

Minnesota's Greatest Known Flash Flood
and
Associated Climatic Conditions during 1867

By Thomas St. Martin

Notes from the Minnesota State Climatology Office: This essay uses historical resources to summarize the prevailing weather conditions and the results of some high-impact weather events during 1867 in Minnesota. In particular, this essay shows that the July 17-19, 1867 extreme rainfall and flash flood event is likely the worst of the last 200 years in Minnesota. We are grateful to Tom St. Martin for great pains he took to assemble this information. We have modified the physical layout of this piece but have left the content as-is.

A wet and extremely cold spring was followed, in 1867, by one of Minnesota's wettest, stormiest summers of record -- a summer which, beginning in April and continuing through late July (and, at least in the Twin Cities area, into September as well), brought frequent and often excessive rainfall to much of the state. Yet, although 1867's warm season rainfall probably approached (or perhaps exceeded) that recorded during the extremely wet summer of 1993 (which [*at the time this was written*] stands as the wettest summer to occur since modern record keeping began), all other precipitation events (including those of 1993) appear to have been dwarfed by what the Rev. Dr. A. B. Paterson, St. Paul's Smithsonian observer, described as an "..incredible" rainstorm which inundated portions of west central and central Minnesota beginning on Wednesday afternoon 17 July and continuing into early Friday morning 19 July.

The history making storm (or, more likely, a series of storm cells generated along a stalled or slow moving frontal boundary) first began to make news in St. Paul newspapers on 19 July when the St. Paul Pioneer reported that "...we hear from Wm. B. Mitchell of the St. Cloud Journal that a very heavy rain occurred at that place on Wednesday afternoon...the river [*i.e. the Mississippi*] at that place rose three feet in eighteen hours....".

This account was followed, during the next ten days, by a fast paced series of reports of unprecedented flooding, extensive damage, massive economic losses (particularly to the state's logging industry) and personal tragedy. On 20 July, an almost incredulous Pioneer writer reported

...a tremendous rise in the upper Mississippi...that far outstrips anything of the kind ever before experienced...the rise was occasioned by a heavy storm which commenced above Crow Wing about noon on Wednesday [17 July]...it continued without cessation from twelve to sixteen hours and during that time the rain fell in torrents. The rise in the river at St. Cloud yesterday and the night before last was perfectly frightful in its rapidity. It rose about twelve feet in the course of 24 hours and at last account was still rising....All the booms between this city [St. Paul] and St. Cloud have been carried away by the force of the flood and logs were passing this city yesterday by the thousands...All the ferries between St. Cloud and St. Anthony have ceased running...The bridge at Sauk Rapids was also carried off...Three million feet more of logs gone.....At Crow Wing, night before last was the severest storm ever known in that region. The Indians state that they have never known anything of the kind

before...The weather yesterday was delightful. All traces of the storm of Thursday evening ¹ disappeared and there was not a cloud to be seen...

On the following day [21 July 1867], the Pioneer reported further:

The river at Minneapolis is much higher than the great rise in June, being estimated at fully two feet above the flood at that time which carried away something like the value of \$200,000 in logs...The river commenced rising at Minneapolis early Thursday morning [18 July] and increased in rapidity and volume as the day advanced. The boom at St. Cloud broke on Wednesday evening and a little before noon on Thursday the river at Minneapolis was filled with logs...On Thursday about four o'clock, the boom belonging to the Minneapolis Boom Company broke...and the logs (about two million feet) went out...Over a million more were in the boom of Dean and Company above the suspension bridge...which did not give way until about noon yesterday. When it broke the logs came down against the bridge in one solid mass...And for a few moments seriously threatened to carry away the bridge...The force and power of the current was perfectly fearful to behold...The bridge withstood the shock, however...

¹ *A reference to the thunderstorm(s) that brought heavy rains to St. Paul between 1330 and 2230 hours on Thursday 18 July. Amounts of 1.06 inches and 0.80 inches were recorded, respectively, at the St. Paul and Ft. Snelling stations. Records kept by St. Paul observer A. B. Paterson indicate that skies were overcast during much of the day and that winds were relatively light (with speeds of 10 to 15 miles per hour from the east and southeast noted at 0700, 1400 and 2100 hours).*

The flood soon reached St. Paul and on Tuesday 23 July ² the St. Paul Pioneer reported that,

...the great rise in the river...continued Sunday and yesterday and at dark last night was still rising slowly at this point...The rise is eight to ten inches higher than at any time before this season...the upper and lower levees have totally disappeared.....West St. Paul is completely submerged...

The same article further stated that,

...at Minneapolis...the water is higher than it was ever known before...About eight o'clock [Saturday] the Coon Creek boom broke. This boom was six miles above Minneapolis...containing about 20 million logs. The logs passed over the falls and by the city during the night....The total number of logs gone is variously estimated at 25 to 45 million...

