

Mountain Snow Conditions and Water Supply Forecasts for Alberta

January 2002



Notes

Alberta Environment publishes the **"Mountain Snow Conditions and Water Supply Forecasts for Alberta"** monthly, usually from February to August. These reports are prepared by the Hydrology Branch, Forecasting Section of the Department's Environmental Operations Division.

Alberta Environment is grateful for the assistance of Environment Canada's Climatological Services Unit and Water Resources Branch in providing weather, precipitation and streamflow data. Snow survey data are also provided by the United States, Soil Conservation Service of Montana and the British Columbia Ministry of Environment, Lands and Parks. The

assistance of a number of private citizens who diligently report observations of precipitation and other data is also appreciated.

Alberta Environment and the National Resources Conservation Service (NRCS) from Portland, Oregon are collaborating on the Water Supply Forecasts for the Milk and St. Mary Rivers. Water Supply forecasts for the Western United States are available through the NRCS web page:

http://www.wcc.nrcs.usda.gov/water/w_gnty.html

All data summarized in this publication are preliminary and subject to revision.

Data used in this report are available on request from: Alberta Environment, Hydrology Branch, 10th Fl, Oxbridge Place, 9820 -106 Street, Edmonton, Alberta, T5K 2J6, Fax: (780) 422-8606

This report is also available through Alberta Environment's automated streamflow information/fax-on-demand service. To access this service toll-free, please call the Alberta Government RITE Operator at 310-0000, available 24 hours a day from anywhere in the province. At the prompt, enter the phone number **207-2718** for our streamflow information/fax on demand service.

Historical Streamflow Information: Environment Canada, Calgary, (403) 292-5317

Equivalents of Measure

Parameter	Metric Unit	Conversion to Imperial Units
Snow depth	centimetres	2.54 cm = 1 inch
Water Equivalent	millimetres	25.4 mm = 1 inch
Elevation	metres	1 m = 3.2808 feet
Streamflow	cubic metres per second	1 cms = 35.3 cfs
Volume	cubic decametre (dam ³)	1 dam ³ = 1000 m ³ = 0.8107 acre-feet

Explanation of Descriptions

Much-above-average	In the upper 15% of recorded values
Above-average	Between the upper 15% and 35% of recorded values
Below-average	Between the lower 15% and 35% of recorded values
Much-below-average	In the lower 15% of recorded values

Overview of Current Conditions

Precipitation was much-below-normal in the province during the month of December. Winter precipitation (November and December) ranges from much-below-normal to below-normal in most areas of the province except in the Peace River and Sundre areas, where precipitation is near normal. As a result, snowpack in the plains area of the province is below-average for this time of the year.

Environment Canada's long-lead precipitation forecast for the December to February period indicates above-normal precipitation in the northern third of the province, normal precipitation in central areas, and below-normal in the southwestern portion of the province. The forecast for the spring period (March to May) is for above-normal precipitation in eastern areas of Alberta and normal precipitation elsewhere. The National Oceanic and Atmospheric Administration (NOAA) is forecasting normal precipitation for the province for the winter (December to February) and spring (March to May) periods.

Snow accumulations in the mountains are near normal values for this time of the year with the exception of the headwaters of the Oldman River basin, which have below-normal accumulations. As of January 1, 2002, snow accumulations in the Oldman River headwaters are slightly higher than values observed at this time last year. The mountain snowpack is an important source of water supply to reservoirs in the province. Normally the accumulation of snowpack at this time of the year accounts for 40 to 50% of the seasonal total.

Water storage as of January 1, 2002 in the major irrigation and hydroelectric reservoirs in the Bow and Oldman River basins is below-normal for this time of the season, with the exception of Keho Lake, Lake Newell and Crawling Valley Reservoir, which are normal. Storage conditions in the Oldman and Bow River basins are less than last year at this time. Water storage in the Red Deer and North Saskatchewan River basins are normal for this time of the season.

