Queensland Climate Change Centre of Excellence Monthly Climate Statement – March 2011

Key messages

- Historically high rainfall for Queensland in the 2010-11 wet season
- Active monsoon season continues
- Wet summer consistent with pre-season assessment indicating a high probability of above average summer rainfall

Findings for March 2011

The Queensland Climate Change Centre of Excellence (the Centre) considers that at this time of year, the Southern Oscillation Index (SOI) or other measures of the El Niño-Southern Oscillation (ENSO) are less reliable as indicators of rainfall for the upcoming autumn season. However, **while the current La-Niña pattern persists, there remains an increased probability of above-median rainfall for Queensland.**

The Centre's understanding is based on the current and projected state of the ENSO phenomenon and on factors which alter the impact of ENSO on Queensland rainfall (e.g. the Pacific Decadal Oscillation (PDO)). This time of year is known as the 'autumn predictability gap' where the ENSO signal tends to be less persistent and El Niño or La Niña events tend to break down.

The autumn predictability gap

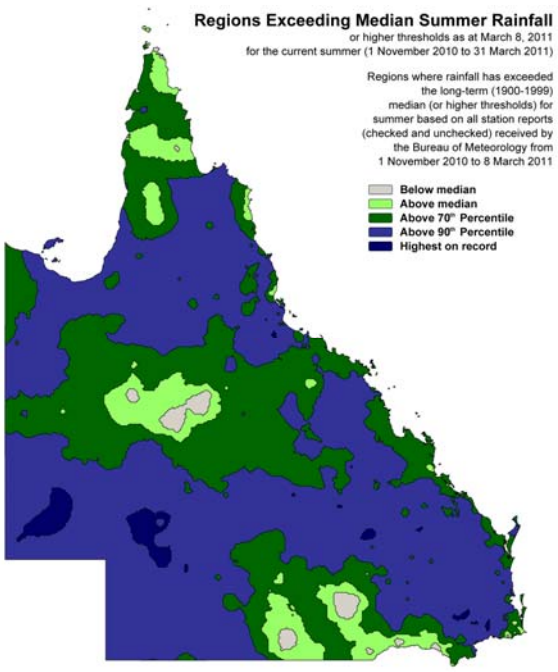
El Niño and La Niña events tend to form in winter or spring, persist through summer and break down in autumn. Seasonal outlooks are based on the persistence of these events and their associated rainfall and climate patterns. Seasonal outlooks are therefore least reliable leading into autumn when El Niño or La Niña events tend to break down. This period is known as the 'autumn predictability gap'.

As at 1 March 2011, the Centre notes that a La Niña pattern currently remains in the Pacific Ocean. However, there are signs of this pattern weakening (see the latest Bureau of Meteorology 'ENSO Wrap-Up'). This pattern is likely to continue to weaken in coming months. Currently:

- The SOI, a key atmospheric ENSO index, remains very positive when averaged over the last month (February: +22.6), two months (January - February: +20.4), and three months (December - February: +22.4). These SOI value are the highest on record for each of these periods.
- Observed sea surface temperatures in the key Niño 3.4 and Niño 4 regions remain cooler than normal, but have warmed markedly during February.

Associated with the formation of the current La Niña pattern, the sea surface temperature gradient (west to east) across the South Pacific Convergence Zone (i.e. between eastern Australia and the Central Pacific) was extremely positive leading into summer (e.g. +1.9°C in October).

- According to the Centre's experimental SPOTA-1 scheme, a positive sea surface temperature gradient across this region, particularly in October, tends to be associated with above-median rainfall in Queensland during the following November to March period.
- Historical evidence suggests that La Niña patterns tend to break down during autumn. The likelihood of the current La Niña pattern weakening further as autumn approaches is supported by most global climate models, however, there remains a possibility of La Niña conditions persisting through 2011.



The recent sea-surface temperature pattern in the North Pacific remains consistent with a 'Cool Phase' of the PDO. The PDO modulates the impact of ENSO on summer rainfall in Queensland, particularly under La Niña conditions.

A cool phase of the PDO, coupled with La Niña conditions, is particularly favourable for November to March rainfall in Queensland (see the Centre's experimental SPOTA-1 scheme which incorporates a measure of both ENSO and the PDO).

