Chronology of the National Weather Service and observations in Montana.

1805 - Lewis and Clark Expedition take weather observations along their journey through present-day Montana.

1807-1820 - Occasional weather observations from Fort Manuel (Ramon) near the mouth of the Bighorn River in Treasure county.

1809-1812 – Sporadic weather observations logged in journals of David Thompson at Saleesh House, near Thompson Falls.

1814 – The Surgeon General ordered surgeons to keep weather diaries.

1829-1866 – Occasional weather observations from Fort Union, near Frazer.

1845 – Telegraph became operational. Visionaries saw the possibility of "forecasting" storms by telegraphing ahead what they observed.

1848 – First volunteer weather observers recruited through the Smithsonian Institution.

1850-1871 – Occasional weather observations from Fort Owen, near Stevensville.

1862 – Weather observations started at Fort Benton.

1867 – Weather observations started at Fort Shaw.

1868 – Army begins weather observations near Bozeman, near the present-day campus of Montana State University.

1869 – Weather observations started at Deer Lodge.

Prior to 1870 – Most observations taken at various forts required by government statute.

1870 – Weather observations started at Fort Logan and continued through 1908.

1870 – A joint resolution was passed authorizing "the Secretary of War to take observations at military stations and to warn of storms on the Great Lakes and on the Atlantic and Gulf coasts."

Within the Department of War, the Signal Service Corps existed. Since the new weather service was dependent upon a reliable communications system, the new weather service was placed under the Secretary of War because "military discipline would probably secure the greatest promptness, regularity and accuracy in the required observations." It was assigned to the Signal Service Corps (organized in 1860) under the first name: The Division of Telegrams and Reports for the Benefit of Commerce." The first storm warning was issued November 8, 1870, as a high wind warning for the Great Lakes.

1871 – Volunteer weather observations started at Virginia City.

1872 - Prior to June 10, 1872, the forecasts were only for the eastern United States, but on this date, Congress extended the service throughout the United States "for the benefit of commerce and agriculture." There was still a significant lack of observational data west of the Mississippi River.

Early forecasts were made for eight large districts (which covered the entire U.S.), three times daily. By October 1870, predictions were made for 24 hours for nine districts, and by 1886, forecasts were made for individual states. In 1888, forecast durations were extended to 36 hours and in 1898 extended to 48 hours.

1879 – Army begins regular weather observations at Ft. Keogh, near Miles City.

1883 – First tornado reported in Montana south of Butte in Silver Bow County. Six people injured.

1889 - Internal strife caused many problems in the Signal Service. By 1889, the problems

had become so severe that President Benjamin Harrison recommended the transfer of the national weather service to the Department of Agriculture. On October 1, 1890, an act was signed into law effecting this transfer and the United States Weather Bureau was formed.

1891 – Weather Bureau becomes responsible for issuing flood warnings to the public.

1897 – First "Inland storm warnings" issued in Montana, for cold, windy and snowy conditions.

1910 – Weather Bureau begins issuing generalized weekly forecasts for agricultural planning.

1912 – First fire weather forecast issued in the U.S.

1916 – Fire Weather Service established, with all district forecast offices authorized to issue fire weather forecasts. The first fire district forecast office was at Medford, Oregon.

1923 – First deaths due to tornadoes in Montana. A tree fell on two men at a copper mine near Rivulet in Mineral county.

1937 – Weather Bureau begins radiosonde observations. Weather Bureau opens Great Falls office.

1940 – Weather Bureau transferred to Department of Commerce – the first official daily forecasts are issued.

1941-53 – Billings started and continued at the state forecast office.

1943 – Upper air observations began at Glasgow in June. Weather Bureau office opened.

1948 – Upper air observations began at Great Falls in January.

1940s – Other weather offices opened in Missoula, Kalispell, Havre, and Glasgow.

1948 – March 25 – The first tornado warning issued in the U.S., for Tinker AFB in Oklahoma.

1953-1996 – State forecast office moved to Great Falls, and continued there through 1996. Nine large forecast zones covered the state.

1960 – First weather satellite, TIROS I, launched.

1965 – Environmental Science Services Administration (ESSA) created in Department of Commerce. Weather Bureau is an agency within ESSA.

Early 1960s – Weather radar (WSR-57) installed on Point Six near Missoula as a network radar and continued to operate through the mid 1990s.

1970 – National Oceanic and Atmospheric Administration (NOAA) created with the weather bureau as an agency under NOAA.

