

# Projected impact of climate change on *wine grape production* opportunities for growers

## summary

Projected climate change presents both opportunities and challenges to Tasmanian wine grape producers. The physical diversity of the island is highly likely to support the continued production of cool climate wines into the future, though location of these vineyards may change.

Tasmanian producers will be able to offer more varieties of wine, particularly those requiring a higher thermal index.

# wine grape production

*In recent years, Tasmania has experienced some of the warmest years on record. It is highly likely that average minimum and maximum temperatures will continue to increase in the future.*

*What does this mean for Tasmania's wine industry?*

## **Dealing with climate**

Over the past decade, Tasmanian farmers have experienced extremely wet years, and some of the warmest and driest years on record. Scientists suggest that climate will be even more variable in the future.

Tasmanian wine grape producers are already thinking about and assessing climate change adaptation options. Large commercial winemakers from mainland Australia are securing fruit contracts and/or vineyards in Tasmania as a response to recent warmer temperatures. While these mainland producers have the option to 'move south', what options are available to Tasmanian wine grape producers?

This information sheet lists current and potential future management actions that are available to producers to maximise high quality wine grape production in the future.

## **Wine grape production and changing temperature**

Projections from [Climate Futures for Tasmania](#) indicate minimal change in annual rainfall in the future. However, temperatures across Tasmania are projected to increase by approximately 2.9 °C by 2100.

Modelling has shown that by 2070, the climate for wine production in northern Tasmania may be similar to the Coonawarra region of South Australia.

Wine grape production is particularly sensitive to temperature. Therefore the projected increase in temperature could affect production in the following ways:

- shortening the growing season, including earlier bud burst, ripening and harvest dates for current varieties,
- ripening grapes during a warmer part of the season, affecting the flavour and aroma profiles of the wines,
- changing yield and quality of grapes produced,
- changing the suitability of grape varieties grown within a region.

Researchers have already reported shifts in wine grape production on the Australian mainland, including earlier bud burst, ripening and harvesting.

Photo: Suzie Gaynor



## ***Modelling impacts of the Tasmanian climate***

Climate Futures for Tasmania projections were used to calculate changes in the number of growing degree days (GDD). This index is a measure of the accumulation of heat units over time (from 1 July) and is calculated from the average daily temperature while subtracting a base temperature, often 10 °C for wine grapes.

Projections suggest that there will be a gradual increase in annual GDD across Tasmania from 1961 to 2100 (Figure 1), which will significantly influence choice of crop, length of growing season, yield and quality. The heat units for wine, biologically effective Growing Degree Days ( $BEGDD = (T \text{ mean} - T \text{ threshold } (10 \text{ }^\circ\text{C}) > 9 = 9)$ ) were calculated for the period October to April, for six wine regions in Tasmania. Requirements for BEGDD vary between different varieties of grapes. For example pinot noir grapes require fewer BEGDD than shiraz or cabernet sauvignon grapes. Trends in BEGDD suggest that there may be substantial increases in BEGDD from 1961-1990 to 2071-2100 of 50%-70% (Figure 2).

## ***Effects of changing temperature on wine grape production***

Changes in BEGDD (Figure 2) may impact on the suitability of wine grape varieties for certain regions of Tasmania. Tasmania's current advantage lies in the production of true cool-climate sparkling and table wines of exceptional quality. The typical character of Tasmanian cool climate wines may be affected into the future and wine makers need to be aware of the potential impact warmer temperature might have on style and quality of their current premium wines. However, there may be considerable opportunities for wine growing (Tasmanian cool climate wines or other varieties), as temperature increases, in areas that are currently climatically marginal to unsuitable for wine grape production.

