



Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY AUGUST 2022

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Alaska’s Statewide Climate Summary for August 2022 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

Rain almost every day of the month in Anchorage, new precipitation record in Homer, mostly dry in Fairbanks

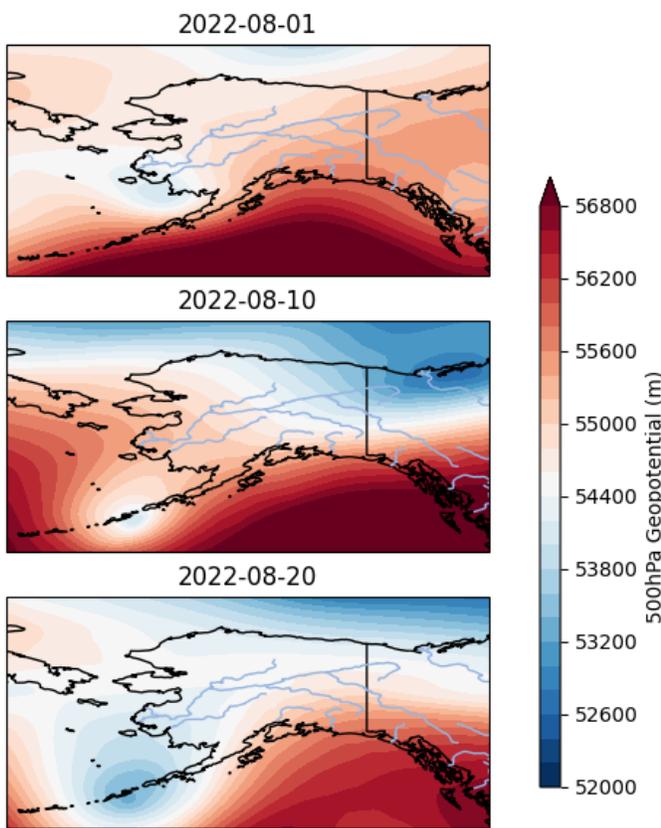
Lightning sparked some **new fires in the Interior**, fire season wound down in other parts of the state

Sea ice extent higher than in several years as the summer minimum approaches

Synoptics and Significant Weather Events

In terms of the large scale upper level pattern, August started out with lows in the Bering Sea and over the Arctic Ocean, and ridging over the eastern Interior. This combination brought relatively warm conditions with some thunderstorms throughout the Interior and unsettled, wetter weather on the coasts. The northern low remained broadly in place through the first week of the month, eventually shifting slightly south to combine with the Bering low into a larger troughing pattern. This large low pressure complex then moved

eastwards from the Bering Sea into Alaska, bringing wetter and much cooler conditions to most of the state. Fronts associated with the system brought snow at mid and high elevations in the Brooks and Alaska Range, as well as significant amounts of rain at lower elevations.



By about August 10th, this unseasonably cool pattern had run its course and high pressure over the Bering Sea pushed into the southern and central parts of the state, leading to a few warmer and mostly dry days. However, troughing in the Arctic Ocean persisted and extended back into the Bering Sea by mid-month, bringing a mix of cool and wet conditions along the western coast and on the North Slope and warmer, drier weather in the central and eastern Interior. As the pattern eventually shifted east, conditions became more unsettled in the Interior with showers and late season thunderstorms. The Arctic

Figure 1: ERA5 reanalysis data of 500hPa geopotential height for August 1, 10, and 20: Broadly shifting low pressure over the Arctic Ocean and Bering Sea throughout the month, often accompanied by a southerly flow in the Interior.

plains saw the first snow falls of the season and there was another round of substantial precipitation in the Brooks Range.

As the Arctic Ocean low shifted and weakened, a low over the Aleutians became a dominant player for the weather across the state around August 20th. This low deepened in the following days, eventually moving into the western Gulf of Alaska and causing a southerly flow over much of the state, allowing high pressure to build as warm air flowed into the Interior from the south. The weather in the west, especially along the coast, remained unsettled and wet, while the Interior saw warm, mostly dry conditions.

Finally, the last week of August was once again characterised by a long wave trough extending from the Arctic Ocean into the Bering Sea. As this system moved east with the zonal flow, troughing covered the entire state bringing more precipitation and locally elevated river levels, particularly on the southwestern slope of the Brooks Range.

Temperature

The 2022 summer season (June-August) was on the warm side of the 1991-2020 normal in much of the state but not extremely so. Some stations saw a summer mean temperature slightly below the climatological mean, particularly in the West and North. The Interior and southern parts of the state mostly recorded positive summer anomalies.

