Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY AUGUST 2024

Eva Creek Windfarm on August 24, 2024. Photo: Martin Stuefer.

IN THIS ISSUE

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Alaska's Statewide Climate Summary for August 2024 provides an overview of weather for the month based on data from selected weather stations throughout the state. "Departure from normal" refers to the climatological average over the 1991-2020 normal period. Here, we report on temperature, precipitation and drought conditions in the state, as well as the condition of the Arctic sea ice.

HIGHLIGHTS

Cooler than normal in Western Alaska

Warm in the North and on the Panhandle

Twice as much rain as normal in Nome and Kotzebue, unusually dry in the Southeast

Severe flooding in Juneau from Suicide Basin GLOF

Significant Weather Events and Synoptics

August started out with some very contrasting weather conditions across the state. A combination of low-pressure over the Bering Sea and a pronounced ridge over Interior Alaska and the BC coast brought a few days of sunny and relatively warm weather for the Interior and Southeast, while western Alaska was pummelled by strong winds, rain and high surf. A strong southerly flow in the upper atmospheric levels (Fig. 1, top panel) pushed warm air masses well into Arctic Alaska, producing downright hot conditions in the far north. A new all-time high temperature record was set in Deadhorse on August 6th with 89°F.

Meanwhile, heavy rain spread across southern Alaska as an atmospheric river reached the Gulf of Alaska coast. Kodiak Island and the Kenai Peninsula got most of the precipitation from this system. Seward received more than three inches of rain in 24 hours on August 6th, the same day as the impressive temperature record in Deadhorse. Conditions remained rainy and unsettled in southern Alaska through the first week of the month.

By the weekend of August 10th, a Bering Sea storm centred near the Pribilof Islands brought even more moisture (Fig. 1, middle panel). The upper level pattern shifted as low pressure pushed into mainland Alaska from the west, allowing precipitation from the Bering Sea storm to eventually move into the Gulf of Alaska and all the way to the Panhandle. This system brought gale force winds and high surf along the Bering and Chukchi

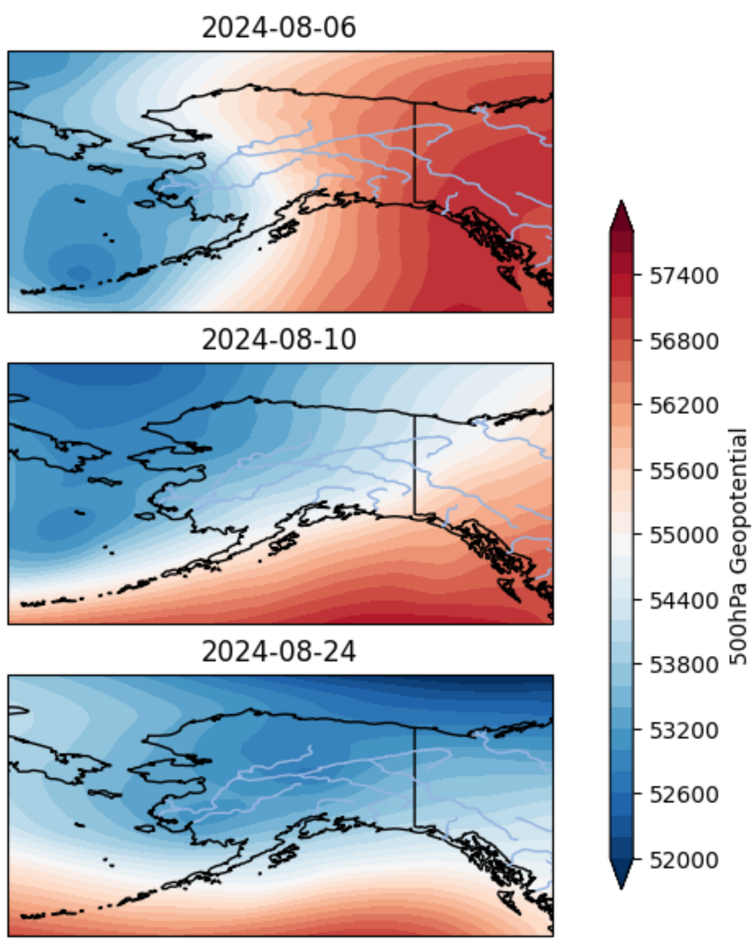

Figure 1. *500hPa Geopotential over Alaska on August 6, 10, and 24.* ERA5 reanalysis data courtesy of copernicus.eu

coasts. High wind warnings and flood advisories were issued for south-central as the storm moved further east.

After a few days of calmer weather, the next series of Bering Sea storms began rolling in around mid-month. Once again, the western coastal areas were impacted by strong winds and high water with a number of flood watches and high surf advisories issued for areas along the coast as far north as Norton Sound. In Kuskokwim Bay, the combined effect of the storm surge and rain produced flooding on the coast as well as on the Kuskokwim River.

Following this round of storms, the weather settled down in much of the state. However the respite didn't last long. While conditions remained calm and often sunny in south-central Alaska and on the Panhandle, former tropical storm Ampil moved from the northern Pacific into the Bering Sea around August 21. This brought more high surf and strong winds on the northern Bering coast. Due to the very rainy weather and continued precipitation, the volume of the Kuskokwim River reached about double the seasonal average as per the NWS.

The unsettled weather continued through the last week of August. Bering Sea storm activity kept going strong and multiple systems moved east into the Gulf, impacting south-central and SE Alaska. In the Interior and northern AK, low-pressure and colder air masses (Fig. 1, lower panel) brought the first substantial snowfalls for higher elevations in the Alaska Range and the Brooks Range.

The recurring Glacial Lake Outburst Flood from Suicide Basin released on August 6th this year. The flooding was even more destructive than last year and caused extensive damage to homes in Juneau neighbourhoods along the Mendenhall River. See the "Newsworthy Events" section at the end of this report or our blog post for more information.

