



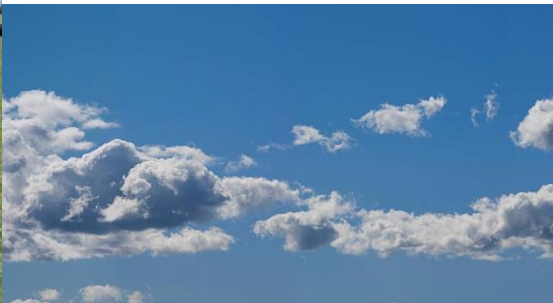
Department of  
Primary Industries

# Change and Variability

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# Overview

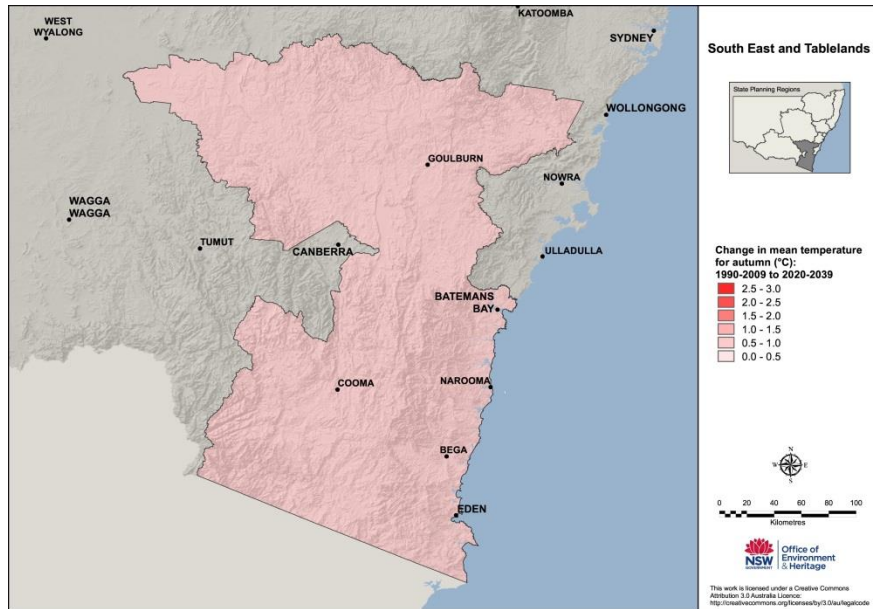
- Bit of climate change
- Bit of impacts
- Discuss some adaptation
- Bit on variability
- Bit on technologies to assist with variability



The screenshot shows a web browser window displaying the AdaptNSW website. The browser's address bar shows the URL: [climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Climate-projections-for-your-region](http://climatechange.environment.nsw.gov.au/Climate-projections-for-NSW/Climate-projections-for-your-region). The website header includes the NSW Government logo, Environment & Heritage, and the AdaptNSW logo. A navigation menu is visible with options: ADAPT NSW HOME, ABOUT CLIMATE CHANGE IN NSW, CLIMATE PROJECTIONS FOR NSW (selected), IMPACTS OF CLIMATE CHANGE, ADAPTING TO CLIMATE CHANGE, EDUCATION RESOURCES, and BACK TO OEH HOME. Below the navigation, a breadcrumb trail reads: You are here: [Adapt NSW Home](#) > [Climate projections for NSW](#) > [Climate projections for your region](#). The main content area features a large image of a landscape with a grid overlay, titled "Climate projections for your region". To the left of this image is a sidebar menu with the following items: "Climate projections for NSW", "Interactive map", "Climate projections for your region" (highlighted), "NSW Climate Change Downloads", "ACT Downloads", "Central Coast Downloads", "Central West and Orana Downloads", "Far West Climate Change Downloads", "Hunter Climate Change Downloads", "Illawarra Climate Change Downloads", "Metro Sydney Climate Change Downloads", "Murray Murrumbidgee Climate Change Downloads", "New England North West Climate Change Downloads", "North Coast Climate Change Downloads", "South East and Tablelands Climate Change Downloads", "Need some help on where to start?", "About NARCIIM", and "Download datasets". The main text on the page states: "The Office of Environment and Heritage has developed Climate Change Snapshots for NSW and each of the State Planning Regions. The snapshots provide details of the: Current climate of the region". It then lists likely changes in climate (temperature and rainfall) by 2030 and 2070, likely changes to Severe Fire Weather by 2030 and 2070, likely changes to Hot days (maximum temperatures >35°C), and likely changes to Cold nights (minimum temperatures <2°C). It also mentions that for each region, a climate change snapshot can be downloaded, and lists the regions: New South Wales, Australian Capital Territory, Central Coast, Central West and Orana, Far West, and Hunter.

