



Climate in Lake Clark

Weather and climate are key physical drivers of ecosystem structure and function. Global climate models indicate that climate change and variability is occurring more rapidly and is amplified at higher latitudes. Trends in southwest Alaska's average annual air temperatures, from 1947 to 2019, show an increase of 5.1°F at Iliamna over that time period. Monitoring is critical to understanding these changes and how they impact park ecosystems, resources and communities now and in the future.

The Hot, Dry Summer of 2019

Last summer was exceptionally clear and dry and resulted in record-high temperatures that made for some of the hottest days, weeks, and months ever recorded in many parts of Alaska. Lake Clark National Park and Preserve was no exception. The extreme temperatures and drought contributed to an increase in fire activity and the resulting smoke impacted everything from air traffic to human health to park visitation and natural resources in southwest Alaska (Figure 1).

The Iliamna weather station, with records dating back to 1920, logged daily maximum temperatures for eight

days in July, including six consecutive days starting on July 4th (Figure 2). Remote Automated Weather Stations throughout Lake Clark also registered record temperatures over the same period but have operated over a much shorter time span.

With Heat Came Drought

Along with extreme heat there was a lack of precipitation in southwest Alaska. Anchorage recorded its driest (0.04 inch, of normally 3.25 inches precipitation) and warmest August ever (average temperature of 62.6°F, 5.9°F above normal). This resulted in the most severe early September drought indices since the

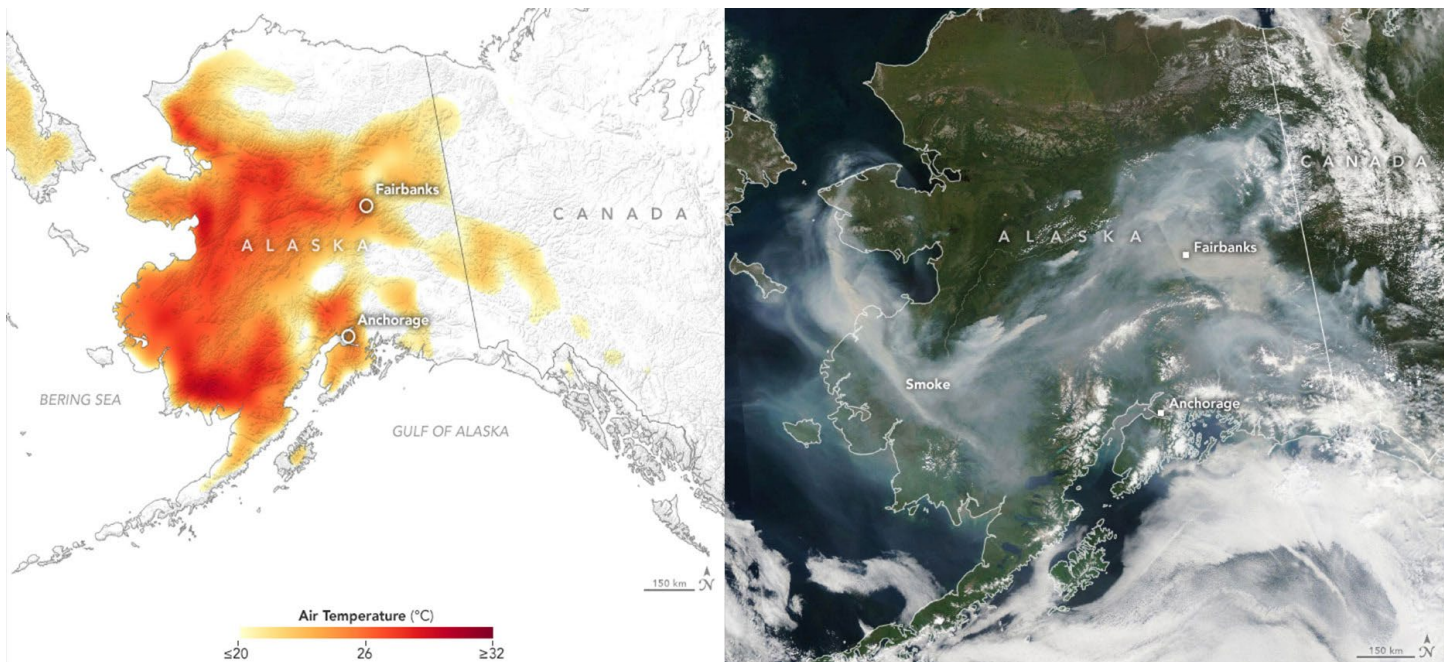


Figure 1. In June and July 2019, a heatwave in Alaska broke temperature records, as shown in this July 8 air temperature map on the left. The corresponding satellite image on the right shows smoke from lightning-triggered wildfires (NASA Earth Observatory).

