The Worst Summer Ever?
Record Temperatures Heat Up the United States

For more information, please contact:
Dan Lashof at
(202) 289-2399.

If you think this summer was the hottest you ever experienced, there is a good chance you are right. NRDC's analysis of June, July, and August 2010 temperature data from the National Oceanographic and Atmospheric Administration's (NOAA's) Historic Climatology Network reveal that this summer set heat records in many parts of the country. In fact, of the 1,218 weather stations in the contiguous United States, with data going back to 1895, 153 locations recorded their hottest summer on record and nearly one in three stations recorded average temperatures among their five hottest on record (see Figure 1 for a map showing the locations of each station and whether it set a record in summer 2010).[1]

Even more telling is that nighttime lows were the hottest ever recorded at nearly one in four weather stations in NOAA's Historic Climatology Network. This means that at 278 stations the average nighttime low temperatures for June, July and August 2010 were hotter than at any time since 1895. More than half the stations recorded average nighttime low temperatures among their five hottest on record (Figure 2). Nighttime temperatures are more sensitive to the buildup of heat-trapping pollution in the atmosphere than daytime temperatures because increases in atmospheric aerosols and cloud cover have counteracted some of the warming effect of greenhouse gases during the day.[2] Hot, stagnant nights can prove even more harmful than daytime highs as vulnerable populations (particularly the elderly) are unable to cool down and get relief from the stress of the daytime heat.

NRDC
The Earth's Best Defense

The Worst Summer Ever?
Record Temperatures Heat
Up the United States

Figure 1

Summer Average Temperatures
NOAA U.S. Historical Climatology Network Monthly Data for June, July & August

Legend
- 2010 was the Hottest Average Summer
- 2010 in the Top Five Hottest Summers
- 2010 in the Top Ten Hottest Summers
- 2010 Not in the Top Ten Hottest Summers

1,218 NOAA Weather Stations
Time Span: 1895 to 2010

Figure 2

Summer Nighttime Temperatures
NOAA U.S. Historical Climatology Network Monthly Data for June, July & August

