final report

FEEDLOTS

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Cattle Heat Loading Forecasting Summer 2007-2008

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Abstract

A weather forecasting system was developed to assist in warning operators of cattle feedlots of impending adverse weather conditions that could lead to excessive heat loads (and potential mortality) for feedlot cattle. This forecasting system covered several locations in the proximity of feedlots where Bureau of Meteorology (BoM) automatic weather stations (AWS) are located.

The forecasts were made over the period 1 December 2007 to 31 March 2008 at 17 sites throughout Queensland, New South Wales, South Australia, Western Australia and Victoria. Forecasts were made of wind speed, temperature and dew point, these being the input parameters necessary to calculate the Heat Load Index (HLI) and ultimately the Accumulated Heat Load Unit (AHLU).

Forecasts for all 17 sites were posted daily onto a website (www.katestone.com.au/mla) for easy access to all feedlot operators.

There was good agreement between the forecast and observed temperature and dew point. The relative humidity was calculated from these parameters. Solar radiation was calculated analytically using the date, time of day and latitude of the site. The wind speed forecasting performance, however, was relatively poor.

Heat stress is divided into four risk categories: low, medium, high and extreme. The risk categories span AHLU values of 0 to greater than 100. The low risk category ranges from 0 to 20 AHLU, the higher risk categories extend over 30 and 50 AHLU. It is more important to predict the risk category well than the actual AHLU. The forecasting system's performance at predicting the risk category has been found to be good. It is much more difficult to predict individual AHLU values and, consequently, the forecasting system did not perform as well in this regard.

An additional 74 sites were also trialed for the 2007/2008 summer. These forecasts were not made publicly available due to the limited data used to train the models. The forecasting performance at these sites is detailed in Appendix E.

Executive summary

Introduction

One of the issues that needs to be addressed in managing feedlots is the possibility of cattle deaths due to heat stress brought on by adverse weather conditions. One tool for managing heat stress is to forecast stress inducing conditions for a prescribed future period. In the summer of 2001-02, Katestone Environmental developed a forecasting system for MLA to predict a cattle heat stress index out to 6 days ahead for four sites in Queensland and New South Wales. Meteorological data were obtained on a daily basis from the on-site meteorological stations and the nearest Bureau of Meteorology automatic weather station (AWS). The Temperature Humidity Index (THI, an indicator of heat stress) was calculated from these data and made available to feedlot operators.

The forecasting study was expanded over the summer of 2002-03 to incorporate a Heat Load Index (HLI) developed specifically for feedlot cattle and to extend the coverage to 14 sites across eastern Australia. The service was expanded for the 2003-04 summer period with the addition of Katanning (Western Australia), again in 2004-05 to include Charlton in Victoria and also to incorporate a revised HLI algorithm and the Accumulated Heat Load Unit (AHLU). In 2005, the service was again expanded to include the site at Cessnock, NSW. The present study (2007-08) includes the following 17 sites:

- Queensland – Amberley, Emerald, Miles, Oakey, Roma, Warwick
- New South Wales – Albury, Armidale, Cessnock, Griffith, Hay, Moree, Tamworth, Yanco
- South Australia – Clare
- Western Australia – Katanning
- Victoria – Charlton

As of 2007, MLA requested that a further 74 sites be included in the study. Historical observational and forecast data were purchased from the Bureau of Meteorology for the purposes of training the models. A trial run (forecasts were performed but not made available to feedlot operators) was conducted during the 2007/2008 summer period in order to evaluate the forecast performance for these additional sites.

Key issues

The key issues in implementing a viable feedlot weather forecasting system include:

a) Identification of primary and derived meteorological parameters that indicate excessive heat load in cattle.

b) Selection of methodology for predicting primary and derived parameters at AWS locations for a suitable time horizon.

c) Development of a forecasting software system for predicting feedlot conditions.

d) Making the forecasting results available to all feedlot operators on a daily basis.

At the outset, the following constraints were identified:

- Bureau of Meteorology AWS sites are not generally in close proximity to feedlots and this limits the utility of forecasts made from these sites. Most AWS sites are situated near significant populations or industrial regions and as such only 17 sites were identified to be in close proximity to feedlot operations.
- The Bureau of Meteorology's weather forecast model data (LAPS and GASP), necessary to conduct a forecast, is only stored by the Bureau of Meteorology when

requested. Therefore the models created for the recently added sites were based on a small amount of historical LAPS/GASP data, which can affect model performance.

- It was found that the most effective technology for making the forecasts available to feedlot operators was through the World Wide Web. The advantages are that the data can be presented in a way which is easily interpreted and is readily accessible by all feedlots.

Selected methodology

The following methodology was adopted following discussions between MLA and Katestone Environmental on the most viable options:

- Utilise fully the information from the nearest AWS maintained by the BoM
- Calculate the key parameters at a fine time resolution out to 6 days ahead
- Transfer forecasts to a web site on a daily basis
- Software system to include automatic model retraining as more data become available

The forecasts were based on the models generated during the previous study conducted by Katestone Environmental for MLA. A description of the models is contained in Appendix A.

Forecast performance

The main factors that affect the HLI (and AHLU) are temperature, relative humidity (obtained from the dew point) and wind speed. There was good agreement between the forecast temperature and dew point and the observed quantities, however, the wind speed forecasting performance was relatively poor.

In terms of forecasting the heat stress category, it should be noted that the categories are broad – the low risk category ranges from 0 to 20 AHLUs, the higher risk categories extend over 30 and 50 AHLUs. Therefore, although agreement between the forecast and observed AHLU values might be poor, these would fall into the same heat stress category, giving better performance in predicting the category in contrast to forecasting individual AHLU values.

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1 Main research report

1.1 Introduction

One of the issues facing feedlot managers is the possibility of cattle death in feedlots due to heat stress caused by adverse weather conditions. One tool in the overall management strategy is the ability to forecast stress inducing conditions for a prescribed future period. In the summer of 2001-02, Katestone Environmental undertook a feasibility study for MLA (FLOT.313) for forecasting excessive heat load in cattle. This forecasting system utilised data from four feedlots that operated on-site meteorological stations and was based on the calculation of the Temperature Humidity Index (THI), previously developed as an indicator of human comfort, derived from available forecast meteorological variables (temperature and dewpoint). Forecasts were conducted for on-site meteorological stations and for the nearest Bureau of Meteorology AWS. These forecasts were then compared with observations and it was confirmed that suitable forecasts could be generated from the AWS stations for the feedlot sites.

Recent studies on cattle heat stress (Gaughan et al., 2002) indicate that the HLI was a better indicator of cattle heat stress than the originally used THI. These studies also found that the number of hours that the HLI was above a threshold (89) was also a good indicator of accumulated heat load in cattle. The studies also found that if the HLI fell below 77 for a number of hours then the cattle would be able to recover somewhat from the heat stress.

Further studies (see MLA report FLOT.327) have indicated that the Accumulated Heat Load Unit (AHLU), a parameter obtained by accumulating the number of hours the HLI exceeds a certain threshold, is indicative of the heat stress in feedlot cattle. Also, it was found that the threshold depended on genus, environmental factors (wind speed, temperature etc) and pen factors (availability of shade, cooled drinking water etc).

This forecasting system has been expanded each summer since 2001-02 and now includes seventeen sites around Australia with forecasts being conducted every day over the summer period. For the 2007/2008 summer period, the service provided heat stress forecasts for the period 1 December 2007 to 31 March 2008 for the following sites:

- Queensland – Amberley, Emerald, Miles, Oakey, Roma, Warwick
- New South Wales – Albury, Armidale, Cessnock, Griffith, Hay, Moree, Tamworth, Yanco
- South Australia – Clare
- Western Australia – Katanning
- Victoria –Charlton

As of 2007, MLA requested that a further 74 sites be included in the study. Historical observational and forecast data were purchased from the Bureau of Meteorology for the purposes of training the models. A trial run was conducted during the 2007/2008 summer period in order to evaluate the forecast performance for these additional sites. The results of this study are presented in Appendix E.

2 Study definition and objectives

MLA requested a forecasting system to assist in identifying potential cattle heat stress events. The objectives of the study were to:

- Provide forecasts out to 6 days ahead for predicted daily maximum and minimum HLI, AHLU for various upper HLI thresholds and forecast rainfall. These forecasts were to be made for the period 1 December 2007 to 31 March 2008.
- Allow the forecasts to be accessible on a daily basis by each of the feedlot operators.
- Retrain the models regularly to improve the forecasts.
- Examine the accuracy of the forecasts.

3 Short-term forecasting of excessive heat load

3.1 Key forecasting parameters

Short-term forecasting of dry bulb temperature, dewpoint temperature and wind speed are performed on a routine basis by the Bureau of Meteorology (BoM). These are the parameters from which many heat stress indices can be derived. It is also highly desirable to include rainfall and solar radiation parameters in any heat load forecasting scheme but there is currently less skill in producing such forecasts.

Regional rainfall forecasts are available from the Bureau of Meteorology which have been included in the daily forecasts. Solar radiation was calculated analytically using the date, time of day and latitude of the site. The solar radiation value does not account for cloud cover and therefore will overestimate solar radiation for cloudy days. The dependence of the HLI on solar radiation used here is relatively minor and as such the resulting overestimation is not considered significant.

The above variables were used to calculate the HLI and AHLU for each site on a half-hourly basis.

3.2 Forecasting methodologies for fine spatial resolution

Most available forecast models give a regional forecast for areas up to usually 25 x 25 km. The forecasting system adopted for this project gives a forecast for the location of interest. This can be more beneficial in incorporating local influences on the meteorology such as terrain.

The forecast models for each site for the meteorological variables were produced using the same methodology as previous forecasting detailed in “FLOT. 313 – Development and trial operation of a weather forecasting service for excessive heat load events for the Australian feedlot industry”. In these models, both the wind speed and wind direction are forecast for all sites except Griffith and Hay. For these sites it was necessary to model wind speed alone (as a scalar quantity) due to the large spatial separation between the feedlot and the upper-level input forecast region.

3.3 Bureau of Meteorology services

LAPS and GASP data were provided by the Bureau of Meteorology for each of the forecasting sites along with the AWS data on a daily basis. Details of this information can be found in the previous forecasting report (Katestone Scientific, 2002). The LAPS and GASP, along with the AWS data, were downloaded, on a daily basis from a web site specially arranged by the Bureau of Meteorology.

3.4 Parameters for characterising Heat Stress

Three parameters for characterising heat stress in feedlot cattle are the HLI, the AHLU and the panting score. The HLI and AHLU are indirect measures of heat stress, being derived from the

prevailing meteorological conditions. The panting score is a direct measure, being derived from the breathing rate of cattle.

3.4.1 Heat Load Index (HLI)

The HLI is obtained from the half-hourly average meteorological parameters. These include wind speed, relative humidity and, through an intermediate parameter – the Black Globe Temperature (BGT) - temperature and solar radiation.

The HLI can be thought of as a rate of heat input into a system. Consequently, even though a high HLI value may potentially be highly detrimental, it will have little effect if it is of short duration. A more sensible measure of heat stress is obtained by integrating the HLI to obtain the AHLU, which will be discussed in the following section.

If any calculation yielded a HLI value less than 50, this value was set to 50.

3.4.2 Accumulated Heat Load Unit (AHLU)

The AHLU is obtained by integrating or, in the case of discrete data, accumulating the product of HLI and time interval (in hours) between HLI estimates. The AHLU can be thought of as the level of heat stress existing in a system. A high HLI for a short time interval will have the same impact as a low HLI over a long time interval. Conversely, a high HLI for long periods of time will result in high (and detrimental) values of AHLU.

The Thermo-Neutral zone is defined as a range of HLI values wherein no heat stress is accumulated by cattle. The lower boundary of the Thermo-Neutral zone is set at a HLI value of 77 – recovery occurs when the HLI falls below this value. The upper boundary (upper HLI threshold) of the Thermo-Neutral zone depends on the genus, physical condition and the pen environment of the cattle in question.

Different genotypes react differently to HLI. For example, healthy Bos Taurus would exhibit the symptoms of heat stress at an earlier stage than a healthy Bos Indicus exposed to identical conditions. In other words, Bos Taurus will reach a given AHLU level more quickly than Bos Indicus. To incorporate this into the AHLU calculation and still maintain a consistent correspondence between AHLU and cattle heat stress, an upper HLI threshold below which the AHLU does not accumulate is obtained in terms of genotype, pen conditions and animal state. For discussion and details of how this upper threshold is calculated, the reader is referred to “FLOT.327 – Development of a Heat Load Risk Assessment Process for the Australian feedlot industry”.

Thus there are two HLI thresholds that must be considered when calculating the AHLU. An upper threshold determined from the report cited above and a lower threshold set at 77. If the HLI value exceeds the upper threshold, the AHLU is incremented by the product of the interval between HLI values and the difference between the HLI and the upper threshold. If the HLI value is less than the lower threshold, the AHLU is decremented by one half of the product of the interval and the difference between the lower HLI threshold and the actual HLI value. The factor of one half is included to allow for the slower recovery rates.

For example, suppose that the current AHLU value is 42 and the upper HLI threshold for a particular cattle type is 90. If the observed HLI were 94, then the excess would be +2 ((94–90)*0.5; the 0.5 representing the half hour interval between observations) and this excess would be added to the current AHLU value giving a new AHLU value of 44. If, instead, the observed HLI value were 65, the nominal excess would be –6 ((65–77)*0.5; 77 being the lower threshold, 0.5 representing the half hour interval between observations). Since the excess is negative, it is

halved as the recovery rate is slower, thus final excess is now –3, giving a new AHLU value of 39. For HLI values between 77 and 90, the Thermo-Neutral zone, the excess would be zero.

Evidently, the upper HLI threshold can take a large number of values depending on the characteristics of the animal and its environment, resulting in a corresponding large number of AHLU values. To avoid the situation where excessive amounts of data are generated and analysed, it was decided to determine AHLU values for discrete upper HLI threshold values of 80, 83, 86, 89, 92 and 95.

3.4.3 Panting Score

A direct measure of heat stress is the panting score. This is obtained by measuring the breathing rates of cattle in the feedlot. The relationship between AHLU and panting score is summarised in the following table:

AHLU	Heat stress category	Cattle indications
0-20	Low risk	No stress or panting score 1
20-50	Medium risk	Panting score 1-2
50-100	High risk	Panting score 2-4
Over 100	Extreme risk	Panting score 4

3.4.3.1 Relative Humidity Calculation

The relative humidity (RelHum in %) used in the calculation of HLI was calculated from the temperature (Temp in ºC) and dew point temperature (DewPt in ºC) using the following equation:

$$RelHum = 100 * \left(\frac{1.8 * DewPt - 0.18 * Temp + 201.8}{1.62 * Temp + 201.8} \right)^8$$

Equation 1. Relative humidity calculated from temperature and dew point

3.4.3.2 Solar Radiation Calculation

Solar radiation (SolRad in W/m^2) is not recorded at any of the Bureau of Meteorology AWS sites. The following equations were used to calculate solar radiation for each hour for each day based on the location of the sun throughout the day and year (Oke, 1987). The equation assumes no reduction in radiation due to cloud cover resulting in a conservative estimate of the HLI.

$$localHr = \frac{15\pi}{180}(12 - t)$$

$$declination = \frac{-23.5\pi}{180} \cos\left(\frac{2\pi(day + 10)}{365} \right)$$

$$elevation = \sin^{-1}\left(\sin(lat)\sin(declination) + \cos(lat)\cos(declination)\cos(localHr)\right)$$

$$SolRad = 1050 \sin(elevation) - 65$$

Equation 2. Solar radiation equation

Where

t is the time of the day in hours
day is the Julian day of the year
lat is the latitude of the site.

3.4.3.3 Heat Load Index Calculation

To calculate the HLI for each data record, the following equations were used:

$$BGT = 1.33*Temp - 2.65*\sqrt{Temp} + 3.21*\log(SolRad + 1) + 3.5$$
$$if\ BGT < 25$$
$$HLI = 1.3*BGT + 0.28*RelHum - WSpeed + 10.66$$
$$else$$
$$HLI = 1.55*BGT + 0.38*RelHum - 0.5*WSpeed + \exp(2.4 - WSpeed) + 8.62$$

Equation 3. Heat Load Index equations

where

Wspeed (wind speed) is measured in m/s.
Temp (temperature) is measured in °C.
RelHum (relative humidity) is expressed as a %.
SolRad (solar radiation) is measured in W/m²
BGT (black globe temperature) stated in ºC.

3.4.3.4 Accumulated Heat Load Unit Calculation

The AHLU was calculated using the following algorithm:

$$if\ HLI < 77$$
$$excess = HLI - 77$$
$$else\ if\ HLI > upper\_threshold$$
$$excess = HLI - upper\_threshold$$
$$else$$
$$excess = 0$$

$$if\ excess < 0$$
$$excess = excess / 2 \qquad // \text{halve it for slower recovery rate}$$

$$excess = excess * time\_interval$$
$$AHLU_{new} = AHLU_{old} + excess$$

Equation 4. Algorithm for accumulating AHLU

where

HLI is the Heat Load Index.
AHLU is the Accumulated Heat Load Unit.
upper_threshold is the HLI value where AHLU starts to accumulate
time_interval is the interval between HLI estimates (0.5 hours)

3.5 Service delivery mechanisms

For this project, forecasts were automatically generated every morning (06:00 hrs), checked by Katestone Environmental staff and transferred to the web site www.katestone.com.au/mla.

4 Overall methodology

The prototype system was based on the models developed in our previous forecasting system developed for the MLA. It consists of the following steps:

a) Obtain upper-level forecast data from numerical weather prediction models via a special web site maintained by the Bureau of Meteorology.
b) Collect concurrent information from an automatic weather station close to the site of interest.
c) Once a sufficient training set of information is collected, use proprietary Katestone software to develop statistical models that relate the surface measurement to a subset of the upper-level variables.
d) Use these models and the most recent data to provide the necessary forecasts.

5 Accuracy of forecasting system

5.1 Statistical measures for forecast accuracy

Three coefficients were used to determine the performance of the HLI forecasting system: the Pearson Correlation Coefficient, Index Of Agreement (IOA) and the Root Mean Square Error (RMSE).

The Pearson Correlation Coefficient is a measure of the strength of the linear relationship between the predicted and observed measurements (defined in Equation 5). The closer this value is to unity the stronger the relationship. The Index Of Agreement (IOA) is defined in Equation 7 and gives an index from 0-1 (1 representing strong agreement). The Root Mean Square Error (RMSE) defined in Equation 6 is an indication of the absolute error. The smaller the RMSE (i.e. the closer the value is to zero) the better the forecast. Note that the RMSE does not indicate whether the forecasts are predominantly higher or lower than the observed values – ie whether the method over or under predicts – it only reports on the difference between the observed and predicted values.

The equations for calculating the coefficients are:

$$r = \frac{N\left(\sum_{i=1}^{N} O_i P_i\right) - \left(\sum_{i=1}^{N} O_i\right)\left(\sum_{i=1}^{N} P_i\right)}{\sqrt{\left[N\left(\sum_{i=1}^{N} O_i^2\right) - \left(\sum_{i=1}^{N} O_i\right)^2\right]\left[N\left(\sum_{i=1}^{N} P_i^2\right) - \left(\sum_{i=1}^{N} P_i\right)^2\right]}}$$

Equation 5. Pearson Correlation Coefficient

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N}\left(P_i - O_i\right)^2}$$

Equation 6. Root Mean Square Error

$$IOA = 1 - \frac{\sum_{i=1}^{N} (P_i - O_i)^2}{\sum_{i=1}^{N} \left(|P_i - O_{mean}| + |O_i - O_{mean}| \right)^2}$$

Equation 7. Index of Agreement

5.2 Forecasting results

The reliability of the AHLU forecasts hinges on the accuracy of the HLI forecasts which ultimately rely on the accuracy of the BoM forecasts. Since any AHLU value also relies on the past behaviour of the HLI (through the accumulation process) any inaccuracies in past HLI predictions will have an impact on the most recent AHLU value. However, in the case of low AHLU values, any extreme behaviour is curtailed by not permitting its value to become negative.

One further issue that the reader should be aware of is that there is a discontinuity imposed on the data in the form of the various cut-off values or thresholds, viz. the Thermo-Neutral zone boundaries. The HLI is also limited to a value of 50 should calculations yield a value lower than 50. AHLU values are not permitted to take on negative values. Consequently, any statistical analyses should not be applied indiscriminately and any results arising from such analyses should be interpreted with this in mind.

By way of example, assume that the observed HLI and the one day ahead forecast HLI are being compared. There will be instances when both of these values will be 50, even though calculations would indicate otherwise. This situation indicates perfect correlation between observed and predicted values. There will also be instances when only one of these parameters will be 50. This will result in a number of (say) observed HLI values paired with predicted values which are set to 50 resulting in statistics which may not be representative of the true situation.

The situation is further complicated since two separate equations are used to calculate the HLI value, depending on whether the Black Globe Temperature (BGT) is less than or greater than or equal to 25.

Finally, the quantity of data available for analysis is rather large. There are 17 sites and for each of these sites there are 3 pairs of HLI data sets that can be considered: the observed HLI with each of the one, three and six day ahead forecasts. Also, for each of these sites there are 3 pairs of AHLU data sets and each of these is further subdivided into 6 HLI threshold categories, resulting in excess of 300 pairs of data sets for each of these parameters.

In order to keep this report to a reasonable length, discussion will be restricted to the general behaviour of the relevant parameters. Detailed summaries are presented in appendices. Any behaviour that warrants further investigation will be discussed in greater detail.

5.2.1 HLI behaviour

The HLI was calculated according to Equation 3 using half-hourly predictions of wind speed, temperature and relative humidity. If the calculated HLI value fell below 50, it was set to 50. Cloud information and solar radiation were not available, hence solar radiation was calculated using Equation 2. This represents the maximum radiation for the time of year, time of day and latitude of the site. Whilst this will tend to overestimate the actual solar radiation, it has only a minor effect on the predicted HLI because of the logarithmic dependence of HLI on solar radiation. To illustrate this, a factor of 10 change in solar radiation (say from 1000 W/m^2 to 100

W/m^2 or cloudless to very cloudy) will cause a decrease in HLI value of either 4.16 to 4.96, depending whether the BGT was below or above 25 respectively.

Appendix B contains a table of statistical and line of best fit parameters describing the accuracy of the forecasting process. The model performed very well with correlation coefficients ranging from 82% to 94% for the one day ahead forecasts and 67% to 89% for the six day ahead forecasts. The other statistical measures showed similar behaviour. The bias indicated that the HLI was over predicted for all the forecast horizons. Overall, the forecasting performance is very good, with the tendency for the forecast accuracy to decrease as the forecast horizon increases, as would be expected. The remainder of this section will focus on specific aspects of HLI behaviour.

The Figure 1 is a scatter plot of the one day ahead forecasts of HLI plotted against observed HLI (half-hourly data) for Warwick. There are several features in this graph which merit some comment.

Firstly, there is a sharp cutoff in the data due to the lower limit of 50. Secondly, the remaining data are scattered about a straight line of unit slope. Perfect forecasts would have resulted in all the points lying exactly on the line. The scatter about the line results from errors in forecasting and increases as the errors in the forecasts increase. This is typical of plots depicting observed versus forecast variables. Note also that the data form two distinct groups or clusters – one centred about a HLI value of about 55 and the other centred on a HLI value of about 88, representing night time and daytime observations/forecasts respectively. Thirdly, there are some data points – the outliers - which are located a substantial distance from the line. Possible explanations for the existence of these are that the forecast technique failed due to exceptional processing conditions (eg an algorithm failed to converge), missing or erroneous input data or the result of using two different expressions for calculating the HLI, ie whether the BGT is above or below 25.

Note that the features discussed above are still present; also the correlation deteriorates noticeably for the six day ahead forecasts. This is to be expected as it is more difficult to forecast accurately weather six days ahead than one day ahead.

Figures 2 and 3 illustrate the variability that can be expected in the data. Figure 2 is the three day ahead and Figure 3 is the six day ahead forecasts plotted against observed HLI (half-hourly data) for Warwick.

