

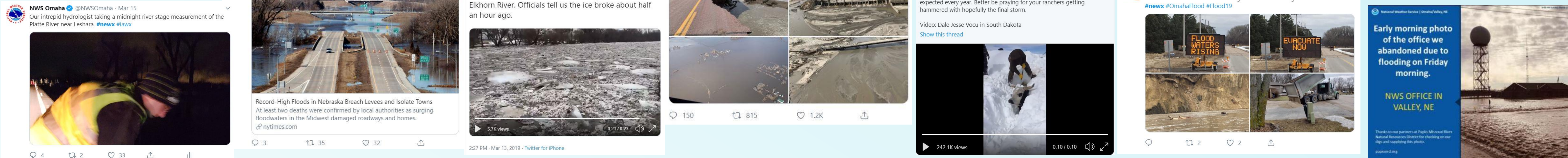


March 2019 Rapid Snowmelt, Heavy Rain, and Ice Jams Lead to Catastrophic Mid-America Spring Flooding and the Evacuation of the NWS Omaha, NE Office

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Tweet Gallery



Event Overview

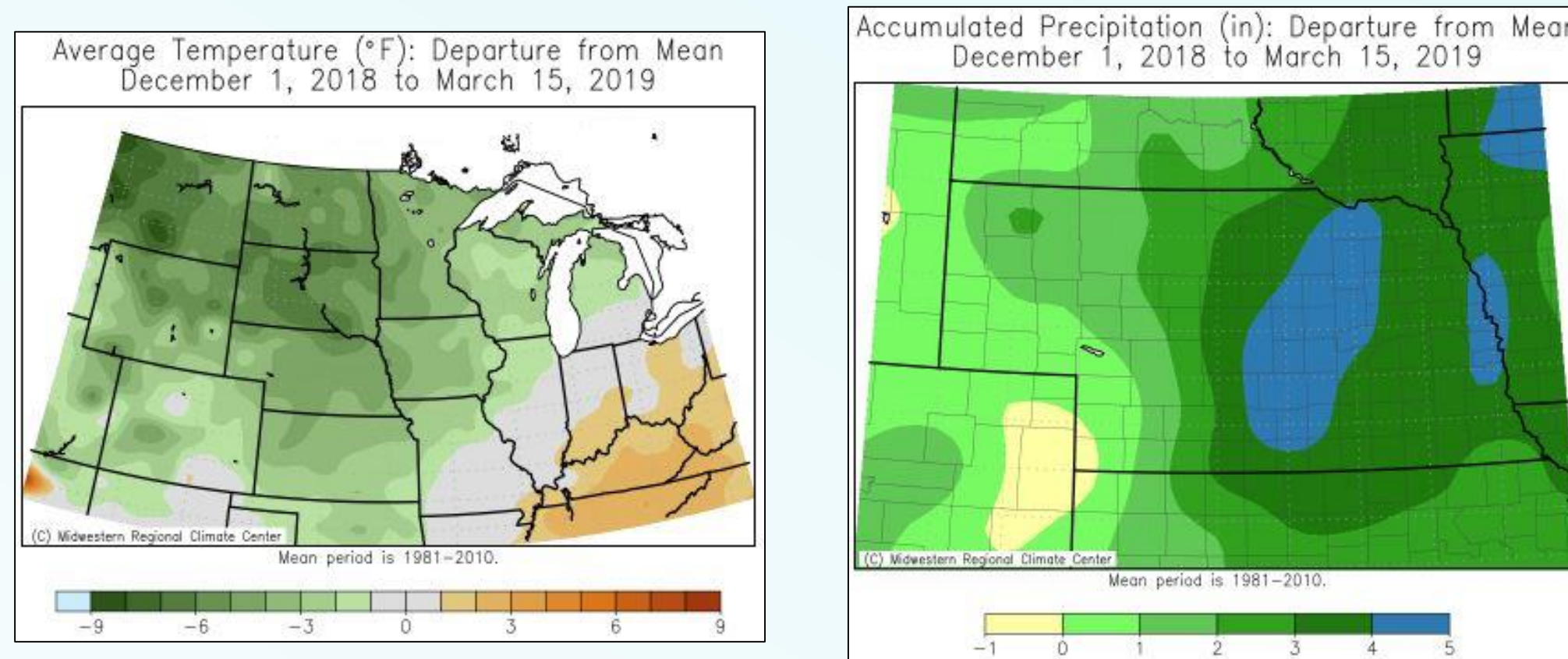
The conditions that came together for the March 2019 flooding event were historic and life-changing with long-lasting effects. The Governor of Nebraska, Pete Ricketts, called the flooding the "most widespread destructive natural disaster to hit Nebraska".

