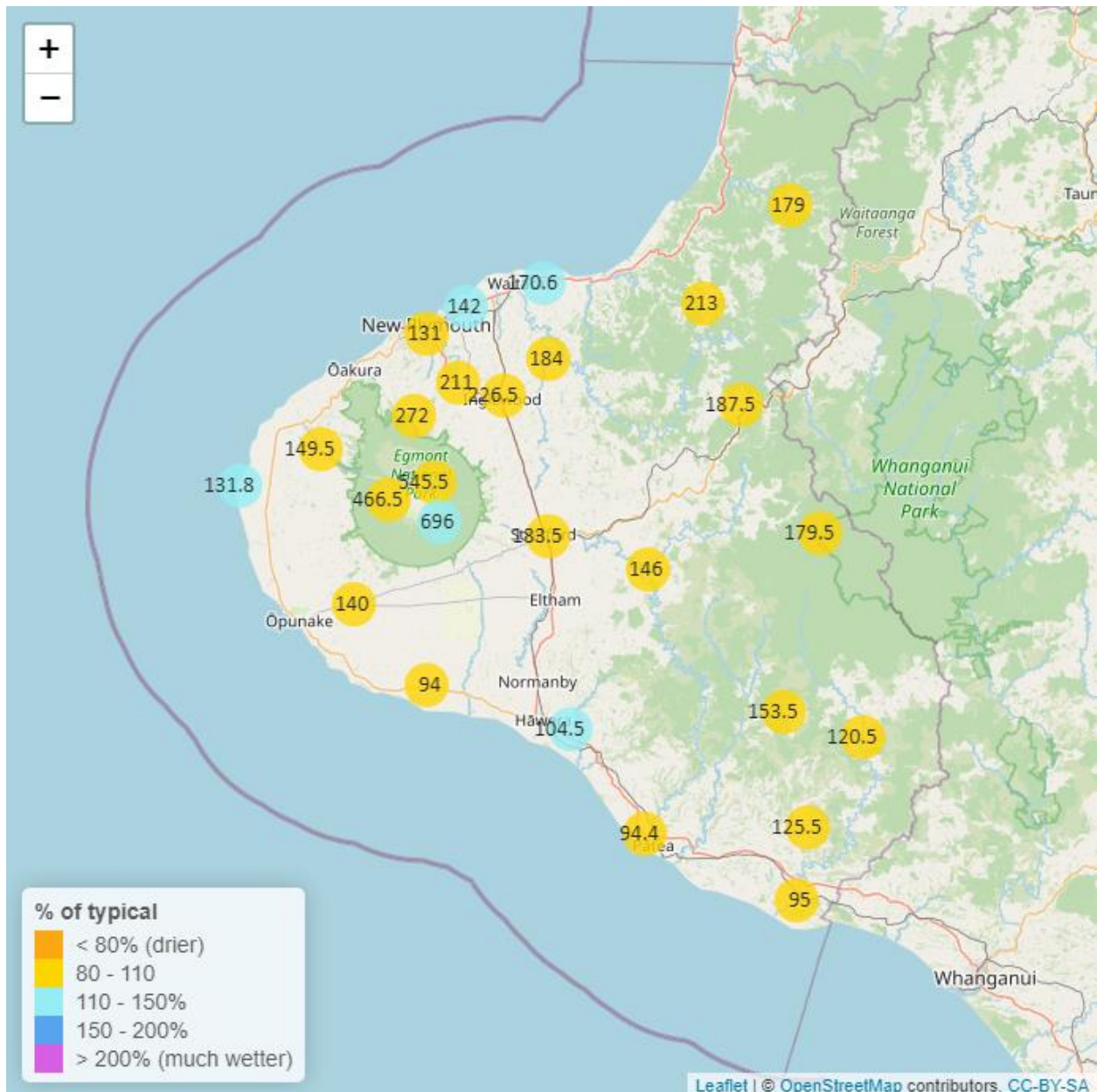


# Taranaki Regional Council Monthly Rainfall and Environmental Data Report for September 2023

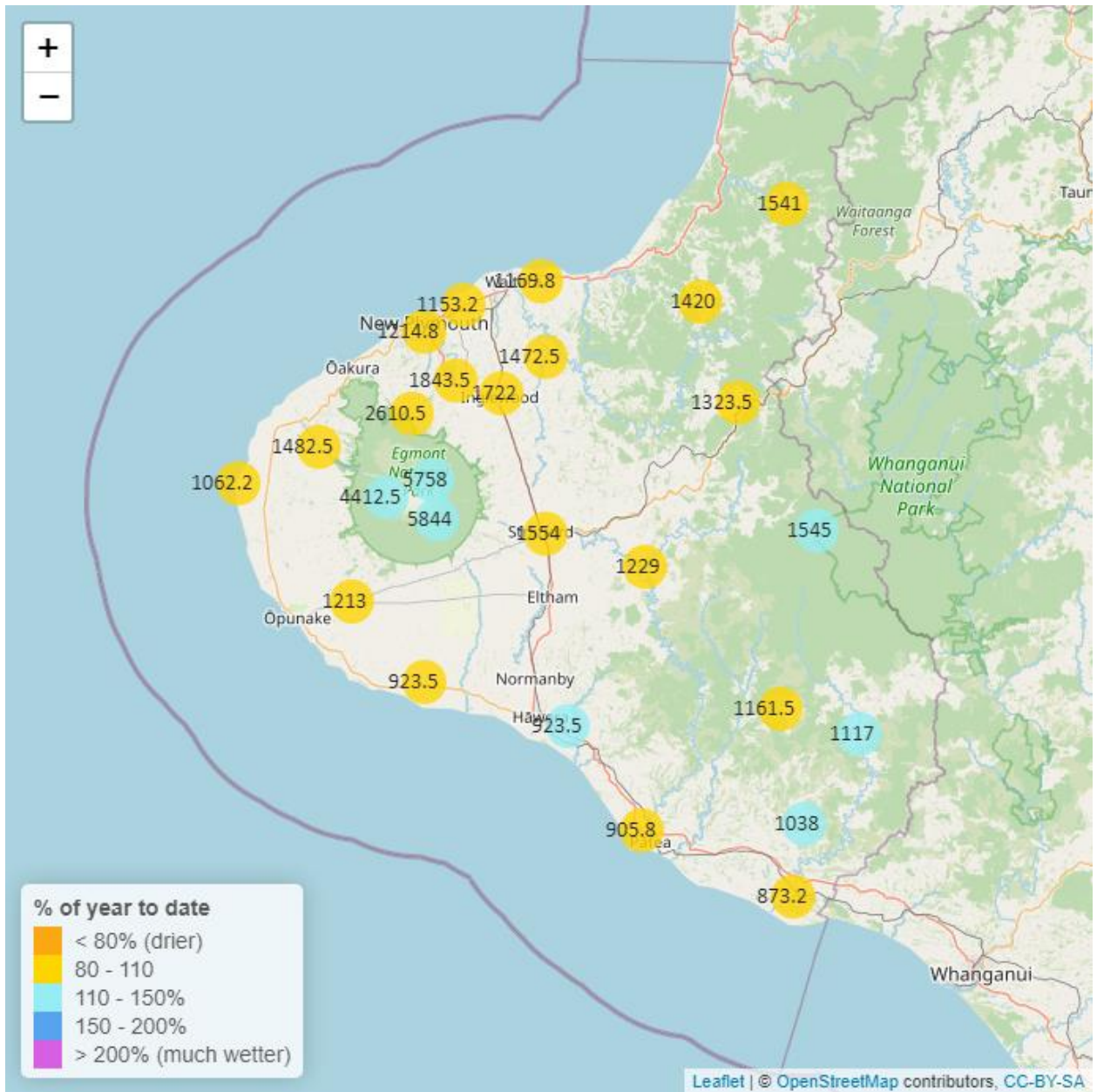
Note: The data presented here are provisional data only and may change as a result of quality control at a later date.

## 1. Rainfall

Map 1: September total rainfall (mm) and percentage of long-term mean (colour key).



Map1a. Total rainfall 1 January to end September (mm) and percentage of long-term mean (colour key).



**Table 1: Rainfall September and year to date totals for rain gauge sites in Taranaki.**

Rain gauge	September			Year to Date			Records Began
	# days with rain	Total rain (mm)	% of typical month	Total to date (mm)	% of typical year to date	% of typical full year	
North Egmont at Visitors Centre	20	545.5	83.5	5758.0	112.7	83.0	1991
Dawson Falls	19	696.0	125.4	5844.0	128.2	98.3	1933
Kapoaiaia at Kahui Hut	23	466.5	94.5	4412.5	112.4	84.1	2006
Mangorei Upper at Forest Hill	20	272.0	100.1	2610.5	94.2	68.6	2018
Waiwhakaiho at Hillsborough	14	169.0	112.0	1344.0	95.1	73.4	2013
Brooklands Zoo at New Plymouth	18	131.0	103.7	1214.8	96.1	75.1	2012
Mangati at SH3	17	142.0	110.3	1153.2	96.3	74.4	2013
Motunui M39 at Weston W3	16	170.6	129.5	1169.8	98.6	74.3	1999
Waiwhakaiho at Egmont Village	17	211.0	102.5	1843.5	104.3	76.0	1991
Manganui at Everett Park	17	184.0	105.0	1472.5	97.0	70.9	1987
Inglewood at Oxidation Ponds	19	226.5	105.6	1722.0	100.1	73.1	2000
Stony at Mangatete Bridge	15	149.5	92.3	1482.5	99.3	73.8	2004
Kapoaiaia at Lighthouse	16	131.8	116.8	1062.2	99.6	76.4	1930
Taungatara at Eltham Rd	16	140.0	97.9	1213.0	102.8	76.5	2005
Kaupokonui at Glenn Rd	16	94.0	92.1	923.5	106.2	78.8	1998
Patea at Stratford	17	183.5	99.2	1554.0	102.4	78.1	1999
Mangaehu at Bridge	15	146.0	102.9	1229.0	103.2	77.1	1999
Kotare at OSullivans	17	179.0	85.2	1541.0	99.7	71.4	1998
Uruti at Kaka Rd	16	213.0	104.3	1420.0	89.0	63.5	1991
Pohokura Saddle	15	187.5	98.3	1323.5	91.5	66.3	1991
Omaru at Charlies	17	179.5	106.1	1545.0	112.8	85.0	2006

Rain gauge	September			Year to Date			Records Began
	# days with rain	Total rain (mm)	% of typical month	Total to date (mm)	% of typical year to date	% of typical full year	
Omahine at Moana Trig	16	153.5	95.1	1161.5	90.9	68.2	2007
Waitotara at Rimunui Station	13	120.5	93.8	1117.0	110.9	81.0	1994
Waitotara at Ngutuwera	14	125.5	106.3	1038.0	110.4	80.7	1999
Tawhiti at Duffys	13	104.5	117.3	923.5	114.5	83.4	1994
Patea at Bore 3	16	94.4	98.6	905.8	103.3	76.4	2006
Waitotara at Hawken Rd	13	95.0	91.3	873.2	95.1	72.4	2016

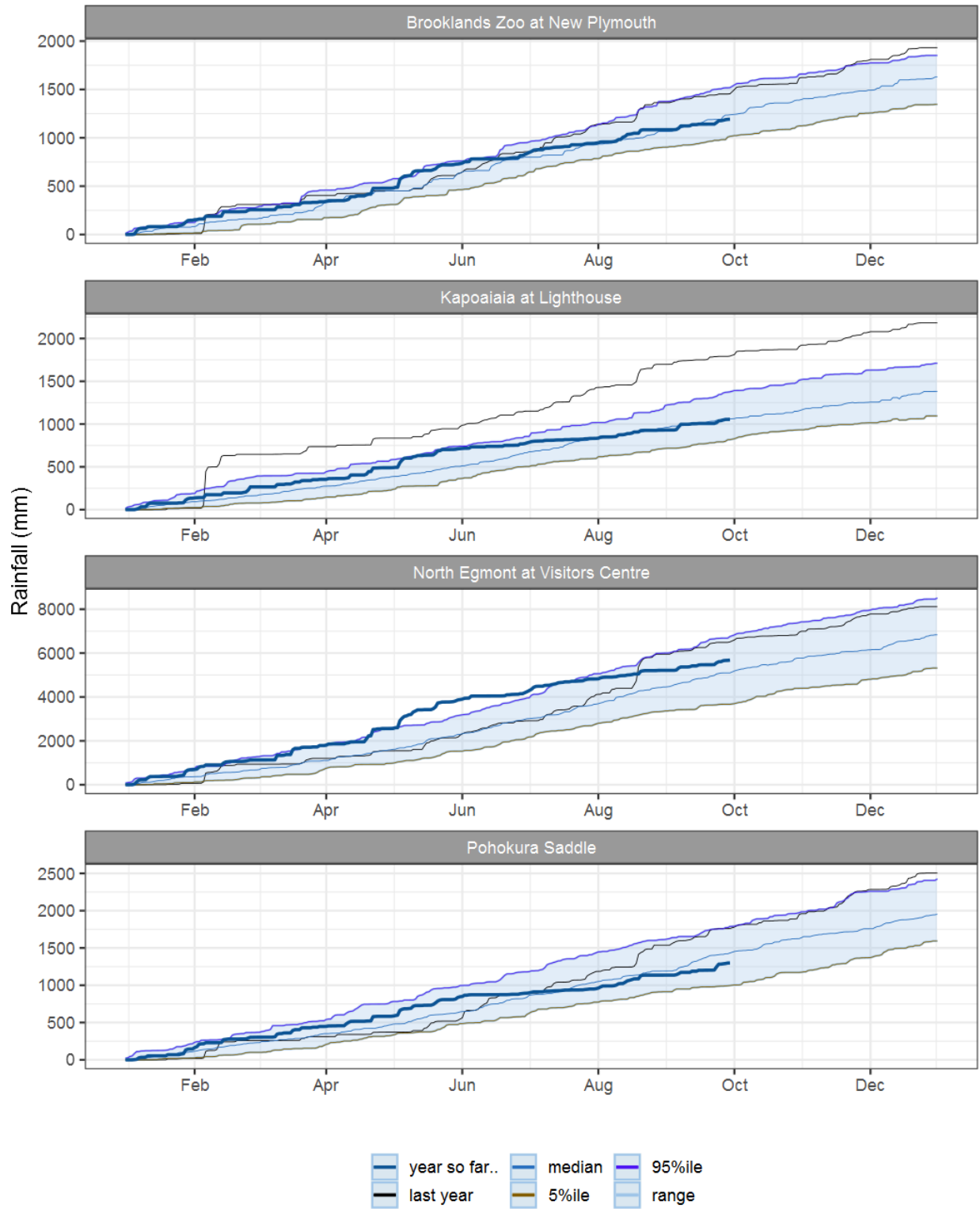


Figure 1.1: This year's and last year's data set in context of historic record at selected rain gauge sites in Taranaki.

