



April – June 2019

Issued: 28 March 2019

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NIWA Outlook: April – June 2019

Outlook Summary

- A *central* Pacific El Niño event continued during March as the ocean and atmosphere remained weakly coupled. Sea surface temperatures warmed across the equatorial Pacific during March and El Niño is expected to continue during the upcoming three-month period.
- While April – June 2019 is expected to start off with mixed air flows, higher pressure than normal is forecast to develop in the northern Tasman Sea along with lower pressure than normal south of New Zealand. This is expected to result in more westerly quarter winds than normal, particularly during the second half of the coming season.
- Air temperatures are forecast to be above average in the north and east of the North Island and east of the South Island and about equally likely to be above average or near average in all remaining regions of New Zealand for April – June 2019.
- Rainfall is about equally likely to be above normal or near normal in the west and north of the South Island and about equally likely to be below normal or near normal for all remaining regions of New Zealand.
- Well above average coastal and Tasman Sea surface temperatures, including marine heatwave conditions, are forecast to have a strong influence on regional temperatures and may contribute to significant rain events.
- For the current tropical cyclone season (November 2018 to April 2019), [NIWA's Southwest Pacific Tropical Cyclone Outlook](#) indicates that the risk for New Zealand is near normal. On

average, at least one ex-tropical cyclone passes within 550 km of New Zealand each year. Significant rainfall, damaging winds, and coastal damage can occur during these events.

April – June 2019 temperatures are forecast to be above average in the north and east of the North Island and east of the South Island (50% chance) and about equally likely to be above average (45% chance) or near average (40% chance) in all remaining regions of New Zealand. However, cold snaps and frosts are likely to occur, particularly in colder locations, as the season progresses.

April – June 2019 rainfall is about equally likely to be above normal (35-40% chance) or near normal (35-40% chance) in the west and north of the South Island and about equally likely to be below normal (35-40% chance) or near normal (35-40% chance) for all remaining regions of New Zealand.

April – June 2019 soil moisture levels and river flows are most likely to be below normal (50-55% chance) in the north of the North Island and east of the South Island. For the west of the South Island, soil moisture levels and river flows are most likely to be above normal (50% chance). In the north of the South Island, soil moisture levels and river flows are most likely to be in the near normal range (40% chance). For the west and east of the North Island, soil moisture levels and river flows are about equally likely to be below normal (40% chance) or near normal (35% chance).

Regional predictions for the April – June 2019 season

Northland, Auckland, Waikato, Bay of Plenty

The table below shows the probabilities (or percent chances) for each of three categories: above average, near average, and below average. In the absence of any forecast guidance there would be an equal likelihood (33% chance) of the outcome being in any one of the three categories. Forecast information from local and global guidance models is used to indicate the deviation from equal chance expected for the coming three-month period, with the following outcomes the most likely (but not certain) for this region:

- Temperatures are most likely to be above average (50% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or below normal (35% chance).
- Soil moisture levels and river flows are most likely to be below normal (50% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	50	25	25	20
Near average	40	40	25	30
Below average	10	35	50	50

Central North Island, Taranaki, Whanganui, Manawatu, Wellington

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be above average (45% chance) or near average (40% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or below normal (35% chance).
- Soil moisture levels and river flows are about equally likely to be below normal (40% chance) or near normal (35% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	45	25	25	25
Near average	40	40	35	35
Below average	15	35	40	40

Gisborne, Hawke's Bay, Wairarapa

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are most likely to be above average (50% chance).
- Rainfall totals are about equally likely to be below normal (40% chance) or near normal (35% chance).
- Soil moisture levels and river flows are about equally likely to be below normal (40% chance) or near normal (35% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	50	25	25	25
Near average	40	35	35	35
Below average	10	40	40	40

Tasman, Nelson, Marlborough, Buller

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be above average (45% chance) or near average (40% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or above normal (35% chance).
- Soil moisture levels and river flows are most likely to be near normal (40% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	45	35	30	30
Near average	40	40	40	40
Below average	15	25	30	30

West Coast, Alps and foothills, inland Otago, Southland

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are about equally likely to be above average (45% chance) or near average (40% chance).
- Rainfall totals are about equally likely to be above normal (40% chance) or near normal (35% chance).
- Soil moisture levels and river flows are most likely to be above normal (50% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	45	40	50	50
Near average	40	35	30	30
Below average	15	25	20	20

Coastal Canterbury, east Otago

Probabilities are assigned in three categories: above average, near average, and below average.

