

Climate and land management information for Agriculture

Grant Stone (and many colleagues)

Queensland Government

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The Long Paddock

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10 Sep 2017
Average SOI value for the last 30 days
+7.03

Managing climate risk for rural Queensland
A Queensland Government initiative providing climate and pasture information to the grazing community

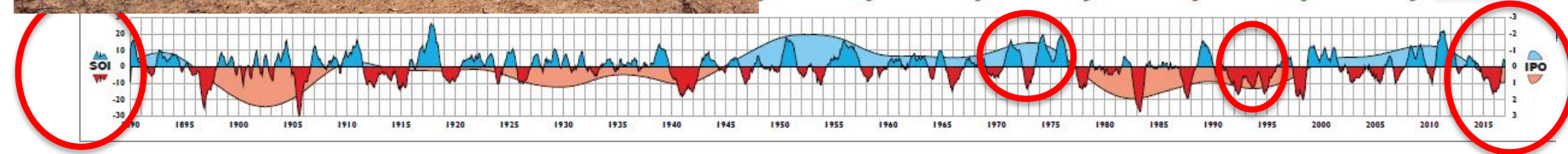
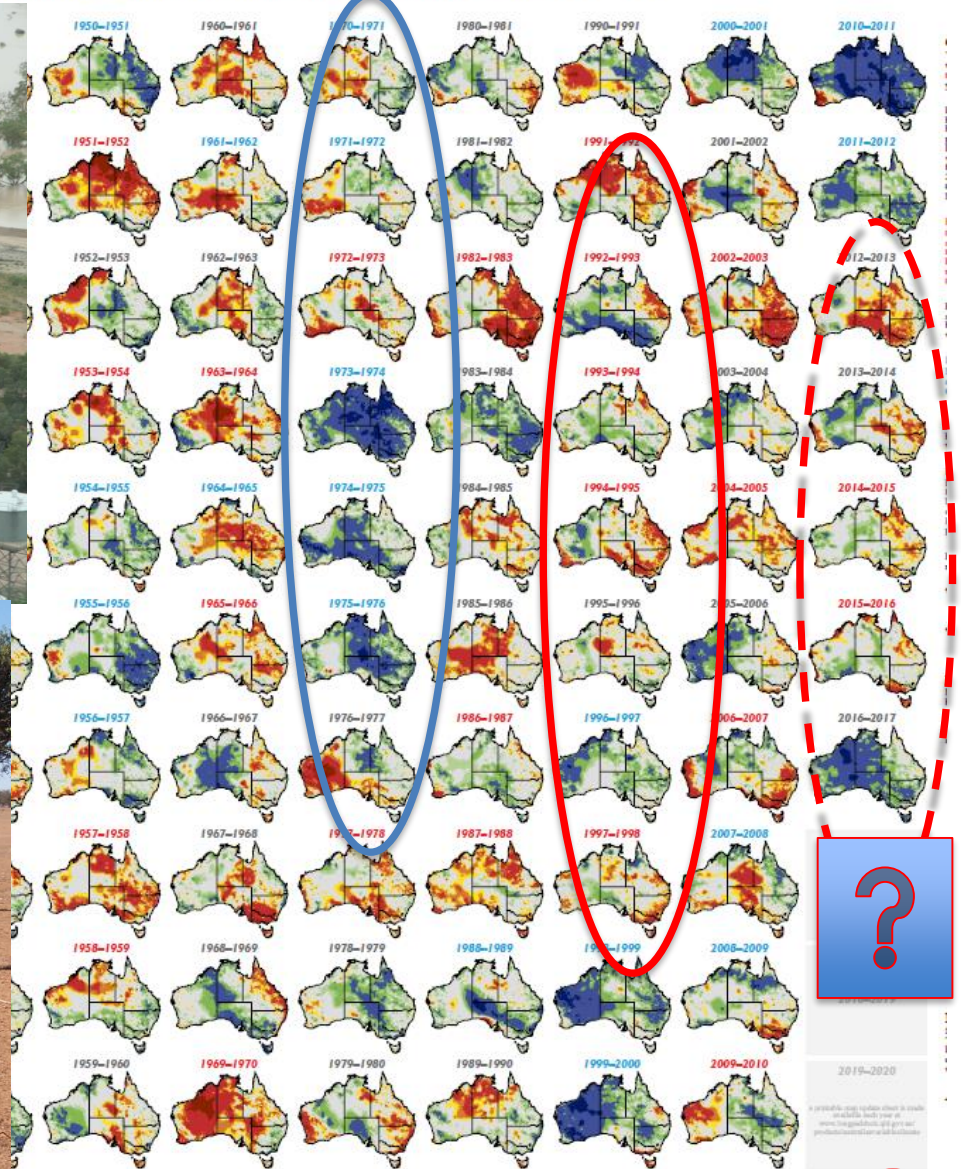


What's covered in this talk

- Historical rainfall sequences
 - Wet and dry sequences and visualisation
 - Drought evolution series
- The new LongPaddock website
- AussieGRASS products
- The FORAGE reporting system
- VegMachine Online groundcover analyses

