



NATIONAL WEATHER SERVICE

Building a Weather-Ready Nation

The Catastrophic Mid-America Floods of March 2019: Ice Jams, Rapid Snowmelt, Heavy Rain, and one of the Costliest Natural Disasters in Nebraska's Recorded History

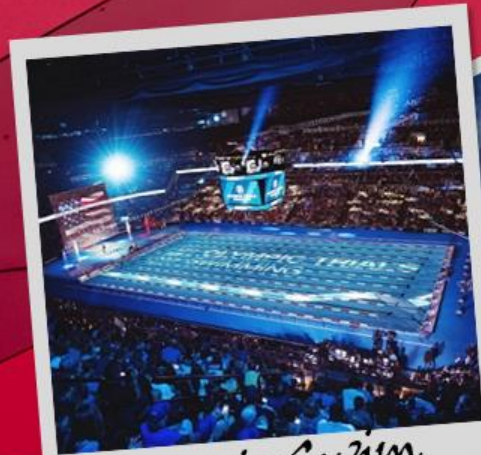
JANUARY 13, 2020

Presenter: Catherine M. Zapotocny | DOC/NOAA/NWS Omaha/Valley, NE



*Aerial photo of NWS Omaha during the flood.
Photo courtesy of Valley, NE resident, Juston Brazda.*

WFO Omaha: We Don't Coast



Olympic Swim Trials



Omaha Zoo



Primary Causes of Flooding Here

Missouri River Basin



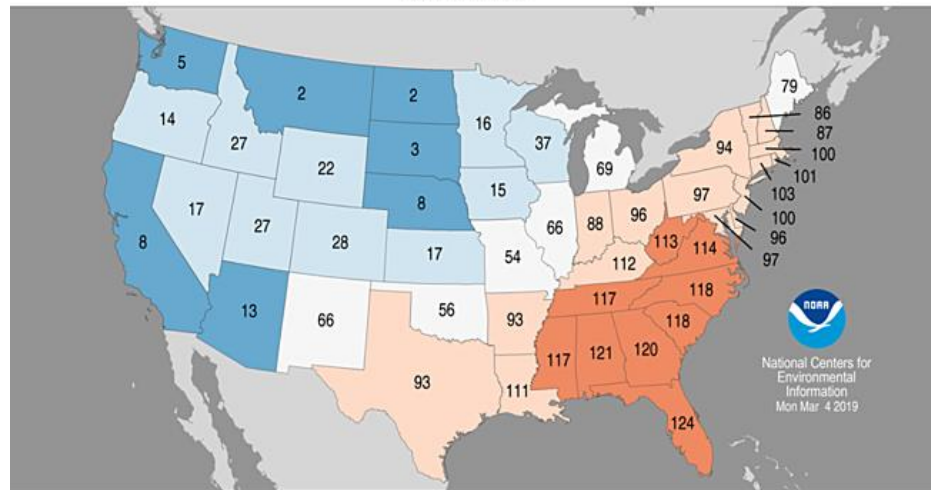
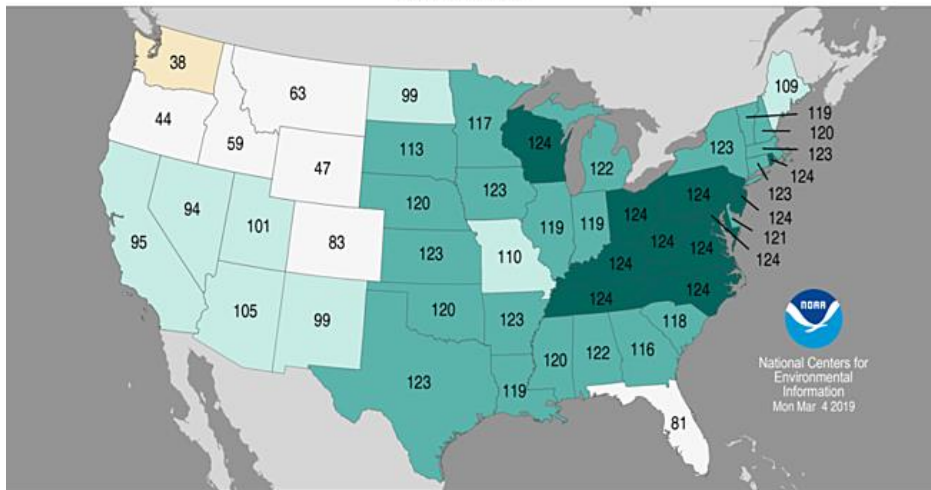
- Locally heavy/ prolonged rainfall
- Spring snowmelt and ice jams
- High flows from the Missouri River

