

PART C

ANNUAL RUNOFF CONDITIONS

1793-1870

INTRODUCTION

In this section, an attempt is made to characterize runoff conditions in the Red River basin on a water-year basis (October-September), based on the archival descriptions of water levels, weather, river breakup dates, crop conditions, etc. For each water-year from 1793-4 to 1869-70 where sufficient information exists, runoff is classified as Very High, High, Normal, Low, or Very Low, using 20th Century conditions as the basis for comparison. The classification is conservative- for example, only years in which overbank flow occurred are classified as Very High, although some other years with a strong (but non-flood) freshet and a very wet summer might in fact have produced much the same runoff volume. The most difficult category to identify is Normal since it usually produced the least commentary. In general, years in which adequate records exist but which make little reference to the state of the rivers, and in which other conditions such as winter snowfall, spring and summer rainfall, etc. appear unremarkable, are classified as Normal. In 10 of the 77 years covered by the survey, data were insufficient or non-existent and these years are not classified. Because the emphasis is on the Red River, years in which information is exclusively about the Assiniboine basin have not been classified.

The classification attempts to consider the overall runoff which might have been produced within the water-year. Consequently, it does not necessarily imply that conditions met that description in all seasons. In some years, high spring runoff was considered to have compensated for apparently low summer flow or even drought-like conditions; in other years, a below-average freshet was compensated for by a very wet summer with clearly above-average flow conditions. Each of these cases might have been classified as normal, despite a striking imbalance between the seasons.

Because the classification is subjective, extensive citations of the archival record are given to indicate the basis for the judgement. Commentary by the author of the report is given in note form only. The details for flood years which have been summarized in PART B are not repeated but reference is made to the relevant points. The citations are a much-abridged version of the entire data base. In some years, virtually all relevant material is given. In others, only the most important have been selected. Many of the citations are included not because they alone are the evidence for the point being made but to illustrate the nature of the comments by the observers and to provide a measure of continuity. The focus is on runoff and consequently other significant environmental observations (grasshoppers, grass fires, etc.) are omitted unless they appear to be directly relevant to the runoff process.

1793-94**- INCONCLUSIVE**

- numerous references to very shallow water on Assiniboine in fall
- numerous drowned buffalo on Assiniboine above Brandon, April 30 and May 1
- very high water reported on Winnipeg River

1794-95**- INCONCLUSIVE**

- low water on Assiniboine in fall, 1794
November 11, 1794: [Assiniboine] River very shoal and Ice in it every Day. (Letter, J. Linlater, Burnt Carrying Place near Pine Fort to Robert Goodwin, Brandon House, dated Nov. 10, 1794, Brandon House Journal B.22/a/2 1794-95)
- high water on Assiniboine in spring, 1795
April 11, 1795: ...the water rises high in the [Assiniboine] River, the small Creek opposite the House open. (Brandon House Journal, op. cit.)

April 19, 1795: ...the water on the [Assiniboine] River rises very high. (ibid)
- considerable rain reported in May-June and high water on Assiniboine in June
June 13, 1795: ...with rain the water rises high in the [Assiniboine] River. (ibid)
- probable normal to high runoff on Assiniboine but no information regarding Red River

1795-96**- LOW**

- shallow water on Assiniboine in fall, 1795
October 14: Leading in many places the Day-the [Assiniboine] river being Shold and narrow. (Fort Pelly Journal, HBCA B.159/a/2 1795-96)
- shallow water on Assiniboine in spring, 1796
May 5, 1796: ...water very shoal [in Assiniboine between Brandon and Forks]. (Brandon House Journal, HBCA B.22/a/3 1796/97)
- very low level of Lake Winnipeg and of Assiniboine, August -September, 1796
August 27, 1796: heavy wind and rain in the morning afterwards fine weather...This Lake however cannot admit of large craft being very shoal, our Boats tuching ground for miles from the [Red] Rivers mouth. (ibid)

August 30, 1796: ...found the water low in the [Assiniboine at Forks], (ibid)

September 8, 1796: leading almost all day, hard work, water low making the Journey very disagreeable. (ibid)
- no direct reference to Red but the low state of Assiniboine during entire year and the low level of Lake Winnipeg suggest low runoff on Red

1796-97**- INCONCLUSIVE****- low water on Assiniboine in fall, 1796**

October 20, 1797: the Batteaux was Stopt by Ice and the Shallowness of the Water in the [Assiniboine] river... (Fort Pelly Journal, HBCA B.159/a/3 1796-97)

November 14, 1797: ...we have not got within five days journey with the Batteaux that we did Last year owing to the Lateness of the season, and the shallowness of the water in the [Assiniboine] river... (Letter, John Sutherland, Fort Pelly, to James Sutherland, Brandon House, Nov. 14, 1796, ibid)

- very high water and flooding in upper Assiniboine in spring, 1797 (PART B)**- shallow water on Assiniboine in September, 1797**

September 6, 1797: ...we make very slow way on account of the shoalness of the water [in Assiniboine near Forks]. (Brandon House Journal HBCA B.22/a/5 1797/98)

- no information about Red**1797-98****- VERY HIGH****- shallow water on Assiniboine in fall, 1797**

October 23, 1797: the [Assiniboine] River set fast here, it being very shallow and no Current, is the cause she sets so soon fast here... (Fort Pelly Journal, HBCA B.159/a/4 1797-98)

- very high water and flooding on Red at Pembina in spring, 1798 (PART B)**1798-99****- INCONCLUSIVE****- shallow water in Assiniboine in fall, 1798**

October 1, 1798: The fall is coming very soon on, and the water very shoal indeed. I am afraid that we will have a bad journey. (Letter, Thos. Harvey to Robert Goodwin at Brandon House in Brandon House Journal, HBCA B.22/a/6 1798/99)

- no information on spring water levels, 1799**- low water on Assiniboine in September, 1799**

September 14, 1799: the waters are very shallow in the [Assiniboine] River this year. (Fort Pelly Journal, HBCA B.159/a/5 1799-1800)

1799-1800**- VERY LOW****- shallow water on Assiniboine in fall, 1799**

October 16, 1799: they cannot Proceed any further [up] the [Assiniboine] River being shallow and a deal of ice driving in the River... (Fort Pelly Journal, HBCA B.159/a/5 1799-1800)

- mild winter with relatively little snow in late winter

February 24, 1800: ...very bad hauling broke all their sleds no Snow being on the Paths & very little on the Plains. (Brandon House Journal, HBCA B.22/a/7 1799/00)

February 28, 1800: this has been the mildest Winter here that ever was known it is Pleasanter weather here now than in Summer. (Fort Pelly Journal, op. cit.)