Temperature

August was another relatively cool month in many parts of the state (Fig. 2, Table 1). Western Alaska had the lowest temperatures in relative terms. Kotzebue was the coldest of the selected First Order stations for the third month in a row with an anomaly of -4.8°F

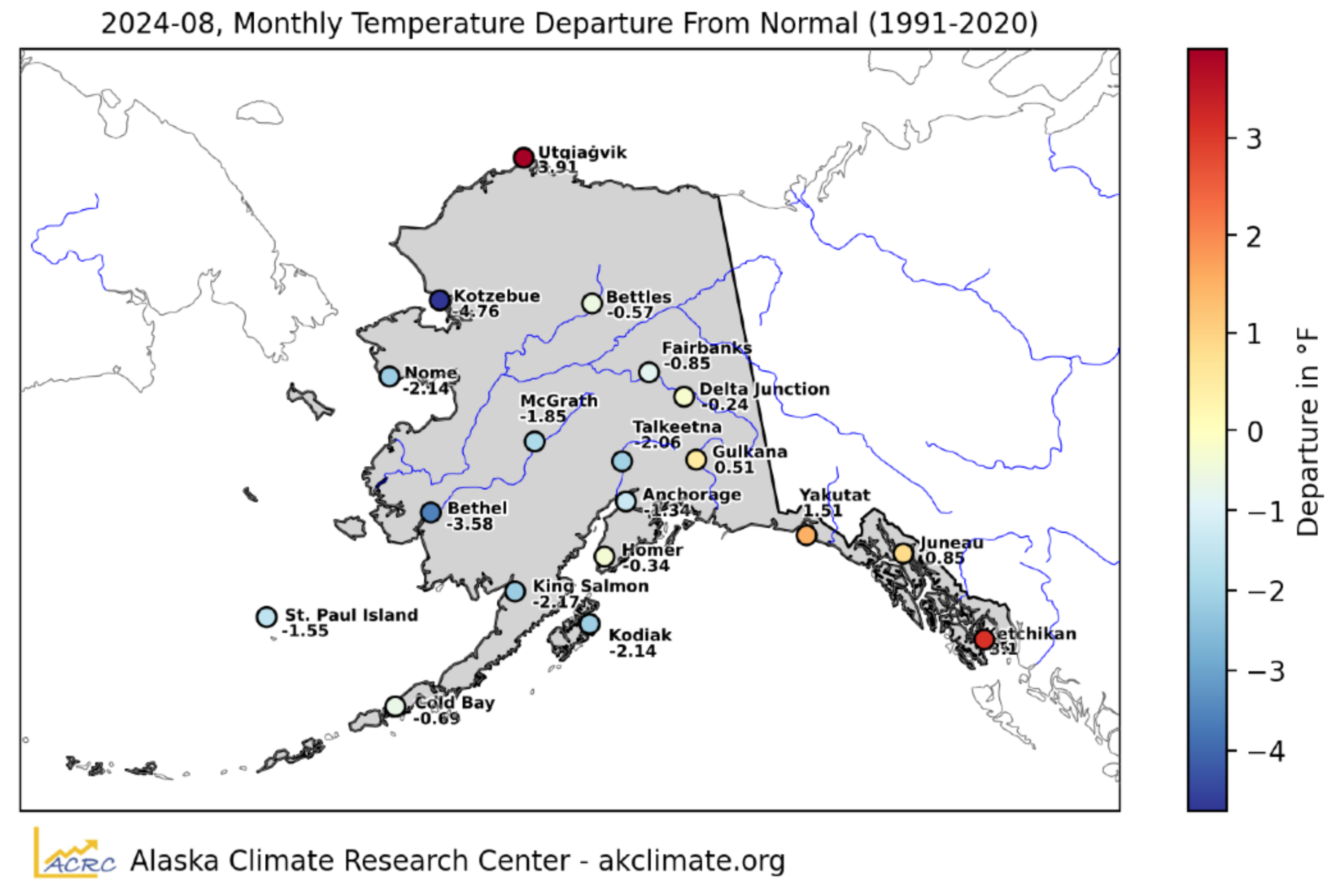

Figure 2 *Monthly mean temperature departure from normal (ºF), August, 2024, at the selected First Order stations in Alaska.*

below the 1991-2020 climate normal. Bethel was next in line with -3.6°F. Kodiak, King Salmon, Nome, and Talkeetna also had negative deviations from normal of more than -2°F. The eastern Interior had near normal monthly mean temperatures. The Panhandle and Arctic Alaska were warmer than normal. The highest anomalies were recorded at opposite ends of the state: Ketchikan was 3.1°F warmer than normal and Utqiaġvik was the warmest of all selected stations (relatively speaking) with an anomaly of +3.9°F

The daily temperature anomalies (Fig. 3) also reflect the strong contrasts we saw across Alaska in August. In Utqiaġvik, a prolonged period of warmer than normal conditions between August 3 and about August 15 stands out, with the highest anomalies around August 6th related to the incursion of warm air masses aloft. This was the same weather pattern that caused the record in Deadhorse mentioned earlier. The stations on the west coast remained west of the warm air masses and experienced cooler than average weather for most of the month. The Interior saw a series of quite pronounced temperature swings. Here, August started cool but brought some unusually warm days around August 6th, like in the far north. Temperatures then dropped again and seesawed multiple times around the climatological normal. In south-central AK, anomalies were generally not very pronounced and alternated between slightly cooler and slightly warmer than average. On the Panhandle, August was mostly warmer than normal although temperatures dropped to slightly cooler than average during the last third of the month in Juneau and Ketchikan.

