Past and Future Climates
Average Seasonal Rainfall and Temperature

Volcanic Plains and Southern Dunes

There is natural variability in the climate of the Limestone Coast region of South Australia (SA), however it is projected that climate change will create a different future climate. The projected changes in climate over coming decades are greater than have been experienced since European settlement in Australia.

Overall these projections show we are moving towards a hotter and drier climate, with more erratic rainfall, an increase in number of hot days and increased bushfire risk. Considering these general projections for the region is very useful in planning for the development of a resilient farm business, however it is also important to consider the specific local climate data projections.

The local projections give an insight into the possible climate patterns for specific locations in 2030 and 2050. This fact sheet explores the projected data for summer, autumn, winter and spring average temperature and rainfall for Keith which is located in the Mallee Woodlands sub-region.

What are Climate 'Projections'?

What climate change might look like in the future cannot be 'forecasted' or 'predicted'. However, there are a series of models that take into consideration the emissions and land use scenarios to create 'projections'.

Why are Climate Projections important?

Climate projections are important for landholders and other natural resource managers in the Limestone Coast region of SA to consider when planning for the future. By understanding the impacts of the local climate change projections, we can plan, prepare and adapt to climate change. The climate is complex so looking at the past trends without considering the impact of changing greenhouse gas levels is unlikely to be a realistic indicator. Local climate projections consider the changing greenhouse gas concentrations, therefore offering a more considered indicator than past climate data alone. These projections can be used to explore what future conditions might look like. These models provide information for Agricultural Industries in the Limestone Coast region which will allow informed decisions to be made. It is important to be prepared for change and to be robust enough to adapt to long term changes in climate.

How are future climatic conditions projected?

One method of creating climate projections is through Representative Concentration Pathways (RCP). These are scenarios that take into consideration a full suite of greenhouse gases, aerosols and chemically active gasses as well as land use and land cover over a time series.

RCP4.5 is considered to be an 'intermediate emissions scenario', in which greenhouse gas production from human activity is stabilised by 2100. This is also thought of as a 'future best case scenario'. RCP8.5 is the 'High Emissions scenario' where little effort is made to reduce the greenhouse gas produced from human activity. This is also thought of as a 'future worst case scenario'. Emissions of CO2 in 2018 were becoming more in line with RCP4.5, however, the temperature change in Australia has been tracking in line with RCP8.5.

The projections used here are calculated from the Climate Ready report where the baseline period for the Limestone Coast is between 1986 and 2005. When referring to an increase in temperature or decreases in rainfall, it is in comparison to this baseline period.

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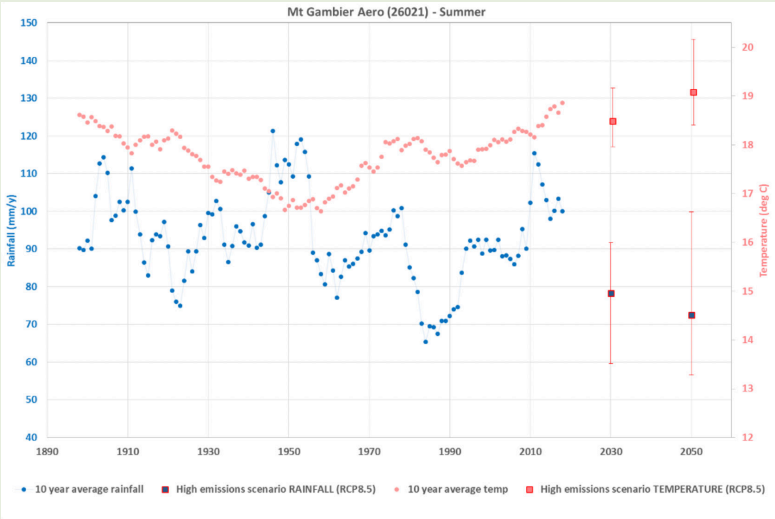
What do the Average Seasonal Rainfall and Temperature projections show for the Volcanic Plains and Southern Dunes sub-region?

The following series of graphs (Figure 1-4) shows the projected data for the 10 year average temperature and rainfall for summer, autumn, winter and spring from the Mount Gambier Aerodrome weather station. This location has been selected to give insight for the Volcanic Plains & Southern Dunes region.