Legend
- 2010 was the Hottest Average Summer Night
- 2010 in the Top Five Hottest Summer Nights
- 2010 in the Top Ten Hottest Summer Nights
- 2010 Not in the Top Ten Hottest Summer Nights
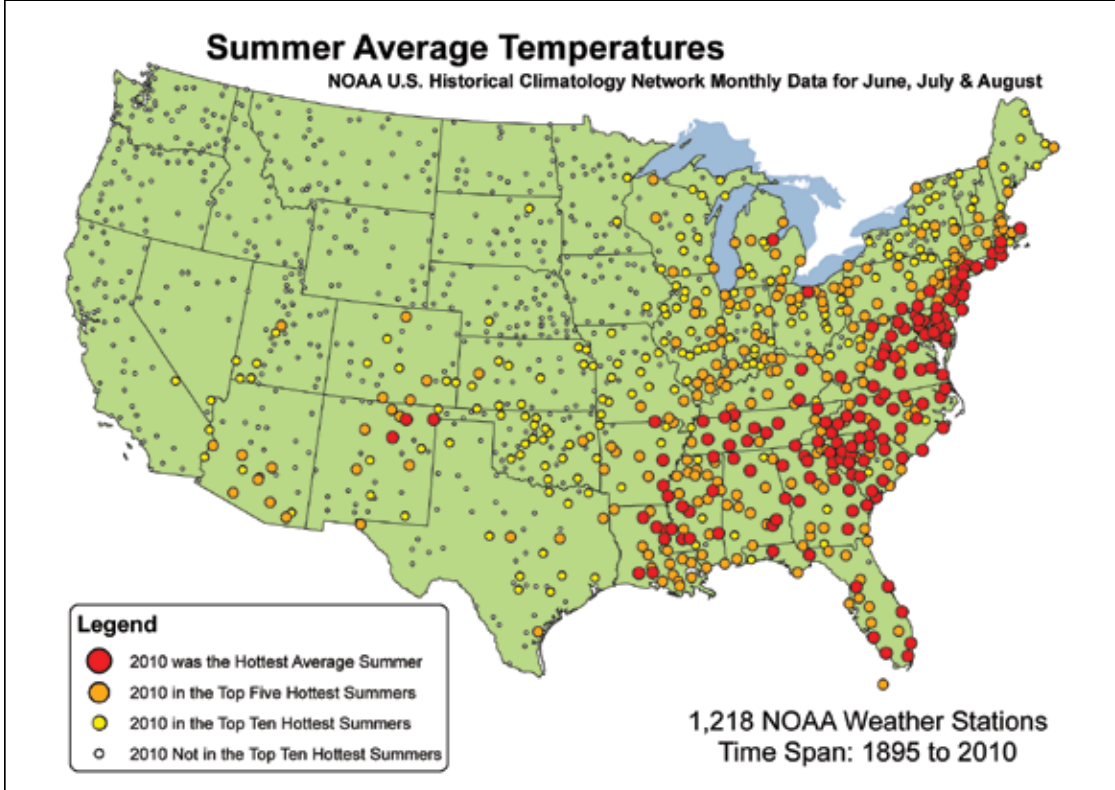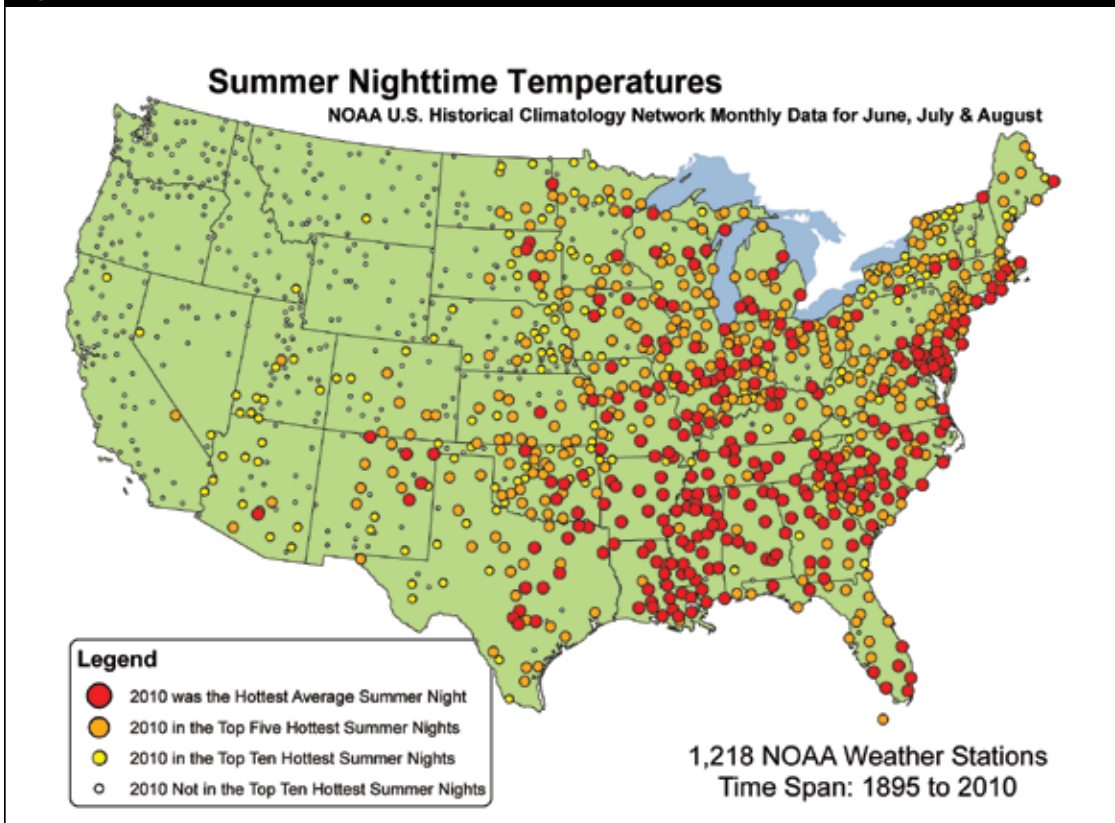
1,218 NOAA Weather Stations
Time Span: 1895 to 2010

The record heat this summer was not isolated to the United States. Global temperature data compiled by the National Aeronautics and Space Administration (NASA) show that the first seven months of 2010 comprise the hottest such period on record.[3] This comes on top of the warmest decade on record (2000-2009), which surpassed the previous record set by the 1990s, which itself supplanted the 1980s as the warmest decade on record at that time.[4]

Record-high temperatures are not the only weather extremes we have seen in 2010. Because the atmosphere can hold more moisture as it warms, there is more rapid evaporation when it is dry and more intense rainfall when it is wet. The result is an increase in severe droughts and floods. As we have seen in Russia, Pakistan, China, and the United States, the results have been tragic. Russia has seen hundreds of wildfires and thousands of deaths in Moscow during its worst heat wave on record. In Pakistan more than a thousand people have been killed, and a million more displaced by floods. Flooding this year has also killed more than a thousand people in China, and more than 50 in Iowa and Tennessee.

State-by-State Data Show Record Temperatures

To learn more about this year's record breaking heat, Table 1 on page 4 displays a state-by-state breakdown of the number of weather stations that reported record average temperatures and record average nighttime low temperatures for June, July, and August 2010. Overall, the table demonstrates that weather stations in 37 states set a temperature record in summer 2010. The table also shows the number of stations for which 2010 was among the five hottest on record. Among other findings, the table reveals the following:

■ In Maryland, 15 of the 16 stations in the Historical Climatology Network reported their hottest average temperatures, and 12 reported their hottest average nighttime low temperatures on record in summer 2010. All 16 Maryland stations reported average temperatures and average nighttime low temperatures among their five hottest on record in summer 2010.