Multiple daily temperature records were set in the north and at Interior stations around August 6, as mentioned above. August 16 to 18 also stands out in the statistics of the daily records with various new high records in Homer, Gulkana, and McGrath. A fair amount of new low records were also set this month, in particular for daily maximum temperatures. See the tables in the appendix for a full list of daily temperature records set this month.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	56.1	57.5	-1.3
Bethel	50.3	53.9	-3.6
Bettles	52.1	52.6	-0.6
Cold Bay	51.9	52.7	-0.7
Delta Junction	55.4	55.6	-0.2
Fairbanks	56.1	57.0	-0.9
Gulkana	54.1	53.5	0.5
Homer	55.0	55.3	-0.3
Juneau	56.9	56.0	0.9
Ketchikan	62.1	59.0	3.1
King Salmon	53.5	55.7	-2.2
Kodiak	54.4	56.5	-2.1
Kotzebue	47.4	52.2	-4.8
McGrath	54.1	55.9	-1.8
Nome	48.1	50.2	-2.1

Station	Observed (ºF)	Normal (ºF)	Departure (ºF)
St. Paul Island	48.0	49.6	-1.6
Talkeetna	54.5	56.5	-2.1
Utqiaġvik	43.7	39.8	3.9
Yakutat	56.2	54.6	1.5

Table 1. *Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, August 2024. Color-coded to match Figure 2 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).*

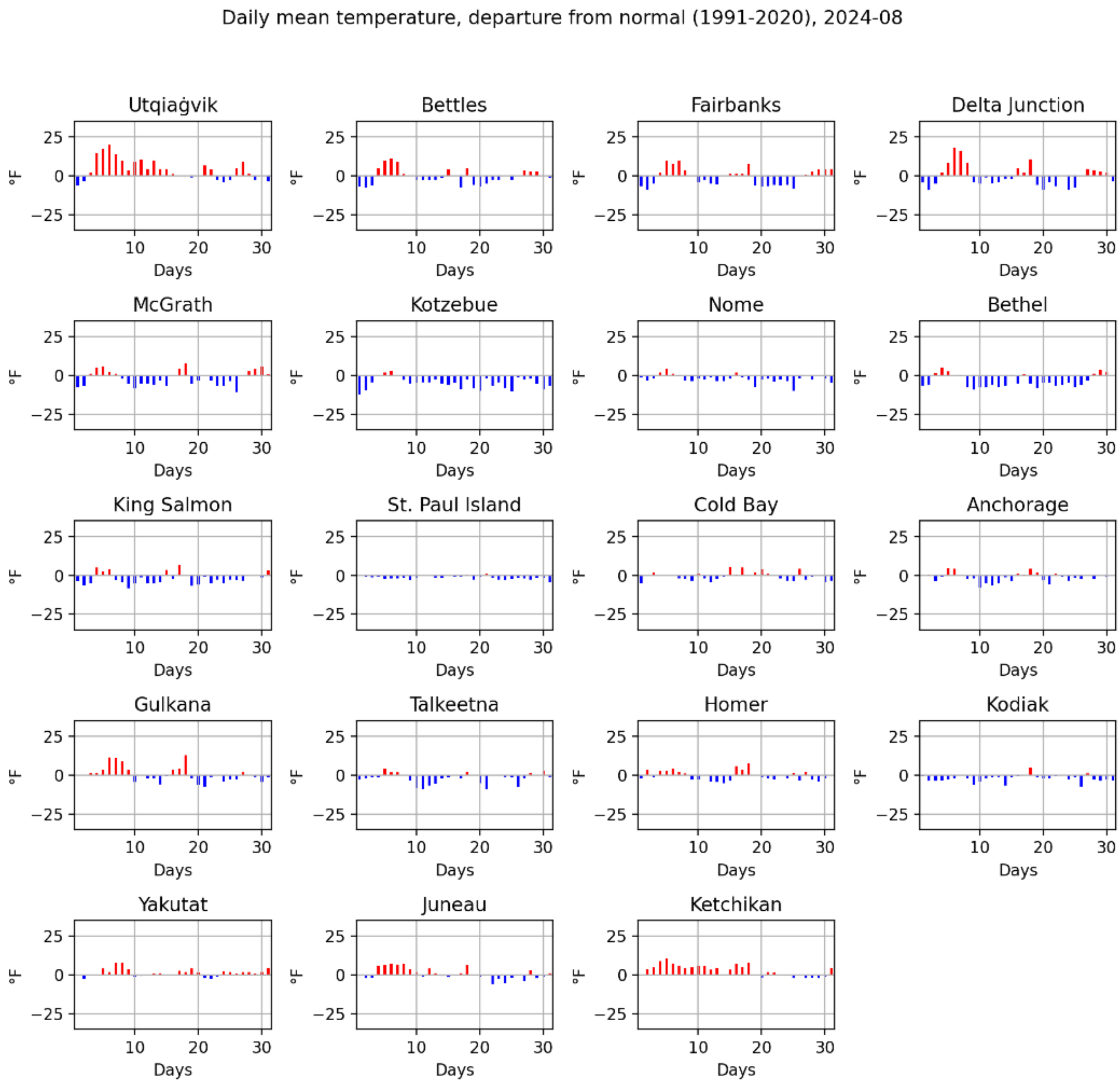

Figure 3. *Daily mean temperature departures for each day in August 2024 at the selected stations.*

Precipitation

August was another unusually wet month, although not quite as rainy as July at most of the selected stations. Once again, the west coast had the highest deviations from normal with about double the average amount of precipitation in Nome and Kotzebue (Fig. 4 & 5, Table 2). Utqiaġvik and stations in the western Interior and South-central clocked in at between 141 % (McGrath) and 176 % (Bettles) of normal. King Salmon and Cold Bay were slightly below average with 94% and 85% of normal. Gulkana and Delta Junction were in a similar range with 87% and 76%, respectively. The Panhandle was driest this month, relatively speaking, with around 70% in Yakutat and Juneau and only 51% of normal precipitation in Ketchikan.

Ketchikan and the southern tip of the Panhandle in general have been unusually dry for several months now. Since early July, the area has been under moderate drought conditions (Fig. 6), as per the Alaska drought monitor. Drought in this region of Alaska can impact hydropower operations and fisheries. Aside from the Panhandle, only a small region on the Alcan Border is currently under abnormally dry conditions.

