

# Mountain Snow Conditions and Water Supply Forecasts for Alberta

February 2001



**Alberta**  
ENVIRONMENT

**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 Water Sciences Branch, Hydrology/Forecasting Section of the Department's Water Management 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\\_qnty.html](http://www.wcc.nrcs.usda.gov/water/w_qnty.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, Water Sciences Branch, Hydrology/Forecasting Section, 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 <sup>3</sup> )	1 dam <sup>3</sup> = 1000 m <sup>3</sup> = 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**

Much-below-normal precipitation amounts were recorded across the province in January. Precipitation remains much-below-normal for the winter season (November 2000 to January 2001). Current predictions from Environment Canada and the National Oceanic and Atmospheric Administration are for above-normal precipitation for the February to May period in southern Alberta.

The February 1 Mountain snowpack was much-below-average in all areas along the eastern slopes. A majority of the measurements completed at the end of January set new historic minimum values. The only area along the mountains and foothills to have near normal accumulations is the Sundre area.

Fall precipitation (September to October) was near normal in the south and below-normal in central regions and the foothills of western Alberta. The lack of precipitation since April 2000 in southern Alberta has resulted in soil moisture conditions being much-below-average heading into the winter season.

Water storage as of February 1, 2001 in the major irrigation and hydroelectric reservoirs in the Bow, Red Deer and North Saskatchewan River basins is normal for this time of the season. The exceptions are: Lake Abraham, which is above-normal and Spray Lake, Lower Kananaskis Lake and Travers Reservoir, which are below-normal. In the Oldman River basin, reservoirs are below-normal except for Keho Lake, which is normal.

As of February 1, 2001, much-below-average May to September natural streamflow volume is forecast for the Milk, Oldman, Bow, Red Deer, and North Saskatchewan River headwaters.

## **January Climatic Conditions**

Much-below-normal precipitation amounts were recorded across the province in January (Figures 1 and 2). Precipitation values ranged from 0 to 44 % of normal during the month, with many locations receiving little or no precipitation. Many locations recorded new records for warmest mean temperature and lowest precipitation totals for the month of January. Precipitation remains much-below-normal for the winter season (November 2000 to January 2001) (Figures 3 and 4).

## **Long-Lead Precipitation Outlook**

Currently, there is no strong discernible signal in the El Niño/La Niña pattern. Environment Canada and the National Oceanic and Atmospheric Administration (NOAA) are forecasting above-normal precipitation for the February to May period in southern Alberta. Preliminary forecasts by Environment Canada for the 2001 summer (June to August) are for above-normal precipitation in the southern two-thirds of Alberta, while NOAA is predicting normal precipitation across the province.

## **Summer Water Supply Volume Forecast**

### **Fall Precipitation**

Fall precipitation (September to October) was near normal in southern areas of the province (Figures 5 and 6). Central regions recorded below-normal fall precipitation and the foothills of western Alberta received below-normal to much-below-normal fall precipitation in 2000. The lack of precipitation since April 2000 in southern Alberta has resulted in soil moisture conditions being much-below-average heading into the winter season.

### **Mountain Snowpack**

The February 1 Mountain snowpack was much-below-average in all areas along the eastern slopes. Of the 23 snow course measurements made in Alberta during the last week of January, 17 recorded new historical minimums. Nearly one-third of the 17 new minimums were one-half to two-thirds the previous recorded minimum. In these cases, normal precipitation from now until the end of the accumulation season (April or May), will only bring current accumulations up to the previous historic minimum values. The only area along the mountains and foothills to have near normal accumulations is in the Sundre area, where an isolated December snowfall accounted for most of the precipitation. The mountain snowpack conditions are shown in Figure 7 and are summarized in Table 1.

## Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

**Table 1 Mountain Snowpack Conditions as of February 1, 2001**

Area	Snowpack Conditions (percent of Average)
Waterton/St. Mary River Headwaters	35 to 50%
Oldman River Headwaters	30 to 40%
Highwood/Kananaskis River headwaters	25 to 35%
Bow River Headwaters	35 to 45%
Red Deer River Headwaters	45 to 100%
North Saskatchewan River Headwaters	35 to 45%
Athabasca River Headwaters	45 to 55%
Smoky River Headwaters	50 to 60%

Average = 100%

### Water Supply Volume Forecasts

As of February 1, 2001, much-below-average May to September natural streamflow volume is forecast for the Milk, Oldman, Bow, Red Deer, and North Saskatchewan River headwaters. These forecasts assume that precipitation over the summer period will be average. The natural streamflow volume forecasts for 2001 and the actual 2000 volumes are presented in Table 2.

Precipitation will have a major impact on the summer water supply forecast between now and the end of September. Streamflow volume forecasts will be updated monthly until mid-summer. Check our Forecaster's Comments web page throughout the month for updated information regarding runoff conditions. A quantitative forecast of the natural streamflow volumes as a percent of average will be shown in the March Report.

