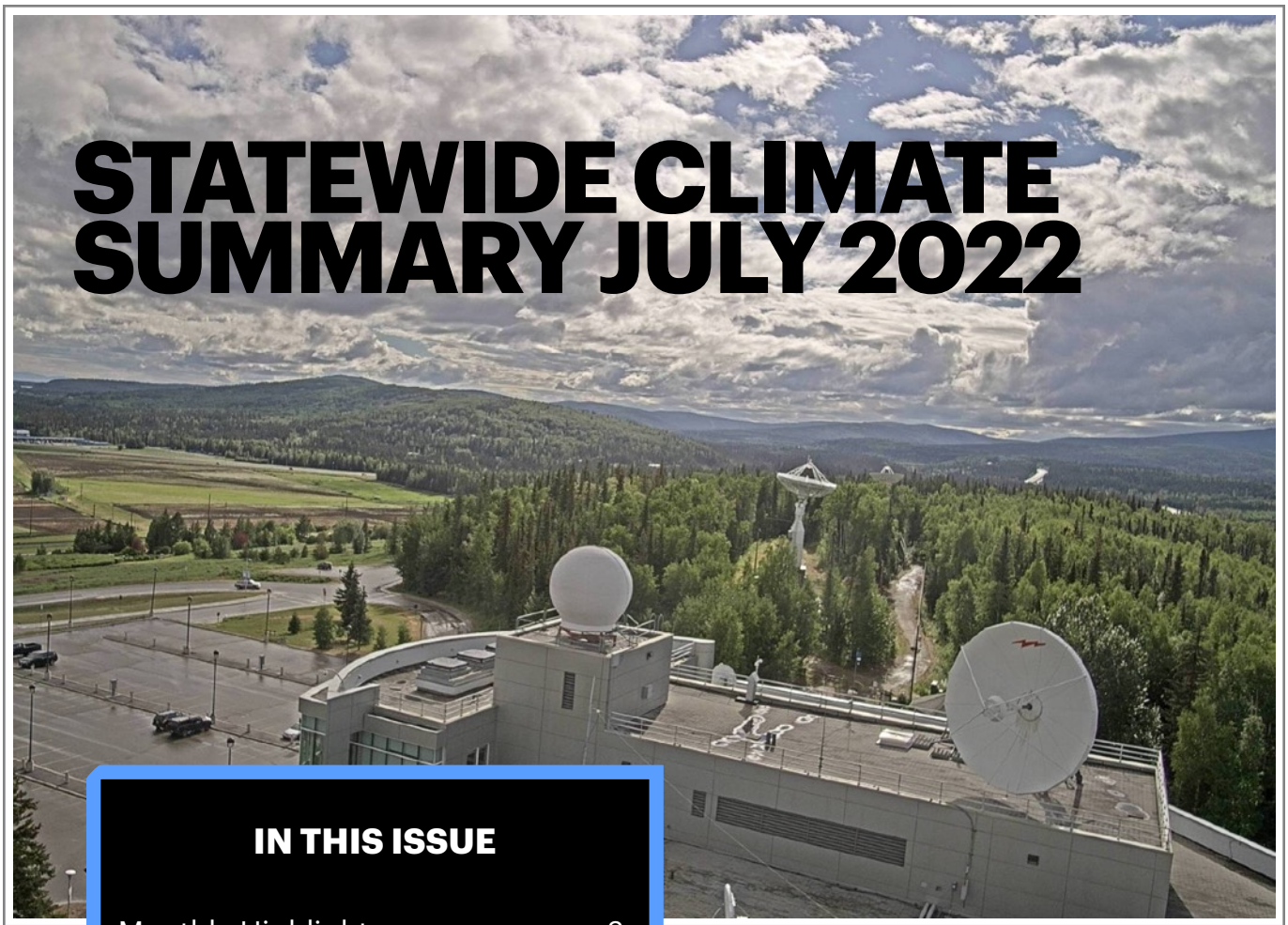
Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY JULY 2022



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GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks

Alaska's Statewide Climate Summary for July 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

More than 500 wildfires burned **over three million acres** by the end of July. Widespread lightning at the beginning of the month strongly contributed to fire activity.

Drought conditions eased after a shift to wetter and cooler weather patterns around mid-month.

Utqiaġvik recorded a new all-time daily precipitation record of 1.42 inches on July 26.

Strong wind storm caused widespread power outages in the Interior.

Damage to the Richardson Highway due to **flash flooding.**

Significant Weather Events and Synoptics

July started out hot and dry, with strong ridging over western Canada and eastern Alaska and a trough off Alaska's west coast in the Bering Sea. This combination caused widespread, often dry thunderstorms with abundant lightning strikes and an increase in fire activity.

The extended period of warm, dry weather ended around July 12, when a cold front reached NW Alaska and subsequently moved south and east across the state bringing cooler temperatures and precipitation. A strong low near the North Pole became increasingly relevant to the weather across Alaska in the following days. As the low moved south, much colder air masses moved into the Interior and unsettled, cool weather spread across the state.

