greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Climate and Water Resources Summary for the Wellington Region

Cold Season (May to October) 2018

Release date: 16 Nov 2018

Contents

Traffic moves along a street covered with hail in Wellington after a winter storm on 28 May 2018 brought Antarctic air into the region. The maximum daytime temperature of only 7.9°C in Kelburn, with 90km/h southerly gusts, was a sharp awakening to the cold season. It was an abrupt change from hot to cold, after we had all been spoiled with one of the hottest summers on record. Source: Peter Graczer/TVNZ.

In this report you will find:

More information

For more information on monitoring sites and up-to-date data please visit http://www.gw.govt.nz/environmental-science/. Several climate sites are operated by NIWA and/or MetService, and GWRC is grateful for permission to present the data in this report.

Disclaimer

Report release date: Nov 2018

The cold season from May to October 2018 saw mostly about average rainfall across the region over the entire six month period. However, a look into the rainfall patterns on a monthly basis (see next page) shows that the rainfall anomaly varied widely from month to month.

Rainfall (May to October)

The map to the right shows rainfall recorded during the entire May to October 2018 period as a percentage of the long term average.

May to October 2018
total recorded rainfall as a percentage of the long-term average rainfall

The pattern for the six month period is that of around average rainfall across the entire region. Areas about the south coast, the Hutt catchment and northern Kapiti had totals up to 120% of normal, while parts of the Wairarapa east coast received around 80% of normal rainfall.

However, individual monthly totals show a highly varied picture (see the following page for monthly rainfall percentage maps). The monthly analysis highlights the variability in rainfall from month to month. The last month of the cold season, October, saw very low rainfall across most of the region. Decent rainfall totals just in the last two days of the month pulled the percentages out of what were going to be extremely low values.

Analysis of the number of days that it rained is interesting. If more than 1mm of rain is recorded in a day this is called a 'Rain Day' and if there is more than 25mm this is termed a 'Heavy Rain Day'.

The table below shows that most areas had around the average number of Rain and Heavy Rain days. The Hutt Valley and Wellington area had three more Heavy Rain Days than normal.

The Eastern Wairarapa had less overall Rain Days but an increase of two Heavy Rain Days over normal.

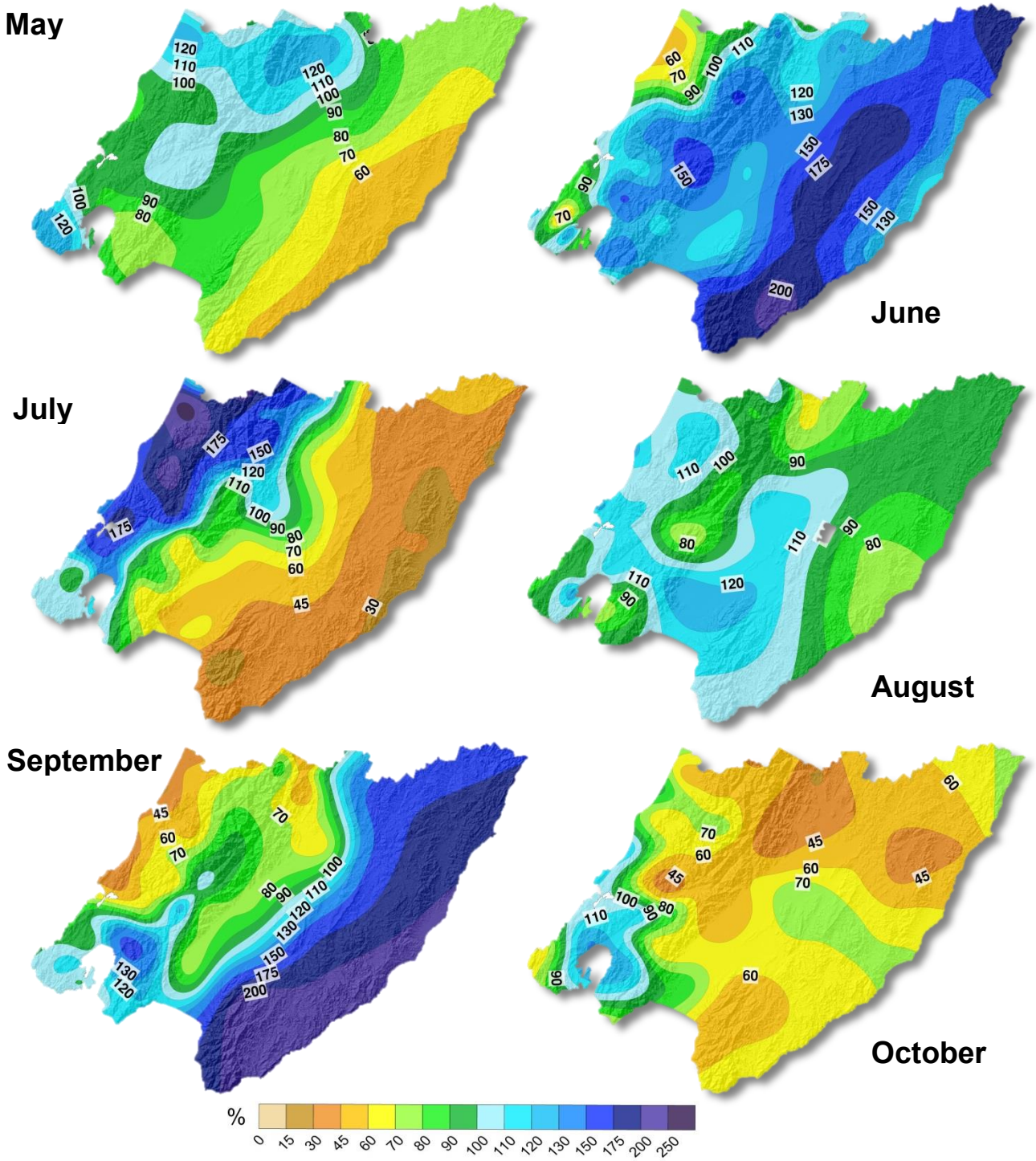
Number of Rain Days and Heavy Rain Days during May to October across the region (long-term average in brackets.)

	Kāpiti Coast		Porirua	Hutt Valley & Wellington		Ruamāhanga		Eastern Wairarapa
	Lowland	Hills	Lowland	Lowland	Hills	Lowland	Hills	
Rain Days (>1mm)	67 [70]	110 [104]	66 [66]	67 [69]	94 [96]	61 [66]	113 [115]	64 [75]
Heavy Rain Days(>25mm)	3 [3]	25 [24]	5 [5]	8 [5]	11 [13]	1 [3]	34 [34]	5 [3]

Rainfall by the month

The maps below show the percentage of average rainfall for each month of the cold season (May to October 2018). May was slightly below average to slightly above average with the exception of the east coast. June was very wet across the whole region except the Kapiti Coast. July was wet in the west and dry in the east while September was the opposite. October had very low rainfall totals leading into the warm season.

Rainfall in the eastern hills and east coast area was very up and down over the six months seeming to fluctuate from very wet conditions to very dry conditions in alternate months.



Monthly rainfall as a percentage of the long-term average

River flow

The map below shows the average river and stream flow conditions between May and October, for various monitored catchments, as a percentage of the long-term average flow over this period.

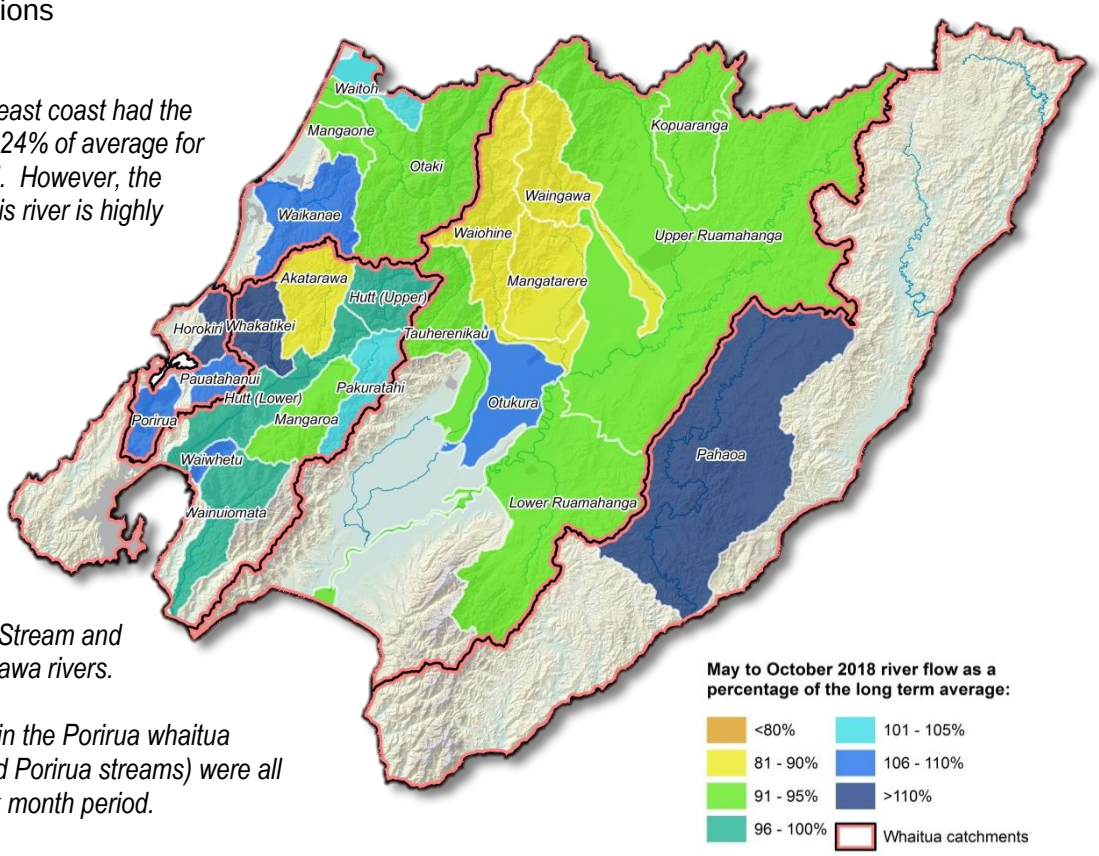
Most of the region's stream and rivers experienced near average flows during the six month period, with just a few exceptions

The Pahaoa River on the east coast had the highest flow anomaly at 124% of average for the May to October period. However, the monthly flow pattern for this river is highly variable:

- *May 57%*
- *June 400%*
- *July 17%*
- *August 54%*
- *September 270%*
- *October 16%*

The lowest flows compared to normal were found in the Mangaratere Stream and the Waingawa and Akatarawa rivers.