The Stage Was Set-Primed for Flooding

Wet Fall and Winter | Snowy and Very Cold February

Statewide Precipitation Ranks
September 2018–February 2019
Period: 1895–2019

Statewide Average Temperature Ranks
February 2019
Period: 1895–2019

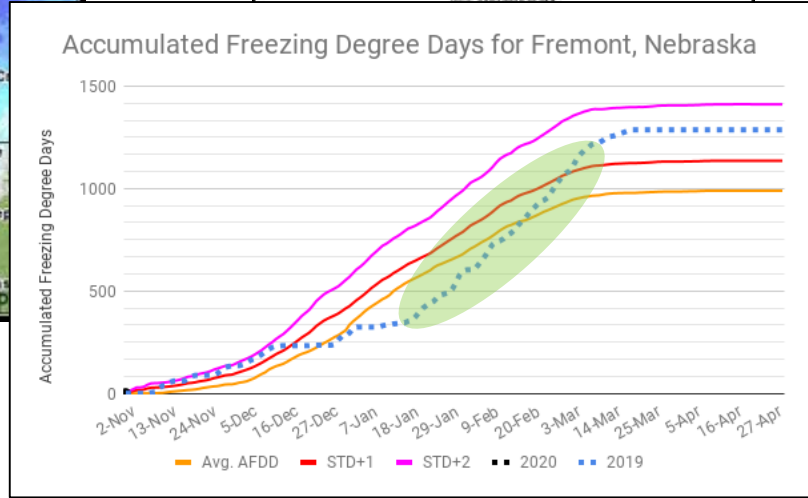
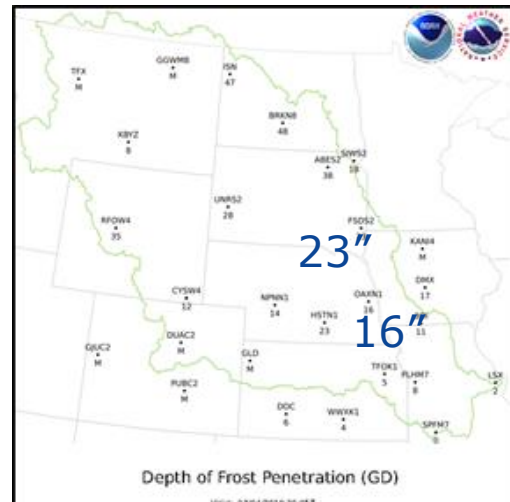
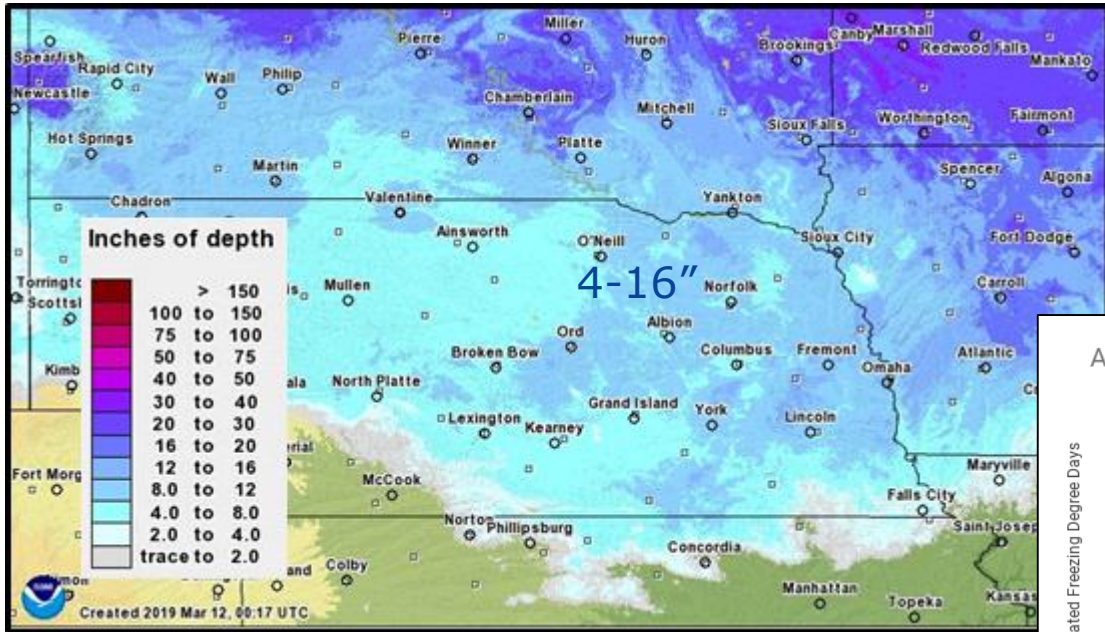