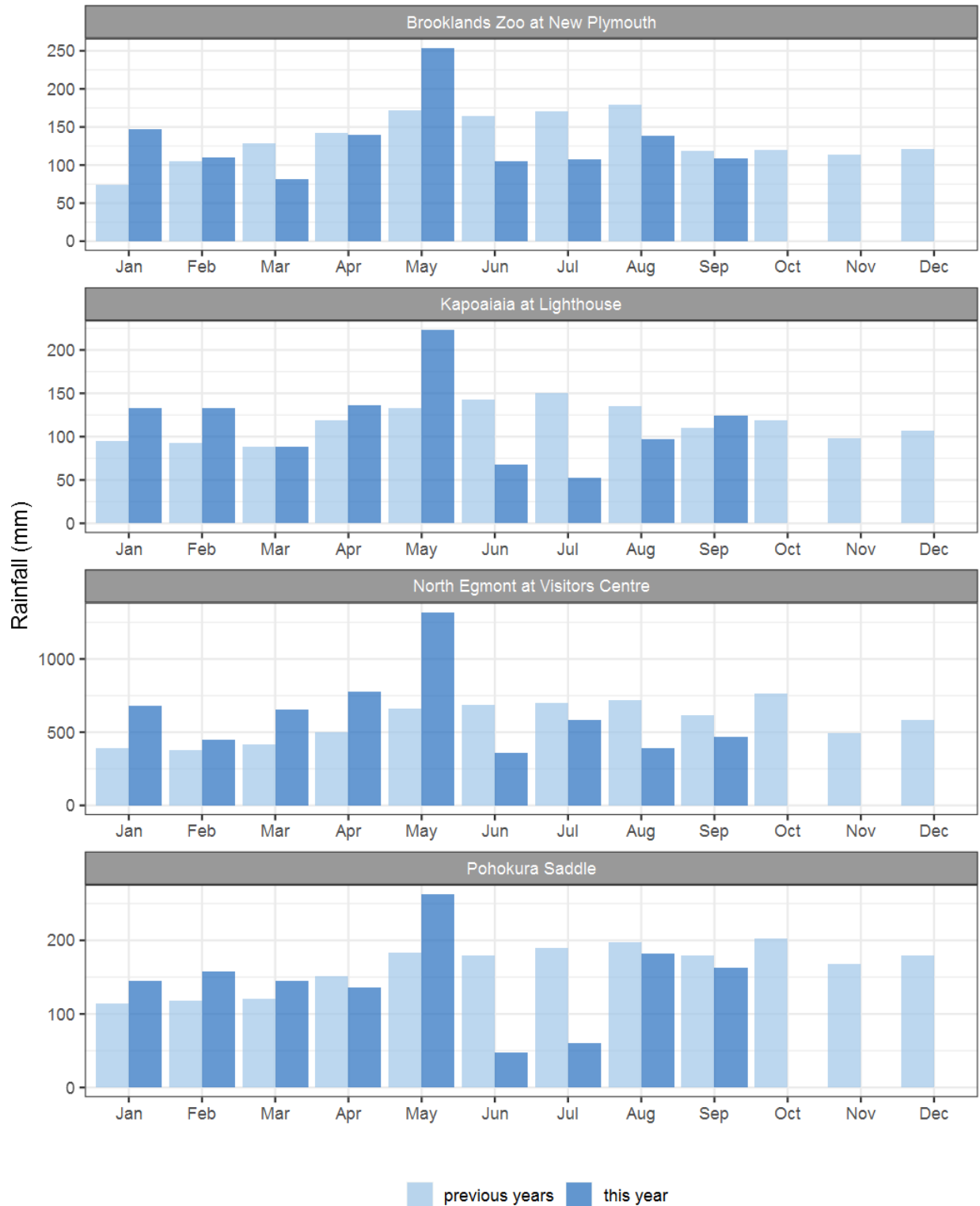


Figure 1.2: Monthly rainfall totals for this month and the mean of all previously recorded months.



## 2. River Flow

Map 2: September mean river flows (m3/sec), with difference as percentage of long-term mean.

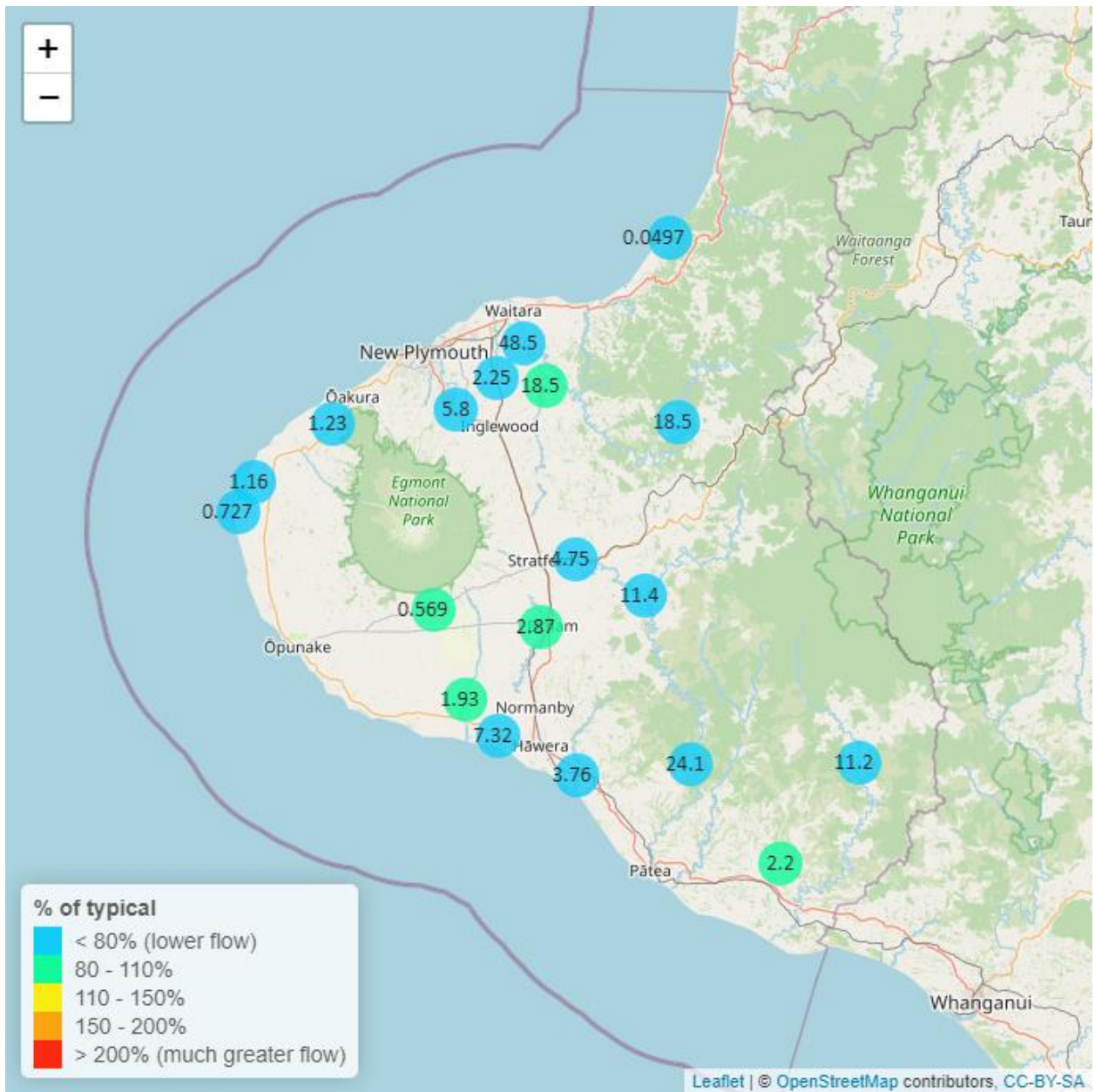


Table 2: Summary of high, low and mean flow for September and for September in all preceding years of record.

September 2023 - Recorded flows (m3/sec)								
River and Site	Highs		Lows		Mean		September maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	2.59	3.66	0.21	0.44	0.73	1.34	8.03	37

September 2023 - Recorded flows (m3/sec)								
River and Site	Highs		Lows		Mean		September maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapuni at Normanby Rd	4.65	4.72	1.09	0.98	1.93	2.36	10.20	24
Mangaehu at Bridge	31.10	47.10	3.66	4.29	11.40	16.10	129.00	44
Manganui at Everett Park	59.00	68.60	6.72	5.32	18.50	22.40	250.00	32
Mangaoraka at Corbett Rd	3.93	5.57	0.89	0.64	1.96	2.31	33.00	48
Mangawheroiti Above Intake W.W	1.29	1.23	0.31	0.24	0.57	0.55	4.05	10
Mangorei at Pipebridge	6.87	8.03	0.59	0.65	2.08	2.99	84.30	14
Moumahaki at Johnston Rd	8.80	7.39	0.69	0.91	2.20	2.64	20.50	5
Patea at McColls Bridge	68.40	73.80	4.43	3.28	24.10	36.40	105.00	34
Patea at Skinner Rd	13.90	15.30	1.89	1.85	4.75	6.08	53.20	45
Tangahoe below Railway Bridge	9.23	12.20	1.35	3.05	3.76	6.20	45.30	5
Tawhiti at Duffys	2.06	2.20	0.83	0.48	1.11	1.12	2.85	38
Tawhiti below Meat Plant	1.11	1.61	0.72	0.51	0.89	1.03	1.64	12
Timaru at Tataraimaka	3.54	5.39	0.47	0.53	1.23	1.91	33.40	10
Waikaramarama at Bridge	0.13	0.56	0.01	0.03	0.05	0.17	1.80	6
Waingongoro at Eltham Rd	9.17	8.31	1.13	1.17	2.87	3.56	23.10	48
Waingongoro at SH45	17.00	20.10	3.81	4.14	7.32	9.82	40.00	42
Waiongana at SH3a	5.12	8.42	0.84	0.73	2.25	3.05	49.00	42
Waitara at Bertrand Rd	162.00	220.00	14.30	14.40	48.50	68.90	436.00	43
Waitara at Purangi Bridge	70.80	112.00	2.43	1.84	18.50	28.40	230.00	24
Waitotara at Rimunui Station	24.60	54.20	4.74	5.64	11.20	19.10	171.00	18
Waiwhakaiho at Egmont Village	18.90	26.10	2.38	2.65	5.80	8.89	97.70	43
Warea at Coast	2.62	3.95	0.59	0.60	1.16	1.54	7.99	6
Weraweraonga at 749 Mangawhio Rd	5.33	7.45	0.27	0.47	1.18	2.21	19.20	6