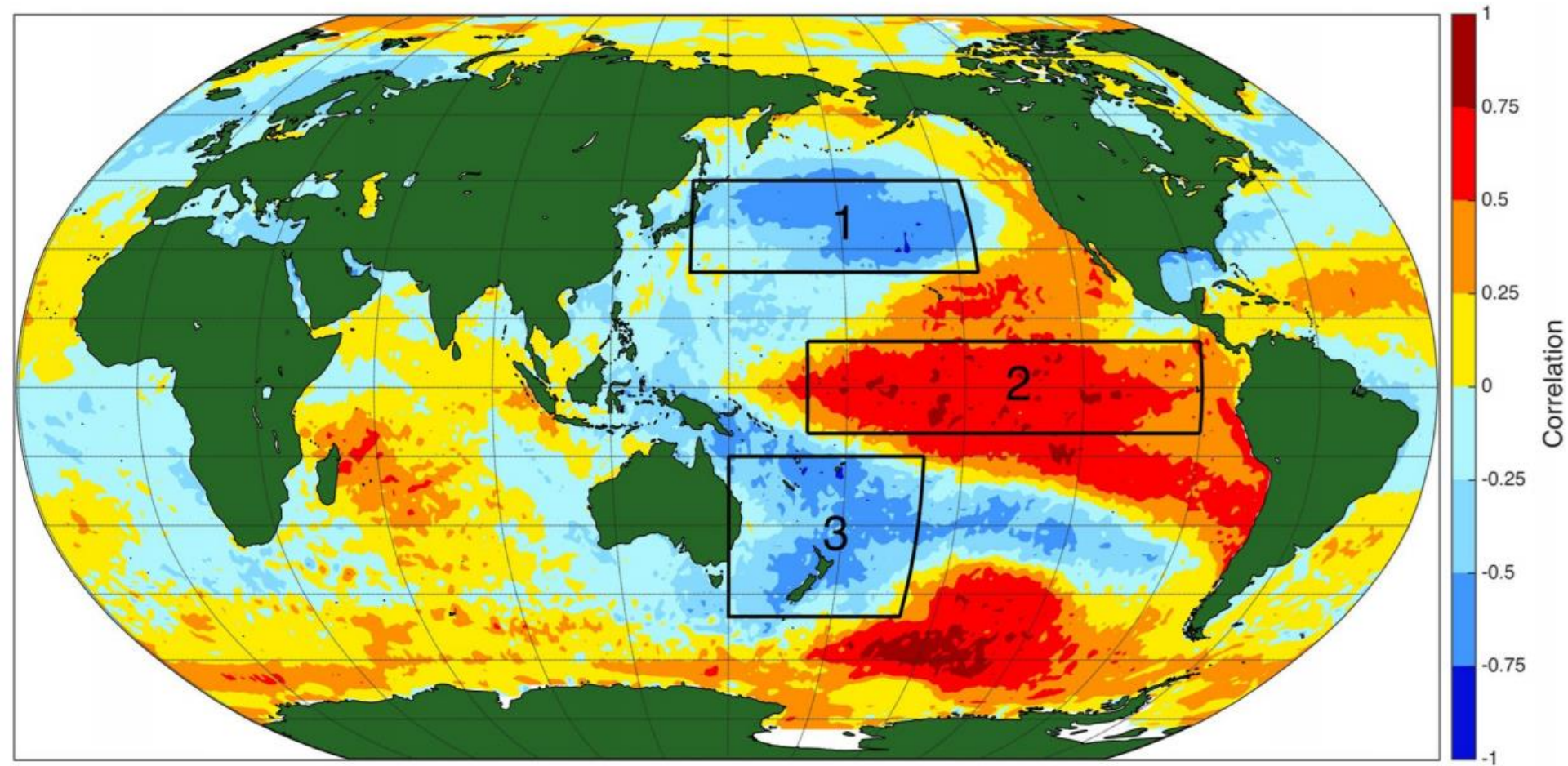
Australia's Variable Rainfall

April to March Annual Australian Rainfall Relative to Historical Records 1890-2017



