

2022/23 Hydrology monitoring



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For the latest available results go to the [GW environmental data hub](#).

Overview

Greater Wellington (GW) operates a hydrometric network for measuring rainfall, river levels and flow, lake and wetland levels, groundwater levels, tidal levels and soil moisture. There are approximately 270 monitoring stations on the hydrometric network, of which the majority are automated to operate continuously and to send the data to the office via a radio or cell phone telemetry system.

This report contains key results for each of the five main whitua (main river) catchments with recorded data for the year summarised and compared to long term averages and any significant hydrological events that occurred.

Monitoring objectives

- Provide information on the state of the Region's water resources and the baseline quantity of water.
 - Detect long and short-term trends in climate and water resources.
 - Provide data on the state of the Region's freshwater resources to enable informed decisions on sustainable allocation and use.
 - Inform whitua committees to enable the creation of a unique vision and to prioritise objectives for land and water management.
 - Provide a flood warning monitoring network and alerting system for the Region.
 - Monitor drought conditions and enable drought warnings.
 - Inform policy and Regional Plan development and review.
 - Contribute to resource consent compliance monitoring.
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Monitoring results

Summary results are presented in the following sections for a representative subset of the sites shown on the monitoring network map below. Use the links below to navigate to each.

- [Rainfall](#) – annual and sub-annual totals, maximum and minimum rainfalls for 44 sites.
- [River levels/flows](#) – averages, maximums, and minimums for 33 sites.
- [Groundwater levels](#) – daily averages for 13 sites in selected groundwater zones.
- [Lake & wetland levels](#) – daily and monthly summaries for 5 sites.
- [Soil moisture](#) – daily averages for 2 sites.

Monitoring network

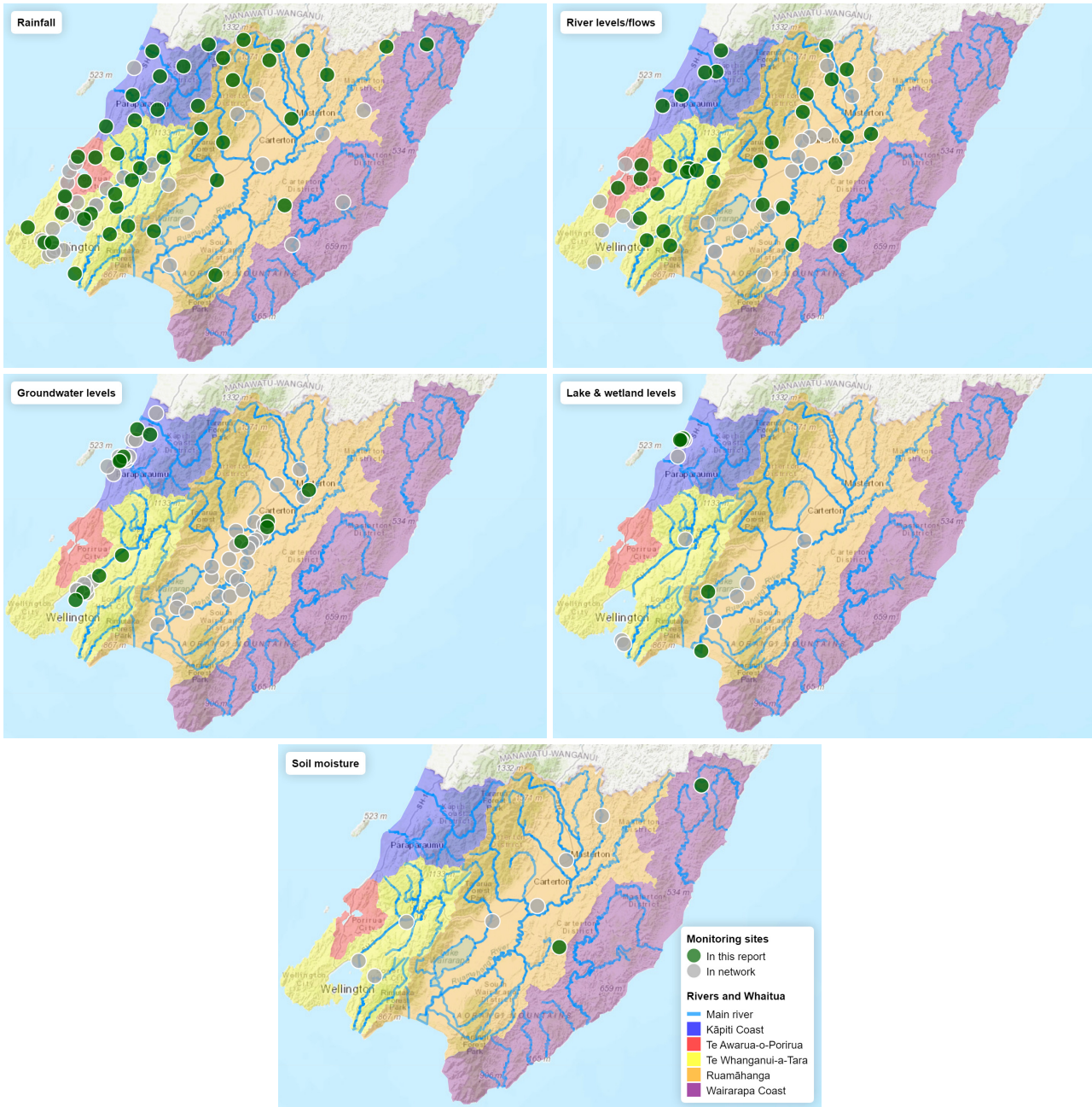


Figure 1: Hydrology monitoring site locations for each hydrometric network. Green circles indicate sites with data summarised in this report, while data for sites shown by grey circles are not reported. *Note: circles marked with a star (*) indicate there are two bores in the same location at different depths.*

Rainfall results

Annual totals

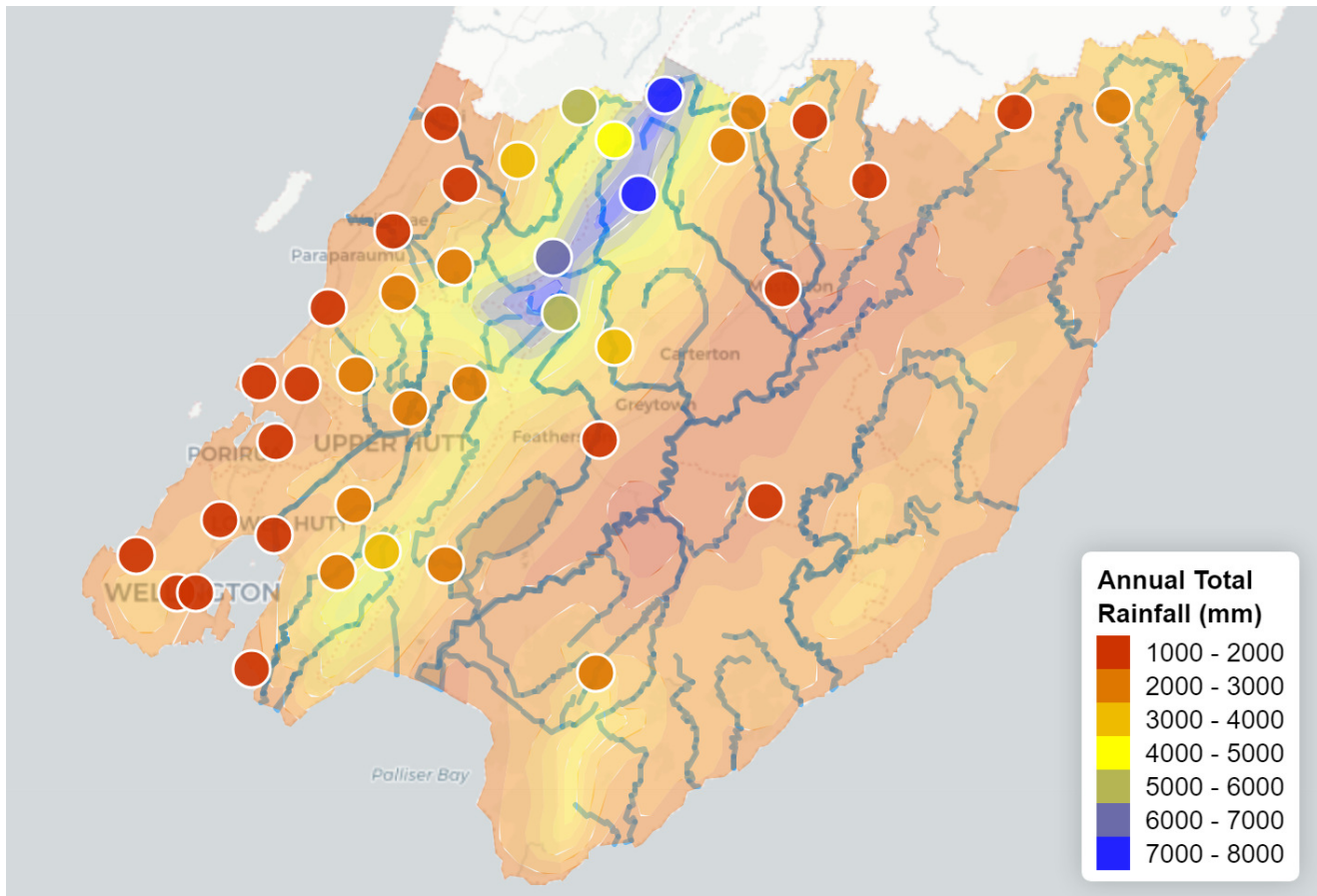


Figure 2: Annual total rainfall (mm) at a range of monitoring sites across the region. The shaded areas under the monitoring sites show the long term mean annual rainfall over the entire region.

Table 1: Annual total rainfall (mm) at a range of monitoring sites across the region. Sites with greater than 20 percent difference from their long-term average have table rows shaded orange (**below average**) or blue (**above average**). Abbreviations: **KC**: Kāpiti Coast, **TP**: Te Awarua-o-Porirua, **TW**: Te Whanganui-a-Tara, **RU**: Ruamāhanga, **WC**: Wairarapa Coast.

Whaitua	Site	Catchment	Annual total mm	Long-term average mm (years)	% of long-term average
KC	Kapakapanui (Taranua)	Ōtaki	2953	2463 (1993-2023)	120
KC	Mackays Crossing	Whareroa	1702	1200 (2008-2023)	142
KC	Mangaone Stream (Transmission Lines)	Mangaone	1948	1734 (1995-2023)	112
KC	McIntosh (Taranua)	Ōtaki	6462	5255 (1995-2023)	123
KC	Ōtaki River (Depot)	Ōtaki	1428	1013 (1972-2023)	141
KC	Oriwa (Taranua)	Ōtaki	5339	4815 (1993-2023)	111
KC	Taungata (Taranua)	Ōtaki	3352	2958 (1996-2023)	113
KC	Waikanae River (Water Treatment Plant)	Waikanae	1531	1247 (1996-2023)	123
RU	Angle Knob (Taranua)	Waingawa	7459	7037 (1985-2023)	106
RU	Bannister Basin (Taranua)	Ruamāhanga	7200	6329 (1976-2023)	114

Whaitua	Site	Catchment	Annual total mm	Long-term average mm (years)	% of long-term average
RU	Carkeek (Tararua)	Waiohine	4990	4597 (1976-2023)	109
RU	Masterton (Wairarapa College)	Ruamāhanga	1438	918 (2003-2023)	157
RU	Mauriceville	Kōpuaranga	1870	1497 (2009-2023)	125
RU	Ruakōkopatuna River (Iraia)	Iraia	2618	1762 (1973-2023)	149
RU	Ruamāhanga River (Mt Bruce)	Ruamāhanga	2865	2400 (1987-2023)	119
RU	Taueru (Castlehill)	Tauweru	1915	1149 (1993-2023)	167
RU	Tauherenikau (Racecourse)	Tauherenikau	1636	999 (1964-2023)	164
RU	Waikoukou (Longbush)	Waikoukou	1612	995 (2008-2023)	162
RU	Waiohine River (Gorge)	Waiohine	3137	2193 (1975-2023)	143
RU	Waiorongomai (Matthews)	Waiorongomai	2097	1524 (2010-2023)	138
RU	Waipoua (Westons)	Waipoua	2726	2435 (2009-2023)	112
RU	Whangaehu River (Waihi)	Whangaehu	1646	1117 (2002-2023)	147
TP	Horokiri Stream (Battle Hill)	Horokiri	1641	1358 (2004-2023)	121
TP	James Cook Reservoir	Duck Creek	1427	1238 (2018-2023)	115
TP	Seton Nossiter Park	Porirua	1879	1277 (1995-2023)	147
TP	Taupō Stream (Whenua Tapu)	Taupō	1502	1098 (1992-2023)	137
TW	Akatarawa River (Cemetery)	Akatarawa	2231	1769 (1991-2023)	126
TW	Akatarawa River (Warwicks)	Akatarawa	2633	2297 (1984-2023)	115
TW	Hutt River (Kaitoke Headworks)	Hutt	2831	2296 (1954-2023)	123
TW	Karori Reservoir	Kaiwharawhara	1924	1341 (1952-2023)	143
TW	Mangaroa River (Tasman Vaccine Ltd)	Mangaroa	2104	1572 (1969-2023)	134
TW	Orongo Swamp	Ōrongorongo	3354	2522 (1985-2023)	133
TW	Pencarrow Lakes	Pencarrow Lakes	1117	920 (2009-2023)	121
TW	Quartz Hill	Mākara	1369	1114 (2009-2023)	123
TW	Shandon Golf Club	Hutt	1576	1090 (2001-2023)	145
TW	Te Papa	Wellington City	1547	1050 (1998-2023)	147
TW	Wainuiomata Reservoir	Wainuiomata	2569	1880 (1950-2023)	137
TW	Whakatikei River (Blue Gum Spur)	Whakatikei	2372	2022 (1993-2023)	117
WC	Tanawa Hut	Whareama	2172	1308 (1957-2023)	166

Long-term

The charts below show annual total rainfall (mm) at a number of sites graphed against the site average total (black line). Years when recorded rainfall was above average are coloured **orange** while years with below average rainfall are **blue**.

Kāpiti Coast



Figure 3: Yearly total rainfall and long-term averages in the Kāpiti Coast whitua.

