



Over many decades, thousands of scientists have painted an unambiguous picture: the global climate is changing and humanity is almost surely the primary cause. The risks have never been clearer and the case for action has never been more urgent.

Our Earth's surface is warming rapidly and we can already see social, economic and environmental impacts in Australia.

Failing to take sufficient action today entails potentially huge risks to our environment, economy, society and way of life into the future. This is the critical decade for action.

This document accompanies *The Critical Decade* report and highlights the key impacts for the Gippsland region.

1. Changes in rainfall patterns pose challenges for water supply and agriculture across Gippsland

There have been significant changes in the pattern of rainfall over Victoria in the past 50 years—it is getting drier. The recent drought in Victoria was the driest period since reliable climate records have been kept, surpassing the previous record droughts that extended from 1936 to 1945 (SEACI 2010).

Studies indicate that the drying trend in Victoria is related to human-induced climate change. Very low rainfall in autumn and low rainfall in winter and spring has been linked to changes in the circulation of the atmosphere, which are driven by rising temperatures.

The drying trend is expected to continue. By 2030, runoff to the Thomson-Macalister and Latrobe river systems is expected to have decreased by up to 25% and 20% respectively (DSE 2008a). Lower runoff will reduce the flow of water in the river systems, which may reduce water quality within the catchment and increase the potential for algal blooms. The drying trend and reduced runoff may also have important consequences for urban water supply and agriculture across Gippsland.

In addition, the frequency and intensity of heavy rainfall events is likely to increase as the climate continues to warm. Intense rainfall events increase the risk of severe flooding with impacts for infrastructure, such as road washouts, and agriculture, such as damage to soil, crops and livestock.

2. Higher temperatures will increase the likelihood of large and intense fires

Average yearly temperature in Victoria has risen by almost 1°C over the past century, with most of this warming occurring since the 1950s (DSE 2008b). The number of high temperature extremes, such as heatwaves and record hot days, has also increased across Australia, especially over the past decade. In Sale, the number of very hot days could more than double by 2070 (DSE 2008a).

Temperature increases of 1 or 2 degrees can be associated with large changes in the nature of extreme weather events. The risks associated with bushfires are increasing as a result of the probable effects of climate change (2009 Victorian Bushfires Royal Commission).

The conditions for large and intense fires – low humidity, high winds and extreme temperatures – are likely to become more common in the region by mid-century. These were contributing factors in the 2009 Black Saturday bushfires which devastated parts of the Gippsland region, including Bunyip, Churchill and Delburn, claiming lives and destroying homes.

More frequent and intense fires may also affect water catchments and water quality, and changes in fire patterns may already be affecting the biodiversity of the Gippsland region (CSIRO 2005). The February 2009 Wilsons Promontory fires burnt around half the national park, including much of the habitat that provides food, shelter and protection from predators for small mammals (2009 Victorian Bushfires Royal Commission; Figure 1).

To counteract the risks that more intense fires pose to human health, property and infrastructure, prescribed burning may need to be increased. This type of climate change adaptation is costly and comes with inherent risks (Williams et al. 2011).

Figure 1: Regeneration after fire in Wilsons Promontory.



Source: Xufang/Shutterstock.com

3. Rising sea levels will exacerbate existing vulnerability of coastal towns and infrastructure in the Gippsland region

The Gippsland Lakes, including Ninety Mile Beach and Corner Inlet, represent one of the most vulnerable coastal areas in Australia (DCC 2009).

Within 50 years, parts of the Gippsland coast will be inundated to an extent requiring protection or relocation of assets, including dwellings and commercial buildings (Gippsland Coastal Board 2008). Increased rainfall and higher sea levels will cause extensive flooding of low-lying towns such as Lakes Entrance (DCC 2009). In the longer term, towns like Lakes Entrance are likely to be permanently flooded from sea level rise, along with important infrastructure such as the Princes Highway (Figure 2).

Sea level rise and storms will likely also reshape the highly-erodible sandy beaches along the Gippsland coastline. Additional risks include increased erosion of structures such as sea walls, roads and bridges, and flooding or erosion of commercial buildings, private residences, utilities (such as powerlines) and stormwater drains.

4. This is the critical decade. Decisions we make from now to 2020 will determine the severity of climate change our children and grandchildren experience

Without strong and rapid action there is a significant risk that climate change will undermine our society's prosperity, health, stability and way of life.

To minimise this risk, we must decarbonise our economy and move to clean energy sources by 2050. That means carbon emissions must peak within the next few years and then strongly decline. The longer we wait to start reducing carbon emissions, the more difficult and costly these reductions become.

This decade is critical. Unless effective action is taken, the global climate may be so irreversibly altered we will struggle to maintain our present way of life. The choices we make this decade will shape the long-term future for our children and grandchildren.

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Figure 2: Image of Lakes Entrance with simulated coastal flooding from a sea level rise of 1.1m.



Source: sahultime.monash.edu.au/LakesEntrance/

Sources

Information is taken from the Climate Commission's report *The Critical Decade* unless otherwise noted above. Other sources are provided in full on the Climate Commission website: www.climatecommission.gov.au