



Northwest Arctic Weather Summary 2013-2014

What is Normal?

“Normals” are used to place recent climate conditions into historical context. It takes 30 years of continuous weather data at one location to calculate what makes temperatures or precipitation amounts “normal”. The four weather stations that anchor NW Alaska are Barrow, Bettles, Nome, and Kotzebue. These stations have long records of temperature, precipitation, and snowfall data. These sites are good index sites and are used to place current weather conditions in the region in climatological context (Fig. 1).

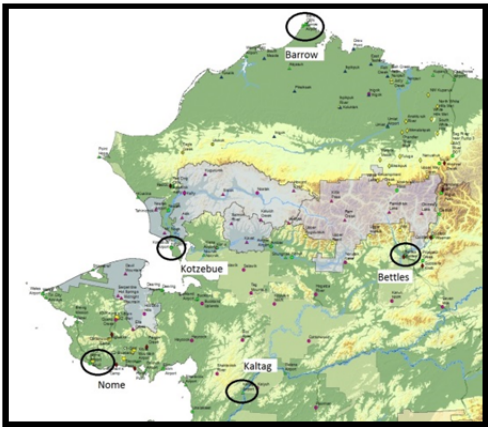


Figure 1. Map of weather index sites in NW Alaska.

The Year at a Glance

The climate of Northwest Alaska varies widely from year to year and from place to place. The past year has been no exception. Over the past 14 months there have been impressive temperature and precipitation deviations from normal for much of northwest Alaska.

The graphs at right show the seasonal temperature, precipitation, and snowfall departures from normal from the fall of 2013 through the fall of 2014 (Figure 2). What is most striking is the persistence of warm temperature anomalies from October through March (Figure 3). With the exception of the summer season for Bettles and Barrow, the index sites had positive seasonal deviations from the long term average.

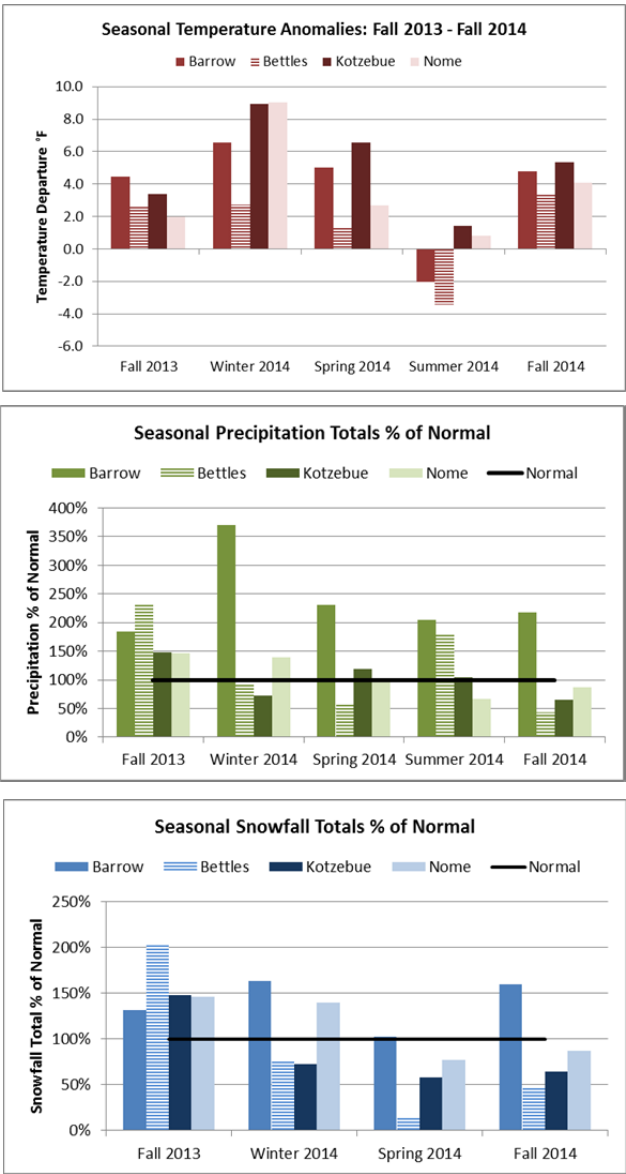


Figure 2. Temperature (top), precipitation (middle), and snowfall (bottom) departures from normal for NW Alaska.

