



Quarterly Weather & Climate Summary Western Arctic Parklands Spring 2015

Kotzebue Spring Weather

It was a warm spring with precipitation totals above normal in Kotzebue. The average temperature for the spring season was 18.1°F, which is 2.7°F warmer than normal and 3.3°F warmer than the long-term average. March was the one month that was cooler than normal; the very warm May temperatures brought the seasonal average above normal. Spring precipitation totaled 1.66 inches (snow water equivalent and rain) and was ~119% of normal. Although snowfall totals were closer to normal for the spring period, the 2014-2015 seasonal snowfall total ended up well below normal. Overall it was the second driest winter on record with a total of 23.8 inches of snow falling between October 1 and May 31. Only 1977-78 had less snowfall for the October-May time period.

March was cooler than normal and was one of only two locations in the state with below normal temperatures for the month (Nome was the other location). The average temperature was -2.3°F, compared to a normal of 1.1°F. Temperatures were the coolest during the middle of the month with several days dropping below -20°F. 5.5 inches of snow fell during the month, normal is 5.9 inches. Precipitation (water equivalent) was 120% of normal for the month.

The average temperature for April was 3.1°F above normal at 16.4°F. The second half of April was the warmest period with several days approaching record high temperatures. Mid-month was the coolest. Precipitation for the month was just about normal with 0.55 inches of rain and snow water equivalent; the snowfall total was 3.9 inches, about an inch less than normal. There was measurable rain on April 19; this was the day the snowpack started to melt-out for the season.

May 2015 was the warmest May on record for Kotzebue with an average monthly temperature of 40.3°F. The previous record was 39.4°F in 2004. Kotzebue also had the

greatest positive deviation from normal of any community in the state for May at a significant 8.4°F above the mean of 31.9°F. There were a number of record high minimum temperature records set and one new daily high temperature on May 31 at 66°F. The precipitation total for the month was 0.58 inches, which is 141% of normal. Most of the precipitation fell as rain between May 11 and 20th. The snow melt-out date in Kotzebue was May 14th (Figures 1 and 2; Tables 1, 2, and 3).

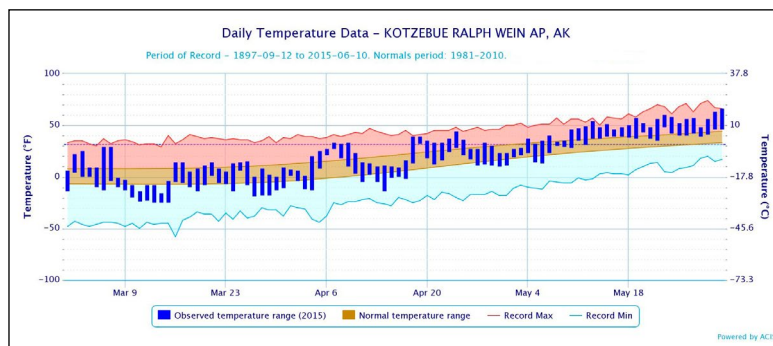


Figure 1. Spring 2015 daily temperatures at Kotzebue showing **record maximum** (red), **record minimum** (blue), **normal** (brown) and **2015 observed range** (blue bars).

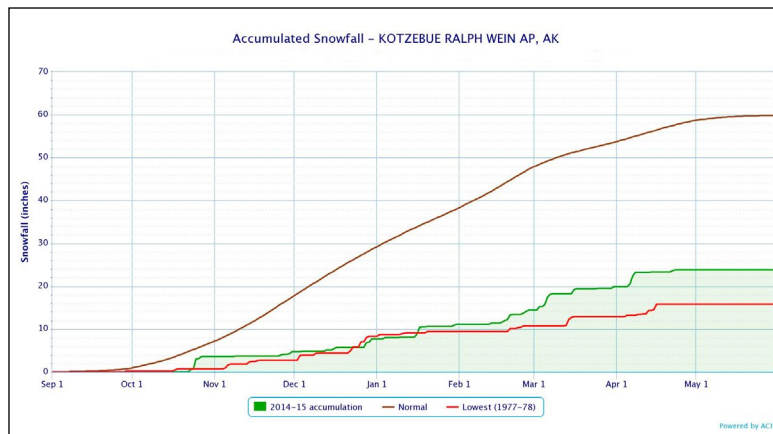


Figure 2. **Spring 2015** (green) snowfall at Kotzebue for September through May compared to the **lowest year** (1977-78; red line) and **normal** (brown line).

