The West Nile Weekly

SUMMARY: After a warm start, the year has settled back down to historical average temperatures. The season has begun and there is a small (1 in 8) chance that our most populated counties will see human cases in this week. There is a larger chance (1 in 6) that we will see cases somewhere.

How's the weather?

The major weather story in 2016 is still the heat, but recent weeks have been almost exactly average over the whole state and temperatures appear to be cooling back down to normal or even below.

Our model of human WNV considers a number of influences from the weather, including temperature. From the model we obtain the *estimated risk due to temperature* (or *temperature risk*), which is the relative impact of recent temperatures on human cases, regardless of all other influences. Given how hot it has been, do we expect more or fewer cases than average, all else being equal? We will consider this weighted average in more detail in a later document, but can use it to compare 2016 to previous years.

In Figure 1, we compare temperature risk in 2016 to low (2011, blue) and high (2012, red) WNV years. This year looked as though it would reproduce 2012's high temperature risk; both 2012 and 2016 were high in late February, for example, but this year's temperature risk has recently fallen and appears to be solidly average. We have neither the extremely warm winter nor the bump in Apr-Jun that were associated with the many human cases in 2012.

Due to the slightly higher temperatures in Feb-Apr, we continue to predict that case reports will be just slightly more numerous than average.

What to expect?

The estimated statewide risk, the proportion of counties expected to report at least one case in the week beginning June 20th, has risen to 1.4% and is displayed in Figure 2 below. There is an estimated 15.2% (approximately 1 in 6) chance that at least one county will report a human case in this week.
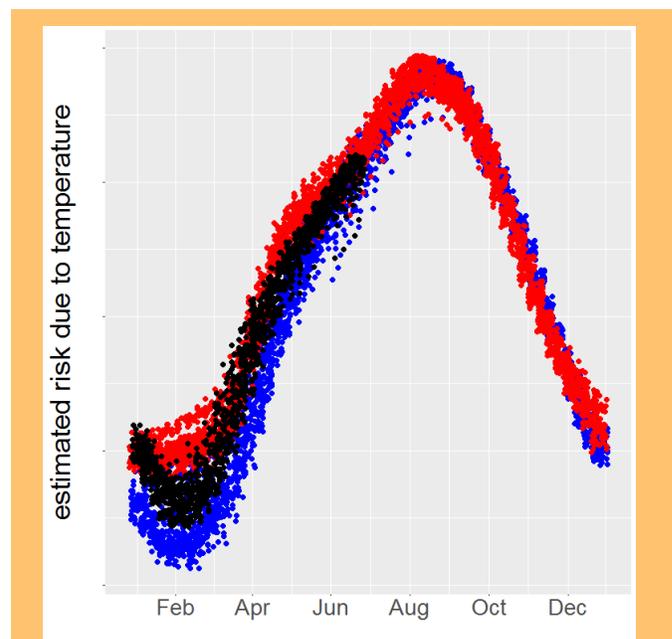