Much-below-average natural runoff volumes are forecast in the Milk River basin for the March to September 2002 period. These forecasts assume that precipitation over the summer period will be normal. Current forecasted values for the March to September period would rank fourteenth lowest on record (1912-95) for the Milk River at Milk River.

Next month, the Plains Runoff Outlook will be added to provide insight on runoff conditions for the plains area of the province. The Mountain Snow Conditions and Water Supply Forecasts will continue to report on current conditions in regards to water supply, snowpack and reservoir storages from the mountain areas.

December Climatic Conditions

Precipitation was much-below-normal in the province during the month of December with very little precipitation being recorded in the plains area of the province (Figures 1 and 2). Snow accumulation at the higher elevations in the mountains was near normal in December. Winter precipitation (November and December) is much-below-normal in the majority of the plains area of the province (Figures 3 and 4).

Long-Lead Precipitation Outlook

Environment Canada's long-lead precipitation forecast for the December to February period indicates above-normal precipitation in the northern third of the province, normal precipitation in central areas, and below-normal in the southwestern portion of the province. The forecast for the spring period (March to May) is for above-normal precipitation in eastern areas of Alberta and normal precipitation elsewhere. The National Oceanic and Atmospheric Administration (NOAA) is forecasting normal precipitation for the province for the winter (January to February) and spring (March to May) periods.

Reservoir Storage Conditions

Water storage in the major irrigation reservoirs of the Oldman River basin is below-normal for this time of the season, with the exception of Keho Lake, which is normal (Table 1).

Table 1 Status of Major Water Storage Reservoirs as of January 1, 2002 – Oldman River Basin

Reservoirs	Current Live Storage			Remarks	January 1, 2001 Live Storage	
	Volume in dam ³	Volume in acre-feet	Volume as % of Capacity		dam ³	acre-feet
Keho Lake	79,700	64,700	83	normal	81,200	65,900
Waterton Reservoir	65,600	53,200	39	below-normal	73,500	59,600
St. Mary Reservoir	35,100	28,400	9	below-normal	35,300	28,600
Ridge Reservoir	21,700	17,600	17	below-normal	28,400	23,000
Total	122,000	99,200	18	below-normal	137,000	111,000
Chin Reservoir	22,400	18,200	12	below-normal	89,100	72,200
Forty Mile Reservoir	9,250	7,500	11	below-normal	42,800	34,700
Total	31,700	25,700	11	below-normal	132,000	107,000
Oldman Reservoir	102,000	82,600	21	below-normal	267,000	216,000

Mountain Snow Conditions and Water Supply Forecasts for Alberta – January 2002

Water storage in most of the major hydroelectric and irrigation reservoirs in the Bow River basin is below-normal for the season, except for Lake Newell and Crawling Valley Reservoir, which are normal (Table 2).

Table 2 Status of Major Water Storage Reservoirs as of January 1, 2002 - Bow River Basin

Reservoirs	Current Live Storage			Remarks	January 1, 2001 Live Storage	
	Volume in dam ³	Volume in acre-feet	Volume as a % of Capacity		dam ³	acre-feet
Lake Minnewanka	120,000	97,300	54	below-normal	137,000	111,000
Spray Lake	75,300	61,100	42	below-normal	111,000	90,400
Upper Kananaskis Lake	50,700	41,100	49	below-normal	45,100	36,500
Lower Kananaskis Lake	36,400	29,500	58	below-normal	53,400	43,300
Total	282,000	229,000	50	below-normal	347,000	282,000
Lake McGregor	182,000	148,000	50	below-normal	309,000	250,000
Travers Reservoir	52,600	42,700	50	below-normal	54,200	44,000
Total	235,000	190,000	50	below-normal	363,000	294,000
Lake Newell	159,000	129,000	89	normal	159,000	129,000
Crawling Valley Reservoir	97,600	79,200	87	normal	102,000	82,400
Total	256,000	208,000	88	normal	260,000	211,000

Water storage in Glennifer Lake (Red Deer River basin) is normal for this time of the season (Table 3).

