

Marlborough meteorological services

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1 Introduction

The funding that the Marlborough Research Centre (MRC) allocates for meteorological services allows for the provision of a wide range of services to the Marlborough community, as follows:

- Provision of monthly meteorological summaries and press releases to local media.
- Publication of monthly meteorological summaries for the Blenheim and Dashwood Awatere weather stations on the MRC website.
- Provision of 11 monthly Met Report articles for inclusion in Winepress, the official magazine of Wine Marlborough.
- Access to the Grovetown Park weather station for education groups.
- Provision of data to the National Institute of Water and Atmospheric Research (NIWA) National Climate Database.
- Maintenance of a database of meteorological data for the Blenheim and Awatere stations by The New Zealand Institute for Plant and Food Research Limited (PFR).
- Provision of weather data to support many of the research projects that are conducted by PFR, Lincoln University, University of Auckland and Nelson Marlborough Institute of Technology.
- Provision of data to organisations associated with the wine industry, e.g. Bragato Research Institute, Sustainable Winegrowing New Zealand, Nelson Marlborough Institute of Technology Viticulture & Wine programme, Wine Marlborough and many wine companies.
- Provision of data for use by the wider agricultural and horticultural industries, e.g. Fruited Supplies, Farmlands Co-Operative Society Limited, Fruition Horticulture (SI) Limited.

Detailed summaries of data from the Blenheim and Awatere weather stations can be accessed on the MRC website www.mrc.org.nz.

2 Weather data for the 2021–22 year

Table 1 summarises the main weather parameters for the 2021–22 year, for the Blenheim weather station located at the Grovetown Park campus of the MRC.

Table 1. Blenheim weather summary for the 12 months from July 2021 to June 2022.

	LTA Mean Max °C	21/22 Mean Max °C	LTA Mean Min °C	21/22 Mean Min °C	LTA Mean °C	21/22 Mean °C	LTA GDD	21/22 GDD	LTA PET mm	21/22 PET mm	LTA Rain mm	21/22 Rain mm	LTA Sun hours	21/22 Sun hours
July	13.2	14.3	2.7	3.3	8.0	8.8	8.8	20.3	36.2	33.5	64.6	143.6	163.2	186.1
August	14.3	14.0	3.9	5.0	9.1	9.5	18.3	22.2	49.6	48.8	61.8	71.2	185.0	158.8
September	16.3	15.9	6.0	6.4	11.1	11.1	52.8	52.1	73.0	78.9	52.8	52.6	196.1	223.9
October	18.4	18.9	7.9	8.8	13.2	13.9	102.2	123.2	102.8	99.5	57.2	70.2	230.7	233.7
November	20.0	21.0	9.6	11.6	14.8	16.3	144.2	189.6	122.5	126.7	49.6	14.2	239.3	228.2
December	21.9	22.9	11.8	14.3	16.9	18.6	211.7	265.5	140.2	135.1	48.4	85.8	249.3	201.5
January	23.6	23.8	12.8	12.9	18.2	18.3	252.2	258.4	144.6	152.5	42.2	12.6	264.3	313.8
February	23.3	21.2	12.5	13.4	17.9	17.3	223.3	204.5	115.5	86.6	45.9	153.4	231.5	156.4
March	21.5	21.2	10.6	11.4	16.1	16.3	189.9	195.3	99.7	87	41.7	17.0	229.9	237.9
April	18.9	20.4	8.1	9.0	13.5	14.7	107.0	140.9	64.5	73.4	49.7	9.6	192.1	239.6
May	16.5	18.0	5.8	7.0	11.2	12.5	54.3	85.9	45.7	48.5	59.5	47.8	176.2	184.4
June	13.9	14.3	3.6	4.7	8.8	9.5	18.1	23.0	33.0	32	65.6	80.4	150.4	138.1
Mean–Jul to Jun	18.5	18.8	8.0	9.0	13.2	13.9								
Total–Jul to Jun							1382.8	1580.9	1027.5	1002.5	639.0	758.4	2508.0	2502.4
LTA Jul to Jun comparison		+0.3°C		+1.0°C		+0.7°C		114%		97.5%		119%		99.7%
Mean–Sep to Apr Total–Sep to Apr LTA Sep to Apr comparison	20.5	20.7	9.9	11.0	15.2	15.8								
		+0.2°C		+1.1°C		+0.6°C	1283.2	1429.5	862.8	839.7	387.2	415.4	1833.6	1835.0
								111%		97%		107%		100%

LTA – Long-term average Rainfall, Temperature, Sunshine, GDD – growing degree-days (1986–2021), PET – potential evapotranspiration (1996–2021).

