

## Introduction

This prototype report presents, for the selected Lot(s) on Plan, the risk of reduced pasture growth and pasture resilience for the next 6 months. The purpose of the report is to provide an assessment on pasture growth and resilience through assessing information of the last 12 months pasture growth, the pasture growth forecast for the next 6 months and the most recent monthly total cover. Pasture growth forecasts are produced using the GRASP pasture growth model in combination with the rainfall forecasts and the current pasture conditions with regard to soil moisture, nutrients and ground cover. The rainfall forecasts are developed from the El Niño - Southern Oscillation (ENSO) forecasts provided by the International Research Institute for Climate and Society (IRI), Columbia University, New York (Barnston, *et al.* 2004). The information presented in this report can be used to facilitate stocking management.

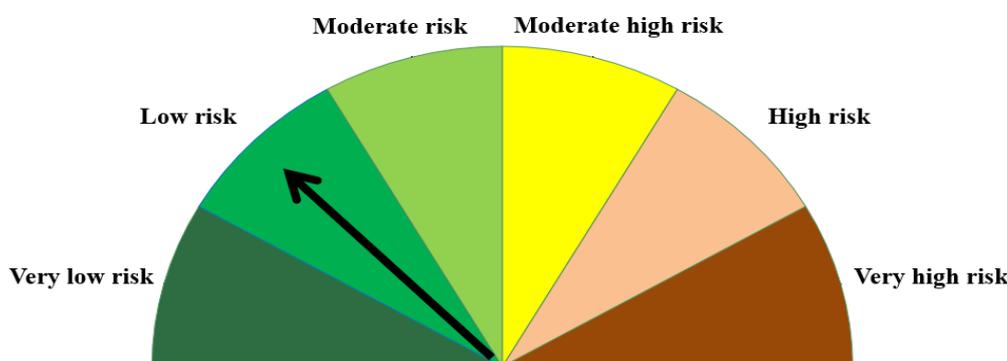
## Background information

<b>Total land area:</b> 35336 ha	<b>Mean foliage projective cover (FPC):</b> 14.9%
<b>Median total cover percentile:</b> 90th	<b>Current month to date rainfall:</b> 41 mm
<b>Last 6-month pasture growth:</b> 1380 kg/ha	<b>Last 6-month rainfall:</b> 762 mm
<b>Last 12-month pasture growth:</b> 1480 kg/ha	<b>Last 12-month rainfall:</b> 851 mm
<b>Long-term* annual pasture growth:</b> 1540 kg/ha	<b>Long-term* annual mean rainfall:</b> 620 mm
<small>*1890-2019</small>	

## Location map



## Pasture growth and resilience risk for the next 6 months (May 2019 to Oct 2019)



## Summary for the selected area (Lot(s) on Plan)

The reduced pasture growth and resilience risk level for the Lot(s) on Plan of interest in the next 6 months is **low**. This is based on the rainfall and pasture growth in the last 12 months, the rainfall and pasture growth forecast for the next 6 months and the last month total cover percentile level.

The key factors are as follows:

- Pasture growth in the last 12 months was **between the 33rd and 66th percentile** of the long-term record for the same period.
- The pasture growth forecast for the next six months is **higher than the 66th percentile** of the long-term record for the same period.
- The median total cover for Apr 2019 across the Lot(s) on Plan is **higher than the 66th percentile** of the long-term (1990 to current) record for the same month.

Other relevant factors are:

- Rainfall in the last 12 months was **higher than the 66th percentile** of the long-term record for the same period.
- The rainfall forecast for the next six months is **between the 33rd and 66th percentile** of the long-term record for the same period.
- The forecast of ENSO probability for the next three months (starting from current month) are: **El Niño 89%** (likely dry), **Neutral 11%**, **La Niña 0%** (likely wet).

\*For information about percentiles, see: <https://longpaddock.qld.gov.au/forage/videos/understanding-percentiles-in-climate-data>

## Management considerations due to the above conditions

The reduced pasture growth and resilience risk level is low at this stage. It is a good time to build pasture resilience, increase the prevalence of 3P grasses and build feed supply by managing grazing pressure. Review stocking rates especially in the paddocks/area with low cover and erosion risks.

