

2017 Spring Flood Outlook

- Late March Update -

Gregory J. Gust

**Warning Coordination Meteorologist
NWS Grand Forks ND**

**Prepared for the Red River of the North and Devils Lake Basin Spring Flood Outlook Video-Webinar
Grand Forks ND - 22 March 2017**

Spring Flooding ??



Of the main ingredients to a spring flood, we are moving into the final couple of steps... as spring finally arrives.





2017 Spring Flood Outlook – March 22nd Update for the Red River and Devils Lake Basins



- Updates -

South Basin:

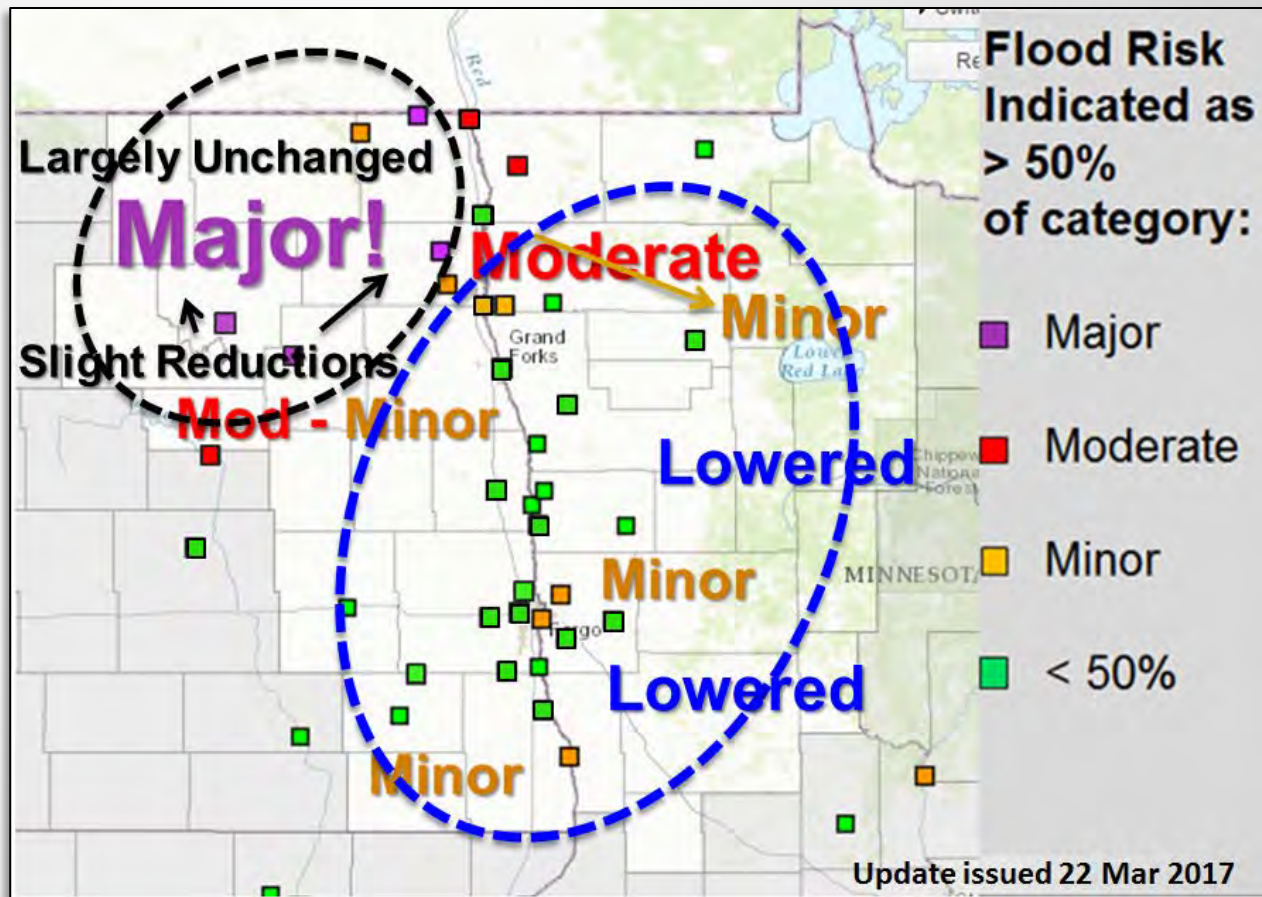
Old Snowpack is Gone.

- Risk near to blo Normal!
- Spring Snow/Rain

North Basin:

Risk slightly lower, but...

- High in *far* North Valley.
- Highest in Devils Lake and northeast ND Tribs.



<https://water.weather.gov/ahps2/index.php?wfo=FGF>

Prepared by: Gregory J. Gust, Warning Coordination Meteorologist - NWS Grand Forks ND



Building a Weather-Ready Nation



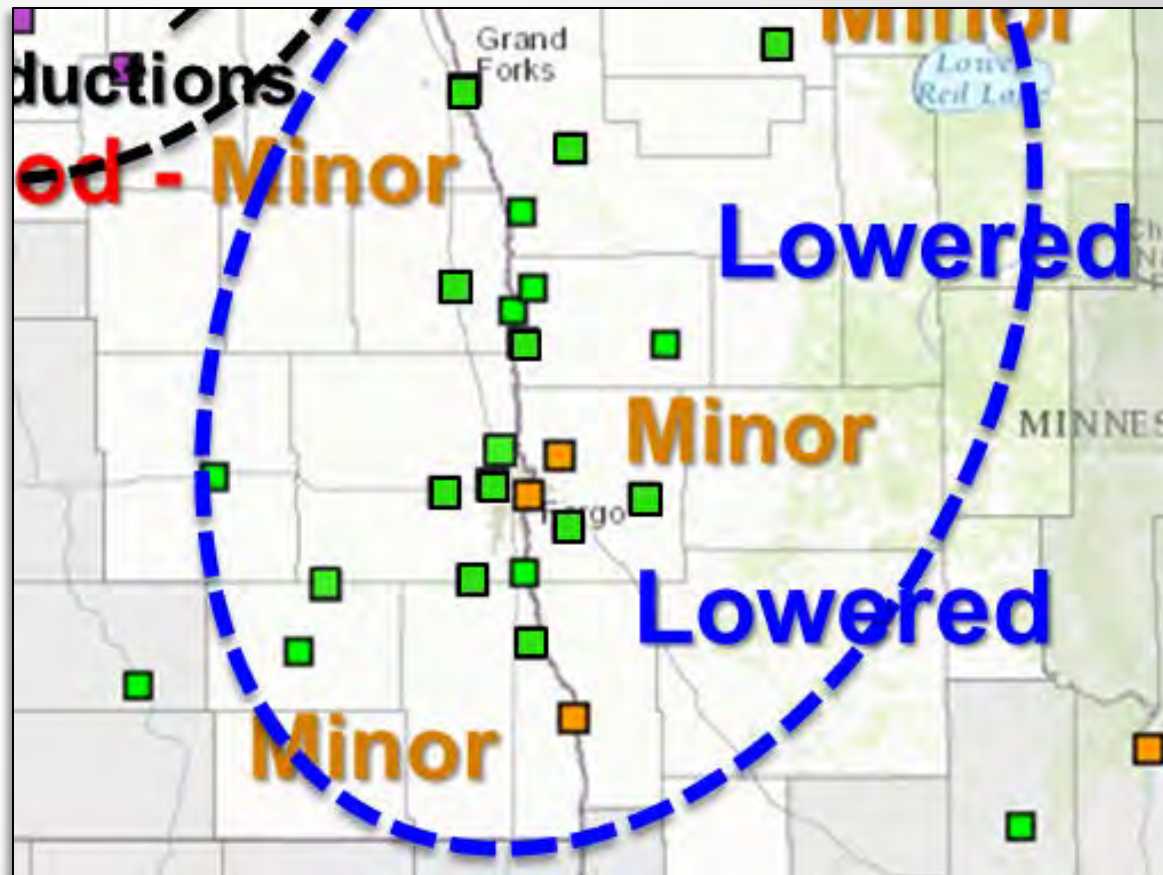
2017 Spring Flood Outlook – March 22nd Update *for the Red River and Devils Lake Basins*



South Basin: *Why?*

Old Snowpack is Gone.

- Some residual runoff still in river systems.
- Heavy Spring Snow or Rain is still possible.
- Topsoil still quite wet... but deep frozen.
- Outlook period now extends through June.
- Risk of Thunderstorms is above normal.



Flood Risk near/blo Normal!

<https://water.weather.gov/ahps2/index.php?wfo=FGF>

Prepared by: Gregory J. Gust, Warning Coordination Meteorologist - NWS Grand Forks ND



Building a Weather-Ready Nation



2017 Spring Flood Outlook – March 22nd Update for the Red River and Devils Lake Basins



North Basin: Why?

Sig Snowpack Remains.

- Most melt/runoff remains in fields and ditches.
- Addn Spring Snow or Rain is *more likely*.
- Deep soil very wet/frozen.
- Outlook period now extends through June.
- Risk of Thunderstorms is above normal.

Flood Risk is quite High!



<https://water.weather.gov/ahps2/index.php?wfo=FGF>

Prepared by: Gregory J. Gust, Warning Coordination Meteorologist - NWS Grand Forks ND



Building a Weather-Ready Nation

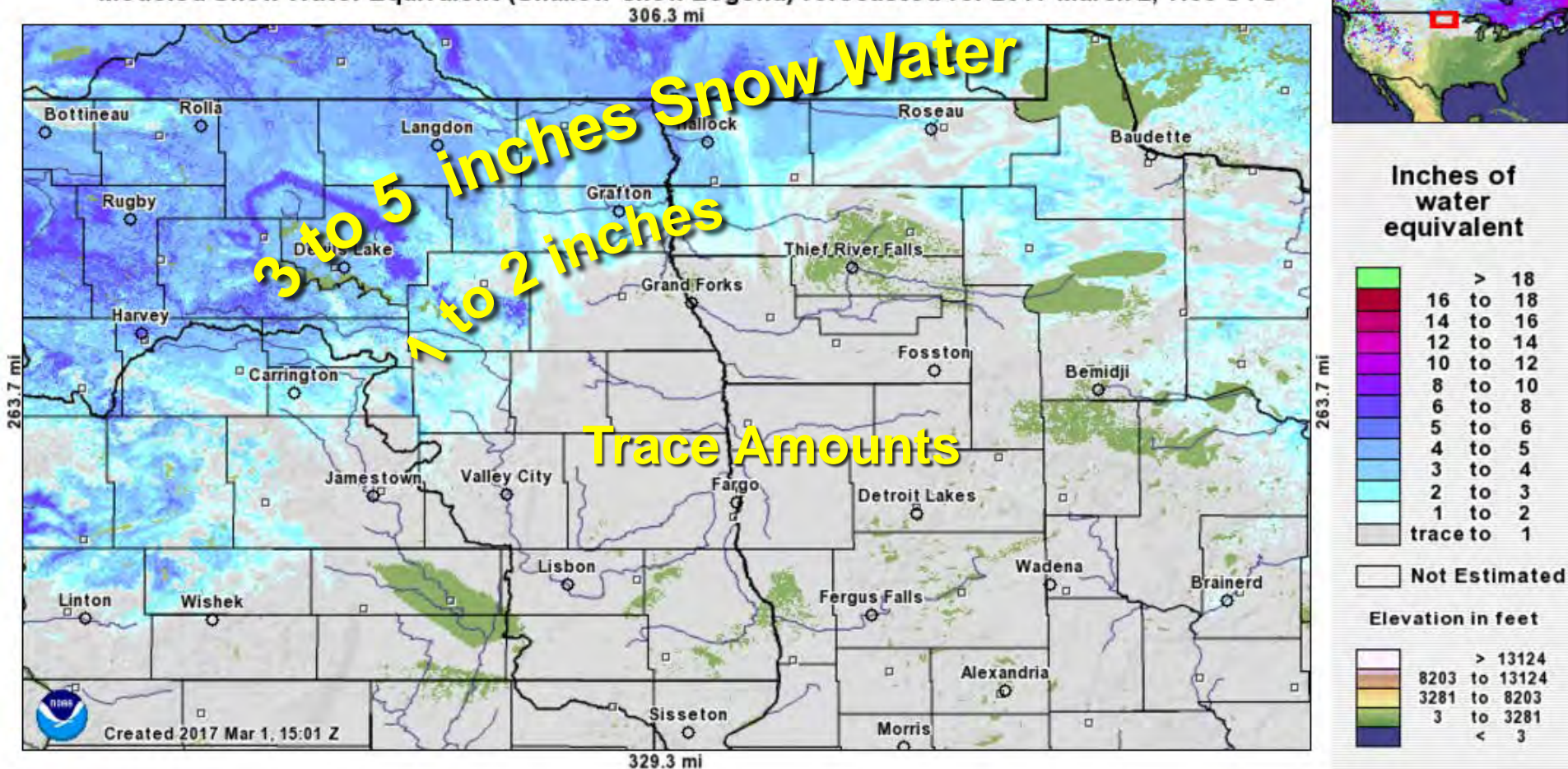


2017 Spring Flood Outlook – Early March Update



Snow Water remains high across far north

Modeled Snow Water Equivalent (Shallow-snow Legend) forecasted for 2017 March 2, 1:00 UTC



Snow Depths have shrunk to half of less of their height, with water content still at 100 to 200+ percent of normal (n-nw).