Monthly mean temperatures in August were above normal in the Southeast and Interior and cool or close to normal in South Central and the western and northern parts of the state (Fig 2, Table 1). Ketchikan and Juneau had the highest positive temperature anomalies in August with 2.75 and 2.1°F above normal, respectively. McGrath and Kotzebue were coldest with 2.4 and 3.1 °F below normal, respectively.

Daily anomalies throughout the month show the same broad geographic pattern. First order stations in the southeast saw a few cooler than normal days in the first week of August and remained consistently above average the rest of the month (Fig 3). In the Interior, e.g., at the First Order stations in Fairbanks and Delta Junction, the latter two thirds of August were also almost continuously above average. The spatial heterogeneity of the time series of daily temperatures this month reflects the changeable August weather, which was characterised by multiple frontal systems moving across the state.

Juneau set new records for highest daily minimum temperature on 4 consecutive days (Aug. 23-26, Table A3) during a pronounced southerly flow.

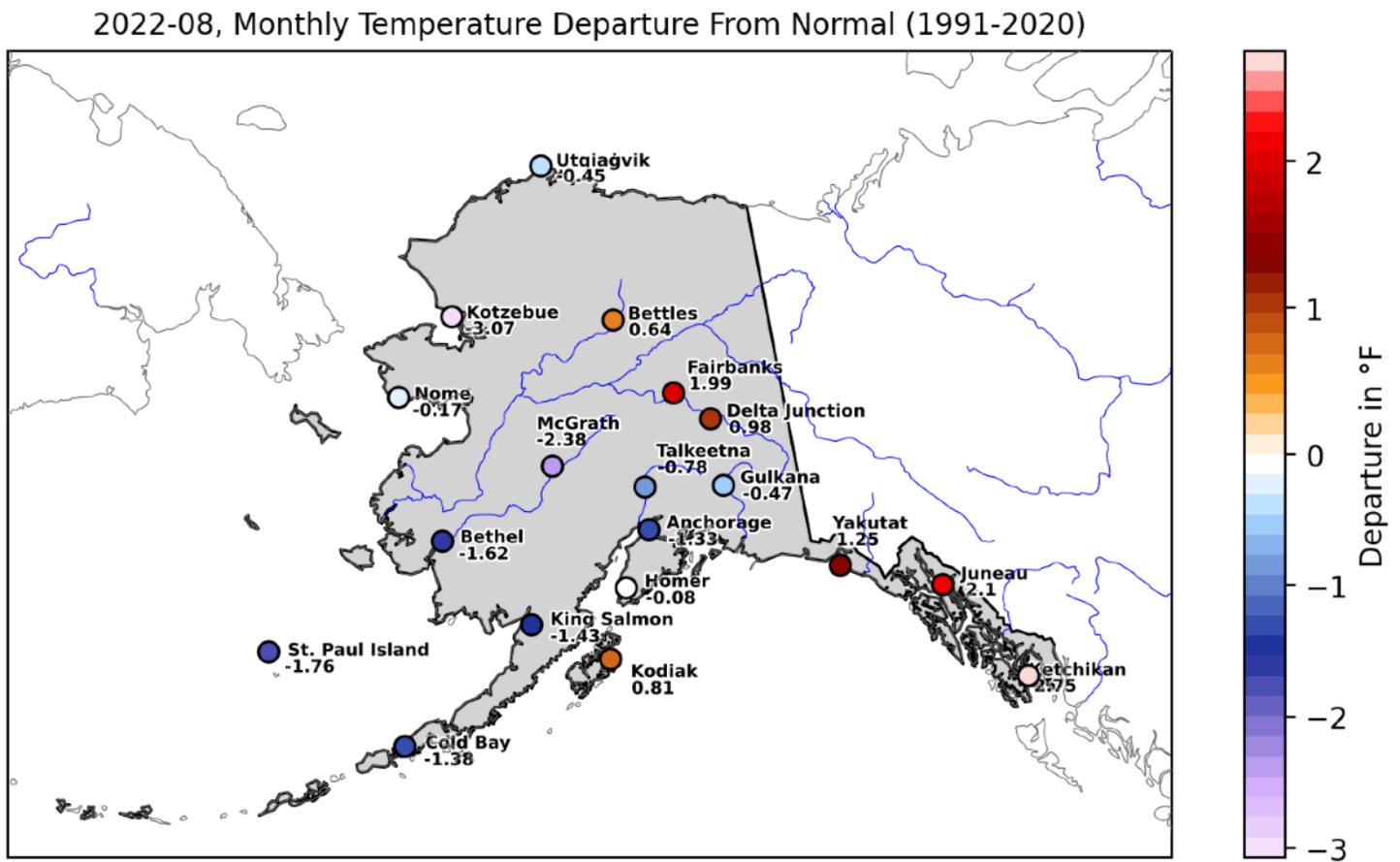


Figure 2. Monthly mean temperature departure from normal (°F), August 2022, at the selected First Order stations in Alaska.