Prior to the commencement of flooding...

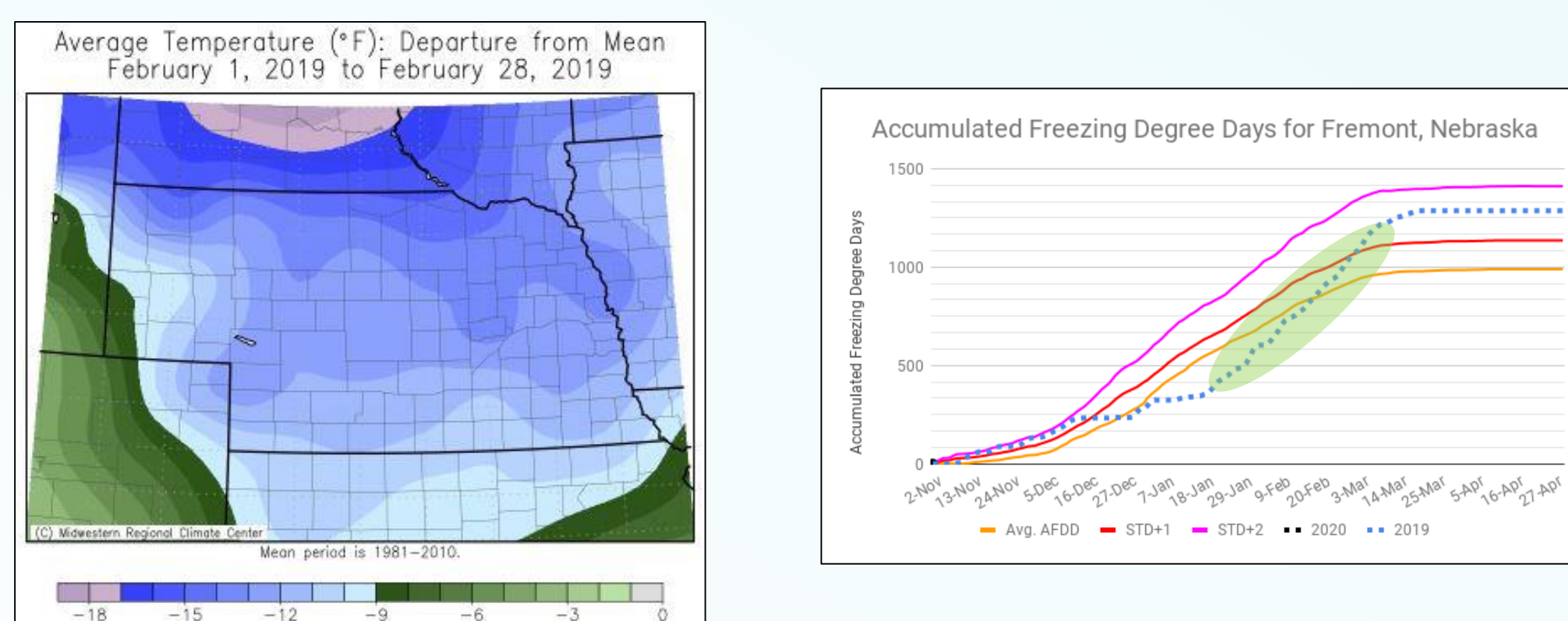
- Rivers were already elevated/2018 was a wet year
- There was an early onset of winter
- Below normal temperatures/more snow than usual in October-December
- Coldest and snowiest February on record for some
- The snow/sub-freezing temperatures persisted into early March and resulted in excessive river ice growth with no snow melted by 10 March
- Snow depths averaged between 4 and 16 inches
- Snow water equivalents ranged from 1 to 4 inches

