



North Dakota Monthly Climate Summary

July 2017

Volume: 11, No: 7

Precipitation

North Dakota State Climate Office

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Based on the National Centers for Environmental Information (NCEI), the statewide total July precipitation was 1.28", 3.05" less than the last year, and 1.59" less than the 1981-2010 average, making it the 11th driest July in the 123-year period of record. It was the driest July since 2006. Below-average precipitation was common in most of the state with the exception of a few above normal spots along the Missouri River basin between the SD and ND border and in Steele County in east-central ND (Figure 1). The greatest monthly precipitation accumulation was 3.39" recorded in Cavalier, Pembina County. The greatest 24-hr precipitation was 1.68" recorded in Edgeley, LaMoure County on July 18. Based on historical records, statewide July precipitation showed a positive long-term trend of 0.26" per century since 1895. The highest and the lowest July precipitation for the state ranged from 7.97" in 1993 to 0.64" in 1936 (Figure 2).

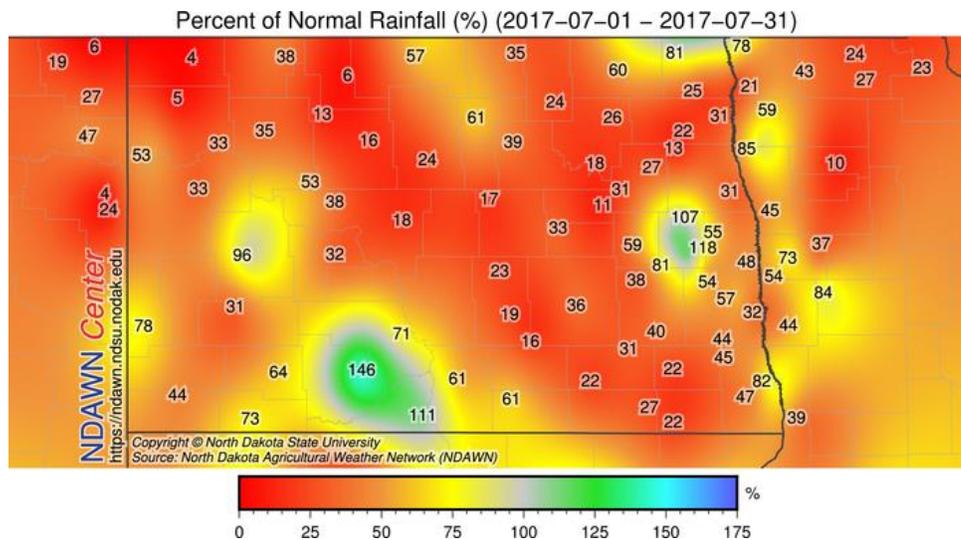


Figure 1. Precipitation Percent of Normal in July 2017 for North Dakota (North Dakota Agricultural Weather Network)