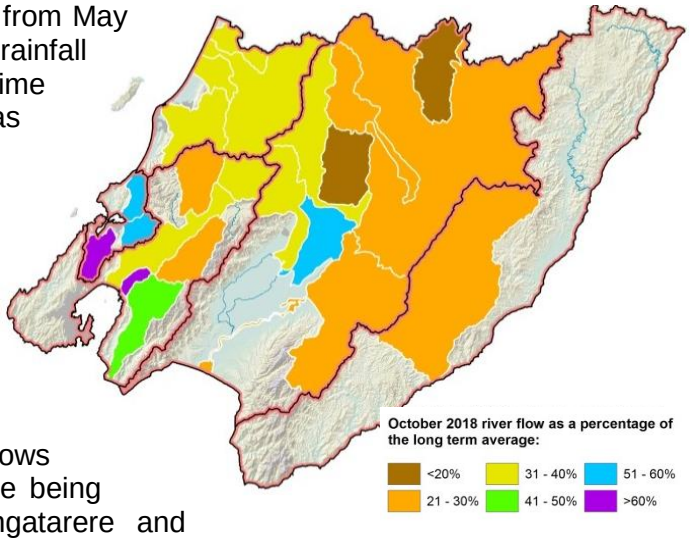
Three monitored streams in the Porirua whaitua (Horokiri, Pauatahanui and Porirua streams) were all 110% of normal for the six month period.



An inauspicious start to summer?

After an alternating mix of wet and dry conditions from May to September a noticeable change to very low rainfall occurred during October. Positive daytime temperature anomalies were observed as well as much lower than normal river and stream flow and falling soil moisture levels.

The map to the right is similar to the one above but this time it is focused on just the recorded river and stream flows during the month of October as compared to the long-term avarages for that month.

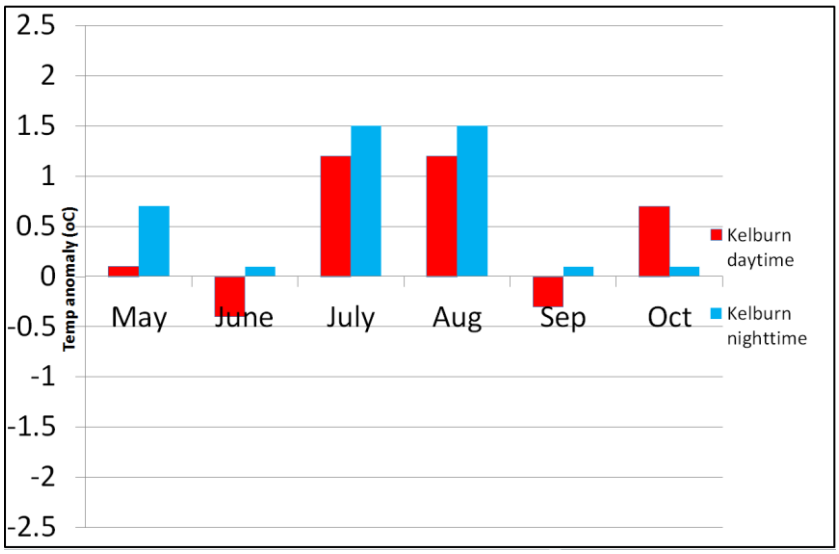


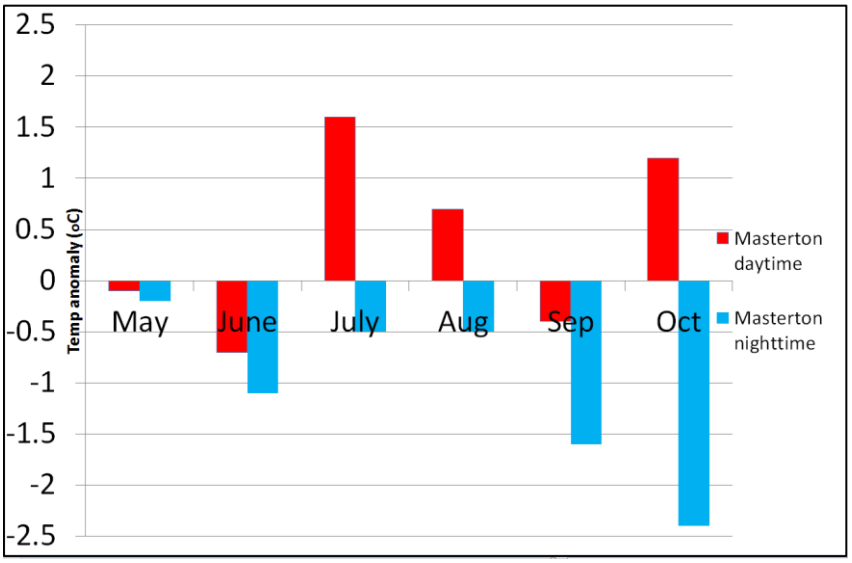
Only two of our monitored catchments recorded flows greater than 60% of the October average – these being the Porirua and Waiwhetu streams. The Mangatarere and Kopuaranga stream flows were just 15% of average, while the Ruamāhanga, Pahaoa, Waingawa. Mangaroa and Akatarawa rivers were all around 25% of normal.

Air temperatures

Air temperature is measured at a number of meteorological monitoring sites across the region. It is useful to look at the anomalies (i.e., departures from normal) in average temperatures month by month, in order to understand the climate anomalies.

The graphs below show the monthly average daytime maximum and average nighttime minimum temperature anomalies (i.e., based on every day of the month) for Kelburn (upper panel) and Masterton (lower panel). We can see that the cold season overall was warmer than normal. For Masterton, the nighttime minimum temperatures were generally below average, possibly as a reflection of drier conditions and clear skies nights into spring, which favour heat loss into space.





Average daytime and nighttime temperature anomalies for Kelburn (top) and Masterton (bottom) for the cold season period. Most of the period has been warmer than average, except June and September. In Masterton, there has been a predominace of cold nights into spring.

SOURCE: Data from MetService meteorological stations.

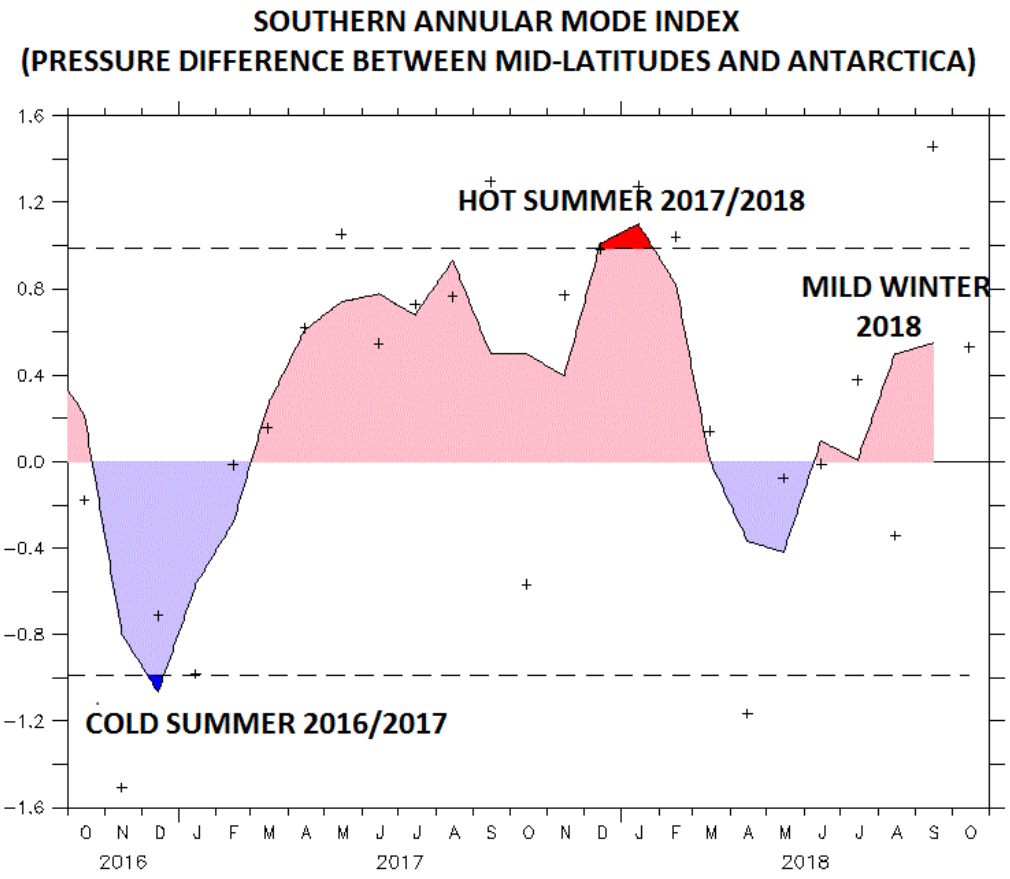
Global climate drivers

Climate variability and climate change

People often ask if the variable weather patterns in our region are a result of climate change. While natural climate variability has always been quite pronounced in our region, weather extremes are expected to get worse as a result of human-induced climate change and "global warming" caused by greenhouse gas emissions (http://www.royalsociety.org.nz/expert-advice/papers/yr2016/climate-change-implications-for-new-zealand/).