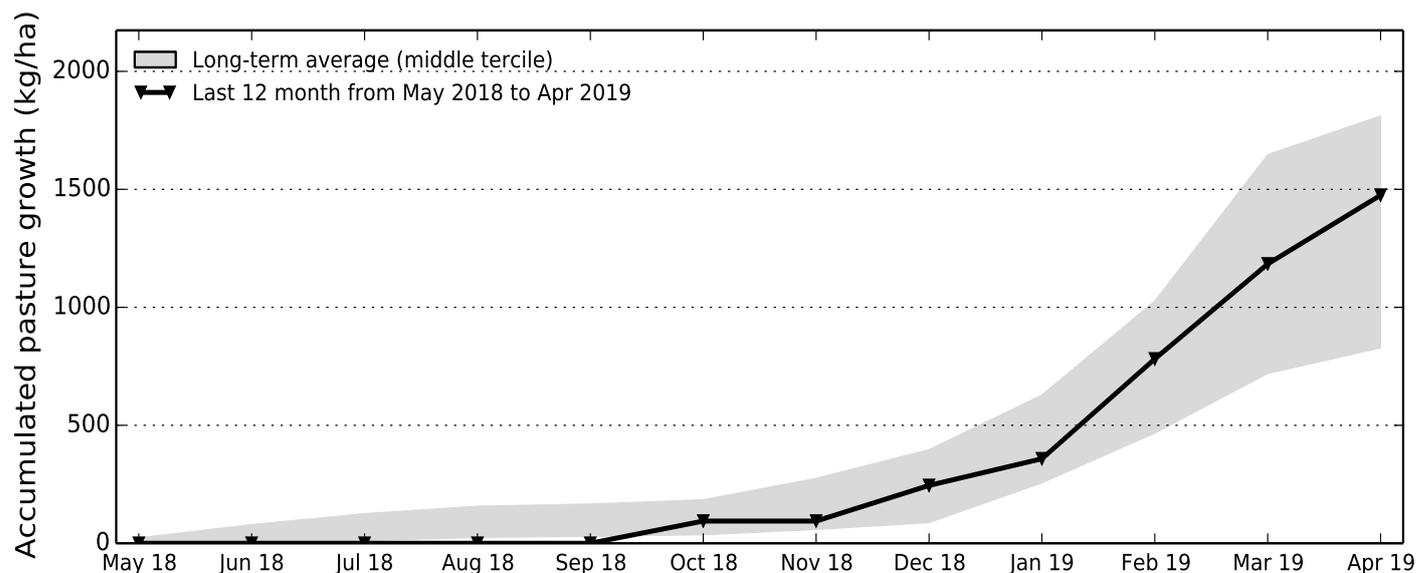
## Reference

Barnston, A. G. *et al.* (2003), Multimodel ensembling in seasonal climate forecasting at IRI, *Bull. Am. Meteorol. Soc.*, 84, 1783-1796.

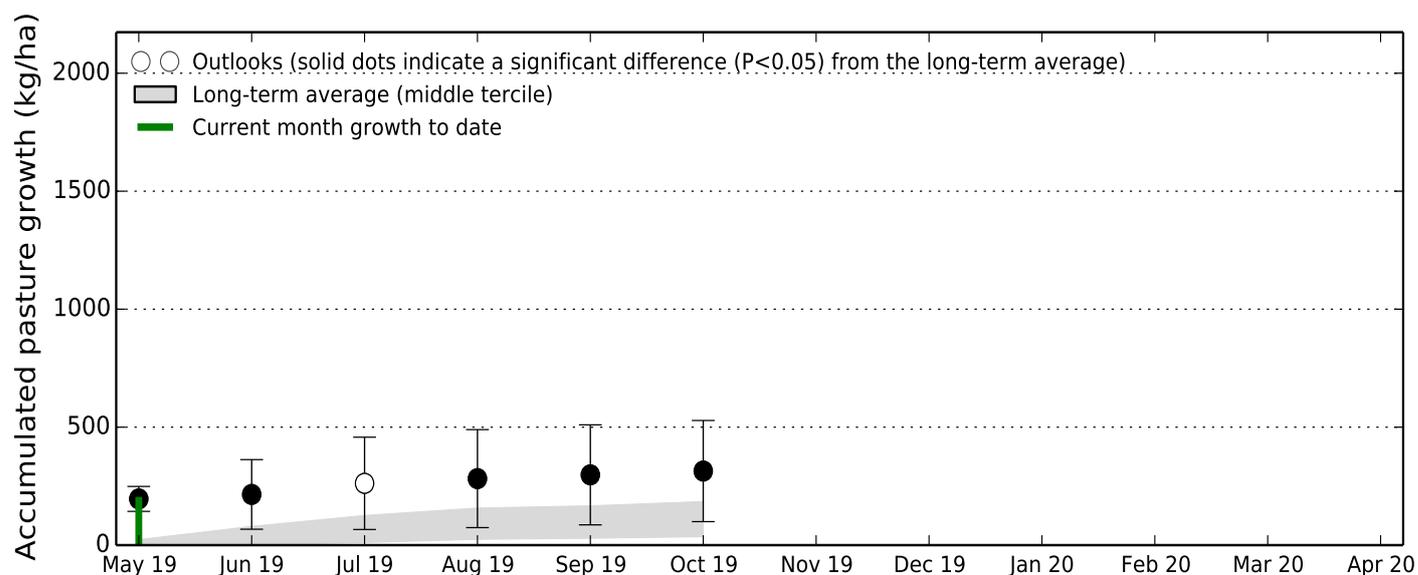
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## Pasture growth history - accumulative