# Temperature

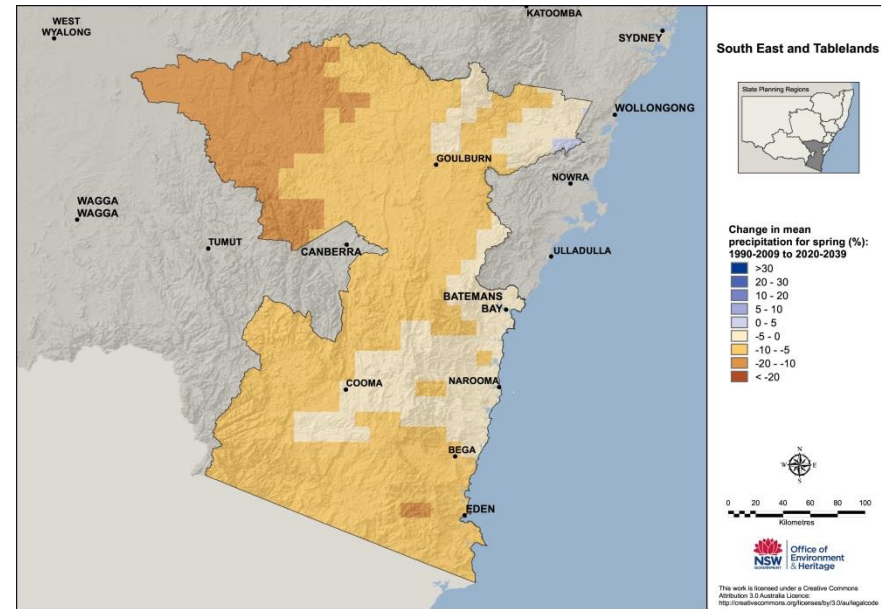
## Autumn



warmer

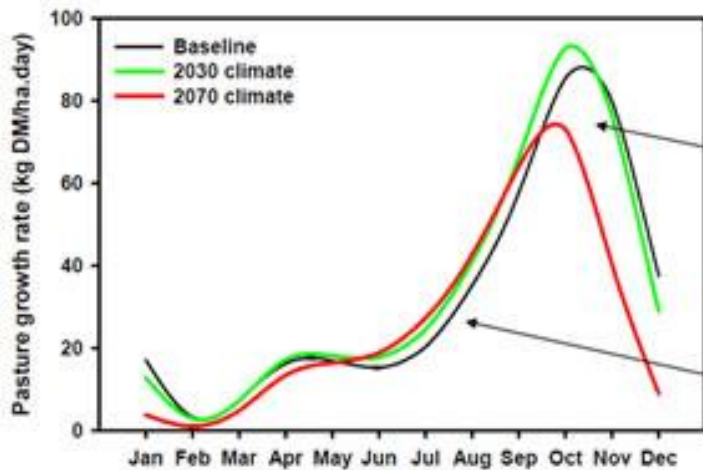
# Rainfall

## Spring



drier

# Change to pasture?



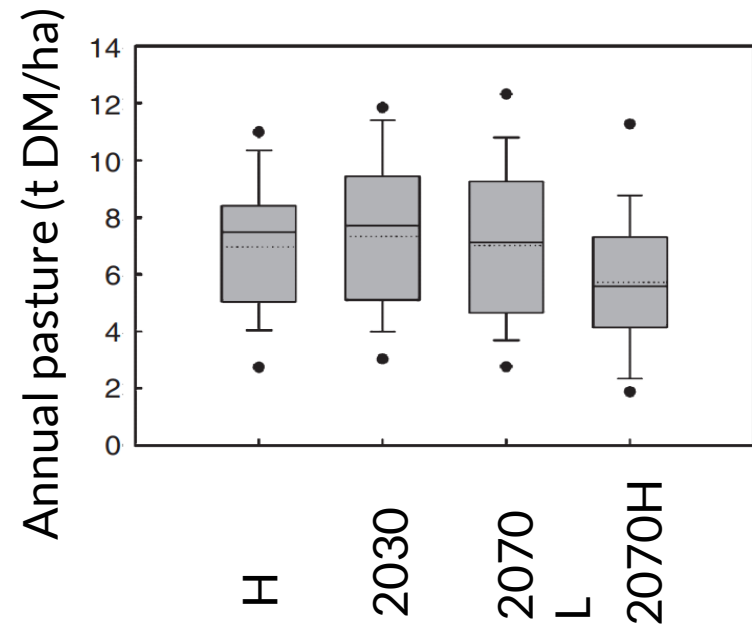
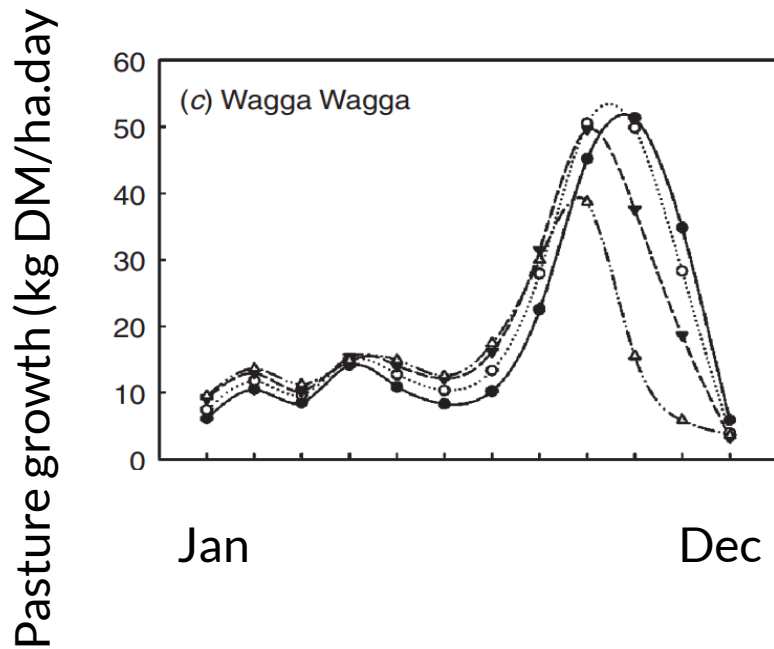
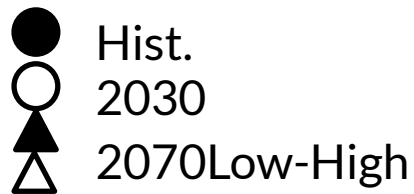