Some key observations about climate variability and change in our region during the period May to October 2018 are:

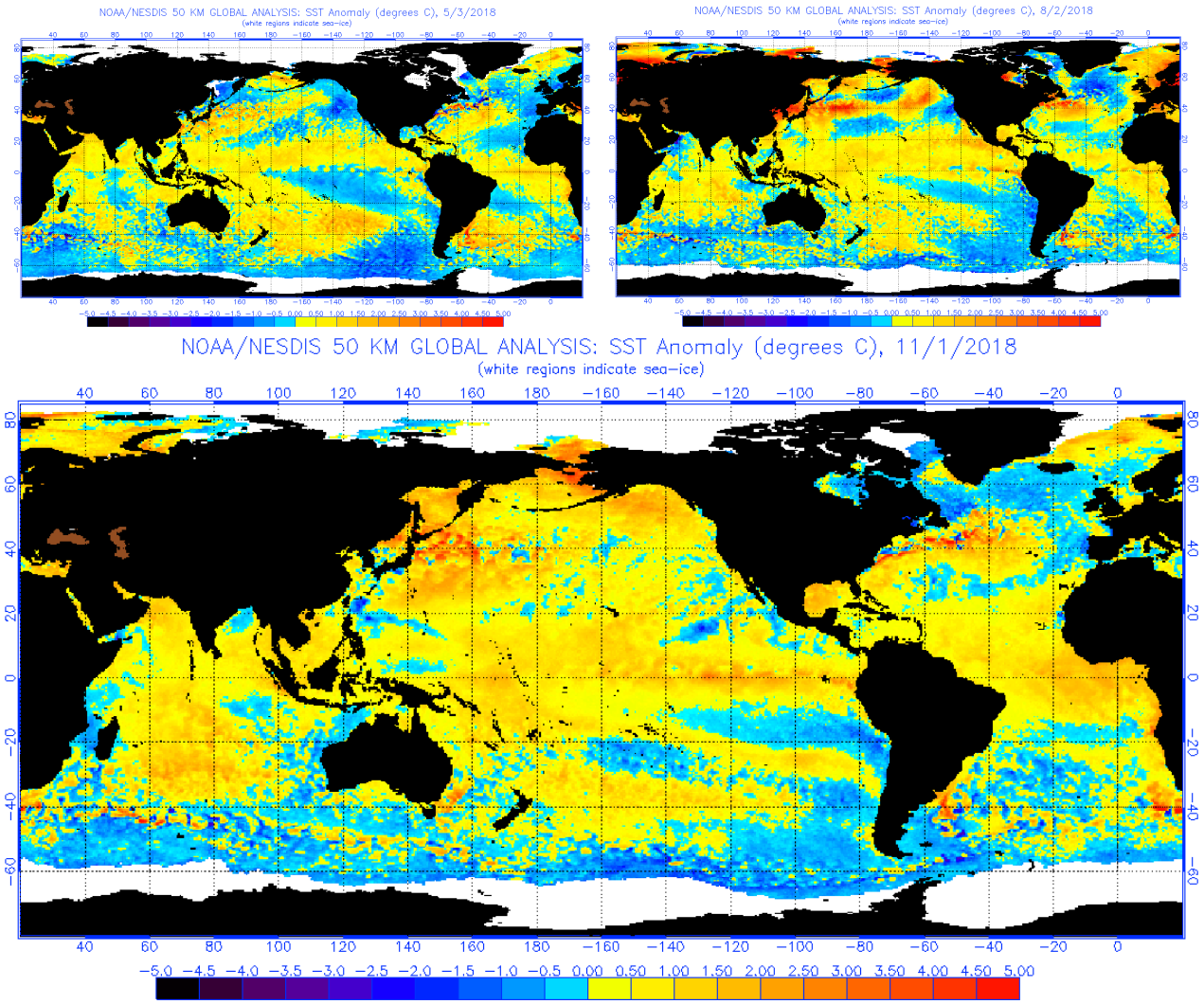
- The six-month period was warmer than normal, with abrupt, short-lived cold waves early in the season, followed by a generally mild winter;
- The sea surface temperatures (following page) have remained generally warmer than normal around New Zealand, after the demise of the exceptional marine heat wave that marked the record breaking summer of 2017-2018;
- High pressure anomalies around New Zealand, associated with the positive phase of the Southern Annular Mode (below), helped block the fronts and reduce the strength of the westerly winds. This has led to a persistence of warmer than normal temperatures around New Zealand.



The Southern annular mode (SAM) has been predominantly positive, helping explain the persistence of warm temperature anomalies this year around New Zealand. Source: NOAA/USA.

Global climate drivers and extreme weather events

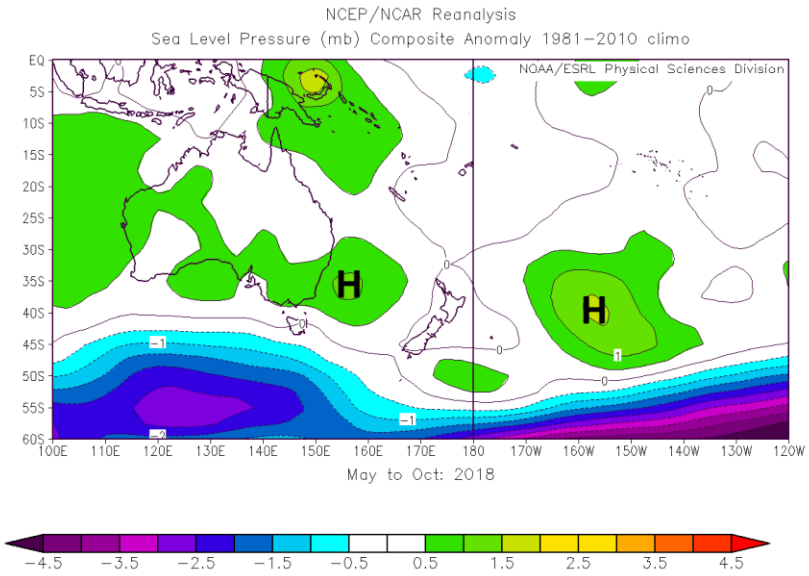
Climate drivers are global mechanisms that can influence the weather in our region. The El Niño/Southern Oscillation[1] (ENSO) phenomenon is now starting to enter a new positive (El Niño) phase, as seen by the warm sea surface temperature anomalies at the beginning of November around the equator line (larger bottom panel below). The sea ice extent (in white) has been below average, with a partial recovery after the winter season (seen in white, bottom panel).



Sea surface temperature anomalies on 3rd May 2018 (left), 2nd Aug 2018 (right) and 1st Nov 2018 (bottom). We can see the equatorial Pacific getting progressively warmer towards reaching El Niño state, after the demise of the weak La Niña that was still seen in May (upper left). The waters remain warmer than normal around and east of New Zealand, which helps explain the persistence of warmer than average air temperatures for most of the country. Source: NOAA/USA.

The pressure anomalies over the six month period show two weak anticyclones (marked as H) dominating the latitudes of New Zealand (see figure on the next page). This pair is related to the positive phase of the Southern Annular Mode (SAM) discussed earlier, helping explain the mild cold season in 2018 and a predominance of warmer than average temperatures since early 2017.

[1] https://www.niwa.co.nz/education-+-and-training/schools/students/enln



Mean sea level pressure anomaly for May to Oct 2018.

Weak high pressure anomalies dominated the oceanic areas east and west of New Zealand. This pattern helped to divert the approaching fronts south of New Zealand, resulting in weaker winds and higher than average temperatures.

Source: NOAA (USA).

Thanks to the positive SAM, the Wellington Region was spared from very extreme weather events in the cold season, with a few exceptions during the beginning and end of the season when the SAM briefly shifted to the negative phase. The high pressure influence also contributed to unusual dryness, with the relative humidity in Wellington dipping to 28% at Greta Point in late October. The rainfall pattern, as discussed earlier, was extremely variable on a month-to-month basis, reflecting the intra-seasonal variation in the high pressure patterns .

Seasonal climate outlook update

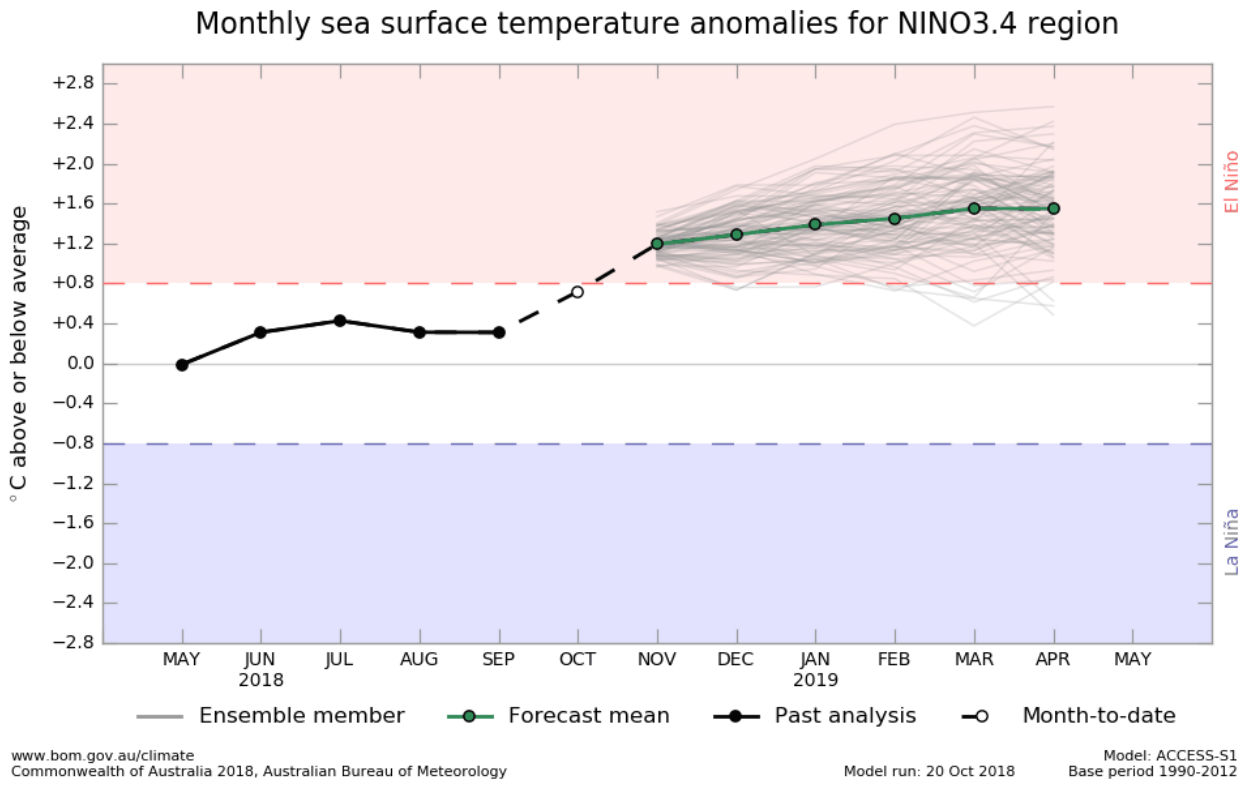
The variable rainfall pattern over the last six months has resulted in a total accumulation of just about average for most of the region. Thanks to the prevailing high pressures, the soil moisture is leaning to the dry side. Overall conditions for farming in the Wairarapa have been good, as indicated by increased pasture growth reported by some farmers.

