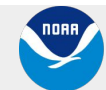




WPC Winter Weather Experiment NBM Evaluation

18-19 January 2023 Snow and PTYPE Event Nebraska to Iowa

**David Stark
Lead Meteorologist
National Weather Service New York, NY**





Impacts from the Event



NWS North Platte @NWSNorthPlatte

Aftermath of 2 feet of snow (and much higher drifts)...
Hwys 40 & 47 south of Arnold #NEwx



4:53 PM · Jan 19, 2023 · 5,488 Views



NWS North Platte @NWSNorthPlatte · Jan 18
Relayed from Buffalo County Emergency Management:

Darrin Lewis @BuffaloCoNeEM · Jan 18

Custer Co EM is requesting Interstate travelers seeking alt routes NOT to travel North thru Custer county. They have had 24 inches of Snow with Drifts blocking the roads. There is NO ROOM in the INN. Hotels are full there is no route north or west out of Custer Co at this time.

1 3 17 3,196



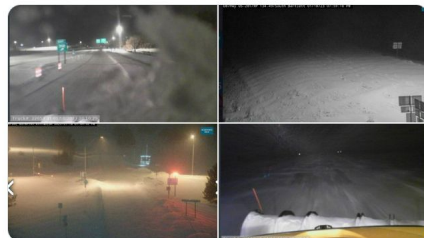
Nebraska DOT @NebraskaDOT · Jan 18

Travel/Weather Update

Snow continues to fall in parts of Nebraska. Roads may be snow-packed & icy. Travel is not advised.

Weather permitting, crews will clear roads to possibly open Thursday around mid-day if conditions allow

Latest road updates 511.nebraska.gov



Nebraska 511 and 6 others

2 14 39 18.7K



NWS North Platte @NWSNorthPlatte · Jan 19

Yesterday we received 13.9 inches of snowfall which is n highest daily snowfall for LBF! It replaces the old record March 21, 1894. #newx

1 9 22 2,378



NWS Omaha @NWSOmaha

For the snow lovers in the I-80 corridor, we tried our best. But that wildcard of mixed precip and dry air that we've been talking about since yesterday came true. Snap! That 0.43" of liquid in Omaha would have been 4-5" if it had been all snow. 1 degree makes a big difference!

7:03 PM · Jan 18, 2023 · 97.4K Views



NWS Omaha @NWSOmaha · Jan 19

We've had a few reports of slide offs in the Omaha area, with hazardous travel conditions continuing across northeast Nebraska and northwest Iowa. Be sure to take it slow if you have to travel this morning.



National Oceanic and Atmospheric Administration

U.S. Department of Commerce

WPC WWE
NBM Evaluation

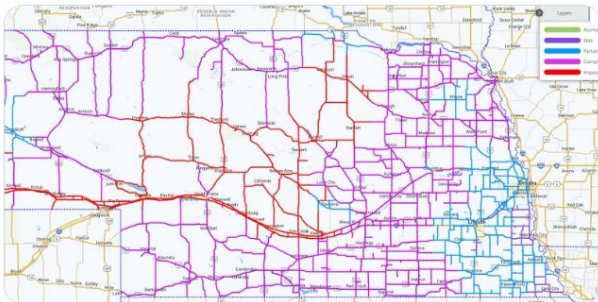


Impacts from the Event



NWS Hastings @NWSHastings · Jan 19

Despite A LOT of work being done by @NebraskaDOT, still lots of red on the road condition map, meaning those roads are closed or impassable as of early Thursday. Be patient. Be safe.



6 5 1,869



NWS Hastings @NWSHastings · Jan 19

We received nearly a foot of snow here at NWS Hastings with our latest storm system. Here's a glimpse of the winter landscape from our office this morning. We'd love to hear how much snow you received in your area, and pictures are always welcome! #kswx #newx



NWS Hastings Retweeted



Sara Kirkley @NTVsSaraKirkley · Jan 18

COMMUTE REPORT: Don't be like me.

Took 1 hour, 25 min longer than normal. Zero to no visibility and rarely knew if I was actually on the road on Hwy 30. Trucks/cars/SUVs in the ditch. If you are in a car, you might as well park it in a snow drift now and save the trip. #NEwx



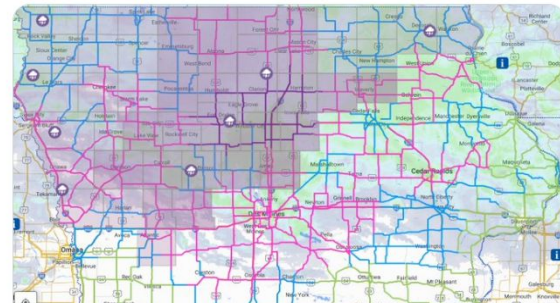
NTV Weather and NTV News

3 10 31 5,552



NWS Des Moines @NWSDesMoines · Jan 18

1/18 10pm: Roads continue to worsen with many areas completely covered, along with some areas of travel not advised in north central Iowa. Please continue to use extra caution on the roads as periods of moderate to heavy snow continue mainly along and north of I-80. #iawx



NWS Des Moines Retweeted



Pocahontas Police @PocahontasPD · Jan 19

At 5a Pocahontas County Deputy Rahn sent photos of N65 and Hwy 3 east of Pocahontas. Use caution on all roads but as you can see N65 is packed with a lot of snow at this time. Make your road choices wisely until plows can make it through. @NWSDesMoines



3 15 4,887



National Oceanic and Atmospheric Administration

U.S. Department of Commerce

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NBM Evaluation

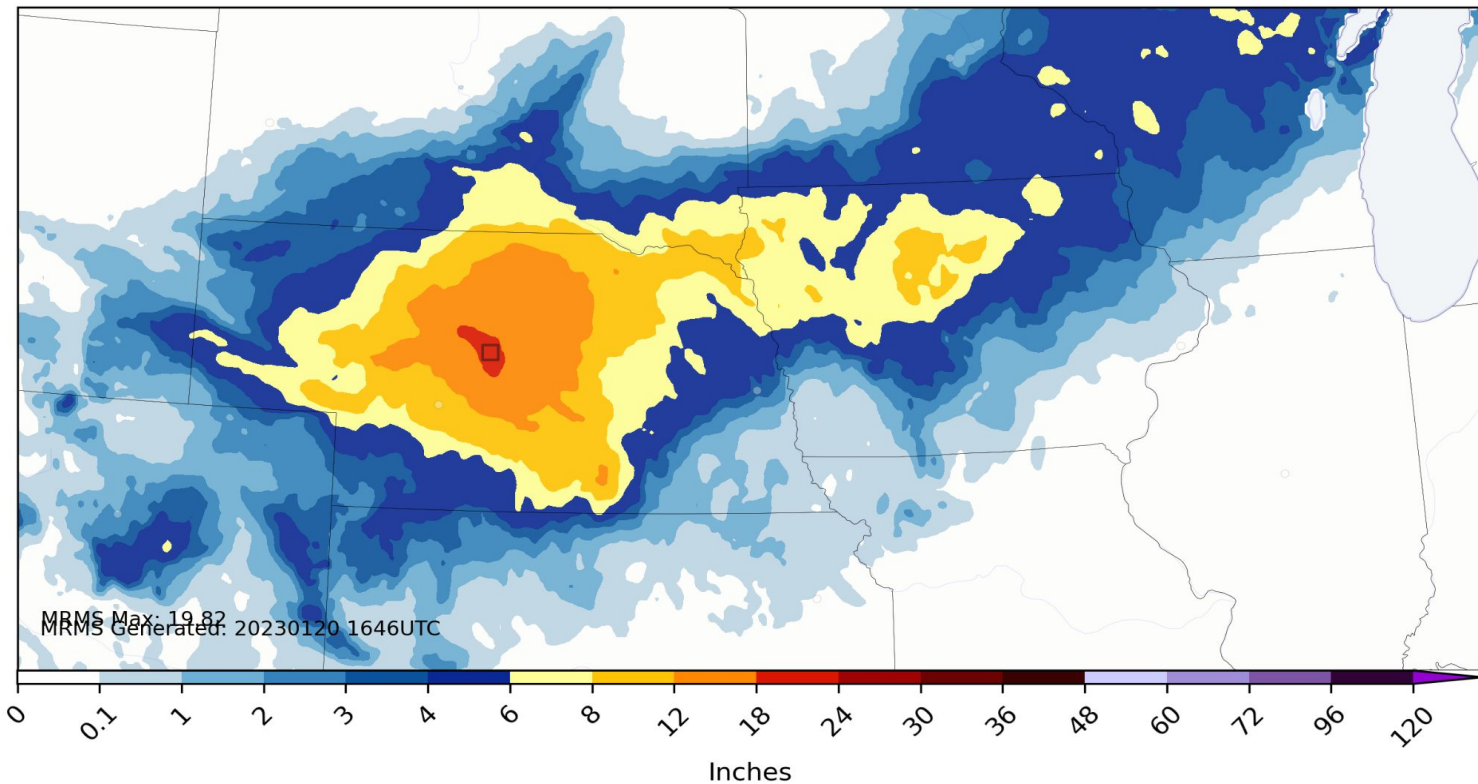


NOHRSC 24-Hour Snowfall

Valid 12z Jan 19, 2023

Valid:20230119 12UTC

NOHRSC Snow 24h



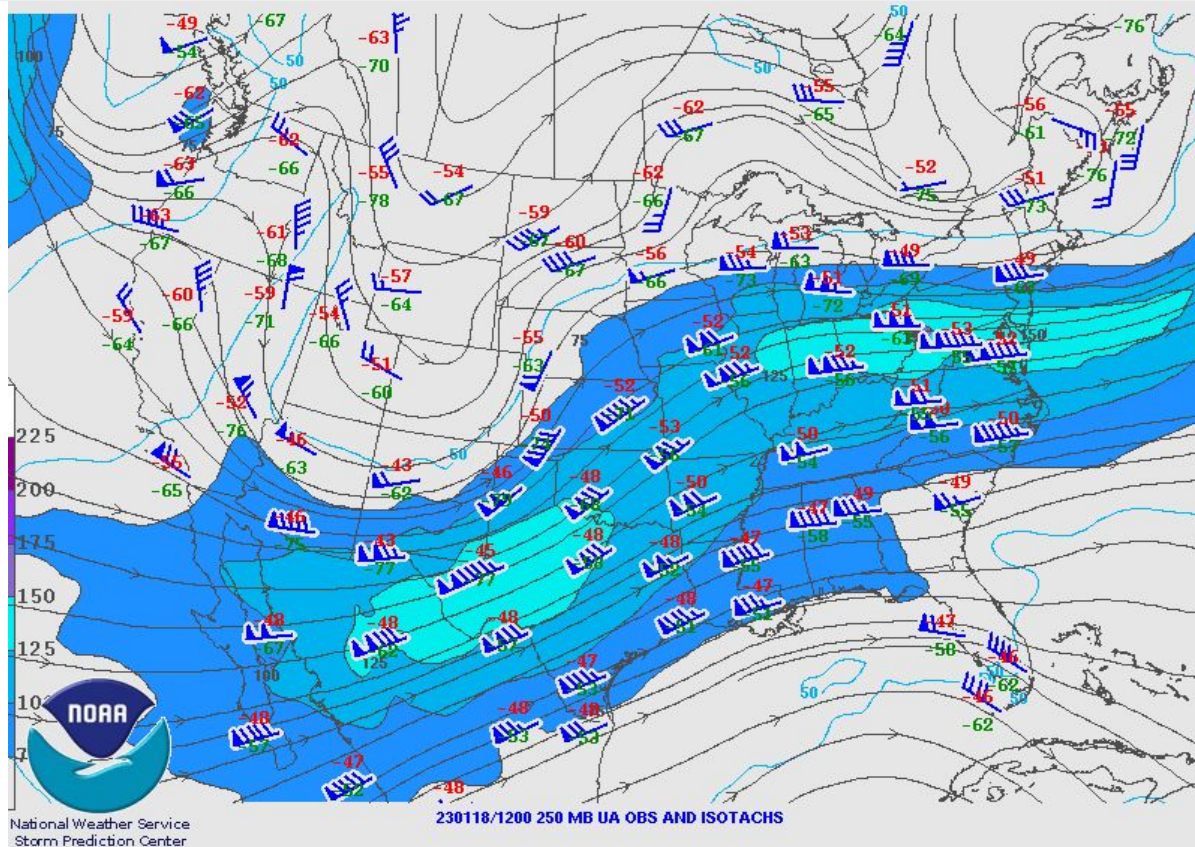
National Oceanic and
Atmospheric Administration
U.S. Department of Commerce

WPC WWE
NBM Evaluation



250 mb Analysis

Valid 12z Jan 18, 2023



National Oceanic and
Atmospheric Administration

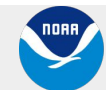
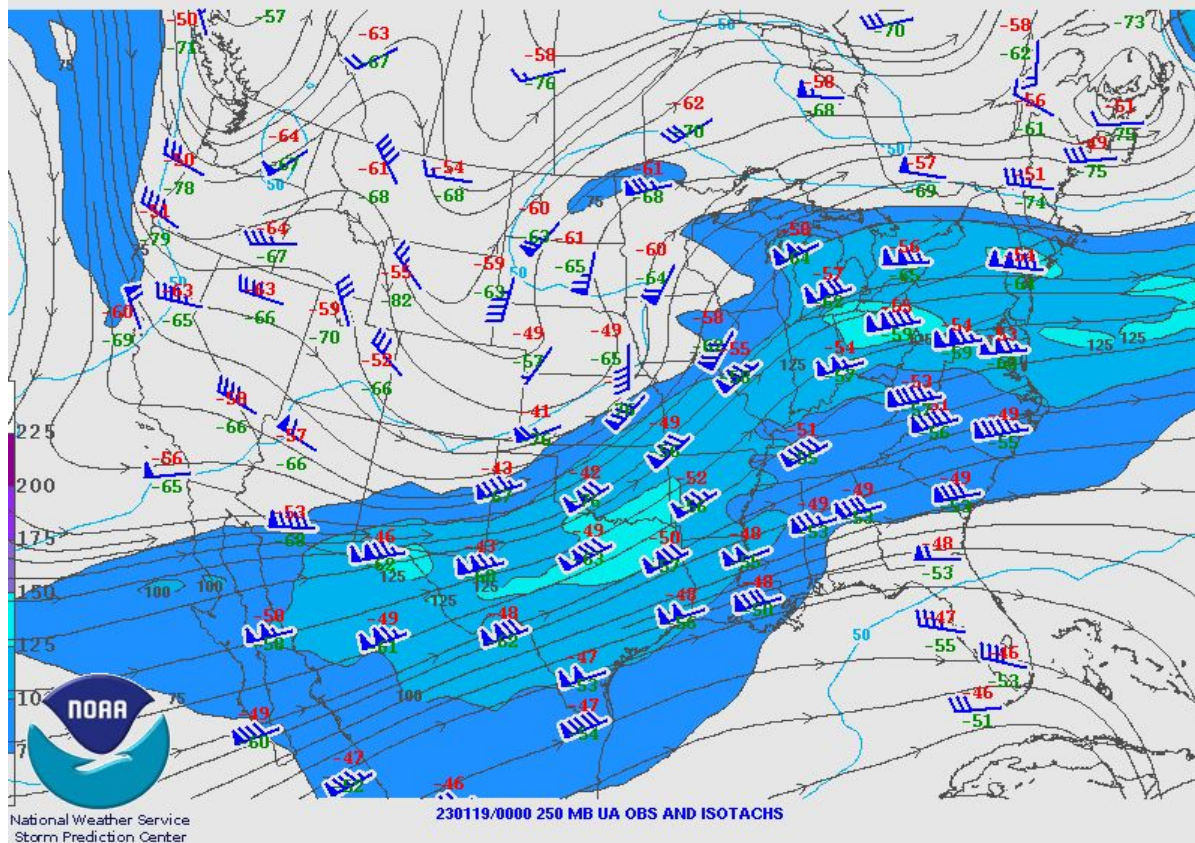
U.S. Department of Commerce

WPC WWE
NBM Evaluation



250 mb Analysis

Valid 00z Jan 19, 2023



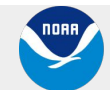
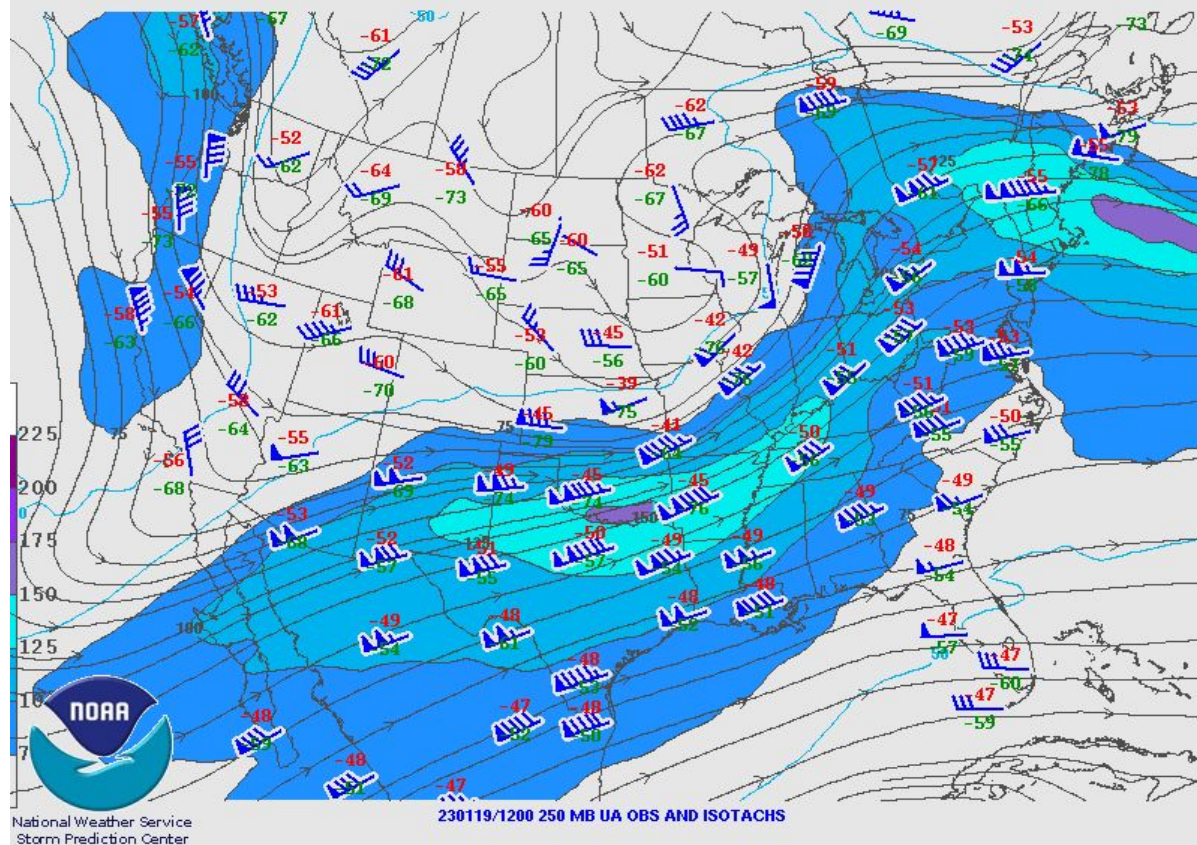
National Oceanic and
Atmospheric Administration
U.S. Department of Commerce