1970 – Soil Conservation Service begins deployment of SNOTEL stations across Montana, to assist in snowfall monitoring at headwater regions in the mountains.

1971 – Weather Bureau renamed as the National Weather Service.

Mid 1970s – Weather radars (WSR-74C) installed at Billings and Williston as a local warning radar and continued to operate through the mid 1990s. FPS-77 installed at Malmstrom AFB with the weather office in Great Falls tapping off this radar.

mid 1970s – Weather radio deployed in Montana with transmitters at Glasgow, Billings, Miles City, Great Falls, Havre, Helena, Missoula, Butte, and Kalispell.

1975 – First geostationary satellite launched into orbit.

1978-late 1990s – Automation of Field Operations (AFOS) deployed and serviced field offices.

1985 – Nested Grid Model (NGM) becomes operational.
1993 – Automatic Surface Observing System (ASOS) deployment at airports started in Montana.
1994 – Montana DOT begins deployment of RWIS (Remote Weather Information Systems) across Montana. Eventually places 59 sensors, some with cameras.
1994 – Modernization of the NWS first brings WSR-88D (Doppler) radar to Montana. Radars installed at Glasgow, Billings, Great Falls, and Point Six near Missoula.
1995 – Modernization continues with the down-sizing of the forecast areas in Montana. In addition to Great Falls, new forecast offices open in Missoula, Glasgow, and Billings. Forty-two forecast zones (nearly one per county) covered the state. Weather offices closed at Kalispell, Helena and Havre.
1997 – Weather radio changes from a human voice to a computerized voice.
1998 – Another change in the forecast zone configuration increased the number of zones to 62. AWIPS deployed in Montana.
2002 – Weather radio expansion continues with new transmitters at Conrad, Browning, Lewistown, Bozeman, Baker, Circle, Glendive, Malta, Plentywood, Poplar, Scobey, and Jordan.
Montana Soil Moisture Environment Initiative begins in the state with local government purchase and deployment of weather stations to monitor air temperature, wind, and soil moisture and temperature conditions.
2003 – Gridded forecasts are released.
Weather radio installed at Dillon, Broadus and Livingston.
2004 – Another change in the forecast zone configuration increased the number of zones to 68. This affected south central Montana.
2005 – Additional weather radios installed at Hardin, Ryegate and Winnett, bringing the total to 28 in Montana.

Montana Weather Extremes

Through September 2006

	Temperature	
	Maximum	**Minimum**
Jan	78 8/1922 Big Timber	-70 24/1954 Rogers Pass
Feb	79 27/1932 Columbus	-66 9/1933 West Yellowstone
Mar	88 22/1910 Miles City 88 29/1902 Lewistown	-45 15/1906 Fort Logan -45 12/1897 Glasgow
Apr	97 26/1952 Hysham 97 20/1980 Poplar	-30 1940 Summit -33 2/2002 Gates Park
May	105 22/1980 Nohly	-5 1/1954 Polebridge -6 1&2/1995 Placer Basin Snotel
Jun	112 26/1988 Wolf Point 112 28/2002 Baker	11 6/1943 Kings Hill 11 2/1917 Brenner 10 6/1998 Placer Basin Snotel
Jul	117 20/1893 Glendive 117 5/1937 Medicine Lake	15 18/1919 Bowen 12 7/1986 Whiskey Creek Snotel
Aug	113 6/1983 Glendive	5 24/1910 Grayling 5 25/1910 Bowen
Sep	107 1/1983 Poplar 107 4/1950 Jordan	-9 24/1926 West Yellowstone -11 21/1983 Whiskey Creek Snotel
Oct	97 1/1953 Miles City	-30 31/1935 Summit
Nov	85 5/1975 Grass Range	-53 16/1959 Lincoln 14NE
Dec	78 5/1939 Crow Agency 78 1/1918 Choteau	-59 19/1924 West Yellowstone

Other Temperature information

Greatest 24-hour temperature change

- 103°F (-54 to 49) at Loma on January 14-15, 1972
- 100°F (44 to –56) at Browning on January 23-24, 1916

Greatest 12 hour temperature change

- 84°F (63 to –21) at Fairfield on December 24, 1924

Most Rapid temperature change

- 47°F (-32 to 15) in 7 minutes at Great Falls on January 11, 1980

Longest consecutive number of days minimum temperature at or below freezing

- 251 days at West Yellowstone September 1970 through May 1971
- 180 days at Outlook October 16, 1949 – April 14, 1950