The ENSO phenomenon is expected to enter a new El Niño phase during the warm season. At this stage, the projection is for a weak event. The sea surface temperature anomalies around New Zealand remain warmer than average for the most part, although not as strong as they were previously. The emerging El Niño is expected to possibly be of the “Modoki” type, which is a specialist term for El Niños that don’t show the traditional water warming signal around South America. If this is confirmed, the impacts on New Zealand will likely be weaker (and less predictable) than those of a regular El Niño. The current warm water pattern around and east of New Zealand is also not normally observed in El Niño years, and could contribute to oppose some of the drying effects from ENSO.

In summary, this is shaping up as a difficult season to predict, with no reliable climate analogues in the recent past to draw a comparison of expected anomalies. The following points summarise the expected pattern over the next three months:

- About **70% probability of El Niño** developing by the end of the year (high confidence);
- "**Weird event**": not too strong, mixed signals, mixed effects. Climate unlikely to behave like normal El Niños (high confidence);
- Predominant **westerly regime**, but easterly rainfall events still possible (moderate confidence);
- **Warm Sea Surface Temperature** around and east of New Zealand adds to variable pattern, reduces severe drought chance for the time being;
- **Drier than average**: dry pattern possible, but unlikely to be severe (low confidence for rainfall totals);
- **Warmer than average**: good chance of heat waves, but more unsettled and not nearly as hot as the record summer of 2017-2018 (high confidence)

The full climate outlook for summer will be released with our regular seasonal briefing by mid-December.



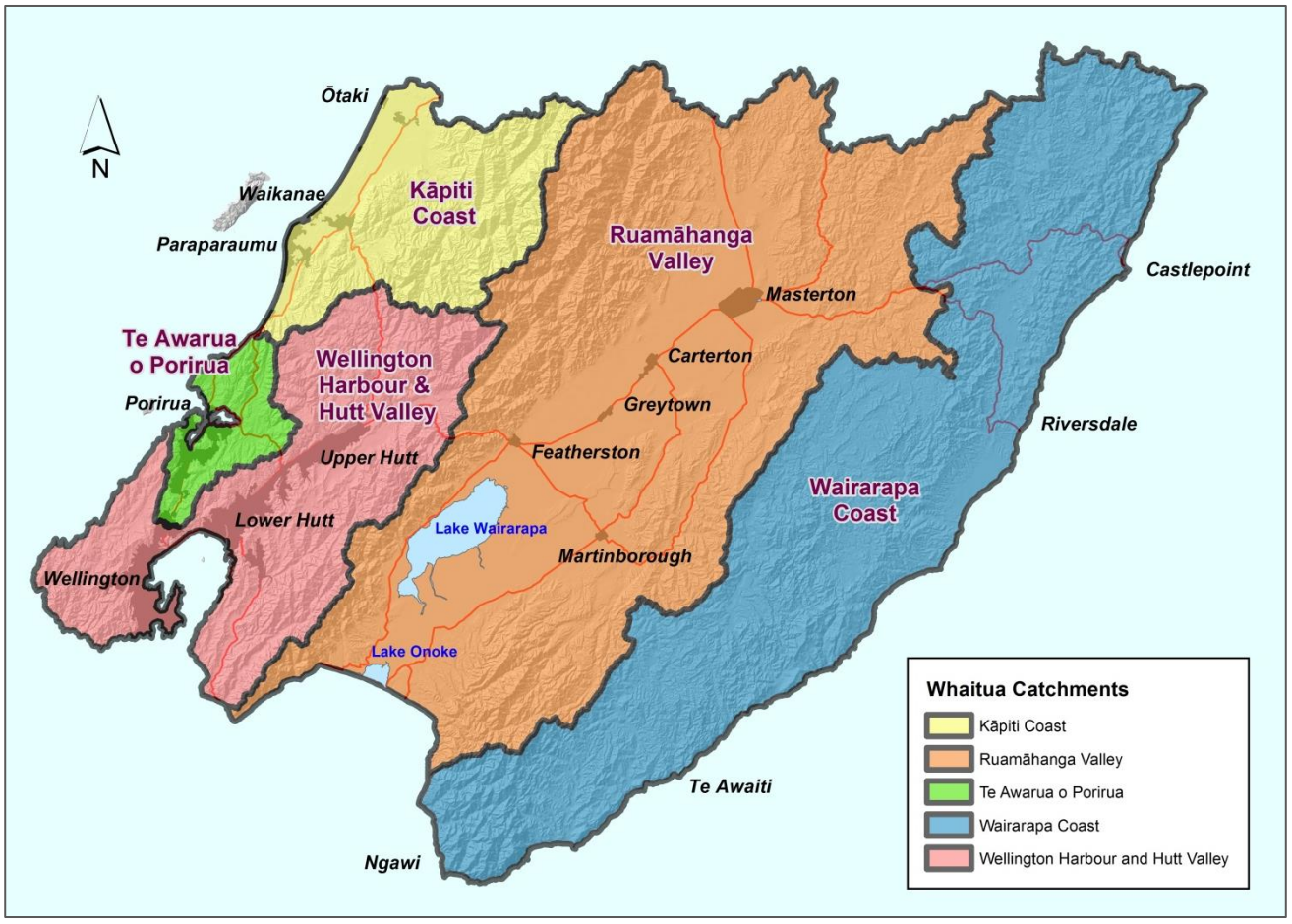
ENSO predictions as of 20 Oct 2018, showing that an El Niño (positive phase) is expected to develop over the summer season. Source: BOM (Australia)

What happened in each whaitua catchment?

Climate and water resource summaries are provided in the following sections for each of the five Wellington region whaitua catchment areas (as shown below). The whaitua catchments provide an important sub-regional basis for environmental management in the Wellington region[2], and roughly coincide with the different climate and water resource zones.

Click the following links for November 2017 to April 2018 summaries for:

- Wellington Harbour and Hutt Valley
- Te Awarua-o-Porirua
- Kāpiti Coast
- Ruamāhanga Valley
- Wairarapa Coast



Map of the five whaitua catchment areas in the Wellington region. Each whaitua roughly coincides with a climatic zone, expressing the marked east-to-west contrast that we experience in our region.

[2] http://www.gw.govt.nz/whaitua-committees/

Wellington Harbour and Hutt Valley climate summary

- **Total rainfall was around average but varied quite markedly from month to month.**
- **High monthly mean temperatures – particularly in July and whole winter period**
- **Very dry October, especially in water supply catchment area of the Hutt River**

Hutt River headwaters dry in October

October rainfall totals in the headwaters of the Hutt River catchment were well below normal:

- Kaitoke 54% of average (114mm). The 8th lowest October total since 1951 and LOWEST since 1978.
- Bull Mound 53% of average (246mm). The 2nd lowest since 1976 and the LOWEST since 1985.

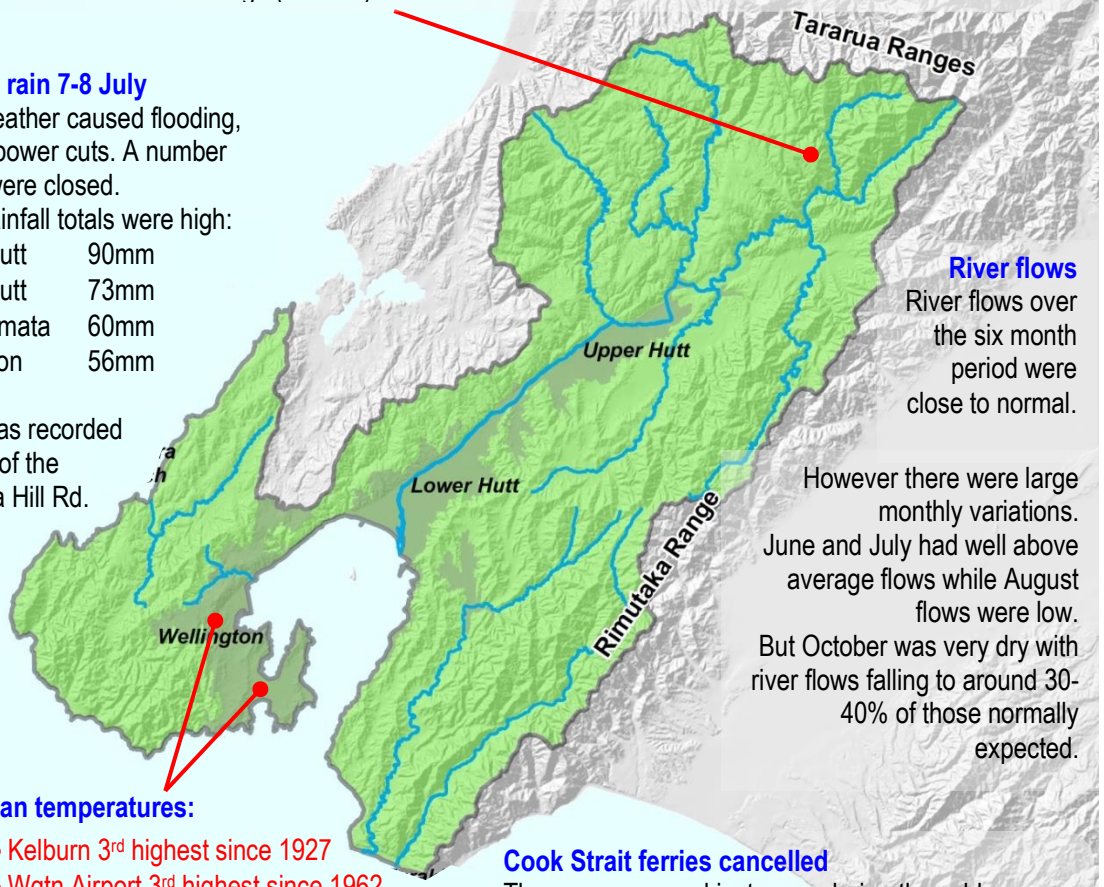
Wind and rain 7-8 July

Stormy weather caused flooding, slips and power cuts. A number of roads were closed.

24 hour rainfall totals were high:

- Upper Hutt 90mm
- Lower Hutt 73mm
- Wainuiomata 60mm
- Wellington 56mm

162mm was recorded at the top of the Akatarawa Hill Rd.



River flows

River flows over the six month period were close to normal.

However there were large monthly variations. June and July had well above average flows while August flows were low. But October was very dry with river flows falling to around 30-40% of those normally expected.