Lower R = contraction and reduction of spring production

Warmer T = slight increase in autumn production

More impact with time

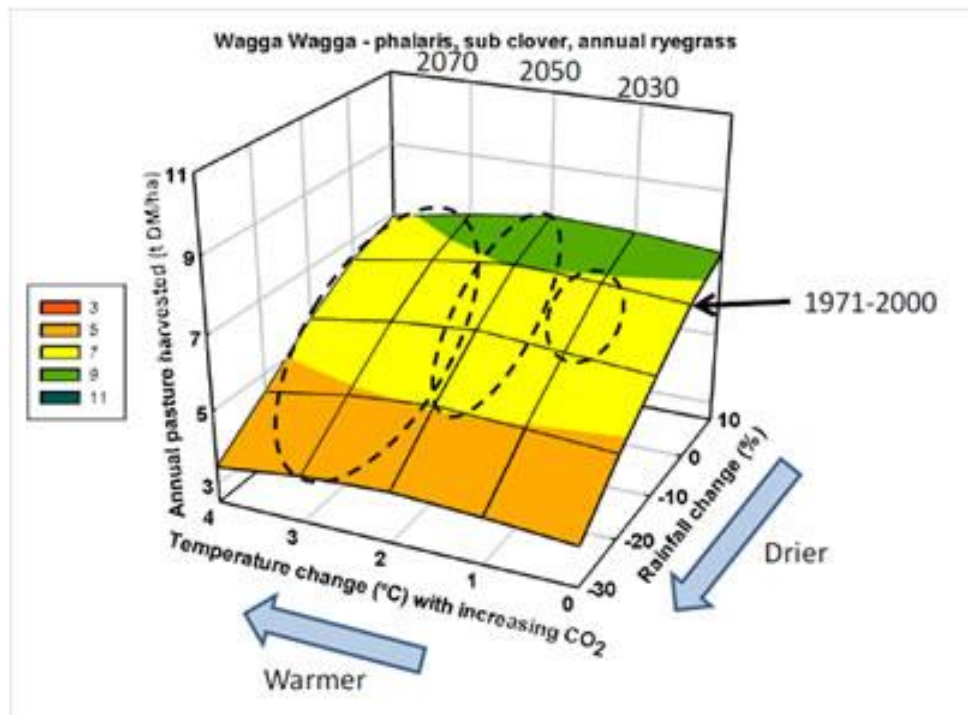
(Cullen et al., 2009)

# Change to pasture – a bit more local



(Cullen et al, 2009)