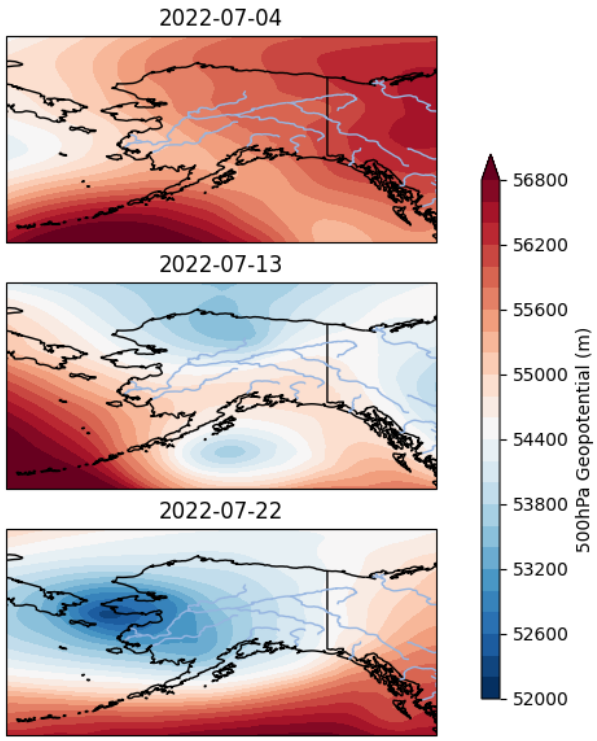


Figure 1: *ERA5 reanalysis data of 500hPa geopotential height for July 4, 13, and 22: High pressure during the beginning of the month gave way to a cooler weather pattern mid-month. Strong low in the west then became the dominant upper level feature.*

Heavy rain from convective activity combined with high river levels due to snow melt fuelled by the high temperatures of previous weeks caused flooding and damage to the Richardson Highway south of Delta Junction on July 12, and localised flooding problems persisted as fronts moved in with the pattern change mid-month.

Low pressure in the Chukchi Sea, the Bering Strait, and northern Bering Sea remained in place through much of the second half of July (Figure 1). The broadly westerly and eventually southwesterly flow brought cool, wet and windy conditions in the west, with elevated surf along the coast. Pronounced southerly gap flow winds developed in the Alaska Range.

A storm system on the West Coast caused blustery, “fall-like” conditions during the last week of the month. High Surf and Coastal Flood Advisories were issued for some of the western coastal areas. A seasonally strong Chinook event brought high wind speeds to the Interior during the same system, with numerous downed trees causing widespread damage to the power grid. Up to 30.000 power outages were reported in Fairbanks during this wind event. Wind speeds of 45mph were recorded at Fairbanks airport and the wind was likely significantly stronger during gusts. The same storm system brought heavy rain to Utqiaġvik, where a new all-time daily precipitation record was set on July 26th.

As high pressure began building over the Interior, the last few days of the month saw calmer weather and a warming trend in parts of the state. With clear nights, temperatures dipped below freezing in parts of the Interior. Weather on the North Slope remained unsettled with low pressure and associated frontal systems along the Beaufort coast.

Temperature

The first 10-12 days of the months were characterised by above average daily mean temperatures at most first order stations across the state, with a few exceptions in the Bristol Bay region (Figure 2). A change in larger scale weather patterns subsequently brought cooler temperatures and negative temperature anomalies throughout the state. The North and Interior remained cool until the end of the month, while the Panhandle and South Central saw rising temperatures and positive anomalies during the last days of July.

Monthly anomalies were relatively close to the 1991-2020 normal in many regions, as the cooler second half of the month compensated for the warm start. Of the first order stations, Kotzebue and King Salmon were over 3°F cooler than normal and lead the monthly ranking of anomaly magnitudes. Most other stations were within about -1.5°F and +1°F of the normal (Figure 3, Table 1).

