



Weather and Climate

Denali Summer 2014 Weather Summary



Denali Summer Weather 2014

In Denali, June temperatures were much cooler than normal and it was wet. The average monthly temperature of 49.1° F was 3.7° F colder than normal. The total rainfall for June was 3.66", which is 1.51" more than normal. Interestingly, it was the 11th wettest and the 11th coolest June on record. On June 26th 1.5" of rain fell over a 24-hour period, a new daily record.

July was cool and wet as well. The average air temperature was 2.4° cooler than normal. There was measurable precipitation on 20 out of 31 days. Total rainfall for the month was 4.61", 143% of the normal 3.22" inches for July. It was the 9th wettest July on record. On July 15th 0.78" of rain fell, which is a new daily record.

Things changed a bit in August and the average temperature for the month was above normal and precipitation was near normal. The monthly average temperature was 51.8° F, 1.2°F warmer than normal. Precipitation was 0.4" below normal at 2.3", half of July 2014s rainfall amount.

All in all, it was a cool wet summer – the average summer temperature was 51.4° F, which is 1.6° F cooler than normal and the total rainfall was 10.58", 2.5" more than normal (Figures 1 and 2; Tables 1 and 2)

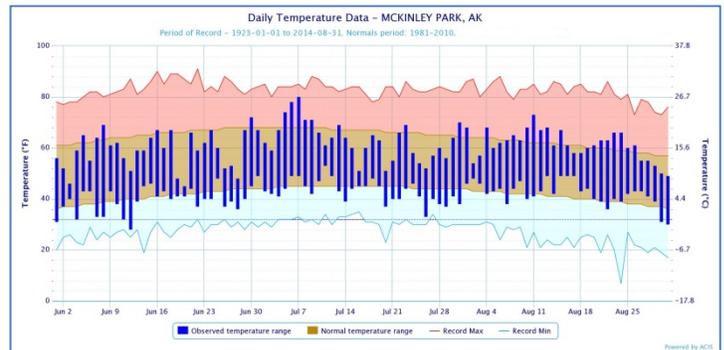


Figure 1. Summer 2014 daily temperatures at Denali showing record maximum (red), record minimum (blue), normal (brown) and 2014 observed range (blue bars).

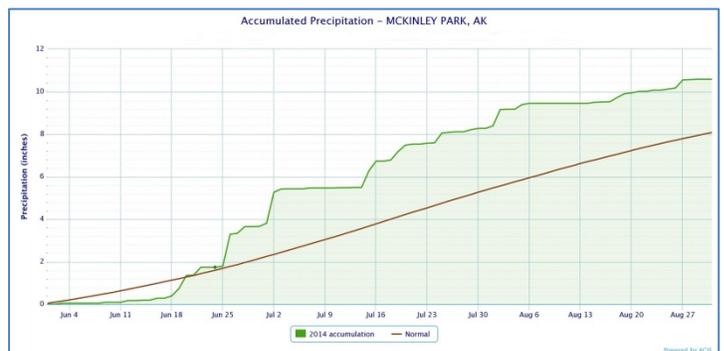


Figure 2. Summer 2014 accumulated precipitation at Denali (green) compared to normal (brown line).

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Table 1. Temperature: Summer 2014 average monthly temperatures compared to the 1981-2010 normal.

Summer 2014	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
June	49.1	52.8	-3.7	72 / Jun 30	28 / Jun 12
July	53.2	55.6	-2.4	80 / Jul 7	33 / Jul 26
August	51.8	50.6	1.2	73 / Aug 11	30 / Aug 31

Summer Season Temperature Departure from Normal: -1.6 °F

Table 2. Precipitation: Summer 2014 monthly precipitation totals compared to normal.

Summer 2014	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
June	3.66	2.15	+1.51	1.50 / Jun 26	16
July	4.61	3.22	+1.39	1.46 / Jul 2	20
August	2.31	2.71	-0.4	0.77 / Aug 2	18

Summer Season Departure from Normal: +2.5 inches; 131% of normal.

Climate Monitoring In Denali

There are additional NPS climate stations in Denali that complement the long-term record available from the National Weather Service station at Park headquarters (Figure 3). These additional sites provide critical data on a park-wide scale that help characterize the climate gradients and patterns affecting resources in Denali National Park and Preserve. This summer, University of Alaska researchers installed a weather station near 14,000' on Denali. Summer statistics from these sites are summarized in Table 4.

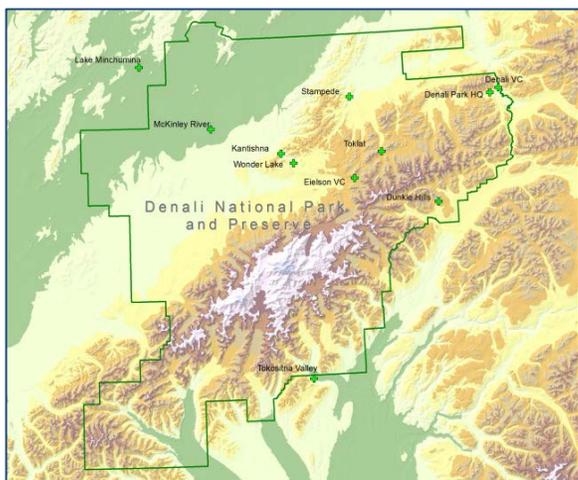


Figure 3. Locations of climate stations in Denali.