Courtesy, B. Cullen

# Hist. vs 2030 production & profit

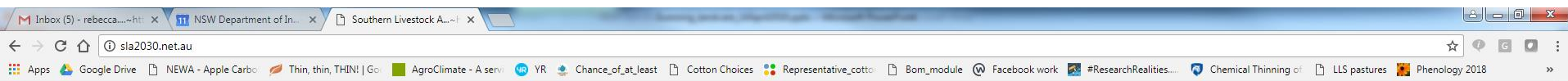
	Pasture as a % of base	DSE/ha as % of base	Profit /ha as % of base
Goulburn	93%	74%	60%
Yass	93%	71%	60%

Annual pasture production, dse set to match ground cover, averaged across sheep and beef enterprises

(Graham, 2012)



# <http://sla2030.net.au/>



Warning: Creating default object from empty value in /home/sla2030/public\_html/wp-content/plugins/media-tags/media\_tags.php on line 42

## SOUTHERN LIVESTOCK ADAPTATION 2030

Most climate scenarios to 2030 suggest *higher temperatures* and *less rainfall*

SEARCH  
[About the Program](#) [Modelling Weather Change & Impacts](#) [Key Findings](#) [Producer Locations](#) [Research Centres](#) [Resources](#)

### ABOUT MAP / HOW TO

To get a better understanding of what impacts future climates (specifically a range of weather scenarios in 2030) might have on pasture and livestock production, and farm profitability, simply click on a location of interest on the map. The Southern Livestock Adaptation 2030 research project modelled these issues for the baseline period of 1970 to 1999, the particularly dry period of 2000 to 2009, and what might be in 2030.

[view full screen map](#)

Reset map

Map data ©2018 Google, ZENRIN | Terms of Use

### KEY FINDINGS

The SLA2030 project identified a range of important findings about how our weather may change at a local level in the future and what the impacts may be for livestock producers in those areas. To view the key findings click below.

[more on key findings](#)

### DESCRIPTION OF PROGRAM

The SLA2030 project brought together researchers, extension experts and producers to look at a range of future climate scenarios and the potential impact on farm productivity and profitability at a local level. A more detailed overview of the program can be found by clicking below

[more about the program](#)

### BACKGROUND / DISCLAIMER

No one can accurately predict the future and this project certainly doesn't try to do that. But the results of the modelling show some interesting trends. More detail about the background and disclaimer can be found by clicking below

[more about background](#)

# Adaptation in Action

## Dual purpose canola in Goulburn

- Cattle and prime lamb operation
- rotation added into the traditional weedy oats and wheat crops

“It gives us the ability to control grass weeds, produce more profitable wheat and supplies a mix of income,”

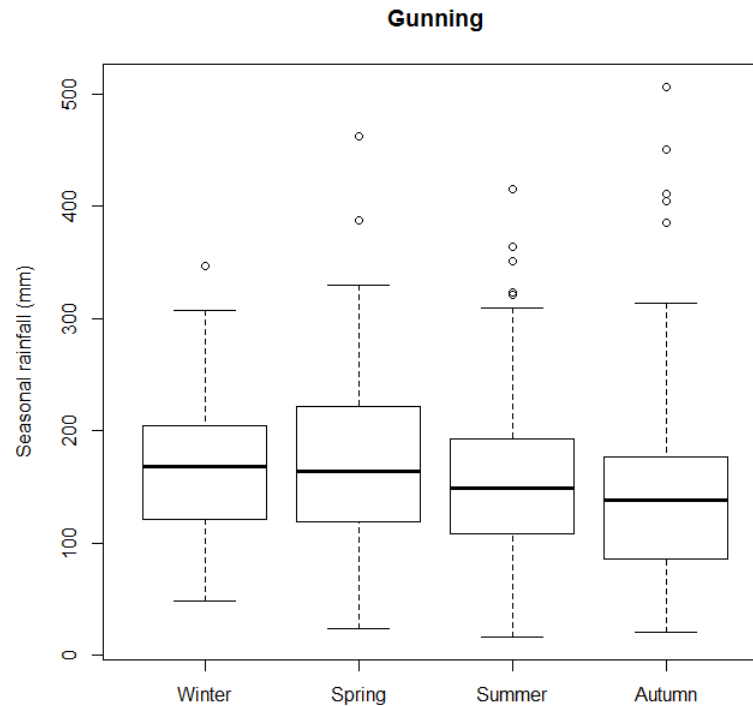
“A well-run program of grazing and grain is a high-expense, high-return system. It costs \$750/ha to run our system, but it returns around \$900/ha for meat and \$900/ha for grain.”



(GRDC, ground cover)

# Climate Variability

Climate variability = significant source of profit variability (greatest?)



Climate change = more variability


# Adapting to Variability

Have you noticed a change in variability?

Can make changes now... perhaps you have?