Antecedent Conditions

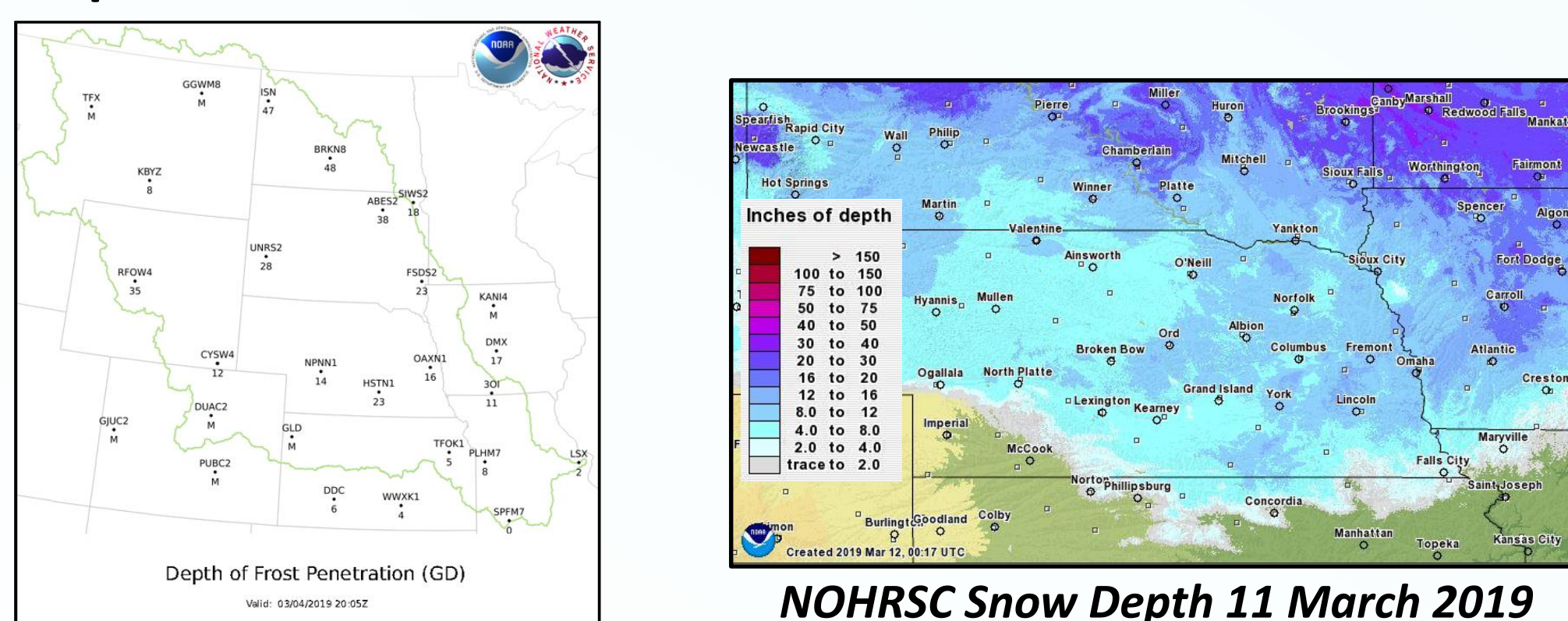
2018 was a wet year as official eastern Nebraska climate sites record well above-normal precipitation. Omaha was +6.20", Lincoln +6.69", and Norfolk +5.98". The first snow of the winter of 2018-2019 was on October 14, a month earlier than normal. This stretch of only 181 days between the last and first snow was the shortest on record. Although the late fall (October and November) had below normal temperatures, both December and January had above normal temperatures.