Record mean temperatures:

July:
- Kelburn 3rd highest since 1927
- Wgtn Airport 3rd highest since 1962

Winter (JJA):
- Kelburn 3rd highest since 1927
- Wgtn Airport 4th highest since 1962

Cook Strait ferries cancelled

There were several instances during the cold season of cancelled ferry services due to adverse conditions. Forecast severe winds on 3-4 September and 12 October caused precautionary cancellations.

Want to look at the summary tables and graphs?

- Rainfall
- River flows

Te Awarua-o-Porirua climate summary

- **Total six month rainfall close to average**
- **Very wet June and july**
- **September rainfall as low as 40% of average at Plimmerton and Battle Hill**

June, July and September higher flows. October very low

River flow in the Porirua and Pauatahanui streams was 130% of average during June, July and September.

October turned very dry with the Pauatahanui and Horokiri streams falling to just 50% of normal over the month.

7 July heavy rain

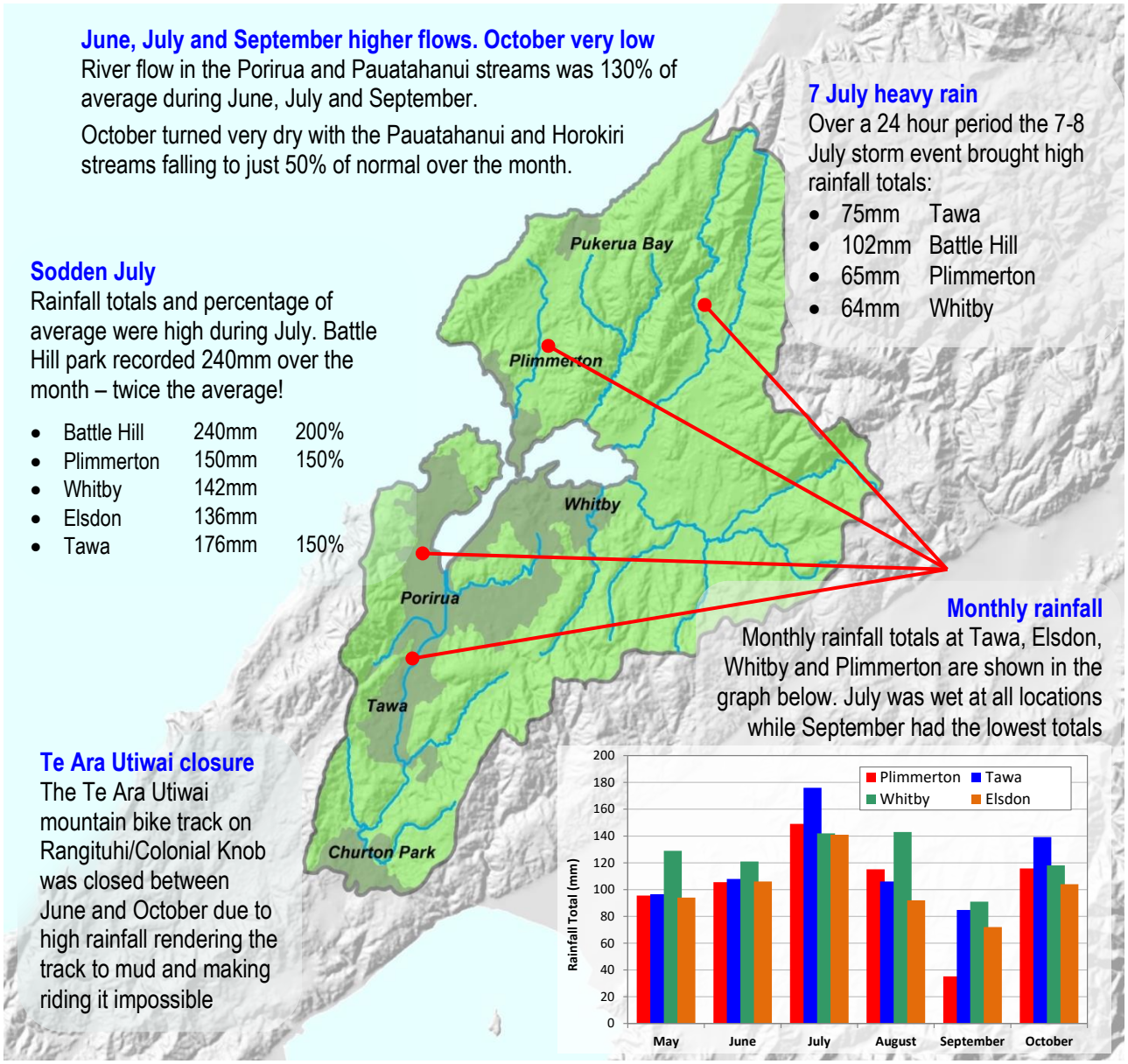
Over a 24 hour period the 7-8 July storm event brought high rainfall totals:

- 75mm Tawa
- 102mm Battle Hill
- 65mm Plimmerton
- 64mm Whitby

Sodden July

Rainfall totals and percentage of average were high during July. Battle Hill park recorded 240mm over the month – twice the average!

Battle Hill	240mm	200%
Plimmerton	150mm	150%
Whitby	142mm	
Elsdon	136mm	
Tawa	176mm	150%



Monthly rainfall

Monthly rainfall totals at Tawa, Elsdon, Whitby and Plimmerton are shown in the graph below. July was wet at all locations while September had the lowest totals

Te Ara Utiwai closure

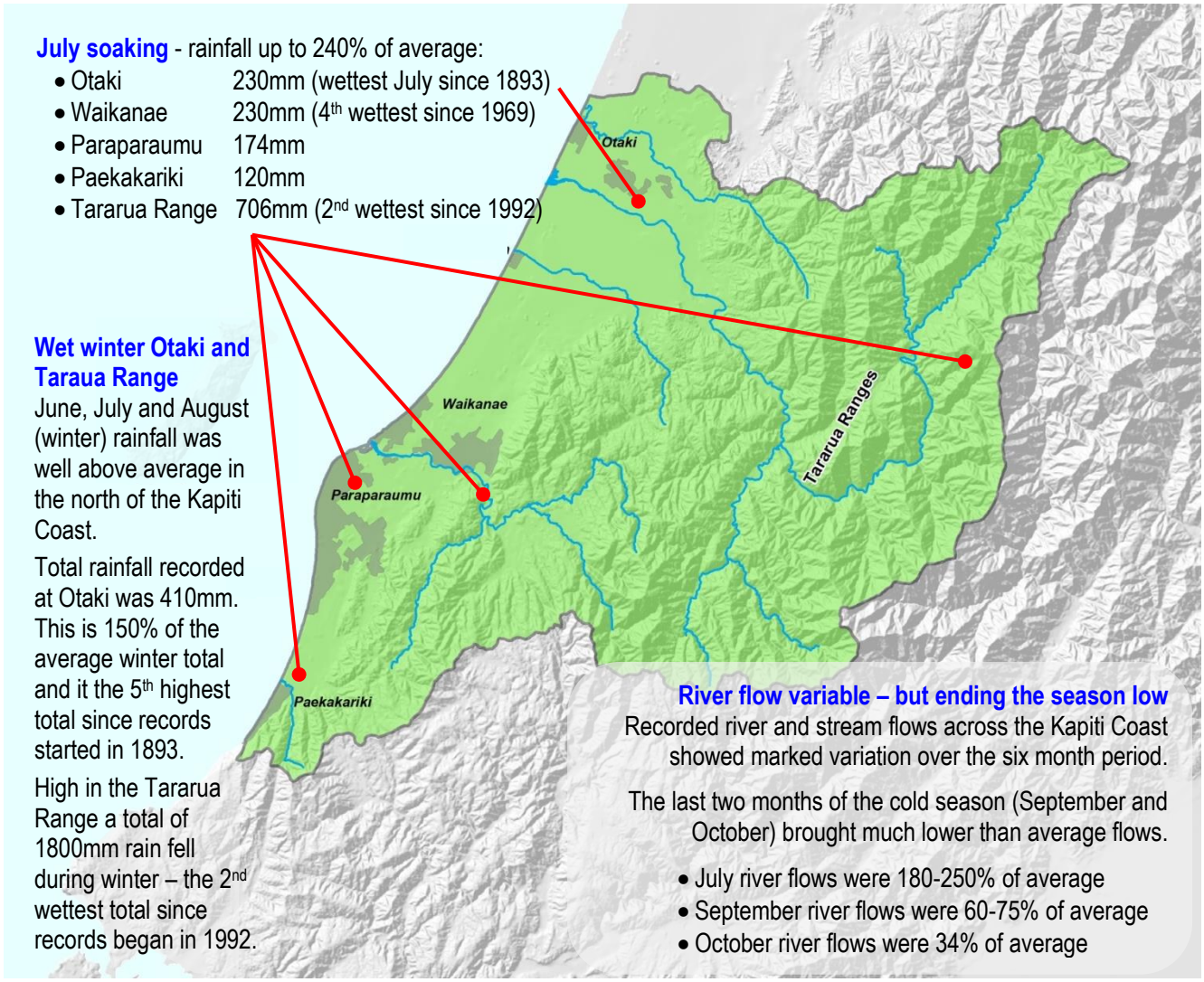
The Te Ara Utiwai mountain bike track on Rangituhi/Colonial Knob was closed between June and October due to high rainfall rendering the track to mud and making riding it impossible

Want to look at the summary tables and graphs?

- Rainfall
- River flows

Kāpiti Coast climate summary

- **Six month rainfall was slightly above average to the north and in the Tararua Range, average in Waikanae and Paraparaumu, and slightly below average to the south at Paekakariki**
- **July was vey wet – particularly in Otaki which had the highest July rainfall total since recording began in 1893**
- **River flows tended low at end of season and heading into the warmer months**



Want to look at the summary tables and graphs?

