

RAINFALL & RIVER FLOW MONTHLY REPORT

OTAGO REGIONAL COUNCIL

June 2005

In Brief

Reasonably settled weather brought drier than normal conditions for much of Otago. North Otago, Queenstown Lakes, and the Manuherikia areas in particular were considerably drier than normal, with some rain gauge totals less than one quarter of the long term average. A few areas recorded normal or above normal rainfall, with the Waipahi district in Southwest Otago being particularly wet. The Tima rain gauge near Millers Flat also recorded above average rain this month.

A considerable amount of the rain that did fall, arrived at the start of the month, and this caused some small flood events across most of the region. In particular the Pomahaka at Burkes Ford peaked at almost 500 cumecs, which has a return period of 4 years (25% chance of occurring in any one year). Elsewhere, the Taieri at Outram peaked at 113 cumecs, and the Kakanui at Clifton Falls reached 11 cumecs. The remainder of the month was relatively dry in most places.

In the Queenstown Lakes district, Wakatipu and Wanaka lake levels for the month were slightly below normal for the month.

Summary text and graphs are provided for the following districts:

- North Otago
- Dunedin
- Lower Taieri and Strath Taieri
- South Otago
- Central Otago
- Queenstown Lakes

A summary table of flow and rainfall at the end of the report gives more detail on sites in each of these areas.

Dunedin enjoys a fair midwinter

The Musselburgh climate station in Dunedin records daily sunshine hours. The total number of sunshine hours for June - the middle of winter, when days are shortest - was 134. Compare this to the unremarkable weather that we experienced six months ago: the total number of sunshine hours for December 2004 - the middle of summer, when days are longest - was just 120.

The rainfall comparison is equally bad. There were 21 days in December when some rain was recorded at Musselburgh, with a total of 108mm collected. In June, there were only 11 rain days, with 50mm recorded.

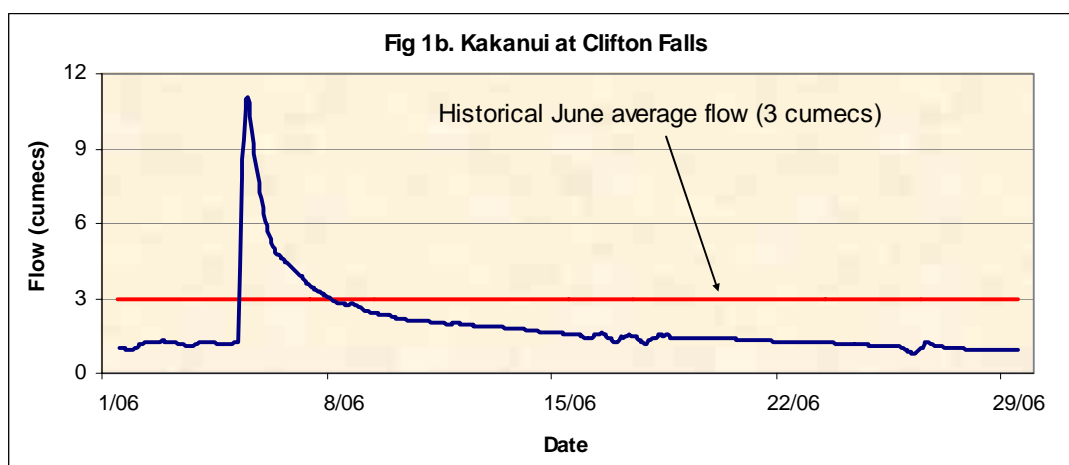
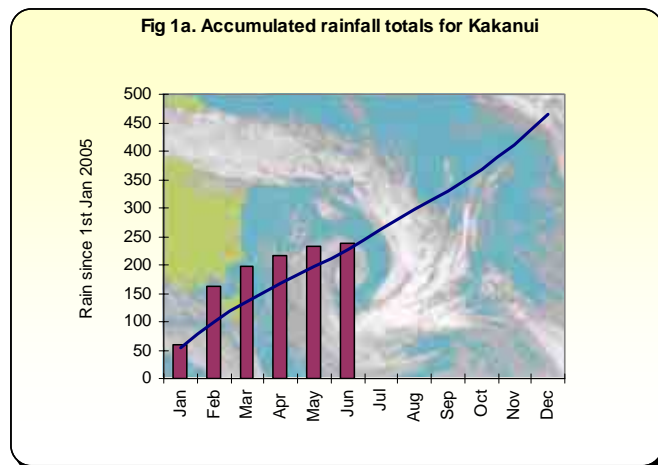
Rainfall & river flows around the region