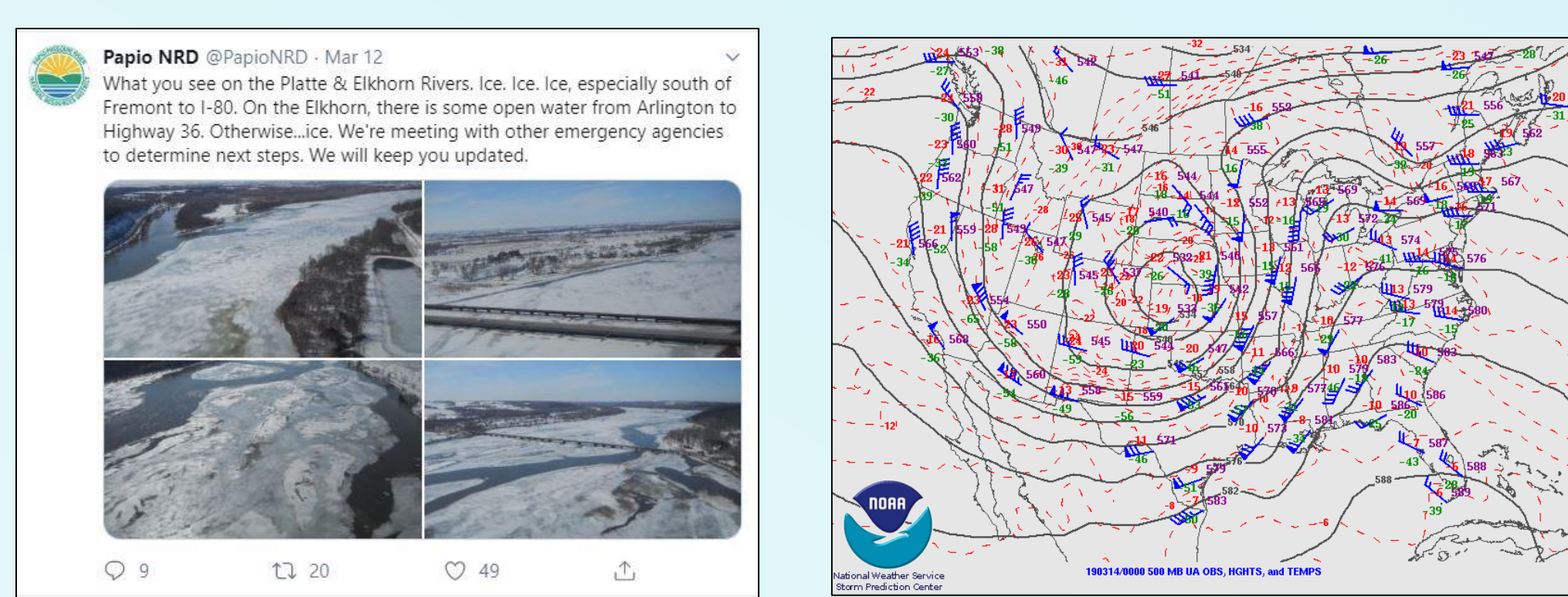
The entire region experienced below normal temperatures for the period 1 October 2018 through 15 March 2019. Precipitation was 3 to 5 inches above normal.



February brought average monthly temperatures of 10 to 12 degrees below normal along with all-time record snow amounts. Compared to normal, there was a large increase in freezing degree days and frost depth from January to March. Prior to the flooding, snow depths were 4 to 16 inches, frost depths were 1 to 2 feet, and snow water equivalents were 1 to 4 inches.