WPC WWE
NBM Evaluation



250 mb Analysis

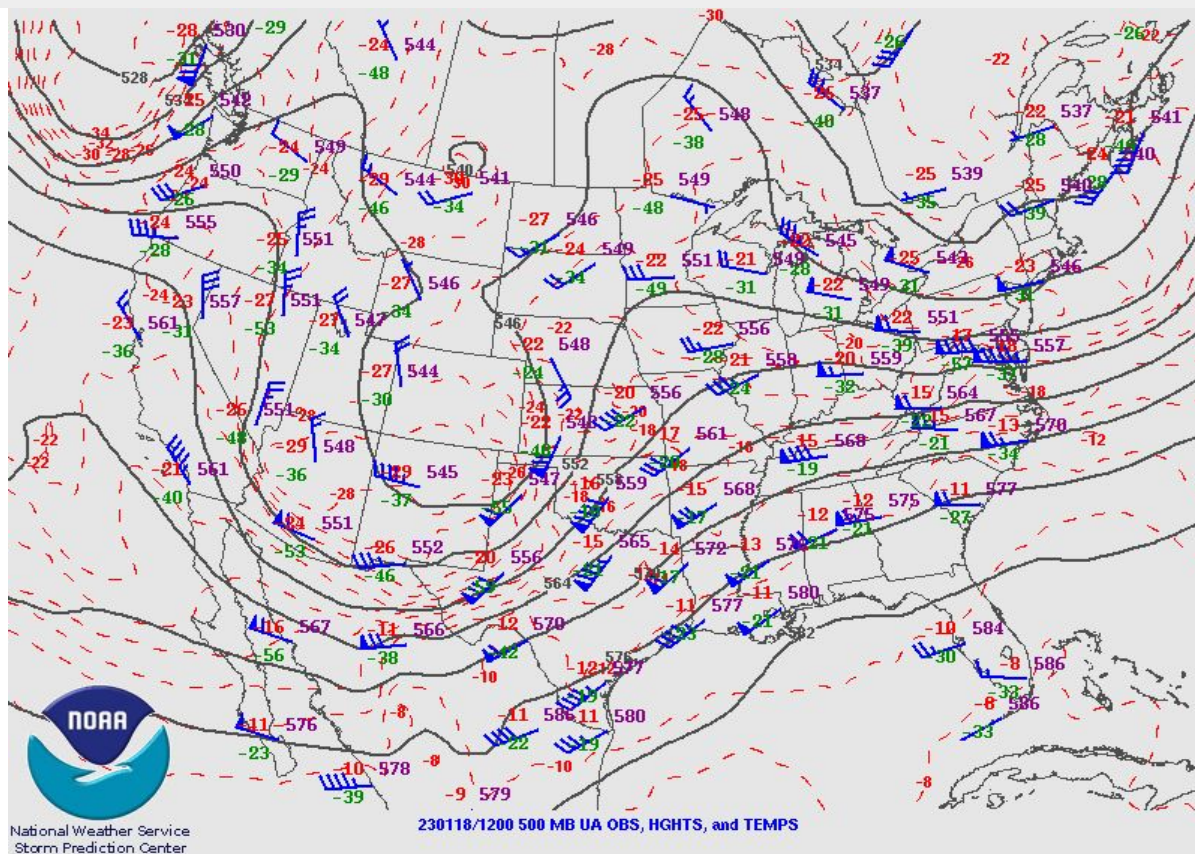
Valid 12z Jan 19, 2023





500 mb Analysis

Valid 12z Jan 18, 2023



National Oceanic and
Atmospheric Administration

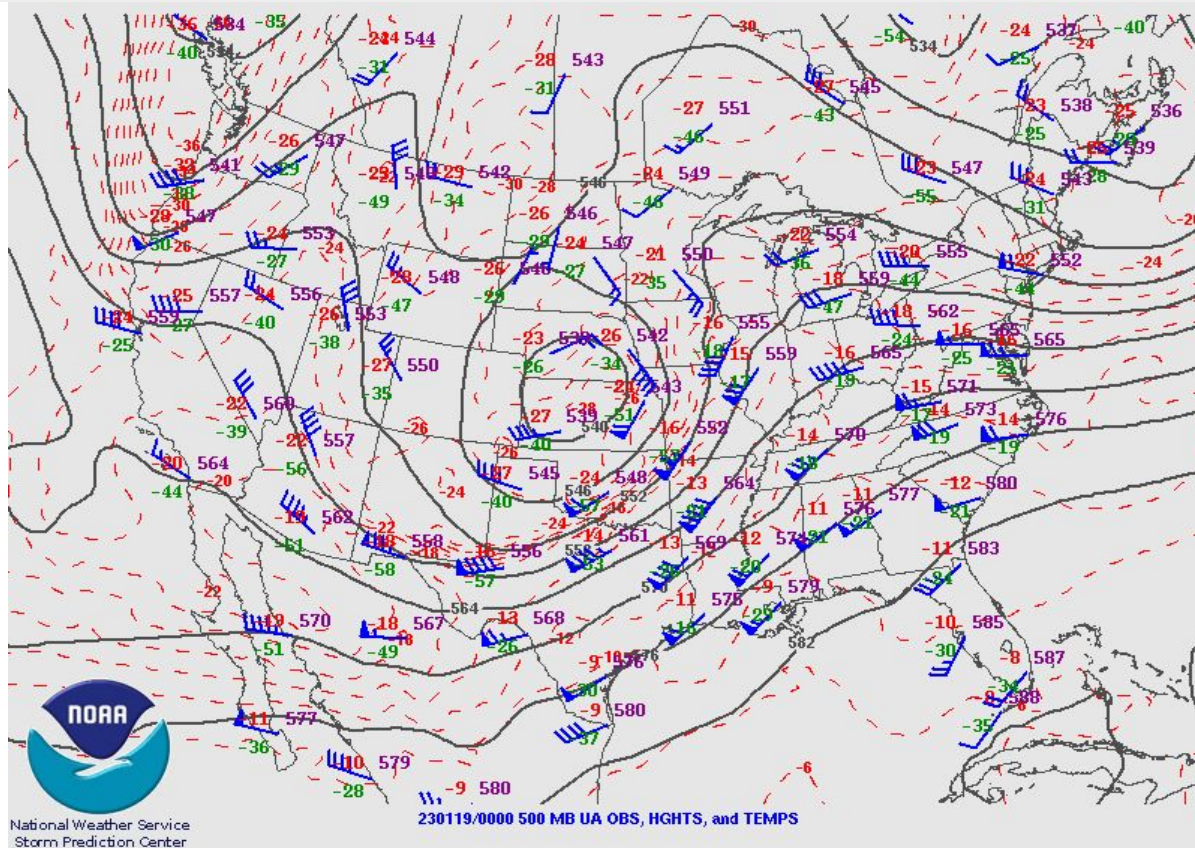
U.S. Department of Commerce

WPC WWE
NBM Evaluation



500 mb Analysis

Valid 00z Jan 19, 2023



National Oceanic and
Atmospheric Administration

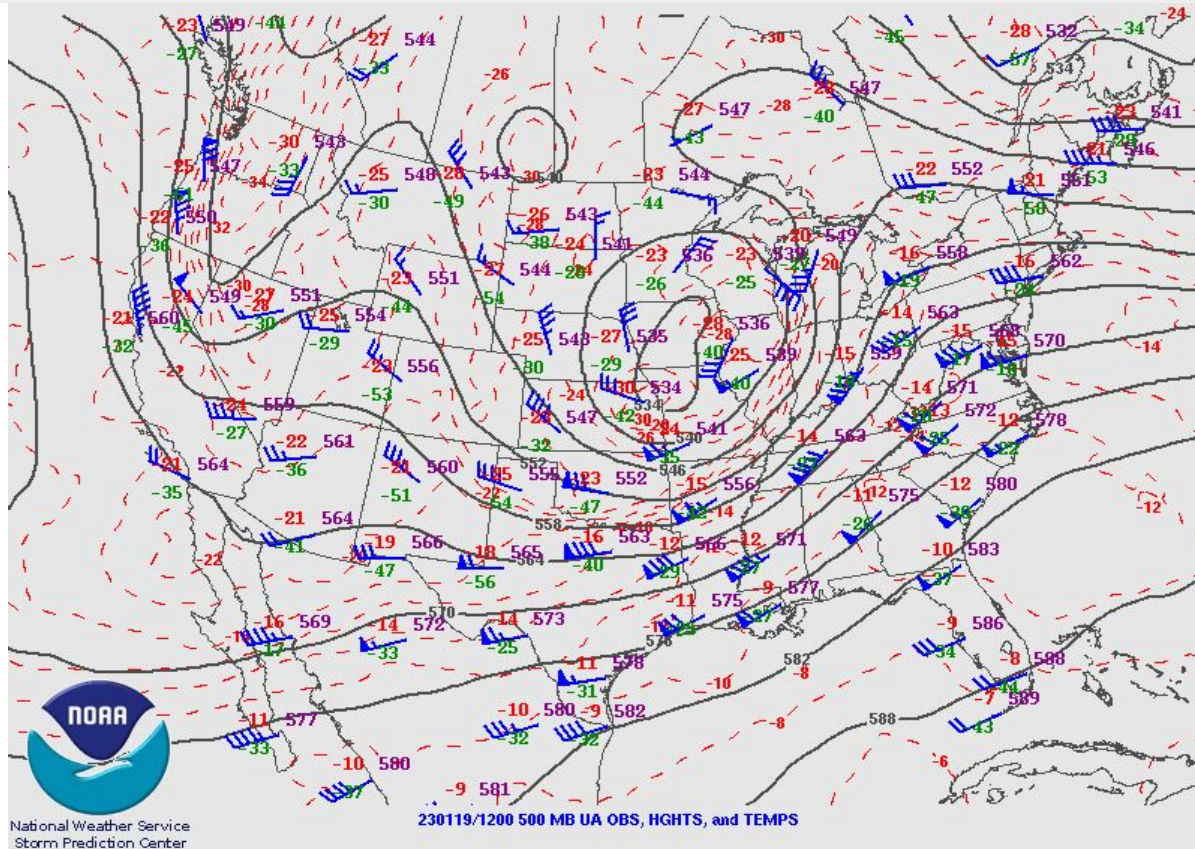
U.S. Department of Commerce

WPC WWE
NBM Evaluation



500 mb Analysis

Valid 12z Jan 19, 2023



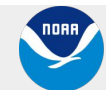
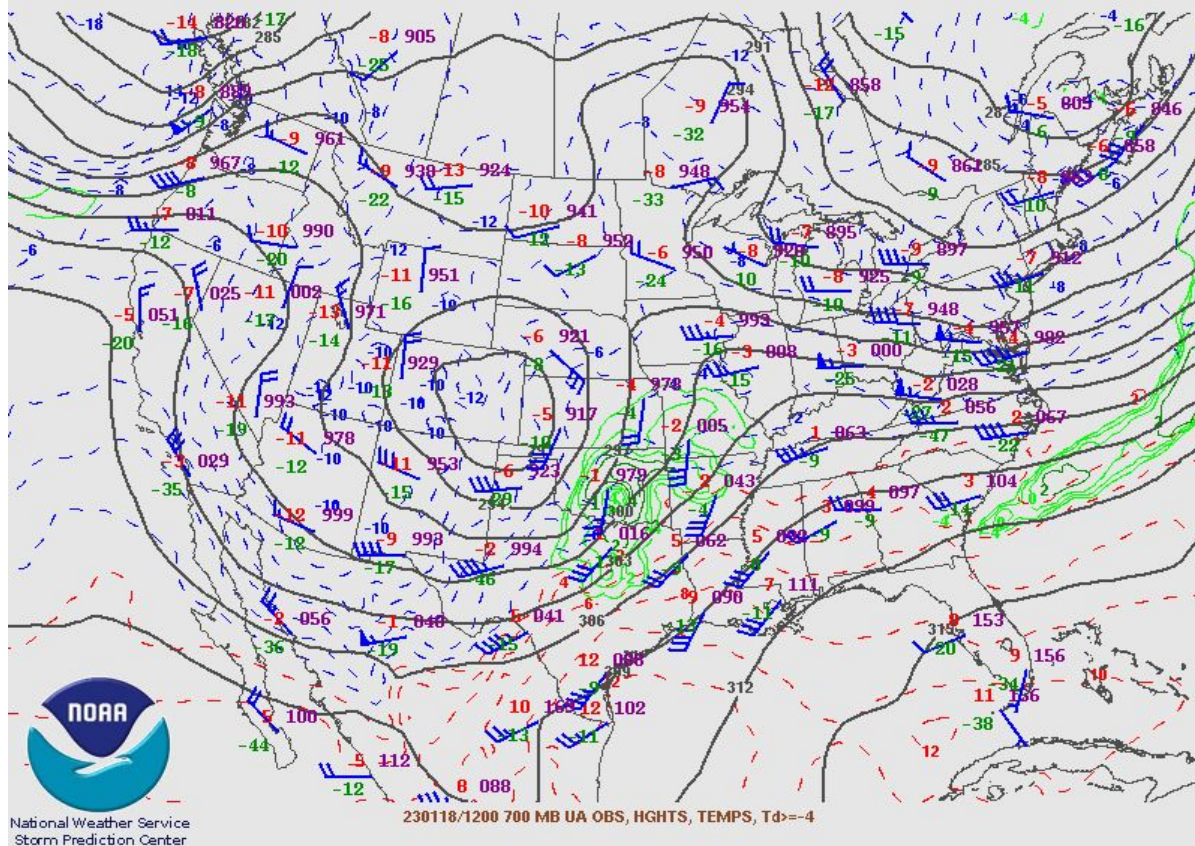
National Oceanic and
Atmospheric Administration

U.S. Department of Commerce

WPC WWE
NBM Evaluation

700 mb Analysis

Valid 12z Jan 18, 2023



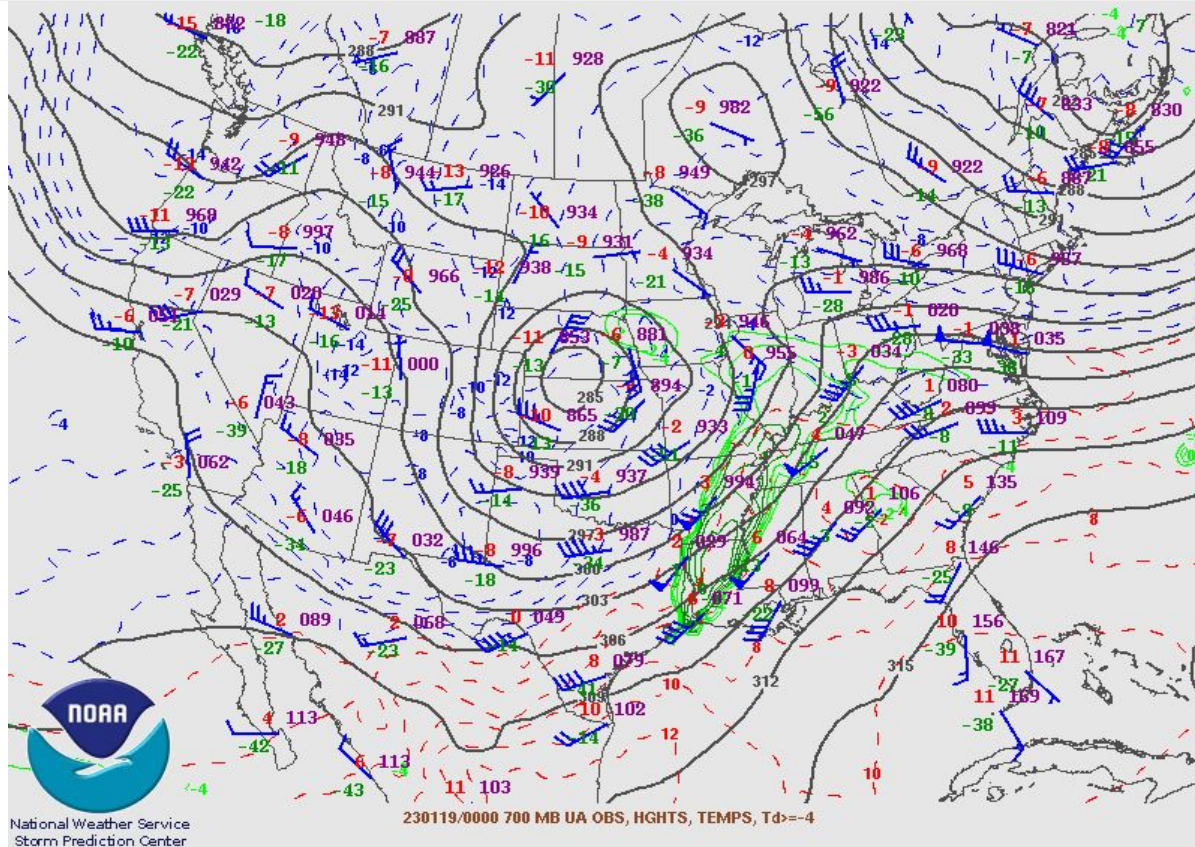
**National Oceanic and
Atmospheric Administration**
U.S. Department of Commerce

WPC WWE
NBM Evaluation



700 mb Analysis

Valid 00z Jan 19, 2023



National Oceanic and
Atmospheric Administration

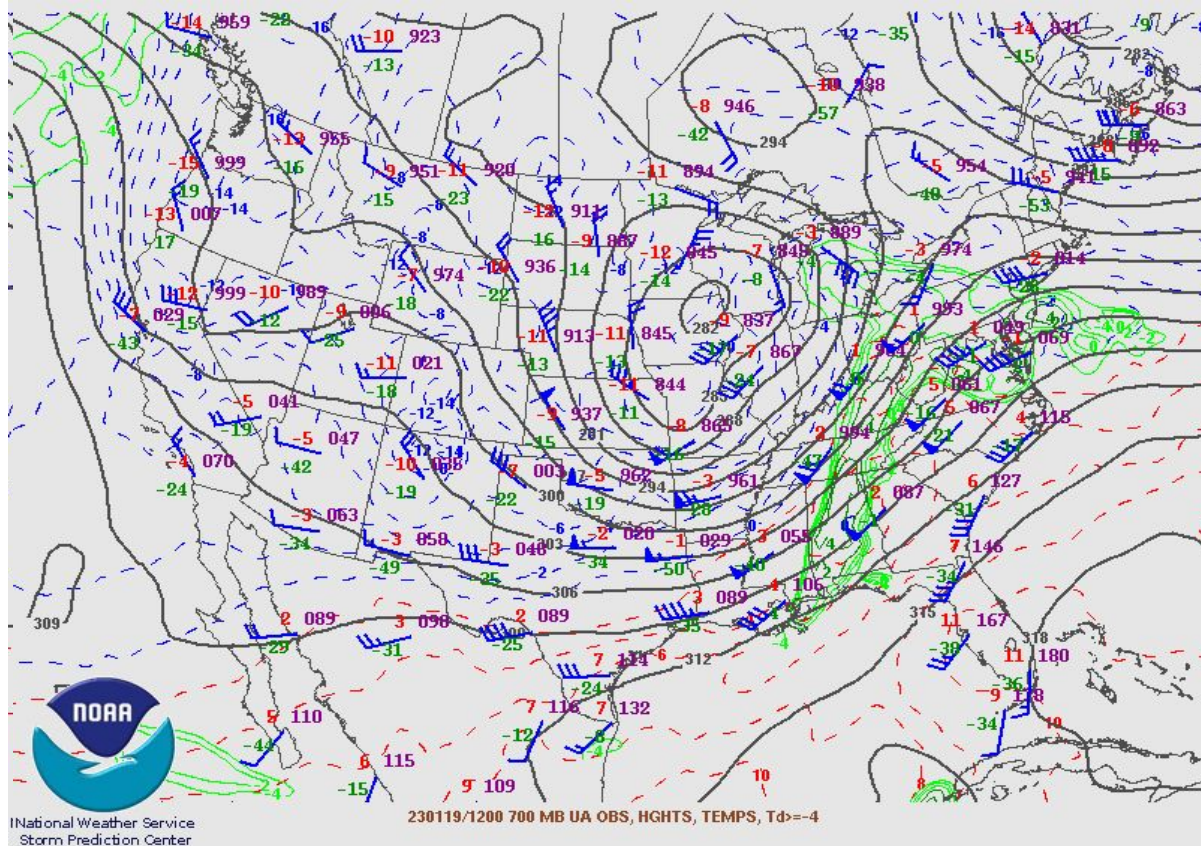
U.S. Department of Commerce

WPC WWE
NBM Evaluation



700 mb Analysis

Valid 12z Jan 19, 2023

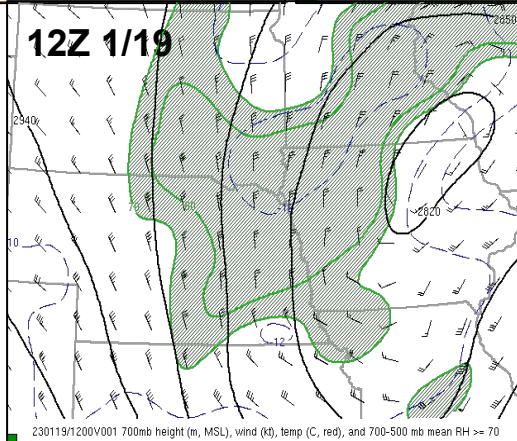
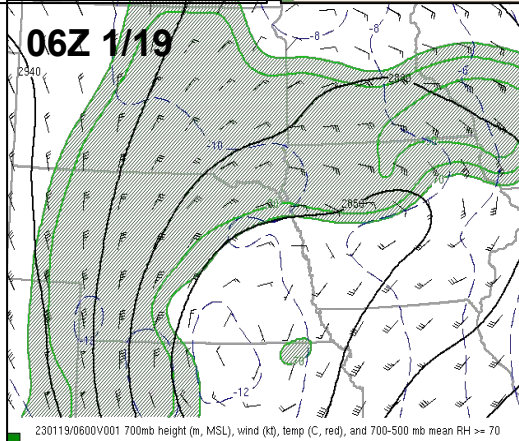
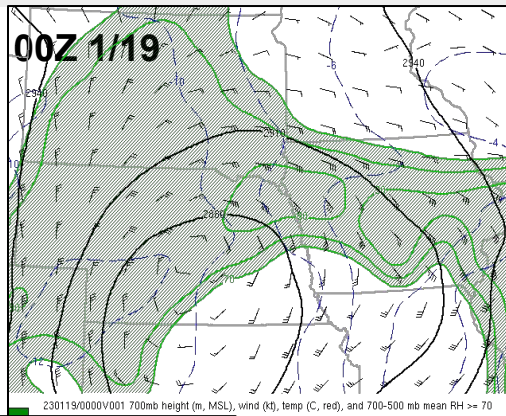
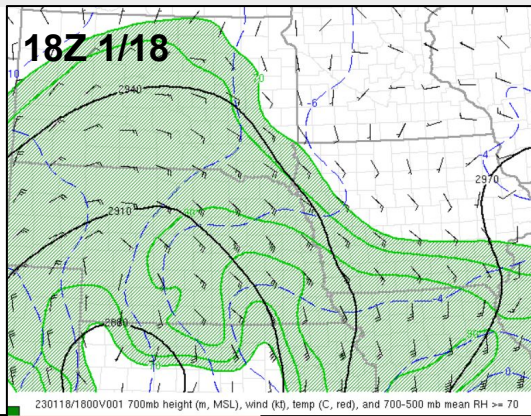
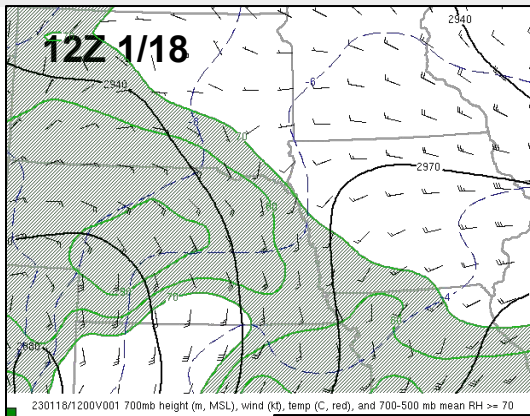


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WPC WWE
NBM Evaluation

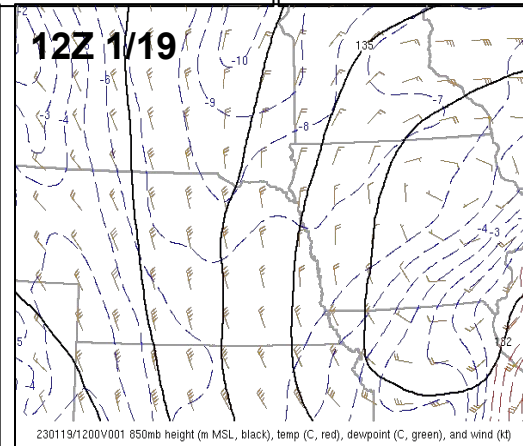
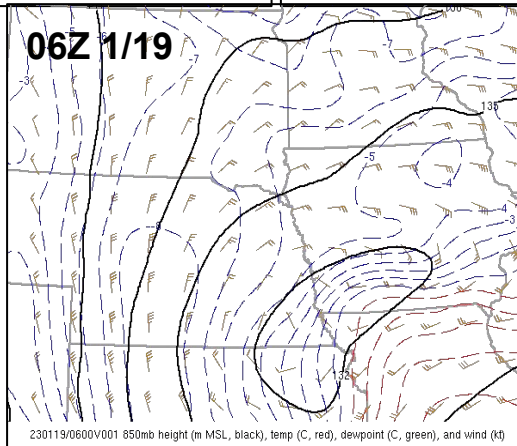
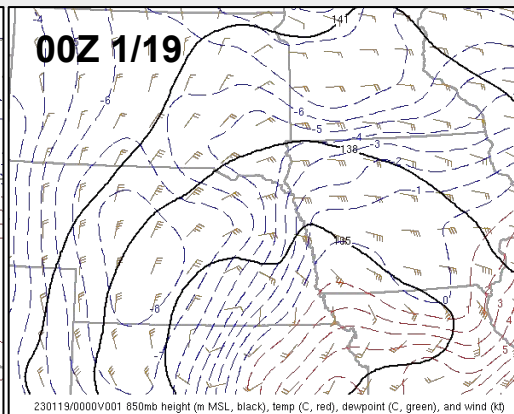
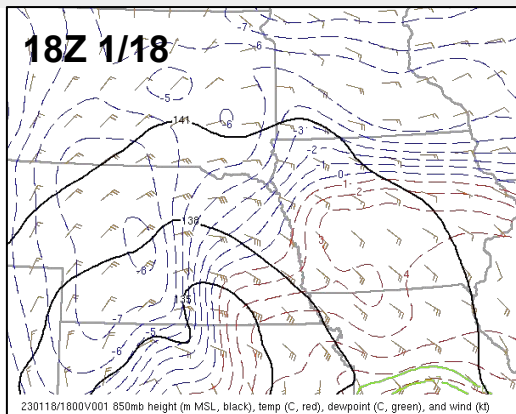
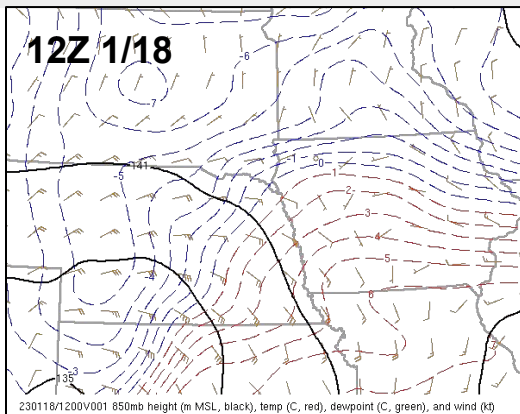