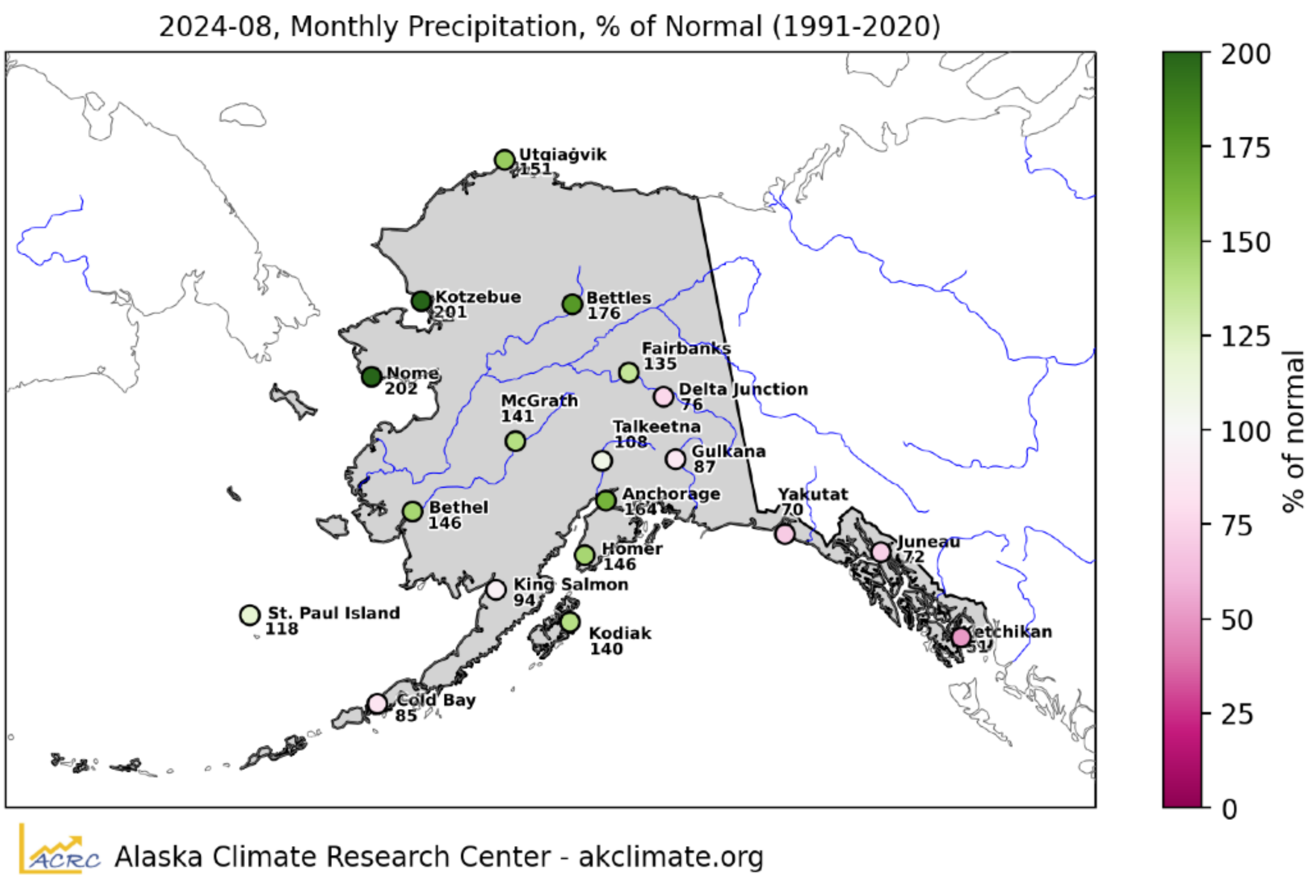

Figure 4. *Monthly precipitation in percentage of normal (ºF, 1991-2020 reference period), August, 2024, at the selected First Order stations in Alaska.*

