



July 2010 (next update by 12 August 2010)

GROWING SEASON OUTLOOK

www.agric.wa.gov.au/climate

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Summary

- A rapid reversal in ocean atmosphere coupling over the last three months now means there is a high chance of a La Nina developing in coming months. However, consistent with changes observed in April-June over the last decade, rain-bearing systems have been weaker than normal over Western Australia. The sea surface temperature gradient to the north and west of WA has reduced, with a warming of water in the central Indian Ocean west of Perth contributing to a dry pattern in the short-term.
- A consensus of most climate models is that rainfall is likely to be below normal for winter over most parts of the WA grainbelt. For eastern Australia, better rainfall and crop prospects are indicated and a developing La Nina pattern adds confidence to the rainfall outlook. For northern and eastern areas of the WA wheatbelt low soil moisture reserves and low yield potentials requires a conservative approach to crop inputs for the remainder of the season

Discussion of Climatic Indicators

ENSO (El Niño – Southern Oscillation), or Pacific indicators

• Most dynamic computer models are predicting La Nina conditions to develop in coming months. The Department's experimental [ENSO Sequence System](#) (ESS) has selected analogues which also suggest there is an 80% chance of a La Nina developing in the next month. (see [DAFWA ENSO Technical Summary](#)).

Local Australian indicators

• [Sea surface temperatures](#) (SSTs) are slightly warmer than normal around most of north and eastern Australia. Slightly cooler than normal SST is found close to the southwest WA coast. Collectively, this enhanced SST gradient is a favourable pattern for eastern Australia. Warmer than normal SST further to the southwest of Perth has acting to reduce the SST gradient that affects WA, i.e. a negative impact on WA rainfall. Barometric pressure went well above normal in June across Australia (Fig. 1), especially in WA. This feature was a part of a hemispheric high pressure anomaly between 30-40S measured by the Southern Annular mode which has been strongly positive since mid-June. Generally frontal activity and tropical inflow of moisture has been weak over southwest WA and more active over south-eastern Australia. A weak Indian Ocean trough off the WA coast in June meant that there has been no process in the upper levels to strengthen surface low pressures and pull moisture down from the Indian Ocean. However, this pattern changed at the end of the first week in July.

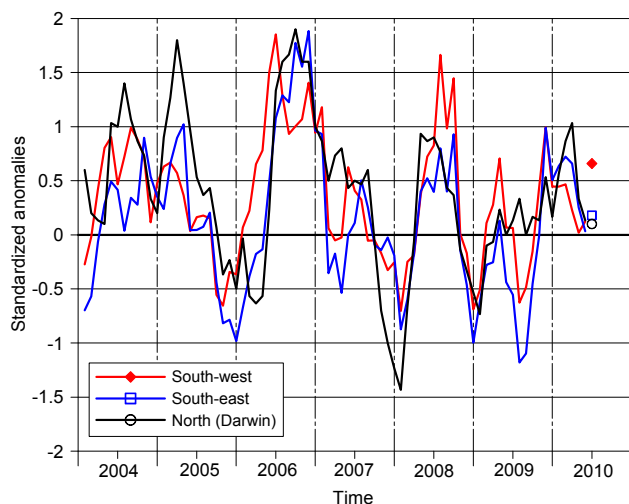


Figure 1: Three month mean sea level pressure anomalies averaged for south-western Australia (Geraldton, Corrigin), south-eastern Australia (Mildura, Alice Springs) and northern Australia (Darwin). The last 2-month mean pressures are shown with the symbol at the end of the time series. Drought to dry conditions are indicated with above normal pressure (stronger high pressures) in 2006, mid 2007 and mid 2008; better rainfall conditions are indicated where pressure was below normal in late 2005, late 2007 and in the south in mid 2009.