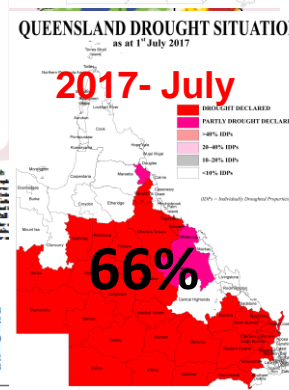
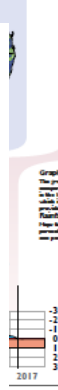
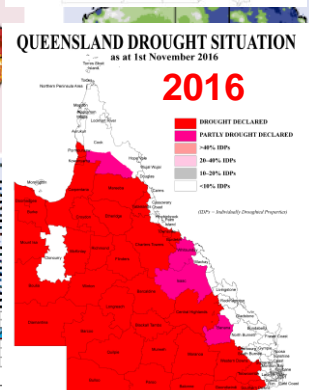
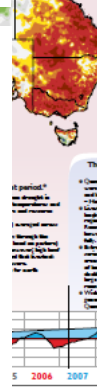
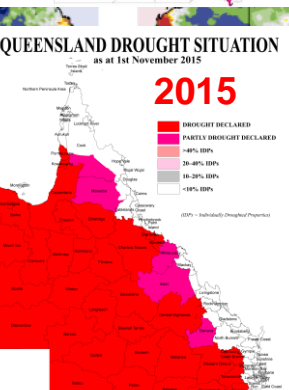
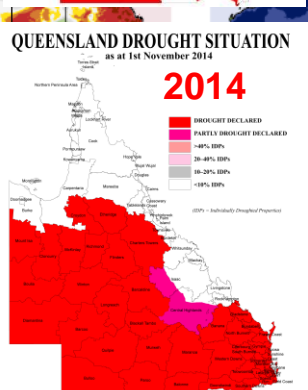
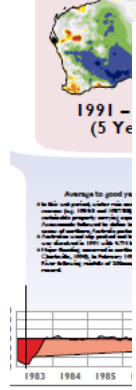
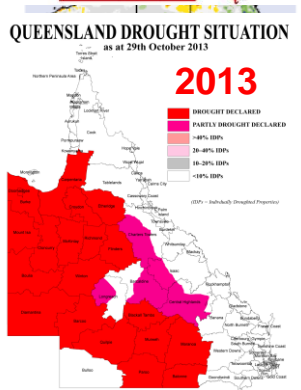
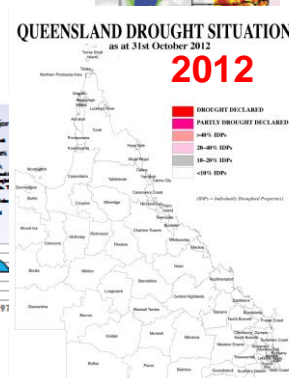
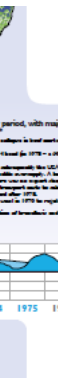
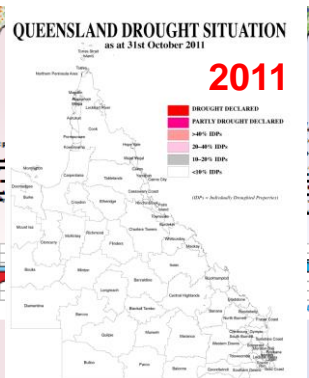
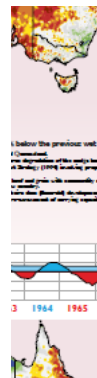
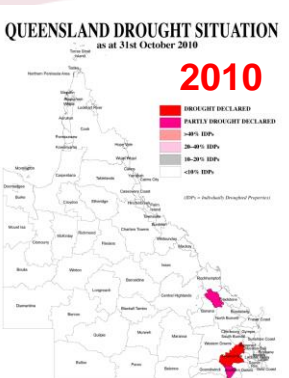
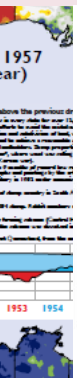
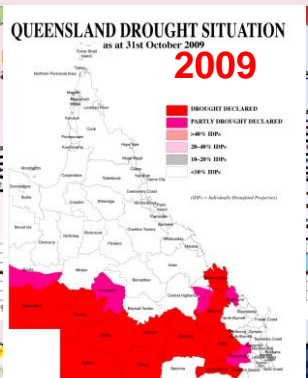
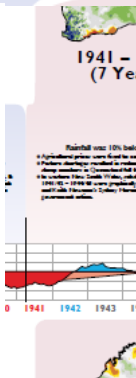
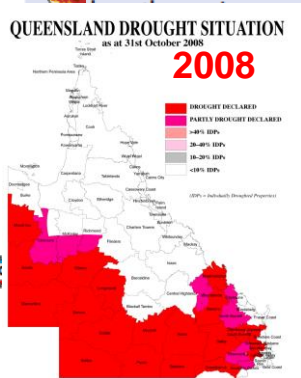
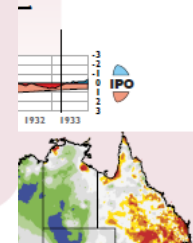
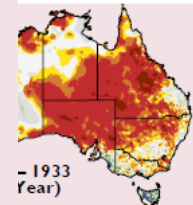
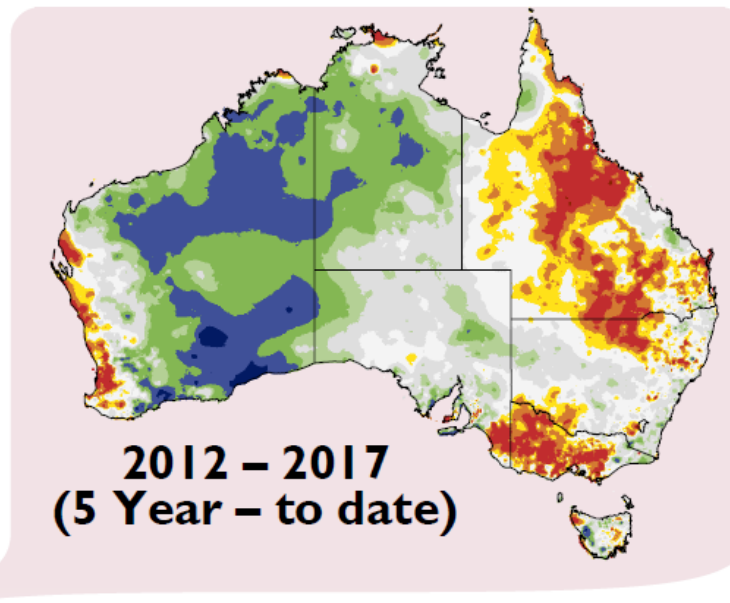
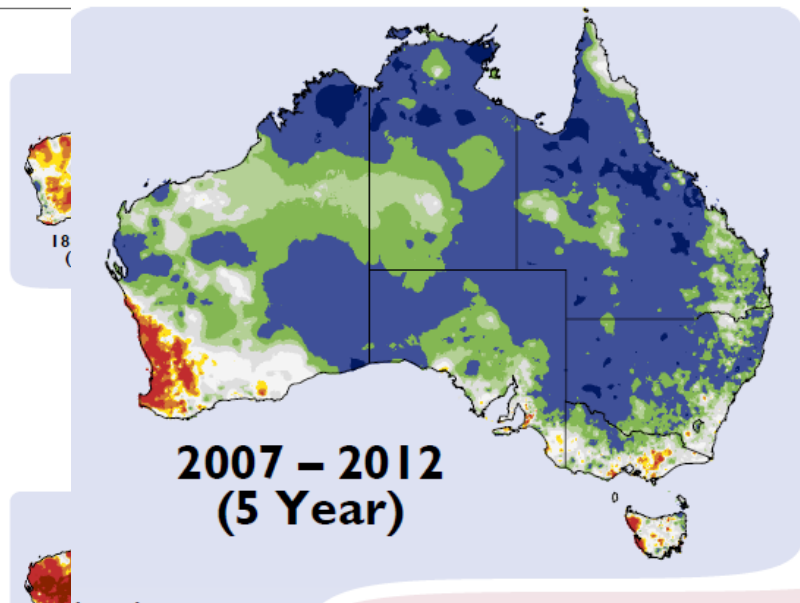
Rainfall Anomalies

ENSO and Inter-decadal Pacific Oscillation (IPO)