- Temperatures are most likely to be above average (50% chance).
- Rainfall totals are about equally likely to be near normal (40% chance) or below normal (35% chance).
- Soil moisture levels and river flows are most likely to be in the below normal range (55% chance).

The full probability breakdown is:

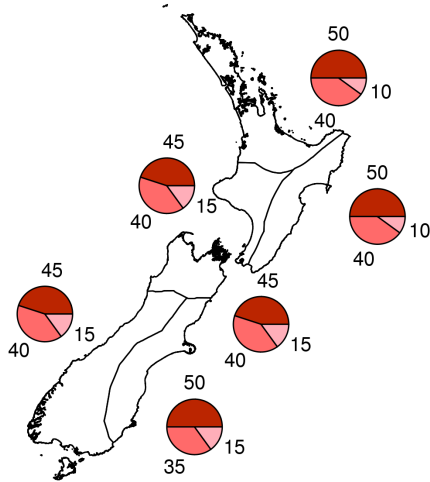
	Temperature	Rainfall	Soil moisture	River flows
Above average	50	25	20	20
Near average	35	40	25	25
Below average	15	35	55	55

Graphical representation of the regional probabilities

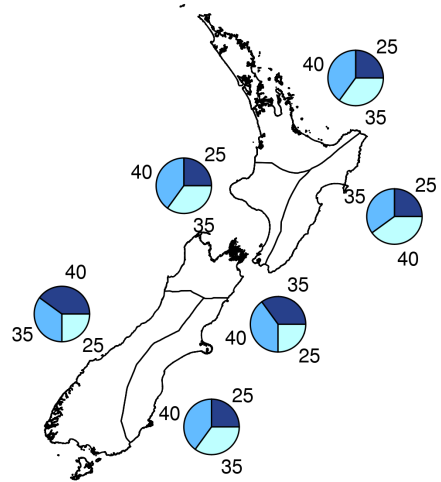
Outlook for April - June 2019



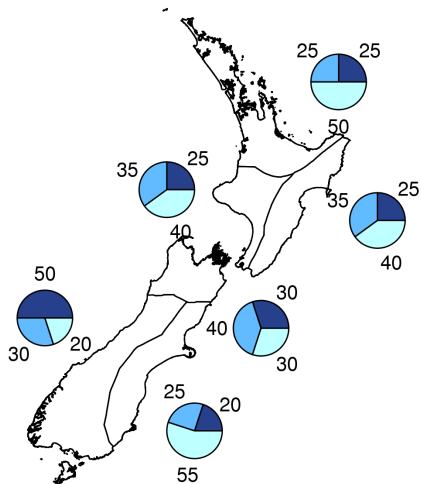
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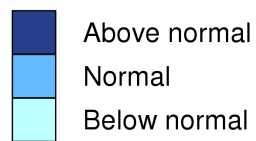
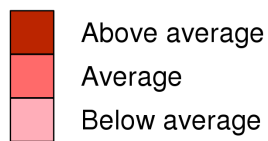
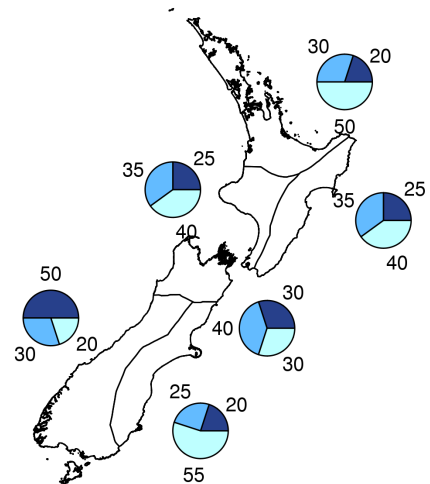
Rainfall



Available Soil Moisture



River Flows



Background

Warmer than average SSTs now cover the equatorial Pacific uniformly, a sign of a strengthening oceanic El Niño event. While the flavour of the El Niño has been closer to the central-based type over the last month or two, the eastward propagation of anomalously warm ocean water may signal that the event is transitioning to an east-based one.

The NINO3.4 Index anomaly for March (to the 24th) was +0.81°C, an increase of 0.38°C compared to February. The NINO1 and NINO2 Index (in the far eastern Pacific) both exceeded an anomaly of +0.60°C but had exceeded +0.80°C earlier in month.