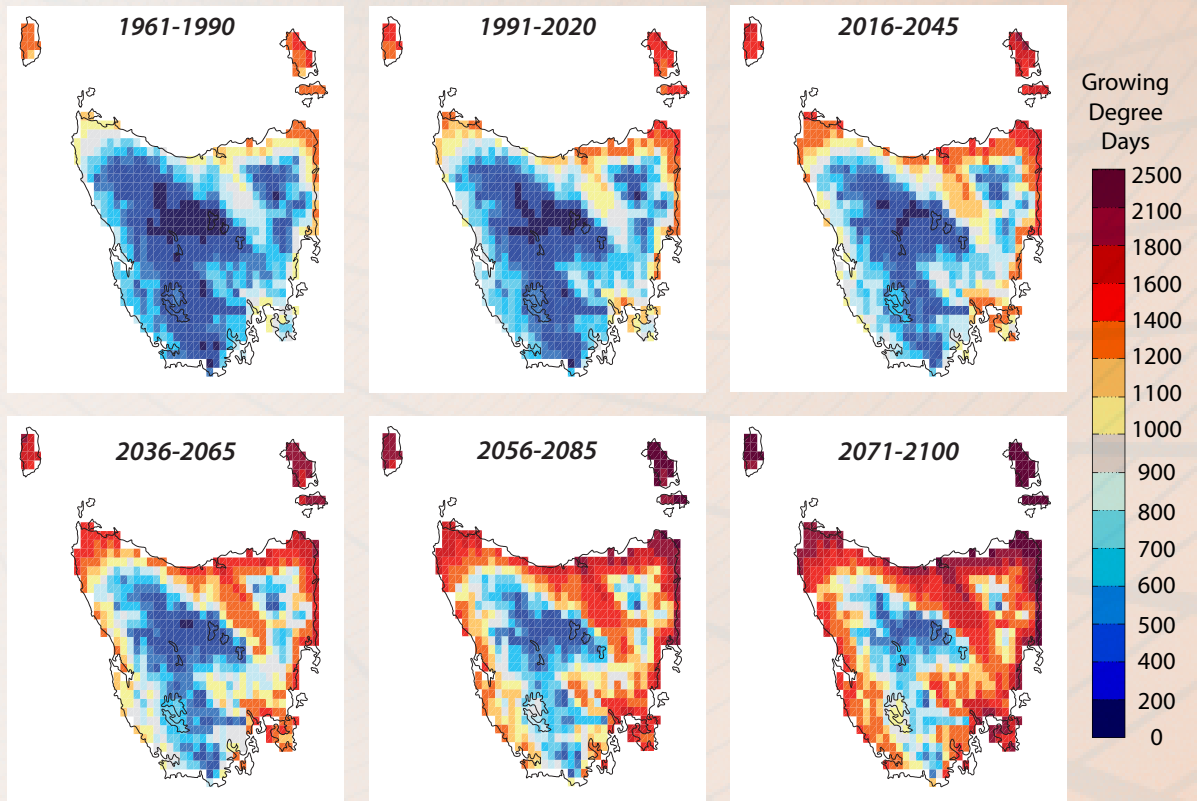
While climate projections of increased temperatures might suggest reduced cold and frost damage in the future, such events are complex phenomena requiring cautious interpretation. If warmer winters and early spring conditions lead to earlier bud burst there will be an increased likelihood that frost-sensitive plant tissue is exposed to spring frosts. Climate Futures for Tasmania modelling indicates an increase in rainfall during summer and autumn, particularly in north east Tasmania. Increased temperature and higher rainfall during this time may promote fungal diseases at vulnerable times of crop development.