Table 1. Kotzebue Temperature: Spring 2015 average monthly temperatures compared to the 1981-2010 normal.

Spring 2015	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
March	-2.3	1.1	-3.4	29 / Mar. 6, 7	-25 / Mar. 13, 14, 15
April	16.4	13.3	+3.1	44 / Apr. 24	-14 / Apr. 14
May	40.3*	31.9	+8.4	66 / May 31	11 / May 1

Spring Season Temperature Departure from Normal: +2.7°F *Warmest May on record.

Table 2. Kotzebue Precipitation: Spring 2015 monthly precipitation totals compared to normal.

Spring 2015	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
March	0.53	0.44	-0.09	0.18 / Mar. 6	9
April	0.55	0.54	+0.10	0.18 / Apr. 7	8
May	0.58	0.41	+0.17	0.19 / May 17	9

Spring Season Precipitation Departure from Normal: +0.27 inches (119% of normal)

Table 3. Kotzebue Snowfall: Spring 2015 monthly snowfall totals compared to normal.

Spring 2015	Total Monthly Snowfall in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. snowfall total in. / Date	Cumulative snowfall since 1-July in.
March	5.5	5.9	-0.4	1.7 / Mar. 6	19.9
April	3.9	1-5.1	-1.2	1.8 / Apr. 7	23.8
May	T	1.2	-1.2	T / May 2, 8	23.8

NPS Climate Monitoring Stations

We now have additional NPS climate stations in Cape Krusenstern, Noatak, and Kobuk Valley that complement existing National Weather Service stations at Kotzebue and along the Kobuk River to the south (Figure 3). These new

NPS stations will provide critical data on high elevation sites in the Arctic and will help characterize the climate gradients and patterns affecting resources in the Western Arctic parklands.