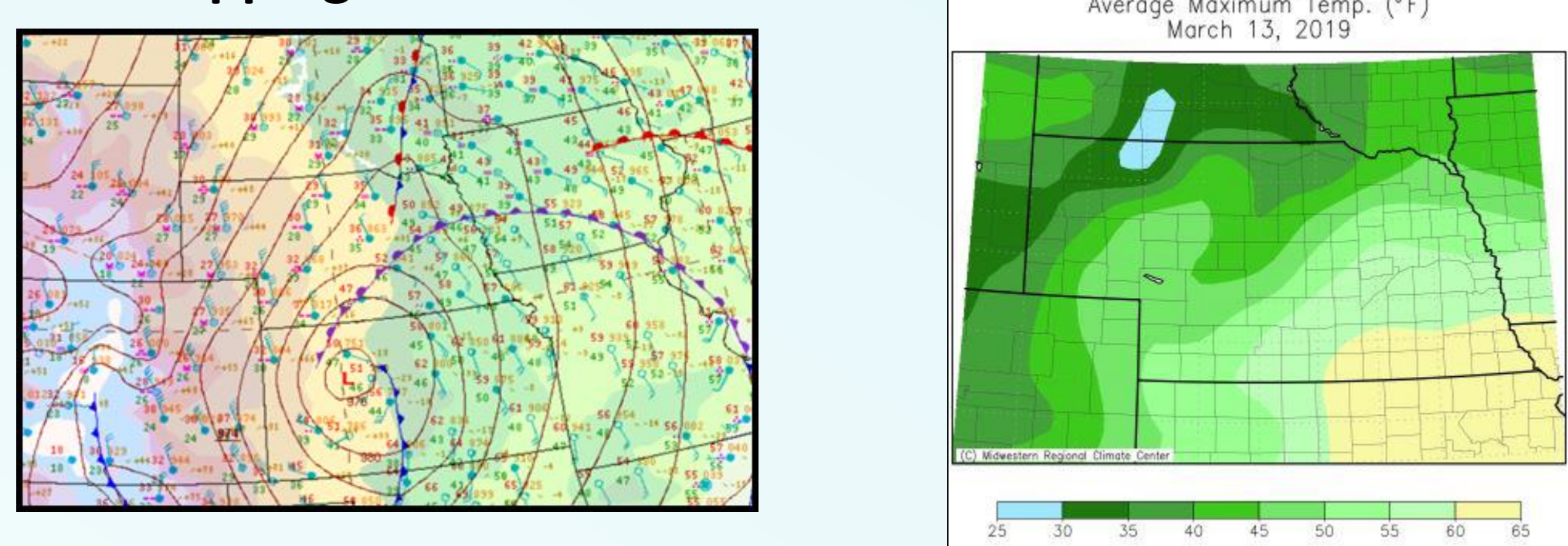


The Bomb Cyclone – The Catalyst



- Ice and snow everywhere 12 March 2019
- No snow 12Z 14 March 2019 across the OAX CWA
- Frozen ground – rain and snowmelt could not soak in

The March bomb cyclone produced 1 to 3 inches of rainfall across eastern Nebraska, wind gusts over 50 mph, dense fog, and warm temperatures that melted the snow pack. With near 100% runoff, the water quickly swelled local creeks, rivers, and streams. The ice jam break-ups further contributed to the high water and forced levee overtopping and failures.