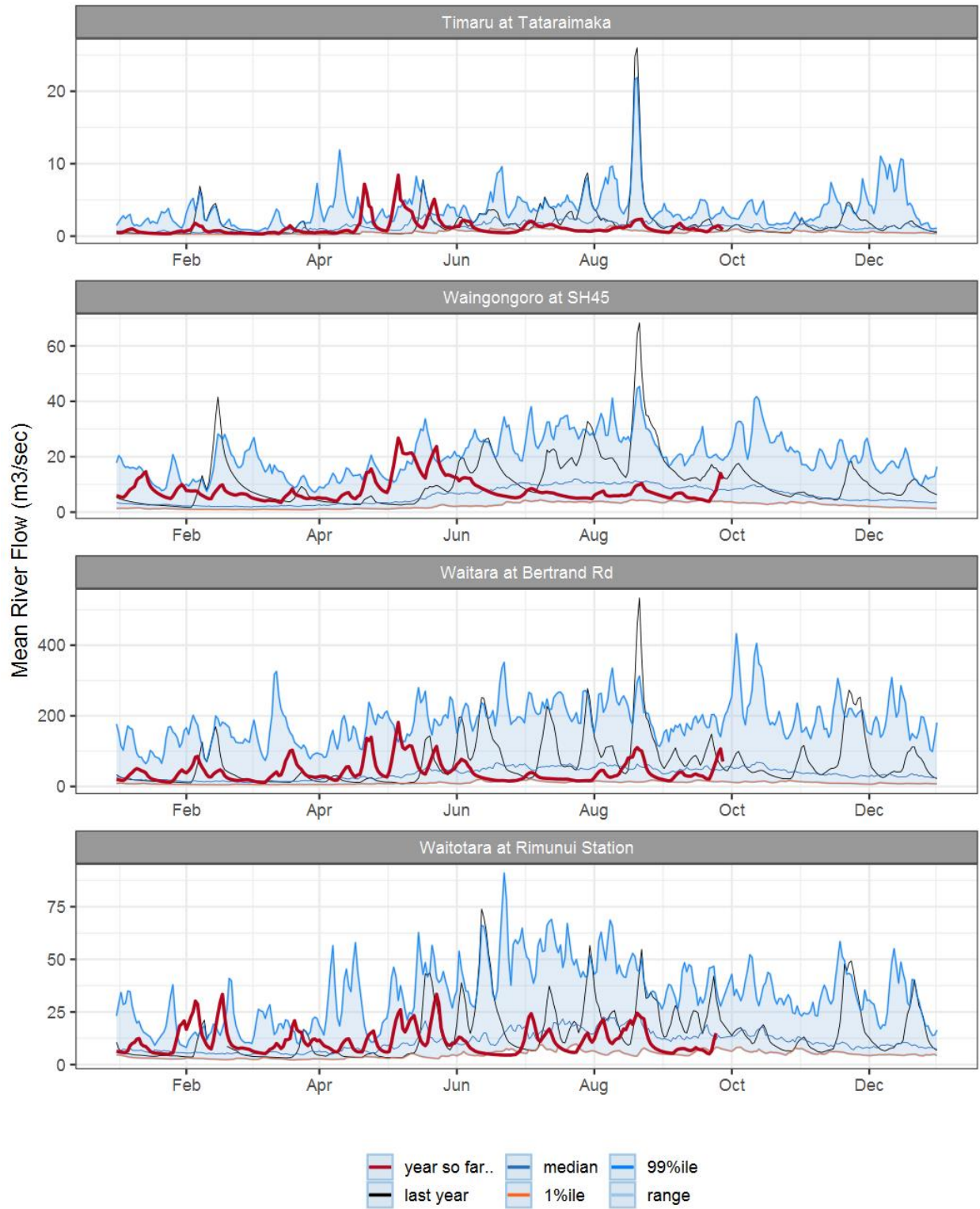


Figure 2.1: Running average river flows for selected sites, set in context of the historic record.

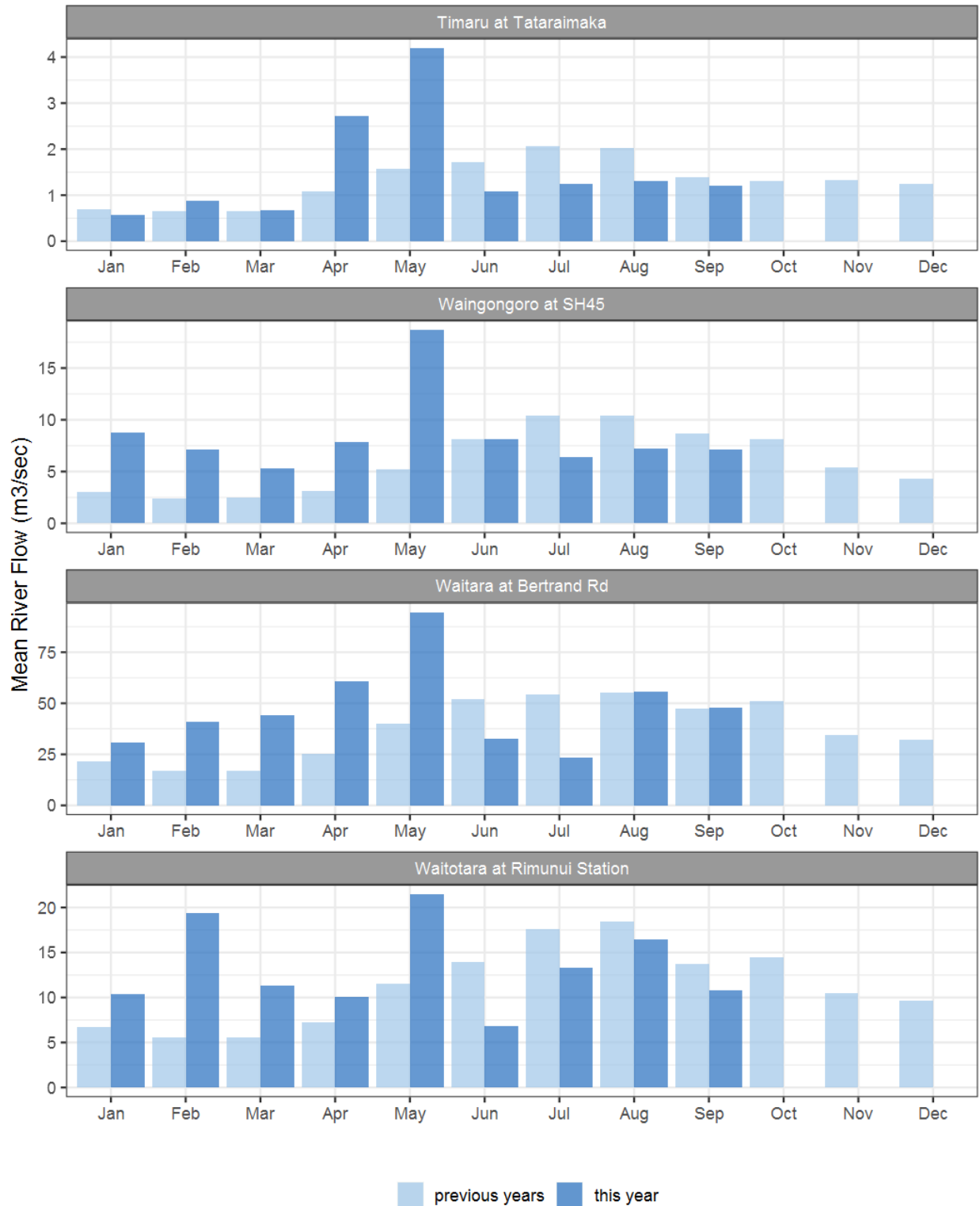
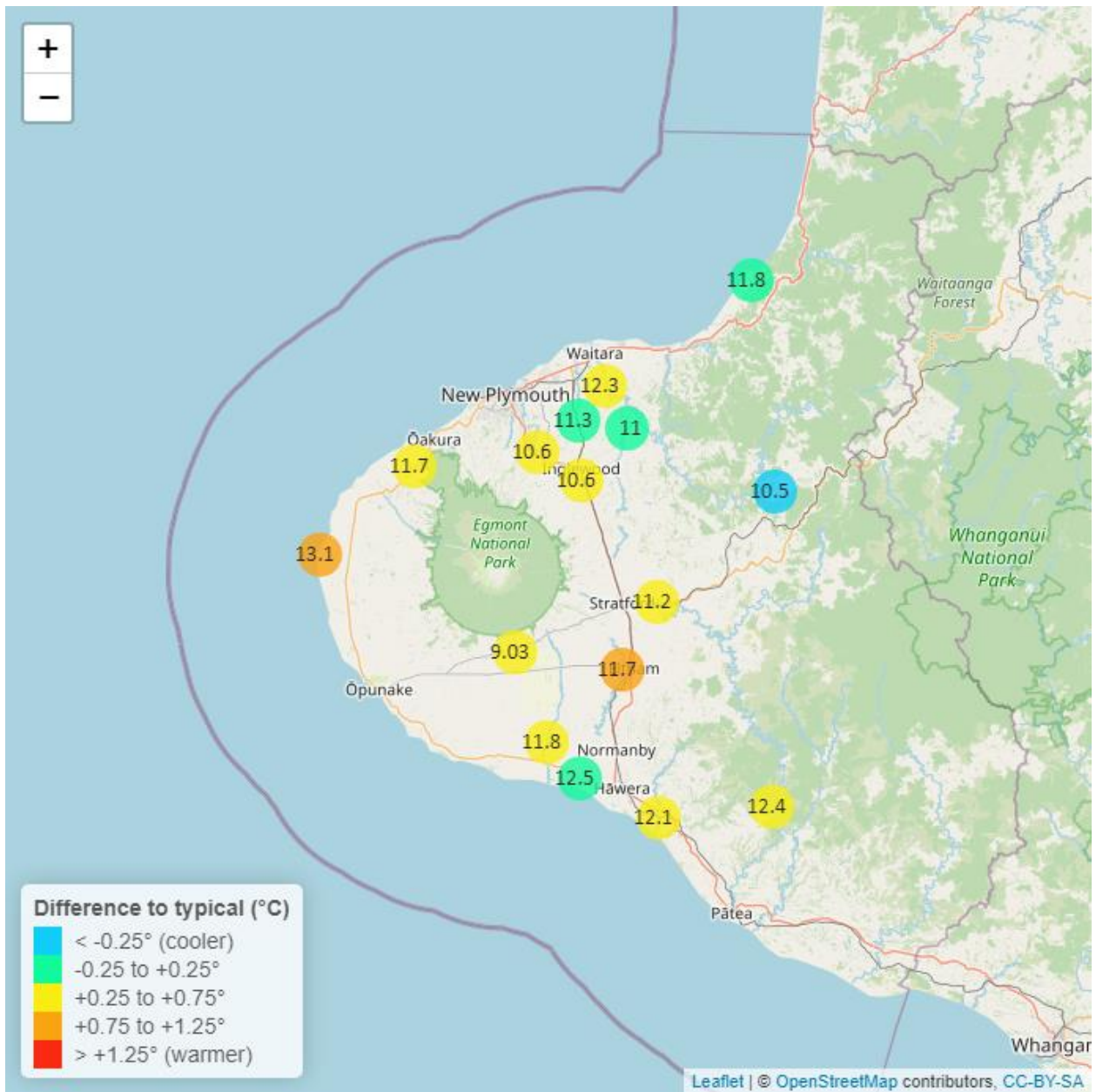


Figure 2.2: Monthly mean river flow for this month and the mean of all previously recorded months.

### 3. River Temperature

Map 3: September mean water temperature with difference to long-term mean (°C).



**Table 3: Summary of high, low and mean river temperature for September and for September in all preceding years of record.**

September 2023 - River Temperatures (°C)								
Monitoring Site	Highs		Lows		Mean		September maximum	data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	15.6	15.1	10.80	9.43	13.10	12.30	17.6	25
Kapuni at Normanby Rd	14.7	14.3	9.47	8.55	11.80	11.20	17.2	24
Manganui at Everett Park	13.4	13.2	8.34	9.04	11.00	11.20	14.5	15
Mangaoraka at Corbett Rd	14.9	14.4	10.20	10.00	12.70	12.30	16.6	19
Mangawheroiti Above Intake W.W	10.6	10.4	7.55	7.01	9.03	8.71	11.7	10
Mangorei at Pipebridge	14.0	13.5	9.31	8.97	11.60	11.20	15.6	8
Matau at Woolshed	12.7	13.0	7.38	8.59	10.50	10.80	14.7	6
Ngatoro at SH3	12.8	12.5	8.40	7.83	10.60	10.20	14.1	22
Patea at McColls Bridge	14.4	13.2	10.80	10.30	12.40	11.70	15.4	9
Patea at Skinner Rd	13.4	13.1	8.78	8.60	11.20	10.80	15.1	19
Tangahoe below Railway Bridge	14.4	13.7	9.34	9.62	12.10	11.50	15.8	5
Tawhiti at Duffys	13.1	14.4	10.20	10.00	11.70	12.20	13.6	19
Tawhiti below Meat Plant	14.2	14.3	10.50	9.62	12.40	12.00	15.3	25
Timaru at Tataraimaka	13.6	13.3	9.61	8.91	11.70	11.20	14.9	9
Waikaramarama at Bridge	13.6	13.4	9.60	9.59	11.80	11.60	14.4	6
Waingongoro at Eltham Rd	14.0	12.9	9.40	8.76	11.70	10.80	15.9	18
Waingongoro at SH45	14.9	16.4	10.30	10.00	12.50	12.50	16.5	18
Waiongana at SH3a	13.5	13.3	8.97	8.90	11.30	11.10	15.2	12
Waitara at Bertrand Rd	14.5	14.1	9.73	10.00	12.30	11.90	15.6	34
Waiwhakaiho at Egmont Village	12.7	12.4	8.45	7.61	10.60	9.98	14.1	34

