RAINFALL & RIVER FLOWM O N T H L YR E P O R TO T A G OR E G I O N A LC O U N C I L

July 2005

In Brief

Otago was drier than normal during July. Settled weather brought more sunshine hours, warmer temperatures and less rain to most areas. North Otago and Central Otago were particularly dry, with only 20-30% of normal rainfall at some sites. The coastal district around Oamaru and the Manuherikia from Lauder through to Ranfurly were especially dry.

Rain was also in short supply around Wanaka, Queenstown, South Otago, Dunedin and the Lower Taieri. Rainfall in these areas ranged from 50-60% of normal. The only areas to receive average rainfall totals were the Upper Taieri and the headwaters of Lake Wakatipu.

Despite lower than normal rainfall, river flows were not consistently below average. Warmer than average temperatures may have caused snow melt in the headwaters of some catchments, which in turn may have helped keep these rivers flowing at relatively high levels. The headwaters of the Taieri, Kakanui and Pomahaka rivers all had higher than normal average monthly flows. By comparison, a large proportion of the Shag catchment is relatively low lying with less input from snow melt and the average monthly flow in this river was well below normal.

Other areas where river flows were considerably lower than normal included the Leith and Silverstream in Dunedin, Nenthorn Stream in the Strath Taieri, Manuherikia at Ophir and Shotover River near Queenstown.

Average lake levels for the month were slightly below normal for Lakes Wakatipu and Wanaka.

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.

North Otago's dry spell

A 'dry spell' is defined as a period of at least 15 consecutive days during which no measurable rain is recorded. The North Otago area has been particularly dry in recent months – there were 23 consecutive days with no rain in June at Kakanui at Clifton Falls. Over a period of 73 days, starting from 3 May, less than a centimetre of rain was recorded. This may seem extreme, but there have actually been two periods within the last five years that have been even drier than this.

Rainfall & river flows around the region

North Otago

July rainfall was below normal in North Otago. The area around Oamaru and along the North Otago coast was the driest, receiving about a quarter of the normal rain for July. More rain was recorded in the hills to the west between Shag at Stoneburn (39mm) and Kauru at the Dasher (63mm).

A westerly storm on 18-19 July brought steady rain to the headwaters of the Kakanui catchment. At an altitude of 540 metres, the Kauru at Dasher site received 56mm over just two days. During the same period, Kakanui at Clifton Falls recorded just 15mm.



River flow in the Kakanui at Clifton Falls was well below average for the first half of July. However, the steady rain that fell in the headwaters of the catchment on 18-19 July caused a noteworthy flood event, with the Clifton Falls recorder site peaking at 100 cumecs. A flood event of this size has a return period of two years – a 50% chance of occurring in any year - catching some people unaware as there was only light rain in the lower catchment. Further south, the Shag River peaked at 12 cumecs during this event, although average flow for the month was still well below normal.



Dunedin

Rainfall totals in the Dunedin area were also below normal. Pine Hill in North Dunedin recorded 54mm, which is considerably lower than the long term average of 86mm. In North East Valley, 50mm was recorded half the normal July rainfall. Across the city at Musselburgh, 25mm was recorded - less than half of normal.



The lower than normal rainfall totals led to reduced flows in Dunedin streams. At the Leith at University footbridge, flow was below average for much of July, with the exception of two relatively small events. Average flow at this site was **0.5 cumecs** for the month, approximately half the historical July average flow.



Lower and Strath Taieri

Rainfall on the Lower and Strath Taieri was approximately half of the normal July total. The Middlemarch gauge recorded the least rain, with just 14mm, while the nearby Nenthorn at Mt Stoker site received 16mm. On the Taieri Plains, 31mm was recorded at Riccarton Road (25% below average), while 18mm fell at Dunedin Airport (less than half of normal).

The accumulated rainfall total for the Taieri Plains at Riccarton Road is still above the long term average, while in the Strath Taieri, Middlemarch accumulated rainfall has now dropped below the long term average. Up to the end of July, the Taieri Plains and Middlemarch sites have recorded **409mm** and **282mm** respectively.



Average monthly flow in the Silverstream at Riccarton Road was also approximately half normal at **0.7 cumecs**, compared to the long term average for July of 1.4 cumecs. The Taieri River at Outram was also flowing below normal for much of the month, with the average flow for the month **20% below long term average**. A small flood event on 19 July peaked at 75 cumecs, although this was short-lived, and flows dropped steadily to less than 30 cumecs by the end of the month.



South Otago

Southern Otago was also drier than usual, with all rain sites recording totals that were less than normal. Waipahi at Cairn in the Catlins area was once again the wettest area in South Otago, with 85mm - 20% below normal. Balclutha was the driest area, recording just 20mm, which is 50% of normal. Further north, Clarks Flat in the Waitahuna and Moa Flat in the Pomahaka recorded 30-35mm.