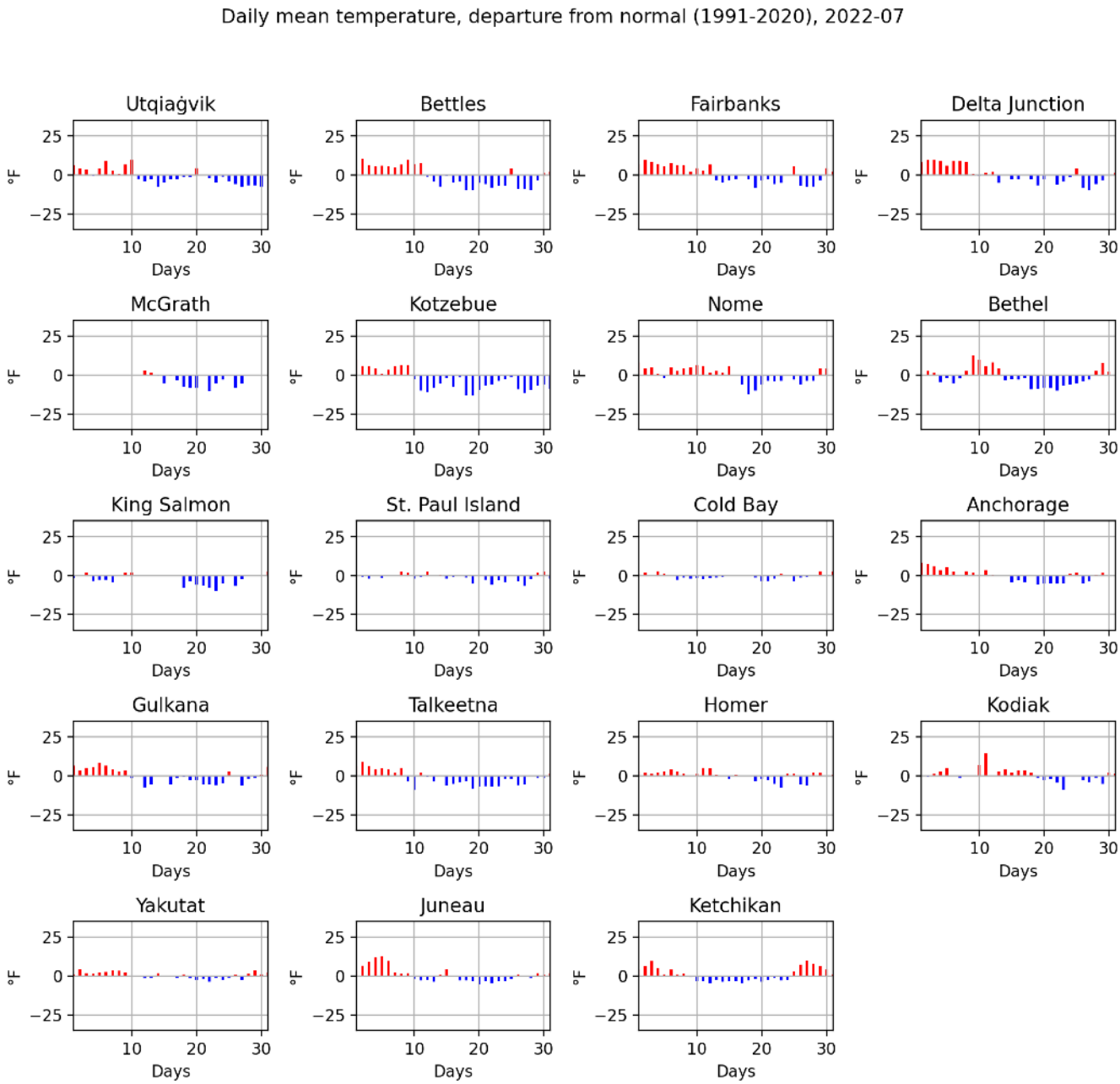


Figure 2. *Daily mean temperature departures for each day in July 2022 at the selected stations.*

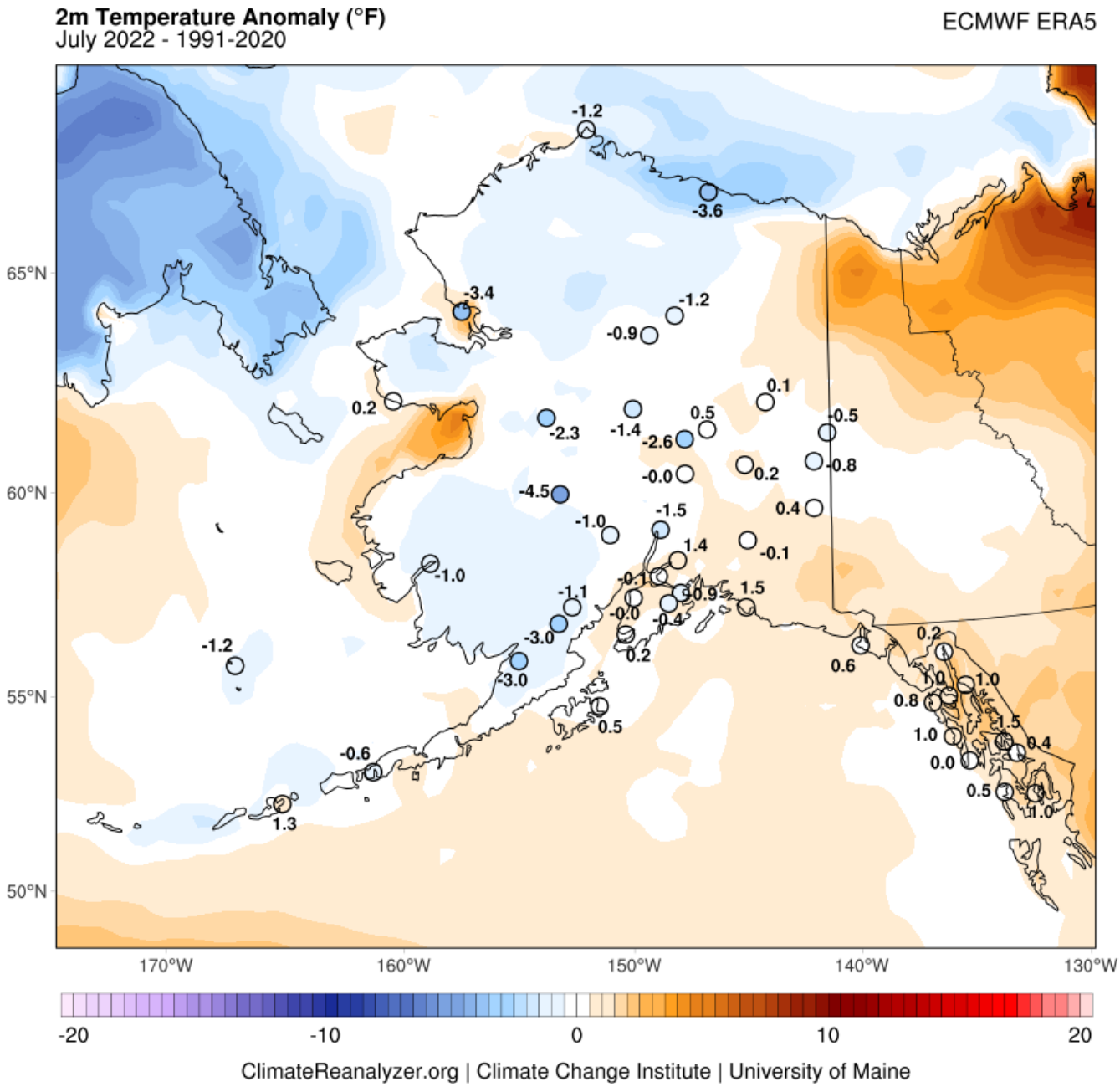


Figure 3. *Monthly mean temperature departure from normal (ºF), June 2022, at stations around the state of Alaska with gridded ERA5 reanalysis overlay.*