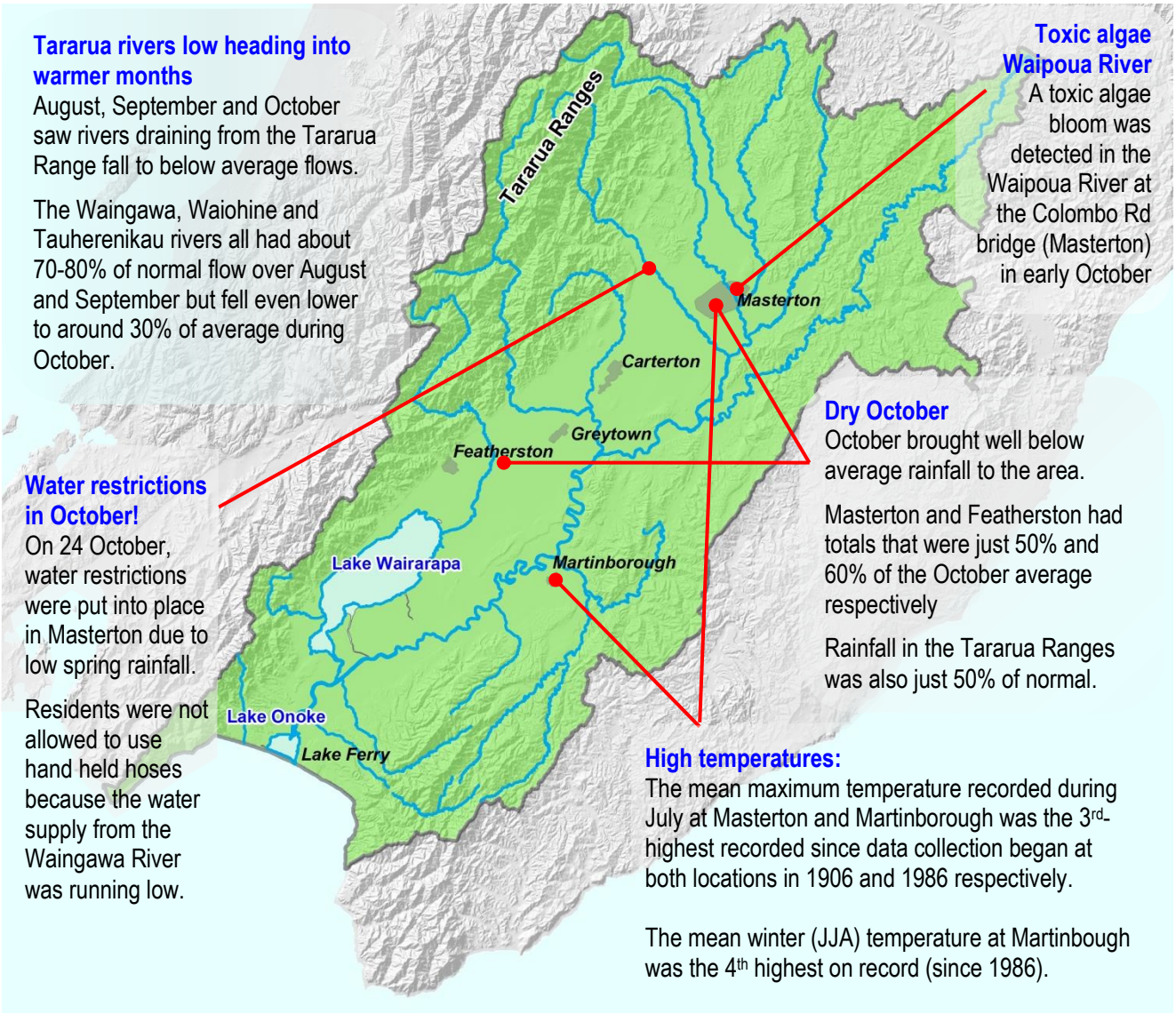
- Rainfall
- River flows

Ruamāhanga Valley climate summary

- **Six month rainfall slightly below average in main Ruamahanga valley, slightly above average to the east and around average in the Tararua Range.**
- **Monthly rainfall totals highly variable. October was very dry (50-60% of normal rainfall)**
- **Winter months warmer than normal**

Tararua rivers low heading into warmer months
August, September and October saw rivers draining from the Tararua Range fall to below average flows.

The Waingawa, Waiohine and Tauherenikau rivers all had about 70-80% of normal flow over August and September but fell even lower to around 30% of average during October.



Toxic algae Waipoua River
A toxic algae bloom was detected in the Waipoua River at the Colombo Rd bridge (Masterton) in early October

Dry October
October brought well below average rainfall to the area.

Masterton and Featherston had totals that were just 50% and 60% of the October average respectively

Rainfall in the Tararua Ranges was also just 50% of normal.

Water restrictions in October!
On 24 October, water restrictions were put into place in Masterton due to low spring rainfall.

Residents were not allowed to use hand held hoses because the water supply from the Waingawa River was running low.

High temperatures:
The mean maximum temperature recorded during July at Masterton and Martinborough was the 3rd-highest recorded since data collection began at both locations in 1906 and 1986 respectively.

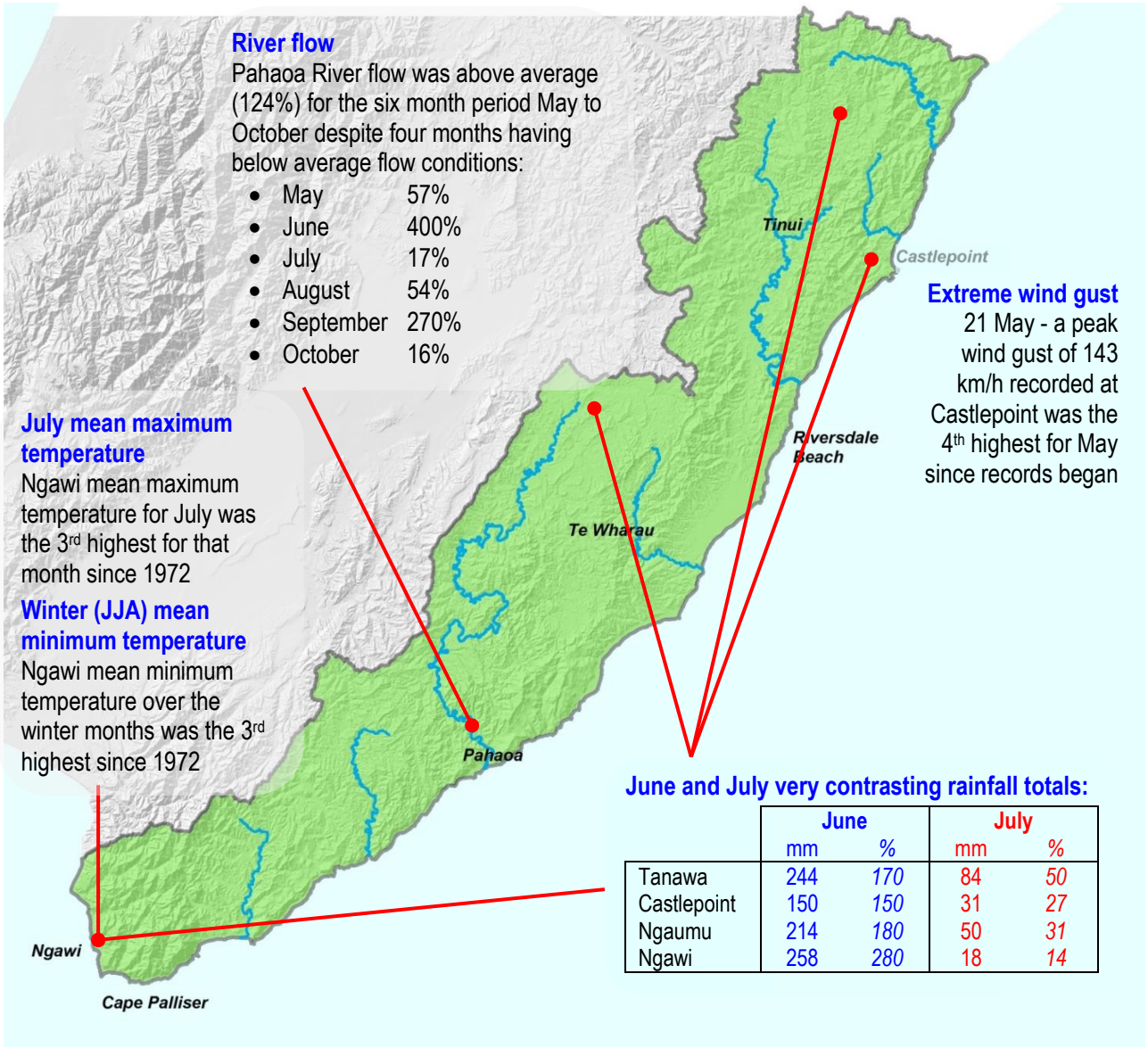
The mean winter (JJA) temperature at Martinbough was the 4th highest on record (since 1986).

Want to look at the summary tables and graphs?

- Rainfall
- River flows

Wairarapa Coast climate summary

- **Very low river flows in July and October**
- **Warm July**
- **Very wet June**



	June		July	
	mm	%	mm	%
Tanawa	244	170	84	50
Castlepoint	150	150	31	27
Ngaumu	214	180	50	31
Ngawi	258	280	18	14

Want to look at the summary tables and graphs?

- Rainfall
- Soil moisture

Rainfall statistics

Rainfall was variable over individual six months in the May to October period, but ended up largely around average.

Ruamāhanga and Wairarapa Coast whaitua had really variable conditions with some months such as June and September being very wet, and July and October being very dry.

