



Quarterly Weather & Climate Summary Gates of the Arctic National Park & Preserve Spring 2015



Bettles Spring Weather

Overall, spring 2015 ranked as the 5th warmest on record in Bettles with an average temperature of 28.4°F for the March-May period. About 20" of snow fell over the three-month period compared to a normal total of 17". The snowfall total for March was 188% of normal, but April and May were exceptionally dry, so overall the total precipitation (rain and snow water equivalent) for the spring was 65% of normal (Figures 1 and 2; Tables 1, 2, and 3).

March was warmer and snowier than normal. The average temperature for the month was 6.1°F, compared to a normal of 4.4°F. A total of 17.5 inches of snow fell, containing 0.82 inches of water (141% of normal). Most of this fell during the first week of March. The coldest temperature in the state for March 2015 was recorded at Bettles; it was -43°F on March 14. The snow depth at the end of the month was 23 inches.

April was warm and dry. The average monthly temperature was 27.6°F, 4.3°F warmer than the 1981-2010 normal. It was the 10th warmest April on record. Only 2.7 inches of snow fell in April containing 0.17 inches of water. This is only 28% of the expected normal. On the first of April there was 23 inches of snow on the ground and by the end of the month 7 inches remained.

May was very warm and dry. The mean monthly temperature was 51.6°F, 7.2°F warmer than normal. The monthly high temperature was 82°F recorded on May 23, a record for the day and for the month for Bettles. There were three other record breaking high temperatures on the 17th (71°F), 18th (73°F), and 20th (74°F).

Precipitation was only about 40% of normal with 0.35 inches of rain for the month. There was only a trace of snow for the month and that occurred on the 1st. Normal snowfall for May is 1.3 inches. The melt-out date was May 14th; the average melt-out date is May 10th.

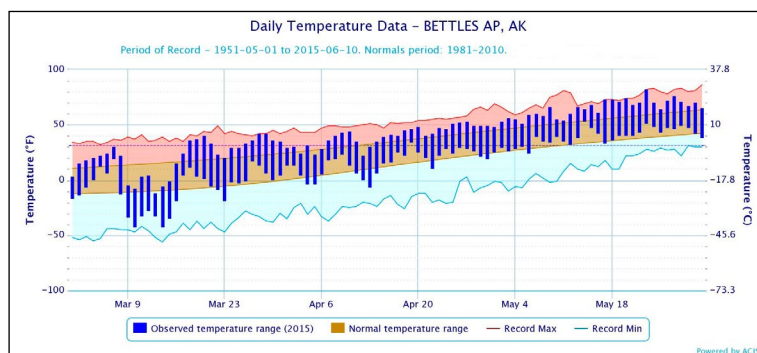


Figure 1. Spring 2015 daily temperatures at Bettles showing **record maximum** (red), **record minimum** (blue), **normal** (brown) and **2015 observed** (blue bars).

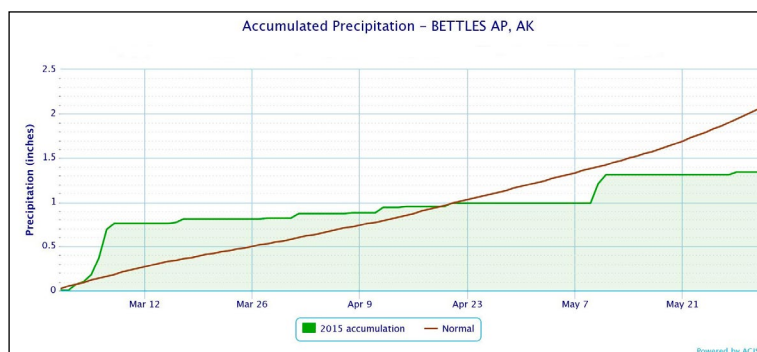


Figure 2. Spring **2015** accumulated precipitation at Bettles (green) compared to **normal** (brown line).

Table 1. 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	6.1	4.4	+1.7	42 / Mar. 28, 29	-43 / Mar. 10, 14
April	27.6	23.3	+4.3	53 / Apr. 27	-7 / Apr. 13
May	51.6	44.4	+7.2	82 / May 23	24 / May 6

Spring Season Temperature Departure from Normal: +4.4°F

Table 2. 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	0.82	0.58	+0.24	0.32 / Mar. 7	9
April	0.17	0.6	-0.43	0.06 / Apr. 12	5
May	0.35	0.88	-0.53	0.22 / May 10	3

Spring Season Precipitation Departure from Normal: -0.72 inches (65% of normal)

Table 3. 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	17.5	9.3	+8.2	6.8 / Mar. 7	68.5
April	2.7	6.3	-3.6	0.8 / Apr. 1	71.2
May	T	1.3	-1.3	T / May 1	71.2

NPS Climate Monitoring Stations

We now have additional NPS climate stations in Gates of the Arctic that complement existing National Weather Service stations at Bettles (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 Gates of the Arctic parklands.