Table 3 Status of Major Water Storage Reservoirs as of January 1, 2002 – Red Deer River Basin

Reservoirs	Current Live Storage			Remarks	January 1, 2001 Live Storage	
	Volume in dam ³	Volume in acre-feet	Volume as a % of Capacity		dam ³	acre-feet
Glennifer Lake	120,000	97,200	59	normal	150,000	122,000

Water storage in the North Saskatchewan River basin major hydroelectric reservoirs is normal for this time of the year (Table 4).

**Table 4 Status of Major Water Storage Reservoirs as of January 1, 2002
North Saskatchewan River Basin**

Reservoirs	Current Live Storage			Remarks	January 1, 2001 Live Storage	
	Volume in dam ³	Volume in acre-feet	Volume as a % of Capacity		dam ³	acre-feet
Lake Abraham	818,000	663,000	58	normal	937,000	760,000
Brazeau Reservoir	273,000	222,000	56	normal	312,000	253,000
Total	1,091,000	885,000	58	normal	1,249,000	1,012,000

Milk River Basin

Precipitation in the headwaters of the Milk River basin was below-normal for December as indicated by the accumulation of snow on the snow pillows at the higher elevations of the basin. Snow pillow information can be found on the department website, located at <http://www3.gov.ab.ca/env/water/WSWaterReports/Index.html>. Precipitation in the plains area was much-below-normal during December (Figures 1 and 2) and is below-normal for the winter (November and December) period (Figures 3 and 4).

Much-below-average natural runoff volumes are forecast in the Milk River basin for the March to September 2002 period (Table 5). These forecasts assume that precipitation over the summer period will be normal. Precipitation over the next few months will have a major impact on the summer water supply forecasts between now and the end of September. Current forecasted values for the March to September period would rank fourteenth lowest on record (1912-95) for the Milk River at Milk River (Table 5, Figure 5)

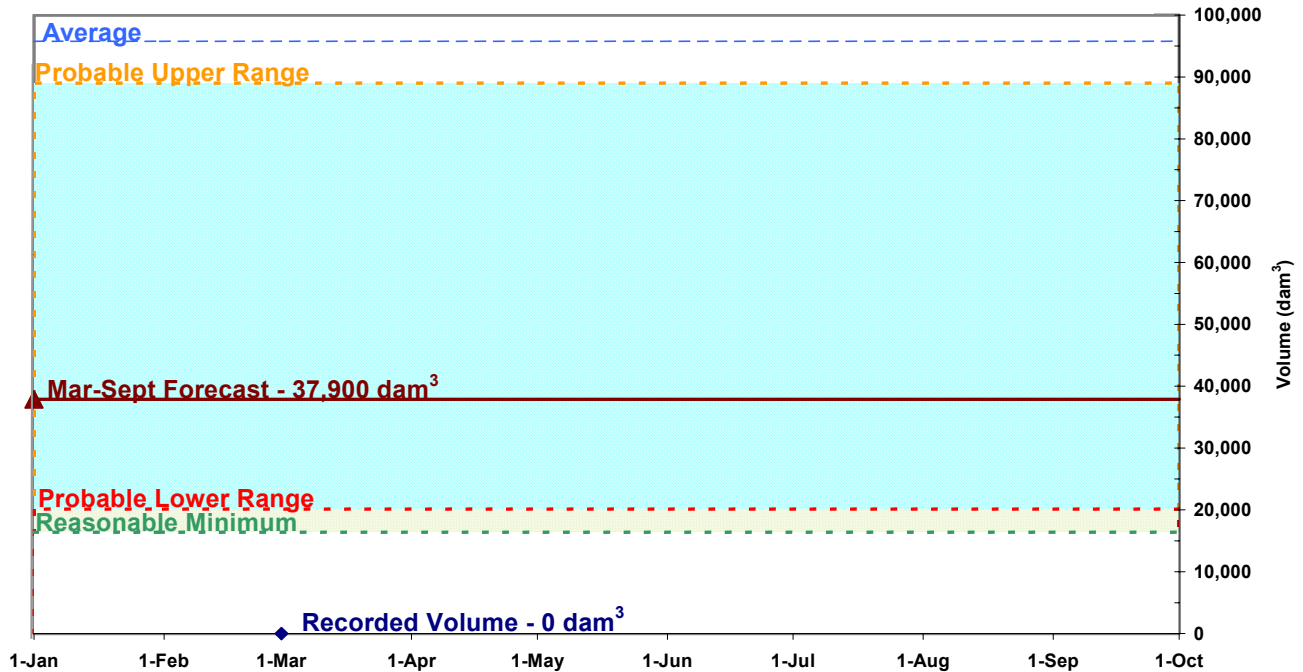
Table 5 Water Supply Forecast as of January 1, 2002 - Milk River Basin (Natural Flows)