700 mb Analysis



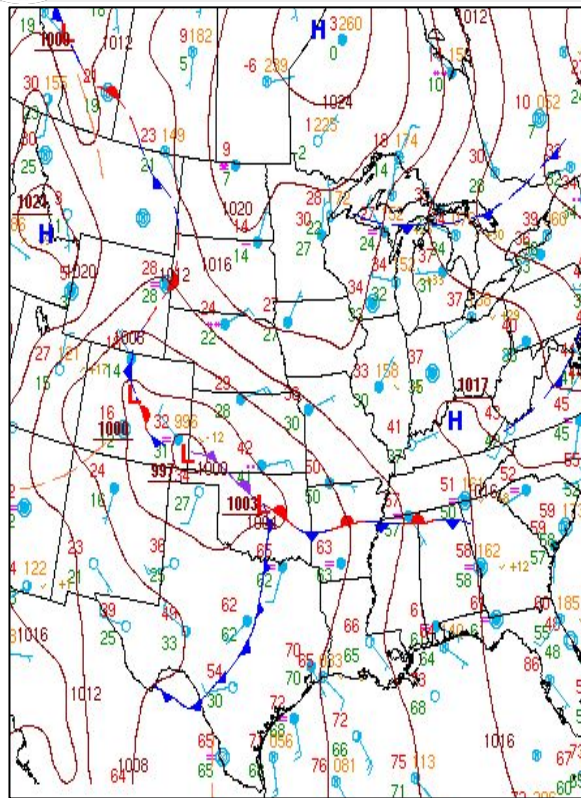


850 mb Analysis

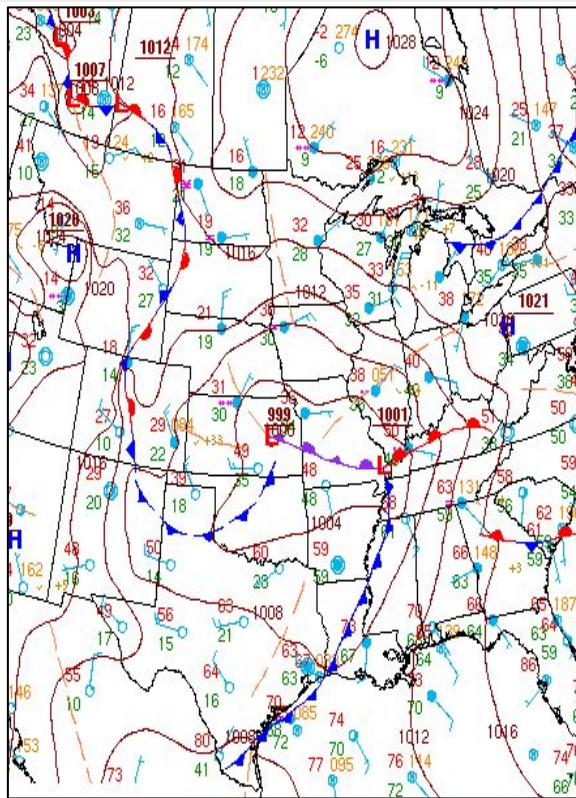




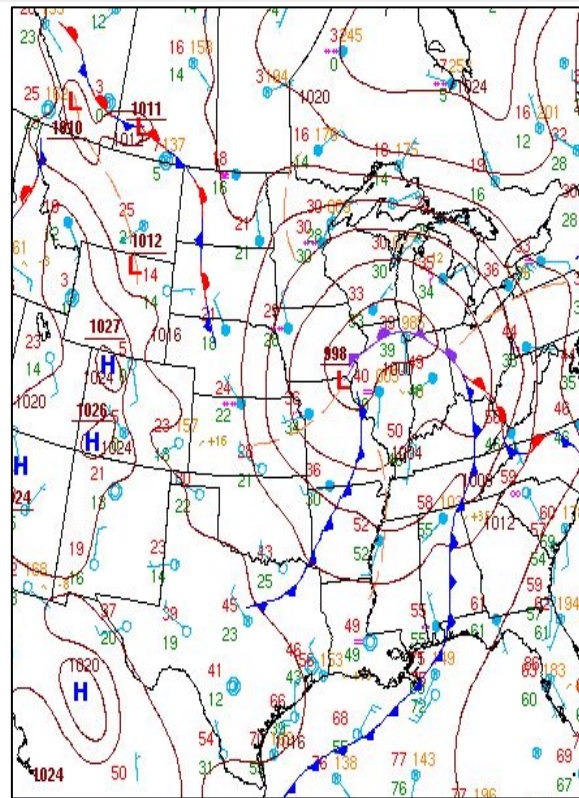
WPC Surface Analysis



12z 1/18



00z 1/19



12z 1/19



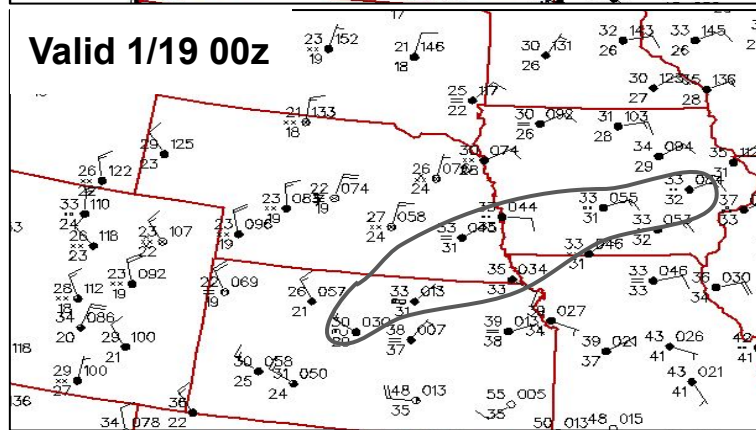
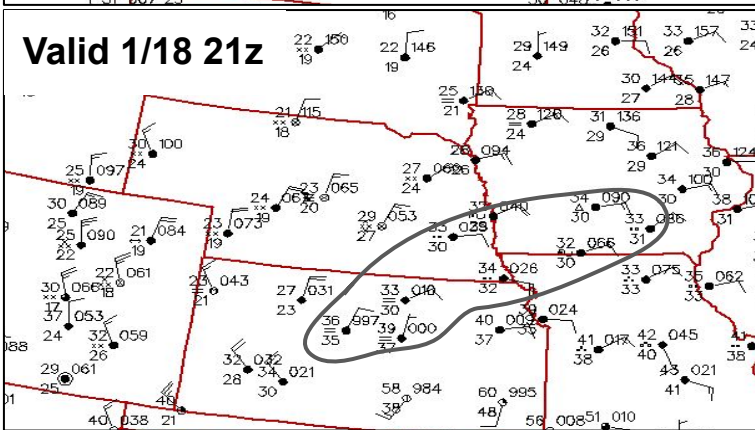
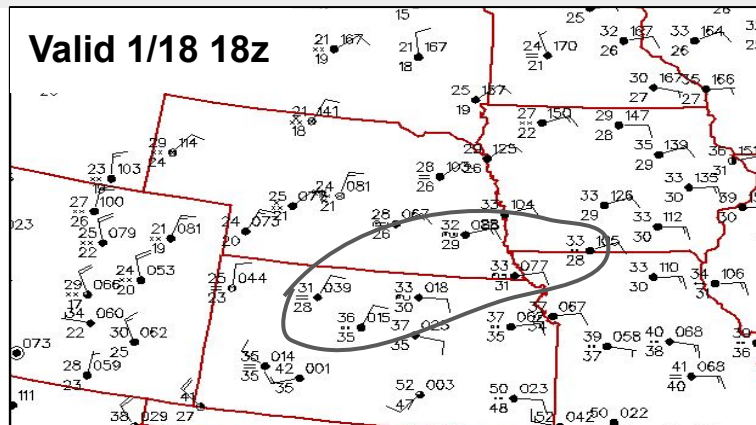
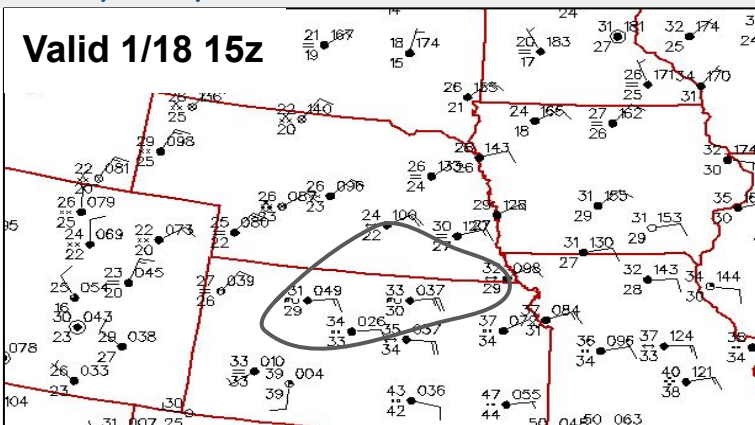


Surface Obs

Courtesy of Plymouth State Weather Center



Denotes
Areas of
Mixed
PTYPE



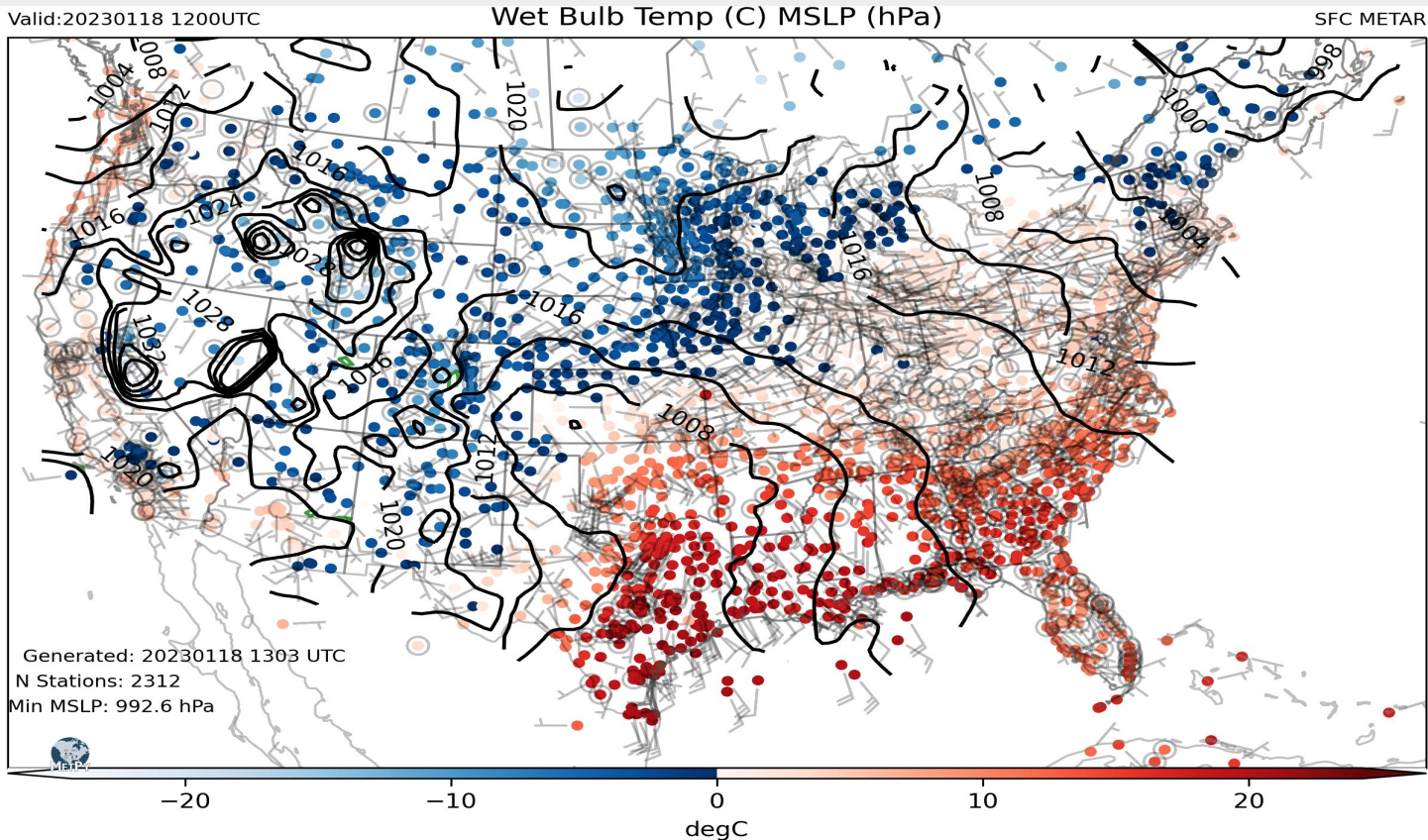
National Oceanic and
Atmospheric Administration

U.S. Department of Commerce

WPC WWE
NBM Evaluation

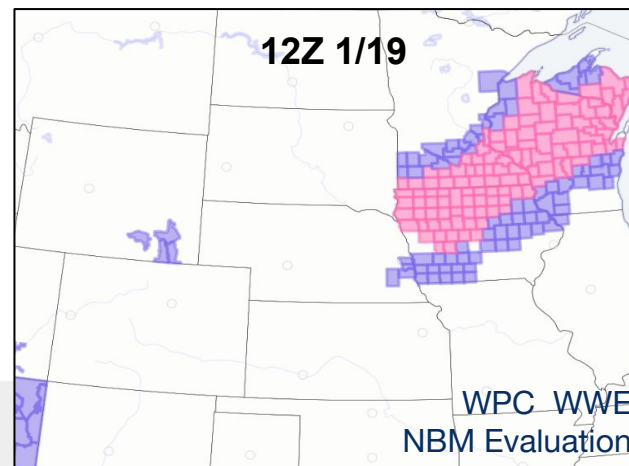
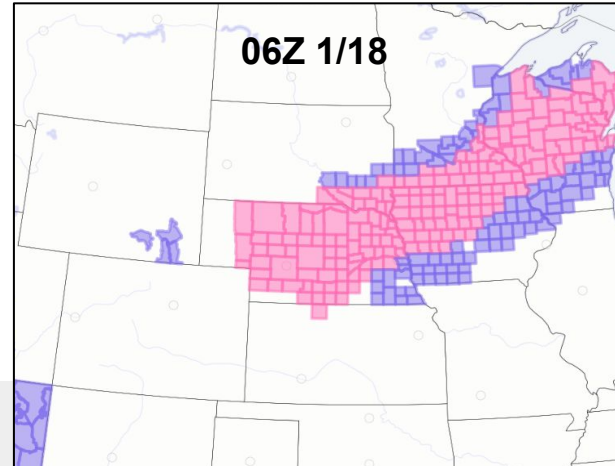
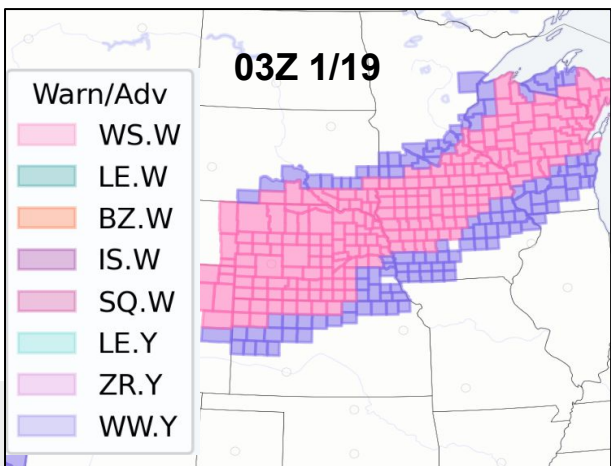
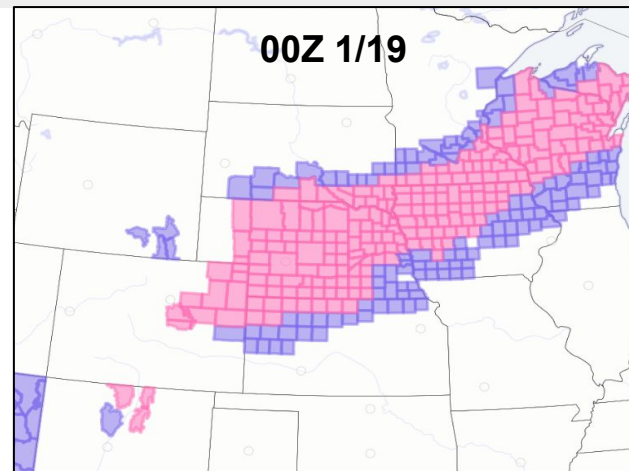
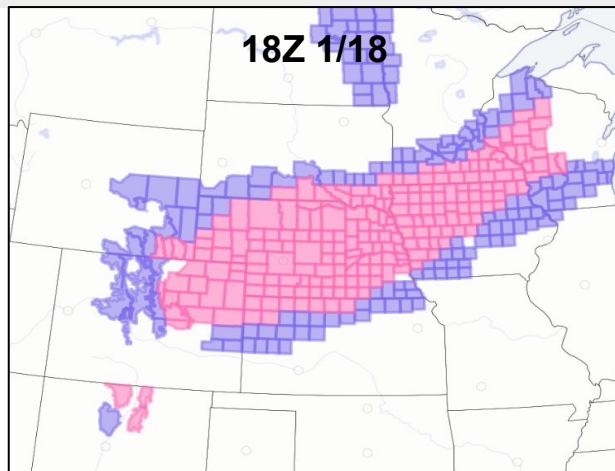
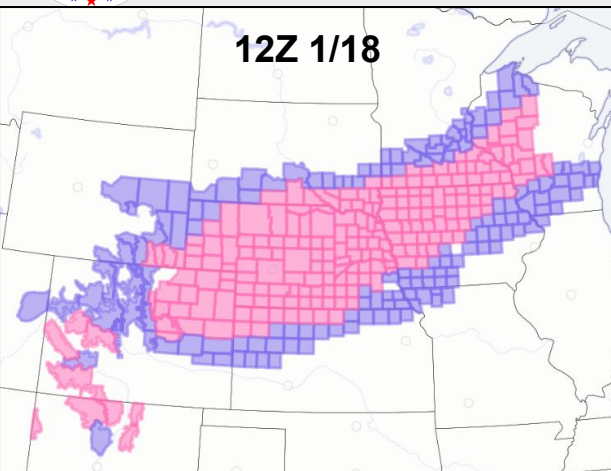


Wet Bulb Temp and MSLP





Winter Headlines

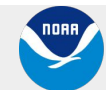
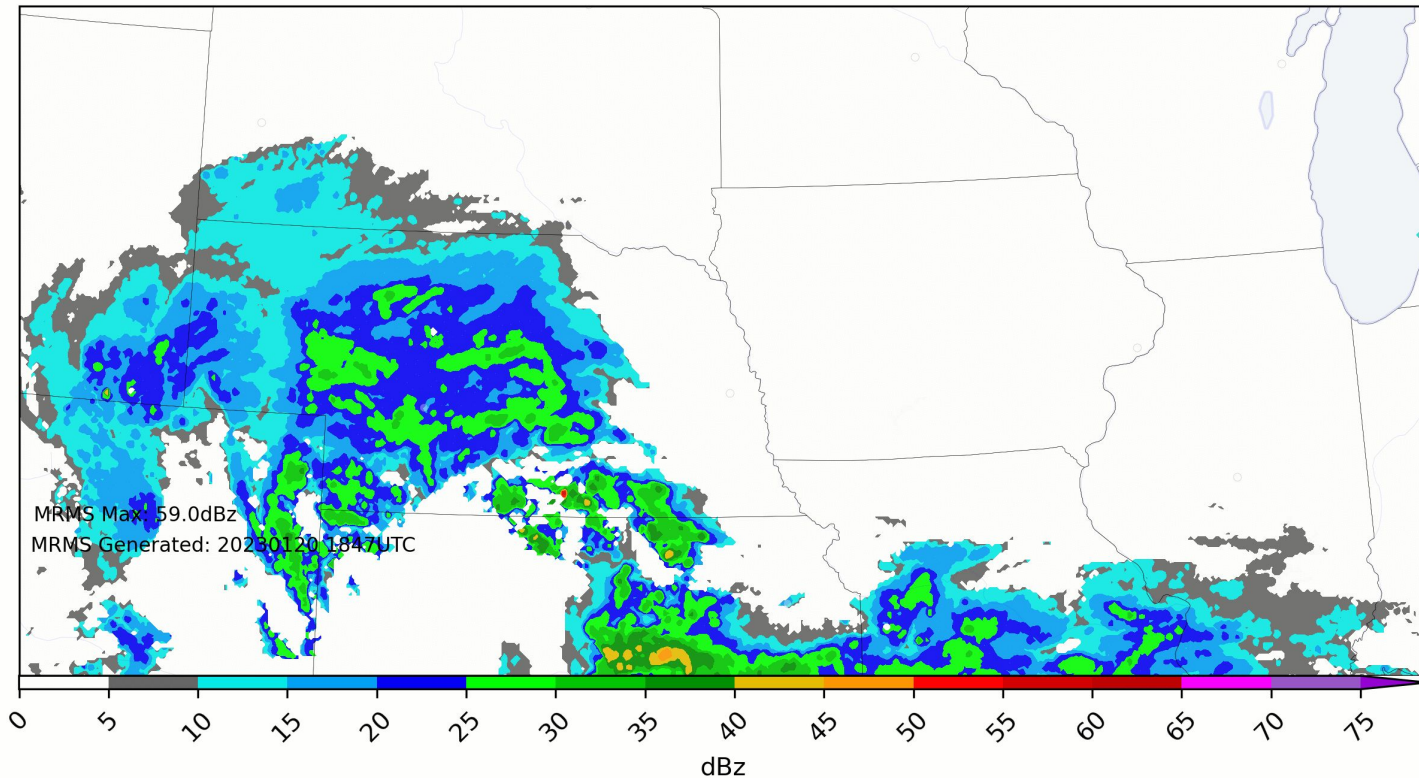