These conditions are also usually associated with enhanced tropical cyclone activity in the Coral Sea. Further information is available in the Bureau of Meteorology's media release. This cyclone season so far, three tropical cyclones made have landfall in Queensland. These were Tasha (25 December 2010), Anthony (30 January 2011) and, by far the largest, Yasi (2 February 2011).

So far this summer, almost all of Queensland has received rainfall totals exceeding the long-term median for the entire summer (November to March) with most regions having already received rainfall totals exceeding the 70th percentile level. Over half of the state has received rainfall exceeding the 90th percentile level for the current summer.

Rainfall outlook

There are various approaches for developing probabilistic rainfall outlooks based on the information above. These approaches tend to differ in terms of which components of the climate system are considered and, for this reason, may convey a different outlook, particularly for specific locations.

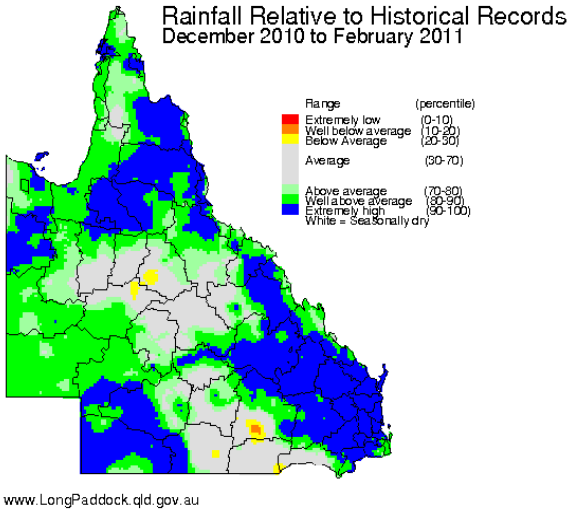
The ENSO and PDO signals have historically had the strongest impact on rainfall in north-eastern Queensland and the weakest impact in south-eastern Queensland.

The Centre produces two statistical climate risk assessment schemes:

- The Centre's experimental SPOTA-1 scheme integrates the above sea-surface temperature information, including indices of ENSO and the PDO. The final SPOTA-1 outlook for this summer (November to March), issued in November 2010, indicated a high probability of exceeding median rainfall across the state. Given the extremely wet start to summer, the Centre issued a special SPOTA-1 analysis in January 2011 to indicate rainfall probabilities for the remainder of summer (January to March). This analysis indicated a high probability of exceeding median rainfall for the remainder of summer.
- The Centre's SOI Phase scheme, which relies on the SOI, indicates a slightly higher than normal probability of exceeding median rainfall across much of the state for the three-month period from March to May.

As the above schemes indicate rainfall probabilities based on historical relationships, it is important that the nature of seasonal outlooks are understood and long-term risk management is undertaken. For example, if an outlook has a 70 per cent probability of above-median rainfall, this also means there is a 30 per cent probability of below-median rainfall. Additionally, an increased risk of above or below-median rainfall in Queensland due to ENSO will not necessarily result in above or below-median rainfall occurring throughout the state (see Australia's Variable Rainfall poster or the Centre's archive of historical rainfall maps).

The Centre understands that each of the schemes may have its own particular following. Although such schemes cannot provide outlooks with absolute certainty each year, users of the information who follow a skilful scheme should benefit from doing so in the long-term. Users should consider the historical track record of any scheme and such information is becoming increasingly available. The Centre's Long Paddock website provides an historical archive of SPOTA-1 reports. Users should also consider the wide range of information available each month describing the current state of the ocean/climate system, for example the 'ENSO Wrap-Up'.



ENSO influences other climate variables apart from rainfall (e.g. temperature, pan evaporation and vapour pressure). This means that the impact of ENSO on crop or pasture growth can be stronger than on rainfall alone. The impact of ENSO on pasture growth is also dependent on current pasture condition and soil water status. The Centre's AussieGRASS model takes these factors into account in producing pasture growth seasonal probabilities.

For further information, visit Long Paddock or contact QCCCE@climatechange.qld.gov.au