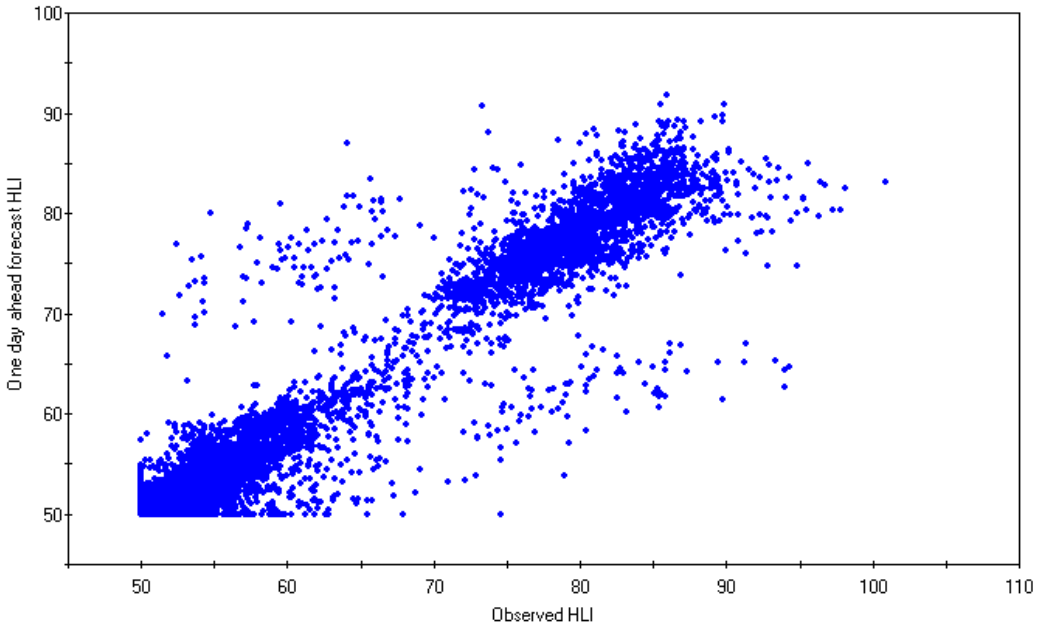

Figure 1: One day ahead forecast versus observed HLI for Warwick

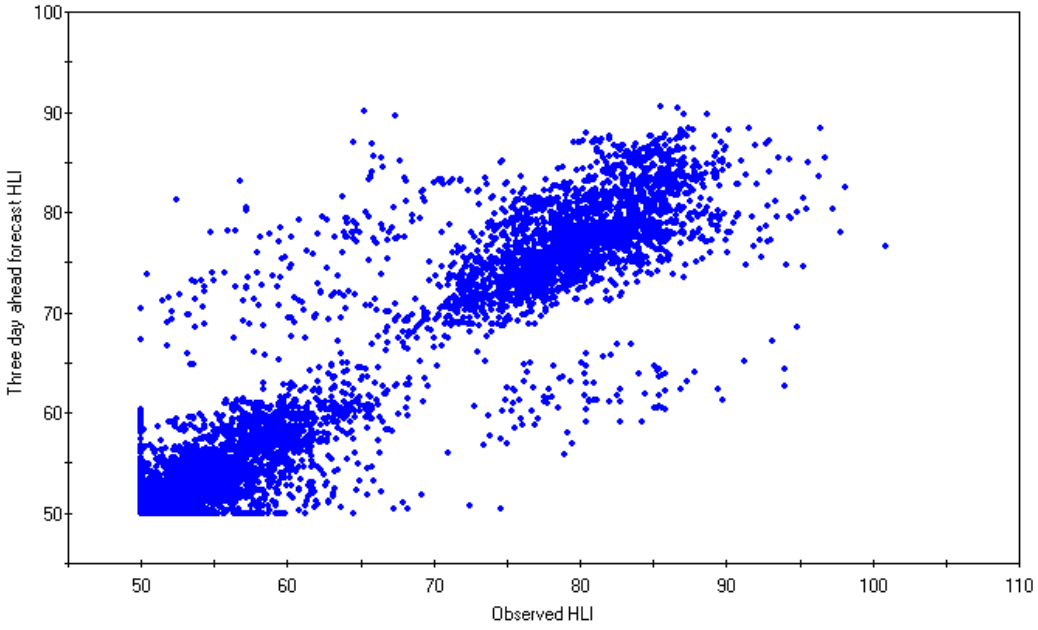

Figure 2: Three day ahead forecast versus observed HLI for Warwick

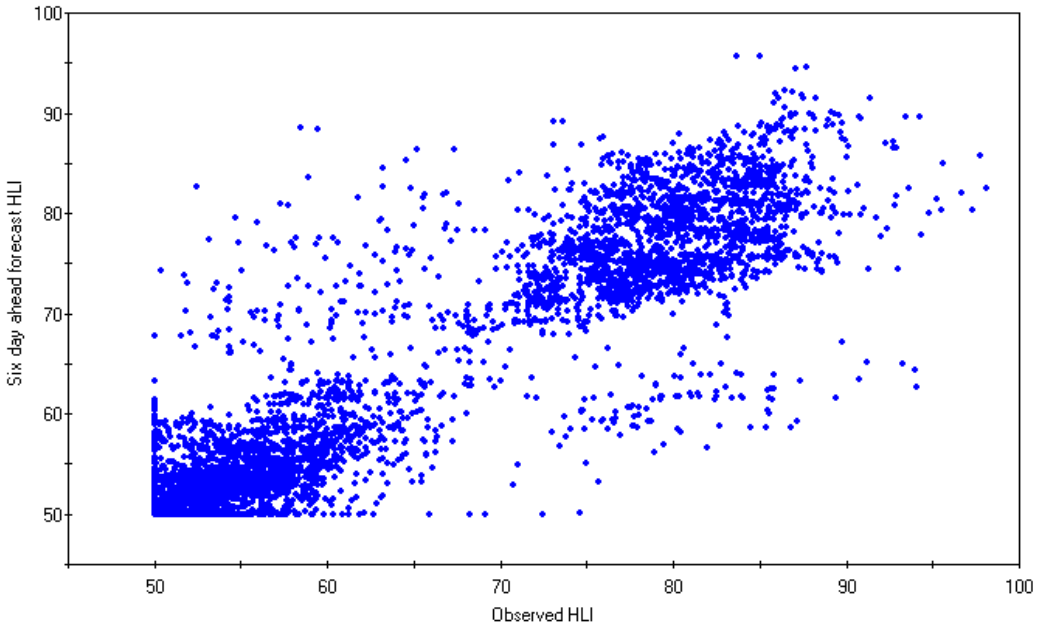

Figure 3: Six day ahead forecast versus observed HLI for Warwick

5.2.2 AHLU Behaviour

In order to keep the volume of information presented in this report to a manageable level, analyses of AHLU will be restricted to those corresponding to an upper HLI threshold of 86. Also, as the daily maximum AHLU value is the parameter of concern, preliminary analyses will concentrate on this variable. Appendix C contains contingency tables for individual sites for one, three and six day ahead forecasts for AHLU categories using Thermo-Neutral zone upper limits (upper HLI thresholds) of 86, 89, 92 and 95. It should be stressed that the algorithm for calculating the AHLU from the HLI includes extremely non-linear features. Consequently, even though the forecasting performance for the HLI is good, the forecasting performance for the AHLU will not be related to the HLI forecast performance. The situation is further complicated because the HLI is truncated at a value of 50. Whilst this will not influence the HLI statistics significantly, it will affect the calculated AHLU value.

Table 1 contains a summary of average forecast performance of the daily maximum AHLU for all sites for the four upper HLI thresholds and three forecast periods. The first row which is labelled “Error” represents the error in the forecasts in terms of risk categories. An error of zero indicates that the correct risk category was forecast. An error of +1 represents a forecast risk category that was one category higher than the observed category (eg forecast a medium and observed a low; forecast extreme and observed a high). Similarly an error of -2 represents a forecast risk category that was two categories lower than the observed category (eg forecast a low and observed a high; forecast medium and observed an extreme). All entries in the table are percentages. Detailed site tables can be found in Appendix C, Tables C6 to C9.

Inspection of Table 1 reveals that the correct risk category (error = 0) was forecast 90% of the time or better. Also, the performance tends to improve as the upper HLI threshold is increased, with correct category predicted in excess of 99.9% of the time for an upper HLI threshold of 95. This can be explained as follows. The higher thresholds represent cattle that are less susceptible to heat stress. For this situation, both the forecast and observed AHLU values tend

to be increasingly in the low risk category with negligible instances of AHLU values occurring in the medium or higher categories.

Table 2 presents the number of sites that fall into each forecast performance range based on accurately forecasting the risk category ± 1 (i.e. forecasting a medium risk event but observing a low, medium or high event). For the upper HLI threshold of 86 the forecast performance was >99% at all but three sites. This increased to all sites for an upper HLI threshold of 92.

There are no obvious dependencies between error and forecast horizons and attempts to infer any dependencies should be tempered by the fact that the equations used to calculate the AHLU values are discontinuous and will introduce anomalous behaviour.

Results for each individual site can be found in Tables C6 to C9, Appendix C. Inspection of these tables reveals that the forecasting system tended to perform poorly at Emerald, Amberley and Miles in comparison with the remaining sites. Time series of daily maximum AHLU values (one day ahead forecasts, upper HLI threshold of 86) for Emerald (worst performing site) are shown in Figure 4. Inspection of this graph shows that the forecasting system is consistently under-predicting the daily maximum AHLU value.

A more detailed investigation revealed that the observed relative humidity was consistently higher than the forecast relative humidity. In some instances, the observed relative humidity was predominantly in the very high nineties, indicating that rain or very damp conditions were prevailing at the time – a set of circumstances not catered for in the models. This is illustrated in Figure 5 which shows the time series of observed and one day ahead forecast relative humidity for the period 12 January to 26 January 2008. Figure 6 shows the HLI time series for the same period. The HLI threshold value of 86 (dotted line) is also included. It is evident from this graph that the observed HLI is about 10 HLI units greater than the forecast HLI for a significant part of this period. It is also worth noting that whereas the forecast HLI is generally close to the 86 threshold line, the observed quantity is significantly greater. The implication for the AHLU calculations is that for a HLI threshold of 86, the contribution to the AHLU will be significantly greater for the observed AHLU than for the forecast AHLU.

Table 1: Table of risk category forecast error averaged over all sites for all HLI thresholds (daily maximum AHLU values)

Error	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
	Upper HLI threshold = 86						
One day	0.10	1.39	3.68	94.55	0.29	0.00	0.00
Three day	0.19	1.63	3.87	93.93	0.33	0.05	0.00
Six day	0.19	1.63	3.59	93.54	0.72	0.29	0.05
	Upper HLI threshold = 89						
One day	0.00	0.14	1.96	97.80	0.10	0.00	0.00
Three day	0.00	0.14	2.06	97.66	0.14	0.00	0.00
Six day	0.00	0.14	1.91	97.46	0.43	0.05	0.00
	Upper HLI threshold = 92						
One day	0.00	0.00	0.33	99.67	0.00	0.00	0.00
Three day	0.00	0.00	0.33	99.67	0.00	0.00	0.00

Six day	0.00	0.00	0.33	99.62	0.05	0.00	0.00
	Upper HLI threshold = 95						
One day	0.00	0.00	0.05	99.95	0.00	0.00	0.00
Three day	0.00	0.00	0.05	99.95	0.00	0.00	0.00
Six day	0.00	0.00	0.05	99.95	0.00	0.00	0.00

Table 2: Number of sites with various forecast performance (risk category ± 1)

	<90%	**90 - 95%**	**95 – 99%**	**>99%**
Forecast	Upper HLI threshold = 86			
One day	1	0	2	14
Three day	1	0	2	14
Six day	1	0	5	11
Upper HLI threshold = 89				
One day	0	0	1	16
Three day	0	0	1	16
Six day	0	0	1	16
Upper HLI threshold = 92				
One day	0	0	0	17
Three day	0	0	0	17
Six day	0	0	0	17
Upper HLI threshold = 95				
One day	0	0	0.05	17
Three day	0	0	0.05	17
Six day	0	0	0.05	17

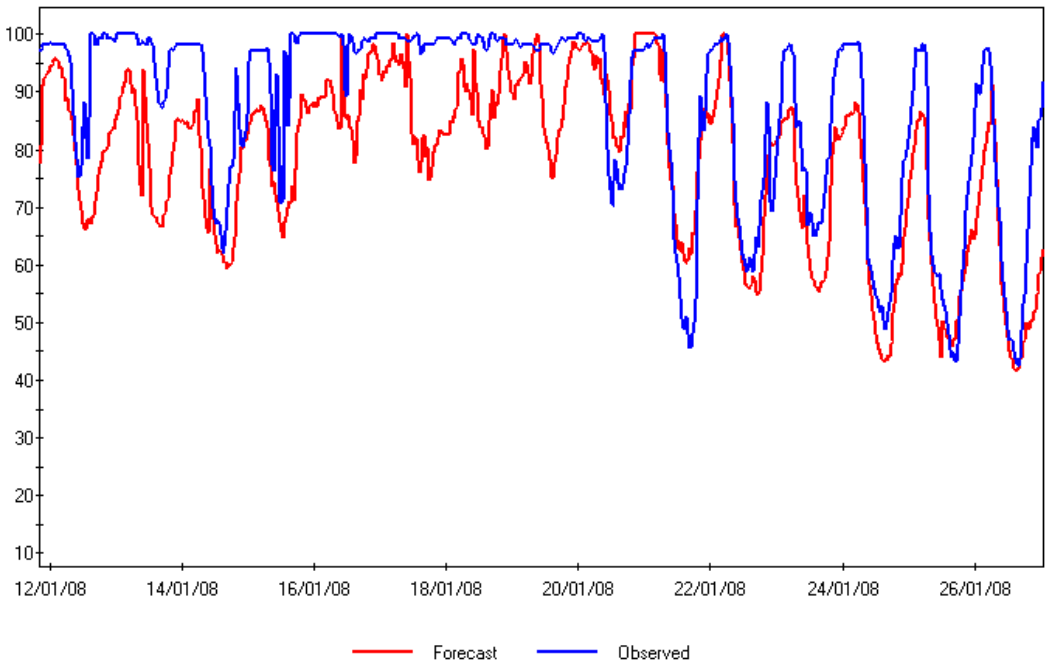

Figure 5: Time series of one day ahead forecast and observed relative humidity (30-minute averages) for Emerald

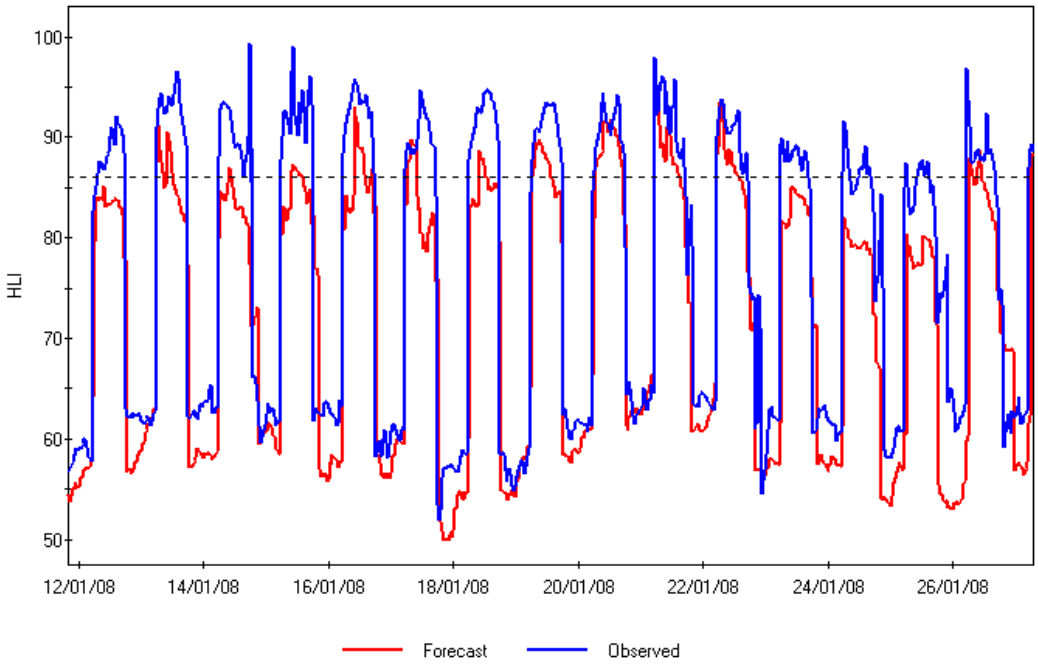

Figure 6: Time series of one day ahead forecast and observed HLI (30-minute averages) for Emerald

5.3 Forecasting performance for Meteorological variables

The meteorological parameters used in this project are derived from BoM forecasts and BoM observations at weather stations. These data are used to train propriety models to produce site specific forecasts. Clearly the accuracy of any forecast is dependent on the accuracy of the input data – in this case, BoM forecasts.

Figures 7, 8 and 9 show scatter plots of one day ahead forecasts plotted against observed temperature, relative humidity and wind speed for Yanco. These results are typical of forecasts obtained for the other sites. The least squares regression line is also included in the figures. The quantisation of the observed wind speed is due to the BoM providing wind speed observations in km/hr quantised to 0.5 km/hr. It is evident that the gross behaviour is modelled reasonably well (except for the wind speed), however, it is not clear to what degree the discrepancies can be attributed to errors in the supplied BoM forecasts. It is envisaged that a substantial effort would be required to resolve this issue.

Statistics for all sites for one, three and six day ahead forecasts are included in Appendix D.

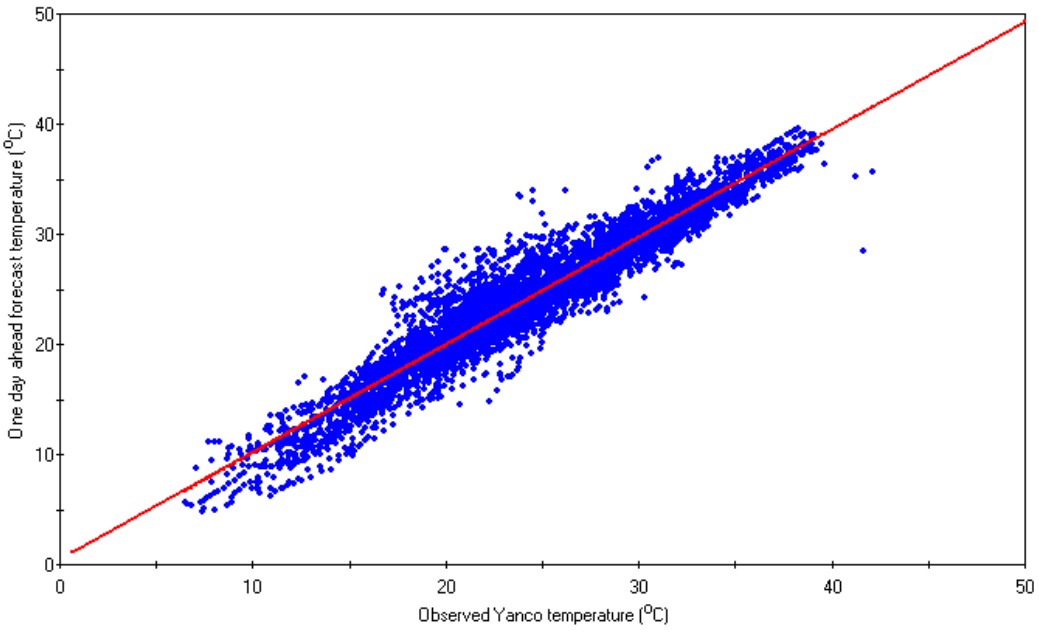

Figure 7: Scatter plot of one day ahead forecast of temperature plotted against observed temperature for Yanco

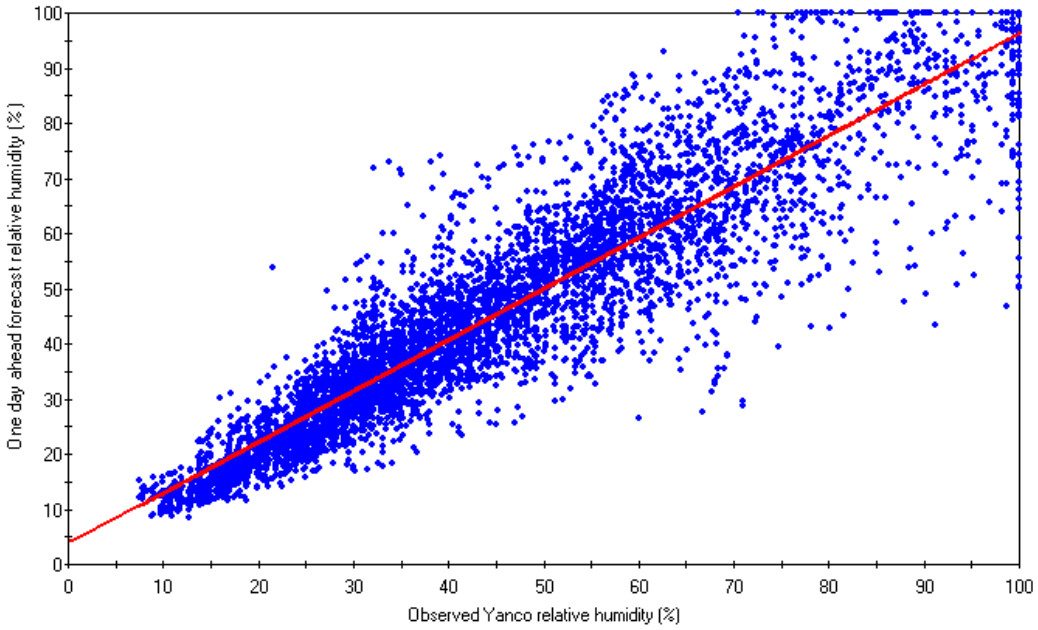

Figure 8: Scatter plot of one day ahead forecast of relative humidity plotted against observed relative humidity for Yanco

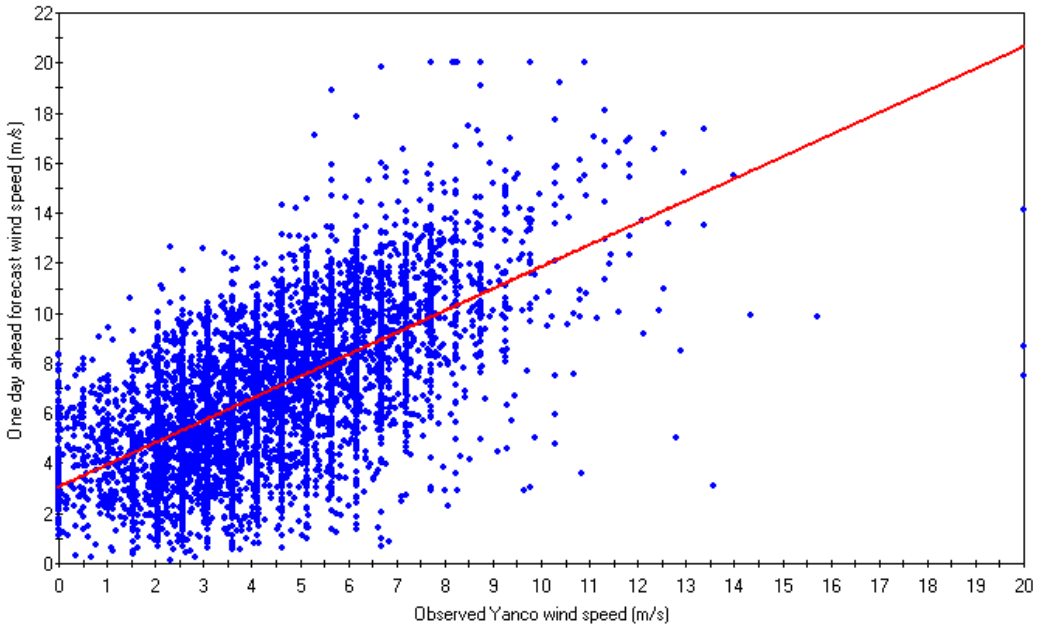

Figure 9: Scatter plot of one day ahead forecast of wind speed plotted against observed wind speed for Yanco

5.4 Service delivery and utility

Forecasts of the following parameters were checked by the Katestone Environmental staff and posted to the web site www.katestone.com.au/mla on a daily basis:

- Tables of previous six days' AHLU values obtained using HLI thresholds of 80, 83, …95
- Tables of previous six days' minimum and maximum daily HLI value
- Tables of previous six days' rainfall
- Tables of six day forecasts of the above parameters
- Graphs of six day forecasts of HLI and AHLU for HLI thresholds of 80, 83, 95

These forecasts were transferred to the web site on a daily basis for access by all feedlot operators. The previous six days' forecasts were also made available should the feedlot operators need to check an earlier forecast.

The implementation of the forecast model is very flexible. Any future need for forecasting at these same locations will require only a basic retraining of the models with more recent data. The addition of new sites would require correspondence with the Bureau of Meteorology in order to make the additional data available. Katestone Environmental would then need to extend the existing models to incorporate the new sites.

6 Conclusions

A system for forecasting the HLI (which now incorporates wind speed) and the AHLU has been developed and implemented over the extended summer period 1 December 2007 to 31 March 2008. Modelling of the various input parameters was performed on a half hourly basis for each of the feedlot sites using the Bureau of Meteorology LAPS and GASP forecasts. The parameters generated were the temperature, wind speed and dew point. The solar radiation was calculated analytically from the date, time of day and latitude of the site.

Two factors were found to contribute to the poor AHLU forecasts these were the performance in forecasting the HLI and the method for determining the AHLU, with the method for calculating the AHLU being the major factor.

Finally, although the forecast AHLU values were generally higher than the values obtained from observations, the performance in predicting the risk categories is good and is more relevant as far as feedlot operations are concerned than predicting the actual AHLU values.

7 References

EA Systems (2004), “FLOT.327 – Development of a Heat Load Risk Assessment Process for the Australian feedlot industry”.

Gaughan J, Goopy J and Spark J (2002), “Excessive Heat Load Index for Feedlot Cattle”, University of Queensland.