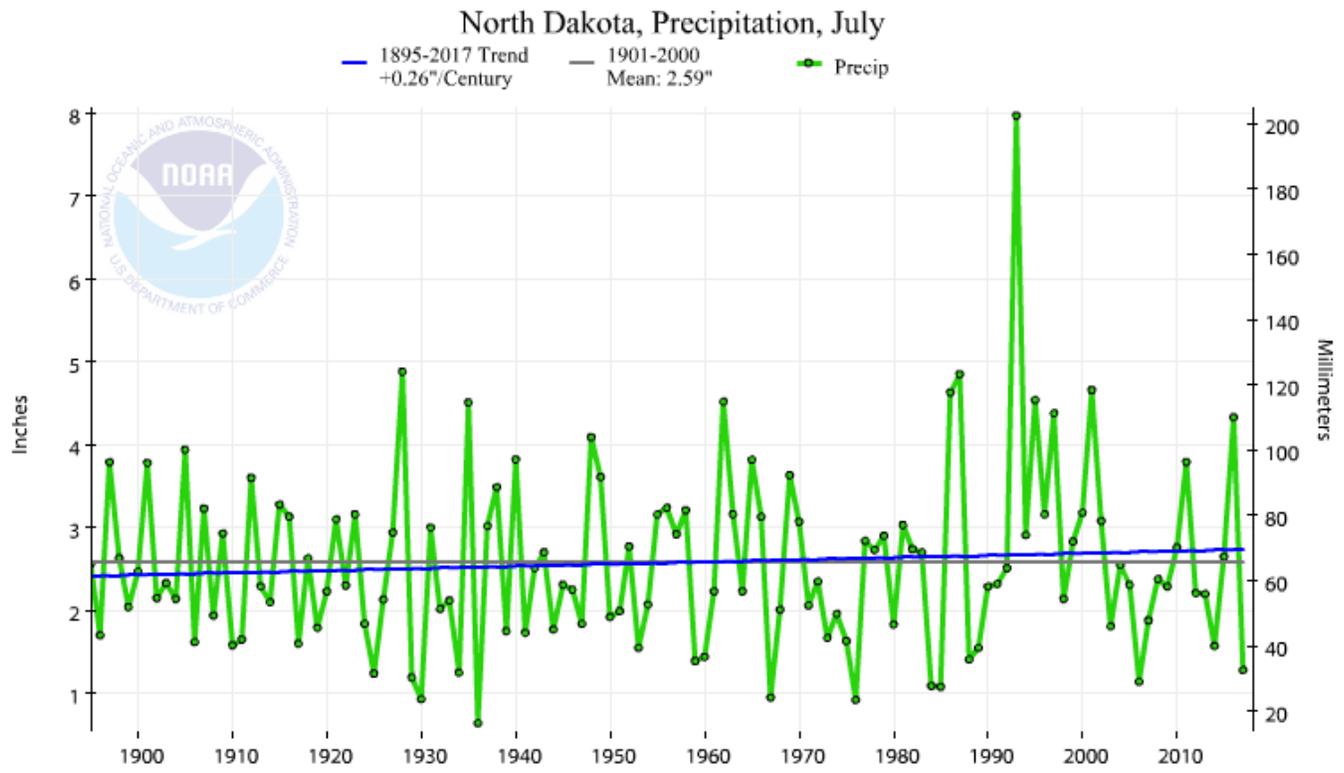
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July Precipitation Statistics

Record High Value: 7.97 inches in 1993
 Record Low Value: 0.64 inches in 1936
 Trend: 0.26" per Century

July 2017 Value: 1.28 inches

1981-2010 Average: 2.87"
 Monthly Ranking: 14th Driest
 Record Length: 123 Years

Figure 2. Historical July Precipitation Time Series for North Dakota.