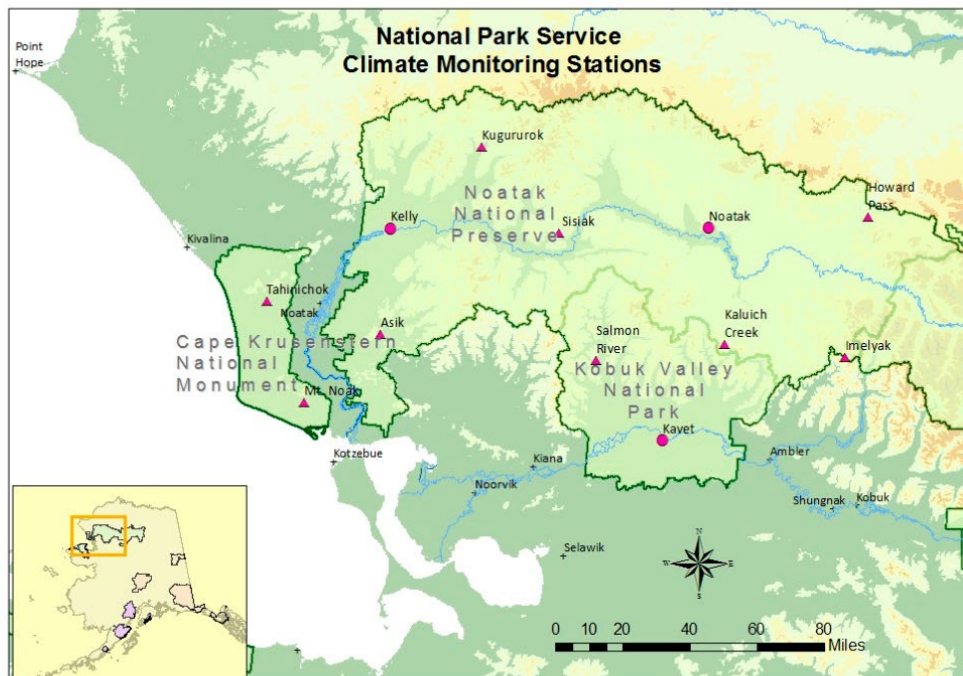


Figure 3. NPS Climate stations in Western Arctic Parklands.

Table 4. Summary of weather statistics from climate stations in and near Western Arctic Parklands. All data are preliminary and subject to review. Sites in **bold font** are NPS stations installed in 2012.

Park	Site	Elev. (ft)	Average Temp °F			Extreme High (°F)	Extreme Low (°F)	Ave. Temp. Spring Season (°F)	Max. Spring Snow Depth (inches)	Snow Off Date	Peak Wind (mph)
			Mar	Apr	May						
CAKR	Tahinichok	966	5.2	m	m	m	-13	m	14/Mar. 6	m	30
	Mt. Noak	809	5.3	21.2	41.2	59	-13	22.6	17/Apr. 9	May 17	30
NOAT	Asik	285	7.9	22.4	42.3	55	-11	24.2	10/Apr.10	May 4	37
	Kelly RAWS/Snotel*	2260	2.3	21.4	44.1	71	-29	22.6	33/Mar. 7	17-May	36
	Kugururok	1020	5.7	21.7	41.2	55	-14	22.9	28/Mar. 8	May 21	29
	Sisiak	1495	4.3	19.4	40.1	53	-14	21.3	4/Mar. 19	Apr. 20	29
	Noatak RAWS	321	-4	15	41.3	74	-39	17.4	—	—	42
	Howard Pass	518	3.8	18.2	41.1	70	-25	21.0	—	—	m
	Kaluich	2486	7.8	18.8	40.1	60	-22	22.2	46/Apr 8	May 18	m
	Imelyak	3569	10.4	23	39.7	59	-22	m	6/Mar. 23 & Apr 29	May 6	48
KOVA	Kavet Creek RAWS	253	3.4	24.6	49.1	73	-38	25.7	—	—	35
	Salmon River	1262	7.3	23.7	42.6	55	-12	24.5	42/Mar. 8	May 18	24

Interesting Notes from the ARCN Climate Stations

- The peak snow depth recorded at the Salmon River station in Kobuk Valley NP&P was just over 42 inches and occurred on March 8th; the phenology camera provides images of the shifting snow deposition and varying depths of the seasonal snowpack.
- Another cold and windy night at Howard Pass: Between midnight and 4:00 pm on December 8th, the average wind speed over the 16 hour period was 64 mph, the average

wind gust was 72 mph, and the peak gust was 89 mph. The average temperature over that period was -30.0F. The 4:00 pm gust of 84 mph was the last one recorded for the year; the wind sensor succumbed once again to the bitter temps and high winds. This year we are replacing it with a more robust model, we'll see if it can withstand the conditions at Howard Pass!

Kotzebue Spring Temperature Trend

The average spring temperature in Kotzebue for 2015 was 18.1°F, the 17th warmest spring on record (1943-2015) and 2.7°F warmer than the 1981-2010 normal period.

We calculate the average spring temperature by simply taking the average of March, April, and May monthly temperatures. Average spring temperatures show great variability with a range between 5.6°F in 1985 and 23.7°F in 1998.

The overall trend is positive, but the temperature increase is non-linear, with multi-decadal variations (Figure 4).

