

final report

Project code: B.FLT.0386.B
Prepared by: Ella Castillo, Andrew Wiebe and
Christine Killip
Katestone Environmental
Date published: November 2013
ISBN: 9781925045741

PUBLISHED BY
Meat & Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Part B - Cattle heat load toolbox upgrade

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

This publication is published by Meat & Livestock Australia Limited ABN 39 081 678 364 (MLA). Care is taken to ensure the accuracy of the information contained in this publication. However MLA cannot accept responsibility for the accuracy or completeness of the information or opinions contained in the publication. You should make your own enquiries before making decisions concerning your interests. Reproduction in whole or in part of this publication is prohibited without prior written consent of MLA.

Abstract

Heat stress in feedlot cattle can have a deleterious effect on cattle performance and in extreme cases lead to cattle death. The National Feedlot Accreditation Scheme requires feedlots to have a heat stress management plan in place to cope with weather events that can lead to excessive heat loads. The Cattle Heat Load Toolbox, developed by Katestone, alerts feedlot operators of impending adverse weather conditions that could lead to excessive heat loads in feedlot cattle. The toolbox is web based and provides access to weather and heat load forecasts out one week, plus heat load risk assessment programs.

The service is underpinned by over 10 years of research into cattle heat load funded by Meat & Livestock Australia. The Cattle Heat Load Toolbox brings all this research together and uses a world class weather forecasting system to generate accurate forecasts across Australia. This service provides useful and practical information to help feedlot operators manage heat stress in cattle through advanced warning of adverse conditions. Thus allowing operators time to undertake appropriate actions to mitigate the risk of heat stress when alerted. This report details the enhancements that have been made to the service in preparation for the 2013-14 summer period.

Executive summary

Heat stress in feedlot cattle can have a deleterious effect on cattle performance and in extreme cases lead to cattle death. The National Feedlot Accreditation Scheme requires that feedlots have a heat stress management plan in place to cope with weather events that can lead to excessive heat loads. The Cattle Heat Load Toolbox (CHLT) has been developed to alert feedlot operators of impending adverse weather conditions that could lead to excessive heat load in feedlot cattle. The toolbox is web based and provides access to weather and heat load forecasts out one week, plus heat load risk assessment programs.

Feedlot operators can subscribe to the service free of charge and request a site-specific forecast for their feedlot. Subscribers can also define risk alert levels suitable to their management plan and cattle condition. Alerts are then sent by email and SMS to designated recipients (e.g. site managers, veterinarians). Under severe heat load conditions Katestone will issue a written heat load advisory detailing the location, cause and likely duration of a heat load event. The advisory is emailed to all subscribers and posted on the toolbox web site.

New features have been added to the CHLT site for the 2013/14 summer including:

- New home page and help for easier navigation
- Updated graphics for public site forecasts
- New features for registered users including new 'My Site' summary page providing all critical information on one page for quick decision making, online access to manage account such as setting alerts, adding more users, updating e-mail and phone numbers.
- Integration of AWS data from registered users into the forecasting system

Table of Contents

1.	Introduction	6
2.	Project objectives	6
3.	Scope of work.....	6
4.	Overview	7
5.	Katestone-Weather Research and Forecasting model	8
6.	Website.....	9
6.1	Public access.....	9
6.1.1	Home	9
6.1.2	Heat Load Data Network.....	9
6.1.3	Major town forecasts.....	9
6.1.4	Major town observations	10
6.1.5	Australia-wide overview – HLI	10
6.1.6	Australia-wide overview – MSLP and Rainfall.....	10
6.1.7	Heat Load Index Calculator.....	10
6.1.8	Risk Analysis Program Calculator	11
6.1.9	Guides.....	11
6.1.10	Glossary.....	11
6.1.11	Documentation.....	11
6.1.12	Reports	11
6.1.13	Contact Page	11
6.1.14	Registration	11
6.1.15	Log-in	12
6.2	Registered user access	12
6.2.1	My sites summary	12
6.2.2	Detailed forecast	13
6.2.3	Observations.....	13
6.2.4	Account management	14
6.2.5	User management.....	14
6.2.6	Add users.....	14
7.	Site Layout.....	14
7.1	Public Access	14
7.2	Registered User Access	15

Figures

Figure 1	CHLT Home.....	16
Figure 2	Heat Load Data Network.....	17
Figure 3	Major Town Forecast	18
Figure 4	AHLU risk levels	19
Figure 5	Observations	20
Figure 6	Australia-wide overview - HLI.....	21
Figure 7	Australia-wide overview – MSLP and Rainfall	22
Figure 8	Heat Load Index Calculator.....	23
Figure 9	Risk Analysis Program Calculator	24
Figure 10	Contact page	25
Figure 11	Registration page.....	26
Figure 12	Login page.....	27
Figure 13	My sites summary	28
Figure 14	Account management	29
Figure 15	User management	30
Figure 16	Add users	31

1. Introduction

Katestone has provided a heat load forecast service to Australian lotfeeders since 2003. During this time the technology involved in delivering the service has changed dramatically. From the data used to initialise the model, the underlying equations for estimating heat load, to the delivery of the forecast on the Cattle Heat Load Toolbox (CHLT) website. While the technology has changed the basic principles of delivering a forecast has remained the same.

The proposed service upgrades for 2013 are based on feedback from registered users during the 2012 end of season survey and changes required to handle over 100 registered feedlots and 130 registered users. Changes are also required to enable the integration of registered feedlots weather station data into the forecasting system.

This report presents the current status of the CHLT including the new features added to the system for the 2013/14 summer period.

2. Project objectives

The CHLT was developed to assist in warning feedlot operators of impending adverse weather conditions that could lead to excessive heat loads (and potential mortality) for feedlot cattle. The objective of the project is to:

- Provide heat load forecasts for feedlot operators across Australia
- Deliver warnings of impending heat load events
- Provide access to forecasts and the Risk Analysis Program over the internet
- Provide guidance to feedlot operators to minimise losses due to heat load

3. Scope of work

The scope of work proposed for the CHLT for the 2013/14 summer period includes:

- Upgrade of the web site to facilitate online control of registered user details, ability to add a new user for a registered feedlot site (e.g. local vet or nutritionist) and alter and set alerts when required
- Integration of site Automatic Weather Station (AWS) data into the forecasting system including smart processing of incoming data to avoid errors in the system
- Modification to the proprietary Katestone Weather Research and Forecasting (K-WRF) model including:
 - implementation of a cycling algorithm to initialise the land surface model from the previous forecast
 - data assimilation from the World Meteorological Organisation (WMO) surface and upper air observations
 - introduction of a background error statistic into the model initialisation

4. Overview

The CHLT website has moved to a new home: <http://chlt.katestone.com.au>. The web site is now hosted by a remote server controlled by Katestone allowing the ability to provide a higher level of service and functionality to the feedlot industry, including:

- New home page and help for easier navigation
- Updated graphics for public site forecasts
- New 'My Site' for registered users, which
 - Simplifies the data to daily summaries
 - Displays critical information quickly and intuitively
 - Allows user to easily navigate to detailed forecasts and observations
 - Has a side panel display of alert logs so users can see what alerts have been sent and when
 - Provides new account management features for registered users, to:
 - Change Accumulated Heat Load Units (AHLU) alert levels
 - Change contact details
 - Be added to multiple sites (handy for veterinarians and nutritionists)
 - Add and remove users from their site
 - Update changes instantly in the online database

This season Katestone and MLA launched the Heat Load Data Network (HLDN). The HLDN has been developed to incorporate onsite weather information into the CHLT service allowing site specific subscribers to view their historical observations of weather parameters and calculated Heat Load Index (HLI) and AHLU. The service also incorporates the actual onsite AHLU in the forecast AHLU by initialising the predicted AHLU with the observations when the forecast is issued.

The HLDN has the added benefit of providing a quality assurance process to each feedlot AWS that becomes part of the network. Katestone reviews the AWS instrumentation and provides guidance on how to connect.

To date the update of the service has been slow with only three users connected to the HLDN before the start of the forecasting season. An additional 26 sites have requested to be connected and been given instructions on how to connect. The Katestone technical services team are currently working with each site to determine their reason for delayed connection to the service and provide assistance with the process.