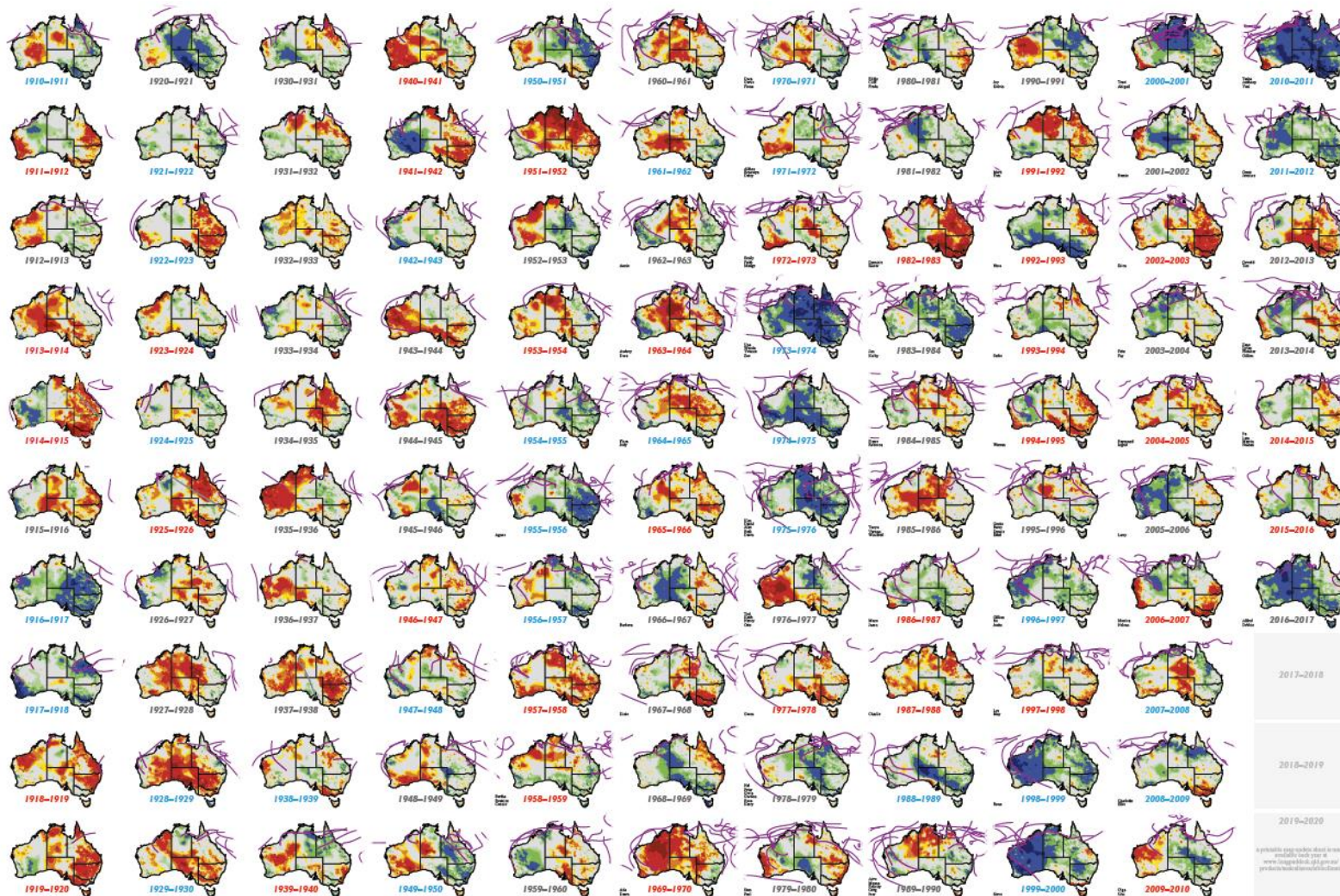
(Henley *et al.* 2015)

Fig. 1 Correlation between SST and IPO_{UKMO} (unfiltered), composite of 10 realisations of HadISST2.1. *Black boxes indicate TPI regions: region 1 25°N–45°N, 140°E–145°W; region 2 10°S–10°N, 170°E–90°W; region 3 50°S–15°S, 150°E–160°W*



New visualisation and posters

Australia's Variable Rainfall with Tropical Cyclone Tracks April to March Annual Australian Rainfall Relative to Historical Records 1910-2017



Classification of years

Years are classified, according to colour, based on whether they are either 'El Niño' years (red), 'La Niña' years (blue) or 'ENSO Neutral' years (grey).

For this poster, El Niño and La Niña year classification is based on values of the Southern Oscillation Index (SOI) between June and March. An original classification proposed by Dr Rob Allan has been modified to allow for late-forming El Niño or La Niña events. Threshold values of the SOI have been adjusted such that the frequency of El Niño and La Niña years from 1950 to 2017 is similar to that obtained by the 'WMO RA IV Consensus Index and Definitions of El Niño and La Niña'.

El Niño
Originally referred specifically to a warming of the sea surface off the coast of Peru, now more generally refers to the warming of the central and eastern equatorial Pacific Ocean, strongly associated with persistently positive values of the SOI. Commonly associated with extended wetter periods.

For this poster, an 'El Niño year' is indicated if the six-month average value of the SOI, ending in any month between November and March, was below a threshold value of negative 6.0.

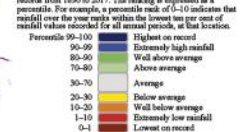
La Niña
Now used to refer to the opposite of El Niño, or events associated with persistently negative values of the SOI. Commonly associated with extended wetter periods.

For this poster, a 'La Niña year' is indicated if the six-month average value of the SOI, ending in any month between November and March, was above a threshold value of positive 6.0.

ENSO Neutral
ENSO refers to the El Niño-Southern Oscillation which fluctuates between El Niño or La Niña (above). 'ENSO Neutral' refers to neither El Niño or La Niña. Often the equatorial Pacific Ocean temperatures are over the long-term average. It is possible to have wet or dry periods associated with 'ENSO Neutral' years.

For this poster, 'ENSO Neutral' are all years which do not fall in either El Niño or La Niña categories (above).

Rainfall classification
Maps for each year show rainfall ranked against historical records from 1850 to 2017. The ranking is expressed as a percentile. For example, a percentile rank of 1-10 indicates that rainfall over the year was within the lowest ten per cent of rainfall values recorded for all annual periods at that location.



Tropical Cyclone tracks

Tropical Cyclone tracks have been sourced from Australian Bureau of Meteorology (see <http://www.bom.gov.au/cyclone/history/index.shtml>). Tracks for 1900-1909 have not been included due to space availability. Data in the postwar era (in 1960s) are considered to be of higher quality. The system depicted is based on the highest intensity the system evolves to in its lifetime. The 'best' version of a track would normally signify a 'worst-case' operational track.

System names are indicated for systems that cross the Commonwealth coast. Systems that occur over the March/April boundary are shown on both year's maps and indicated by a dotted line. Tracks that originate or terminate outside the map's boundary are faded and shown by a broken line. Track colour changes when over land.