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Temperature

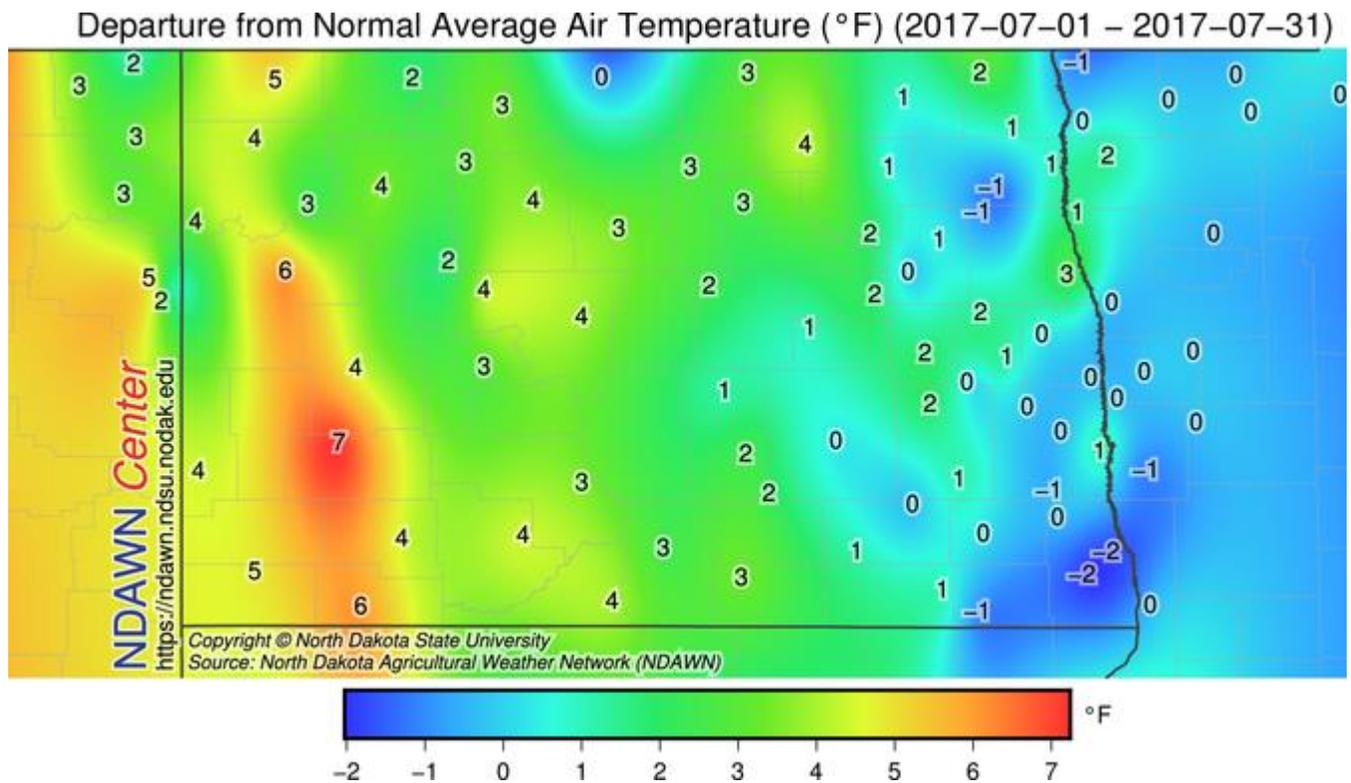


Figure 3. Temperature Departure from Normal in July 2017 for North Dakota (NDAWN).

The official state average July temperature was 72.1°F, 2.8° warmer than the last year, and 3° warmer than the 1981-2010 average, making it the 15th warmest July in the 123-year period of record. It was the warmest July since 2012. Above-average temperatures were observed commonly in all drought-stricken parts of the state. Cooler-than-average conditions were limited to the eastern parts of the state where the drought conditions were either non-existent or were not as severe as western ND (Fig. 3). The state's highest and lowest daily temperatures ranged from 105° on July 15 in Kildeer, Dunn County to 42° on July 1 in Dickinson Ranch, Dunn County. Based on historical records, the state average July temperature showed a positive trend of 0.11°F per decade since 1895. The highest and the lowest monthly state July average temperatures ranged from 80.1° in 1936 to 61.8° in 1992 (Figure 4).