The HLDN (<http://chlt.katestone.com.au/heat-load-data-network-hldn/>) has the following functions:

- Feedlot weather station data can now be uploaded to the remote server and displayed on the CHLT website through the 'My Site' observation page
- HLDN data feeds into the forecast by initialising the AHLU
- Data is quality checked before calculating the HLI and AHLU
- Discrepancies between the HLI and AHLU retrieved from the AWS and calculated by Katestone are flagged and corrective action taken

Along with the new location of the site, and the introduction of the HLDN, Katestone has also upgraded the hardware used to provide the service:

- The Katestone Weather Research and Forecasting (K-WRF) model now runs on a much faster system, reducing the time required to run the model from 6 hours to 4 hours.
- The reduced modelling time means that the forecast and alert are now available at 4.00am
- Improvements to the database that stores the forecast data:
 - The structure for the database was previously created on Microsoft SQL Server running on Windows. The database structure has been upgraded to MariaDB, running on Linux, which is more flexible and robust.
 - The hardware for the server hosting the data storage has been upgraded. The current setup has been upgraded to two databases located on two servers, serving as mirrors for each other.
 - The entire system is hosted on a remote server located in a data centre, allowing Katestone to have control over the hardware and the implementation of the software
 - Aside from improvements to the backup system, the dual server setup allows faster and direct online access to the data by the users, without compromising security.

5. Katestone - Weather research and forecasting model

Katestone has been running a high resolution numerical model for the feedlot industry for the past 3 three years. The modelling system is the result of extensive research and is configured specifically to simulate and forecast Australian weather. Continuous performance reviews of this forecasting system are made by Katestone's scientists to ensure ongoing improvements to its performance and delivery of data into the future.

The K-WRF uses the Weather Research and Forecasting (WRF) Model to simulate meteorological conditions on a 12 km grid for all of Australia out to four days. The K-WRF forecast is extended out to 7 days using output from the Global Forecasting System (GFS).

Katestone is currently maintaining the operational status of the CHLT service. The service is a technological ecosystem that incorporates multiple connections to external data sources across Australia and overseas. The technical requirements to operate a system of this magnitude necessitate supervision and human intervention to reduce downtime and ensure the continuous flow of data.

Work on improving the forecast accuracy is continuing in parallel with the delivery of the service. Katestone is currently testing a cycling scheme where the previous forecast data is used to initialise the next forecast. This process also allows for the assimilation of observations which may improve the performance of the forecast.

Katestone is also trialling the inclusion of a custom background error statistic template (BEST) for the Australian region. This is similar to a model output statistic (MOS) post processing step to correct the bias inherent in the model, except that the BEST does the correction prior to the forecast. This way the dynamic relationships between variables such as temperature and humidity are preserved.

6. Website

6.1 Public access

6.1.1 Home

A screenshot of the CHLT homepage is shown in Figure 1. This page is accessible to public users and registered subscribers.

As an initial stop, the CHLT home page provides a short description of CHLT, and a link to a short video regarding the practical use of the service for cattle heat load management in Australian feedlots.

Links to pages for registration, login, information on the HLDN, and weather warnings are also shown.

6.1.2 Heat Load Data Network

A screenshot of the HLDN page is shown in Figure 2. This page is accessible to public users and registered subscribers. Access to this page is available as a submenu under homepage and from various links throughout the site.

The HLDN page gives a summary of the service, added benefits, an invitation to participate, and a link to the contact page.

6.1.3 Major town forecasts

A screenshot of the major town forecast page is shown in Figure 3. This page can be accessed directly from the menu.

Once a major town is selected from the drop down menu the user is taken to the detailed forecast page and 7-day outlook table. The page displays 7 day outlooks for minimum and maximum HLI, average daily wind speed, and total rainfall. The detailed forecast table displays hourly predictions of:

- HLI
- AHLU
- Black Globe Temperature (BGT)
- temperature
- relative humidity
- wind direction
- wind speed
- rain

Colour coded AHLU risk indicators have been introduced this season as a new initiative. The arrows adjust to the direction of the AHLU risk level, up for increasing, down for decreasing and horizontal for no change. If the user hovers the mouse pointer over the arrow, the numeric value of the AHLU will be displayed (Figure 4).

6.1.4 Major town observations

A screenshot of the major town observation page is shown in Figure 5. This page is only accessible as a link from the major town forecast page (Section 6.1.3).

The detailed forecast page shows hourly data, for the next four days on the following variables:

- HLI
- AHLU
- BGT
- temperature
- relative humidity
- wind direction
- wind speed
- rain

New data quality checks have been introduced this year to remove erroneous data from the Bureau of Meteorology AWS data files.

6.1.5 Australia-wide overview – HLI

A screenshot of the Australia-wide overview – HLI page is shown in Figure 6. This page can be accessed directly from the menu, and shows snapshots of HLI contours for the next four days.

The page also contains a link to the Australia-wide overview of Mean Sea-Level Pressure (MSLP) and Rainfall (Section 6.1.6), as well as links to animated loops of HLI and MSLP.

6.1.6 Australia-wide overview – MSLP and Rainfall

A screenshot of the Australia-wide overview – MSLP and Rainfall page is shown in Figure 7. This page can be accessed directly from the menu, and shows snapshots of MSLP and rainfall contours for the next four days.

The page also contains a link to the Australia-wide overview of HLI (Section 6.1.5), as well as links to animated loops of HLI and MSLP.

6.1.7 Heat Load Index Calculator

A screenshot of the HLI calculator is shown in Figure 8. This page is accessible to public users and registered subscribers from the menu and through numerous links within the site.

The page presents different options for calculating HLI, depending on available variables. The page also provides an overview of HLI in the side panel, as well as a link to the RAP calculator.

This page should be updated in the future to improve user access.

6.1.8 Risk Analysis Program Calculator

A screenshot of the Risk Analysis Program (RAP) calculator is shown in Figure 9. This page is accessible to public users and registered subscribers from the menu and through numerous links within the site, particularly where alert options for users are discussed.

The page prompts the user to enter variables to calculate the RAP. The page also provides an overview of RAP in the side panel. The side panel also contains a link to the user management page and HLI calculator.

This page should be updated in the future to improve user access.

6.1.9 Guides

Guides to assist potential and registered users to utilise the services offered in the CHLT website are available as a direct link from the menu. Information on registration, setting of alert preferences, and interpretation of the forecast are provided.

6.1.10 Glossary

A glossary of terms, particularly acronyms, is also available as a direct link from the menu. In this section, the discussion of the terms commonly used throughout the website is intended to be a general description, rather than a technical discussion.

6.1.11 Documentation

The documentation for the more technical aspects of the CHLT service is available as a direct link from the main menu. This section discusses a more detailed discussion of the forecast models, RAP, BGT, HLI, and AHLU.

6.1.12 Reports

Reports related to the CHLT service, as well as tips and tools for the feedlots are provided as a direct link from the menu.

6.1.13 Contact page

A screenshot of the contact page is shown in Figure 10, and is available as a direct link from the menu. This page is accessible to public users and registered subscribers, and simply requires name, email and a message, which is then sent to Katestone.

6.1.14 Registration

A screenshot of the registration page is shown in Figure 11. This page is accessible to public users and registered subscribers.

The registration page can be accessed directly from the menu prior to login, and from a few links within the CHLT site.

The registration process for CHLT requires the site name, NFAS accreditation number, name and contact details for the proposed subscriber.

During the registration process, the potential subscribers also have the option to register either an existing AWS, or an expression of interest for one.

The potential subscriber also has the option to configure alert preferences at time of registration.

On submission, the information provided by the potential subscriber is sent to Katestone, where a member of the team performs the necessary checks, adds the subscriber to the database, and sends an email of confirmation plus login details to the subscriber.

Due to the manual verification required, the processing time for responding to a registration may take from 24-48 hours, and could be longer if the registration request is lodged during the weekend or on public holidays.

6.1.15 Log-in

A screenshot of the login page is shown in Figure 12.

The login page has a standard format, with a form requiring a username and password. Links to the main CHLT site (with no access to subscriber features), registration, and option to reset password details are available, and do not require login details.

Upon a successful login, the subscriber is redirected to the My sites summary page (Section 6.2.1).

6.2 Registered user access

6.2.1 My sites summary

A screenshot of the registration page is shown in Figure 13. This page is only available to registered users. Once logged in, the page can be accessed directly from the menu. The page is also the initial page shown upon log in.

