



Climate in Southwest Alaska

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 amplified at higher latitudes. Trends in southwest Alaska's average annual air temperatures from 1947 to 2019, our longest consistent records, show an increase of 4.9°F at Kenai and 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. 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).

Southwest Alaska parks experienced some of the highest temperatures ever recorded at nearby weather stations operating for 75 years or more (Figure 2). The extreme temperatures increased water temperatures in some rivers and lakes and enhanced the melting of glaciers that in turn contributed to greater runoff and higher water levels in others.

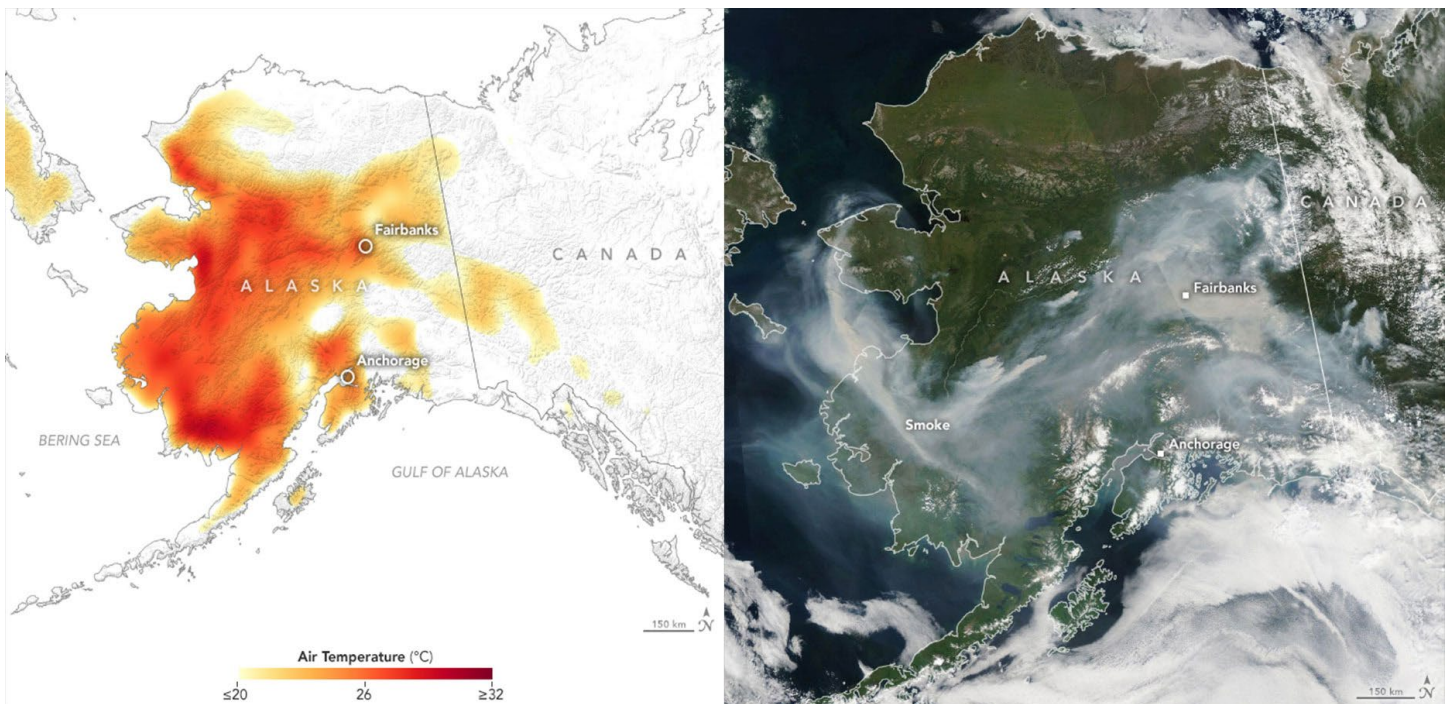


Figure 1. In June and July 2019, a heatwave in Alaska broke temperature records, as shown in this July 8 air temperature map on the left. The corresponding satellite image on the right shows smoke from lightning-triggered wildfires (NASA Earth Observatory).