Longest consecutive number of days maximum temperature at or below freezing

- 118 days at Lake View November 4, 1948 – March 1, 1949
- 73 days at Outlook & Medicine Lake December 6, 1949 – February 16, 1950

Longest consecutive number of days minimum temperature at or below zero

- 56 days at Outlook December 11, 1949 – February 4, 1950

- 52 days at Lake View December 20, 1948 – February 9, 1949

Longest consecutive number of days maximum temperature at or below zero

- 19 days at Havre February 2-20, 1936

Coldest maximum temperature

- -38°F at Havre on January 27, 1916

Annual temperature extremes

- 175°F (117°F to –58°F) Medicine Lake (US extreme?)
- 170°F (100°F to –70°F) Rogers Pass

Annual mean temperature extremes

Warmest

- 51.1°F Yellowtail Dam
- 48.9°F Billings Water Plant

Coolest

- 33.1°F Cooke City
- 36.0°F Lake View

Range from Coolest to Warmest Month

Largest range

- 60.9°F (6.2° Jan to 67.1°F Jul) Westby

Smallest range

- 36.5°F (23.5°F Jan to 60.3°F Jul) Philipsburg

Monthly mean temperature extremes

Warmest month on average - July

- 74.1°F Miles City and Yellowtail Dam

Warmest Month on Record in Montana

- July 1936 – statewide average: 74.7°F
- July 2007 – statewide average: 74.1°F

Warmest monthly average

- 84.2°F – July 1936 at Miles City

Coolest average July

- 55.3°F Cooke City

Coolest month on average - January

- 6.2°F Westby

Coolest Month on Record

- January 1916 – statewide average: –1.7°F

Coolest monthly average temperature

- -17.7° - January 1950 at Outlook

Warmest average January

- 29.0°F Yellowtail Dam
- 28.4°F Thompson Falls

Precipitation

	Precipitation (inches)		**Snow**
	Greatest Monthly	Greatest Daily precip	Greatest Monthly
Jan	14.00 1953 Summit 23.20 2006 Flattop Mtn 23.20 1972 Twin Lakes	5.38 31/1954 Summit	131.1 1972 Summit E113 2006 Flattop
Feb	8.52 1979 Summit 17.25 1979 Poorman Ck	2.85 27/1951 Lincoln 5.50 3/1990 NF Jocko	94.5 1976 Summit
Mar	7.42 1916 Heron 18.60 1997 Bear Mtn	4.46 25/1935 Haugen	86.4 1980 Heron
Apr	9.02 1958 Red Lodge 14.00 1993 Noisy Basin Sn	4.67 17/1941 BIL WTP	96.0 1958 Mystic Lake
May	12.63 1989 Red Lodge 15.90 1990 Noisy Basin S	7.75 17/2000 Red Lodge	74.0 1982 Shonkin
Jun	18.17 1906 Warrick	11.50 1951/20 Circle	31.0 2002 East Glacier
Jul	12.67 1993 Plentywood	6.55 22/1993 Plentywood	4.0 1972 Summit 4.0 1950 Kings Hill
Aug	8.01 1985 Lewistown 10S 9.10 2004 Poorman Ck	5.70 5/1916 Glendive	12.0 1992 St Mary
Sep	9.39 1986 Content 11.20 1985 Noisy Basin	5.80 12/1978 Shonkin	37.5 1968 Del Bonita
Oct	8.47 1950 Heron 15.40 1990 Flattop Mtn	4.40 26/1931 BIL WTP	61.0 1951 Summit
Nov	12.50 1909 Saltese 25.00 2006 Poorman Ck	3.80 6/1986 Deborgia 6.00 6-7/2006 Flattop Mtn	81.0 1900 Augusta
Dec	9.10 1912 Saltese 28.30 1996 Flattop Mtn	3.16 16.1979 Lindberg Ldg 4.90 5/1989 NF Jocko	125.0 1977 Cooke City

Greatest rainfall in one hour

- 2.60 inches at Glendive on August 30, 1989
- 2.57 inches at Kalispell on July 29, 1982

Greatest rainfall in one day

- 11.50 inches at Circle on June 20, 1921

Greatest precipitation in one month

- 18.17 inches near Warrick in June 1906
- 16.79 inches at Circle in June 1921
- 28.30 inches at Flattop Mountain Snotel – December 1996
- 25.00 inches at Poorman Creek Snotel – November 2006

Greatest precipitation in one year

- 55.51 inches at Summit in 1953
- 138.20 inches at Grinnell Glacier 1953-54
- 122.4 inches at Flattop Mountain Snotel 1990
- 98.40 inches at Poorman Creek Snotel 2001-02
- 98.3 inches at Noisy Basin Snotel 1996-97