Table 1. *Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, July 2022. Color-coded to Figure 3 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual). * McGrath experienced technical problems during the first half of the month, too many missing values for reliable monthly mean.*

Station	Observed (ºF)	Normal (ºF)	Departure (ºF)
Anchorage	59.5	59.6	-0.1
Bethel	55.3	56.3	-1.0
Bettles	58.9	59.8	-0.9
Cold Bay	50.9	51.6	-0.7
Delta Junction	61.0	60.7	0.4
Fairbanks	63.4	62.9	0.5
Gulkana	57.8	57.9	-0.1
Homer	56.3	56.1	0.1
Juneau	58.0	57.0	1.0
Ketchikan	59.8	58.8	0.9
King Salmon	53.7	56.8	-3.0
Kodiak	56.3	56.2	0.1
Kotzebue	51.9	55.3	-3.4
McGrath	56.3 *	60.8	-4.3 *
Nome	52.1	52.0	0.1
St. Paul Island	46.7	47.9	-1.2
Talkeetna	58.6	60.1	-1.4
Utqiaġvik	40.7	41.7	-1.0
Yakutat	56.0	55.4	0.7

Precipitation

Utqiaġvik recorded a new all-time daily precipitation record of 1.42 inches on July 26. Since recording began there in 1920, daily precipitation exceeded 1 inch only twice. Utquiagvik receives only 5.39 inches of precipitation in an average year, so the new daily record represents over a fifth of the normal annual precipitation.

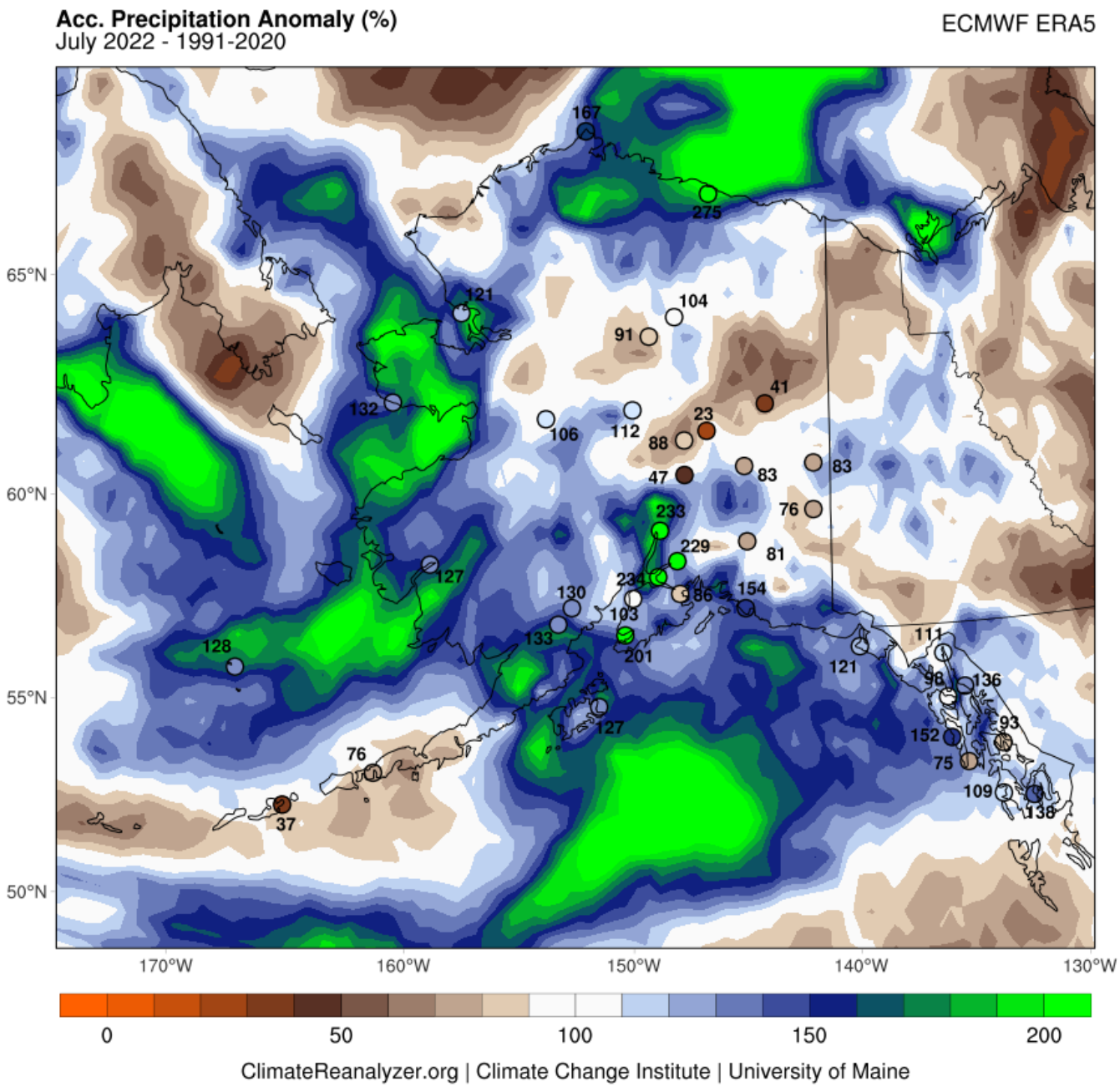


Figure 4. *Monthly mean precipitation departure from normal (in percent), July 2022, for selected stations around the state of Alaska with gridded ERA5 reanalysis overlay.*

July was a relatively wet month along the coasts and in Southcentral. The Interior remained drier than normal, with moderate drought conditions still registered in some areas by the end of the month. Of the first order stations, Fairbanks was driest in relative terms and received only 22% of normal monthly precipitation. Homer, Anchorage, and Talkeetna all clocked in at over 200% of normal, leading the ranking of wettest first order stations (Figures 4, 5; Table 2). Utqiaġvik and Talkeetna received the majority of their monthly precipitation in 1 or 2 days. Intense local precipitation associated with convective activity caused flash flooding and road damage along the Richardson Highway mid-month.