Graph
The bottom graph shows fluctuations in the six-month moving average of the Southern Oscillation Index (SOI). The SOI compares the difference in atmospheric pressure between Tahiti and Darwin. The graph also shows fluctuations in the inter-decadal Pacific Oscillation (IPO), an oceanic moving fluctuation in Pacific Ocean sea surface temperatures which influences climate variability. The IPO values on the graph are the Global Index score over 1 year. Credit: Graph provided by Andrew Coleman, Met Office, updated to June 2016.

Produced by

Science Division, Department of Science, Information Technology and Innovation (DSITI), Economics Precinct, GPO Box 363, Brisbane Queensland 4001, email: rainposters@dsiti.qld.gov.au web: www.long.brisbank.qld.gov.au

Acknowledgments

- Rainfall data sourced from the Australian Bureau of Meteorology (www.bom.gov.au) and processed into percentile calculations by DSITI.
- SOI data sourced from the Australian Bureau of Meteorology (www.bom.gov.au) with monthly values smoothed using a six-month moving average.
- IPO data sourced under C. Cowan copyright, UK Met Office, Reproduced under Licence Number: MetOffice/2010/0027.
- Tropical Cyclone track database sourced from the Australian Bureau of Meteorology (www.bom.gov.au/dm_data/TCOCSYSTMET060606).



Queensland Government



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10 Sep 2017

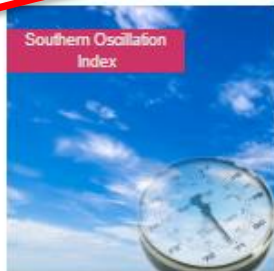
Average SOI value for the last 30 days

+7.03

Managing climate risk for rural Queensland

A Queensland Government initiative providing climate and pasture information to the grazing community

Southern Oscillation
Index



FORAGE



AussieGRASS



Drought



SILO



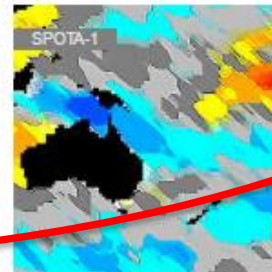
Climate Change
Projections



Seasonal climate
outlook



SPOTA-1



Request maps and graphs

Rainfall and pasture growth maps

Time series graphs

*Region

*Map Types

*Duration

*End on

Rainfall Relative

[Rainfall Total](#)

[Forecast Curing Anomaly](#)

[Pasture Curing Index](#)

[Pasture Grass Fire Risk](#)

[Potential Flow To Stream Seasonal Probability](#)

[Potential Flow To Stream Relative](#)

Australia

New South Wales

Northern Territory

Queensland

South Australia

Tasmania

Victoria

Western Australia

3 months

1 month

3 months

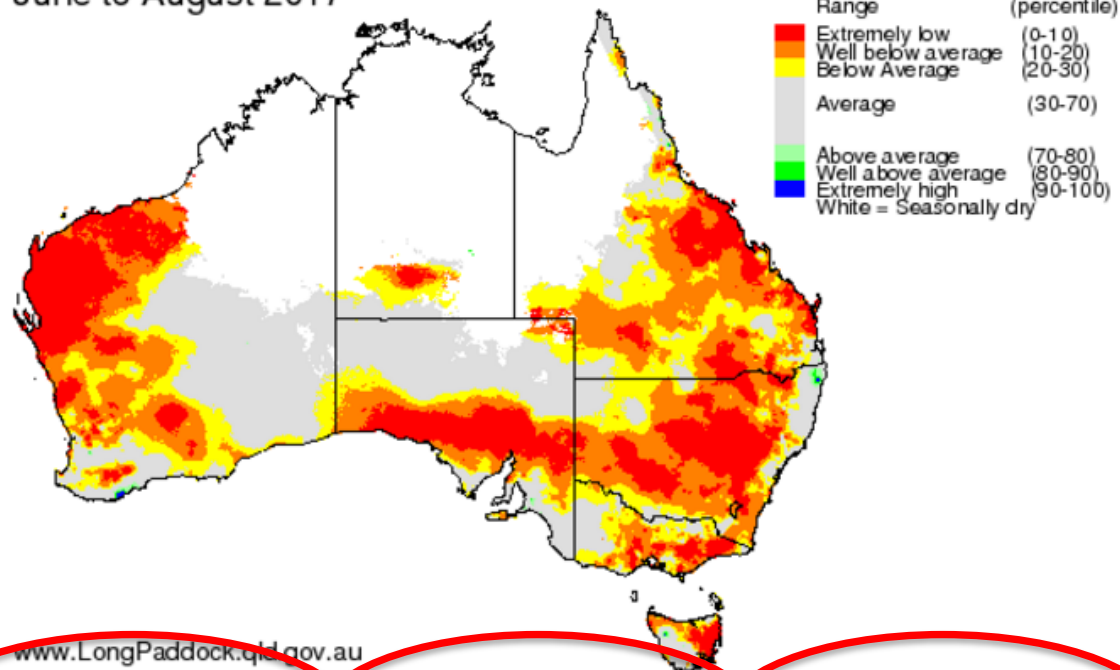
6 months

12 months

24 months

36 months

Rainfall Percentile June to August 2017



www.LongPaddock.qld.gov.au

Ⓜ Maps (GIF, 17KB)

Last updated: 05 September 2017

Ⓜ Maps (PDF, 108KB)

Last updated: 05 September 2017

Ⓜ GIS file (ZIP, 115KB)

Last updated: 05 September 2017

Streamflow products (runoff for Qld & NSW)

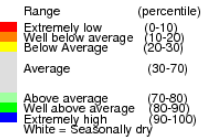
12 mths

24 mths

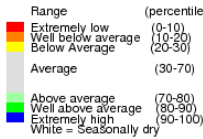
36 mths

3 mths ahead

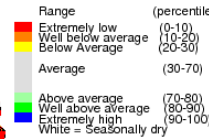
Potential Flow to Stream, Relative to September 2016 to August 2017



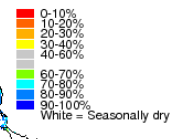
Potential Flow to Stream, Relative to September 2015 to August 2017