Building a Weather-Ready Nation

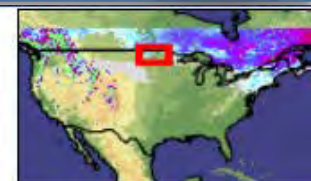
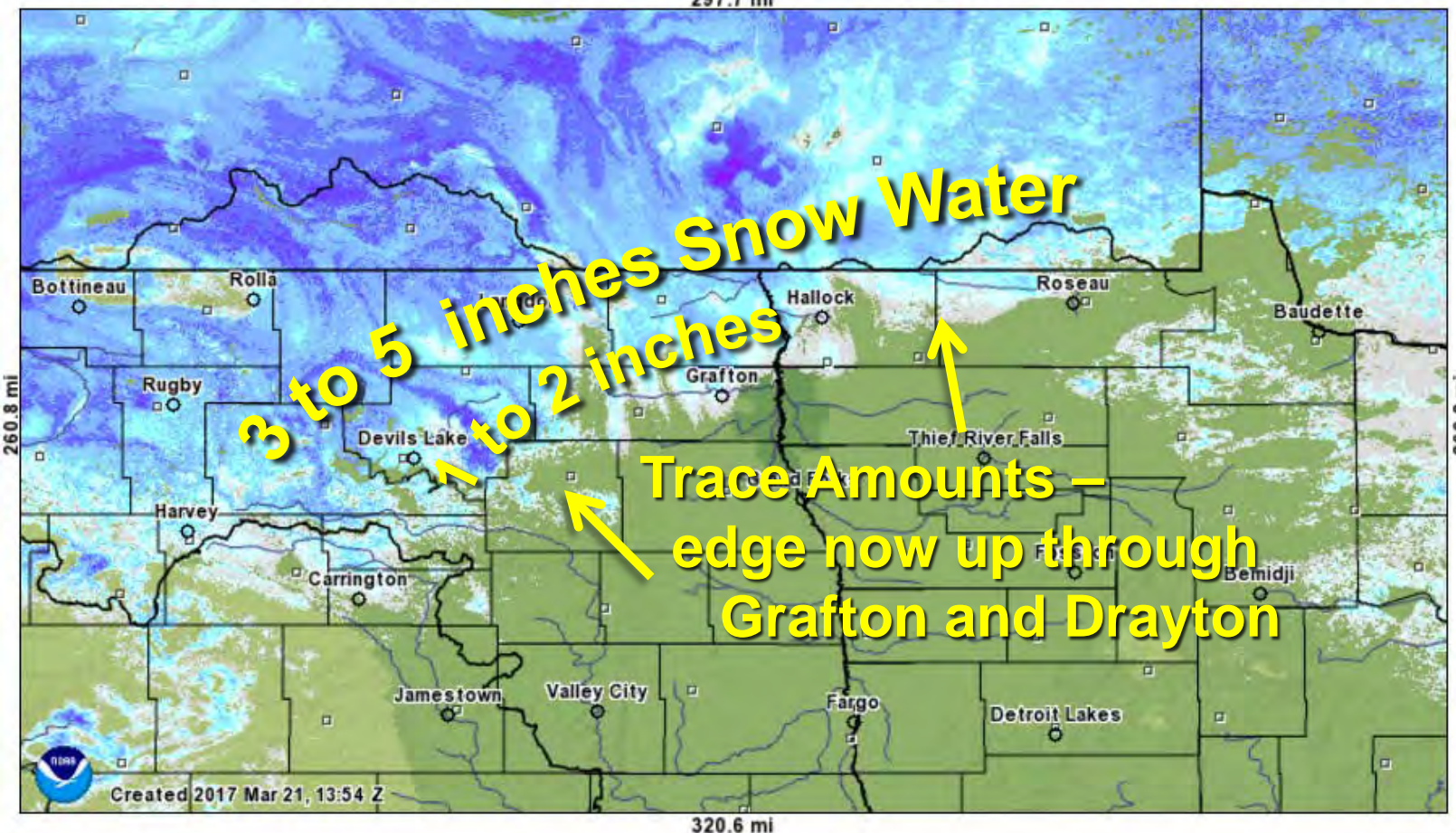


2017 Spring Flood Outlook – March 22nd Update

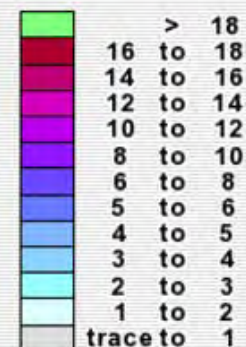


Snow Water remains high across far north

Modeled Snow Water Equivalent (Shallow-snow Legend) forecasted for 2017 March 21, 13:00 UTC
297.7 mi

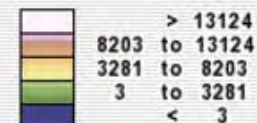


Inches of water equivalent



Not Estimated

Elevation in feet



Snow Depths have shrunk appreciably. Where snow remains, water content still at 100 to 200+ percent of normal (n-nw).



Building a Weather-Ready Nation



2017 Spring Flood

Soil Moisture

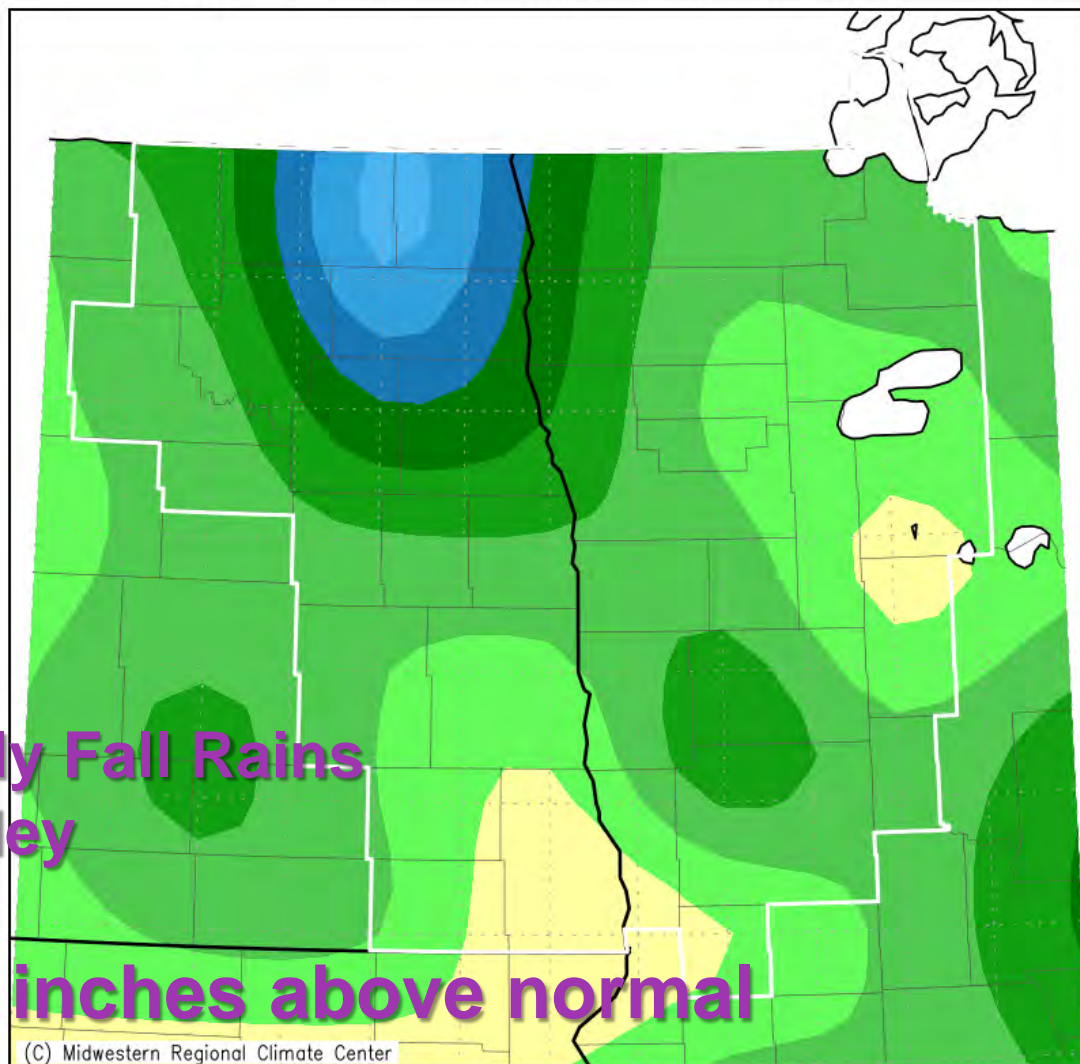
North: Soil Moisture still 90-99th percentile Northeast ND into far northwest MN.

- Deep wet soils
- *Then* Snow covered

Due to Summer and early Fall Rains especially in North Valley

...since May 1st, 8-14 inches above normal

Accumulated Precipitation (in): Departure from Mean
May 1, 2016 to September 30, 2016



Mean period is 1981–2010.



Building a Weather-Ready Nation



2017 Spring Flood Outlook

Soil Moisture

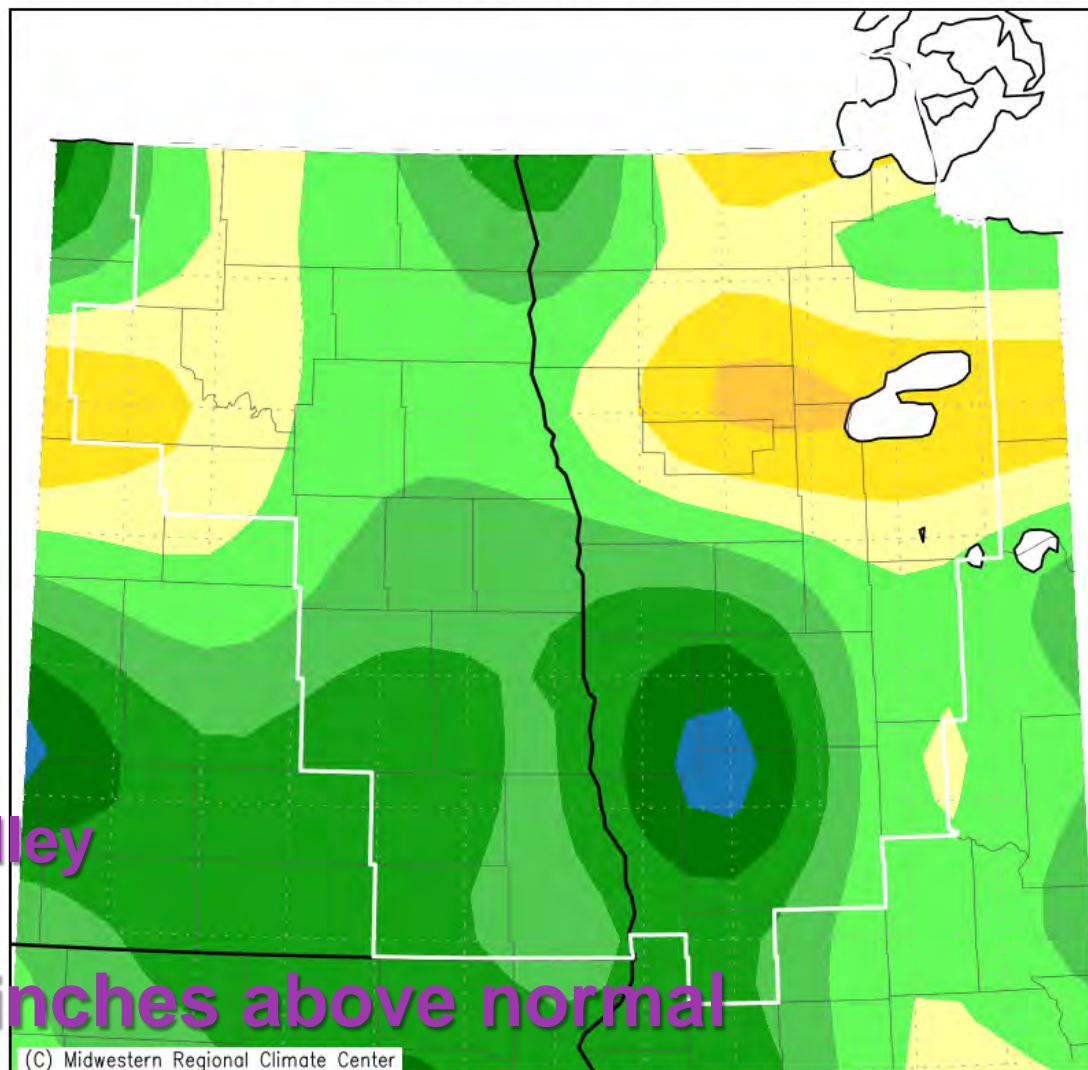
North: Soil Moisture still 90-99th percentile in DL and north basin.

South: Soil Moisture now 80-90th percentile in south basin.

Due to late Fall Rains especially in South Valley

...since Oct 1st, 1-3 inches above normal

Accumulated Precipitation (in): Departure from Mean
October 1, 2016 to March 22, 2017



Mean period is 1981-2010.



Building a Weather-Ready Nation



2017 Spring Flood Outlook

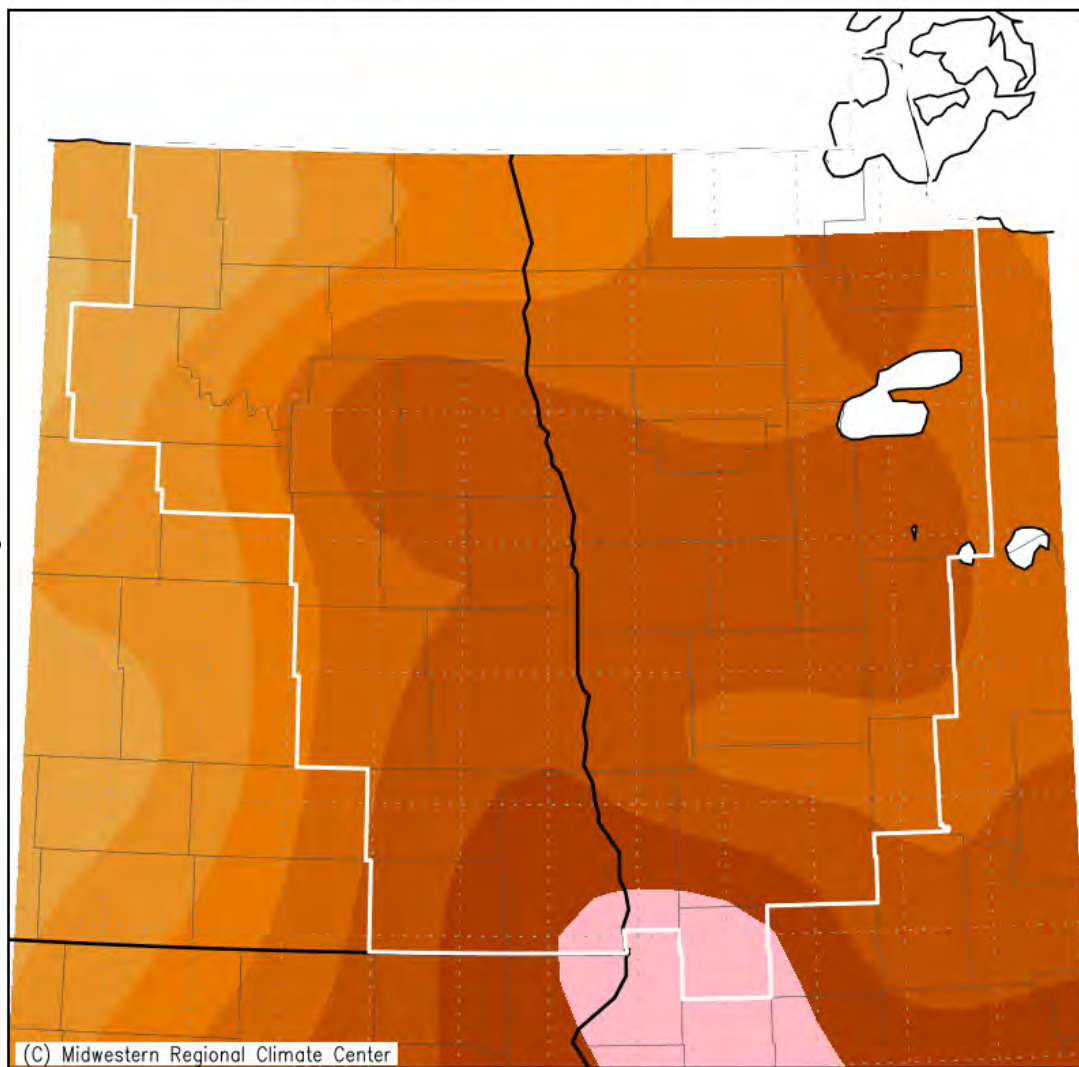
Temps in February:

North: Warmer than normal by 3-7 degrees
...14th warmest at GF.