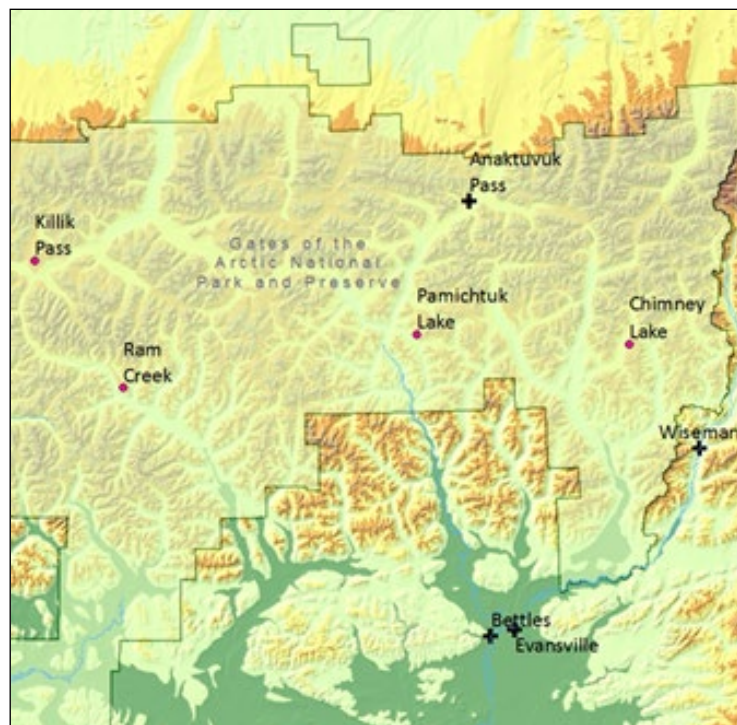


Figure 3. NPS Climate stations in Gates of the Arctic National Park and Preserve.

Table 4. Summary of weather statistics from climate stations in and near Gates of the Arctic. 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)	Average Temp. Spring Season (°F)	Apr. 30 Snow Depth (inches)	Peak Wind (mph)
			Mar	Apr	May					
GAAR	Killik Pass	4355	6.3	19.1	m	m	-24	m	m	33
	Ram Creek	4100	10.9	20.6	41.5	63	-18	24.3	10.9	34
	Pamichtuk	3135	9.6	22.0	44.0	70	-24	25.2	4	45
	Chimney Lake	3700	9.4	22.2	42.2	65	-22	24.6	0	44
Other	Ivotuk CRN	1909	-5.4	6.3	37.7	71	-41	12.9	—	30
	Atigun Pass	4800	3.0	17.4	37.0	60	-36	19.1	40	0
	Norutak Lake RAWs	800	m	m	52.2	80	m	m	—	m

-- Missing data from Killik Pass and Norutak Lake. Snow depth is not measured at Ivotuk or Norutak Lake.

Interesting Notes from the ARCN Climate Stations

- The melt-out date at the Ram Creek site above 4,000 feet was ~ May 7 and by May 23 the 50 cm soil temperature probe was recording soil temperatures that were above freezing and began to show diurnal temperature fluctuations.
- East (E) and east-southeast (ESE) winds were the predominant wind directions at Pamichtuk Lake for spring 2015; at Chimney Lake and at Ram Creek winds were predominantly from the east-northeast (ENE).
- For March, the sites in the Brooks Range were on average 4°F warmer than Bettles; the winter inversion started to break down in April with the increasing daylight. In contrast, April and May temperatures in Bettles were on average 7 – 9°F warmer than the Brooks Range sites.

Bettles Spring Temperature Trend

The average spring temperature in Bettles for 2015 was 28.4°F, the 5th warmest spring on record and 4.4°F warmer than the 1981-2010 normal period. Spring 2015 was 3.0°F warmer than 2014 and the warmest spring since 1981.

We calculate the average spring temperature by simply taking the average of March, April, and May monthly temperatures. Average spring temperatures are variable and have ranged between 12.4°F in 1964 and 31.5° F in 1998.

The overall trend in spring temperatures is positive, with a significant increase of 0.68°F per decade based on a simple linear regression (p<0.01). The 10-year moving average shows that the warmest period occurred in the 1990s (Figure 4).