- Record Driest (1)
- Much Below Average
- Below Average
- Near Average
- Above Average
- Much Above Average
- Record Wettest (124)

- Record Coldest (1)
- Much Below Average
- Below Average
- Near Average
- Above Average
- Much Above Average
- Record Warmest (125)



Deep Snow Cover/Frozen Ground



Pre-Event Messaging/Preparations



Local Ice Jam Meeting - Columbus, NE
6 March 2019 - Standing Room Only -
Public - NEMA - Law Enforcement

- December of 2018 - River Ice Meeting
- Monthly, and then Weekly Ice Jam Conference Calls Began February 8th
- Twice-Weekly calls began March 4th



Pre-Event Messaging / Preparations



Upfront Information



- There is an **much-above-normal risk** for spring flooding this year, this is due to the following factors:
 - High soil moisture
 - Elevated streamflows
 - Existing Snowpack
- **Furthermore, there is an increased risk for major flooding this year.**
- Since the last outlook two weeks ago, we've only increased our flood potential.
- This increased threat, the past two weeks, is largely from additional snow and cold air. This has increased the snowpack and only worsened the ice jam potential.



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NATIONAL WEATHER SERVICE OMAHA/VALLEY, NE

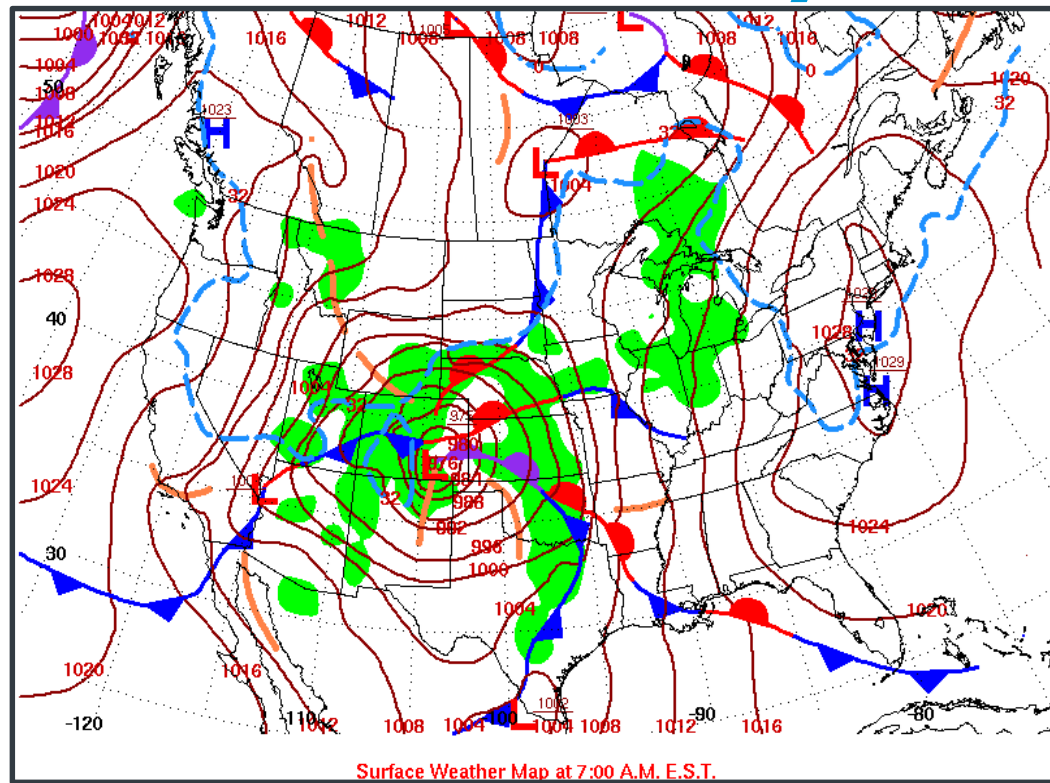
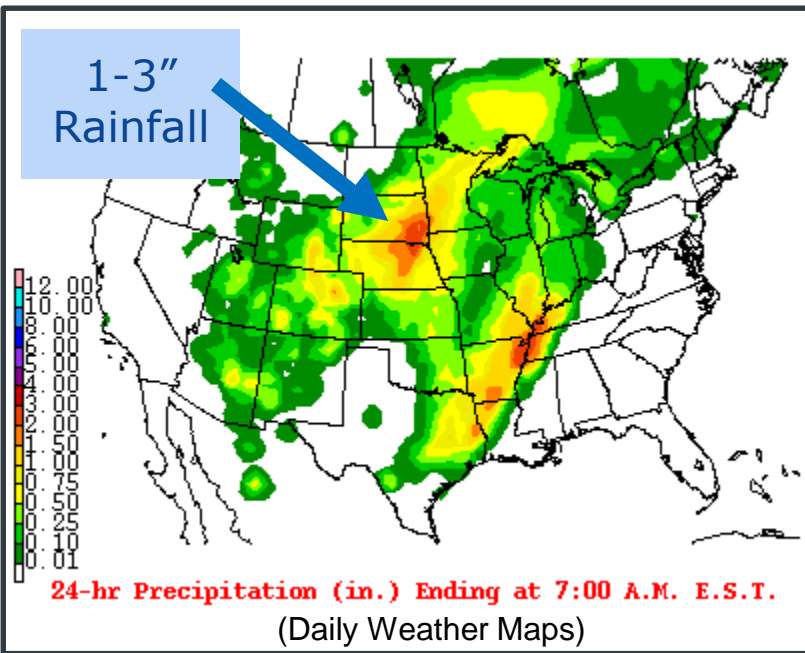
@NWSOmaha