South: Warmer than normal by 6-10 degrees
...6th warmest at FAR.

Near-record early thaw process...
especially across the south and central Red River Basin.

Average Temperature (°F): Departure from Mean
February 1, 2017 to March 1, 2017



Mean period is 1981–2010.



Building a Weather-Ready Nation



2017 Spring Flood Outlook – Early March Update

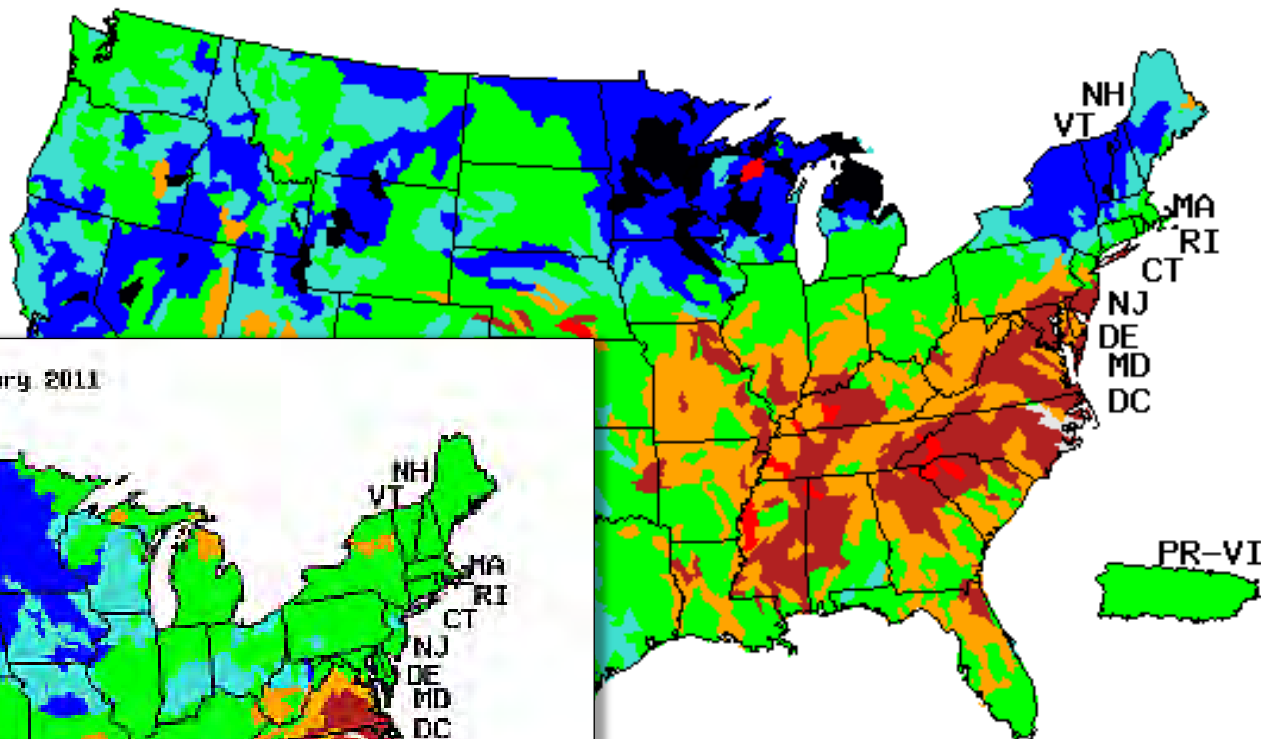


Base Streamflow was quite high

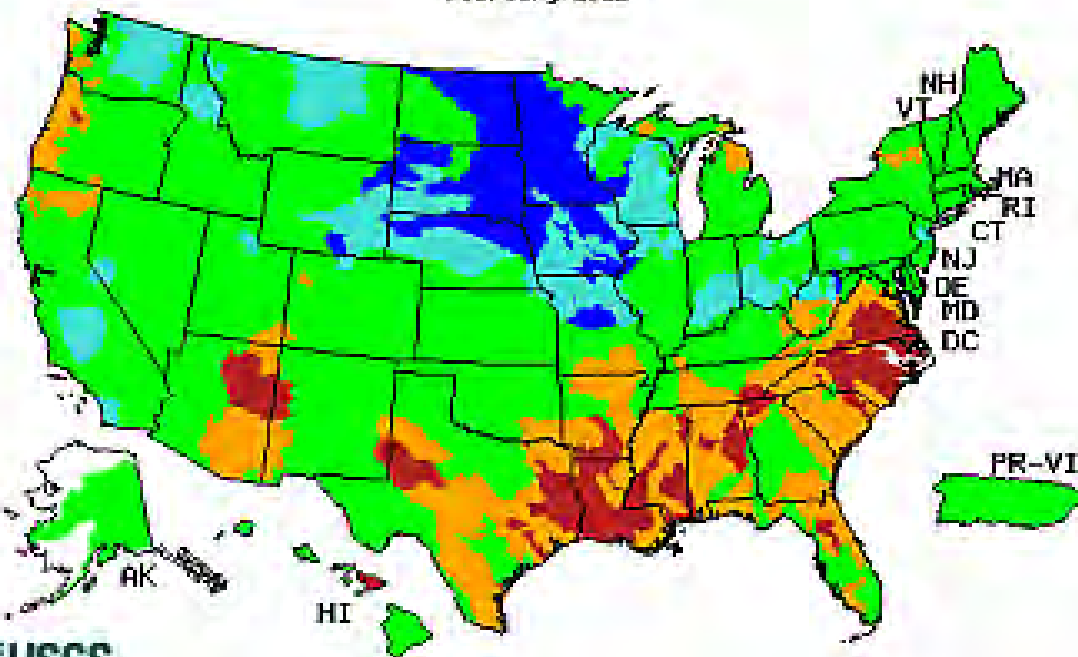
-- Soil Moisture
80-99th percentile

-- Base Streamflow
90-99th percentile

Tuesday, February 28, 2017



February 2011



Percentile classes

25-75	76-90	>90	High	No Data
Normal	Above normal	Much above normal		





2017 Spring Flood Outlook – March 22nd Update

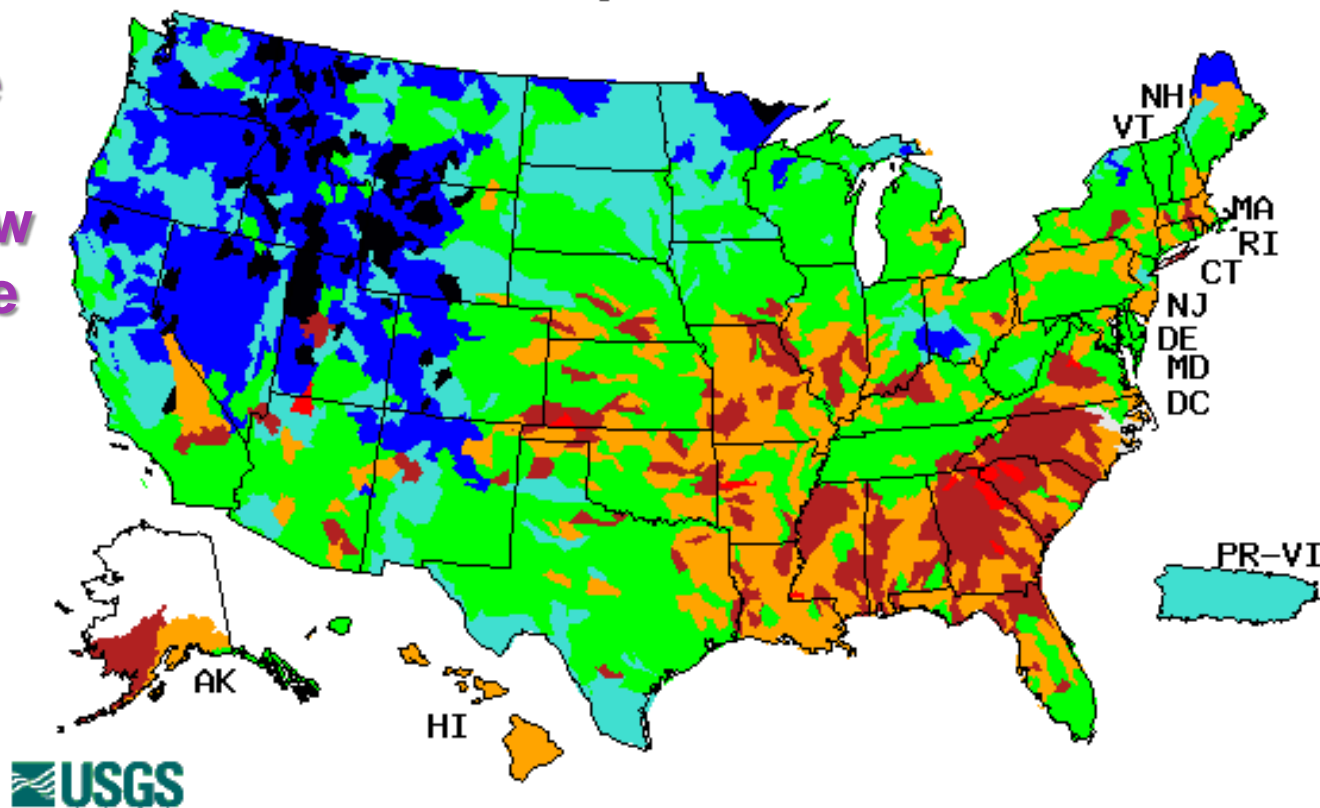


Base Streamflow has lowered a bit

-- Soil Moisture
80-99th percentile

-- Base Streamflow
76-90th percentile

Tuesday, March 21, 2017



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal		



Building a Weather-Ready Nation

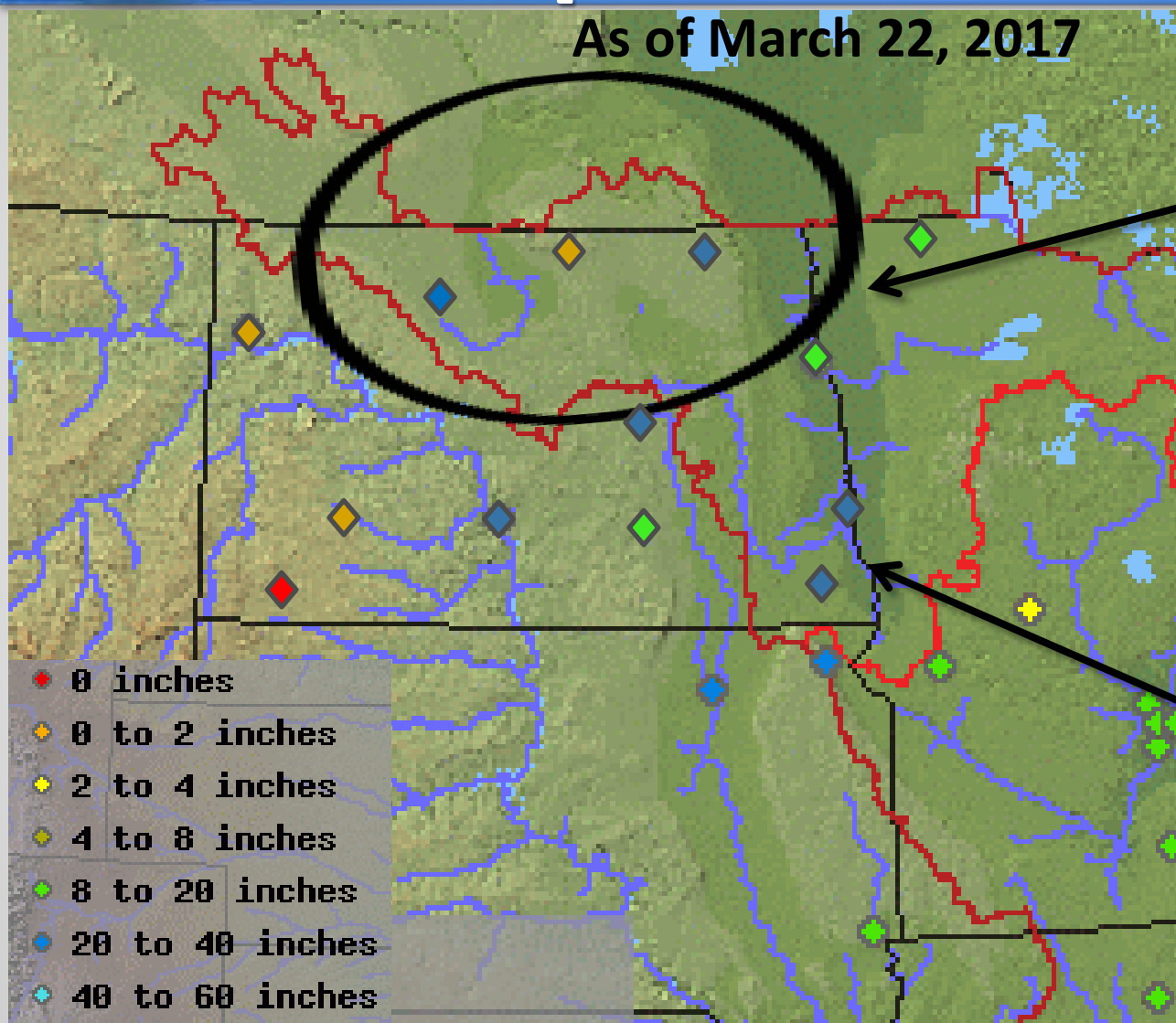


NWS/NDAWN Frost Depth

[Shallow to Normal]



As of March 22, 2017



- Varies 8-20 inches across northeast ND and northwest MN.
- Deep/early snow led to shallow frost.
- Record thaws have exposed areas to potential deep frost.