North Otago

Rainfall totals in North Otago were below normal for the third consecutive month. Kakanui at Clifton Falls recorded the least rainfall with just **3.5mm**, which is **10%** of the historic average for June. Oamaru was also very dry, with **9mm** recorded. The Dome Hills gauge, situated at the head of the Maerewhenua catchment, collected the highest total in North Otago, with **22.5mm**, although this is still only **half the average** for June. In the Shag catchment, the Stoneburn gauge recorded **16mm**, which is less than **half the average** June total of 40mm.

Figure 1a shows that the accumulated rainfall for 2005 at Kakanui at Clifton Falls is still slightly above the long term average, despite very little rain being recorded over the last month.

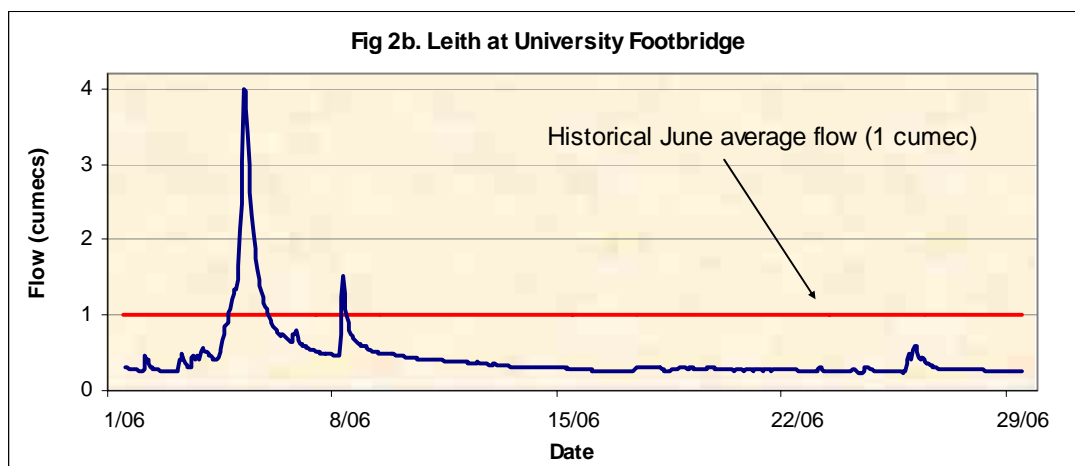
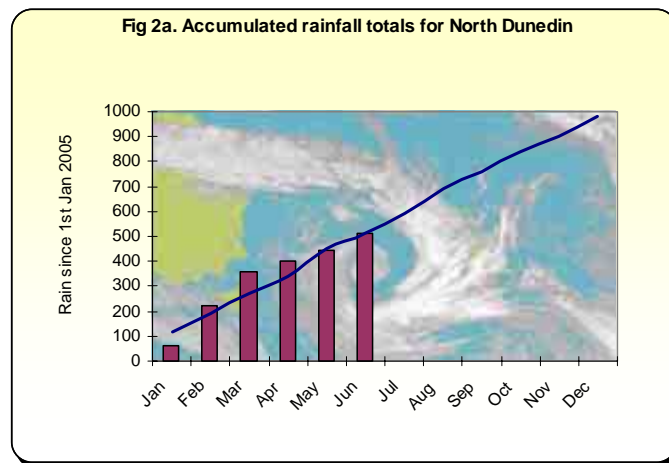
River flow in the Kakanui at Clifton Falls was **below average** for most of June (Figure 1b). A small event of 11 cumecs occurred during the first week, due to rain falling in the upper catchment. Rainfall was considerably higher at Dansey's Pass - **50mm** for June and just 12km to the west of Clifton Falls - although very little of this rain spilled over into coastal North Otago.