March, 1800: Early in March the snow was entirely gone [at Pembina]. (Alexander Henry in Coues, I. (ed.), 1965. The Manuscript Journals of Alexander Henry and of David Thompson. Ross and Haines Inc., Minneapolis, Minnesota, p. 4)

March 31, 1800: This winter, 1799-1800, we considered one of the most extraordinary known for many years. Early in November we had an extremely heavy fall of snow; but the rest of the season was open and mild [at Whitemud]. (ibid)

- low water in Assiniboine in spring, 1800

April 10, 1800: in the evening the Men returned from the boats-who tells me that they cannot get them further up than my old Station at the Elbow-for want of water. (Fort Pelly Journal, op. cit.)

April 15, 1800: ...the Water in the [Assiniboine] River is very shoal. (Brandon House Journal, HBCA B.22/a/7 1799/00)

- very low water in Red and reference to extreme drought in August

August 22, 1800: I am told the water [in the Red] is lower than has ever been known before... (Alexander Henry, op. cit.)

August 28, 1800: The drought has been so great this season that there is scarcely any water in this little river [Plum River] and the entrance is dry ground; this is thought extraordinary by those acquainted with the country. (ibid, p. 69)

- reference to extreme low water on Clearwater River, indicating its regional extent

October 28, 1800: This river [Clearwater River] is navigable for small Indian canoes, but very rapid near the entrance, where there is famous sturgeon-fishing in the spring-indeed, it may be said to last all summer, unless the water is very low which was the case at present...But it must be observed this is a year of extraordinarily low water... (Alexander Henry, op. cit., p. 128)

1800-01**- HIGH****- flooding on Assiniboine in spring, 1801 (PART B)**

- little direct reference to Red but drowned buffalo observed and reference in 1802 to high water on Red in previous year (PART B)

- high water on Winnipeg River, August, 1801

August 25, 1801: I slept in the Pinawa, water being too high to go by the White River [John McKay on Winnipeg River going from Osnaburgh House to Brandon]. (Brandon House Journal, HBCA B.22/a/9 1801-02)

- good flow of Assiniboine in September, 1801

September 9, 1801: ...water very good in the [Assiniboine] river. (ibid)

1801-02

- NORMAL

- cold winter and deep snow

February 28, 1802: The cold is very severe, snow deep and no grass. (Alexander Henry in Coues, I. (ed.), 1965. The Manuscript Journals of Alexander Henry and of David Thompson. Ross and Haines Inc., Minneapolis, Minnesota, p. 194)

- high water in spring

May 11, 1802: Nine inches of snow. Water falling it had risen almost as high as last year. (ibid, p. 197)

- no further information; although there is some indication that runoff may have been above-average or high, it seems to have at least been normal

1802-03

- HIGH

- early winter

November 4, 1802: We crossed the Red river [at Pembina] on the ice, as it was an extraordinarily early winter; however, it did not last long. On the 6th the river was again clear of ice, and fine mild weather ensued until the 17th, when it began to snow, and we once more ran sleighs. (Alexander Henry in Coues, I. (ed.), 1965. Manuscript Journals of Alexander Henry and of David Thompson. Ross and Haines Inc., Minneapolis, Minnesota, p. 206)

November 24: We had a heavy fall of snow and hail with tremendous claps of thunder and lightning, which continued most of the day, and a strong N.E. wind. About 18 inches of snow fell in 12 hours. The river froze again. (ibid, p. 206)

- deep snow in early January, 1803

January 4, 1803: The snow is very deep, but in the plains hard enough to bear a man on snowshoes and my dogs also. (ibid, p. 208)

February 27, 1803: ...the ground was frozen solid for 3 ½ feet. (ibid, p. 209)

- early spring and high water on Red

March 25, 1803: Heavy rain; snow all gone...Red river clear of ice. Water very high. (ibid, p. 210)

March 27, 1803: The plains are covered with water from the melting of the snow so suddenly...The water is commonly knee deep, in some places up to the middle and in the morning is usually covered with ice... (ibid, p. 210)

- very wet prairie and high water persisted through May

May 24, 1803: Set off...for Portage la Prairie...We found much water in the plains...mosquitoes by the millions. (ibid, p. 212)

May 30, 1803: ...arrived at the Lake [Winnipeg]. Wind a head blowing a Storm. it's amazing the quantity of dead Buffalo we saw coming down the River. I counted 640 in a piece of a day [John McKay travelling from Brandon House to Osnaburgh House]. (Brandon House Journal, HBCA, B.22/a/10 1802-03)

May 31: ...there was too much water on the plains for our horses to proceed [between Riviere aux Gratiis (Morris River) and Pembina River]. (Alexander Henry, op. cit., p. 213)

1803-04

- VERY LOW

- little snowfall in winter, 1803-04

December 1, 1803: its surprising no snow will fall which prevents the Cattle from coming nigh this place. (Brandon House Journal, HBCA B.22/a/11 1803-04)

December 30: There was not enough snow for a train. (Alexander Henry in Coues, I. (ed.), 1965. The Manuscript Journals of Alexander Henry and of David Thompson. Ross and Haines inc., Minneapolis, p. 233)

February 6, 1804: The grass has been burned here the same as all over the plains of Red River; what little snow falls is instantly drifted off, and the bare ground is so much exposed to the frosts that the earth has cracked in a surprising manner. We met with crevices in the portage half a foot wide, and some few near a foot...The ground is so dry that our dogs and cariole raised a thick dust. (ibid, p. 238)

- nevertheless, Henry reported

March 19, 1804: I set off at dusk for Riviere aux Marais- a tedious trip; no frost but water on the plains, and dogs of no use. (ibid, p. 239)

March 21, 1804: Snow entirely melted. (ibid, p. 239)

- little direct reference to rivers but low water reported in Assiniboine in fall, 1804

October 4, 1804: ...men started for the Elbow, I kept twelve parcels back, as the water here is too shoal. (Brandon House Journal, op.cit.)

- evidence for a intense drought from Lake Superior to Missouri River region from winter,1803-4, to fall,1805, summarized in

Kemp, D.D., 1982. The drought of 1804-1805 in central North America. Weather, v. 37 (2), 34-41.