2.1 Temperature

The mean temperature for the 12 months from 1 July 2021 to 30 June 2022 was 13.9°C; 0.7°C above the long-term average (LTA). Ten months in the 2021–22 year recorded above the LTA, 1 month the same as the LTA and 1 month below the LTA (Table 1).

The 2021–22 year is the fourth warmest July to June year for Blenheim, in the 90-year period from 1932–33 to 2021–22 (Table 2). Five of the 10 warmest years on record have occurred between 2013–14 and 2021–22.

Table 2. The 10 warmest July to June mean temperatures on record for Blenheim (1932 to 2022).

Year	Mean temperature (°C)
2018–19	14.02
2017–18	14.01
2013–14	13.93
2021–22	13.89
1989–90	13.82
1998–99	13.76
2020–21	13.75
1997–98	13.70
1974–75	13.69
1970–71	13.69
LTA	13.20 (1986–2021) 12.72 (1932–1985)

The trend line in Figure 1 indicates that over the 90-year period 1932–33 to 2021–22 Blenheim’s mean annual temperature has risen from 12.35°C to 13.52°C, an increase of 1.17°C.

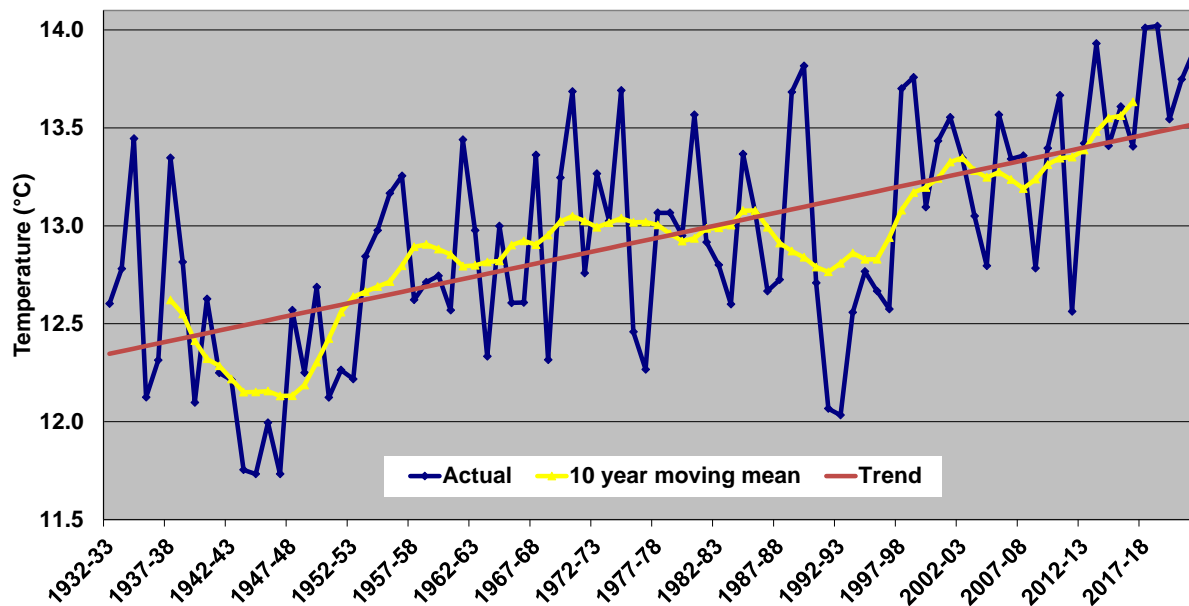


Figure 1. Mean annual temperatures in Blenheim (July to June) over the 90 years 1932–33 to 2021–22.

2.2 Sunshine

Total sunshine for the 12 months from 1 July 2021 to 30 June 2022 was 2502.4 hours (Table 1), only 5.6 hours below the LTA. However, this 12-month period recorded 104.3 hours less sunshine than in 2020–21 and 278.6 hours less than the highest ever total, recorded in 2015–16.