Building a Weather-Ready Nation

- Spring Flood Outlook - March 7, 2019 - increased threat for **MAJOR** flooding
- Flood Watch March 11, 2019 highlighted the potential for MAJOR flooding due to upcoming potential rain on frozen ground.
- A dry run for helicopter ice jam drop explosives 3/13 – were not needed due to the natural break-up.

A Bomb Cyclone Was The Catalyst

- 13 March, 2019 - Rapid Snowmelt/Heavy Rain



Messaging the Historic Flood

SitReports/Conference Calls/SM/Interviews



NWS Omaha @NWSOmaha · Mar 11
 We see 1-3" rains all the time in the summer. Why all the fuss now? #Newx #IAwx

Flood Watch

Tuesday Night thru Thursday Eve

- 1-3" of Rain Expected
- Frozen Ground Leads to Quick Runoff
- Mild Temps Forecast
- Melting Snow Could Release Another 1-3"
- Ice Covered Rivers Could Produce Ice Jams

WHEN FLOODED TURN AROUND DON'T DROWN

Map showing Flood Watch area from Lake Park to St. Joseph, including cities like Omaha, Lincoln, and St. Joseph.

WEATHER FORECAST OFFICE • OMAHA/VALLEY, NE
 3/11/2019 10:52 PM

4 17 45

Prevent house flooding

- Clear ice from downspouts
- Clear a path for downspouts
- Remove snow from street storm drains



Friday March 8, 2019



NWS Omaha @NWSOmaha · Mar 12
 Why is the National Weather Service so concerned about 1 to 2.5 inches of rain / It all comes down to a rare confluence of spring and winter / Here are the details / #flooding #news #iawx

Why this Isn't Your Garden Variety Rain Event

--- SIMPLY PUT ---

We have an exceptionally rare confluence of nature variables in the region this week

- Mild Temperatures
- Heavy Spring Like Rains
- Saturated Soil that is Frozen Below the Surface
- Lingering Snowpack
- Thick Ice Cover on Area Rivers

NATIONAL WEATHER SERVICE
 WEATHER FORECAST OFFICE • OMAHA/VALLEY, NE
 @nwsOmaha
 CREATED: 4:59 AM MAR 12, 2019





March 8, 2019
NWS Omaha/Valley, NE



PAPJO-MISSOURI RIVER NRD
Highway 6 over the ice-packed Platte River
Resources District has dynamite crews ready
the calm before today's storm as he jogs dr