- pasture mix to take advantage of changing seasonal conditions?
- natives?

Can technology help better manage variability now and in the future?

- seasonal climate forecasts
  - moisture probes
- 

# Some New Findings - Teaser

What is the value of including SCF to make the decision of when to sell lambs (Nov or Feb)?

Case study in Holbrook

\*exploratory\* NOT advice!

What else matters?

- pasture in Nov
- lamb price in Nov
- supp. Feed price



“Improved Use of Seasonal Forecasting to Increase Farmer Profitability”  
RnD 4 Profit (DAWR)  
Ends June 2018

# Some New Findings - Teaser

## ★ Without Forecast Decision



**Low Pasture**

Supplementary Feed Price		Nov Lamb Price		
	High	Low	Medium	High
High	0	100	100	
Medium	0	100	100	
Low	0	0	100	

% lambs sold in Nov

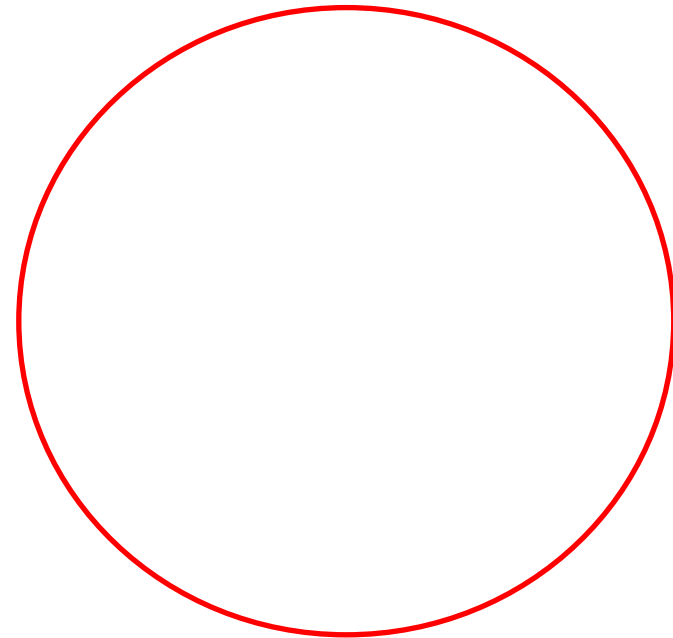
# ★ Perfect Forecast Decision

Dry State

**Low Pasture**  
Supplementary Feed Price

High	0	100	100
Medium	0	100	100
Low	0	0	100
	Low	Medium	High

Lamb Price





## Forecast Value Average State

Dry State

Wet State

**Low Pasture**

Supplementary Feed Price	High	0	0	0
	Medium	0	0	0
	Low	0	0	0
		Low	Medium	High
		Lamb Price		

Supplementary Feed Price

Supplementary Feed Price	High	0	0	0
	Medium	0	0	0
	Low	0	0	0
		Low	Medium	High
		Lamb Price		

Supplementary Feed Price

Supplementary Feed Price	High	0	0	0
	Medium	0	0	0
	Low	0	0	0
		Low	Medium	High
		Lamb Price		

**High Pasture**

Supplementary Feed Price	High	0	53.8	0
	Medium	0	20.7	0
	Low	0	0	0
		Low	Medium	High
		Lamb Price		

Supplementary Feed Price

Supplementary Feed Price	High	0	0	0
	Medium	0	0.7	0
	Low	0	0	0
		Low	Medium	High
		Lamb Price		

Supplementary Feed Price

Supplementary Feed Price	High	0	0	9.1
	Medium	0	0	21.4
	Low	0	0	43.7
		Low	Medium	High
		Lamb Price		

\$/ha

# Some New Findings - Teaser

- Pasture amount very important
- Price settings also important
- SCF valuable depending on these settings
- **\*exploratory\*** i.e. forecasts are not {dry, average, wet} and are imperfect^

Knowing pasture amount is useful... your LLS is here to help!



# LLS here to help

Soil Moisture Probes

HOME ABOUT SEASONAL REPORTS PARTNERS CONTACT US

## SOUTHERN SOIL MOISTURE NETWORK

Welcome to the Soil Moisture Network for the Tablelands and Monaro region. The network of 14 soil moisture probes are strategically positioned across the landscape from Delegate and Cooma in the **south** to Braidwood, Gunning and Bigga in the **north**.

The network is a partnership between the **South East Local Land Services**, **Tablelands Farming Systems** and **Monaro Farming Systems** that aims to arm farmers and land managers with better soil moisture information to help measure and guide management decisions across critical times of the year.

