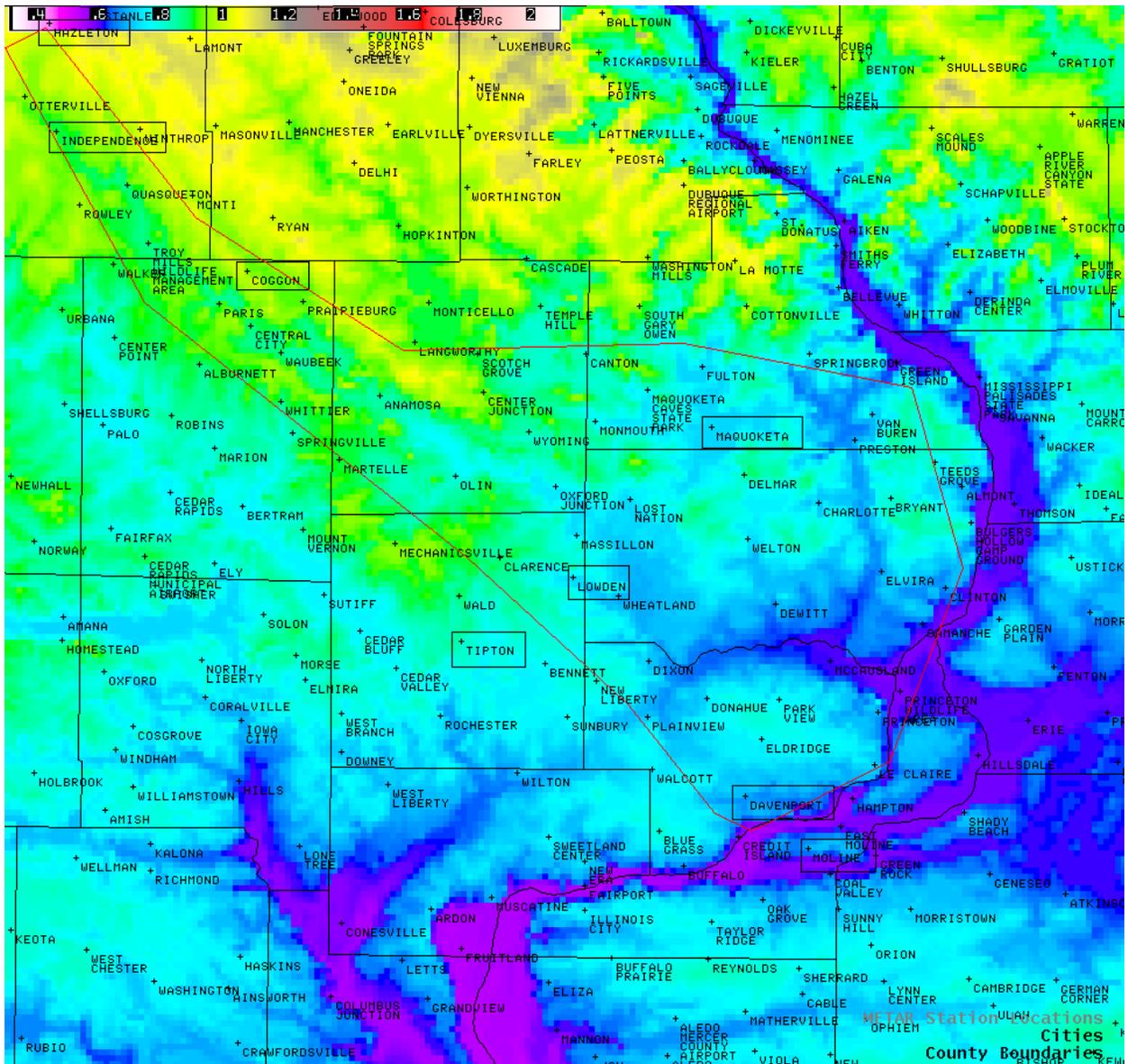


Wapsipinicon Valley Radiational Cooling Effect

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One microclimate within the WFO Quad Cities county warning area is the Wapsipinicon River Valley. In the grand scheme of things elevation changes little in eastern Iowa: from about 1100ft in east central Iowa to around 500ft near the banks of the Mississippi River. Much in the same way, the Wapsi Valley has very little elevation change, with ridge tops above the river around 200ft higher than the valley floor. However, these few hundred feet have a large impact on sensible weather, especially when it comes to low temperatures. When conditions are favorable for radiational cooling (clear skies and light winds – especially in association with a nearby ridge of high pressure) the Wapsi Valley is often cooler than surrounding locations by more than a few degrees. From the northern edge of the CWA, near Hazelton, through Independence, Coggon, Lowden and eventually to the Mississippi, daily low temperatures will come in as some of the coldest across the CWA (see Figure 1. for location of valley and cities). As one moves downstream the valley widens and begins to branch out in all directions, encompassing the towns of DeWitt and Maquoketa with some of the tributaries. Even the WFO can experience colder temperatures as a result of the cold air drainage in the valley. During the record cold of early 2009, the Wapsi Valley had some of the coldest readings anywhere in the CWA. ON the morning of January 16th, the low at Stanley 4W was -36°F, Independence -33°F, Coggon -40°F, Lowden -37°F, and Maquoketa 4W -36°F. These readings were generally at least 5 degrees colder than surrounding sites (for instance Lowden -37°F and only about 10 miles away Tipton 4NE -27°F), some of which included other river valleys. The microclimate is not confined to winter either, as when summertime conditions favor radiational cooling the Wapsi Valley will react in a similar way. Also, aside from morning low temperatures, it can also have an effect on other sensible weather, like fog development. River valleys are well known for fog development, and the Wapsi Valley is no different. However, with this valley often times being 5 degrees or more colder than surrounding sites, fog may first appear there or occasionally only appear there. It is something to be cognizant of, because guidance struggles to capture the detail. Especially since the Wapsi Valley lies between climate sites, there is only one AWOS near the valley, Independence (IIB), and COOP reports only come in once a day, data can be sparse at times. Often times it can affect operations as across the Quad Cities there can be quite the range in



temperatures. Davenport, IA (DVN) will often be 5 to 10 degrees colder than Moline, IL (MLI), which is only 10 miles south. Therefore it is important for forecasters to recognize the microclimate, and impacts it has on one of the more populated regions of the CWA.

Figure 1. Wapsipinicon Valley and surrounding towns. The towns mentioned in the text are outlined in boxes and the Wapsipinicon valley is outlined in a polygon.