Dunedin

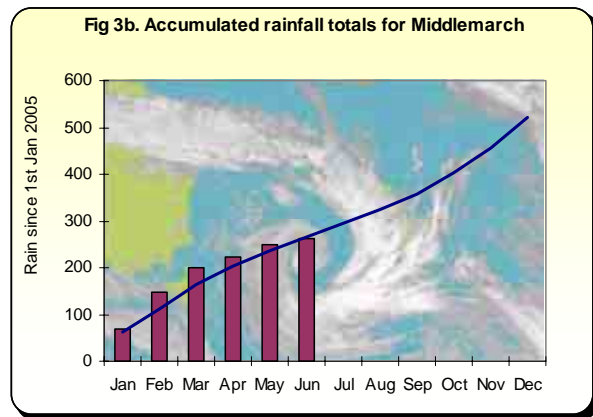
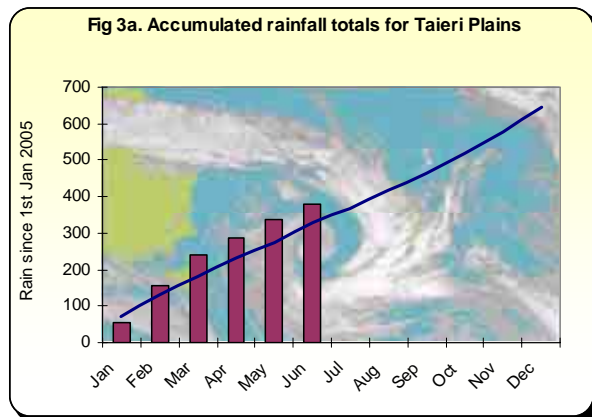
Dunedin rainfall totals for June were also generally below normal, although considerably higher than in North Otago. Pine Hill in North Dunedin recorded **66mm**, which is approximately **normal** for June. In North East Valley, **68mm** was recorded, **15% below normal**. Across the city at Musselburgh, **50mm** was recorded, which is **30% below normal**. Accumulated annual rainfall up to the end of June at the Pine Hill gauge remains similar to the long term average (Figure 2a).

The lower than normal rainfall totals led to reduced flows in local Dunedin streams. Figure 2b shows the flow in the Leith at University footbridge was below average for much of June, with the exception of two events early on. Average flow at this site was **0.4 cumecs** for the month.