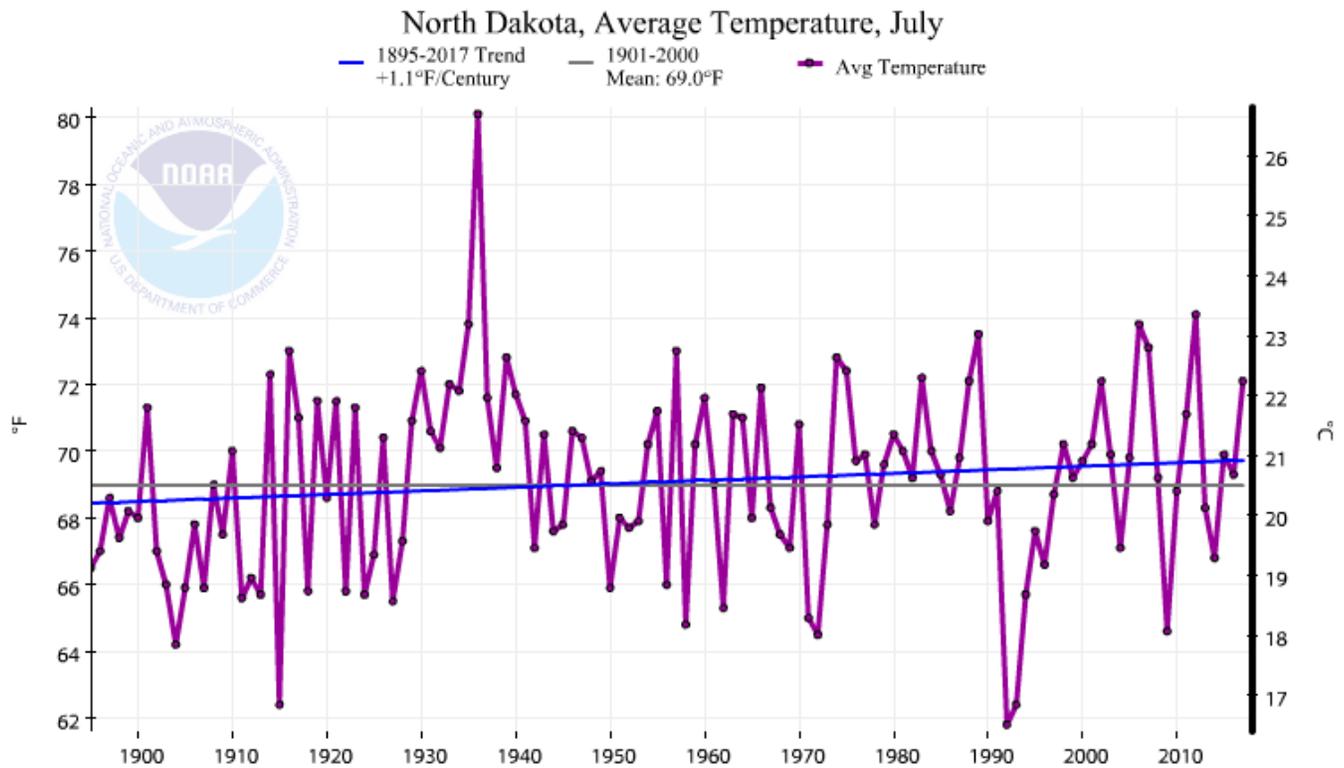
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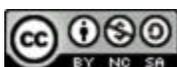


July Temperature Statistics

Record High Value: 80.1°F in 1936
 Record Low Value: 61.8°F in 1992
 Trend: 0.11°F per Decade

July 2017 Value: 72.1°F
 1981-2010 Average: 69.1°F
 Monthly Ranking: 15th Warmest
 Record Length: 123 Years

Figure 4. Historical July Temperature Time Series for North Dakota.



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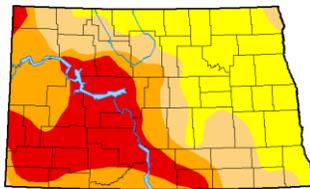
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Notable Impacts

U.S. Drought Monitor
North Dakota



June 27, 2017
(Released Thursday, Jun. 29, 2017)
Valid 8 a.m. EDT

	None	D0	D1	D2	D3	D4
Current	0.02	90.98	66.77	46.90	25.96	0.00
Last Week (6/20/2017)	0.02	90.98	67.34	39.00	7.73	0.00
3 Months Ago (3/28/2017)	93.83	6.17	0.00	0.00	0.00	0.00
Start of Calendar Year (1/1/2017)	93.87	6.13	0.00	0.00	0.00	0.00
Start of Water Year (8/27/2016)	96.70	3.30	0.41	0.00	0.00	0.00
One Year Ago (6/28/2016)	82.42	17.58	3.61	0.19	0.00	0.00

Intensity:
 D0 Abnormally Dry
 D1 Moderate Drought
 D2 Severe Drought
 D3 Extreme Drought
 D4 Exceptional Drought

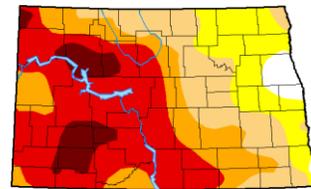
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Jessica Blunden
NCEI/NOAA