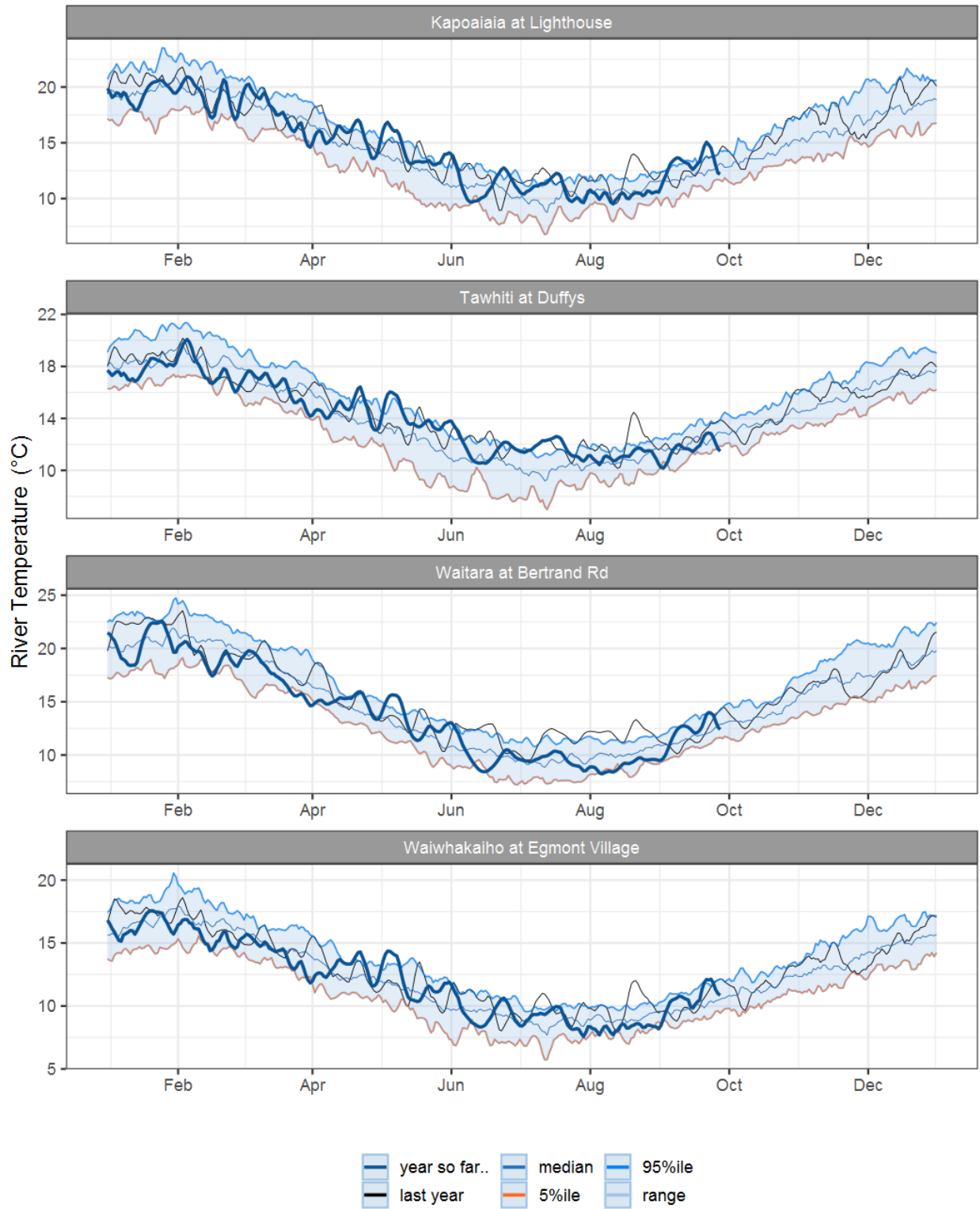


Figure 3.1: Running average river temperature for selected sites, set in context of the historic record.

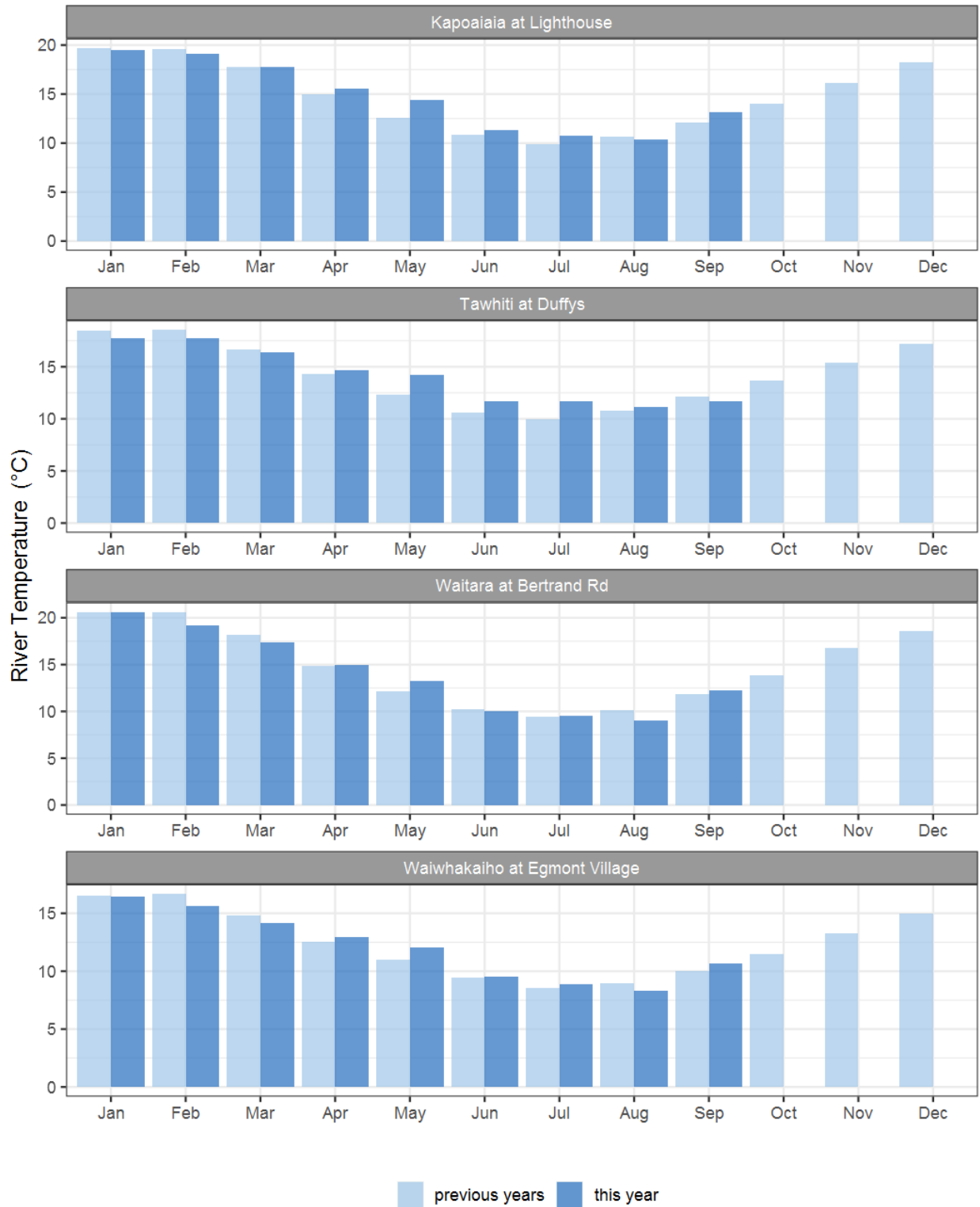
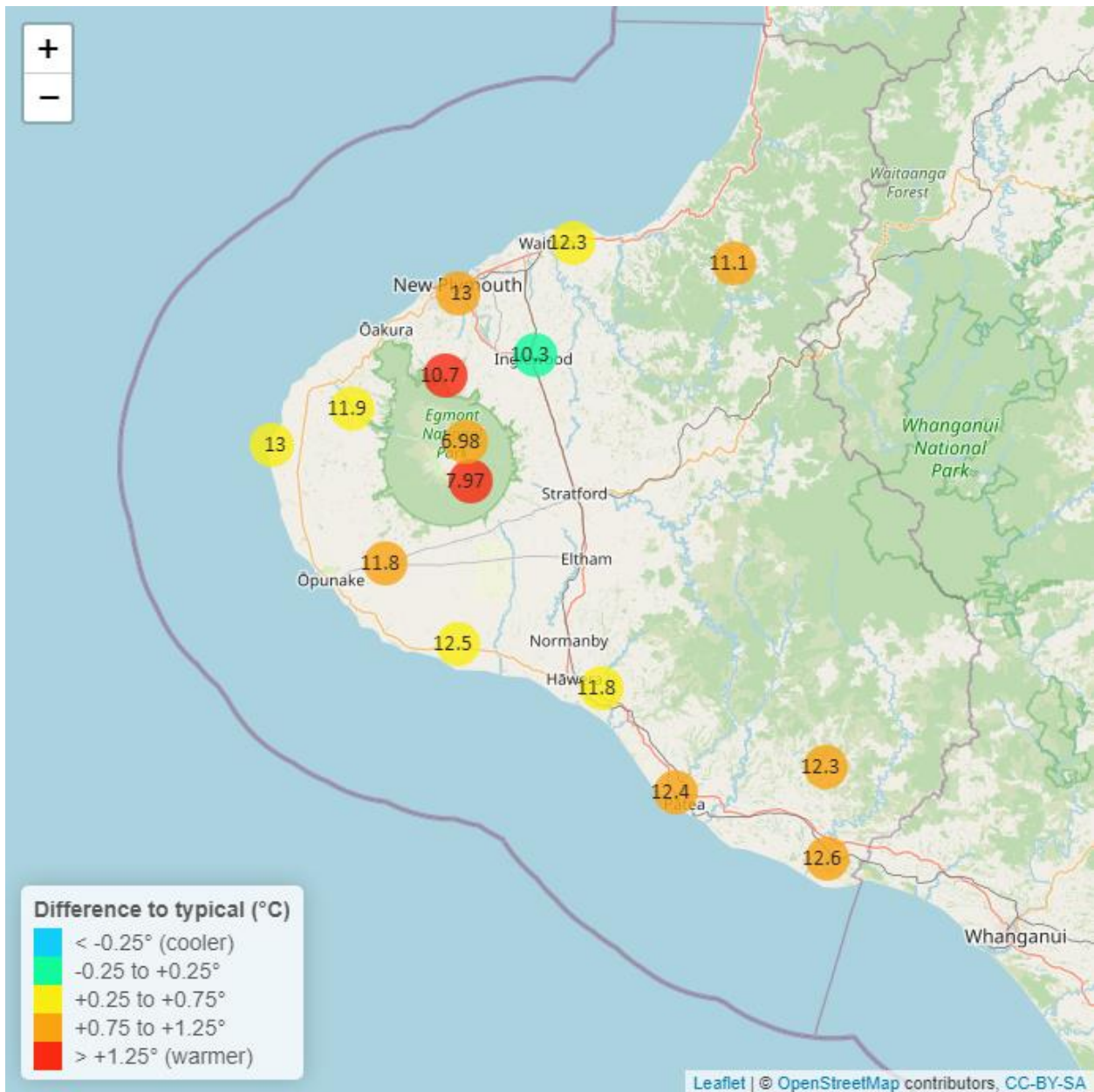


Figure 3.2: Monthly mean river temperature for this month and the mean of all previously recorded months.



## 4. Air Temperature

Map 4: September mean air temperature with difference to long-term mean (°C).