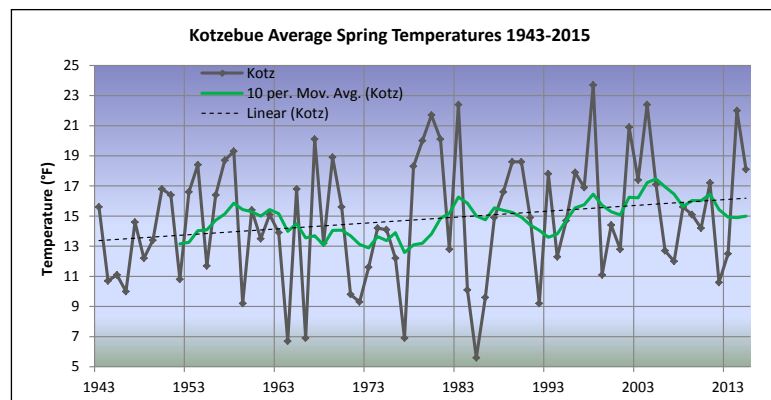


Figure 4. Average spring temperatures (March, April, May) at Kotzebue since 1949. The **green line** is a 10-year moving average. The dashed line is a simple linear regression.

Kotzebue Spring Precipitation Trend

The total spring precipitation in Kotzebue in 2015 was 1.66 inches. Normal spring precipitation totals average 1.39 inches. Spring is the driest season in Kotzebue and annual totals are variable. 1939 is on record as the driest with 0.03 inches and 2009 is the wettest with 3.47 inches on record.

There has been a significant increase of 0.08 inches per decade in spring precipitation since 1944 based on a simple linear regression ($p < 0.05$). 2015 ranked as the 12th wettest spring on record (Figure 5).

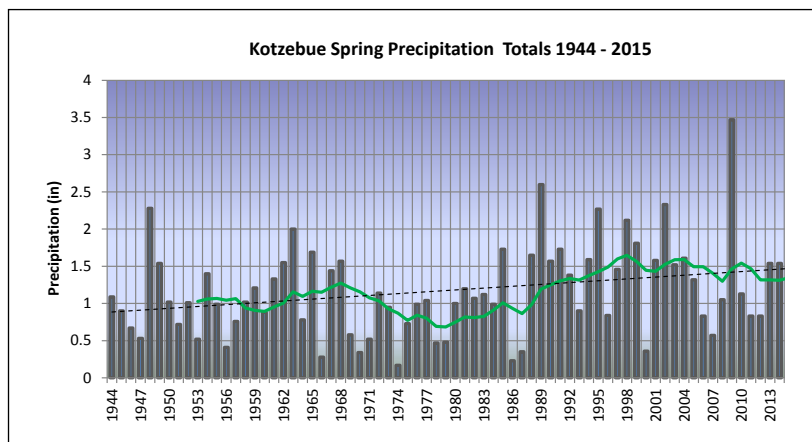


Figure 5. Spring precipitation totals (March, April, May) at Kotzebue since 1949. The **green line** represents a 10-year moving average and the dashed line is a simple linear regression.

Glimpses of the spring season in Kobuk Valley

The new phenology camera on the Salmon River station in Kobuk Valley National Park and Preserve site captured images through the spring season and were downloaded the first week of June. The photos (below) captured both the peak snow accumulation and the melt-out in mid-May with scenes from March 8, April 12, and May 27, 2015

(Figure 6). The camera captures images five times per day; the images are downloaded once a year. On September 22 a bear was caught on camera (Figure 7). The photos are used to help quantify the snow season, green-up period, and other basic phenologic information.



Figure 6. Photos from spring 2015: March 8, 2015 - peak snow depth 42" (left), April 12 (center), and May 17 spring melt-out (right).



Figure 7. September 22, 2014. Bear captured on camera!

Connecting Further

- Previous weather summaries and other climate monitoring documents on the [Arctic Network web portal](#)
- 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

- [Maps](#) of projected temperature and precipitation changes for the Western Arctic Parklands

More Information

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