**Table 2 Water Supply Volume Outlook as of February 1, 2001**

Location	May to September 2001 Natural Streamflow Volume Outlook	May to September 2000 Actual Natural Streamflow Volumes
Milk River at Milk River *	much-below-average	much-below-average
Oldman River at Lethbridge	much-below-average	much-below-average
Bow River at Calgary	much-below-average	much-below-average
Red Deer River at Red Deer	much-below-average	Below-average
North Saskatchewan River at Edmonton	much-below-average	Below-average

\* - Milk River forecast is from March 1 to September 30

## Milk River Basin

Conditions remained dry in the headwaters of the Milk River basin as much-below-normal precipitation was recorded in January (Figures 1 and 2). Precipitation remains much-below-normal during the winter season (November to January) (Figures 3 and 4).

Much-below-average natural runoff volumes are forecast for the March to September 2001 period (Table 3).

**Table 3 Water Supply Forecast as of February 1, 2001 - Milk River Basin (Natural Flows)**

Locations	Volume Forecast for March 1 to September 30					2000 Actual March to September Volume as a % of Median
	Volume in dam <sup>3</sup>	Volume in acre-feet	Volume as a % of Median	Probable Range as a % of Median	Reasonable Minimum As % of Median	
Milk River at Western Crossing	13,600	11,000	24	15-84	11	31
Milk River at Milk River	22,600	18,400	24	14-83	11	27
Milk River at Eastern Crossing	27,900	22,600	24	15-85	10	N/A

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.

## Oldman River Basin

Precipitation was much-below-normal in the Oldman River basin during January (Figures 1 and 2). Five snow course measurements were made in the basin during the last week of January, of which, four sites recorded new historical minimums (Table 4).

The lack of precipitation since last spring has resulted in extremely dry conditions in the basin. Water storage in the major irrigation reservoirs of the Oldman River basin is below-normal for this time of the season, except for Keho Lake which is normal (Table 5).

**Table 4 February 2001 Snow course measurements in the Oldman River Basin**

Station Name	Feb 1/01 SWE(mm)	% of Avg.	Max SWE(mm)	Min SWE(mm)	Avg. SWE(mm)	Years of Data	Feb 1/01 Ranking (lowest to highest)
Akamina	192	52	638	191	369	21	2
Allison Pass	133	40	521	193	329	18	1
Gardiner HW	173	38	710	231	451	14	1
South Racehorse	125	35	841	161	354	17	1
West Castle	122	45	457	157	271	17	1

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

**Table 5 Status of Major Water Storage Reservoirs as of February 1, 2001 - Oldman River Basin**

Reservoirs	Current Live Storage			Remarks	February 1, 2000 Live Storage	
	Volume in dam <sup>3</sup>	Volume in acre-feet	Volume as % of Capacity		dam <sup>3</sup>	Acre-feet
Keho Lake	81,200	65,900	72	normal	78,400	63,600
Waterton Reservoir	72,000	58,400	42	below-normal	119,000	96,500
St. Mary Reservoir	30,300	24,500	8	below-normal	128,000	104,000
Ridge Reservoir	28,400	23,000	22	below-normal	106,000	85,900
<b>Total</b>	131,000	106,000	19	below-normal	353,000	286,000
Chin Reservoir	89,100	72,200	47	below-normal	180,000	146,000
Forty Mile Reservoir	42,800	34,700	50	below-normal	84,800	68,700
<b>Total</b>	132,000	107,000	48	below-normal	265,000	215,000
Oldman Reservoir	260,000	211,000	53	below-normal	394,000	319,000

### **Bow River Basin**

Precipitation during January was much-below-normal in the Bow River basin (Figures 1 and 2). Precipitation since November 1 has been much-below-normal in the basin (Figures 3 and 4). Thirteen snow course measurements were made at the end of January in the Bow River basin (Table 6). Twelve of the thirteen sites set new historical minimum values. Snow course measurements in the Highwood River basin are particularly low, with measured values approximately one-half of the previously recorded minimum values.

Water storage in most of the major hydroelectric and irrigation reservoirs is normal for the season with the exception of Spray Lake, Lower Kananaskis Lake and Travers Reservoir, which are below-normal (Table 7).