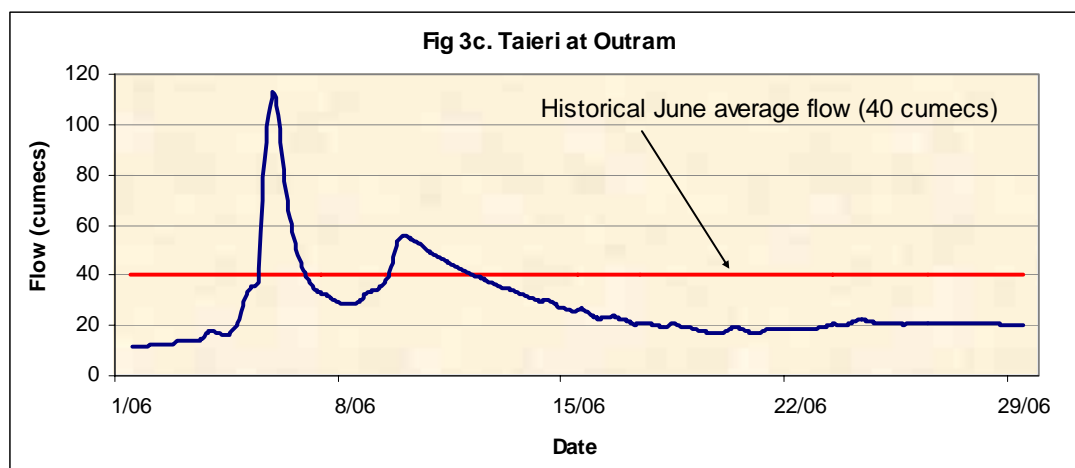


Lower and Strath Taieri

Rainfall totals for the Lower and Strath Taieri were also generally below normal. On the Taieri Plains, **40mm** was recorded at Riccarton Road (**25% below average**), while **30mm** fell at Dunedin Airport (**40% below average**). On the Strath Taieri, Middlemarch received **13mm**, **less than half** the long term average of 31mm. The accumulated rainfall total for the Taieri Plains at Riccarton Road is still above the long term average line (Figure 3a), while in the Strath Taieri, Middlemarch accumulated rainfall is currently the same as the long term average (Figure 3b).

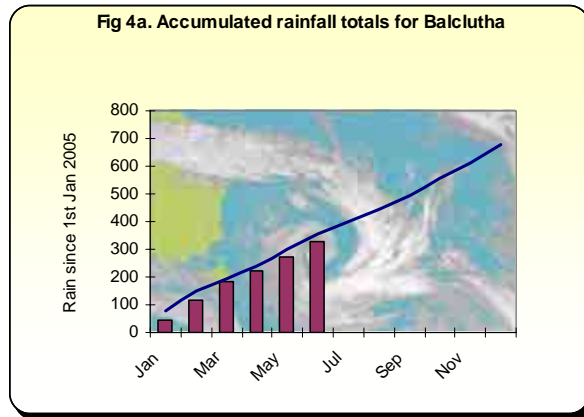


Average monthly flow in the Silverstream at Riccarton Road was far below normal (**0.29 cumecs**, compared to the long term average for June of 0.95 cumecs). The Taieri River at Outram peaked at 113 cumecs early in the month, with the majority of this flow coming from the Deep Stream catchment. By the end of the month, Taieri at Outram flow had declined to approximately 20 cumecs, well below the historical June average of 40 cumecs (Figure 3c). Average flow for the month for Deep Stream at SH87 was **above average** at **5.8 cumecs**.