In recent years, Blenheim has not been doing so well in the annual race for sunniest town in New Zealand. Blenheim last won the race in 2015. Richmond entered the race part way through 2015 and won the title for the four consecutive years from 2016 to 2019. Whakatane took the title in 2020 and New Plymouth in 2021.

2.3 Rainfall

Total rainfall for the 12 months July 2021 to June 2022 was 758.4 mm (Table 1). This was 119% of the LTA (639.0 mm) and the highest 12-month July to June total since 2009–10, which recorded 759.6 mm. There was considerable variation in monthly rainfall totals throughout the 12 months as indicated in Figure 2. February 2022 recorded the highest total of 153.4 mm and April 2022 the lowest total of 9.6 mm.

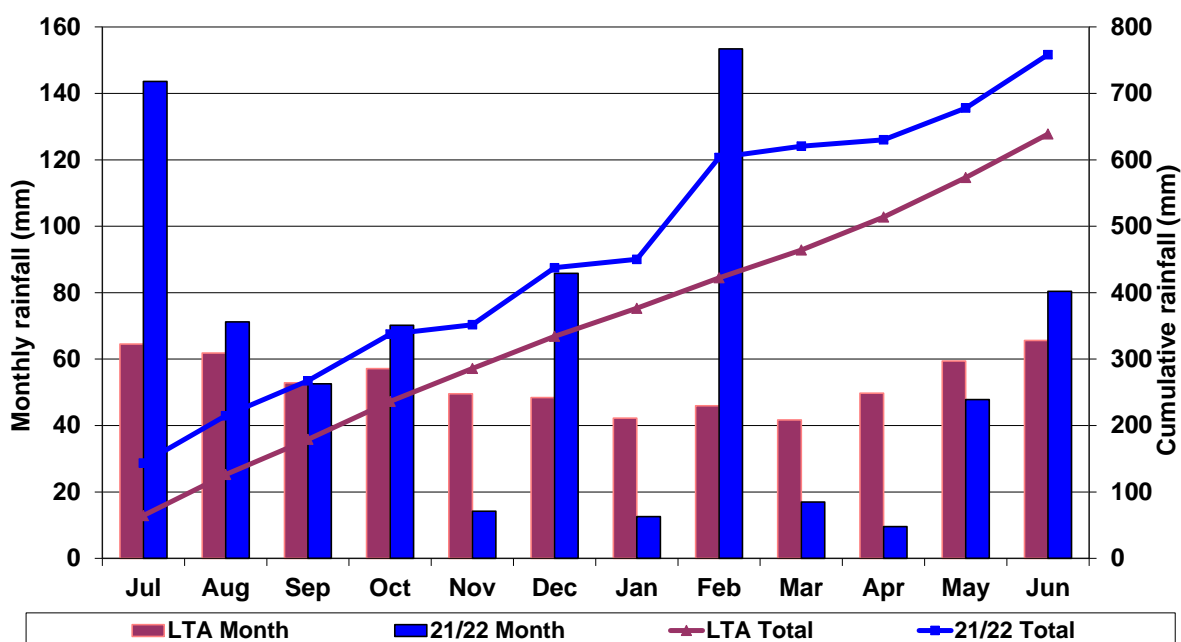


Figure 2. Blenheim monthly and annual rainfall for the 12 months July 2021 to June 2022.

In previous reports it has been discussed that there is not a large variation in Blenheim’s LTA monthly rainfall, from the low of 41.7 mm for March to the high of 65.6 mm for June (Table 3). However, the mean monthly totals do not give any indication of the variation in rainfall that occurs for any particular month from year to year. The 2021–22 monthly rainfall is a typical example of the wide variation in the monthly totals that occur. The maximum, minimum and mean monthly rainfall totals are presented in Table 3. Over the 92 years 1930 to 2022 the average monthly maximum rainfall is 163.4 mm, the average monthly minimum rainfall is 3.3 mm, giving a range of 160.1 mm. These data clearly demonstrate that Blenheim’s monthly rainfall can deviate markedly from the mean.

Table 3: Maximum, minimum and mean monthly rainfall totals for Blenheim for the 92 years 1930 to 2021.