Subscribers registered for more than one site can change the site through the use of a dropdown selection box, which lists all the sites the user has access to. Site selection is followed by an immediate update of the page.

The summary page for each site presents a summary of daily weather data on the following parameters for the next four days:

- minimum/maximum HLI
- minimum temperature
- average wind speed
- total rain
- daily AHLU risk level

Links to detailed forecast and historical observations are available from the site. The side panel of the page also displays the AHLU risk level key, alerts log for the site being viewed, links to the RAP calculator and user management page (Section 6.2.5).

6.2.2 Detailed forecast

The detailed forecast page can be accessed as a link from the My sites summary (Section 6.2.1) and observations (Section 6.2.3) pages.

It provides the same type of data as the major town detailed forecast but for the users selected site:

- HLI
- AHLU
- BGT
- temperature
- relative humidity
- wind direction
- wind speed
- rain

Subscribers registered for more than one site can change the site through the use of a dropdown selection box, which lists all the sites the user has access to. Site selection is followed by an immediate update of the page.

The page also provides a quick access to the My sites summary (Section 6.2.1) and observations (Section 6.2.3) pages.

6.2.3 Observations

The observations page can be accessed as a link from the My sites summary (Section 6.2.1) and detailed forecast (Section 6.2.2) pages, and is only available to subscribers with a registered AWS that are uploading to the HLDN.

The observations page shows hourly data for the most recent four days on the following variables:

- HLI
- AHLU
- BGT
- temperature
- relative humidity
- wind direction
- wind speed
- rain

Subscribers with access to more than one site with a registered AWS can change the site through the use of a dropdown selection box, which lists all the sites the user has access to. Site selection is followed by an immediate update of the page.

The page also provides a quick access to the My sites summary (Section 6.2.1) and detailed forecast (Section 6.2.2) pages.

6.2.4 Account management

A screenshot of the account management page is shown in Figure 14. This page is only accessible to registered users. Once logged in, the page can be accessed directly from the menu.

The account management provides a user the ability to change their contact details, password, and alert preferences directly on the database. The changes take place instantly and any changes to the alert preferences will be applied to the next forecast.

The page also shows the AHLU risk level key as a reference for alert options, a link to the RAP calculator, and the alerts log.

6.2.5 User management

The user management page is shown in Figure 15. This page is accessible to registered users who are nominated as site administrators. Once logged in, the page can be accessed directly from the menu. Registered subscribers who are not site administrator will be asked to contact their site administrators to manage user accounts.

The user management page provides control to the site administrator with a list of all users registered to the site, and a link to each person's account management page (Section 6.2.4). The site administrator is then able to update contact details and alert preferences to the subscribers registered for the managed sites. The site administrator also has the option to delete users and add new users to the site.

6.2.6 Add users

A screenshot of the account management page is shown in Figure 16. This page is accessible as a link from the user management page, and as such is only accessible to registered users who are nominated as site administrators.

The add users page prompts for the username, nominated password, contact details and alert preferences for the subscriber being added. Once added, the user is immediately added to the database, and can access subscriber pages and services (including automated alerts for the next forecast).

7. Site layout

7.1 Public access

Prior to login

- Home
 - Heat Load Data Network (HLDN) – (</heat-load-data-network-hldn/>)
- Forecasts – (</major-town-forecast/>)
 - Select a major town forecast – (</major-town-forecast/>)
 - Australia Wide Overview – HLI – (</hli-contour-overview/>)
 - Australia Wide Overview – MSLP and Rainfall – (</mslp-contour-overview/>)
- Tools
 - HLI Calculator – (</hli-calculator/>)
 - RAP Calculator – (</rap-calculator/>)

- Register – (/register/)
 - Why Register? – (/why-register/)
- Help – (/help/)
 - Guides – (/help/guides/)
 - Glossary – (/help/glossary/)
 - Documentation – (/help/documentation/)
 - Forecast Models – (/help/documentation/forecasting-models/)
 - Risk Analysis Program (RAP) – (/help/documentation/risk-analysis-program-rap/)
 - Black Globe Temperature (BGT) – (/help/documentation/black-globe-temperature-bgt/)
 - Heat Load Index (HLI) – (/help/documentation/heat-load-index-hli/)
 - Accumulated Heat Load Units (AHLU) – (/help/documentation/accumulated-heat-load-units-ahlu/)
- Contact Us – (/contact/)

7.2 Registered user access

- Home
 - Heat Load Data Network (HLDN) – (/heat-load-data-network-hldn/)
- Forecasts – (/major-town-forecast/)
 - Select a major town forecast – (/major-town-forecast/)
 - Australia Wide Overview – HLI – (/hli-contour-overview/)
 - Australia Wide Overview – MSLP and Rainfall – (/mslp-contour-overview/)
- My sites – (/my-site-summary/)
 - My sites – (/my-site-summary/)
 - My Account – (/my-site-summary/my-account/)
 - Manage Users – (/my-site-summary/manage-users/)
- Tools
 - HLI Calculator – (/hli-calculator/)
 - RAP Calculator – (/rap-calculator/)
- Help – (/help/)
 - Guides – (/help/guides/)
 - Glossary – (/help/glossary/)
 - Documentation – (/help/documentation/)
 - Forecast Models – (/help/documentation/forecasting-models/)
 - Risk Analysis Program (RAP) – (/help/documentation/risk-analysis-program-rap/)
 - Black Globe Temperature (BGT) – (/help/documentation/black-globe-temperature-bgt/)
 - Heat Load Index (HLI) – (/help/documentation/heat-load-index-hli/)
 - Accumulated Heat Load Units (AHLU) – (/help/documentation/accumulated-heat-load-units-ahlu/)
- Contact Us – (/contact/)

CATTLE HEAT LOAD TOOLBOX
protecting your investment

[HOME](#)
[FORECASTS](#)
[MY SITES](#)
[TOOLS](#)
[HELP](#)
[CONTACT US](#)

Search

You are here: Home
OCTOBER 29, 2013

Cattle Heat Load Toolbox Home

Welcome to the new Cattle Heat Load Toolbox (CHLT).

We have changed some features and the look and feel of the CHLT, most notably the url has changed from:

www.nws-katestone.com.au to <http://chlt.katestone.com.au>

New features are improvements to the Alert service, giving you the ability to change these online via your Account page. Registered users can login here >>

What is the Cattle Heat Load Toolbox?

The Cattle Heat Load Toolbox is designed to help Australian lot feeders proactively manage heat load in their cattle, by providing location specific weather and heat load forecasts for any feedlot across Australia.

Katestone has developed the capacity to deliver numerical weather predictions (NWP) for any location in Australia using the Weather Research and Forecasting (WRF) model. The Katestone implementation of the WRF model (K-WRF) runs twice daily for 4 days at an hourly time step at a horizontal resolution of 12 km.

Katestone currently provides weather and heat load forecasts for 191 locations specifically for the feedlot industry to manage cattle heat stress.



Register

If you would like to register your site to receive a heat load forecast for your feedlot location and/or the e-mail and/or SMS alert service, click here >>

Originally developed by Katestone with funding from Meat and Livestock Australia (MLA), today the ongoing operational costs of the Cattle Heat Load Toolbox are met by funding through Animal Health Australia.



(Edit)





What is CHLT?

The Cattle Heat Load Toolbox (CHLT) is designed to help Australian lot feeders proactively manage heat load in their cattle, by providing location specific weather and heat load forecasts for any feedlot across Australia.

Why Register?

Registration is free and takes only a couple of minutes. By registering your feedlot you will receive four-day forecasts specific to your location and automated alerts to warn you of upcoming heat load events.

Quick Links

- HLI Calculator
- RAP Calculator
- HLI Contour Loop
- MSLP Contour Loop
- Site Map

• RETURN TO TOP OF PAGE
COPYRIGHT © 2013 - TERMS AND CONDITIONS OF USE - DEVELOPED BY KATESTONE

Figure 1 CHLT Home
[\(http://chlt.katestone.com.au/\)](http://chlt.katestone.com.au/)

CATTLE HEAT LOAD TOOLBOX

protecting your investment



Search

HOME
FORECASTS
MY SITES
TOOLS
HELP
CONTACT US
OCTOBER 29, 2013

You are here: Home / What is the Heat Load Data Network (HLDN)?

What is the Heat Load Data Network (HLDN)?