Te Awarua-o-Porirua

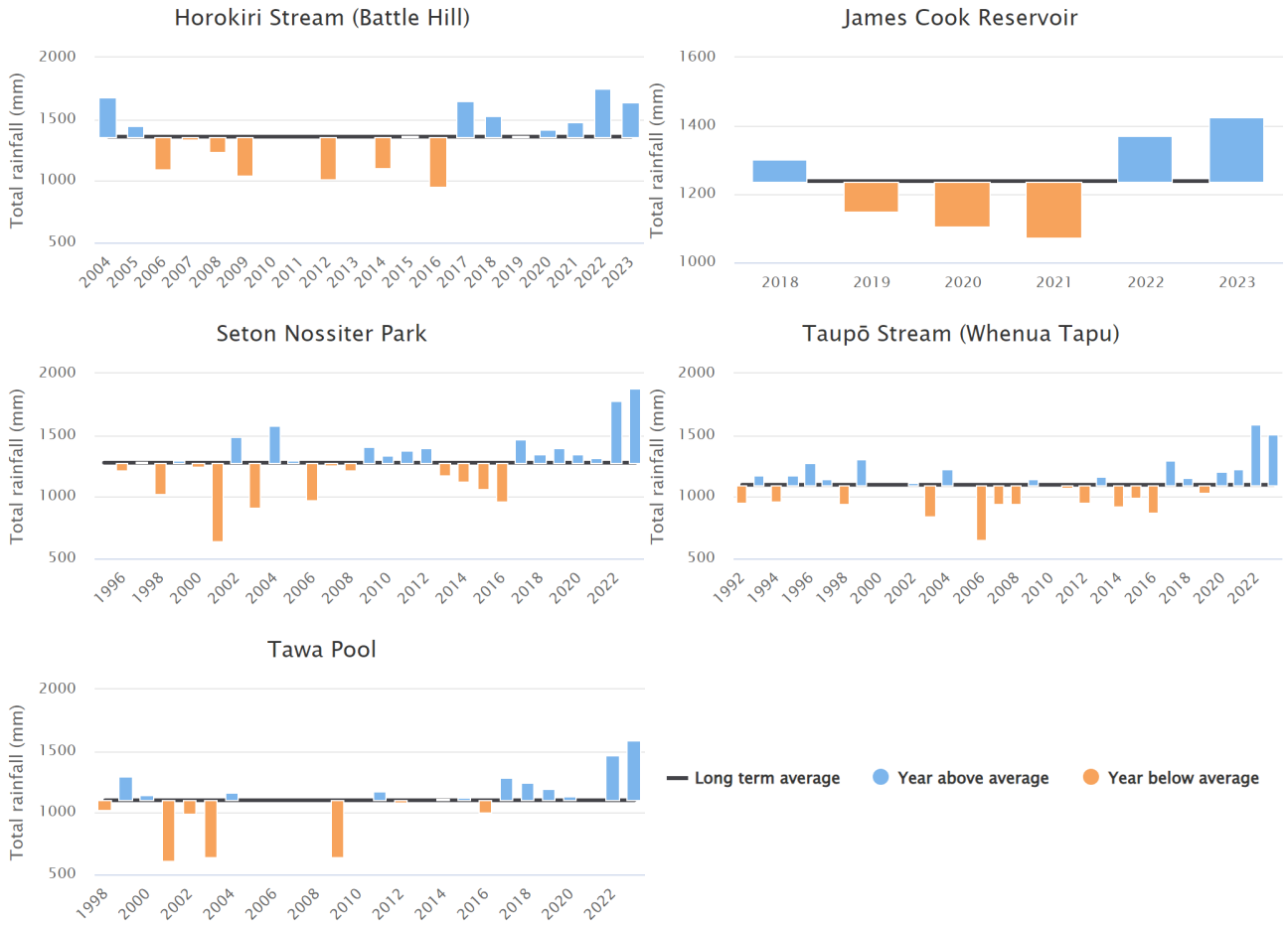


Figure 4: Yearly total rainfall and long-term averages in the Te Awarua-o-Porirua whaitua.

Te Whanganui-a-Tara

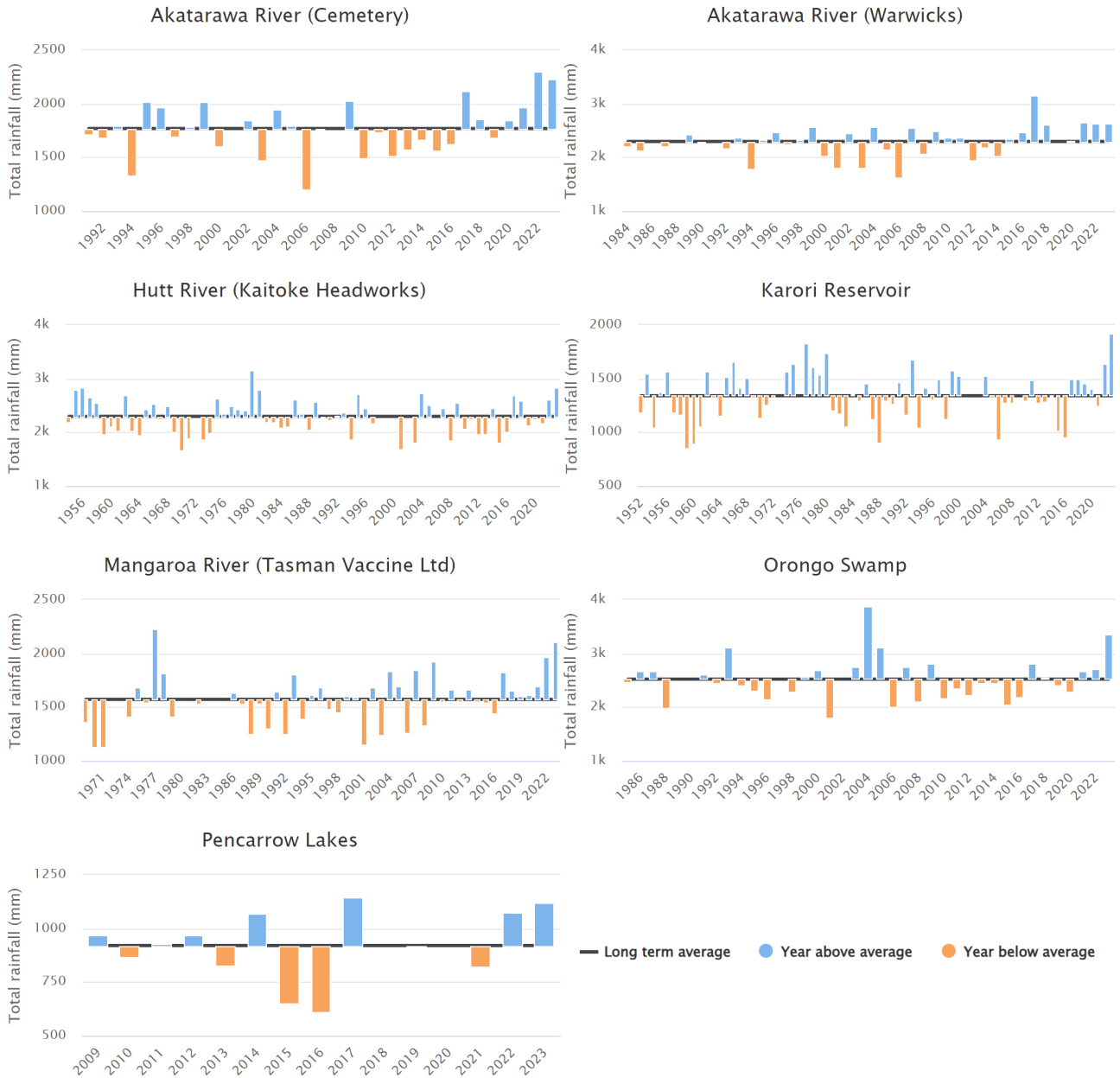


Figure 5: Yearly total rainfall and long-term averages in the Te Whanganui-a-Tara whaitua.

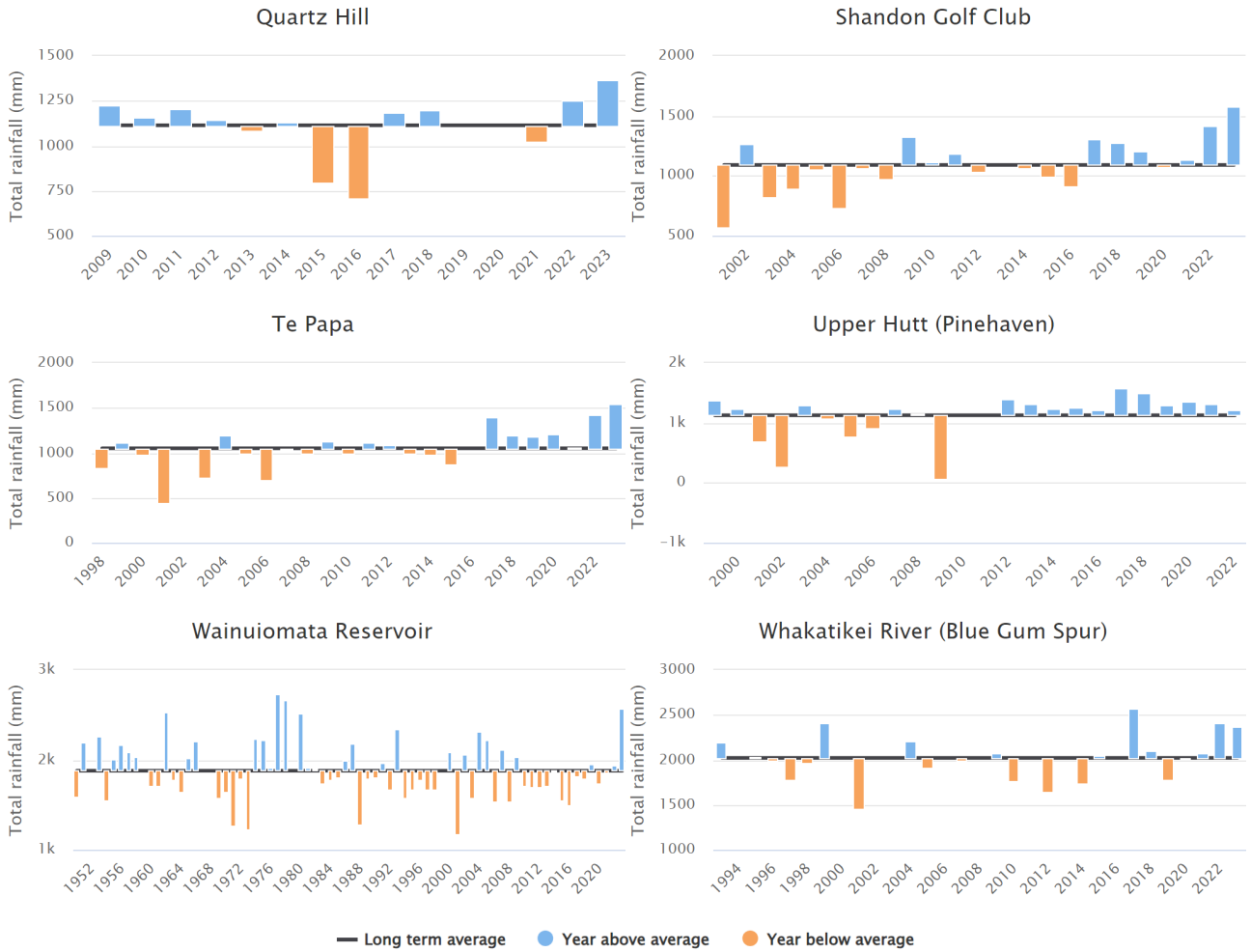


Figure 6: More yearly total rainfall and long-term averages in the Te Whanganui-a-Tara whaitua.

Ruamāhanga

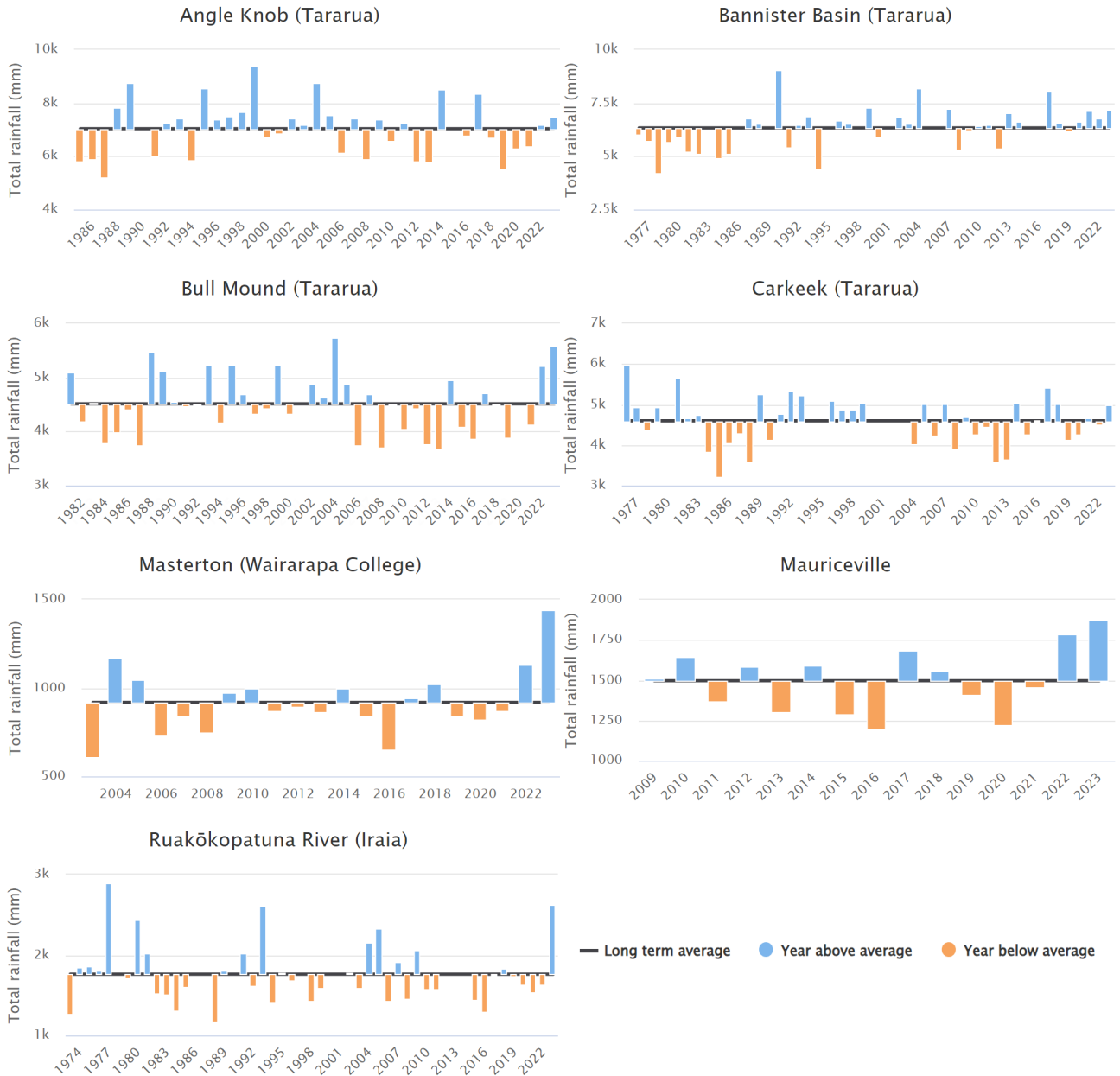


Figure 7: Yearly total rainfall and long-term averages in the Ruamāhanga whaitua.



