RAINFALL & RIVER FLOW MONTHLY REPORT
OTAGO REGIONAL COUNCIL

November 2005

In Brief

River flows and soil moisture levels had decreased to very low levels by the end of November, after almost seven months of below average rainfall. Two small rainfall events early in the month had very little impact on soil moisture or river flows. This was followed by a southerly front on the 21st, which did bring some useful rainfall to the east coast of Otago. This was a temporary respite however, with river flows falling away again quickly.

The driest areas were in North Otago and on the lower and Strath Taieri. The Taieri Plains, Deep Stream, Middlemarch, and Nenthorn in the Taieri, and the headwaters of the Kakanui and Kauru Rivers, and the Shag catchment in North Otago all had rainfall totals that were **less than half of normal**. Rainfall totals in these areas were all less than 30mm. The Queenstown Lakes region was also considerably drier than normal, with totals **30 to 40% below average**.

The cumulative effect of seven months of low rainfall is very low soil moisture levels, and rivers flowing at levels more often seen at the end of a dry summer. All the river level sites operated by the Otago Regional Council were well **below normal** this month.

Average monthly flows for November 2005 were the **lowest on record** at a number of sites, including the Waipahi and Waitahuna Rivers in South Otago, and the Taieri River at both Outram and Waipiata. Even the Clutha River has dropped to record low levels, both downstream at Balclutha, and further upstream at the confluence with the Cardrona.

The Shag River in North Otago was also extremely low this month, with the second lowest average monthly flow since records began in 1989.

Summary text and graphs are provided for the following districts.

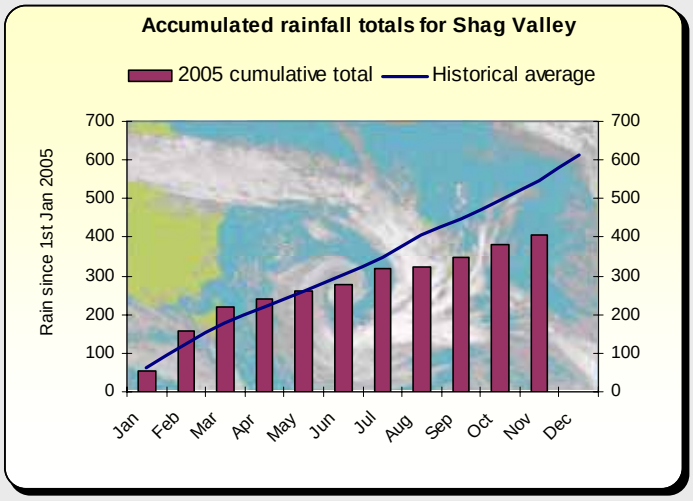
- North Otago
- Dunedin
- Lower Taieri and Strath Taieri
- South Otago
- Central Otago
- Queenstown Lakes

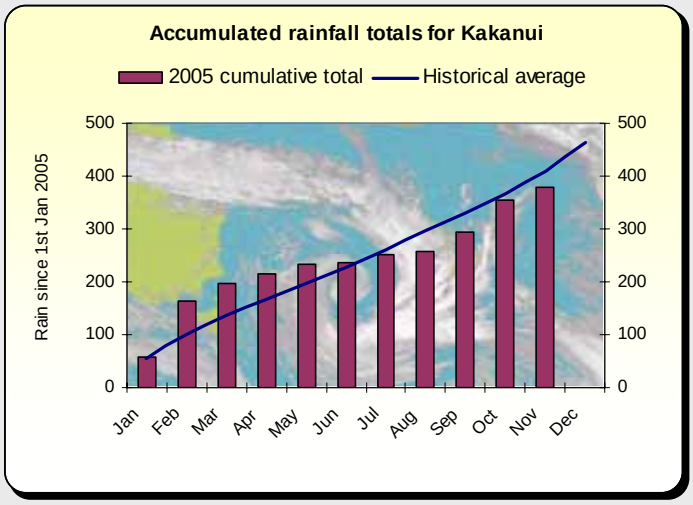
A summary table of flow and rainfall is attached to this report, which gives more detail on sites in each of these areas.