Locations	Volume Forecast for March 1 to September 30						Actual March-September 2001 Volume as a % of Median
	Volume in dam ³	Volume in acre-feet	Volume as a % of Median	Probable Range as a % of Median	Reasonable Minimum as % of Median	Forecast Ranking (lowest to highest)	
Milk River at Western Crossing	22,800	18,500	40	22-95	17	14	24
Milk River at Milk River	37,900	30,700	40	21-93	17	14	24
Milk River at Eastern Crossing	47,200	38,300	40	22-95	17	13	21

Median is calculated for the March 1 to September 30 period from 1912 to 1995

NOTE: There is: a 50% chance that the actual natural flow will fall within the probable range given; a 25% chance that the actual flow will be less than the lower bound of the probable range given; and a 10% chance that the actual natural flow will be less than the reasonable minimum. Actual day to day streamflow conditions may vary throughout the season as a result of the effects of streamflow diversion and reservoir storage.

Figure 5 Water Supply Forecast as of January 1, 2002 for the Milk River at Milk River



Oldman River Basin

Precipitation in the headwaters of the Oldman River basin was near normal in December as indicated by the accumulation of snow on the snow pillows at the higher elevations of the basin. As of January 1, 2002, snow accumulations are below-normal but values are slightly higher than those recorded at the same time last year. Snow pillow information can be found on the department website, located at <http://www3.gov.ab.ca/env/water/WSWaterReports/Index.html>. Precipitation in the plains area was much-below-normal in December (Figures 1 and 2). Winter precipitation (November and December) in the plains area (Figures 3 and 4) of the basin remains much-below-normal and as a result, there is a very shallow snowpack in place at this time.

Bow River Basin

Precipitation in the headwaters of the Bow River basin was near normal for December as indicated by the accumulation of snow on the snow pillows at the higher elevations of the basin. Snow pillow information can be found on the department website, located at <http://www3.gov.ab.ca/env/water/WSWaterReports/Index.html>. Snow accumulation at the higher elevations, as indicated by the snow pillows, is normal for this time of the year. Precipitation in the plains area was much-below-normal in December (Figures 1 and 2). Winter precipitation (November and December) is below-normal to much-below-normal in the plains area of the basin (Figures 3 and 4).

Red Deer River Basin

Precipitation in the headwaters of the Red Deer River basin during December was near normal as shown by the snow accumulation on the snow pillows. Snow accumulation at the higher elevations of the basin is normal for this time of the year. Snow pillow information can be found on the department website, located at: <http://www3.gov.ab.ca/env/water/WSWaterReports/Index.html>. Precipitation in the plains area of the basin was much-below-normal except in the Sundre area, which recorded normal precipitation (Figures 1 and 2). Winter precipitation (November and December) is below-normal to normal in the plains area of the basin (Figures 3 and 4).

North Saskatchewan River Basin

Precipitation in the North Saskatchewan River basin was much-below-normal in December (Figures 1 and 2). Winter precipitation (November and December) is much-below-normal in the plains area of the basin (Figures 3 and 4). There is no snow pillow information for the North Saskatchewan River basin.