Figure 8: More yearly total rainfall and long-term averages in the Ruamāhanga whitua.

Wairarapa Coast

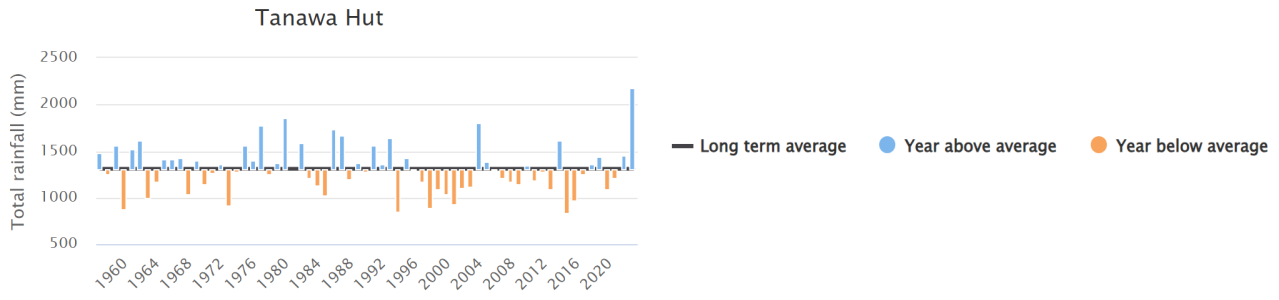


Figure 9: Yearly total rainfall and long-term averages in the Wairarapa Coast whitua.

Subannual totals

The charts below show monthly total, and cumulative monthly, rainfall (mm) at several monitoring sites compared to the previous year and the long-term monthly average.

Kāpiti Coast

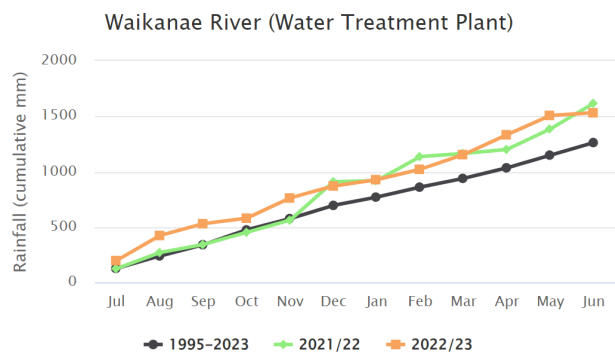
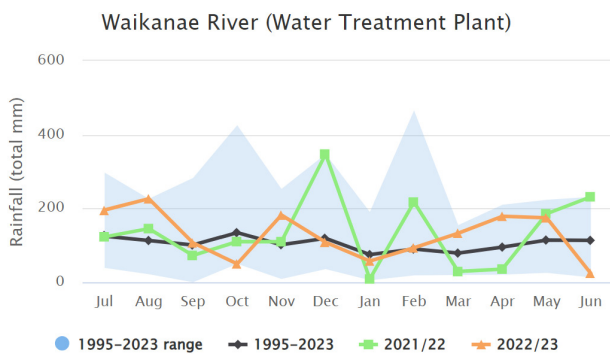
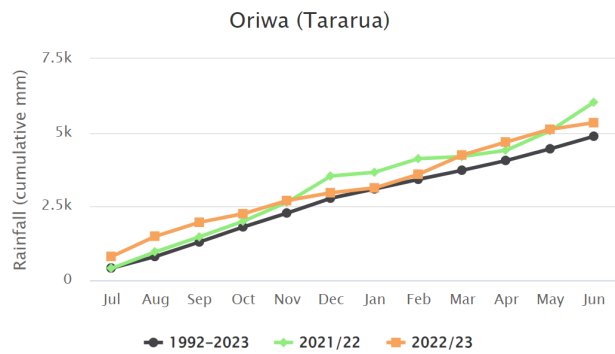
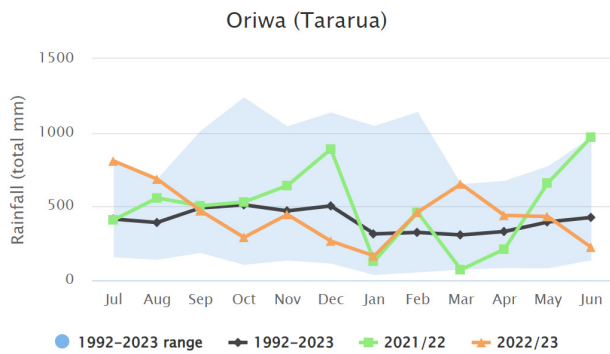
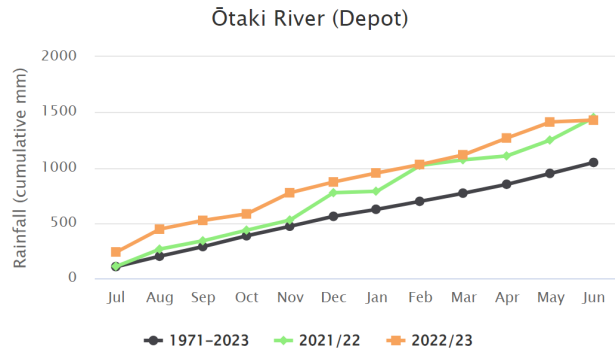
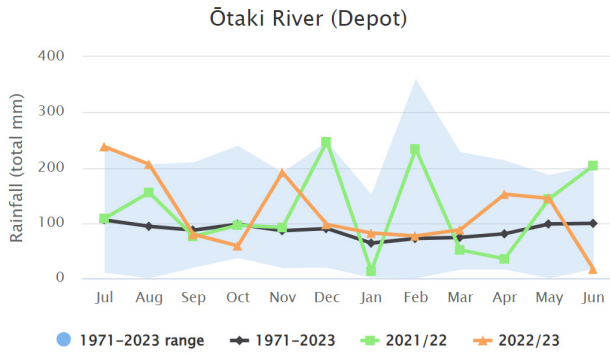


Figure 10: Monthly total and cumulative rainfall in the Kāpiti Coast whitua.

Te Awarua-o-Porirua

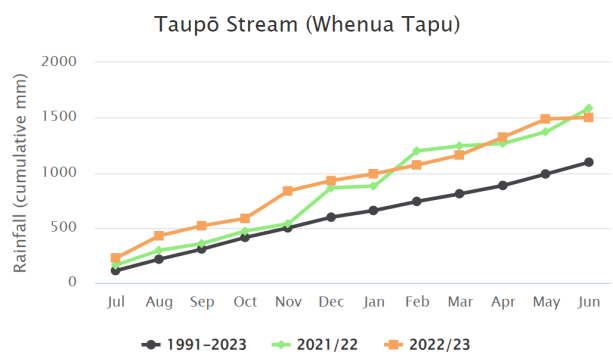
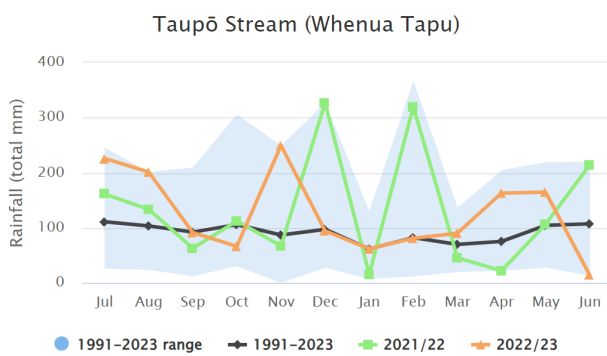
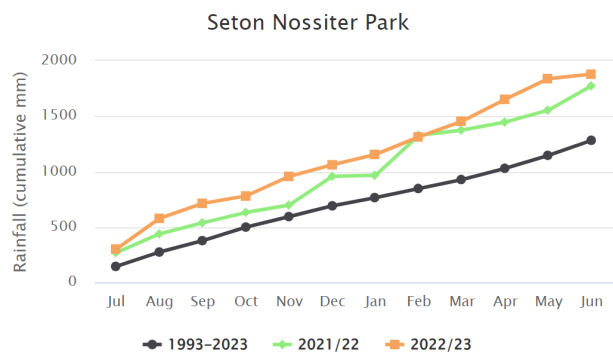
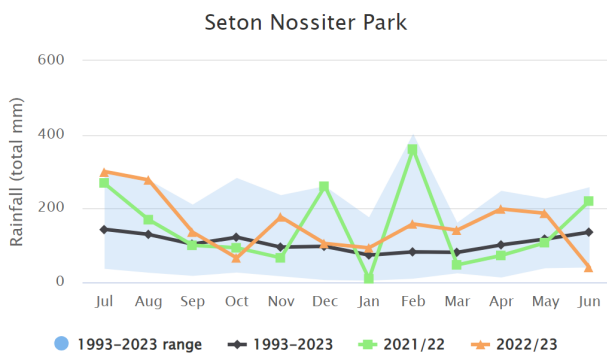
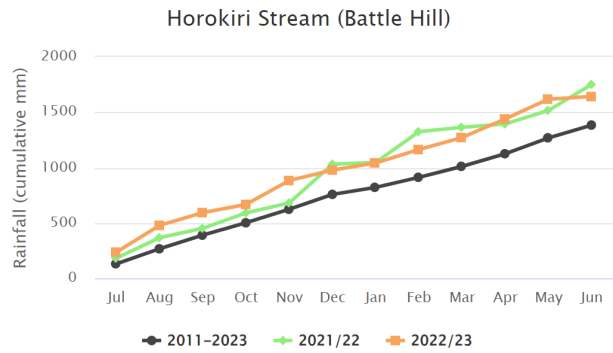
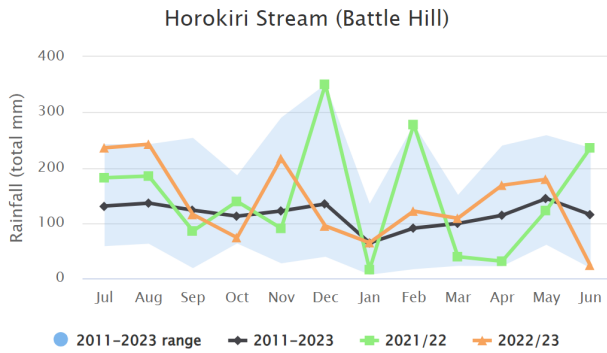


Figure 11: Monthly total and cumulative rainfall in the Te Awarua-o-Porirua whaitua.

Te Whanganui-a-Tara

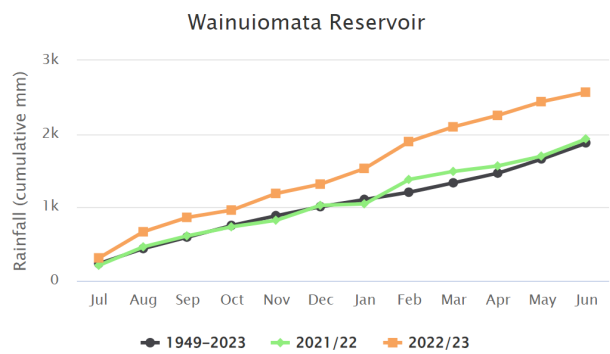
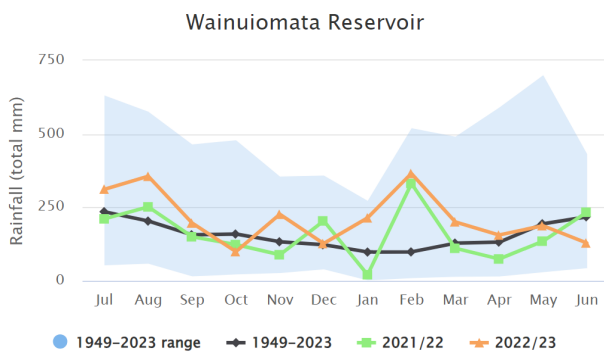
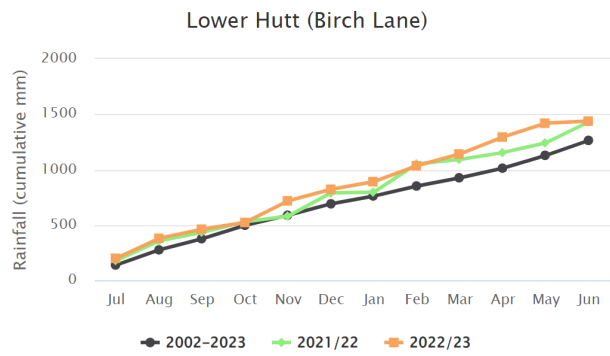
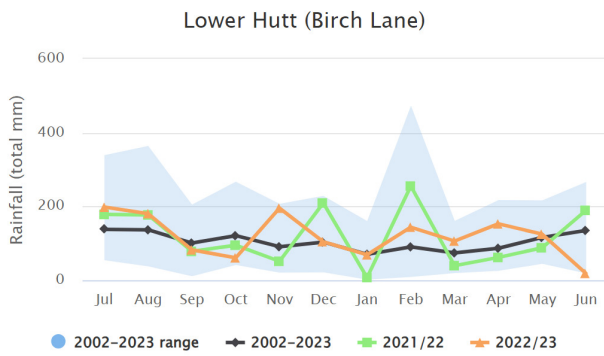
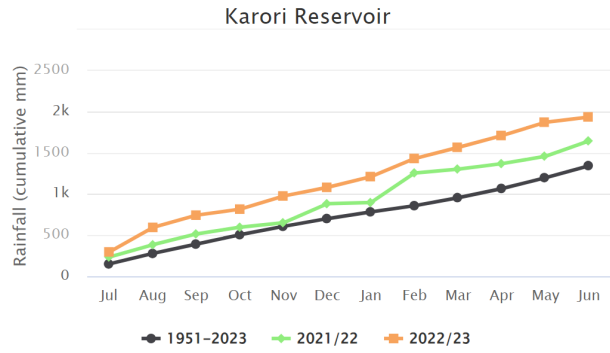
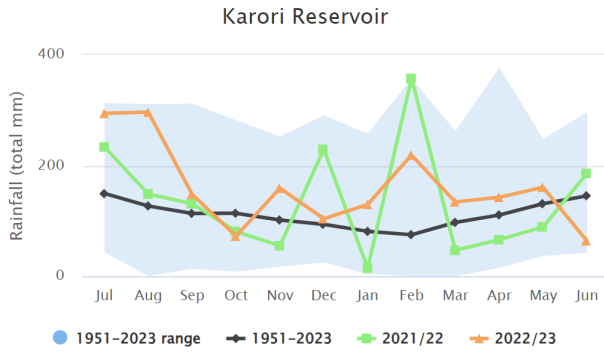


Figure 12: Monthly total and cumulative rainfall in the Te Whanganui-a-Tara whitua.