Summer

The high emissions scenario rainfall projections for both 2030 and 2050 are similar to the low rainfall summers experienced in the late 1980's.

However temperature projections for 2030 and 2050 are both increased from past 10 year average temperature recordings.

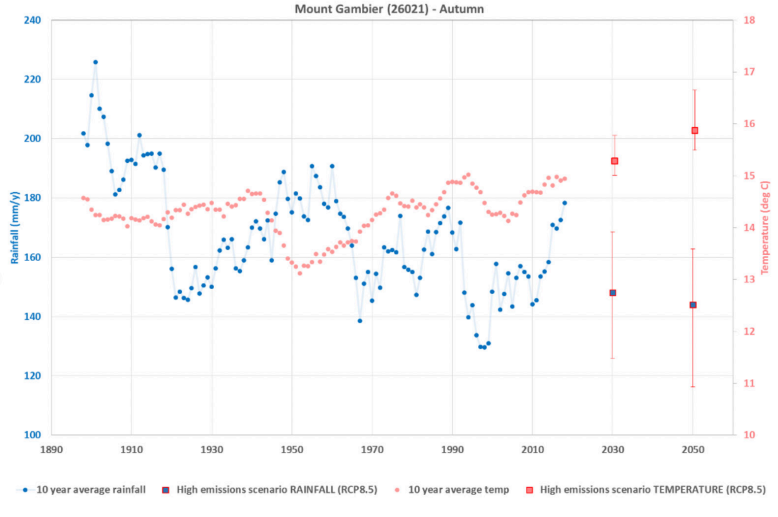
Figure 1: Graph showing high emissions scenario rainfall projections for both 2030 and 2050 during summer

The projected reduced summer rainfall and increased average temperature is likely to increase evapotranspiration if this trend continues overtime which may impact our agricultural systems due to changes in natural processes in the environment.

Evapotranspiration is the term used to describe the part of the water cycle which removes liquid water from soil and water surfaces. Transpiration is the term used to describe the process of water movement from vegetation followed by the evaporation into the atmosphere. As temperature increases, the rate of evapotranspiration increases resulting in less water from rainfall being available for plant growth. When the temperature changes are combined with the projected declines in rainfall, an increase in aridity is likely.

In the Volcanic Plans & Southern Dunes region many agricultural systems utilise underground water resources for irrigation during the summer period. Under the projected climate in 2030 and 2050 it is likely there will be more pressure on this resource due to reduced rainfall and increased aridity. Development and adoption of water use efficiency tools and technology could help to mitigate this risk.

The increase in aridity in the region during the summer means a reduction in the moisture in vegetation, this results in an increased bushfire risk.



Autumn

The high emissions scenario rainfall projections for both 2030 and 2050 are in line with the long term rainfall trend of lower rainfall however this rainfall level is similar to low autumn rainfall years previously experienced over the past century.

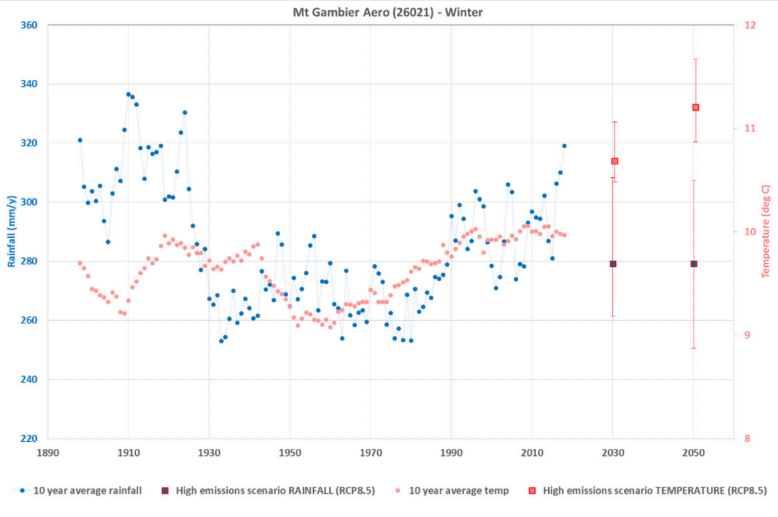
Temperature projections for 2030 and 2050 are both increased from past 10 year average temperature

Figure 2: Graph showing high emissions scenario rainfall projections for both 2030 and 2050 during autumn

The 'autumn break' in the South East is defined as at least 25mm of rainfall over three days prior to the commencement of the winter cropping season and pasture growth cycle.