Whaitua	Location	May %	Jun %	Jul %	Aug %	Sep %	Oct %	May-Oct (mm)	May-Oct %
Wellington Harbour & Hutt Valley Click to see cumulative rainfall plots	Kaitoke	104	156	124	88	99	54	1382	104
	Lower Hutt	116	154	127	98	141	99	897	122
	Wainuiomata	66	131	67	93	148	117	1188	101
	Karori	126	120	98	124	115	114	836	116
	Wellington	108	118	104	121	140	113	666	117
Te Awarua-o-Porirua Click to see cumulative rainfall plots	Battle Hill	88	125	196	111	44	94	841	108
	Whenua Tapu	97	100	150	120	38	110	616	102
	Tawa	86	92	153	98	105	114	711	104
Kāpiti Coast Click to see cumulative rainfall plots	Otaki	159	64	237	134	52	60	657	121
	Waikanae	102	67	189	102	55	70	686	98
	Paekakariki	82	93	83	93	40	111	607	83
	Tararua (Otaki headwaters)	109	147	149	98	89	69	3115	109
Ruamāhanga Click to see cumulative rainfall plots	Masterton	84	133	61	104	72	48	437	82
	Featherston	80	87	68	98	72	61	475	79
	Longbush	74	205	56	103	193	71	645	115
	Tararua (Waiohine headwaters)	114	116	151	90	74	51	2658	98
Wairarapa Coast Click to see cumulative rainfall plots	Tanawa Hut	91	172	49	94	171	65	826	105
	Ngaumu	63	188	31	70	109	43	516	83

Click the following links to return to climate summaries for:

- Wellington Harbour & Hutt Valley
- Te Awarua-o-Porirua
- Kāpiti Coast
- Ruamāhanga
- Wairarapa Coast

Cumulative rainfall plots

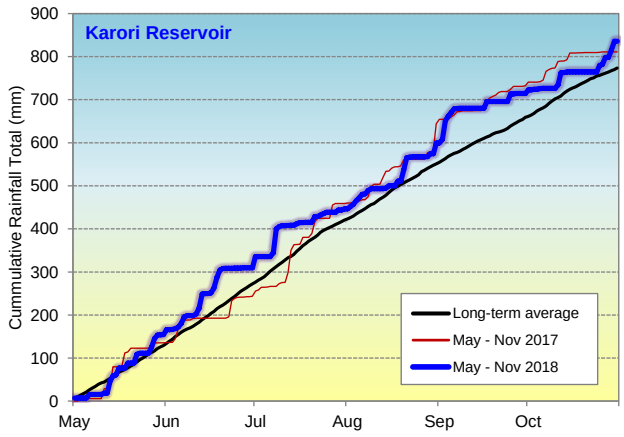
Cumulative rainfall totals for the May to October 2018 period are detailed for various rain gauges sites across the regional whaitua areas, as denoted by the blue trace on the following plots. The May to October 2017 period is denoted by the red trace and the black trace represents the long-term average rainfall accumulation.

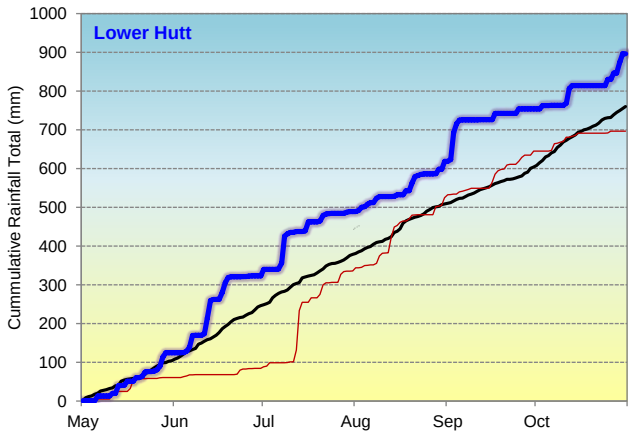
Wellington and Hutt Valley

The plots highlight that the rainfall accumulation during the May to October period was around average in Wellington and slightly above average in the Hutt Valley.

Periods of high rainfall accumulation are evident during June, July and September.

The total rainfall at Karori was similar to the previous year while Lower Hutt saw around 200mm more rainfall.

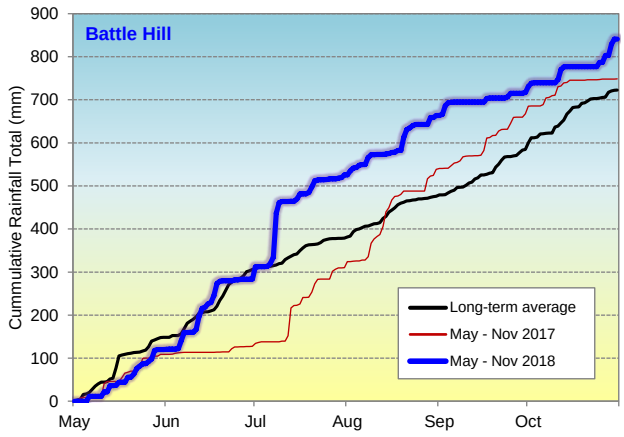


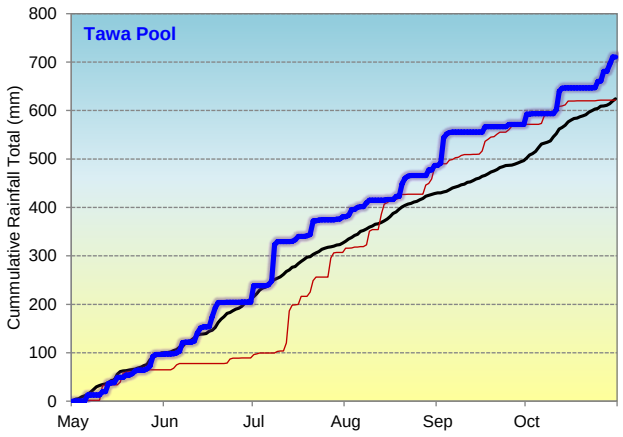


Porirua Harbour

The plots show that the rainfall accumulation evolution over the May to October period at the two sites within the Te Awarua-o-Porirua whaitua area were quite similar, with around average rainfall untilJuly before higher than normal totals brought the entire period above average.

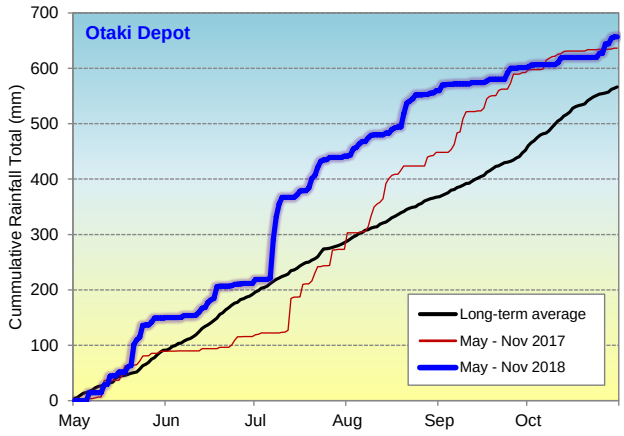
Rainfall for the period was around 15% greater than average.

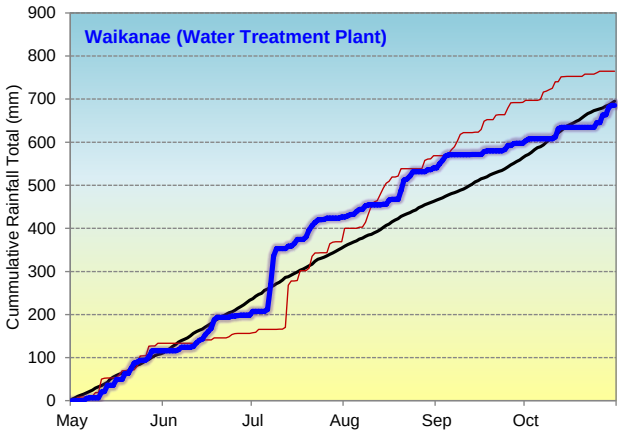




Kāpiti Coast

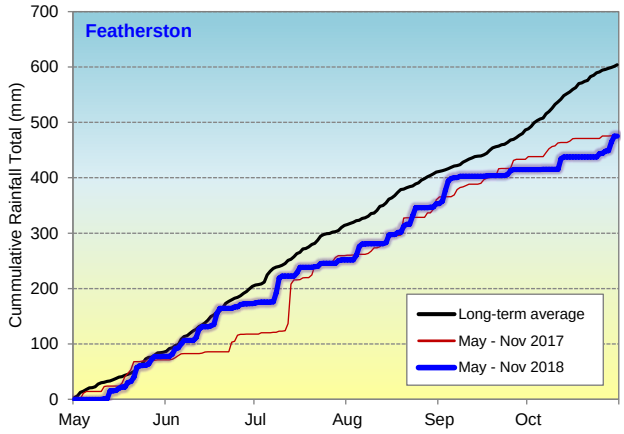
Rainfall recorded at Otaki was 100mm higher than average for the May to October period, and around the same as the previous year. July was exceptionally wet with the monthly total (230mm) being 240% of what is normally expected for the month.

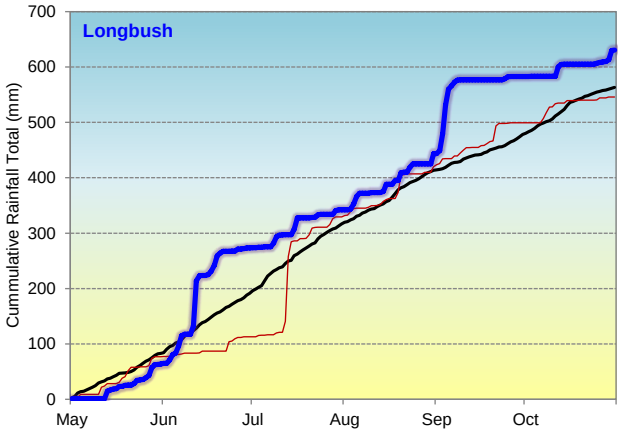




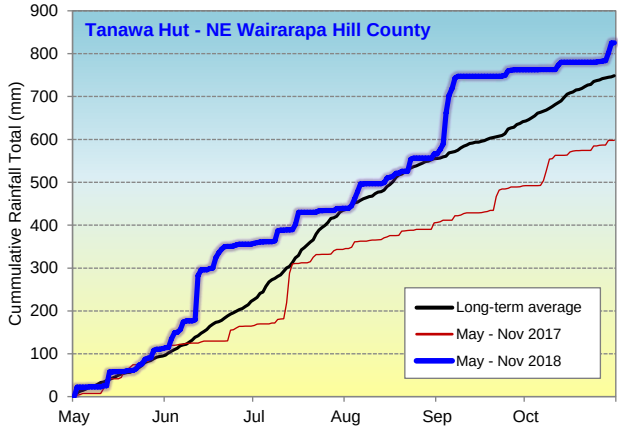
Ruamāhanga

Rainfall at Featherston ended up 130mm below average for the May to October period – very similar to 2017. In contrast, Longbush received a slightly above average total with two very wet periods in June and September evident.





Wairarapa Coast



The Tanawa Hut rain gauge in the Wairarapa Coast area showed a similar rainfall accumulation trend to the Longbush gauge (above) with the May to October total being around 10% higher than aevrage.

The total rainfall of 825mm is 230mm (or almost 40%) higher than that received for the same period in 2017.

River flows - averages

The average river flows over the entire May to October period were very close to normal. But as can be seen each individual month was quite variable with June and July having very high flows in most areas. August flows were below average but October flows were exceptionally low with some streams in the Ruamāhanga whaitua dipping down lower than 20% of normal.