Ruamāhanga

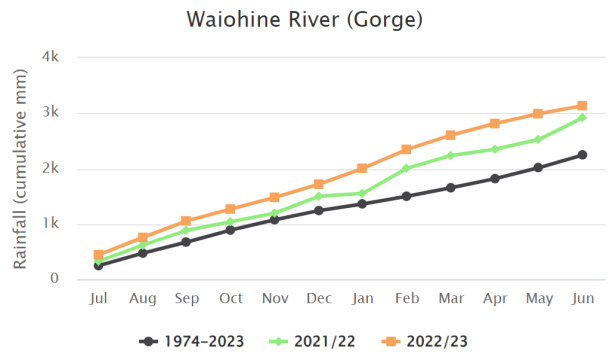
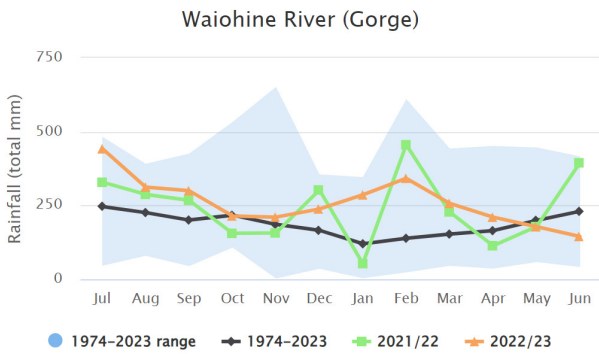
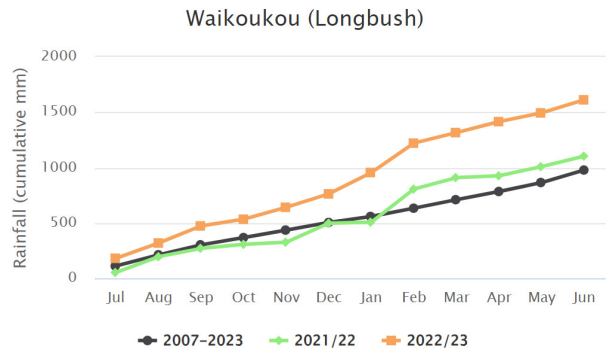
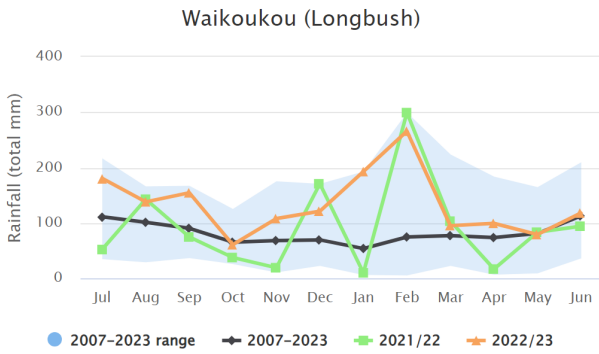
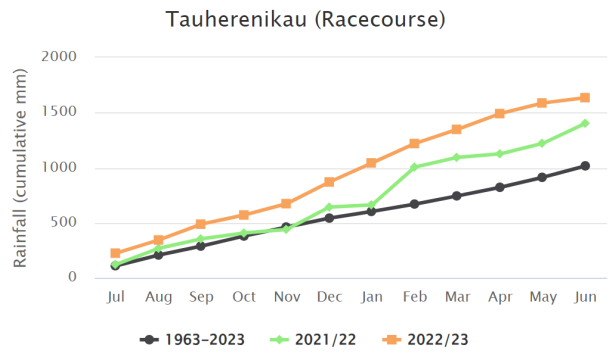
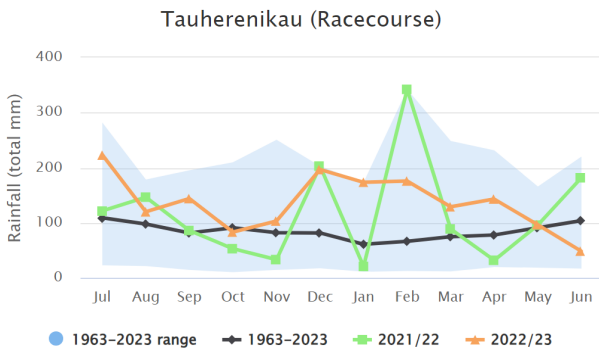
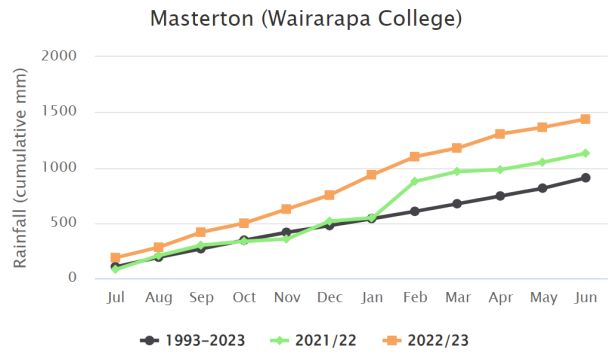
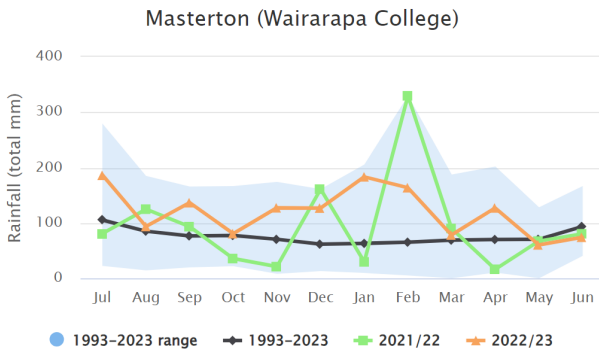
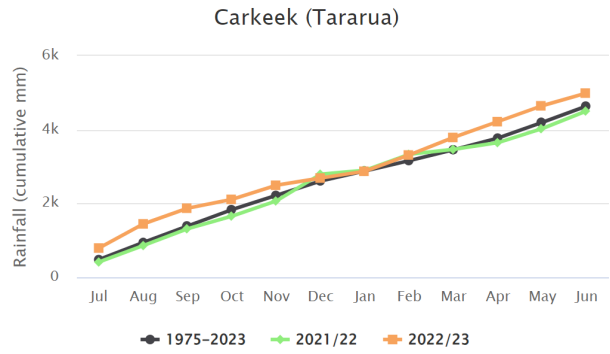
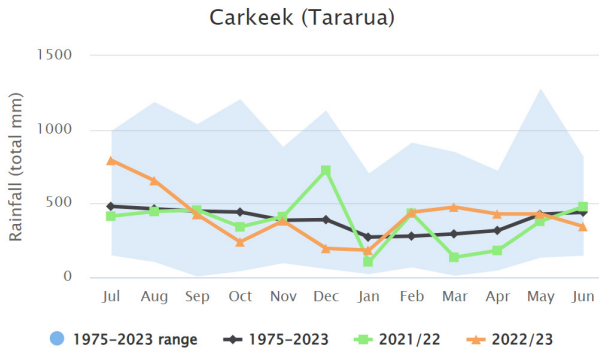


Figure 13: Monthly total and cumulative rainfall in the Ruamāhanga whitua.

Wairarapa Coast

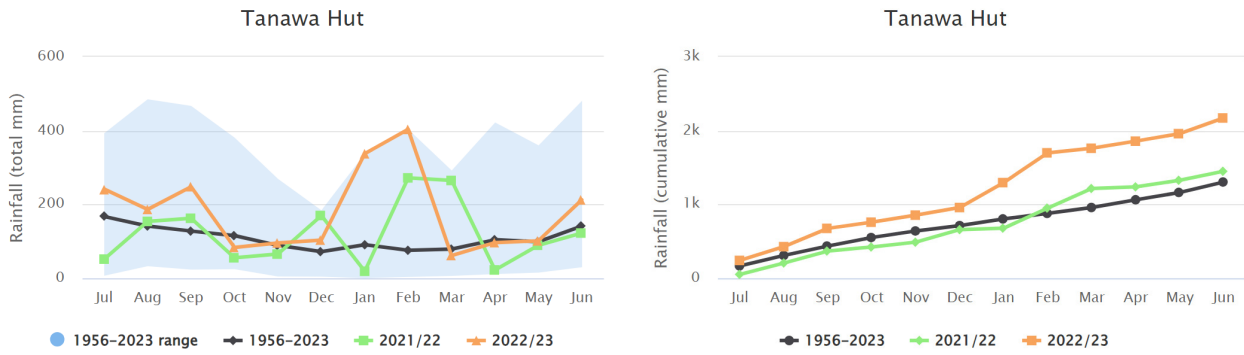


Figure 14: Monthly total and cumulative rainfall in the Wairarapa Coast whitua.

Seasonal totals

Table 2: Seasonal rainfall totals for select monitoring sites. Those sites that have a greater than 20 percent difference from their long-term seasonal average are shaded orange (**below average**) or blue (**above average**).

Site	Winter	Spring	Summer	Autumn
Carkeek (Taranua)	132	82	87	129
Hutt River (Kaitoke Headworks)	140	93	121	138
Karori Reservoir	158	116	184	130
Lower Hutt (Birch Lane)	98	109	121	141
Mackays Crossing	138	132	144	196
Masterton (Wairarapa College)	127	161	259	134
Ōtaki River (Depot)	161	125	114	156
Oriwa (Taranua)	144	81	79	150
Quartz Hill	148	100	142	117
Ruamāhanga River (Mt Bruce)	126	99	140	120
Seton Nossiter Park	154	119	143	180
Tanawa Hut	145	129	369	92
Taueru (Castlehill)	154	133	312	105
Tauherenikau (Racecourse)	130	130	272	153
Waikanae River (Water Treatment Plant)	131	102	94	173
Waikoukou (Longbush)	143	156	333	119
Wainuiomata Reservoir	123	117	226	120
Whangaehu River (Waihi)	128	127	262	128

Maximum recorded rainfalls

The highest and lowest recorded rainfall totals throughout the year at various monitoring sites have been assigned estimated return periods based on frequency analysis of long term recorded data (see [NIWA's HIRDS V4](#) for more information). **Blue** shaded values indicate a rainfall total with a 5-year return period or greater.

Note that for all frequency analysis results (rainfall and flows) a return period expressed as 100 years can be assigned a probability of occurring being 1/100, or 1% in any one year. Similarly, a 5-year return period event equates to 1/5 or a 20% chance of occurring in any one year.

Table 3: Maximum recorded rainfalls over short duration periods. Rainfall values are in mm, and return periods in years.

Site	1 hour			6 hours			12 hours		
	Rainfall	Start date	Return period	Rainfall	Start date	Return period	Rainfall	Start date	Return period
Bannister Basin (Tararua)	27.5	Mar 13, 2023	<2	84.5	Mar 13, 2023	<2	121.0	Aug 06, 2022	<2
Karori Reservoir	22.8	May 27, 2023	<2	45.2	Apr 19, 2023	<2	68.4	Apr 19, 2023	2
Mackays Crossing	23.8	May 04, 2023	3	42.0	May 03, 2023	<2	65.6	May 03, 2023	3
Masterton (Wairarapa College)	24.8	Nov 17, 2022	10	55.2	Nov 17, 2022	23	65.6	Nov 17, 2022	5
Ōtaki River (Depot)	22.4	Nov 22, 2022	3	38.4	Mar 17, 2023	<2	48.0	Jul 20, 2022	<2
Oriwa (Tararua)	41.5	Mar 26, 2023	3	99.5	Sep 29, 2022	<2	135.5	Sep 29, 2022	<2
Shandon Golf Club	20.8	Jan 13, 2023	2	42.4	Nov 27, 2022	<2	59.2	Nov 27, 2022	<2
Tanawa Hut	27.0	Feb 14, 2023	8	110.5	Feb 14, 2023	73	167.0	Feb 14, 2023	78
Tauherenikau (Racecourse)	30.6	Dec 25, 2022	100	45.4	Feb 15, 2023	10	57.6	Feb 15, 2023	4
Wainuiomata Reservoir	21.2	Jan 10, 2023	2	58.4	Feb 15, 2023	<2	101.2	Feb 14, 2023	3
Waiohine River (Gorge)	50.5	Dec 20, 2022	86	57.5	Dec 20, 2022	<2	72.5	Jul 12, 2022	<2

Table 4: Maximum recorded rainfalls over long duration periods. Rainfall values are in mm, and return periods in years.