March 10,
2019
Platte River
near
Ashland, NE

March 16, 2019
Platte River near
Ashland, NE

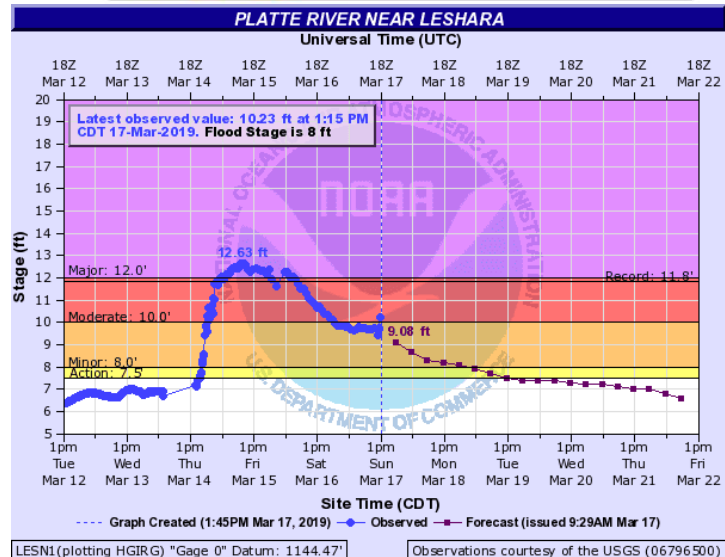
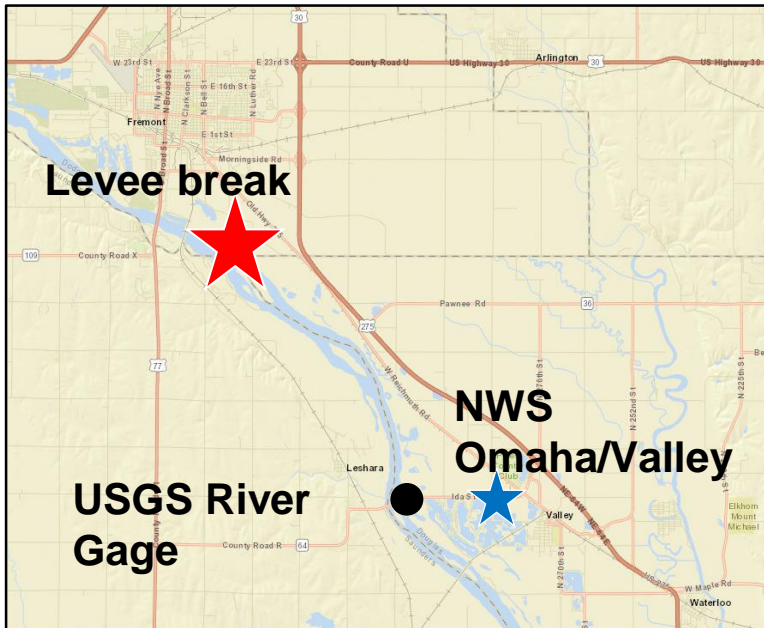


Observers were vigilant, however hyper-rapid rises still caught people off-guard



NWS Omaha @NWSOmaha · Mar 15

Our intrepid hydrologist taking a midnight river stage measurement of the Platte River near Leshara. #newx #iawx



LESNI (plotting HGIRG) "Gage 0" Datum: 1144.47'

Observations courtesy of the USGS (06796500)