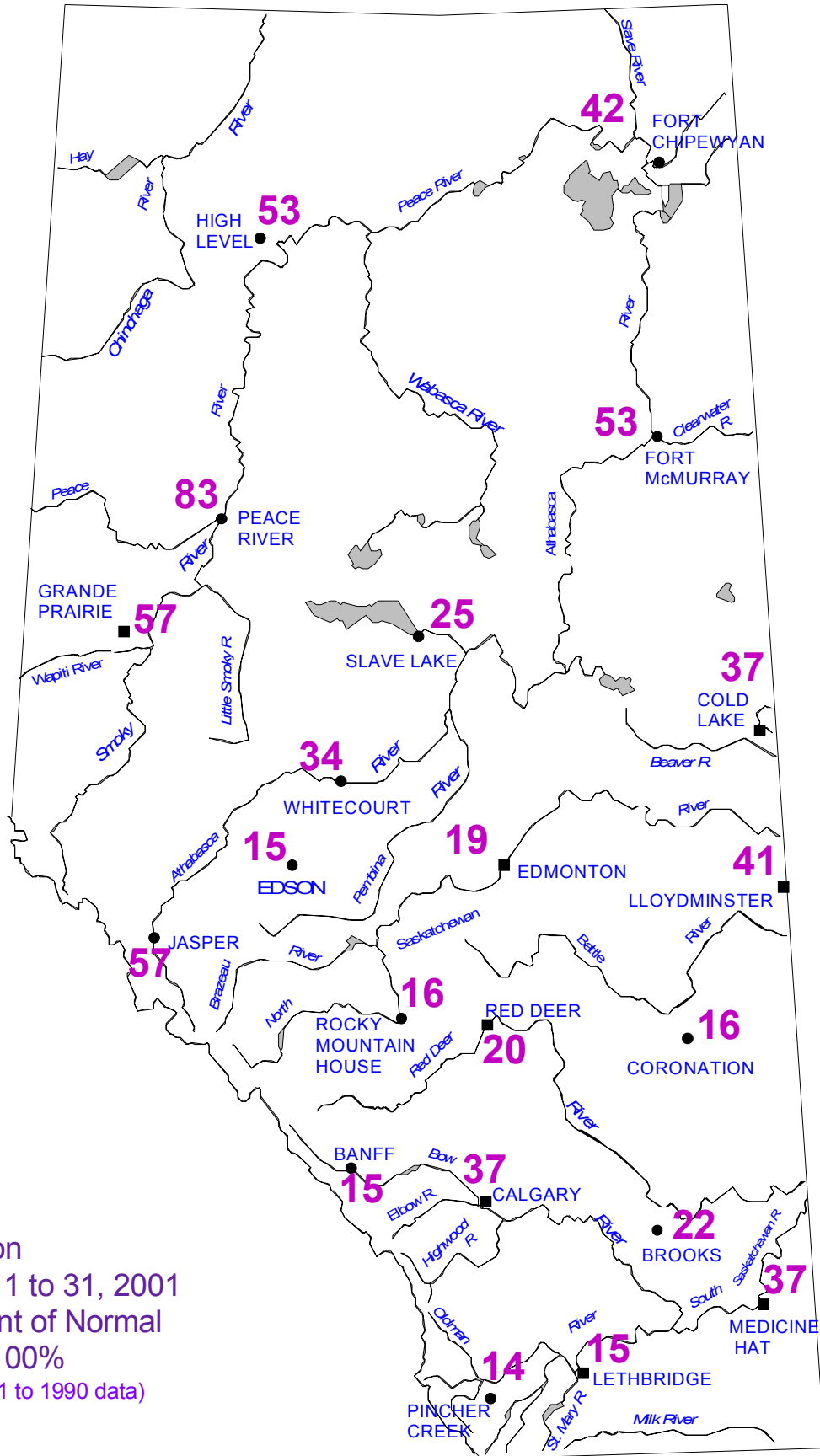


Figure 1
 Precipitation
 December 1 to 31, 2001
 as a percent of Normal
 Normal = 100%
 (based on 1961 to 1990 data)