**Table 4: Summary of high, low and mean air temperature for September and for September in all preceding years of record.**

September 2023 - Air Temperature (°C)								
Monitoring Site	Highs		Lows		Mean		September maximum	data years
	current month	historic	current month	historic	current month	historic		
Brooklands Zoo at New Plymouth	18.7	17.2	7.62	6.62	13.00	12.20	21.2	11
Dawson Falls	14.3	10.9	3.30	1.56	7.97	6.04	19.1	8
Inglewood at Oxidation Ponds	15.7	15.5	3.80	4.44	10.30	10.50	19.2	12
Kapoaiaia at Lighthouse	15.8	15.5	8.94	7.62	13.00	12.40	17.5	11
Kaupokonui at Glenn Rd	17.1	16.2	7.21	6.67	12.50	11.80	19.7	8
Mangorei Upper at Forest Hill	14.4	13.1	6.71	5.14	10.70	9.34	17.2	6
Motunui M39 at Weston W3	16.2	15.5	7.52	6.15	12.30	11.70	17.7	7
North Egmont at Visitors Centre	12.7	10.2	2.37	1.38	6.98	5.87	17.6	8
Patea at Bore 3	16.6	15.7	7.42	6.48	12.40	11.50	18.5	11
Stony at Mangatete Bridge	15.8	15.1	7.85	6.61	11.90	11.30	18.1	7
Taungatara at Eltham Rd	16.2	14.9	6.77	6.18	11.80	10.90	19.3	8
Tawhiti at Duffys	17.2	16.1	3.49	3.62	11.80	11.20	19.5	10
Uruti at Kaka Rd	15.5	14.1	7.01	5.41	11.10	9.95	18.6	5
Waitotara at Hawken Rd	17.4	16.5	6.66	6.31	12.60	11.80	19.6	7
Waitotara at Ngutuwera	16.7	15.3	7.18	5.91	12.00	10.80	19.4	5
Waiwhakaiho at Hillsborough	16.5	15.3	8.26	6.92	12.50	11.60	18.4	11
Weraweraonga at 749 Mangawhio Rd	18.5	16.6	4.70	4.10	12.30	11.10	21.8	6

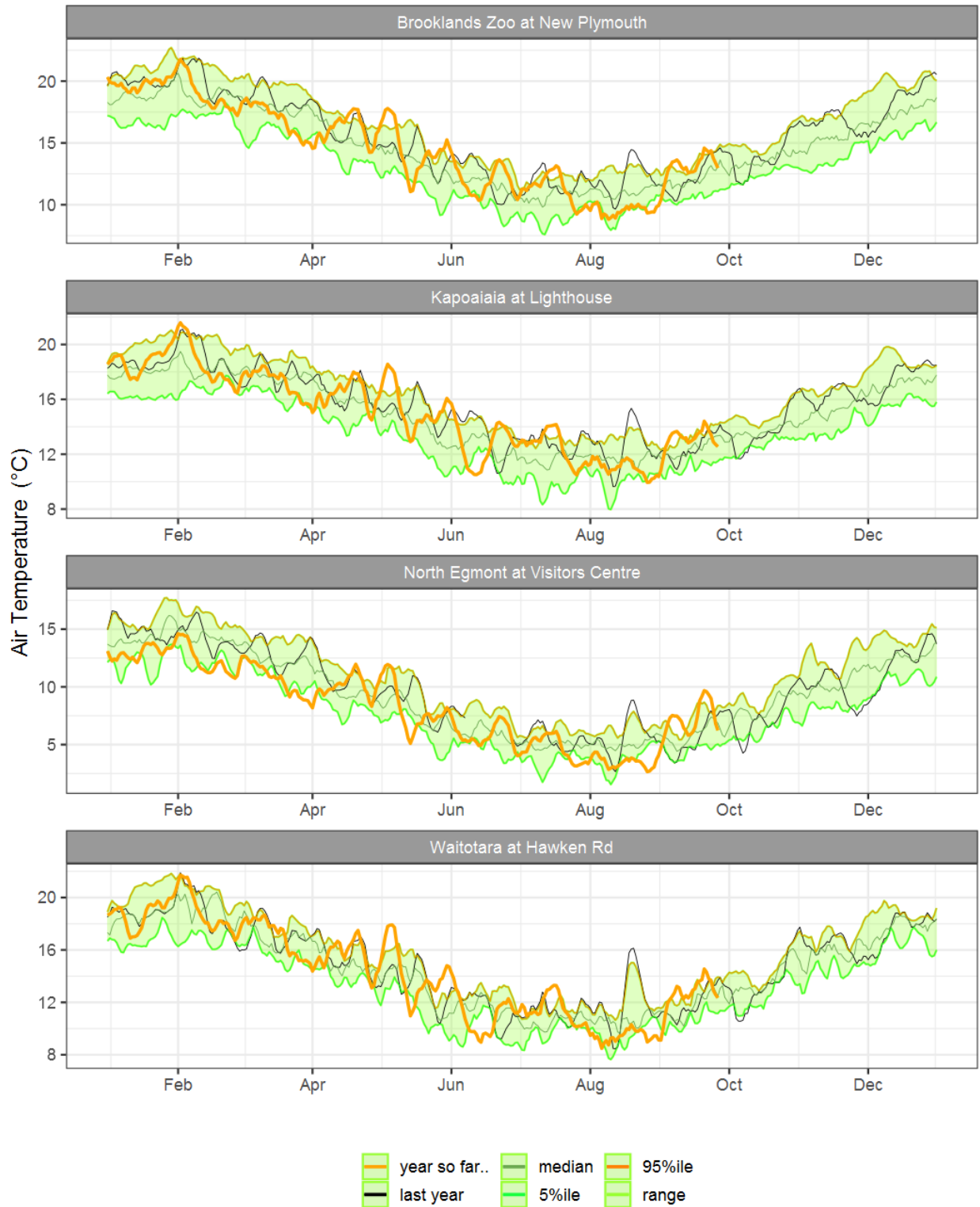


Figure 4.1: Running average air temperature for selected sites, set in context of the historic record.

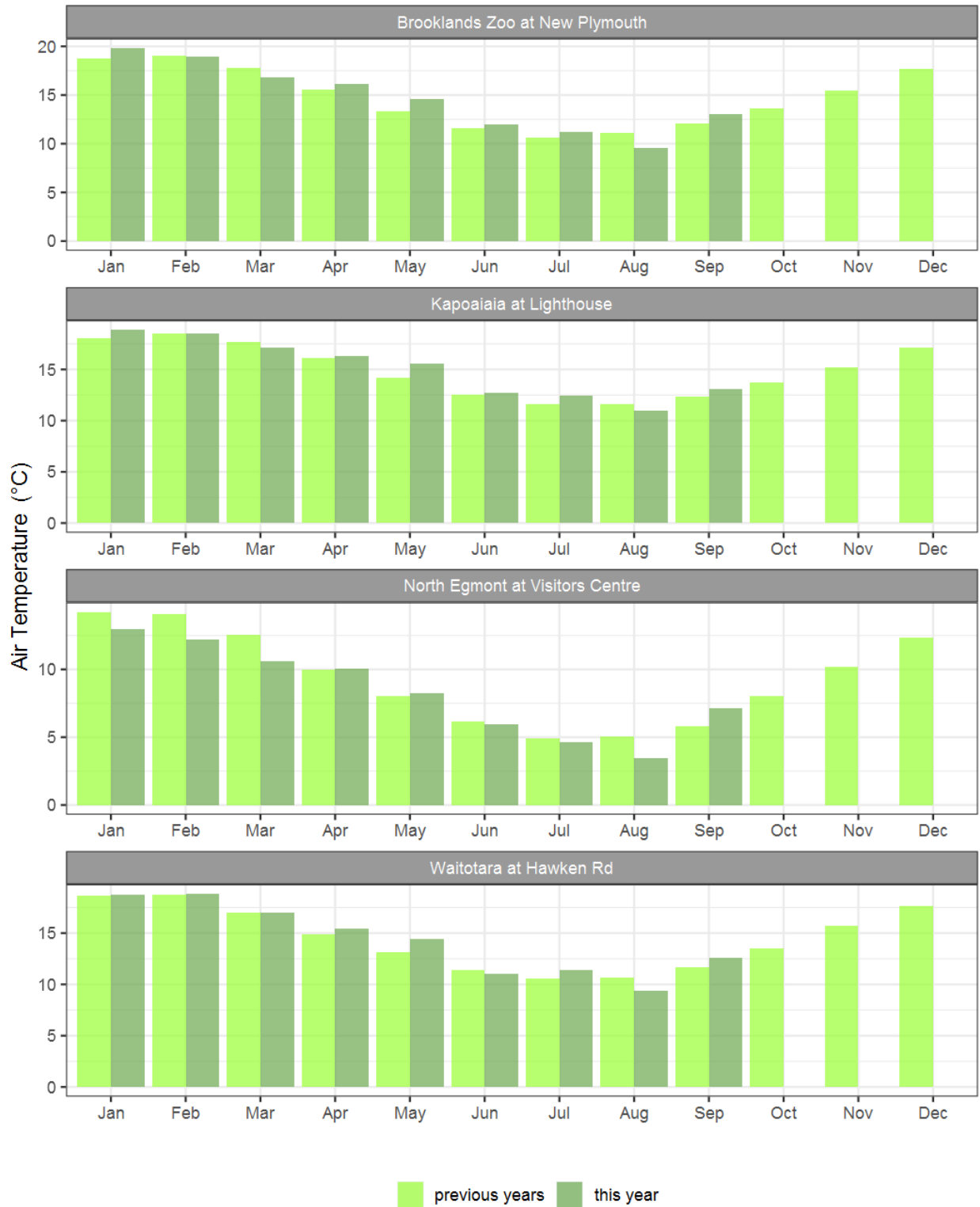
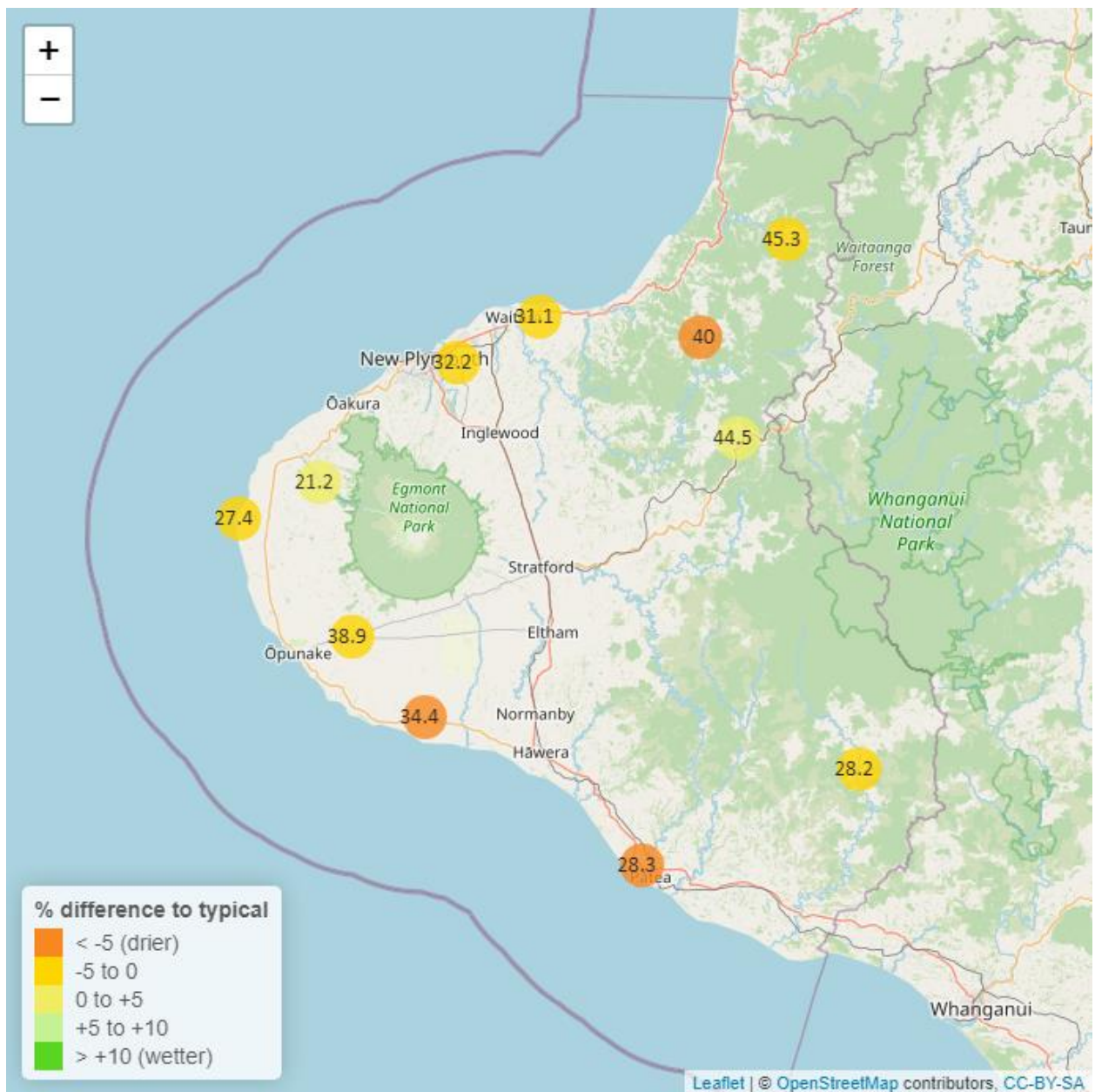


Figure 4.2: Monthly mean air temperature for September and the mean of all previously recorded months.

## 5. Soil Moisture

Map 5: September mean soil moisture content (%).