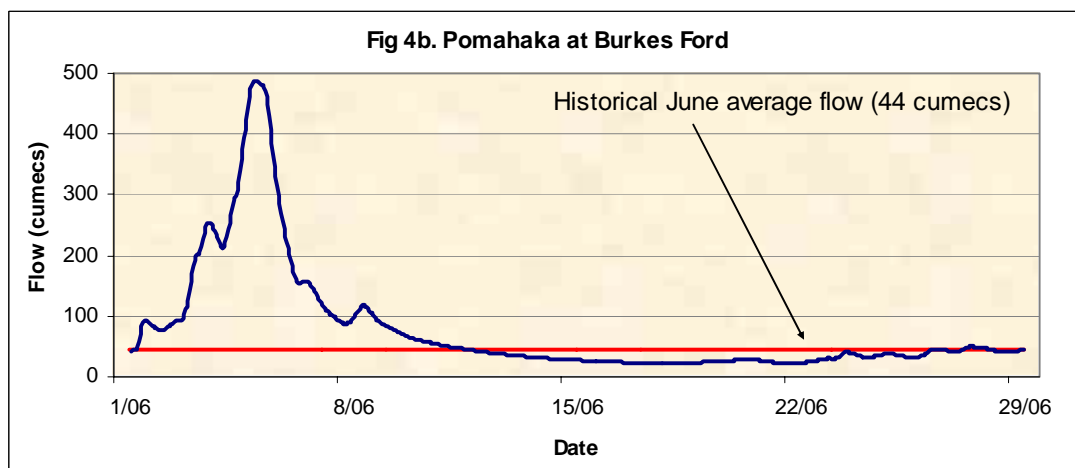


South Otago

South Otago rainfall totals were generally above normal this month. The wettest site was Waipahi at Cairn, with **206.5mm (60% above normal)**. Crested View, also in the Waipahi catchment, recorded **159mm**, which is **80% above the normal** total of 89mm. The lowest total in South Otago was Balclutha, which recorded **56mm**, which is normal for June. Figure 4a shows accumulated rainfall totals for 2005 at Balclutha are still slightly below the long term average line.

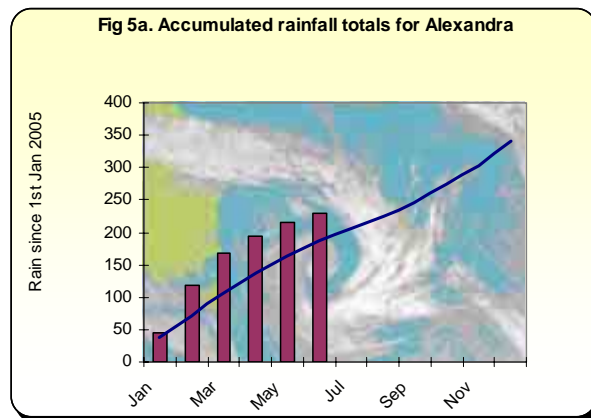


Rainfall at Moa Flat on the Pomahaka was approximately average this month, with **75mm** recorded. At least half of this rain fell during the first week however, and this caused the Pomahaka at Burkes Ford to peak at **490 cumecs** on 4 June (Figure 4b). Drier conditions during the middle of the month resulted in Pomahaka flows steadily declining. Elsewhere in the district, the Waipahi River peaked at **115 cumecs**, and the average flow for the month was **70% above normal** at **10.6 cumecs**. Average flow in the Waitahuna was **4.2 cumecs, 23% above normal** for June.