Composite Reflectivity

Valid: 20230118 12UTC

Comp Refl





NOHRSC 24-Hour Snowfall

Valid 12z Jan 19, 2023

KLBF:
North Platte

KBBW:
Broken Bow

KHSE:
Hastings

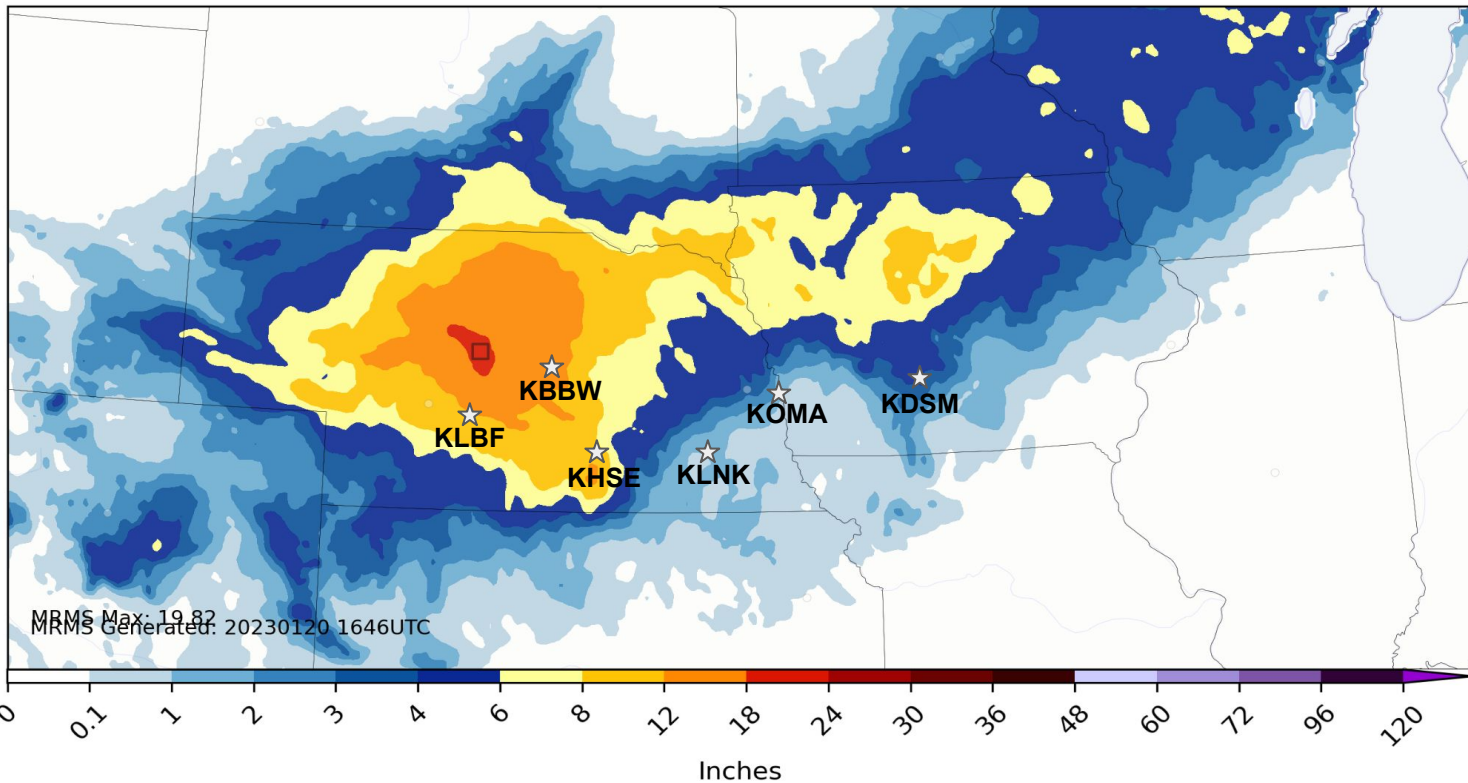
KLNK:
Lincoln

KOMA:
Omaha

KDSM:
Des Moines

Valid:20230119 12UTC

NOHRSC Snow 24h

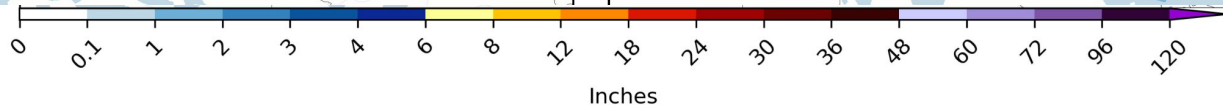
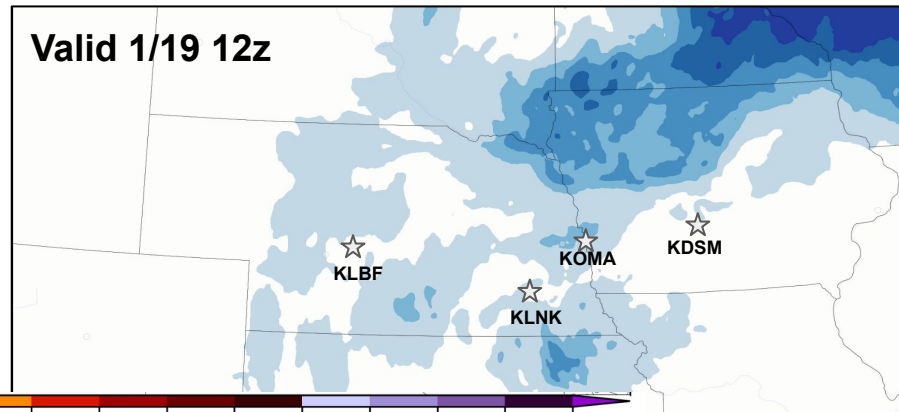
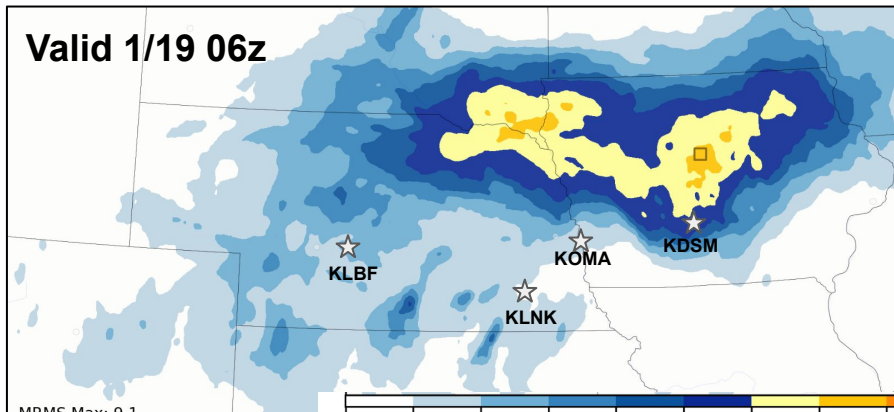
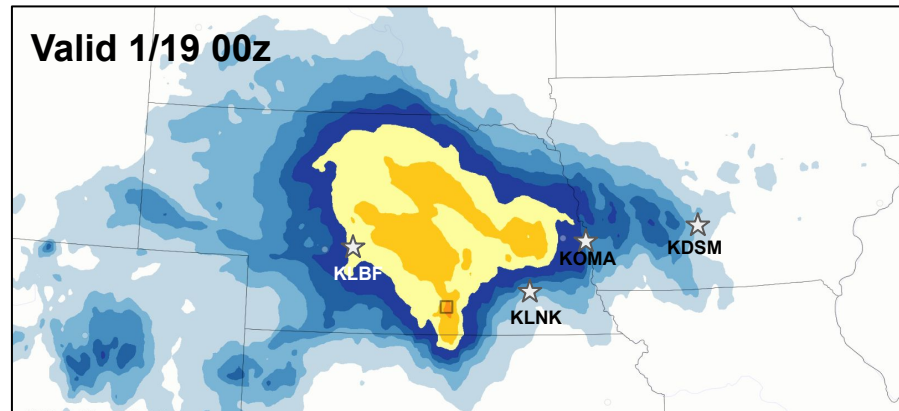
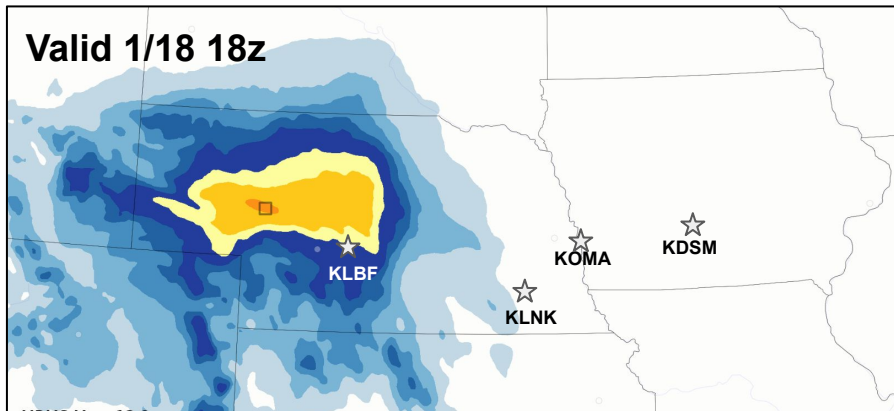


National Oceanic and
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U.S. Department of Commerce

WPC WWE
NBM Evaluation



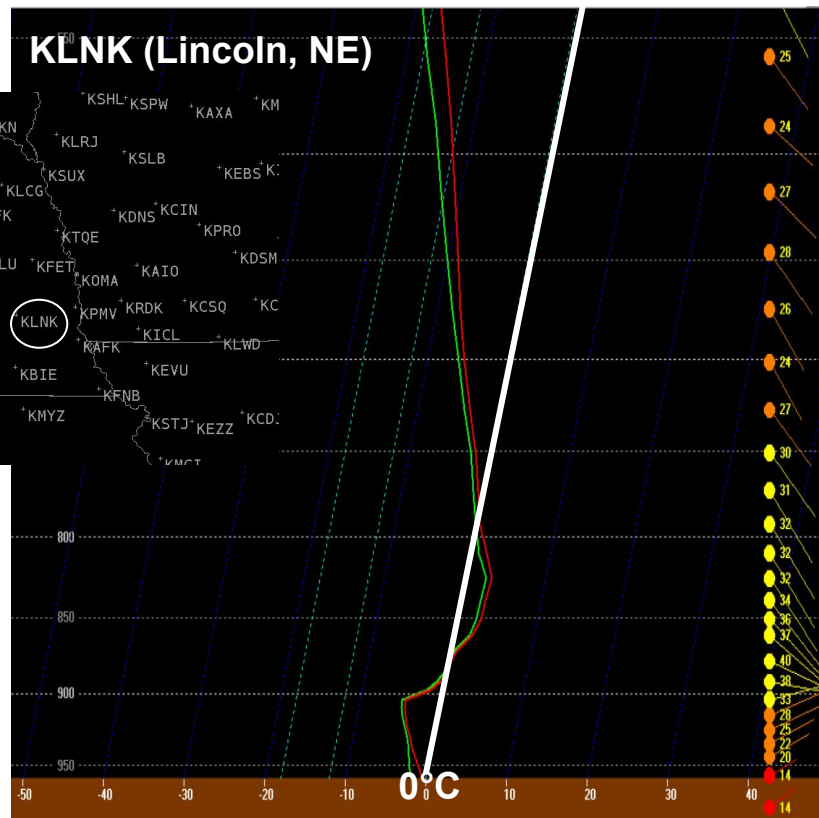
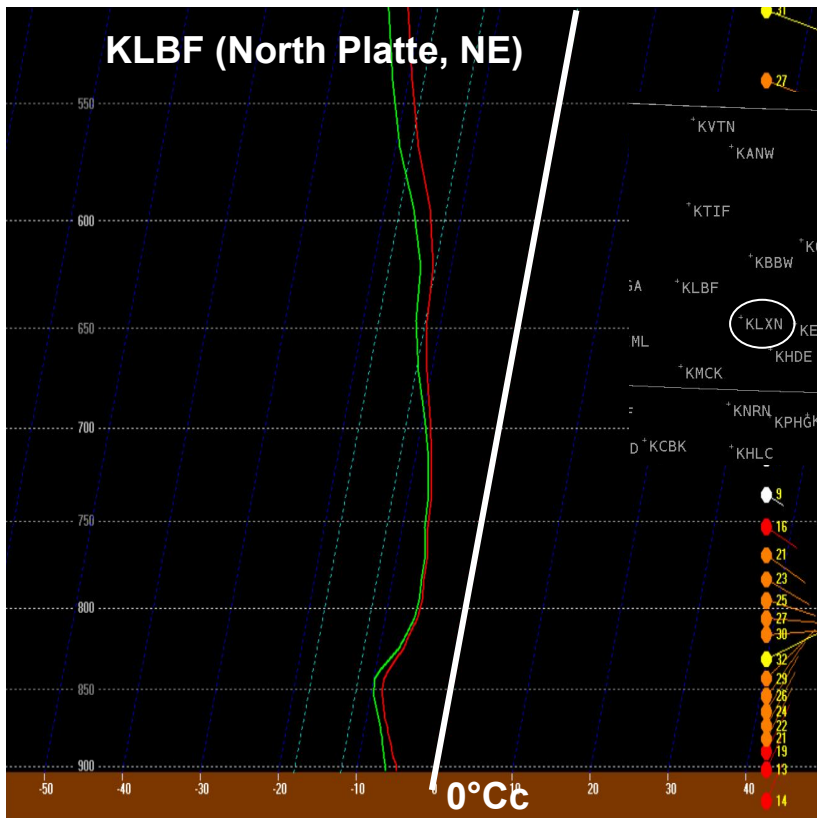
NOHRSC 6-Hour Snowfall





NAM Analysis Soundings

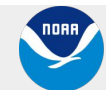
Valid 18z Jan 18, 2023





Operational Challenges

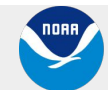
- **Snowfall amounts**
 - **Location and extent of heaviest snowfall including amounts over a foot of snow**
- **Location of Mixed PTYPE**
 - **Track of surface and middle level low**
 - **Lower snow amounts**
 - **Southeast Nebraska and southern Iowa including I-80 corridor (Lincoln to Omaha to Des Moines in the mixed PTYPE zone)**





NBM Evaluation

Day 3

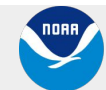




NBM Evaluation Links

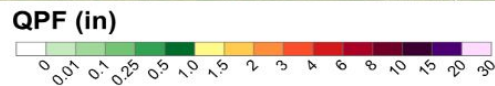
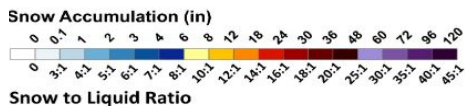
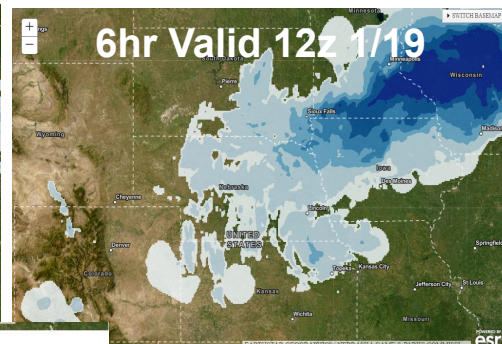
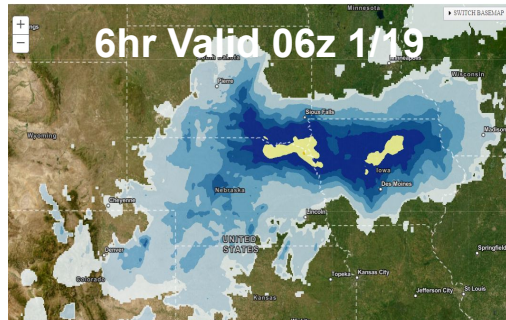
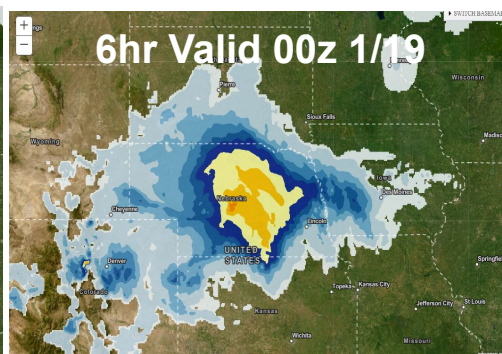
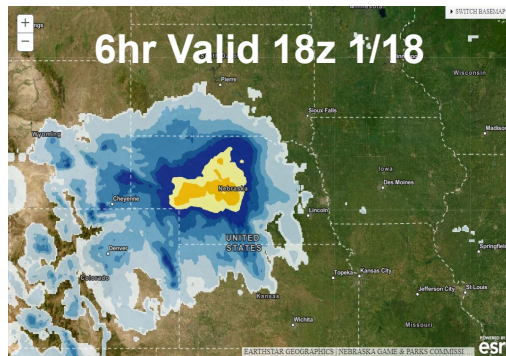
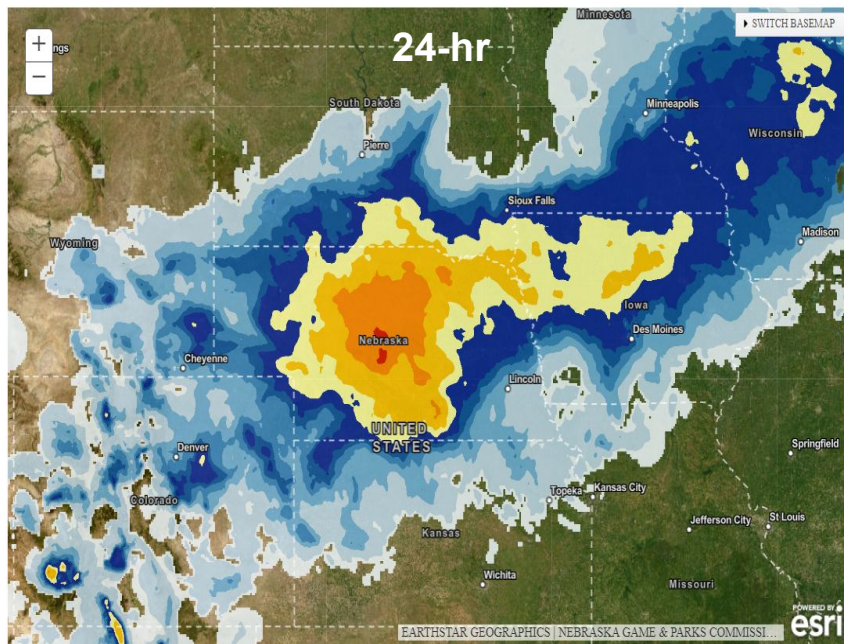
Day 3

- **GFS Day 3 (00z 16 January) 60-84 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)
 - [24-hour Snowfall](#)





NOHRSC Snowfall



National Oceanic and
Atmospheric Administration

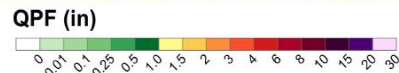
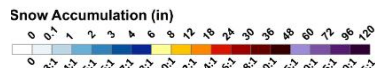
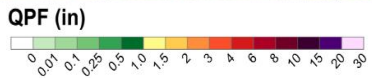
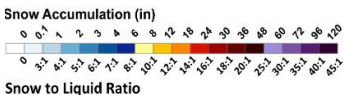
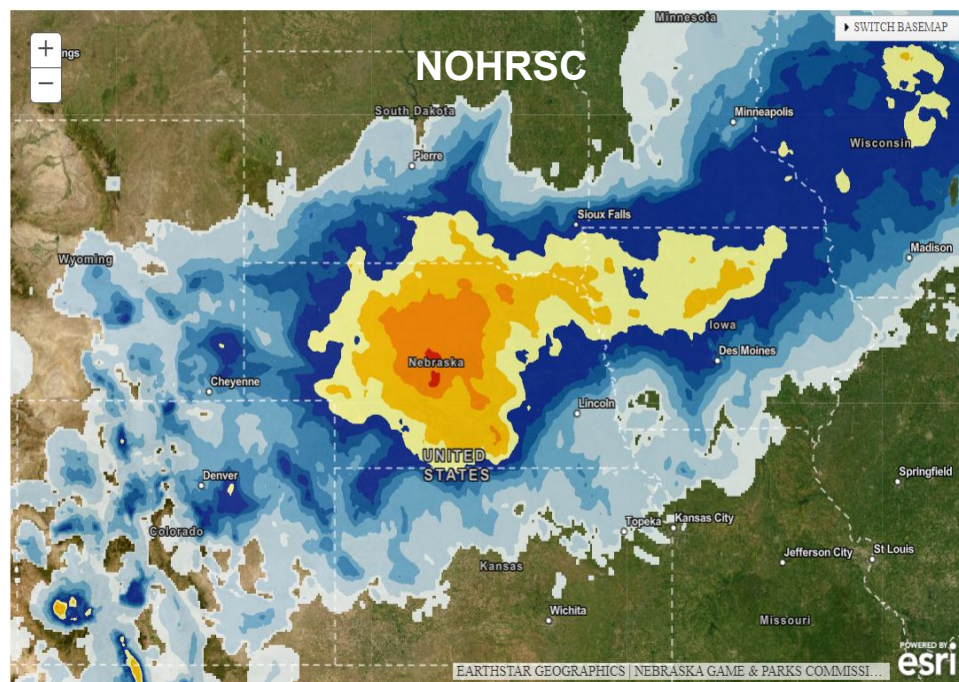
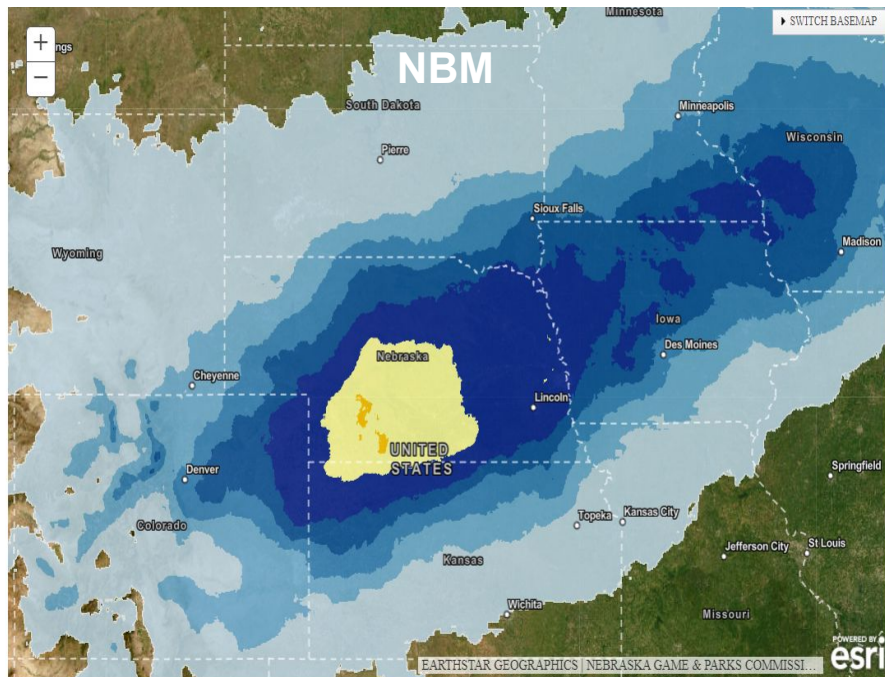
U.S. Department of Commerce

WPC WWE
NBM Evaluation



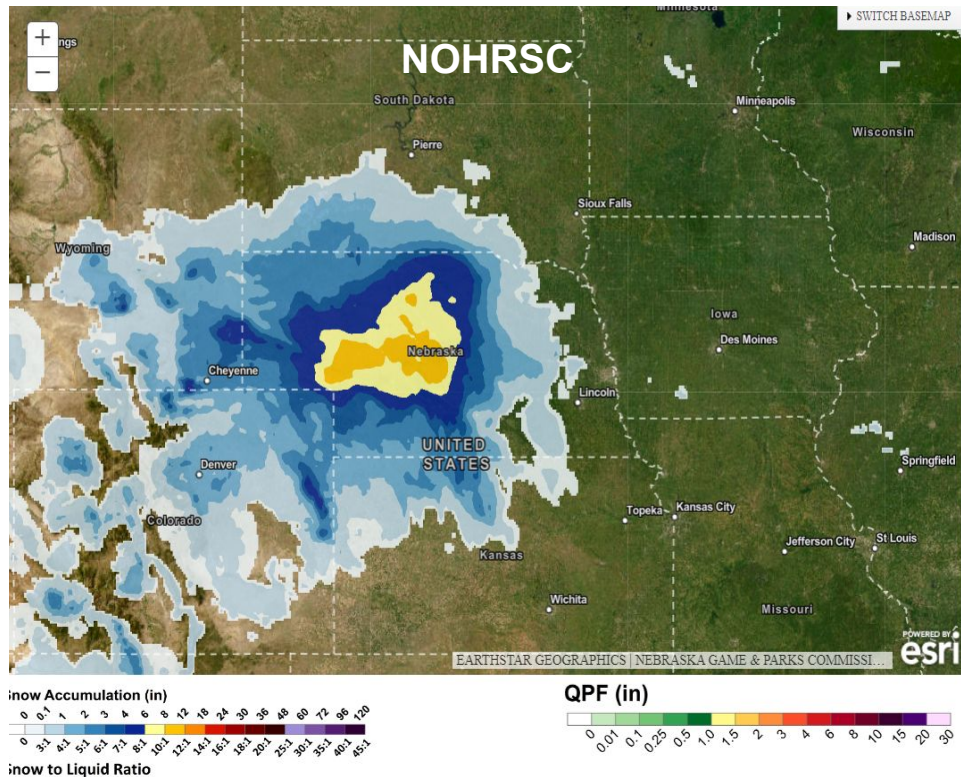
NBM 24 Hour Snowfall 12z 1/18 - 12z 1/19