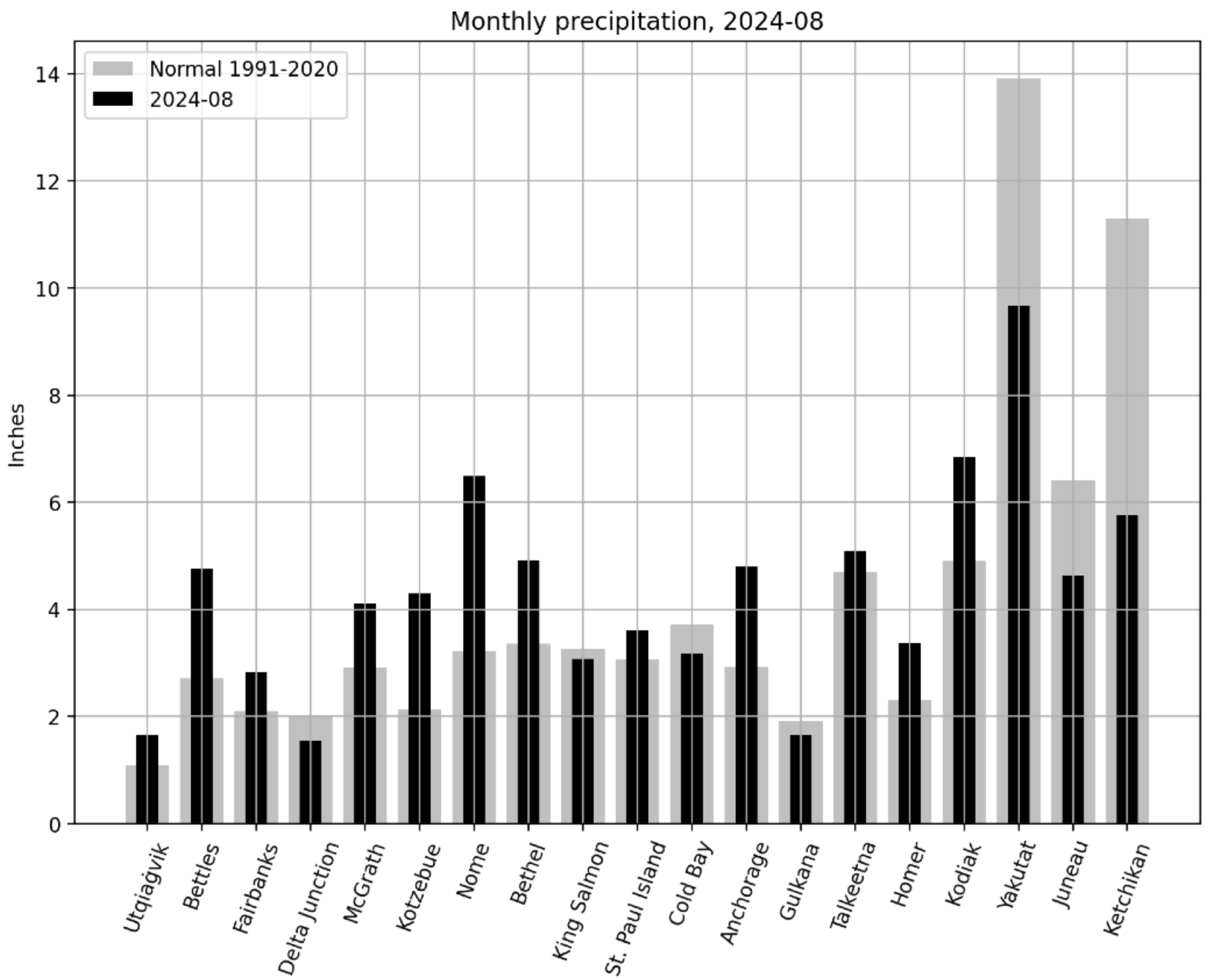

Figure 5. *Monthly precipitation sum (black bars) compared to the 1991-2020 normal (grey bars) at the First Order stations.*

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	4.8	2.9	163.8
Bethel	4.9	3.4	146.4
Bettles	4.8	2.7	175.6
Cold Bay	3.2	3.7	85.4
Delta Junction	1.5	2.0	76.2
Fairbanks	2.8	2.1	134.8

Station	Precipitation (in)	Normal (in)	% of Normal
Gulkana	1.7	1.9	86.9
Homer	3.4	2.3	145.9
Juneau	4.6	6.4	72.4
Ketchikan	5.8	11.3	51.0
King Salmon	3.1	3.3	94.2
Kodiak	6.8	4.9	139.6
Kotzebue	4.3	2.1	201.4
McGrath	4.1	2.9	141.2
Nome	6.5	3.2	201.6
St. Paul Island	3.6	3.1	117.6
Talkeetna	5.1	4.7	108.3
Utqiaġvik	1.6	1.1	151.4
Yakutat	9.7	13.9	69.6

Table 2. *Monthly precipitation sum, normal (1991-2020) and departure expressed as a percentage of the normal (1991-2020) for selected stations throughout the state, August 2024. Colors match the color scale in Figure 4.*

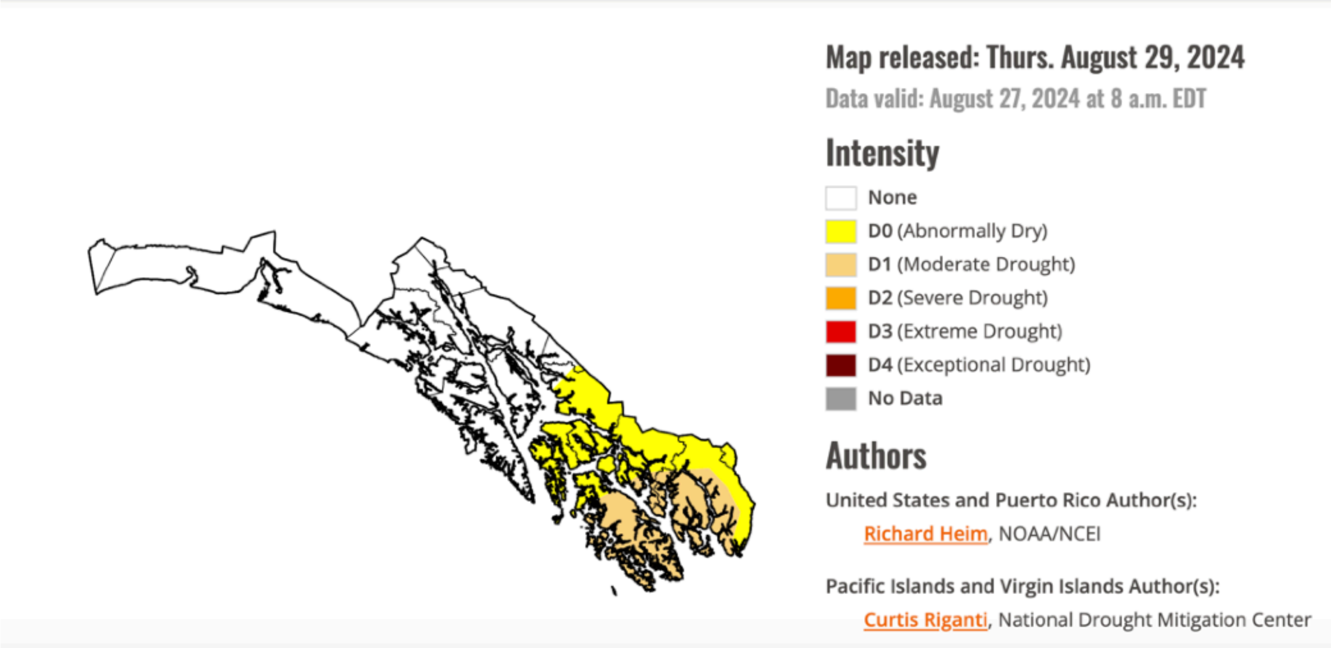

Figure 6. *The southern Panhandle remains under moderate drought conditions (https://droughtmonitor.unl.edu/)*

Wildfires

The warm weather around august 6 and 7 contributed to renewed fire activity in parts of the Interior, where the Sinnott Fire and and the American Fire produced noticeable smoke columns near Eagle (Sinnott Fire) and north of the Steese Highway in the Preacher Creek drainage (American Fire). Around mid-month, the Forest Service began monitoring the Circle Bay Fire on Woronkofski Island near Wrangell.

Aside from the scattered, generally small remaining fires, the 2024 season looks to have come to a close overall. The AICC situation report on September 1 lists a total of 385 fires to date and 664,092.5 burned acres. Total burned acreage is up from 629.970 acres on August 1. The vast majority of the burned area stems from lightning caused fires. Only about 0.5% of the total are from human caused fires.

Arctic Sea Ice

Arctic sea ice extent decreased throughout the month at relatively variable rates between about 11% and 4%. As of August 29, the sea ice extent was 4.577 M km2, down from 6.241 M km2 on August 1. Fig. 8 shows the development of Arctic sea ice extent for the current season compared to prior years. Winter sea ice extent in the waters around Antarctica is still very low but has recovered slightly from last months even more extreme values. Fig. 9 A and B show Arctic sea ice extent and concentration on August 29, respectively.