Much of the St. Paul Pioneer's information concerning the 1867 megastorm was obtained from outstate "correspondents" and from outstate residents whose business brought them to St. Paul during the latter part of July. One such account, provided by a correspondent from Alexandria, was published as follows in the 24 July edition of the Pioneer:

...the rain commenced falling at Alexandria on Wednesday [17 July] and was undoubtedly an extension southward of the storm striking the

² *During much of the pioneer period, St. Paul newspapers were not published on Mondays. Because newspaper offices, like other businesses, were closed from Saturday night until Monday morning, it was not possible to print and distribute a Monday edition.*

Mississippi at Crow Wing...A PORK BARREL STANDING AWAY FROM ANY BUILDING WAS RAINED FULL IN THIRTEEN HOURS AT ALEXANDRIA...ALLOWING FOR THE GREATER CENTRAL DIAMETER OF THE BARREL, THIS WOULD BE EQUAL TO 36 INCHES OF WATER (emphasis added)...All crops in the bottom land along the Sauk Valley are destroyed...All bridges over the Sauk and its tributaries...are gone and transportation will be interrupted for several days...The dam of McClure and Moore at Sauk Centre broke away on Friday evening...some of the inhabitants barely escaped with their lives...Three men were drowned at the mouth of the Asheley river about six miles above Sauk Centre on Friday [19 July]...

The same story also noted that the "...the flood at this point [St. Paul] is at a stand, having ceased to rise yesterday evening...There are no more reports of damage at Minneapolis...The water is some two feet deep in West St. Paul...Loss of logs is estimated to total 34,800,000 feet..."

As late as 1 August 1867, the Pioneer featured another account obtained from a St. Paul visitor:

...we conversed yesterday with a gentleman from the Sauk Valley who says that a good deal of wheat in that vicinity has been covered with water, some to a depth of six feet...in the lowlands...He thinks that at least one quarter of the wheat in that vicinity has been destroyed by the water, yet notwithstanding this, that there will be fully as much, if not more, wheat in that region than there was last year...

One of the most comprehensive accounts of the 1867 storm did not appear, however, until 1876, nine years after the event. In a paper ³ delivered before the Minnesota Academy of Natural Science on 7 March 1876, George B. Wright, a pioneer era land surveyor, stated that "...the 18th of July 1867 will long be remembered by those persons who were, at the time in the region comprising the counties of Pope, Douglas and the western part of Stearns...".

Wright, who was a member of a survey party operating at the time in an area about 15 miles southwest of Glenwood in Pope county ⁴, continued by saying that his crew "...experienced rainfall perhaps without parallel in temperate climates...". According to his account, the "remarkable" storm commenced on 17 July "with some thunder and lightning and a little wind". He further noted that it seemed to form in the vicinity of the camp and that he,

...had no clear recollection of its commencement except that the sky clouded up and it began to rain...The rainfall was moderate at first, but continued to increase during the night. It was not until morning that we became aware of the enormous amount of rain that was falling. The storm lasted about 30 hours and further north and east it is reported to have continued for 36 hours. Early in the day, in the first lulls of the storm, we saw the Chippewa valley before us as one broad sheet of water as far as the eye could reach...The Chippewa spread from bluff to bluff,

³ . *Entitled "Notes of a Remarkable Storm". The full text of this paper can be obtained from the Minnesota Historical Society.*

⁴ *More specifically, the camp was described as being "on high ground under tall cottonwood trees about four miles west of the Chippewa river and about fives miles east of the Pomme de Terre (Potato) river..". Both rivers, in their normal state, can best be described as meandering western Minnesota streams.*

nowhere less than 50 to 60 rods and in places three or four miles in breadth and did not get fully into its natural channel until October...Four weeks afterward we crossed the Chippewa at our old ford...The water at that point -- a narrow place -- was 40 rods wide, two to six feet deep on the flood plain and perhaps 15 to 20 feet deep in the channel... (The normal channel depth, according to Wright, was one to three feet.)

Wright's account continued by saying that, although there was no way in which to accurately measure/determine the amount of rainfall received, "people in Sauk Center , Osakis and vicinity, claim with great unanimity that it exceeded 30 and probably reached 36 inches."

I have heard it stated by several of them, reliable persons I believe, that empty barrels, standing where they could catch no drip or anything but the average rainfall, filled and ran over before the storm ended. One very intelligent farmer at Westport, Pope county, told me that a large kerosene cask, empty, standing on the prairie some rods from any building, filled from two-thirds to three-fourths full. The heaviest part of the storm was.....probably further north and east than Westport, and I think it probable that the rainfall in some places reached 30 inches in as many hours, or as much as the average deposit of rain and snow in the same region of the country, something I believe entirely unparalleled in the records of this state or of this latitude anywhere...