1804-05**- VERY LOW**

- low water level in Assiniboine in October, 1804 (see 1803-04 above)
- low water level on Assiniboine in June, 1805 and report of no rain since fall
June 1, 1805: The [Assiniboine] River [near Pine Fort] at present being so low (as we have not had a drop of Rain since last autumn). (D.W.Harmon in Lamb, W.K. (ed.), 1957. Sixteen Years in the Indian Country: The Journal of Daniel Williams Harmon, 1800-1816. The MacMillan Company of Canada, Toronto, p. 90)
- low water level on Assiniboine, September 25, 1805
September 25, 1805: The [Assiniboine] water is so shoal and the boats so worn out by hard Launching that the men really thinks that they will not arrive at this House. (Brandon House Journal, HBCA B.22/a/13 1805-06)
- evidence for widespread drought from winter, 1803-04, to fall, 1805, in Kemp (1982)- see 1803-04 entry

1805-06**- HIGH**

- low water in fall, 1805 (see 1804-05 above)
- heavy late winter snow and wet spring, 1806 (PART B)
- very high water level (possible flooding) in Red in June-August, 1806 (PART B)

1806-07**- NO DATA**

- presumed high moisture state in fall, 1806, after very wet summer
- no information on water levels during entire 1806-07 water year

1807-08**- LOW**

- normal freezeup in fall, 1807
- early disappearance of snow and river breakup in spring, 1808
April 8, 1808: Snow entirely gone. (Alexander Henry in Coues, I. (ed.), 1965. The Manuscript Journals of Alexander Henry and of David Thompson. Ross and Haines Inc., Minneapolis, Minnesota, p. 429)

April 9, 1808: The river broke up. (ibid, p. 429)

April 11, 1808: River clear of ice. (ibid, p. 429)
- low water in Minnesota in May
May 14, 1808: Jean Baptiste...whome I sent to Leech Lake for sugar, arrived on foot with one Indian, having found the water so low that he was obliged to put his cargoes en cache above Riviere a l'Eau Claire. (ibid, p. 429)

- excessive heat in late June

June 25, 1808: Took horse at Riviere Sale, and set out for my fort. The weather was excessively hot and horse suffered intolerably from the burning rays of the sun. (ibid, p. 430)

- low water in Red in September, 1808

September 1, 1808: the water [in the Red] very low [between Forks and Pembina]. (Journal of Occurrences at Pabana River, HBCA B.160/a/1 1808/1809)

September 2, 1808: the water Shoaler and Shoaler [between Forks and Pembina]. (ibid)

- although the information is not abundant, it seems to indicate low runoff

1808-09

- INCONCLUSIVE

- lack of snow in April, 1809

April 10, 1809: [Thomas Thorn] not...able to get the least thing hauled for want of snow. (Brandon House Journal, HBCA B.22/a/16 1808-09)

- grasshopper plague in September, 1809

September 14, 1809: Arrived at the [Brandon] House and found...that the Grass Hopper had eaten all the Vegetables in my Garden...the Men informs me that when they rose they were in such Clouds that they darkened the Sky, they carry their devastation as far as the Summer Berry River. (ibid)

- no mention of river conditions

1809-1810

- INCONCLUSIVE

- high water in Assiniboine in spring, 1810 (PART B)

- no information about Red

1810-11

- VERY HIGH

- very heavy winter snowfall (PART B)

- exceptional flood on Red in spring, 1811 (PART B)

- normal flow on Assiniboine in spring, 1811 (PART B)

1811-12

- HIGH

- relatively high storage in fall after large flood in spring, 1811, can be assumed although there is no information about the nature of summer precipitation

- relatively early freezeup in fall, 1811

October 18, 1811: The weather still very cold a good deal of Ice driving in the [Assiniboine] River. (Brandon House Journal, HBCA B.22/a/18a 1811/12)

October 22, 1811: The Ice in [Assiniboine] River set fast strong enough to cross with Horses. (ibid)

- subsequent milder conditions and the Red did not freeze until mid-November

October 31, 1811: I arrived at the forks, found a good deal of Ice still driving in the [Red] River notwithstanding the fine weather of these past few days. (ibid)

- several heavy falls of snow recorded in Brandon House Journal in November

- late breakup, cold spring

April 18, 1812: Weather remarkably cold for this season of the year. (ibid)

April 22, 1812: heavy rain- a good number of Geese & Swans flying northward-so that I hope the Spring is at last going to commence. (ibid)

April 28, 1812: The [Assiniboine] River Ice gave way. (ibid)

May 2, 1812: Weather continues very cold. (ibid)

- high water in Souris in May, in Red and on plains in June

May 21, 1812: people [sent to Souris River the day before to fish] from the Souris arrived...without success owing to the great flush of water. (ibid)

June 4, 1812: I returned up the [Red] river [toward Forks] with two men in a Canoe to look after our men who were coming down with horses. we found them 3 points above when we stoped and learned from them that the water was so deep in the plains that they could not take them farther down in consequence I sent 4 men down with the canoe & I returned to the fort, with our man & the horses to leave them in the care of some freeman till the water abates...very heavy rain. (ibid)

- fall entry in Pembina Journal indicates very high water for the year

October 10, 1812: no post down there [near the mouth of the Red River] is perfectly able to support itself unless they have an opportunity of catching a great number of fish in the fall- which the very high water of this year forbids me to expect. (Pembina Journal of Occurrences, HBCA B.160/a/4 1812/13)

1812-13

- INCONCLUSIVE

- freezeup and breakup dates for Red at Pembina not unusual

November 11, 1812: This day the [Red] river was set fast by the frosts of the last and preceding nights. (Pembina Journal of Occurrences, HBCA, B.160/a/4 1812/13)

April 9, 1813: The ice in the main [Red] river opened before the Fort. (Journal No. 2 of Miles McDonell, Fort Daer, Selkirk Papers, vol. 62, pp. 16813-16816)

April 15, 1813: The water in the [Red] river keeps rising much ice drifting. (ibid)

- no additional information about either the Red or Assiniboine Rivers

1813-14**- NORMAL**

- freezeup in fall and breakup in spring appear to have been normal
 - November 8, 1813: the river takes across this morning. (Miles McDonnell's Journal No. 3, Fort Daer, Selkirk Papers, vol. 63, 16863)
 - April 23, 1814: the ice on Red R. broke up. (ibid, p. 16894)
- significant rainfall must have occurred in upper Red basin in August because the river was reported rising
 - August 13, 1814: Water rising fast in the river these 4 days from Rains in the Upper Country. (Peter Fidler's Journal, HBCA B.235/a/3 1814/15)
 - August 31, 1814: Heavy rain from 4 to 7 am & fell 2 inches & 6 tenths. (ibid)
- Assiniboine rising in early October implies significant September rainfall
 - October 6, 1814: water rising [in Assiniboine] very fast these 5 days. (ibid)
- there is very little information in general about river levels but none that would suggest that the rivers were very different from normal