Katestone and MLA are building the **Heat Load Data Network (HLDN)** to bring your site weather station data into the forecast.

By registering with CHLT and requesting to be part of the **HLDN**, Katestone will work with you to have your onsite data automatically sent to our *High Performance Computing Facility* for initialisation of your site specific forecast.

We will also check and correct your data as it arrives to ensure accurate calculation of the heat load index and accumulated heat load using the most up-to-date equations. These data will also be used for your site specific display on the CHLT so you can view it and the forecast it helped to generate.

HLI Calculator

Calculate your HLI

RAP Calculator

Use the RAP Calculator to work out which ALHU you need to view to manage your site

Benefits

Access to your data online

Once your site is connected to the data network you will be able to view your site's AWS data on a secure web page.

More accurate forecast

When each new forecast is issued (6 am and 6 pm), the AHLU's will be initialised from the actual measurements from your site, therefore providing a more accurate forecast for your site.

QA of your AWS

To ensure the equations being used to calculate the HLI and AHLUs (and BGT, if required) are correct they will be reviewed to ensure the most up to date algorithms are being used and are programmed correctly.

Participation in the Heat Load Data Network (HLDN) is optional. There is no fee associated with the service and limited funding is also available to each feedlot from MLA if upgrades to your site AWS are needed.

If you would more info about how to the site-specific forecast works with your on-site weather data, please contact Frank or Andrew at Katestone.

(Edit)

What is CHLT?

The Cattle Heat Load Toolbox (CHLT) is designed to help Australian lot feeders proactively manage heat load in their cattle, by providing location specific weather and heat load forecasts for any feedlot across Australia.

Why Register?

Registration is free and takes only a couple of minutes. By registering your feedlot you will receive four-day forecasts specific to **your location** and automated alerts to warn you of upcoming heat load events.

Quick Links

- HLI Calculator
- RAP Calculator
- HLI Contour Loop
- MSLP Contour Loop
- Site Map

✦ RETURN TO TOP OF PAGE
COPYRIGHT © 2013 · TERMS AND CONDITIONS OF USE · DEVELOPED BY KATESTONE

Figure 2 Heat Load Data Network

[\(http://chlt.katestone.com.au/heat-load-data-network-hldn/\)](http://chlt.katestone.com.au/heat-load-data-network-hldn/)

CATTLE HEAT LOAD TOOLBOX
protecting your investment

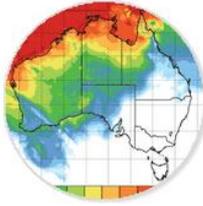
Search this website... **Search**

HOME FORECASTS TOOLS REGISTER HELP CONTACT **OCTOBER 31, 2013**

You are here: Home / Select a Major Town Forecast

Select a Major Town Forecast

Major Town Forecasts



Queensland	Select town from here	▼
New South Wales	Select town from here	▼
South Australia	Select town from here	▼
Western Australia	Select town from here	▼
Victoria	Select town from here	▼
Tasmania	Warra	
Northern Territory	Darwin Airport	

The Major Town Forecasts provide a seven day forecast for selected locations across Australia. Weather parameters, the HLI and AHLUs, are also presented for every hour for the first four days of the forecast. These forecasts are provided twice a day by Katestone's Numerical Weather Prediction Centre.

You do not have to be a registered user to access these forecasts. **However if you would like a specific forecast for your feedlot, click here to Register.**

What is CHLT?

The Cattle Heat Load Toolbox (CHLT) is designed to help Australian lot feeders proactively manage heat load in their cattle, by providing location specific weather and heat load forecasts for any feedlot across Australia.

Why Register?

Registration is free and takes only a couple of minutes. By registering your feedlot you will receive four-day forecasts specific to **your location** and automated alerts to warn you of up-coming heat load events.

Quick Links

- HLI Calculator
- RAP Calculator
- HLI Contour Loop
- MSLP Contour Loop
- Site Map

[+ RETURN TO TOP OF PAGE](#) COPYRIGHT © 2013 - TERMS AND CONDITIONS OF USE - DEVELOPED BY KATESTONE

Figure 3 Major Town Forecast
[\(http://chlt.katestone.com.au/heat-load-data-network-hldn/\)](http://chlt.katestone.com.au/heat-load-data-network-hldn/)

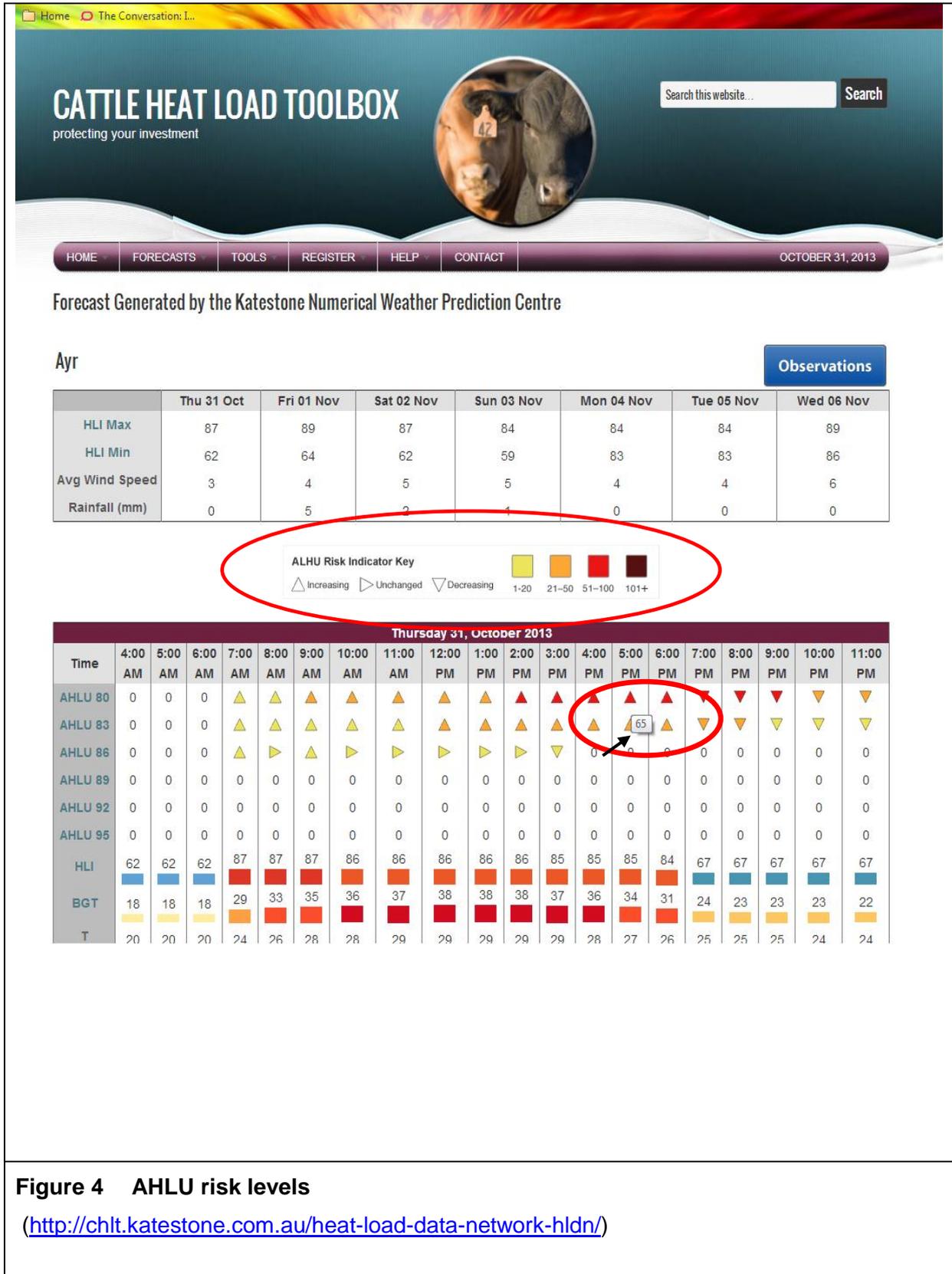


Figure 4 AHLU risk levels

(<http://chlt.katestone.com.au/heat-load-data-network-hldn/>)