415mm for the period up to the end of July.

Despite less than average rainfall, flows in the Pomahaka River were generally **above normal**. Extra runoff from snow melt due to relatively warm temperatures this month may have contributed here. Two small flood events during the middle of the month caused the river to peak at 130 cumecs at Burkes Ford. There was very little rain during the last two weeks however, and flows steadily declined over the second half of the month.



Elsewhere in the district, the Waipahi River was also flowing **above normal** for July, while the Waitahuna was slightly **lower than normal**.

Central Otago

The Central Otago area had another dry month, with rainfall below normal at most monitoring sites. The township of Lauder received just **4mm** while Ranfurly, Hills Creek, Alexandra and Clyde all collected **7mm** for the month. Rainfall in the Manuherikia was generally only **a quarter of normal** for July. The area around Ettrick and Roxburgh was somewhat wetter, although still less than average. Millers Flat recorded **31mm** -**30% below normal**. In the headwaters of the Taieri, Pat-Paerau rainfall was approximately normal, with **18.5mm**.



being below average for the third consecutive month.

Flow in the Manuherikia was less than half of the historical July average this month. There were no significant events recorded at the Ophir site and very little variation in the flow pattern.



Queenstown Lakes

July was also a drier than normal month for most of the Queenstown Lakes District. The driest areas were around Wanaka and the Upper Shotover. Wanaka airport collected 21mm, compared to the long term average of 56mm. Shotover at Peats recorded just 46mm - 30% below normal. In the headwaters of Lake Wakatipu, both Routeburn Station and the Hillocks sites had above average rain, receiving 184mm and 140mm respectively.



The accumulated rainfall total for Queenstown up to the end of July has continued to drop further below the historic average line.

Average monthly river flows were below normal, with the Shotover River at Peat's Hut flowing at 12 cumecs - approximately half the long term average for July. The Dart River at the Hillocks averaged 29 cumecs, which is 20% below normal. The Kawarau at Chards Road peaked at 138 cumecs, with an average flow of 123 cumecs. Long term average flow for July is 134 cumecs.

Lake levels at the end of July were **normal** for Wakatipu and Wanaka. Average levels for the month were slightly **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: <u>neil.allison@orc.govt.nz</u>; 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 (July 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	12.400	41.0	-69.76	212.90	280.00	-23.96	
Grandview	North Otago	12.200	40.0	-69.50	296.80	302.00	-1.72	
Glenrowan	North Otago	15.900	49.0	-67.55	313.15	367.00	-14.67	
Clifton Falls	North Otago	15.500	36.0	-56.94	251.50	262.00	-4.01	
Stoneburn telemetry	North Otago	38.500	50.0	-23.00	316.50	352.00	-10.09	
Kauru at The Dasher	North Otago	63.000	68.0	-7.35	391.50	478.00	-18.10	
Dome Hills	North Otago	41.500	55.0	-24.55		397.00		
Leith at Sullivan's Dam	L/S Taieri, Dun	61.500	107.0	-42.52	653.00	717.00	-8.93	
Leith at Pine Hill	L/S Taieri, Dun	53.500	86.0	-37.79	565.50	596.00	-5.12	
Musselburgh	L/S Taieri, Dun	24.600	61.0	-59.67	406.40	466.00	-12.79	
Taieri Depot	L/S Taieri, Dun	31.000	41.0	-24.39	409.00	371.00	10.24	
Dunedin Airport	L/S Taieri, Dun	18.000	46.0	-60.87	295.80	390.00	-24.15	
Mt Stoker	L/S Taieri, Dun	16.000	31.0	-48.39	267.50	270.00	-0.93	
Glengarry	L/S Taieri, Dun	20.500	41.0	-50.00	340.00	338.00	0.59	
Middlemarch-Garthmyl	L/S Taieri, Dun	13.700	28.0	-51.07	282.00	294.00	-4.08	
Balclutha	Southwest Otago	20.000	50.0	-60.00	349.00	414.00	-15.70	
Warepa	Southwest Otago	35.600	63.0	-43.49	491.80	498.00	-1.24	
Clarks Flat	Southwest Otago	35.500	49.0	-27.55	412.00	462.00	-10.82	
Cairn	Southwest Otago	85.000	106.0	-19.81	694.00	793.00	-12.48	
Waikoikoi at Rosebank	Southwest Otago	50.800	66.0	-23.03	555.20	545.00	1.87	
Moa Flat	Southwest Otago	29.000	43.0	-32.56	573.00	465.00	23.23	
Ranfurly	Central Otago	7.400	28.0	-73.57	207.40	266.00	-22.03	
Pat-Paerau	Central Otago	18.500	18.0	2.78	282.50	217.00	30.18	
Tima	Central Otago	31.000	46.0	-32.61	396.50	390.00	1.67	
Ettrick No2	Central Otago	25.400	33.0	-23.03	373.90	349.00	7.13	
Blackstone Hill	Central Otago	13.200	39.0	-66.15	273.70	373.00	-26.62	
Hills Creek	Central Otago	7.500	31.0	-75.81	243.50	295.00	-17.46	
Lauder EWS	Central Otago	3.800	25.0	-84.80	222.40	278.00	-20.00	
Alexandra	Central Otago	7.000	18.0	-61.11	236.50	203.00	16.50	
Clyde EWS	Central Otago	7.400	20.0	-63.00	216.40	230.00	-5.91	
Hunter Valley 2	Lakes district	59.300	82.0	-27.68		617.00		
Makarora telemetry	Lakes district	144.000	168.0	-14.29	934.50	1165.00	-19.79	
West Wanaka	Lakes district	49.000	88.0	-44.32	397.00	560.00	-29.11	
Wanaka Aero AWS	Lakes district	21.000	48.0	-56.25	261.80	384.00	-31.82	
Peat's Hut	Lakes district	46.000	66.0	-30.30	397.00	443.00	-10.38	
Routeburn Station	Lakes district	184.500	154.0	19.81		1229.00		
Glenorchy telemetry, Hillocks	Lakes district	139.000	127.0	9.45	763.74	920.00	-16.98	
Queenstown	Lakes district	52.800	57.0	-7.37	416.70	477.00	-12.64	
Queenstown AWS	Lakes district	31.400	59.0	-46.78	347.60	427.00	-18.59	