1814-1815**- HIGH**

- high water in Assiniboine in fall, 1814 (see 1813-14)
- very deep snow during winter 1814-15 (PART B)
- flooding in Red in spring, 1815 (PART B)
- lower than usual spring water level in Assiniboine (PART B)
- water levels began falling in June; exceptionally late spring
 - June 6, 1815: the water falling fast daily- very few leaves have yet made their appearance. Indians arrived from Lake Winnipeg say it is fast yet except a little water along the shore. (Peter Fidler's Journal, HBCA B.235/a/3 1814/15)
- shallow water on Assiniboine in August and on Red in October
 - August 29, 1815: Mr. McKay sent off his boat for Brandon with half a Cargo on account of the shallowness of the Assiniboine River. (Colin Robertson's Diary at Fort Douglas, Vol. 3 (1815), HBCA E/10/1)
 - October 8, 1815: The weather remarkably fine...I am afraid the Rafters [coming from Fort Daer] will have some difficulty on account of the lowness of the water [on the Red]. (ibid)

1815-16**- LOW**

- low water on Red in October, 1815 (see 1814-15)

- late freezeup; mild, dry fall, 1815

November 24, 1815: they have had no snow at Fort Daer and the season has been altogether remarkably mild. (Colin Robertson's Diary, at Fort Douglas, Vol. 3 (1815), HBCA E/10/1)

December 8, 1815: there is no snow on the ground. (ibid)

December 12, 1815: The Wind South West. the weather extremely fine for this season of the year, indeed so much so, that for want of Snow the Indians cannot approach an animal. (ibid)

January 8, 1816: The weather uncommonly fine, our Cattle are feeding on the plains the same as in the fall of the year. (ibid)

- some subsequent snow but melted by very early spring

March 24, 1816: Fine weather, the snow has almost left us. (ibid)

March 30, 1816: very little snow left on the Ground, only in low places & in the thickets. (Brandon House Journal, HBCA B.22/a/19 1815/16)

- normal breakup of Red

April 22, 1816: The [Red] River entirely clear of Ice, but the Assiniboine is still fast, this is owing to the want of water to raise the ice from its old bank...The Ice moved in the Assiniboine River this afternoon. (Robertson's Diary, op. cit.)

- inconsistent descriptions of water levels in late May

May 29, 1816: water remarkably high in the Red River & low in this or the Assiniboine. (Brandon House Journal, HBCA B.22/a/19 1815/16)

May 29, 1816: The weather warm we had little or no rain this spring which makes the Rivers very low in this quarter. (Robertson Diary, op. cit.)

- very dry spring

May 30, 1816: The weather exceedingly warm, the ground almost parched up. (ibid)

- the Assiniboine was again reported as "shoal" on June 6 (Brandon House Journal, op. cit.)

- there are no further reports of water levels for the rest of the water year

- given the low water in the Red in the fall, the lack of snow by the late winter, the early spring, and Robertson's first-hand observation of low water on the Red, it appears that runoff must have been low, regardless of the peculiar May 29 comment in the Brandon House Journal.

1816-17**- LOW**

- no information regarding water levels in spring

- very low water on Red and drought in July

July 12, 1817: water very low in the [Red] river. (Peter Fidler at Red River Settlement, in Brandon House Journal, HBCA B.22/a/20 1817-18)

July 20, 1817: heavy rain-water remarkably low in the [Red] river-& the crops exceedingly backwards...The Grass is also remarkably short & ground dry-all the little runs of water now Dry-so there is every reason to expect a bad Crop on account of the great want of rain-The Season has also been colder than usual. (Fidler, op. cit.)

July 30, 1817: Water very low in the [Red] River. (Fidler, op. cit.)

- many comments in August by Fidler about low water or lack of water between Forks and Brandon House (Brandon House Journal, op. cit.)

August 12, 1817: water very low here [at Brandon House] and the French Garden every bit as backward as those at the Forks, all for want of rain. (Fidler, op. cit.)

September 27, 1817: [the hay] is very short to what it [usually] is owing to the Dryness of the summer. (Fidler, op. cit.)

- despite the lack of information about the water levels in the spring, it seems that overall, the runoff must have been low.

1817-1818

- LOW

- early freezeup of Assiniboine in fall, 1817

October 23, 1817: The [Assiniboine] river froze over in the night being very early in the season... (Brandon House Journal, HBCA B.22/a/20 1817-1818)

- cold winter

January 18, 1818: These last two winters have been particularly severe and the Summers short, cold & little rain the crops not ripening as usual. (Brandon House Journal, HBCA B.22/a/20 1817/18)

- very cold weather reported throughout January and February in Hibernia (Fort Pelly) Journal (HBCA B.159/a/6 1817-18)

- rapid change in weather in March to early spring

March 9, 1818: Thawed much the plains almost entirely bare of Snow heavy rain this afternoon-Snow on the Ground on the level this winter 7 Days ago only 6 3/4 inches which is the least I have ever observed these 30 years past. The Ind. say it is deep 1/2 way between this & the Mandan villages...could not hawl any firewood for want of Snow. (Brandon House Journal, op. cit.)

April 1, 1818: Ice broke up in the Red River at Fort Daer being very early in the season [report from man just arrived from Forks]. (ibid)

April 8, 1818: [a man] could not proceed to Red Lake to Trade Sugar as the Snow was off the Ground. (ibid)

April 10, 1818: The Red River was open upon the 10th of April and the settlers arrived from Pembina the 15th of that month. (Letter, Alex MacDenell to Lord Selkirk, dated at Fort Douglas, July 20, 1818, in Selkirk Papers, vol. 15, p. 5192, PAM 175)

April 11, 1818: water very low [in Assiniboine] & no Snow. (Brandon House Journal, op. cit.)