Katestone Scientific (2002), “FLOT.313 – Development and trial operation of a weather forecasting service for excessive heat load events for the Australian feedlot industry.”

Leonard MJ, Spiers DE and GL Hahn, “Adaptation of feedlot cattle to repeated sinusoidal heat challenge”, Livestock Environment VI – Proceedings of the Sixth International Symposium Galt House Hotel Louisville, Kentucky, May 21-23, 2001, Published by The Society for engineering in agriculture, food and biological systems.

Oke TR (1987), “Boundary Layer Climates”, Second Edition, Routledge.

8 Appendices

8.1 Appendix A - Description of model

8.1.1 A1 Preliminary considerations

The first step in producing site-specific weather forecasts takes advantage of detailed information made readily available from well-proven numerical models in association with determined correlations of local weather variables with such numerical forecasts. The direct predictions from the traditional numerical modelling may be very useful for some variables under normal conditions but are unlikely to properly predict the detailed diurnal variations of key parameters required for constructing heat comfort indices.

Some type of expert system is needed to improve such forecasts. This could involve, for example, the use of more detailed or a wide variety of numerical models to give greater confidence in predictions or alternatively the use of a trained meteorologist to be able to estimate the likely differences between feedlot conditions and those forecast by the numerical model.

An automated approach would utilise the available database of concurrent site measurements and upper-level forecasts to determine statistically significant correlations. These correlations are then assumed to hold over forthcoming events and are used with numerical forecasts to predict feedlot conditions over the next 48-144 hours. The predicted time history of individual meteorological variables can then be combined in various ways to give a time history of a selected thermal comfort index. These index values can be screened against critical thresholds determined from field studies in order to give suitable alarms for various types of likely animal reactions.

This “downscaling” methodology (i.e. relying on a correlation procedure to produce site-specific values from a regional model prediction of atmospheric profiles) has been shown by experience elsewhere to require at least a period of 1-3 months of training data before adequate results are obtained and thereafter a regular retraining over a one year period to produce optimal results. The correlations themselves are only as good as the database upon which they are based.

For general predictions, a short database may suffice as relatively simple relationships are likely to be useful for normal conditions. Extreme conditions are less frequently encountered and may not be present in a short-term database. Given that there is considerable variability between years in general weather conditions (and even more so for extreme events), there is no guarantee that the recent past is a good guide to the forecasting of a series of adverse days, as required in heatwave analysis. The accuracy of the downscaling methodology in heatwave conditions is reliant on the ability of numerical models to accurately predict fluctuations in parameters outside the ranges for which they have been optimised and hence is expected to be limited.

8.1.2 A2 Available data

Over the past 30 years, many field and theoretical studies have demonstrated the sensitivity of near-surface meteorological conditions to changes in local and regional terrain characteristics. Temperatures are very sensitive to terrain elevation, distance from the nearest coastline and vegetation cover. Relative humidity is sensitive to the presence of vegetation cover, local water bodies or the coastline. Wind speed is strongly influenced by the presence of trees, hills or valleys, inland location and the aerodynamic roughness of land within 1 km of the weather station.

In contrast, numerical weather prediction models (regional forecast models) use relatively coarse terrain and land-use information and are very unlikely to capture the influences of the surface characteristics within 1-3 km of the site. On the other hand, on-site measurements will show directly the influences of the local environment by the presence of strong diurnal patterns in wind and, to a lesser extent, temperature variables. On-site weather information is often very important, especially if the nearest Bureau of Meteorology (BoM) automatic weather station is over 15-20 km away or if the feedlot environment is unusual compared to that of the region (say within 25 km).

There are several Australian agencies (hereafter referred to as “service providers”) that routinely run numerical models that could be suitable for either direct forecasts or in conjunction with an expert system using local meteorological information (that is, the prediction of parameter values at a given point from values predicted over a broader scale). These include:

The BoM operates the Global Analysis and Prediction Scheme (GASP) and Limited Area Prediction System (LAPS) models on a regular basis for their Australia-wide weather prediction service. The LAPS model covers an area of Australasia, South East Asia and much of the Indian and Pacific Oceans at various resolutions. The finest resolution (5 km) is only currently used in research work or for the use of the internal BoM consulting arm. The 25 km resolution forms the basis of most publicly-available forecasts.

The information available from these forecasts that is most applicable to the current project includes surface level (screen height) temperature, dew point, sensible and latent heat fluxes, total heat flux and a set of upper-level temperature, dew point and wind components.

By special arrangements, these forecasts can be provided for any given grid point on a three-hourly basis out to a prediction horizon of 48 hours. They do not generally take account of local weather station data from the nearest BoM AWS site. The numerical forecasts from the model are not edited or screened for reliability and are from one model run.

The GASP model provides a similar set of temperature and wind variables at a coarser resolution of 75 km on a twelve-hourly basis to a time horizon of 6 days. No local data assimilation is included at this scale.

The numerical model results can be made available relatively cheaply on a dedicated web site. Various energy companies have used such information over the past 4 years (using the Katestone downscaling software) as a basis for demand prediction and trading activities. The service has proved to be very reliable with only very infrequent excursions in some parameters. The BoM model accuracy is reported in various BoM publications.

The CSIRO runs a different type of numerical model on a regular basis for a current trial service for agricultural and energy users. The model is run at a resolution of 5 km or better to a time horizon of 8 days. The predicted variables include rainfall and cloud cover, as well as the standard temperature, wind and moisture variables.

The University of New South Wales provides a commercial prediction system to a time horizon of 7-10 days at spatial resolution to 1 km. Their approach is claimed to be a more refined model than the operational models used by the BoM and can include site-specific data assimilation. The support services and reliability are less clear as they depend on staff availability but several publications have been produced showing the very satisfactory performance in extreme events (e.g. bushfires, air quality and sailing forecasts).

8.1.3 A3 Description of model

The system that was implemented was strongly based on a pre-existing and proven scheme developed by Katestone Scientific for use in energy forecasting. It consists of the following steps:

- Obtain upper-level forecast data from numerical weather prediction models via a special web-site provided by the BoM.
- Collect concurrent information from an automatic weather station close to the site of interest.
- Once a sufficient training set of information is collected, use proprietary Katestone software to develop statistical models that relate the surface measurement to a subset of the upper-level variables.
- Use these models and the most recent data to provide the necessary forecasts.

The process is illustrated in Figure A1.
Past experience has shown that an accounting of natural diurnal and seasonal cycles together with a partitioning of the data into half-hourly time steps allows relatively simple linear regression techniques to be used, rather than more complex hybrid statistical/neural network schemes often used.

The robustness of this approach was demonstrated by the error statistics Table A obtained for a period of one year for various parameters and the location of Sydney and Brisbane. For example, there is a pleasing performance for temperature and windspeed, with only minor seasonal variations and the expected slow decrease in accuracy with an increasing prediction horizon.

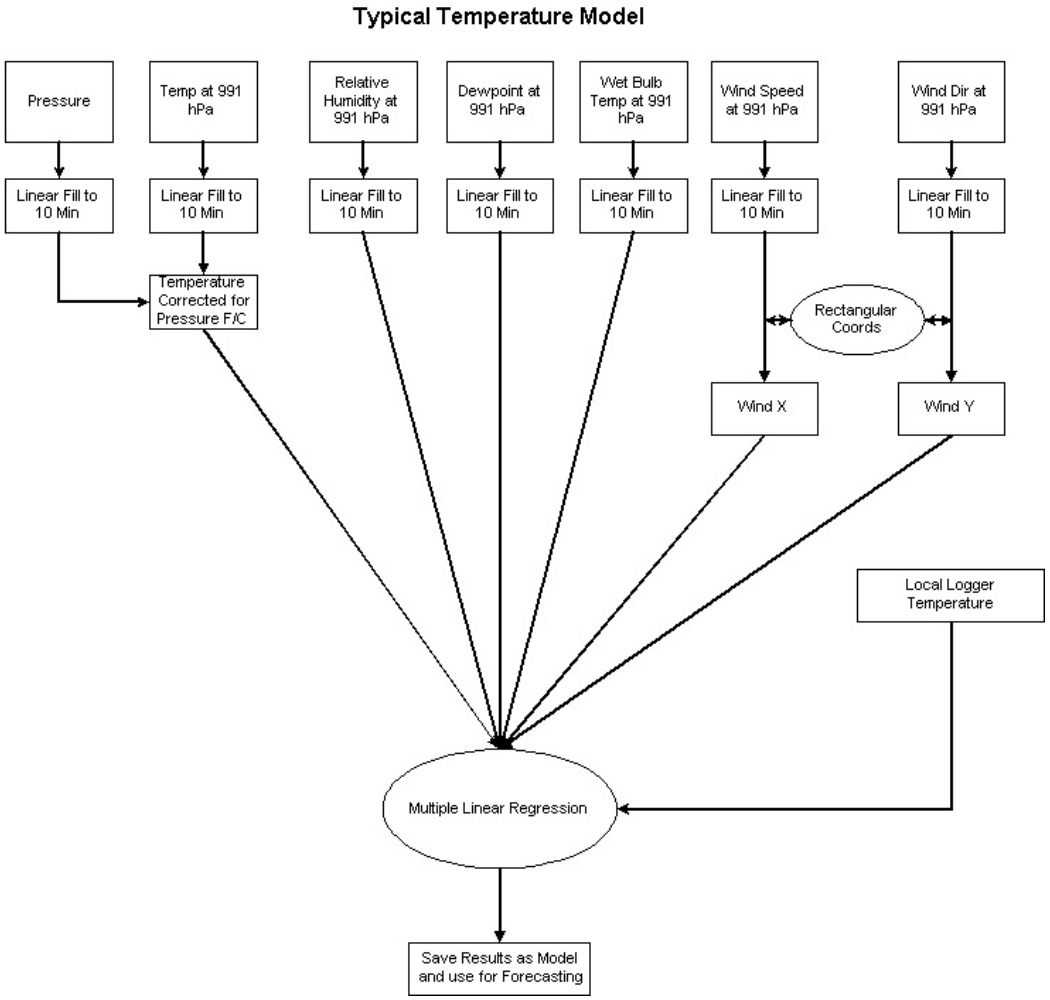

Figure A1: Example of process of using LAPS/GASP data (e.g. 991 hpa parameters) in downscaling to give a surface temperature forecast

Table A1: Mean Absolute Error for Sydney and Brisbane forecasts

Variable	Season	Forecast horizon		
		1 - 2 days	3 - 4 days	5 - 6 days
Sydney Temp (°C)	Summer	1.44	1.78	2.15
	Autumn	1.26	1.72	1.88
	Winter	1.27	1.52	1.71
	Spring	1.37	1.61	2.23
Sydney Wind Speed (m/s)	Summer	1.62	1.84	1.95
	Autumn	1.54	1.56	1.60
	Winter	1.44	1.74	1.68
	Spring	1.86	2.03	2.09

8.2 Appendix B

8.2.1 Overall behaviour of the HLI

The performance of the forecasting model was characterised using (a) a line of best fit, (Slope and Intercept) (b) the Pearson Correlation Coefficient, (c) the Root Mean Square Error (RMSE), (d) the Index of Agreement (IOA) and (e) the Bias. The Bias is obtained by summing the difference between the predicted and observed quantities and dividing by the number of samples. Although it is not, strictly speaking, a statistical measure, it does give an indication whether the model is under predicting (negative bias) or over predicting (positive bias).
Table B1 lists the above parameters for the one, three and six day ahead forecasts. The parameters include the three statistical measures, the bias and the slope and intercept of the line of best fit of the forecast vs observed quantities. The column labelled "Count" reports how many data points were processed to produce the associated statistical measures. All data points where either of the observed or forecast HLI was equal to 50 were omitted.
Features worth noting are:

- The overall performance is very good. Correlation coefficients range from about 90% for the one day ahead forecasts to about 70%-80% for the six day ahead forecasts.
- All statistics show the same behaviour – forecasting performance slightly decreases as the forecast horizon increases.
- The Bias indicates that the model, in general, under predicts the HLI for one and three day ahead forecasts and over predicts about half of the six day ahead forecasts.

Table B1: HLI statistics for the period 1 December 2007 to 31 March 2008

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
One day ahead forecasts							
Albury	0.83	10.50	0.85	5.90	0.92	-1.11	3770
Amberley	0.87	7.33	0.92	5.44	0.96	-1.71	5548
Armidale	0.82	10.23	0.80	6.29	0.89	-2.01	2928
Cessnock	0.85	7.62	0.88	6.47	0.93	-2.54	4848
Charlton	0.96	1.67	0.91	4.01	0.95	-1.21	3086
Clare	0.79	12.74	0.79	5.60	0.88	-1.51	2650
Emerald	0.88	5.31	0.90	6.84	0.93	-3.56	5375
Griffith	0.87	7.52	0.89	4.76	0.93	-1.94	3417
Hay	0.84	10.00	0.87	5.09	0.92	-1.68	3225
Kataning	0.81	10.45	0.81	5.71	0.88	-2.41	2552
Miles	0.87	7.31	0.91	5.86	0.94	-2.22	5071
Moree	0.87	7.92	0.87	5.59	0.93	-1.43	3939
Oakey	0.84	9.26	0.90	5.50	0.94	-2.15	4050
Roma	0.88	6.83	0.91	5.41	0.95	-1.69	4786
Tamworth	0.81	10.38	0.90	5.59	0.93	-2.89	3668
Warwick	0.90	5.21	0.94	4.64	0.96	-1.66	5014
Yanco	0.87	7.16	0.89	4.95	0.93	-2.32	3396
Three day ahead forecasts							
Albury	0.83	11.12	0.82	6.68	0.90	-0.73	3846
Amberley	0.82	10.40	0.90	6.49	0.94	-2.46	5665

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Armidale	0.72	19.07	0.76	6.59	0.87	0.62	3125
Cessnock	0.86	9.98	0.89	5.82	0.94	0.79	5263
Charlton	0.83	11.58	0.81	5.50	0.90	-0.14	3055
Clare	0.95	5.36	0.82	6.09	0.89	1.85	2849
Emerald	0.83	8.41	0.88	7.52	0.91	-4.20	5400
Griffith	0.78	14.20	0.83	5.53	0.90	-1.36	3459
Hay	0.74	17.28	0.80	5.83	0.89	-1.25	3187
Kataning	0.69	21.38	0.68	6.95	0.82	0.83	2673
Miles	0.81	12.30	0.88	6.33	0.93	-0.74	5289
Moree	0.83	12.21	0.88	5.62	0.93	0.40	4256
Oakey	0.81	11.56	0.89	5.74	0.94	-1.85	4472
Roma	0.83	9.18	0.89	6.32	0.93	-2.72	4737
Tamworth	0.84	11.32	0.89	5.05	0.94	-0.33	3849
Warwick	0.86	8.23	0.92	5.29	0.95	-1.61	5145
Yanco	0.78	14.05	0.84	5.67	0.91	-1.47	3455
Six day ahead forecasts							
Albury	0.76	16.54	0.76	7.60	0.87	-0.37	3334
Amberley	0.79	11.39	0.87	7.20	0.92	-2.96	5205
Armidale	0.62	26.98	0.65	8.13	0.80	1.92	2725
Cessnock	0.85	11.27	0.86	6.87	0.92	1.52	4866
Charlton	0.75	17.45	0.70	7.19	0.83	-0.03	2602
Clare	0.79	15.94	0.69	7.45	0.82	1.58	2379
Emerald	0.79	10.59	0.85	8.57	0.89	-4.91	4500
Griffith	0.68	21.67	0.72	6.94	0.84	-1.27	2991
Hay	0.76	16.66	0.75	6.64	0.86	-0.67	2834
Kataning	0.63	25.66	0.60	7.85	0.78	1.07	2345
Miles	0.79	14.08	0.85	7.08	0.92	-0.36	4558
Moree	0.83	13.05	0.85	6.38	0.92	1.24	3913
Oakey	0.79	13.06	0.86	6.68	0.92	-1.66	3512
Roma	0.78	12.83	0.83	7.43	0.90	-2.43	4269
Tamworth	0.81	13.54	0.84	6.36	0.91	0.46	3441
Warwick	0.85	8.51	0.90	5.81	0.94	-1.32	4175
Yanco	0.65	23.18	0.72	7.20	0.84	-1.41	2950

8.3 Appendix C

8.3.1 Overall behaviour of the AHLU

The performance of the forecasting model is presented as a collection of contingency tables contained in Tables C1 through to C4 for one, three and six day ahead forecasts for the four risk categories. Table C1 is for HLI cutoff of 86, C2 corresponds to 89 etc. In the contingency tables, the horizontal represents the observed and the vertical represents the forecast AHLU category. The AHLU categories are defined in the following table.

Table C1: Table of AHLU values for the four categories

AHLU	Heat stress category
0-20	Low risk
20-50	Medium risk
50-100	High risk
Over 100	Extreme risk

Tables C6 through to C9 present an alternative to the contingengy tables. Again, the results are presented for the three forecast periods and the four HLI cutoff values. The row at the top of each table containing the entries -3, -2 …2, 3 represent the forecast error, that is, "-3" indicates that the model predicted a category three below the observed category – eg predicted an low risk event and an extreme risk event was observed. A "0" indicates no error – that is the correct heat stress category was predicted. At the other extreme, a "3" indicates that the model predicted an extreme event and a low risk event was recorded.

All entries in the tables are percentages.

Inspection of the contents of the tables indicates that the performance of the forecasting model in predicting the AHLU categories is generally quite good.

Finally, since only one datum per day is available for the daily maximum, any statistics obtained from such data sets may not reveal trends that would otherwise be evident were a larger quantity of data available.

Table C2: Contingency tables of forecast vs observed daily maximum AHLU using an upper HLI threshold of 86

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Albury												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Amberley												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0.8	0	0	0	0.8	0	0	0	0.8	0.8	0
Medium	0	5.8	5	0	1.7	1.7	2.5	0	0.8	0.8	1.7	0
Low	73.6	12.4	2.5	0	71.9	16.5	5	0	72.7	17.4	5	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Armidale												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Cessnock												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	1.7	0	0	0	0	0	0	0	2.5	0	0	0
Low	94.2	3.3	0.8	0	95.9	3.3	0.8	0	93.4	3.3	0.8	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Charlton												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0.8	0	0	0	0	0	0	0
Low	100	0	0	0	99.2	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Clare												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	1.7	0	0	0	0	0	0	0
Low	100	0	0	0	98.3	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Emerald												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0.8	0.8	0	0	0	0	0	0	0	0	0

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Medium	0	2.5	5.8	1.7	0	0.8	3.3	0	0	0.8	2.5	0
Low	62	10.7	14	1.7	62	13.2	17.4	3.3	61.7	13	18.3	3.3
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Griffith												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Hay												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	1.7	0	0	0
Medium	0	0	0	0	0	0	0	0	0.9	0	0	0
Low	99.1	0.9	0	0	99.1	0.9	0	0	96.6	0.9	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Katanning												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0.8	0	0	0
Low	100	0	0	0	100	0	0	0	99.2	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Miles												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0.8	1.7	2.5	0
Medium	0.8	0.8	1.7	0	0	0	1.7	0	1.7	0	0	0
Low	81	11.6	4.1	0	81.8	12.4	4.1	0	79.2	10.8	3.3	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Moree												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Med	0	0	0	0	0	0	0	0	1.7	0	0	0
Low	97.5	2.5	0	0	97.5	2.5	0	0	95.9	2.5	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Oakey												
Extreme	0	0	0	0	0	0	0	0	0.8	0	0	0
High	0	0	0	0	0.8	0	0	0	1.7	0	0	0
Medium	0	0	0	0	0.8	0	0	0	1.7	0	0	0
Low	100	0	0	0	98.3	0	0	0	95.8	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Roma												

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0.8	0.8	0	0	0	0.8	0	0	0	0	0	0
Low	90.9	7.4	0	0	91.7	7.4	0	0	91.7	8.3	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Tamworth												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	99.2	0.8	0	0	99.2	0.8	0	0	99.2	0.8	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Warwick												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
Extreme	0	0	0	0	0	0	0	0	0.8	0	0	0
Medium	0	0.8	0	0	0	0	0	0	0	1.7	0	0
Low	96.7	1.7	0.8	0	96.7	2.5	0.8	0	95.8	0.8	0.8	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Yanco												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext

Table C3: Contingency tables of forecast vs observed daily maximum AHLU using an upper HLI threshold of 89

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Albury												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Amberley												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0.8	0.8	0	0	0.8	0	0	0	0.8	0.8	0	0
Low	90.9	7.4	0	0	90.9	8.3	0	0	90.9	7.4	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Armidale												

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Cessnock												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0.8	0	0	0
Low	99.2	0.8	0	0	99.2	0.8	0	0	98.3	0.8	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Charlton												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Clare												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0.8	0	0	0	0	0	0	0
Low	100	0	0	0	99.2	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Emerald												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0.8	0.8	0	0	0	0	0	0	0	0	0	0
Low	76.9	19	2.5	0	77.7	19.8	2.5	0	77.5	20	2.5	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Griffith												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Hay												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	1.7	0	0	0
Low	100	0	0	0	100	0	0	0	98.3	0	0	0

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Katanning												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Miles												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	1.7	1.7	0	0
Low	94.2	5.8	0	0	94.2	5.8	0	0	92.5	4.2	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Moree												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Med	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Oakey												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0.8	0	0	0
Medium	0	0	0	0	0.8	0	0	0	1.7	0	0	0
Low	100	0	0	0	99.2	0	0	0	97.5	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Roma												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Tamworth												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Warwick												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
Extreme	0	0	0	0	0	0	0	0	0	0	0	0

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Medium	0	0	0	0	0	0	0	0	0.8	0	0	0
Low	99.2	0.8	0	0	99.2	0.8	0	0	98.3	0.8	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Yanco												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext

Table C4: Contingency tables of forecast vs observed daily maximum AHLU using an upper HLI threshold of 92

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Albury												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Amberley												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	98.3	1.7	0	0	98.3	1.7	0	0	98.3	1.7	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Armidale												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Cessnock												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Charlton												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Clare												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Emerald												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	96.7	3.3	0	0	96.7	3.3	0	0	96.7	3.3	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Griffith												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Hay												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Katanning												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Miles												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	99.2	0.8	0	0	99.2	0.8	0	0	99.2	0.8	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Moree												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Med	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Oakey												

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0.8	0	0	0
Low	100	0	0	0	100	0	0	0	99.2	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Roma												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Tamworth												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Warwick												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Yanco												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext

Table C5: Contingency tables of forecast vs observed daily maximum AHLU using an upper HLI threshold of 95

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Albury												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Amberley												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	98.3	1.7	0	0	98.3	1.7	0	0

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Armidale												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Cessnock												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Charlton												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Clare												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Emerald												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	99.2	0.8	0	0	96.7	3.3	0	0	96.7	3.3	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Griffith												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Hay												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Katanning												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Miles												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	99.2	0.8	0	0	99.2	0.8	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Moree												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Med	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Oakey												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0.8	0	0	0
Low	100	0	0	0	100	0	0	0	99.2	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Roma												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Tamworth												
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Warwick												
Ext	0	0	0	0	0	0	0	0	0	0	0	0
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext
Yanco												

Site	One day ahead forecasts				Three day ahead forecasts				Six day ahead forecasts			
Extreme	0	0	0	0	0	0	0	0	0	0	0	0
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0	0	0	0	0
Low	100	0	0	0	100	0	0	0	100	0	0	0
	Low	Med	High	Ext	Low	Med	High	Ext	Low	Med	High	Ext

Table C6: Model forecast performance for a HLI cutoff of 86

Site	One day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0
Amberley	0.00	2.44	17.07	79.67	0.81	0.00	0
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0
Cessnock	0.00	0.81	3.25	94.31	1.63	0.00	0
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0
Emerald	1.63	15.45	16.26	65.85	0.81	0.00	0
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0
Hay	0.00	0.00	0.81	99.19	0.00	0.00	0
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0
Miles	0.00	4.07	13.01	82.11	0.81	0.00	0
Moree	0.00	0.00	2.44	97.56	0.00	0.00	0
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0
Roma	0.00	0.00	7.32	91.87	0.81	0.00	0
Tamworth	0.00	0.00	0.81	99.19	0.00	0.00	0
Warwick	0.00	0.81	1.63	97.56	0.00	0.00	0
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0
	Three day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	4.88	18.70	73.98	2.44	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.81	3.25	95.93	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Clare	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Emerald	3.25	17.07	16.26	63.41	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	4.07	13.82	82.11	0.00	0.00	0.00
Moree	0.00	0.00	2.44	97.56	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	98.37	0.81	0.81	0.00
Roma	0.00	0.00	7.32	92.68	0.00	0.00	0.00
Tamworth	0.00	0.00	0.81	99.19	0.00	0.00	0.00

Warwick	0.00	0.81	2.44	96.75	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Six day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	4.88	18.70	74.80	1.63	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.81	3.25	93.50	2.44	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	3.25	17.89	15.45	63.41	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.81	96.75	0.81	1.63	0.00
Katanning	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Miles	0.00	3.25	10.57	82.11	3.25	0.81	0.00
Moree	0.00	0.00	2.44	95.93	1.63	0.00	0.00
Oakey	0.00	0.00	0.00	95.93	1.63	1.63	0.81
Roma	0.00	0.00	8.13	91.87	0.00	0.00	0.00
Tamworth	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Warwick	0.00	0.81	0.81	97.56	0.00	0.81	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table C7: Model forecast performance for a HLI cutoff of 89

Site	**One day ahead forecasts**						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	7.32	91.87	0.81	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	2.44	18.70	78.05	0.81	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	5.69	94.31	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Three day ahead forecasts						
	-3	-2	-1	0	1	2	3

Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	8.13	91.06	0.81	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Emerald	0.00	2.44	19.51	78.05	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	5.69	94.31	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Six day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	7.32	91.87	0.81	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.81	98.37	0.81	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	2.44	19.51	78.05	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	4.07	94.31	1.63	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	97.56	1.63	0.81	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.81	98.37	0.81	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table C8: Model forecast performance for a HLI cutoff of 92

Site	**One day ahead forecasts**						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	1.63	98.37	0.00	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	0.00	3.25	96.75	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Three day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	1.63	98.37	0.00	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	0.00	3.25	96.75	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Six day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	1.63	98.37	0.00	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	0.00	3.25	96.75	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Miles	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table C9: Model forecast performance for a HLI cutoff of 95

Site	**One day ahead forecasts**						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Three day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	Six day ahead forecasts						
	-3	-2	-1	0	1	2	3
Albury	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Amberley	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Armidale	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cessnock	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Charlton	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Clare	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Emerald	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Griffith	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hay	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Katanning	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Miles	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Moree	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Oakey	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Roma	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Tamworth	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warwick	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Yanco	0.00	0.00	0.00	100.00	0.00	0.00	0.00

8.4 Appendix D

8.4.1 Summary of statistics for meteorological parameters

Tables D1, D2 and D3 present statistics for one, three and six day ahead forecasts of temperature, relative humidity and wind speed respectively. The explanation of these statistics can be found in Appendix B. The trends portrayed by these statistics are similar to the trends followed by the HLI.