Potential Flow to Stream, Relative to September 2014 to August 2017



Chance of Exceeding Median September to November 2017



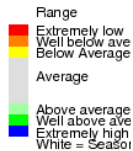
www.LongPaddock.qld.gov.au

www.LongPaddock.qld.gov.au

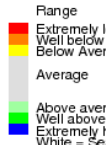
www.LongPaddock.qld.gov.au

www.LongPaddock.qld.gov.au

Potential Flow to Stream, Relative to September 2016 to August 2017



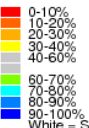
Potential Flow to Stream, Relative to September 2015 to August 2017



Potential Flow to Stream, Relative to September 2014 to August 2017



Chance of Exceeding Median Potential September to November 2017



www.LongPaddock.qld.gov.au

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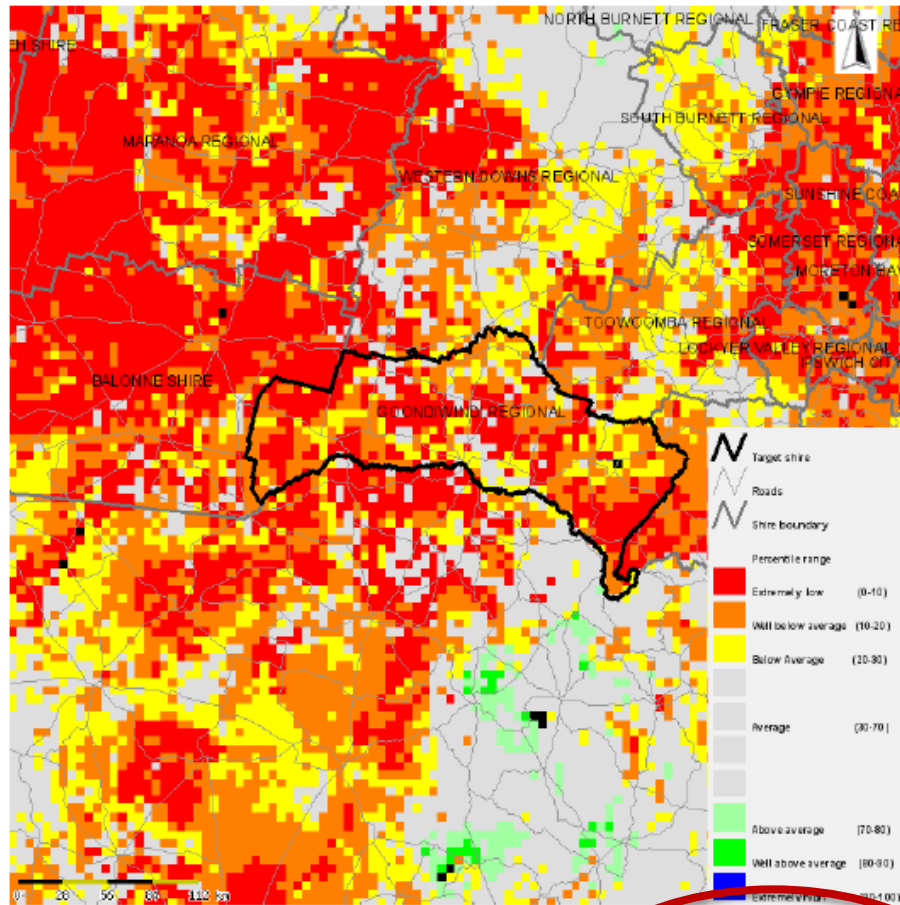
Drought Assessment Information report

FORAGE REPORT: DROUGHT ASSESSMENT INFORMATION

<http://www.longpaddock.qld.gov.au/forage> September 11, 2017 Shire: GOONDIWINDI REGIONAL Label: noLabel



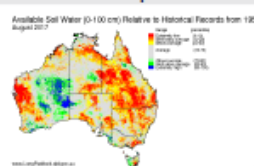
One-month available soil moisture relative to historical records - Aug 2017



About the map

This map shows the available soil moisture (modelled) in the soil profile (one metre) for the month indicated, relative to the same month each year since 1957, and ranked on a 0-100 (percentile) scale. Map accuracy depends on rainfall station density. Data quality improves rapidly from the beginning of the month and the number of stations typically doubles within the first two weeks of the month. Pixel size is 0.05 degree - approximately 5km.

Australia wide snapshot



Shire-based – broad outlook

Sourced from AussieGRASS

- 23 maps including:

- rainfall
- maximum temperature
- pasture growth & biomass
- growth forecast
- runoff
- soil moisture
- green cover decile
- Originally for LDC's