Wright's account of the July 1867 storm also included comments as to its lingering effects. He noted, for example, that,

...in twenty years of camping experience, I think I saw and felt ten times more of mosquitos between July 25th and October 1st 1867 than in all the balance of the time together. The sun shone out of a coppery sky and the hot heavy vapor in the air could be seen and felt everywhere and all the time. Our provisions had not been injured by the storm....but sugar melted and ran out of the barrels under the influence of that steam bath, and clothing mildewed and rotted in spite of all the air and sunshine that we could give it. It was just such a summer as one might find in Central America or along the Orinoco river. Waters of the lakes...which before the storm were at a very low mark...rose to full bank. The rise varied from two to three to ten or twelve feet in the course of two to three days time.

The geographical extent of the storm was probably not great, perhaps extending (according to Wright) only as far as St. Cloud (where one Samuel Lawrence reported "tremendous" rains on upper Mississippi "at or about that time"). Wright also reports that the storm did not reach Fort Wadsworth, Dakota territory and was "light" at Big Stone Lake. He also noted that he visited to Ottertail river in September 1867 and saw no traces of flooding (an observation which he qualified by noting that the Ottertail is a stream that "rises and falls very slowly and comparatively very little").

Still another account of the 1867 storm appeared in a history of the Wadsworth Trail (an unimproved pioneer era prairie trail or complex of trails connecting St. Cloud and Ft. Wadsworth, located in what is now the northeastern corner of South Dakota). Written in 1937 by Grace C. Hall, a Morris, Minnesota resident, this account of the event states that,

...in 1867 there came a terrific rain. Rivers became lakes; every rivulet and ravine a foaming stream. A government train was on the east side of the Pomme de Terre river, and another on the west side -- and other wayfarers were waiting to cross. They waited for two weeks for the waters to subside sufficiently for them to dare to proceed. From the Fort came a mail carrier bearing important dispatches. He first attempted to cross with his stage, but could not make it. Then he took his dispatches and, on the back of a horse, attempted to swim the river. When he was part way over, watches on shore saw his horse fall over backward and both horse and rider disappear...

As noted previously, July 1867 was but one in a series of very wet months. Extant records indicate that an extremely backward and generally wet spring⁵ was followed by widespread and frequent rainfall during much of June and July 1867. As early as 2 June, the St. Paul Pioneer noted the unusually wet conditions, stating that "...such a rainy spell as we have had in the last three months is almost unprecedented in the history of the state..."

⁵. *Temperatures at Dr. Paterson's St. Paul Smithsonian station averaged about 13 F, 40 F and 49 F, respectively, during March, April and May 1867. The overall spring average was about 34 F, the coldest recorded at a Twin Cities station since 1843 and the second coldest in a record extending back to 1820. Precipitation at the Paterson station totaled 2.9 inches during April and 4.4 inches during May (a month which, in Paterson's words, was remarkable because of its "extreme backwardness and humidity"). Temperatures at the Surgeon General's Ft. Snelling station (which was re-opened on 1 April 1867 after a nine year hiatus) averaged about 42 F and 50 F, respectively, during April and May. Fort records, however, show only 1.6 and 2.4 inches of precipitation, respectively, during these two months. Snowmelt and above normal spring precipitation in central Minnesota combined to produced near record spring flooding along the upper Mississippi. At St. Paul, spring flooding peaked on 24 April with a crest which was said to have been about four inches below the flood of 1859.*

Five days later, the Pioneer told St. Paul residents that the river "was rising rapidly: we have not had as protracted a good stage of water in eight or ten years..". On 8 June, the Pioneer's attention shifted up river: "the bridges over the Sauk River are washed away and the ferry has stopped running at St. Cloud." Predictably, St. Cloud flooding was followed by further rises in the Mississippi at Minneapolis and St. Paul and on Sunday 9 June, the Pioneer once again told its rain weary readers that "the river here has been rising rapidly for several days and now lacks only a few inches of the flood of several weeks ago...". On 13 June, the newspaper further noted that the Rum river was "...still rising...coming over the falls of the river...". And, on 15 June, St. Paul residents were informed that,

...the heavy rains in this vicinity and to the north of us this past week and last raised the Mississippi river higher than it has been for eight years. Commencing on Thursday morning, the 6th last, it rose rapidly - - at one time at the rate of six inches per hour...A drive on their way down the river with 15 million feet of logs awoke one morning to find water in their tents...and the logs gone...