The projected rainfall during the autumn period is similar to that previously experienced during lower rainfall averages.

Changes to autumn rainfall may disrupt the regular autumn break pattern to that which has been experienced in late seasonal break years

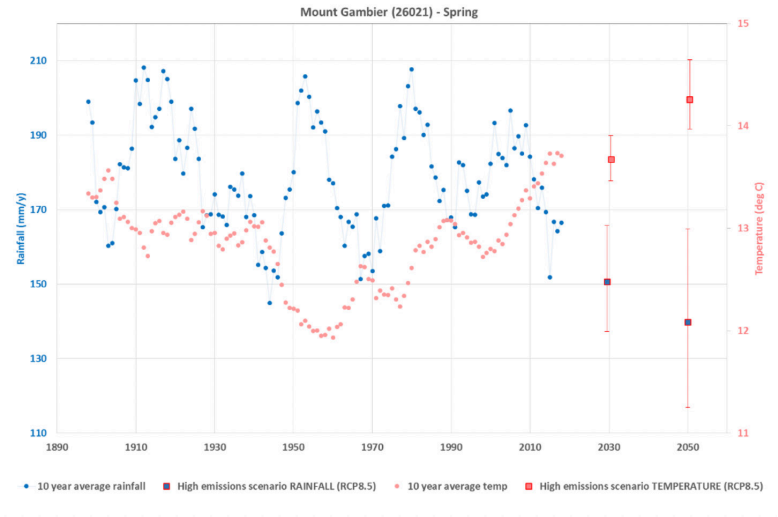


Winter

The high emissions scenario rainfall projections for both 2030 and 2050 are in line with the long term rainfall trend and is similar to average winter rainfall years already experienced over the past century.

Temperature projections for 2030 and 2050 are both increased from past 10 year average temperature recordings.

Figure 3: Graph showing high emissions scenario rainfall projections for both 2030 and 2050 during winter



Spring

The high emissions scenario rainfall projections for both 2030 and 2050 suggest a trend of lower rainfall similar to the low rainfall seasons experienced since 2010.

Temperature projections for 2050 is increased from past recordings.

Figure 4: Graph showing high emissions scenario rainfall projections for both 2030 and 2050 during spring

The projected decrease in spring rainfall by 2050 is likely to result in a shortening of the traditional growing season. A shorter growing season may impact the establishment of some perennial crops, success of some dryland annuals, and place pressure on water recourses or result in reduced crop production. Production systems that rely on water resources may need to increase the length of their irrigation season to maintain production. Adopting water use efficiency technology may be important if the climate changes occur as projected.

The combination of lower rainfall and higher temperatures over spring and summer may put pressure on dryland perennial pasture systems particularly during establishment. Other agricultural crops may also have a change in growth pattern impacting crop quality and yield.

The projected changes in climate over coming decades show we are moving to a hotter and drier climate than that of the current climate that are agricultural systems are currently adapted to. Farmers have an amazing ability and resilience to adapt to great changes in weather conditions.

The purpose of this sheet is to provide the Agricultural Industry in the South East with information to allow informed decisions to be made. It is important to be prepared for change and to be robust enough to adapt to long term changes in climate.

How to build on this picture of the future climate for your location:

A climate analogue site is a location where the currently experienced climate is similar to the projected future climate in another location, based on the annual average rainfall and temperature. For example, for the climate projected with a high emissions scenario in 2030, the analogue site for Mount Gambier is Penola.

This means that the future climate being predicted for Mount Gambier (under RCP8.5 scenario in year 2030) is currently being experienced in Penola. Likewise, the future climate being predicted for Lucindale (under RCP8.5 scenario in year 2030), is currently being experienced at Keith.

More information can be found at the Climate Change Australia Website.

The purpose of this information is to provide the agricultural industry in the Limestone Coast with information to allow informed decisions to be made. It is important be prepared for change and to be robust enough to adapt to long term changes in climate. This general information is intended as a guide only. For further information on your own specific situation, please seek expert advice.

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