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

**Table 6 February Snow course measurements in the Bow River Basin**

Station Name	Feb 1/01 SWE(mm)	% of Avg.	Max SWE(mm)	Min SWE(mm)	Avg. SWE(mm)	Years of Data	Feb 1/01 Ranking (lowest to highest)
Bow River	76	46	262	79	164	34	1
Bow Summit	130	49	460	86	264	20	2
Chateau Lawn	58	28	284	109	207	32	1
Highwood Summit	89	32	480	132	274	26	1
Little Elbow	61	27	462	119	226	22	1
Lost Creek	112	26	685	279	437	11	1
Mt. Odium	99	31	508	150	319	16	1
Mirror Lake	79	37	348	104	216	34	1
Mud Lake	66	29	376	124	226	19	1
Pipestone Upper	69	40	279	89	171	34	1
Sunshine Village	150	37	678	231	406	23	1
Tent Ridge	71	30	460	130	239	18	1
Three Isle Lake	147	35	660	239	424	17	1

**Table 7 Status of Major Water Storage Reservoirs as of February 1, 2001 - Bow River Basin**

Reservoirs	Current Live Storage			Remarks	February 1, 2000 Live Storage	
	Volume in dam <sup>3</sup>	Volume in acre-feet	Volume as a % of Capacity		dam <sup>3</sup>	Acre-feet
Lake Minnewanka	120,000	97,300	54	normal	139,000	113,000
Spray Lake	78,500	63,600	44	below-normal	87,200	70,700
Upper Kananaskis Lake	26,900	21,800	26	normal	33,200	26,900
Lower Kananaskis Lake	45,500	36,900	72	below-normal	46,100	37,400
<b>Total</b>	271,000	220,000	48	normal	306,000	248,000
Lake McGregor	309,000	250,000	85	normal	302,000	245,000
Travers Reservoir	54,200	44,000	52	below-normal	76,000	61,600
<b>Total</b>	363,000	294,000	77	normal	378,000	306,000
Lake Newell	159,000	129,000	89	normal	156,000	126,000
Crawling Valley Reservoir	102,000	82,400	90	normal	106,000	85,900
<b>Total</b>	260,000	211,000	90	normal	262,000	212,000

## Red Deer River Basin

The Red Deer River basin recorded little or no precipitation in January (Figures 1 and 2). Precipitation remains much-below-normal for the winter period (November to January) with the exception of the Sundre area, which has recorded normal precipitation (Figures 3 and 4). This area of higher precipitation is evident in the data from the snow pillows and snow courses in the basin. Limestone snow course (Table 8) indicated normal accumulation while



## Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

the Skoki Pillow (headwater portion of the basin) remains much-below-average. Snow pillow plots are located on the department website at: ([www.gov.ab.ca/env/water/WSWaterReports/Index.html](http://www.gov.ab.ca/env/water/WSWaterReports/Index.html)).

Water storage in Glennifer Lake is normal for this time of the season (Table 9).

**Table 8 February 2001 Snow course measurements in the Red Deer, North Saskatchewan and Athabasca River Basins**

Station Name	Feb 1/01 SWE(mm)	% of Avg.	Max SWE(mm)	Min SWE(mm)	Avg. SWE(mm)	Years of Data	Feb 1/01 Ranking (lowest to highest)
<b>Red Deer</b>							
Limestone	86	100	150	33	86	18	11
<b>Skoki Lodge Pillow North</b>	<b>102</b>	47	374	101	218	17	2
Nigel Creek	130	44	528	94	294	29	2
<b>Athabasca</b>							
Marmot-Jasper	86	48	191	170	180	3	1
Sunwapta Falls	66	46	254	48	143	29	2

**Table 9 Status of Major Water Storage Reservoirs as of February 1, 2001 – Red Deer River Basin**

Reservoirs	Current Live Storage			Remarks	February 1, 2000 Live Storage	
	Volume in dam <sup>3</sup>	Volume in acre-feet	Volume as a % of Capacity		dam <sup>3</sup>	acre-feet
Glennifer Lake	125,000	101,000	62	normal	141,000	114,000

### North Saskatchewan River Basin

Precipitation during January was much below-normal in the North Saskatchewan River basin (Figures 1 and 2). Winter precipitation (November to January) remains much-below-normal (Figures 3 and 4). The only snow course measured in the basin at the end of January recorded the second lowest value in 29 years (Table 8).

Water storage in the North Saskatchewan major hydroelectric reservoirs is above-normal at Lake Abraham and normal at Brazeau Reservoir (Table 10).

**Table 10 Status of Major Water Storage Reservoirs as of February 1, 2001 – North Saskatchewan River Basin**

Reservoirs	Current Live Storage			Remarks	February 1, 2000 Live Storage	
	Volume in dam <sup>3</sup>	Volume in acre-feet	Volume as a % of Capacity		dam <sup>3</sup>	Acre-feet
Lake Abraham	784,000	636,000	56	above-normal	771,000	625,000
Brazeau Reservoir	202,000	164,000	42	normal	184,000	149,000
<b>Total</b>	<b>986,000</b>	<b>799,000</b>	<b>52</b>	<b>above-normal</b>	<b>955,000</b>	<b>774,000</b>