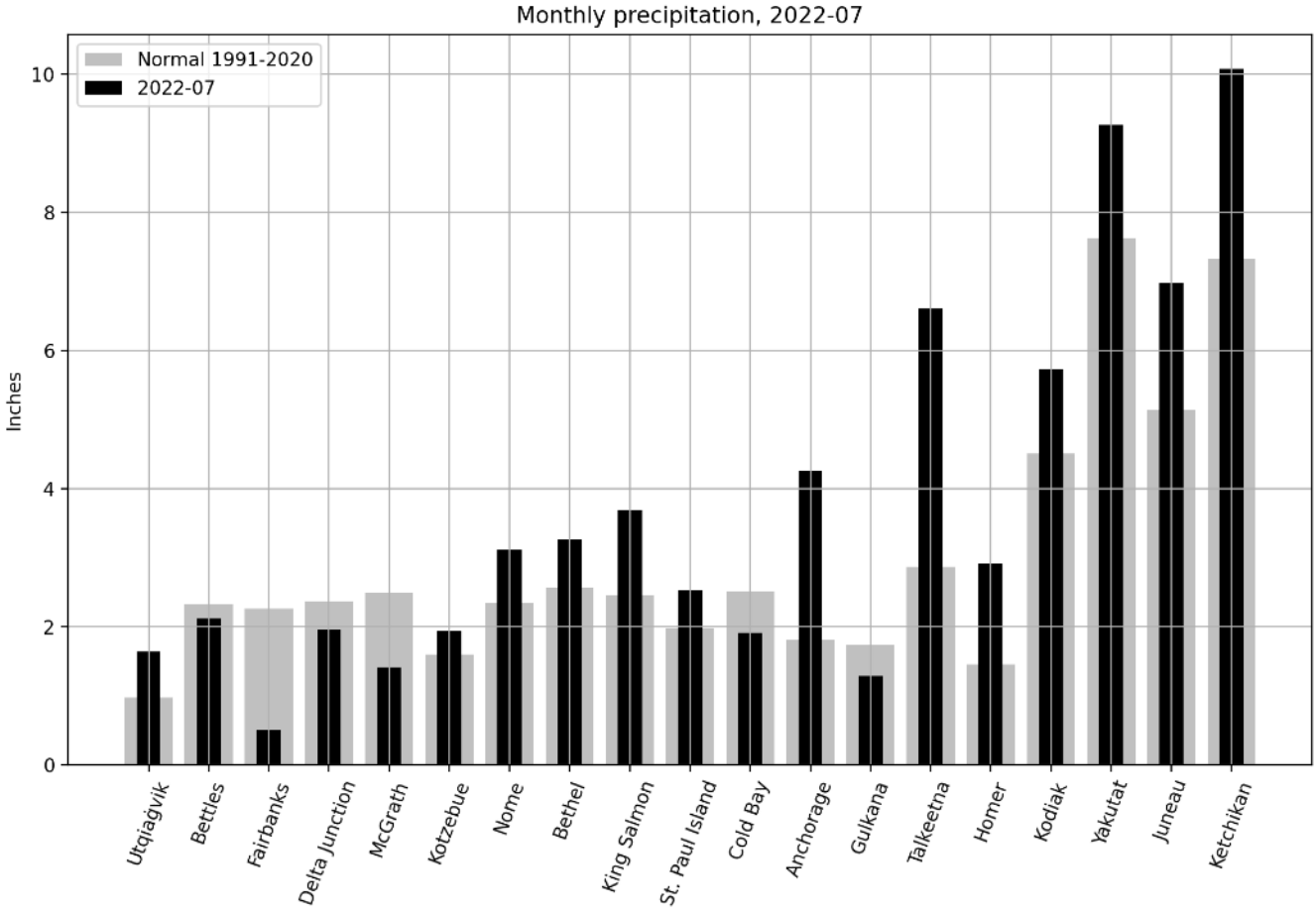


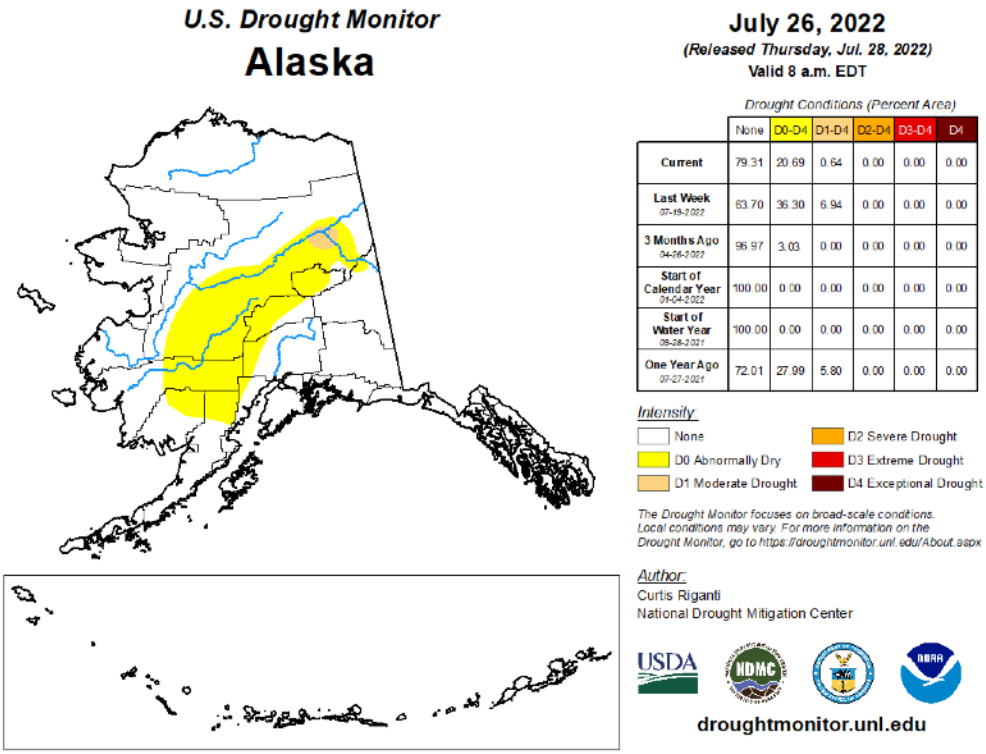
Figure 5. *Monthly precipitation sums for July 2022 at the selected stations compared to the normal (1991-2020), in inches. McGrath experienced technical problems during the first half of the month.*