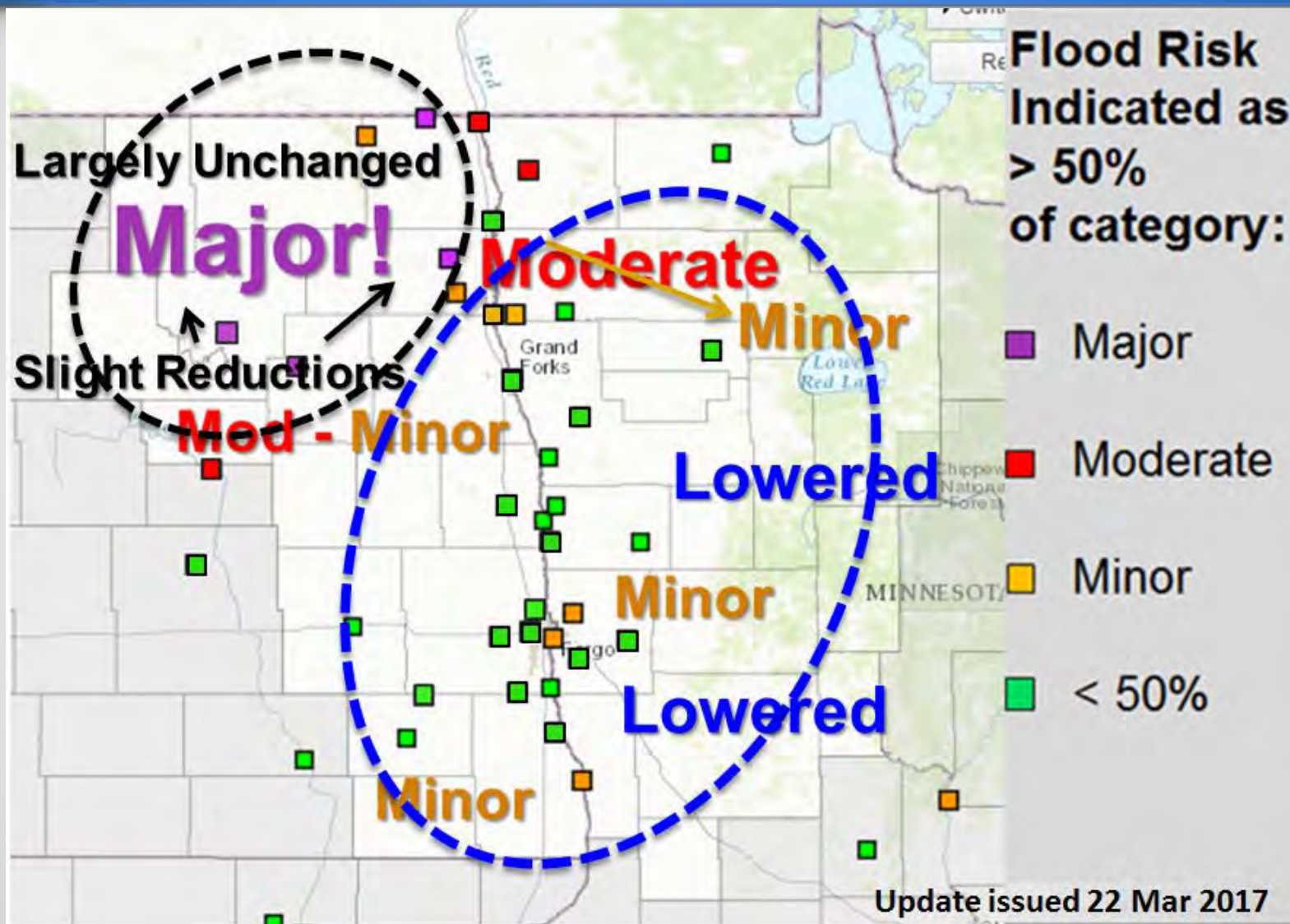
12-20 inches near GFK
20-30 inches near FAR





Spring Flood Risk by Category

Outlook issued on 22 Mar 2017



Building a Weather-Ready Nation

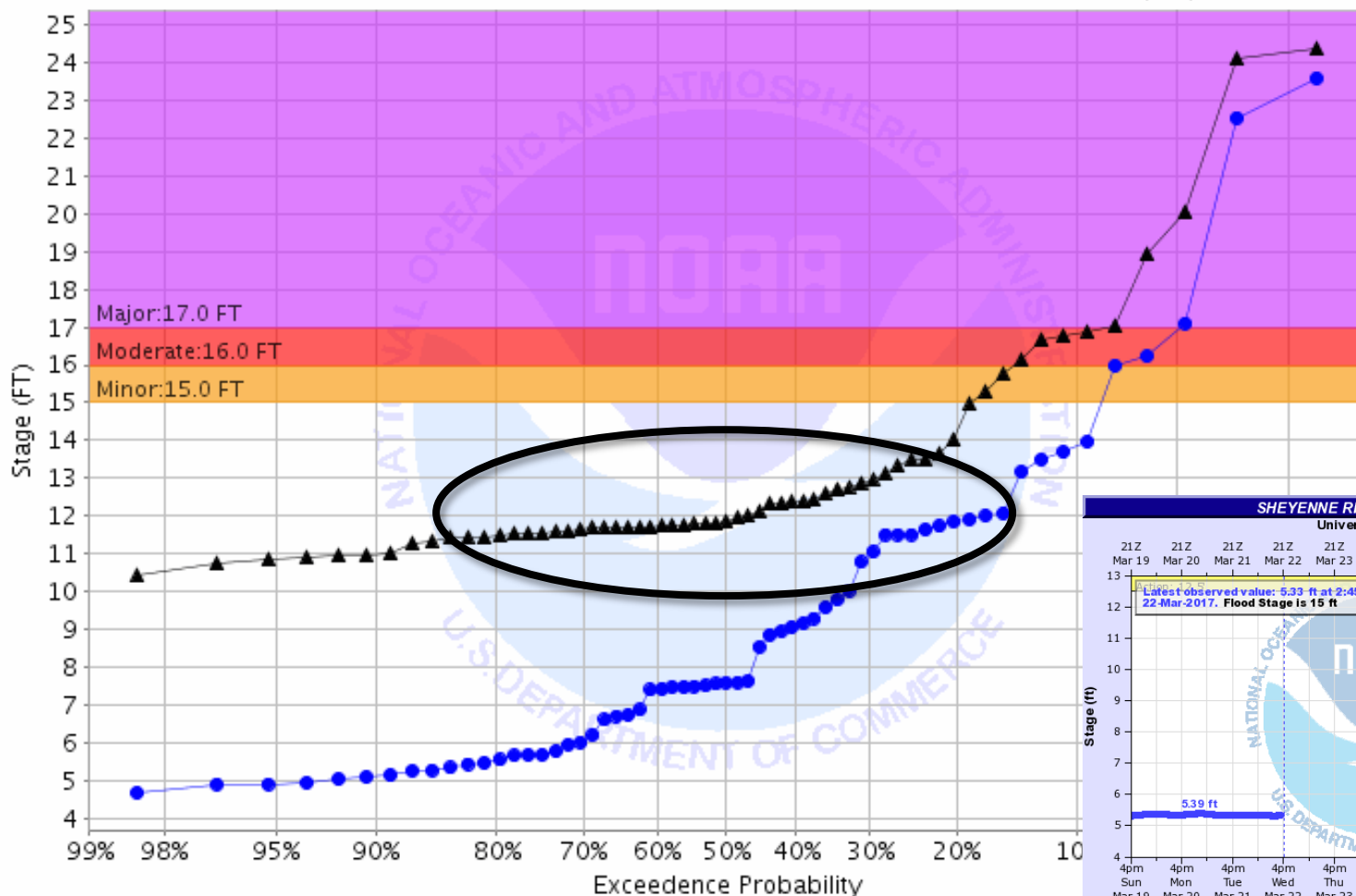


Sheyenne River at Valley City

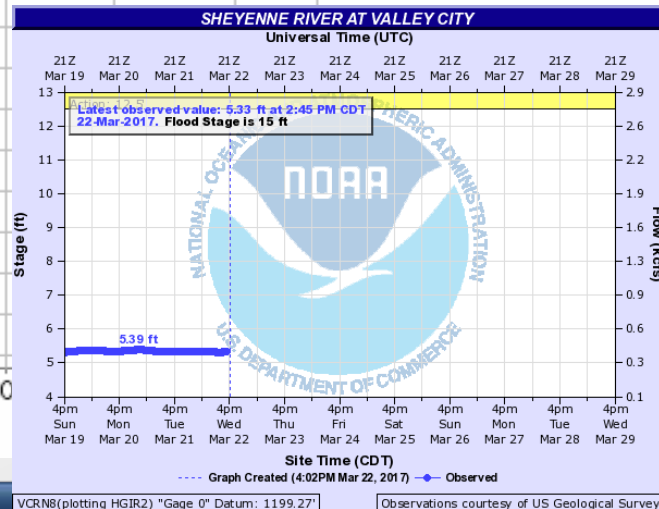
None or Minor Flooding Expected



Chance of Exceeding River Stage at VCRN8
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017



Flood of Record
- 20.69 feet
4/13/2009



Building a Weather-Ready Nation



Red River at Fargo-Moorhead

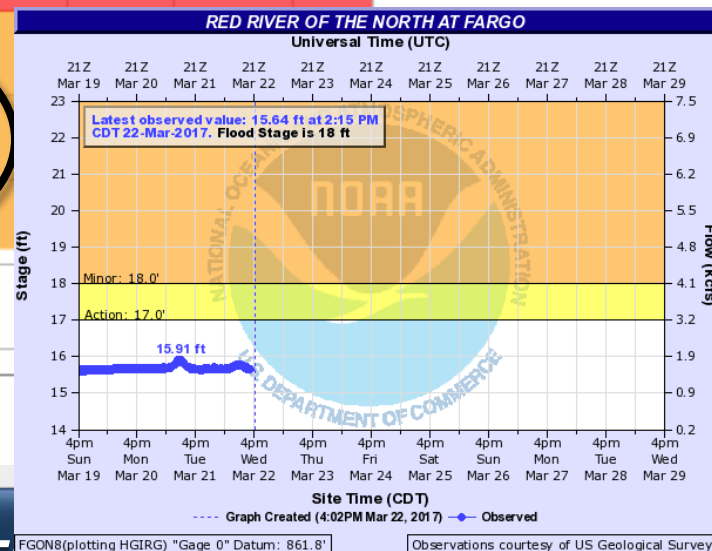
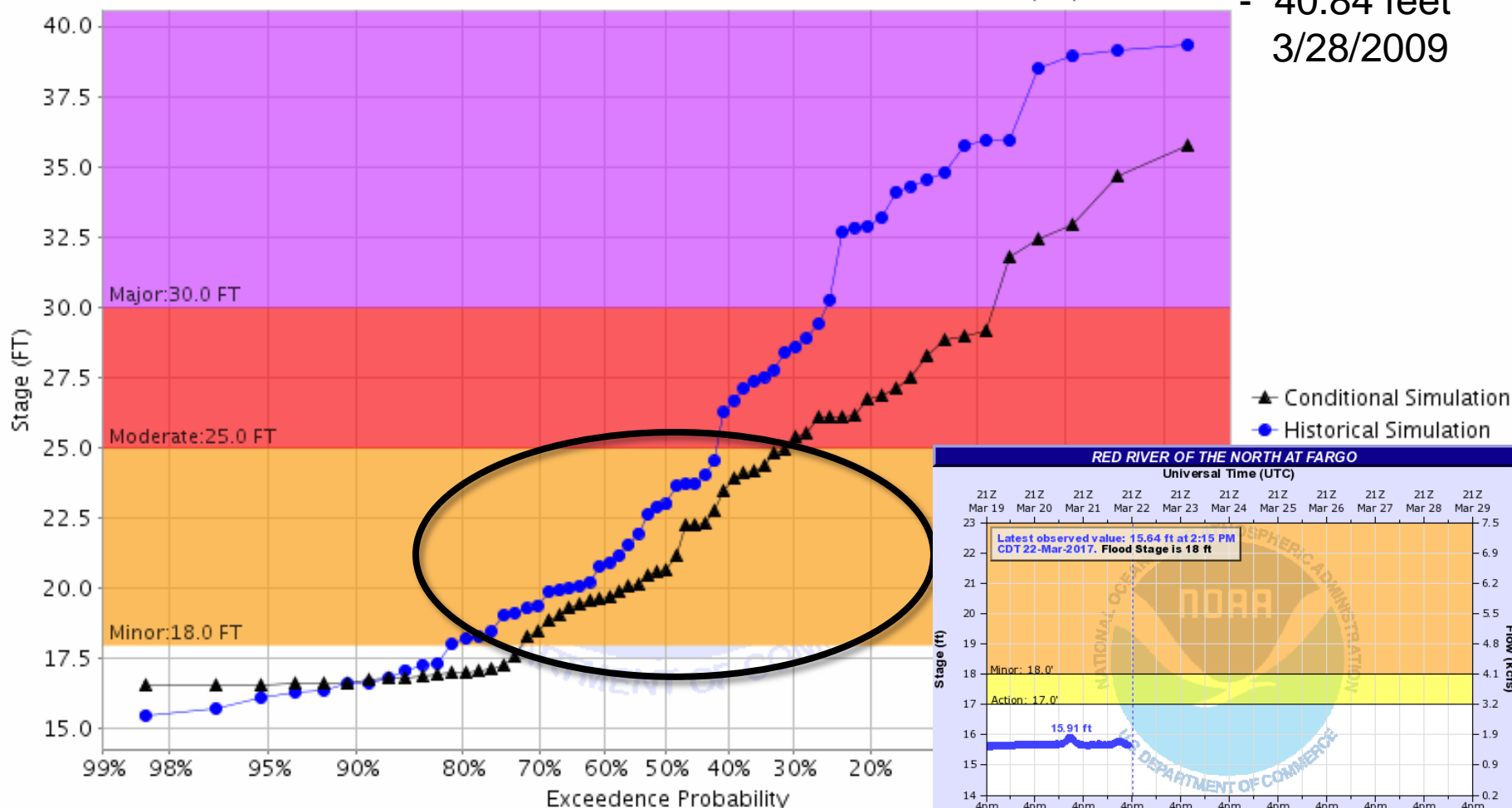
Minor Flooding Expected



Chance of Exceeding River Stage at FGON8
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017

