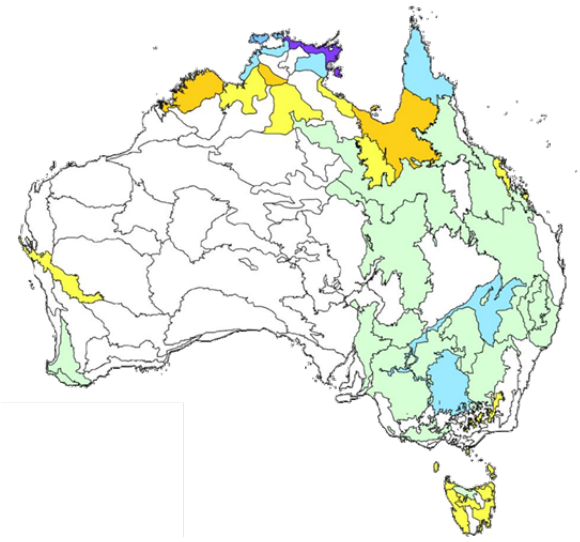
- Australia's population increased by 391,000 in 2017, the 3rd fastest growth on record (ABS).
- Population has increased 31% since 2000, with three-quarters of that in the capital cities (ABS).



Annual population growth

Land cover change

- National data on land cover and land cover change are of relatively uncertain.
- National forest cover increased by 510,000 ha in 2017. The increase was mainly due to (re)growth in open forests and woodlands in inland Eastern Australia, most likely in response to improved water availability in the previous year.
- Forest cover decreases occurred in northern Australia, possibly in response to 5 years of below-average rainfall.

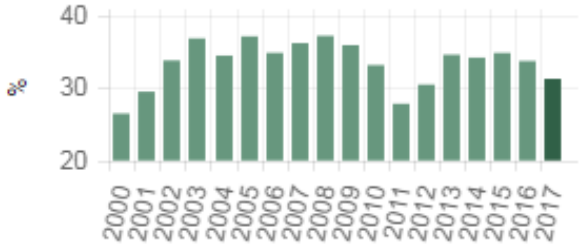


Forest cover change by bioregion. In yellow/orange decreases of up to 0.5/1%, in green/blue similar increases.

Australia's Environment in 2017

Soil

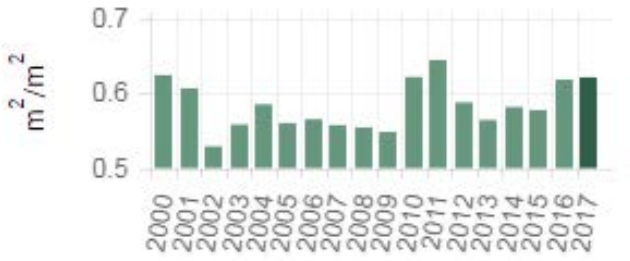
- Spoil protection by vegetation and litter was average or above average throughout and nationally the best since 2012.
- Soil protection improved considerably in northwest Australia.



Percentage exposed soil

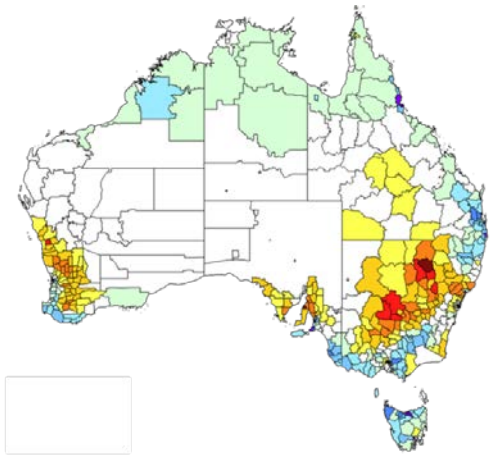
Vegetation

- Total vegetation leaf area increased slightly and reached the highest level since 2011.

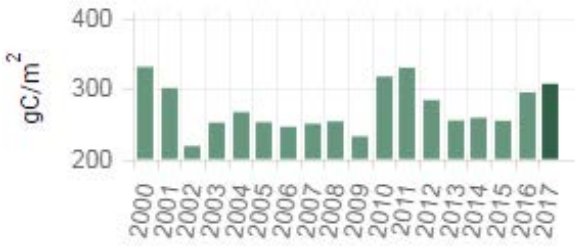


National average leaf area index

- Vegetation density was well-above average throughout the country, with record high values (2000-2017) in several wetter regions.
- Spatial changes in carbon uptake (photosynthesis) largely mirror changes in leaf area.
- Total national vegetation carbon uptake was estimated 2,400 million tonnes of carbon in 2016; 5% higher than in 2016 and approaching levels last seen in 2011.
- Vegetation growth was greater than in the previous year in most high rainfall regions, and less in most of the drier inland agricultural regions.