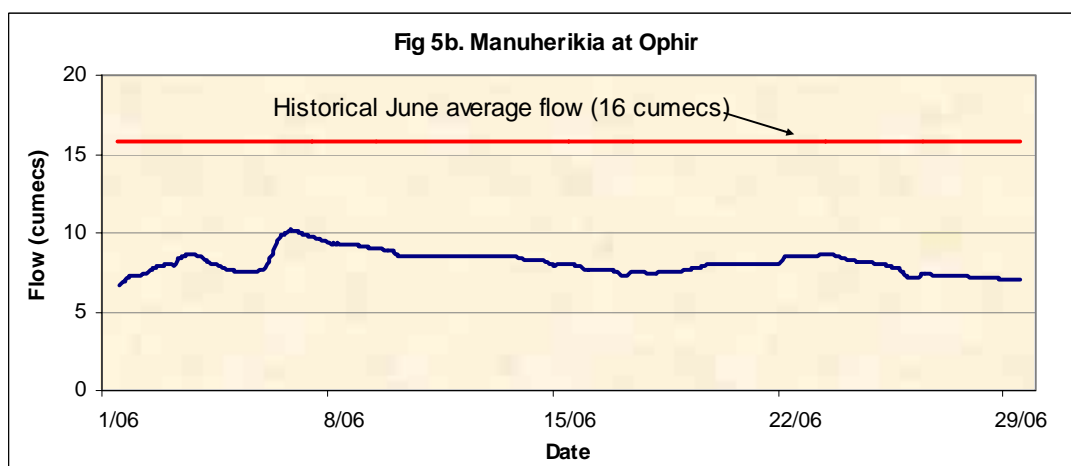


Central Otago

In Central Otago, rainfall was **below normal** in the Manuherikia and Idaburn catchments, and **above normal** around Ettrick and Roxburgh. Just **7mm** was recorded at both Lauder and Ranfurly, while Alexandra collected **14.4mm** and Clyde measured **11mm**. Pat-Paerau rainfall was approximately normal with **19.5mm**. At the other end of the scale, Millers Flat recorded **92mm**, which is **twice the normal** amount for June. Figure 5a shows that the accumulated rainfall total for Alexandra is still ahead of the average line, despite the total for June being below average for the second month running.

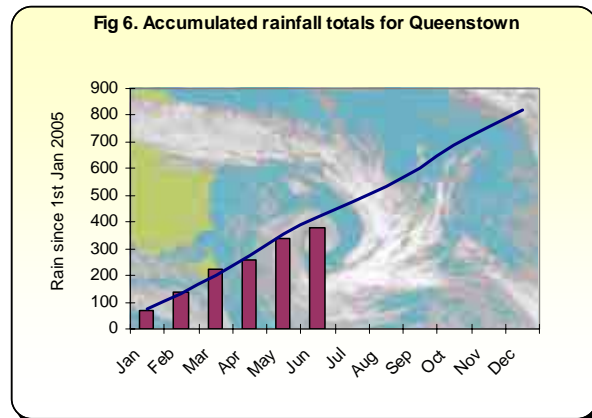


Flow in the Manuherikia was well below average this month, with a peak of just 10 cumecs at Ophir. There was very little variation in the flow pattern, and this is likely to be due to water being diverted to fill Falls Dam in the upper catchment. Figure 5b shows there were no significant flow events during the month.



Queenstown Lakes

June was also a dry month in the Queenstown Lakes district. The driest site was West Wanaka, which recorded just **16mm, 80% below** the long term average of 86mm. The Wanaka and Queenstown Airport sites both collected **30mm**, also well **below average**. The Hillocks site near Glenorchy recorded **70mm**, although the normal total for June is over 200mm. The highest total for the area was **137mm**, recorded at Makarora. The total for Queenstown was **38mm, 40% below average**. As a result, the 2005 accumulated rainfall total up to the end of June is now slightly below the historic average line.



Average monthly river flows were below normal, with the Shotover River at Peat's Hut and Dart River at the Hillocks both flowing at less than half the long term average for the month. Average flow in the Shotover River was **12 cumecs**, while the Dart River at the Hillocks averaged **25 cumecs**. The Kawarau peaked at **143 cumecs**, with an average flow of **130 cumecs**. Average flow for June is **175 cumecs**.

Lake levels at the end of June were approximately 30cm **below normal** for Wakatipu and Wanaka. Average levels for the month were also **below normal**.

Further information

See the Otago Regional Council website for regular rainfall and river flow updates:
<http://www.orc.govt.nz/waterinfo>

For more information phone John Threlfall, Director Environmental Information and Science on 03 474 0827.

More detailed rainfall and river flow data is available from Chris Arbuckle, Manager Resource Science, on 03 474 0827 or e-mail: chris.arbuckle@orc.govt.nz

Mailing list

This report is available by email

To update your contact details on our mailing lists, please contact: neil.allison@orc.govt.nz; tel: 03 474 0827.

Acknowledgement

The information produced in this report was derived from rainfall, flow, lake level and lake outflow data collected from stations throughout the region operated by private individuals and corporate bodies, the National Institute of Water & Atmospheric Research Limited, Dunedin City Council and Contact Energy who are gratefully acknowledged.