Rainfall & river flows around the region

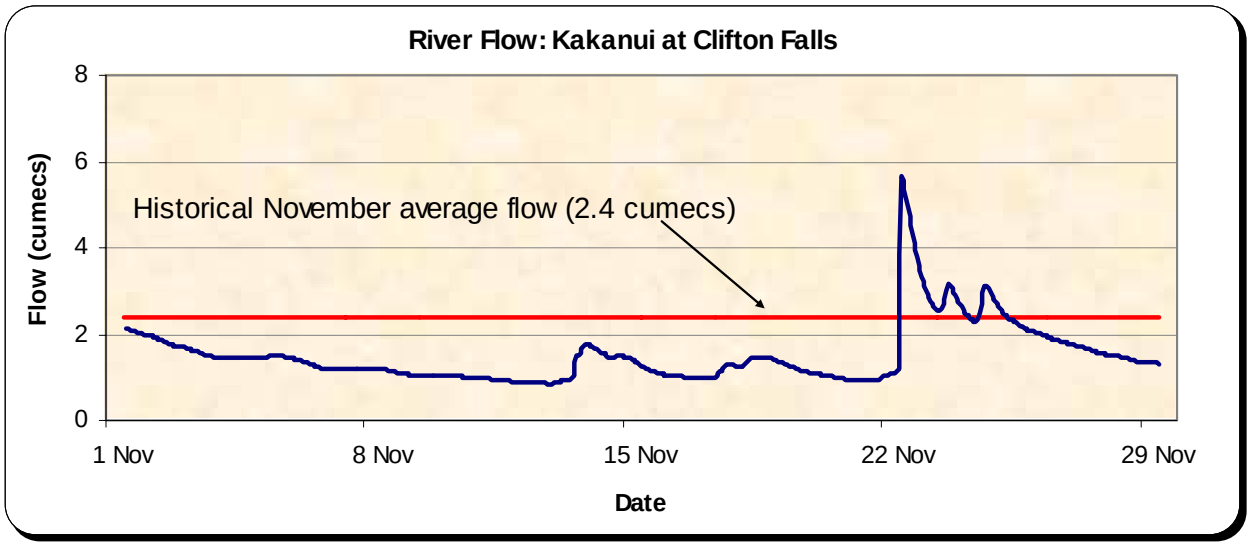
North Otago

November rainfall was **50% below normal** in the headwaters of the Kakanui catchment, and at the Shag at Stoneburn. Coastal North Otago received slightly more rain, with **42mm** recorded at Oamaru, **7% below** normal. The wettest area was the headwaters of the Maerewhenua, where **56mm** was recorded at Fairview, **16% below** normal.





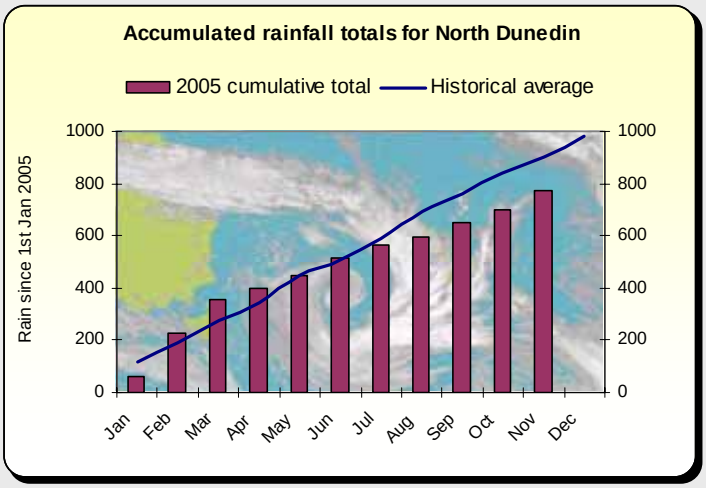
The accumulated rainfall total for the Shag at Stoneburn up to the end of November is now **150mm** less than the historical average, after a series of dry months. Further north, a drier than normal month in the Kakanui at Clifton Falls resulted in the 2005 cumulative total dropping below the historical average again.



River flow in the Kakanui at Clifton Falls remained well below average, with the exception of a small fresh on the 22nd. Average flow for the month was **1.5 cumecs**, **40% below** normal. In the Shag River at The Grange, average flow for the month was **0.3 cumecs**, **64% below** the normal November flow of 1 cumec.