Table D1: Temperature statistics for the period 1 December 2007 to 31 March 2008

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
One day ahead forecasts for Temperature							
Albury	0.93	1.23	0.93	2.32	0.96	-0.25	5784
Amberley	0.96	0.42	0.90	1.87	0.94	-0.49	5809
Armidale	0.93	0.94	0.92	1.68	0.96	-0.13	5809
Cesnock	0.89	1.37	0.83	2.72	0.90	-0.82	5809
Charlton	1.01	-0.79	0.95	2.40	0.97	-0.64	5780
Clare	0.84	2.65	0.91	3.19	0.95	-0.81	5809
Emerald	0.80	5.36	0.91	1.82	0.95	0.35	5809
Griffith	0.97	0.42	0.95	2.08	0.97	-0.22	5809
Hay	1.00	-0.58	0.93	2.62	0.96	-0.61	5549
Katanning	0.88	1.42	0.90	2.87	0.94	-0.94	5738
Miles	0.85	3.54	0.87	2.40	0.93	-0.16	5809
Moree	0.87	3.27	0.90	2.14	0.95	0.10	5809
Oakey	0.89	2.08	0.90	1.90	0.95	-0.23	5809
Roma	0.81	4.84	0.88	2.27	0.93	0.29	5718
Tamworth	0.88	2.42	0.93	1.92	0.96	-0.13	5772
Warwick	0.91	1.82	0.93	1.61	0.96	-0.12	5809
Yanco	0.98	0.30	0.96	1.83	0.98	-0.20	5605
Three day ahead forecasts for Temperature							
Albury	0.90	2.33	0.88	3.16	0.93	0.14	5784
Amberley	0.85	2.72	0.84	2.27	0.91	-0.74	5809
Armidale	0.91	3.26	0.88	2.64	0.90	1.71	5809
Cesnock	0.91	2.40	0.83	2.75	0.90	0.62	5809
Charlton	0.93	1.57	0.92	2.90	0.96	0.05	5780
Clare	0.93	1.73	0.92	2.94	0.96	0.30	5809
Emerald	0.76	6.19	0.86	2.14	0.92	0.15	5809
Griffith	0.97	1.08	0.91	2.74	0.95	0.26	5809
Hay	0.94	1.24	0.91	2.93	0.95	-0.16	5549
Katanning	0.84	3.41	0.87	3.21	0.93	0.35	5738
Miles	0.84	5.29	0.86	2.86	0.90	1.48	5809
Moree	0.84	5.36	0.85	3.09	0.89	1.69	5809
Oakey	0.86	3.50	0.90	2.00	0.94	0.49	5809
Roma	0.79	5.27	0.85	2.49	0.92	0.37	5718
Tamworth	0.90	4.43	0.89	3.29	0.90	2.27	5772
Warwick	0.90	2.46	0.88	2.17	0.93	0.42	5809

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Yanco	0.94	1.82	0.92	2.57	0.96	0.40	5605
Six day ahead forecasts for Temperature							
Albury	0.86	3.41	0.84	3.53	0.92	0.22	5376
Amberley	0.79	3.76	0.77	2.79	0.86	-1.08	5401
Armidale	0.86	4.53	0.80	3.45	0.83	2.28	5401
Cesnock	0.90	3.15	0.75	3.55	0.84	1.10	5401
Charlton	0.88	2.76	0.84	4.19	0.91	0.01	5372
Clare	0.85	3.25	0.86	3.91	0.93	0.04	5362
Emerald	0.74	6.73	0.80	2.54	0.89	0.08	5233
Griffith	0.91	2.54	0.84	3.76	0.91	0.49	5401
Hay	0.91	2.26	0.84	3.90	0.92	0.05	5156
Katanning	0.79	4.44	0.80	3.94	0.89	0.49	5384
Miles	0.81	6.33	0.80	3.45	0.86	1.80	5440
Moree	0.80	6.99	0.82	3.61	0.85	2.27	5401
Oakey	0.83	4.40	0.82	2.62	0.90	0.67	5323
Roma	0.76	6.53	0.77	3.20	0.87	0.84	5310
Tamworth	0.84	6.32	0.83	4.08	0.85	2.81	5364
Warwick	0.89	2.74	0.81	2.67	0.89	0.59	4951
Yanco	0.89	3.33	0.84	3.62	0.92	0.58	5197

Table D2: Relative humidity statistics for the period 1 December 2007 to 31 March 2008

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
One day ahead forecasts for relative humidity							
Albury	0.81	9.54	0.87	10.54	0.93	0.03	5784
Amberley	0.83	13.87	0.85	9.02	0.92	0.79	5809
Armidale	0.81	15.67	0.85	10.42	0.92	0.32	5809
Cesnock	0.77	19.94	0.67	14.73	0.81	3.15	5809
Charlton	0.96	7.32	0.92	10.34	0.94	5.40	5780
Clare	0.81	13.06	0.87	13.16	0.92	4.61	5809
Emerald	0.69	15.77	0.85	13.66	0.89	-6.83	5809
Griffith	0.88	6.50	0.90	9.42	0.95	1.48	5809
Hay	0.85	7.30	0.86	11.28	0.92	1.21	5549
Katanning	0.81	14.50	0.82	13.59	0.90	3.35	5738
Miles	0.67	19.79	0.80	12.71	0.89	-0.64	5809
Moree	0.70	13.64	0.80	13.66	0.88	-3.85	5809
Oakey	0.85	10.94	0.88	8.84	0.93	0.48	5809
Roma	0.74	14.80	0.81	13.10	0.89	-2.40	5718
Tamworth	0.82	9.39	0.88	9.38	0.94	-1.70	5772
Warwick	0.83	13.40	0.88	8.69	0.93	0.43	5809
Yanco	0.93	3.65	0.92	8.76	0.96	0.41	5605
Three day ahead forecasts for relative humidity							
Albury	0.64	16.34	0.76	13.83	0.86	-1.78	5784
Amberley	0.73	18.91	0.78	10.80	0.88	-1.39	5809

Armidale	0.79	11.96	0.80	12.95	0.88	-4.87	5809
Cesnock	0.84	15.60	0.70	14.71	0.82	3.83	5809
Charlton	0.77	12.69	0.82	12.81	0.90	2.88	5780
Clare	0.72	16.58	0.85	13.50	0.91	4.30	5809
Emerald	0.56	22.18	0.76	17.50	0.81	-9.67	5809
Griffith	0.61	15.68	0.76	13.99	0.86	-0.98	5809
Hay	0.62	15.48	0.74	14.43	0.85	-0.28	5549
Katanning	0.78	16.62	0.81	13.74	0.89	3.57	5738
Miles	0.63	16.03	0.74	15.84	0.84	-6.54	5809
Moree	0.58	16.28	0.74	16.91	0.81	-8.12	5809
Oakey	0.84	7.82	0.83	11.19	0.90	-3.30	5809
Roma	0.63	17.15	0.76	15.89	0.83	-7.32	5718
Tamworth	0.72	8.70	0.80	14.56	0.85	-8.39	5772
Warwick	0.84	9.49	0.81	11.48	0.89	-2.33	5809
Yanco	0.65	12.88	0.78	13.85	0.87	-2.80	5605
Six day ahead forecasts for relative humidity							
Albury	0.59	18.8	0.74	14.33	0.84	-2.08	5376
Amberley	0.68	23.47	0.73	11.46	0.85	-1.28	5401
Armidale	0.72	16.38	0.72	15.32	0.83	-5.81	5401
Cesnock	0.83	16.01	0.65	15.65	0.79	3.15	5401
Charlton	0.75	14.15	0.79	14.28	0.88	3.44	5372
Clare	0.66	20.52	0.79	16.13	0.87	5.59	5362
Emerald	0.51	23.98	0.70	19.59	0.76	-11.74	4887
Griffith	0.52	19.00	0.67	16.21	0.80	-1.88	5401
Hay	0.57	16.43	0.70	15.52	0.82	-1.23	5156
Katanning	0.77	16.18	0.80	13.77	0.89	2.68	5384
Miles	0.54	20.51	0.63	18.64	0.77	-8.07	5059
Moree	0.52	19.44	0.67	18.62	0.77	-9.08	5401
Oakey	0.83	7.63	0.75	13.21	0.85	-4.69	4698
Roma	0.50	23.66	0.61	19.78	0.74	-9.88	5310
Tamworth	0.65	12.27	0.73	16.41	0.80	-9.20	5364
Warwick	0.85	8.85	0.78	12.23	0.87	-2.98	4831
Yanco	0.56	16.15	0.70	16.15	0.81	-3.76	5197

Table D3: Wind speed statistics for the period 1 December 2007 to 31 March 2008

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
One day ahead forecasts							
Albury	0.42	1.74	0.47	1.98	0.68	0.22	5784
Amberley	1.26	0.53	0.70	3.14	0.71	1.37	5809
Armidale	1.08	2.18	0.56	3.93	0.55	2.55	5809
Cesnock	0.50	2.71	0.44	2.53	0.61	1.30	5809
Charlton	0.95	2.86	0.66	3.42	0.62	2.66	5780
Clare	0.59	2.79	0.42	2.73	0.57	1.45	5809
Emerald	0.95	2.62	0.64	3.33	0.63	2.41	5809

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Griffith	0.66	4.04	0.57	3.44	0.61	2.59	5809
Hay	0.53	3.87	0.56	2.60	0.67	1.63	5549
Katanning	0.65	3.84	0.59	2.79	0.65	1.92	5738
Miles	0.64	2.13	0.58	2.00	0.67	1.22	5809
Moree	0.30	3.60	0.25	2.67	0.53	0.50	5809
Oakey	1.38	1.04	0.67	4.74	0.60	2.98	5809
Roma	0.77	2.40	0.53	2.74	0.62	1.60	5718
Tamworth	0.83	2.08	0.60	2.67	0.69	1.43	5772
Warwick	1.11	1.42	0.67	2.74	0.65	1.73	5809
Yanco	0.88	3.04	0.64	3.47	0.64	2.52	5605
Three day ahead forecasts							
Albury	0.26	1.79	0.36	2.02	0.60	-0.16	5784
Amberley	0.81	0.80	0.65	2.09	0.78	0.19	5809
Armidale	0.97	2.47	0.52	3.74	0.55	2.32	5809
Cesnock	0.61	1.81	0.54	2.08	0.70	0.70	5809
Charlton	0.68	2.88	0.55	2.67	0.65	1.61	5780
Clare	0.50	2.42	0.43	2.15	0.63	0.81	5809
Emerald	0.72	2.28	0.52	2.71	0.66	1.13	5809
Griffith	0.43	4.21	0.49	2.79	0.61	1.80	5809
Hay	0.37	4.23	0.48	2.43	0.64	1.27	5549
Katanning	0.33	6.12	0.44	3.16	0.53	2.43	5738
Miles	0.54	1.69	0.52	1.69	0.70	0.52	5809
Moree	0.31	2.74	0.28	2.54	0.55	-0.30	5809
Oakey	1.24	0.44	0.61	4.14	0.64	1.64	5809
Roma	0.64	2.04	0.49	2.28	0.66	0.78	5718
Tamworth	0.64	1.88	0.53	2.26	0.71	0.54	5772
Warwick	0.96	1.41	0.59	2.60	0.65	1.30	5809
Yanco	0.44	3.61	0.41	2.76	0.62	1.18	5605
Six day ahead forecasts							
Albury	0.27	1.69	0.36	2.01	0.60	-0.18	5376
Amberley	0.71	0.97	0.60	2.12	0.76	0.04	5401
Armidale	0.55	4.04	0.32	3.71	0.48	1.92	5401
Cesnock	0.48	1.96	0.45	2.14	0.65	0.52	5401
Charlton	0.57	3.56	0.44	3.08	0.58	1.85	5372
Clare	0.50	2.65	0.39	2.39	0.58	1.04	5401
Emerald	0.49	3.26	0.37	2.97	0.57	1.14	5383
Griffith	0.28	4.98	0.30	3.25	0.52	1.96	5401
Hay	0.25	4.77	0.26	2.88	0.54	1.25	5156
Katanning	0.29	6.37	0.32	3.37	0.50	2.44	5384
Miles	0.42	1.91	0.43	1.80	0.65	0.49	5440
Moree	0.20	3.12	0.19	2.61	0.49	-0.41	5401
Oakey	1.01	1.29	0.52	4.14	0.61	1.35	5440
Roma	0.52	2.32	0.41	2.34	0.61	0.68	5310

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Tamworth	0.39	2.53	0.34	2.55	0.60	0.26	5364
Warwick	0.78	1.60	0.51	2.48	0.64	0.98	5401
Yanco	0.30	4.39	0.27	3.20	0.53	1.38	5197

8.5 Appendix E

Forecast performance for additional sites for 2007/2008 summer period

8.5.1 E1 Introduction

In 2001, Katestone Environmental was commissioned by MLA to develop a system for forecasting heat stress in feedlot cattle. The system was operational for the 2001/2002 summer period, forecasting heat stress six days ahead at four sites. In the following years, the system was gradually expanded, and by the 2007/2008 summer period, a total of 17 sites were included in the scheme. A complete description of the system can be found in Appendix A.

In 2007, MLA requested that an additional 74 sites be included in the programme. This latest system was operational for the 2007/2008 summer period, however, as it was still undergoing validation, the results were not made available to the feedlot operators.

This appendix presents the results of the forecasting system for the 2007/2008 summer period for the additional 74 sites. Because of the vast quantity of data that need to be analysed, only summaries will be presented. Where warranted, a more detailed analysis will presented.

8.5.2 E2 HLI forecast performance

The HLI forecast performance is summarised in Table E1, which shows the various statistics describing the performance of the forecasting system for a one, three and six day forecast horizon. The statistics, which are fully described in the main report, include:

- Pearson correlation coefficient
- Root mean square error
- Index of agreement
- Bias

Inspection of Table E1 shows that, on average, the correlation coefficient between the observed and one, three and six day ahead forecasts ranged from 0.9 to 0.73 respectively, decreasing as the forecast horizon increased.

Table E1: Average forecast performance statistics for the 74 sites

Forecast horizon	Pearson			RMSE			IOA			Bias		
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
One day ahead	0.79	0.90	0.94	3.89	4.70	8.99	0.88	0.95	0.97	-2.23	-0.10	1.17
Three day ahead	0.66	0.84	0.94	4.66	5.75	8.13	0.81	0.91	0.97	-2.24	0.78	3.45
Six day ahead	0.46	0.74	0.93	5.38	7.13	9.94	0.70	0.85	0.96	-3.12	1.01	4.15

Tables E8, E9 and E10 contain the statistics for each site. From these tables, we see that the sites with the poorest performance were St. George, Condobolin, Mt. Ginini, Cowra and Warra. The best forecast performance occurred at Gayndah, Gympie, Kingaroy, Rockhampton, Gatton, Grafton, St Lawrence and Casino. The scatter plot of observed and one day ahead HLI for St. George (poor performance) and Gayndah (good performance) are shown in Figs E1 and E2 respectively.

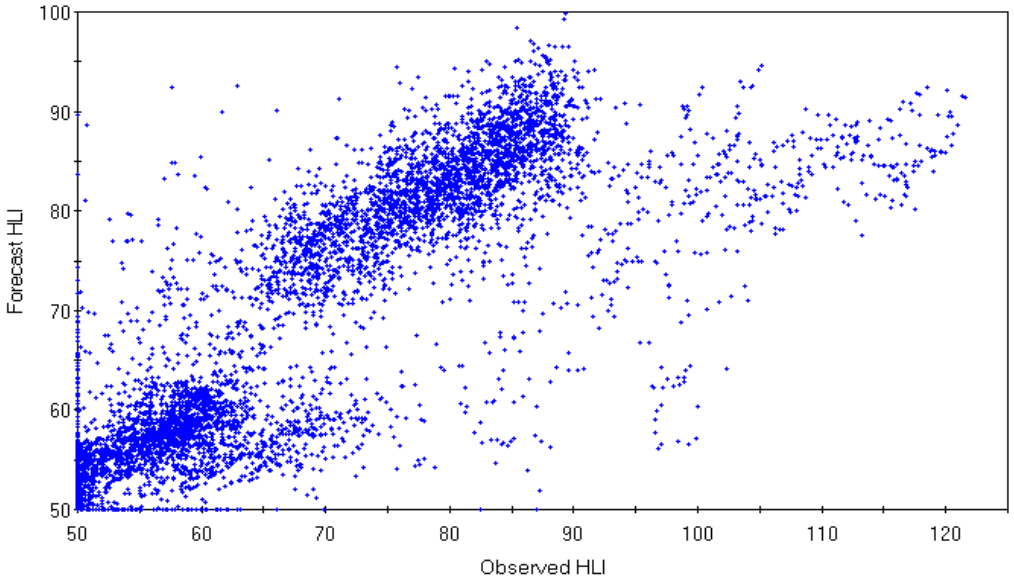

Figure E1. Scatter plot of one day ahead forecast vs observed HLI for St. George

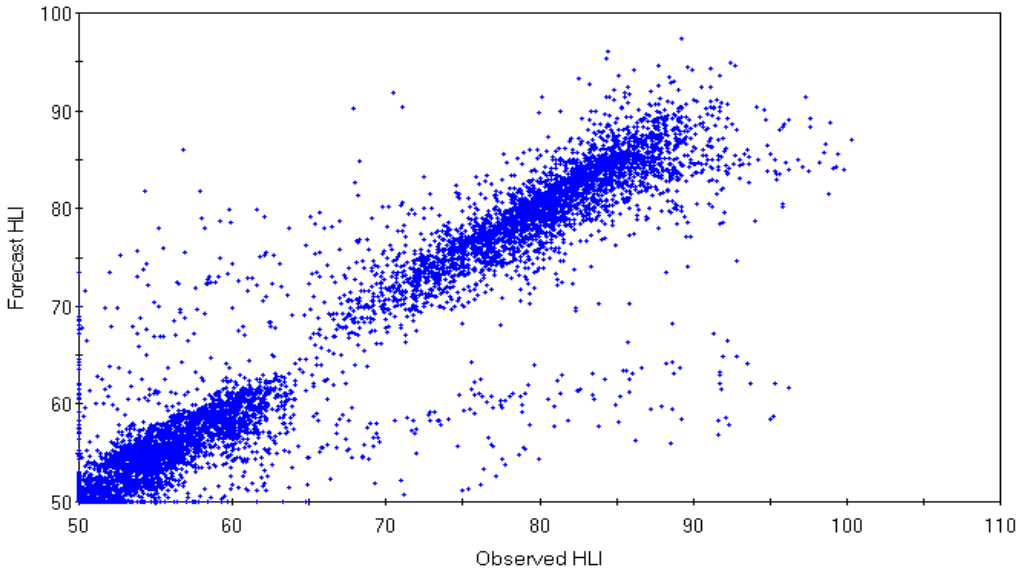

Figure E2. Scatter plot of one day ahead forecast vs observed HLI for Gayndah

Examination of these figures reveals that the data are mostly grouped into two elongated clusters that are aligned along a line of unit slope. One cluster is centred around HLI values of about 80 and corresponds to HLI values obtained during the daytime. The lower cluster corresponds to HLI values obtained at night. The gap separating the clusters is caused by the relatively rapid transition of the HLI from its daytime to its nighttime value. There are also a number of data points that are significantly removed from the main clusters – a feature which is

more prominent in the St. George (poor performance) graph. This is due to a combination of poorer forecast performance and the use of two separate equations for calculating the HLI (see: MLA FLOT 334 Cattle Heat Load Forecasting Summer 2005/2006 - Appendix. D).

8.5.3 E3 AHLU forecast performance

The AHLU forecast performance is summarised in Table E3 and E4 which shows the difference between the forecast and observed daily maximum AHLU in terms of the risk category. The AHLU risk categories are defined in Table E2. Statistics for all sites are shown in Tables E11 to E14.

Table E2: Table of AHLU values for the four categories

AHLU	Heat stress risk category
0-20	Low risk
20-50	Medium risk
50-100	High risk
Over 100	Extreme risk

Table E3 shows the average performance for all sites for one three and six day ahead forecasts. The row at the top of Table E3 containing the entries -3, -2 …2, 3 represents the forecast error . That is, "-3" indicates that the forecast category was three below the observed category – eg predicted an low risk event and an extreme risk event was observed. A "0" indicates no error. That is the correct heat stress category was predicted. At the other extreme, a "2" indicates that the model predicted a high risk event whereas a low risk event was recorded. All entries in the tables are percentages.

Inspection of the contents of the tables indicates that, on average, the performance of the forecasting model in predicting the AHLU categories is generally quite good. One trend that is evident is that the performance improves for all forecast horizons as the HLI cutoff is increased. The cause of this is that as the cutoff is increased, (ie representing more hardy cattle) the percentage of low risk category events (both forecast and observed) increases, resulting in better forecasts. Overall, the correct risk category was forecast, on average, over 90% of the time.

Table E4 presents the number of sites that fall into each forecast performance range based on accurately forecasting the risk category ± 1. That is, forecasting a medium risk event but observing a low, medium or high event. Most sites perform very well with > 99% of forecasts within ± 1 risk category. The poorest performing sites are St George and Mareeba followed by Ayr, Woolshed, Rockhampton, Gympie, St Lawrance, Gayndah and Dalby. Interestingly, most of these sites, except for St George and Mareeba, actually performed well for the HLI alone. This again confirms the complex nature of the AHLU calculations and potential source of errors.

A review of the forecasts for St George reveals a period in late December when the relative humidity sensor recorded 100% for a few days. This resulted in a significant period of very high AHLU which extended well past the period of erroneous data because the AHLU does not reset itself to zero. The erroneous relative humidity data have been removed from the BoM's

validated data set and highlights the potential issues with using unvalidated data sent directly from the BoM.

We recommend that the sites that performed poorly are reviewed before the summer and any erroneous data removed before the sites are retrained and forecasts are live on the web for the 2008/2009 summer forecasting period.

Table E3: Table of average differences between forecast and observed risk category

Forecast	HLI Cutoff	-3	-2	-1	0	1	2	3
One day ahead	86	0.16	0.41	1.81	95.48	1.62	0.22	0.30
	89	0.18	0.14	1.15	97.73	0.55	0.06	0.20
	92	0.19	0.02	0.38	98.97	0.34	0.07	0.03
	95	0.16	0.03	0.09	99.44	0.18	0.09	0.01
Three day ahead	86	1.15	0.88	2.67	93.69	1.10	0.31	0.20
	89	0.60	0.36	1.43	96.95	0.48	0.10	0.08
	92	0.43	0.08	0.46	98.61	0.27	0.10	0.05
	95	0.21	0.09	0.11	99.41	0.12	0.07	0.00
Six day ahead	86	1.22	1.25	3.05	93.07	1.11	0.24	0.05
	89	0.68	0.59	1.67	96.43	0.54	0.08	0.01
	92	0.45	0.15	0.59	98.62	0.15	0.03	0.00
	95	0.21	0.09	0.13	99.49	0.07	0.01	0.00

Table E4: Number of sites with various forecast performance (risk category ± 1)

	<90%	90 - 95%	95 – 99%	>99%
Forecast	Upper HLI threshold = 86			
One day	3	1	6	64
Three day	6	2	6	64
Six day	7	1	6	60
Upper HLI threshold = 89				
One day	2	2	0	70
Three day	2	3	2	67
Six day	3	1	3	67
Upper HLI threshold = 92				
One day	1	0	3	70
Three day	2	0	3	69
Six day	2	0	3	69
Upper HLI threshold = 95				
One day	1	1	0	72
Three day	2	0	0	72
Six day	1	1	0	72

8.5.4 E4 Meteorological forecast performance

The following tables summarise the average forecast performance for the three meteorological parameters: temperature, relative humidity and wind speed for one, three and six day horizons.