- possibly normal water level in Assiniboine in mid-April but low water by early May

April 18, 1818: Ice driving [in the Assiniboine]...Water rose about 2 feet perpendicular this last week. (ibid)

April 21, 1818: Much Ice driving down the [Assiniboine] River & many drowned buffalo. (ibid)

May 18, 1818: these 2 last years the [Assiniboine] river has been very shoal... (ibid)

- widespread reports of low water through June and July

June 2, 1818: owing to the shoalness of the water [in the Assiniboine] & numerous Sand banks it was Sun Set before we reached Grants village [near Portage la Prairie]. (Peter Fidler's Journal, HBCA B.22/a/21 1818/1819)

June 8, 1818: water low in the Red River [at Forks], but rather More than in the N branch [Assiniboine]. (ibid)

June 20, 1818: the water [on the lower Red River] is very shoal. (ibid)

June 23, 1818: ...water low here [on Winnipeg River] but all the small rivulets falling in are entirely full of water owing to the very heavy rain that fell last night.- In the evening very heavy Thunder & a Deluge of rain-that lasted 2 Hours. (ibid)

June 26, 1818: ...came to the head of the Pinawa which the NW Canoes go down in years of very high water, now not an Indian light canoe could go down it without frequently carrying... (ibid)

August 25, 1818: very little water in White River now [tributary to Winnipeg River near Slave Falls]... (ibid)

August 30, 1818: The Fishery [in the Red] this Summer has been bad, owing to the very low state of the Water [in the Red]. (ibid)

September 1, 1818: water very low in the [Red] River-and a very dry season scarce a single shower of Rain all summer...These 3 Summers past remarkably little rain-as also very little Snow in winter- quite different from what it used to be. (ibid)

- a rise in the Red occurred in early September but the reports continued to emphasize low water

September 8, 1818: ...water rising fast in the Red River owing to heavy rains above. (ibid)

September 9, 1818: [Sturgeon] have been scarce all summer, which is attributed to the Shoalness of the water [in the Red]. (ibid)

September 17, 1818: little [goods] can be taken [to Brandon House] in Canoes the water very shoal in the Assiniboyne River. (ibid)

1818-19**- NORMAL****- relatively mild early winter with little snow**

January 5, 1819: From November 20 to 22 there was a fall of snow, which has stayed on the ground; however, there is not more than a good six inches of it at Pembina, and eight leagues farther up [the river] almost none at all. The ice on the [Red] river began to take on November 13; we have not yet had any very cold spells. (Letter, Dumoulin, Pembina, to Plessis, Quebec City, in Nute, G.L. (ed.), 1942. Documents Relating to Northwest Missions. Minnesota Historical Society, Saint Paul, Minnesota, p. 176)

April 20, 1819: at Noon the [Assiniboine] river Ice floated past no rise scarcely in the water-many thick drifts of snow still unmelted-hot and windy. (Peter Fidler's Journal at Brandon House, HBCA B.22/a/21 1818/19)

April 22, 1819: All the Ice seems to have passed and the water [in the Assiniboine] is low for so soon in the Season. (Brandon House Journal, HBCA B.22/a/21 1818/19)

- the level of the Assiniboine rose gradually toward the end of April due to rain, snow and snowmelt - water levels appear to have been normal in Assiniboine**- water levels fluctuated through late April and May with alternating reports of rising and falling water****- by late May, levels were falling in both rivers**

May 28, 1819: Water [in the Red] rose 1 foot last week. (Peter Fidler's Journal, HBCA B.51/a/2 1819/20)

May 29, 1819: Water [in the Red] falling a little. (ibid)

June 2, 1819: Water falling fast in the Assiniboine River [observed from the Forks]. (ibid)

- in May, Fidler expressed the general opinion that the "country" was becoming drier

May, 1819: Wherever I have been and from information from the tribes I gather that the country is becoming drier than formerly. Numbers of small lakes have become good firm land with timber of various kinds but generally willows or poplar or ash is the first to produce. (Peter Fidler, quoted in Kavanagh, M. The Assiniboine Basin: A Social Study of the Discovery, Exploration and Settlement of Manitoba, Hammersmith, London, p. 46)

- by late June, the Red was again rising but the Assiniboine remained low and by late August, both rivers were low

June 22, 1819: Water rising fast from Red River-Assiniboine river low. (ibid)

August 29, 1819: Water very shoal in both rivers. (ibid)

- the fluctuating late spring and summer flows in the Red indicate that rainfall in the early summer at least was sufficient to produce periodically rising water**- there are no references to droughts or excessively low water except in the Assiniboine and in the Red at the end of summer, a time when both rivers are normally low****- it seems most likely that runoff was within the normal range**

1819-20**- NO DATA**

- no information exists from the fall of 1819 to the fall of 1820

1820-21**- NORMAL**

- the Red froze over on November 8, 1820

November 8, 1820: The [Red] river was frozen over and the winter set in with severity. (West, J., 1824 [reprinted 1966]. The Substance of a Journal During a Residence at the Red River Colony. S.R.Publishers Limited, Johnson Reprint Corporation, N.Y., p. 22)

- very cold and unusually mild weather alternated throughout the entire winter

January 7, 1821: Mild cloudy weather with heavy rain towards night, a circumstance that happens but very seldom in these parts, at this period of the Year. (Red River Journal, HBCA B.235/a/4 1820/21)

- winter precipitation appears to have been normal but considerable snow was reported in April

- breakup was late

May 1, 1821: Cold cloudy weather with a fall of Snow...the Ice on the River got under way in the early part of the Day and did not stop until the River was quite clear. (Red River Journal, op. cit.)

- May and June were unusually cold

July 2, 1821: An agreeable change has taken place in the scenery around us; the trees are breaking into leaves, and many plants are in blossom, where, but a short time ago, every thing bore the aspect of winter. (West, op. cit.)