Daily mean temperature, departure from normal (1991-2020), 2022-08

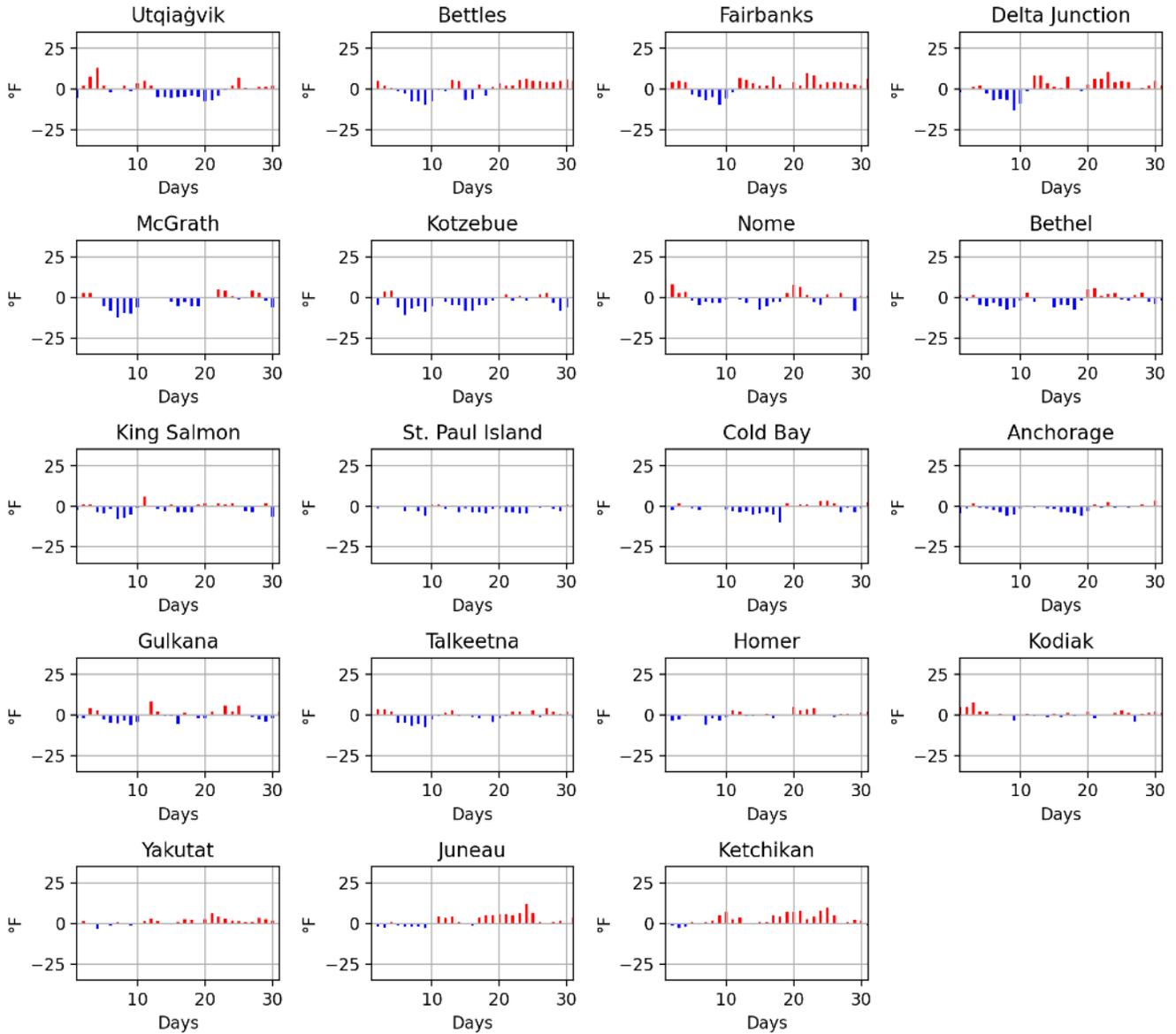


Figure 3. Daily mean temperature departures for each day in August 2022 at the selected stations.