During the second week of June, much of southern Minnesota was raked by a series of severe storms which, like the earlier storms to the north, caused extensive damage and triggered extensive local flooding. On 13 June, the St. Paul Pioneer reported that Wabashaw [sic] was,

...visited last night by one of the most terrific thunderstorms ever seen...telegraph communication is entirely cut off from here...". In a story published on 16 June, the Pioneer reported that the Cannon Falls

area "...had been visited with the most terrific flood ever known to the oldest inhabitant. The water raised at the rate of six feet an hour for two hours, creating such a body of water that it swept most everything before it...

And, on 18 June, it was reported that, at Rochester, "...several bridges and a long piece of track have been washed away...". The rains continued with "another great rise" in the river at St. Cloud noted on 30 June 1867. At that time the water was said to have been "...within three inches of the high point reached some two weeks since.." The St. Paul newspaper also noted that, during the last week in June, the Twin Cities area had experienced "...continued rains...rain has fallen every day for six days...". Even faraway Ft. Abercrombie, Dakota Territory,⁶ reported that "...we are having heavy rains almost daily and growing was never better at this season of the year..." The Mississippi river at St. Paul reached the second of its three 1867 crests on Monday 1 July when, according to the St. Paul Pioneer, "...it was just about the height of the flood in April..." And on 4 July, a report from Shakopee indicated that the Minnesota river was "still above its bank with a fair prospect of it remaining so for several days yet...the oldest inhabitant does not remember it remaining so high as long as it has this season..."

Nor did 1867's excessive precipitation end with the 17-19 July cloudburst. The 28 July edition of the St. Paul Pioneer reported still another severe storm: "...we learn from a gentleman who arrived...last evening from Winona that the damage to Winona and St. Peter railroad caused by the heavy rain of Wednesday night was greater than first supposed....the storm was the most terrific of any this year

⁶ . *Ft. Abercrombie was located in the Red River valley a few miles north of Breckenridge, Minnesota.*

but lasted for only about an hour and a half...we are also informed that damage to the crops is not as great as was thought....". This same storm (or perhaps series of storms) was also noted by Dr. Paterson in his July 1867 monthly meteorological report (published in the 2 August 1867 edition of the Pioneer).

Extant records indicate, however, that August 1867 brought some relief from the earlier summer pattern of rainstorms and floods. Beginning in late July, newspaper accounts document steadily declining river levels and prolonged periods of relatively hot and dry weather. These accounts are confirmed by Dr. Paterson's August 1867 record: the third warmest August in his nine years of record, the equivalent of twenty three clear days and monthly mean cloudiness factor of 2.5. Besides being notably warm and sunny, the month (at least in the Twin Cities area) was also dry: with the exception of a heavy rainfall on 11-12 August, precipitation was light and infrequent.⁷

Although the August pattern continued into early September, a series of equinoctial storms brought excessive rains at mid-month. On Sunday 15 September, a "furious" three hour rainstorm dumped 2.5 and 2.7 inches of rain, respectively, on Ft. Snelling and St. Paul. Other heavy rains fell during the remainder of the week of 15-22 September but drier weather soon returned, persisting throughout much of the fall. September's heavy rainfall, moreover, had little effect on the Mississippi river at St. Paul (suggesting, of course, that the mid-month rainfall was localized and/or was rapidly absorbed by ground which had been dried out during August).

⁷. *Precipitation totaled 2.7, 2.3 and 2.2 inches, respectively, at Minneapolis, St. Paul and Ft. Snelling. Approximately three-fourths of the August 1867 rainfall recorded at these stations occurred during the 11-12 August event.*

Surprisingly, Minnesota's overall crop yields do not appear to have been seriously affected by 1867's perverse weather. As early as 20 July, the St. Paul Pioneer noted that "...farmers look forward to abundant crops...". In a similar vein, a 25 July "crop survey" report "indicated prospects for generally good yields..". Generally favorable harvesting weather prevailed during much of August and, according to the 15 August edition of the Pioneer, "...it is believed that the injury to wheat [as a result of floods and excessive rains] is very slight and that the crop will be a very heavy one....". These evaluations are supported by Dr. Paterson's September crop report to the Department of Agriculture/Smithsonian -- a report which asserted that area yields were "generally good" with "average wheat about eighteen bushels to the acre...corn above average and oats, barley and potatoes good...".

Despite several light frosts on 1 and 6 September, the autumn of 1867 -- unlike the spring which preceded it -- was generally warm. St. Paul's first killing frost did not occur until 12 October and, as late as 20 November, the St. Paul Pioneer proclaimed "balmy weather...warm as it usually is in September...". A brief late November Arctic outbreak was followed by a generally moderate December with no notably cold weather recorded by Twin Cities observers until the last week of the month.