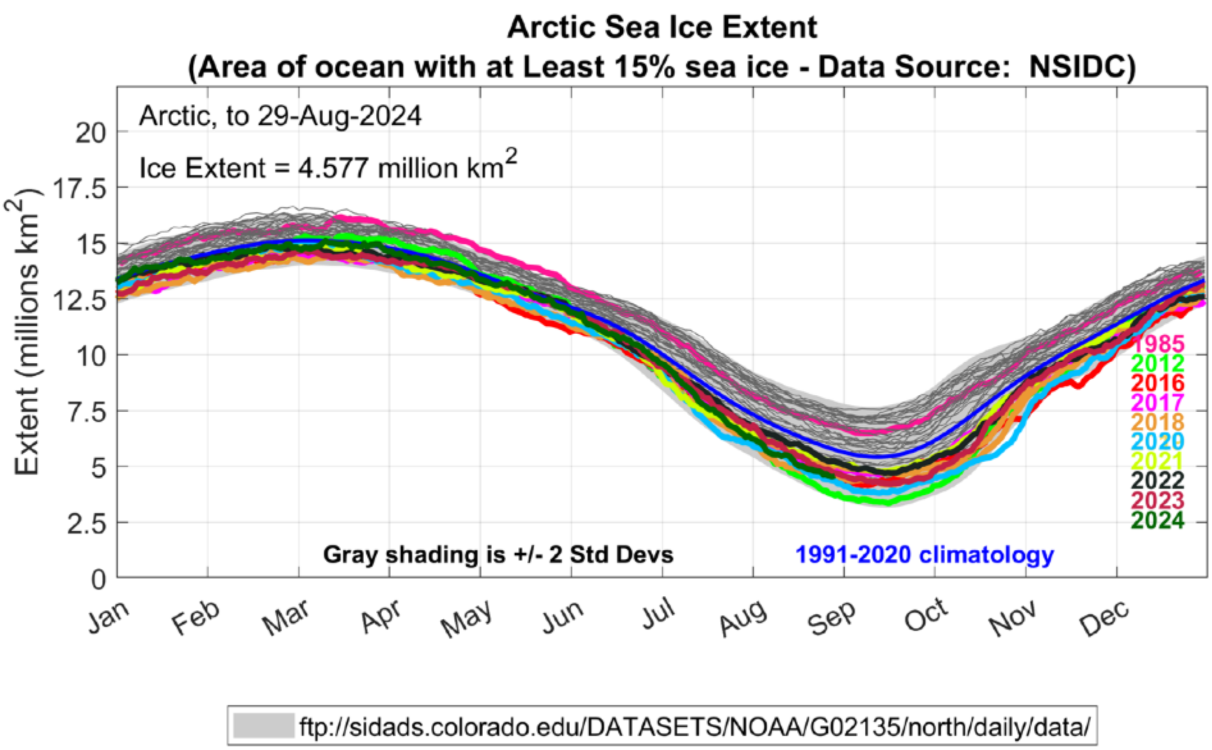

Figure 8. *Time series of daily Arctic sea ice extent. This year's data (dark red) are updated until August 29, 2024. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)*