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor
North Dakota



August 1, 2017
(Released Thursday, Aug. 3, 2017)
Valid 8 a.m. EDT

	None	D0	D1	D2	D3	D4
Current	3.08	36.91	61.74	62.45	44.09	7.62
Last Week (7/25/2017)	6.91	63.39	79.21	61.16	45.56	7.62
3 Months Ago (5/28/2017)	91.22	8.78	0.00	0.00	0.00	0.00
Start of Calendar Year (1/1/2017)	93.87	6.13	0.00	0.00	0.00	0.00
Start of Water Year (8/27/2016)	96.70	3.30	0.41	0.00	0.00	0.00
One Year Ago (8/28/2016)	86.05	9.95	2.98	1.20	0.00	0.00

Intensity:
 D0 Abnormally Dry
 D1 Moderate Drought
 D2 Severe Drought
 D3 Extreme Drought
 D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
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National Drought Mitigation Center



<http://droughtmonitor.unl.edu/>

Figure 5. Drought Monitor map comparison for North Dakota in the beginning (on the left) and at the end (on the right) of July 2017.

Drought Monitor: Consistently dry conditions in western North Dakota worsened the drought status in these parts of the state. Northeastern parts of the state received some timely and sufficient amounts of rain to improve the conditions there. Warmer than average temperatures in the drought stricken areas exacerbated the drought conditions to the Exceptional Drought category based on a scale developed by the National Drought Monitor (DM). Since the inception of the DM, the second time the state experienced the drought in this category (2006 is the first time of occurrence). Based on the DM map on August 1, 7% of the state was in Exceptional Drought (D4), 36% of the state was in Extreme Drought (D3), 18% of the state was in Severe Drought (D2), 19% of the state was in Moderate Drought (D1), and the rest of the state was in abnormally dry conditions (D0). Figure 5 shows a comparison of the drought conditions across the state between the beginning and the end of the month.

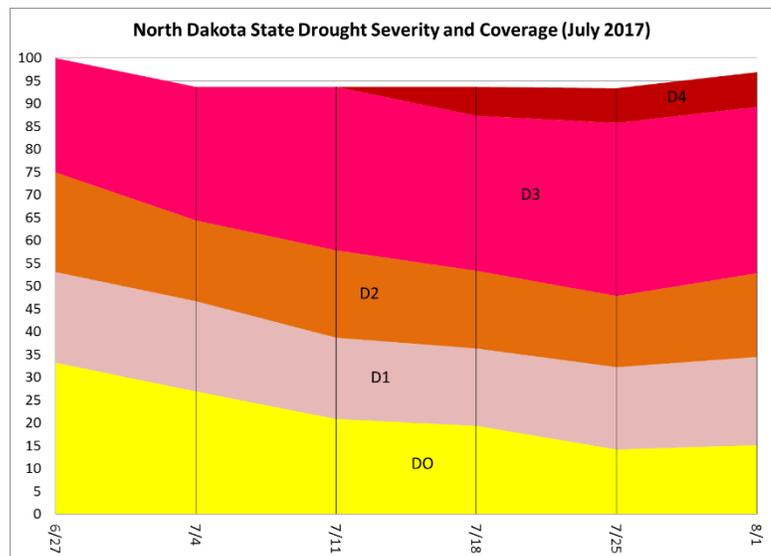
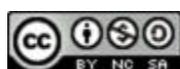


Figure 6. North Dakota State Drought Severity and Coverage Graph for July 2017.



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Figure 6 on the right shows the statewide drought coverage in % and intensity (i.e. DO, and D1) in time scale representing the state from the beginning to the end of the month with one-week resolution.

Counties in exceptional drought areas as of August 1: Divide, Williams, Mountrail, Dunn, Mercer, McLean, Oliver, Morton, Stark, Slope, Hettinger, Grant, Adams, and Bowman.