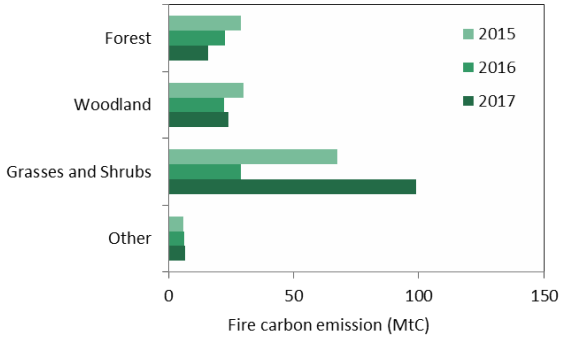


Change in carbon uptake from 2016 to 2017 by local government area, showing reductions (brown) and increases (purple) of more than 4000 tC per ha



National average annual vegetation carbon uptake

- Only a small fraction of carbon uptake is retained in biomass and organic matter. The vegetation itself again releases almost half of absorbed carbon; much of the remainder returns to the atmosphere via decomposition and fire.
- Bushfires released 148 million tonnes of carbon in 2015, 81% more than in 2015 but close to the 2003-2016 average.
- Fire emissions increased from grasslands and shrublands, but decreased for forests.



Fire carbon emissions from different land cover types

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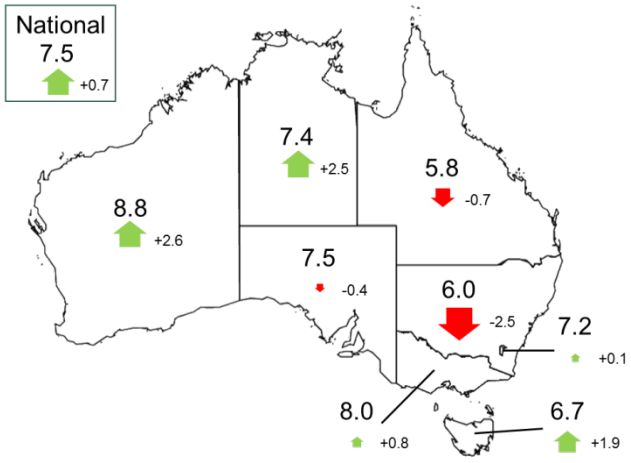
Biodiversity

- Increased sea temperatures are impacting coral reefs and Tasmanian kelp forests. Warm water species are migrating southward, assisted by a strengthening East Australian Current.
- The impacts of extreme heat on terrestrial ecosystems is largely unknown, except for mass mortality events observed in flying fox colonies.
- The total number of water birds in NSW and southern Queensland increased from 2016, but the number of species breeding declined, consistent with inundation extent (UNSW)
- Four species were added to the list of threatened species (DoEE), with 492 species added since 200 and 1,721 species now listed in total.

Headline indicators

- An experimental Environmental Condition (EC) score was calculated by ranking indicator values for the year among those for 2000 onwards. While subjective and incomplete, patterns in the different indicators over time are often similar, making the outcome less sensitive to the method of calculation.
- National-level ECS increased by 0.7 to 7.5.
- Scores improved strongly in WA, NT and Tasmania, and declined in NSW and Queensland.



Environmental Condition Score by State and Territory, and change from the previous year

About this report

- This report summarises a large amount of environmental information made available through our interactive website, supplemented by information from other sources.
- Our objective is to understand how Australia's environment is changing, what environmental information is currently available, and where important gaps exist.
- In Australia's Environment Explorer, data on 13 indicators in 6 themes can be viewed as maps, accounts or charts; examined by region and land cover type; compared to preceding years; and downloaded for further analysis.
- Data and summary reports for 2018 are planned for release in February 2019.

How were the data derived?

- Mapping of tree cover, land cover, inundation, bushfire intensity and occurrence, exposed soil and vegetation leaf area was derived through automated interpretation of satellite imagery.
- We estimated the other indicators by integrating ground- and satellite data with spatial environmental models using ANU's OzWALD model-data fusion system.

Acknowledgements

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More information

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