Month	Maximum (mm)	Minimum (mm)	Mean (mm)
January	167.0	0.0	42.2
February	181.4	1.0	45.9
March	118.0	2.8	41.7
April	173.0	1.0	49.7
May	182.6	4.0	59.4
June	154.9	8.0	65.6
July	174.1	9.9	64.5
August	171.6	4.6	61.8
September	191.5	3.0	52.8
October	161.0	2.3	57.2
November	154.6	2.8	49.6
December	131.6	0.8	48.4
Average	163.4	3.3	639.0
Annual	1003.4	381.6	

2.4 Seasonal water balance

The seasonal water balance (Figure 3) is the difference between the 3-monthly running totals of rainfall and evapotranspiration. It is a way of identifying whether the current season is tracking wetter or drier than the LTA. The LTA line indicates that water balance in Blenheim is normally negative for the 8 months from early–October through until mid-June; i.e. there is normally a water deficit over this period, hence the need for irrigation in order to keep plants growing to their optimum over the growing season. It also means that there is usually a 4-month period from mid-June thorough until early-October when there is a water surplus, over which time the soil moisture is recharged.

The yellow line indicates that apart from the tail end of the 2021–22 year (mid-May to the end of June 2022) the water balance was above or close to the LTA and largely above the water balance in the previous 3 seasons. The very high water balance from July to October 2021 was a result of the very high rainfall in July and average to above the LTA rainfall from August to October 2021. From November 2021 through until early February 2022 the water balance was close to the LTA. The high rainfall in February 2022 again pushed the water balance up well above the LTA. Although rainfall was very low in March and April 2022 the water balance remained high right through until mid-May, at which time the high February rainfall dropped out of the 3 month total.

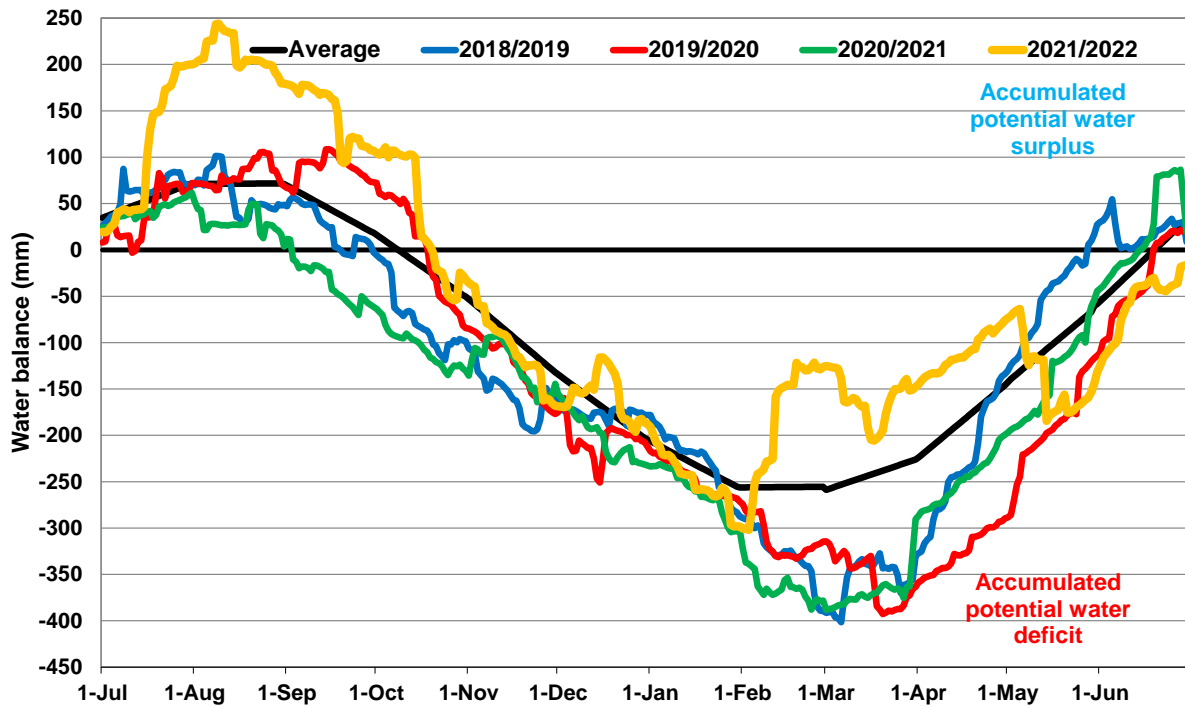


Figure 3. Season water balance for Blenheim: difference between 3 month totals of rainfall and potential evapotranspiration

2.5 Wind-run

Daily wind-run is a measure of the total wind received in a 24-hour period, measured in kilometres (km). In weather summaries for Blenheim over recent years it has been noted that Blenheim’s average monthly wind-run has declined markedly over the past decade. The 12 months July 2021 to June 2022 continued this trend with September 2021 being the only month during the year to record above average wind-run (Figure 4).