Table 1. Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, August 2022. Color-coded to match Figure 2 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	56.1	57.5	-1.3
Bethel	52.3	53.9	-1.6
Bettles	53.3	52.6	0.6
Cold Bay	51.3	52.7	-1.4
Delta Junction	56.6	55.6	1.0
Fairbanks	59.0	57.0	2.0
Gulkana	53.1	53.5	-0.5
Homer	55.2	55.3	-0.1
Juneau	58.1	56.0	2.1
Ketchikan	61.7	59.0	2.7
King Salmon	54.2	55.7	-1.4
Kodiak	57.4	56.5	0.8
Kotzebue	49.1	52.2	-3.1
McGrath	53.3	55.9	-2.4
Nome	50.0	50.2	-0.2
St. Paul Island	47.8	49.6	-1.8
Talkeetna	55.7	56.5	-0.8
Utqiaġvik	39.4	39.8	-0.4
Yakutat	55.9	54.6	1.3

Precipitation

August was very wet in South Central Alaska. The First Order stations in Anchorage, Homer, and Kodiak all received close to or over 200% of normal precipitation. While July precipitation was characterised by intense but short rain events with some extremely high daily precipitation totals, August saw much more continuous rain with moderate daily totals. Anchorage recorded precipitation on all but 4 days of the month. Fairbanks and Delta Junction were among the driest stations this month with about half of normal precipitation. St. Paul Island was the driest station in relative terms at 42% of normal. (Figures 4, 5; Table 2).

Homer broke its long-standing record for August monthly precipitation, clocking in with a total of 5.84 inches. The previous August record was set in 1939 (5.56 inches). Over 5 inches of precipitation in August have only been measured in four years at this station (2022, 1939, 1945, 1966).

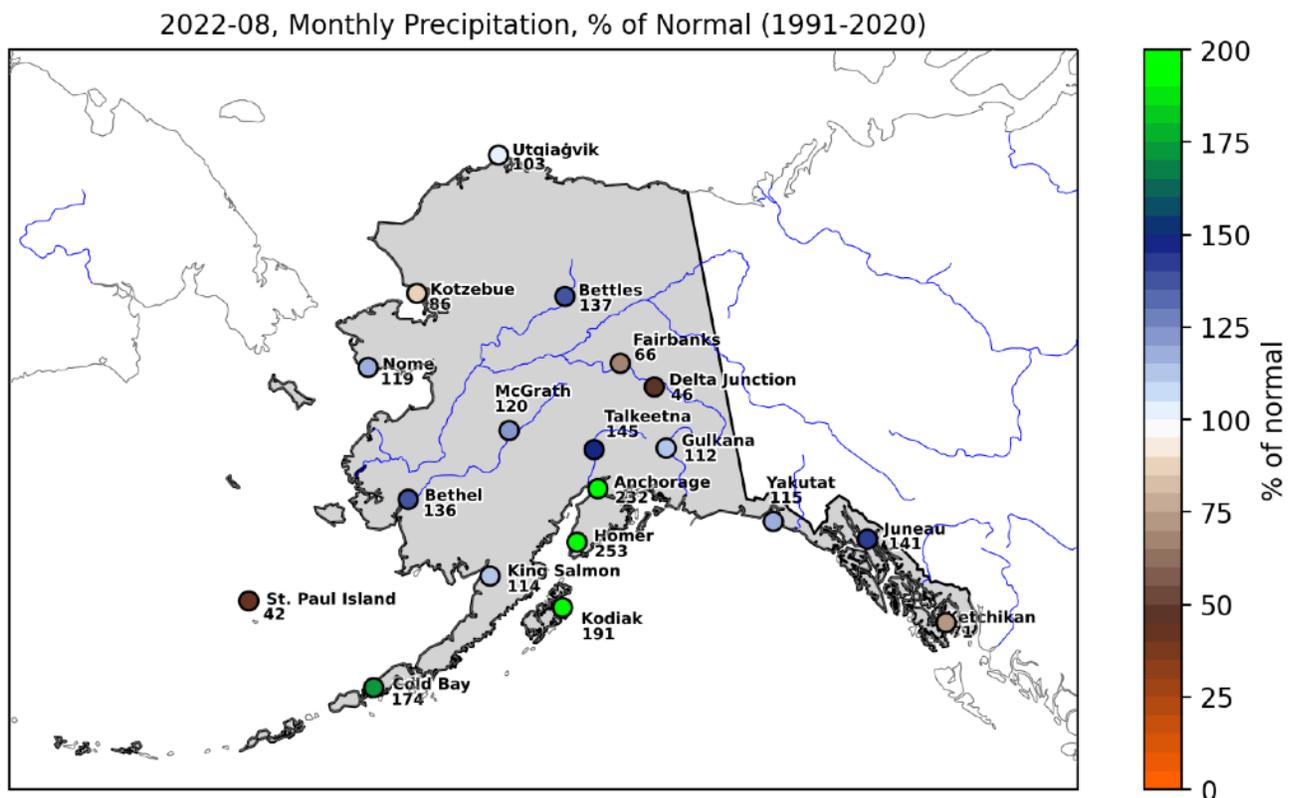


Figure 4. Monthly precipitation sum in percent of normal, August 2022, at the selected First Order stations in Alaska.