Figure 1: Estimated risk due to temperature for all counties. Higher means more human cases, and is generally associated with warmer temperatures. Each dot represents the risk for a county on that day of the year, with 2011 (blue), 2012 (red), and 2016 (black).
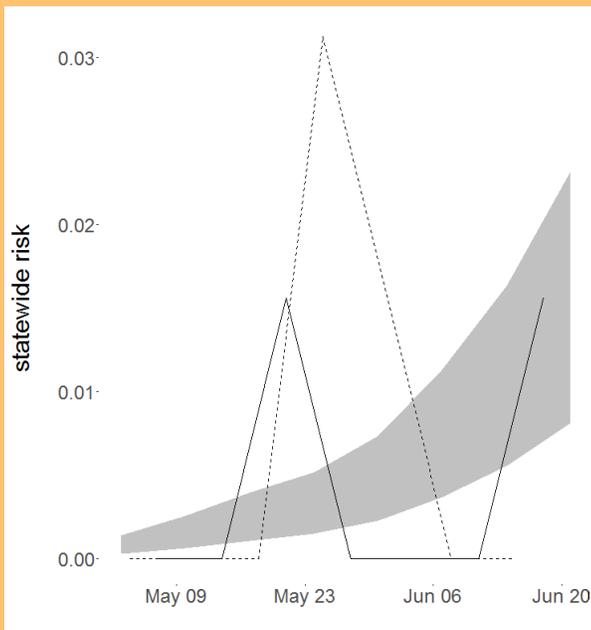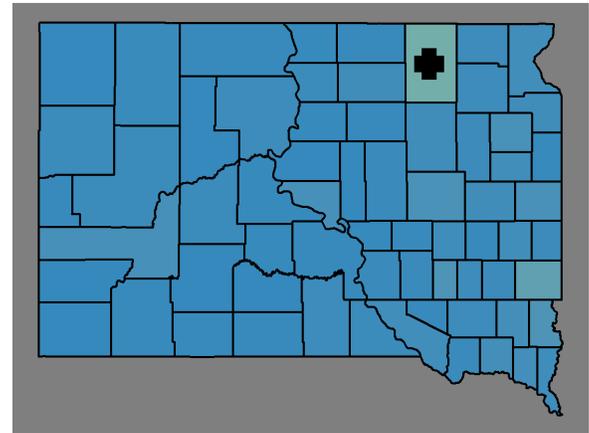
Figure 2: Estimated statewide risk (band) compared to actual risk in 2012 (solid) and 2015 (dashed).

Figure 3: Estimated per-county risk for the week of June 20th—26th[th]. The + indicates Brown County, with the highest risk.

The estimated per-county risk is displayed in Figure 3. The map this week is still mostly flat and blue, indicating that no county is very likely to report cases. This map will change rapidly in the coming weeks. Brown County has, for example, risen to an estimated 12.4% (~1 in 8) chance of reporting a case, up from 7.0% in the previous week.

This county is followed by Minnehaha (7.8%), Lincoln (3.9), Hughes (3.8), and Davison (3.1) counties. Only 1.5% of cases have ever been reported before June 26th in any year. These were from Brown County (5), Hughes (4), Minnehaha, Davison, and Pennington (2 each), and twenty other counties (1 each).

Therefore, while overall risk is still low and the spatial distribution of cases is set mostly by population, it is not impossible to see early cases spread throughout the state.

The estimated per-person risk, in Figure 4, is almost completely unchanged from the previous week's predictions. Sanborn County continues to have the highest per-person risk. Custer and Davison are lowest due to elevation, lower temperatures, while Minnehaha has the next lowest due to its predominately urban Sioux Falls.

In future weeks this map will change in response to weather events that impact any areas of the state unevenly; e.g. if the western half of the state received high precipitation, this might enhance the risk in this area.
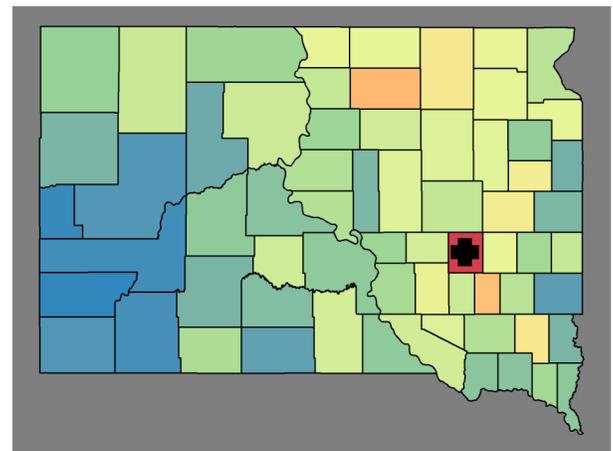
Figure 4: Estimated per-person risk for the week of June 20th—26th. The + indicates Sanborn County, with the highest risk.

For more info, visit mosquito.sdstate.edu, or write to michael.wimberly@sdstate.edu or michael.hildreth@sdstate.edu.