■ In Florida, 9 out of 22 stations reported their hottest average temperatures and 8 reported their hottest average nighttime low temperatures on record in summer 2010. In Fort Lauderdale the average nighttime low temperature for the full summer was 77.7 degrees. Nearly all—21 of 22—Florida stations reported average nighttime low temperatures among their five hottest on record in summer 2010.

■ The Midwest also experienced very warm nighttime temperatures. In Illinois and Indiana, 92 percent and 86 percent of the stations, respectively, reported average nighttime low temperatures among their five hottest on record in summer 2010.

■ Considering all 513 weather stations east of the Mississippi, 40 percent reported their hottest average nighttime low temperatures and more than 80 percent reported average nighttime low temperatures among their five hottest on record in summer 2010.

■ The Western United States was not as hot as the Eastern half of the country. Nonetheless, seven stations in Arizona reported average temperatures for this summer among their five hottest on record, and 11 stations in New Mexico reported average nighttime low temperatures among their five hottest.

For Many, the Hottest Summer on Record

Summer 2010 was the hottest on record in many locations in the United States. Not only was it hot during the day, but it didn't cool off at night. While one hot summer does not prove that global warming is happening, the long-term global trend does, according to the U.S. National Academy of Sciences, among others.[5] The long, hot summer of 2010 follows the hottest decade on record and more record high temperatures can be expected in the future as heat-trapping pollution continues to build up in our atmosphere.

[1] The National Climate Data Center, NOAA. U.S. Historical Climatology Network. http://www.ncdc.noaa.gov/oa/climate/research/ushcn/. This dataset was developed by NOAA specifically to examine climate trends. NOAA has rigorously evaluated these data to ensure quality and remove any spurious biases due to, for example, changes in instrumentation, station locations or urban heat island effects. NRDC calculated average temperatures and average nighttime temperatures over the period June 1 – August 31 for each station in this database. Results for 2010 were compared to all other available years, which generally go back to 1895.

[2] Braganza, K., D. J. Karoly, and J. M. Arblaster, 2004. Diurnal temperature range as an index of global climate change during the twentieth century, Geophys. Res.Lett., 31, L13217, doi:10.1029/2004GL019998. Hansen, J., and R. Ruedy, 1995. Long-term Changes of the Diurnal Temperature Cycle: Implications about Mechanisms of Global Climate Change. Atmospheric Research 37.1-3: 175-209.

[3] http://data.giss.nasa.gov/gistemp/2010july/

[4] NOAA, State of the Climate 2009, Bulletin of the American Meteorological Association, July 2010. http://www.ncdc.noaa.gov/bams-state-of-the-climate/2009.php

[5] National Research Council, 2010. America's Climate Choices. http://americasclimatechoices.org/

Table 1: Summer 2010 Temperatures from Weather Stations in NOAA's Historic Climatology Network, by State
Numbers in each column represent the number of weather stations in that catagory

State	Total Stations	Hottest Average Temperature Recorded	Average Temperature Among Top 5 Hottest Recorded	Hottest Average Night Temperature Recorded	Average Night Temperature Among Top 5 Hottest Recorded
Alabama	15	4	13	11	13
Arizona	25	0	7	1	4
Arkansas	15	3	9	11	12
California	54	0	0	0	1
Colorado	24	0	4	0	6
Connecticut	4	2	4	1	3
Delaware	5	4	5	4	4
Florida	22	9	20	8	21
Georgia	23	11	21	14	19
Idaho	29	0	0	0	0
Illinois	36	0	13	16	33
Indiana	36	0	13	8	31
Iowa	23	0	0	4	16
Kansas	31	0	1	2	19
Kentucky	13	2	11	8	10
Louisiana	18	5	18	16	18
Maine	12	0	2	1	7
Maryland	16	15	16	12	16
Massachusetts	12	1	10	2	10
Michigan	24	1	8	8	23
Minnesota	33	0	0	2	12
Mississippi	32	10	28	30	31
Missouri	26	0	3	11	22
Montana	44	0	0	0	0
Nebraska	46	0	0	0	6
Nevada	13	0	0	0	0
New Hampshire	5	0	2	1	1
New Jersey	12	8	11	4	11
New Mexico	29	3	8	5	11
New York	57	4	12	5	32
North Carolina	29	19	27	19	26
North Dakota	24	0	0	1	6
Ohio	26	1	13	6	22
Oklahoma	44	0	1	6	26
Oregon	40	0	0	0	0
Pennsylvania	24	3	17	3	14
Rhode Island	3	3	3	2	3
South Carolina	29	19	26	15	24
South Dakota	25	0	0	3	10
Tennessee	15	11	15	12	14
Texas	49	0	5	12	32
Utah	40	0	1	0	1
Vermont	8	0	0	0	0
Virginia	19	13	18	6	17
Washington	44	0	0	0	0
West Virginia	13	2	8	1	9
Wisconsin	23	0	4	7	20
Wyoming	29	0	0	0	0
Totals	**1218**	**153**	**377**	**278**	**616**