- there are no references to the rivers from May to July but there seems to have been a distinct change in the weather to abundant storms and intense heat beginning in June

June-August, 1821: ...The intense heat we have had since the first of June has been the cause of frequent and abundant storms, always accompanied by terrible thunder. (Letter, Destroismaisons, St. Boniface, to Plessis, Quebec City, in Nute, G.L. (ed.), 1942. Documents Relating to Northwest Missions. Minnesota Historical Society, Saint Paul, p. 328-9)

- by late August low water was reported in rivers on the divide between the upper Mississippi and Red basins

August 31, 1821: It is further asserted by the Indians that the water in these remote streams, and upon these rapids, is at all times shallow, but it is particularly so this season...They concurred in opinion that, in the present low state of the water on these summits [travel was impractical]. (Schoolcraft, H.R., 1855. Summary Narrative of an Exploratory Expedition to the Sources of the Mississippi River in 1820. Lippincott, Grambo, and Co., Philadelphia, Pa., reprinted, 1973, Kraus Reprint Co., Millwood, New York, p. 132-3)

- with the exception of the last, there are no references to low water, drought etc. and it seems that runoff was probably in the lower part of the normal range

1821-22**- NORMAL**

- the Red froze in early November and winter seems to have been severe, at least in late January

November 8, 1821: Set fast in Ice going to Pembina in Boats at the big point. (Diary ascribed to Paul Reyburger, Red River Settlement, HBCA E8/9 1821/22)

January 28, 1822: ...another man was frozen to death on the Plains; others lost their toes in the severity of the winter & all [Swiss settlers at Pembina] are suffering privations. (West, J., 1824. The Substance of a Journal During a Residence at the Red River Colony. reprinted 1966, S.R.Publishers Limited, Johnson Reprint Corporation, N.Y., p. 71)

- a thaw began in mid-March

March 14, 1822: The river at present produces a very few fish but that cannot be expected to continue beyond a week as the current is now getting so Strong owing to the melting of the snow that it is unsafe to set nets. (Governor George Simpson's Journal, HBCA D/3 1821/22)

March 24, 1822: ...compelled to walk through the plains up to the knees in Slush & water 16 miles to the Fort on acct. of the bad state of the Ice. (Simpson Journal, op. cit.)

March 25, 1822: The thaw continues...shouldn't be late before the River breaks up, & is clear of Ice, so as to prevent catching Sturgeon...Saw two geese, the sure harbingers of spring. (West, J. The British North American Indians with Free Thoughts on the Red River Settlement, 1820-1823, PAM MG7 B1 M33, p. 37)

- more severe weather followed in April, causing a late spring and delaying breakup until April 28

- George Simpson reported that winter had been severe with heavy snow in the region of the Red River Settlement but milder and little snow to the south

May 20, 1822: ...in this part of the Country and to the Northward we have had an unusually severe Winter with an extraordinary quantity of snow nearly 3 ft Deep, whereas to the Southward the Season has been mild and little or no snow so that the unfavourable state of the season prevented our Cattle from taking their usual Northern tour... (Simpson's Journal, op. cit.)

- there are no reports on the Red or Assiniboine Rivers but the upper Mississippi was reported high in August

August, 1822: This summer the water was very high and, working along with our keelboat, we found it difficult to work with poles, as we could find no bottom and had to pull along by the brush a good deal of the time. We were three days getting above the mouth of the Missouri. (Philander Prescott in Parker, D.M., (ed.), 1966. The Recollections of Philander Prescott: Frontiersman of the Old Northwest, 1819-1862. University of Nebraska Press, Lincoln, Neb., p. 43)

- the absence of any reports of low water suggests conditions were within the normal range

1822-23**- LOW****- freezeup in the fall of 1822 was early, beginning in late October**

October 22, 1822: Cold and windy weather. Some of our men in a boat started this morning for Pembina but were obliged to return in consequence of the [Red] River being frozen over. Those who were to go to Netley Creek, but also failed for the same reason. (Red River Journal, HBCA B.235/a/5 1822/23)

- grass fires burning over very large area

October 31, 1822: ...Fire still raging in the plains, and the Country burnt in every direction... (Fort Ellice Journal, HBCA B.235/a/5 1822/23)

November 1, 1822: [some Stone Indians] inform us that the whole way between this and the Saskatchewan River is burnt. (ibid)

November 13, 1822: The prairies are nearly all burned; meat will be scarce this winter... (Letter, Dumoulin, Pembina, to Plessis, Quebec City, in Nute, G.L. (ed.), 1942. Documents Relating to Northwest Missions. Minnesota Historical Society, Saint Paul, Minnesota, p. 378)

- dry fall, milder weather in late November

November 29, 1822: The season has been so dry that the prairies are burned almost completely, a condition which will probably cause us to experience famine at least as far as meat is concerned...The fire not only traversed the Red River area, but also all the prairies as far as Fort des Prairies whence the company gets much of its supplies...I did not receive his letter until the day before All Saints; and even then the rivers had for some twelve days been frozen solid enough in spots to carry men and even horses; it is true that subsequent mild weather has caused the ice to melt, and the rivers are now open. (Letter, Bishop Provencher, St. Boniface, to Bishop Plessis, Quebec City, in Nute, op. cit., p. 379-80)

- cold weather and heavy snowfall in mid-December

December 19, 1822: Weather still so severe that it requires the work of six or seven men to furnish the different dwelling houses with firewood. In the evening John McLeod and [?] arrived from Pembina with two horses but owing to the depth of the snow and the consequent badness of the roads they were under the necessity of leaving about 400 lbs fresh meat about half way from this. (Red River Journal, op. cit.)

- very mild winter through most of January**- severe cold alternated with mild weather through February and early March****- thaw began in March and greatly reduced the snowpack but colder weather and snow in April and low water delayed breakup**

April 14: Visited two nets which are set in an opening of the ice, but caught only 5 small fish. The sturgeon have not yet made their appearance, the water being so low that the ice cannot drift too much broken. (Red River Journal, op. cit.)

- significant snow in late April**- May was dry**

May 26, 1823: Fine warm weather. The growth of our crops...is much retarded for want of rain. (ibid)

May 30, 1823: Wind southerly blowing fresh with clouds of dust and smoke. Weather excessively

warm. (ibid)

- some rain in early June but complaints of drought beginning

June 6, 1823: Fine warm weather, the seed crop comes on but slowly on account of the drought. (ibid)

- by August, the Red and other water bodies throughout Manitoba and Northwest Ontario are described as unusually low

August, 1823: ...but the river at that time was unusually low [Keating on Red River just below Pembina]. (Keating, W.H., reprinted 1959. Narrative of an Expedition to the Source of St. Peter's River, Lake Winnipeg, Lake of the Woods etc. Performed in the Year 1823. Ross & Haines Inc., Minneapolis, Minnesota, p. 96)

August, 1823: It is probable that this, as well as the other rapids of the river, is at times much finer than it was when we saw it, for the stream was considered low [Keating on Winnipeg River]. (Keating, op. cit.)

August, 1823: ...it is usual for voyagers to make a small portage over this point. It did not exceed one hundred yards at the time we crossed it. Our guide says that it is often under water so that the canoes pass without difficulty. This requires a rise of five or six feet above the level of the waters at that time [Keating on Lake of the Woods]. (Keating, op. cit.)