Three month Outlook based on local indicators – June-August

Skill testing of the ESS at this time of the year shows that it provides a better prediction of July-October rainfall than rainfall for the next three months, so an array of local and global indicators should be used as a guide for the next 3 months. In Table 1 the ENSO state is compared with local indicators and when there is agreement between the indicators a higher level of confidence is placed in a positive outlook (labelled √), or a negative outlook (labelled X), i.e. low confidence for mixed indicators. Over the last 3 months there has generally been a trend to more positive global indicators, however local WA indicators have remained negative in relation to short-term rainfall prospects. Overall, the indicators are more positive for eastern Australia.

Table 1 Global and Local indicators

Climate Indicator	Meaning	Current status
1. ENSO state (global – Indo-Pacific)	Pressure, SST - picked by ESS	Developing La Nina (√)
2. Southern Annular Mode (SAM)	Hemispheric Pressure difference 40 S – 65 S	Positive values– high pressure at 40 S, low pressure at 65 S (X)
3. Barometric Pressure over Australia	Strongly relates to rain – stronger high pressures relate to dry conditions	Above normal, esp. over WA in June (X)
4. SST gradient northwest of Australia	How warm is ocean surface northwest of Australia compared to southwest of Australia	SSTs mainly warmer than normal, especially around northern and eastern Australia, however warmer water west of Perth (√ to X)
5. Tropical moisture inflows and cloud band activity	Important in more northern areas	Cloud-band activity quiet over southwest, more active over SE Australia (√ to X)
6. Longwave trough/Frontal activity	Important in southern Australia	Weak frontal activity over Western Australia, slightly better in south-eastern Australia (X to -)

(X) = negative trend, (-) = no trend indicated, (√) = positive trend

Growing Season Outlook 2010 – July to October

The growing season rainfall outlook based on ESS analogue years is shown in Fig. 2 for the rest of the growing season, i.e. July-October. This map is based on the median (middle) rainfall ranking of the 5 analogue years. The degree of confidence that should be attributed to forecasts is related to the level of skill shown in the figure to the right of the outlook map.

A. ESS median rainfall outlook map and associated cross validated correlation skill using May analogues to predict July-October rainfall.