Day 3



National Oceanic and
Atmospheric Administration
U.S. Department of Commerce

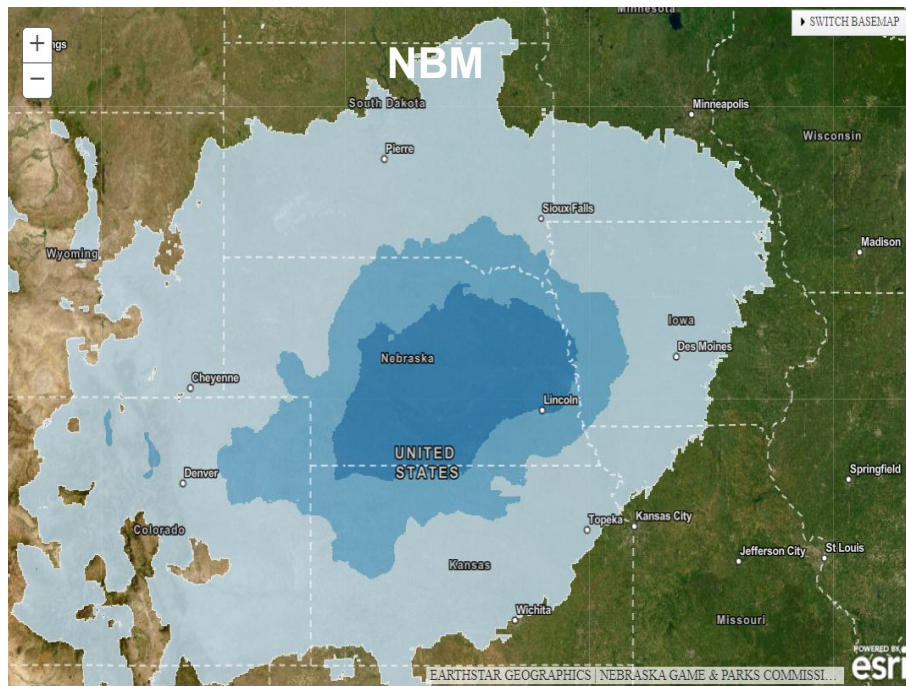
WPC WWE
NBM Evaluation





NBM 6 Hour Snowfall Valid 00z 1/19

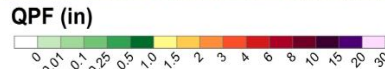
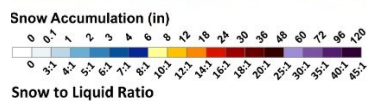
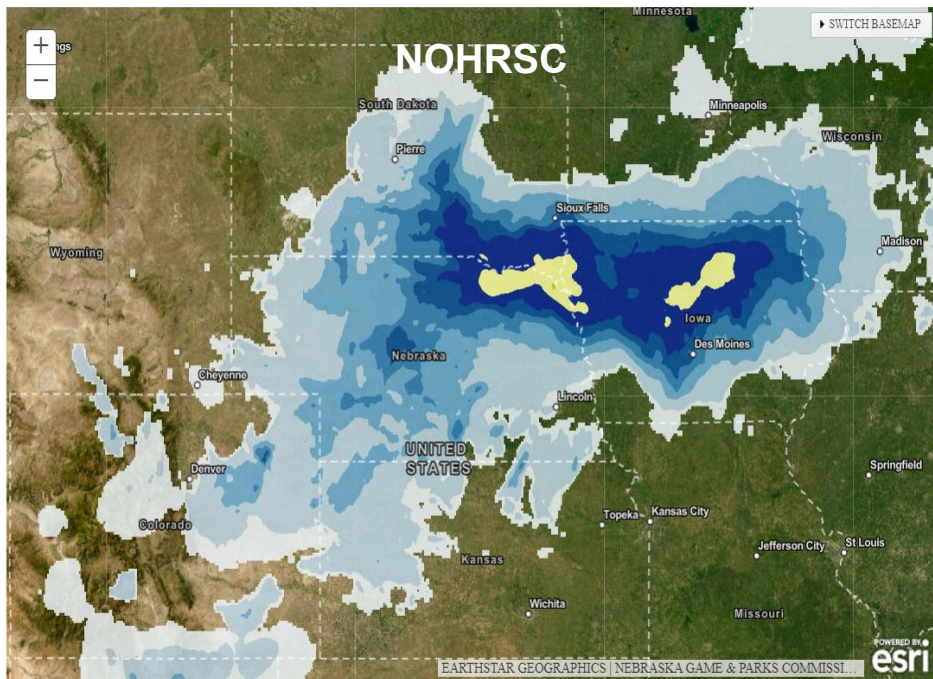
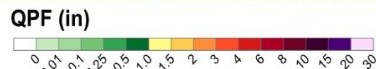
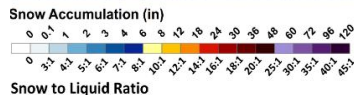
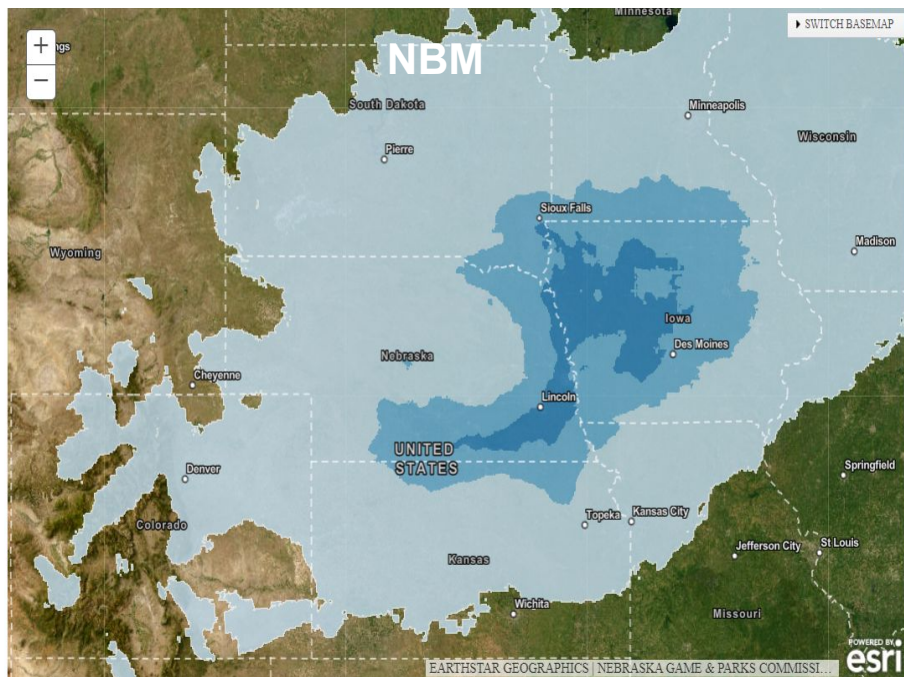
Day 3





NBM 6 Hour Snowfall Valid 06z 1/19

Day 3



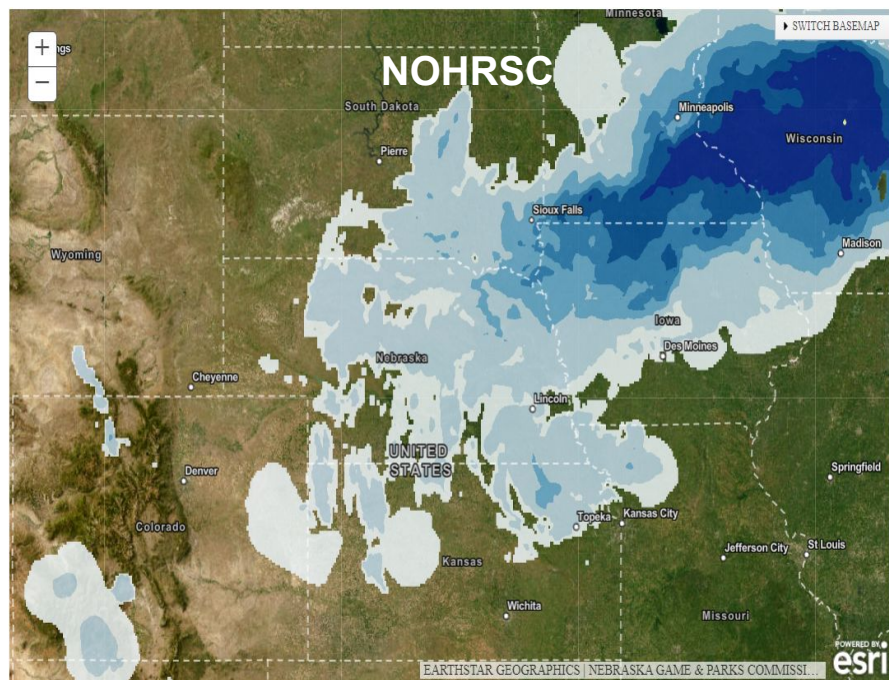
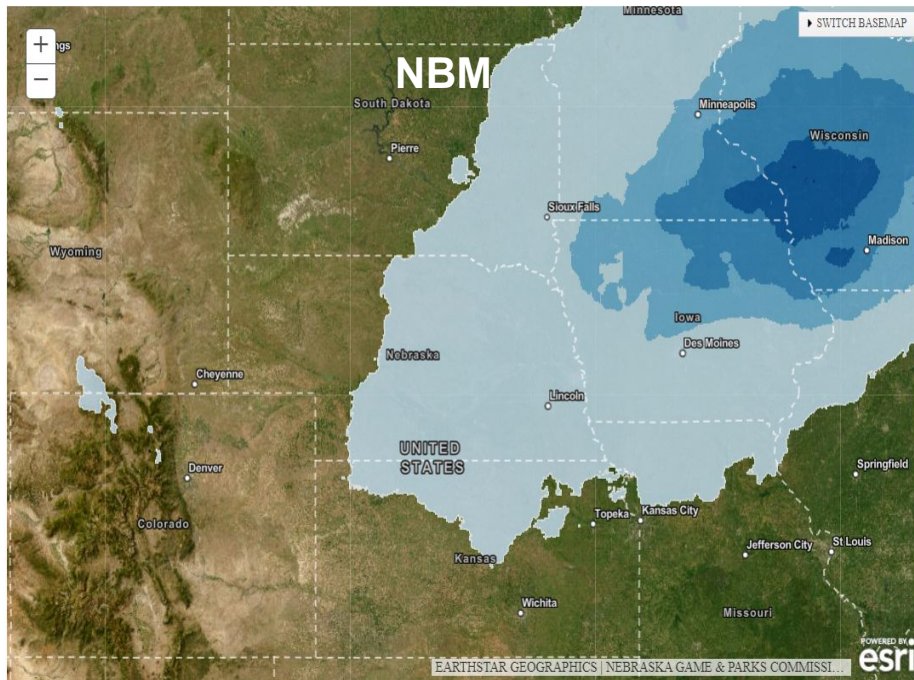
National Oceanic and
Atmospheric Administration
U.S. Department of Commerce

WPC WWE
NBM Evaluation



NBM 6 Hour Snowfall Valid 12z 1/19

Day 3



National Oceanic and
Atmospheric Administration

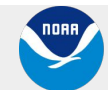
U.S. Department of Commerce

WPC WWE
NBM Evaluation



NBM Evaluation

Day 2

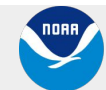




NBM Evaluation Links

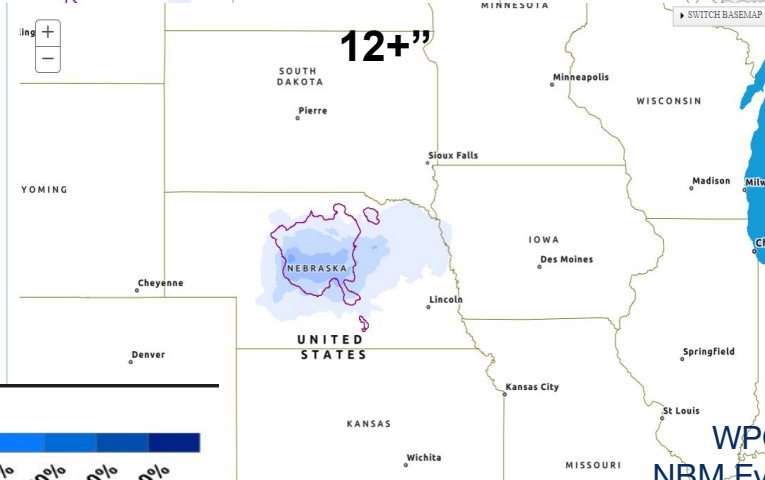
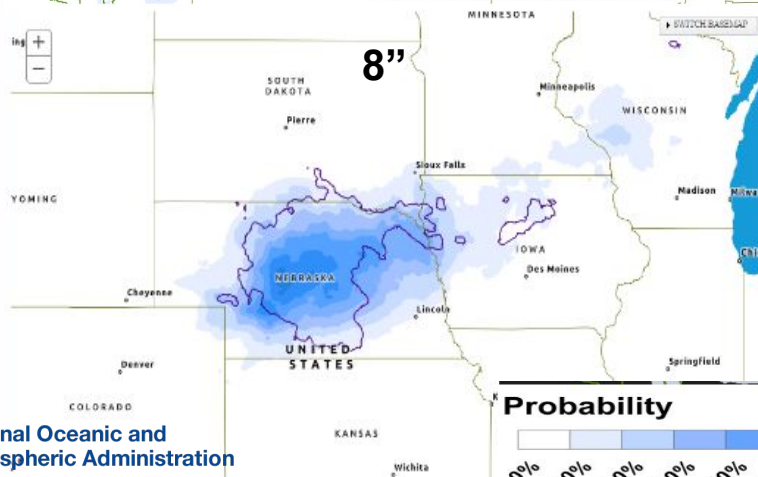
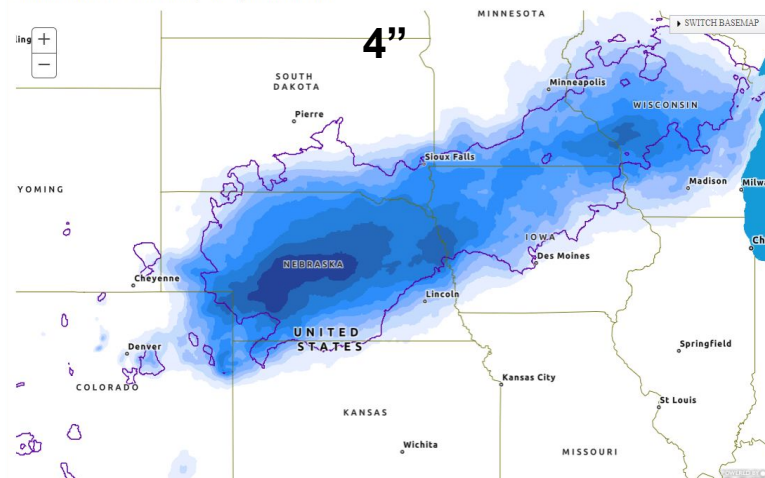
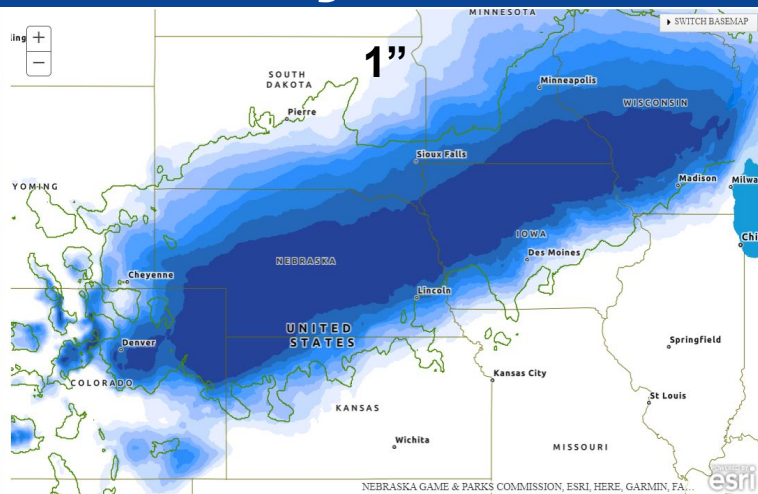
Day 2

- **GFS Day 2 (00z 17 January) 36-60 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)
 - [24-hour Snowfall](#)
- **NAMNest Day 2 (00z 17 January) 36-60 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)
 - [24-hour Snowfall](#)
- **FV3 Day 2 (00z 17 January) 36-60 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)





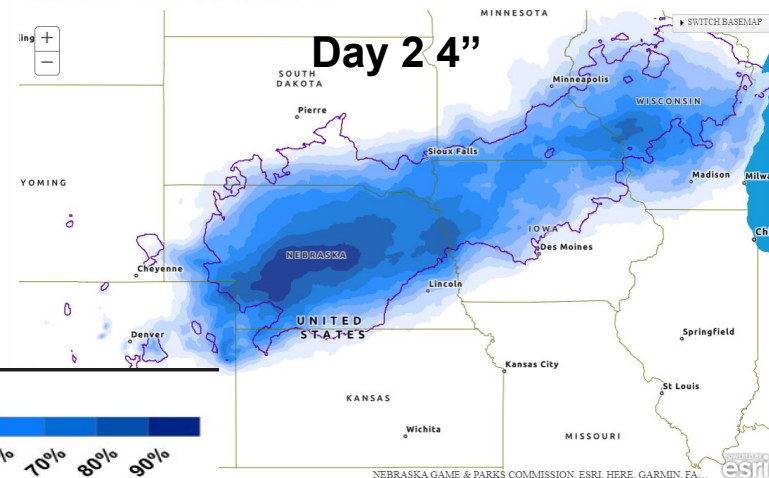
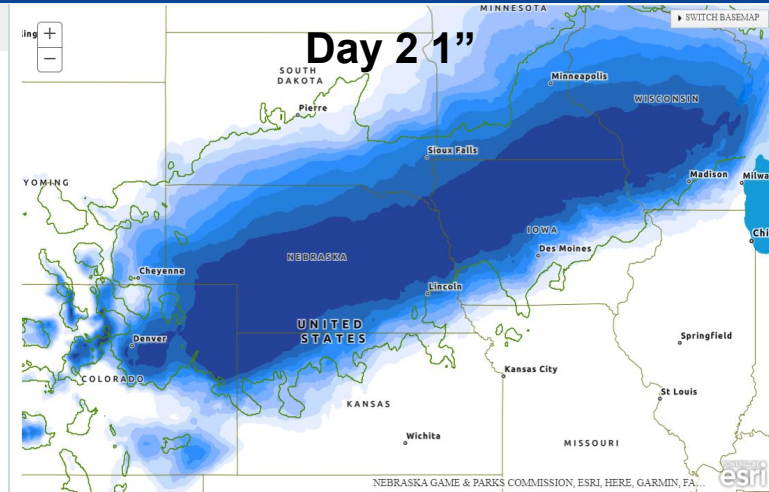
NBM Day 2 Probabilities NOHRSC Outlined

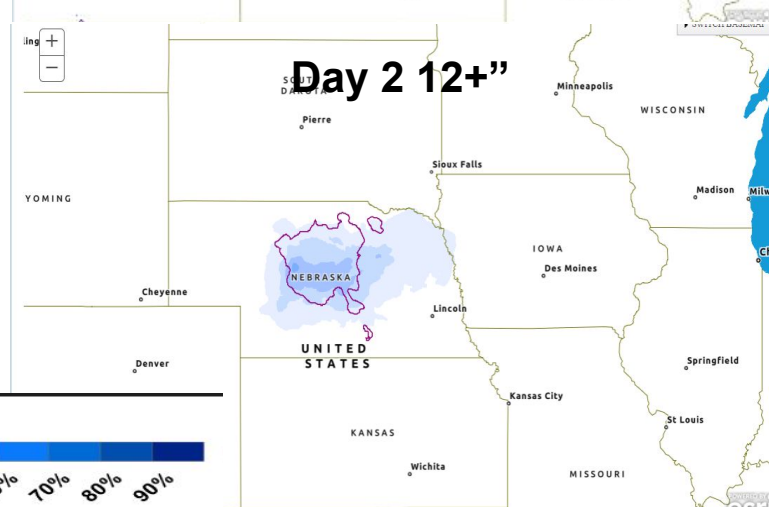
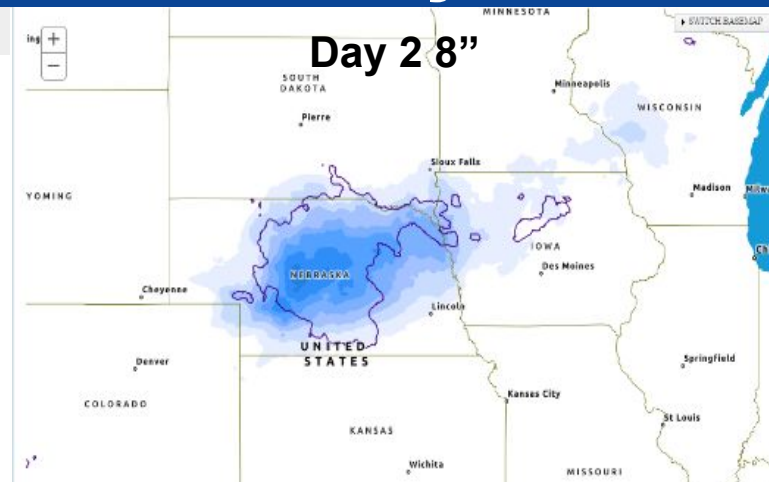


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U.S. Department of Commerce

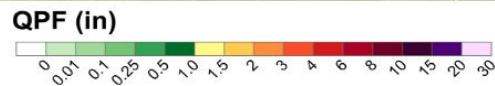
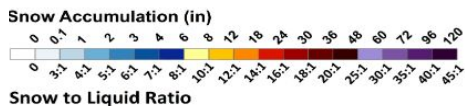
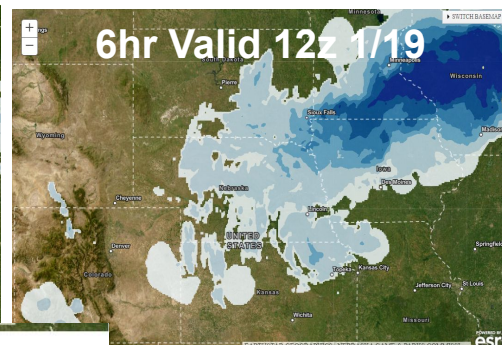
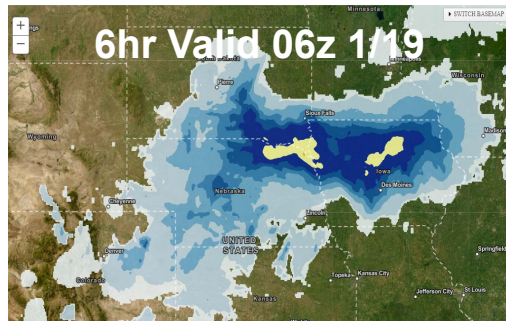
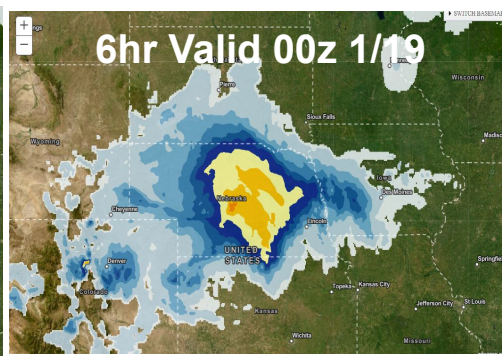
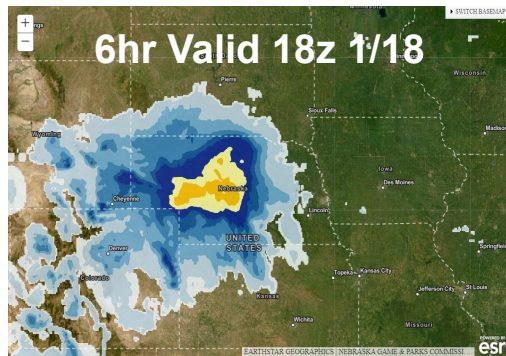
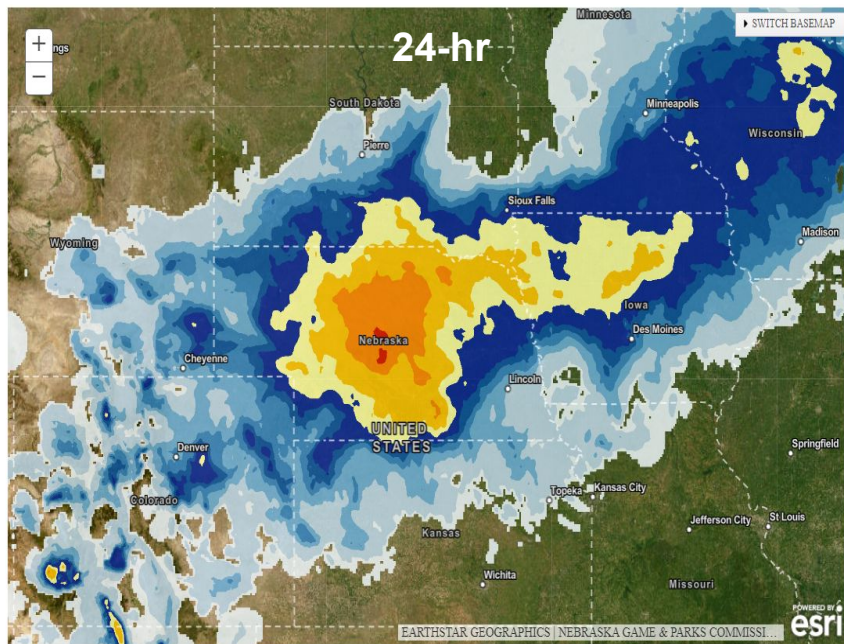
WPC WWE
NBM Evaluation