Denali Summer Temperature Trend

The average summer temperature for 2014 was 51.4° F, which is 1.6° F cooler than the 1981-2010 normal (the latest climate normal period) and 1.2° F degrees cooler than the long-term average (1926-2014). It was the 22nd coolest summer on record. 2009, with a summer average temperature of 50.2°F was the most recent year with cooler summer temperatures.

We calculate the average summer temperature by simply taking the average of June, July, and August monthly temperatures. The range in summer temperatures over the 88 year period of record is between 48.9° F (1971) and 58.7° F (2005). The overall trend is positive, but the temperature increase is non-linear, with multi-decadal variations.

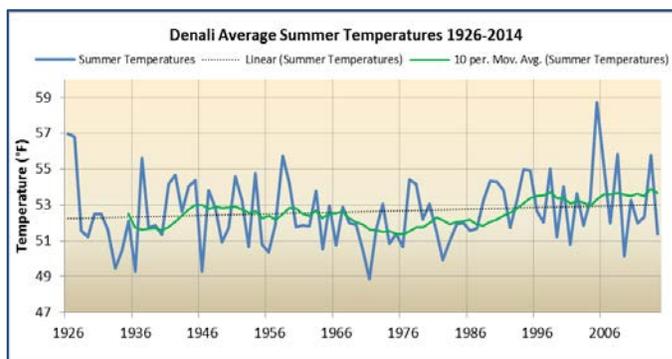


Figure 4. Average **summer temperatures** (June, July, August) at Denali Park Headquarters over the past 88 years. The green line shows a **10-year moving average**. The dotted line shows a simple linear regression trend.

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Table 4. Summary of weather statistics from the Denali climate stations (* values from the automated RAWs stations, not the manual stations on site).

Site	Elev. Ft.	Average Temp ° F			Summer 2014 Avg. Temp °F	Extremes ° F		Summer Rain In.	Peak Wind mph
		Jun	Jul	Aug		High	Low		
Denali VC	1650	51.8	55.3	52.7	53.3	84	27	9.50	23
Toklat	2920	46.8	50.7	48.9	48.8	75	30	13.42	27
Eielson VC*	3653	44.5	49.9	49.2	47.9	74	30	21.36	22
Wonder Lake*	2050	48.9	53.6	51.7	51.4	79	29	15.68	39
Stampede	1800	49.4	53.3	50.5	51.1	81	28	10.28	10
Wigand	1741	50.2	54.1	52.3	52.2	79	30	10.05	26
Kantishna	1550	49.4	53.4	51.1	51.3	80	31	16.0	--
Dunkle Hills	2651	45.6	49.9	47.8	47.8	75	27	8.55	24
Tokositna Valley	850	50.6	54.8	51.9	52.4	81	34	17.4	--
14K Denali	14000	14.2	18.9	17.6	16.9	53	-9.8	--	71

Denali Summer Rainfall

Park Headquarters

The total summer rainfall at park headquarters was 10.58", normal is 8.08". 2014 was the 17th wettest summer on record. 1967, with a total of 14.9" of summer rain, holds the record for the wettest summer. The most recent summer with more rain was 2008 with 13.2", more than half of that falling in July.

The June 2014 total of 3.66" was the 11th wettest June on record; 2012 was the most recent June in history with more rain with 4.76". The July total ranks as the 9th wettest on record. The wettest July on record was 2003 with 8.63" of rain, followed by 2008 with 8.25" (Figure 5).

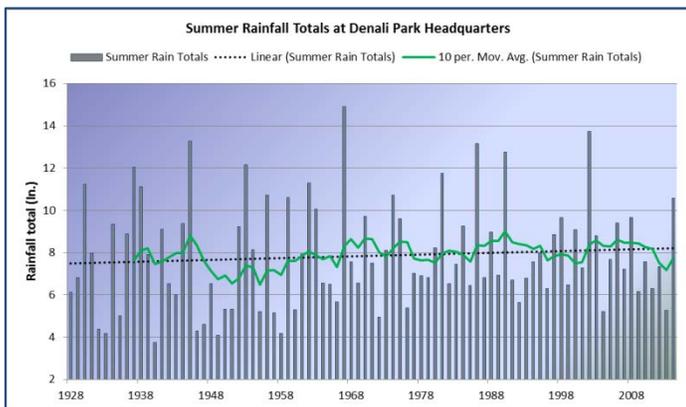


Figure 5. Total summer rainfall (June, July, August) at Denali over the past 88 years. The green line shows a 10-year moving average. The dotted line shows a simple linear regression.

Due to the soggy conditions this summer this summary includes rainfall information for the stations on the west end of the park road. Precipitation can be quite variable between sites due to isolated rain events.