Site	24 hours			48 hours			72 hours		
	Rainfall	Start date	Return period	Rainfall	Start date	Return period	Rainfall	Start date	Return period
Bannister Basin (Tararua)	198.5	Aug 18, 2022	<2	313.5	Jul 11, 2022	<2	430.5	Aug 18, 2022	4
Karori Reservoir	69.2	Apr 18, 2023	<2	104.8	Feb 14, 2023	<2	124.0	Feb 13, 2023	2
Mackays Crossing	98.2	May 03, 2023	9	106.4	May 03, 2023	5	111.8	May 03, 2023	3
Masterton (Wairarapa College)	66.6	Nov 17, 2022	<2	75.8	Nov 17, 2022	<2	90.8	Feb 13, 2023	<2
Ōtaki River (Depot)	67.2	May 03, 2023	<2	80.6	Jul 19, 2022	<2	92.8	Aug 18, 2022	<2
Oriwa (Tararua)	162.0	Sep 29, 2022	<2	207.5	Aug 18, 2022	<2	313.5	Aug 18, 2022	<2
Shandon Golf Club	68.0	Nov 27, 2022	<2	87.0	Feb 14, 2023	<2	107.4	Feb 13, 2023	<2
Tanawa Hut	240.5	Feb 13, 2023	82	279.0	Feb 13, 2023	100	297.5	Feb 13, 2023	100
Tauherenikau (Racecourse)	81.8	Dec 20, 2022	6	88.4	Dec 19, 2022	4	102.4	Feb 13, 2023	6
Wainuiomata Reservoir	137.8	Feb 13, 2023	4	236.2	Feb 14, 2023	12	295.0	Feb 13, 2023	14
Waiohine River (Gorge)	132.5	Dec 20, 2022	2	143.5	Feb 14, 2023	<2	189.0	Feb 13, 2023	2

Lowest recorded rainfalls

Table 5: Minimum total rainfalls (mm) over periods of 14, 28, and 90 days.

Site	14 days		28 days		3 months	
	Rainfall	Start date	Rainfall	Start date	Rainfall	Start date
Bannister Basin (Taranua)	12.5	Jan 13, 2023	245.5	Dec 24, 2022	1179.5	Nov 03, 2022
Horokiri Stream (Battle Hill)	0.6	Jan 12, 2023	23.0	May 31, 2023	233.8	Dec 21, 2022
Karori Reservoir	1.0	Jan 12, 2023	47.8	Sep 30, 2022	302.8	Oct 07, 2022
Mackays Crossing	0.0	Jan 12, 2023	26.2	Jun 01, 2023	243.6	Aug 20, 2022
Masterton (Wairarapa College)	0.4	Oct 25, 2022	13.2	Oct 14, 2022	225.8	Mar 18, 2023
Ōtaki River (Depot)	0.4	Jun 04, 2023	14.8	Jun 01, 2023	207.4	Jan 08, 2023
Oriwa (Taranua)	33.0	Jun 07, 2023	97.0	Dec 24, 2022	853.5	Nov 03, 2022
Savage Park	0.4	Jan 12, 2023	29.2	Sep 30, 2022	307.8	Nov 03, 2022
Shandon Golf Club	0.0	Oct 13, 2022	24.4	May 30, 2023	225.2	Aug 20, 2022
Tanawa Hut	0.5	Oct 15, 2022	11.0	Oct 14, 2022	241.0	Oct 03, 2022
Tauherenikau (Racecourse)	0.2	Oct 13, 2022	11.6	Oct 13, 2022	273.6	Sep 15, 2022
Tawa Pool	0.0	Jan 12, 2023	23.2	Aug 26, 2022	202.0	Dec 20, 2022
Waikanae River (Water Treatment Plant)	1.4	Oct 13, 2022	18.6	Jun 01, 2023	243.0	Aug 20, 2022
Waikanae River (Water Treatment Plant)	1.4	Jan 11, 2023	18.6	Jun 01, 2023	243.0	Aug 20, 2022
Waikoukou (Longbush)	0.8	Oct 25, 2022	6.4	Oct 14, 2022	247.4	Aug 12, 2022
Wainuiomata Reservoir	0.4	Jan 12, 2023	53.6	Sep 30, 2022	408.2	Aug 20, 2022
Waiohine River (Gorge)	1.5	Jan 12, 2023	85.5	May 20, 2023	495.5	Mar 18, 2023

River level and flow results

Average flows

Mean monthly river flows (m³/s) for the year compared against the previous year and the long-term average/range.

Kāpiti Coast

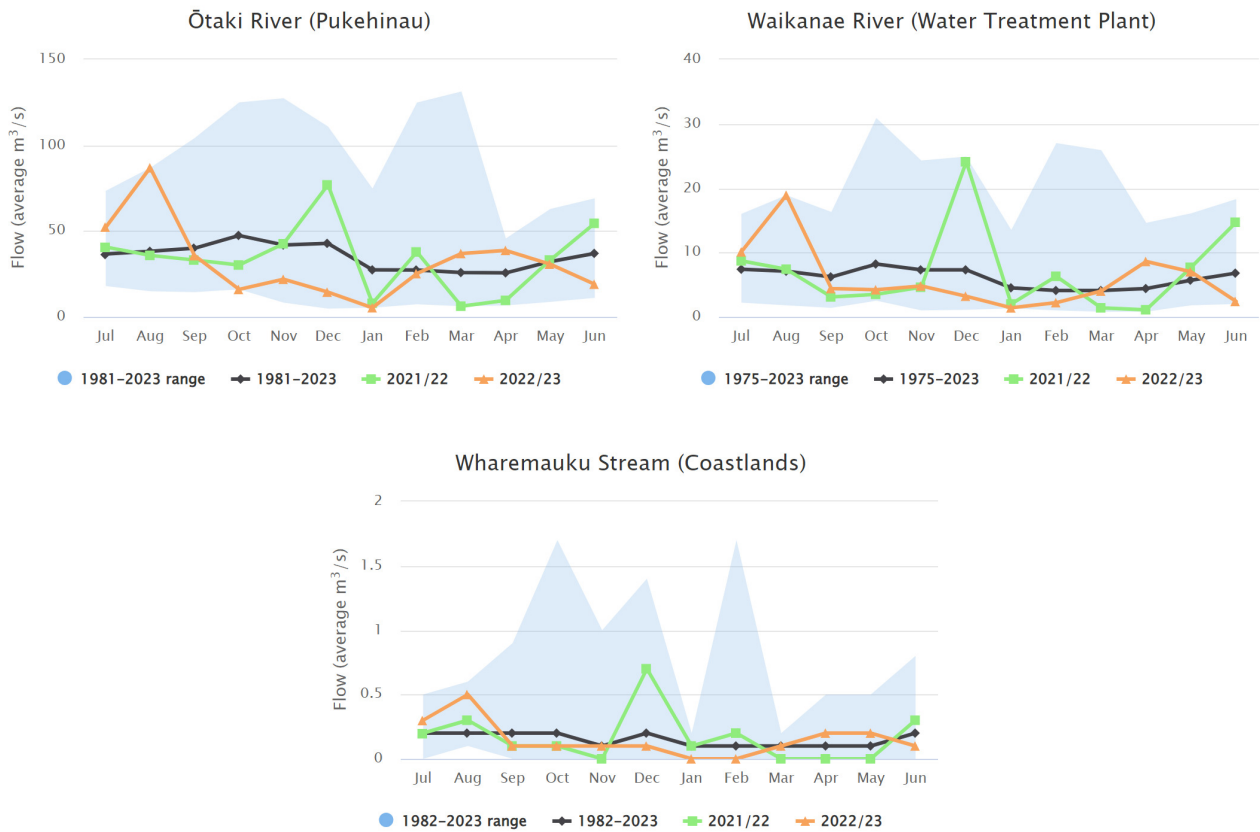


Figure 15: Monthly average river flow in the Kāpiti Coast whitua.

Te Awarua-o-Porirua

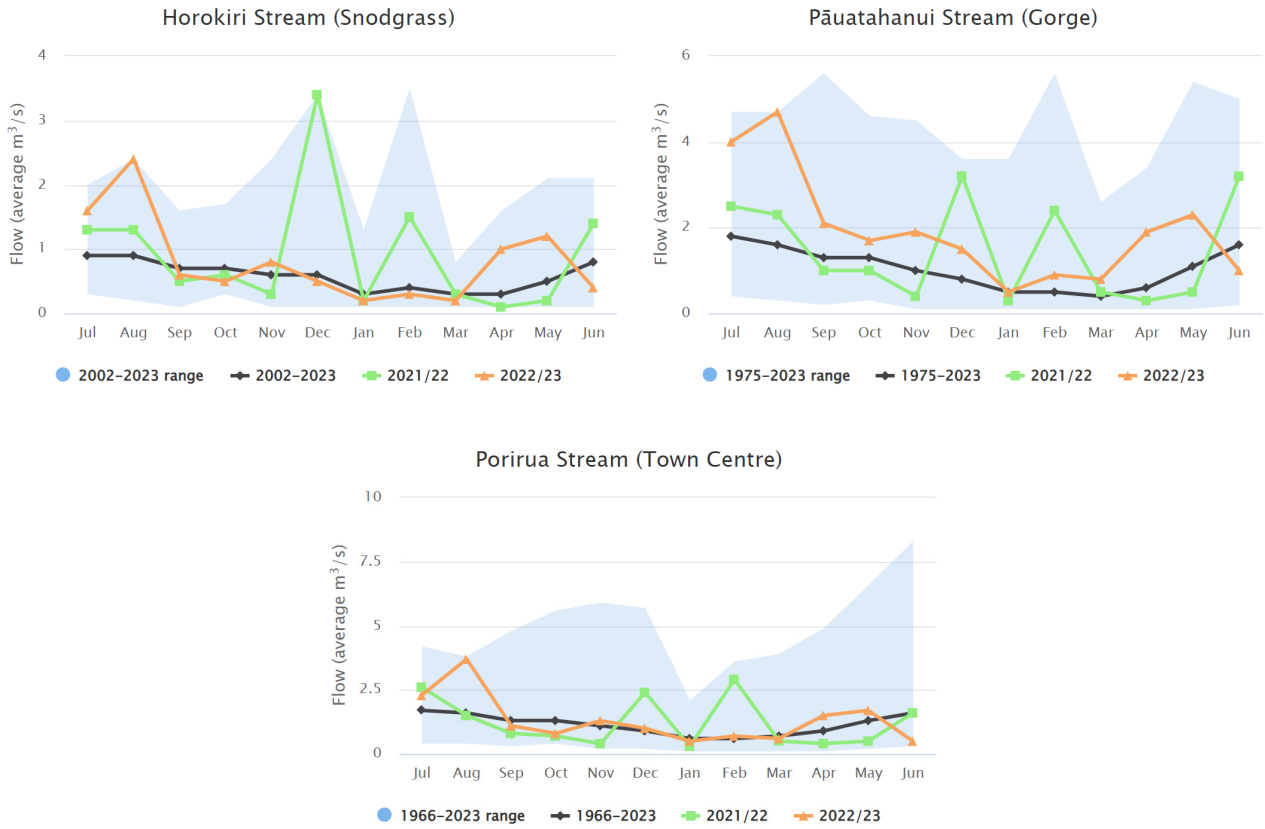


Figure 16: Monthly average river flow in the Te Awarua-o-Porirua whaitua.

Te Whanganui-a-Tara

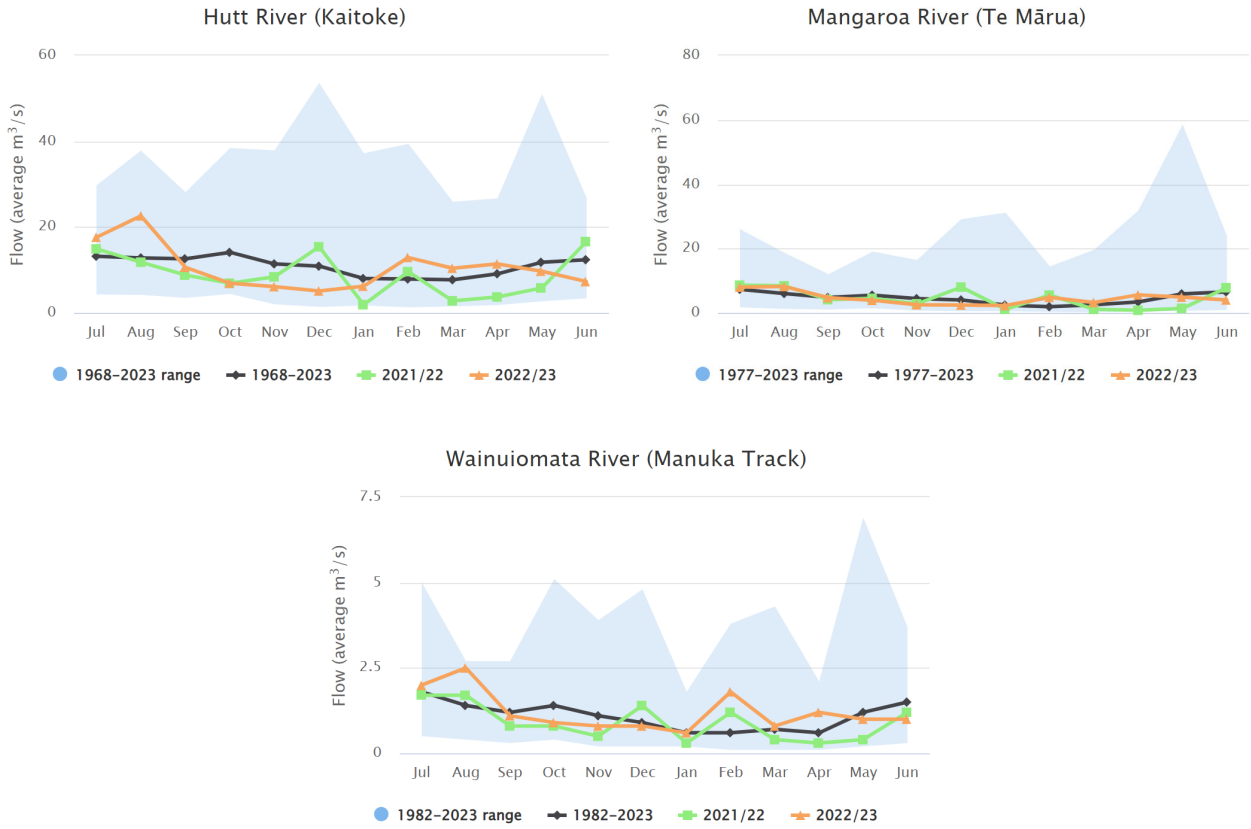


Figure 17: Monthly average river flow in the Te Whanganui-a-Tara whaitua.