## Pasture growth forecast - accumulative (based on current conditions + IRI forecast)



## How to interpret the above graphs

In the top graph, the shaded area is the long-term average for 12-month accumulative pasture growth, which is the middle third of the historical record (between the 33rd percentile and 66th percentile, i.e. middle tercile). The black line is the accumulated pasture growth over the last 12 months.

In the bottom graph, the shaded area is the long-term average for 6-month accumulative pasture growth corresponding to the 6 months forecast. The vertical green line at the current month indicates the growth to date from the beginning of the current month. The dots are the forecasts of accumulated pasture growth for the next six months (starting from current month) with error bars representing  $\pm$  one standard deviation. The t test results between the forecasted cumulative mean and the long-term cumulative mean for the forecasted months are indicated by the solid or open dots. If the t test is significant (solid dot) for a month, the forecast for that month is significantly different (higher or lower) from the cumulative long-term mean of the month; otherwise (i.e. open dot), the forecast is not significantly different from average conditions.

The historical pasture growth is simulated by the GRASP model. The pasture growth forecast is also simulated by the GRASP model through incorporating the rainfall seasonal forecast and taking into account of current soil and pasture conditions (e.g. soil water status, soil nitrogen availability and ground cover). The rainfall seasonal forecast is calculated based on ENSO probabilities forecast, sourced from International Research Institute for Climate and Society (IRI) with the forecast made by more than 20 dynamical and statistical models for SST in the Niño 3.4 region (<http://iri.columbia.edu/our-expertise/climate/>). The forecasts provide the likely probability for El Niño, Neutral and La Niña conditions for the next six months. The skill generally decreases as the lead time increases. Forecasts made between June and December can be used with more confidence while ENSO forecasts made between February and May have less skill.

## About the rainfall

Rainfall data used in this report were sourced from SILO database (<https://www.longpaddock.qld.gov.au/silo>) which were interpolated from the rainfall records provided by the Bureau of Meteorology (BoM). The accuracy of the rainfall data (and therefore the simulation of pasture growth) depends on how close BoM's rainfall stations are to the centre of the Lot(s) on Plan of interest. Last month, there were 0, 1 and 5 stations (reporting quality controlled data) located within approximately 25 km, 25-50 km and 50-75 km of the centre of the selected Lot(s) on Plan.