**USE THE MENU TO THE LEFT TO FIND OUT MORE ABOUT THE PROJECT AND TO OBTAIN INFORMATION ABOUT EACH PROBE SITE INCLUDING PADDOCK HISTORY**

Click on the locations to access real time soil moisture and soil temperature measurements at various levels down to a depth of 1m. Each site also features an automatic rain gauge. **seasonal forecasting reports** are released each autumn and spring, providing information on pasture production over a three month period.

To navigate your way around the website and interpret the graphs, please download the quick user guide

[WEBSITE QUICK USER GUIDE](#)



- HOME
- PROBES MAP
- BANNISTER
- BIGGA
- BOOROWA
- BRAIDWOOD
- BUKALONG
- BUNGARBY
- DELEGATE
- GUNNING**
- LAGGAN
- LAKE BATHURST
- MUNIONG
- RUGBY
- TARALGA
- WHEEO

## GUNNING

Property "Collingwood"

Collingwood is located 3km east of Gunning on the Southern Tablelands of NSW. The terrain is predominantly gently rolling granite soils, rising to steeper basalt and shale peaks. Altitude ranges from 560m to 800m and average annual rainfall is 640mm. Collingwood is a family owned property and is managed by Charles Knight. The businesses prime focus is on wool production. Enterprises include a self-replacing wool flock which is run along side a first cross terminal lamb flock and a cattle trading enterprise.

**Annual rainfall** 640mm

**Altitude** 590m

**Soil type** Granite  
 (refer to soil section for further detail)

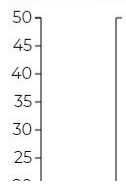
**Pasture type** Introduced  
 (refer to pasture section for further detail)



## INTERACTIVE GRAPH

It may take a few seconds to load all the data

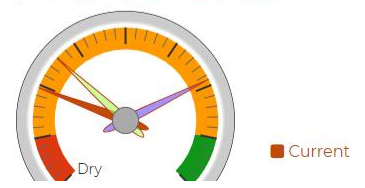
### RAINFALL SINCE 9AM



### SOIL MOISTURE PROFILE



### OVERALL SOIL MOISTURE



# LLS here to help

- Soil Moisture Probes
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WEBSITE QUICK USER GUIDE





## INNOVATION TO SUPPORT ON-FARM DECISION MAKING

To support decision making, a three month 'seasonal outlook' for each of the 14 localities will be produced every autumn and spring. These reports are publicly available and provide relevant information for each probe location.

South East Local Land Services and NSW Department of Primary Industries complete the reports for the benefit of the Southern Soil Moisture Network.

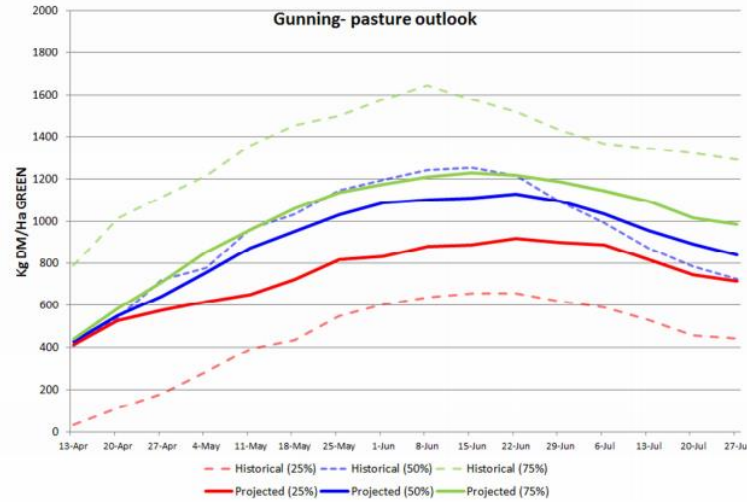
This project is part of the \$25 million of National Landcare Programme investment that Local Land Services is delivering to boost farm gate productivity and improve economical health across NSW.



- Seasonal Outlook – Autumn 2017
- Seasonal Outlook – Spring 2017



## Gunning



- Green feed by mid-April was sitting around the long-term average. This can be seen on the left hand side of the graph where the starting position of around 400kg DM (green).
- At the time of writing this site had just received **23mm** (24-26 April). This rainfall is very timely as the graph shows soil moisture becoming a factor by late April. This is indicated by the separation of the solid lines.
- **The BOM outlook for May is very dry, with only a 41% chance of receiving at least 25mm. Past accuracy for this location at this time of year is high.**
- Given that this site has been a bit drier (compared to other sites) future rainfall is more important. The likelihood is that pasture supply will move below the "typical" year (dotted blue line) but not into a difficult position.
- **In summary, pasture at this site is expected to below average across the next three months but will remain in the 'normal' range.**