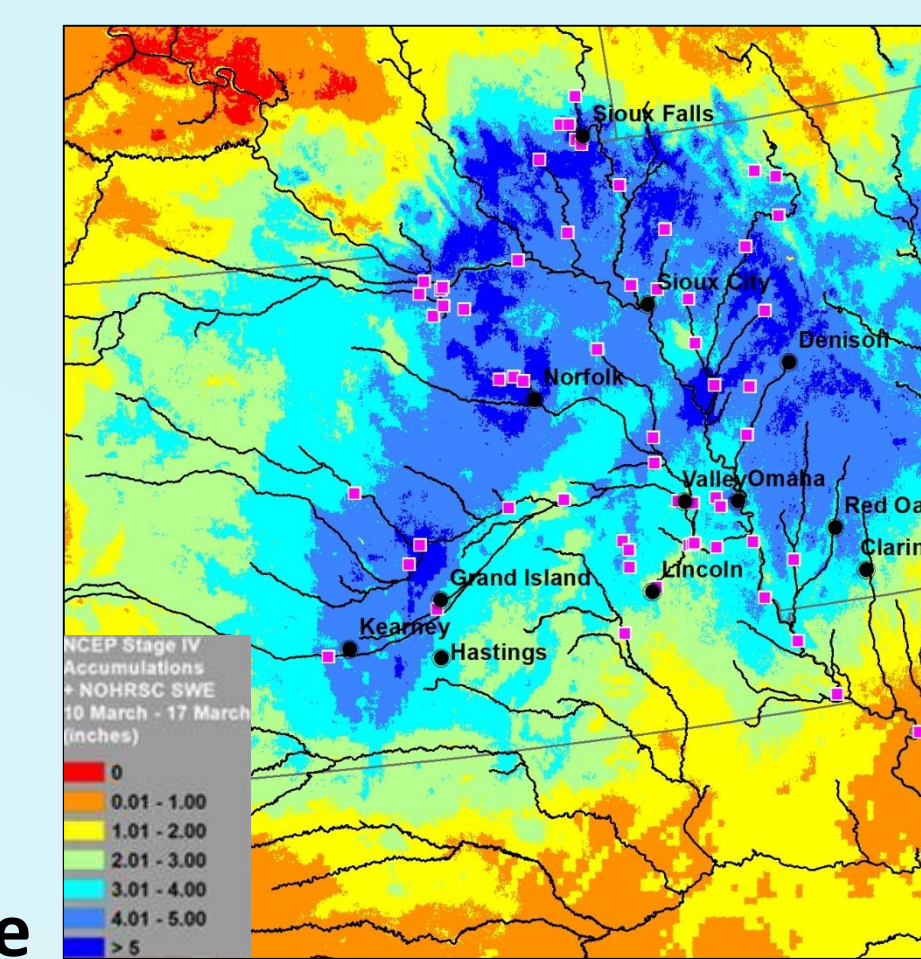


Impacts – Lives/Livelihoods Lost

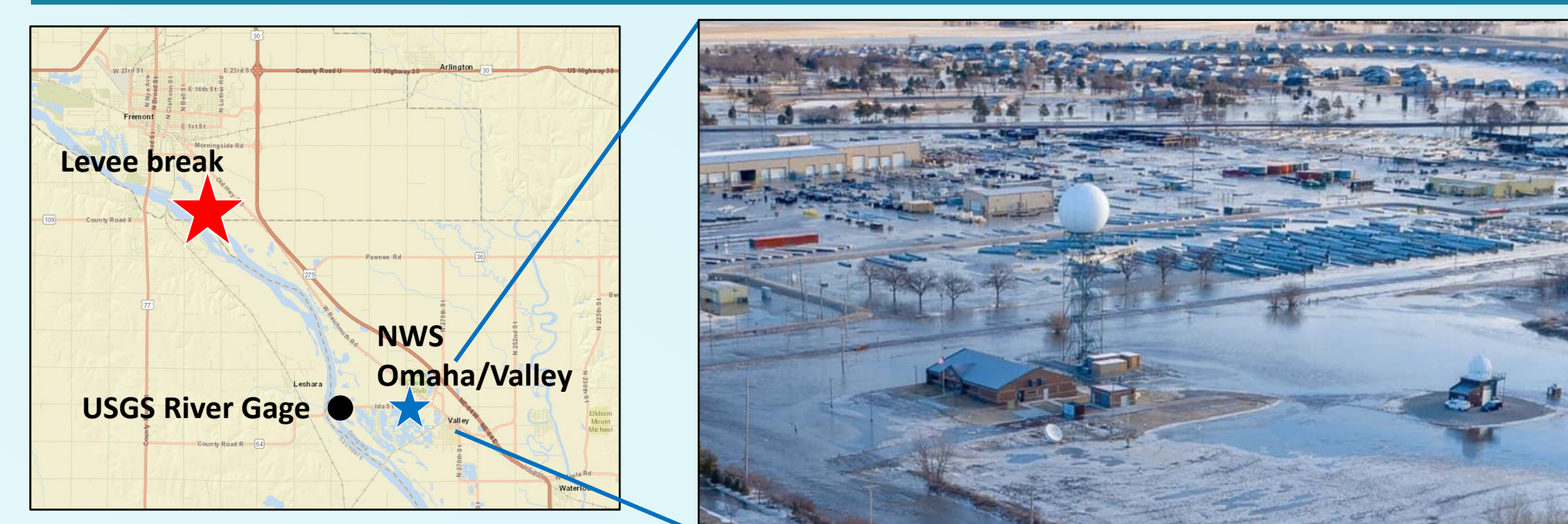
- Five lives lost/112 people rescued -NE National Guard and many more rescued by local first responders
- At least US\$1.3B in Nebraska and US\$1.6B in Iowa in damage/losses due to flooding
- AON estimates regionally total economic losses US\$4.0B and US\$1B in claims
- Offutt Air Force Base - \$420M in damage
- 3300 mi of closed highways during the storm and 200 mi of roads (NE) & 27 bridges damaged/destroyed
- Major Disaster Declaration – 104 cities and 81 of 93 counties in Nebraska and 56 of 99 counties in Iowa

