



August – October 2017

Issued: 1 August 2017

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NIWA Outlook: August – October 2017

Overview

ENSO (El Niño – Southern Oscillation) neutral conditions (neither El Niño nor La Niña) continued in the tropical Pacific during July 2017, but this month mixed signals were again present. In particular some atmospheric patterns have been recently leaning more towards weak La Niña conditions. Sea-surface temperatures (SSTs) in the equatorial Pacific Ocean are slightly above normal (*i.e.* on the El Niño side of neutral), but these positive anomalies weakened over the course of the month. On the other hand, the Southern Oscillation Index is currently positive (+0.8, *i.e.* on the La Niña side of neutral) and large-scale circulation anomalies along the Equator as well as rainfall anomalies in the western Pacific are consistent with patterns usually associated with a La Niña state.

International guidance favours a persistence of ENSO-neutral conditions over the next three months period (59% chance for August – October 2017), a likelihood comparable to the one indicated last month. ENSO-neutral remains the most likely outcome throughout the first quarter of 2018. Note however that the models used to build this consensus forecast have not picked up yet on the most recent changes shown by the La Niña-leaning atmospheric indicators.

For August – October 2017 as a whole, the atmospheric circulation around New Zealand is forecast to be characterised by lower pressure than normal west of the country, leading to weak northwesterly flow anomalies over New Zealand. La Niña-like atmospheric signals currently present in the Pacific might however be associated with intermittent periods of anomalous easterly or northeasterly flows. Significant low pressure systems, occasionally with a deep sub-tropical moisture

connection, are also expected to sweep the country from time to time during the August – October 2017 period, and may be associated with intense rainfall.

Outlook Summary

August – October 2017 temperatures are forecast to be above average for all regions of New Zealand, with high confidence (55% to 70% chance for above average temperatures). Nevertheless, frosts and cold snaps will occur during the remainder of winter and in early spring. Coastal water temperatures around New Zealand are forecast to remain above average over the next three month period.

August – October 2017 rainfall totals are most likely to be near normal (45% chance) for the east of the South Island, and about equally likely to be near normal (35-40% chance) or above normal (35-40% chance) for all remaining regions of New Zealand.

August – October 2017 soil moisture levels and river flows are most likely to be near normal (40-45% chance) in the west of the North Island and the west and east of the South Island. In the north and east of the North Island, soil moisture levels and river flows are about equally likely to be near normal (35-40% chance) or above normal (35-40% chance). In the north of the South Island, soil moisture levels are about equally likely to be near normal (40% chance) or above normal (35% chance), and river flows most likely to be in the near normal range (45% chance).

Regional predictions for the August – October 2017 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 very likely to be above average (60% chance).
- Rainfall totals are about equally likely to be in the above normal range (40% chance) or near normal range (35% chance).
- Soil moisture levels are equally likely to be near normal (40% chance) or above normal (40% chance), and river flows are about equally to be near normal (40% chance) or above normal (35% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	60	40	40	35
Near average	30	35	40	40
Below average	10	25	20	25

Central North Island, Taranaki, Whanganui, Manawatu, Wellington

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

- Temperatures are very likely to be above average (60% 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 both most likely to be in the near normal range (45% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	60	35	30	25
Near average	30	40	45	45
Below average	10	25	25	30

Gisborne, Hawke's Bay, Wairarapa

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

- Temperatures are very likely to be above average (60% chance).
- Rainfall totals, soil moisture levels and river flows are all about equally likely to be near normal (40% chance) or above normal (35% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	60	35	35	35
Near average	30	40	40	40
Below average	10	25	25	25

Tasman, Nelson, Marlborough, Buller

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

- Temperatures are very likely to be above average (70% chance).
- Rainfall totals are about equally likely to be above normal (40% chance) or near normal (35% chance).
- Soil moisture levels are about equally likely to be near normal (40% chance) or above normal (35% chance).
- River flows are most likely to be in the near normal range (45% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	70	40	35	30
Near average	20	35	40	45
Below average	10	25	25	25

West Coast, Alps and foothills, inland Otago, Southland

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

- Temperatures are very likely to be above average (70% chance).
- Rainfall totals equally likely to be near normal range (40% chance) or above normal (40% chance).
- Soil moisture levels and river flows are most likely to be in the near normal range (45% chance).

The full probability breakdown is:

	Temperature	Rainfall	Soil moisture	River flows
Above average	70	40	30	30
Near average	20	40	45	45
Below average	10	20	25	25

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 (55% chance).
- Rainfall totals, soil moisture levels and river flows are all most likely to be in the near normal range (40-45% chance).

The full probability breakdown is:

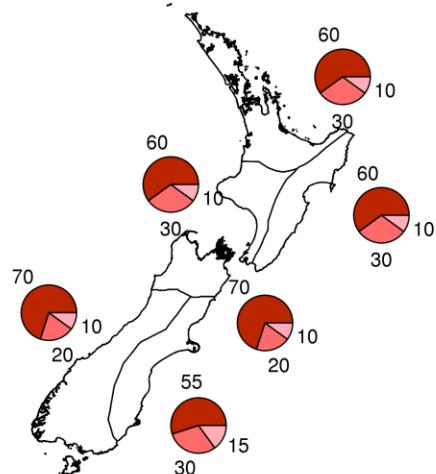
	Temperature	Rainfall	Soil moisture	River flows
Above average	55	30	30	30
Near average	30	45	40	40
Below average	15	25	30	30