**Table 5: Summary of high, low and mean soil moisture for September and for September in all preceding years of record.**

September 2023 - Soil Moisture (%)								
Monitoring Site	Highs		Lows		Mean		September maximum	Data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	28.8	30.7	26.3	21.7	27.4	27.0	31.7	11
Kaupokonui at Glenn Rd	37.0	43.5	31.6	32.2	34.4	36.4	38.5	12
Kotare at OSullivans	50.2	50.9	40.8	36.2	45.3	43.3	54.9	11
Motunui M39 at Weston W3	32.8	33.7	29.8	29.3	31.1	31.3	34.5	10
Patea at Bore 3	30.3	34.6	26.9	25.0	28.3	30.1	31.3	7
Pohokura Saddle	52.0	51.6	37.2	39.2	44.5	45.7	55.2	9
Stony at Mangatete Bridge	25.6	25.1	17.3	15.5	21.2	19.7	31.2	7
Taungatara at Eltham Rd	43.6	46.1	36.0	29.9	38.9	38.4	44.9	10
Uruti at Kaka Rd	41.0	47.0	38.6	38.7	40.0	42.8	41.8	12
Waitotara at Rimunui Station	30.4	30.7	26.9	26.3	28.2	28.1	32.5	6
Waiwhakaiho at Hillsborough	34.4	36.0	30.3	26.4	32.2	31.1	37.0	11

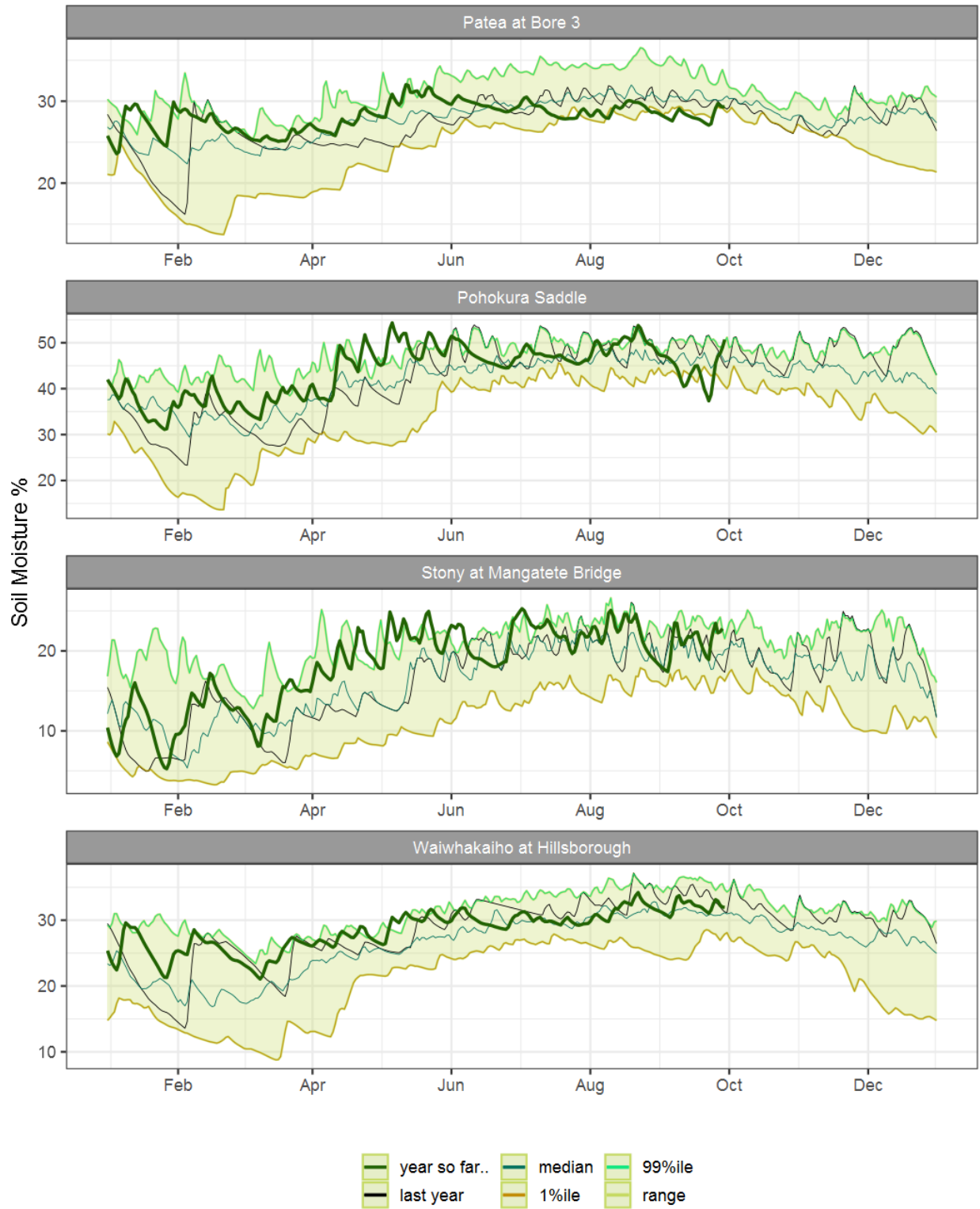


Figure 5.1: Running average soil moisture for selected sites, set in context of the historic record.

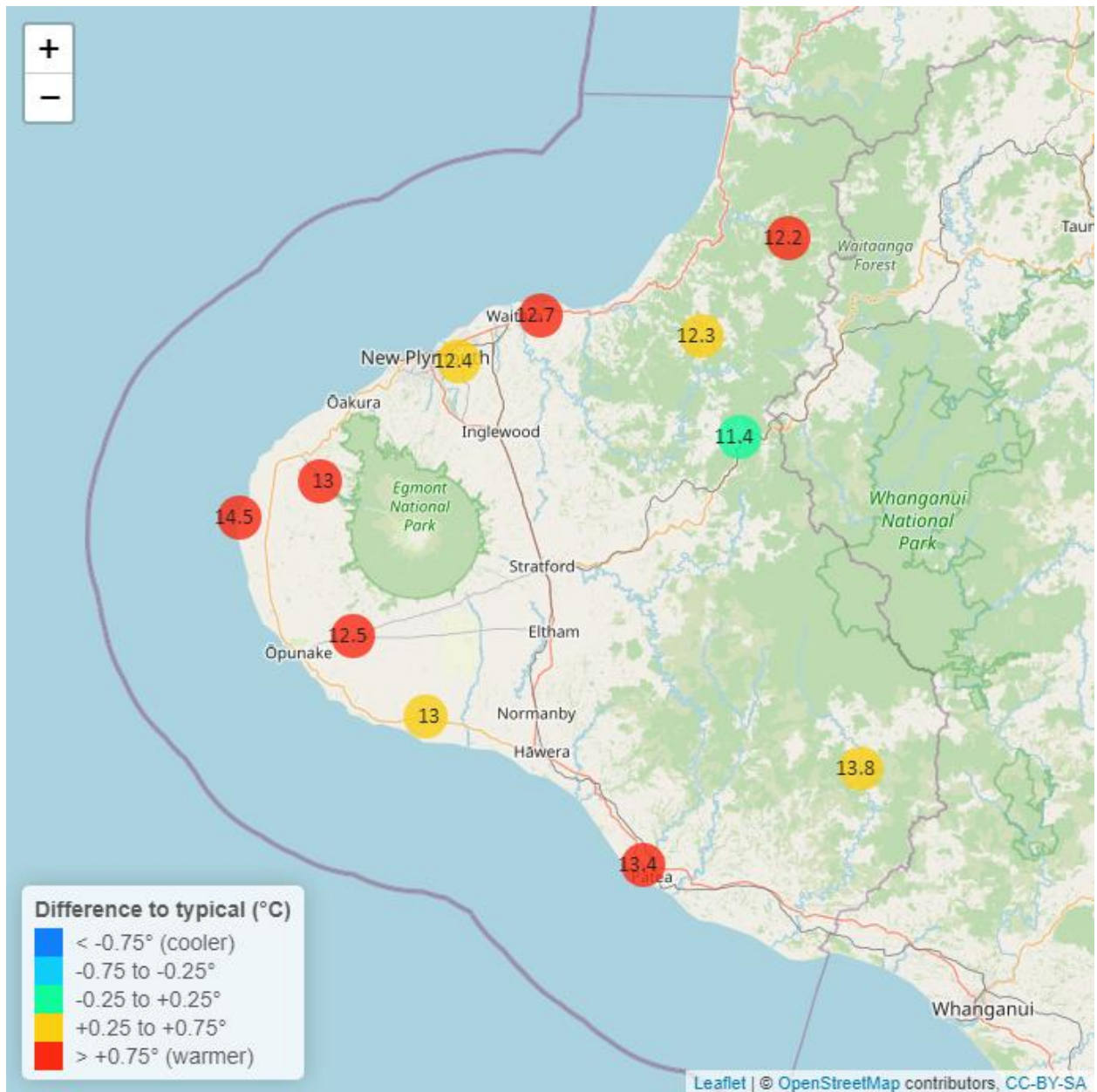


Figure 5.2: Monthly mean soil moisture for this month and the mean of all previously recorded months.



## 6: Soil Temperature

Map 6: September mean soil temperatures with difference to long-term mean (°C).



**Table 6: Summary of high, low and mean soil temperature for September and for September in all preceding years of record.**

September 2023 - Soil Temperatures (°C)								
Monitoring Site	Highs		Lows		Mean		September maximum	data years
	current month	historic	current month	historic	current month	historic		
Kapoaiaia at Lighthouse	17.4	15.1	12.00	11.00	14.5	13.0	19.3	11
Kaupokonui at Glenn Rd	15.0	14.6	11.10	10.40	13.0	12.3	19.2	12
Kotare at OSullivans	14.1	13.6	9.58	8.94	12.2	11.2	14.5	11
Motunui M39 at Weston W3	14.6	13.7	10.20	9.74	12.7	11.6	15.1	10
Patea at Bore 3	15.4	14.8	11.50	10.10	13.4	12.5	16.7	7
Pohokura Saddle	13.1	13.3	9.37	9.52	11.4	11.3	13.3	9
Stony at Mangatete Bridge	15.3	14.6	10.20	9.76	13.0	12.0	16.4	6
Taungatara at Eltham Rd	14.2	13.4	10.70	9.74	12.5	11.6	15.0	10
Uruti at Kaka Rd	13.7	13.6	10.20	9.77	12.3	11.7	13.8	12
Waitotara at Rimunui Station	16.2	16.0	10.60	11.10	13.8	13.5	17.5	6
Waiwhakaiho at Hillsborough	14.5	13.9	9.96	10.30	12.4	12.1	14.8	11