NOHRSC Snowfall



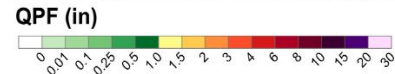
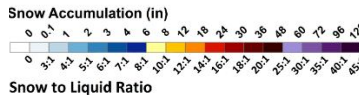
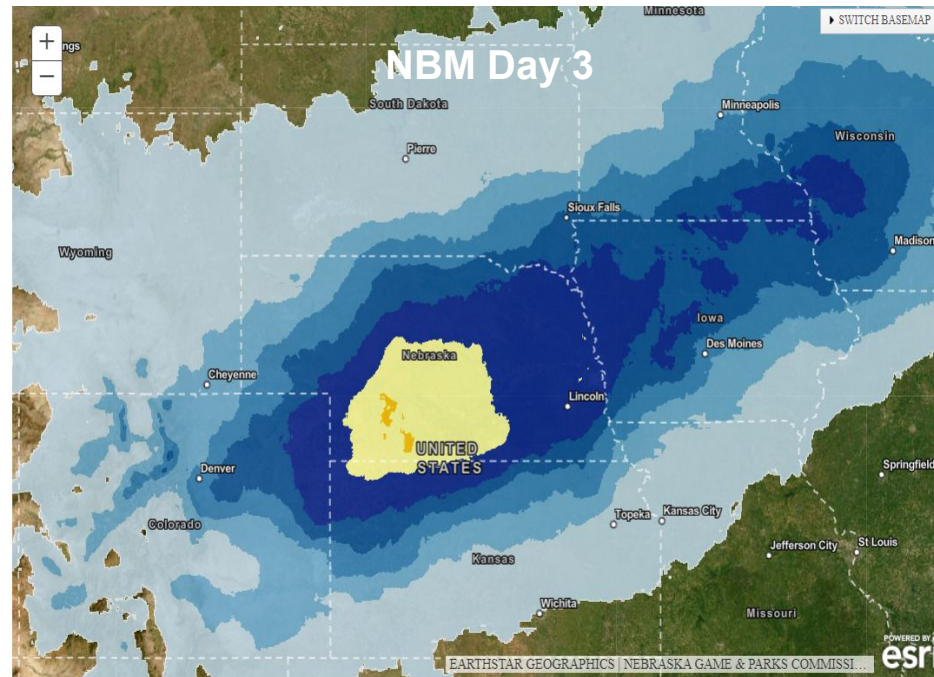
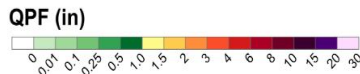
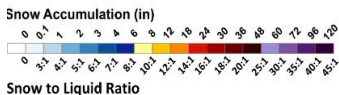
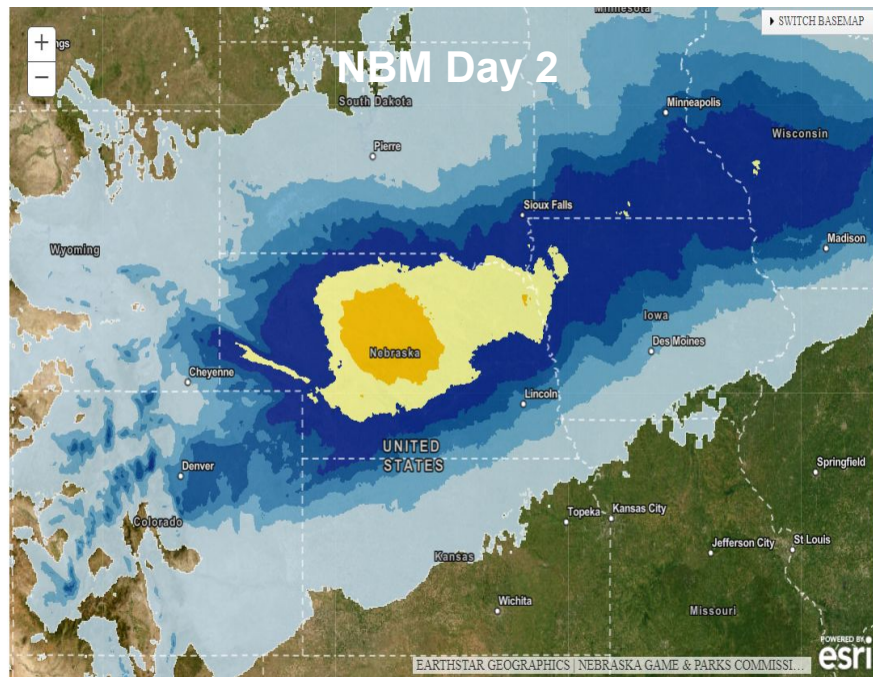
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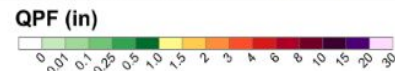
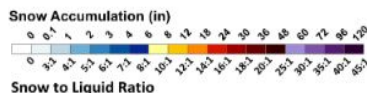
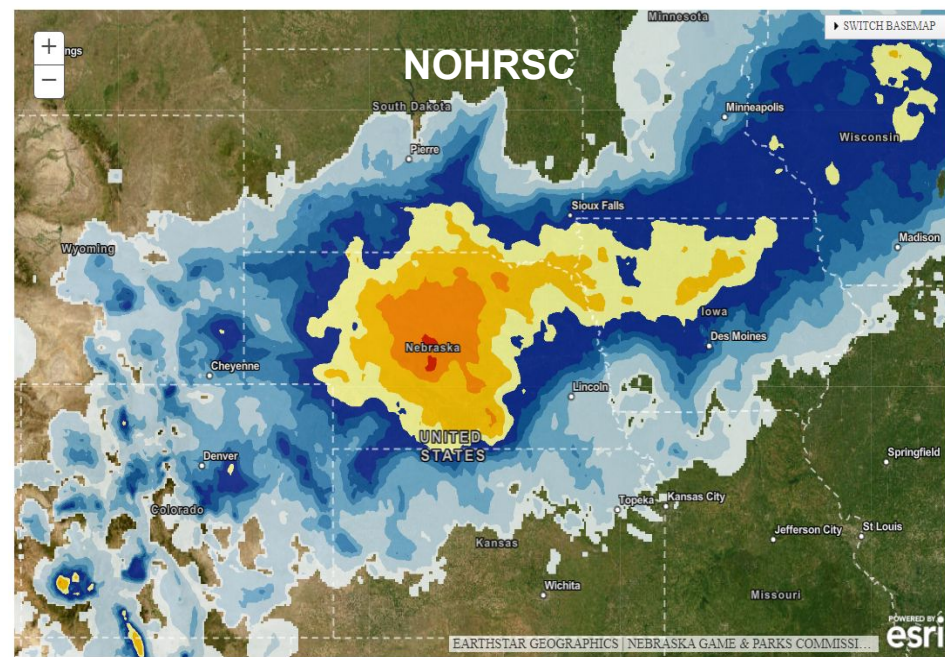
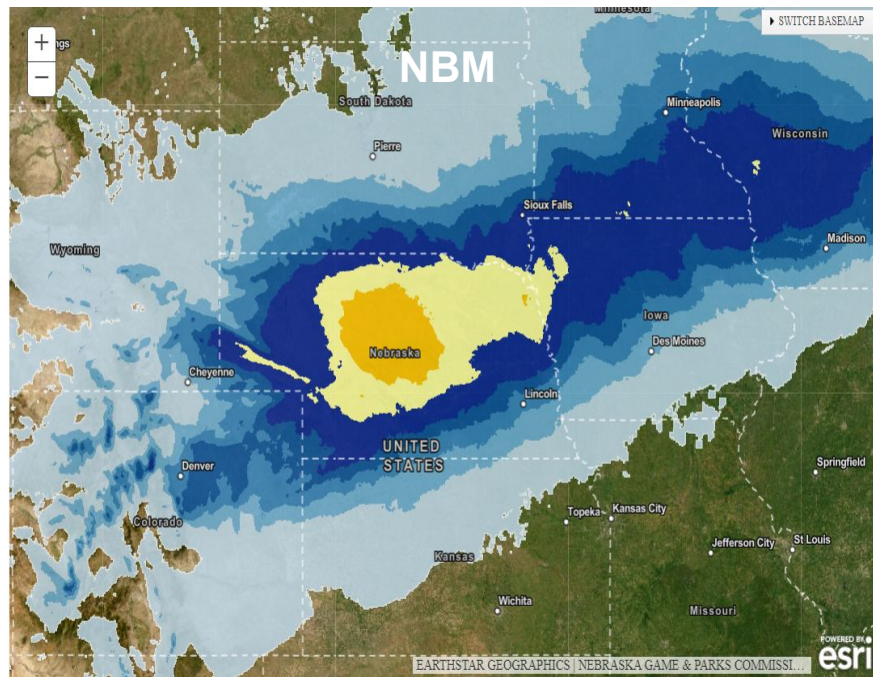
NBM 24 Hour Snowfall Day 2 vs Day 3



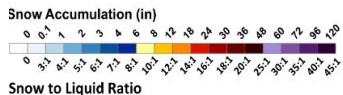


NBM 24 Hour Snowfall 12z 1/18 - 12z 1/19

Day 2



Snow to Liquid Ratio



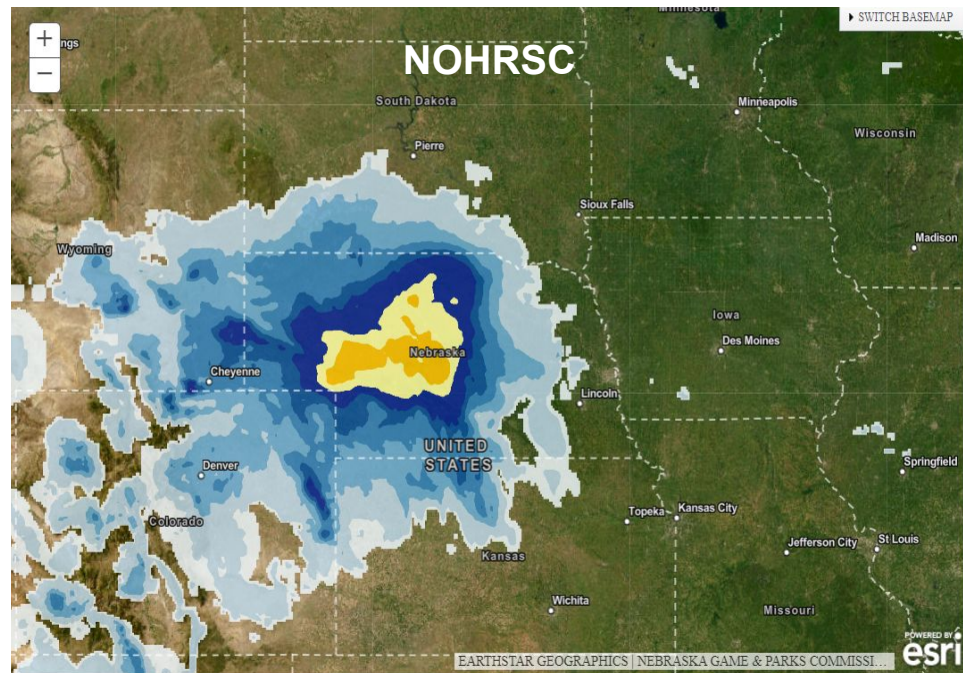
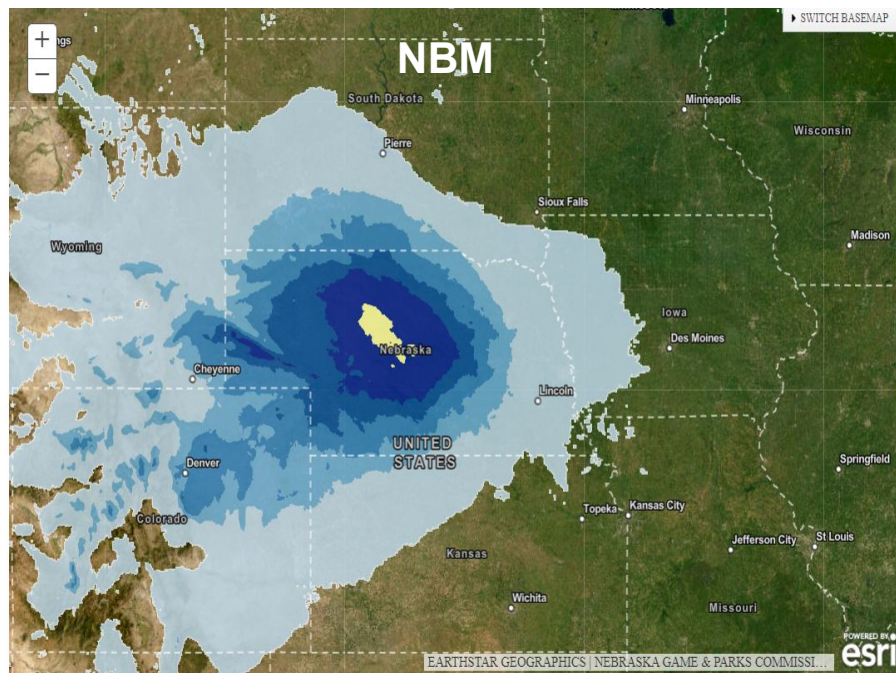
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NBM 6 Hour Snowfall Valid 18z 1/18

Day 2



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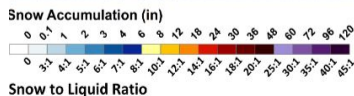
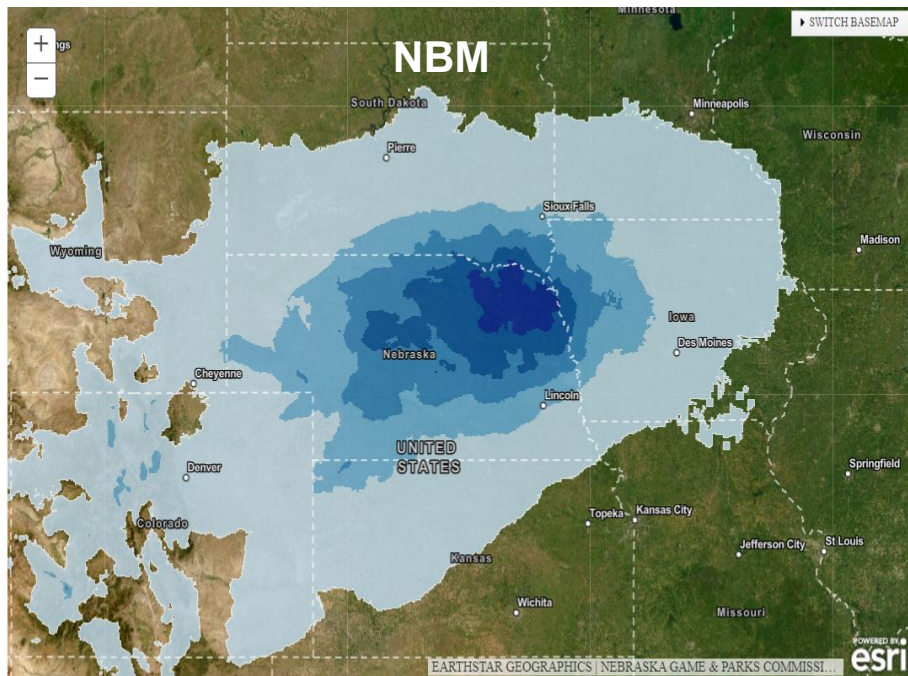
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NBM 6 Hour Snowfall Valid 00z 1/19

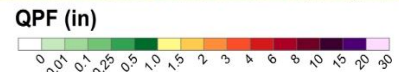
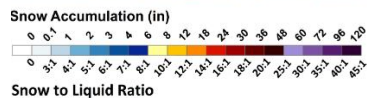
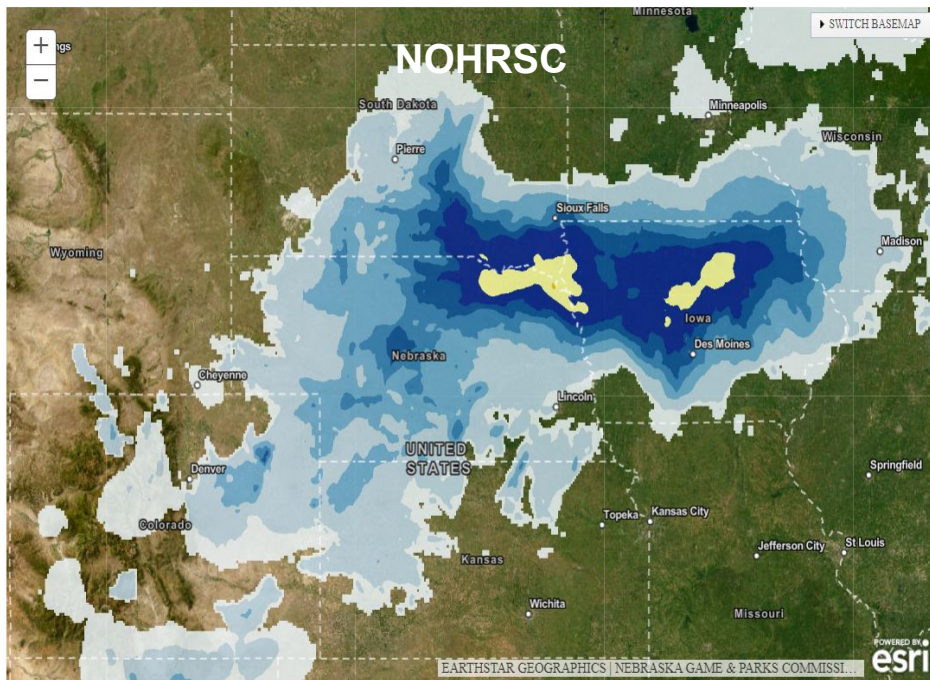
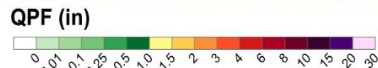
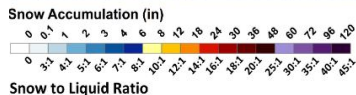
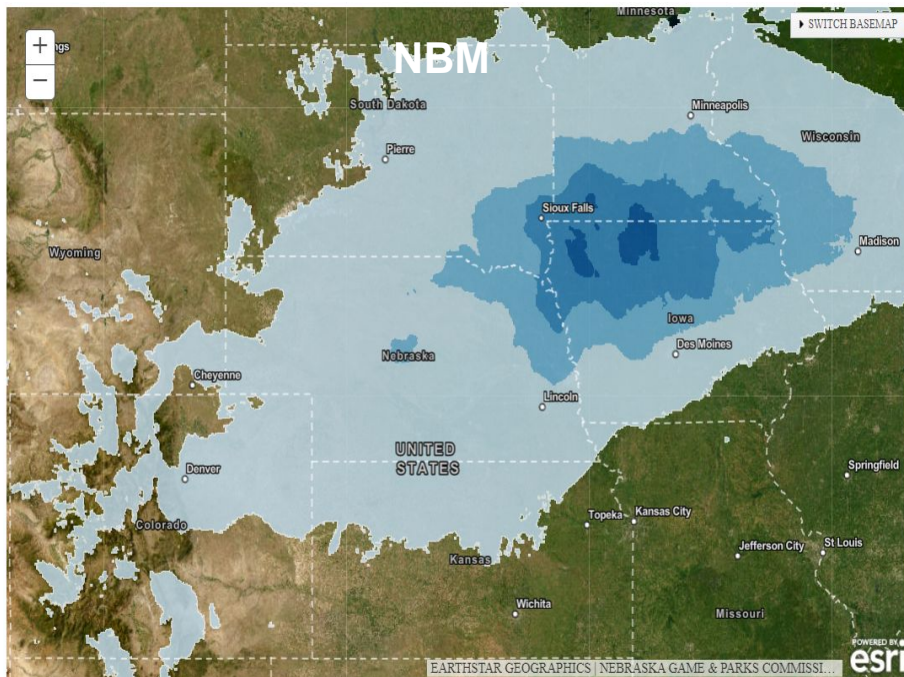
Day 2





NBM 6 Hour Snowfall Valid 06z 1/19

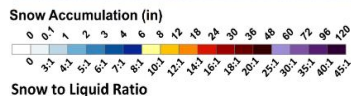
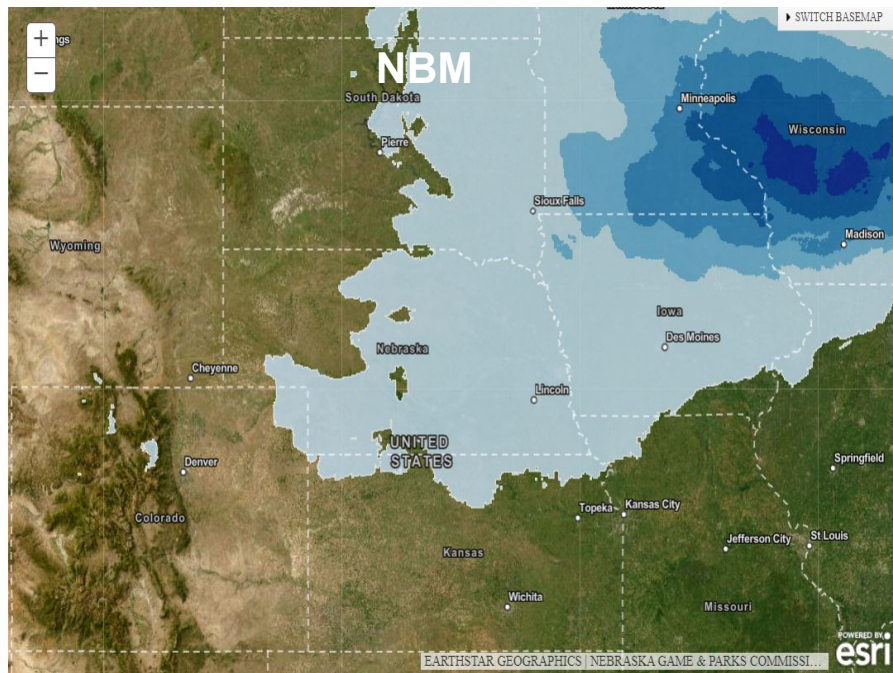
Day 2





NBM 6 Hour Snowfall Valid 12z 1/19

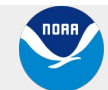
Day 2





NBM Evaluation

Day 1

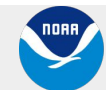




NBM Evaluation Links

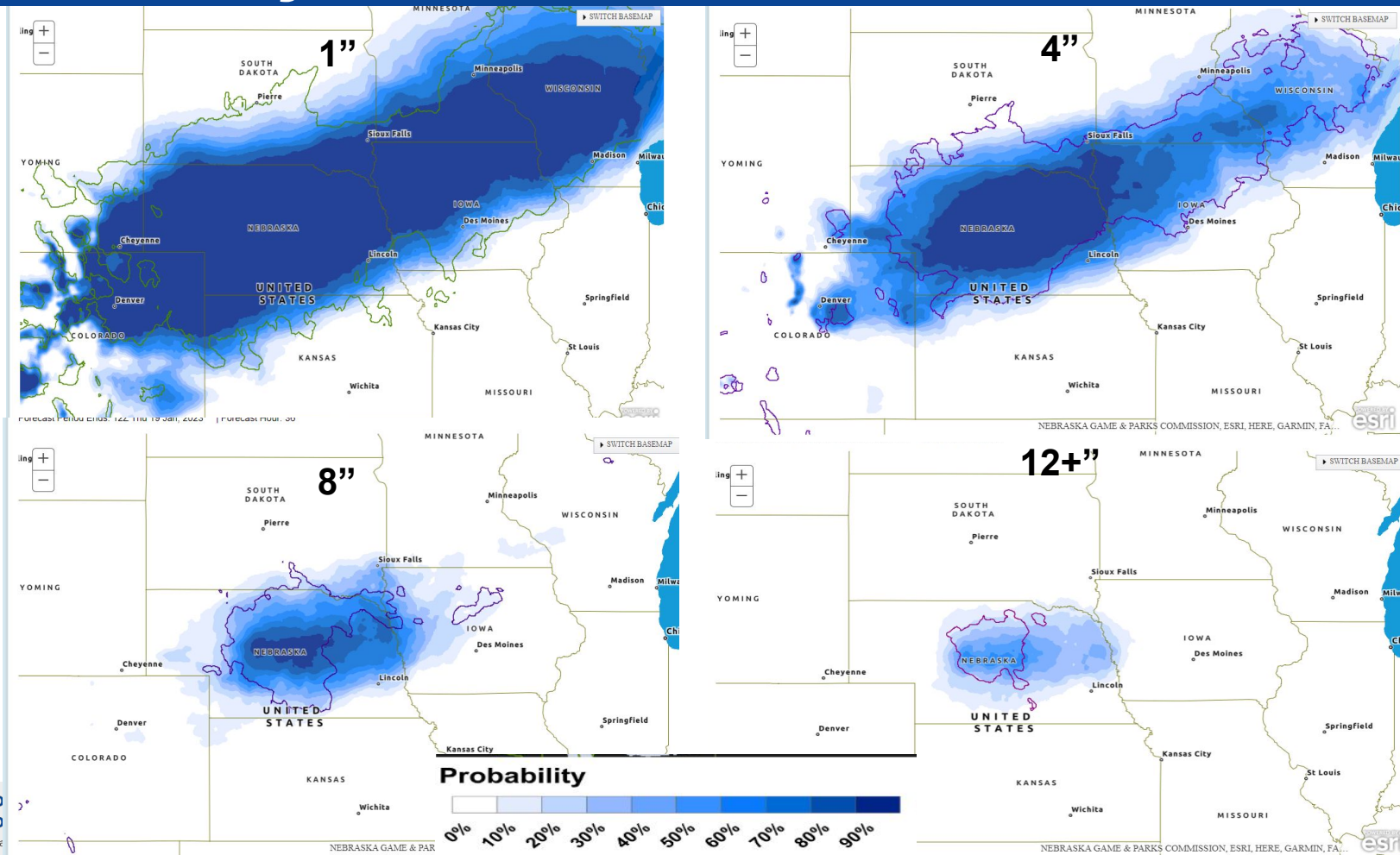
Day 1

- **HRRR Day 1 (00z 18 January) 12-36 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)
 - [24-hour Snowfall](#)
- **NAMNest Day 1 (00z 18 January) 12-36 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)
 - [24-hour Snowfall](#)
- **FV3 Day 1 (00z 18 January) 12-36 hours)**
 - [850 mb](#)
 - [Surface](#)
 - [PTYPE](#)