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

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	4.3	1.8	234.1
Bethel	3.3	2.6	127.2
Bettles	2.1	2.3	91.4
Cold Bay	1.9	2.5	76.1
Delta Junction	2.0	2.4	82.7
Fairbanks	0.5	2.3	22.6
Gulkana	1.3	1.7	74.1
Homer	2.9	1.5	201.4
Juneau	7.0	5.1	135.8
Ketchikan	10.1	7.3	137.5
King Salmon	3.7	2.5	150.0
Kodiak	5.7	4.5	127.1
Kotzebue	1.9	1.6	121.1
McGrath	1.4	2.5	56.8
Nome	3.1	2.4	132.3
St. Paul Island	2.5	2.0	127.8
Talkeetna	6.6	2.9	230.3
Utqiaġvik	1.6	1.0	167.3
Yakutat	9.3	7.6	121.5

Drought

Drought conditions have eased significantly compared to the previous month. Parts of Southcentral and Interior Alaska remain abnormally dry, but widespread precipitation during the second half of July brought an end to drought conditions in most regions. Moderate drought persists locally in an area around Fort Yukon. Figure 7 illustrates the Alaska drought monitor, which has been produced through a collaboration of the USDA, NOAA and the National Drought Mitigation Center.



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	79.31	20.69	0.64	0.00	0.00	0.00
Last Week 07-19-2022	63.70	36.30	6.94	0.00	0.00	0.00
3 Months Ago 04-26-2022	96.97	3.03	0.00	0.00	0.00	0.00
Start of Calendar Year 01-04-2022	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year 09-28-2021	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago 07-27-2021	72.01	27.99	5.80	0.00	0.00	0.00

Figure 7. *U.S. Drought Monitor map for Alaska, updated on July 26, 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

Dry conditions and convective activity with widespread lightning during the first week of July caused a further up-tick in the already high number of active fires and acres burned. Air quality and visibility were often poor during the first half of the month, particularly in

the Interior. By mid-month, wetter and cooler weather patterns led to a reduction in fire activity and improved air quality throughout much of the state. As of August 1st, the year-to-date fires total is 557 (up from 370 at the end of June), with 3,065,189.0 acres burned (Alaska Interagency Coordination Center Situation Report). 253 fires were human-caused, burning 11,619.2 acres, while 268 were lightning-sparked, burning 3,006,704.1 acres. Another 36 fires (burning 46,865.7 acres) 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 loss continued at an accelerated pace throughout the month of July. Weekly decrease rates grew throughout the month, from about 6% in the first week of July to over 10% as of July 28th. Figure 8 shows a time series of sea ice extent while Figures 9 A, B show the sea ice extent and concentrations as of July 30, 2022 compared to the average from 1981-2010.

