Monthly Climate Statement — April 2013

Key messages

- Extensive areas of inland Queensland were dry to extremely-dry last summer (November to March) and the number of 'Individually Droughted Property' declarations is currently increasing. Conversely, much of central and south-eastern Queensland received very high summer rainfall.
- Based on DSITIA's analysis of the Southern Oscillation Index, for most of Queensland there is an equal likelihood of rainfall being either above or below the long-term median over the next three-month period (April to June), a view supported by most international outlooks.
- However, the Bureau of Meteorology's statistical forecast system points to a high probability of April to June being wet over much of eastern Queensland south of the Tropic of Capricorn.
- DSITIA's initial long-lead outlook for the 2013/14 summer (November to March) indicates, for much of Queensland, a slightly higher than normal probability of above-median summer rainfall.

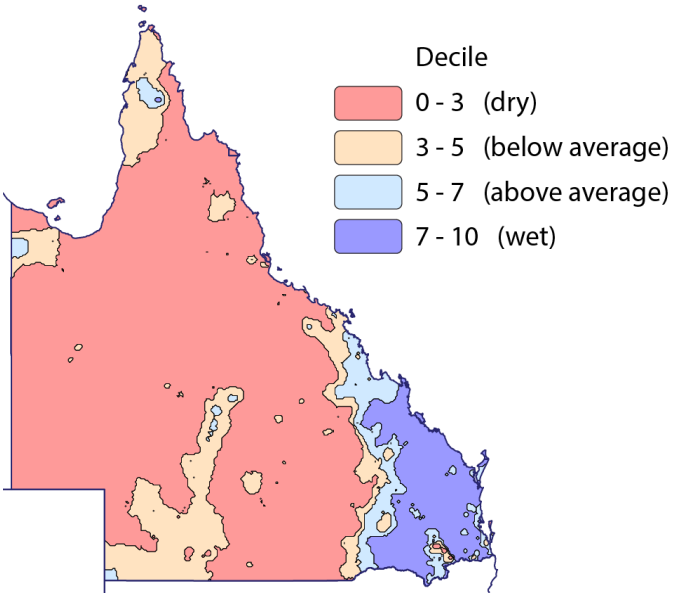
Findings for April 2013

The Science Delivery Division of the Department of Science, Information Technology, Innovation and the Arts (DSITIA) notes that **there is an equal likelihood of either above-median or below-median rainfall over the next three-month period (April to June) based on DSITIA's analysis of the Southern Oscillation Index. DSITIA's initial long-lead outlook for the 2013/14 summer (November to March) indicates, for much of Queensland, a slightly higher than normal probability of above-median summer rainfall.**

Seasonal forecasts are 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)). ENSO based forecasts are least reliable at this time of year, a period known as the 'autumn predictability gap'.

Of most relevance at the current time, is the legacy of the extreme conditions experienced over last summer (November to March). Extensive areas of inland Queensland experienced a very dry summer and the number of 'Individually Droughted Property' declarations is currently increasing. Conversely, much of central and south-eastern Queensland received very high summer rainfall and water storages remain near capacity.

Rainfall Relative to Historical Records
November 2012 to March 2013



Currently:

- The SOI, a key atmospheric measure of ENSO, averaged +0.9 over the January to March period, remaining within the 'ENSO-neutral' range as anticipated.
- Observed sea-surface temperature anomalies in the key Niño 3.4 region of the central equatorial Pacific currently remain near-average (-0.2 ºC in March).
- The majority of international global climate models and those surveyed by the Bureau of Meteorology ('ENSO Wrap-Up' 9 April) suggest that sea-surface temperatures in the tropical Pacific Ocean will most likely remain within the 'ENSO-neutral' range leading into winter (April to June).

Rainfall outlook

There are various approaches used to provide rainfall outlooks. These approaches tend to differ in terms of the components of the climate system that are considered. For this reason, each approach may convey a different outlook, particularly for specific locations.

DSITIA uses two statistical schemes to develop its forecasts of seasonal rainfall:

- the experimental long-lead SPOTA-1 scheme, which integrates sea-surface temperature information, including indices of ENSO and the PDO; and
- the SOI Phase scheme, which relies solely on the SOI, an atmospheric measure of ENSO).

The experimental SPOTA-1 scheme provides long-lead probabilities of summer (November to March) rainfall for Queensland from mid-April through to mid-November each year. An initial outlook for summer 2013/14 based on the experimental SPOTA-1 scheme is now available. The SPOTA-1 scheme currently indicates, for much of Queensland, a slightly higher than normal probability of above-median summer rainfall. This assessment is based on an index of March sea-surface temperature anomalies which reflect the current 'cool' phase of the PDO. This assessment will be modified when the SPOTA-1 scheme takes into account a monthly ENSO index from June through to November this year.

DSITIA's SOI Phase scheme provides probabilities of rainfall for the coming three-month season based on SOI values over the previous two months. The SOI Phase scheme currently indicates that the probability of above-median rainfall across most of Queensland is 40 to 60 per cent for the next three-month period (April to June). This analysis is based on the SOI being in a 'Rapidly Rising' phase at the end of March, as discussed further in the Commentary on Rainfall Based on 'Phases' of the SOI.

The SPOTA-1 and SOI Phase schemes indicate probabilities based on historical relationships. It is important that the probabilistic nature of seasonal outlooks is understood and long-term risk management is undertaken. For example, if an outlook indicates a 70 per cent probability of above-median rainfall, this also means there is a 30 per cent probability of below-median rainfall.

An increased risk of above- or below-median rainfall in Queensland will not necessarily result in above- or below-median rainfall occurring throughout all of the state (see Australia's Variable Rainfall poster, or the Department's archive of historical rainfall maps).

Each of the above schemes may have their own particular following. Although such schemes cannot provide outlooks with absolute certainty, 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. DSITIA's Long Paddock website provides an archive of SPOTA-1 reports and past commentaries on the SOI Phase scheme.

Whilst DSITIA places emphasis on the SPOTA-1 and SOI-Phase analyses, a much wider range of information from national and international agencies is also considered. DSITIA pays particular attention to the Bureau of Meteorology's 'ENSO Wrap-Up' which is updated fortnightly on the Bureau's website.

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, for example, is also dependent upon current pasture condition and soil water status. DSITIA's AussieGRASS model takes these factors into account in producing seasonal pasture growth probabilities.

The Pacific Decadal Oscillation

The Pacific Decadal Oscillation (PDO) is a long-lived Pacific Ocean sea-surface temperature pattern which, approximately every 10 to 30 years, 'flips' between what is known as its 'warm' and 'cool' phases. The sea-surface temperature pattern associated with 'warm' and 'cool' phases of the PDO resemble the familiar 'El Niño' (warm) and 'La Niña' (cool) sea-surface temperature patterns of the El Niño-Southern Oscillation (ENSO). However, unlike ENSO, the PDO sea-surface temperature pattern is most pronounced in the extra-tropics, particularly in the North Pacific. The PDO can either reinforce or lessen the impact of an El Niño or La Niña event. The strongest El Niño events tend to occur when the PDO is in its warm phase whereas the strongest La Niña events tend to occur when the PDO is in its cool phase.

For more information, please visit **www.longpaddock.qld.gov.au/seasonalclimateoutlook** or contact **ken.a.day@science.dsitia.qld.gov.au**.