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

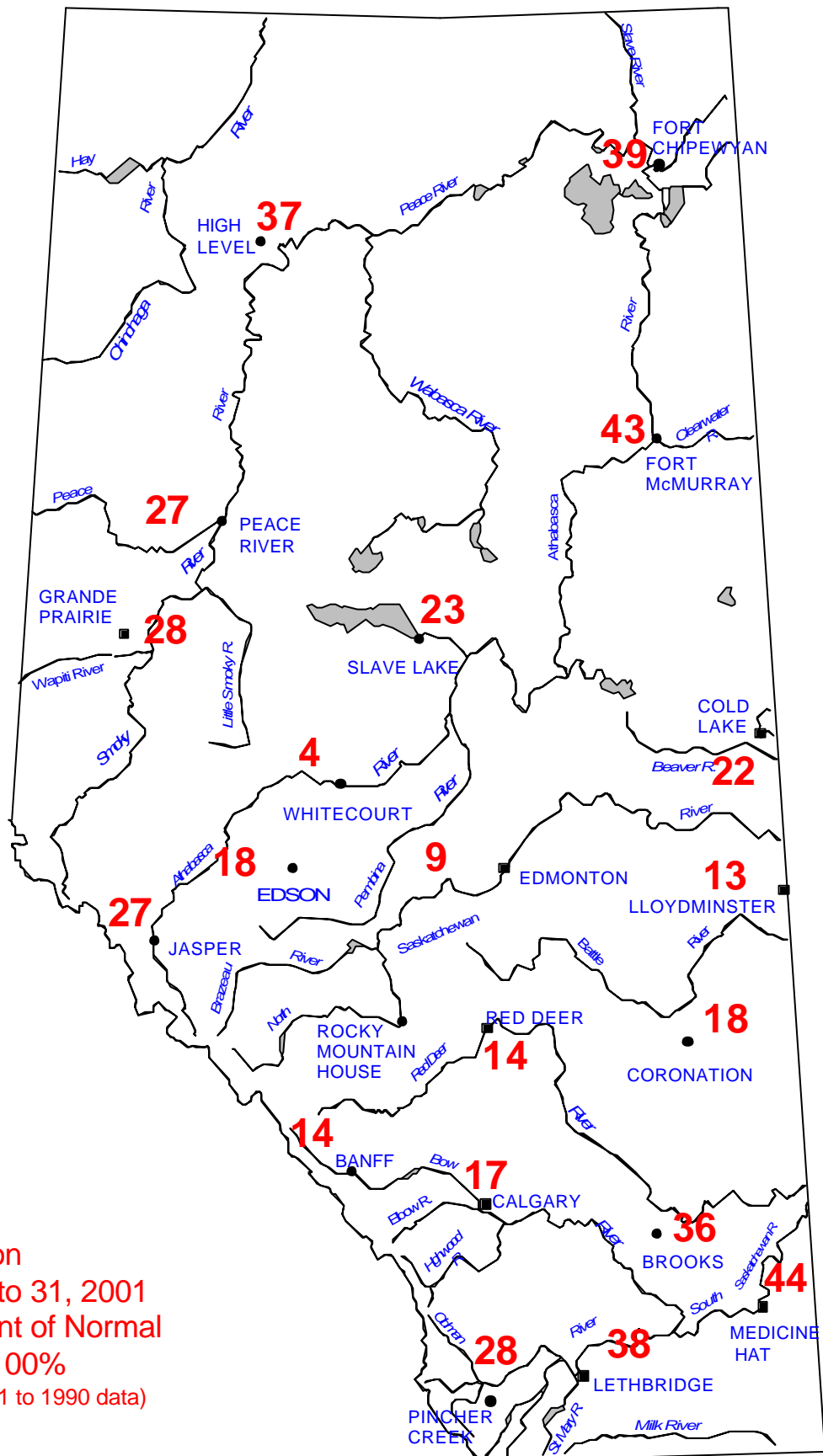


Figure 1  
 Precipitation  
 January 1 to 31, 2001  
 as a percent of Normal  
 Normal = 100%  
 (based on 1961 to 1990 data)