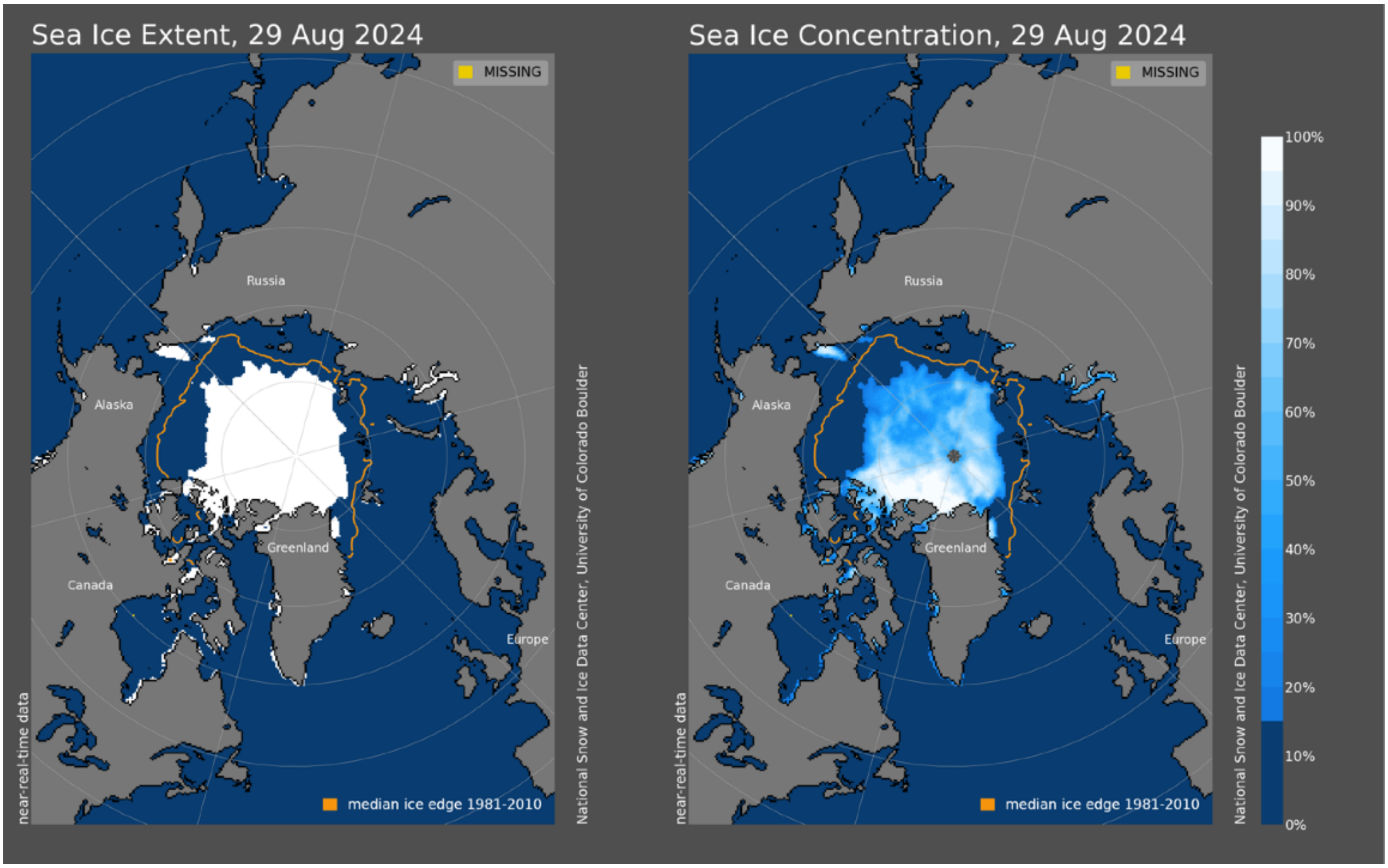

Figure 9. *A (left) Arctic sea ice extent and B (right concentrations as of August 29, 2024 compared to the average from 1981-2010 (Data and images: NSIDC)*

Newsworthy Information

Suicide Basin Glacial Lake Outburst Flood (GLOF) causes severe flooding

Almost every year (since 2011), a Glacial Lake Outburst Flood occurs when Suicide Basin drains into the Mendenhall River. This year, the Suicide Basin GLOF released during the night of August 5 to 6. Water levels at the Auke Bay gauge on the Mendenhall River peaked at almost 16 ft in the early morning of August 6 (Fig. 10), nearly a foot above the previous GLOF-record set in 2023. Numerous homes in neighbourhoods in Mendenhall Valley were inundated.

The GLOF was preceded by relatively dry weather and the Mendenhall River was not at very high levels prior to the GLOF. Based on the data from the Mendenhall River Auke Bay gauge, discharge was around the time series median before the GLOF peak. From the NWS gauge analysis graph in Fig. 11, it is apparent that the same amount of excess water from Suicide Basin could have had even more destructive consequences if it had come on top of already elevated river levels, for example after a period of rainy weather.

See our blog post for more information. The event was also covered by Alaskan and national media, for example: Slate, Juneau Empire, and an overview on climate.gov. Resources related to flood response and disaster assistance are gathered by the city of Juneau: https://juneau.org/manager/flood-response

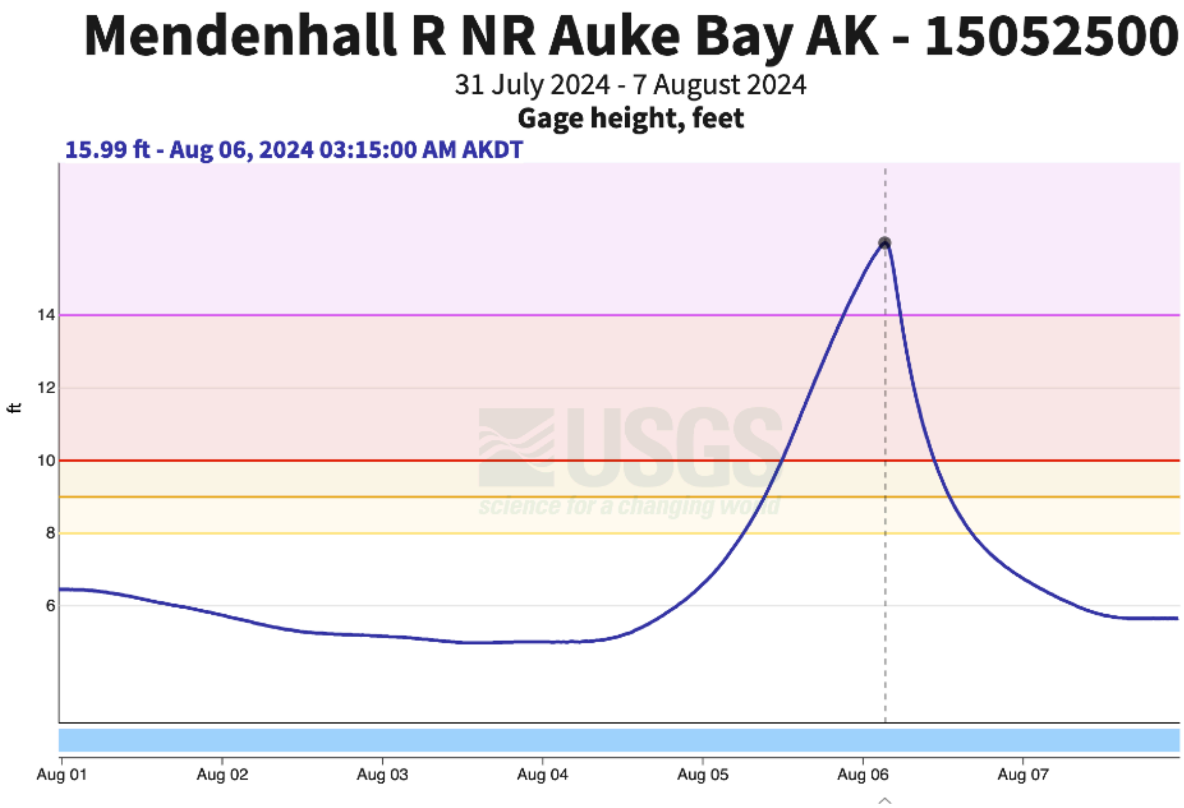

Figure 10: *The USGS Mendenhall Auke Bay gage reached major flood stage during the night of August 5 to 6 peaking at almost 16ft in the early morning hours of August 6.*