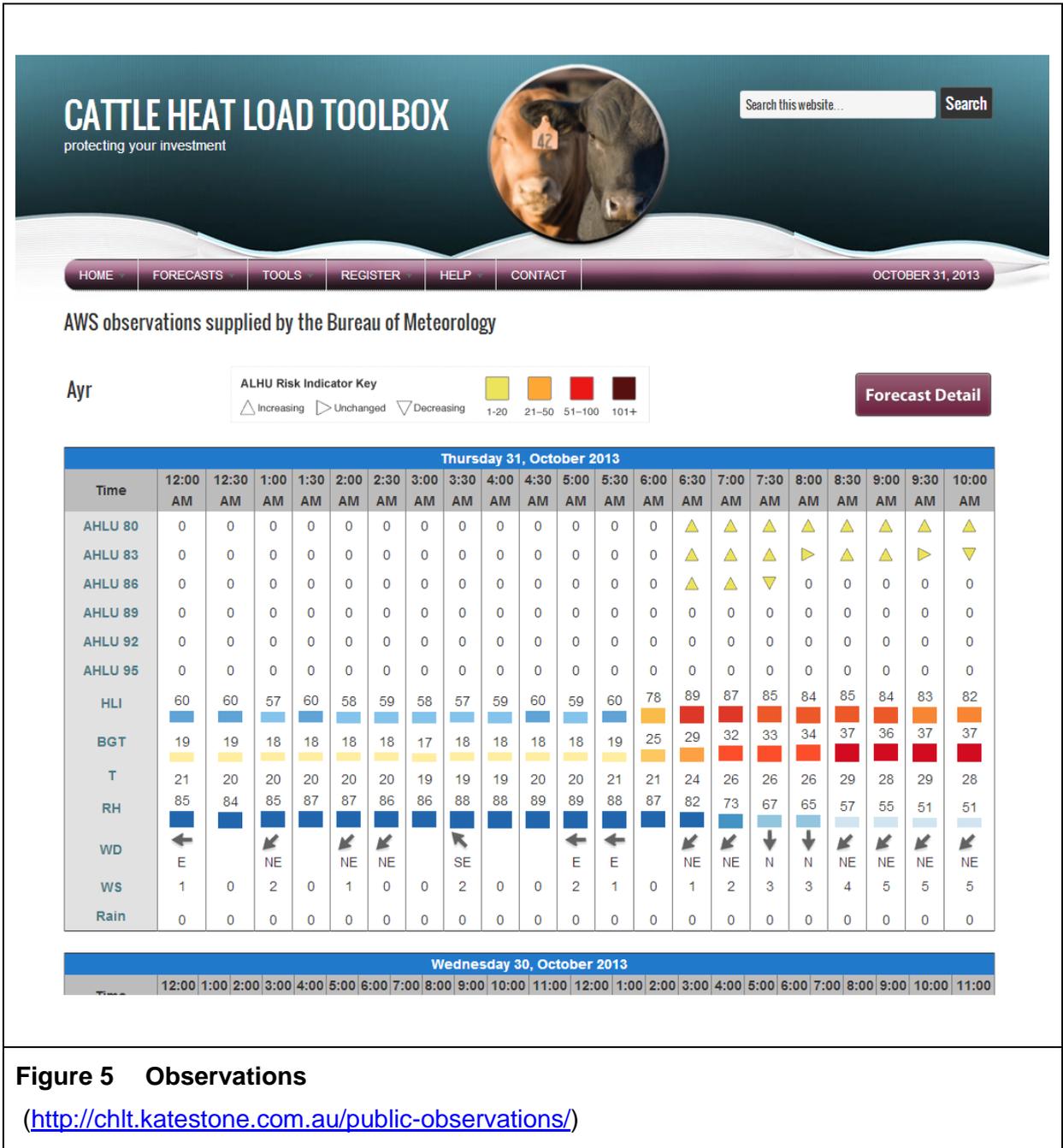
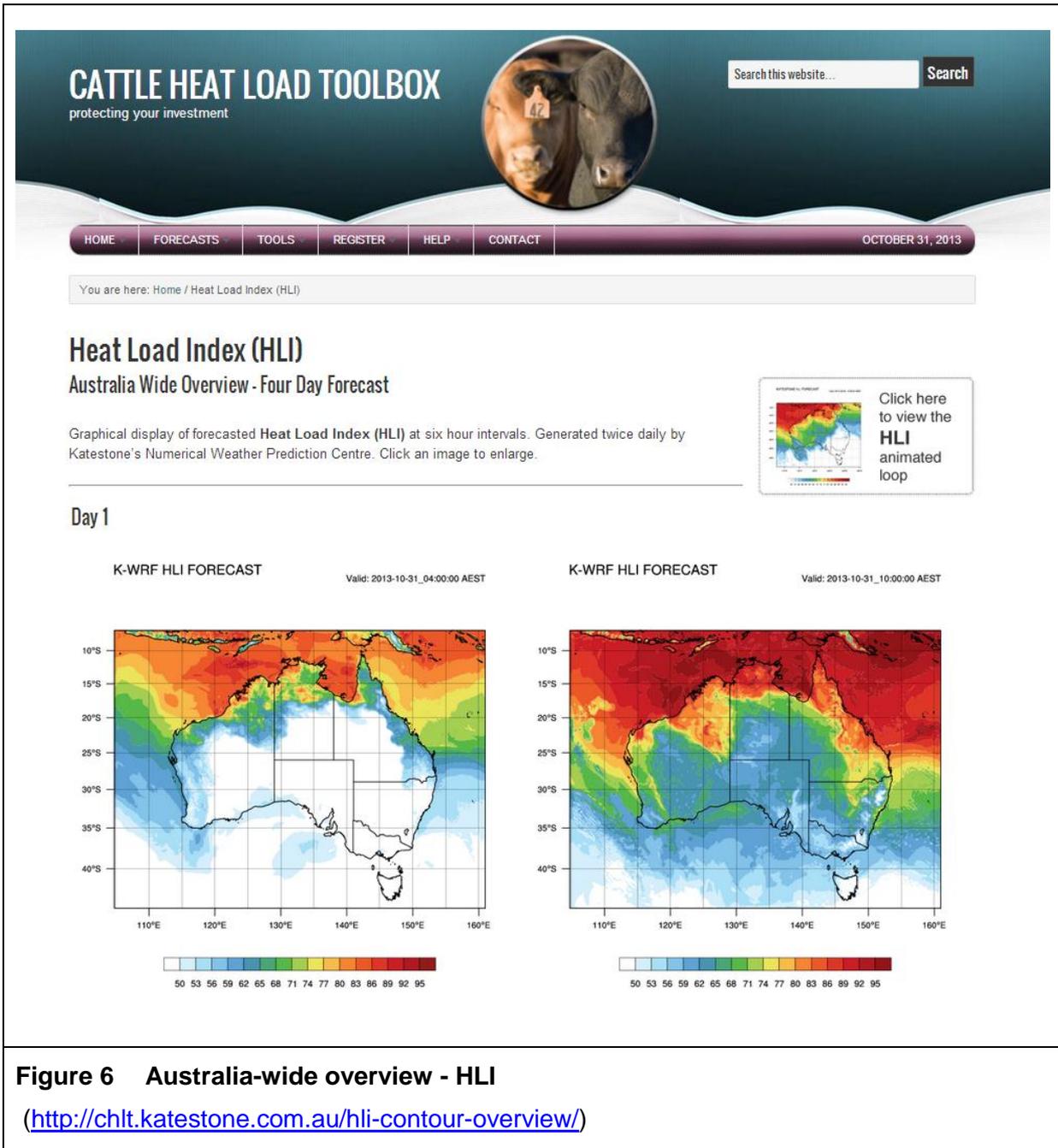


Figure 5 Observations

(<http://chlt.katestone.com.au/public-observations/>)



CATTLE HEAT LOAD TOOLBOX

protecting your investment



Search

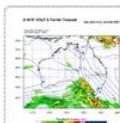
HOME
FORECASTS
TOOLS
REGISTER
HELP
CONTACT
OCTOBER 31, 2013

You are here: Home / Mean Sea-Level Pressure (MSLP) & Rainfall

Mean Sea-Level Pressure (MSLP) & Rainfall

Australia Wide Overview - Four Day Forecast

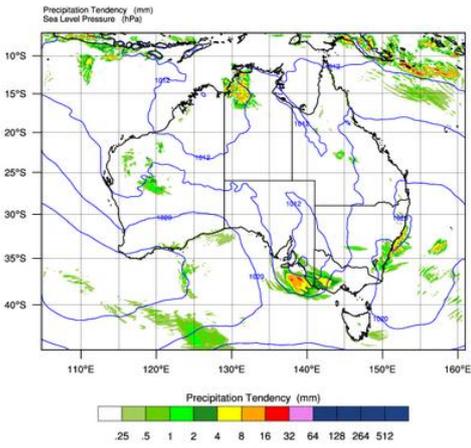
Graphical display of forecasted Mean Sea-Level Pressure (MSLP) and Rainfall Tendency (mm) at six hour intervals. Generated twice daily by Katestone's Numerical Weather Prediction Centre. Click an image to enlarge.