Ruamāhanga

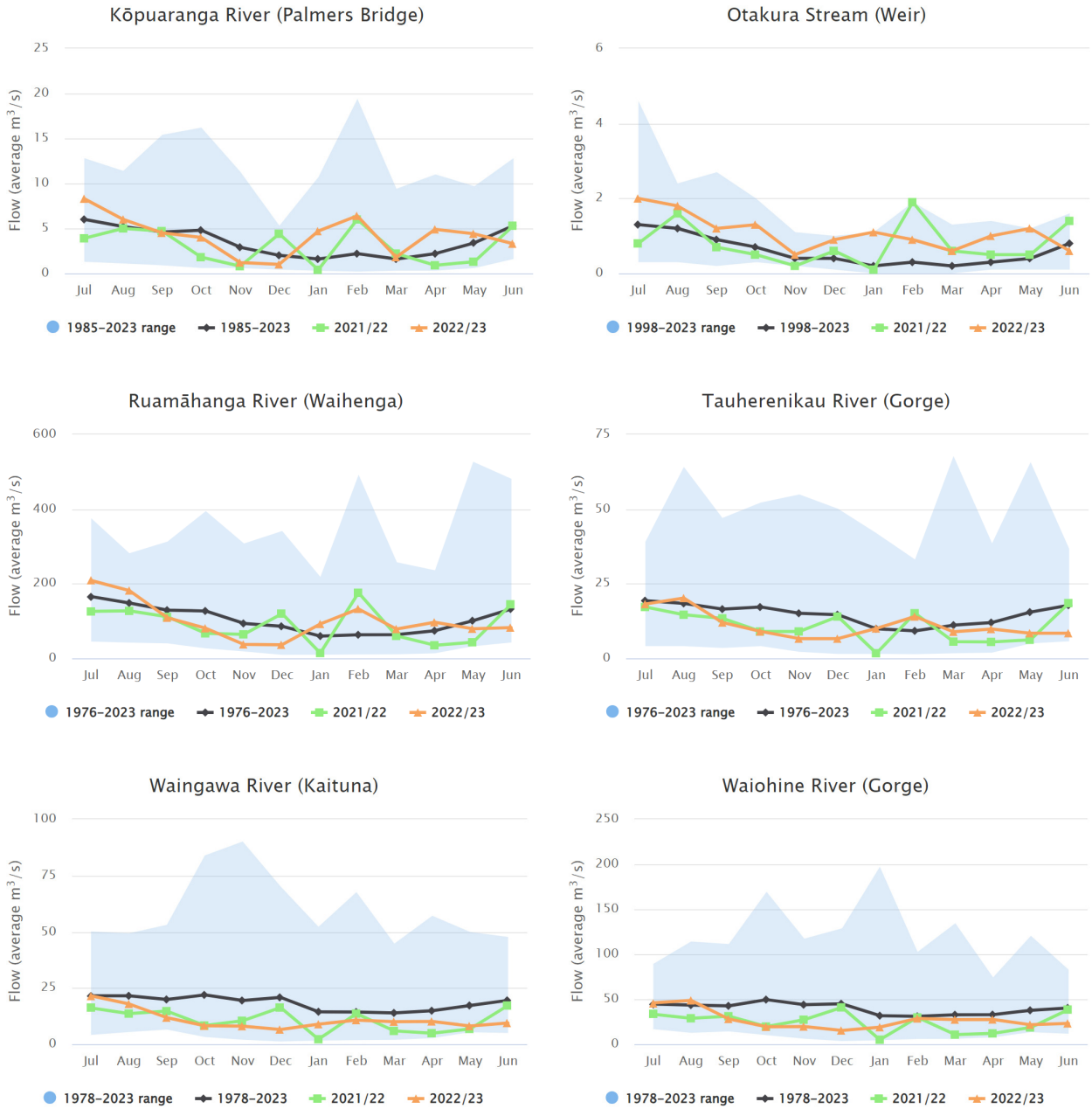


Figure 18: Monthly average river flow in the Ruamāhanga whaitua.

Wairarapa Coast

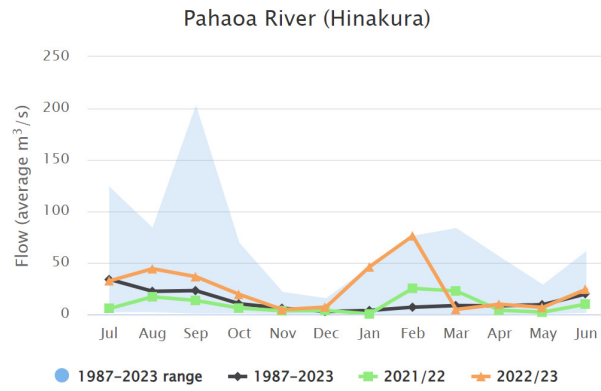


Figure 19: Monthly average river flow in the Wairarapa Coast whitua.

Maximum flows

Table 6: Maximum recorded river flows with return periods derived by flood frequency analysis of annual peak flows recorded at each site. Sites highlighted in **blue** indicate a flood flow in excess of a 5-year return period. Note that for all frequency analysis results (high or low flows and rainfall) a return period expressed as 100 years can be assigned a probability of occurring being 1/100, or 1% in any one year. Similarly, a 5-year return period event equates to 1/5 or a 20% chance of occurring in any one year.

Site	Date of occurrence	Max flow (m ³ /s)	Estimated return period (yrs)
Ōtaki River (Pukehinau)	Aug 07, 2022	645	<2
Akatarawa River (Cemetery)	Aug 07, 2022	176	<2
Horokiri Stream (Snodgrass)	Aug 19, 2022	19	<2
Huangaaru (Hautotara)	Aug 08, 2022	330	8
Hutt River (Birchville)	Aug 07, 2022	420	<2
Hutt River (Kaitoke)	Feb 14, 2023	184	<2
Hutt River (Taita Gorge)	Aug 07, 2022	459	<2
Kōpuaranga River (Palmer's Bridge)	Apr 22, 2023	65	2
Mangaone Stream (Ratanui)	Aug 07, 2022	6	<2
Mangaroa River (Te Mārua)	Jul 21, 2022	67	<2
Mangatarere River (Gorge)	Jul 12, 2022	52	<2
Pāuatahanui Stream (Gorge)	Jul 21, 2022	31	<2
Pahaoa River (Hinakura)	Feb 14, 2023	1391	48
Pakuratahi River (Truss Bridge)	Sep 23, 2022	96	<2
Porirua Stream (Town Centre)	Apr 19, 2023	44	4
Ruamāhanga River (Gladstone Bridge)	Mar 30, 2023	1325	21
Ruamāhanga River (Mt Bruce)	Jul 13, 2022	196	<2
Ruamāhanga River (Waihenga)	Jul 13, 2022	1141	<2
Ruamāhanga River (Wardells)	Jul 12, 2022	660	8
Taueru River (Te Weraiti)	Feb 15, 2023	356	9
Tauherenikau River (Gorge)	Feb 14, 2023	225	<2
Waikanae River (Water Treatment Plant)	Aug 07, 2022	139	<2
Waingawa River (Kaituna)	Jul 13, 2022	180	<2
Wainuiomata River (Leonard Wood Park)	Feb 16, 2023	63	<2
Wainuiomata River (Manuka Track)	Feb 16, 2023	25	<2
Waiohine River (Gorge)	Feb 14, 2023	441	<2
Waipoua River (Mikimiki Bridge)	Jul 12, 2022	199	<2
Waiwhetū Stream (Whites Line East)	Feb 16, 2023	13	<2
Whakatikei River (Dude Ranch)	Sep 30, 2022	49	<2

Low flow periods

Table 7: Minimum recorded river flows (m³/s averaged over 7- and 28-day periods). Significant flow events (5-year return period or greater) are shaded **blue**. Note that for all frequency analysis results (high or low flows and rainfall) a return period expressed as 100 years can be assigned a probability of occurring being 1/100, or 1% in any one year. Similarly, a 5-year return period event equates to 1/5 or a 20% chance of occurring in any one year.

Site	7-day duration			28-day duration		
	Lowest mean flow	Start date	Return period	Lowest mean flow	Start date	Return period
Akatarawa River (Cemetery)	1.33	Jan 20, 2023	<2	1.70	Jan 08, 2023	<2
Horokiri Stream (Snodgrass)	0.12	Feb 07, 2023	<2	0.16	Jan 17, 2023	<2
Hutt River (Birchville)	5.14	Jan 20, 2023	<2	9.10	Jun 30, 2023	<2
Hutt River (Kaitoke)	2.91	Dec 30, 2022	<2	3.82	Jun 30, 2023	<2
Hutt River (Taita Gorge)	5.42	Jan 20, 2023	<2	9.40	Jun 30, 2023	<2
Kōpuaranga River (Palmer's Bridge)	0.49	Dec 29, 2022	<2	0.87	Oct 20, 2022	<2
Mangaone Stream (Ratanui)	0.09	Feb 23, 2023	<2	0.10	Feb 08, 2023	<2
Mangaroa River (Te Mārua)	0.86	Jan 20, 2023	<2	1.36	Jan 16, 2023	<2
Mangatarere River (Gorge)	0.21	Nov 10, 2022	<2	0.41	Oct 20, 2022	<2
Ōtaki River (Pukehinau)	2.27	Jan 20, 2023	<2	4.86	Jan 08, 2023	<2
Pahaoa River (Hinakura)	0.57	Feb 07, 2023	<2	1.58	Nov 23, 2022	<2
Pakuratahi River (Truss Bridge)	0.54	Nov 05, 2022	<2	0.78	Feb 08, 2023	<2
Porirua Stream (Town Centre)	0.27	Feb 07, 2023	<2	0.34	Jun 30, 2023	<2
Ruamāhanga River (Mt Bruce)	1.80	Jan 20, 2023	<2	3.56	Oct 21, 2022	<2
Ruamāhanga River (Waihenga)	10.10	Nov 06, 2022	<2	20.75	Oct 21, 2022	<2
Ruamāhanga River (Wardells)	13.11	Jul 01, 2022	<2	19.53	Oct 20, 2022	<2
Tauherenikau River (Gorge)	2.43	Jan 21, 2023	<2	3.53	Jun 30, 2023	<2
Waikanae River (Water Treatment Plant)	1.16	Jan 20, 2023	<2	1.28	Jan 08, 2023	<2
Waingawa River (Kaituna)	2.35	Dec 30, 2022	<2	4.36	Oct 20, 2022	<2

Site	7-day duration			28-day duration		
	Lowest mean flow	Start date	Return period	Lowest mean flow	Start date	Return period
Wainuiomata River (Manuka Track)	0.35	Feb 07, 2023	<2	0.45	Jan 14, 2023	<2
Waiohine River (Gorge)	5.53	Jan 21, 2023	<2	10.65	Jun 30, 2023	<2
Waipoua River (Mikimiki Bridge)	0.77	Nov 04, 2022	<2	1.10	Oct 20, 2022	<2
Whakatikei River (Dude Ranch)	0.43	Jan 20, 2023	<2	0.51	Jan 08, 2023	<2

Low flow exceedances

Table 8: GW has defined low flow thresholds on several rivers and streams across the Region to signify when restrictions on abstractions should begin (restriction thresholds) and when all abstractions shall stop (minimum flows). These are defined in the [GW Freshwater Plan](#)). This table summarises the number of instances that the first restriction threshold was reached for rivers and streams as specified in the Regional Freshwater Plan. Values for the current year are in **bold** and results from the previous three years are included for comparison.

Site	First restriction threshold (m ³ /s)	Number of days below threshold			
		2019/20	2020/21	2021/22	2022/23
Hutt River (Birchville)	1.45	0	0	0	0
Kōpuaranga River (Palmer's Bridge)	0.27	65	10	0	0
Mangaone Stream (Ratanui)	0.05	0	0	0	0
Mangatarere River (Gorge)	0.33	119	106	42	18
Ōtaki River (Pukehinau)	4.38	0	3	21	29
Orongorongo River (Truss Bridge)	0.10	0	0	0	0
Ruamāhanga River (Waihenga)	9.80	53	33	10	11
Ruamāhanga River (Wardells)	2.70	51	35	6	0
Tauherenikau River (Gorge)	1.35	49	28	14	0
Waikanae River (Water Treatment Plant)	0.90	0	0	10	0
Waingawa River (Kaituna)	1.90	86	65	48	0
Wainuiomata River (Leonard Wood Park)	0.36	13	0	28	3
Waiohine River (Gorge)	3.04	16	8	6	0
Waipoua River (Mikimiki Bridge)	0.30	63	37	7	0
Waitohu Stream (Water Supply Intake)	0.18	56	18	78	24

High river level alarms

As part of its flood warning and response service, GW sets high river level alarms on many of its monitoring sites to provide early warning of rising river levels and possible flooding.

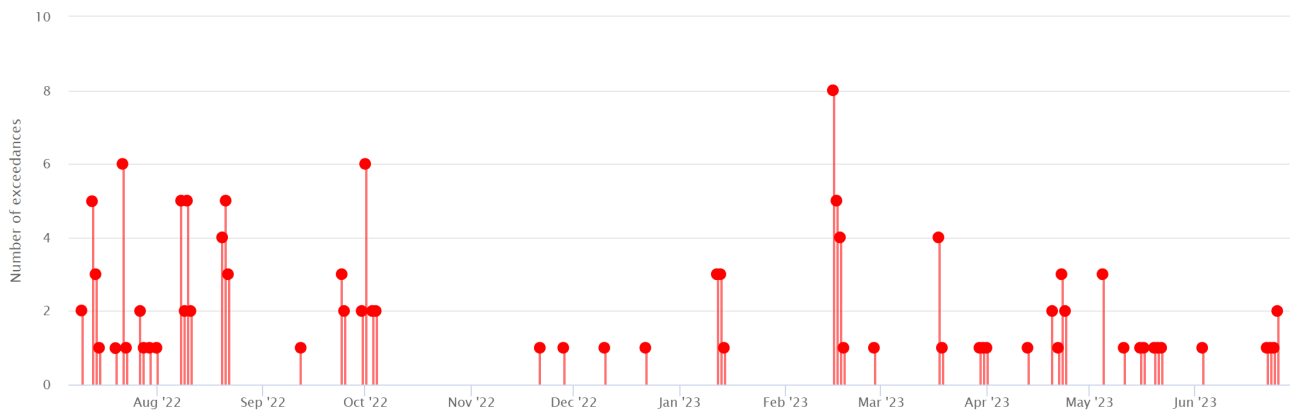


Figure 20: Number of flood warning alarms triggered by date.

Table 9: River levels that triggered alarms at each site with thresholds included.