Table E5 shows that the average forecast performance (as portrayed by the correlation coefficient) for temperature ranges from 0.94 for the one day ahead forecast to 0.84 for the six day ahead forecast. The poor performance (correlation coefficient of 0.66) for the three day horizon occurred at Cowra. Here the temperature sensor failed for a period of time resulting in a constant temperature reading for long periods. In one instance, the recorded temperature remained at zero for four days. The coefficient of 0.69 for the six day horizon is associated with the Rocky Gully site. In this case, the cause was due to poor forecasting, which, given that the forecast is six days ahead, should not be criticized too harshly.

Overall the performance ranges from good in the case of temperature forecasts to somewhat poorer for the wind speed forecasts. Again, as expected, the performance decreases with increasing forecast horizon.

Table E5: Summary of temperature forecast performance.

Forecast horizon	Pearson			RMSE			IOA			Bias		
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
One day ahead	0.81	0.94	0.97	1.33	2.08	4.55	0.89	0.97	0.98	-1.63	-0.02	0.57
Three day ahead	0.66	0.90	0.95	1.60	2.78	6.00	0.80	0.94	0.97	-1.48	0.57	1.62
Six day ahead	0.69	0.84	0.91	1.86	3.51	5.00	0.81	0.91	0.95	-2.24	0.67	1.67

Table E6: Summary of relative humidity forecast performance

Forecast horizon	Pearson			RMSE			IOA			Bias		
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
One day ahead	0.62	0.87	0.93	7.42	10.66	18.58	0.78	0.93	0.96	-4.77	-0.59	2.35
Three day ahead	0.57	0.80	0.88	8.59	13.29	20.11	0.74	0.88	0.94	-6.07	-1.91	5.71
Six day ahead	0.44	0.70	0.82	9.67	16.50	23.48	0.67	0.83	0.89	-5.87	-2.04	5.32

Table E7: Summary of wind speed forecast performance

Forecast horizon	Pearson			RMSE			IOA			Bias		
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max
One day ahead	0.20	0.59	0.76	1.03	1.93	3.41	0.41	0.74	0.85	-1.49	-0.52	0.15
Three day ahead	0.22	0.51	0.70	1.08	1.99	3.00	0.48	0.68	0.81	-2.28	-0.52	0.38
Six day ahead	0.12	0.38	0.63	1.21	2.26	3.22	0.44	0.61	0.77	-2.33	-0.48	0.36

8.5.5 E5 Summary

The forecasting performance for the additional 74 sites for the 2007/2008 summer period was overall very good, with average one day ahead correlation coefficients in the vicinity of 0.9 for HLI, temperature, and relative humidity. The AHLU risk category was correctly predicted for over 95% of instances.

The forecast performance falls for the three and six day ahead forecasts with correlation coefficients ranging from 0.7 to 0.8. In contrast, the AHLU risk category was correctly predicted for over 90% of the time for these horizons.

We recommend that the sites which performed poorly be reviewed before the summer and any erroneous data removed before the sites are retrained and forecasts are live on the web for the 2008/2009 summer forecasting period.

Table E8: HLI Statistics for all sites – one day ahead forecasts

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.94	3.52	0.92	4.42	0.96	-0.29	4907
Avalon Airport	0.90	6.84	0.87	5.26	0.93	0.26	3629
Ayr DPI Res. Stn.	0.88	9.14	0.92	5.63	0.96	0.05	7158
Bendigo Airport	0.93	5.35	0.90	4.29	0.95	0.33	3463
Bridgetown	0.91	5.70	0.89	4.55	0.94	-0.36	4499
Casino Airport	0.94	2.91	0.94	4.63	0.97	-0.90	6409
Casterton	0.95	3.92	0.89	4.74	0.94	0.51	3280
Cleve Aerodrome	0.92	5.59	0.90	4.35	0.94	0.52	3510
Cobar Airport	0.95	3.25	0.91	4.59	0.96	-0.22	4766
Collie East	0.91	5.54	0.89	4.92	0.94	-0.48	4497
Condobolin Airport	0.91	4.41	0.89	5.42	0.93	-2.23	3806
Coonamble Airport	0.94	3.47	0.92	4.77	0.96	-0.57	4834
Cowra Airport	0.90	6.34	0.86	5.80	0.93	-0.39	4294
Cunderdin Airfield	0.93	4.66	0.90	4.35	0.95	-0.25	4247
Dalby Airport	0.98	1.68	0.93	4.80	0.96	0.47	5221
Dalwalinu	0.88	7.48	0.88	4.56	0.94	-0.45	4471
Deniliquin Airport	0.94	4.28	0.90	4.23	0.95	0.12	3718
Dubbo Airport	0.94	3.03	0.92	4.42	0.96	-0.87	4345
Dunns Hill	0.90	6.28	0.87	5.09	0.93	0.10	3198
Esperance Aerodrome	0.87	8.60	0.88	4.80	0.94	0.01	3972
Forbes Airport	0.96	2.48	0.91	4.54	0.95	-0.51	4333
Gayndah Airport	0.92	4.92	0.94	4.60	0.97	-0.62	6294
Glen Innes Airport	0.93	4.79	0.88	5.02	0.94	0.29	3804
Grafton Res. Stn.	0.93	3.79	0.94	4.60	0.97	-0.93	6194
Gunnedah Airport	0.96	2.31	0.91	4.75	0.95	-0.36	4392
Gympie	0.92	4.67	0.94	4.90	0.97	-0.97	6656
Hamilton Airport	0.96	3.18	0.87	4.80	0.93	0.77	2896
Hopetoun Airport	0.95	4.47	0.92	3.91	0.96	1.17	3519
Inglewood Forest	0.95	3.79	0.93	4.26	0.96	0.03	4222
Inverell Res. Ctr.	0.94	4.30	0.90	5.08	0.95	0.16	4580
Keith (Munkora)	0.96	3.84	0.91	4.06	0.95	0.85	3459
Kingaroy Airport	0.93	3.84	0.94	4.40	0.97	-0.66	5796
Kingscote Aerodrome	0.86	10.03	0.86	4.75	0.93	0.68	3369
Lameroo (Austin Plains)	0.89	8.12	0.89	4.32	0.94	0.94	3380
Longerenong	0.92	6.09	0.89	4.30	0.94	0.87	3218
Mareeba Airport	0.86	8.44	0.93	5.59	0.96	-1.36	7037
Minlaton Aerodrome	0.91	7.13	0.89	4.01	0.94	0.83	3293
Minnipa DPI	0.93	5.05	0.91	3.95	0.96	0.08	3639
Morawa Airport	0.92	5.00	0.90	4.68	0.95	-0.51	5110
Mount Ginini	0.85	7.99	0.81	4.59	0.89	-0.91	2335
Mudgee Airport	0.93	4.60	0.91	4.83	0.96	-0.29	4676
Narrabri Airport	0.97	1.57	0.91	4.63	0.95	-0.47	4553
Newdegate Res. Stn.	0.90	6.20	0.90	4.08	0.95	-0.37	3441
Nhill Aerodrome	0.93	5.08	0.91	3.90	0.95	0.62	3286
Orange Airport	0.92	5.49	0.88	4.84	0.94	0.00	3381

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Padthaway South	0.96	3.66	0.91	4.35	0.95	0.73	3585
Parafield Airport	0.90	7.92	0.88	4.46	0.94	0.75	3746
Parkes Airport	0.94	3.40	0.89	5.00	0.94	-0.49	4297
Port Augusta Aerodrome	0.93	4.91	0.90	4.37	0.95	-0.18	4193
Rockhampton Aerodrome	0.93	5.01	0.94	4.75	0.97	-0.23	7039
Rocky Gully	0.87	8.08	0.87	4.73	0.93	-0.32	3671
Salmon Gums Res. Stn.	0.89	7.41	0.88	4.51	0.94	0.17	3844
Scone Airport	0.91	4.62	0.92	5.09	0.96	-1.36	5629
Shepparton Airport	0.92	5.61	0.90	4.41	0.95	0.40	3717
Snowtown (Rayville Park)	0.94	4.85	0.91	3.97	0.95	0.69	3514
Southern Cross Airfield	0.90	6.33	0.88	4.43	0.94	-0.30	4190
St. George Airport	0.70	21.56	0.79	8.99	0.88	-0.08	5594
St. Lawrence	0.91	6.15	0.94	4.93	0.97	-0.47	7140
Stawell Aerodrome	0.94	4.69	0.89	4.66	0.94	0.51	3341
Strathalbyn Racecourse	0.89	8.06	0.88	4.62	0.94	0.59	3235
Swan Hill Aerodrome	0.95	4.52	0.92	3.89	0.96	0.83	3629
Temora Airport	0.94	3.50	0.90	4.71	0.95	-0.40	4123
Toowoomba Airport	0.90	6.59	0.89	4.97	0.95	0.02	4193
Trangie Res. Stn.	0.96	2.35	0.93	4.50	0.96	-0.64	4762
UQ Gatton	0.92	4.87	0.94	4.65	0.97	-0.69	6051
Wagga Wagga	0.94	4.05	0.90	4.79	0.95	-0.15	4155
Walgett Airport	0.96	2.35	0.93	4.58	0.96	-0.36	4935
Wandering	0.91	5.64	0.88	4.75	0.94	-0.09	4242
Wangaratta Aerodrome	0.92	5.68	0.88	5.08	0.94	0.12	4101
Warra	0.83	9.53	0.82	5.00	0.91	-0.41	2347
West Wyalong Airport	0.95	3.33	0.91	4.46	0.95	-0.06	4371
Woolshed	0.91	5.29	0.93	5.09	0.97	-1.15	7150
Yarrawonga	0.93	5.36	0.90	4.28	0.95	0.59	3802
Young Airport	0.96	2.36	0.91	4.44	0.95	-0.12	3844

Table E9: HLI statistics for all sites – three day ahead forecasts

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.87	8.17	0.83	5.85	0.91	-0.33	2346
Avalon Airport	0.83	13.44	0.78	7.16	0.87	2.51	1848
Ayr DPI Res. Stn.	0.87	10.02	0.91	6.08	0.96	0.74	4200
Bendigo Airport	0.81	14.69	0.80	5.91	0.89	1.77	1691
Bridgetown	0.84	11.44	0.79	6.90	0.88	1.03	2748
Casino Airport	0.93	3.47	0.93	4.81	0.96	-0.96	3652
Casterton	0.90	8.23	0.82	6.15	0.89	2.08	1738
Cleve Aerodrome	0.81	13.47	0.82	5.41	0.90	0.69	2036
Cobar Airport	0.87	8.67	0.88	4.79	0.94	-0.16	2251
Collie East	0.82	13.65	0.74	7.88	0.85	1.71	2636
Condobolin Airport	0.79	12.14	0.80	6.26	0.88	-2.24	1875
Coonamble Airport	0.89	7.20	0.89	4.68	0.95	-0.12	2348
Cowra Airport	0.70	21.02	0.67	8.13	0.82	0.82	2023

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Cunderdin Airfield	0.84	12.53	0.78	6.88	0.88	1.65	2506
Dalby Airport	0.93	5.40	0.89	5.38	0.94	0.48	2607
Dalwalinu	0.80	15.44	0.76	7.06	0.87	1.67	2679
Deniliquin Airport	0.89	10.04	0.82	6.06	0.89	2.62	1867
Dubbo Airport	0.87	8.61	0.88	4.86	0.94	-0.57	2099
Dunns Hill	0.87	9.08	0.79	6.71	0.88	1.14	1575
Esperance Aerodrome	0.87	10.23	0.83	6.07	0.90	1.44	2402
Forbes Airport	0.90	6.84	0.87	4.84	0.93	0.35	2102
Gayndah Airport	0.87	8.19	0.91	5.39	0.95	-0.78	3391
Glen Innes Airport	0.83	11.72	0.76	6.12	0.87	0.53	1690
Grafton Res. Stn.	0.90	5.67	0.93	4.86	0.96	-1.03	3455
Gunnedah Airport	0.88	8.21	0.85	5.25	0.92	0.18	2099
Gympie	0.90	6.04	0.92	5.30	0.96	-0.91	3792
Hamilton Airport	0.90	8.66	0.82	5.99	0.89	2.27	1456
Hopetoun Airport	0.95	5.60	0.86	5.42	0.91	2.21	1817
Inglewood Forest	0.89	7.63	0.87	5.35	0.93	-0.06	2472
Inverell Res. Ctr.	0.88	8.72	0.84	5.73	0.91	0.66	2280
Keith (Munkora)	1.01	1.20	0.87	5.28	0.92	1.63	2007
Kingaroy Airport	0.91	5.77	0.90	5.49	0.95	-0.50	3162
Kingscote Aerodrome	0.83	12.37	0.82	5.37	0.90	1.19	1974
Lameroo (Austin Plains)	0.91	7.83	0.84	5.63	0.90	2.09	1954
Longerenong	0.97	4.37	0.83	5.76	0.89	2.24	1618
Mareeba Airport	0.86	8.72	0.94	5.07	0.97	-0.95	4139
Minlaton Aerodrome	0.83	12.82	0.83	4.86	0.91	1.24	1907
Minnipa DPI	0.91	6.16	0.86	4.98	0.92	0.28	2181
Morawa Airport	0.84	11.18	0.81	6.48	0.90	0.39	3164
Mount Ginini	0.89	7.07	0.71	5.05	0.82	0.79	1012
Mudgee Airport	0.88	8.20	0.86	5.76	0.93	0.14	2244
Narrabri Airport	0.91	6.36	0.86	5.07	0.93	0.44	2164
Newdegate Res. Stn.	0.85	10.93	0.81	5.60	0.90	0.90	2024
Nhill Aerodrome	0.98	3.45	0.85	5.39	0.91	1.90	1687
Orange Airport	0.89	7.96	0.79	6.38	0.88	1.29	1505
Padthaway South	0.94	5.86	0.85	5.76	0.91	1.79	2042
Parafield Airport	0.90	7.83	0.86	4.84	0.93	1.01	2189
Parkes Airport	0.87	9.53	0.84	5.45	0.92	0.46	2098
Port Augusta Aerodrome	0.86	9.84	0.86	4.93	0.93	0.31	2451
Rockhampton Aerodrome	0.92	5.21	0.92	5.60	0.96	-0.56	4040
Rocky Gully	0.80	13.37	0.79	6.26	0.89	0.92	2239
Salmon Gums Res. Stn.	0.88	9.34	0.83	5.96	0.90	1.67	2340
Scone Airport	0.91	5.23	0.90	5.34	0.95	-0.80	2950
Shepparton Airport	0.81	15.03	0.80	6.12	0.88	1.84	1865
Snowtown (Rayville Park)	0.87	9.71	0.86	4.77	0.92	1.09	1954

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Southern Cross Airfield	0.79	14.99	0.77	6.34	0.87	0.63	2473
St. George Airport	0.86	12.78	0.81	8.06	0.88	3.45	2729
St. Lawrence	0.91	5.88	0.92	5.59	0.96	-0.44	4134
Stawell Aerodrome	0.94	6.20	0.81	6.31	0.89	2.01	1701
Strathalbyn Racecourse	0.83	13.24	0.82	5.80	0.90	1.98	1832
Swan Hill Aerodrome	0.93	6.52	0.86	5.25	0.91	1.83	1850
Temora Airport	0.90	7.36	0.85	5.55	0.92	0.70	2033
Toowoomba Airport	0.79	14.40	0.77	6.36	0.88	0.09	1993
Trangie Res. Stn.	0.88	7.59	0.89	4.89	0.94	-0.64	2354
UQ Gatton	0.88	7.67	0.90	5.56	0.95	-0.30	3260
Wagga Wagga	0.91	6.90	0.87	5.23	0.93	0.91	2062
Walgett Airport	0.91	6.07	0.90	4.66	0.95	0.03	2340
Wandering	0.89	8.61	0.79	6.83	0.88	1.40	2485
Wangaratta Aerodrome	0.88	10.23	0.84	6.16	0.90	1.97	2118
Warra	0.72	16.56	0.66	7.07	0.81	0.09	1236
West Wyalong Airport	0.90	7.34	0.86	5.22	0.93	0.65	2137
Woolshed	0.96	2.71	0.94	4.87	0.97	-0.44	4214
Yarrawonga	0.88	10.66	0.84	5.79	0.90	2.35	1975
Young Airport	0.92	6.43	0.85	5.36	0.91	1.06	1774

Table E10: HLI statistics for all sites – six day ahead forecasts

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.89	7.35	0.81	6.46	0.90	0.39	2155
Avalon Airport	0.73	20.56	0.69	8.40	0.82	2.59	1580
Ayr DPI Res. Stn.	0.86	11.69	0.89	6.84	0.94	0.93	3687
Bendigo Airport	0.77	16.83	0.73	6.83	0.85	1.20	1434
Bridgetown	0.68	23.12	0.62	9.44	0.78	2.28	2433
Casino Airport	0.95	3.14	0.91	5.41	0.95	-0.23	3156
Casterton	0.69	22.52	0.66	8.34	0.80	2.59	1490
Cleve Aerodrome	0.75	17.37	0.76	6.32	0.87	0.55	1771
Cobar Airport	0.75	17.48	0.75	6.65	0.86	-0.23	1908
Collie East	0.68	23.46	0.62	9.84	0.78	2.62	2351
Condobolin Airport	0.67	19.97	0.70	7.58	0.81	-3.12	1617
Coonamble Airport	0.80	14.32	0.79	6.36	0.89	0.13	1984
Cowra Airport	0.75	17.45	0.72	7.22	0.85	0.20	1766
Cunderdin Airfield	0.69	24.07	0.63	9.27	0.78	2.73	2226
Dalby Airport	0.93	5.91	0.88	5.47	0.94	1.01	2354
Dalwalinu	0.69	23.09	0.67	8.10	0.81	1.82	2321
Deniliquin Airport	0.83	13.85	0.72	7.28	0.83	2.16	1593
Dubbo Airport	0.79	14.33	0.78	6.14	0.88	-0.38	1786
Dunns Hill	0.68	21.64	0.61	9.11	0.78	1.34	1281
Esperance Aerodrome	0.68	22.55	0.66	8.17	0.81	1.41	2062
Forbes Airport	0.75	17.17	0.74	6.48	0.86	0.29	1794
Gayndah Airport	0.84	10.87	0.88	5.94	0.94	-0.33	2950
Glen Innes Airport	0.86	10.21	0.74	6.80	0.85	1.50	1533
Grafton Res. Stn.	0.91	5.88	0.90	5.44	0.95	-0.20	2905
Gunnedah Airport	0.86	10.22	0.79	6.17	0.89	0.66	1857

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Gympie	0.89	7.08	0.91	5.69	0.95	-0.56	3293
Hamilton Airport	0.63	26.53	0.59	8.65	0.76	2.63	1240
Hopetoun Airport	0.85	12.02	0.75	6.80	0.85	1.94	1552
Inglewood Forest	0.87	9.51	0.86	5.38	0.93	0.28	2204
Inverell Res. Ctr.	0.90	8.01	0.81	6.31	0.89	1.24	2018
Keith (Munkora)	0.84	13.41	0.72	7.67	0.83	2.39	1768
Kingaroy Airport	0.89	7.83	0.88	5.79	0.94	0.07	2735
Kingscote Aerodrome	0.73	19.47	0.73	6.65	0.85	1.21	1741
Lameroo (Austin Plains)	0.81	15.11	0.72	7.50	0.83	2.61	1710
Longerenong	0.82	14.29	0.67	8.01	0.80	2.31	1392
Mareeba Airport	0.85	9.60	0.93	5.40	0.96	-1.06	3636
Minlaton Aerodrome	0.73	19.60	0.71	6.36	0.84	1.36	1666
Minnipa DPI	0.83	11.51	0.77	6.40	0.88	-0.17	1924
Morawa Airport	0.73	19.71	0.73	7.59	0.85	0.77	2685
Mount Ginini	0.78	13.15	0.64	5.39	0.79	0.63	806
Mudgee Airport	0.81	13.44	0.78	6.93	0.88	0.50	1874
Narrabri Airport	0.86	10.55	0.79	6.12	0.89	0.99	1921
Newdegate Res. Stn.	0.63	25.61	0.62	7.91	0.79	1.07	1791
Nhill Aerodrome	0.82	13.60	0.71	7.35	0.83	1.72	1449
Orange Airport	0.77	15.87	0.69	7.52	0.83	1.17	1278
Padthaway South	0.78	16.84	0.71	7.82	0.83	2.46	1766
Parafield Airport	0.82	13.64	0.74	6.91	0.85	1.22	1942
Parkes Airport	0.77	15.92	0.75	6.67	0.86	0.48	1812
Port Augusta Aerodrome	0.78	15.52	0.75	6.63	0.86	0.27	2127
Rockhampton Aerodrome	0.88	7.94	0.89	6.39	0.94	-0.45	3509
Rocky Gully	0.59	28.67	0.58	9.07	0.76	2.24	1986
Salmon Gums Res. Stn.	0.67	23.48	0.63	8.56	0.78	1.71	2046
Scone Airport	0.89	6.93	0.85	6.53	0.92	-0.35	2561
Shepparton Airport	0.68	23.07	0.65	7.78	0.80	1.59	1579
Snowtown (Rayville Park)	0.78	16.20	0.77	6.28	0.87	1.48	1751
Southern Cross Airfield	0.63	26.25	0.61	8.22	0.78	1.12	2138
St. George Airport	0.86	13.69	0.79	8.68	0.86	4.15	2402
St. Lawrence	0.88	8.47	0.90	6.31	0.95	-0.49	3648
Stawell Aerodrome	0.76	18.22	0.65	8.69	0.79	2.32	1400
Strathalbyn Racecourse	0.71	21.57	0.70	7.60	0.83	2.22	1640
Swan Hill Aerodrome	0.84	12.66	0.74	6.95	0.85	1.55	1567
Temora Airport	0.73	18.42	0.72	7.03	0.85	0.22	1718
Toowoomba Airport	0.76	17.41	0.72	7.21	0.84	1.01	1817
Trangie Res. Stn.	0.79	14.59	0.79	6.36	0.89	-0.36	1965
UQ Gatton	0.88	8.96	0.88	6.10	0.94	0.52	2832
Wagga Wagga	0.79	15.13	0.74	7.06	0.86	0.68	1764
Walgett Airport	0.84	11.35	0.82	5.89	0.91	0.34	2050

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Wandering	0.70	22.70	0.60	9.94	0.76	2.89	2182
Wangaratta Aerodrome	0.72	20.39	0.68	8.01	0.82	1.50	1809
Warra	0.48	31.08	0.46	8.91	0.70	0.42	1057
West Wyalong Airport	0.71	20.48	0.72	7.02	0.85	0.76	1802
Woolshed	0.94	4.03	0.92	5.45	0.96	-0.28	3698
Yarrawonga	0.70	22.34	0.66	7.53	0.80	2.00	1667
Young Airport	0.82	13.21	0.73	6.83	0.85	0.85	1523