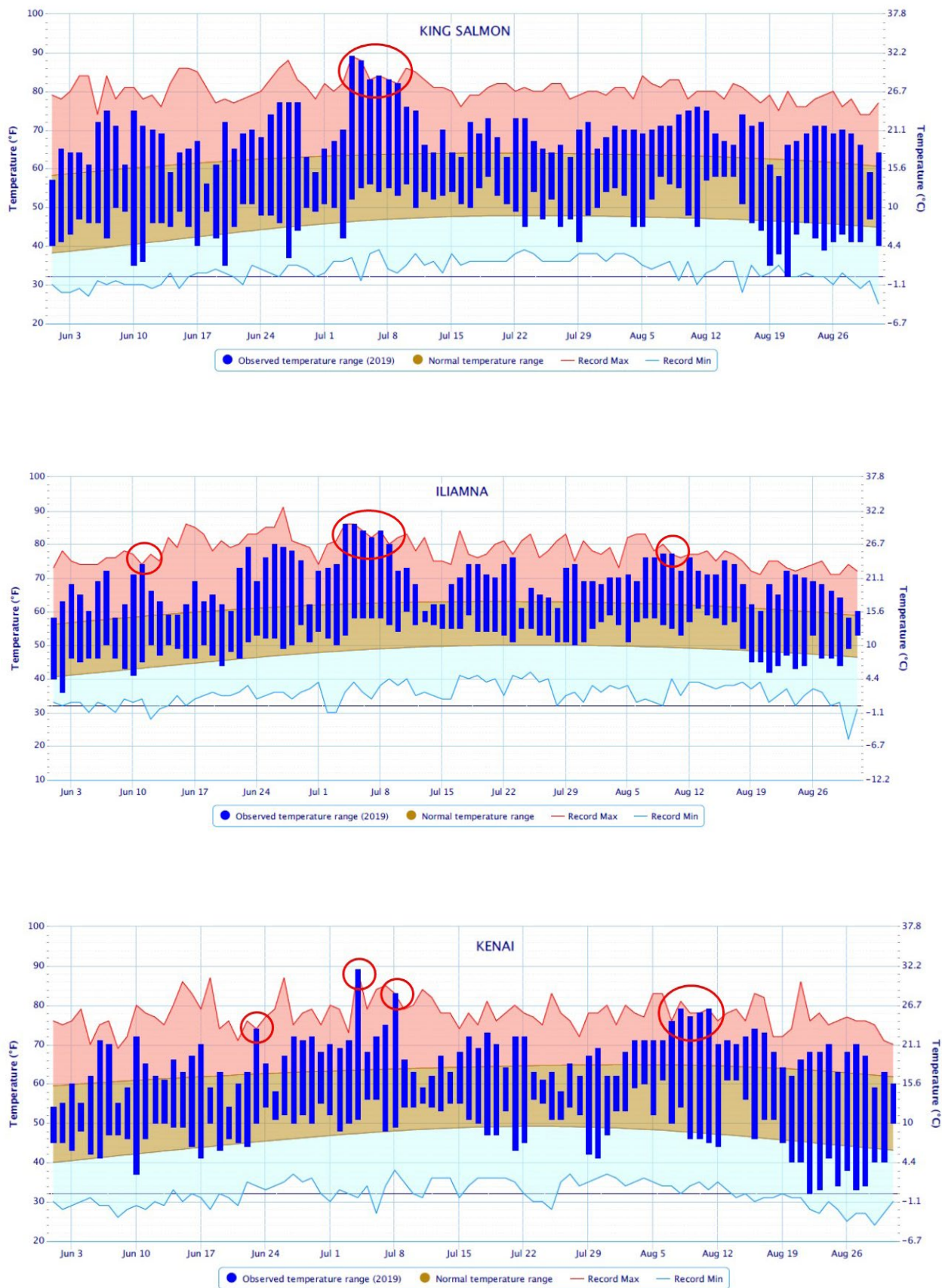


Figure 2. Summer maximum temperatures across Southwest Alaska broke records, red circles; King Salmon (top, Katmai) broke records for six consecutive days starting on July 4th, the highest temperature recorded at Iliamna (center, Lake Clark) had eight record-breaking days, including six consecutive days in early July. Kenai (bottom, Kenai Fjords) broke records across seven days, including July 4th, also the hottest day on record (NOAA ACIS).