# FORAGE REPORT: PASTURE GROWTH ALERT (prototype)

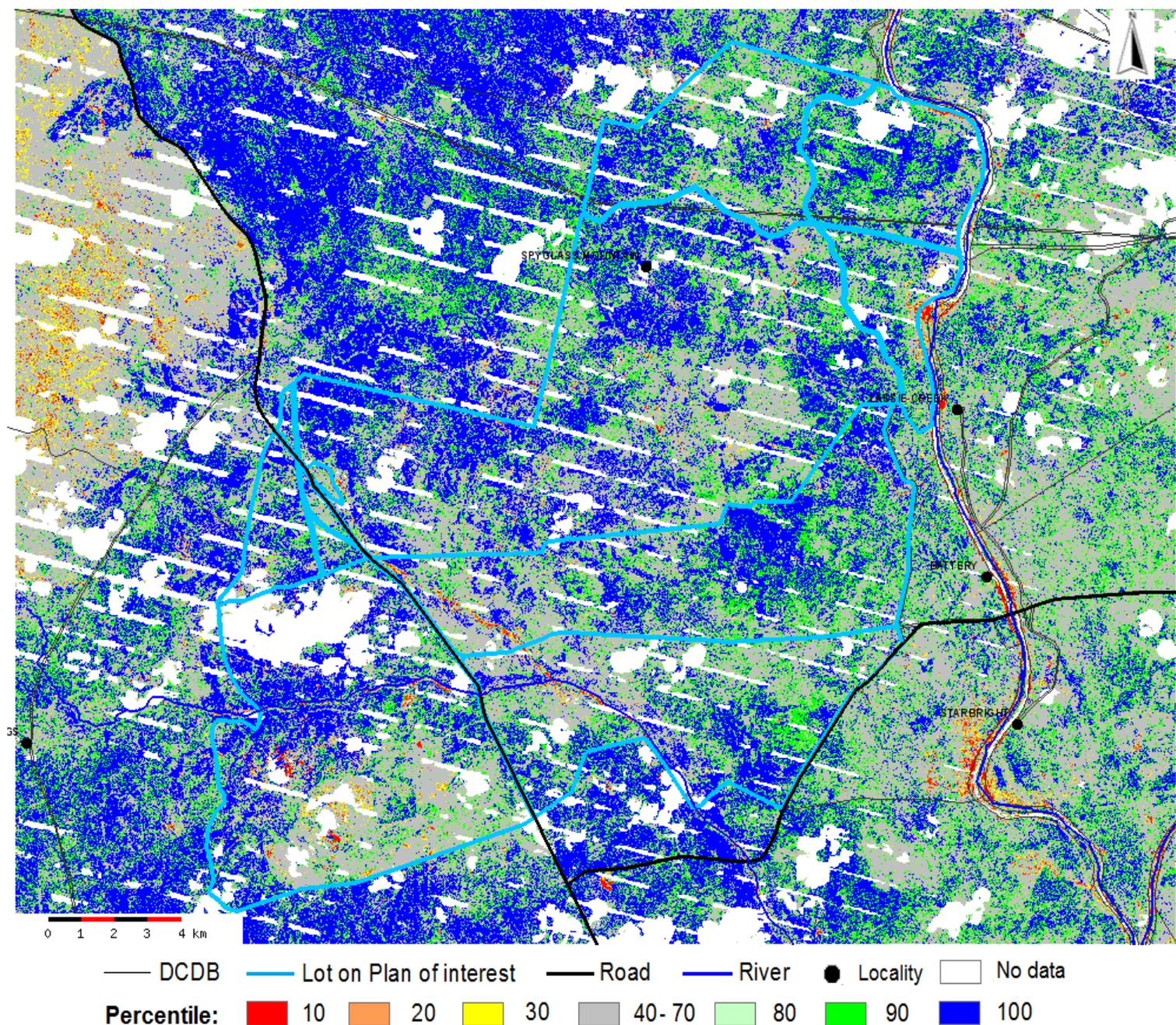
<http://www.longpaddock.qld.gov.au/forage>

May 23, 2019

Lot on Plan: 1OC57,4835CP858256,3RP841848,4SP etc.