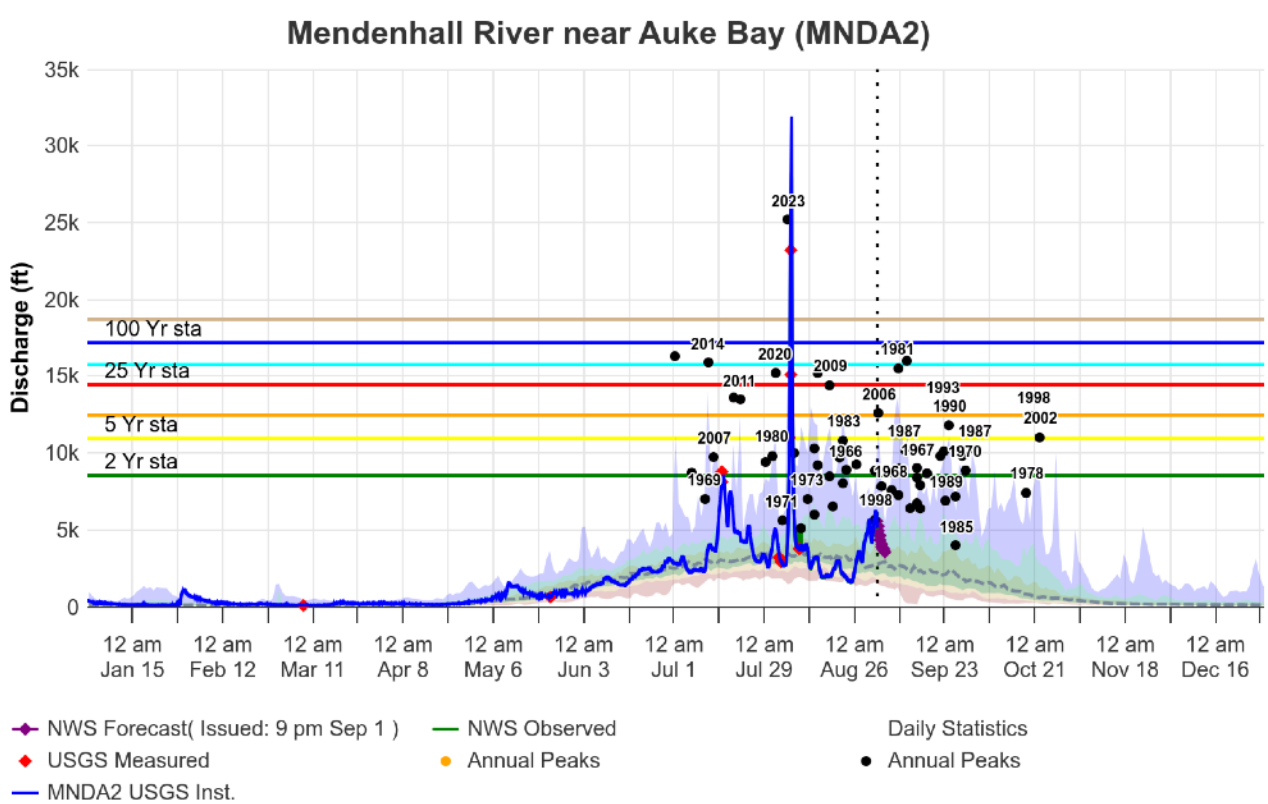

Figure 11: *NWS gage analysis for the same location. The blue line represents 2024 discharge. The blue shaded area marks the 90% quantile for the time series. (https://www.weather.gov/source/aprfc/gageAnalysis.html?site=mnda2)*

Appendix

Highest Mean Daily Temperature on Record				
Station	Date	New Record (ºF)	Year of Old Record	Old Record (ºF)
Delta Junction	2024-08-06	76.0	1994	75.0
Delta Junction	2024-08-07	73.5	1994	73.0
Gulkana	2024-08-18	66.0	1977	64.5
Homer	2024-08-18	63.0	2004	60.0
Utqiaġvik	2024-08-06	60.5	2023	58.0
Yakutat	2024-08-07	63.5	2019	62.5
Lowest Mean Daily Temperature on Record				
Anchorage	2024-08-10	51.0	1982	52.0

Table A1: August 2024 daily records of mean daily temperature, i.e. highest/lowest values of mean daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. Six new high records and one new low record were set.

Highest Maximum Daily Temperature Record				
Station	Date	New Record (ºF)	Year of Old Record	Old Record (ºF)
Anchorage	2024-08-05	77.0	1968	76.0
Homer	2024-08-18	73.0	1974	70.0
Juneau	2024-08-04	82.0	1941	80.0
Utqiaġvik	2024-08-06	74.0	1930	70.0
Lowest Maximum Daily Temperature Record				
Anchorage	2024-08-10	54.0	1982	56.0
Bethel	2024-08-10	48.0	1932	49.0

Bethel	2024-08-23	49.0	2011	50.0
Bettles	2024-08-17	49.0	1997	50.0
Delta Junction	2024-08-02	52.0	1971	56.0
Talkeetna	2024-08-10	54.0	2002	55.0

Table A2: August 2024 daily records of maximum daily temperature, i.e. highest/lowest values of maximum daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. Four new highest and six new lowest maximum daily temperature records were set.

Highest Minimum Daily Temperature Record				
Station	**Date**	**New Record (°F)**	**Year of Old Record**	**Old Record (°F)**
Delta Junction	2024-08-06	71.0	1981	60.0
Delta Junction	2024-08-07	69.0	1994	59.0
Gulkana	2024-08-06	59.0	2019	56.0
Gulkana	2024-08-07	59.0	1944	54.0
Gulkana	2024-08-08	56.0	1997	55.0
Gulkana	2024-08-18	53.0	1963	52.0
Homer	2024-08-16	57.0	1967	55.0
McGrath	2024-08-18	59.0	2004	58.0
Talkeetna	2024-08-07	58.0	2021	57.0
Yakutat	2024-08-08	59.0	1981	57.0
Lowest Minimum Daily Temperature Record				
King Salmon	2024-08-03	34.0	2002	38.0

King Salmon	2024-08-20	33.0	1963	35.0

Table A3: August 2024 daily records of minimum daily temperature, i.e. highest/lowest values of minimum daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. Ten new records for highest minimum daily temperature were set. Two were set for lowest minimum daily temperature.

This information consists of climatological data compiled by the Alaska Climate Research Center, Geophysical Institute, University of Alaska Fairbanks. For more information on weather and climatology, visit the center website at http://akclimate.org. Please report any comments, ideas or errors to uaf-climate@alaska.edu.