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 National Weather Service began reporting them for Alaska in 2000 (Figure 3).

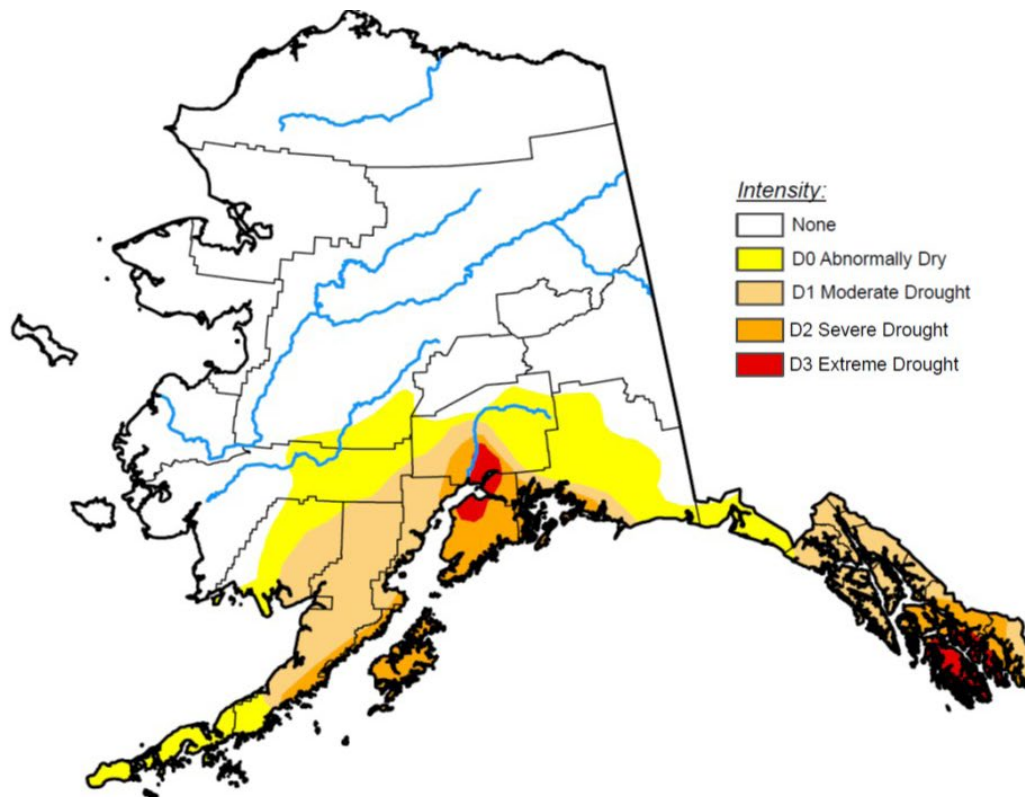


Figure 3. September 3rd drought conditions were the most severe reported since monitoring began in 2000, with moderate to extreme drought throughout much southwest southcentral and southeast Alaska ([National Drought Mitigation Center](#)).

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 4). 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](#).

What is in Store for this Spring and Summer

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.