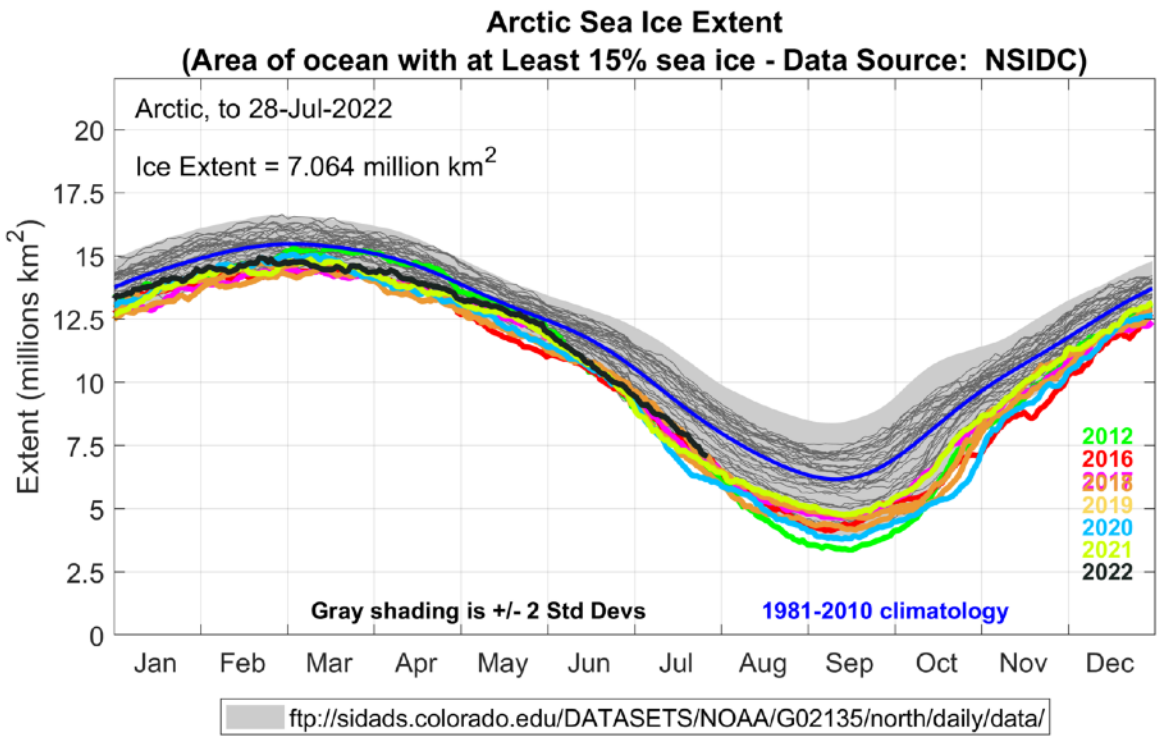


Figure 8. *Time series of daily Arctic sea ice extent. This year's data (jungle green) are updated until July 28, 2022. The median sea ice extent for the 1981-2010 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory*

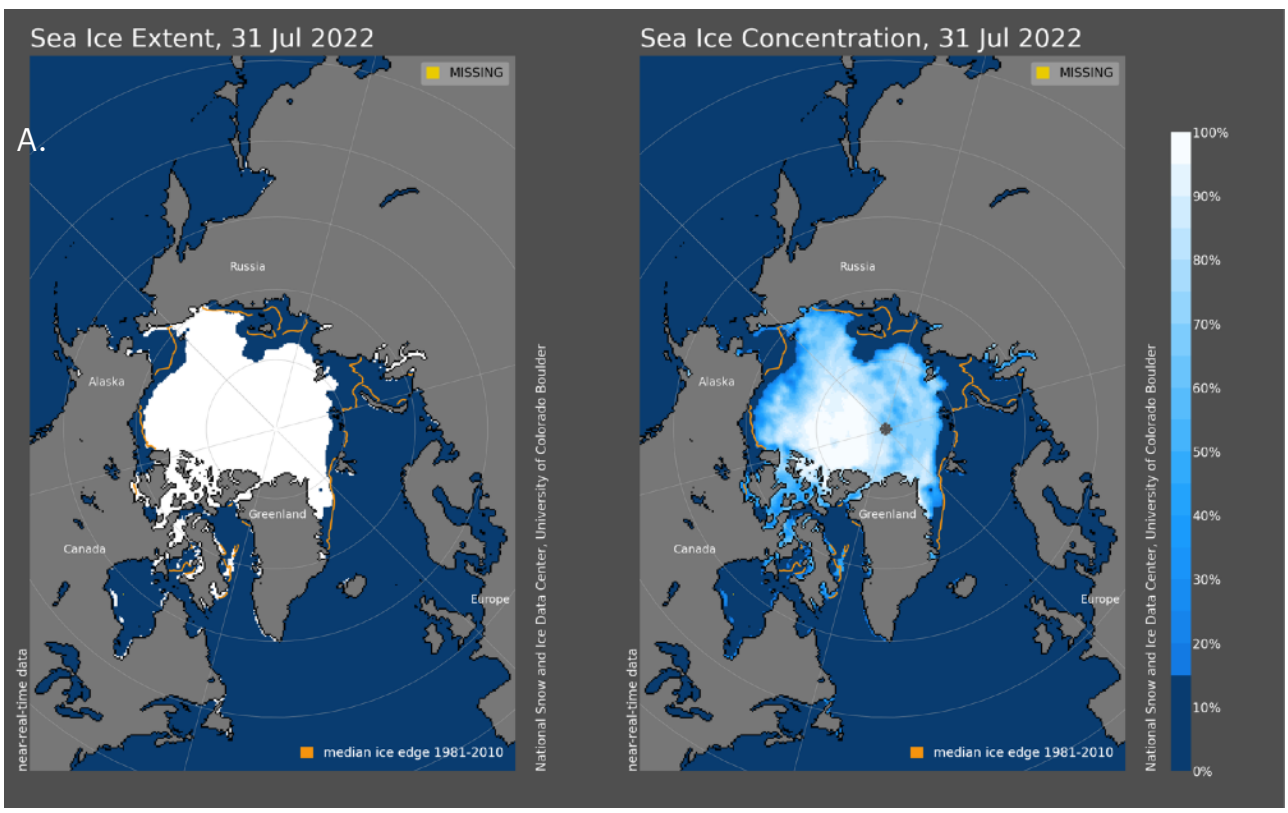
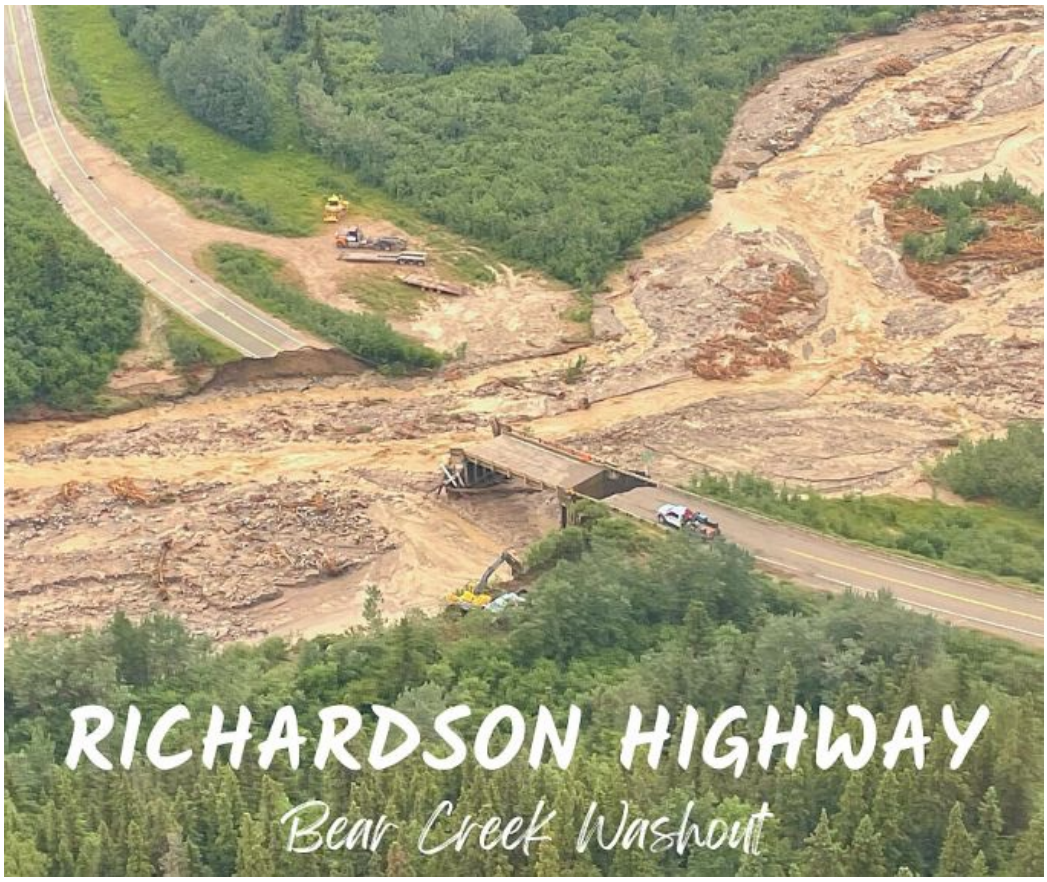