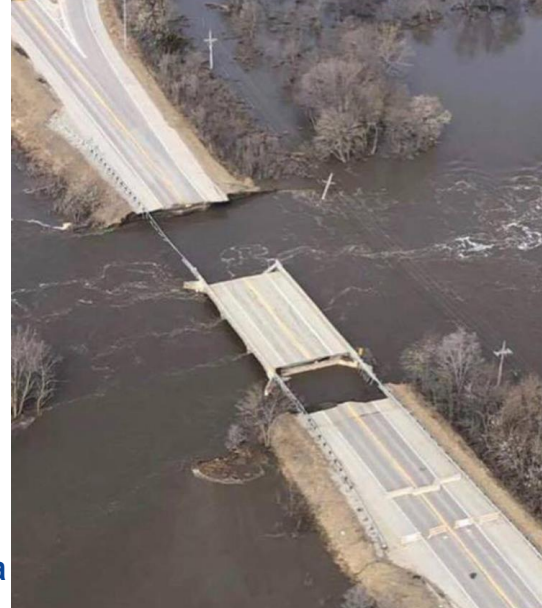
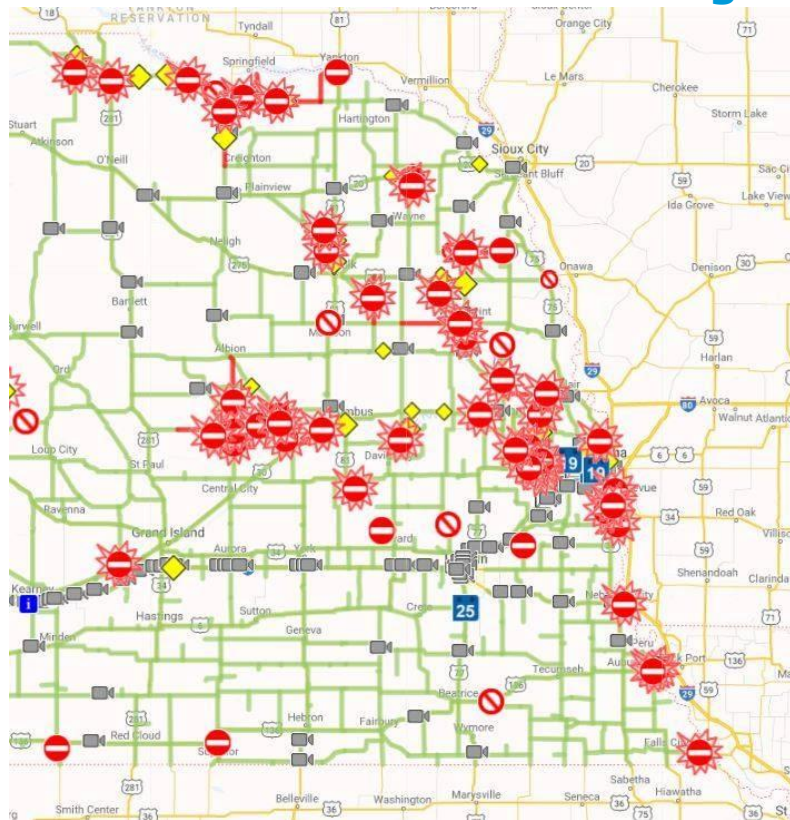






Our People...

Evacuation Routes Were Closing Fast



Photos at NWS Omaha After the Evacuation



National Weather Service | Omaha/Valley, NE

Early morning photo of the office we abandoned due to flooding on Friday morning.

NWS OFFICE IN VALLEY, NE

Thanks to our partners at Papio-Missouri River Natural Resources District for checking on our digs and supplying this photo.

papionrd.org



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Catastrophic Damage

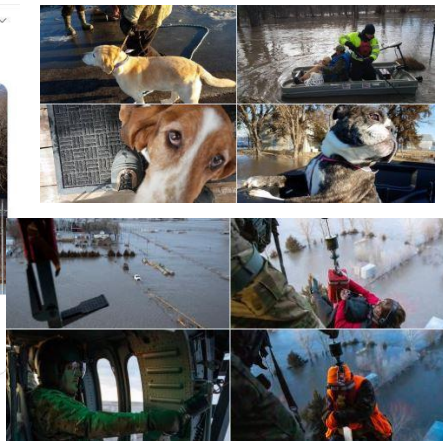


Gov. Pete Ricketts @GovRicketts · Mar 17
"Record-high river levels were reported in at least 38 locations in the Midwest, particularly in Nebraska and Iowa, said Jonathan Erdman, a senior meteorologist with weather.com."



Record-High Floods in Nebraska Breach Levees and Isolate Towns
At least two deaths were confirmed by local authorities as surging floodwaters in the Midwest damaged roadways and homes.
[nytimes.com](#)