Eielson Visitor Center

We have a 17 year record from the Eielson Visitor Center (EVC) manual station; the rangers on-site record the high and low temperature and amount of precipitation each morning. This differs from the co-located automated site that was installed in 2005 that records hourly totals (data in Table 4). The manual gage had a total of 22.01" of rain for the summer (automated site = 21.36"). There has been on average 19.39" of summer rainfall total over the past 17 years at EVC. Summer 2014 was the 5th wettest, 2002 was wettest with 29.12" (Figure 6). For the automated site this was the 2nd wettest summer of the 9 year record after 2008 with 21.79". The two sites track well, with an average difference of 0.6" for seasonal rainfall totals.

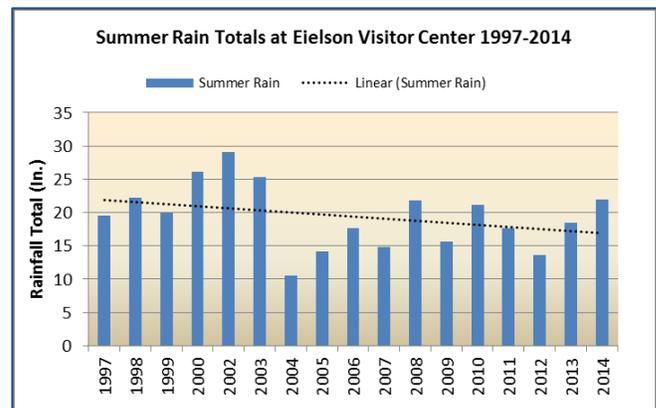


Figure 6. Total summer rainfall (June, July, August) at Eielson VC from 1997-2014. The dotted line shows a simple linear regression.

Note: There were many missing values in earlier years, so they are not included. The recording location moved in 2005 when construction for the new visitor center began. The old site was closer to the building and surrounded by willows.

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Wonder Lake Ranger Station

The summer rainfall at Wonder Lake totaled 15.68". The average summer rainfall total for the 13 years analyzed is 11.64". 2014 ranks as the 2nd wettest summer after 2003 (Figure 6). More than three inches of rain fell across western portions of Denali National Park on June 26 and 27. 2.91" fell at the Wonder Lake station over a 12-hour period. This produced flash flooding on many of the Kantishna area streams, wiping out the park road and stranding visitors at the west end lodges for a while (Figure 7). There was twice as much rain in 2014 as there was in 2013.

Note: The Wonder Lake data is a combination of manual readings taken by the Wonder Lake Ranger each morning and the automated weather station nearby. Again, we do have earlier records, but there are many missing values for June.

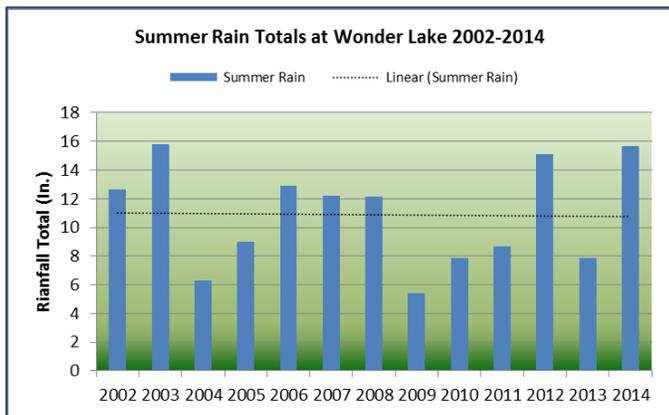


Figure 7. Total summer (June, July, August) rainfall at Wonder Lake Ranger Station from 2002-2014.



Figure 8. Photo of flooding near Denali Backcountry Lodge on June 26, 2014. Photo courtesy of Christina Blakey.

Kantishna

And, finally we have rainfall data from Kantishna; the site is just north of the Denali Backcountry Lodge (not far from the location in Figure 8). 2014 ranks as the 2nd wettest summer for the 9 years the station has been in operation (Figure 8).

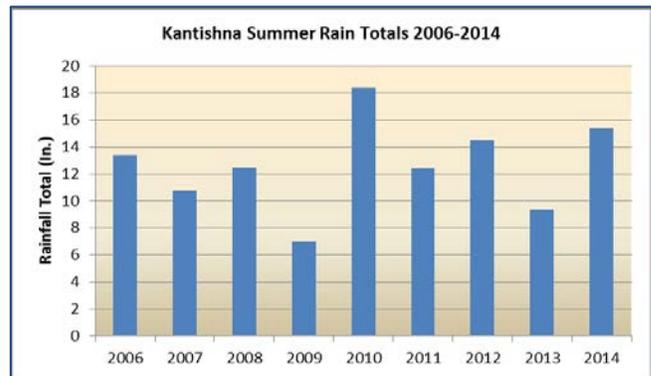


Figure 9. Total summer rainfall at Kantishna 2006-2014.

Thanks to all the observers in Denali that record the weather each day at the Denali Park Kennels, Eielson VC, and the Wonder Lake Ranger Station!

Connecting Further

- Previous weather summaries and other climate monitoring documents on the [Central Alaska 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
- [Map](#) of projected temperature and precipitation changes for Denali National Park and Preserve.



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