The atmosphere continued to respond to a warm pool of water in the central and western equatorial Pacific, as evidenced by above normal rainfall and cloud cover across the region. As this warm water propagates eastward with time, the atmospheric response may become more aligned with an east-based El Niño.

The Southern Oscillation Index (SOI) was negative during March (preliminary value of -0.7), although not as persistently negative as in February. Typically, SOI values below -1.0 for three consecutive months indicate El Niño – the current El Niño event has not reached this conventional threshold. This could be the result of the *central-based* El Niño event influencing the synoptic pressure patterns near Darwin and Tahiti away from what might be considered conventional. For now, a weakly coupled *central-based* El Niño remains present.

The probability for oceanic El Niño conditions, according to the consensus from international models, is 90% for the April – June period. For July – September, the probability has increased to 73% from 55% last month. El Niño conditions remain the most likely outcome for the October – December period at 61%. This continues to suggest the potential for a ‘protracted’ event (multi-year duration).

New Zealand’s coastal water temperatures for March 2019 were above or well above average. Anomalies of 1 to 3°C were common in the eastern Tasman Sea and in east-coastal areas of the North Island. Very warm air temperatures during late March pushed anomalies to 2 to 4°C. Marine heatwave conditions continued in the Tasman Sea and in parts of New Zealand’s coastal waters.

Warmer than average sea surface temperatures are forecast to persist during the coming three-month period, very likely influencing above average air temperatures for at least the start of the season. These warm seas may also invigorate low pressure systems as they approach New Zealand from the west.

The Southern Annular Mode (SAM) spent much of March in neutral to positive territory, as evidenced by frequent patterns of high pressure near New Zealand. A neutral to positive SAM is forecast to continue in early April. As the upcoming season continues, the SAM may have a tendency to become more negative as the Tasman Sea begins to turn more active.

For comment, please contact

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Notes to reporters and editors

1. NIWA's outlooks indicate the likelihood of climate conditions being at, above, or below average for the season as a whole. They are not 'weather forecasts'. It is not possible to forecast precise weather conditions three months ahead of time.
2. The outlooks are the result of the expert judgment of NIWA's climate scientists. They take into account observations of atmospheric and ocean conditions and output from global and local climate models. The presence of El Niño or La Niña conditions and the sea surface temperatures around New Zealand can be a useful indicator of likely overall climate conditions for a season.
3. The outlooks state the probability for above average conditions, near average conditions, and below average conditions for rainfall, temperature, soil moisture, and river flows. For example, for winter (June–July–August) 2007, for all the North Island, we assigned the following probabilities for temperature:
 - Above average: 60 per cent
 - Near average: 30 per cent
 - Below average: 10 per centWe therefore concluded that above average temperatures were very likely.
4. This three-way probability means that a random choice would be correct only 33 per cent (or one-third) of the time. It would be like randomly throwing a dart at a board divided into three equal parts, or throwing a dice with three numbers on it. An analogy with coin tossing (a two-way probability) is not correct.
5. A 50 per cent 'hit rate' is substantially better than guesswork, and comparable with the skill level of the best overseas climate outlooks. See, for example, analysis of global outlooks issued by the International Research Institute for Climate and Society based in the US published in the Bulletin of the American Meteorological Society (Goddard, L., A. G. Barnston, and S. J. Mason, 2003: Evaluation of the IRI's "net assessment" seasonal climate forecasts 1997–2001. *Bull. Amer. Meteor. Soc.*, 84, 1761–1781).
6. Each month, NIWA publishes an analysis of how well its outlooks perform. This is available online and is sent to about 3500 recipients of NIWA's newsletters, including many farmers. See www.niwa.co.nz/our-science/climate/publications/all/cu
7. All outlooks are for the three months as a whole. There will inevitably be wet and dry days, and hot and cold days, within a season. The exact range in temperature and rainfall within each of the three categories varies with location and season. However, as a guide, the "near average" or middle category for the temperature predictions includes deviations up to $\pm 0.5^{\circ}\text{C}$ for the long-term mean, whereas for rainfall the "near normal" category lies between approximately 80 per cent and 115 per cent of the long-term mean.
8. The seasonal climate outlooks are an output of a scientific research programme, supplemented by NIWA's Capability Funding. NIWA does not have a government contract to produce these outlooks.
9. Where probabilities are within 5% of one another, the term "about equally" is used.

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