Table E11: Risk category forecast performance for a HLI cutoff of 86

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3
Applethorpe	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Avalon	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	98.37	0.00	0.81	0.00
Ayr	0.00	0.00	0.00	74.80	1.63	7.32	16.26	48.78	1.63	1.63	26.83	2.44	4.88	13.82	51.22	4.88	17.07	18.70	4.88	3.25	0.00
Bendigo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Bridgetown	0.00	0.00	1.63	98.37	0.00	0.00	0.00	0.00	0.00	1.63	94.31	1.63	2.44	0.00	0.00	0.00	1.63	95.12	3.25	0.00	0.00
Casino	0.00	0.81	3.25	90.24	5.69	0.00	0.00	0.00	2.44	7.32	87.80	2.44	0.00	0.00	0.00	1.63	7.32	86.18	4.88	0.00	0.00
Casterton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cleve	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cobar	0.00	0.00	1.63	93.50	4.88	0.00	0.00	0.00	0.00	2.44	96.75	0.81	0.00	0.00	0.00	0.00	2.44	95.93	1.63	0.00	0.00
Collie East	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	95.93	4.07	0.00	0.00	0.00	0.00	0.00	95.93	2.44	1.63	0.00
Condobolin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.00	0.81	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Coonamble	0.00	0.00	2.44	94.31	3.25	0.00	0.00	0.00	0.00	4.07	94.31	1.63	0.00	0.00	0.00	0.00	4.07	95.12	0.81	0.00	0.00
Cowra	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Cunderdin	0.00	0.00	0.81	95.93	3.25	0.00	0.00	0.00	0.00	1.63	93.50	4.88	0.00	0.00	0.00	0.00	1.63	92.68	3.25	1.63	0.81
Dalby	0.00	0.00	0.00	86.99	4.07	3.25	5.69	0.00	0.00	1.63	95.93	1.63	0.81	0.00	0.00	0.00	1.63	97.56	0.00	0.00	0.81
Dalwalinu	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.81	97.56	0.81	0.81	0.00	0.00	0.00	0.81	97.56	0.81	0.81	0.00
Deniliquin	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	96.75	2.44	0.00	0.00	0.00	0.00	0.81	98.37	0.00	0.81	0.00
Dubbo	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Dunns	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Esperance	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	97.56	2.44	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Forbes	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	97.56	1.63	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Gayndah	0.00	0.81	12.20	84.55	1.63	0.81	0.00	0.00	0.81	13.01	85.37	0.81	0.00	0.00	0.00	1.63	13.82	83.74	0.81	0.00	0.00
Glen Innes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Grafton	0.00	0.81	2.44	92.68	4.07	0.00	0.00	0.00	1.63	11.38	86.99	0.00	0.00	0.00	0.00	0.81	10.57	85.37	3.25	0.00	0.00
Gunnedah	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	1.63	98.37	0.00	0.00	0.00	0.00	0.00	1.63	98.37	0.00	0.00	0.00
Gympie	0.00	1.63	12.20	81.30	4.88	0.00	0.00	0.00	7.32	17.89	70.73	3.25	0.81	0.00	0.00	8.94	17.07	69.92	2.44	1.63	0.00
Hamilton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hopetoun	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.00	95.93	3.25	0.81	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Inglewood	0.00	0.00	0.81	95.12	4.07	0.00	0.00	0.00	0.00	0.81	96.75	0.81	1.63	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00
Inverell	0.00	0.00	0.81	97.56	1.63	0.00	0.00	0.00	0.00	0.81	97.56	1.63	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00
Keith	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.81	96.75	2.44	0.00	0.00	0.00	0.00	0.81	97.56	0.81	0.81	0.00
Kingaroy	0.00	0.00	3.25	93.50	3.25	0.00	0.00	0.00	0.00	3.25	95.12	1.63	0.00	0.00	0.00	0.00	4.07	95.93	0.00	0.00	0.00
Kingscote	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Lameroo	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	96.75	2.44	0.00	0.00	0.00	0.00	0.81	95.93	3.25	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts							
Longerenong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	97.56	1.63	0.81	0.00	0.00	0.00	0.00	97.56	2.44	0.00	0.00
Mareeba	1.63	9.76	26.02	58.54	4.07	0.00	0.00	2.44	12.20	26.02	57.72	1.63	0.00	0.00	2.44	16.26	33.33	45.53	2.44	0.00	0.00
Minlaton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Minnipa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Morawa	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.81	95.93	3.25	0.00	0.00	0.00	0.00	0.81	97.56	1.63	0.00	0.00
Mount Ginini	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mudgee	0.00	0.81	1.63	96.75	0.81	0.00	0.00	0.00	0.00	2.44	96.75	0.81	0.00	0.00	0.00	0.81	2.44	96.75	0.00	0.00	0.00
Narrabri	0.00	0.00	0.81	97.56	1.63	0.00	0.00	0.00	0.00	0.81	97.56	1.63	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Newdegate	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Nhill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	97.56	1.63	0.81	0.00	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Orange	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Padthaway	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	97.56	2.44	0.00	0.00	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Parafield	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.00	0.00	0.81
Parkes	0.00	0.00	2.44	96.75	0.81	0.00	0.00	0.00	0.00	2.44	95.93	1.63	0.00	0.00	0.00	0.00	1.63	98.37	0.00	0.00	0.00
Port Augusta	0.00	0.00	0.00	95.93	4.07	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Rockhampton	0.00	0.81	6.50	80.49	10.57	1.63	0.00	1.63	8.13	13.01	74.80	0.81	0.81	0.81	2.44	11.38	16.26	65.85	3.25	0.00	0.81
Rocky Gully	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Salmon Gums	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Scone	0.00	1.63	5.69	90.24	2.44	0.00	0.00	0.00	6.50	7.32	83.74	2.44	0.00	0.00	0.00	7.32	7.32	82.93	2.44	0.00	0.00
Shepparton	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Snowtown	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Southern Cross	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	97.56	1.63	0.00	0.00
St. George	9.76	6.50	5.69	58.54	17.07	2.44	0.00	14.63	1.63	9.76	72.36	0.81	0.81	0.00	14.63	2.44	8.94	69.11	4.88	0.00	0.00
St. Lawrence	0.81	1.63	10.57	82.11	4.88	0.00	0.00	10.57	8.94	17.07	60.16	2.44	0.81	0.00	12.20	17.89	17.89	47.97	2.44	1.63	0.00
Stawell	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.81	97.56	1.63	0.00	0.00	0.00	0.00	0.81	97.56	0.81	0.81	0.00
Strathalbyn	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Swan Hill	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Temora	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Toowoomba	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Trangie	0.00	0.81	0.00	98.37	0.81	0.00	0.00	0.00	0.00	2.44	96.75	0.81	0.00	0.00	0.00	0.81	1.63	97.56	0.00	0.00	0.00
Gatton	0.00	0.00	6.50	88.62	4.88	0.00	0.00	0.00	3.25	13.01	81.30	1.63	0.81	0.00	0.00	3.25	14.63	77.24	4.88	0.00	0.00
Wagga Wagga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Walgett	0.00	0.00	3.25	91.06	5.69	0.00	0.00	0.00	0.00	6.50	91.87	0.00	1.63	0.00	0.00	0.00	5.69	94.31	0.00	0.00	0.00
Wandering	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	96.75	2.44	0.81	0.00	0.00	0.00	0.00	94.31	2.44	2.44	0.81
Wangaratta	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Warra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
West Wyalong	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00
Woolshed	0.00	4.07	17.07	74.80	3.25	0.81	0.00	7.32	10.57	19.51	55.28	4.88	2.44	0.00	7.32	14.63	21.95	50.41	4.07	1.63	0.00
Yarrawonga	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Young	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table E12: Risk category forecast performance for a HLI cutoff of 89

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3
Applethorpe	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Avalon	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Ayr	0.00	0.00	0.00	81.30	6.50	1.63	10.57	30.08	8.94	4.88	51.22	0.81	0.81	3.25	35.77	17.89	9.76	31.71	4.88	0.00	0.00
Bendigo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Bridgetown	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.00	97.56	2.44	0.00	0.00
Casino	0.00	0.00	2.44	95.93	1.63	0.00	0.00	0.00	0.00	3.25	96.75	0.00	0.00	0.00	0.00	0.00	3.25	95.93	0.81	0.00	0.00
Casterton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cleve	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cobar	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Collie East	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Condobolin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Coonamble	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Cowra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cunderdin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	96.75	0.81	1.63	0.00
Dalby	0.00	0.00	0.00	92.68	0.81	2.44	4.07	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.00	0.81	0.00
Dalwalinu	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Deniliquin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Dubbo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Dunns	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Esperance	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Forbes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gayndah	0.00	0.00	3.25	95.12	1.63	0.00	0.00	0.00	0.00	3.25	96.75	0.00	0.00	0.00	0.00	0.00	3.25	95.93	0.81	0.00	0.00
Glen Innes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Grafton	0.00	0.00	1.63	96.75	1.63	0.00	0.00	0.00	0.00	2.44	97.56	0.00	0.00	0.00	0.00	0.00	2.44	97.56	0.00	0.00	0.00
Gunnedah	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gympie	0.00	0.81	8.94	89.43	0.81	0.00	0.00	0.00	0.00	12.20	86.18	1.63	0.00	0.00	0.00	0.81	12.20	84.55	2.44	0.00	0.00
Hamilton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hopetoun	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Inglewood	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	98.37	0.81	0.81	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Inverell	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Keith	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Kingaroy	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Kingscote	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Lameroo	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Longerenong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mareeba	0.00	5.69	13.82	79.67	0.81	0.00	0.00	0.00	4.88	17.07	72.36	4.07	1.63	0.00	0.00	4.07	21.95	71.54	2.44	0.00	0.00
Minlaton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Minnipa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Morawa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mount Ginini	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mudgee	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Narrabri	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Newdegate	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Nhill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Orange	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Padthaway	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Parafield	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.00	0.81	0.00
Parkes	0.00	0.00	1.63	98.37	0.00	0.00	0.00	0.00	0.00	1.63	98.37	0.00	0.00	0.00	0.00	0.00	1.63	98.37	0.00	0.00	0.00
Port Augusta	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Rockhampton	0.00	0.00	5.69	85.37	8.94	0.00	0.00	0.00	1.63	11.38	80.49	4.88	0.81	0.81	0.00	3.25	12.20	82.11	0.81	0.81	0.81
Rocky Gully	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Salmon Gums	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Scone	0.00	0.00	7.32	91.87	0.81	0.00	0.00	0.00	0.00	8.13	91.87	0.00	0.00	0.00	0.00	0.00	8.94	90.24	0.81	0.00	0.00
Shepparton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Snowtown	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Southern Cross	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
St. George	13.01	2.44	3.25	75.61	5.69	0.00	0.00	13.82	1.63	2.44	81.30	0.81	0.00	0.00	13.82	1.63	3.25	79.67	1.63	0.00	0.00
St. Lawrence	0.00	0.00	14.63	82.93	2.44	0.00	0.00	0.81	4.88	14.63	75.61	2.44	0.00	1.63	0.81	8.94	18.70	67.48	3.25	0.81	0.00
Stawell	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Strathalbyn	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Swan Hill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Temora	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Toowoomba	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Trangie	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Gatton	0.00	0.81	4.07	93.50	1.63	0.00	0.00	0.00	0.81	4.07	94.31	0.00	0.81	0.00	0.00	0.81	4.88	94.31	0.00	0.00	0.00
Wagga Wagga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Walgett	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	98.37	0.81	0.81	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Wandering	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	95.93	3.25	0.81	0.00
Wangaratta	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Warra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
West Wyalong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Woolshed	0.00	0.81	13.82	80.49	4.88	0.00	0.00	0.00	4.07	15.45	72.36	6.50	1.63	0.00	0.00	6.50	15.45	71.54	6.50	0.00	0.00
Yarrawonga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Young	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table E13: Risk category forecast performance for a HLI cutoff of 92

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3
Applethorpe	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Avalon	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Ayr	0.00	0.00	0.00	82.11	14.63	0.81	2.44	17.89	3.25	4.88	62.60	4.07	4.07	3.25	19.51	8.94	8.94	62.60	0.00	0.00	0.00
Bendigo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Bridgetown	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Casino	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Casterton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cleve	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cobar	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Collie East	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Condobolin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Coonamble	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cowra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cunderdin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Dalby	0.00	0.00	0.00	94.31	1.63	4.07	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Dalwalinu	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Deniliquin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Dubbo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Dunns	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Esperance	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Forbes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gayndah	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Glen Innes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Grafton	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Gunnedah	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gympie	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Hamilton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Hopetoun	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Inglewood	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Inverell	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Keith	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Kingaroy	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Kingscote	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Lameroo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Longerenong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mareeba	0.00	1.63	10.57	86.99	0.81	0.00	0.00	0.00	1.63	8.94	86.18	3.25	0.00	0.00	0.00	1.63	10.57	86.99	0.81	0.00	0.00
Minlaton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Minnipa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Morawa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mount Ginini	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mudgee	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Narrabri	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Newdegate	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Nhill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Orange	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Padthaway	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Parafield	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Parkes	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Port Augusta	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Rockhampton	0.00	0.00	3.25	92.68	4.07	0.00	0.00	0.00	0.00	3.25	91.87	2.44	1.63	0.81	0.00	0.00	4.07	94.31	0.00	1.63	0.00
Rocky Gully	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Salmon Gums	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Scone	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	0.81	99.19	0.00	0.00	0.00
Shepparton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Snowtown	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Southern Cross	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
St. George	13.82	0.00	0.81	85.37	0.00	0.00	0.00	13.82	0.00	0.81	85.37	0.00	0.00	0.00	13.82	0.00	0.81	85.37	0.00	0.00	0.00
St. Lawrence	0.00	0.00	5.69	91.87	2.44	0.00	0.00	0.00	0.00	5.69	91.06	2.44	0.81	0.00	0.00	0.00	8.13	90.24	1.63	0.00	0.00
Stawell	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Strathalbyn	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Swan Hill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Temora	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Toowoomba	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Trangie	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gatton	0.00	0.00	2.44	97.56	0.00	0.00	0.00	0.00	0.00	2.44	96.75	0.81	0.00	0.00	0.00	0.00	2.44	97.56	0.00	0.00	0.00
Wagga Wagga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Walgett	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Wandering	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Wangaratta	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
West Wyalong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Woolshed	0.00	0.00	1.63	96.75	1.63	0.00	0.00	0.00	0.81	4.07	90.24	4.07	0.81	0.00	0.00	0.81	4.88	90.24	3.25	0.81	0.00
Yarrawonga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Young	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table E14: Risk category forecast performance for a HLI cutoff of 95

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3	-3	-2	-1	0	1	2	3
Applethorpe	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Avalon	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Ayr	0.00	0.81	2.44	82.11	7.32	6.50	0.81	3.25	4.88	3.25	79.67	4.07	4.88	0.00	3.25	4.88	4.07	86.99	0.00	0.81	0.00
Bendigo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Bridgetown	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Casino	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Casterton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cleve	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cobar	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Collie East	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Condobolin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Coonamble	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cowra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Cunderdin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Dalby	0.00	0.00	0.00	95.93	4.07	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Dalwalinu	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Deniliquin	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Dubbo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Dunns	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Esperance	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Forbes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gayndah	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Glen Innes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Grafton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gunnedah	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gympie	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hamilton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Hopetoun	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Inglewood	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Inverell	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Keith	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Kingaroy	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Kingscote	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Lameroo	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Longerenong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mareeba	0.00	0.00	3.25	96.75	0.00	0.00	0.00	0.00	0.00	3.25	96.75	0.00	0.00	0.00	0.00	0.00	3.25	96.75	0.00	0.00	0.00
Minlaton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Minnipa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Morawa	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mount Ginini	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Mudgee	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Narrabri	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Newdegate	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Nhill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Orange	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Padthaway	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Parafield	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Parkes	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Port Augusta	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Rockhampton	0.00	0.00	0.00	98.37	1.63	0.00	0.00	0.00	0.00	0.00	97.56	2.44	0.00	0.00	0.00	0.00	0.00	98.37	1.63	0.00	0.00
Rocky Gully	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Salmon Gums	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Scone	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Shepparton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Snowtown	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

	One day ahead forecasts							Three day ahead forecasts							Six day ahead forecasts						
Southern Cross	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
St. George	12.20	1.63	0.00	86.18	0.00	0.00	0.00	12.20	1.63	0.00	86.18	0.00	0.00	0.00	12.20	1.63	0.00	86.18	0.00	0.00	0.00
St. Lawrence	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00	0.00	0.00	0.81	98.37	0.81	0.00	0.00
Stawell	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Strathalbyn	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Swan Hill	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Temora	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Toowoomba	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Trangie	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Gatton	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Wagga Wagga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Walgett	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Wandering	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	99.19	0.81	0.00	0.00
Wangaratta	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Warra	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
West Wyalong	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Woolshed	0.00	0.00	0.81	99.19	0.00	0.00	0.00	0.00	0.00	1.63	96.75	1.63	0.00	0.00	0.00	0.00	1.63	96.75	1.63	0.00	0.00
Yarrawonga	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
Young	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00

Table E15: Temperature statistics for all sites for one day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.94	0.92	0.92	1.74	0.96	-0.11	7221
Avalon Airport	0.85	2.91	0.93	2.19	0.96	0.21	7221
Ayr DPI Res. Stn.	0.74	7.24	0.85	1.46	0.92	0.29	7201
Bendigo Airport	0.90	2.11	0.95	2.16	0.98	0.17	7180
Bridgetown	0.87	2.44	0.94	2.14	0.97	0.06	7227
Casino Airport	0.91	1.39	0.91	1.70	0.95	-0.52	7227
Casterton	0.92	1.15	0.95	2.14	0.98	-0.19	7221
Cleve Aerodrome	0.90	1.92	0.95	2.07	0.97	-0.04	7227
Cobar Airport	0.96	0.59	0.95	2.04	0.98	-0.24	7227
Collie East	0.87	2.54	0.94	2.27	0.97	0.04	7227
Condobolin Airport	0.85	1.75	0.88	3.64	0.93	-1.63	6596
Coonamble Airport	0.92	1.63	0.94	2.06	0.97	-0.12	7227
Cowra Airport	0.69	6.03	0.81	4.55	0.89	-0.12	7223
Cunderdin Airfield	0.93	1.67	0.96	2.05	0.98	0.14	7227
Dalby Airport	0.90	2.26	0.91	2.21	0.96	0.09	7198
Dalwalinu	0.90	2.35	0.95	2.17	0.97	0.07	7227
Deniliquin Airport	0.97	0.22	0.96	2.06	0.98	-0.53	7227
Dubbo Airport	0.92	1.70	0.95	1.92	0.98	0.01	7227
Dunns Hill	0.94	0.71	0.96	1.62	0.98	-0.20	7187
Esperance Aerodrome	0.86	2.71	0.92	2.27	0.96	0.12	7227
Forbes Airport	0.97	0.20	0.96	2.03	0.98	-0.45	7227
Gayndah Airport	0.92	1.89	0.92	1.92	0.96	-0.03	7221
Glen Innes Airport	0.94	0.67	0.94	1.88	0.97	-0.23	7227
Grafton Res. Stn.	0.91	1.23	0.92	1.64	0.95	-0.59	7190
Gunnedah Airport	0.95	0.58	0.94	2.04	0.97	-0.40	7138
Gympie	0.96	0.77	0.92	1.77	0.96	-0.11	7221
Hamilton Airport	0.93	1.09	0.95	2.13	0.98	-0.09	7133
Hopetoun Airport	0.91	2.39	0.96	2.31	0.98	0.47	7192
Inglewood Forest	0.87	2.97	0.93	1.99	0.96	0.17	6188
Inverell Res. Ctr.	0.98	0.00	0.95	1.69	0.97	-0.31	7100
Keith (Munkora)	0.94	1.23	0.96	2.31	0.98	0.05	7227
Kingaroy Airport	0.99	0.09	0.90	2.19	0.95	-0.05	7221
Kingscote Aerodrome	0.86	2.82	0.92	2.53	0.95	0.38	7227
Lameroo (Austin Plains)	0.94	1.59	0.96	2.13	0.98	0.35	7226
Longerenong	0.96	0.89	0.96	2.16	0.98	0.07	7221
Mareeba Airport	0.90	2.67	0.93	1.33	0.96	0.29	7187
Minlaton Aerodrome	0.93	1.47	0.95	1.97	0.98	0.11	7179
Minnipa DPI	0.95	1.10	0.97	1.81	0.98	0.05	7036
Morawa Airport	0.92	2.20	0.95	2.26	0.97	0.12	7227
Mount Ginini	0.99	-0.06	0.97	1.39	0.98	-0.19	7227
Mudgee Airport	0.91	1.45	0.94	1.99	0.97	-0.15	7184
Narrabri Airport	0.94	0.88	0.94	2.02	0.97	-0.40	7227
Newdegate Res. Stn.	0.92	1.93	0.95	2.03	0.98	0.31	7150
Nhill Aerodrome	0.96	0.77	0.97	1.95	0.98	0.07	7221
Orange Airport	0.94	0.62	0.96	1.71	0.98	-0.25	7210
Padthaway South	0.93	1.26	0.95	2.39	0.98	0.02	7227
Parafield Airport	0.93	1.44	0.96	2.10	0.98	0.01	7227
Parkes Airport	0.95	0.77	0.96	1.98	0.98	-0.31	7227
Port Augusta	0.88	2.92	0.95	2.14	0.97	0.05	7227

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Aerodrome							
Rockhampton Aerodrome	0.85	3.82	0.90	1.62	0.95	0.26	7221
Rocky Gully	0.90	1.66	0.94	1.78	0.97	-0.08	7227
Salmon Gums Res. Stn.	0.87	2.67	0.92	2.57	0.96	0.12	7227
Scone Airport	0.90	1.58	0.93	2.05	0.97	-0.29	7227
Shepparton Airport	0.87	3.01	0.95	2.26	0.97	0.39	7221
Snowtown (Rayville Park)	0.91	2.17	0.96	2.26	0.98	0.38	7215
Southern Cross Airfield	0.90	2.37	0.95	2.24	0.97	0.12	7206
St. George Airport	0.70	7.59	0.86	2.83	0.91	0.54	7024
St. Lawrence	0.91	2.39	0.91	1.61	0.95	0.20	7221
Stawell Aerodrome	0.94	1.08	0.96	2.02	0.98	0.00	7221
Strathalbyn Racecourse	0.89	2.18	0.95	2.10	0.97	0.10	7212
Swan Hill Aerodrome	0.90	2.40	0.96	2.27	0.98	0.31	6987
Temora Airport	0.96	0.69	0.95	2.19	0.98	-0.22	7222
Toowoomba Airport	0.86	2.74	0.93	1.42	0.96	0.07	7221
Trangie Res. Stn.	0.94	1.13	0.95	1.92	0.98	-0.21	7227
UQ Gatton	0.97	0.64	0.91	2.19	0.95	-0.04	7221
Wagga Wagga	0.97	0.51	0.96	1.94	0.98	-0.19	7227
Walgett Airport	0.89	2.34	0.93	2.31	0.96	-0.16	7227
Wandering	0.91	1.96	0.94	2.36	0.97	0.09	7227
Wangaratta Aerodrome	0.87	3.10	0.96	2.38	0.97	0.57	7221
Warra	0.91	1.01	0.95	1.74	0.97	-0.03	7227
West Wyalong Airport	0.94	1.35	0.96	1.88	0.98	0.02	7227
Woolshed	0.88	2.75	0.90	1.33	0.95	0.11	7221
Yarrawonga	0.88	3.12	0.95	2.22	0.97	0.49	7221
Young Airport	0.95	0.75	0.95	2.14	0.98	-0.16	6936

Table E16: Temperature statistics for all sites for three day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.84	2.86	0.87	2.39	0.93	0.34	4273
Avalon Airport	0.80	4.97	0.83	3.59	0.89	1.52	4321
Ayr DPI Res. Stn.	0.81	4.98	0.78	1.93	0.88	0.24	4225
Bendigo Airport	0.87	3.46	0.93	2.77	0.96	1.06	4280
Bridgetown	0.80	4.12	0.87	3.17	0.93	0.47	4561
Casino Airport	0.90	1.65	0.88	2.10	0.93	-0.30	4321
Casterton	0.91	2.45	0.92	2.92	0.95	0.91	4321
Cleve Aerodrome	0.85	2.88	0.89	3.10	0.94	-0.09	4705
Cobar Airport	0.96	1.36	0.94	2.44	0.97	0.48	4321
Collie East	0.78	5.02	0.79	4.31	0.88	0.86	4561
Condobolin Airport	0.82	2.33	0.87	3.83	0.92	-1.48	3949
Coonamble Airport	0.87	2.93	0.93	2.35	0.96	0.34	4321
Cowra Airport	0.50	9.43	0.66	6.00	0.80	0.47	4320
Cunderdin Airfield	0.84	4.00	0.89	3.21	0.94	0.53	4561
Dalby Airport	0.87	3.40	0.91	2.56	0.95	0.83	4250
Dalwalinu	0.82	4.76	0.89	3.09	0.94	0.75	4561
Deniliquin Airport	0.93	2.07	0.95	2.45	0.97	0.69	4321
Dubbo Airport	0.85	3.34	0.93	2.34	0.96	0.50	4321