Figure 9. *(A) Sea ice extent and (B) sea ice concentration as of June 30, 2022, and as compared with the 1981 - 2010 median edge. Images: National Snow and Ice Data Center (nsidc.org).*

Newsworthy Information

Flash flooding in the Alaska Range caused damage and road wash-outs at multiple creeks along the Richardson Highway on July 11. The road remained closed from July 11 to July 17 when it was reopened for one lane traffic. More information: Alaska DOT.

A strong **wind event** on July 24-26 led to damage to the powder grid due to downed trees and widespread outages in Southcentral and the Interior. Damage was particularly extensive in and around Fairbanks. Around 30.000 outages were registered on the Golden Valley Electric Association outage map. The Fairbanks Communications Center temporarily lost power, causing an about 45 minute breakdown of 911 services across much of the Interior. More information: AK Public Media.



Bear Creek road MP 233 Richardson Highway road washout. Photo by Alyeska Pipeline (https://dot.alaska.gov/nreg/richardson-washout/)

Appendix

Table A1: July 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. Five new highest mean daily temperature records were set and two were 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)**
Anchorage	2022-07-01	67.0	1974	65.5
Delta Junction	2022-07-03	71.5	1958	70.5
Delta Junction	2022-07-07	70.5	2019	70.0
Fairbanks	2022-07-02	73.5	1986	72.0
Juneau	2022-07-04	68.5	2019	68.0
Lowest Mean Daily Temperature on Record				
Nome	2022-07-18	40.0	1910	41.5
St. Paul Island	2022-07-27	42.0	1973	42.5

Table A2: June 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 highest maximum daily temperature record was set and five were set for lowest maximum daily temperature record.

Highest Maximum Daily Temperature Record				
Station	**Date**	**New Record (°F)**	**Year of Old Record**	**Old Record (°F)**
Delta Junction	2022-07-02	83.0	1990	82.0
Lowest Maximum Daily Temperature Record				
Bethel	2022-07-22	49.0	1963	50.0

Highest Maximum Daily Temperature Record				
Station	**Date**	**New Record (°F)**	**Year of Old Record**	**Old Record (°F)**
Delta Junction	2022-07-02	83.0	1990	82.0
Lowest Maximum Daily Temperature Record				
Bethel	2022-07-22	49.0	1963	50.0
Gulkana	2022-07-12	54.0	1985	55.0
Gulkana	2022-07-16	56.0	1978	57.0
King Salmon	2022-07-18	51.0	1950	52.0
Kotzebue	2022-07-19	46.0	1965	48.0

Table A3: July 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. Seven new records for highest minimum daily temperature were set and three new records for lowest minimum daily temperature.

Highest Minimum Daily Temperature Record				
Station	**Date**	**New Record (°F)**	**Year of Old Record**	**Old Record (°F)**
Delta Junction	2022-07-07	61.0	1975	60.0
Delta Junction	2022-07-08	60.0	1955	59.0
Fairbanks	2022-07-02	63.0	2007	62.0
Homer	2022-07-12	57.0	1971	55.0
Ketchikan	2022-07-01	57.0	1915	55.0
Kodiak	2022-07-11	63.0	1993	59.0
Talkeetna	2022-07-02	58.0	1990	57.0
Lowest Minimum Daily Temperature Record				
Bettles	2022-07-24	34.0	1969	37.0
King Salmon	2022-07-23	35.0	1970	39.0
Kodiak	2022-07-27	40.0	1939	43.0

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.