Updated: Monthly

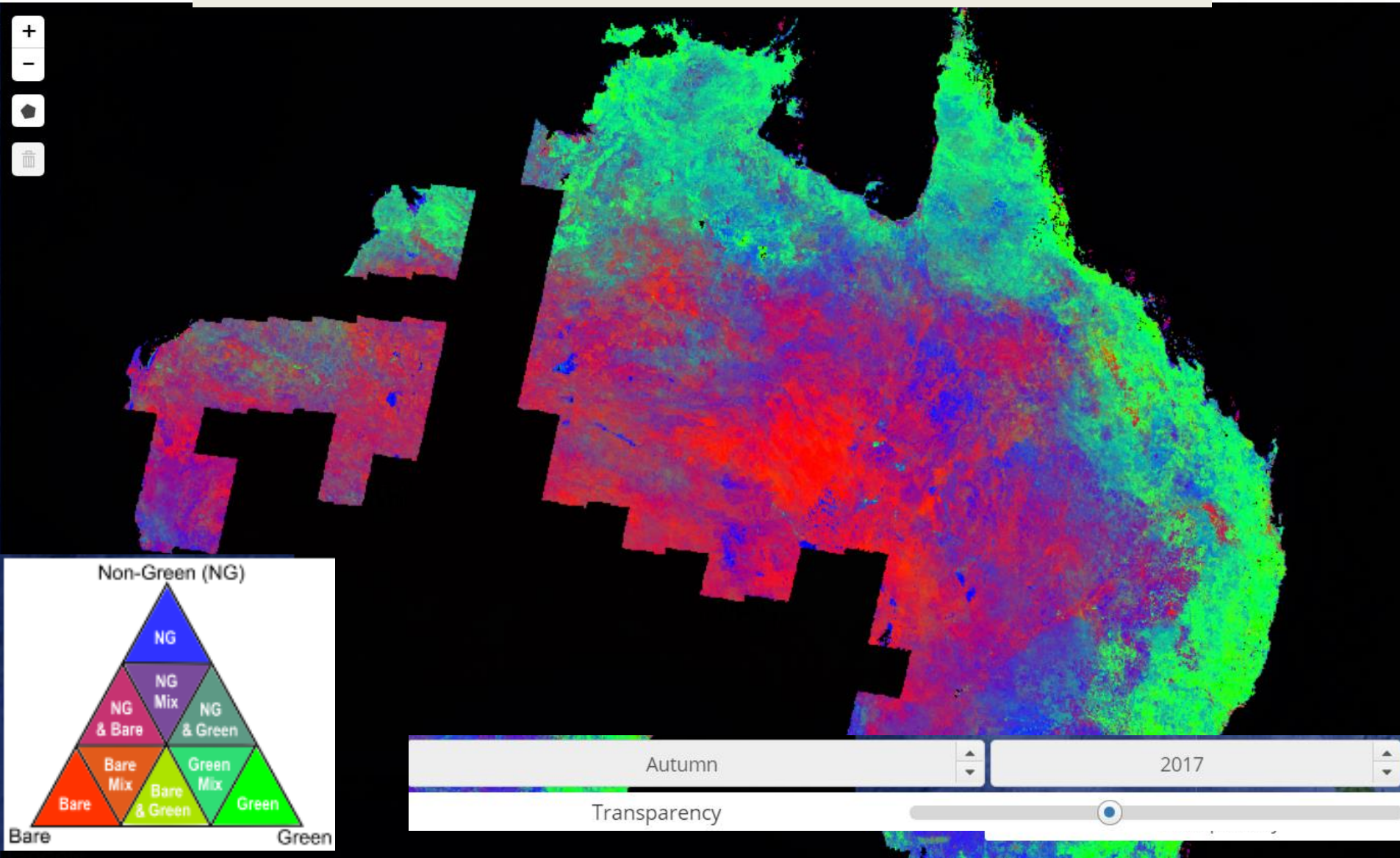
Access: ad hoc, Monthly awareness



Welcome to VegMachine (www.vegmachine.net)

ion

Seasonal ground cover image (Autumn March – May 2017)



Import shapefiles/KML

Using groundcover layer



- and compare by season

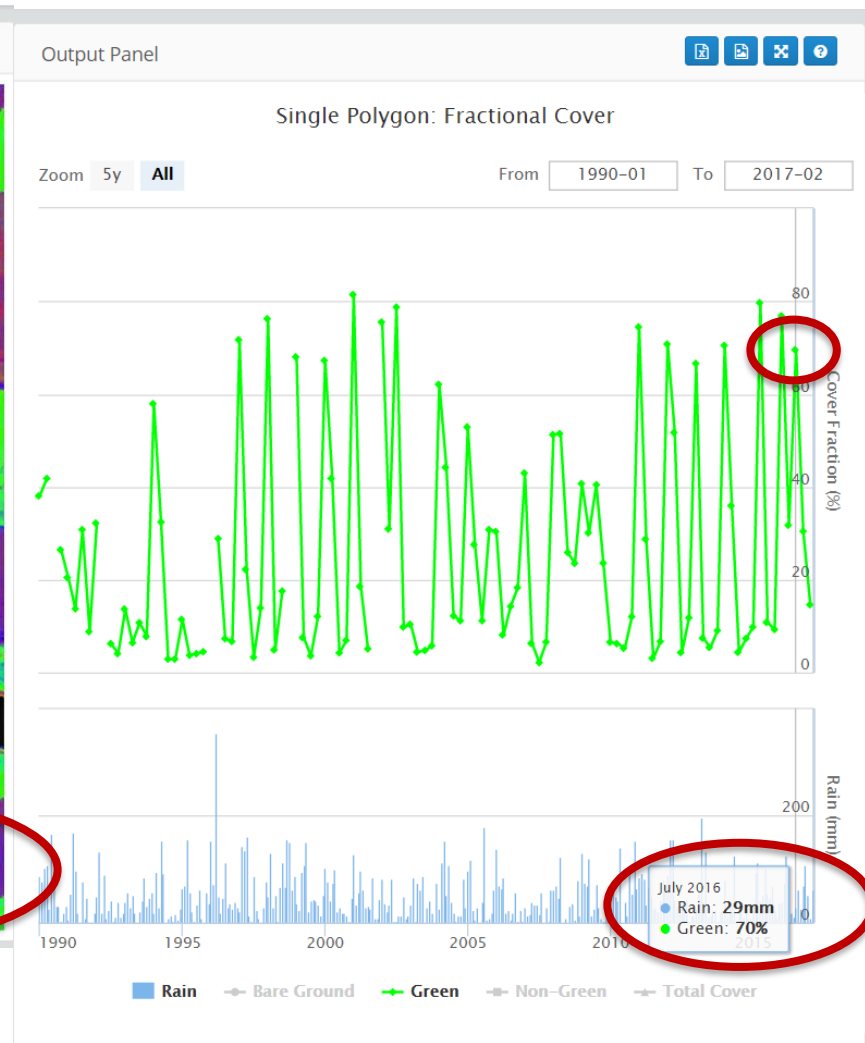
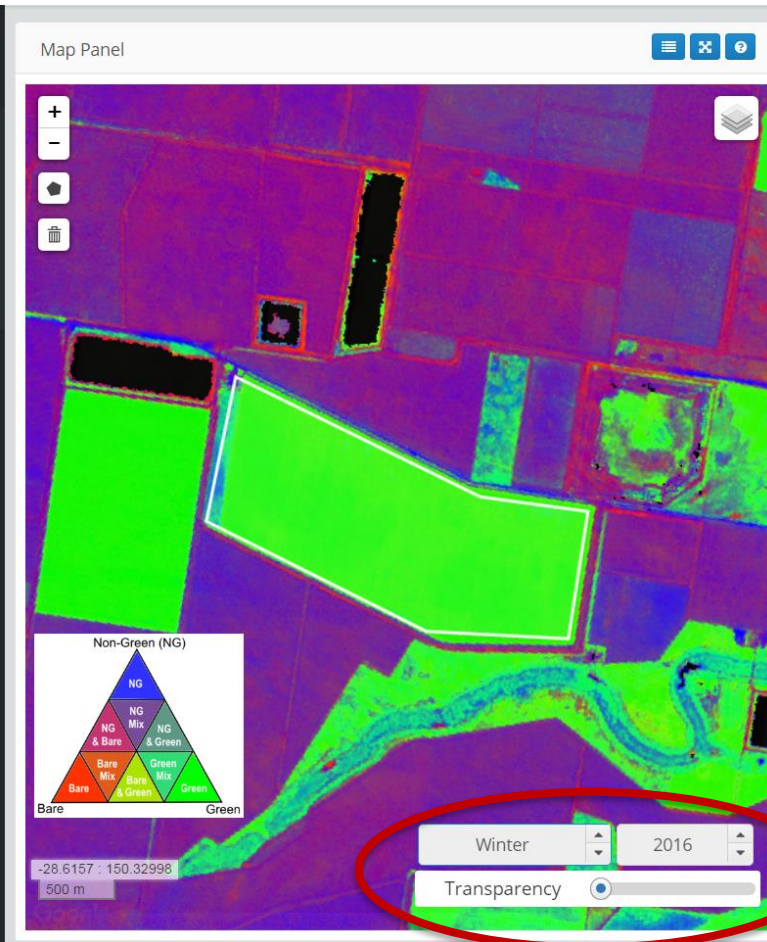
Summer