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

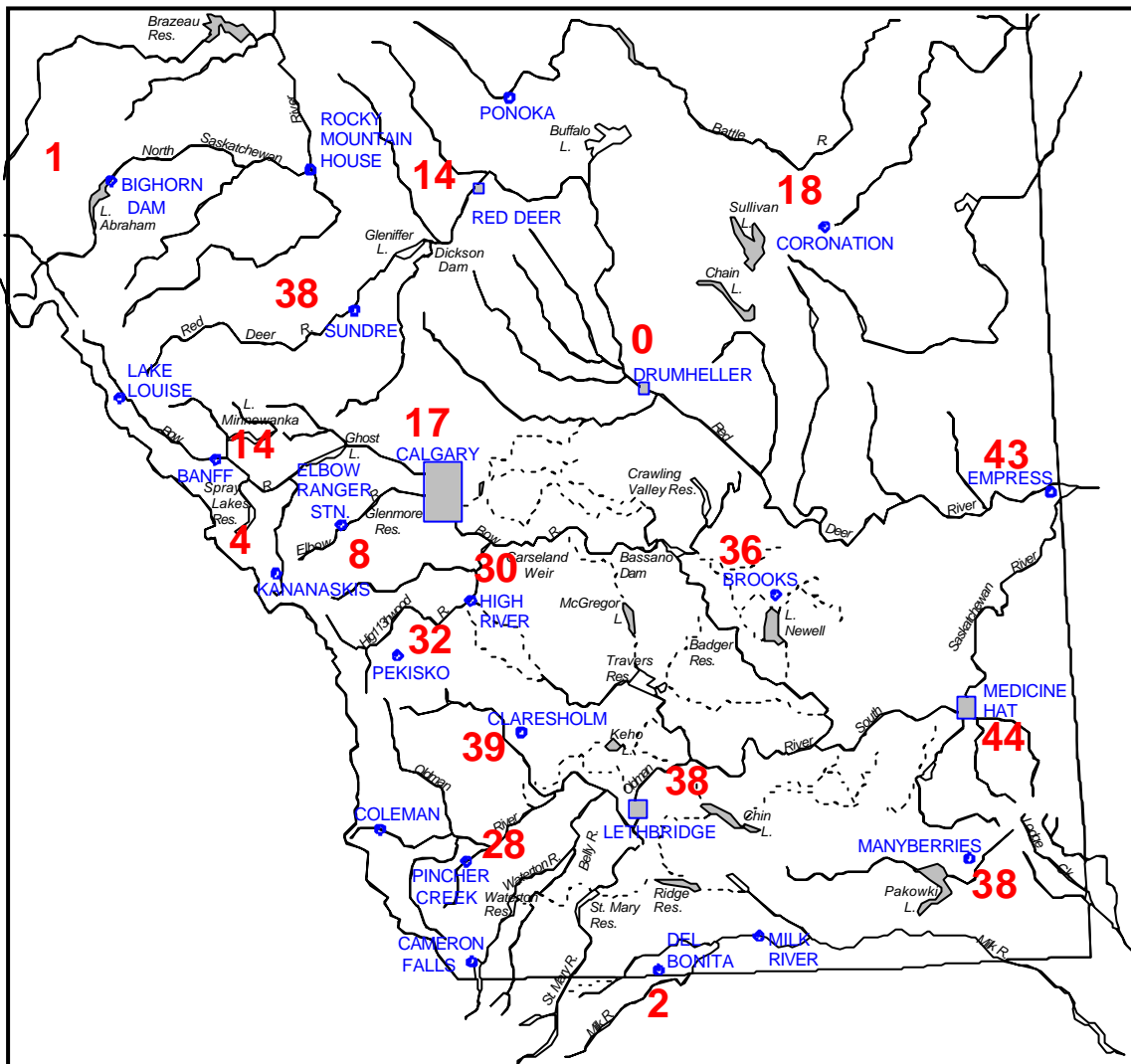


Figure 2  
 Winter Precipitation  
 Southern Alberta  
 January 1 to 31, 2001  
 as a percent of Normal  
 Normal = 100%  
 (based on 1961 to 1990 data)