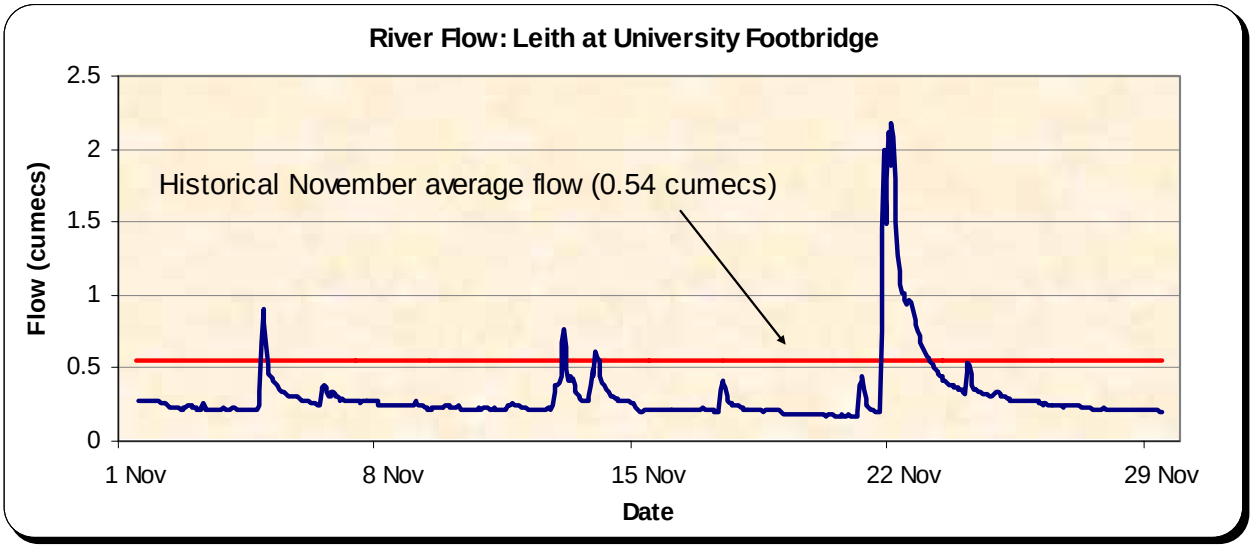
Dunedin

Rainfall totals in the North Dunedin area were **normal** to **above normal** this month. Pine Hill recorded **69mm**, while Sullivan's Dam collected **79mm**. Across town, Musselburgh rainfall was well **below normal**, with just **45mm** recorded.



The accumulated rainfall total for North Dunedin is now **130mm** below the historical average up to the end of November. **771mm** has been collected so far, compared to a 'normal' year, when 900mm could be expected.

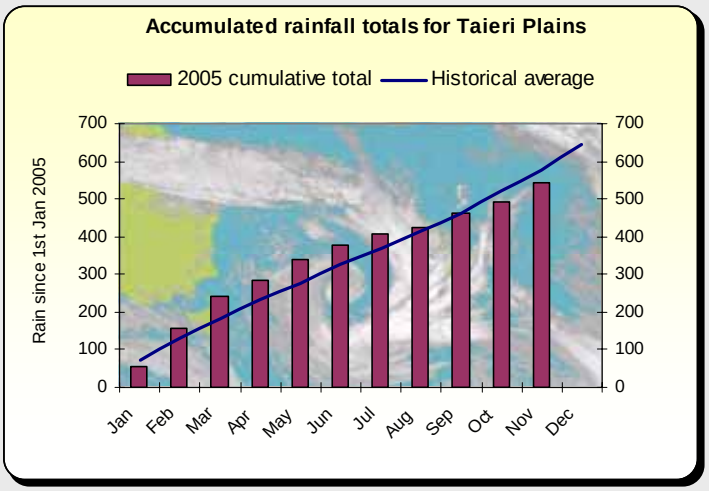
River flows remained low in local Dunedin streams this month. In the Water of Leith at the University Footbridge, flow was **below average** for most of November, with the exception of a small event on the 22nd. The average flow for the month was **0.3 cumecs**, **45% below** the historical November average.

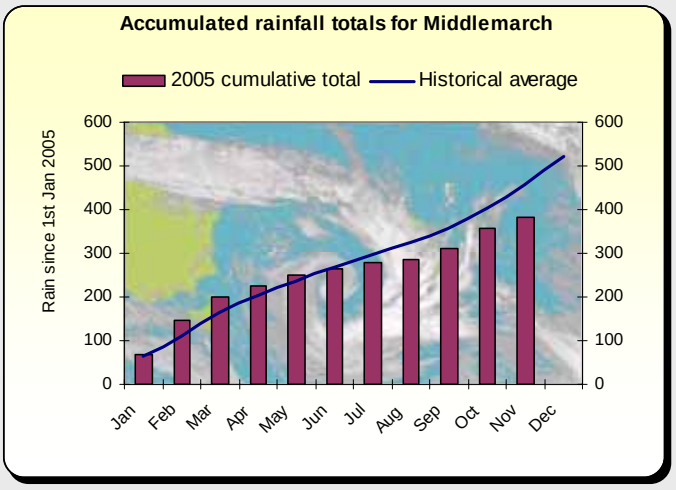


Lower and Strath Taieri

On the Lower Taieri, rainfall was slightly below normal at the Riccarton Road site with **48mm** recorded. Further south, the Dunedin Airport gauge only collected **29mm**, which is approximately **half** the normal November total.