Site	Event date	River level (m)	Threshold (m)
Akatarawa River (Cemetery)	Aug 08, 2022	3.60	3.20
Akatarawa River (Cemetery)	Oct 01, 2022	3.62	3.35
Akatarawa River (Cemetery)	Mar 18, 2023	2.61	2.50
Horokiri Stream (Snodgrass)	Jul 22, 2022	1.41	1.30
Horokiri Stream (Snodgrass)	Aug 20, 2022	3.22	3.20
Horokiri Stream (Snodgrass)	Aug 21, 2022	3.48	3.20
Horokiri Stream (Snodgrass)	Aug 22, 2022	3.45	3.20
Horokiri Stream (Snodgrass)	Sep 30, 2022	1.40	0.90
Horokiri Stream (Snodgrass)	May 05, 2023	3.81	2.00
Huangerua (Hautotara)	Aug 09, 2022	3.86	3.35
Huangerua (Hautotara)	Aug 10, 2022	9.14	9.00
Huangerua (Hautotara)	Dec 22, 2022	3.65	3.40
Huangerua (Hautotara)	Feb 15, 2023	2.69	2.50
Lake Onoke	Jul 13, 2022	2.36	1.80
Porirua Stream (Town Centre)	Jul 20, 2022	0.94	0.90
Porirua Stream (Town Centre)	Aug 01, 2022	1.05	0.90
Porirua Stream (Town Centre)	Nov 21, 2022	0.92	0.90
Porirua Stream (Town Centre)	Nov 28, 2022	1.35	0.90
Porirua Stream (Town Centre)	Dec 10, 2022	1.18	0.90
Porirua Stream (Town Centre)	Apr 20, 2023	1.36	1.30
Porirua Stream (Town Centre)	May 11, 2023	1.28	0.90
Ruamāhanga River (Gladstone Bridge)	Jul 10, 2022	3.54	3.35
Ruamāhanga River (Gladstone Bridge)	Jul 27, 2022	3.61	3.35
Ruamāhanga River (Gladstone Bridge)	Aug 11, 2022	4.77	3.35
Ruamāhanga River (Gladstone Bridge)	Sep 24, 2022	2.22	1.90
Ruamāhanga River (Gladstone Bridge)	Sep 25, 2022	4.06	3.35
Ruamāhanga River (Gladstone Bridge)	Oct 03, 2022	3.66	3.35

Site	Event date	River level (m)	Threshold (m)
Ruamāhanga River (Gladstone Bridge)	Oct 04, 2022	3.35	3.35
Ruamāhanga River (Gladstone Bridge)	Jan 12, 2023	10.16	9.00
Ruamāhanga River (Gladstone Bridge)	Jan 13, 2023	10.16	9.00
Ruamāhanga River (Gladstone Bridge)	Feb 16, 2023	1.43	1.30
Ruamāhanga River (Gladstone Bridge)	Feb 27, 2023	2.34	2.00
Ruamāhanga River (Gladstone Bridge)	Mar 30, 2023	3.83	2.00
Ruamāhanga River (Gladstone Bridge)	Mar 31, 2023	3.97	2.00
Ruamāhanga River (Gladstone Bridge)	Apr 01, 2023	2.82	2.00
Ruamāhanga River (Gladstone Bridge)	Apr 13, 2023	2.42	2.00
Ruamāhanga River (Gladstone Bridge)	Apr 22, 2023	3.69	2.00
Ruamāhanga River (Gladstone Bridge)	Apr 23, 2023	3.79	3.00
Ruamāhanga River (Gladstone Bridge)	Apr 24, 2023	4.54	3.35
Ruamāhanga River (Gladstone Bridge)	May 16, 2023	3.80	2.00
Ruamāhanga River (Gladstone Bridge)	May 17, 2023	3.07	2.00
Ruamāhanga River (Gladstone Bridge)	May 20, 2023	3.43	2.00
Ruamāhanga River (Gladstone Bridge)	May 21, 2023	3.69	2.00
Ruamāhanga River (Gladstone Bridge)	May 22, 2023	3.51	2.00
Ruamāhanga River (Gladstone Bridge)	Jun 03, 2023	3.27	2.00
Ruamāhanga River (Gladstone Bridge)	Jun 22, 2023	3.66	2.00
Ruamāhanga River (Gladstone Bridge)	Jun 23, 2023	3.92	2.00
Ruamāhanga River (Gladstone Bridge)	Jun 24, 2023	3.75	2.00
Ruamāhanga River (Gladstone Bridge)	Jun 25, 2023	3.57	3.35
Ruamāhanga River (Waihenga)	Jul 14, 2022	2.63	2.50
Ruamāhanga River (Waihenga)	Jul 15, 2022	4.92	3.35
Ruamāhanga River (Waihenga)	Jul 23, 2022	3.57	3.35
Ruamāhanga River (Waihenga)	Jul 28, 2022	3.46	3.35
Ruamāhanga River (Waihenga)	Jul 30, 2022	3.59	3.35
Ruamāhanga River (Waihenga)	Sep 12, 2022	3.67	3.35
Ruamāhanga River (Waihenga)	Jan 14, 2023	3.35	3.35
Ruamāhanga River (Waihenga)	Feb 17, 2023	1.65	1.30
Ruamāhanga River (Waihenga)	Feb 18, 2023	3.44	3.35
Ruamāhanga River (Waihenga)	Mar 19, 2023	3.47	3.35

Groundwater level results

The figures below show mean daily groundwater levels for this and last year compared to historical mean daily levels. All units are metres above average sea level.

Rumahāhanga

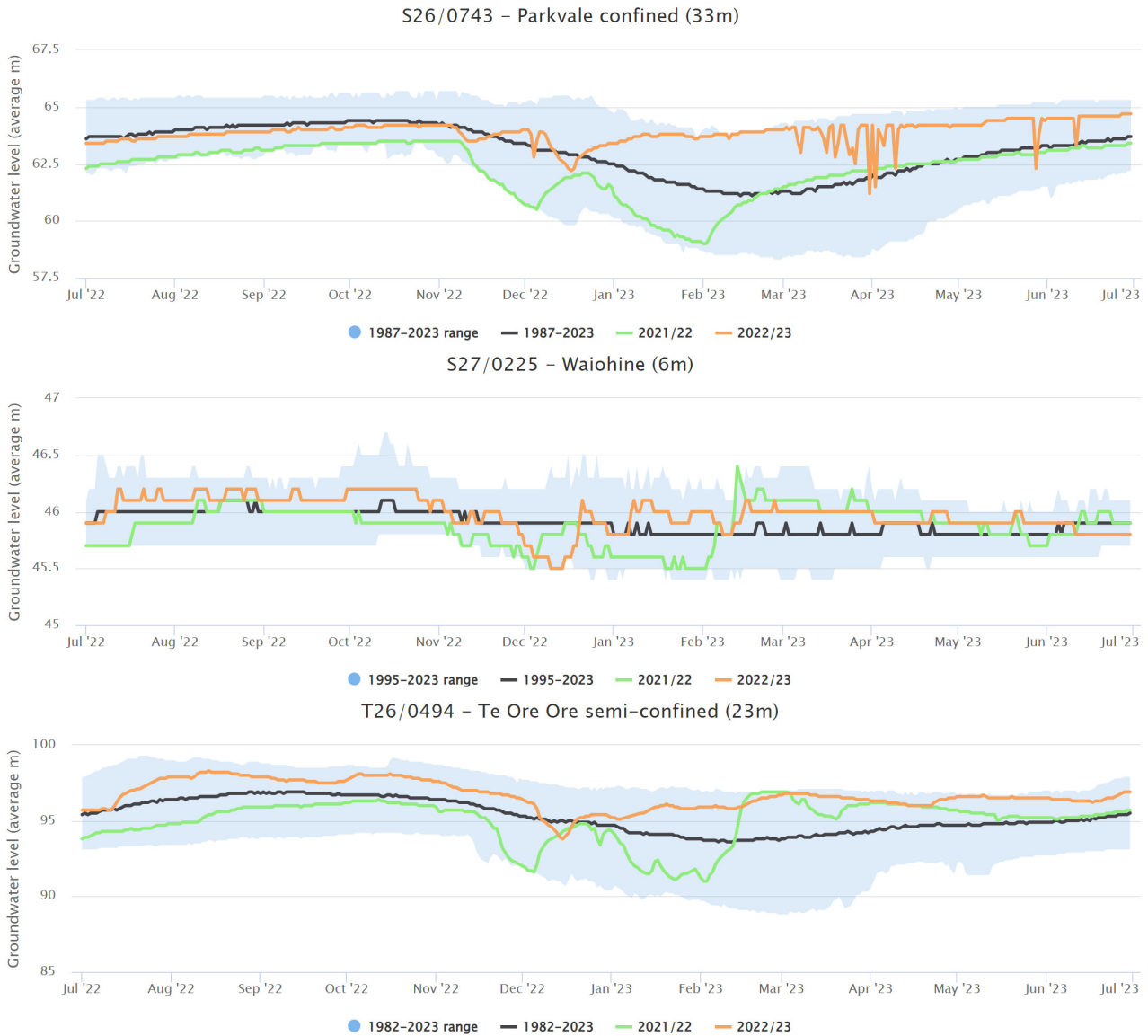


Figure 21: Daily groundwater levels in the Rumahāhanga whaitua.

Te Whanganui-a-Tara

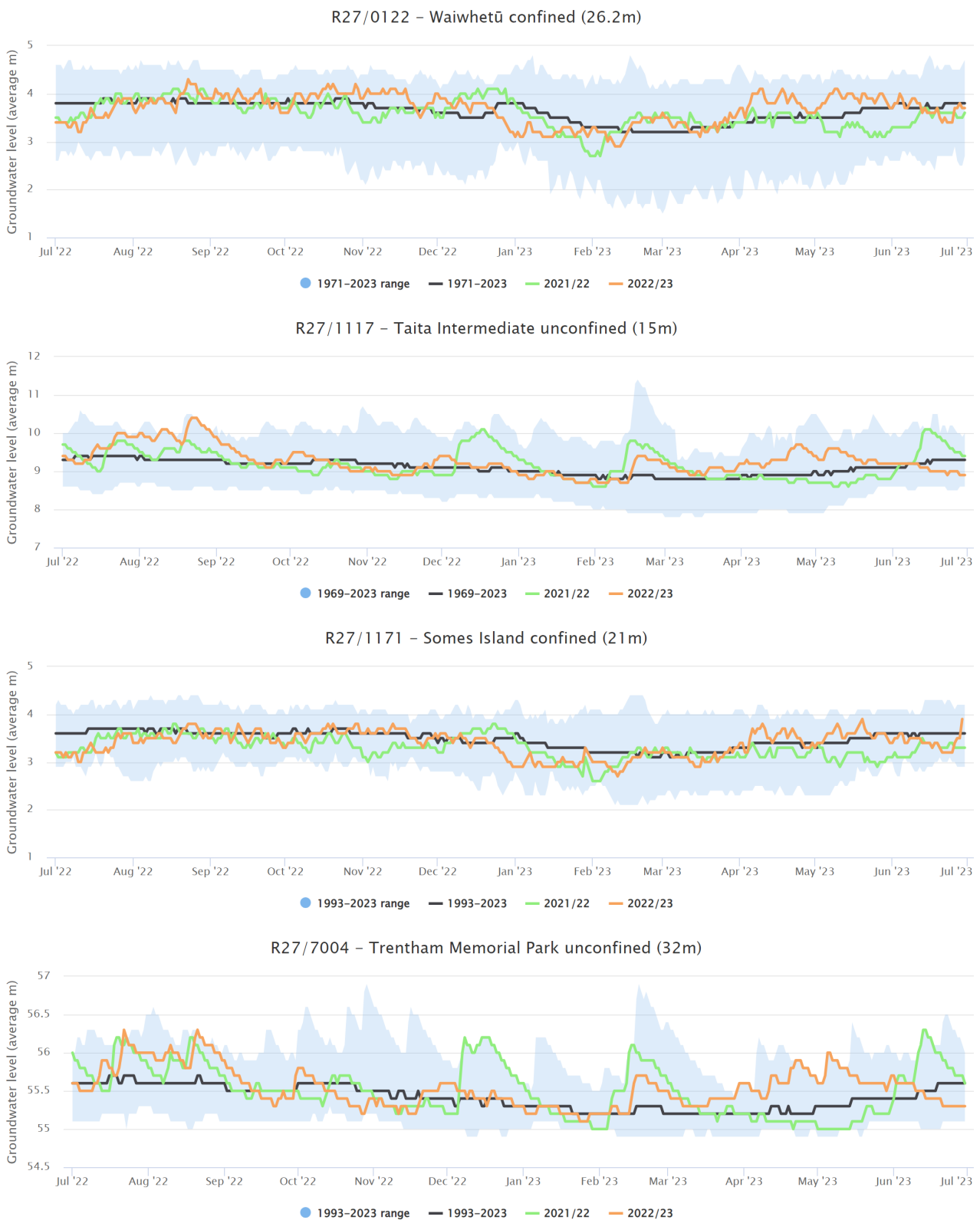


Figure 22: Daily groundwater levels in the Te Whanganui-a-Tara whaitua.