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	1.212	330.969	12.622	8.135	55.16
Kakanui River at Clifton Falls	North Otago	0.852	102.040	4.654	3.982	16.90
Shag River at The Grange	North Otago	0.249	11.983	1.123	2.954	-61.99
Leith at University Foot Br	L/S Taieri, Dun	0.262	4.924	0.488	1.120	-56.39
Silverstream at Taieri Depot	L/S Taieri, Dun	0.141	7.886	0.731	1.390	-47.42
Taieri River at Outram	L/S Taieri, Dun	22.786	75.224	34.541	44.112	-21.70
Taieri River at Sutton	L/S Taieri, Dun	14.642	38.697	20.707	24.431	-15.24
Taieri River at Tiroiti	L/S Taieri, Dun	11.223	30.586	15.402	17.751	-13.23
Taieri River at Waipiata	Central Otago	11.165	25.226	14.736	11.552	27.57
Nenthorn Stream at Mt Stoker Rd	L/S Taieri, Dun	0.234	1.545	0.472	1.914	-75.37
Deep Stream at SH 87	L/S Taieri, Dun	1.945	27.338	4.681	3.480	34.49
Waipori River at Berwick	Southwest Otago	1.094	34.984	20.880	19.961	4.60
Clutha River at Balclutha	Southwest Otago	220.543	765.933	448.633	512.273	-12.42
Waitahuna River at Tweeds Br	Southwest Otago	1.635	9.170	2.990	3.613	-17.24
Pomahaka River at Burkes Ford	Southwest Otago	17.170	132.870	46.764	37.952	23.22
Pomahaka River at Glenken	Southwest Otago	7.169	76.327	17.087	12.967	31.77
Waipahi River at Waipahi	Southwest Otago	2.676	28.435	9.062	6.954	30.32
Manuherikia River at Ophir	Central Otago	4.789	8.216	7.016	15.606	-55.04
Clutha at Clyde	Central Otago	109.075	776.151	355.059	405.130	-12.36
Clutha River at Cardrona Confluence	Lakes District	143.020	331.773	232.232	298.019	-22.07
Kawarau River at Chards Rd	Lakes District	114.468	137.881	123.132	134.555	-8.49
Shotover River at Bowens Peak	Lakes District	18.539	49.297	21.582	25.920	-16.74
Shotover River at Peat's Hut	Lakes District	8.755	46.453	12.308	21.539	-42.86
Dart River at The Hillocks	Lakes District	19.371	171.956	29.232	37.247	-21.52

River Flow Table (July 2005)

Lake Level and Outflow Table

Lake		Lake lev (m abov	Historic mean lake level			
	First Day	Last Day	Min.	Max.	Mean	(m above mean sea level)
Lake Wakatipu	309.570	309.656	309.497	309.682	309.587	309.695
Lake Wanaka	276.756	276.796	276.614	276.829	276.745	276.859

Lake		Lake outf	Historic mean outflow (m ³ /s)			
	First Day	Last Day	Min.	Max.	Mean	
Lake Wakatipu	91.3	108.1	77.9	113.4	94.6	119.54
Lake Wanaka	119.5	125.0	100.8	129.6	118.1	129.24

Notes:

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

* = Controlled Outflows.