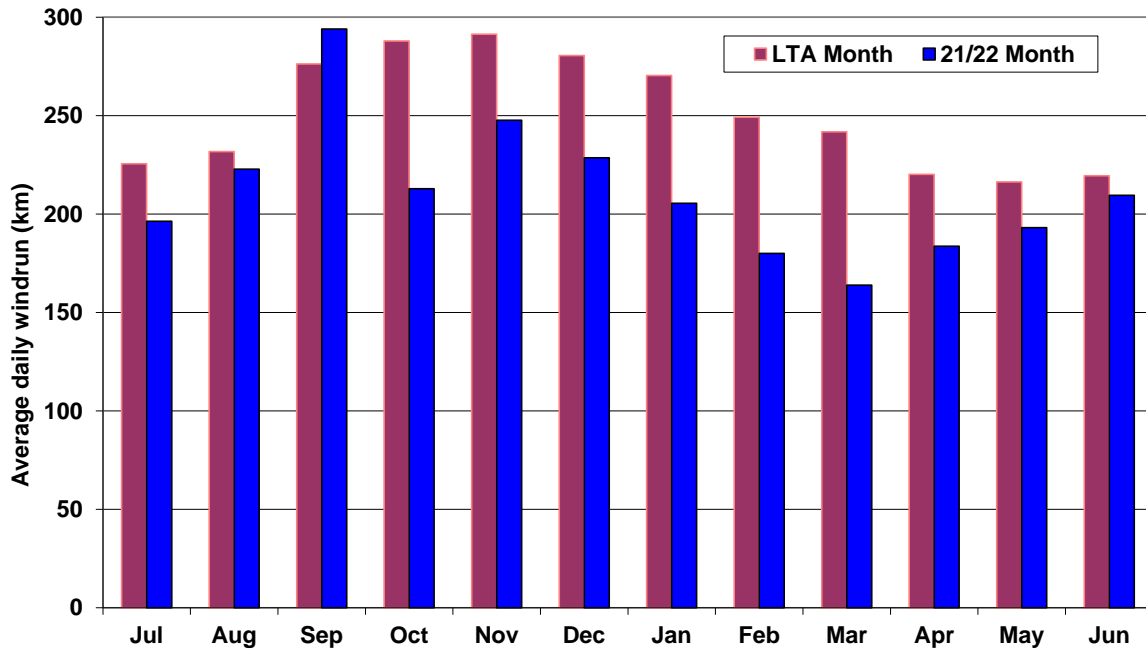


Figure 4. Blenheim monthly wind-run for the 12 months July 2021 to June 2022.

2.6 Growing season 2021–22

Total growing degree days (GDD) in Blenheim for the 2021–22 season were 1580.9, 114% of the LTA (Table 1). GDDs in the first 2 months of the season during September and October 2021 were close to average, unlike the previous season when they were much higher than average (Figure 5). However, from late October 2021 through until early January 2022 the temperatures were much higher than normal and this time period was one of the warmest on record. Because of the warm temperatures, the GDD line in early January 2022 was further above average than in almost all previous seasons (Figure 5). In early January 2022 NIWA predicted that there was a high chance that temperatures would remain above average for the 3 months January to March 2022. Consequently, in early January 2022 it looked as if Marlborough was heading for one of the warmest seasons on record. However, temperatures from January to March 2022 only turned out to be near to average and as a result the GDD line over that period was close to horizontal.