Flood of Record

- 40.84 feet
3/28/2009



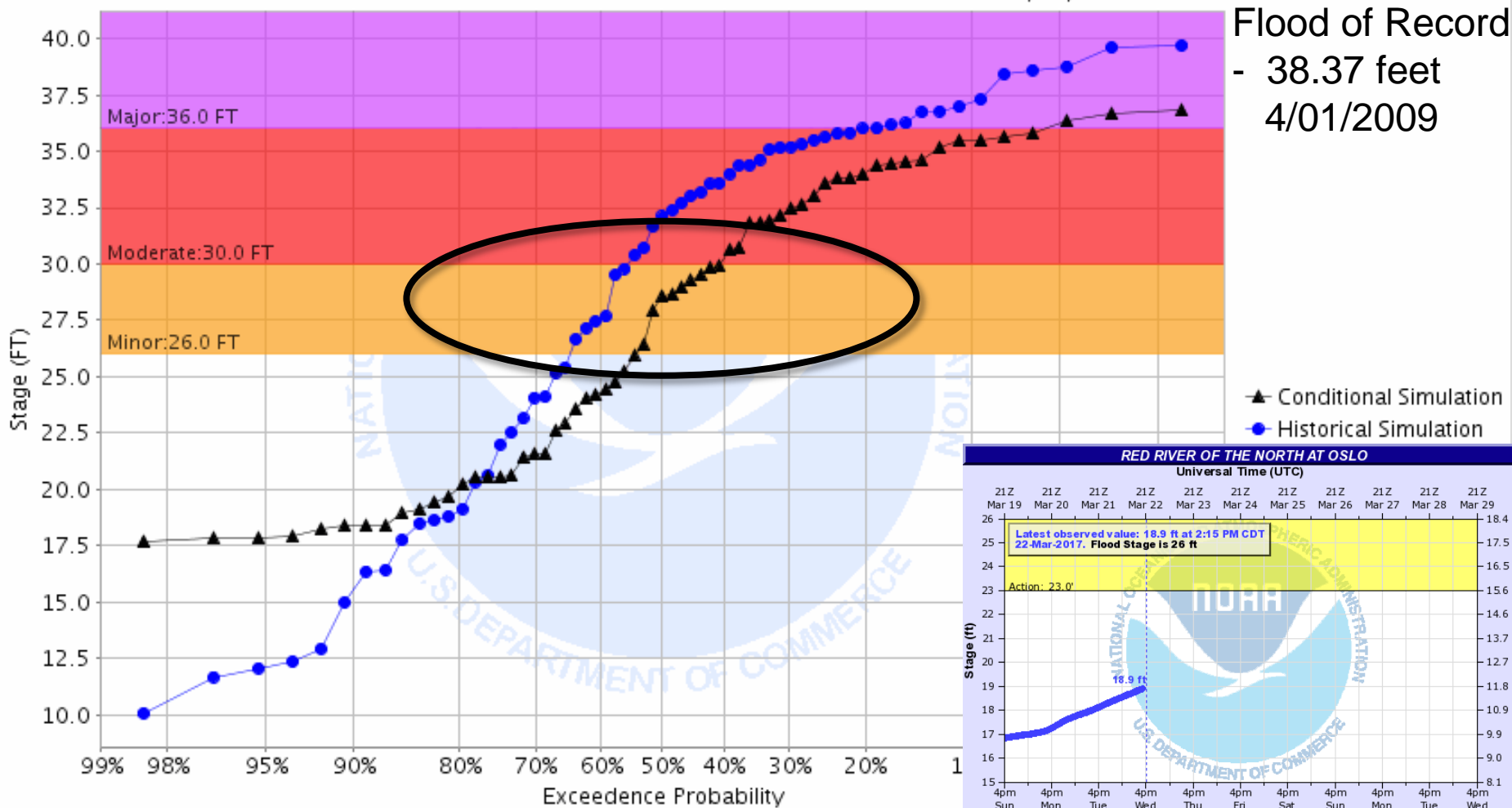
Building a Weather-Ready Nation



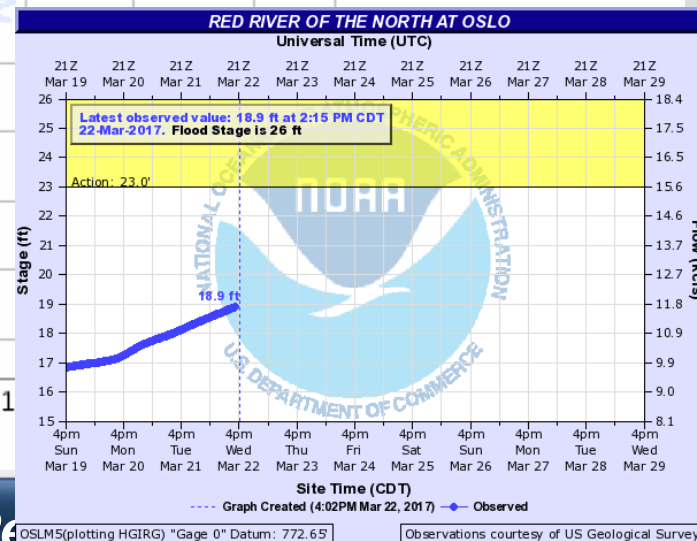
Red River at Oslo

Minor Flooding Expected

Chance of Exceeding River Stage at OSLM5
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017



Flood of Record
- 38.37 feet
4/01/2009



Building a Weather-Ready Nation

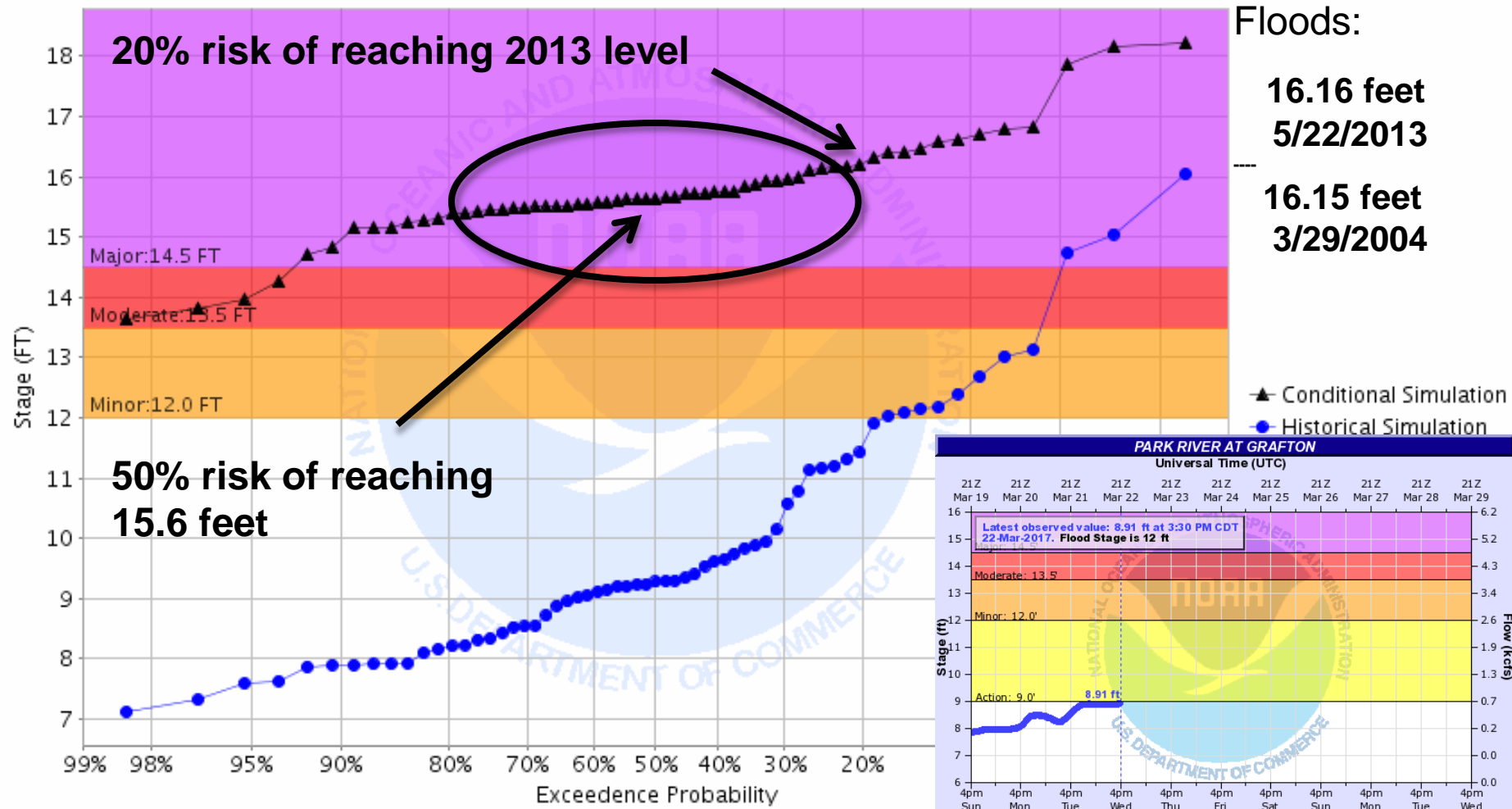


Park River at Grafton

Major to near Record Flooding Expected



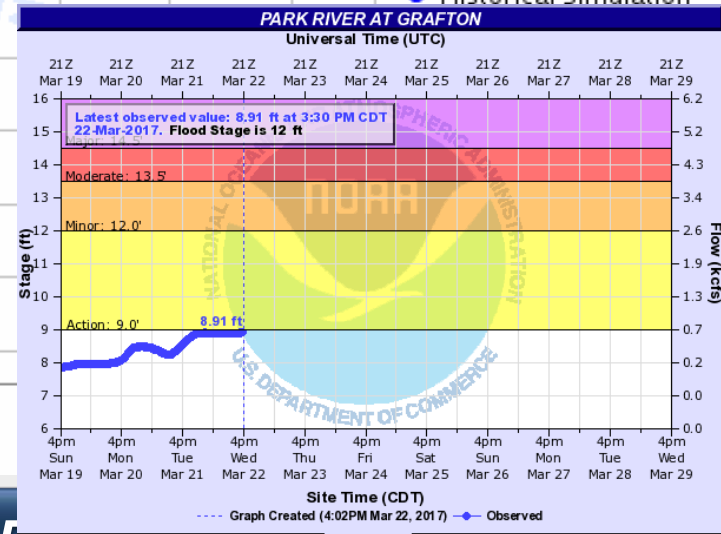
Chance of Exceeding River Stage at GRNN8
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017



Recent Major Floods:

16.16 feet
5/22/2013

16.15 feet
3/29/2004



Building a Weather-Ready Nation

GRNN8(plotting HGIRG) "Gage 0" Datum: 811'

Observations courtesy of US Geological Survey



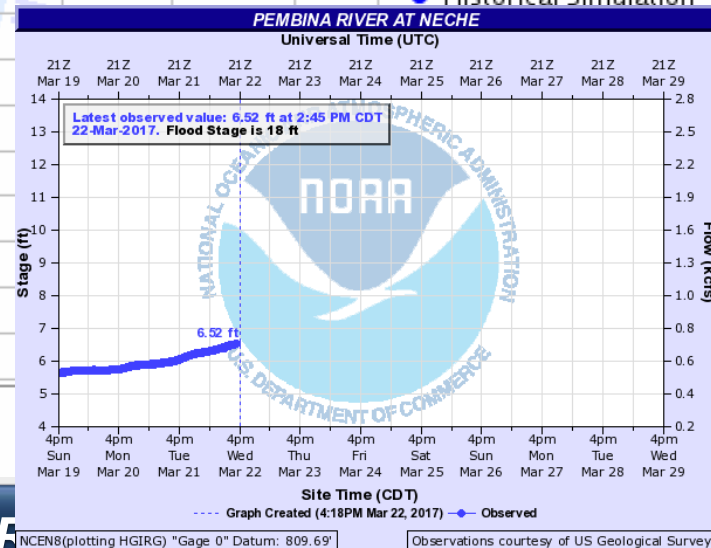
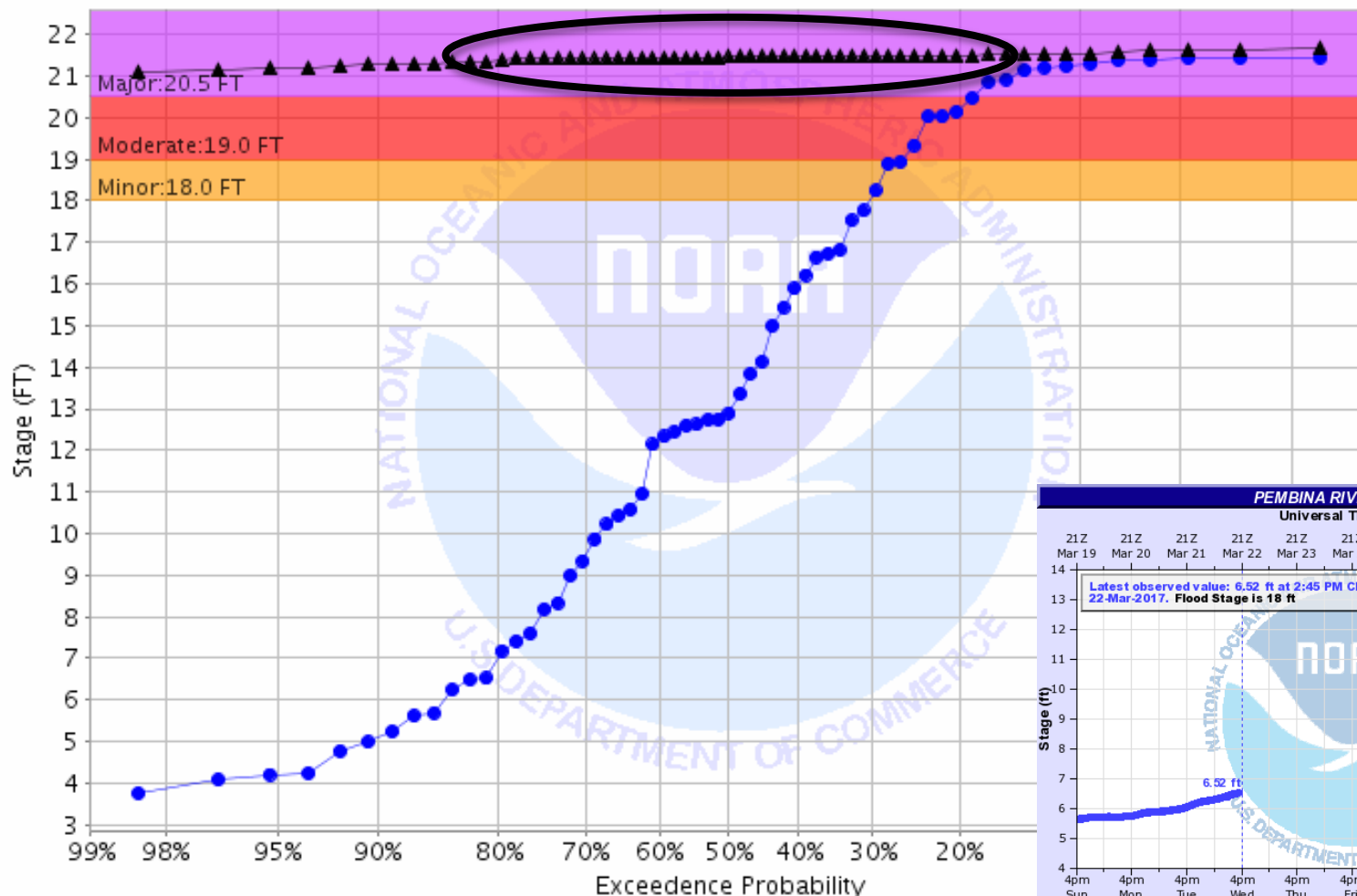
Pembina River at Neche

Major to near Record Flooding Expected



Chance of Exceeding River Stage at NCEN8
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017