3 35 32

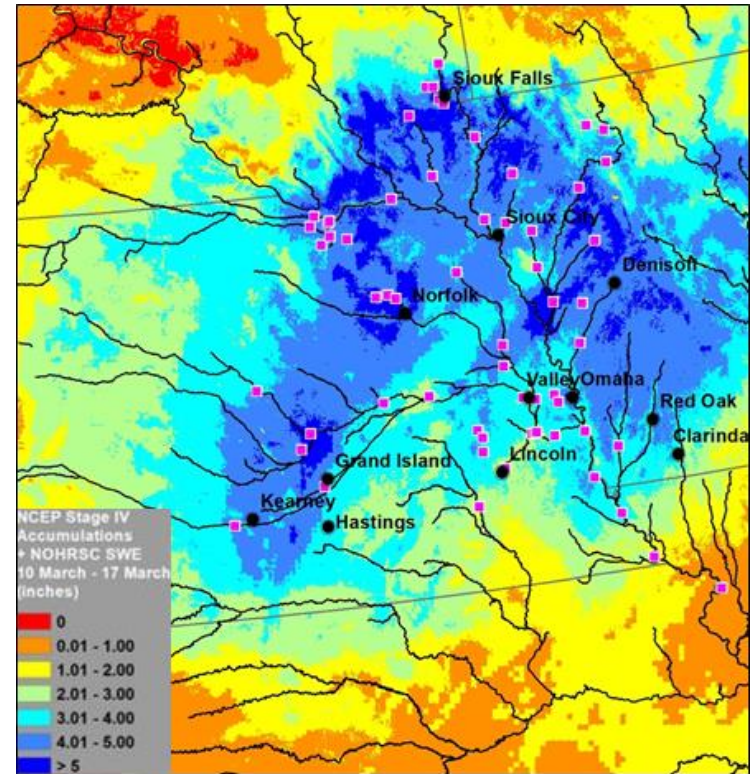


Dan Lucht



The Catastrophic Flood

- 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 124 gages reached flood stage (OAX HSA)
- 21 gages exceeded major flood stage, 23 crested in the moderate flood category - 31 reached minor flood stage



Rainfall plus snow-water equivalent
■ River gages that set records

Impacts – Lives/Livelihoods Lost

- Five lives lost. 112 people rescued by Nebraska National Guard. 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 highways were closed during the storm. 200 mi of roads (NE) & 27 bridges were damaged or destroyed.
- Major Disaster Declaration – 104 cities and 81 of 93 counties in Nebraska and 59 of 99 counties in Iowa.

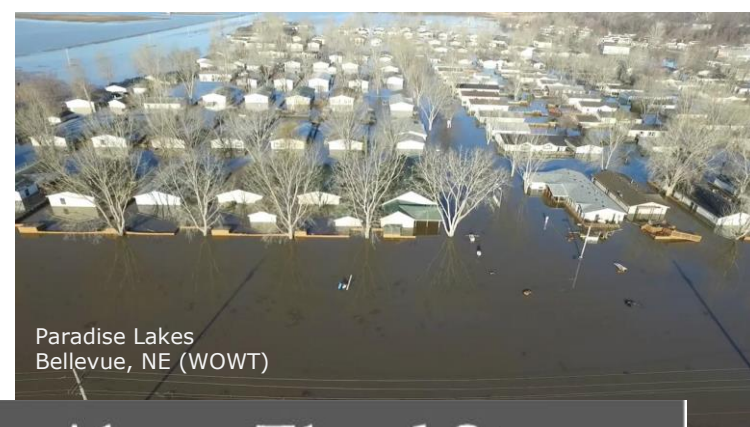


Lessons Learned...

- Communication and good partner relationships prior to events are critical
- Maintain a well-trained/experienced staff
- Conduct flood surveys immediately afterwards
- Pair new employees with experienced staff when deployed to the state EOC
- Include alternate routes in the evacuation plan
- Practice the COOP (Continuity of Operations) plan to identify gaps in services

CR AAR March 2019 Flooding/Blizzard

https://docs.google.com/document/d/17AJJoU_sPz8OxMnwhEIVSeRcMBpMWRfuSg8tsrRZnSdA/edit?usp=sharing



Paradise Lakes
Bellevue, NE (WOWT)

Days Above Flood Stage

	2019	2011
Decatur	18	86
Blair	52	110
Omaha	36	102
Plattsmouth	224	156
Nebraska City	270	164
Brownville	272	170
Rulo	272	167



Acknowledgements

NWS Omaha would like to thank:

- Nebraska/Iowa Emergency Management and first responders for their dedication in saving lives and assisting residents to safety.
- NWS WFO Hastings for their dedication and support during major flooding/flash flood emergency; hosting WFO Omaha for the week while they were evacuated
- NWS WFO Sioux Falls for providing service backup
- Papio Missouri River Natural Resource District & US Dept of Agriculture for hosting WFO Omaha
- Many individuals and groups, both internal and external to the NWS

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