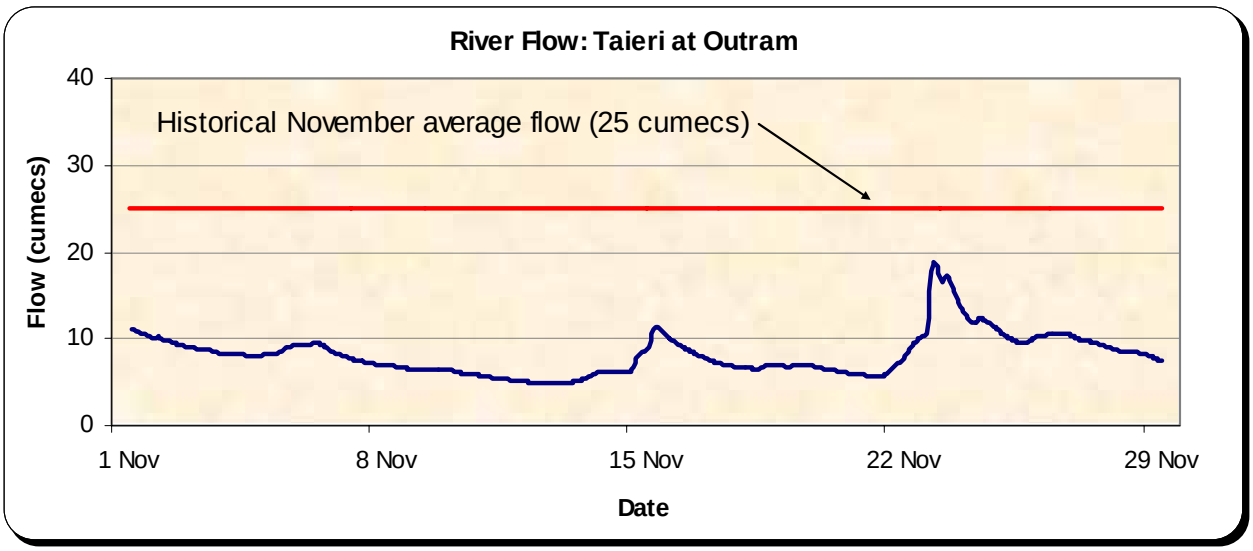
In the Strath Taieri, rainfall totals were very low this month. **23mm** was the total for Nenthorn at Mt Stoker, **24mm** was collected at Middlemarch, and Deep Stream received **26mm**. These totals are all approximately **half** the long term average rainfall for November.





The accumulated rainfall total for the Taieri Plains at Riccarton Road remains slightly below the long term average, with drier than normal conditions since June. At Middlemarch, accumulated rainfall to the end of November dropped further below normal, with another dryer than normal month.

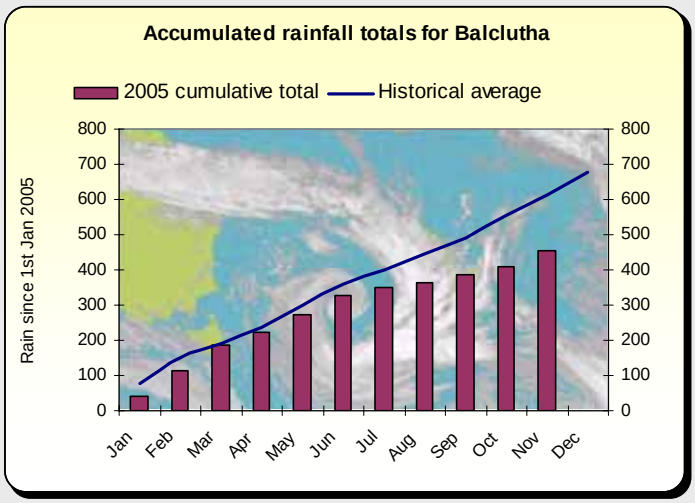
The Taieri River remained at a very low level this month. Average flow at Outram was **8 cumecs**, **68% below normal**, and the lowest November monthly average flow on record. Further upstream at Waipiata, average flow was **2.4 cumecs** this month, **72% below normal**, and also the lowest November average flow since records began.



Average monthly flow in the Silverstream at Riccarton Road was **0.2 cumecs**, which is **one third** of the long term average for November.