Snow was not recorded at the selected stations, but August did bring snow to the higher elevations as well as to the Arctic planes. It also snowed a little in Utqiagvik in mid-August.

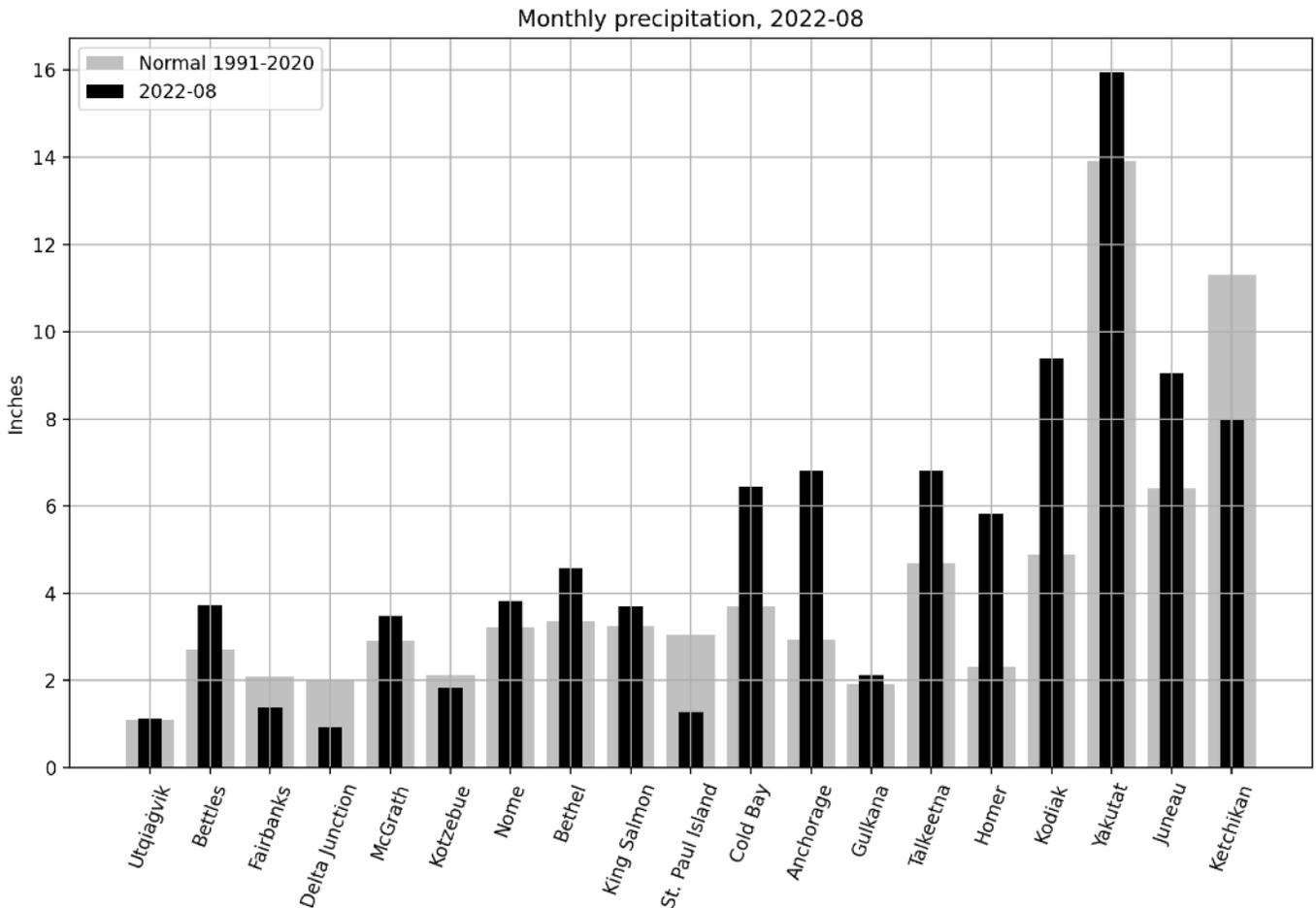


Figure 5. Monthly precipitation sums for August 2022 at the selected First Order stations compared to the normal (1991-2020), in inches.