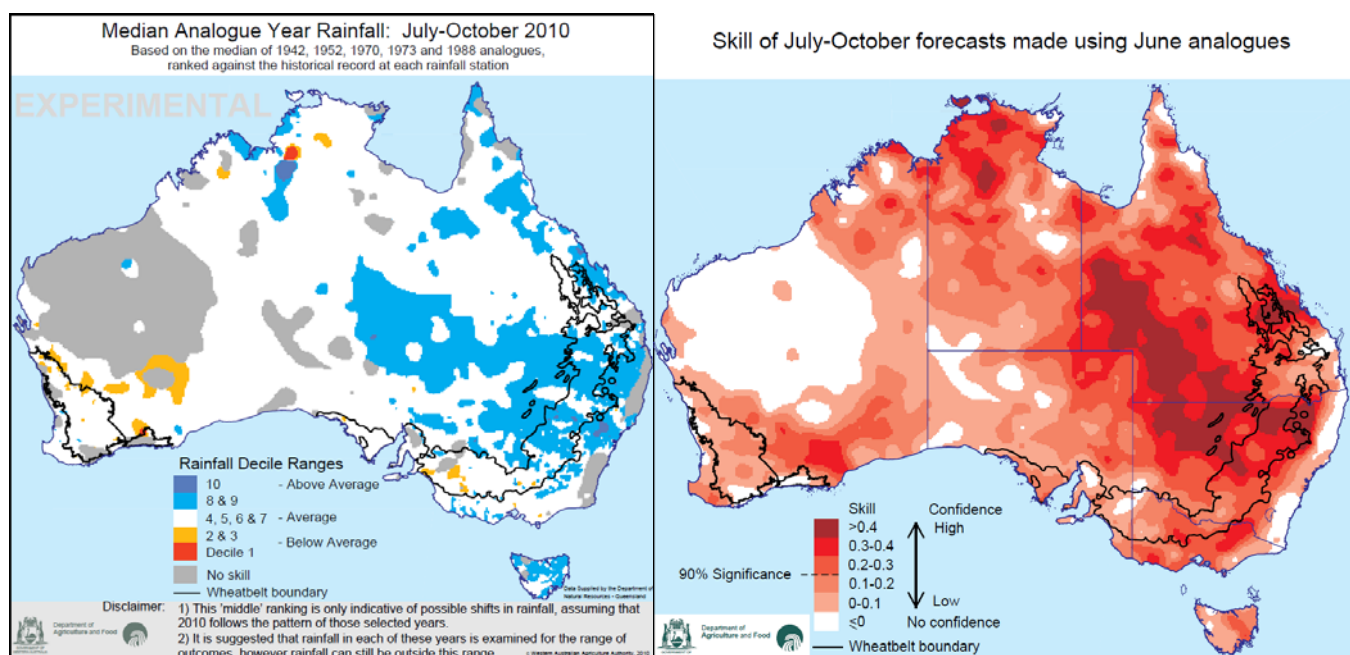


Figure 2: ESS median rainfall outlook for July-October rainfall. The right-most map is the associated cross validated correlation skill for the respective periods. Positive skill is shaded red and regions that have significant skill at the 90% level are marked by dashed lines. Regions that have skill below 90% significance (none in WA for this period) should have a low confidence attributed to them. Regions that have no skill are shaded white and do more poorly than a no-skill predictor such as climatology, i.e. predicting average. The white area in the skill map matches the grey area blanked out in the outlook map.

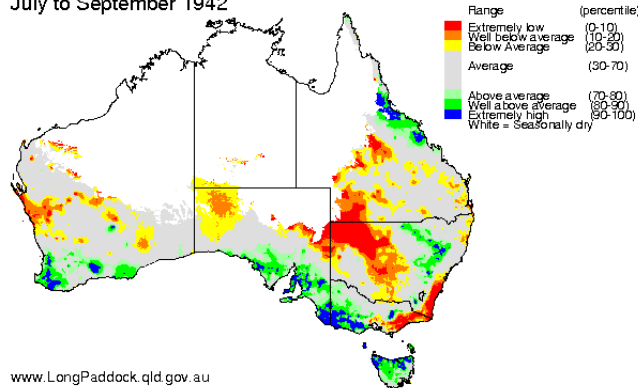
Experimental Map disclaimer:

This outlook should not be interpreted to mean that rainfall will be the same in the selected period, but may be indicative of possible trends in rainfall as long as 2010 conditions follows the pattern of those selected years.

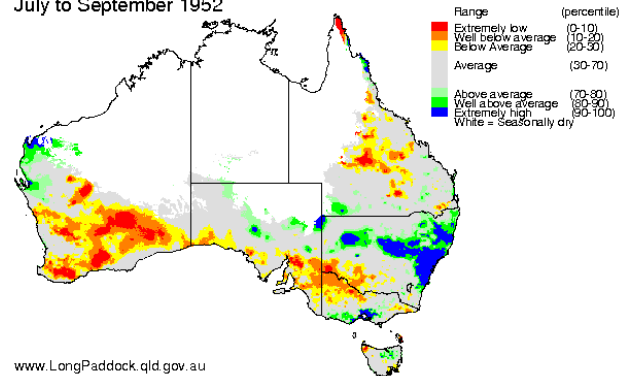
July to September – Individual analogue years

There is a lot of variation in the analogue rainfall though there is a tendency for below average rainfall for northern grain growing areas of Western Australia and average rainfall in the southern wheatbelt. Given the skill levels mapped in Figure 2, a low to moderate confidence in an average to below average forecast can be made for the southern half of the WA wheat-belt, while a higher confidence can be attributed to an average to above average forecast for eastern Australia.