Southwest Otago

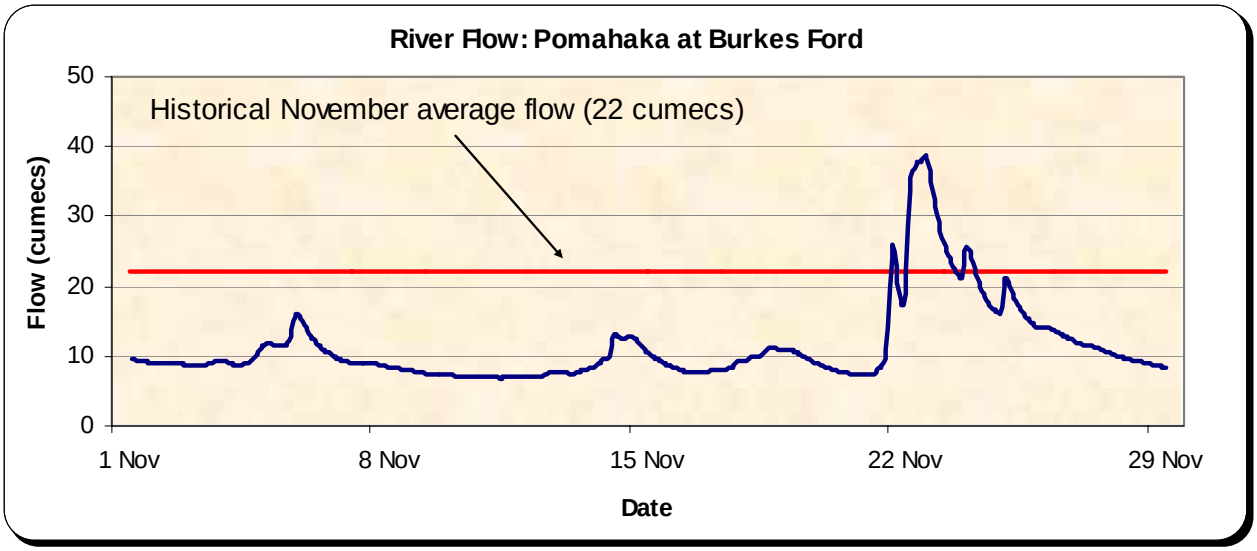
Rainfall totals in southwest Otago were **normal** to **below normal** this month. Balclutha was the driest area, recording **48mm** this month, **21% below** normal. The wettest site was Waipahi at Cairn, where **98mm** fell, although this is still **24% below** the November average.



The cumulative rainfall total for 2005 at Balclutha is now **160mm below normal**, after 5 consecutive months of drier than normal conditions.

A good indication that the dry conditions are widespread throughout southwest Otago is the continuing low flows in the Pomahaka River. With the exception of a small 40 cumec event on the 22nd, flow at Burkes Ford remained approximately **half of normal** for the entire month.

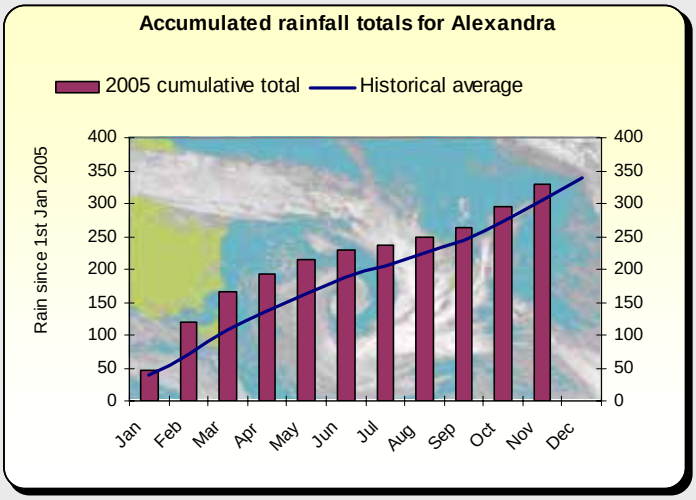
The situation in smaller streams is even worse, with both the Waipahi and Waitahuna rivers having average monthly flows approximately **65% below normal**.