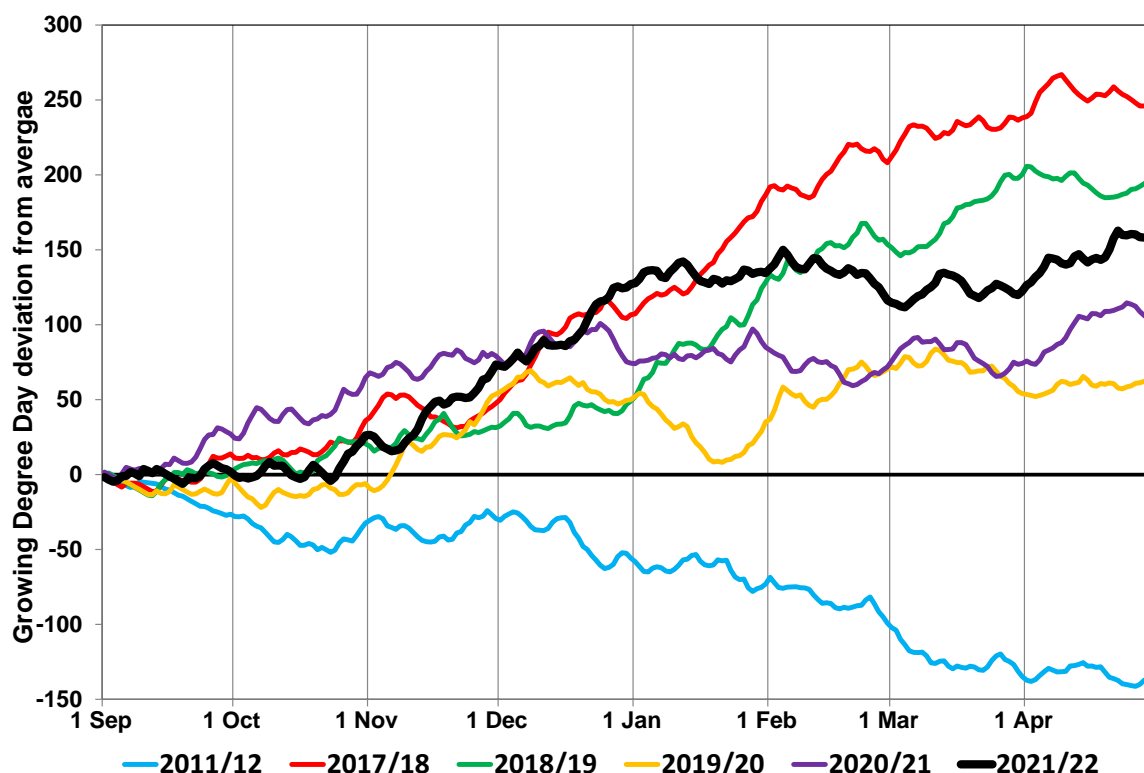


Figure 5. Normalised growing degree days for Blenheim: days above (+) or below (-) the long-term average (LTA) for the period 1 September to 30 April.

Temperatures over the period of grape flowering have the largest influence on determining the final yield of grapes at harvest. Cooler than average temperatures lead to lower than average fruitset and warmer than average temperatures to higher than average fruitset. In Marlborough, Sauvignon blanc flowering occurs between mid-November and mid-December. The data in Table 4 indicate that temperatures over the flowering period in 2021 at a central Rapaura vineyard, and generally in Marlborough, were much warmer than temperatures over flowering in 2020. Because of the warmer temperatures over flowering in 2021, fruitset as determined by number of berries per bunch at harvest, was higher and yield per vine was markedly higher.

Table 4. Temperatures over the flowering period of Sauvignon blanc at a central Rapaura vineyard in Marlborough in 2020 and 2021 and yield per vine at harvest.

Flowering period	Mean Maximum ¹ (°C)	Mean Minimum ¹ (°C)	Mean ² (°C)	Berry number per bunch	Average Berry Weight (g)	Yield per Vine (kg)	% of LTA ³ yield 5.2 kg
19 Nov–5 Dec 2020	20.7	8.7	14.7	44.7	1.92	4.09	78%
27 Nov–7 Dec 2021	23.3	13.1	17.6	71.1	2.24	6.84	131%

¹Mean maximum and minimum temperatures are calculated from daily averages

²Mean temperatures are calculated from hourly averages

³Long-term average (LTA) yield — 2005–2021

3 Key funding sources

- Marlborough Research Centre Trust funding: \$27,500 towards this project
- The New Zealand Institute for Plant and Food Research Limited. Additional staff time covered by PFRs weather station operational funding \$7500
- Tasman Crop Protection provides sponsorship to Wine Marlborough for the inclusion of Met Report in Winepress
- National Institute of Water & Atmospheric Research. Annual calibration and maintenance of the Blenheim weather station and provision of data in the national climate database, estimated to be \$4000

Confidential report for:

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