- 97.7 inches at Flattop Mountain Snotel 1989
- 96.3 inches at Poorman Creek Snotel 2001-02
- 92.60 inches at Flattop Mountain Snotel 1996-97
- 92.50 inches at Flattop Mountain Snotel 1995-96

Lowest precipitation in one year

- 2.97 at Belfry in 1960

Highest average annual precipitation

- 79.90 inches at Flattop Snotel
- 73.80 inches at North Fork Jocko Snotel
- 73.00 inches at Noisy Basin Snotel
- 49.40 inches at Many Glacier
- 34.82 inches at Hungry Horse

Lowest average annual precipitation

- 9.22 inches at Glen 4N
- 9.82 inches at Joplin

Greatest snowfall in one day

- 48 inches at Millegan 14SE on December 27, 2003
- 48 inches at Shonkin 7S on May 29, 1982

Greatest snowfall in one storm

- 77.5 inches at Summit on January 17-22, 1972

Greatest snowfall in one month

- 131.1 inches at Summit in January 1972

Greatest snowfall in one season

- 426 inches at Kings Hill during the winter of 1964-65.

Highest average seasonal snowfall

- 305 inches at Kings Hill

Greatest Snowdepth

- 240 inches at Grace (Boulder Mtns) in March 1916
- 240 inches at Hebgen in March 1919
- 208 inches at Bald Eagle Peak (Cabinet Mtns) on March 28, 1974
- 202 inches at Summit on February 24, 1979

Largest hailstones

- 5 inches in Rosebud county on July 11, 1955
- 5 inches in Powder River county on June 3, 1971
- 4.5 inches near Winifred in Fergus county on June 26, 1996
- 4.5 inches near Brady in Pondera county on August 13, 1991

Pressure

Highest barometric pressure

- 31.42 inches (1067.3 mb) at Miles City on December 24, 1983 (Lower 48 record)
- 31.40 inches (1066.5 mb) at Helena on January 9, 1962.

Lowest barometric pressure

- 28.68 inches (971 mb) at Glendive on September 25, 1986
- 28.80 inches (978.2 mb) at Havre on January 11, 1932

Wind

	Wind (mph)
	Highest Monthly
Jan	133 29/1997 Heart Butte
Feb	143 21/2002 Miller Colony
Mar	117 12/2007 Logan Pass 103 11/2007 Choteau north
Apr	106 13/2006 Logan Pass 90 22/1960 Lake Blaine
May	99 9/2004 Logan Pass 84 24/1966 Miles City
Jun	138 30/1979 N of Havre
Jul	140 30/1957 NE Hill County
Aug	100 10/1957 N Blaine Co 100 24/1953 Joplin
Sep	109 29/1999 Nr East Glacier
Oct	106 17/2003 Babb 106 17/2005 Logan Pass 106 14/2008 Logan Pass
Nov	126 13/2006 Logan Pass 124 15/2006 Choteau
Dec	130 31/2008 Logan Pass 117 24/1992 Dupuyer

Highest wind gusts

- 143 mph at Miller Colony on February 21, 2002

Highest annual average wind speed

- 15.8 mph at Livingston
- 14.6 mph at East Glacier
- 14.6 mph at Norris

Lowest annual average wind speed

- 5.0 mph at Kalispell

Monthly highest average wind speed

- 27.5 mph at Heart Butte in January
- 20.9 mph at Livingston in December
- 20 mph at Norris in November and December
- 19 mph at Browning/East Glacier in January

Monthly lowest average wind speed

- 3.9 mph at Kalispell in December

Tornado

Tornado resulting in most deaths
- 2 deaths when a tree fell on two miners in Mineral county on June 10, 1923

Tornado resulting in most damage
- an F2 tornado at Lewistown on August 14, 1999

Earliest tornados
- March 2, 1991 near Arlee in Lake County (F0)
- March 23, 1988 near Bridger in Carbon County (F0)
- April 22, 2003 near Stanford in Judith Basin County (F0)

Latest tornados
- September 21, 1969 in Roosevelt County (F0)
- October 16, 1988 at Hamilton in Ravalli County (F0)

Sources:

Monthly State Maximum/Minimum Temperature Extremes - NCDC
History of the National Weather Service - NWS
Western Region Climate Center
Evolution of the National Weather Service - Gray/Portland, ME NWFO
Storm Data
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Old weather records