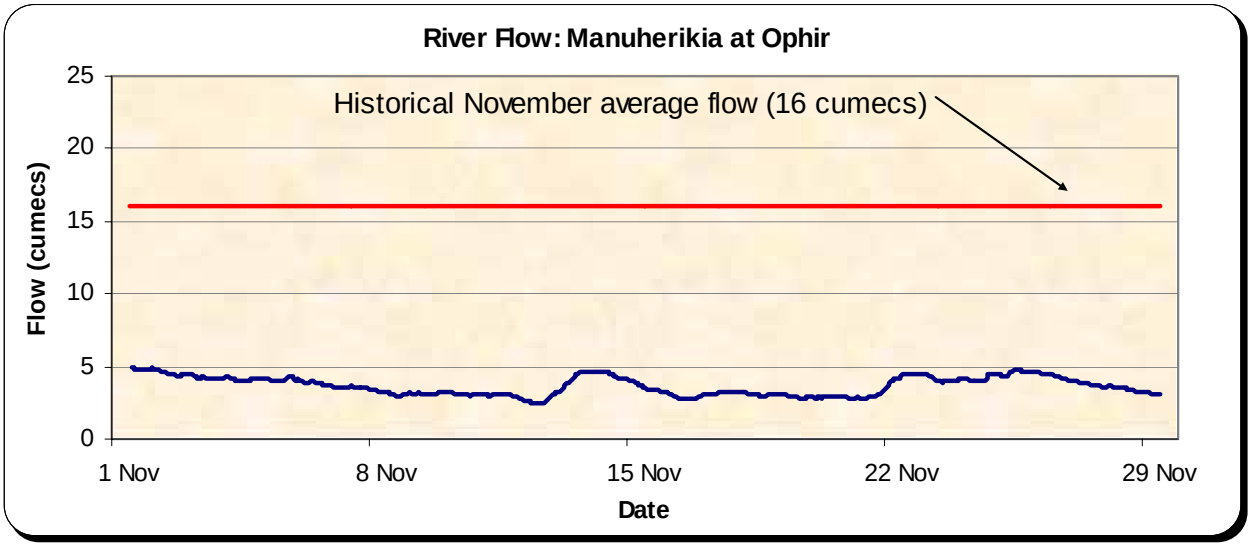
Central Otago

Rainfall totals in the Central Otago area were once again a mixed bag. Alexandra received **above normal** rain (**36mm**), while Clyde was **40% below normal** (**28mm**). In the mid Clutha, Millers Flat recorded **70mm** (**27% above normal**), while just up the road in Ettrick, only **44mm** was registered (**25% below normal**). These totals show how localised rain showers can affect a small area, with little or no rain just a few kilometres away.

In the Manuherikia, Lauder also had a reasonably dry month, with 31mm recorded (**25% below normal**).



The accumulated rainfall total for Alexandra is still slightly above the long term average line.



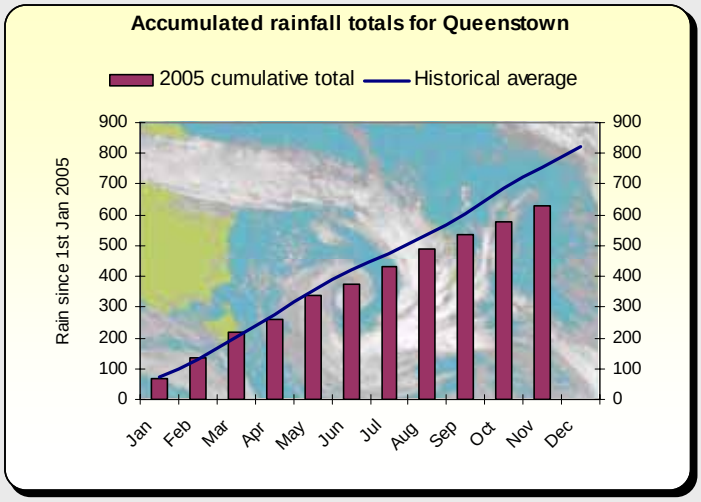
The figure above illustrates clearly the serious situation that faces the Manuherikia Basin this coming summer. With no significant rainfall totals this month, flow remained at a very low level, declining to just a fraction of the normal November level. Average monthly flow at Ophir was **3.6 cumecs**, **77% below normal**.

Further upstream, the Dunstan Creek at Beatties Road recorder measured an average flow of **1 cumec** this month. This site has only been running for 3 years. Previous November average flows were 1.8 cumecs in 2003, and 4.7 cumecs in 2004.

Queenstown Lakes

In the Queenstown Lakes district, rainfall was once again well below normal. Totals were all in the range of **30 to 45% below average**. Wanaka airport received just **34mm**, while Queenstown collected **53.5mm**.