NBM Day 1 Probabilities NOHRSC Outlined

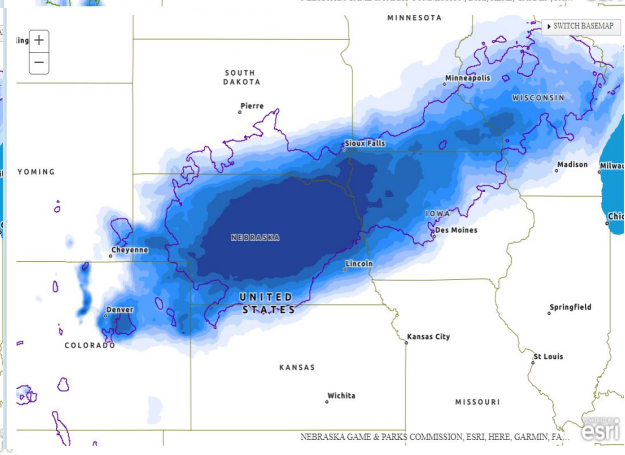
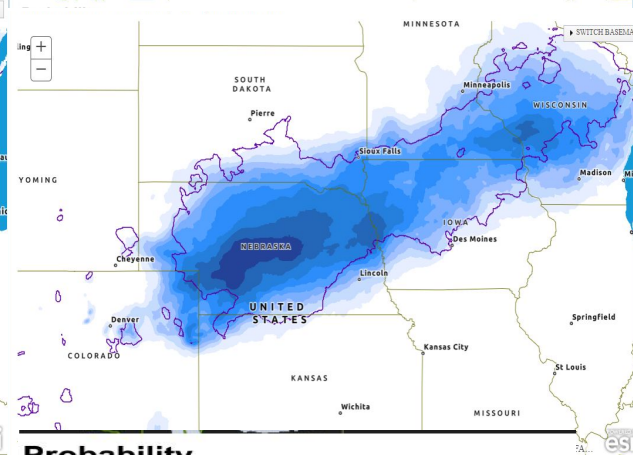
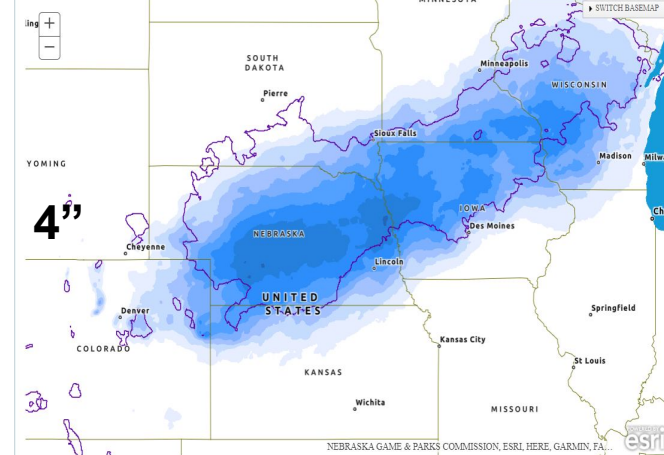
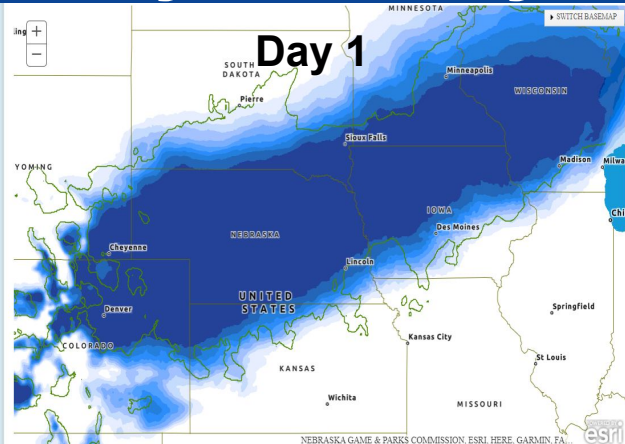
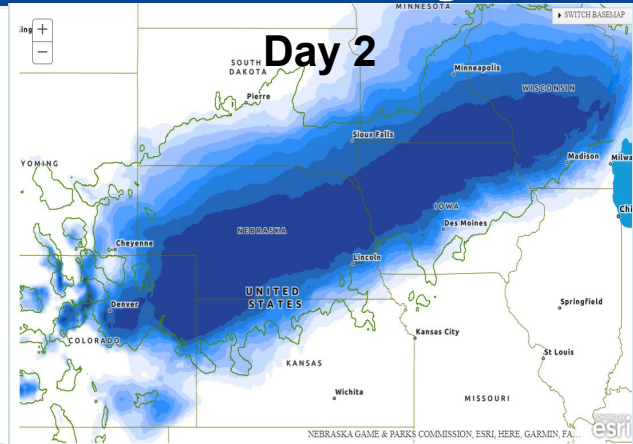
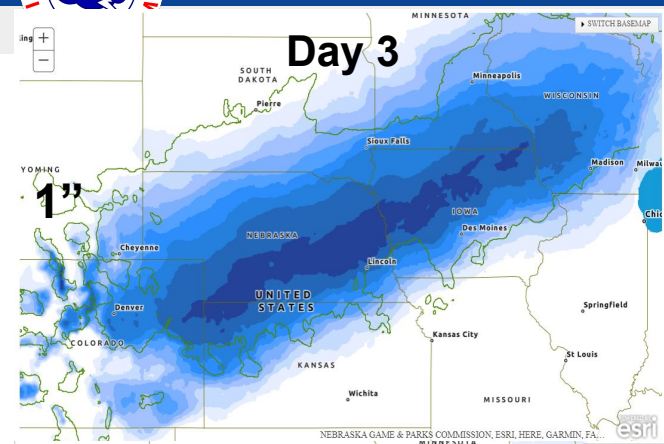


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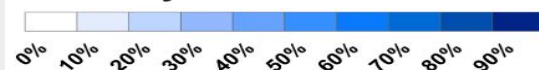
WWE
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NBM 1" and 4" Probs Day 3 Vs Day 2 Vs Day 1



Probability

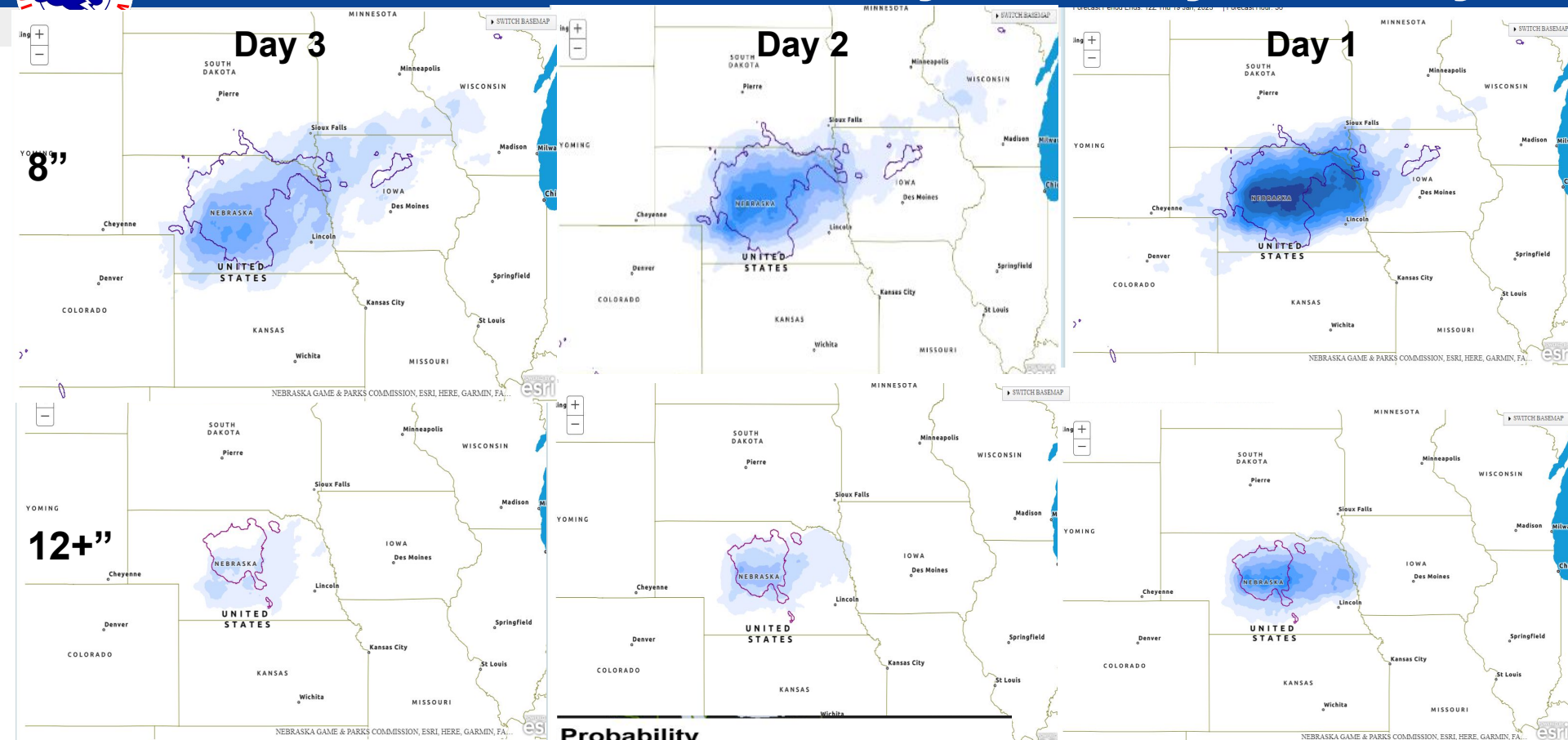


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U.S. Department of Commerce

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NBM 8" and 12+" Probs Day 3 Vs Day 2 Vs Day 1

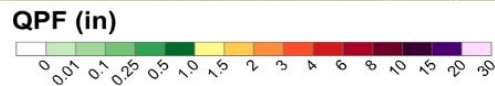
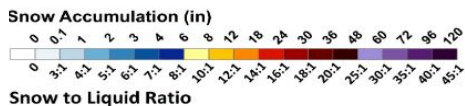
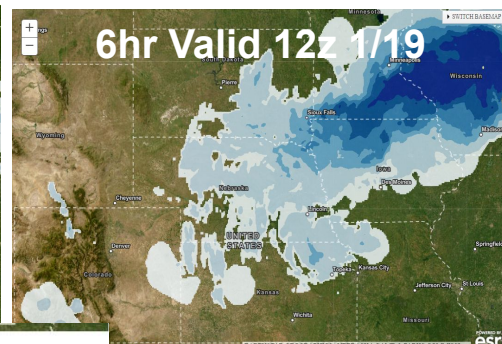
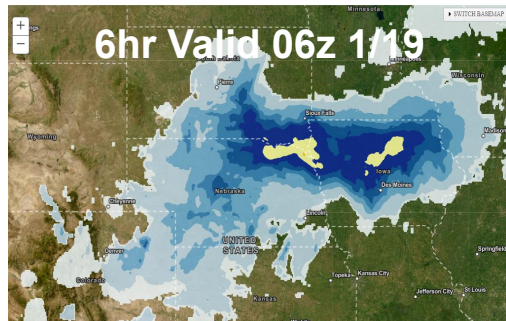
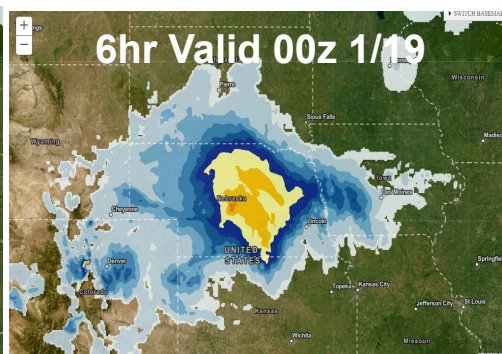
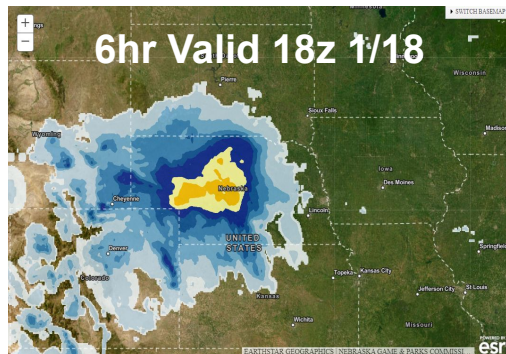
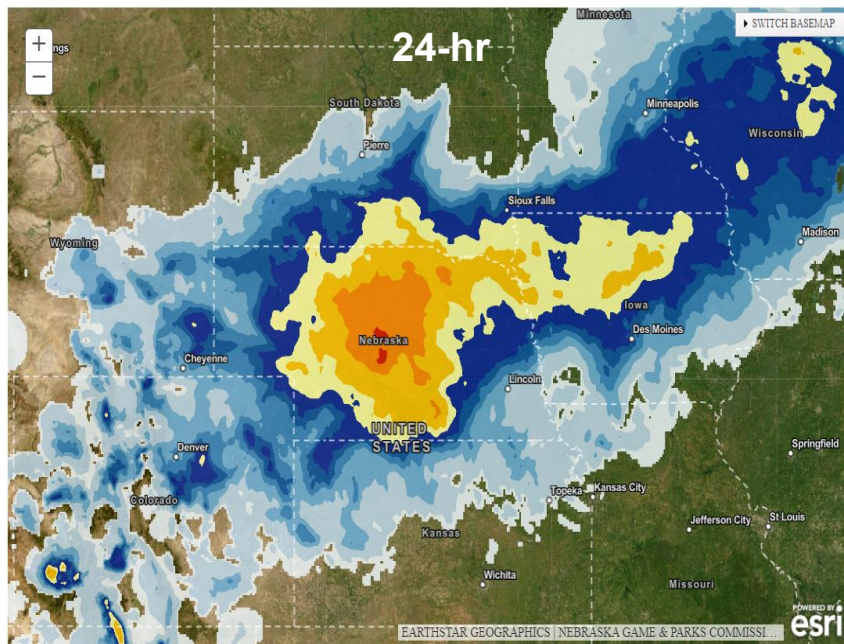


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U.S. Department of Commerce

WPC WWE
NBM Evaluation



NOHRSC Snowfall



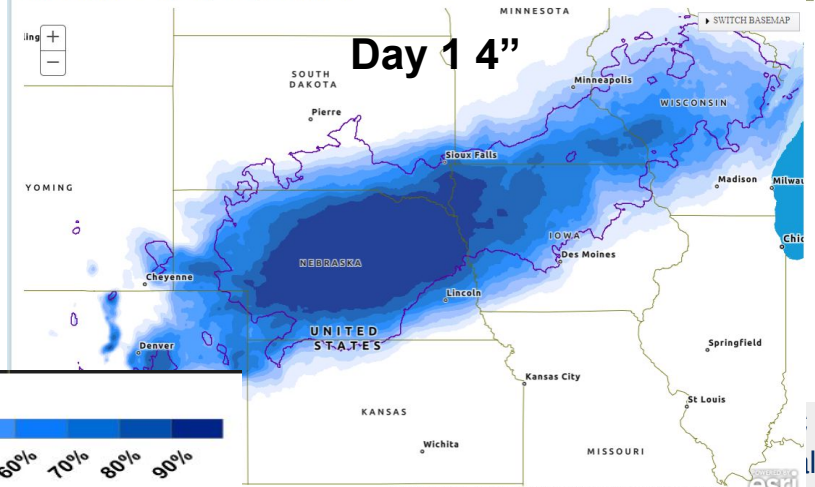
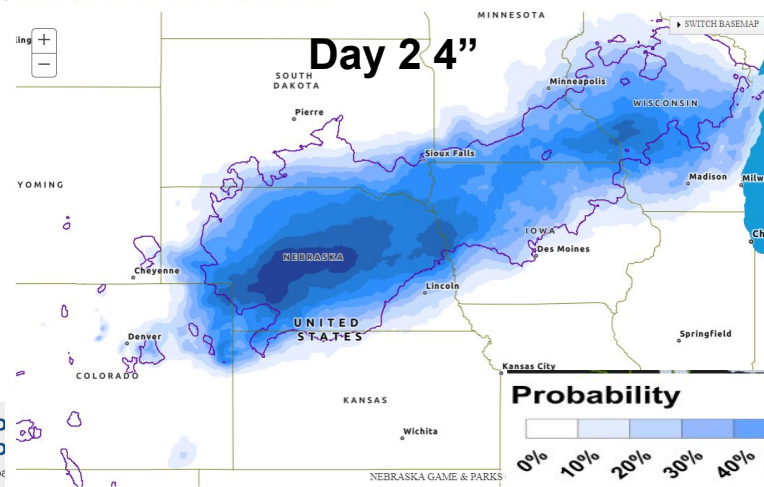
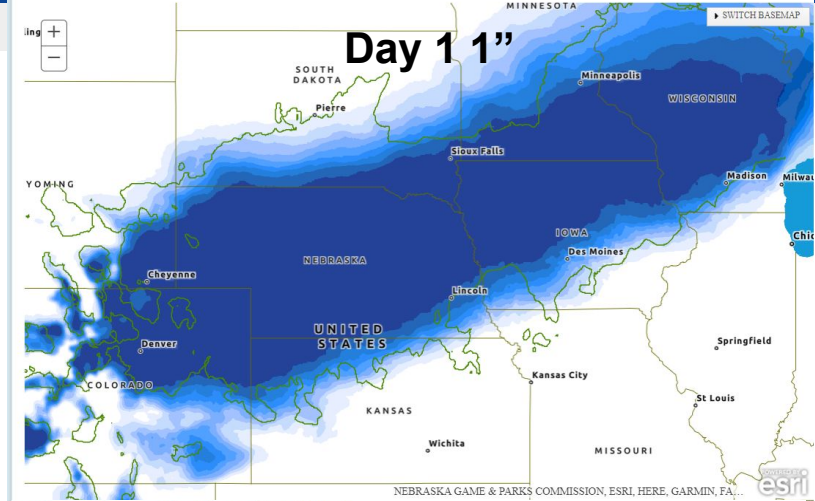
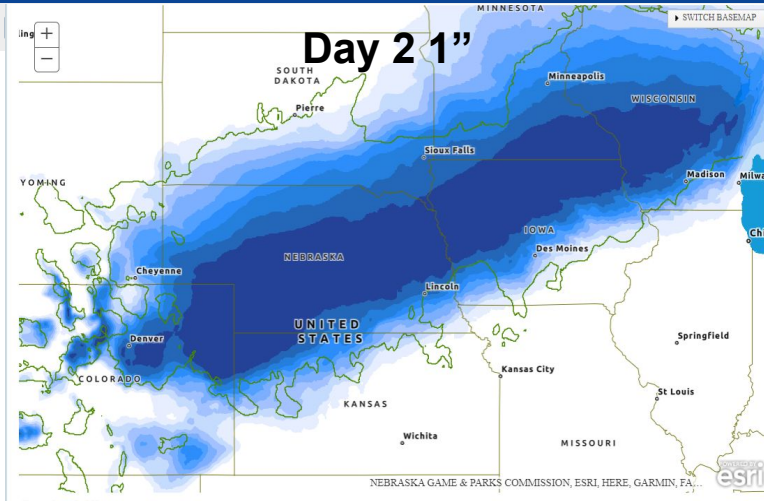
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Atmospheric Administration

U.S. Department of Commerce

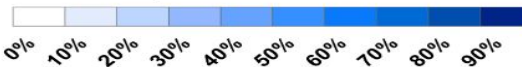
WPC WWE
NBM Evaluation



NBM 1" and 4" Probabilities Day 2 Vs Day 1



Probability

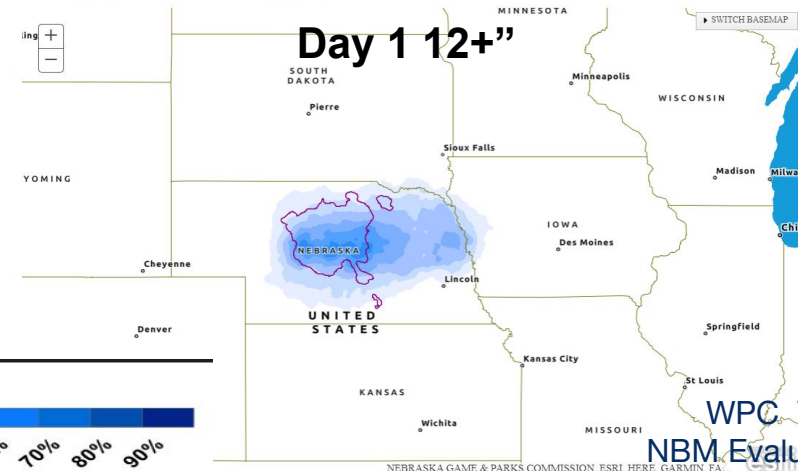
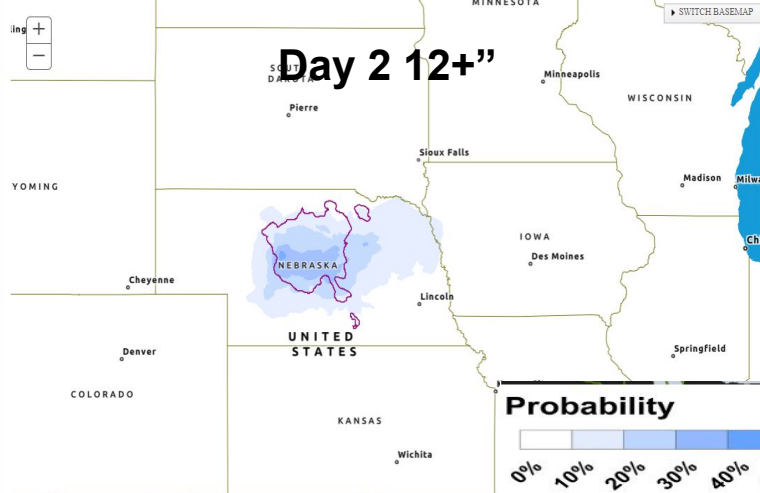
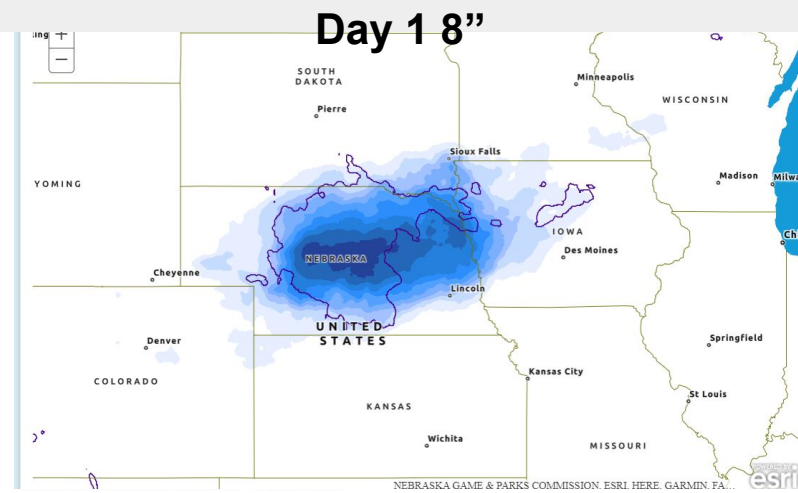
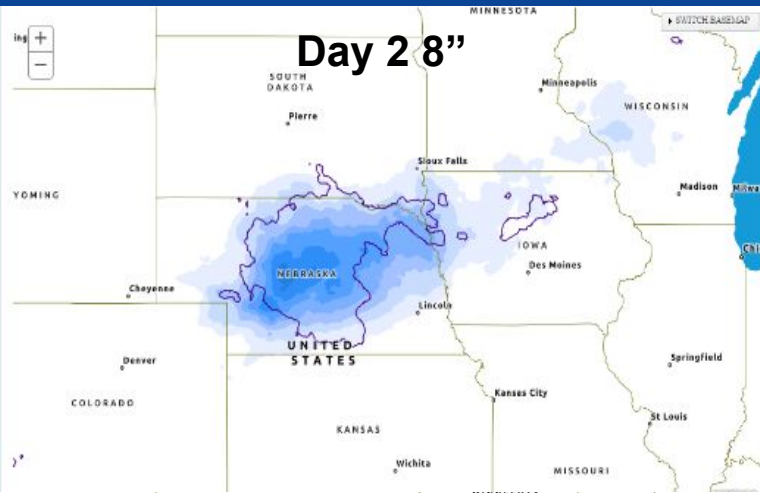