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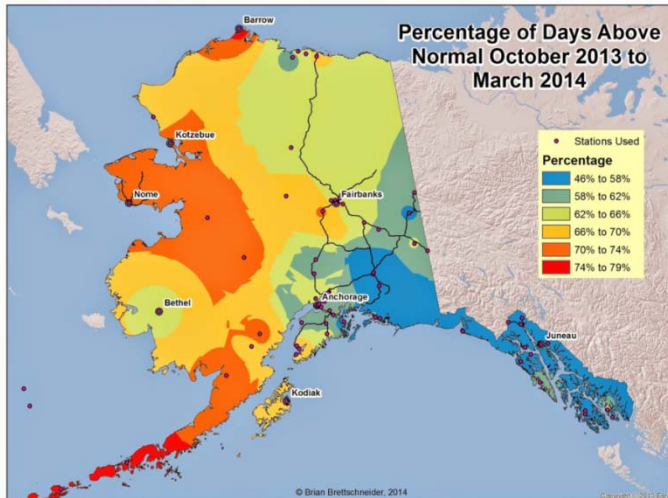


Figure 3. Percentage of days above normal for Alaska between October 2013 and March 2014.

Fall 2013: The fall of 2013 was warm and wet for NW Alaska. On average it was 3°F degrees warmer than normal for the fall season as a whole. The largest temperature deviations occurred in October 2013. Warm moist air was pumped from the mid-latitudes to Alaska, making it the warmest October on record for the state. The index sites in NW Alaska were on average 9.2°F warmer than normal. It was the warmest October on record in Bettles and Kotzebue. All of the index sites had above normal precipitation for the fall season. It was cold enough for snow in Bettles, and snowfall totals were 186% of normal for the fall season. However, in the coastal communities, precipitation fell as rain rather than snow throughout much of the fall.

the winter months of 2013 – 2014. On average, the sites were ~ 7°F warmer than normal for the winter season. The warm temperatures in January of 2014 were most notable, especially in the coastal communities of Nome and Kotzebue where the monthly average temperatures were 17.1°F and 16.1°F above normal, respectively. Another widespread and long-lasting weather pattern affected Alaska in January. A high pressure system pumped warm air from the tropics for almost two weeks. The result was high winds, wet snow, and many broken temperature records. The winter of 2013-2014 was the warmest winter on record in Barrow and the second warmest on record in Kotzebue. Despite above average precipitation, warm temperatures prevented much snow from accumulating in early December and for the month of February.

Winter 2013-2014: The warmth persisted through

Bare Ground in January

There was very little snow on the ground in mid-winter in the interior Seward Peninsula. Figure 4 shows images captured from the camera at the Serpentine Hot Springs weather station on November 7 (left), January 27 (middle), and April 3 (right).



Figure 4. Images from Serpentine Hot Springs climate station throughout the winter season.

Winter Temperatures above Freezing High in the Brooks Range

There are now climate stations at higher elevations in the Brooks Range, the interior Seward Peninsula, and the Nulato Hills that complement the long-term records available from the National Weather Service stations in Nome, Kotzebue, Bettles, and Barrow. These upper elevation sites are often warmer than the index sites during the winter months, due to persistent winter inversions. During the warm spell in



Figure 5. Imelyak climate station in Noatak National Preserve.

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January, the temperatures rose above freezing at all of the weather stations between the 24 and 29th of the month. On January 27, the maximum temperature at Imelyak, a site high in the Brooks Range in the southeastern area of Noatak Preserve, was 51°F. For perspective, the average temperature at Imelyak for July 2013 was only 46° F.

Wind Chills ~ -100°F at Howard Pass

On February 14th, the National Weather Service reported that the Howard Pass station in Noatak set a new record low wind chill for Alaska. The hourly average temperature was -42°F with an average wind speed of 71 mph, resulting in a -97°F wind chill. A gust of 103 mph was recorded the following day. The story was widely publicized as an Associated Press article. The longevity and widespread nature of the cold wind event in mid-February was even more impressive. Wind chills below -50°F were recorded at eight different high-elevation stations across the Brooks Range during this event. These wind events are fairly common in the short time this station has been operating.



Figure 6. Looking NW at Howard Pass climate station in Noatak National Preserve.

Spring 2014: The spring temperatures remained warmer than normal at all locations, but the precipitation was variable. The average spring temperature in Kotzebue was 6.6° F warmer than the 1981-2010 normal. In April, Kotzebue had the greatest positive temperature deviation from normal statewide, while the precipitation totals were only 39% of normal. In Nome, the average spring temperature for 2014 was 2.7°F warmer than normal; the seasonal precipitation totals were just about normal. The interior was also warmer than normal, while the seasonal precipitation total was 65% of normal. There was only 2.7 inches of measurable snowfall in Bettles during the spring season. In contrast, it was the fourth wettest spring on record in Barrow. Spring temperatures were exceptionally warm on the north coast; the seasonal temperature was 5.0°F warmer than normal, making it the third warmest spring on record in Barrow.

The seasonal snowfall totals for the region were below normal on the western coast, just above normal in the interior, and well above normal on the northern coast. The total snowfall for the 2013-2014 season at Kotzebue was 32 inches, normal is 52 inches; Nome had 72 inches, normal is 76 inches; Bettles had 93 inches, normal is 91 inches; and Barrow had a total of 53 inches of total snowfall, normal is 37 inches.