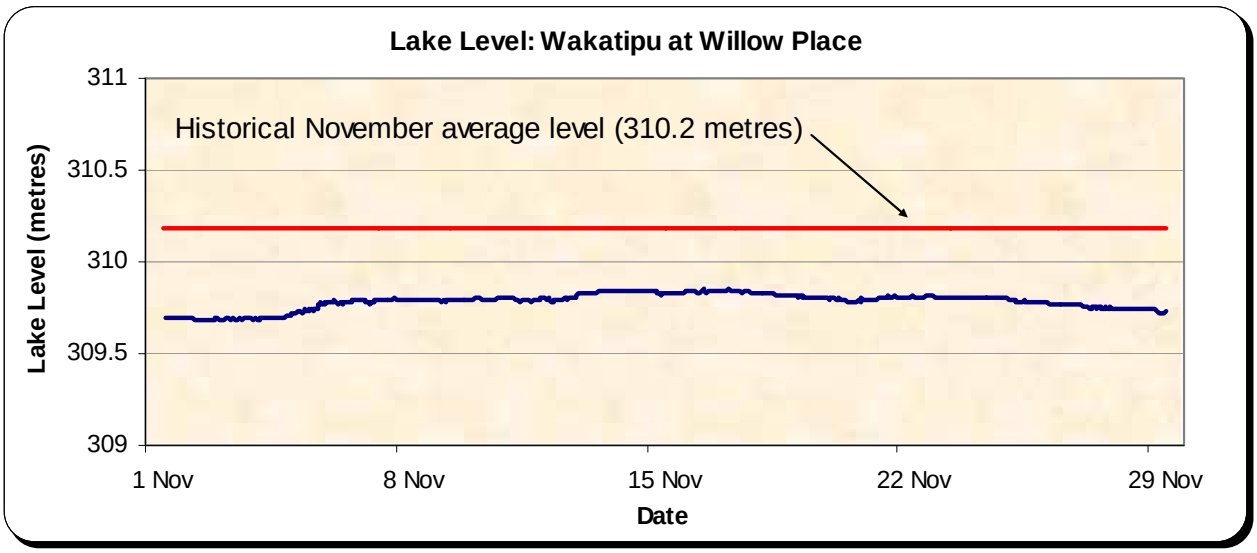
Further west, there was some spillover from the Southern Alps, with Makarora recording **104mm**, and the Dart at the Hillocks registering **94mm**. Both these totals are **44% below normal**.



The cumulative rainfall total for Queenstown dropped further below the historic average line this month.

Low rainfall means lower than normal river flows and lake levels, and average monthly river flows in the Queenstown Lakes district were once again approximately half of normal this month. The Shotover River at Peat's Hut was flowing at an average of **22 cumecs**, while the Dart River at the Hillocks averaged **66 cumecs**. In the Kawarau at Chards Road, average flow for the month was **164 cumecs**.

Lake levels were also low, with Lake Wakatipu almost **half a metre** below the historical November average for much of the month. Lake Wanaka was also low, finishing the month **0.7 metres** below the November long term average.



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 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: environmentalinfo@orc.govt.nz; tel: 0800 474 082.

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 (November 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	41.800	45.0	-7.11	356.00	440.00	-19.09
Grandview	North Otago	40.200	49.0	-17.96	453.10	488.00	-7.15
Glenrowan	North Otago	30.950	46.0	-32.72	461.10	552.00	-16.47
Waikoura	North Otago	40.500	44.0	-7.95		482.00	
Clifton Falls	North Otago	23.000	41.0	-43.90	377.50	406.00	-7.02
The Dasher	North Otago	31.000	71.0	-56.34	591.00	727.00	-18.71
Stoneburn telemetry	North Otago	23.500	50.0	-53.00	404.00	551.00	-26.68
Dome Hills	North Otago	56.000	67.0	-16.42	606.00	614.00	-1.30
Leith at Sullivan's Dam	L/S Taieri, Dun	78.500	88.0	-10.80	907.50	1110.00	-18.24
Leith at Pine Hill	L/S Taieri, Dun	69.500	57.0	21.93	768.00	897.00	-14.38
Musselburgh	L/S Taieri, Dun	44.600	68.0	-34.41	531.30	704.00	-24.53
Taieri Depot	L/S Taieri, Dun	47.500	56.0	-15.18	541.50	580.00	-6.64
Dunedin Airport	L/S Taieri, Dun	29.200	55.0	-46.91	383.30	596.00	-35.69
Mt Stoker	L/S Taieri, Dun	23.000	47.0	-51.06	350.00	416.00	-15.87
Glengarry	L/S Taieri, Dun	26.000	58.0	-55.17	447.00	531.00	-15.82
Middlemarch-Garthmyl	L/S Taieri, Dun	23.900	51.0	-53.14	384.70	453.00	-15.08
Balclutha	Southwest Otago	47.500	60.0	-20.83	455.00	631.00	-27.89
Warepa	Southwest Otago	62.400	69.0	-9.57	671.90	754.00	-10.89
Clarks Flat	Southwest Otago	65.500	74.0	-11.49	581.00	713.00	-18.51
Cairn	Southwest Otago	97.500	129.0	-24.42	987.00	1238.00	-20.27
Waikoikoi at Rosebank	Southwest Otago	77.400	78.0	-0.77	756.40	830.00	-8.87
Moa Flat	Southwest Otago	74.500	81.0	-8.02	808.50	732.00	10.45
Ranfurly	Central Otago	35.600	39.0	-8.72	294.00	396.00	-25.76
Pat-Paerau	Central Otago	47.500	36.0	31.94	401.00	328.00	22.26
Tima	Central Otago	70.000	55.0	27.27	583.00	593.00	-1.69
Ettrick No2	Central Otago	43.600	58.0	-24.83	520.60	530.00	-1.77
Blackstone Hill	Central Otago	50.600	57.0	-11.23	421.40	573.00	-26.46
Hills Creek	Central Otago	52.000	50.0	4.00	388.50	454.00	-14.43
Lauder EWS	Central Otago	31.200	42.0	-25.71	337.00	398.00	-15.33
Alexandra	Central Otago	35.800	29.0	23.45	329.60	300.00	9.87
Clyde EWS	Central Otago	27.800	47.0	-40.85	310.00	346.00	-10.40
Hunter Valley 2	Lakes district	62.100	93.0	-33.23		1032.00	
Makarora telemetry	Lakes district	103.500	184.0	-43.75	1647.50	1969.00	-16.33
West Wanaka	Lakes district	50.500	81.0	-37.65	653.50	940.00	-30.48
Wanaka Aero AWS	Lakes district	33.700	48.0	-29.79	399.30	590.00	-32.32
Peat's Hut	Lakes district	49.000	69.0	-28.99	629.00	778.00	-19.15
Glenorchy telemetry, Hillocks	Lakes district	94.000	168.0	-44.05	1194.24	1591.00	-24.94
Queenstown	Lakes district	53.500	70.0	-23.57	617.90	760.00	-18.70
Queenstown AWS	Lakes district	40.600	59.0	-31.19	485.40	670.00	-27.55

