



Weather and Climate



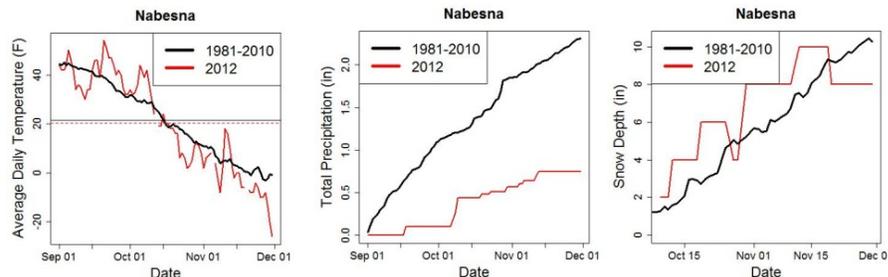
Wrangell – St. Elias Fall 2012 Weather Summary

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 latest normal period is 1981-2010. There are three weather stations in & around the park that have records dating back long enough to calculate normals - Nabesna, Gulkana, and Yakutat. These sites provide valuable long-term records for the park and are good index sites to use for climate comparisons.

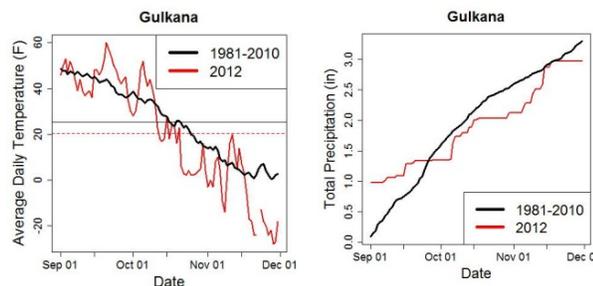
In Nabesna, fall 2012 started out warmer than normal. The average temperature in September was 41.2 °F, 1.1 degrees warmer than normal. There were many missing values for precipitation so the monthly total was not calculated. The temperatures were cooler in October; the average for the month was 21.1 °F; normal is 22.6 °F. The total precipitation for the month was 0.47 inches, 84% of normal. A total of 9.4 inches of snow fell in October. November was a cold, dry month. The average monthly temperature was -2.5 °F, 6.4 degrees cooler than normal. Only 2.0 inches of snow was recorded for November.

Nabesna Temperature, Precipitation and Snow Depth (red) compared to Normal (black)



In Gulkana, September was warmer and slightly drier than normal. The average temperature was 2.1 °F warmer than normal and the total precipitation was 86% of normal at 1.36 inches; 0.98 inches of that fell as rain on September 1st, a daily record. The temperatures cooled in October with an average monthly temperature of 21.3 °F, 5.3 °F below the 1981-2010 normal. The total precipitation for the month was 0.78 inches, normal is 1.01 inches. November was particularly cold with just a bit more precipitation than normal. The average temperature for the month was -6.9 °F. It was the fifth coldest November on record. The total precipitation was 0.85 inches, just above the normal 0.78 inches. Unfortunately, snowfall has not been measured at Gulkana since 1999.

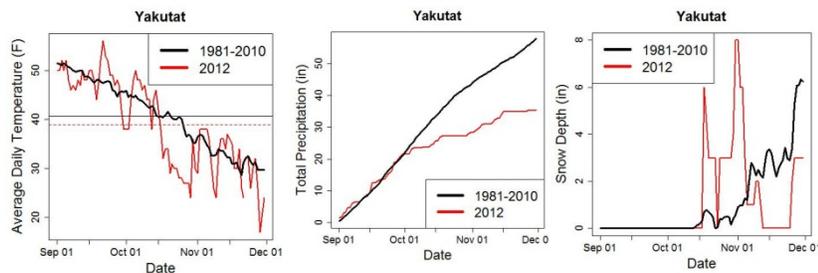
Gulkana Temperature and Precipitation (red) compared to Normal (black).