Flood of Record
- 21.87 feet
4/11/2011



Building a Weather-Ready Nation

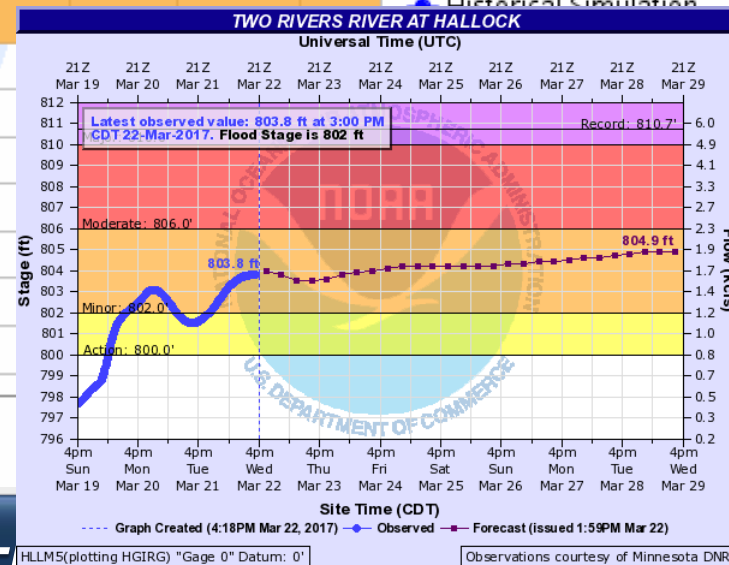
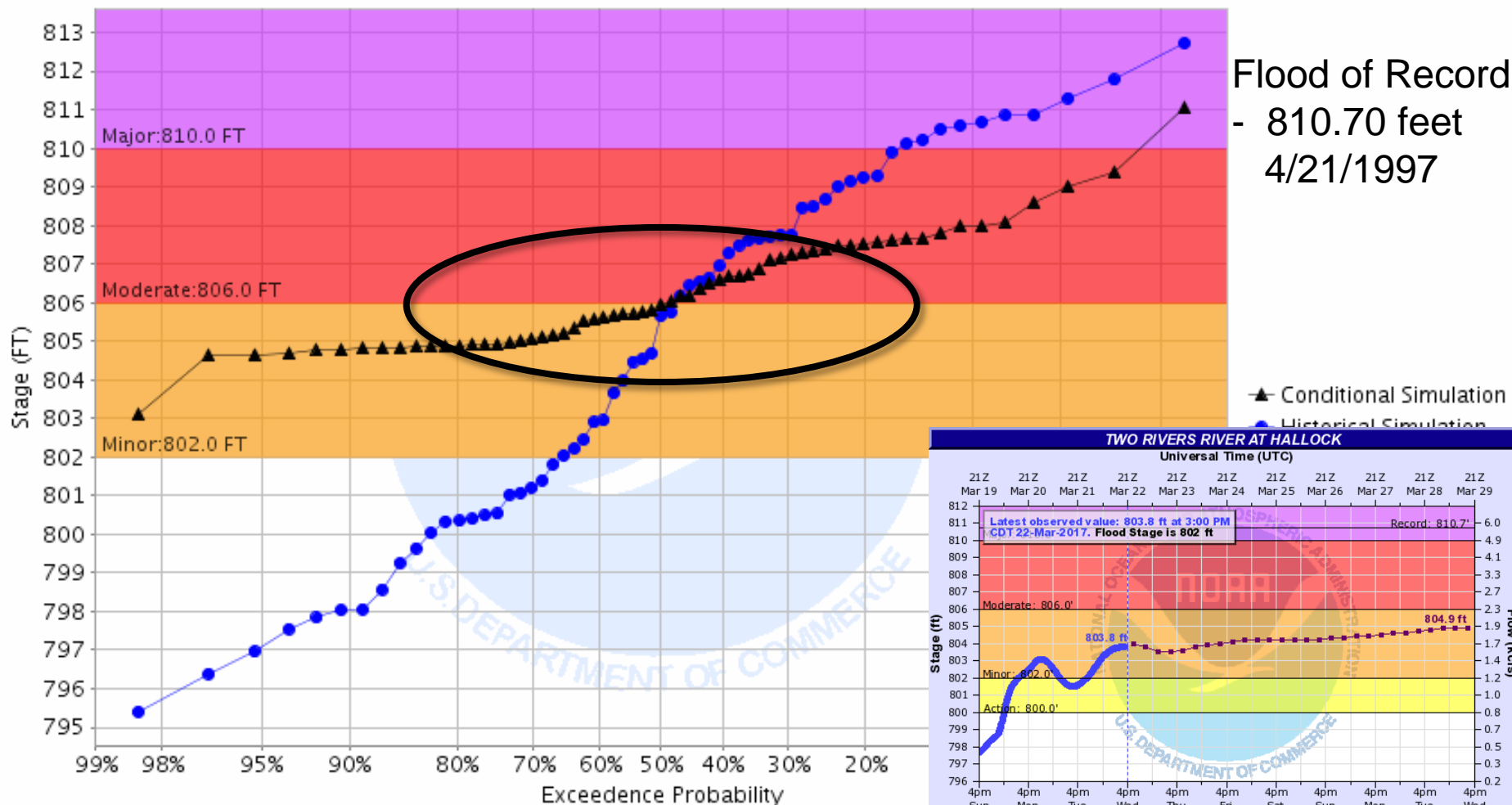


Two Rivers River at Hallock

Minor to Moderate Flooding Expected



Chance of Exceeding River Stage at HLLM5
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017



Building a Weather-



Red River at Pembina

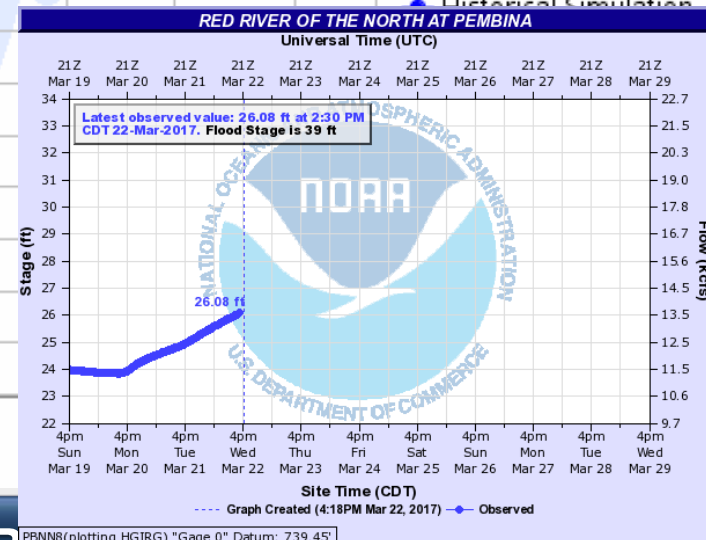
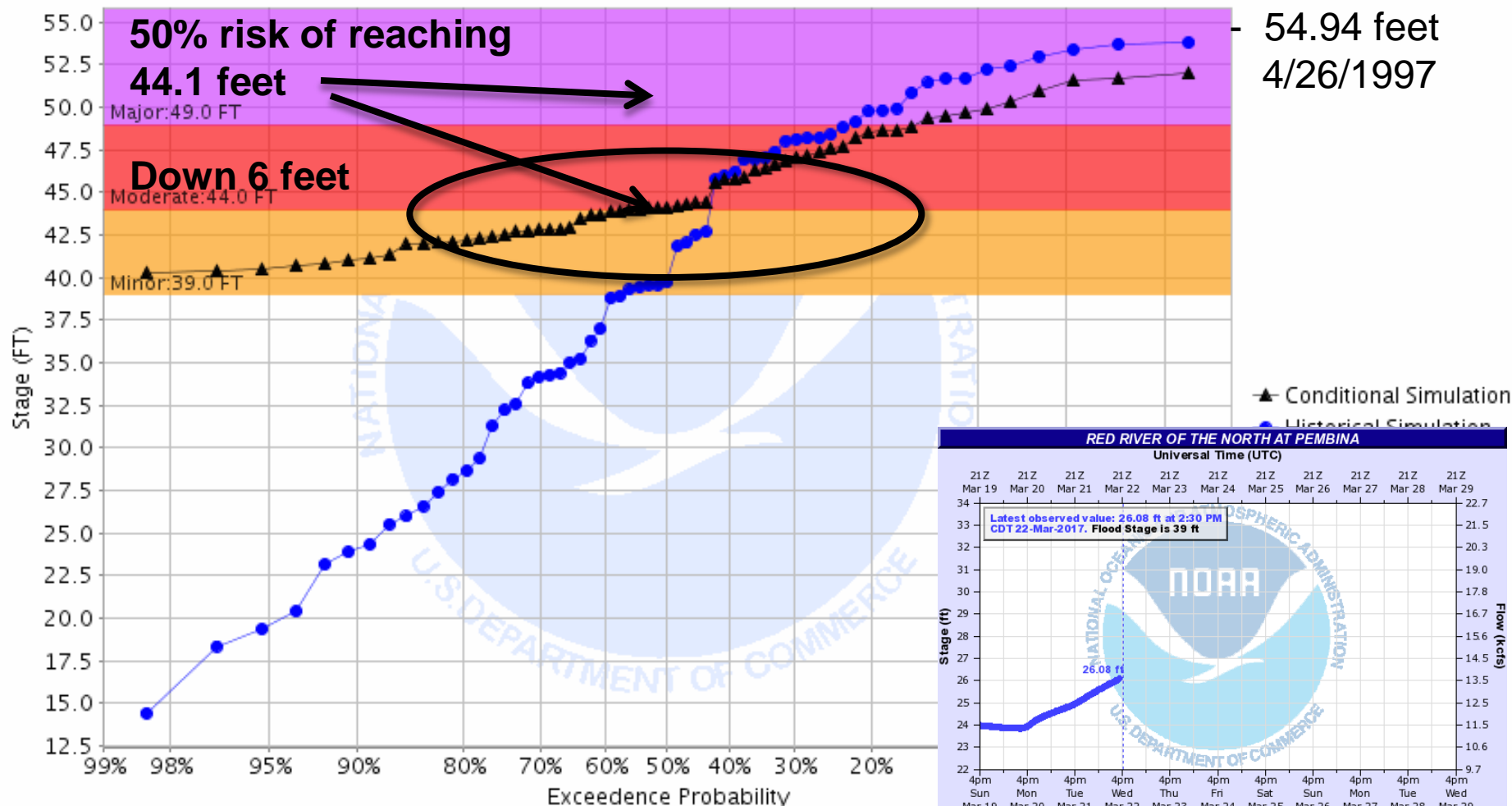
Moderate Flooding Expected



Chance of Exceeding River Stage at PBNN8
Forecast for the period 03/26/2017 - 06/24/2017
This is a conditional simulation based on the conditions as of 03/19/2017

Flood of Record

- 54.94 feet
4/26/1997



Building a Weather-Ready Nation

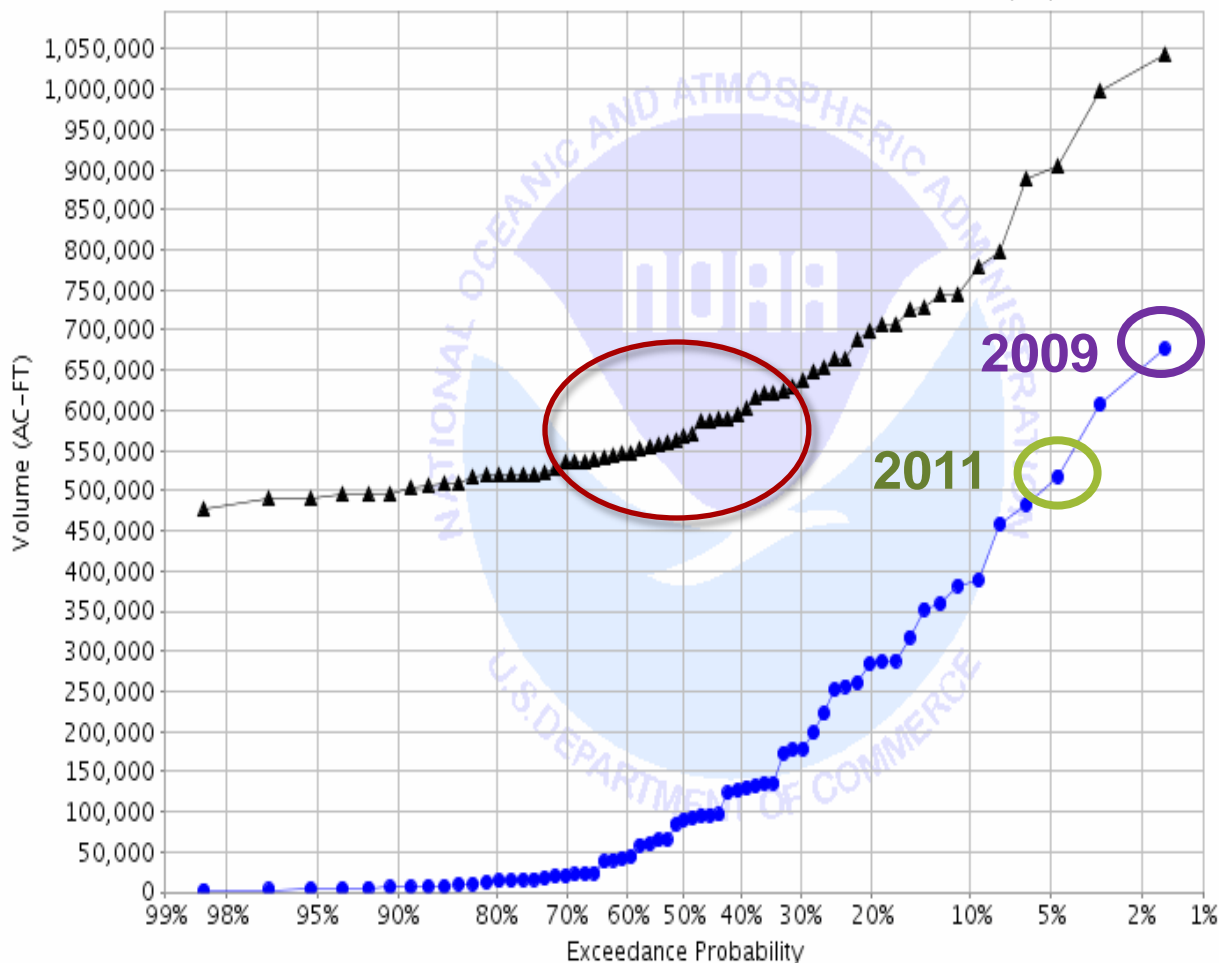


Devils Lake at Creel Bay

Major Flooding Expected



Chances of Exceeding Inflow Volume at DCBN8
Forecast for the period 03/19/2017 - 9/30/2017
This is a conditional simulation based on the conditions as of 03/19/2017



- **Historical Simulation**
is what occurred in
a particular year.

- **Conditional Simulation**
is what those same
years could produce
given the current
basin conditions.

With a very wet fall most
all historical scenarios
point to a significant
runoff, rivalling amounts
seen in 2009 and 2011.