RIVER FLOW TABLE (November 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	1.067	7.394	1.998	3.255	-38.64
Kakanui River at Clifton Falls	North Otago	0.839	5.669	1.485	2.375	-37.49
Shag River at The Grange	North Otago	0.208	0.546	0.341	0.955	-64.33
Leith at University Foot Br	L/S Taieri, Dun	0.169	2.301	0.299	0.548	-45.39
Silverstream at Taieri Depot	L/S Taieri, Dun	0.084	3.265	0.219	0.583	-62.50
Taieri River at Outram	L/S Taieri, Dun	4.808	18.920	8.036	24.995	-67.85
Taieri River at Sutton	L/S Taieri, Dun	3.498	9.684	5.697	16.054	-64.52
Taieri River at Tiroiti	L/S Taieri, Dun	2.149	7.501	3.978	10.269	-61.26
Taieri River at Waipiata	Central Otago	1.648	4.472	2.443	8.774	-72.16
Nenthorn Stream at Mt Stoker Rd	L/S Taieri, Dun	0.052	0.746	0.143	0.590	-75.84
Deep Stream at SH 87	L/S Taieri, Dun	0.595	11.989	1.236	3.690	-66.51
Clutha River at Balclutha	Southwest Otago	199.031	537.932	372.649	704.448	-47.10
Waitahuna River at Tweeds Br	Southwest Otago	0.527	5.386	0.851	2.385	-64.33
Pomahaka River at Burkes Ford	Southwest Otago	6.871	38.758	11.094	22.093	-49.78
Pomahaka River at Glenken	Southwest Otago	3.658	26.745	6.533	15.654	-58.27
Waipahi River at Waipahi	Southwest Otago	1.196	2.908	1.644	4.887	-66.37
Manuherikia River at Ophir	Central Otago	2.430	4.973	3.626	16.047	-77.40
Clutha at Clyde	Central Otago	108.813	720.774	360.749	650.978	-44.58
Clutha River at Cardrona Confluence	Lakes District	143.971	265.092	177.248	345.564	-48.71
Kawarau River at Chards Rd	Lakes District	148.083	199.162	164.380	288.265	-42.98
Shotover River at Bowens Peak	Lakes District	21.712	67.943	27.948	62.409	-55.22
Shotover River at Peat's Hut	Lakes District	12.930	76.077	22.467	39.926	-43.73
Dart River at The Hillocks	Lakes District	27.570	332.826	65.708	103.960	-36.79

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 Hawea	341.291	341.781	341.268	341.787	341.520	342.001
Lake Wakatipu	309.690	309.709	309.650	309.874	309.779	310.181
Lake Wanaka	276.967	276.912	276.898	277.113	277.030	277.652

Lake	Lake outflow for the month (m^3/s)					Historic mean outflow (m^3/s)
	First Day	Last Day	Min.	Max.	Mean	
Lake Hawea	47.2	11.2	11.0	96.2	19.9	38.79
Lake Wakatipu	115.0	119.1	106.9	156.3	134.4	246.11
Lake Wanaka	143.9	135.7	133.7	166.7	153.7	265.52

Notes:
L/S Taieri, Dun = Lower Taieri, Strath Taieri and Dunedin.
** = Controlled Outflows.*