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And along the southern coast.....in Yakutat, the fall started out quite normal, with a monthly average temperature of 48.5 °F, normal is 48.4 °F. The total precipitation for the month was 21.51 inches, normal is 21.11 inches. October however was cool and dry. The average temperature for October was 37.0 °F, 3.9 degrees cooler than normal. The normal snowfall total for October is 2.5 inches; 18.5 inches of snow fell in 2012 (with 9.1 inches falling on October 18 - a daily record). Even with the above average snowfall, the total precipitation (rainfall and melted snow) for the month was well below average. October normally has ~ 21.98 inches of precipitation, only 6.86 inches of precipitation was recorded in October 2012, which is 31% of normal. November was another cool, dry month. The average temperature was 31.0 °F, 1.3 degrees cooler than normal. The November precipitation total was 7.63 inches, 53% of normal.

Yakutat Temperature, Precipitation, and Snow Depth (red) compared to Normal (black).



Nabesna Weather Records:

Climate Normal Period 1981 – 2010; Climate Record Period 1967 – 2012

Temperature

Nabesna Fall 2012	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
September	41.2	40.1	+1.1	66 / Sep 20	16 / Sep 11
October	21.1	22.6	-1.5	50 / Oct 3	-9 / Oct 26
November	-2.5	3.9	-6.4	25 / Nov 11	-31 / Nov 30

Fall Season Temperature Departure from Normal: -2.3 °F

Precipitation

Nabesna Fall 2012	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 – hr. total in. / Date	Total Monthly Snowfall	Snow Depth at end of month in.
September	0.15*	1.15	-	0.1 */ Sep 17	-	-
October	0.47	0.56	-0.09	0.18 / Oct 9	9.4	8
November	0.18	0.55	-0.37	0.06 / Nov 12	2.0	8

* There were many missing values for precipitation in September, this value may be low.

Fall Season Departure from Normal: not calculated

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Gulkana Weather Records:

Climate Normal Period 1981 – 2010; Climate Record Period 1949 – 2012

Temperature

Gulkana Fall 2012	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
September	45.4	43.3	+2.1	68 / Sep 20	16 / Sep 30
October	21.3	26.6	-5.3	56 / Oct 5	-14 / Oct 22, 23, 25
November	-6.9	5.8	-12.7	24 / Nov 11	-39 / Nov 29

Daily record high temps on Sep 19, 21, and 24 at 62, 64, 66 ° F, respectively. Note 68 °F on Sep 20 was not a record high for that date (record high 72° F in 1995)

Fall Season Temperature Departure from Normal: -5.3°F

Precipitation

Gulkana Fall 2012	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 –hr. total in. / Date	# Days with >=0.01 in. rain or snow
September	1.36	1.58	-0.22	0.98* / Sep 1	8
October	0.78	1.01	-0.23	0.24 / Oct 6	12
November	0.85	0.72	0.13	0.28 / Nov 14	8

* Daily record precipitation total. Fall Season Departure from Normal: -0.11 inches

Yakutat Weather Records:

Climate Normal Period 1981 – 2010; Climate Record Period 1949 – 2012

Temperature

Yakutat Fall 2012	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
September	48.5	48.4	+0.01	61 / Sep 21	33 / Sep 30
October	37.0	40.9	-3.9	52 / Oct 5, 11	12 / Oct 27
November	31.0	32.3	-1.3	46 / Nov 4	7 / Nov 29

Daily record low temps on Oct 27, 28, 29 at 12, 14, 13 °F, respectively.

Fall Season Temperature Departure from Normal: -1.7°F

Precipitation

Yakutat Fall 2012	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 –hr. total in. / Date	# Days with >=0.01 in. rain or snow
September	21.51	21.11	+0.40	3.08 / Sep 16	28
October	6.86	21.98	-15.12	1.06 / Oct 17	16
November	7.63	14.45	-6.82	1.25 / Nov 3	16