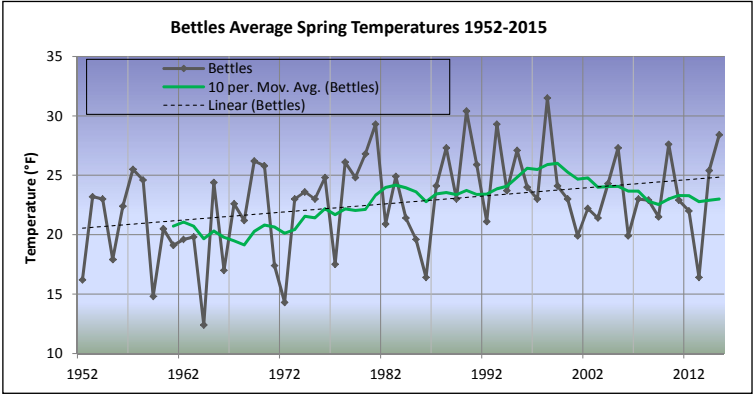


Figure 4. Average spring temperatures (March, April, May) at Bettles since 1952. The green line is a 10-year moving average. The dashed line is a simple linear regression.

Bettles Spring Precipitation Trend

The spring season 2015 precipitation total was 1.34 inches, 71% of the long-term average (1952-2015) and 65% of normal based on the latest climate normal period (1981-2010). The average precipitation (snow water equivalent and rainfall) for the spring season in Bettles is 2.06 inches.

Spring is the driest season in Bettles with precipitation amounts ranging between <1 inch to just over 5 inches. The spring of 1963 was the wettest on record with 5.17 inches of precipitation over the three month season. There is no significant trend in the spring precipitation data for Bettles (Figure 5).

The total snowfall for the spring season was 20.2 inches, which is much more than the dry spring of 2014 when 2.6 inches of snow fell. The long term average is 17 inches.

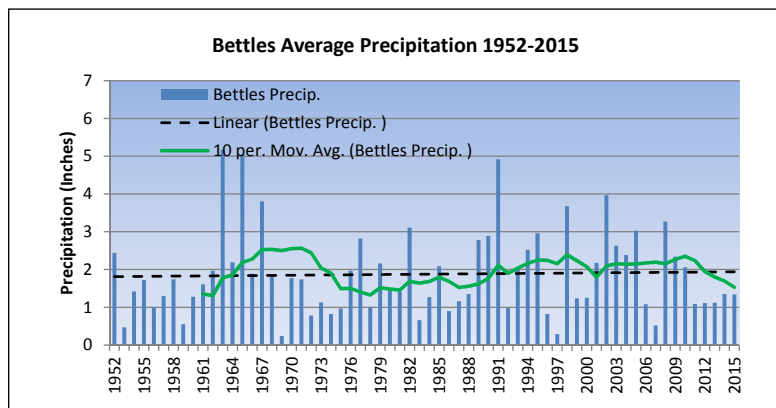
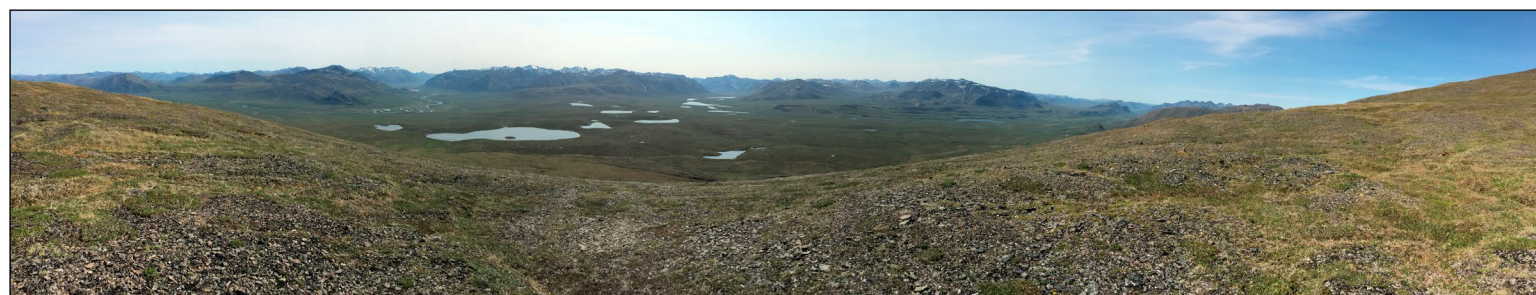


Figure 5. The bars show the spring precipitation totals in Bettles between 1952 and 2015. The **green line** represents a 10-year moving average and the dashed line is a simple linear regression.



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 Gates of the Arctic National Park and Preserve

More Information

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