Click here to view the MSLP animated loop

Day 1

K-WRF MSLP & Rainfall Forecast Valid: 2013-10-28_04:00:00 AEST



K-WRF MSLP & Rainfall Forecast Valid: 2013-10-28_10:00:00 AEST

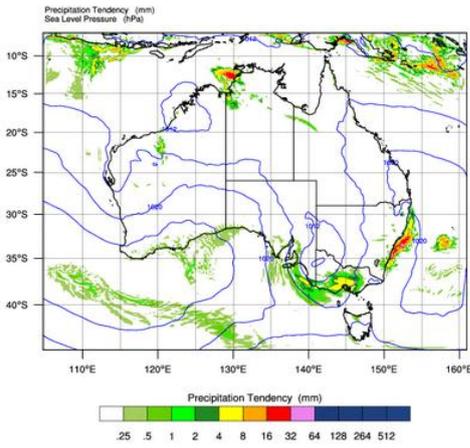


Figure 7 Australia-wide overview – MSLP and Rainfall
[\(http://chlt.katestone.com.au/mslp-contour-overview/\)](http://chlt.katestone.com.au/mslp-contour-overview/)

Page 22 of 31

CATTLE HEAT LOAD TOOLBOX

protecting your investment



[HOME](#)
[FORECASTS](#)
[TOOLS](#)
[REGISTER](#)
[HELP](#)
[CONTACT](#)

OCTOBER 31, 2013

You are here: Home / Tools / HLI Calculator

HLI Calculator

The Heat Load Index (HLI) – has been developed as an indicator of the environmental heat load placed on cattle.

HEAT LOAD INDEX (HLI)

Helping define Environmental Heat Load in your cattle

Parameter	Units	Value	Comments
Wind speed (WS)	m/s	<input type="text"/>	Required
Relative humidity (RH)	%	<input type="text"/>	If the relative humidity is not available, supply the temperature and wet bulb temperature .
Black Globe Temperature (BGT)	°C	<input type="text"/>	If the BGT is not available, supply the temperature and either: 1: Solar radiation , or 2: location, month, day of month and time of day .
Temperature (T)	°C	<input type="text"/>	Temperature must be supplied if either the BGT or relative humidity are not available.
Solar radiation (SolRad)	W/m ²	<input type="text"/>	Solar radiation must be supplied if BGT is not available.
Wet bulb temperature (WBT)	°C	<input type="text"/>	Wet bulb temperature must be supplied if relative humidity is not available.
Location		<input type="text" value="Amberley (Qld)"/>	Location must be selected if solar radiation is not known.
Month		<input type="text" value="Dec"/>	Must be selected if solar radiation is not known.
Day of month		<input type="text" value="1"/>	Must be selected if solar radiation is not known.
Time of day		<input type="text" value="Midday"/>	Must be selected if solar radiation is not known.
Wet pen adjustment		<input type="checkbox"/>	This feature increases the relative humidity. Tick this if you have received recent rainfall and your pens are wet.

What is the Heat Load Index (HLI)?

There are a number of climatic conditions that may predispose feedlot cattle to high body heat loads, including

- A recent rain event
- A high ongoing minimum and maximum ambient temperature
- A high ongoing relative humidity
- An absence of cloud cover with a high solar radiation level
- Minimal air movement over an extended period (4-5 days)
- A sudden change to adverse climatic conditions

It is usually a combination of some or all of these conditions that leads to an excessive heat load event, which may result in cattle deaths if conditions persist for a number of days. The Heat Load Index (HLI) has been developed as an indicator of the environmental heat load placed on cattle. The interaction and duration of the following meteorological variables contribute to heat stress;

- BGT = Black Globe Temperature (°C)
- RelHum = relative humidity (%)
- WSpeed = wind speed (m/s)

The technical discussion of HLI, including the formulas used to calculate can be found here.

Have your conditions changed?

Figure 8 Heat Load Index Calculator

[\(http://chlt.katestone.com.au/hli-calculator/\)](http://chlt.katestone.com.au/hli-calculator/)

Page 23 of 31

CATTLE HEAT LOAD TOOLBOX

protecting your investment



HOME FORECASTS TOOLS REGISTER HELP CONTACT

OCTOBER 31, 2013

You are here: Home / Tools / RAP Calculator

RAP Calculator

The Heat Load Index (HLI) – has been developed as an indicator of the environmental heat load placed on cattle.

RISK ANALYSIS PROGRAM (RAP)

Helping define the local risk of Heat Load in your cattle

RAP Version 1.0 | Effective from 20 December 2006

Site information

Select site Amberley (Qld) ▼

Select period Long Term ▼

Stock characteristics

Cattle Type Bos taurus ▼

Coat colour Black ▼

Health status Healthy ▼

No. of days on feed 80 - 130 ▼

Management practices

Amount of shade No shade ▼

Trough water temperature 20 - 30 degree ▼

Manure management class Class 1 ▼

Mitigation measures

Install extra water troughs

Heat load ration fed

Wet manure removal

User notes:

What is the Risk Analysis Program (RAP)?

The ability of cattle to tolerate heat load varies depending on factors such as cattle breed, health status, coat colour, degree of finish, and pen conditions (i.e. whether the pen is shaded or unshaded and the manure management practices employed). For this reason the threshold at which heat load starts to accumulate also varies depending on these factors. For the purposes of forecasting, various heat load thresholds have been incorporated to account for these factors (for example - AHLU86 and AHLU95 where 86 and 95 are the heat load thresholds upper limit (UL) respectively).

The RAP calculator is used to calculate the HLI threshold to use for your particular operation. If the threshold you calculate for your operation falls between the values utilised in the forecasts, you will have to estimate the results for your situation by interpolating between the forecast values. The RAP also gives an assessment of the risk of heatload events based on the site specific data entered and historical climatic data.

The technical discussion of RAP, including the formulas used to calculate can be found here.

Heat Load Calculator

Calculate your HLI

Figure 9 Risk Analysis Program Calculator
[\(http://chlt.katestone.com.au/rap-calculator/\)](http://chlt.katestone.com.au/rap-calculator/)

CATTLE HEAT LOAD TOOLBOX

protecting your investment

HOME FORECASTS MY SITES TOOLS HELP CONTACT US OCTOBER 29, 2013

You are here: Home / Contact

Contact

The 2013/14 heat load forecasting season has begun.
 Information or assistance with this forecast service is available by filling in the form below.

Contact Form

Name*

Email*

Your message*

Additional information or assistance with cattle heat load matters is available from Des Rinehart, MLA Feedlot R&D Project Manager: Phone (07) 5464 2277.

The Cattle Heat Load Toolbox is a service provided by Katestone.





(Edit)

What is CHLT?	Why Register?	Quick Links
The Cattle Heat Load Toolbox (CHLT) is designed to help Australian lot feeders proactively manage heat load in their cattle, by providing location specific weather and heat load forecasts for any feedlot across Australia.	Registration is free and takes only a couple of minutes. By registering your feedlot you will receive four-day forecasts specific to your location and automated alerts to warn you of upcoming heat load events.	<ul style="list-style-type: none"> • HLI Calculator • RAP Calculator • HLI Contour Loop • MSLP Contour Loop • Site Map

+ RETURN TO TOP OF PAGE
COPYRIGHT © 2013 · TERMS AND CONDITIONS OF USE · DEVELOPED BY KATESTONE

Figure 10 Contact page
[\(http://chlt.katestone.com.au/contact/\)](http://chlt.katestone.com.au/contact/)

CATTLE HEAT LOAD TOOLBOX

protecting your investment

Search

HOME
FORECASTS
MY SITES
TOOLS
HELP
CONTACT US

OCTOBER 29, 2013

You are here: Home / Register

Register

Registration Form

To register your site, please fill in your details below and click Register. We will endeavour to accommodate your request within 24-48 hours*. You will receive a confirmation email once the process is complete, together with your login details. Please note: fields with an asterisk (*) are required.

