



FEATURE I

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The Summer of 2012

One for the Record Books or a View of the Future?

One can not ascribe climate change as the proximate cause for individual weather events. Climate does vary, but how much of what we are observing in this summer heat wave can be attributed to climate change? That is a difficult question to answer and beyond my range as turf scientist. I do know that it is hot, dry, and extremely unusual weather that we're experiencing. Those of you who have around the block a few times remember the summers of 1995 and 1988 as exceptionally hot or dry, respectively. How do those summers compare with what we've experienced in 2012? How does 2012 compare to some of the all time hottest summers, like 1936 or 1934?

The State of Illinois climatologist, Jim Angel, is based at the Illinois Natural History Survey and has posted online the daily climate record for Champaign-Urbana going all the way back to 1888. I've used that data to put together some comparisons that will give you an idea of just how hot 2012 has been.

In Chicago, the 1995 heat wave was blamed for nearly 750 deaths. I don't have data for Chicago, but C-U is usually warmer than Chicago, so the C-U climate data is a good proxy. In this series of graphs, I've plotted high temperatures from June 1 through July 31 in 2012 compared to 1995 (Figure 1), 1988 (Figure 2), and 1936 (Figure 3.) Plotting all of these together is more efficient but you really can't see the differences.

While 1995 was hot, it can't hold a candle to the heat we've had in 2012. From June 1 till June 26th, the two years were similar, but in 1995, it cooled off in late June with a high temperature of 72° on July 1. In contrast, in 2012 the temperatures touched 100° F for two days in a row near the end of June. In early July, it got really hot with 4 consecutive days at 100° or higher. The end of July saw significantly higher temperatures in 2012 compared to 1995. Clearly, 2012 has been hotter in June and July than 1995.

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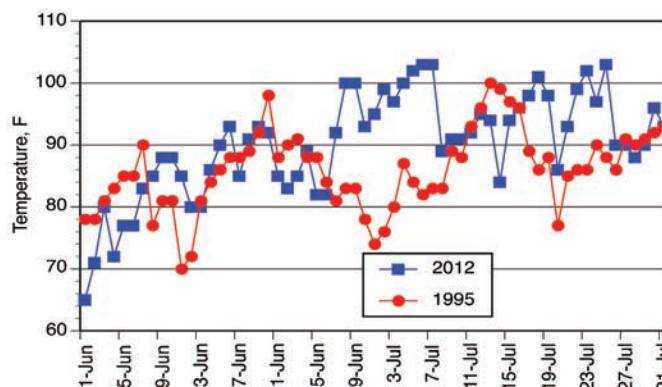


Figure 1. Daily high temperatures for June 1 through July 31 for 2012 and 1995.

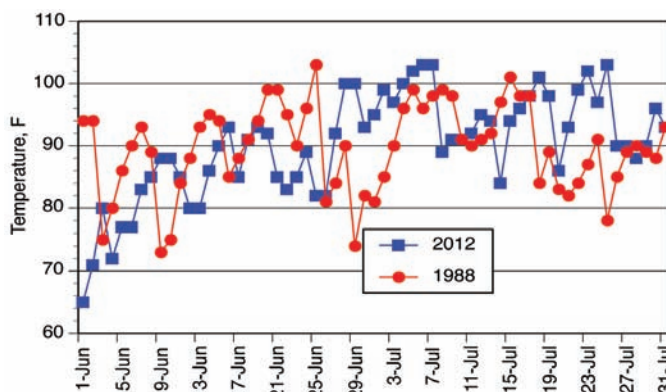


Figure 2. Daily high temperatures for June 1 through July 31 for 2012 and 1988.

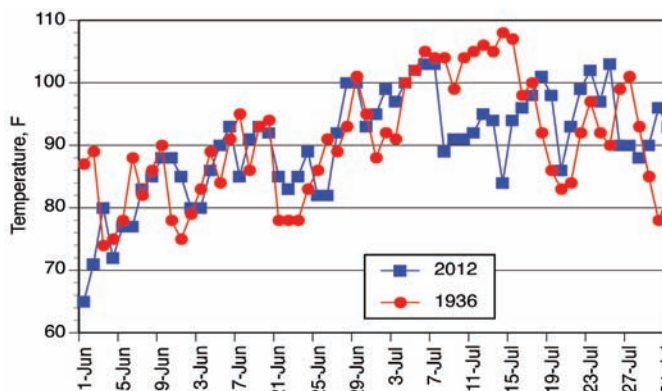


Figure 3. Daily high temperatures for June 1 through July 31 for 2012 and 1936.

