

Impacts of Climate Change



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SECTION 1 –What is Climate Change?

Climate can be defined for a particular place or region, usually on the basis of local rainfall patterns or seasonal temperature variations. Climate change is therefore regarded as a change in the average pattern of weather over a long period of time¹.

Causes for Climate Change

Climate change is caused by the greenhouse effect which is a natural process that warms the Earth's surface.

Due to human activities such as burning fossil fuels (coal, oil and natural gas), agriculture and land clearing – more greenhouse gases are generated. This so-called enhanced greenhouse effect contributes to an increase of the Earth's surface temperature. As tourism also includes several activities that accelerate global warming, it is important that we as an industry find ways to minimize our impacts .

Source: Australian Government

Consequences of Climate change in Australia

Australia faces a number of significant risks, these include²:

- Warmer summers and warmer winters;
- Increased extreme weather events;
- Water scarcity / extended drought;
- Loss of marine biodiversity (especially on the Great Barrier Reef);
- Sea level rises;
- Increased disease outbreaks (including Dengue Virus); and
- Increased travel costs increases affecting longer-haul markets.

For more information look at :

1) Australian Academy of Science 2010 <http://www.science.org.au/reports/climatechange2010.pdf>

2) Tourism Queensland—Understanding Climate Change http://www.tq.com.au/tqcorp_06/fms//tq_corporate/industrydevelopment/Factsheet%201_1-Understanding%20Climate%20Change.pdf

3) Department of Industry, Innovation & Climate Change 2013 <http://www.climatechange.gov.au/greenhouse-effect>



SECTION 2 –Climate Change in Western Australia

For more information look at: www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/western-australia

Environmental impacts

Western Australia is known as the state with the longest coastline within Australia. As climate change leads to a rise in the sea level, several coastal settlements in Western Australia will be affected. Besides, various roads and commercial buildings run the risk of inundation which would cause losses in the billions. In addition to that, numerous species such as fish will be negatively affected due to higher temperatures.



Changing weather conditions

It has been forecasted that without reducing emissions the annual average number of days with 35 or more degrees Celsius in Perth would more than double by 2070. Furthermore, in the North of Western Australia, there will be more intense tropical cyclones and more intense and frequent bushfires are projected.

Water shortage and agriculture

Greenhouse gases caused by human activities contributed to half the decline in rainfall in South-West Western Australia. If these activities go on and current climate trends do not change, there will be 80 per cent more drought-months by 2070 in South-West Western Australia. As a consequence, Western Australia's soils which are important for agricultural production will become dry due to the reduction in rainfall so that cropping might not be possible there anymore. In this regard, several regional centres that concentrate on agriculture will have strong economic losses. Wheat production in Western Australia is projected to decline by 8.9 per cent by 2030.



Impacts on humans

All the extreme weather events in Western Australia such as bushfires, heatwaves and air pollution represent health risks for humans living in WA.

Source: Australian Government– Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

SECTION 3 –Climate Change in New South Wales

Environmental impacts

Due to an annual sea level rise of approximately 2.1 mm in New South Wales, several residential buildings are likely to be inundated especially the areas of Lake Macquarie, Wyong, Gosford, Wollongong, Shoalhaven and Rockdale.

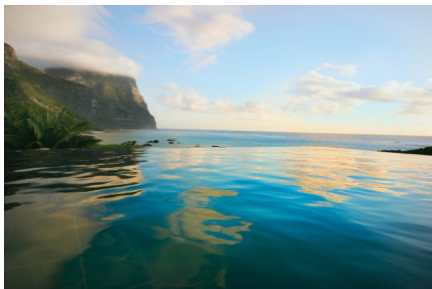
Moreover, due to global warming, some vulnerable areas such as the Australian Alps will face a decrease in rain and decrease in the length of the snow season. Consequently, animals that live in cold environments will lose their natural habitat.

In addition to that, climate change causes a change in the quantity and quality of marine food so that seabirds may suffer from a food scarcity.

Changing weather conditions

Due to variable rainfall, winds and drought, fires may spark on a more frequent basis in the Greater Blue Mountains region. As many eucalypt plants need fire-free periods of at least six years, climate change results in a loss of some of these species.

Besides, the annual average number of hot days with at least 35 degrees Celsius in bigger cities such as Sydney will more than triple by 2070 if nothing will change.



Impacts on humans

One consequence caused by more frequent days with at least 35 degrees Celsius is that more people suffer heat-related illnesses and death. Between 1997 and 1999, approximately 176 people aged 65 and older died per year in Sydney for this reason. This number could increase to 417 people per year by 2020.