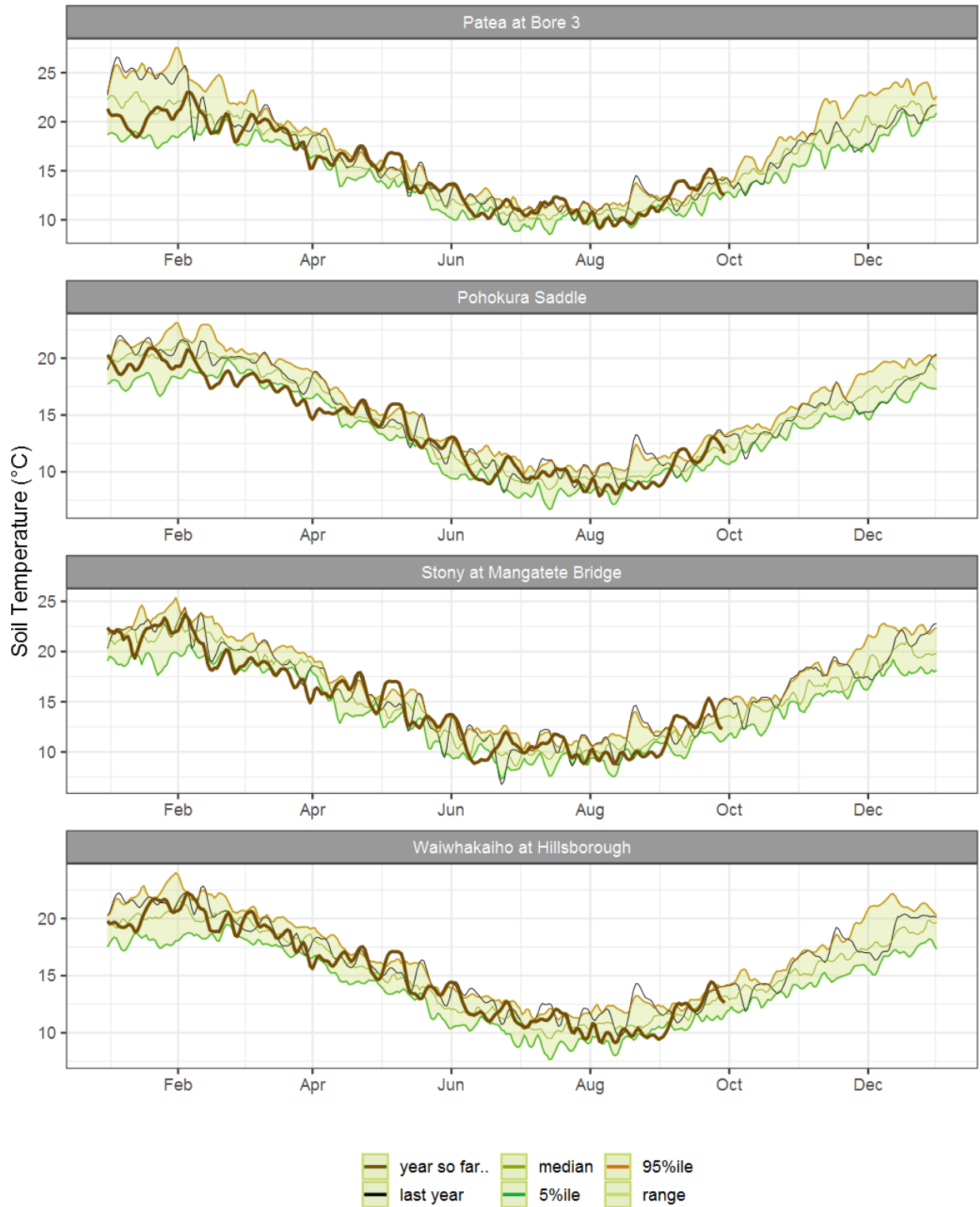


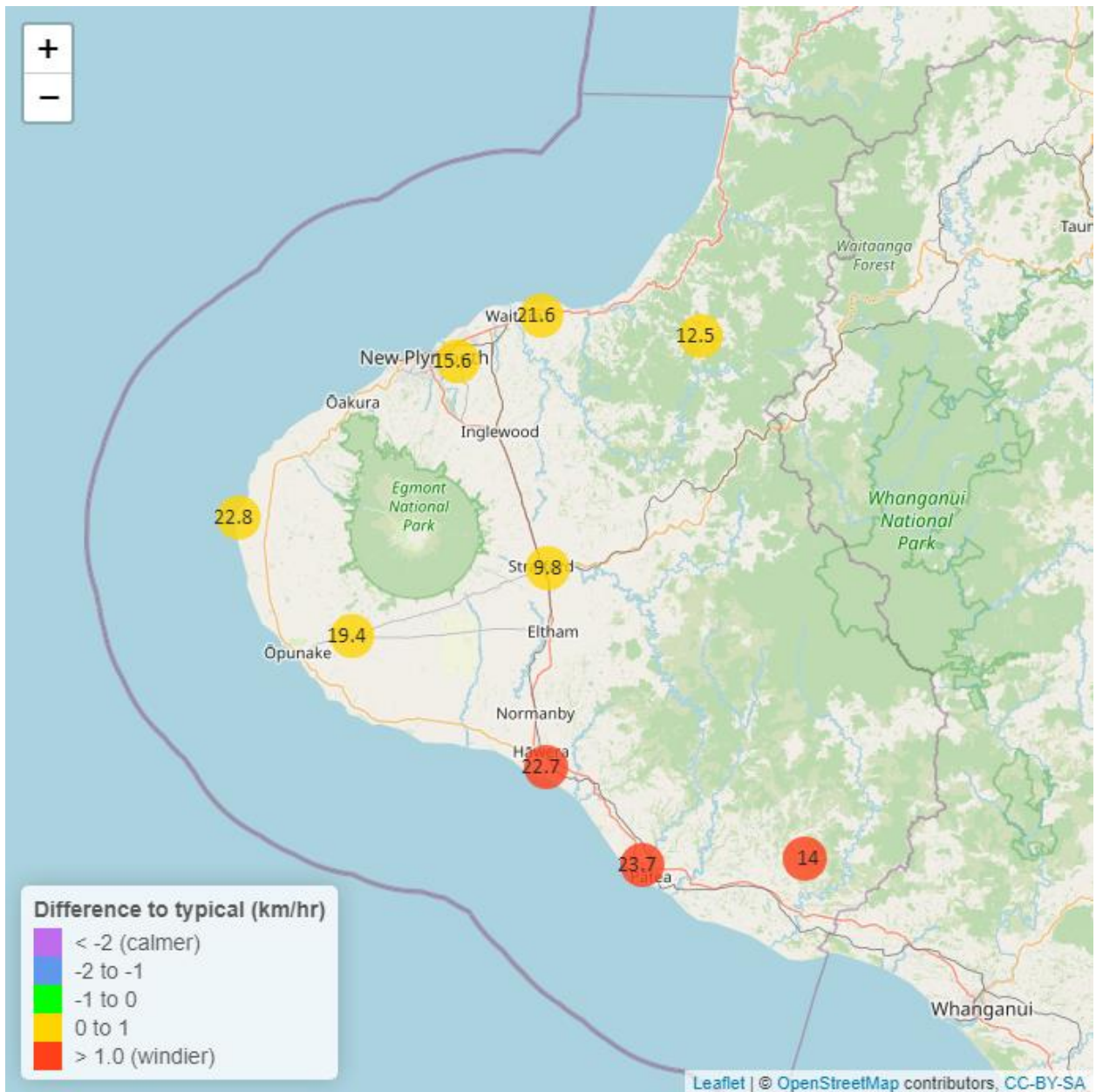
Figure 6.1: Running average soil temperature for selected sites, set in context of the historic record.



Figure 6.2: Monthly mean soil temperature for this month and the mean of all previously recorded months.

## 7: Wind Speed and Maximum Gusts

Map 7: September mean of wind speed with difference to long-term values (km/hr).



**Table 7: Summary of high, low and mean wind speed for September and for September in all preceding years of record.**

September 2023 - Wind Speed (average) - (km/hr)								
Monitoring Site	Highs		Lows		Mean		September maximum	Data years
	current month	historic	current month	historic	current month	historic		
Hawera AWS	42.6	38.9	8.33	5.56	22.7	20.00	48.2	18
Kapoaiaia at Lighthouse	43.3	42.5	7.42	6.76	22.8	22.00	57.7	25
New Plymouth AWS	42.6	42.6	5.56	6.48	21.6	21.50	56.5	15
Patea at Bore 3	43.6	43.9	6.80	6.76	23.7	22.10	57.0	7
Patea at Stratford	19.4	20.5	2.98	2.45	9.8	9.43	30.2	17
Taungatara at Eltham Rd	36.6	34.8	7.46	6.84	19.4	19.10	44.6	8
Uruti at Kaka Rd	25.0	25.4	1.20	3.87	12.5	12.20	36.5	26
Waitotara at Ngutuwera	28.1	24.3	3.58	2.48	14.0	11.70	43.5	25
Waiwhakaiho at Hillsborough	36.1	32.2	4.29	4.25	15.6	15.60	47.5	6

**Table 8: Summary of high, low and maximum wind gusts for September and for September in all preceding years of record.**

September 2023 - Wind Speed (Max. Gust) - (km/hr)								
Monitoring Site	Highs		Lows		Mean		September maximum	Data years
	current month	historic	current month	historic	current month	historic		
Hawera AWS	74.1	77.8	27.8	22.2	51.1	48.5	77.8	18
Kapoaiaia at Lighthouse	76.0	86.5	25.2	24.1	46.4	51.0	85.9	24
New Plymouth AWS	75.9	85.2	18.5	24.1	46.8	50.6	85.2	15
Patea at Bore 3	83.1	83.9	24.4	24.6	51.4	51.1	91.3	7
Patea at Stratford	58.7	65.9	20.5	20.5	40.3	40.3	61.2	17
Taungatara at Eltham Rd	72.2	81.7	23.7	26.8	51.4	50.5	82.6	8
Uruti at Kaka Rd	71.6	76.6	20.2	21.7	46.2	43.9	72.7	24
Waitotara at Ngutuwera	110.0	75.2	23.8	20.2	60.6	43.8	128.0	25
Waiwhakaiho at Hillsborough	67.2	79.3	17.2	24.2	43.7	48.0	93.9	6



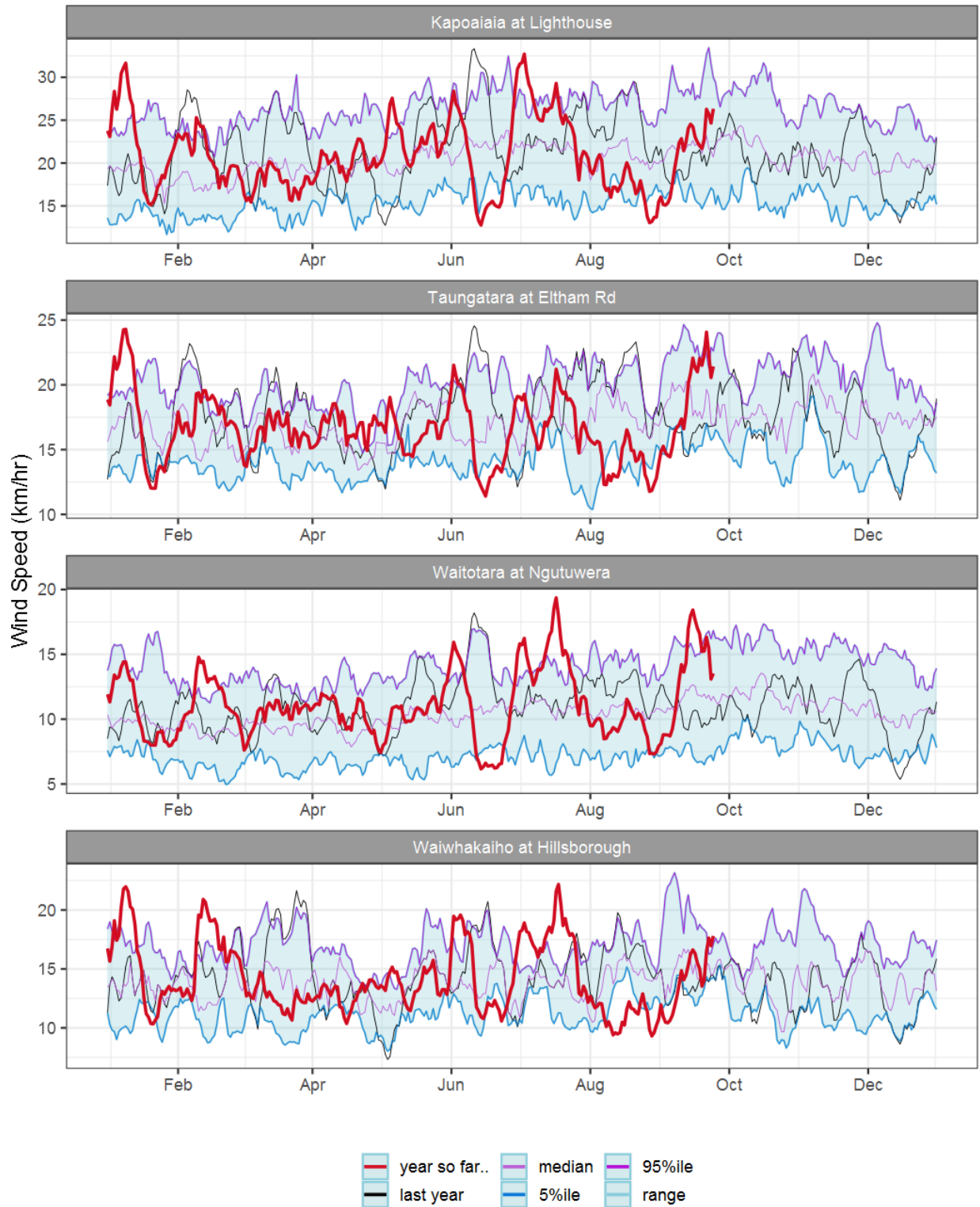


Figure 7.1: Running average wind speed (km/hr) for selected sites, set in context of the historic record.