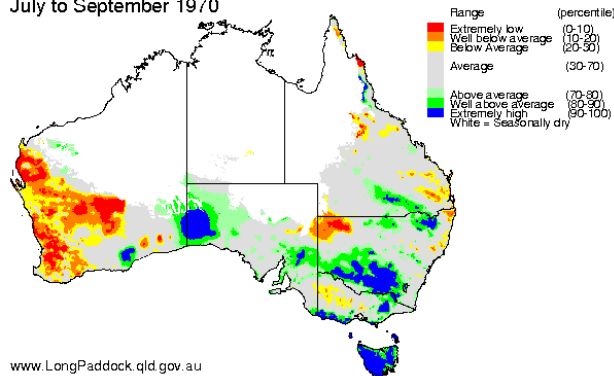
Rainfall Relative to Historical Records
July to September 1942



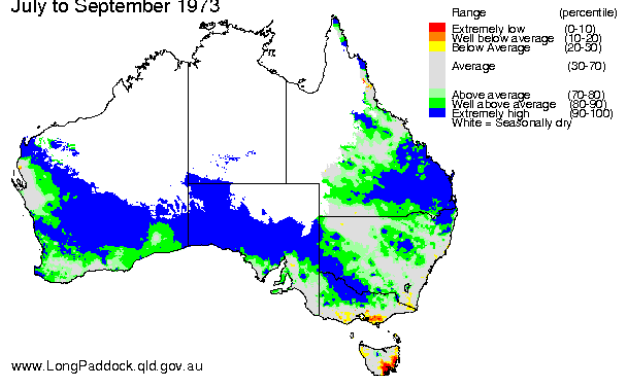
Rainfall Relative to Historical Records
July to September 1952



Rainfall Relative to Historical Records
July to September 1970



Rainfall Relative to Historical Records
July to September 1973



Rainfall Relative to Historical Records
July to September 1988

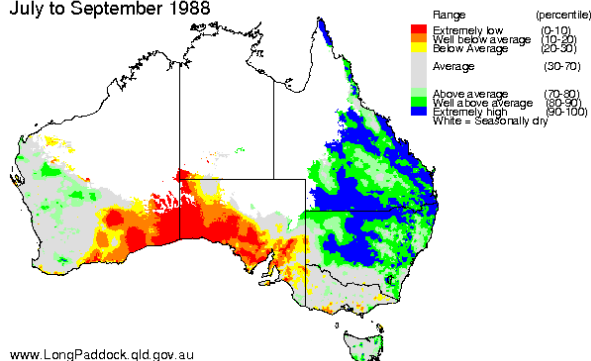


Figure 4: The July-September rainfall rankings for the five analogue years selected by ESS

Other Seasonal Outlooks for south-west Western Australia

Some other agencies that produce seasonal rainfall and temperature outlooks for July to September 2010 are listed below. Predictive skill levels have not been assessed by DAFWA for all the systems, though skill information is available on most host websites.

A survey of these and other experimental models indicates a clear preference for the next three months' rainfall to be most likely below normal. Most of the outlooks (six out of nine) have higher chances of seasonal rainfall being below median. None indicated wetter than normal conditions being more likely for southern WA, while three (BoM, IRI and Long Paddock) showed no preference to either drier or wetter conditions. The strong prevalence to below average rainfall outlooks from most models would imply that the most relevant seasons with similar rainfall prospects for comparison would be 1942, 1952 and 1970.

For temperature, six out of eight models surveyed indicate warmer than normal conditions are likely over most of southern WA for July to September.

- [Bureau of Meteorology](#)
- [Queensland Department of Natural Resources and Mines](#)
- [International Research Institute](#) (IRI)
- [European Centre for Medium Range Weather Forecasts](#) (ECMWF)
- [UK Met Office](#)
- [Experimental Centre for Climate Prediction](#)

Additional Information for Western Australia

October's edition of DAFWA's [Seasonal Update](#) which has a map of predicted wheat yield rankings, as well as seasonal rainfall summary.

Latest [Pestfax](#) – reports on diseases and pests threatening crops and pastures throughout the grain belt of WA

List of [tools to assist in decision making](#)

Farmnote on [where to find rainfall data](#)

Farmnote on [rainfall deciles](#)

Weather websites and short term outlooks:

[Australian Bureau of Meteorology](#)

[Water and the Land](#)

[Australian Weather News](#)

[Centre for Ocean-Land-Atmosphere Studies short term climate outlooks](#)

[US Navy's Fleet Numerical Meteorology and Oceanography Centre](#)

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