For more information look at:
[www.climatechange.gov.au/
climate-change/climate-science/
climate-change-impacts/new-
south-wales](http://www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/new-south-wales)

Water shortage and agriculture

According to the Sydney Water Balance Project, there will be a decrease in annual rainfall as well as minor increases in the coastal catchments by 2030. Furthermore, New South Wales' agriculture which plays a major role in its economy will face severe shortages in the production of wheat, beef, sheep meat and dairy

Source: Australian Government– Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

SECTION 4—Climate Change in Queensland

Environmental impacts

Along Queensland's coastline, between 48,300 and 67,700 residential buildings, 4700 kilometres of roads and 1440 commercial buildings run the risk of inundation due to the rising sea levels.

The Great Barrier Reef Marine Park is known as one of the strongest tourist industries in Queensland. However, the sea surface temperatures have increased over the last 30 years by 0.4 degrees. As a consequence, more than 50 per cent of the reef's corals have been affected by bleaching. This bleaching represents a serious threat to the Great Barrier Reef ecosystems.

On the other hand, a further rise in temperature would affect the rainforests in the Wet Tropics which could lead to an extinction of endemic species such as insects, tree kangaroos and ringtail possums.

Changing weather conditions

Even though there will be a decrease in the frequency of cyclones in Queensland, more intense cyclones in the categories three until five are projected which could have severe impacts on Queensland's infrastructure and agriculture.

Impacts on humans

Days with temperatures with more than 35 degrees Celsius will increase from 1 per year to up to 21 per year by 2070 if climate change will go on. This increases at the same time the number of temperature-related deaths in Queensland.

Source: Australian Government— Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

For more information look at: www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/queensland



Water shortage and agriculture

Climate change in Queensland will cause a decrease in surface water supply which is normally used for water catchments and dams.

In terms of agriculture, there will be a decline in the production of sugar and beef due to higher temperatures and less rainfall.



SECTION 5–Climate Change in Victoria

For more information look at:
www.climatechange.gov.au/climate-change/

Environmental impacts

Similar to the other states, Victoria will have to deal with a rising sea level. Consequently, buildings with a current value of up to \$11 billion could be inundated. From 1990 on, the sea level has increased by 2.6 and 2.8 millimetres per year. Besides, an increase in the temperature presents a danger to Victoria's alpine ecosystems. In this regard, many endangered animals such as the Mountain Pygmy could not live under these extreme conditions. Additionally, higher temperatures would also lead to a reduction in snow depth in some of Victoria's Alpine resorts. As a consequence, Victoria's ski industry which is regarded as a driving economic force would face losses.

Due to some fires on Philip Island, numerous penguins were injured or died. If climate change continues in the same way, further fires could lead to a significant reduction of the penguin population on Philip Island.



Changing weather conditions

Provided that emissions won't be reduced in the future, the average annual number of days above 35 degrees Celsius could rise from 9 days to up to 26 days by 2070 in Melbourne. Furthermore, Victoria could face more bushfires resulting from less rain and higher temperatures.

Water shortage and agriculture

Especially in the Murray Darling Basin which lies in Victoria, people will have to cope with changes on water resources due to climate change. Without any mitigation concerning climate change Melbourne's water supply could be reduced by up to 11 per cent by 2020. With regard to agriculture, especially the region of Birchip will suffer from a strong reduction of the yields due to the rising temperatures.

Impacts on humans

During the next years, heatwaves will occur on a more frequent basis which could lead to an increased number in temperature-related deaths

Source: Australian Government– Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

SECTION 6–Climate Change in South Australia

Known as Australia’s driest state, South Australia is quite susceptible to climate change.

Environmental impacts

On the one hand, South Australia’s coastline will be affected by rising sea levels causing damages amounting to billions of dollars. As almost 50 per cent of South Australia’s coastline are sandy beaches, a rising sea level would cause shoreline recession. Especially, species and ecosystems located on Kangaroo Island and in the Mount Lofty Ranges might suffer the most from climate change.



Water shortage and agriculture

With regard to water supply, there will be a significant decline in the quality of water that is delivered from the Murray Darling Basin because of higher salinity levels by 2050. In large parts of South Australia, there will be more droughts which result in a reduction in water supply catchments. In terms of agriculture, South Australia is the nation’s most meaningful producer and exporter of grapes. This production will be affected negatively by a reduction in rainfall and further global warming so that the quality of grapes will decrease which will also affect the turnover generated with them.



Changing weather conditions

As in all other states in Australia, the main change in weather patterns will be the rise in temperature. Accordingly, the average number of days above 35 degrees Celsius is likely to increase from 17 days currently to 24-47 days by 2070 in Adelaide. At the beginning of the year 2008, people experienced 15 consecutive days with 35

Impacts on humans

Due to these changing temperatures, the number of 200 people aged over 65 that die every year in Adelaide from this heat could even increase to 342-371 by 2020 .