Graphical representation of the regional probabilities

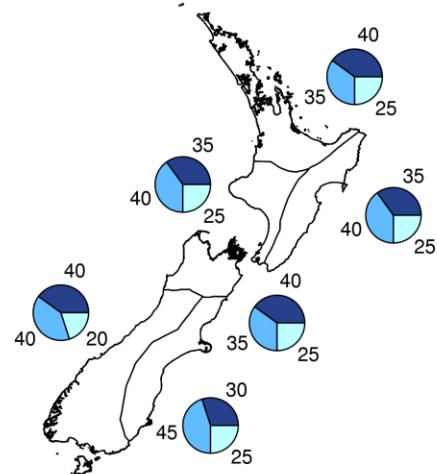
Outlook for August - October 2017



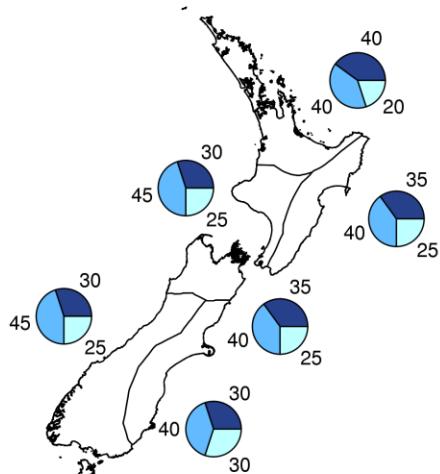
Air Temperature



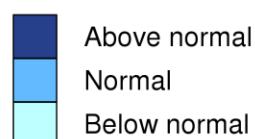
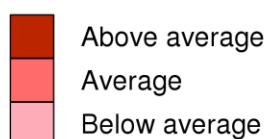
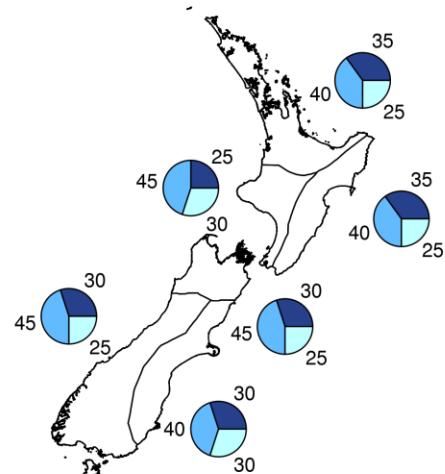
Rainfall



Available Soil Moisture



River Flows



Background

ENSO (El Niño – Southern Oscillation) neutral conditions persisted across the tropical Pacific overall during July 2017, but oceanic and atmospheric anomalies were mixed, with some indicators leaning towards El Niño, and others towards La Niña. Some atmospheric patterns in particular, such as equatorial zonal winds, rainfall in the tropical Pacific, and the SOI, have been leaning more towards La Niña conditions during the second half of July 2017.

Sea surface temperatures (SSTs) in the equatorial Pacific Ocean continue to be slightly above average in July 2017, but the anomalies have weakened compared to last month, especially during the past week or so. The latest monthly SST anomaly (data ending 30th July 2017) in the NINO3.4 region (in the central Pacific) is currently at +0.43°C (was +0.5°C last month). Slightly cooler than average waters have recently appeared in the far eastern equatorial Pacific.

Subsurface ocean temperatures remain slightly above average along the equator in the western and central Pacific in the first 100 meters of the ocean, but the positive anomalies have weakened slightly during July 2017. At depth, between 100 to 200 meters and across the whole equatorial Pacific, ocean waters remain slightly cooler than average.

The preliminary [value estimated on the 1st of August] Southern Oscillation Index (SOI) for the month of July 2017 is positive at +0.8, *i.e.* on the La Niña side of neutral. This is in stark contrast with last month, which was characterized by significant negative SOI values (-0.9 for June 2017; *i.e.* on the El Niño side of neutral).

Zonal wind anomalies along the equator currently indicate enhanced trade-winds and accelerated Walker (zonal) circulation, a pattern which is consistent with a positive SOI. Moreover, rainfall and convection anomalies in the tropical Pacific continue to show La Niña-like signals, with more intense than normal convection and rainfall observed over large parts of the Maritime Continent.

Accordingly, the ENSO Precipitation Index (ESPI) is currently significantly negative with a value of ~ -1.7 (*i.e.* indicative of a La Niña state).

In summary, while the Ocean – Atmosphere system in the tropical Pacific Ocean overall remains consistent with an ENSO-neutral state, La Niña-like signals have become more prominent in the atmosphere during the second half of July 2017.

International guidance favours a persistence of ENSO-neutral conditions over the next three month period (59% chance for August – October 2017), a likelihood comparable to the one issued last month. ENSO-neutral remains the most likely outcome throughout the first quarter of 2018. Note however that the models used to build this consensus forecast haven't picked up yet on the most recent shift in some atmospheric indicators towards La Niña-like signals.

Coastal waters remain generally warmer than average all around New Zealand, with anomalies still exceeding +0.5°C along the west coast of the South Island. Anomalies in the “NZ box” (160°E-170°W, 30-45°S) are currently reaching about +0.5°C. Ocean waters are still much warmer than average in the southern part of the Tasman Sea, but these anomalies have weakened compared to last month and are less extensive. The dynamical models' forecasts indicate that warmer than average SSTs around New Zealand are likely to persist over the August – October 2017 period.

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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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