### Required rainfall to drive pasture growth for Gunning

Month	Long term median	Required rainfall
Blue line		
May	39	23
June	52	25
July	49	36

### Gunning assumptions

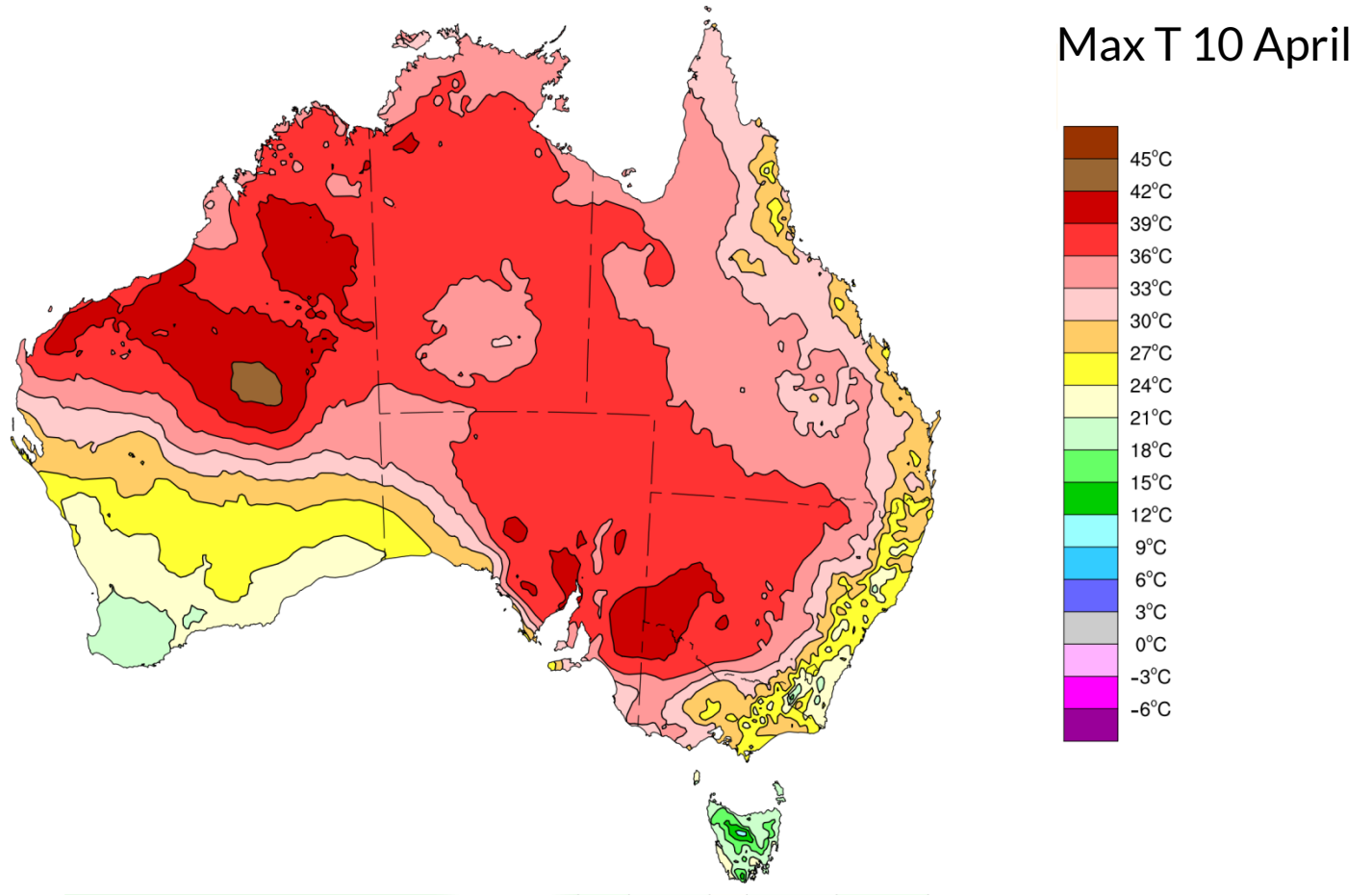
<b>Enterprise</b>	Self-replacing Merino flock lambing mid August
<b>DSE rating</b>	12.4 DSE
<b>Pasture</b>	Microlaena, sub clover and annual grasses
<b>Elevation</b>	590m