Impacts - River Flooding/Levee Failures

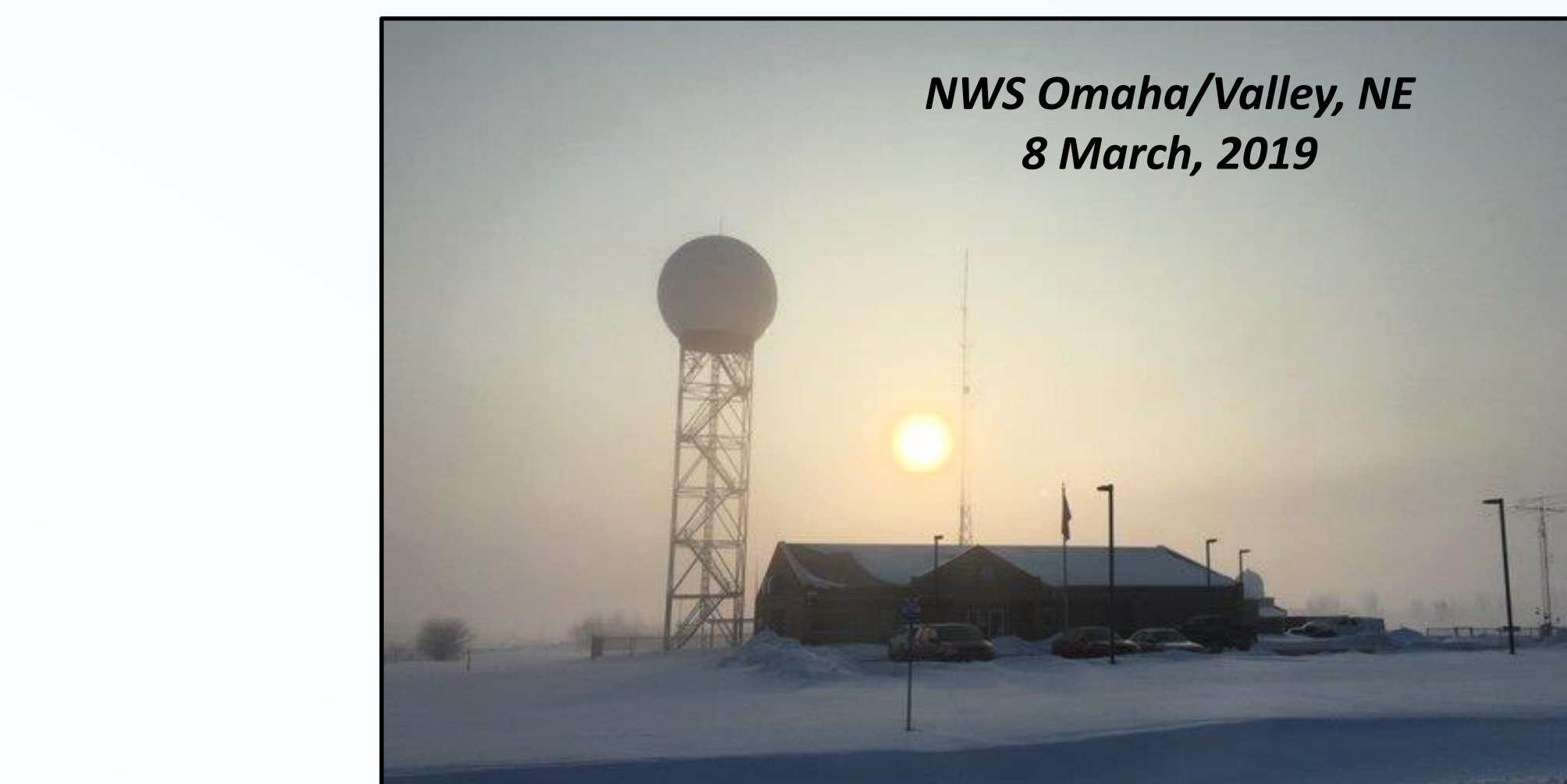
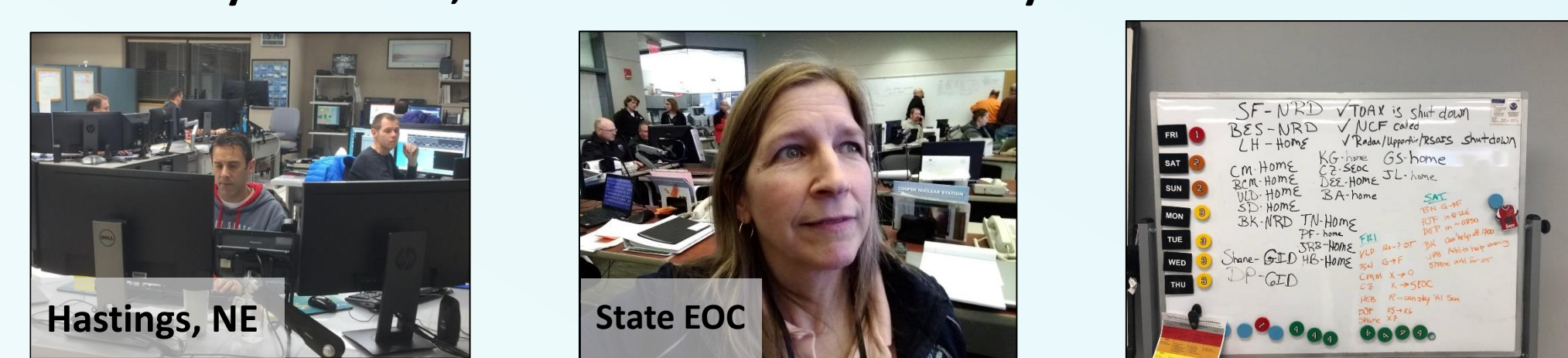
- 35 all-time record crests
- 47 federal levees failed
- 350 miles of levees on the Missouri, Platte, Elkhorn rivers and tributaries experienced significant damage
- 75 of 115 gages reached flood stage (OAX HSA)
- 21 exceeded major flood stage and 23 crested in moderate flood - 31 reached minor flood stage