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

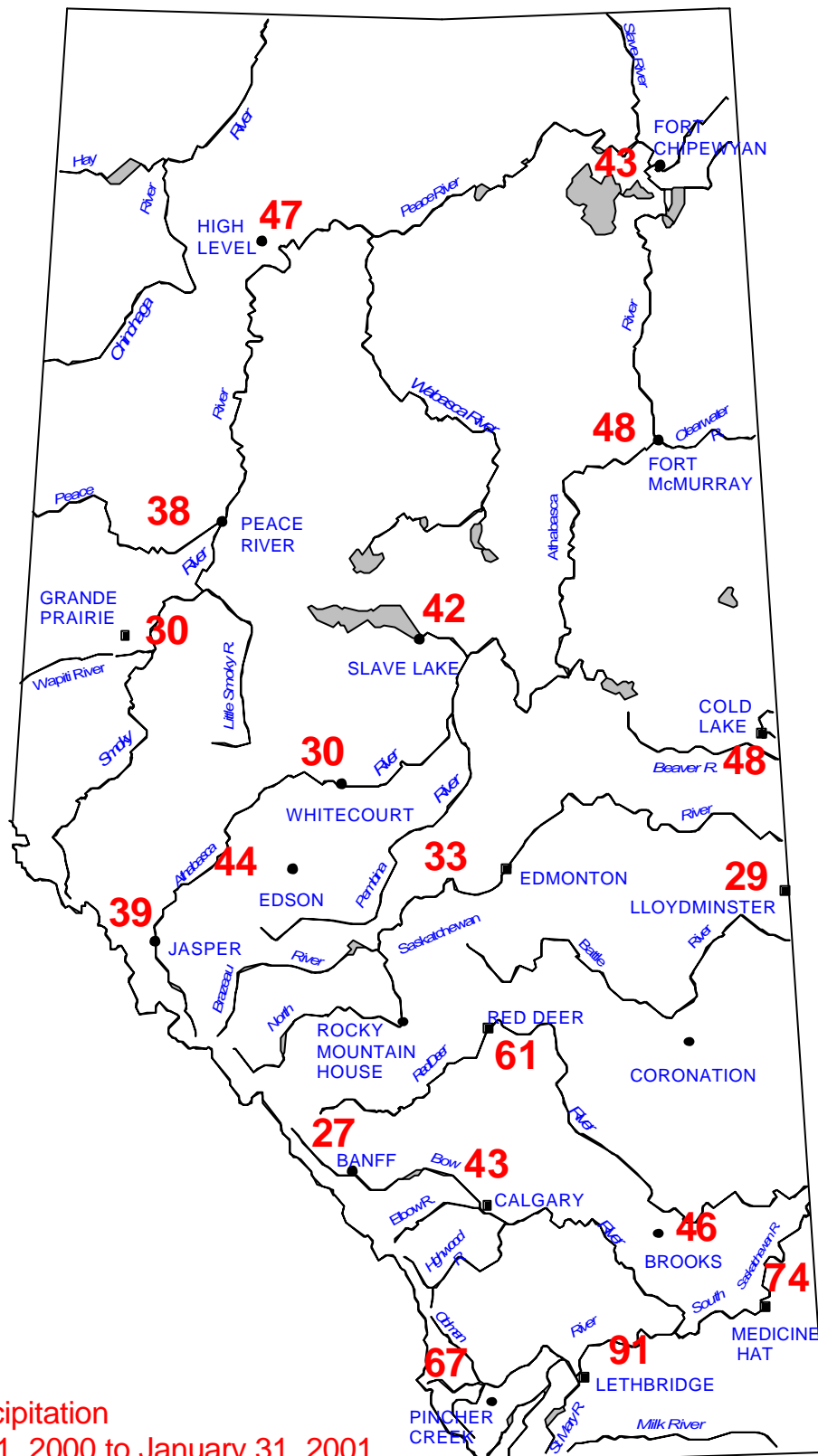


Figure 3  
 Winter Precipitation  
 November 1, 2000 to January 31, 2001  
 as a percent of Normal  
 Normal = 100%  
 (based on 1961 to 1990 data)