- the drought of early season confirmed by Provencher in September

September 16, 1823: Last year's harvest provided some of the comforts...that we had not had before. This year the harvest will bring little drought having killed the grain to some extent and even more the garden stuff, a part of which did not come up until July, when rain finally came to moisten the earth. (Letter, Bishop Provencher, Red River, to Bishop Plessis, Quebec City, in Nute, op. cit., p. 407)

- low water was also experienced in Minnesota in fall, 1823

October 31, 1823: It now began to be late in the fall...The [Minnesota] river was quite low, and we experienced considerable trouble in getting over, or around, sand bars, or shoals... (Reminiscences of Mrs. Ann Adams, Minnesota Historical Collections, 2:124, quoted in Parker, D.D., 1964. Lac Qui Parle: Its Missionaries, Traders and Indians. South Dakota State University Press, p. 241)

- there is some evidence that spring runoff may have been below normal and certainly there was widespread drought and low water in the summer

1823-24

- HIGH

- low water in late summer, 1823, due to summer drought

August 13: ...but the [Red] river [near Pembina] at that time was unusually low. (Keating, W.H., 1959 (reprint). Narrative of an Expedition to the Source of the St. Peter's River, Lake Winnipeg, Lake of the Woods, etc. Performed in the Year 1823. Ross & Haines Inc., Minneapolis, Minnesota, p. 37)

- spring runoff unknown but inferred to be normal because of lack of mention

- heavy summer rainfall in 1824 with high waters (and possible flooding) throughout summer of 1824 (PART B)

1824-25**- VERY HIGH**

- wet summer and fall, 1824

January 2, 1825: [The people are starving] owing to the failure of their crops last Autumn from heavy rains and frost. (Red River Journal, HBCA B.235/a/6 1824/25)

- high water in spring, 1825 (PART B)
- flooding or high water on both Red and Assiniboine throughout summer, 1825 (PART B)

1825-26**- VERY HIGH**

- late summer flooding, heavy rains in fall of 1825 (PART B)
- largest flood on record in spring, 1826, continuing into early summer (PART B)
- high water reported into fall, 1826 (PART B)
- high spring runoff in Assiniboine (PART B)

1826-27**- VERY HIGH**

- high water levels and heavy rainfall in fall (1826)
- high runoff in spring (1827) with minor flooding (PART B)
- abundant rainfall in late July, August and September, 1827 (PART B)
- second peak in late summer with very high water in September, 1827 (PART B)

1827-28**- VERY HIGH**

- very high water levels in fall, 1827, and heavy late-summer rain (PART B)
- significant flooding in spring, 1828 (PART B)
- significant late summer rainfall, 1828

August 15, 1828: The weather mild and showery... a tolerable crop [of barley], except on the low ground which was much destroyed by the water standing on it after the frequent heavy rains. (W. Cochran's Journal, PAM MG7 B2 CMS A85)

August 22, 1828: The most awful night I ever witnessed...The rain which fell...being now standing on the ground...to a depth of three inches. (ibid)

1828-29**- NORMAL**

- high water level in Assiniboine in fall, 1828

October 7, 1828: Want of food induced our people to make several attempts at erecting fish weirs in the Rapid River, which unfortunately proved unsuccessful owing to the unusual height of the waters-The same result followed similar attempts in the Assiniboine River... (New Brandon House Journal, HBCA B.22/a/22 1828/29)

- dry weather and very extensive grass fires in October, 1828

October 9, 1828: Fine weather but the fire in the Plains is not far from the Fort. (Red River Journal, HBCA B.235/a/12 1828/29)

October 10, 1828: Dry windy Weather by which the conflagration of the Plains is increased to a furious degree. (New Brandon House Journal, op. cit.)

October 20, 1828: Fine weather, in the evening we saw the fire Blazing on the opposite side of the River the wind blowing very strong from the South. (Red River Journal, op. cit.)

- relatively late freezeup in fall, 1828

November 23, 1828: The Assiniboine River set fast-The small lakes have been so for some time back. (New Brandon House Journal, op. cit.)

- cold and mild weather alternated through December to February, becoming generally mild with thawing in March (additional citations in PART B)

March 2, 1829: we have had a slight thaw today for the first time and it only requires a slight one, indeed, to render the plains, which have burned in Autumn, impassable with sleds; there being on such grounds scarcely any snow during the winter. The weather since the 15th Ult. has been changeable sometimes tolerable, at others, cold, windy and snowy-This day, however, has brightened the scene, and afforded us a glimpse of spring. (New Brandon House Journal, op. cit.)

March 27: much astonished at the mildness of the atmosphere, the clouds were dense and dark like thunder clouds in summer passing from North to South. About 8 o'clock...it began to thunder, which was succeeded by heavy rain, which continued till about four in the afternoon when the wind veered to the North and brought us large flakes of snow. (William Cochrane's Journal, PAM MG7 B2 CMS A85)

- normal breakup in mid-April (PART B)

- Swan River reported as high on April 18 (PART B) but Assiniboine falling by April 25 (PART B)

- low water reported in Red on May 1

May 1, 1829: The Weather fine the water [in the Red] very low for the season. (Red River Journal, op. cit.)

- showers reported on about 1/3 of the days at the Red River Settlement in May and June, occasionally heavy

- the Assiniboine reported as very high in the Red River Settlement on June 12 and 17 but falling again at the end of June (PART B)

- July and August were warm with only occasional rain; water levels falling faster

July 9, 1829: The weather very warm, & the water falling very much. (ibid)

July 31, 1829: The weather fine & the water falling very much. (ibid)

- by September, the water level in either the Red or the Assiniboine was low and late summer dryness had hardened the ground

September 9, 1829: The weather fine & the water very low. (ibid)

September 25, 1829: Froze hard last night...the Weather fine the Water [in Red and/or Assiniboine?] very low. (ibid)

September 26, 1829: Weather still fine owing to the dryness of the Season the Ground is so hard that the farmers are unable to Plough. (ibid)

- despite the reports of low water (possibly on the Red) in the late summer, the absence of similar statements in the spring and the very high water levels in the Assiniboine in response to rainfall in May and June suggest that overall runoff was within the normal range

1829-30

- NORMAL

- October, 1829, was rather stormy with frequent rain and snow

October 26, 1829: The weather fine. Doctr. Toods [?] men who left [today] were detained at White Horse Plain owing to the fall of snow. (Red River Journal, HBCA B.235/a/13 1829/30)