Site Name*

Name of feedlot (not office)

NFAS Accreditation*

No National Feedlot Accreditation Scheme (NFAS) Number? Call 1800 621 903

Full Name* First Last

Email* Enter Email Confirm Email

5. Do you have a weather station (AWS) at your site?*

Yes

No

Want one

Do you have internet access at your feedlot?*

Yes

No

Hoping to soon

Do you want to be part of the Heat Load Data Network (HLDN)?

Yes

No

Need more info

Find out more about the HLDN here (opens in new window).

Set up my Alerts:

Now

Later

Register

Login

Login

If you registered after the previous season closed, you should already be in the system. Please contact us if you have lost your login details.

Heat Load Calculator

HLI Calculator

Calculate your HLI

Have your conditions changed?

RAP Calculator

Use the RAP Calculator to work out which ALHU you need to view to manage your site

Figure 11 Registration page

[\(http://chlt.katestone.com.au/register/\)](http://chlt.katestone.com.au/register/)

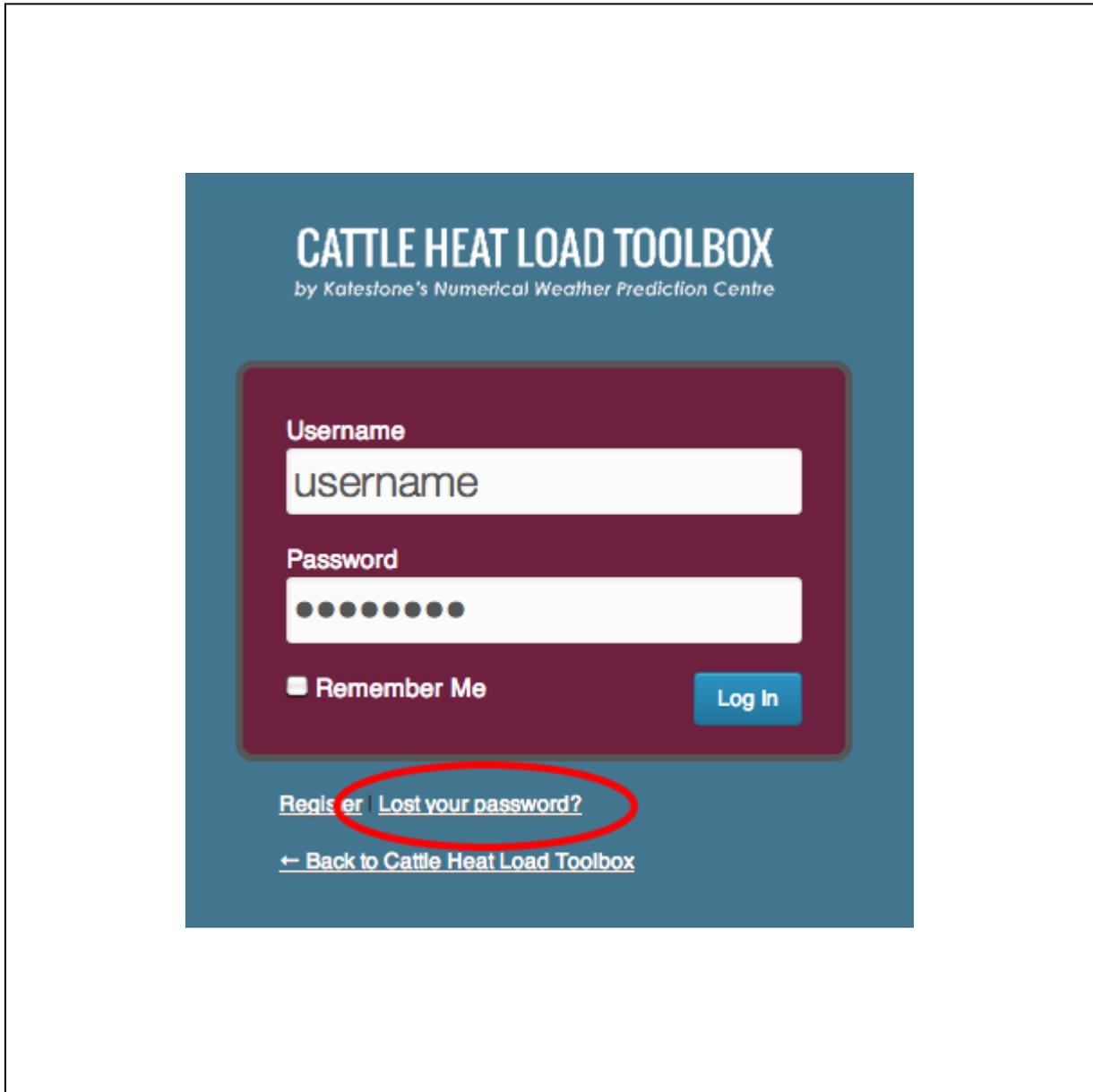


Figure 12 Login page
(<http://chlt.katestone.com.au/login/>)

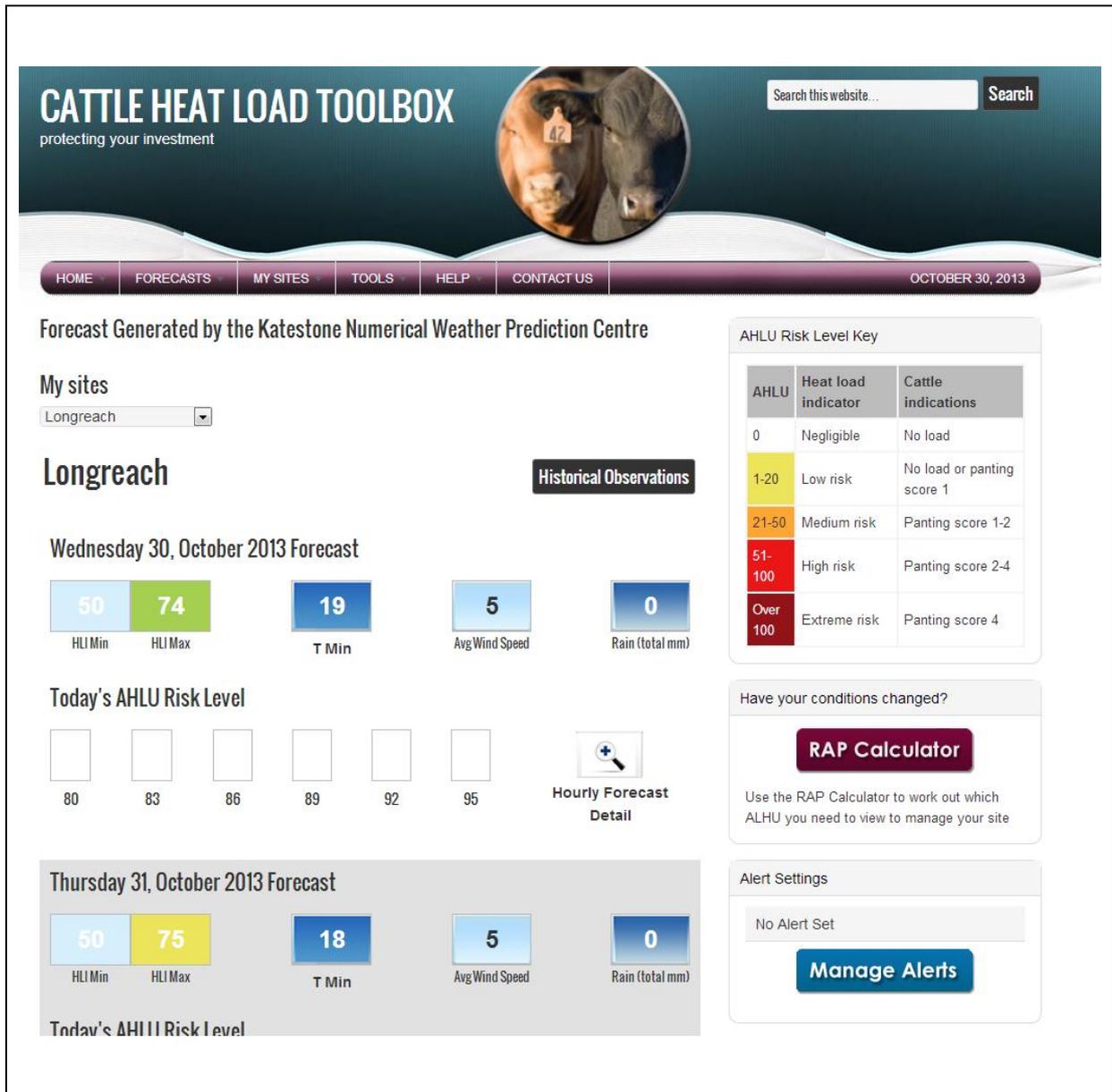


Figure 13 My sites summary

(<http://chlt.katestone.com.au/my-site-summary/>)