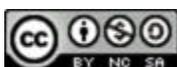
Agricultural Impact: Persistent dry conditions in the western parts of the state caused the drought to intensify. By the end of the month, more than 43% of the state was under at least Extreme Drought conditions, 8% of which was in the Exceptional Drought category. Historically since the inception of the DM, the state has only been designated as Exceptional Drought category once more in 2006. The ND DOA started taking applications for a hay lottery where eligible applicants register their names. Only one application per operation will be eligible. The deadline for applications is August 31, 2017. Hay will be distributed in semi-load lots with the first drawing in early September. Other drought stricken states (MT and SD) quickly joined the hay lottery system. The web site to register for the hay lottery for these 3 states is: <https://www.nd.gov/ndda/hay-lottery>

In addition, Secretary Perdue authorized emergency haying on Conservation Reserve Program (CRP) acres beginning July 16 through Aug. 30 for eligible counties and those with any part of its border within 150 miles of an eligible county.



Drought conditions are expected to persist despite above normal rainfall in the short term, which is not enough to reverse the conditions already taking place on the ground. However, it will certainly halt the worsening progress. The CPC 3-month outlook gives equal chance of having above below or near normal precipitation.

Poor Emergence in Extreme Drought (D3) Area. Oliver County on July 11. By Richard Schmidt, NDSU Extension.



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Storm Reports: NDAWN's highest peak gust in July was 94 mph, recorded at the Galesburg weather station in Cass County on July 7, 2017. The Hillsboro weather station in Traill County recorded a peak gust of 78 mph on July 11. The NOAA Storm Report reported 167 storm events including 15 tornadoes, 108 hail events, and 144 wind damage reports. An outbreak on July 11 brought multiple tornadoes, hail and wind damage to eastern and north eastern portions of the state including two EF2 tornadoes; one in Traill County, and the other in Norman County. Another nine tornadoes reported on July 11 were weaker than EF2 intensity. Table 1 summarizes the number of tornado, hail and damaging wind reports in July, while Figure 7 geographically displays the locations of these storm reports.

Table 1. Summary of July Severe Storm Reports of North Dakota (SPC, NOAA)

<i>Category</i>	<i>Number of Reports</i>
<i>Tornado Reports</i>	15
<i>Hail Reports</i>	108
<i>Wind Reports</i>	144
<i>Total</i>	167

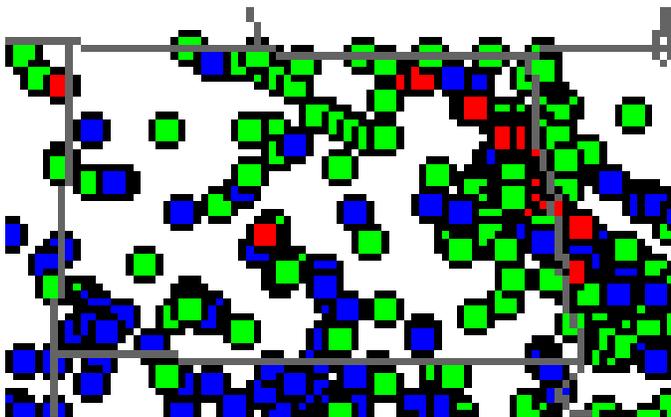


Figure 7. July 2017 North Dakota Storm Events (Red: Tornado; Blue: Wind; Green: Hail).





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Daily Record Event in July: Across the observation network of weather stations with at least 30 years of history, a total of 22 daily high-temperature related and 2 daily low-temperature related records were set or tied. A total of 2 highest daily precipitation related records were set or tied. Details of the records are in Table 2 below.

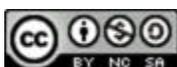
Table 2. Summary of daily July records broken or set in North Dakota in July (NCEI Daily Weather Records)

<i>Category</i>	Number of Records
<i>Highest Daily Max Temp.</i>	18
<i>Highest Daily Min Temp.</i>	4
<i>Lowest Daily Max Temp.</i>	1
<i>Lowest Daily Min Temp.</i>	1
<i>Highest Daily Precipitation</i>	2
<i>Highest Daily Snowfall</i>	0
Total	26

Highlight of the Month

A daily highest temperature record of 104°F set in Dickinson Regional Airport on July 5, breaking the previous record by 6° that was broken in 1981 (Years on record: 68).

Acknowledgment: Many thanks to Loretta Herbel (NDAES) for her diligent editorial corrections.



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