Source: Australian Government– Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

For more information look at: <http://www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/south-australia>

SECTION 7—Climate Change in Tasmania



For more information look at:
www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/

Environmental impacts

Due to the rising sea level, thousands of buildings with a current value of \$4 billion are likely to be inundated if the sea level continues to rise. Therefore, coastal areas will be affected mostly by climate change. Moreover, more frequent fires will cause a decline in many conifer species such as the Huon pine. In addition to that, several endemic species living in Tasmania's highlands are at risk of extinction.

Water shortage and agriculture

Tasmania's economy concentrates a lot on agriculture. If climate change goes on, the production of dairy products will decrease. Besides, the Tasmanian salmon industry will suffer from rising sea water temperatures as these species need cool water. In this regard, a rise of three degrees Celsius in temperature would mean severe stress for salmon.

Changing weather

conditions

Climate change without mitigation will cause an increase in



Impacts on humans

In comparison to other Australian states, Tasmania is less susceptible to heat-related deaths.

Source: Australian Government— Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

SECTION 8—Climate Change in Northern Territory

For more information click here: www.tourismnt.com.au/Portals/3/docs/industry/green/how_will_climate_change_impact_tourism.pdf

Environmental impacts

In comparison to the other states, only between 260 and 370 residential buildings are likely to be affected by climate change in Northern Territory. However, this doesn't mean that Northern Territory is less affected by it. The reason for this lower number is rather its lower settlement. Especially Darwin is susceptible to riverine flooding and cyclonic activity that will become more intense in the future if climate change continues in the same way. Northern Territory has experienced an increase in sea level for the last 12 years of up to 7.1 millimetres per year. Another important issue, Northern Territory will have to deal with, will be an increase in salinity in the groundwater and lowlands for example in the Kakadu area.



Changing weather conditions

Currently, there are 11 days per year in Darwin with temperatures over 35 degrees Celsius. The number is likely to be six times as high by 2030 and even 28 times as high by 2070. In Alice Springs, there are currently even 90 days per year with these temperatures which will further increase to 182 by 2070 .

Water shortage and agriculture

Climate change will have a negative impact on Northern Territory's agriculture especially on the beef production. In this regard, it is projected that beef production will be reduced by 19.5 per cent by 2030 and by 33.2 per cent by 2050 without no mitigation in climate change.

Impacts on humans

Between 1997 and 1999, two people over 65 years died per year from heat-related deaths. This number is expected to increase to between 37 and 126 per year by 2050.

Source: Australian Government— Department of Industry, Innovation, Climate Change, Science Research and Tertiary Education

SECTION 9—How can you measure Climate Change?

Environmental impacts

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Changing weather

conditions

Climate change without mitigation will cause an increase in Tasmania's wind speed as well as fire regimes.



Changing weather conditions

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For more information look at: www.gbrmpa.gov.au/__data/assets/pdf_file/0008/4031/

[gbrmpa_ReefFactsfortourguides.pdf](http://www.gbrmpa.gov.au/__data/assets/pdf_file/0008/4031/gbrmpa_ReefFactsfortourguides.pdf)

<http://www.livinggreener.gov.au/travel>

SECTION 8–Actions to reduce climate change

Climate change is an issue that concerns us all. In this regard, everyone can become active and help to mitigate its effects by just following a few simple steps.

Actions to reduce climate change

- Reduce your waste, re-use and recycle whenever possible
- Use energy that is produced from renewable sources
- Switch off lights and electrical devices when you do not use them
- Use energy efficient lights
- Cool and heat your houses using natural insulation and ventilation
- Measure your emissions through a free online calculator. Eg. Carbon Neutral Calculator: <http://www.carbonneutral.com.au/carbon-calculator.html>



Travel more environmentally friendly

Even though it might be more convenient for many people to travel by car to different destinations, motor transport has a strong negative impact on the environment. In order to minimize these impacts, it is important to focus on the following recommendations whenever using transport facilities.

- Buy a fuel-efficient car, drive only when necessary, use car shares and car pools
- Use public transport which includes buses, trains and ferries, this is a more environmentally friendly way to travel as it reduces emissions
- Use bikes for short trips as cycling does not only reduce your travelling costs but also negative impacts on the environment
- Similar to cycling, walking reduces pollution and noise at the same time, so walk short distances instead of using your car

Source: Australian Government-Living Greener

For more information look at: www.gbrmpa.gov.au/__data/assets/pdf_file/0008/4031/

[gbrmpa_ReefFactsfortourguides.pdf](#)

<http://www.livinggreener.gov.au/travel>



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