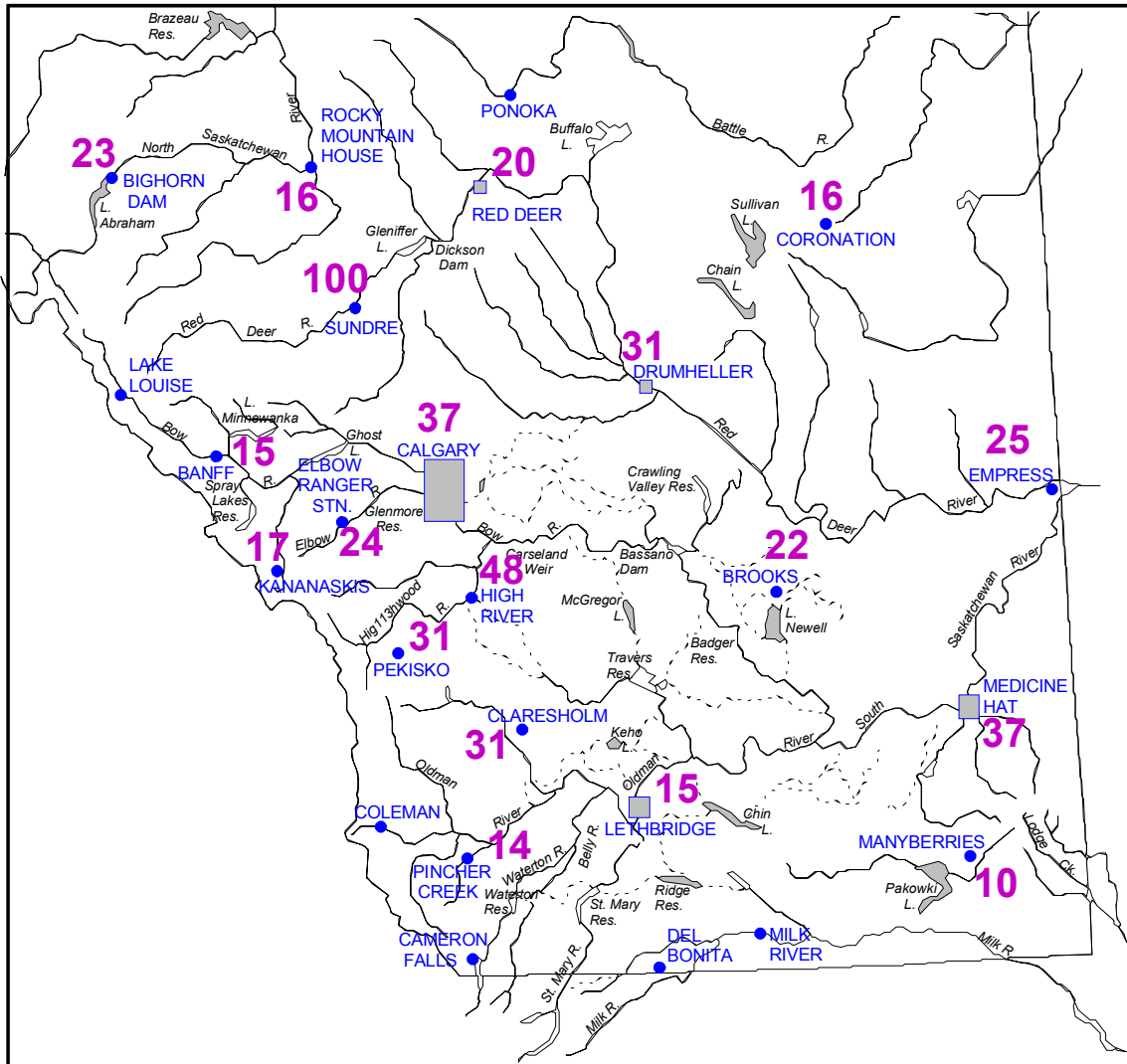


Figure 2
Precipitation
Southern Alberta
December 1 to 31, 2001
as a percent of Normal
Normal = 100%
 (based on 1961 to 1990 data)