CATTLE HEAT LOAD TOOLBOX

protecting your investment

Search

HOME
FORECASTS
MY SITES
TOOLS
HELP
CONTACT US
OCTOBER 31, 2013

My Account Details:

Update your details then click the 'Submit Changes' button below:

Name:

Email:

Phone:

Change Password:

Update your password using a combination of letters and numbers (6 character min – 8-12 characters are better - try this handy tool)

Old Password:

New Password:

Repeat New Password:

My Alert Details:

Please note: SMS alerts are usually sent out at 3am.

Site:

Alert Type:

Alert Level:

Notification Type:

Submit Changes

AHLU Risk Level Key

AHLU	Heat load indicator	Cattle indications
0	Negligible	No load
1-20	Low risk	No load or panting score 1
21-50	Medium risk	Panting score 1-2
51-100	High risk	Panting score 2-4
Over 100	Extreme risk	Panting score 4

Have your conditions changed?

RAP Calculator

Use the RAP Calculator to work out which ALHU you need to view to manage your site

My Alerts Log

- 24-10-2013:Medium AHLU_83 SMS for Darwin
- 24-10-2013:Medium AHLU_83 Email for Darwin
- 23-10-2013:Medium AHLU_83 SMS for Darwin
- 23-10-2013:Medium AHLU_83 Email for Darwin

What is CHLT?

The Cattle Heat Load Toolbox (CHLT) is designed to help Australian lot feeders proactively manage heat load in their cattle, by providing location specific weather and heat load forecasts for any feedlot across Australia.

Why Register?

Registration is free and takes only a couple of minutes. By registering your feedlot you will receive four-day forecasts specific to your location and automated alerts to warn you of up-coming heat load events.

Quick Links

- HLI Calculator
- RAP Calculator
- HLI Contour Loop
- MSLP Contour Loop
- Site Map

◀ RETURN TO TOP OF PAGE
COPYRIGHT © 2013 · TERMS AND CONDITIONS OF USE · DEVELOPED BY KATESTONE

[Log out](#)

Figure 14 Account management

[\(http://chlt.katestone.com.au/my-site-summary/my-account/\)](http://chlt.katestone.com.au/my-site-summary/my-account/)

CATTLE HEAT LOAD TOOLBOX
protecting your investment

Search this website... Search

HOME FORECASTS MY SITES TOOLS HELP CONTACT US NOVEMBER 1, 2013

My Site's Users

All users associated with your feedlot site's [account](#) are listed below. Use this page to modify a user's account by clicking on their username. Send a user an email by clicking their email address. Use the delete button to remove a user's access.

Test Feedlot

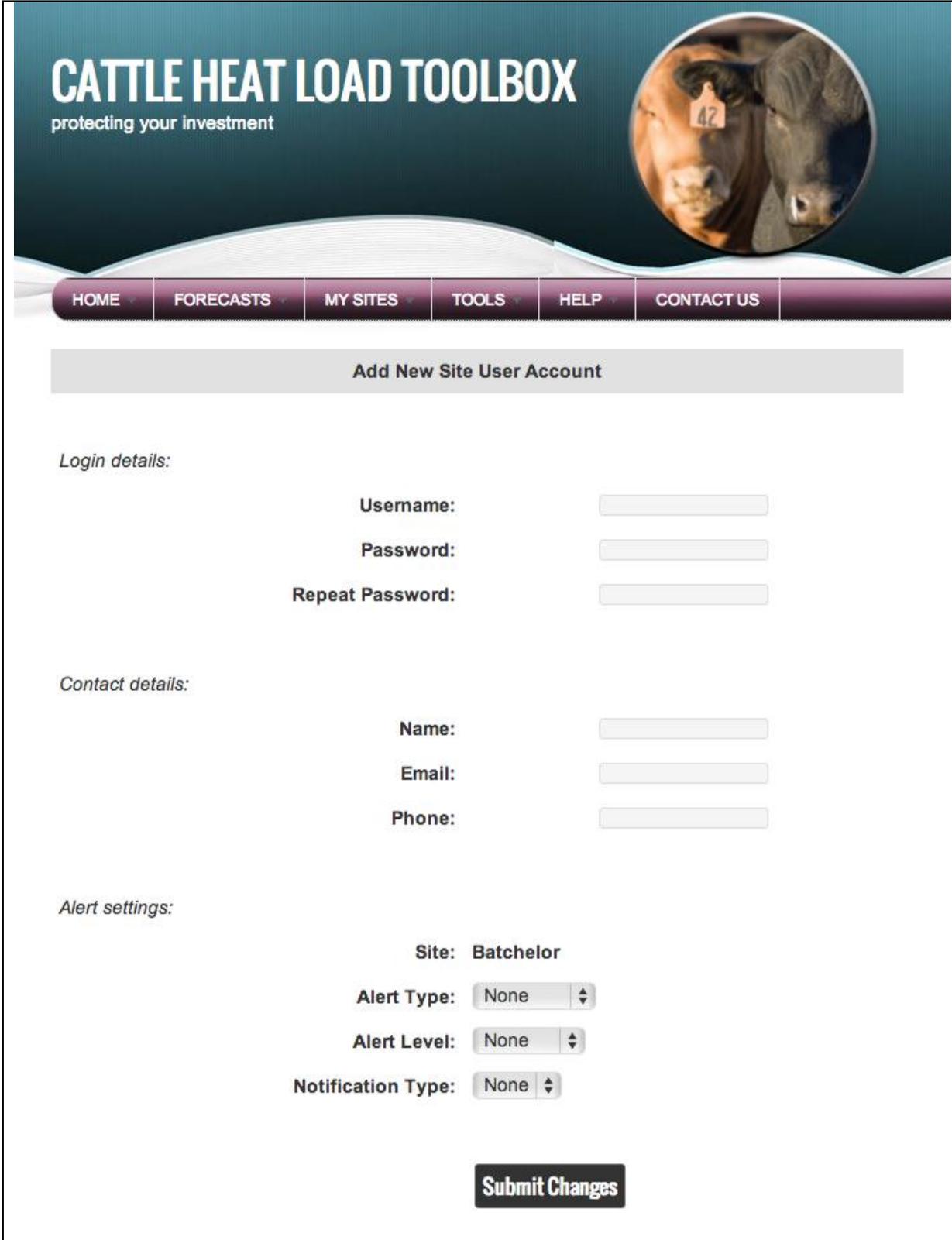
Username	Name	Email	Delete
kate.stone	Kate Stone	katestone@katestone.com.au	Delete
john.green	John Green	johngreen@katestone.com.au	Delete

Add New User to My Site

Click the Add User button to add a new [user account](#). If you have multiple sites, please select the appropriate site from the dropdown list first.

Add User

Figure 15 User management
(<http://chlt.katestone.com.au/my-site-summary/manage-users/>)



CATTLE HEAT LOAD TOOLBOX
protecting your investment

HOME FORECASTS MY SITES TOOLS HELP CONTACT US

Add New Site User Account

Login details:

Username:

Password:

Repeat Password:

Contact details:

Name:

Email:

Phone:

Alert settings:

Site: Batchelor

Alert Type:

Alert Level:

Notification Type:

Submit Changes

Figure 16 Add users
[\(http://chlt.katestone.com.au/my-site-summary/add-new/\)](http://chlt.katestone.com.au/my-site-summary/add-new/)