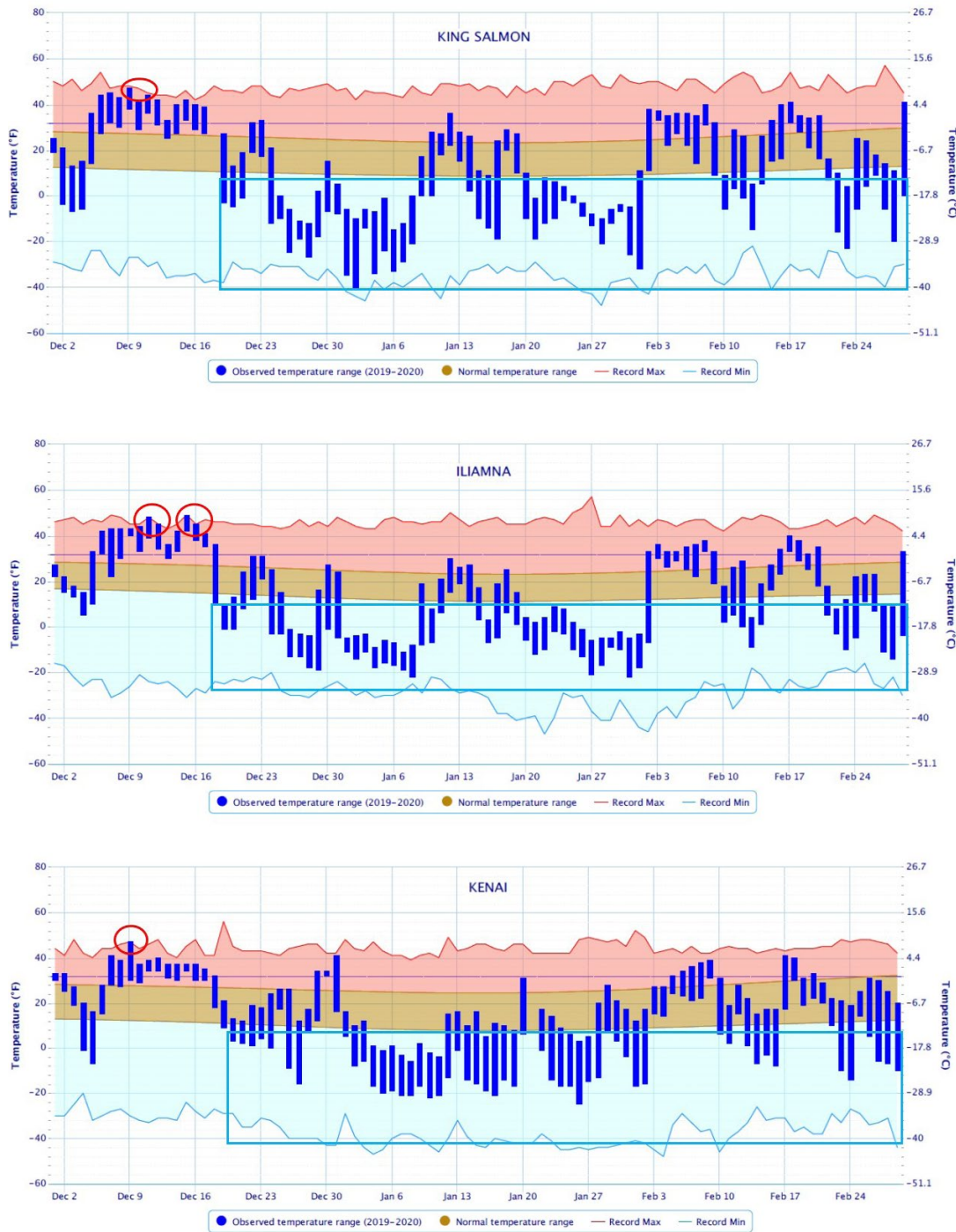


Figure 4. Winter temperatures in southwest Alaska were below average for extended periods over the winter, blue boxes. Maximum temperatures were also recorded in early December, red circles; King Salmon (top, Katmai) broke high temperature records for two days in December, Iliamna (center, Lake Clark) broke records for four days in December, and Kenai (bottom, Kenai Fjords) recorded a maximum daily temperature record on December 9th.

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