Kāpiti Coast

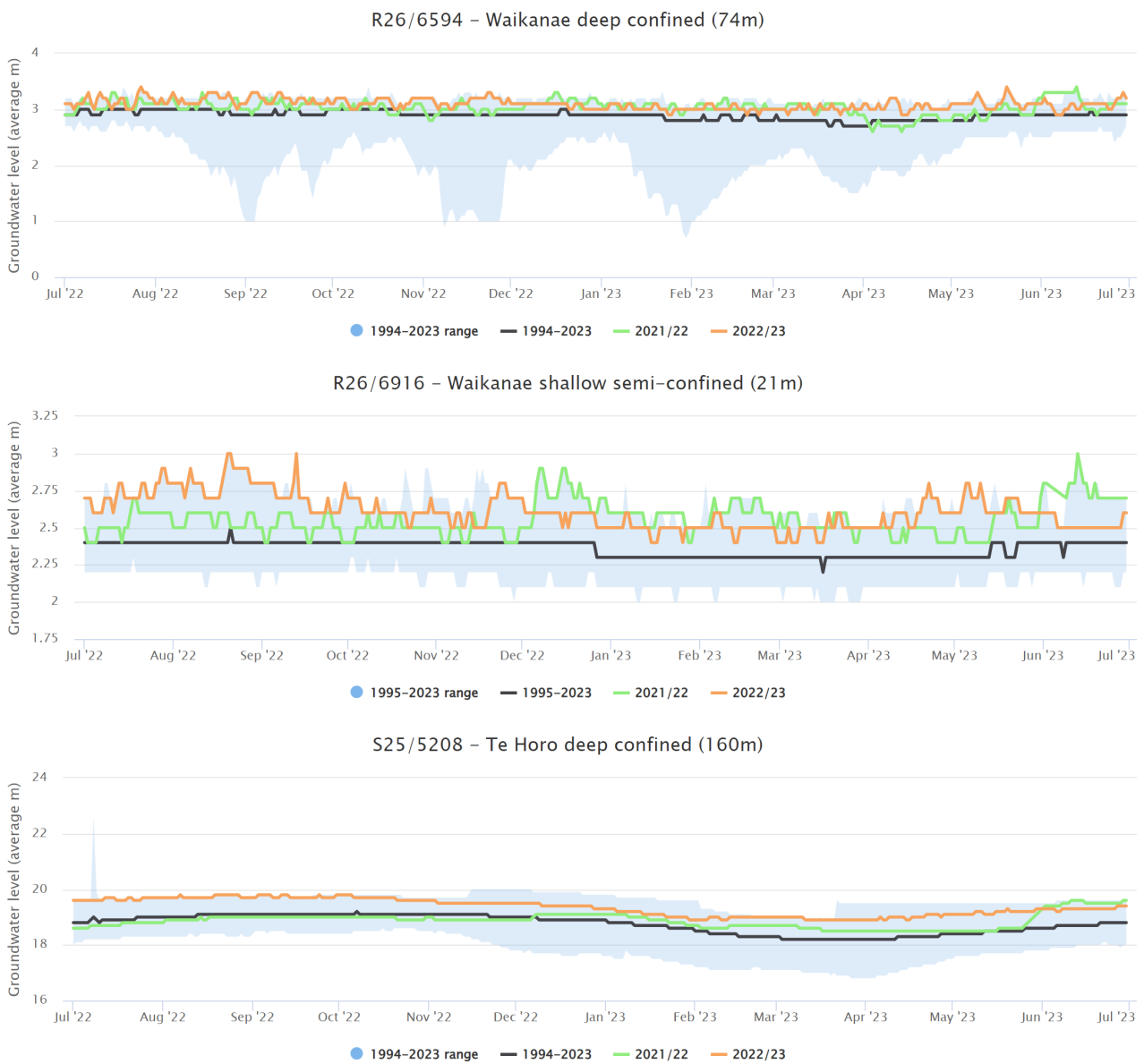


Figure 23: Daily groundwater levels in the Kāpiti Coast whaitua.

Lake & wetland level results

Lakes

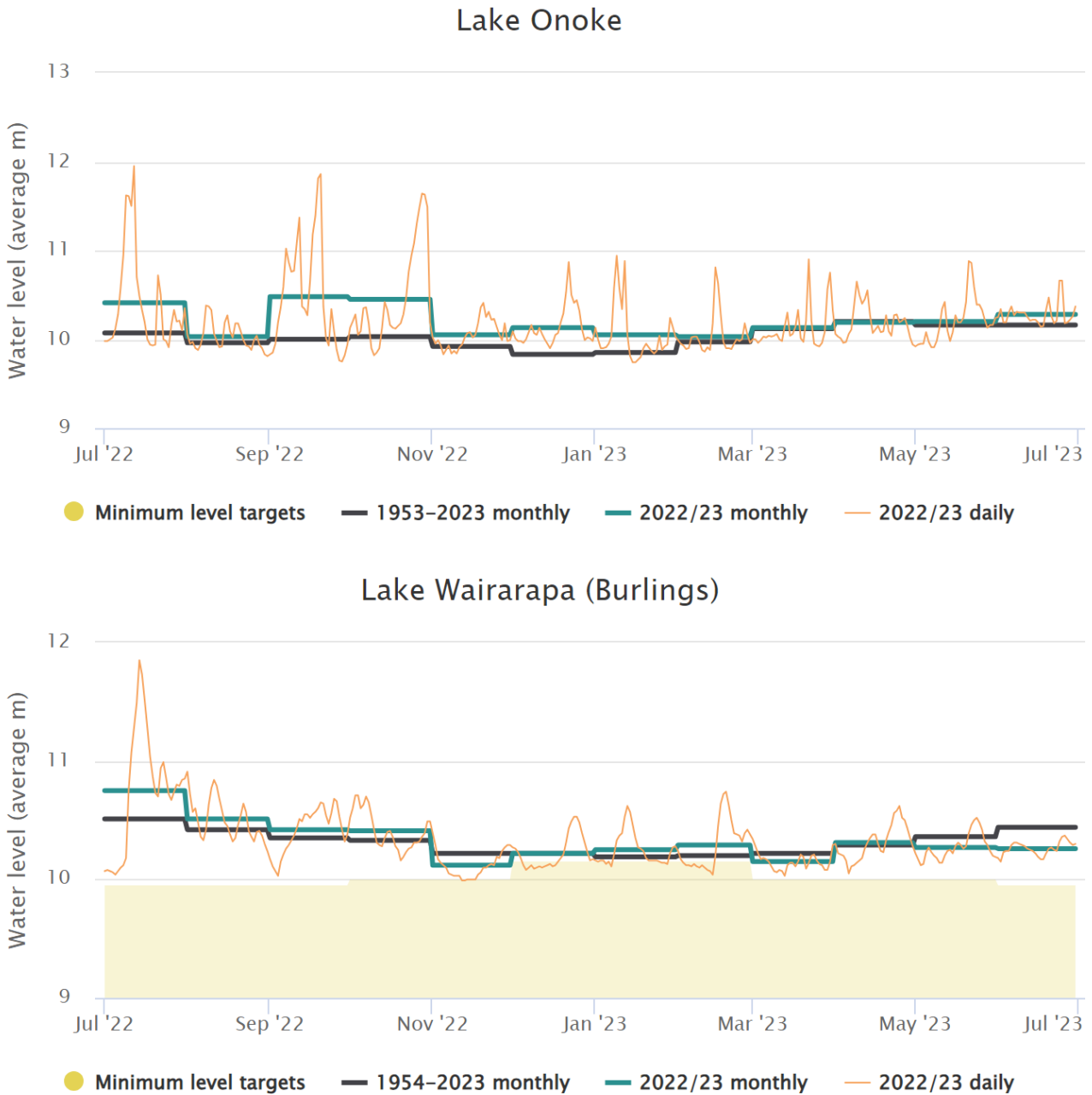


Figure 24: Recorded lake levels (metres above average sea level) at Lake Wairarapa and Lake Onoke. This year’s data are presented as a daily mean level and a monthly mean level with the long-term monthly mean for comparison. The minimum lake water level for Lake Wairarapa (as specified in the [GW Regional Freshwater Plan](#)) is shown by the shaded yellow area. There is no minimum level set for Lake Onoke.

Wetlands

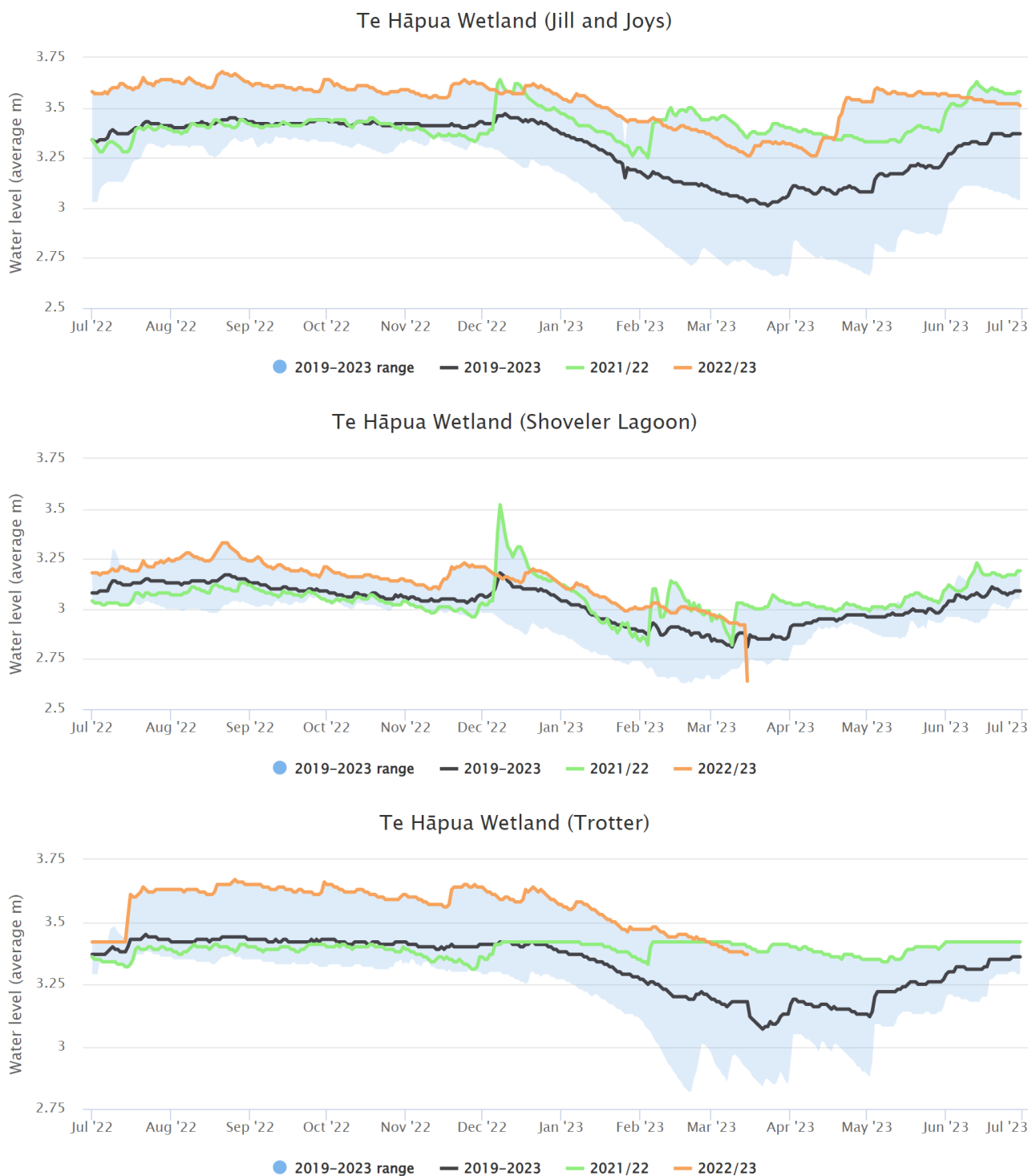


Figure 25: Water levels have been recorded at three monitoring sites within the Te Hāpua wetland complex on the Kāpiti Coast since 2008. Below shows this years recorded daily mean water levels (metres above average sea level) at each site in comparison to last year and historical averages/ranges.

Soil moisture results

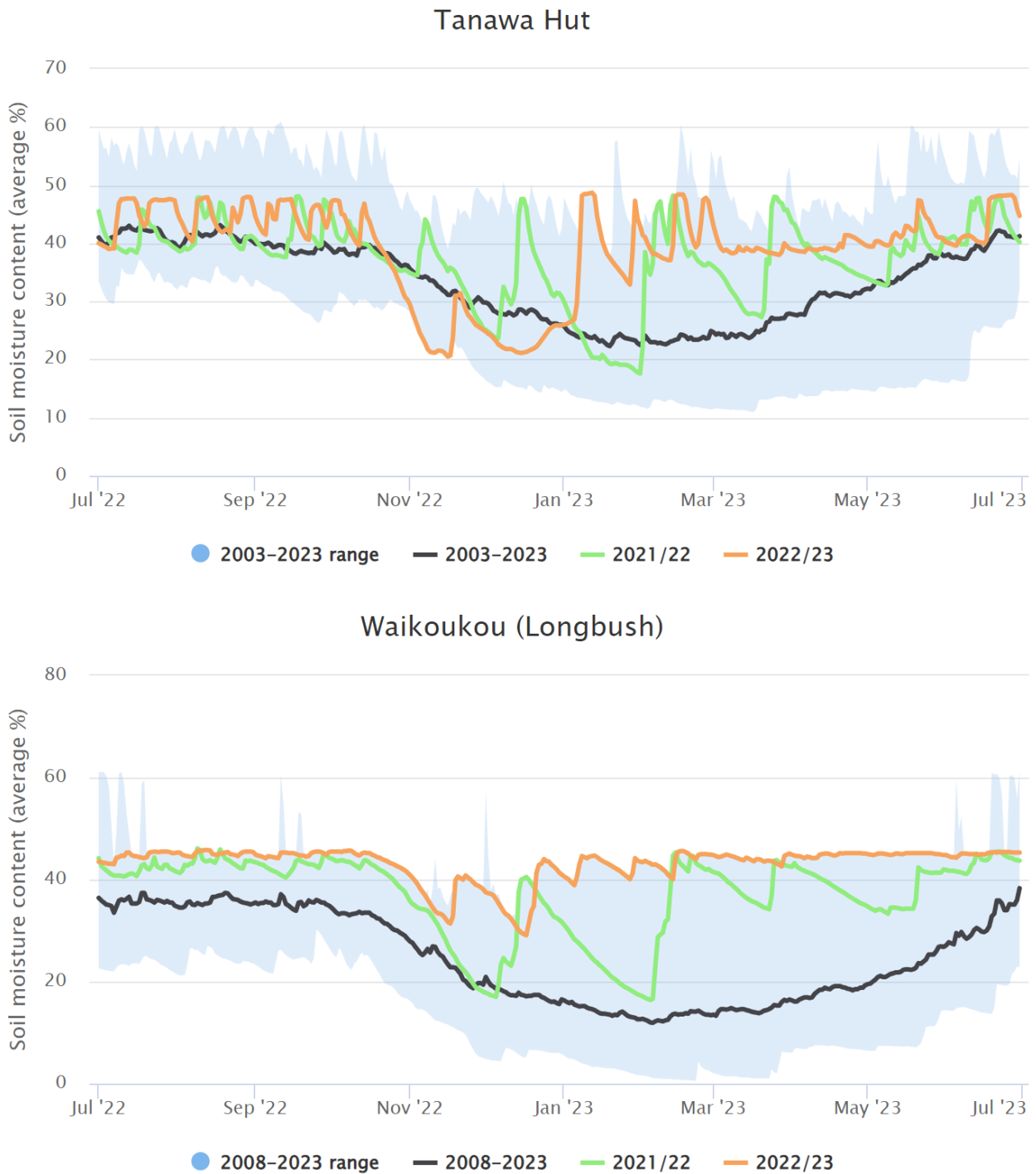


Figure 26: Daily average soil moisture content (%) is shown below for the Tanawa Hut (near Tinui) and Waikoukou (Longbush) monitoring sites. The previous year and long-term average/range are also shown for comparison.