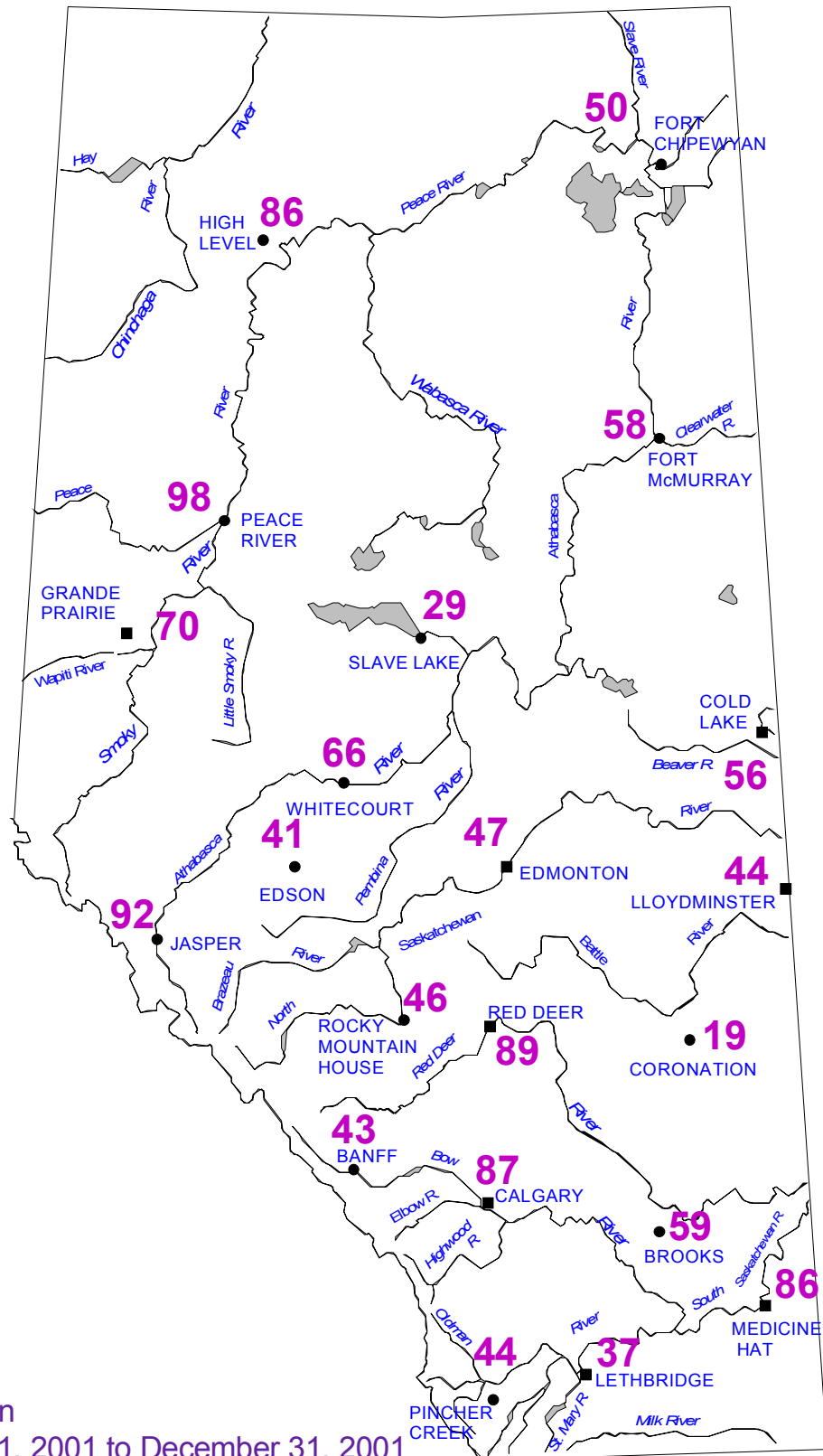


Figure 3
 Precipitation
 November 1, 2001 to December 31, 2001
 as a percent of Normal
 Normal = 100%
 (based on 1961 to 1990 data)