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

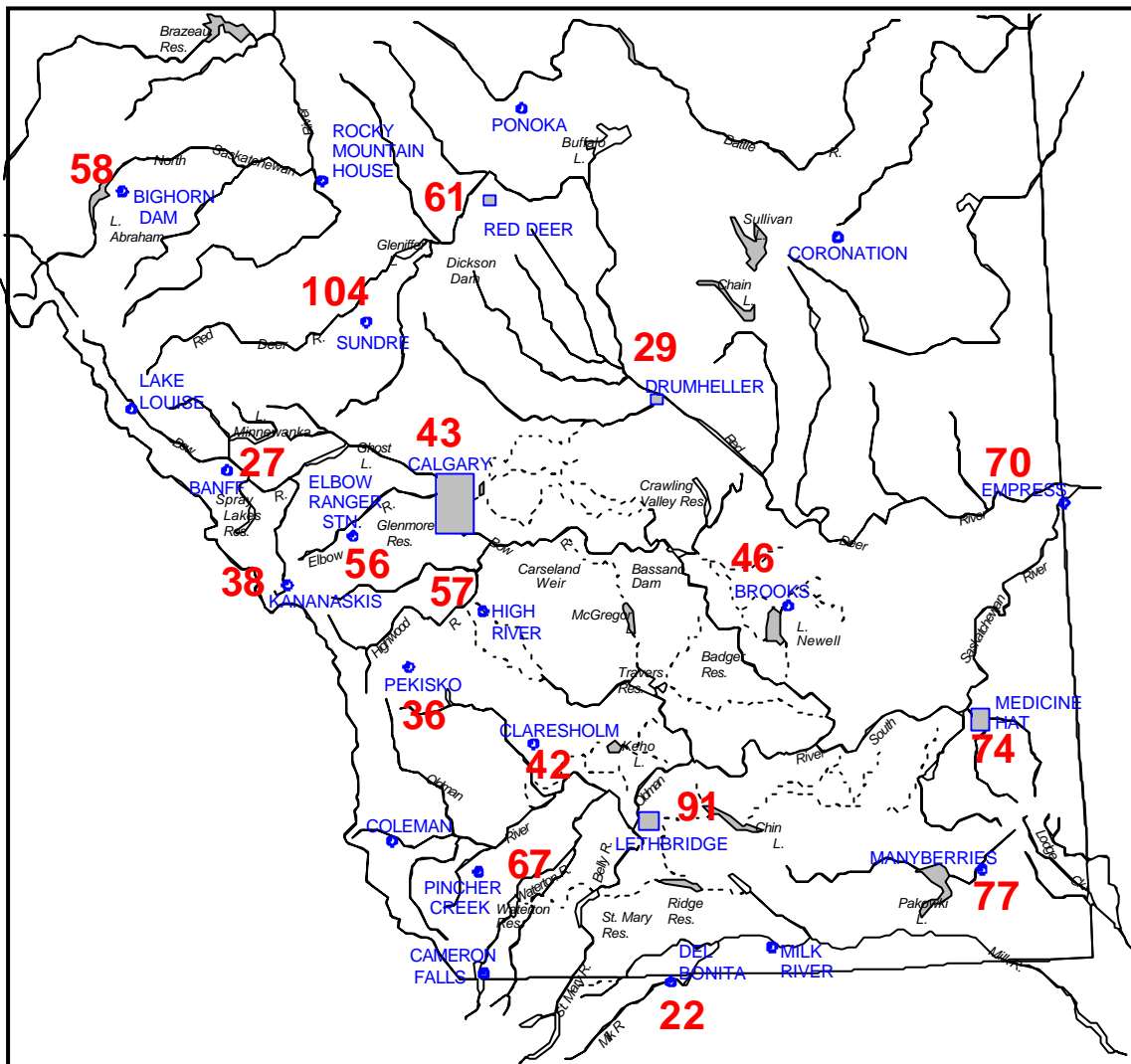


Figure 4  
Winter Precipitation  
Southern Alberta  
November 1, 2000 to January 31, 2001  
as a percent of Normal  
Normal = 100%  
(based on 1961 to 1990 data)

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

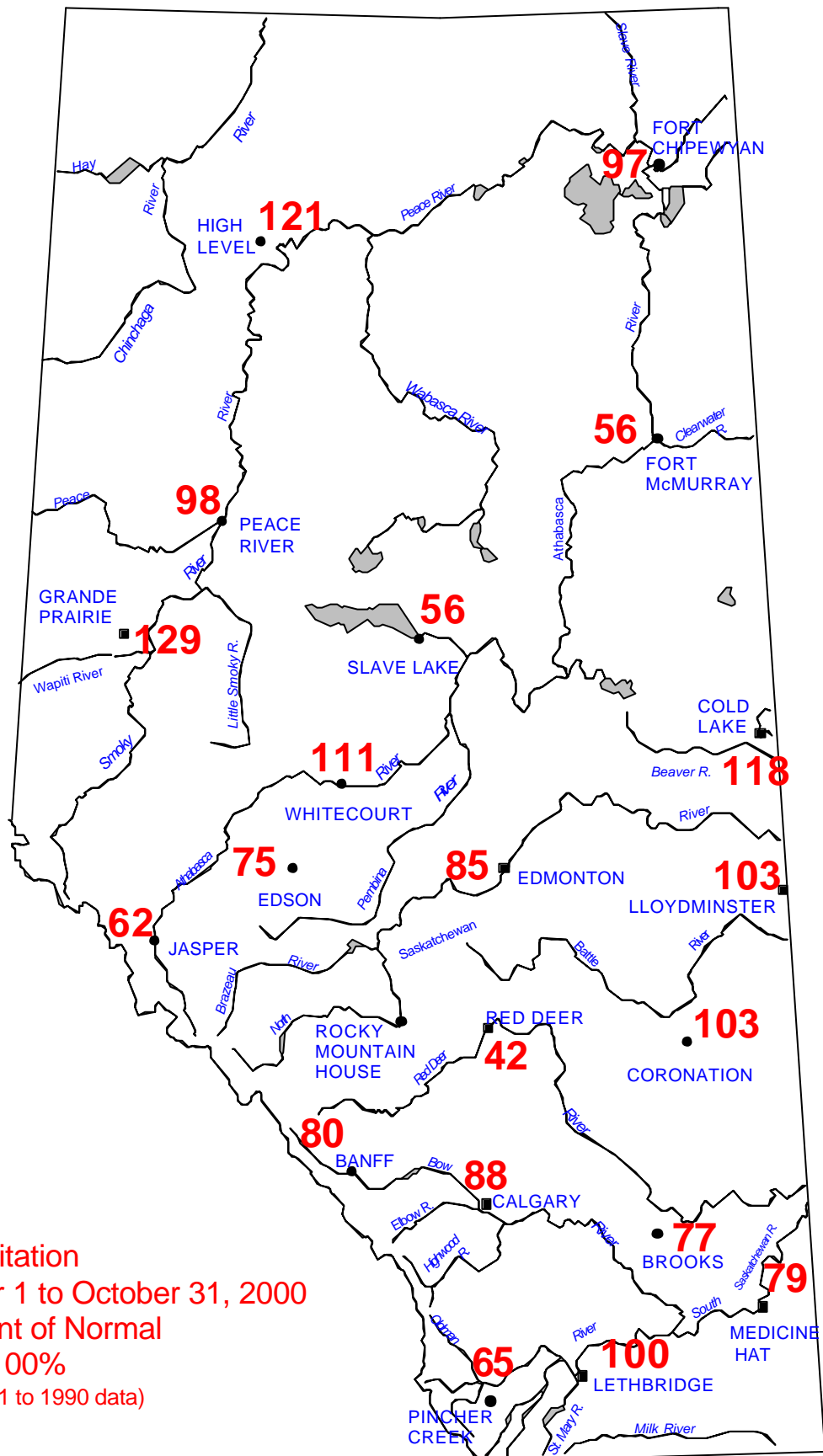


Figure 5  
 Fall Precipitation  
 September 1 to October 31, 2000  
 as a percent of Normal  
 Normal = 100%  
 (based on 1961 to 1990 data)