- freezeup of the Red was early

October 30, 1829: Bird arrived from York Factory but was Oblig'd to leave his boat at the entrance of the River, several People have crossed the River on the ice in different places. (Fort Garry Journal of Occurrences, HBCA B.235/a/3 1829/30)

- snow began to accumulate significantly in January (PART B) and by early March there was apparently a heavy snowpack (PART B)

- thawing conditions began in late March and breakup of both rivers occurred at a normal time in mid-April (PART B)

- the level of the Assiniboine was very high in late April and May due to both snowmelt and abundant rain in May (PART B)

- although there is no direct reference to it, it is reasonable to assume that the level of the Red was also high, or at least above-average, given the heavy rain reported in the Red River Settlement (PART B)

- from mid-June to the end of July, there was virtually no rain at the Settlement and the ground was described as "parched" (PART B)

- however, rain was reported on about 1/4 of the days in August and early September at Fort Pelly (no records from Red River Settlement), including several heavy falls and snow on August 9 (!) and September 6

August 9, 1830: Rained last night and ended in a fall of Snow this morning. (Fort Pelly Journal, HBCA B.159/a/12 1830-31)

August 14, 1830: Constant rain last night and continued so all day. (ibid)

September 4, 1830: Loud thunder with heavy rain. (ibid)

September 6, 1830: The Ground was all covered this morning with Snow and a pretty Sharp Frost. (ibid)

- although there are no direct references to the Red, the high water on the Assiniboine in May and June and the apparent heavy rainfall over Red River Settlement in May and June, and the return of rain in the Fort Pelly region in August and early September suggest that runoff was most probably within the normal range.

1830-31**- NORMAL**

- very mild weather throughout most of winter, 1830-31

December 18, 1830: The weather has been uncommonly fine so far, no snow, little frost & the river not yet all fast. [Letter, Alexander Ross, Red River Settlement, to James Hargrave, dated Dec. 18, 1830, in *The Hargrave Correspondence, 1821-1843*. Greenwood Press, Publishers, New York, 1968, p. 61)

January 5, 1831: The weather continuing mild all winter was much against us ... [making salt at Salt Lake 50 mi. south of Pembina]. (Campbell, R., 1958. *Two Journals of Robert Campbell (Chief Factor Hudson's Bay Company) 1808-1853*. Limited edition, Seattle, Washington, p. 67)

January 18, 1831: Weather mild thawing in the middle of the day about the doors. (Fort Pelly Journal, HBCA B.159/a/12 1830-31)

- very little snow reported from Fort Pelly at least until mid-February and mild weather continued with strong thawing in early March

- significant snowfall at Fort Pelly in March

- colder temperatures began in early April and continued through most of April, making spring very late

April 23, 1831: Thawing a little on the Height of the day...appearance of it being a late Spring and it is much to be feared the Swan River will be very Shallow as the portion of Snow already Melted is entirely dried up with the frost. (ibid)

April 27, 1831: fine Clear weather all the Snow is nearly off the Ground...an Indian...informs us that the Ice is drifting down the Rivers, Which appears to be rising fast. (ibid)

April 28, 1831: Snowing this morning and continued at intervals most of the day. Blowing fresh from the NE...we are told that the rivers are rising. commenced ploughing but could not continue as the ground is too much frozen. (ibid)

- the upper Assiniboine experienced a short freshet but was falling by the end of April

- May was very dry and alternately warm and cold

May 20, 1831: the Spring is most backward Northerly Winds month after month and little or no appearance of Vegetation. Lake Winnipeg is as solid as in the Depth of Winter and McMillan says that he is ploughing through Ice instead of Soil. (Letter, George Simpson to John G. McTavish, Moose Factory, dated Red River Settlement, 20 May, 1831, HBCA B.135/c/2, p. 66)

- heavy rains (and some snow) in Fort Pelly region throughout June and July and into August caused the Assiniboine to rise to a very high level

June 5, 1831: Raining most of the day...Garden... coming on very Slowly by reason of the cold weather. (Fort Pelly Journal, HBCA B.159/a/13 1831-32)

June 7, 1831: Weather became more Settled the water continues rising; our Hay Ground of Last year is in one complete Lake. (ibid)

June 8, 1831: ...the River is too High for Crossing either on foot or on Horseback. (ibid)

June 12, 1831: weather Cloudy raining at times. the River Still rising all the low Ground Covered with water. (ibid)

June 17, 1831: Rained most of the night very warm to day...Millar went to the Crossing place...and Says the River has rose about 4 feet and thinks from the Height of Water that the Gardens at Lower fort is all overflowed. (ibid)

June 28, 1831: The Same Sultry weather...nearly all the Gardens below are destroyed by the High waters. (ibid)

July 2, 1831: heavy rain during the night...the Ground is so completely drenched with Water that nothing can be done to [the potatoes] the Hay Ground is also covered with water. (ibid)

July 24, 1831: Raining most of the day, was not the River So High we might be able to obtain a livelihood on fish but there is no possibility of making a Barrier. (ibid)

August 20, 1831: the rest of us Carrying the Hay that was cut to dry Ground as the Late rains has almost Set it a float. (ibid)

- no information exists about the Red but given the apparently normal spring runoff and very wet summer in the Assiniboine basin, it is not unreasonable that the Red had at least normal runoff

1831-32

- NORMAL

- severe weather in December, 1831, with little snow

December 20, 1831: Unusually severe has it hitherto been from 10 to 28 below zero during what has passed of this month with little or no Snow... (George Simpson to Donald Ross, quoted in Williams, G. [ed.], 1975. Hudson's Bay Miscellany, 1670-1870. Hudson's Bay Record Society, Winnipeg, Manitoba, p. 160)

- strong thawing beginning in late March at Fort Pelly produced an early freshet

March 23, 1832: Thermometer rose as high as 37 above 0. the Snow nearly dissolved...Rained a little this Evening. (Fort Pelly Journal, HBCA B.159/a/13 1831-32)

March 30: ...the Small Creeks nearly overflow their banks, the Snow, except in the woods & Sheltered places was entirely dissolved and very little water in the Plains. (ibid)

- breakup of the Red occurred in mid-April

April 18, 1832: The [Red] River being now clear of ice, as far as Netley Creek, and most of the snow thawed. (Rev. W. Cochran's Journal, PAM MG7 B2 CMS A85)

- by late April, fears were expressed at Fort Pelly about the possible low water in the Assiniboine