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U.S. Department of
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NBM 8" and 12+" Probabilities Day 2 Vs Day 1

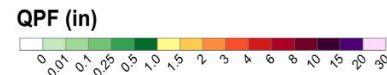
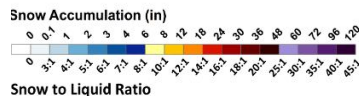
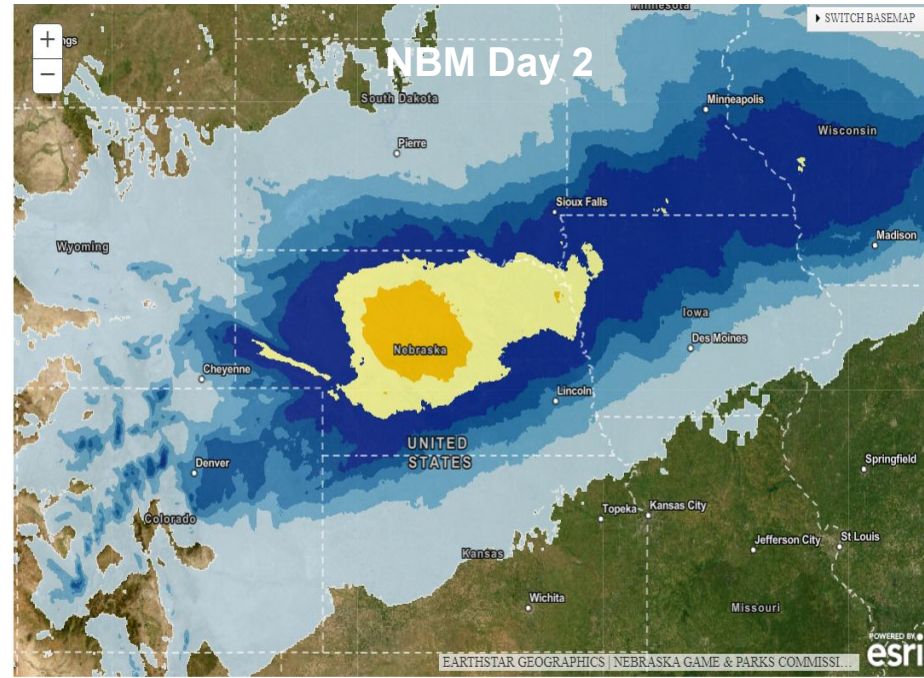
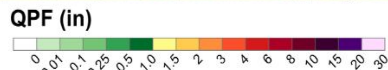
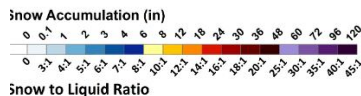
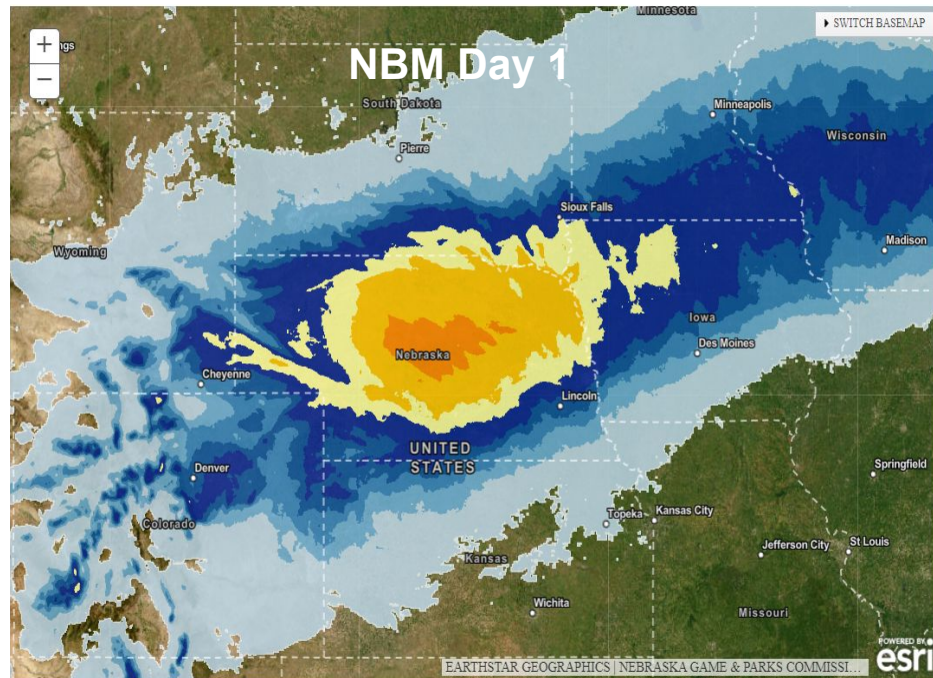


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WPC, WWE
NBM Evaluation



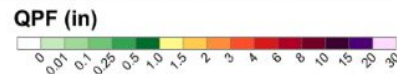
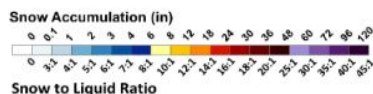
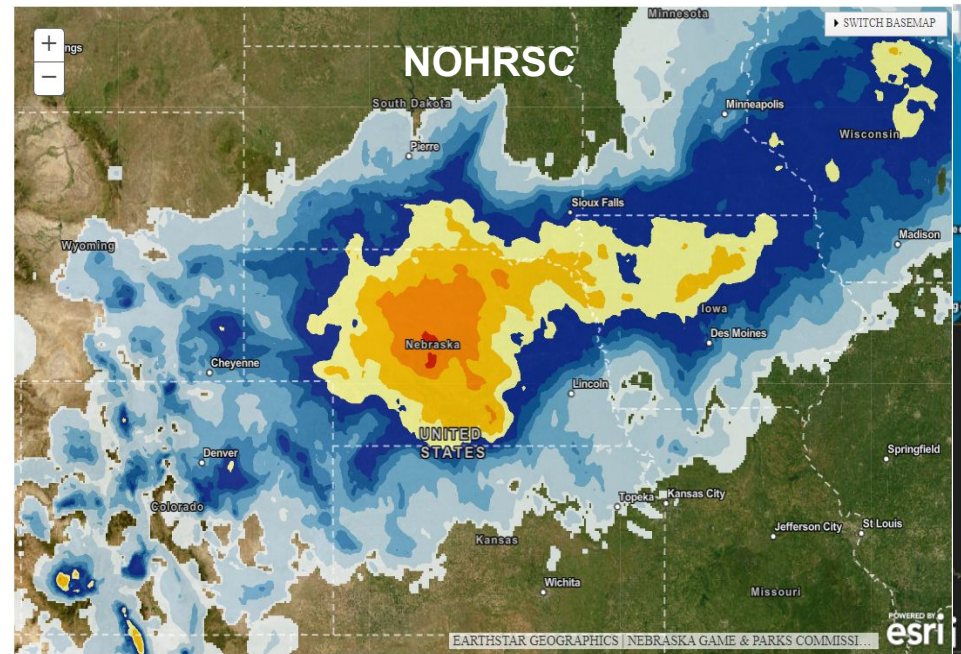
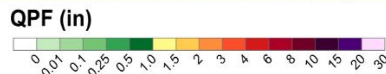
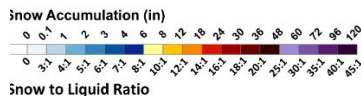
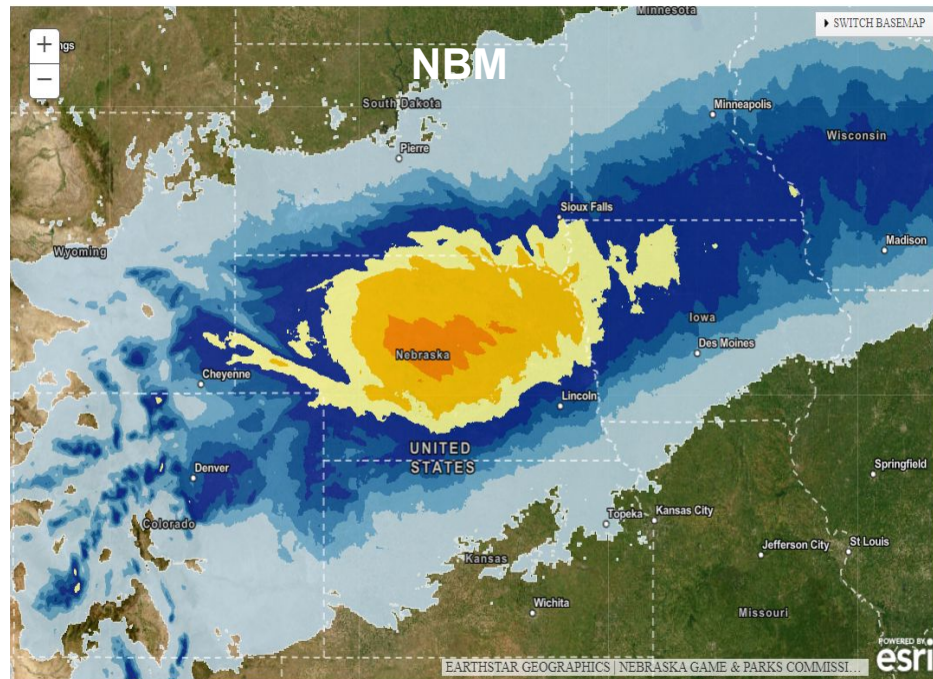
NBM 24 Hour Snowfall Day 1 Vs Day 2





NBM 24 Hour Snowfall 12z 1/18 - 12z 1/19

Day 1



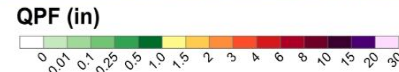
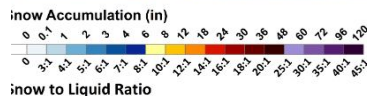
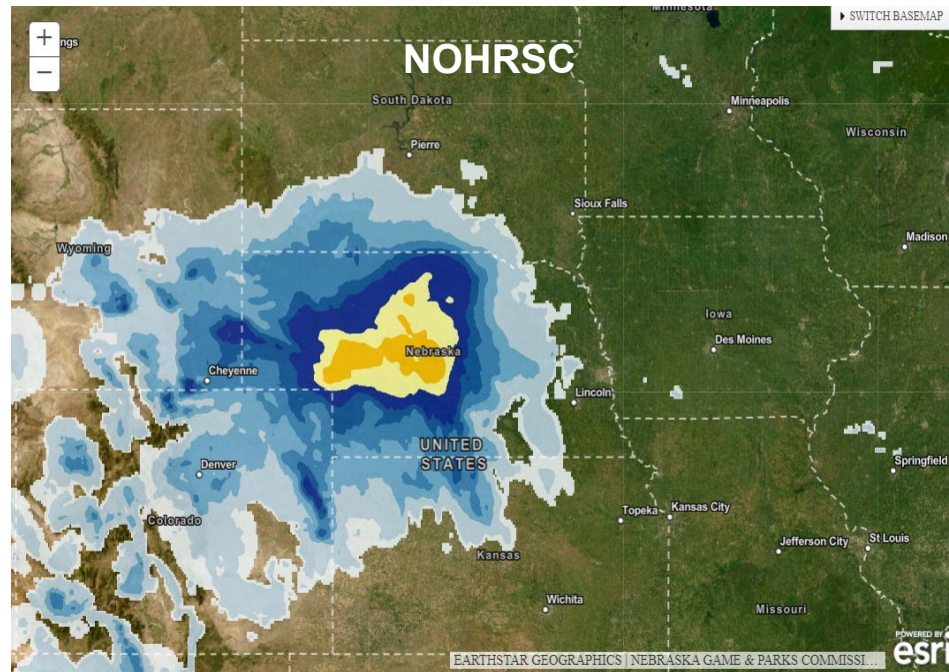
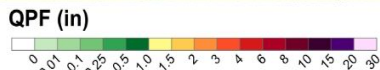
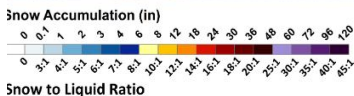
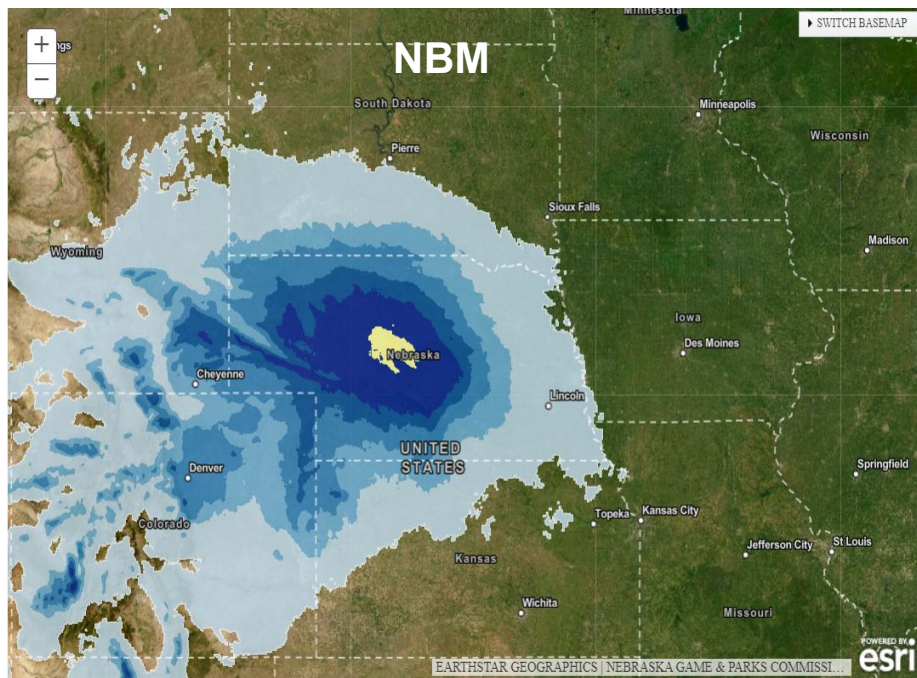
National Oceanic and
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WPC WWE
NBM Evaluation



NBM 6 Hour Snowfall Valid 18z 1/18

Day 1

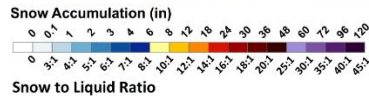
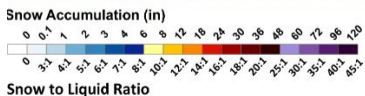


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WPC WWE
NBM Evaluation



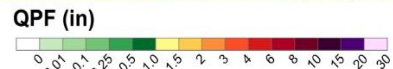
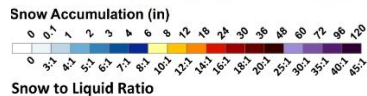
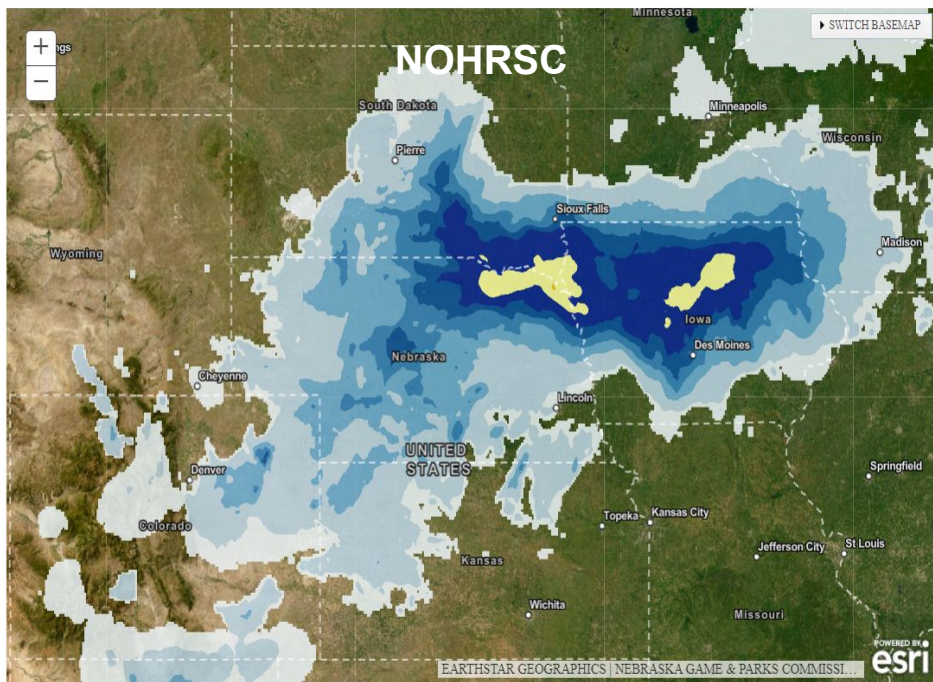
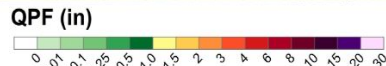
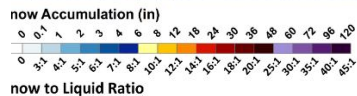
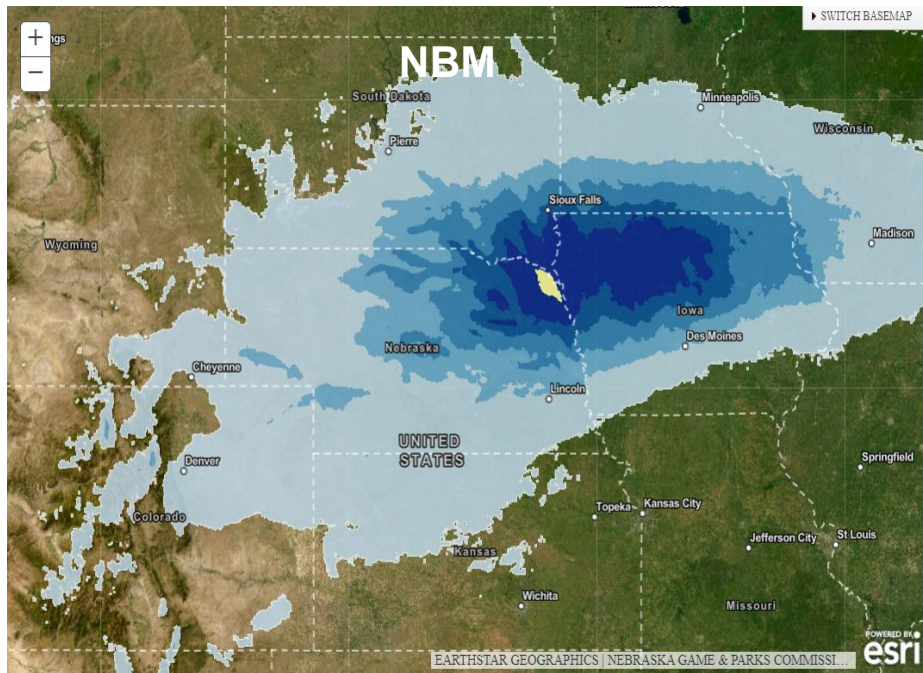
Day 1





NBM 6 Hour Snowfall Valid 06z 1/19

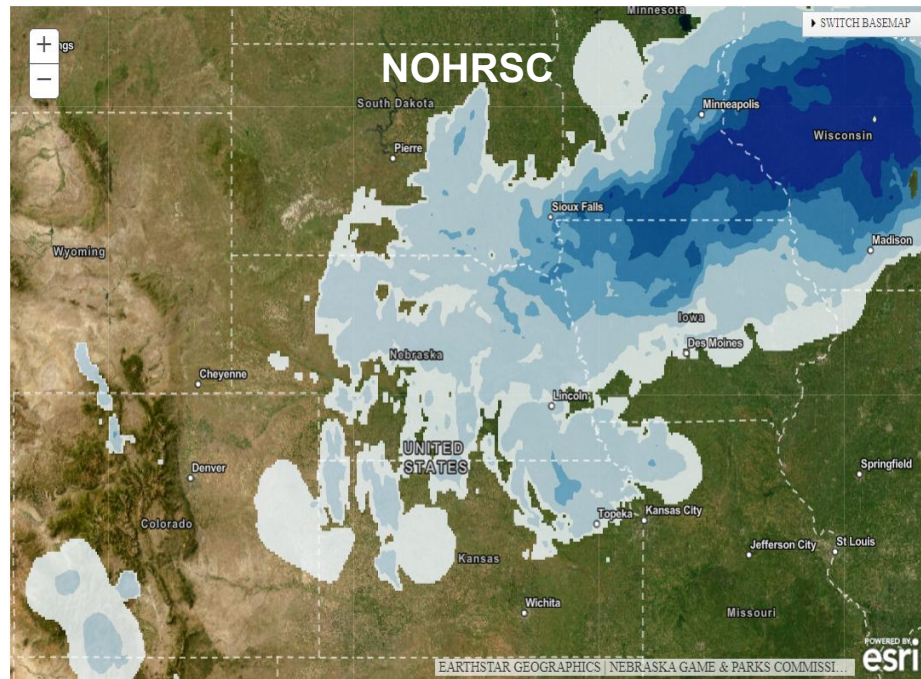
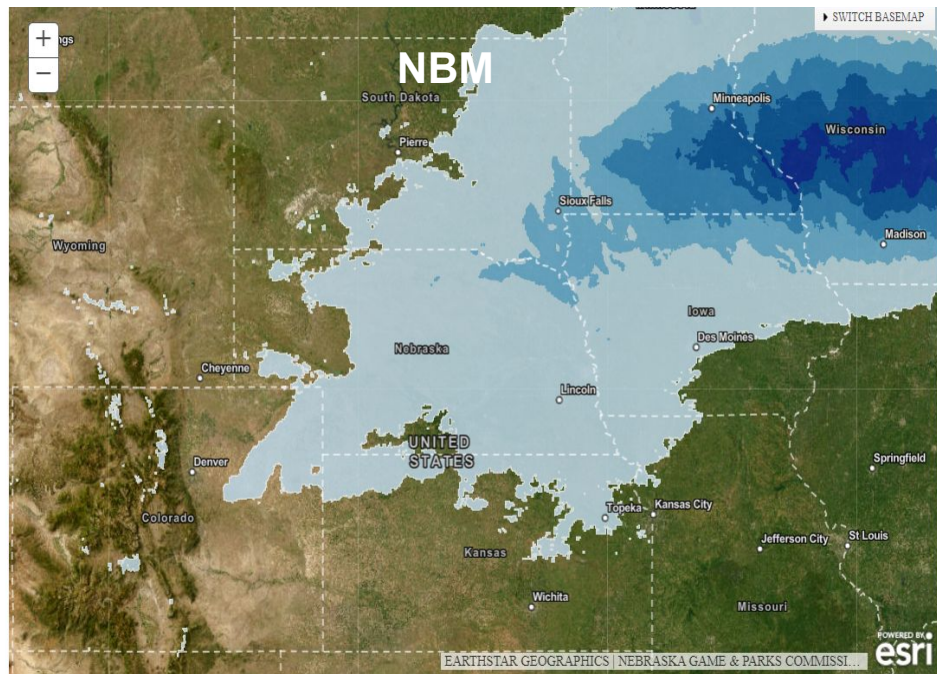
Day 1





NBM 6 Hour Snowfall Valid 12z 1/19

Day 1



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NBM Evaluation



Discussion

- **Did the NBM catch on to heavier amounts further NW too slow to help with IDSS messaging?**
- **Did a SE bias impact model forecasts, similar to what we see in east coast cyclones.**