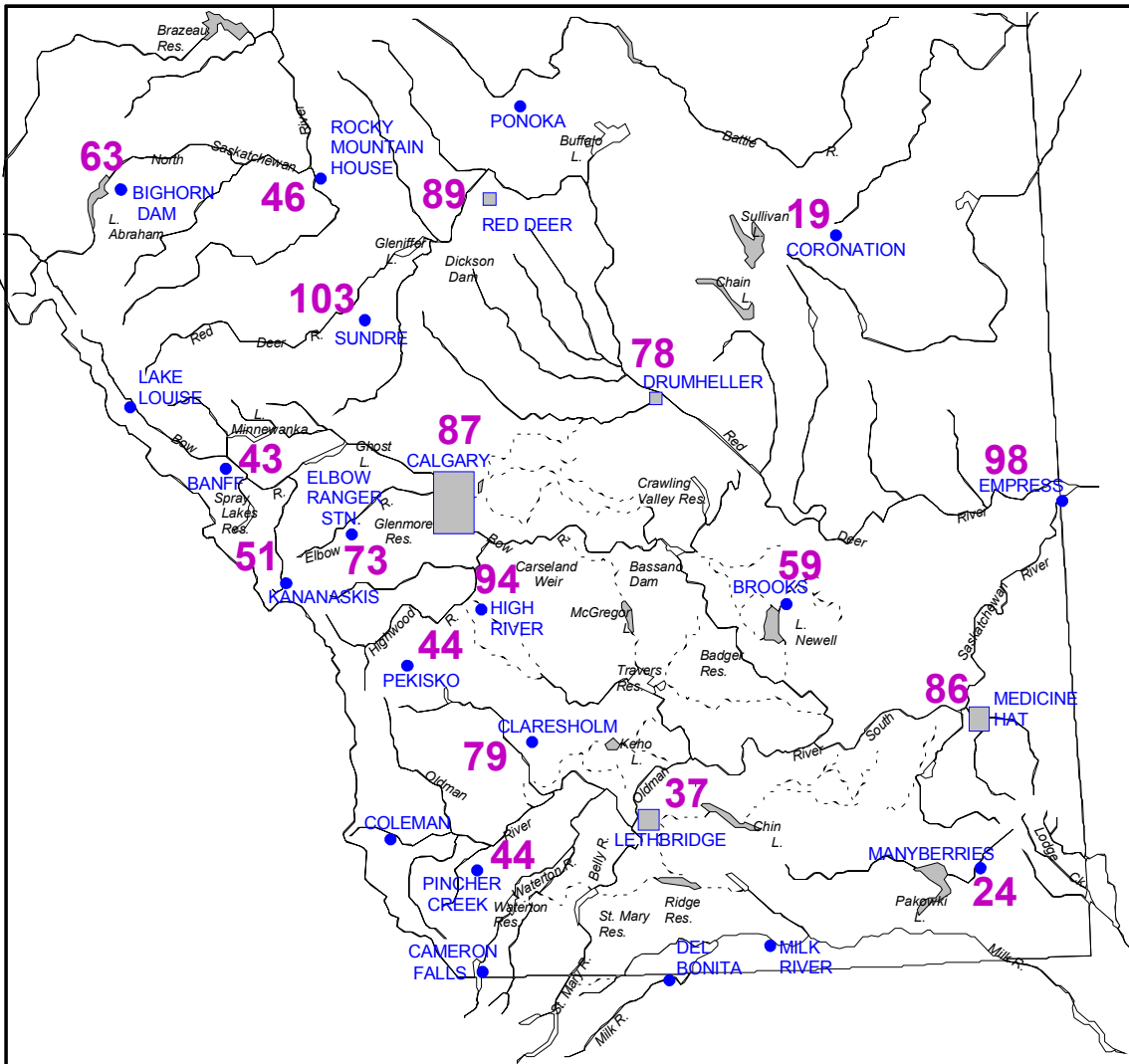


Figure 4
Precipitation
Southern Alberta
November 1, 2001 to December 31, 2001
as a percent of Normal
Normal = 100%
 (based on 1961 to 1990 data)