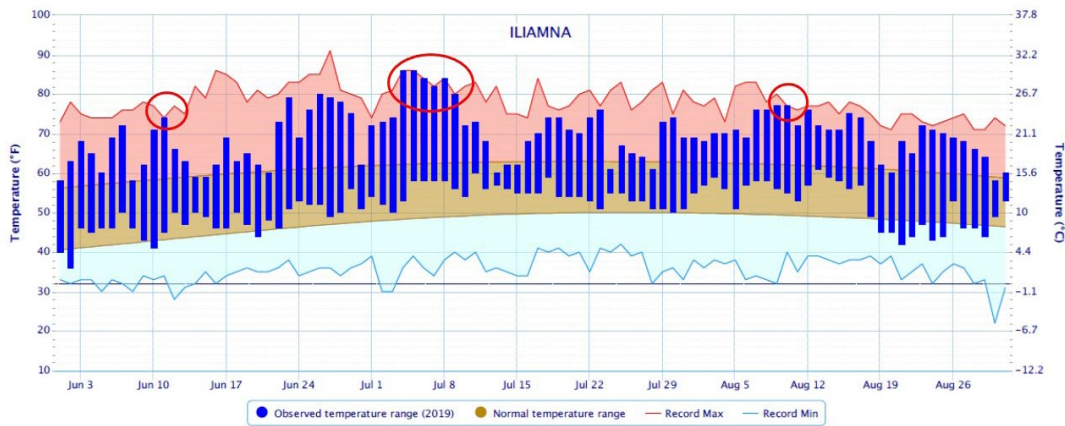


Figure 2. Summer maximum temperatures at Iliamna broke records eight days, including six consecutive days in early July, red circle (NOAA ACIS).

National Weather Service began reporting them for Alaska in 2000.

The Cold Winter of 2020

The heat of this past summer may seem like a distant memory after experiencing the sustained, often sub-zero, cold of the past winter. While it may have seemed extremely cold, the statewide temperatures have not been extreme when compared to the long-term climate observations (Figure 3). However, the cold persisted for longer than it has for decades in most of Alaska, which was due to the consistent strong low-pressure

circulation over Alaska known as the [polar vortex](#). The polar vortex exhibited less seasonal variation last winter than it has in recent years when it brought Arctic air to the central and eastern US. The variability in the polar vortex and its relationship to climate change is an active area of current [research](#).

Climate [predictions](#) for the spring through summer of 2020 show high probabilities for near normal temperatures in April phasing into a warmer-than-average spring and a hot summer across southwest Alaska.

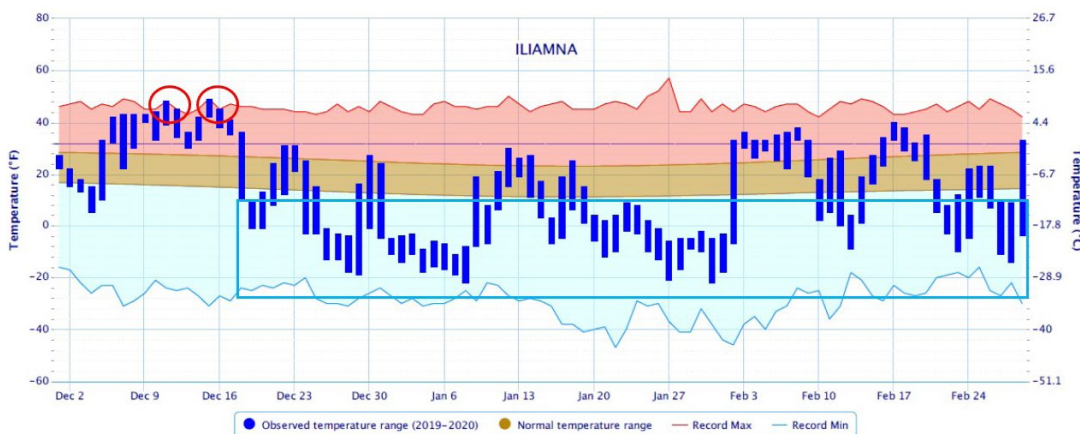


Figure 3. Winter temperatures at Iliamna were below average for extended periods over the winter, blue box, although maximum temperatures broke records four days in December, red circles (NOAA ACIS).

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