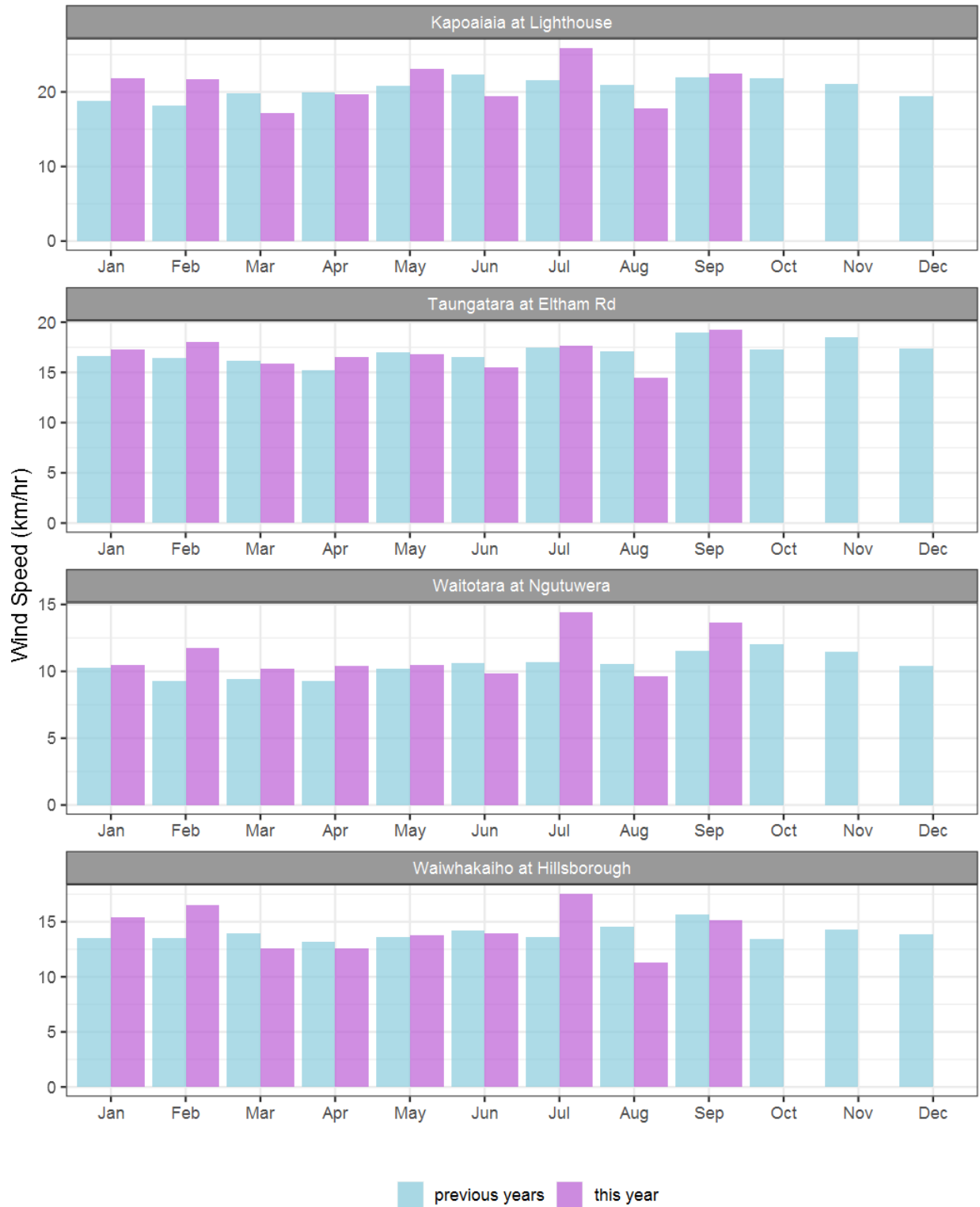


Figure 7.2: Monthly mean wind speed (km/hr) for selected sites, relative to the mean of all previously recorded months.

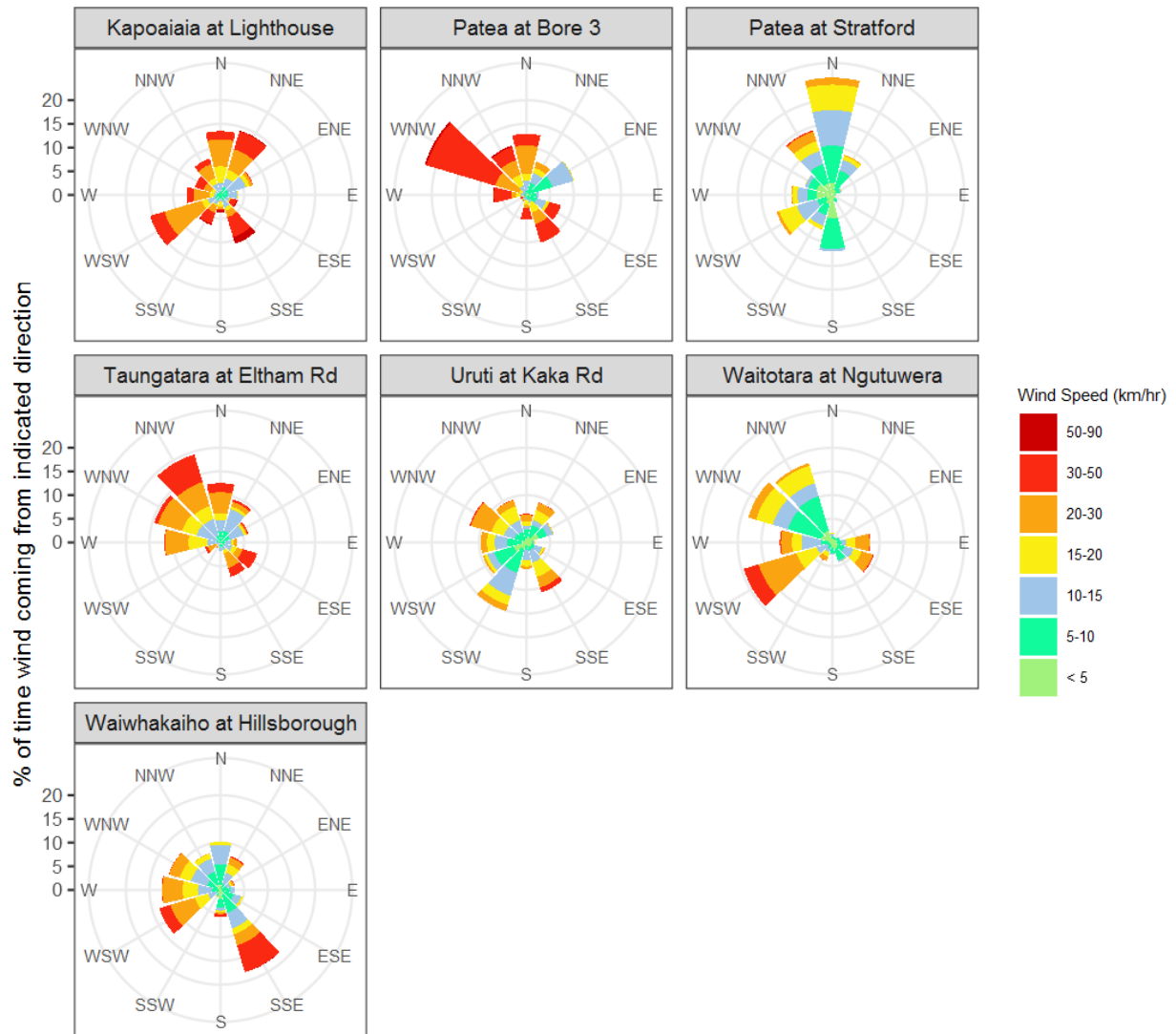


Figure 7.3: Wind roses for September for average wind speed (km/hr).

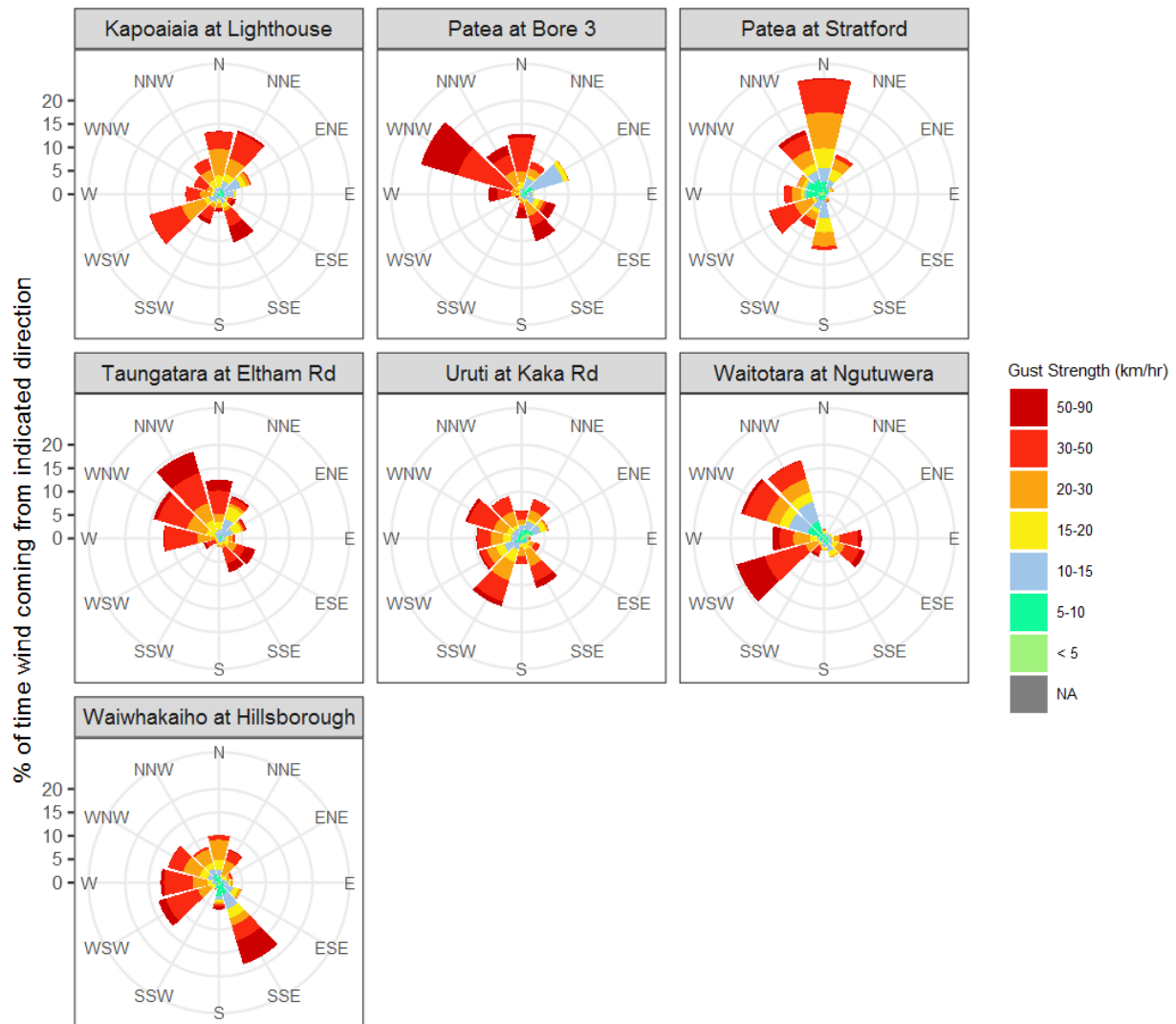


Figure 7.4: Wind roses for September for maximum wind gust (km/hr).

## Summary of month's conditions

### Rainfall

On average rainfall for September was 158.5 mm, 3% more typical September rainfall, and ranging from 15% less rainfall at Kotare at OSullivans, and 30% more rainfall at Motunui M39 at Weston W3 than a typical September.

Year to date rainfall ranges from 11% less rainfall at Uruti at Kaka Rd, and 14% more rainfall at Tawhiti at Duffys, with an average of 1% more than normal. Compared to typical full year totals, on average sites have already received 75% of a typical years rainfall, with the highest value at Omaru at Charlies, 85% of normal, whereas Uruti at Kaka Rd sits at 64% of the typical years total.

### River Flow

Mean river flows for September were 31.5% lower than typical values, low flows were 8.8% lower, and high flows 25.5% lower than typical values. The maximum river flow recorded in September was 436 m<sup>3</sup>/sec at Waitara at Bertrand Rd.

### River Water Temperature

Mean river (non-mountain) water temperatures were 11.6°C, an average of 0.3°C warmer than long-term September values. Nighttime-low water temperatures were on average 0.3°C warmer than historic lows, and day-time high temperatures were on average 0.2°C warmer than historic highs. The maximum river water temperature recorded in September was 17.6°C at Kapoiaia at Lighthouse.

### Air Temperature

The average air temperature for the region (excluding Te Maunga sites) was 11.5°C, which is 0.9°C warmer than long-term September averages. Low air temperatures for September were on average 0.9°C warmer than the September average for previous years. Day-time high temperatures were on average 1.3°C warmer than historic highs. The maximum air temperature recorded in September was 21.8°C at Weraweraonga at 749 Mangawhio Rd.

### Soil Moisture

The average soil moisture for September across sites in Taranaki region was 33.8%. Soil moistures were on average 0.2% drier than typical September values. On average, low soil moistures were 1.9% wetter than previous lows, and the highs were on average 2.2% drier than previous values for September.

### Soil Temperature

September soil temperatures were generally 0.8°C warmer than long-term averages. Average nighttime low soil temperatures were 0.5°C warmer than recorded lows, and upper day-time soil temperatures were on average 0.6°C warmer than long-term

September highs. The maximum soil temperature recorded in September was 19.3°C at Kapoiaia at Lighthouse.

### **Wind Speed (average and 10 minute gust)**

September average wind speeds were 19km/hr, with average gust strength of 49.7km/hr, these were 1km/hr stronger, and 1.3km/hr gustier than the long-term average. Average calm weather wind speeds were 0.2km/hr stronger than recorded lows, and windy conditions were on average 1.7km/hr stronger than long-term September highs. The maximum wind gust recorded in September was 128km/hr at Waitotara at Ngutuwera. Cape Egmont is generally the windiest station the TRC monitors, and Stratford is often the calmest.

Notes: Low and high values refer to the upper and lower 5th percentiles of the historic record for each site (wind, river flow and soil moisture are upper and lower 1st percentiles). These percentile values give a better indication of the general upper and lower range of the historic data against which to compare the current month. For example, minimum air temperature, because it is the lowest recorded value, accentuates the difference of the current month's colder conditions relative to the historical data. The start year (records began) for each site and variable in the respective tables shows the length of data used to compute historic highs, lows, and "typical values". Sites with a longer data record will generally provide a more reliable comparison to values in the current year.

Report date: 11 October, 2023.