What about 1988? That was a year of unrelenting drought and stifling heat. Interstate pavement buckled around Omaha, NE as temperatures soared above 100°. These two years look more similar than did 1995 and 2012. However, while mid- to late June was hotter in 1998 than in 2012 with a 102° reading on June 25 in 1988, by the end of the June, 2012 is clearly much hotter. There were two days with temperature readings above 100° in 1988 and nine in 2012. In 1988, there were 34 days at 90° or above for June and July. In 2012, there 36 days at 90° or above including 27 days in July. So, both summers were hot, but the average daily high temperature in 2012 was 90.2° while in 1988 the average daily high for June and July was 89.6° F, which would indicate that 2012 was slightly warmer than 1988. However, if I just remove the first 2 days in June from the average, then the 2012 average becomes 90.9° and the 1988 average becomes 89.4°, indicating 2012 had a daily high air temperature that was 1.5° F higher than in 1988.

My father grew up on a farm and often talked about how hot the summer of 1936 was. This was during the dust bowl, and while it wasn't dusty in central Illinois, it was hot and dry and no one had air conditioning. Here we see that 2012 meets its match. The temperatures were very similar throughout June and early July in both years. However, in 2012 we had 4 days of 100°+ temperatures in early July, almost exactly the same pattern seen in 1936. In fact, during high temperatures in early July, every record high came from 1936. In 2012, our temperatures cooled off to a relatively balmy 89° F on July 8th and stayed in the low 90°s over the six days. In 1936, by contrast, the temperature dropped all the way to 99° on July 8th and then stayed over 100° for the next six days reaching a high of 108° F on July 14th. In 1936, the average daily high temperature for June and July was 90.8° versus 90.2° in 2012, a difference of over a half of a degree per day. July of 1936 had 13 days of temperatures over 100° F versus 7 days in 2012. So, 2012 is not the hottest summer on record, but very close to the hottest in human records (which are no more than a nanosecond of the history of the earth).

What about drought during these years? In 2012, we had decent rain in early June, but since June 17th, we've had a total of 0.67" of rain. For the two months of June and July, the average precipitation in C-U is 9.04" and we've had a total of 2.89" in 2012. In 1995, 1988, and 1936; C-U received 3.92, 3.96, and 1.82" of rain, respectively. While the 1988 number looks respectable, the drought broke near the end of July, and we received 3.24" of rain between July 18 and July 25. In 1988, the drought started in late April

and lasted until mid-July. While 1995 was hot, the bigger problem for turf managers was the rain. In the first 9 days of August of 1995 (the data I'm showing is for June and July), we received 4.5" of rain. It is more difficult to manage turf through excess moisture than lack of moisture. Receiving all of that rain in early August when temperatures were still above 90 F created sauna-like conditions perfect for rapid disease development. It is the disease pressure that makes turf management such a challenge for today's superintendents. So while 2012 has been very challenging, disease pressure has been relatively light and thus turf problems have not been as catastrophic as we might expect had we had more rain. As a note caution to golf turf managers, if the rain does return yet this summer, be prepared. The humidity that will accompany significant rain when combined with the weakened state of most turf will put tremendous disease pressure on the turf. Periods of control can be much shorter than anticipated and turf loss can be rapid and severe.

Weather Extremes

One last graph I'll leave you with. We saw that the temperatures in 1936 were similar to 2012 and actually warmer. What about the winter of 1936, was it warm like we had in 2012? As can be seen in Figure 4, the winter of 1936 was pretty severe with a low temperature below -20° F and many days of below zero lows. The average daily low temperature in 2012 was 25.2° F while in 1936 the average daily low temperature was 13.4° F. I would consider 1936 a year of temperature extremes while 2012 is just plain hot.

I will not start a debate about climate change in this post, but let us hope that 2012 is a weather extreme and not the start of long-term change in our climate. **-OC**

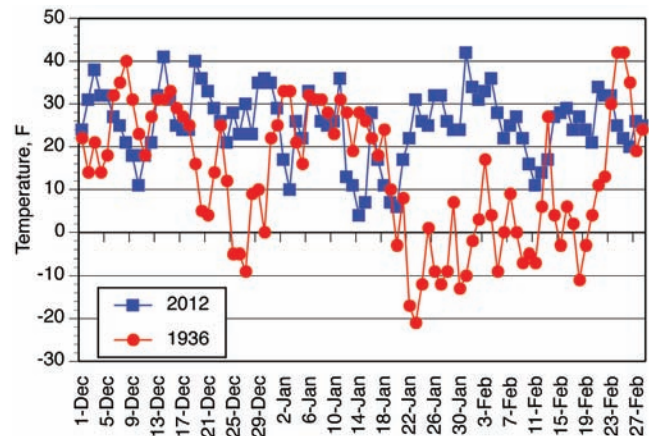


Figure 4. Daily low temperatures from Dec 1 through Feb 28 for 2012 and 1936.

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