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RAINFALL TABLE (June 2005)

Station	Area	Total Rainfall for this Month (mm)			Total Rainfall this Year Up to the End of this Month (mm)		
		Recorded	Historic	% Change	Recorded	Historic	% Change
Oamaru AWS	North Otago	9.000	36.0	-75.00	200.50	239.00	-16.11
Grandview	North Otago	15.100	41.0	-63.17	284.60	262.00	8.63
Glenrowan	North Otago	14.750	51.0	-71.08	297.25	318.00	-6.53
Waikoura	North Otago	7.500	40.0	-81.25	237.00	271.00	-12.55
Clifton Falls	North Otago	3.500	32.0	-89.06	236.00	226.00	4.42
The Dasher	North Otago	19.500	59.0	-66.95	328.50	410.00	-19.88
Stoneburn telemetry	North Otago	16.000	40.0	-60.00	278.00	302.00	-7.95
Dome Hills	North Otago	22.500	44.0	-48.86		342.00	
Leith at Sullivan's Dam	L/S Taieri, Dun	64.000	103.0	-37.86	591.50	610.00	-3.03
Leith at Pine Hill	L/S Taieri, Dun	66.000	65.0	1.54	512.00	510.00	0.39
Musselburgh	L/S Taieri, Dun	49.600	69.0	-28.12	381.80	405.00	-5.73
Taieri Depot	L/S Taieri, Dun	40.500	54.0	-25.00	378.00	330.00	14.55
Dunedin Airport	L/S Taieri, Dun	30.000	49.0	-38.78	277.80	344.00	-19.24
Mt Stoker	L/S Taieri, Dun	17.000	38.0	-55.26	251.50	239.00	5.23
Glengarry	L/S Taieri, Dun	46.000	47.0	-2.13	319.50	297.00	7.58
Middlemarch-Garthmyl	L/S Taieri, Dun	13.300	31.0	-57.10	268.30	266.00	0.86
Balclutha	Southwest Otago	56.500	62.0	-8.87	329.00	364.00	-9.62
Warepa	Southwest Otago	108.200	76.0	42.37	456.20	435.00	4.87
Clarks Flat	Southwest Otago	73.000	70.0	4.29	376.50	413.00	-8.84
Cairn	Southwest Otago	206.500	131.0	57.63	609.00	687.00	-11.35
Crested View	Southwest Otago	158.950	89.0	78.60	546.00	577.00	-5.37
Waikoikoi at Rosebank	Southwest Otago	126.700	75.0	68.93	504.40	479.00	5.30
Moa Flat	Southwest Otago	74.500	77.0	-3.25	544.00	422.00	28.91
Ranfurly	Central Otago	7.000	29.0	-75.86	200.00	238.00	-15.97
Pat-Paerau	Central Otago	19.500	24.0	-18.75	264.00	199.00	32.66
Tima	Central Otago	92.000	47.0	95.74	365.50	344.00	6.25
Ettrick No2	Central Otago	59.800	46.0	30.00	348.50	316.00	10.28
Blackstone Hill	Central Otago	28.400	42.0	-32.38	260.50	334.00	-22.01
Hills Creek	Central Otago	23.000	39.0	-41.03	236.00	264.00	-10.61
Lauder EWS	Central Otago	6.800	33.0	-79.39	218.60	253.00	-13.60
Merino Ridges	Central Otago	15.000	27.0	-44.44		225.00	
Alexandra	Central Otago	14.400	22.0	-34.55	229.50	185.00	24.05
Clyde EWS	Central Otago	10.600	29.0	-63.45	209.00	210.00	-0.48
Hunter Valley 2	Lakes district	42.700	106.0	-59.72		535.00	
Makarora telemetry	Lakes district	137.000	170.0	-19.41	790.50	997.00	-20.71
West Wanaka	Lakes district	16.000	86.0	-81.40	348.00	472.00	-26.27
Wanaka Aero AWS	Lakes district	30.800	56.0	-45.00	240.80	336.00	-28.33
Peat's Hut	Lakes district	29.000	98.0	-70.41	351.00	377.00	-6.90
Glenorchy telemetry, Hillocks	Lakes district	70.199	204.0	-65.59	624.74	793.00	-21.22
Queenstown	Lakes district	38.300	66.0	-41.97	363.90	420.00	-13.36
Queenstown AWS	Lakes district	30.200	70.0	-56.86	316.20	368.00	-14.08