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Dunns Hill	0.89	2.45	0.89	2.84	0.94	0.78	4287
Esperance Aerodrome	0.83	3.57	0.82	3.33	0.90	0.27	4561
Forbes Airport	0.93	1.76	0.94	2.39	0.97	0.28	4321
Gayndah Airport	0.98	0.92	0.86	2.94	0.92	0.53	4273
Glen Innes Airport	0.83	2.56	0.91	2.27	0.95	0.17	4321
Grafton Res. Stn.	0.87	2.47	0.90	1.77	0.95	-0.13	4284
Gunnedah Airport	0.89	2.17	0.92	2.37	0.96	-0.01	4232
Gympie	0.97	1.38	0.83	3.04	0.90	0.71	4273
Hamilton Airport	0.91	2.47	0.91	3.10	0.95	1.04	4233
Hopetoun Airport	0.89	3.40	0.94	2.88	0.96	1.18	4321
Inglewood Forest	0.83	4.11	0.90	2.50	0.94	0.62	4273
Inverell Res. Ctr.	0.88	2.36	0.93	1.88	0.96	0.13	4294
Keith (Munkora)	0.94	2.21	0.94	2.98	0.96	1.03	4705
Kingaroy Airport	0.99	0.97	0.85	3.14	0.91	0.85	4273
Kingscote Aerodrome	0.89	2.80	0.88	3.16	0.93	0.96	4705
Lameroo (Austin Plains)	0.94	2.35	0.95	2.68	0.97	1.14	4656
Longerenong	0.95	1.89	0.94	2.89	0.96	1.04	4321
Mareeba Airport	0.91	2.59	0.89	1.60	0.94	0.45	4273
Minlaton Aerodrome	0.88	2.81	0.93	2.44	0.96	0.45	4561
Minnipa DPI	0.96	1.15	0.94	2.56	0.97	0.36	4705
Morawa Airport	0.84	4.57	0.89	3.00	0.94	0.64	4561
Mount Ginini	0.90	0.66	0.94	1.86	0.97	-0.19	4321
Mudgee Airport	0.86	2.67	0.91	2.62	0.95	0.36	4278
Narrabri Airport	0.87	2.89	0.92	2.37	0.96	0.11	4321
Newdegate Res. Stn.	0.86	3.07	0.90	2.92	0.94	0.45	4561
Nhill Aerodrome	0.96	1.70	0.95	2.60	0.97	0.95	4321
Orange Airport	0.86	2.10	0.93	2.16	0.96	0.17	4304
Padthaway South	0.93	2.46	0.93	3.17	0.96	1.16	4609
Parafield Airport	0.89	2.99	0.94	2.56	0.97	0.60	4609
Parkes Airport	0.89	2.31	0.93	2.43	0.96	0.26	4321
Port Augusta Aerodrome	0.82	4.87	0.93	2.80	0.95	0.81	4609
Rockhampton Aerodrome	0.90	2.83	0.83	2.45	0.90	0.58	4273
Rocky Gully	0.79	3.98	0.87	2.66	0.93	0.38	4561
Salmon Gums Res. Stn.	0.75	4.81	0.87	3.26	0.92	-0.04	4561
Scone Airport	0.84	2.94	0.90	2.56	0.95	0.12	4321
Shepparton Airport	0.82	4.56	0.93	2.89	0.95	1.30	4321
Snowtown (Rayville Park)	0.89	3.07	0.94	2.77	0.97	0.80	4609
Southern Cross Airfield	0.75	5.97	0.89	3.25	0.93	0.55	4540
St. George Airport	0.67	8.43	0.85	3.28	0.89	1.21	4094
St. Lawrence	1.12	-2.34	0.84	2.92	0.89	0.45	4273
Stawell Aerodrome	0.94	2.01	0.92	2.91	0.96	1.00	4321
Strathalbyn Racecourse	0.84	3.75	0.91	2.85	0.95	0.78	4561
Swan Hill Aerodrome	0.88	3.63	0.95	2.62	0.97	1.15	4265
Temora Airport	0.88	2.80	0.90	3.16	0.94	0.49	4321
Toowoomba Airport	0.85	3.26	0.86	2.25	0.92	0.63	4273

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Trangie Res. Stn.	0.87	3.34	0.93	2.32	0.96	0.64	4321
UQ Gatton	0.96	1.67	0.84	3.32	0.91	0.77	4273
Wagga Wagga	0.93	1.91	0.94	2.42	0.97	0.57	4321
Walgett Airport	0.88	2.94	0.92	2.58	0.96	0.29	4321
Wandering	0.84	3.44	0.89	3.15	0.94	0.39	4561
Wangaratta Aerodrome	0.81	4.91	0.93	3.20	0.95	1.62	4321
Warra	0.83	2.46	0.83	3.04	0.91	0.67	4561
West Wyalong Airport	0.92	2.24	0.94	2.36	0.97	0.69	4321
Woolshed	0.91	2.29	0.85	1.79	0.92	0.29	4273
Yarrawonga	0.82	4.75	0.93	2.85	0.95	1.20	4321
Young Airport	0.90	2.19	0.93	2.73	0.96	0.38	4030

Table E17: Temperature statistics for all sites for six day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.84	3.28	0.82	2.95	0.90	0.69	3754
Avalon Airport	0.73	5.95	0.81	3.79	0.88	1.42	3799
Ayr DPI Res. Stn.	0.72	7.55	0.77	2.01	0.87	0.43	3709
Bendigo Airport	0.84	3.77	0.88	3.54	0.93	0.92	3764
Bridgetown	0.69	7.10	0.76	4.58	0.85	1.41	4024
Casino Airport	0.89	2.19	0.85	2.36	0.92	-0.03	3799
Casterton	0.79	4.26	0.86	3.75	0.92	0.84	3799
Cleve Aerodrome	0.76	4.31	0.83	3.96	0.91	-0.48	4165
Cobar Airport	0.86	3.35	0.89	3.17	0.94	0.36	3799
Collie East	0.72	6.62	0.74	4.95	0.85	1.44	4024
Condobolin Airport	0.75	2.93	0.80	5.00	0.87	-2.24	3461
Coonamble Airport	0.82	4.15	0.89	3.03	0.94	0.53	3799
Cowra Airport	0.64	6.47	0.78	4.68	0.87	-0.28	3799
Cunderdin Airfield	0.79	5.69	0.84	4.03	0.90	1.20	4024
Dalby Airport	0.84	4.48	0.85	3.41	0.91	1.28	3739
Dalwalinu	0.76	6.88	0.82	4.06	0.89	1.41	4024
Deniliquin Airport	0.89	2.65	0.88	3.61	0.94	0.47	3799
Dubbo Airport	0.80	4.47	0.89	3.09	0.94	0.63	3799
Dunns Hill	0.82	3.17	0.82	3.69	0.90	0.53	3768
Esperance Aerodrome	0.64	7.04	0.69	4.30	0.82	0.28	4024
Forbes Airport	0.85	3.10	0.88	3.31	0.94	0.20	3799
Gayndah Airport	0.89	3.42	0.83	3.22	0.90	1.02	3754
Glen Innes Airport	0.83	2.96	0.89	2.67	0.94	0.46	3799
Grafton Res. Stn.	0.86	2.93	0.86	2.17	0.92	0.07	3765
Gunnedah Airport	0.87	2.78	0.88	3.04	0.94	0.24	3716
Gympie	0.88	3.69	0.83	2.99	0.90	1.10	3754
Hamilton Airport	0.80	4.17	0.85	3.99	0.92	0.94	3715
Hopetoun Airport	0.84	4.09	0.90	3.79	0.94	1.02	3799
Inglewood Forest	0.81	4.67	0.85	3.09	0.91	0.85	3754
Inverell Res. Ctr.	0.87	2.63	0.90	2.32	0.95	0.34	3772
Keith (Munkora)	0.86	3.61	0.90	3.84	0.94	0.98	4165
Kingaroy Airport	0.93	2.71	0.81	3.70	0.88	1.34	3754
Kingscote Aerodrome	0.78	4.92	0.84	3.75	0.90	1.06	4165
Lameroo (Austin Plains)	0.87	3.52	0.91	3.62	0.95	0.97	4117
Longerenong	0.89	2.87	0.89	3.74	0.94	0.87	3799
Mareeba Airport	0.93	2.36	0.87	1.86	0.92	0.63	3754

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Minlaton Aerodrome	0.79	4.53	0.87	3.37	0.93	0.29	4024
Minnipa DPI	0.87	2.69	0.89	3.56	0.94	-0.01	4165
Morawa Airport	0.77	6.74	0.82	4.08	0.89	1.24	4024
Mount Ginini	0.89	0.65	0.89	2.57	0.94	-0.33	3799
Mudgee Airport	0.83	3.22	0.86	3.25	0.93	0.45	3759
Narrabri Airport	0.85	3.53	0.87	2.99	0.93	0.41	3799
Newdegate Res. Stn.	0.72	5.82	0.79	4.17	0.88	0.62	4002
Nhill Aerodrome	0.89	2.81	0.90	3.54	0.95	0.70	3799
Orange Airport	0.81	2.81	0.87	2.92	0.93	0.20	3785
Padthaway South	0.85	3.62	0.89	3.84	0.94	1.05	4069
Parafield Airport	0.80	4.57	0.89	3.48	0.94	0.43	4069
Parkes Airport	0.82	3.68	0.87	3.43	0.93	0.25	3799
Port Augusta Aerodrome	0.76	6.26	0.88	3.58	0.93	0.79	4069
Rockhampton Aerodrome	0.83	4.79	0.82	2.50	0.89	0.72	3754
Rocky Gully	0.68	6.91	0.69	4.42	0.81	1.32	4024
Salmon Gums Res. Stn.	0.58	8.09	0.73	4.57	0.84	-0.07	4024
Scone Airport	0.82	3.49	0.85	3.24	0.92	0.31	3799
Shepparton Airport	0.79	5.19	0.86	3.96	0.91	1.30	3799
Snowtown (Rayville Park)	0.83	4.15	0.90	3.63	0.94	0.83	4069
Southern Cross Airfield	0.65	8.58	0.80	4.34	0.88	0.92	4004
St. George Airport	0.63	9.65	0.80	3.93	0.85	1.67	3591
St. Lawrence	0.99	0.78	0.84	2.71	0.90	0.62	3754
Stawell Aerodrome	0.86	3.17	0.87	3.69	0.93	0.85	3799
Strathalbyn Racecourse	0.74	5.55	0.84	3.86	0.91	0.84	4024
Swan Hill Aerodrome	0.84	4.34	0.89	3.80	0.94	1.05	3746
Temora Airport	0.81	3.93	0.85	3.82	0.92	0.45	3799
Toowoomba Airport	0.82	4.35	0.77	3.08	0.86	1.06	3754
Trangie Res. Stn.	0.79	4.81	0.87	3.12	0.93	0.65	3799
UQ Gatton	0.92	2.71	0.81	3.84	0.88	1.16	3754
Wagga Wagga	0.89	2.61	0.88	3.39	0.94	0.47	3799
Walgett Airport	0.83	4.28	0.88	3.26	0.93	0.58	3799
Wandering	0.79	5.16	0.83	4.10	0.90	1.17	4024
Wangaratta Aerodrome	0.77	5.68	0.87	4.13	0.92	1.67	3799
Warra	0.70	3.59	0.72	3.90	0.84	0.36	4024
West Wyalong Airport	0.85	3.57	0.88	3.36	0.93	0.61	3799
Woolshed	0.89	2.72	0.84	1.87	0.91	0.31	3754
Yarrawonga	0.78	5.48	0.85	4.02	0.91	1.31	3799
Young Airport	0.85	2.88	0.88	3.55	0.94	0.30	3550

Table E18: Relative humidity statistics for all sites for one day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.86	9.65	0.87	9.38	0.93	-1.15	7221
Avalon Airport	0.75	15.67	0.81	11.04	0.90	-1.16	7221
Ayr DPI Res. Stn.	0.82	9.37	0.76	9.23	0.83	-4.77	7201
Bendigo Airport	0.84	7.87	0.88	10.73	0.94	-0.79	7180
Bridgetown	0.83	9.95	0.90	10.68	0.94	-1.02	7227

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Casino Airport	0.77	16.93	0.86	7.70	0.92	-0.25	7227
Casterton	0.80	13.98	0.89	10.85	0.94	1.31	7221
Cleve Aerodrome	0.81	10.80	0.87	11.52	0.93	0.81	7227
Cobar Airport	0.82	7.79	0.88	10.02	0.94	-0.68	7227
Collie East	0.84	9.16	0.89	9.72	0.94	-0.41	7227
Condobolin Airport	0.60	19.58	0.66	18.58	0.82	-0.67	7032
Coonamble Airport	0.76	12.42	0.85	11.95	0.92	-1.48	7227
Cowra Airport	0.74	15.02	0.82	13.07	0.90	0.24	7223
Cunderdin Airfield	0.83	6.95	0.88	10.39	0.94	-1.32	7227
Dalby Airport	0.83	9.99	0.86	10.12	0.93	-1.13	7198
Dalwalinu	0.86	5.76	0.88	11.94	0.94	-0.85	7227
Deniliquin Airport	0.90	6.99	0.90	10.64	0.94	2.35	7227
Dubbo Airport	0.79	9.73	0.87	10.93	0.93	-2.95	7227
Dunns Hill	0.81	13.96	0.86	11.17	0.92	0.32	7187
Esperance Aerodrome	0.79	12.99	0.81	12.80	0.90	-1.24	7227
Forbes Airport	0.80	10.83	0.89	11.04	0.94	0.32	7227
Gayndah Airport	0.84	10.00	0.87	8.88	0.93	-0.53	7221
Glen Innes Airport	0.80	16.15	0.89	9.68	0.94	0.37	7227
Grafton Res. Stn.	0.76	17.81	0.86	7.42	0.92	0.08	7190
Gunnedah Airport	0.78	12.88	0.88	9.89	0.93	-0.20	7138
Gympie	0.87	9.81	0.86	8.35	0.92	-0.38	7221
Hamilton Airport	0.82	12.86	0.90	10.88	0.95	1.10	7133
Hopetoun Airport	0.93	3.85	0.93	8.61	0.96	0.51	7192
Inglewood Forest	0.80	12.55	0.86	12.06	0.92	0.21	6188
Inverell Res. Ctr.	0.80	12.34	0.87	10.53	0.93	-0.98	7100
Keith (Munkora)	0.86	8.17	0.92	10.35	0.96	0.71	7227
Kingaroy Airport	0.87	8.15	0.88	8.57	0.94	-1.31	7221
Kingscote Aerodrome	0.79	12.47	0.84	10.97	0.92	-0.92	7227
Lameroo (Austin Plains)	0.90	4.73	0.92	9.88	0.96	-0.02	7226
Longerenong	0.92	5.85	0.90	10.97	0.95	1.76	7221
Mareeba Airport	0.87	6.49	0.85	9.37	0.91	-3.56	7187
Minlaton Aerodrome	0.82	9.73	0.88	10.95	0.93	-0.23	7179
Minnipa DPI	0.90	4.05	0.92	10.08	0.96	-0.54	7036
Morawa Airport	0.85	4.79	0.87	11.84	0.93	-1.91	7227
Mount Ginini	0.73	18.11	0.84	11.67	0.90	-3.57	7227
Mudgee Airport	0.81	12.25	0.87	10.10	0.93	-1.23	7184
Narrabri Airport	0.71	15.59	0.84	11.19	0.91	-0.07	7227
Newdegate Res. Stn.	0.85	6.02	0.89	10.78	0.94	-2.47	7150
Nhill Aerodrome	0.94	4.44	0.92	9.70	0.96	1.42	7221
Orange Airport	0.84	11.71	0.89	9.37	0.94	0.03	7210
Padthaway South	0.85	9.39	0.91	10.32	0.95	0.65	7227
Parafield Airport	0.80	8.88	0.87	10.24	0.93	-0.37	7227
Parkes Airport	0.78	12.78	0.87	12.14	0.93	-0.17	7227
Port Augusta Aerodrome	0.80	9.43	0.84	12.38	0.91	1.05	7227
Rockhampton Aerodrome	0.79	14.00	0.86	8.74	0.92	-1.27	7221
Rocky Gully	0.85	9.81	0.89	9.41	0.94	-0.60	7227
Salmon Gums Res. Stn.	0.83	9.36	0.84	12.86	0.92	-0.64	7227

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Scone Airport	0.81	13.40	0.89	10.31	0.94	-2.09	7227
Shepparton Airport	0.78	8.96	0.86	11.05	0.92	-2.30	7221
Snowtown (Rayville Park)	0.81	7.87	0.88	11.28	0.94	-1.36	7215
Southern Cross Airfield	0.83	6.59	0.85	12.79	0.92	-1.23	7206
St. George Airport	0.48	33.87	0.62	18.47	0.78	1.54	7024
St. Lawrence	0.87	9.07	0.86	8.37	0.92	-0.64	7221
Stawell Aerodrome	0.86	9.80	0.89	10.99	0.94	1.91	7221
Strathalbyn Racecourse	0.81	10.90	0.88	10.50	0.94	-0.37	7212
Swan Hill Aerodrome	0.86	5.88	0.89	10.18	0.94	0.06	6987
Temora Airport	0.86	7.35	0.89	10.16	0.94	-0.49	7222
Toowoomba Airport	0.76	18.04	0.76	12.28	0.87	0.77	7221
Trangie Res. Stn.	0.79	10.95	0.88	10.25	0.93	-1.11	7227
UQ Gatton	0.87	7.25	0.87	8.74	0.93	-1.80	7221
Wagga Wagga	0.86	7.78	0.88	10.29	0.94	0.45	7227
Walgett Airport	0.78	11.79	0.86	10.94	0.92	-0.31	7227
Wandering	0.88	6.21	0.90	10.53	0.95	-0.37	7227
Wangaratta Aerodrome	0.77	9.74	0.87	12.93	0.93	-2.93	7221
Warra	0.78	16.02	0.81	9.81	0.90	-0.35	7227
West Wyalong Airport	0.86	7.88	0.91	9.14	0.95	0.30	7227
Woolshed	0.91	6.00	0.89	8.00	0.94	-1.94	7221
Yarrawonga	0.81	6.70	0.87	10.66	0.93	-2.27	7221
Young Airport	0.86	6.85	0.90	9.80	0.95	-0.98	6936

Table E19: Relative humidity statistics for all sites for three day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.81	13.35	0.83	11.90	0.91	-1.35	4273
Avalon Airport	0.60	21.43	0.65	15.77	0.79	-5.22	4321
Ayr DPI Res. Stn.	0.66	21.96	0.66	10.44	0.77	-4.98	4225
Bendigo Airport	0.76	9.12	0.83	13.03	0.90	-4.23	4280
Bridgetown	0.76	14.57	0.81	14.25	0.90	-1.55	4561
Casino Airport	0.76	16.77	0.82	9.58	0.90	-1.11	4321
Casterton	0.75	14.21	0.81	14.03	0.90	-2.40	4321
Cleve Aerodrome	0.65	19.98	0.71	17.32	0.84	1.67	4705
Cobar Airport	0.63	12.42	0.83	13.22	0.87	-6.07	4321
Collie East	0.66	19.15	0.69	16.72	0.83	-2.36	4561
Condobolin Airport	0.70	14.99	0.74	15.63	0.86	0.35	4126
Coonamble Airport	0.69	13.54	0.85	12.96	0.90	-4.19	4321
Cowra Airport	0.63	21.45	0.76	15.04	0.86	-0.30	4320
Cunderdin Airfield	0.70	16.39	0.69	16.79	0.83	0.30	4561
Dalby Airport	0.83	9.32	0.85	11.52	0.92	-1.67	4250
Dalwalinu	0.70	15.82	0.71	18.01	0.84	0.29	4561
Deniliquin Airport	0.75	11.16	0.85	11.72	0.92	-0.61	4321
Dubbo Airport	0.72	11.67	0.86	12.47	0.91	-5.40	4321
Dunns Hill	0.73	16.12	0.75	15.31	0.86	-3.61	4287
Esperance Aerodrome	0.66	21.93	0.68	16.54	0.82	-0.97	4561
Forbes Airport	0.72	13.63	0.87	11.87	0.92	-1.27	4321
Gayndah Airport	0.89	4.14	0.85	11.33	0.91	-3.00	4273
Glen Innes Airport	0.72	21.08	0.87	11.59	0.92	-0.16	4321
Grafton Res. Stn.	0.75	16.66	0.84	8.59	0.91	-1.53	4284

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Gunnedah Airport	0.76	10.78	0.88	10.66	0.93	-2.53	4232
Gympie	0.90	3.38	0.84	10.56	0.90	-4.14	4273
Hamilton Airport	0.77	11.90	0.81	15.48	0.89	-3.60	4233
Hopetoun Airport	0.89	5.78	0.87	11.09	0.93	0.80	4321
Inglewood Forest	0.71	17.45	0.77	15.74	0.88	0.72	4273
Inverell Res. Ctr.	0.74	14.59	0.85	11.92	0.91	-1.29	4294
Keith (Munkora)	0.80	8.89	0.86	13.87	0.92	-2.52	4705
Kingaroy Airport	0.93	1.90	0.86	11.14	0.92	-3.40	4273
Kingscote Aerodrome	0.76	11.31	0.79	13.26	0.88	-3.85	4705
Lameroo (Austin Plains)	0.84	6.47	0.88	12.22	0.94	-1.36	4656
Longerenong	0.88	5.54	0.85	13.41	0.92	-0.68	4321
Mareeba Airport	0.87	6.54	0.81	10.74	0.88	-3.60	4273
Minlaton Aerodrome	0.73	12.28	0.84	13.01	0.90	-3.09	4561
Minnipa DPI	0.83	5.20	0.87	13.67	0.93	-2.75	4705
Morawa Airport	0.69	13.03	0.73	16.29	0.85	-2.04	4561
Mount Ginini	0.46	42.89	0.65	15.42	0.78	-1.07	4321
Mudgee Airport	0.77	11.71	0.85	12.03	0.91	-4.35	4278
Narrabri Airport	0.69	13.58	0.83	11.73	0.90	-2.32	4321
Newdegate Res. Stn.	0.83	9.66	0.80	14.50	0.89	-0.30	4561
Nhill Aerodrome	0.88	5.42	0.88	11.84	0.94	-0.38	4321
Orange Airport	0.70	19.24	0.84	11.63	0.91	-1.98	4304
Padthaway South	0.79	9.90	0.85	13.66	0.92	-3.28	4609
Parafield Airport	0.69	11.42	0.82	12.70	0.89	-3.26	4609
Parkes Airport	0.70	16.61	0.85	13.18	0.91	-1.12	4321
Port Augusta Aerodrome	0.70	12.15	0.77	14.48	0.87	-0.76	4609
Rockhampton Aerodrome	0.79	10.78	0.80	11.87	0.88	-3.91	4273
Rocky Gully	0.72	17.76	0.77	13.01	0.87	-1.96	4561
Salmon Gums Res. Stn.	0.72	20.24	0.71	17.52	0.84	4.01	4561
Scone Airport	0.77	13.70	0.86	12.93	0.92	-4.32	4321
Shepparton Airport	0.71	12.80	0.82	12.12	0.89	-3.41	4321
Snowtown (Rayville Park)	0.69	11.92	0.81	14.48	0.89	-3.69	4609
Southern Cross Airfield	0.66	15.34	0.69	18.02	0.83	-1.12	4540
St. George Airport	0.47	35.50	0.57	20.11	0.74	5.71	4094
St. Lawrence	0.87	7.17	0.78	12.08	0.87	-2.56	4273
Stawell Aerodrome	0.84	7.80	0.81	14.23	0.90	-1.05	4321
Strathalbyn Racecourse	0.69	15.80	0.78	14.58	0.87	-2.26	4561
Swan Hill Aerodrome	0.84	6.13	0.87	10.75	0.93	-0.96	4265
Temora Airport	0.71	14.38	0.82	12.50	0.90	-1.73	4321
Toowoomba Airport	0.77	15.13	0.76	13.78	0.87	-0.83	4273
Trangie Res. Stn.	0.67	14.51	0.86	12.09	0.90	-4.96	4321
UQ Gatton	0.85	7.47	0.84	11.21	0.91	-3.03	4273
Wagga Wagga	0.76	12.42	0.86	10.97	0.92	-0.58	4321
Walgett Airport	0.68	14.03	0.85	11.67	0.90	-2.84	4321
Wandering	0.72	16.05	0.74	16.15	0.86	-0.31	4561
Wangaratta Aerodrome	0.73	12.61	0.84	14.13	0.90	-3.45	4321

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Warra	0.63	22.99	0.63	14.09	0.77	-5.16	4561
West Wyalong Airport	0.75	13.26	0.85	11.45	0.92	0.03	4321
Woolshed	0.70	24.12	0.73	12.35	0.85	-1.18	4273
Yarrawonga	0.79	10.85	0.86	10.47	0.92	0.52	4321
Young Airport	0.79	11.66	0.87	11.09	0.93	-0.59	4030