Label: burdekin

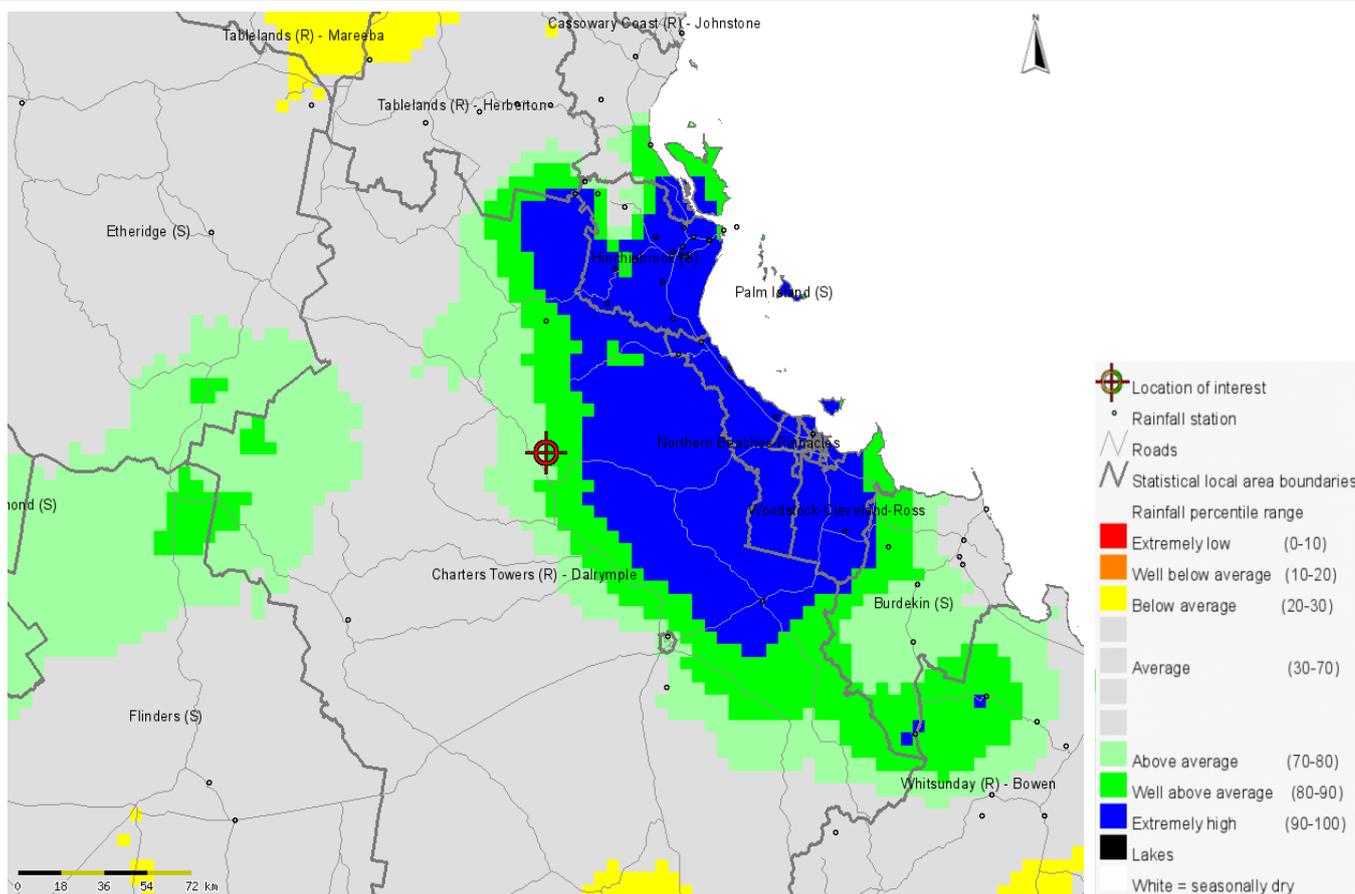
Total cover percentile map for Apr 2019 (median total cover percentile: 90th )