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 2022. Shades of brown, blue, and green correlate with Figure 4.

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	6.8	2.9	232.1
Bethel	4.6	3.4	136.0
Bettles	3.7	2.7	137.3
Cold Bay	6.4	3.7	173.9
Delta Junction	0.9	2.0	45.5
Fairbanks	1.4	2.1	66.2
Gulkana	2.1	1.9	111.5
Homer	5.8	2.3	252.8
Juneau	9.0	6.4	141.2
Ketchikan	8.0	11.3	70.7
King Salmon	3.7	3.3	113.8
Kodiak	9.4	4.9	191.4
Kotzebue	1.8	2.1	85.9
McGrath	3.5	2.9	119.9
Nome	3.8	3.2	118.9
St. Paul Island	1.3	3.1	41.8
Talkeetna	6.8	4.7	144.9
Utqiagvik	1.1	1.1	102.8
Yakutat	15.9	13.9	114.6

Drought

No part of Alaska is currently experiencing drought conditions. Abnormally dry conditions persist locally in an area around Fort Yukon, which has been the driest region of the state for the past months. Figure 6 illustrates the Alaska drought monitor, which is produced through a collaboration of the USDA, NOAA and the National Drought Mitigation Center.

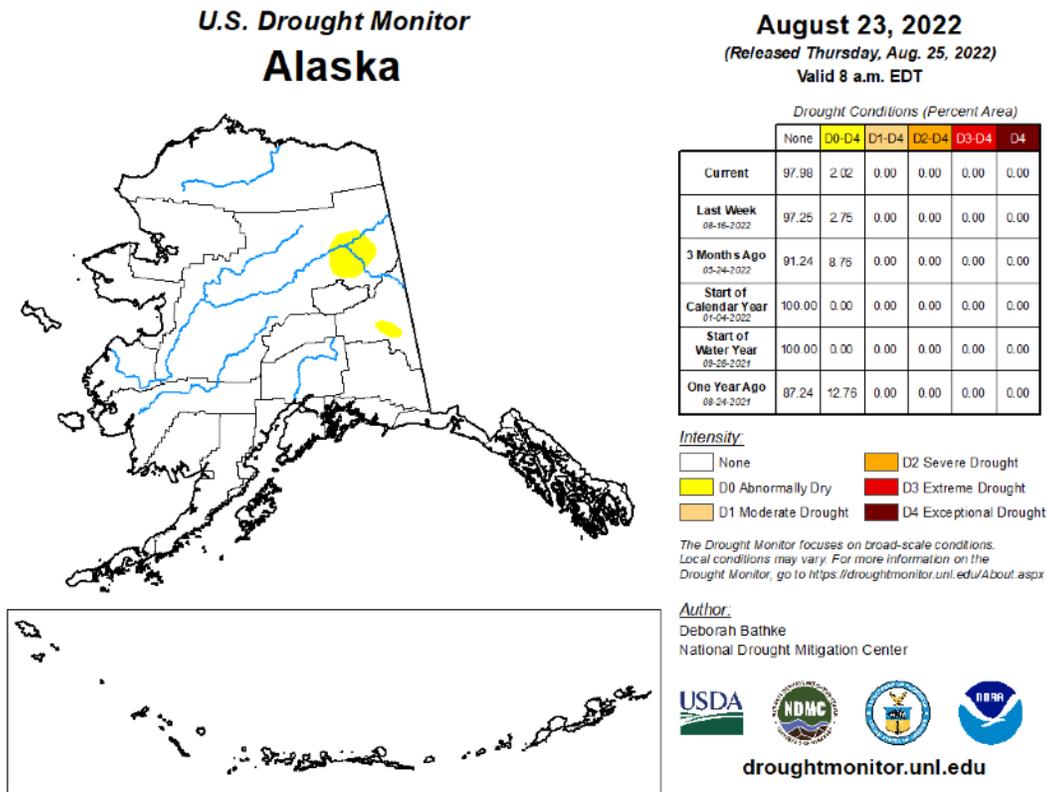


Figure 6. U.S. Drought Monitor map for Alaska, updated on August 23, 2022. The table on the right shows the percent area affected by different categories of drought intensity. Figures and data produced and released by the U.S. Drought Monitor, a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration (<https://droughtmonitor.unl.edu>).