Transparency

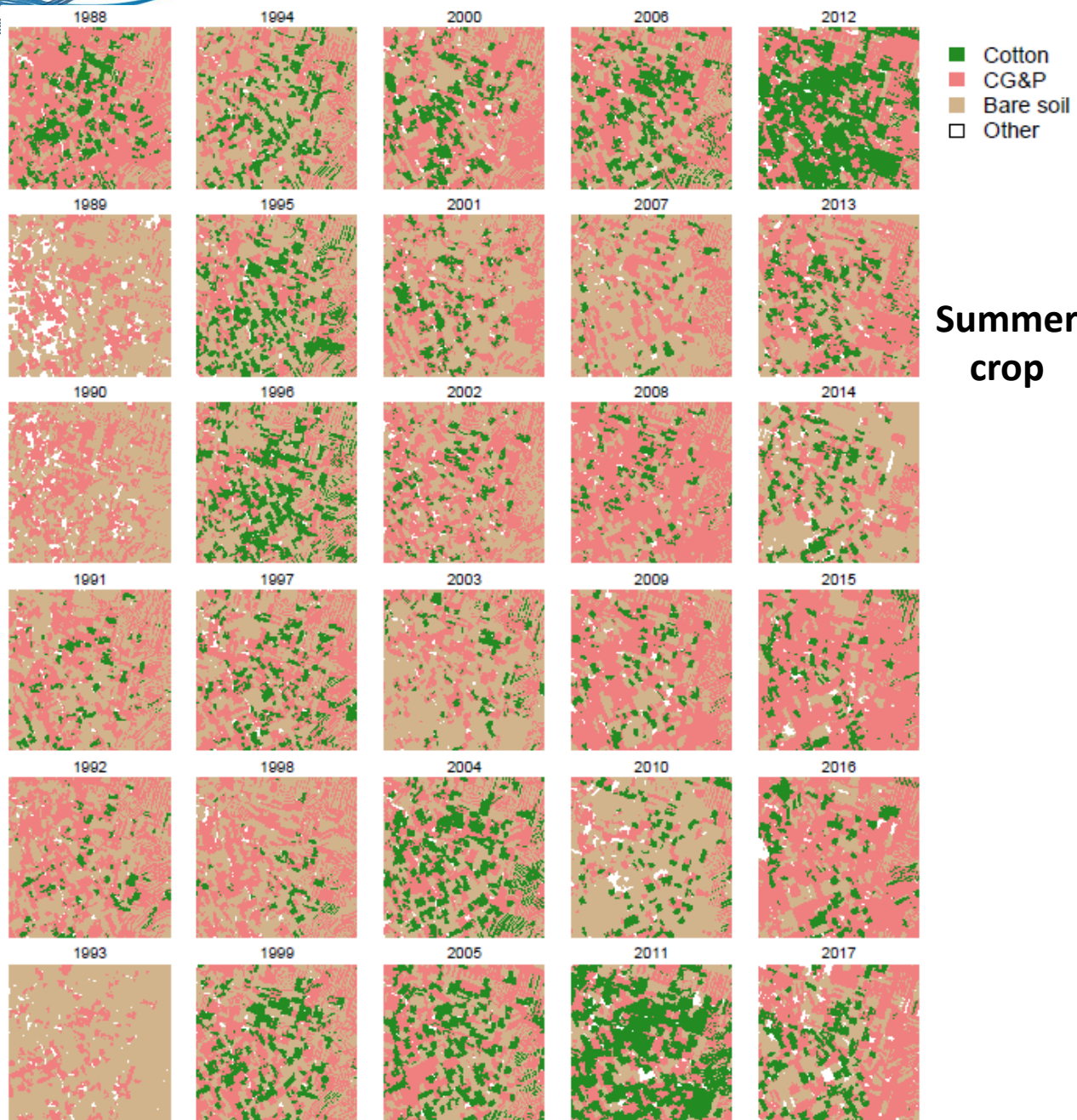
Then, compare using fractional analysis green, non-green, bare - with rainfall

VEGMACHINE

- Map Functions
- Interactive Analyses
 - Single Polygon
 - Ground Cover
 - Fractional Cover
 - Polygon Comparison
 - PEPER
 - Reports



Crop differentiation



Summary of land management products

- Latest technology products assist with awareness and land management decision-making
- Online, free and easy to access
- Niche market (graziers, farmers, extension staff, BMP, consultants, education, policy)
- FORAGE can be linked with other products (e.g. shapefiles with GIS, Google Earth, VegMachine)
- Joint support with BMP, DAF and NRM groups
- More prototypes in development – watch this space!
- Contacts: Grant.Stone@qld.gov.au; Terry.Beutel@daf.qld.gov.au

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