SOUTH DAKOTA MOSQUITO INFORMATION SYSTEMS Week of July 18, 2016

The West Nile Weekly

SUMMARY: Four to eight counties are expected to report at least one human case. Due to lower temperatures and rain, some counties in the east have fallen in risk this week, but this is expected to reverse as temperatures again rise above normal. By the 24th, we will be 1/6 of the way through total 2016 cases.

How's the weather?

Statewide temperatures may have halted their downward trend (Figure 1). This brief dive put us back to mid-June if we measure the WNV season by temperature rather than time, and has lowered the risk of human WNV cases in the week of July 18th - 24th.

Nearly the entire state has received recent precipitation, reversing a trend of dryness in some areas. A series of thunderstorms between July 1st - 7th dropped 3-4" of total precipitation the southwest and 1-2" near Pierre and some counties east of the Missouri.

What to expect?

Estimated statewide risk has risen to 8.1% for the week of July 18th - 24th. Around 4.5% of cases occur during this week of the year, and 16.5% of all cases have occurred before the 24th. That is, if we measure by human cases, by the end of next week we will be 1/6 of the way through the WNV season.

We expect four to eight counties to report a human case during this week, which is a slight increase over the three to seven counties estimated last week. However, not all counties have risen in risk; e.g. Brown County has an estimated 48.2% (1 in 2) chance of reporting at least one case this week, falling from 59.2% in the previous week. This difference requires some explanation - why has Brown fallen in risk while the state as a whole has crept slightly up?

In figures like Figure 1, we have only considered statewide averages, and the spatial pattern of temperature is more complicated. Specifically, counties on the south and western borders of the state have carried the brunt of high temperatures over the past month. Some eastern counties, including Brown, have been cooler than their western counterparts.

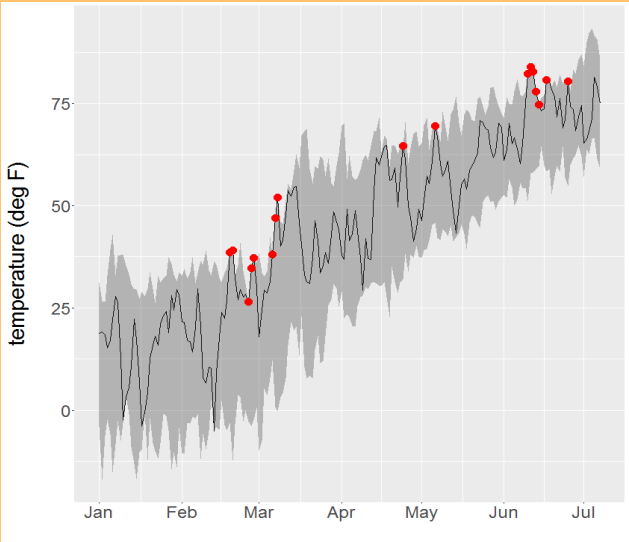

Figure 1: Mean daily temperatures in SD (line) with min/max over 2004-2016 (band). Circles indicate a new record high was set in 2016.

So while Brown County still has the highest risk (Figure 2), it has fallen back into the pack, and average risk is still rising for the state as a whole. We continue to hear that temperatures should again rise above normal for all areas of the state in the coming weeks, and risk will climb again for all counties.

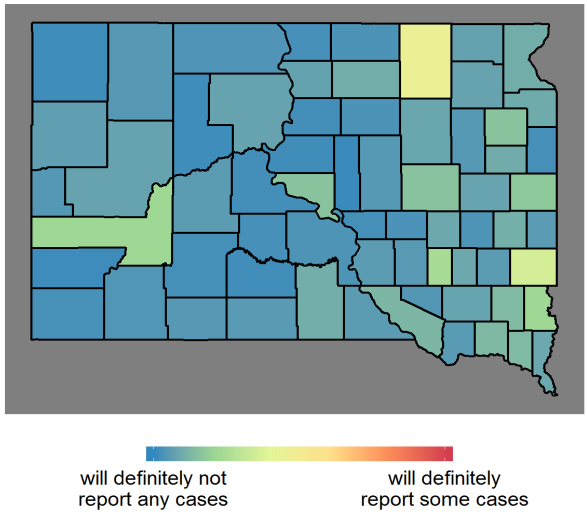

Figure 3: Estimated risk for the week of July 18th - 24th. Brown County continues to have the highest risk of any cases.

We continue to recommend adulticides, larvicides, and breeding habitat destruction now rather than later. Moisture is available for pools, especially after the series of thunderstorms that passed through the state during the week of July 4th, and any disruption of the mosquito now can help to prevent human cases later.

What's going on elsewhere?

TX has reported its first neuroinvasive case of 2016 in Dallas. CA still reports no human cases, but the number of dead birds, positive pools, and positive sentinel chickens are all more than twice what is expected. MA reported its first positive mosquito pools.

Is this a tropical disease?

West Nile virus is studied primarily by specialists in tropical medicine and has occasionally been called a tropical disease, but this can be misleading. WNV does have a tropical history - the virus was first identified in the West Nile region of Uganda in the 1930s.

However, the virus is not restricted to tropical regions. Up to a third of humans surveyed in Egypt in 2010 showed signs of exposure, and the country is mostly hot desert. In a rural area of Turkey with moderate climate, around 1 in 25 had signs of exposure.

Closer to home, nearly 1 in 7 residents surveyed in Wyoming were positive for antibodies after the 2003 outbreak, and Wyoming is hardly tropical. A survey in Texas after the 2012 epidemic showed that around 1 out of 55 had been exposed, and droughts in the area, rather than tropical conditions, have been blamed for increases in prevalence.

In our own back yard, it is estimated that by 2010 up to 13.3% of the SD population had been infected with WNV at some time, the highest incidence in the country, but our state can hardly be called tropical.

While the virus is certainly most prevalent in humans in tropical regions and has a longer history there, it also circulates in other locations. Climate change is expected to expand the areas of WNV risk in Europe and elsewhere. Dengue, Chikungunya, and Zika are transmitted primarily by *Aedes* mosquitoes and can still be called tropical diseases, but WNV is now essentially global.

What about domestic animals?

Horses are dead-end hosts; while they may contract infections, even deadly neuroinvasive infections, they do not tend to pass the virus back to mosquitoes. Fortunately, a vaccine exists for horses.

Domestic cats can contract infections from eating infected mice, but neither cats nor dogs tend to show symptoms. In other studies, dogs had mild muscle inflammation, and there is a report of fatal disease in a dog with a pre-existing disease. Animals kept outside are at higher risk of infection, but because neither cats nor dogs tend to develop symptomatic disease, no special care is warranted for WNV in particular.

Cattle, sheep, and mules, along with goats and alpacas, seldom show signs of infection and - like humans - seem to only rarely develop neuroinvasive illness.

This does not mean all farmed populations are safe. For example, more than 1,000 farmed alligators fed infected horse meat died en masse in the early 2000s.

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