Building a Weather-Ready Nation

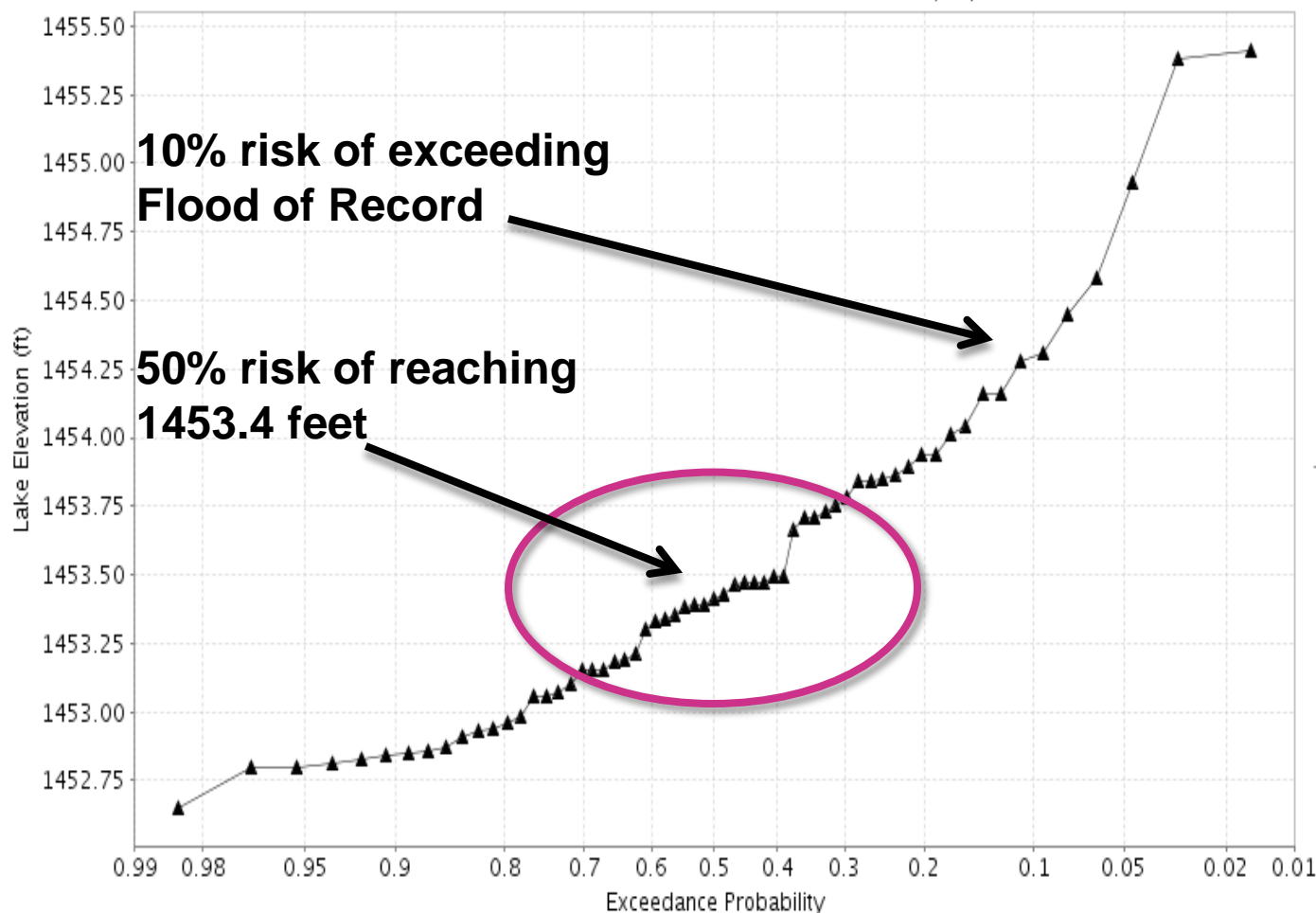


Devils Lake at Creel Bay

Major Flooding Still Expected



Probability of Rising to High Lake Levels on the DCBN8
Forecast for the period 03/19/2017 - 09/30/2017
This is a conditional simulation based on the conditions as of 03/19/2017



Flood of Record:
- 1454.30 feet
6/27/2011

Expected Range:
1453.1 - 1453.8





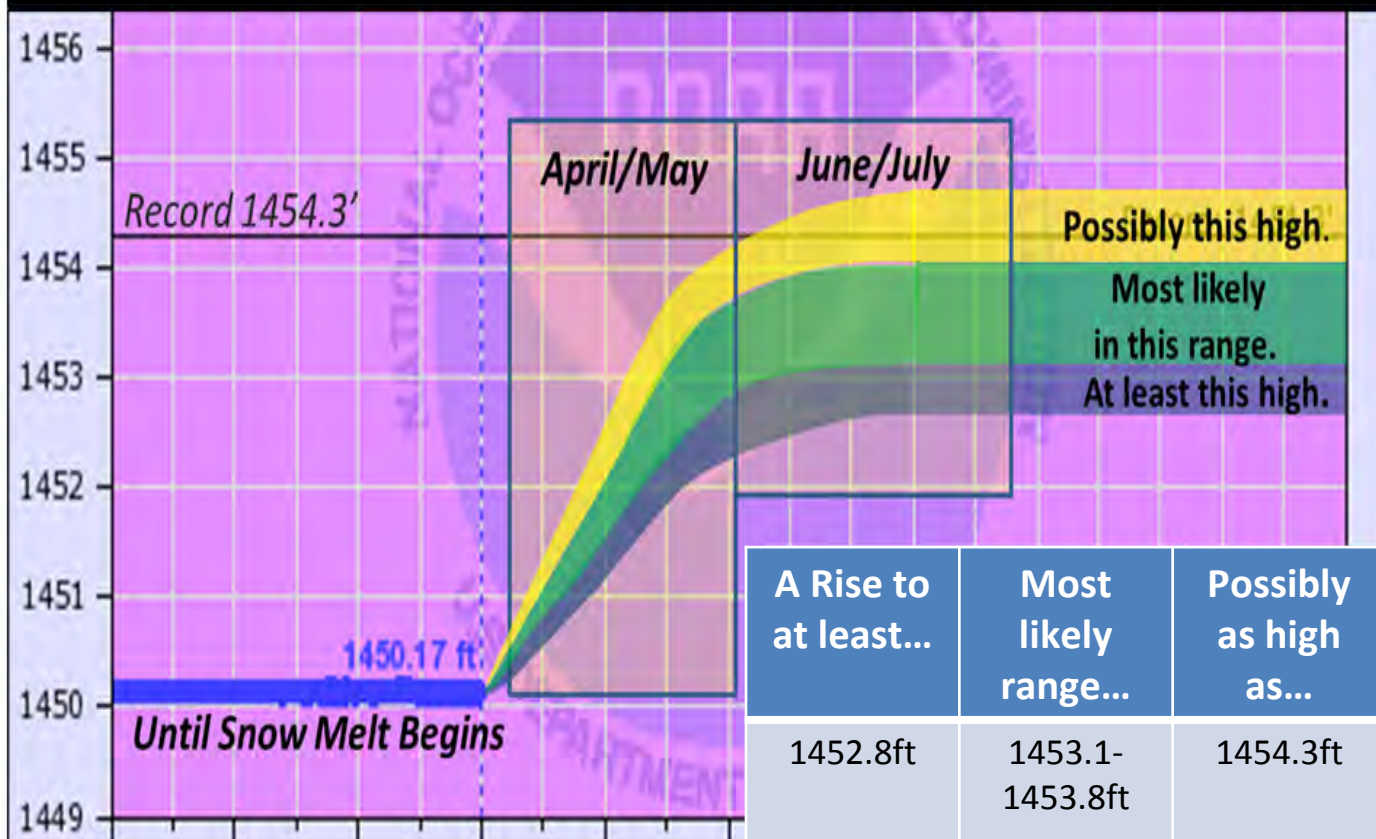
Devils Lake at Creel Bay

Major Flooding Expected



Devils Lake currently at or near 1450.2 feet. Natural overflow level is 1458.0 feet.
Permanent flood protection is in place for communities and critical infrastructure.

22 March 2017 Outlook for Devils Lake Spring Rise Probabilities



Flood of Record:
- 1454.30 feet
6/27/2011



Building a Weather-Ready Nation

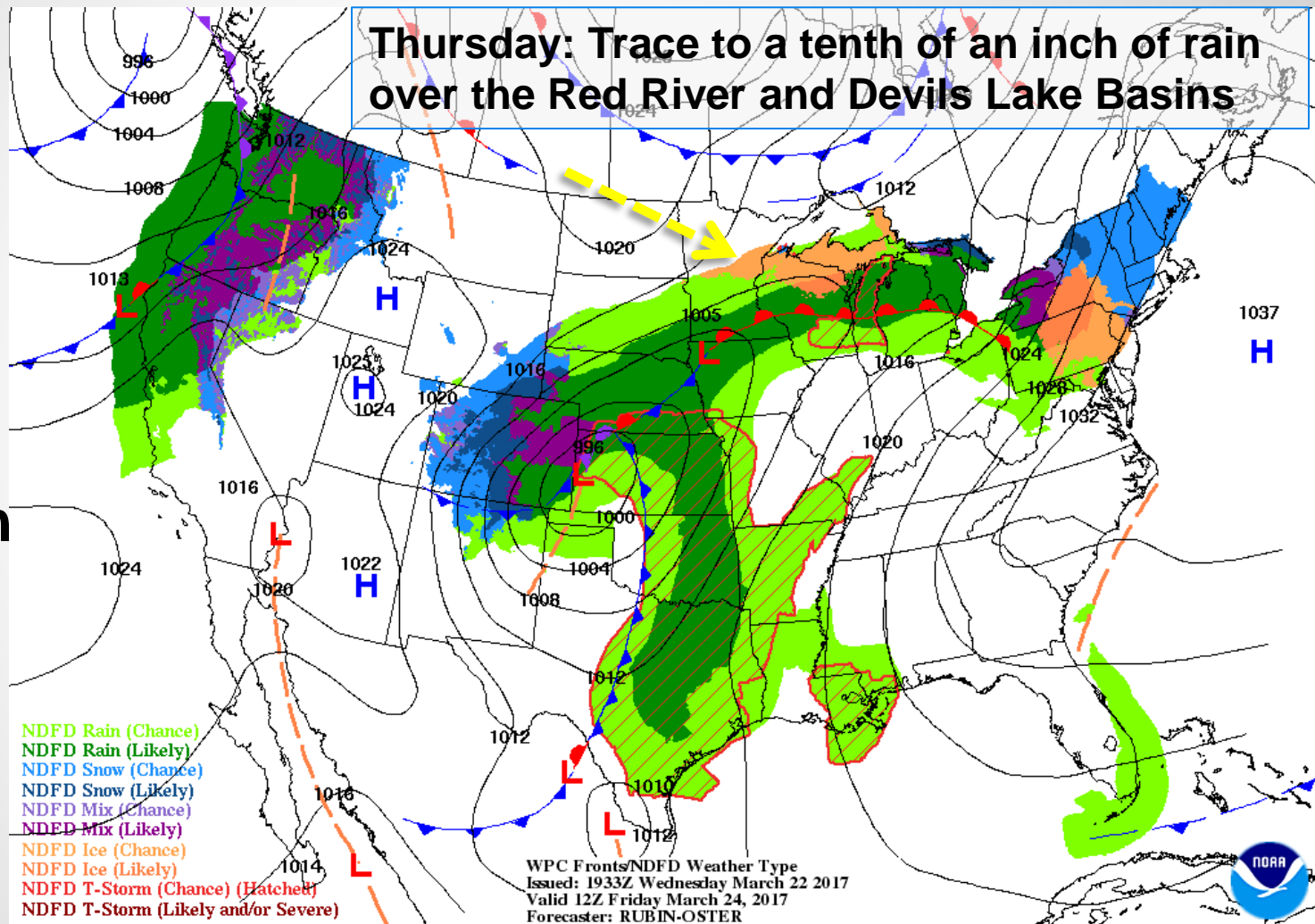


Friday Afternoon's Weather...

Issued Wednesday afternoon at 2:33 pm CST



- Low pressure system digs into the central plains.
- Heavier rain across eastern SD into southern MN.



Building a Weather-Ready Nation

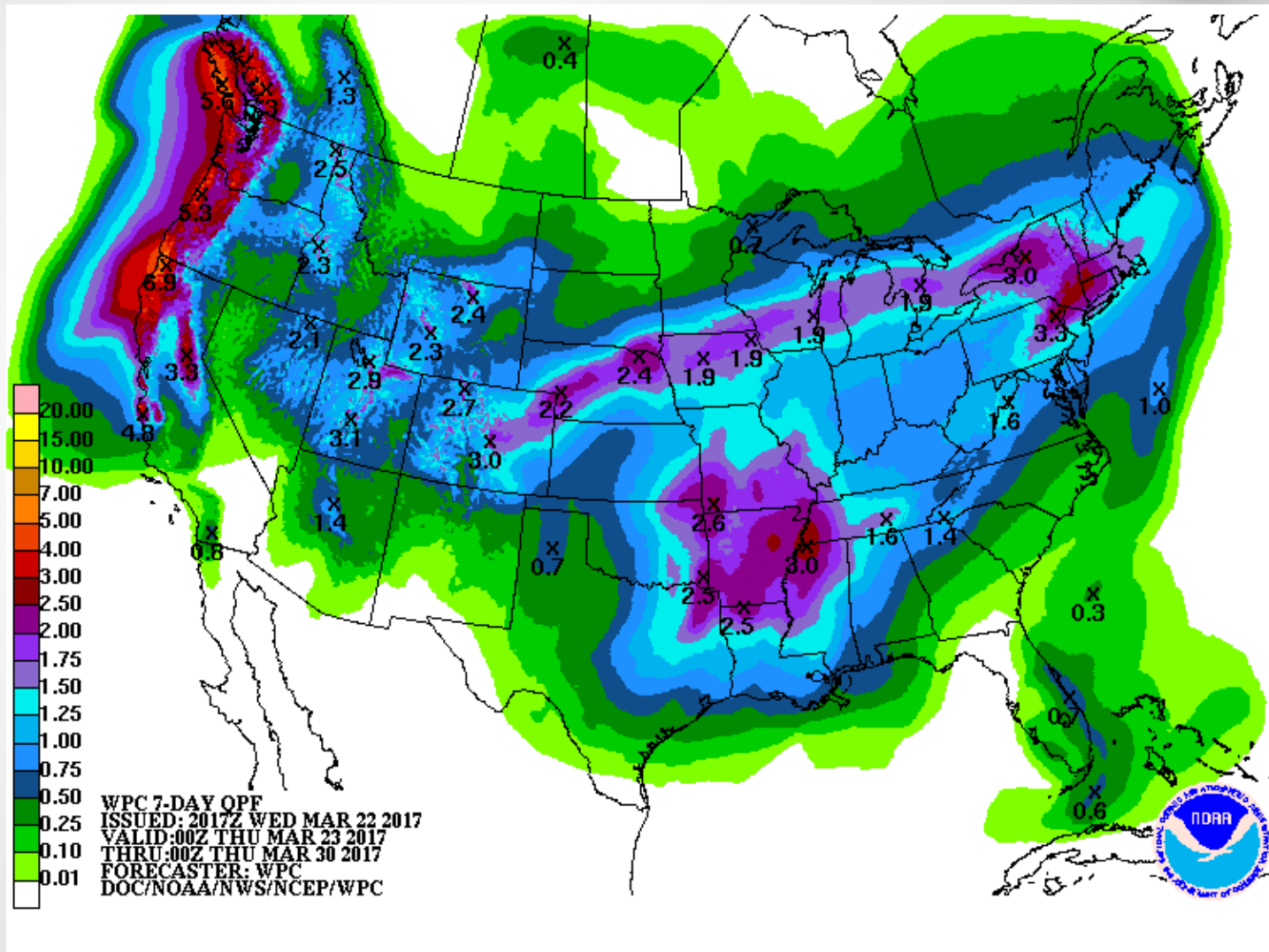


7-Day Precipitation Forecast

March 23-30, 2017



- A couple of shots at a trace to a tenth of an inch of moisture late this week and early next.
- Big storm misses us to south Thu- into Fri.