Photo: David Russell



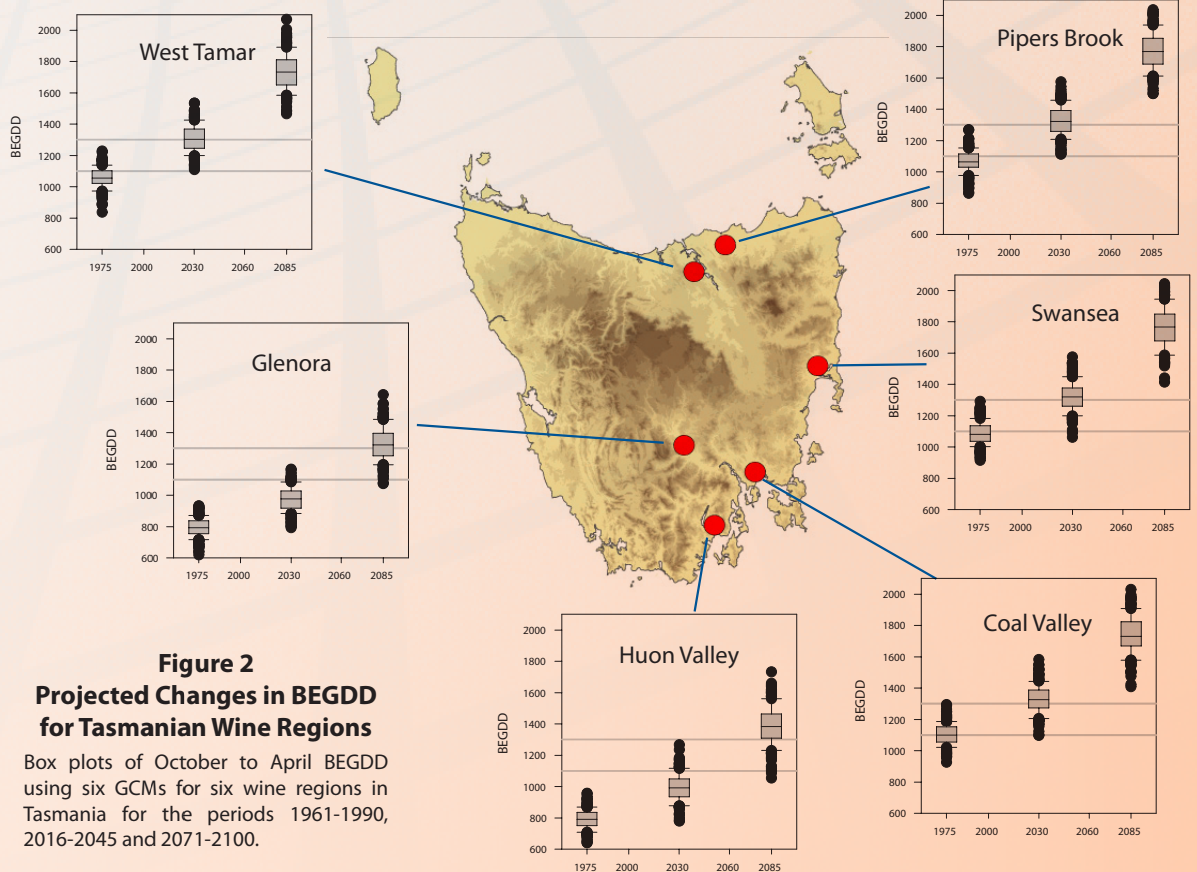
Photo: Liam Gash

## Projected Changes in Growing Degree Days



**Figure 1 Growing Degree Days**

Projected change in growing degree days (GDD 10 °C) across Tasmania for six periods from 1975 to 2085. Mean GDD from six downscaled GCMs.



**Figure 2**  
**Projected Changes in BEGDD for Tasmanian Wine Regions**

Box plots of October to April BEGDD using six GCMs for six wine regions in Tasmania for the periods 1961-1990, 2016-2045 and 2071-2100.

**Figures Source:** Holz GK, Grose MR, Bennett JC, Corney SP, White CJ, Phelan D, Potter K, Kriticos D, Rawnsley R, Parsons D, Lisson S, Gaynor SM & Bindoff NL 2010, *Climate Futures for Tasmania: impacts on agriculture technical report*, Antarctic Climate and Ecosystems Cooperative Research Centre, Hobart, Tasmania.

## Potential management options

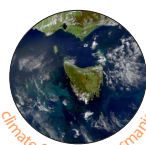
Wine grape producers have a number of management options for the short, medium and long-term.

### Short-term

- Increased rainfall events in some regions will mean that growers will need to manage canopies to allow better airflow and spray penetration to manage pests and disease.
- Increased temperatures may require canopy management to protect fruit from sunburn.
- On extremely hot days (>35 °C), impacts can be minimised by managing the vineyard floor to reduce reflective heat and buffer ambient heat.
- Irrigation may also be used to manage extremely hot days (>35 °C).
- Growers can start to trial alternative varieties that are better suited to warmer temperatures, later season rainfall and shorter growing seasons.

### Medium to long-term

- Where water is limiting, plant more drought and heat tolerant varieties or alternative clones of existing varieties.
- Select more disease resistant varieties and clones.
- Develop new vineyards in topographically and geographically diverse locations, eg plant at higher (or lower) elevations, modify aspect selection.
- Trial Mediterranean varieties.



climate futures for tasmania

#### About Climate Futures for Tasmania

The material in this information sheet was developed from outputs from the Climate Futures for Tasmania project. In particular, from the Impacts on Agriculture Technical Report (Holz et al 2010).

The Climate Futures for Tasmania project was funded primarily by the State Government of Tasmania, the Australian Government's Commonwealth Environment Research Facilities Program and Natural Disaster Mitigation Program. The project also received additional funding support from Hydro Tasmania.

The Climate Futures for Tasmania project was managed by the Antarctic Climate & Ecosystems Cooperative Research Centre (ACE CRC). For more information about the project go to:

[www.acecrc.org.au](http://www.acecrc.org.au)



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Explore the possibilities

This information sheet is a joint production of the Tasmanian Government and the Tasmanian Institute of Agriculture.

## Further information

This information sheet is part of a series produced by TIA on the impacts of climate change in agriculture. The full suite of information sheets is available at:

[www.dpipwe.tas.gov.au/climatechange](http://www.dpipwe.tas.gov.au/climatechange)

The Tasmanian Government's Tasmanian Climate Change Office (TCCO) provides information on climate change mitigation, and adaptation programs and options:

[www.climatechange.tas.gov.au](http://www.climatechange.tas.gov.au)

Climate Futures for Tasmania reports provide information on the impacts of climate change in Tasmania on general climate, water and catchments, impacts on agriculture and extreme events:

[www.climatechange.tas.gov.au](http://www.climatechange.tas.gov.au)

The Bureau of Meteorology provides data on weather forecasts and climate variability:

[www.bom.gov.au/](http://www.bom.gov.au/)

The [Tasmanian Institute of Agriculture](http://www.tia.tas.edu.au) (TIA) and [Wine Tasmania](http://www.winetasmania.com.au) provide RD&E for the Tasmanian wine sector, collecting and collating vintage statistics and assisting with investment enquiries.

[www.tia.tas.edu.au](http://www.tia.tas.edu.au)

[www.winetasmania.com.au](http://www.winetasmania.com.au)

For further information to assist farmers and potential investors to allow comparisons to be made between enterprises including cash crop and livestock enterprise tools visit

[www.dpipwe.tas.gov.au/wealthfromwater](http://www.dpipwe.tas.gov.au/wealthfromwater)

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