Table E20: Relative humidity statistics for all sites for six day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.79	13.87	0.78	14.20	0.88	-1.96	3754
Avalon Airport	0.55	24.55	0.61	16.89	0.76	-5.23	3799
Ayr DPI Res. Stn.	0.60	25.99	0.61	11.58	0.73	-5.87	3709
Bendigo Airport	0.72	11.52	0.74	16.19	0.85	-4.08	3764
Bridgetown	0.69	17.98	0.73	17.37	0.85	-2.60	4024
Casino Airport	0.76	16.58	0.78	10.89	0.88	-0.97	3799
Casterton	0.65	19.83	0.74	16.59	0.85	-2.85	3799
Cleve Aerodrome	0.55	25.49	0.62	20.05	0.78	2.72	4165
Cobar Airport	0.54	16.96	0.65	16.85	0.78	-5.58	3799
Collie East	0.69	18.63	0.68	17.33	0.82	-1.24	4024
Condobolin Airport	0.57	21.96	0.58	20.11	0.76	1.26	3615
Coonamble Airport	0.55	20.34	0.69	17.61	0.81	-4.41	3799
Cowra Airport	0.60	23.96	0.69	16.57	0.83	1.17	3799
Cunderdin Airfield	0.67	16.71	0.64	18.32	0.80	-0.74	4024
Dalby Airport	0.80	10.36	0.79	14.52	0.88	-2.89	3739
Dalwalinu	0.62	17.95	0.62	20.94	0.79	-1.64	4024
Deniliquin Airport	0.73	11.82	0.76	15.32	0.87	-1.08	3799
Dubbo Airport	0.62	17.02	0.76	16.02	0.85	-5.74	3799
Dunns Hill	0.61	24.37	0.66	17.73	0.81	-3.62	3768
Esperance Aerodrome	0.49	33.95	0.50	20.84	0.72	0.23	4024
Forbes Airport	0.62	18.96	0.74	16.13	0.85	-0.77	3799
Gayndah Airport	0.81	8.45	0.77	14.11	0.87	-3.81	3754
Glen Innes Airport	0.66	25.31	0.82	13.70	0.89	-0.04	3799
Grafton Res. Stn.	0.74	17.64	0.80	9.67	0.89	-0.90	3765
Gunnedah Airport	0.65	16.87	0.76	14.62	0.87	-2.50	3716
Gympie	0.83	8.56	0.78	12.21	0.87	-4.26	3754
Hamilton Airport	0.66	18.60	0.72	18.62	0.84	-3.67	3715
Hopetoun Airport	0.80	10.76	0.74	16.79	0.86	1.14	3799
Inglewood Forest	0.65	20.61	0.68	18.80	0.83	0.09	3754
Inverell Res. Ctr.	0.63	21.14	0.74	15.40	0.86	-0.92	3772
Keith (Munkora)	0.70	14.73	0.76	18.24	0.87	-1.84	4165
Kingaroy Airport	0.89	3.54	0.79	14.22	0.88	-4.64	3754
Kingscote Aerodrome	0.66	17.27	0.73	15.08	0.84	-3.94	4165
Lameroo (Austin Plains)	0.75	12.13	0.77	17.26	0.88	-0.11	4117
Longerenong	0.80	10.21	0.74	18.06	0.86	-0.02	3799
Mareeba Airport	0.88	4.39	0.77	12.66	0.85	-5.27	3754
Minlaton Aerodrome	0.60	20.35	0.70	17.27	0.83	-1.90	4024
Minnipa DPI	0.68	12.31	0.72	19.52	0.85	-2.68	4165
Morawa Airport	0.59	15.90	0.61	20.09	0.78	-4.24	4024
Mount Ginini	0.40	47.38	0.54	18.01	0.73	-0.60	3799
Mudgee Airport	0.71	15.71	0.78	14.71	0.87	-4.38	3759
Narrabri Airport	0.54	20.43	0.67	15.82	0.81	-2.73	3799

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Newdegate Res. Stn.	0.73	15.92	0.69	18.33	0.83	-0.13	4002
Nhill Aerodrome	0.80	10.42	0.76	16.89	0.87	0.50	3799
Orange Airport	0.61	25.40	0.72	15.21	0.84	-2.26	3785
Padthaway South	0.71	14.73	0.77	16.86	0.87	-2.90	4069
Parafield Airport	0.57	17.96	0.65	17.47	0.80	-2.12	4069
Parkes Airport	0.60	22.20	0.72	17.61	0.84	-0.76	3799
Port Augusta Aerodrome	0.59	16.53	0.63	18.49	0.79	-0.72	4069
Rockhampton Aerodrome	0.66	19.79	0.73	13.53	0.84	-4.13	3754
Rocky Gully	0.60	23.40	0.60	18.73	0.77	-4.04	4024
Salmon Gums Res. Stn.	0.55	31.14	0.55	22.17	0.74	5.32	4024
Scone Airport	0.72	17.25	0.79	15.93	0.88	-4.43	3799
Shepparton Airport	0.66	14.58	0.74	15.01	0.85	-4.21	3799
Snowtown (Rayville Park)	0.62	15.31	0.72	17.46	0.84	-3.56	4069
Southern Cross Airfield	0.43	25.24	0.47	23.48	0.69	-2.96	4004
St. George Airport	0.37	39.73	0.44	22.78	0.67	4.86	3591
St. Lawrence	0.79	12.26	0.72	13.62	0.84	-3.02	3754
Stawell Aerodrome	0.73	14.35	0.70	18.75	0.83	-0.85	3799
Strathalbyn Racecourse	0.60	21.01	0.69	17.30	0.82	-2.32	4024
Swan Hill Aerodrome	0.79	7.96	0.74	15.90	0.86	-1.27	3746
Temora Airport	0.64	17.43	0.75	14.88	0.86	-2.60	3799
Toowoomba Airport	0.74	17.49	0.66	17.29	0.81	-0.50	3754
Trangie Res. Stn.	0.55	21.13	0.71	16.07	0.82	-4.71	3799
UQ Gatton	0.82	9.08	0.77	13.71	0.87	-3.71	3754
Wagga Wagga	0.69	14.98	0.78	14.06	0.88	-1.29	3799
Walgett Airport	0.54	20.30	0.68	16.07	0.81	-3.35	3799
Wandering	0.74	14.31	0.73	16.85	0.86	-1.03	4024
Wangaratta Aerodrome	0.68	13.64	0.78	17.00	0.87	-4.90	3799
Warra	0.51	33.66	0.53	15.28	0.71	-4.26	4024
West Wyalong Airport	0.66	18.38	0.72	15.91	0.84	0.25	3799
Woolshed	0.67	26.30	0.69	13.56	0.83	-1.09	3754
Yarrawonga	0.73	12.23	0.75	14.10	0.87	-0.95	3799
Young Airport	0.72	15.05	0.80	13.96	0.89	-0.74	3550

Table E21: Wind speed statistics for all sites for one day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.46	1.34	0.61	1.09	0.76	-0.20	7221
Avalon Airport	0.56	1.35	0.64	2.39	0.77	-0.99	7221
Ayr DPI Res. Stn.	0.27	1.61	0.54	2.35	0.58	-1.49	7201
Bendigo Airport	0.54	1.41	0.60	1.81	0.76	-0.41	7180
Bridgetown	0.55	1.10	0.71	1.25	0.82	-0.21	7227
Casino Airport	0.56	0.87	0.66	1.52	0.80	-0.39	7227
Casterton	0.60	1.27	0.61	1.76	0.77	-0.25	7221
Cleve Aerodrome	0.46	2.35	0.55	2.43	0.72	-0.73	7227
Cobar Airport	0.39	1.52	0.56	1.80	0.70	-0.61	7227
Collie East	0.54	0.97	0.71	1.07	0.82	-0.08	7227
Condobolin Airport	0.42	1.49	0.65	1.86	0.74	-0.72	7032

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Coonamble Airport	0.34	1.86	0.43	2.03	0.62	-0.80	7227
Cowra Airport	0.36	1.16	0.53	1.88	0.67	-0.76	7223
Cunderdin Airfield	0.56	1.98	0.66	1.85	0.80	-0.32	7227
Dalby Airport	0.47	1.88	0.38	2.86	0.58	-0.47	7198
Dalwalinu	0.51	2.40	0.52	2.59	0.70	-0.59	7227
Deniliquin Airport	0.49	1.49	0.64	2.06	0.75	-0.92	7227
Dubbo Airport	0.53	1.69	0.59	1.76	0.75	-0.47	7227
Dunns Hill	0.67	0.83	0.65	1.88	0.78	-0.68	7187
Esperance Aerodrome	0.66	1.23	0.71	1.88	0.82	-0.69	7227
Forbes Airport	0.34	1.76	0.55	2.21	0.66	-0.85	7227
Gayndah Airport	0.54	1.28	0.65	1.50	0.79	-0.12	7221
Glen Innes Airport	0.73	1.01	0.73	1.72	0.85	-0.32	7227
Grafton Res. Stn.	0.60	0.63	0.74	1.41	0.82	-0.56	7190
Gunnedah Airport	0.51	1.47	0.64	1.79	0.77	-0.60	7138
Gympie	0.58	1.16	0.72	1.40	0.83	0.15	7221
Hamilton Airport	0.66	1.22	0.68	1.91	0.81	-0.59	7133
Hopetoun Airport	0.63	1.25	0.62	2.07	0.77	-0.65	7192
Inglewood Forest	0.37	1.58	0.33	1.60	0.56	-0.62	6188
Inverell Res. Ctr.	0.43	0.82	0.55	1.42	0.67	-0.79	7100
Keith (Munkora)	0.64	1.09	0.66	1.99	0.79	-0.53	7227
Kingaroy Airport	0.59	1.40	0.63	1.53	0.79	0.05	7221
Kingscote Aerodrome	0.66	1.29	0.73	1.87	0.85	-0.30	7227
Lameroo (Austin Plains)	0.59	1.60	0.61	2.19	0.76	-0.62	7226
Longerenong	0.63	1.31	0.65	2.01	0.79	-0.59	7221
Mareeba Airport	0.42	1.39	0.60	1.78	0.73	-0.57	7187
Minlaton Aerodrome	0.60	1.77	0.60	2.40	0.75	-0.91	7179
Minnipa DPI	0.51	2.03	0.58	2.03	0.74	-0.59	7036
Morawa Airport	0.50	2.07	0.36	3.23	0.56	-0.60	7227
Mount Ginini	0.87	-0.15	0.76	1.55	0.83	-0.73	7227
Mudgee Airport	0.40	1.13	0.63	1.63	0.72	-0.70	7184
Narrabri Airport	0.41	1.82	0.53	2.00	0.70	-0.65	7227
Newdegate Res. Stn.	0.64	1.74	0.70	1.91	0.83	-0.29	7150
Nhill Aerodrome	0.67	1.34	0.47	3.00	0.64	-0.25	7221
Orange Airport	0.56	1.13	0.68	1.68	0.79	-0.59	7210
Padthaway South	0.64	1.06	0.68	1.62	0.82	-0.33	7227
Parafield Airport	0.31	2.21	0.37	2.55	0.60	-0.86	7227
Parkes Airport	0.38	1.53	0.54	2.07	0.68	-0.95	7227
Port Augusta Aerodrome	0.52	2.09	0.60	2.43	0.76	-0.63	7227
Rockhampton Aerodrome	0.54	1.40	0.52	1.68	0.71	-0.21	7221
Rocky Gully	0.61	1.30	0.68	1.44	0.80	-0.48	7227
Salmon Gums Res. Stn.	0.61	1.57	0.54	2.24	0.72	-0.43	7227
Scone Airport	0.52	1.33	0.68	1.87	0.80	-0.35	7227
Shepparton Airport	0.59	1.25	0.69	1.84	0.82	-0.41	7221
Snowtown (Rayville Park)	0.62	1.25	0.65	2.24	0.79	-0.68	7215
Southern Cross Airfield	0.52	2.26	0.39	3.19	0.57	-0.26	7206
St. George Airport	0.17	1.93	0.20	3.41	0.41	-0.66	7024

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
St. Lawrence	0.55	1.22	0.62	1.24	0.78	-0.04	7221
Stawell Aerodrome	0.62	1.17	0.48	2.71	0.65	-0.16	7221
Strathalbyn Racecourse	0.62	1.26	0.67	2.02	0.81	-0.52	7212
Swan Hill Aerodrome	0.57	1.37	0.65	1.74	0.79	-0.47	6987
Temora Airport	0.49	1.34	0.62	1.83	0.76	-0.55	7222
Toowoomba Airport	0.69	1.64	0.65	2.09	0.80	-0.32	7221
Trangie Res. Stn.	0.35	1.77	0.53	1.82	0.67	-0.51	7227
UQ Gatton	0.51	1.08	0.61	1.56	0.76	-0.35	7221
Wagga Wagga	0.44	1.13	0.62	1.77	0.73	-0.70	7227
Walgett Airport	0.43	1.47	0.58	1.63	0.71	-0.66	7227
Wandering	0.43	1.76	0.42	2.13	0.61	-0.30	7227
Wangaratta Aerodrome	0.44	1.01	0.62	1.84	0.74	-0.59	7221
Warra	0.48	1.17	0.64	1.62	0.76	-0.56	7227
West Wyalong Airport	0.49	1.51	0.63	1.74	0.77	-0.43	7227
Woolshed	0.36	1.60	0.46	1.03	0.67	-0.14	7221
Yarrawonga	0.56	1.07	0.64	1.83	0.77	-0.74	7221
Young Airport	0.39	1.30	0.56	1.90	0.70	-0.68	6936

Table E22: Wind speed statistics for all sites for three day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.35	1.72	0.50	1.23	0.69	-0.02	4273
Avalon Airport	0.38	2.02	0.54	2.62	0.69	-1.14	4321
Ayr DPI Res. Stn.	0.19	1.77	0.54	3.00	0.54	-2.28	4225
Bendigo Airport	0.41	1.77	0.52	1.90	0.70	-0.45	4280
Bridgetown	0.38	1.39	0.54	1.58	0.71	-0.32	4561
Casino Airport	0.46	1.19	0.57	1.58	0.74	-0.21	4321
Casterton	0.45	1.82	0.53	1.75	0.72	-0.21	4321
Cleve Aerodrome	0.32	3.01	0.42	2.70	0.64	-0.81	4705
Cobar Airport	0.26	1.88	0.47	1.90	0.62	-0.50	4321
Collie East	0.38	1.19	0.55	1.34	0.72	-0.17	4561
Condobolin Airport	0.30	1.87	0.51	1.98	0.65	-0.53	4126
Coonamble Airport	0.29	1.90	0.45	1.92	0.61	-0.84	4321
Cowra Airport	0.25	1.32	0.47	1.92	0.61	-0.77	4320
Cunderdin Airfield	0.39	2.38	0.50	2.29	0.69	-0.68	4561
Dalby Airport	0.41	2.51	0.49	2.05	0.69	-0.01	4250
Dalwalinu	0.31	2.79	0.43	2.79	0.62	-1.20	4561
Deniliquin Airport	0.31	1.83	0.50	2.35	0.62	-1.18	4321
Dubbo Airport	0.37	2.35	0.44	1.89	0.66	-0.34	4321
Dunns Hill	0.44	1.76	0.45	2.25	0.66	-0.75	4287
Esperance Aerodrome	0.47	1.96	0.52	2.40	0.69	-0.96	4561
Forbes Airport	0.22	2.20	0.40	2.42	0.55	-0.65	4321
Gayndah Airport	0.50	1.38	0.62	1.49	0.77	0.02	4273
Glen Innes Airport	0.53	2.42	0.54	2.09	0.74	0.20	4321
Grafton Res. Stn.	0.55	0.84	0.65	1.42	0.78	-0.44	4284
Gunnedah Airport	0.35	2.20	0.48	1.91	0.67	-0.42	4232
Gympie	0.53	1.44	0.70	1.43	0.81	0.38	4273
Hamilton Airport	0.49	2.01	0.53	2.18	0.71	-0.68	4233
Hopetoun Airport	0.52	1.72	0.58	2.13	0.75	-0.67	4321
Inglewood Forest	0.34	1.77	0.28	1.55	0.52	-0.55	4273
Inverell Res. Ctr.	0.27	1.32	0.35	1.47	0.57	-0.67	4294

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Keith (Munkora)	0.54	1.38	0.58	2.10	0.75	-0.60	4705
Kingaroy Airport	0.48	1.89	0.58	1.59	0.74	0.31	4273
Kingscote Aerodrome	0.55	1.85	0.68	1.93	0.81	-0.17	4705
Lameroo (Austin Plains)	0.44	2.19	0.48	2.45	0.68	-0.75	4656
Longerenong	0.51	1.73	0.57	2.18	0.74	-0.71	4321
Mareeba Airport	0.35	1.82	0.53	1.94	0.69	-0.51	4273
Minlaton Aerodrome	0.42	2.56	0.47	2.73	0.65	-1.28	4561
Minnipa DPI	0.33	2.90	0.40	2.28	0.63	-0.58	4705
Morawa Airport	0.29	2.28	0.41	2.63	0.60	-1.30	4561
Mount Ginini	0.62	0.85	0.54	1.99	0.70	-0.75	4321
Mudgee Airport	0.31	1.39	0.57	1.70	0.67	-0.60	4278
Narrabri Airport	0.29	2.24	0.39	2.14	0.61	-0.67	4321
Newdegate Res. Stn.	0.47	2.38	0.51	2.44	0.71	-0.52	4561
Nhill Aerodrome	0.49	1.92	0.57	2.10	0.75	-0.43	4321
Orange Airport	0.37	1.73	0.50	1.93	0.67	-0.64	4304
Padthaway South	0.52	1.44	0.57	1.78	0.75	-0.32	4609
Parafield Airport	0.37	1.92	0.50	2.21	0.68	-0.83	4609
Parkes Airport	0.32	1.59	0.47	2.09	0.64	-0.94	4321
Port Augusta Aerodrome	0.49	2.34	0.56	2.37	0.74	-0.39	4609
Rockhampton Aerodrome	0.52	1.54	0.64	1.36	0.79	-0.09	4273
Rocky Gully	0.53	1.47	0.58	1.74	0.74	-0.65	4561
Salmon Gums Res. Stn.	0.40	2.19	0.46	2.21	0.66	-0.69	4561
Scone Airport	0.36	1.82	0.52	2.14	0.69	-0.27	4321
Shepparton Airport	0.42	1.76	0.55	2.15	0.72	-0.38	4321
Snowtown (Rayville Park)	0.54	1.41	0.57	2.44	0.74	-0.81	4609
Southern Cross Airfield	0.33	2.61	0.45	2.32	0.65	-0.68	4540
St. George Airport	0.18	1.75	0.22	2.30	0.48	-0.90	4094
St. Lawrence	0.44	1.56	0.51	1.28	0.69	0.13	4273
Stawell Aerodrome	0.44	1.59	0.55	1.97	0.73	-0.25	4321
Strathalbyn Racecourse	0.49	1.92	0.55	2.26	0.73	-0.36	4561
Swan Hill Aerodrome	0.49	1.57	0.58	1.87	0.75	-0.48	4265
Temora Airport	0.37	1.78	0.52	1.80	0.69	-0.30	4321
Toowoomba Airport	0.52	3.07	0.52	2.33	0.72	0.17	4273
Trangie Res. Stn.	0.32	1.91	0.49	1.68	0.66	-0.23	4321
UQ Gatton	0.43	1.40	0.53	1.62	0.71	-0.20	4273
Wagga Wagga	0.26	1.58	0.42	1.88	0.60	-0.59	4321
Walgett Airport	0.35	1.69	0.51	1.71	0.67	-0.59	4321
Wandering	0.27	1.94	0.48	1.85	0.62	-0.57	4561
Wangaratta Aerodrome	0.36	1.13	0.57	1.84	0.70	-0.48	4321
Warra	0.40	1.33	0.55	1.71	0.70	-0.58	4561
West Wyalong Airport	0.37	2.16	0.49	1.86	0.68	-0.01	4321
Woolshed	0.21	2.00	0.31	1.08	0.54	-0.03	4273
Yarrawonga	0.36	1.48	0.50	2.05	0.65	-0.94	4321
Young Airport	0.24	1.75	0.37	2.00	0.59	-0.47	4030

Table E23: Wind speed statistics for all sites for six day ahead forecast

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Applethorpe	0.27	1.81	0.37	1.42	0.61	-0.16	3754
Avalon Airport	0.39	2.15	0.48	2.83	0.67	-1.01	3799
Ayr DPI Res. Stn.	0.17	1.78	0.43	3.11	0.51	-2.33	3709
Bendigo Airport	0.34	2.39	0.38	2.22	0.64	-0.09	3764
Bridgetown	0.30	1.62	0.43	1.75	0.64	-0.29	4024
Casino Airport	0.36	1.36	0.47	1.74	0.68	-0.34	3799
Casterton	0.39	2.14	0.43	2.01	0.66	-0.11	3799
Cleve Aerodrome	0.24	3.60	0.31	3.06	0.56	-0.80	4165
Cobar Airport	0.19	2.24	0.33	2.09	0.55	-0.42	3799
Collie East	0.28	1.40	0.41	1.53	0.63	-0.17	4024
Condobolin Airport	0.25	2.16	0.42	2.11	0.61	-0.46	3615
Coonamble Airport	0.16	2.39	0.24	2.15	0.50	-0.91	3799
Cowra Airport	0.18	1.51	0.33	2.10	0.55	-0.86	3799
Cunderdin Airfield	0.28	2.75	0.35	2.64	0.60	-0.81	4024
Dalby Airport	0.38	2.49	0.44	2.18	0.66	-0.17	3739
Dalwalinu	0.21	3.42	0.28	3.05	0.55	-1.14	4024
Deniliquin Airport	0.30	2.13	0.42	2.47	0.61	-0.96	3799
Dubbo Airport	0.20	3.01	0.25	2.15	0.53	-0.40	3799
Dunns Hill	0.26	2.83	0.25	2.67	0.54	-0.51	3768
Esperance Aerodrome	0.39	2.48	0.45	2.53	0.66	-0.89	4024
Forbes Airport	0.19	2.37	0.34	2.57	0.52	-0.63	3799
Gayndah Airport	0.47	1.53	0.58	1.56	0.75	0.04	3754
Glen Innes Airport	0.44	2.56	0.43	2.35	0.68	-0.07	3799
Grafton Res. Stn.	0.45	1.06	0.52	1.67	0.70	-0.53	3765
Gunnedah Airport	0.20	2.62	0.29	2.21	0.55	-0.59	3716
Gympie	0.48	1.57	0.63	1.57	0.77	0.36	3754
Hamilton Airport	0.36	2.98	0.35	2.69	0.61	-0.39	3715
Hopetoun Airport	0.37	2.85	0.38	2.60	0.63	-0.31	3799
Inglewood Forest	0.29	1.87	0.23	1.72	0.47	-0.63	3754
Inverell Res. Ctr.	0.24	1.31	0.32	1.54	0.54	-0.79	3772
Keith (Munkora)	0.44	1.96	0.46	2.45	0.67	-0.54	4165
Kingaroy Airport	0.42	2.00	0.51	1.69	0.71	0.24	3754
Kingscote Aerodrome	0.40	2.66	0.47	2.55	0.69	-0.06	4165
Lameroo (Austin Plains)	0.31	3.07	0.32	2.84	0.58	-0.59	4117
Longerenong	0.42	2.55	0.41	2.67	0.64	-0.37	3799
Mareeba Airport	0.31	1.81	0.46	2.12	0.64	-0.69	3754
Minlaton Aerodrome	0.25	3.89	0.27	3.22	0.53	-1.15	4024
Minnipa DPI	0.22	3.54	0.25	2.69	0.54	-0.59	4165
Morawa Airport	0.18	2.94	0.24	2.89	0.52	-1.18	4024
Mount Ginini	0.43	1.74	0.33	2.48	0.58	-0.69	3799
Mudgee Airport	0.22	1.64	0.41	1.91	0.58	-0.63	3759
Narrabri Airport	0.14	2.71	0.18	2.47	0.49	-0.85	3799
Newdegate Res. Stn.	0.32	3.26	0.35	2.73	0.62	-0.40	4002
Nhill Aerodrome	0.36	2.73	0.39	2.59	0.64	-0.21	3799
Orange Airport	0.24	2.19	0.32	2.23	0.57	-0.68	3785
Padthaway South	0.35	2.18	0.38	2.19	0.63	-0.26	4069
Parafield Airport	0.30	2.35	0.39	2.45	0.62	-0.73	4069
Parkes Airport	0.19	2.10	0.29	2.33	0.54	-0.92	3799
Port Augusta Aerodrome	0.39	3.05	0.42	2.79	0.66	-0.18	4069

Site	Slope	Intercept	Pearson	RMSE	IOA	Bias	Count
Rockhampton Aerodrome	0.41	1.84	0.55	1.53	0.73	-0.19	3754
Rocky Gully	0.39	2.18	0.42	2.02	0.64	-0.59	4024
Salmon Gums Res. Stn.	0.25	2.94	0.28	2.47	0.56	-0.64	4024
Scone Airport	0.29	1.94	0.41	2.39	0.63	-0.35	3799
Shepparton Airport	0.42	2.22	0.47	2.46	0.69	0.08	3799
Snowtown (Rayville Park)	0.44	2.17	0.45	2.82	0.68	-0.58	4069
Southern Cross Airfield	0.18	3.39	0.23	2.65	0.53	-0.60	4004
St. George Airport	0.09	2.05	0.12	2.39	0.44	-0.99	3591
St. Lawrence	0.36	1.78	0.43	1.35	0.65	0.08	3754
Stawell Aerodrome	0.42	1.95	0.46	2.25	0.69	0.05	3799
Strathalbyn Racecourse	0.41	2.37	0.45	2.57	0.67	-0.31	4024
Swan Hill Aerodrome	0.42	2.23	0.44	2.22	0.67	-0.14	3746
Temora Airport	0.28	2.10	0.37	2.05	0.61	-0.27	3799
Toowoomba Airport	0.37	3.88	0.37	2.70	0.63	0.09	3754
Trangie Res. Stn.	0.23	2.17	0.36	1.86	0.58	-0.29	3799
UQ Gatton	0.39	1.49	0.50	1.65	0.69	-0.28	3754
Wagga Wagga	0.17	1.90	0.25	2.14	0.51	-0.57	3799
Walgett Airport	0.24	2.06	0.35	1.90	0.58	-0.65	3799
Wandering	0.18	2.19	0.31	2.04	0.53	-0.62	4024
Wangaratta Aerodrome	0.36	1.34	0.49	2.03	0.68	-0.27	3799
Warra	0.29	1.72	0.33	2.14	0.58	-0.56	4024
West Wyalong Airport	0.30	2.43	0.37	2.15	0.62	-0.03	3799
Woolshed	0.22	1.93	0.27	1.21	0.53	-0.09	3754
Yarrawonga	0.32	1.93	0.38	2.22	0.62	-0.66	3799
Young Airport	0.21	1.88	0.30	2.10	0.54	-0.46	3550