NWS Omaha/Valley, NE Evacuates



- ✓ Wed. 13 March - 3:40 pm 2mi. long ice jam forms at the confluence of the Platte and Elkhorn Rivers.
- ✓ Thur. am 14 March – High Platte River stages and ice flow moves the ice jam out that morning.
- ✓ Thur. 11:30 pm 14 March – Papio NRD observes Platte River overtopping the Union Dike north of Valley .
- ✓ Fri. 6-8 am 15 March – Valmont workers report water over Hwy 64/NRD concludes a dike breach and contacts the Mayor of Valley.
- ✓ Fri. 9:30 am – NWS Omaha/Valley confirms levee breach.
- ✓ Fri. 11 am – NWS Omaha/Valley evacuates the office and executes the Continuity of Operations Plan.
- ✓ Fri. 1:30 pm – OAX Staff arrives at Hastings NWS to resume forecast and warning operations. The staff splits operations between Hastings, the State EOC, and the Papio-NRD/US Dept. of Agriculture.
- ✓ Friday 22 March, - OAX staff returns to Valley NWS location.



NWS Omaha/Valley, NE 8 March, 2019



The Platte River near Ashland 10 March, 2019 Above And 16 March, 2019 Right

The 12-14 March "bomb" cyclone produced 1 to 3 inches of rain. The rapid warm-up and runoff from snowmelt caused the river ice to break up. The ground was deeply frozen, leading to nearly 100% runoff. These factors combined to result in widespread catastrophic flooding.

Acknowledgements

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