RIVER FLOW TABLE (June 2005)

Station	Area	Minimum flow recorded (m ³ /s)	Maximum flow recorded (m ³ /s)	Mean flow for the month (m ³ /s)	Historic mean for the month (m ³ /s)	% Change of Historic Mean
Kakanui River at Mill Dam	North Otago	1.324	23.032	2.761	4.419	-37.53
Kakanui River at Clifton Falls	North Otago	0.764	11.203	1.828	2.953	-38.09
Shag River at The Grange	North Otago	0.220	0.722	0.409	1.123	-63.59
Leith at University Foot Br	L/S Taieri, Dun	0.232	4.215	0.438	1.005	-56.41
Silverstream at Taieri Depot	L/S Taieri, Dun	0.046	5.283	0.290	0.951	-69.50
Taieri River at Outram	L/S Taieri, Dun	11.458	113.010	29.279	40.538	-27.78
Taieri River at Sutton	L/S Taieri, Dun	8.174	42.152	17.322	23.799	-27.22
Taieri River at Tiroiti	L/S Taieri, Dun	5.727	33.019	13.192	18.108	-27.15
Taieri River at Waipiata	Central Otago	4.795	35.304	12.846	13.873	-7.40
Nenthorn Stream at Mt Stoker Rd	L/S Taieri, Dun	0.171	0.655	0.328	0.988	-66.82
Deep Stream at SH 87	L/S Taieri, Dun	0.887	84.523	5.802	4.520	28.37
Waipori River at Berwick	Southwest Otago	1.196	32.554	24.957	20.638	20.92
Clutha River at Balclutha	Southwest Otago	236.609	1220.467	545.481	583.935	-6.59
Waitahuna River at Tweeds Br	Southwest Otago	1.611	26.112	4.256	3.423	24.33
Pomahaka River at Burkes Ford	Southwest Otago	21.340	489.034	82.431	44.340	85.91
Pomahaka River at Glenken	Southwest Otago	9.180	278.947	31.199	18.223	71.21
Waipahi River at Waipahi	Southwest Otago	3.034	115.584	17.955	10.636	68.81
Manuherikia River at Ophir	Central Otago	6.701	10.194	8.065	15.845	-49.10
Clutha at Clyde	Central Otago	108.900	767.240	402.632	472.507	-14.79
Clutha River at Cardrona Confluence	Lakes District	155.600	348.190	284.090	308.512	-7.92
Kawarau River at Chards Rd	Lakes District	116.106	143.862	126.956	174.857	-27.39
Shotover River at Bowens Peak	Lakes District	19.788	37.749	22.823	31.312	-27.11
Shotover River at Peat's Hut	Lakes District	9.013	33.858	12.349	27.793	-55.57
Dart River at The Hillocks	Lakes District	19.905	80.114	25.452	58.002	-56.12

LAKE LEVEL AND OUTFLOW TABLE

Lake	Lake level for the month (m above mean sea level)					Historic mean lake level (m above mean sea level)
	First Day	Last Day	Min.	Max.	Mean	
Lake Wakatipu	309.686	309.575	309.500	309.724	309.596	309.848
Lake Wanaka	276.911	276.773	276.589	276.936	276.771	277.07

Lake	Lake outflow for the month (m ³ /s)					Historic mean outflow (m ³ /s)
	First Day	Last Day	Min.	Max.	Mean	
Lake Wakatipu	114.2	92.2	78.4	122.2	96.3	155.99
Lake Wanaka	141.3	121.8	97.6	145.1	121.7	161.88

Notes:

L/S Taieri, Dun = Lower Taieri, Strath Taieri and Dunedin.

* = Controlled Outflows.