Summer 2014: June and July were cool across all of Northwest Alaska, especially in Bettles and Barrow. The average seasonal summer temperatures at both locations were well below normal. Bettles was almost 5°F cooler in June than normal and Barrow was almost 6°F cooler than normal. It was the fourth coldest and second wettest June on record in Bettles; the monthly precipitation total was 253% of normal. It was the wettest June on record for Barrow, the monthly total rainfall of 1.47 inches was 459% of normal. The temperatures moderated a bit in August statewide, and on the western coast warmed to well above normal. Average monthly temperatures in Kotzebue and Nome were 6.7°F and 5.6°F warmer than normal for August, respectively. The end of summer warmth brought the average seasonal temperatures above the long-term average for Nome, and Kotzebue. Bettles and Barrow remained cool through the entire summer.



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Fall 2014: After the brief interlude of cool temperatures in summer, warmer temperatures again were the norm this fall. Northwest Alaska was, on average, 4.4°F warmer than normal for the fall season, with exceptional warmth recorded in November for all of the index sites. September and October were 1 to 2°F warmer than normal region wide, while November was more than 9°F warmer than normal. September was wetter than normal, with heavy rainfall in the interior during the first week of the month; the moisture dropped off in October and November and the region south and west of the Brooks Range ended up being considerably drier than normal. Barrow, on the other hand, continued to receive more precipitation than normal throughout the fall season. Snowfall totals for early winter were well below normal in Bettles and Kotzebue, near normal in Nome, and above normal in Barrow.

Big Picture

There are several large-scale climate patterns and indices that are of particular interest to Alaska, including the Pacific Decadal Oscillation (PDO) which is an index of sea surface temperatures in the North Pacific Ocean. Typical winter sea surface temperatures during the warm phase of the PDO are warmer off of the Gulf Coast of Alaska moderating air temperatures over Alaska. The index (below left) was thought to have a cyclic nature, alternating between warm and cool phases about every 30 years; however, there is debate now about whether there is any consistency in the pattern. The index has been predominantly negative since 2005; but in 2014 there were more positive deviations (warmer water) than negative. The largest positive departure occurred in October and November 2014. This pattern does not influence the area north of the Brooks Range, but the presence or absence of sea ice does influence temperatures on the north and west coasts. According to the National Snow and Ice Data Center, the seasonal maximum extent of sea ice occurred on March 21, 2014 and the minimum on September 17 (below right); the Arctic Ocean lost a total of 9.89 million square kilometers (3.82 million square miles) of ice for the season. In context, this is the 9th largest amount of seasonal ice loss in the satellite record, but the least amount of seasonal loss since 2006.

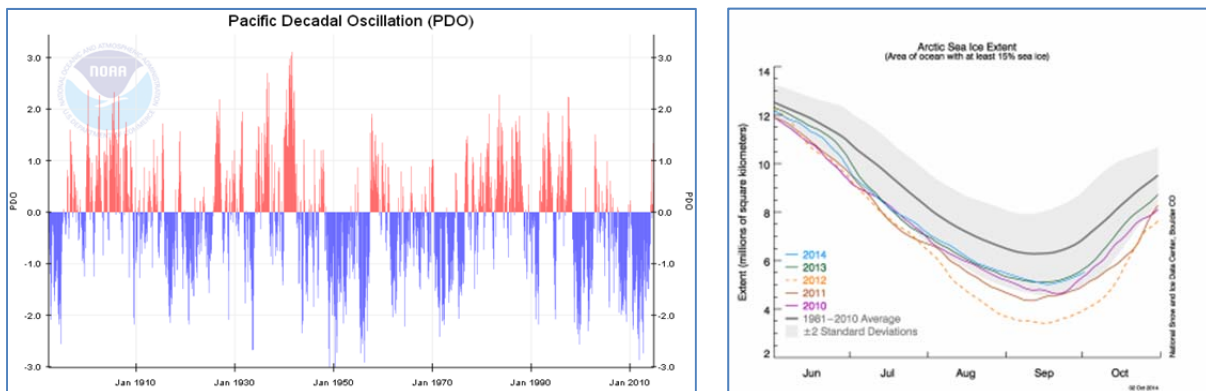


Figure 7. Pacific Decadal Oscillation Index (left) courtesy of NOAA and graph of sea ice extent for 2014 (right) courtesy NSIDC).

Connecting Further

- New paper published [Consistency and Lack Thereof in PDO Impacts on North American Winter Climate](#)
- Access near real-time data from [Western Regional Climate Center](#) and [MesoWest](#)
- Statewide summary of weather highlights in the latest [Alaska Climate Dispatch](#) from the Alaska Center for Climate Assessment and Policy

For more information contact:

Pam Sousanes or Ken Hill
National Park Service - Arctic Inventory and Monitoring Network
pam_sousanes@nps.gov; kenneth_hill@nps.gov
907.455.0677 907.455.0678

Please Note: The summarized data are preliminary and have not undergone final quality control. Therefore, these data are subject to