		Flow as a percentage of average						
Whaitua	**River**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**May-Oct**
Wellington Harbour & Hutt Valley	Hutt River - Kaitoke	91	158	127	70	107	40	99
	Hutt River - Taita Gorge	79	178	141	69	105	34	100
	Akatarawa River	71	125	156	65	71	28	84
	Mangaroa River	70	225	89	55	117	28	92
	Waiwhetu Stream	82	156	105	94	150	77	110
	Wainuiomata River	61	169	83	80	179	43	100
Te Awarua-o-Porirua	Porirua	81	129	127	83	134	83	107
	Pauatahanui	73	133	142	104	133	57	110
	Horokiri	75	190	205	80	81	52	115
Kāpiti Coast	Waitohu	104	91	254	109	54	33	101
	Otaki	105	107	181	81	75	37	94
	Mangaone	117	78	205	95	60	36	94
	Waikanae	77	104	258	98	77	35	108
Ruamāhanga	Kopuaranga	142	142	84	57	135	15	92
	Waingawa	113	121	126	80	70	26	88
	Waiohine	101	134	127	78	79	32	90
	Mangatarere	88	142	90	81	88	14	82
	Tauherenikau	91	158	102	78	99	35	94
	Otukura	108	158	85	100	159	58	108
	Ruamāhanga	100	160	97	74	113	25	94
Wairarapa Coast	Pahaoa	57	400	17	54	270	16	124

Click the following links to return to climate summaries for:

- Wellington Harbour & Hutt Valley
- Te Awarua-o-Porirua
- Kāpiti Coast
- Ruamāhanga
- Wairarapa Coast

River flows – lowest

Minimum river and stream flows recorded during the May to October 2018 period. A number of flows recorded during October were record lows for that month.

Whaitua	River	Minimum Flow		
		Flow (m^3/s)	Date	Comment
Wellington Harbour & Hutt Valley	Hutt (Kaitoke)	1.653	22 October	*Lowest Oct flow on record (1967)*
	Hutt (Taita Gorge)	6.313	22 October	*Lowest Oct flow since 2001*
	Akatarawa	1.278	22 October	*Lowest Oct flow since 1989*
	Mangaroa	0.716	22 October	*Lowest Oct flow since 2001*
	Wainuiomata	0.122	9 May	
Te Awarua-o-Porirua	Porirua	0.278	8 May	
	Pauatahanui	0.358	7 October	
	Horokiri	0.209	7 May	
Kāpiti Coast	Waitohu	0.227	8 May	
	Otaki	0.292	8 May	
	Mangaone	5.24	22 October	
	Waikanae	0.141	8 October	
Ruamāhanga	Kopuaranga	1.623	22 October	
	Waingawa	0.441	22 October	*Lowest Oct flow since 2001*
	Waiohine	1.337	22 October	*Lowest Oct flow on record (1976)*
	Mangatarere	3.965	22 October	*Lowest Oct flow on record (1979)*
	Tauherenikau	0.18	22 October	*Lowest Oct flow on record (1999)*
	Otukura	1.74	22 October	*Lowest Oct flow since 1985*
	Ruamāhanga (Upper)	0.284	9 May	
	Ruamāhanga (Lower)	3.013	22 October	*Lowest Oct flow on record (1977)*
Wairarapa Coast	Pahaoa	13.415	22 October	*Lowest Oct flow on record (1976)*

** Analyses have been completed on provisional data which may be subject to change once it is processed and archived.*

Click the following links to return to climate summaries for:

- Wellington Harbour & Hutt Valley
- Te Awarua-o-Porirua
- Kāpiti Coast
- Ruamāhanga
- Wairarapa Coast

River flows – highest

Maximum river and stream flows recorded during the May to October 2018 period. The estimated return period is given for each event.

Whaitua	River	Maximum Flow		
		Flow (m^3/s)	Date	Return Period (years)
Wellington Harbour & Hutt Valley	Hutt (Kaitoke)	237	12 June	1
	Hutt(Taita Gorge)	715	12 June	1
	Akatarawa	167	8 July	1
	Mangaroa	144	12 June	3
	Waiwhetu	10	8 July	1
	Wainuiomata	25	12 June	1
Te Awarua-o-Porirua	Porirua	40	8 July	3
	Pauatahanui	26	8 July	1
	Horokiri	27	8 July	2
Kāpiti Coast	Otaki	31	8 July	1
	Mangaone	613	7 July	1
	Waikanae	10	7 July	1
Ruamāhanga	Kopuaranga	184	8 July	3
	Waingawa	33	5 September	1
	Waiohine	153	12 June	1
	Mangatarere	517	12 June	1
	Tauherenikau	33	12 June	1
	Otukura	295	12 June	2
	Ruamāhanga (Upper)	6	4 September	1
	Ruamāhanga (Lower)	355	12 June	1
Wairarapa Coast	Pahaoa	1012	13 June	1

** Analyses have been completed on provisional data which may be subject to change once it is processed and archived.*

Click the following links to return to climate summaries for:

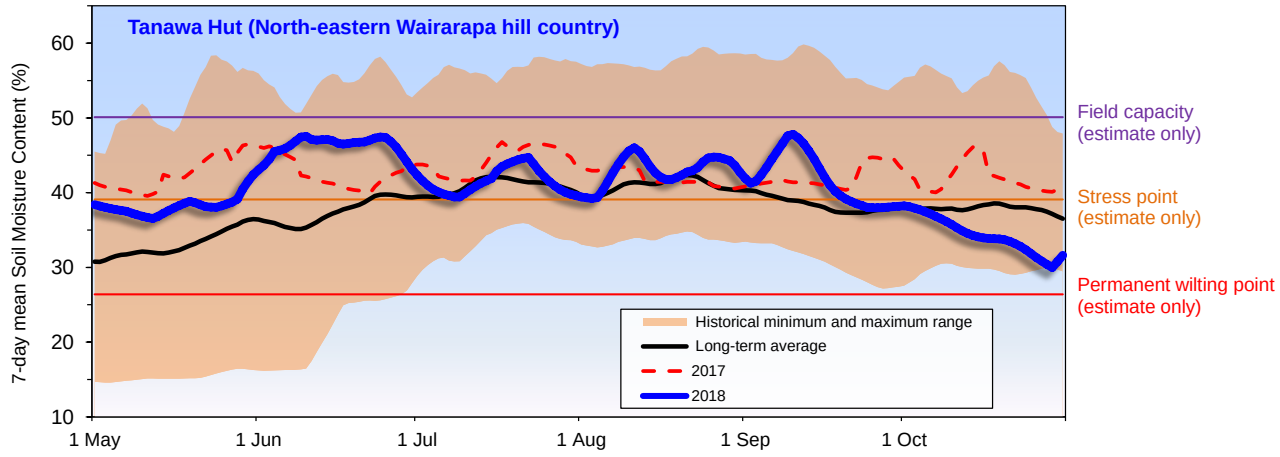
- Wellington Harbour & Hutt Valley
- Te Awarua-o-Porirua
- Kāpiti Coast
- Ruamāhanga
- Wairarapa Coast

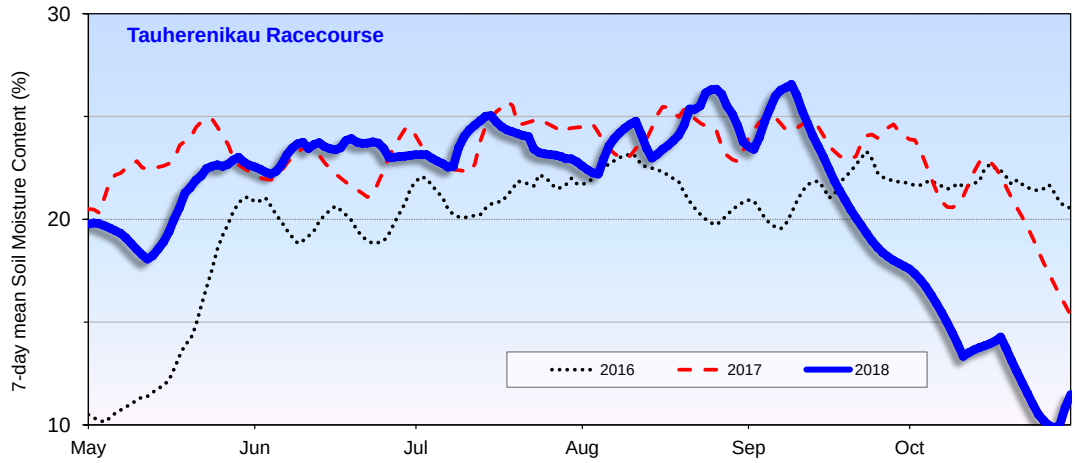
Soil moisture content

Wairarapa Coast

May to October 2018 soil moisture content at monitoring sites at Tanawa Hut in north-east Wairarapa (Wairarapa Coast whaitua) and Tauherenikau racecourse (Ruamāhanga whaitua) are plotted below.

Soil moisture at Tanawa Hutt started the period slightly higher than average and continued to show average characteristics until October when low rainfall and and warmer conditions contributed to it dropping to relatively low levels for that time of the year.





Drought monitoring

GWRC maintains a drought check webpage with regional anomaly maps and links to live data across the region:

http://www.gwrc.govt.nz/drought-check/

Climate Briefings

Additionally to the extended water resources reports, the Environmental Science department, GWRC, also produces seasonal updates specifically targeting the farming community. Those can be accessed from the main Climate and Water Resource webpage:

http://www.gw.govt.nz/seasonal-climate-and-water-resource-summaries-2/

Environmental data

GWRC maintains a comprehensive online environmental data server feeding real time, live data across the region for several climatic and hydrological variables

http://graphs.gw.govt.nz

Interactive Climate Change Mapping

The Environmental Science department at GWRC has produced one of the first comprehensive climate change mapping tools publicly available in New Zealand. The online mapping tool is fully interactive and easy to understand, allowing users to plot over twenty different variables, projected over every available IPCC scenario for both mid and late century

https://mapping1.gw.govt.nz/gw/ClimateChange/

The Greater Wellington Regional Council's purpose is to enrich life in the Wellington Region by building resilient, connected and prosperous communities, protecting and enhancing our natural assets, and inspiring pride in what makes us unique

For more information contact the Greater Wellington Regional Council:

Wellington office
PO Box 11646
Manners Street
Wellington 6142

04 384 5708

Upper Hutt office
PO Box 40847
Upper Hutt 5018

04 526 4133

Masterton office
PO Box 41
Masterton 5840

06 378 2484

Follow the Wellington Regional Council

info@gw.govt.nz
www.gw.govt.nz