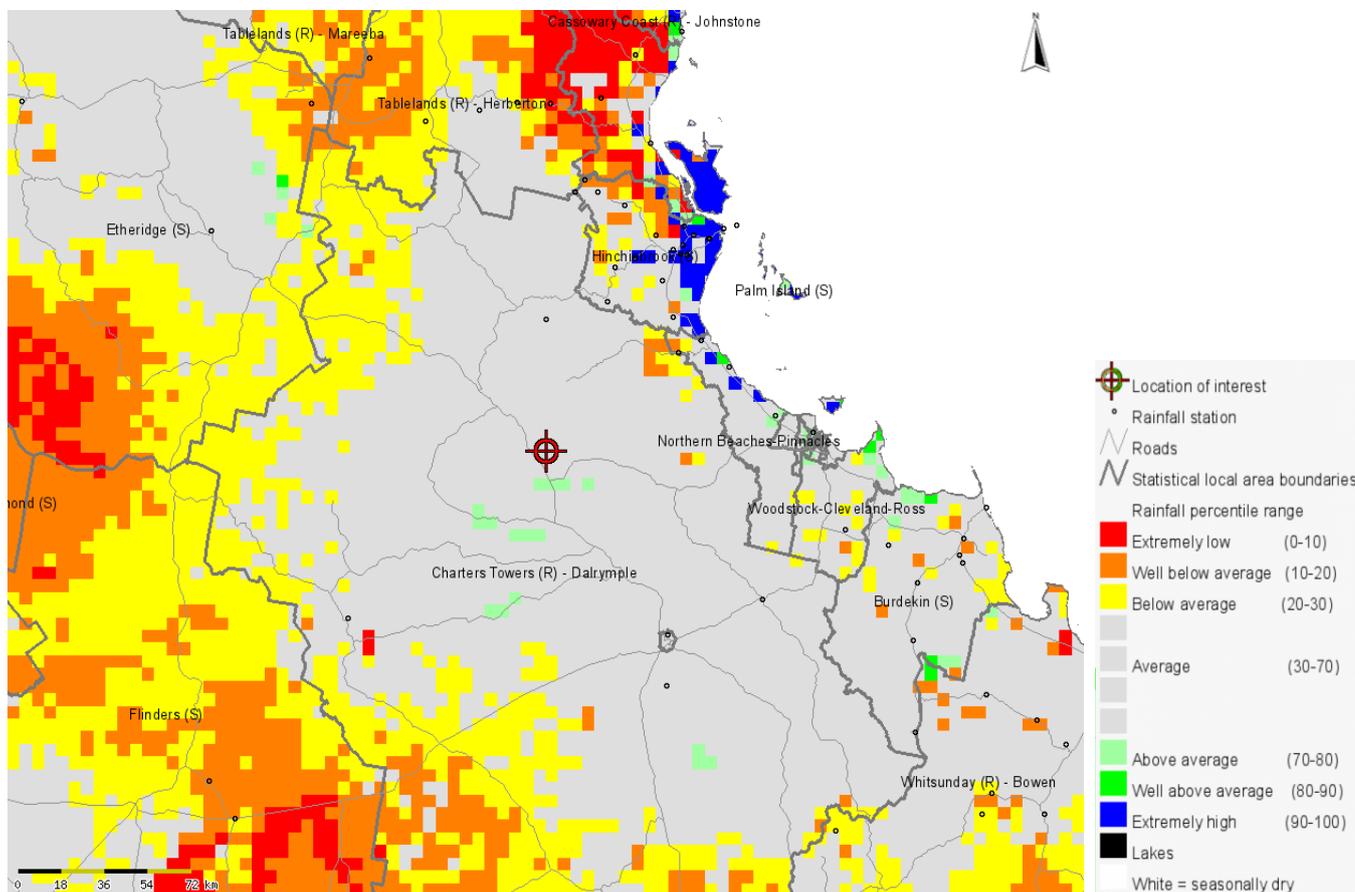
## How to interpret the total cover percentile map

The above map was generated from Landsat/Sentinel images which compares, at the pixel level (30m), the total cover (trees, grass and litter) for the month indicated, against the long term (from 1990) total cover for the same month. For each pixel, all cover values over the entire time-series of monthly images are classified into percentiles (from lowest 1 to highest 100). The cover value for the pixel in the month indicated is then classified according to the percentile in which it falls. The map helps to identify areas of low, medium or high total cover, during the month indicated. **Any areas with yellow, orange or red colour on the map indicate that the total cover for these areas are ranked at the bottom of those same months in history.** Percentile variability can be caused by run-on and run-off areas, response to soil type (e.g. sand vs clay), local rainfall variability, grazing effect, tree response to rainfall, tree grass competition, cropping and tree clearing.

## Regional 12-month (from May 2018 to Apr 2019) rainfall relative to historical records



## Regional 12-month (from May 2018 to Apr 2019) pasture growth relative to historical records



### How to interpret the above maps

The maps above show, for the Lot(s) on Plan of interest (indicated by the cross and red circle), the percentile ranges of total rainfall (or pasture growth) for the period from May 2018 to Apr 2019 compared to the total rainfall (or pasture growth) for the same periods in history. For example, if the total rainfall (or pasture growth) for the 12 month period is lower than 30th percentile, then the total rainfall for this period is within the lowest 30% of years in history (1957 - current). The map data are sourced from AussieGRASS.