Fall Season Departure from Normal: -7.18 inches

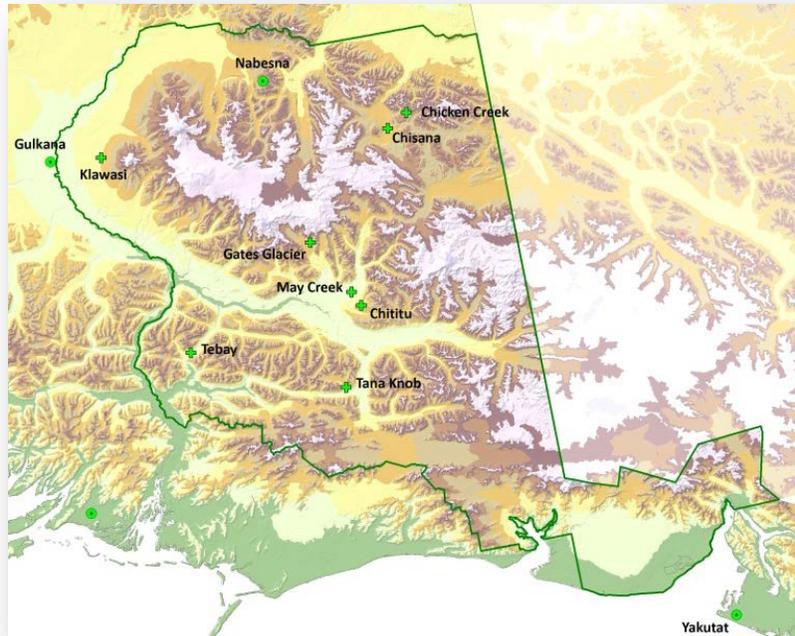
Snowfall

Yakutat Fall 2012	Total Monthly Snowfall in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 – hr. snowfall total in. / Date	Snow Depth End of Month In.
September	0	T	-	-	0
October	18.1	2.5	+15.6	9.1* / Oct 17	8
November	7.8	18.2	-10.4	3.5 / Nov 26	3

* Daily record. A second daily snowfall record on Oct 18 with 2.1 inches

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As part of the climate monitoring vital sign, additional NPS climate stations were installed in the park to complement the long-term records at Nabesna, Gulkana, and Yakutat. These additional sites provide critical data on a park-wide scale that help characterize the climate gradients and patterns affecting resources in Wrangell-St. Elias National Park and Preserve.



Wrangell – St. Elias Remote Automated Weather Station (RAWS) summaries – Fall 2012:

Site	Elev. Ft.	Average Temp °F			Fall 2012	Extremes °F		Snow Depth In. *	Peak Wind mph	High T – Low T °F **
		Sep	Oct	Nov	Avg. Temp °F	High	Low			
Chicken Creek	5240	37.1	18.9	2.9	19.6	57	-16	7	37	73
Chisana	3318	40.3	15.2	-10.7	14.9	72	-44	7	31	116
Gates Glacier	4060	37.9	23.8	9.8	23.8	54	-9.0	15	28	63
May Creek	1600	45.2	21.0	-6.5	19.9	74	-15	9	31	89
Tana Knob	3450	39.8	24.5	4.4	22.9	58	-17	10	35	75
Tebay	2000	41.7	25.5	5.4	24.2	58	-17	12	13	75

* Snow depth on Nov. 30th; ** Difference between the high and low temperature for the season
Klawasi and Chititu sites are currently not transmitting real-time data and therefore are not summarized.

Interesting notes from RAWS stations:

- Gates Glacier site, in the heart of the Wrangell Mountain Range, had the least amount of temperature variation of any of the RAWS sites in fall 2012. It is a high elevation site that sits on an exposed ridgeline between the Kennecott and Gates Glacier, northwest of McCarthy (see photo on next page).
- Temperature inversions become apparent ~ November when the higher elevation sites average ~14 degrees F warmer than the river valley sites.
- At the river valley sites the difference between the low temperature and the high temperature for the fall season averaged ~103 degrees F, while the difference in the mountain sites averaged ~ 72 degrees F.
- There was ~ a 19 degree F difference in the average monthly temperatures for September vs. October and ~ a 21 degree F difference between October and November as the available daylight (and heat) fades fast during the fall months.

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Climate Station at Gates Glacier



Tebay Climate Station

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

Connecting Further

New paper published – [The First Decade of the New Century: A Cooling Trend for Most of Alaska](#)

[Central Alaska Network](#) climate monitoring vital sign

Access near real-time data from [Western Regional Climate Center](#) and [MesoWest](#)

Check out the 3 month weather outlook from the [NOAA Climate Prediction Center](#)

Statewide summary of weather highlights in the latest [Climate Dispatch](#) from the Alaska Center for Climate Assessment and Policy

[Map](#) of projected temperature and precipitation changes Wrangell - St. Elias National Park and Preserve.

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