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

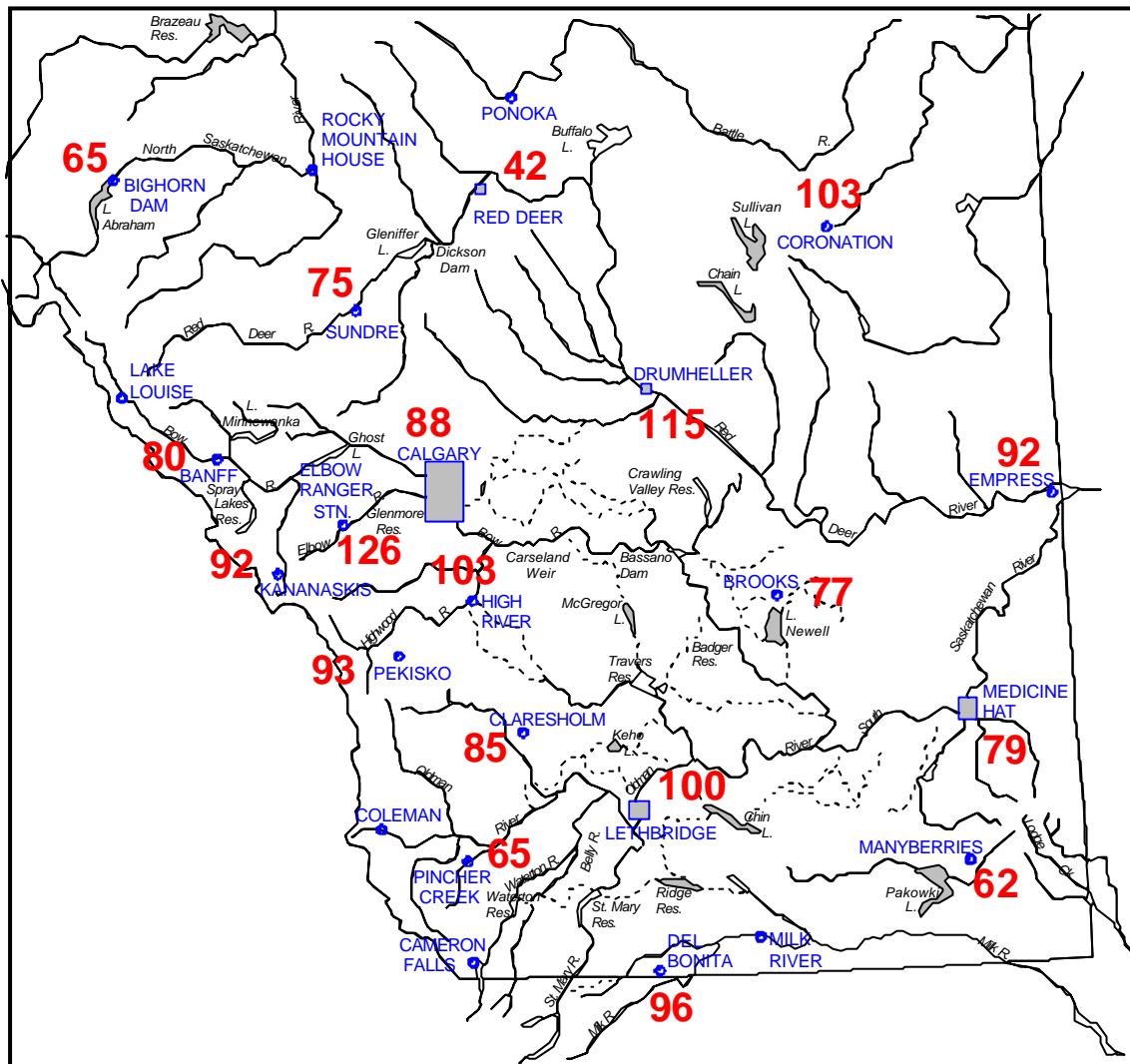


Figure 6  
Fall Precipitation  
Southern Alberta  
September 1 to October 31, 2000  
as a percent of Normal  
Normal = 100%  
(based on 1961 to 1990 data)

Mountain Snow Conditions and Water Supply Forecasts for Alberta – February 2001