Wildfire Activity

Compared to last month, the 2022 fire season has distinctly levelled off and there was only a relatively small increase in the total number of fires and burned acreage throughout August. While there was some lightning activity over the Interior that caused new fires and evacuations around Delta Junction, the wet weather has significantly dampened fuels in other parts of the state, likely putting an end to the unusually intense 2022 fire season in the southwest and other parts of the state.

As of August 31st, the year-to-date fires total is 585 (moderately up from 557 at the end of July), with 3,107,570.6 acres burned (Alaska Interagency Coordination Center Situation Report). 283 fires were human-caused, burning 111,715.1 acres, while 282 were lightning-sparked, burning 3,095,816.0 acres. Another 20 fires had undetermined causes according to the AICC. The last fire season with more than 3 million acres burned was 2015. The 3 million mark was only reached in 7 years (2022, 2015, 2005, 2004, 1990, 1969, 1957) since accurate reporting began in 1950.

Please check our UAFSmoke website at <http://smoke.alaska.edu> for current and updated fire information. UAFSmoke shows current wildfire status information and up to 72 hours forecast of concentrations of black carbon and particulate matter emitted from Alaska wildfires.

Arctic Sea Ice

Arctic sea ice extent is higher than it has been in several years at this time of year, although loss continued at a somewhat accelerated pace in the second half of August with 2022 extent diving closer than previously to 2021 values. Weekly decrease rates stand at about 9% as of August 25. The surface melt season is approaching its end but melting driven by heat stored in the ocean may continue for several weeks. Figure 7 shows a time series of sea ice extent while Figures 8 A, B show the sea ice extent and concentrations as of August 30, 2022 compared to the average from 1981-2010.

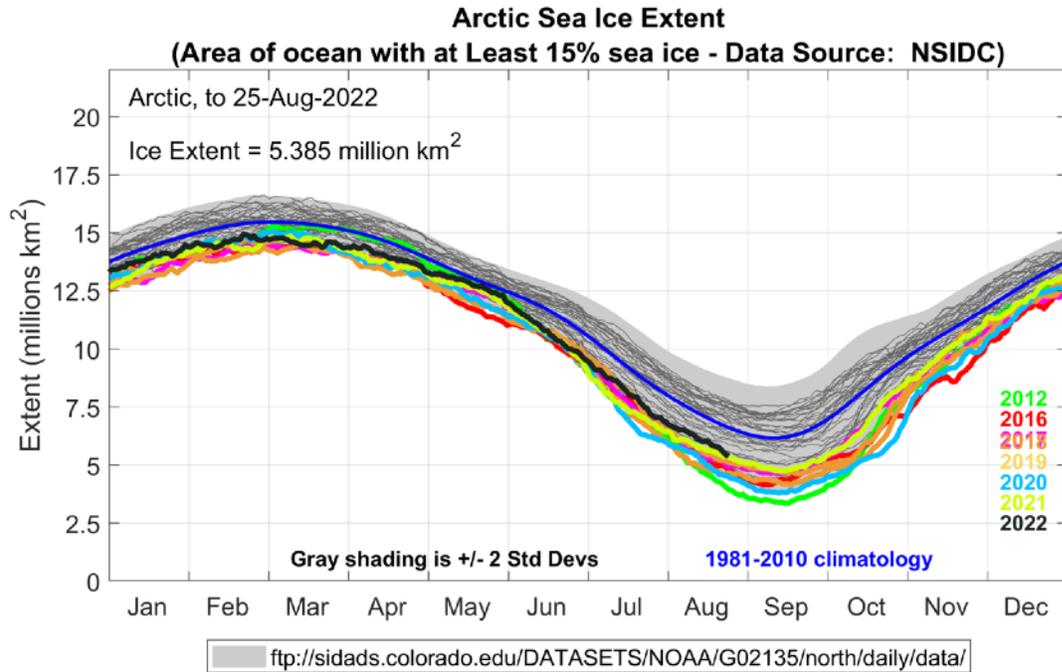


Figure 7. Time series of daily Arctic sea ice extent. This year's data (black) are updated until August 25, 2022. The median sea ice extent for the 1981-2010 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory

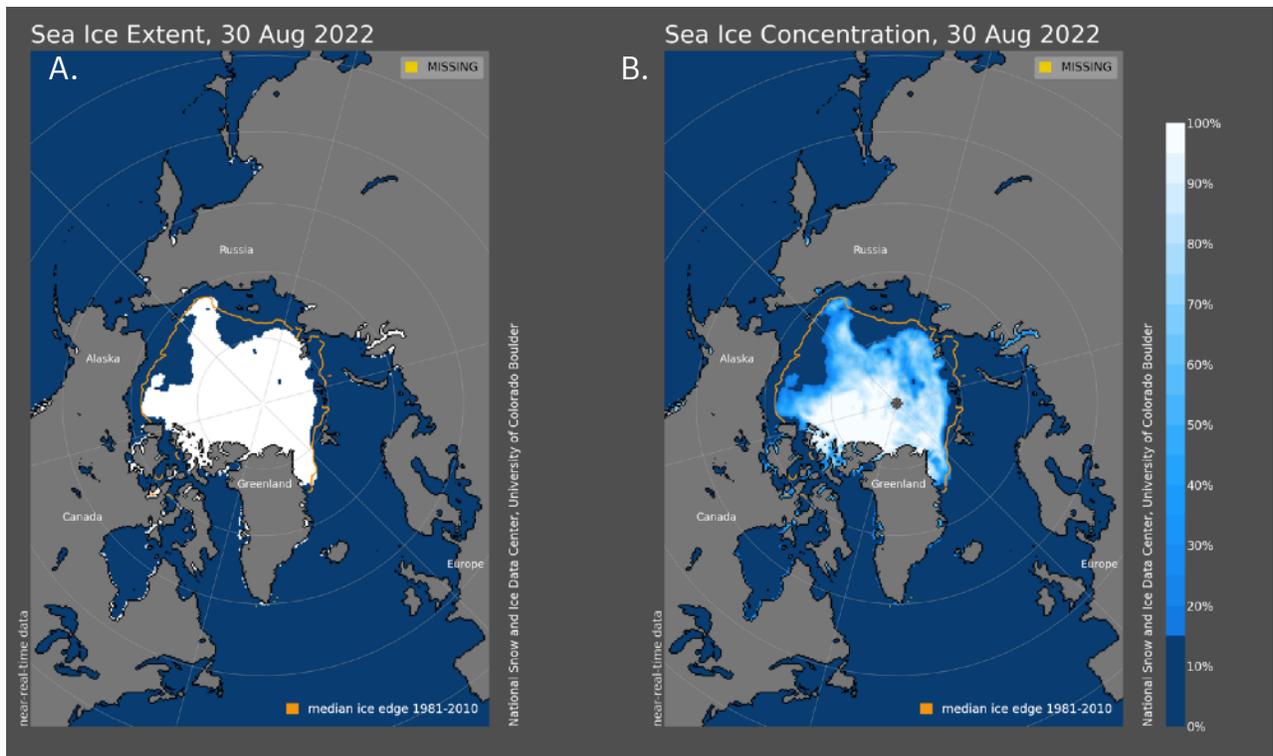


Figure 8. (A) Sea ice extent and (B) sea ice concentration as of August 30, 2022, and as compared with the 1981 - 2010 median edge. Images: National Snow and Ice Data Center (nsidc.org).

News-worthy Information

The annual State of the Climate report was published in late August as a supplement to the Bulletin of the American Meteorological Society. Several UAF scientists contributed to the chapter on climate in the Arctic.

Summarising 2021 climatic developments, the report finds that temperatures across mainland Alaska were near or below average during 2021, while the eastern Canadian Arctic and Greenland were warmer. Glaciers throughout the Arctic and particularly in Alaska and Canada lost significant ice during the 2020-2021 ablation season. Vegetation productivity was lower in 2021 than in the previous years.

Appendix

Table A1: August 2022 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. Two new highest mean daily temperature records were set and now was set for lowest mean daily temperature record.

Highest Mean Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Delta Junction	2022-08-23	64.5	1954	64.0
Juneau	2022-08-24	67.0	1981	61.0
Lowest Mean Daily Temperature on Record				
Cold Bay	2022-08-18	43.0	1952	45.5

Table A2: August 2022 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. One new lowest maximum daily temperature record was set.

Lowest Maximum Daily Temperature Record				
Delta Junction	2022-08-09	50.0	1998	51.0

Table A3: August 2022 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. Five new records for highest minimum daily temperature were set, 4 of them in Juneau on consecutive days. One new record was set for lowest minimum daily temperature.

Highest Minimum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Delta Junction	2022-08-23	60.0	1989	57.0
Juneau	2022-08-23	56.0	1958	55.0
Juneau	2022-08-24	59.0	1992	55.0

Juneau	2022-08-25	56.0	1984	55.0
Juneau	2022-08-26	53.0	1987	52.0
Lowest Minimum Daily Temperature Record				
Cold Bay	2022-08-18	32.0	1967	39.0

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.