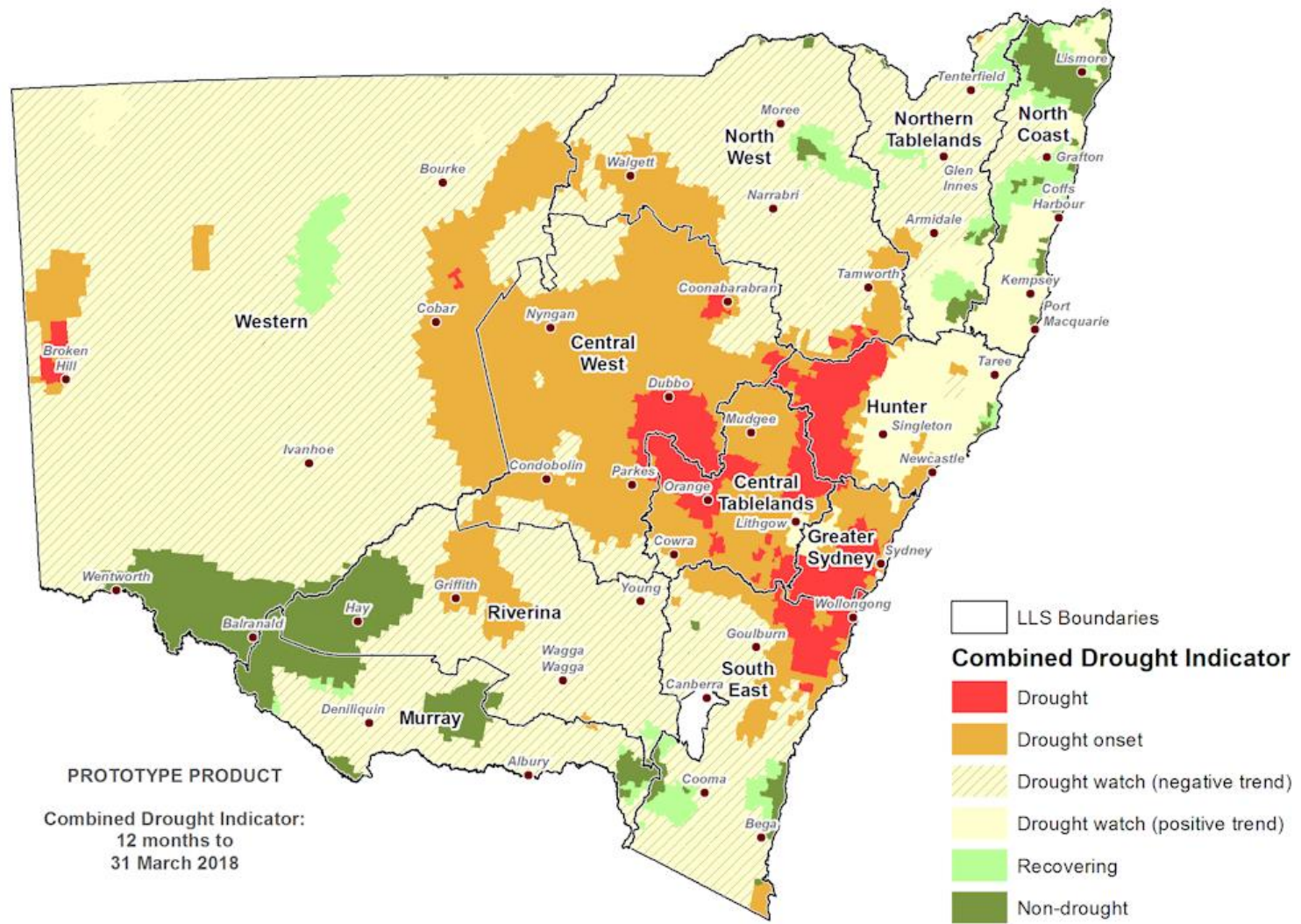
If time...?



# If time... BoM




# If time... NSW DPI conditions report



[https://www.dpi.nsw.gov.au/climate-and-emergencies/drought-hub/information-and-resources/seasonal-conditions/ssu/march-2018](https://www.dpi.nsw.gov.au/climate-and-emergencies/drought/drought-hub/information-and-resources/seasonal-conditions/ssu/march-2018)

# My Thoughts

- Likely shift in pasture productivity windows
  - Likely downward shift in total pasture production
    - Do I change my animals management (e.g. joining timing)
    - Do I modify my pasture mix?
    - Do I do a mixture of things?
  - Climate is likely to be more variable
  - What can I do to manage variability better?
  - What is actually on the ground right now? Know what is knowable.
  - SCF in combination with knowing current conditions could add value
  - LLS seasonal conditions summary = Australian leaders
  - LLS preparing local climate change info
- 



Thank You

[Rebecca.Darbyshire@dpi.nsw.gov.au](mailto:Rebecca.Darbyshire@dpi.nsw.gov.au)