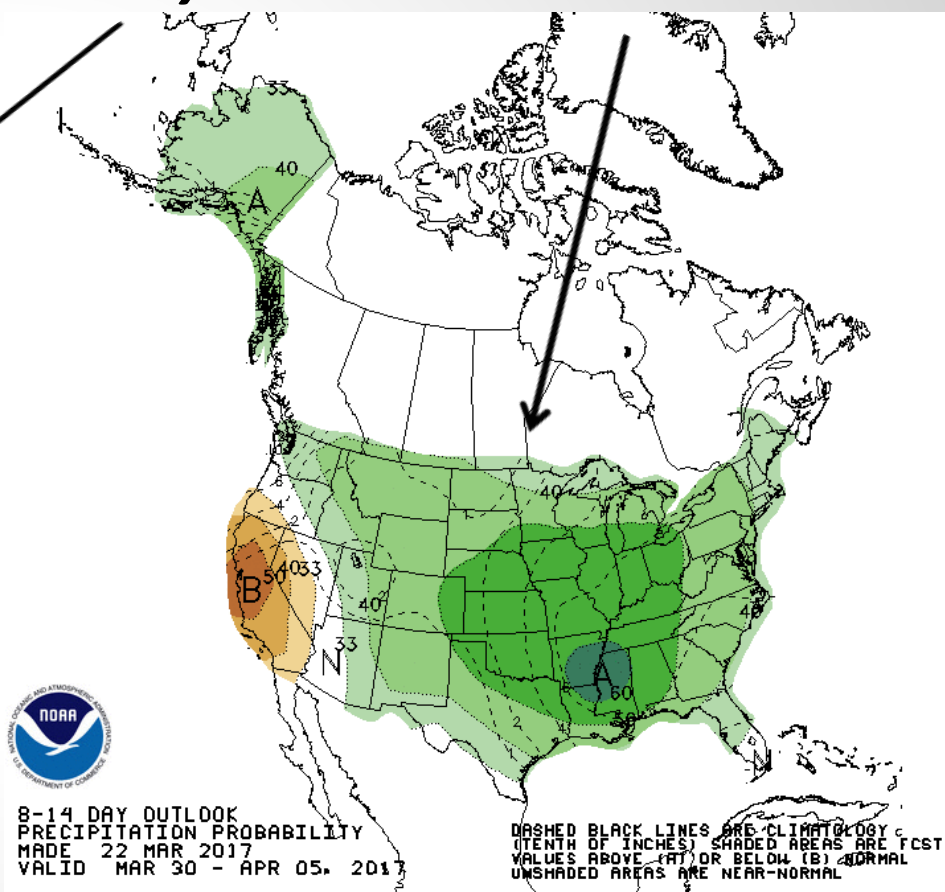
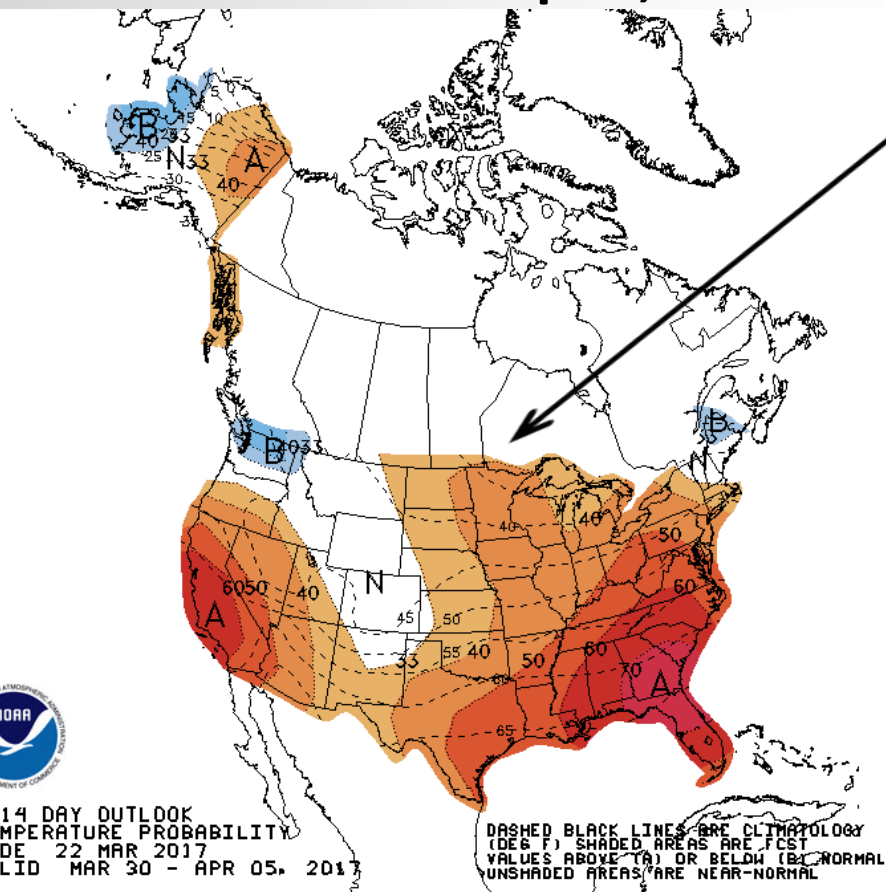
Building a Weather-Ready Nation



8-14 Day Outlook - updated [mild and damp]



March 30 - Apr 5, 2017... *Relatively Mild and Wettish.*



90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%

Probability of Below | Normal | Probability of Above

90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%

Probability of Below | Normal | Probability of Above

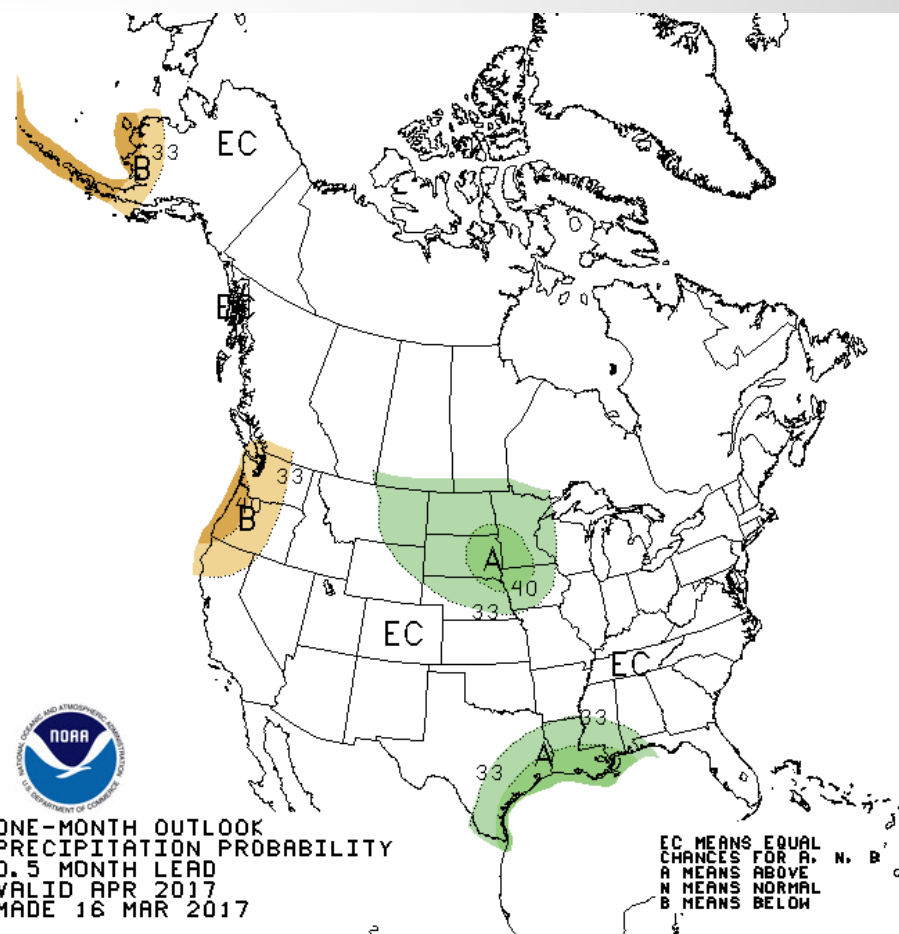
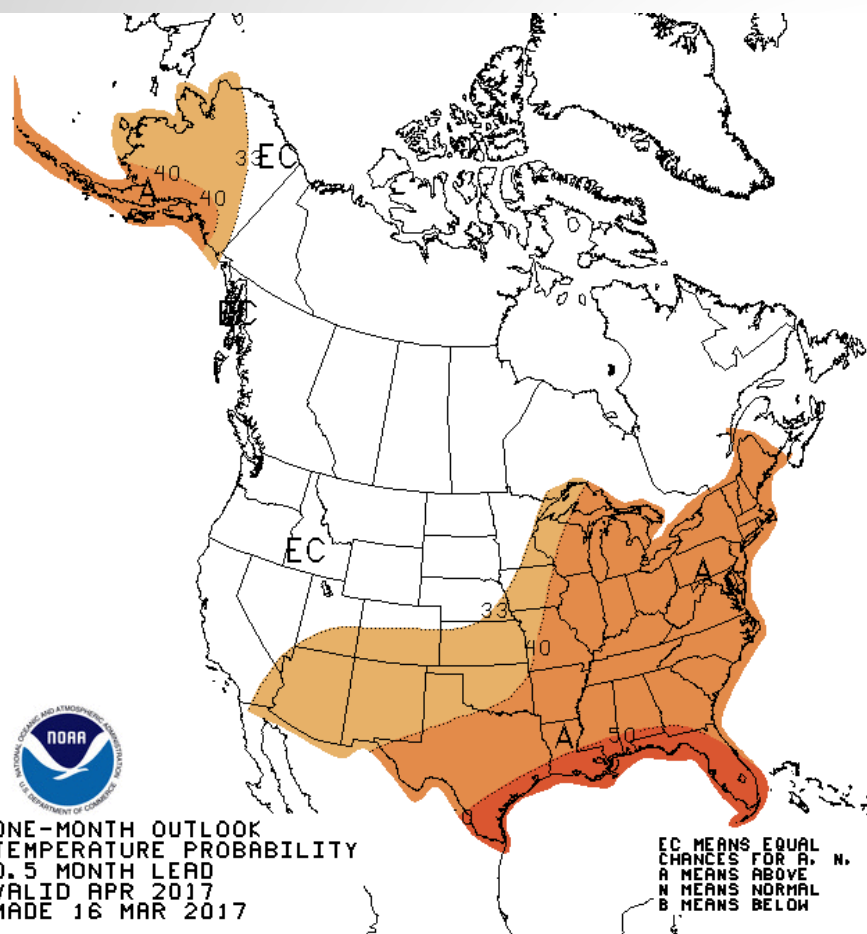


Building a Weather-Ready Nation



30 Day Outlook *for* April

Now... Near normal temps. Slight wet signal persists.

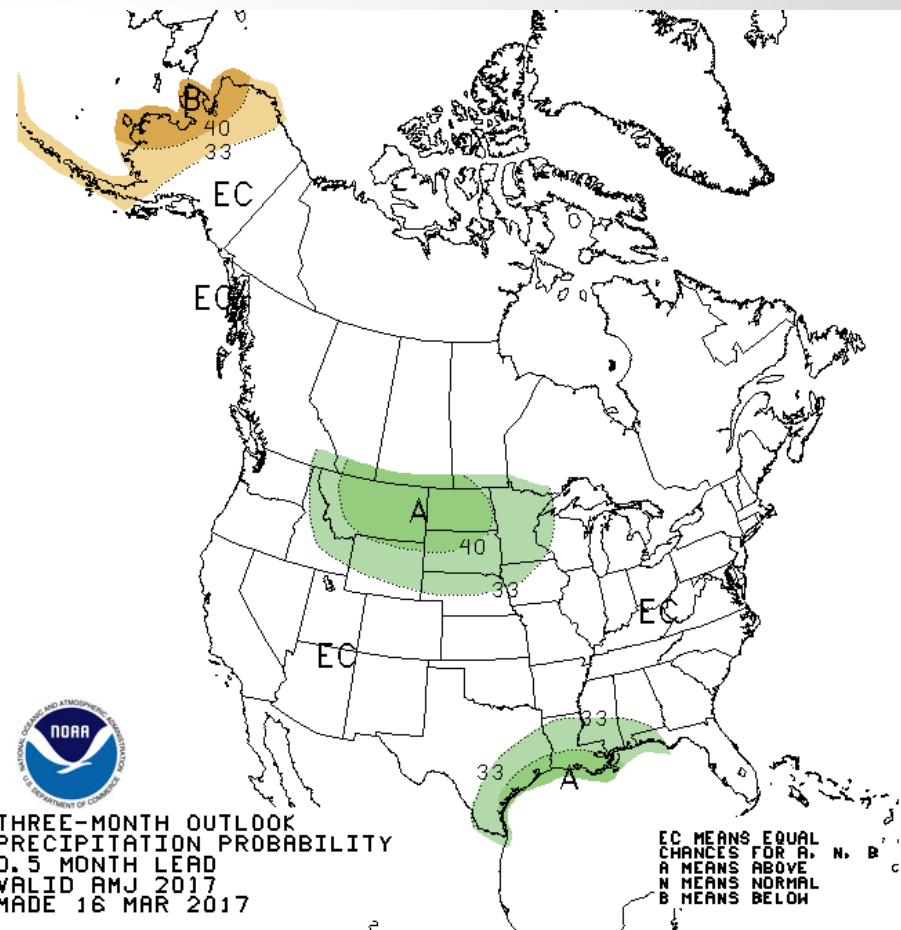
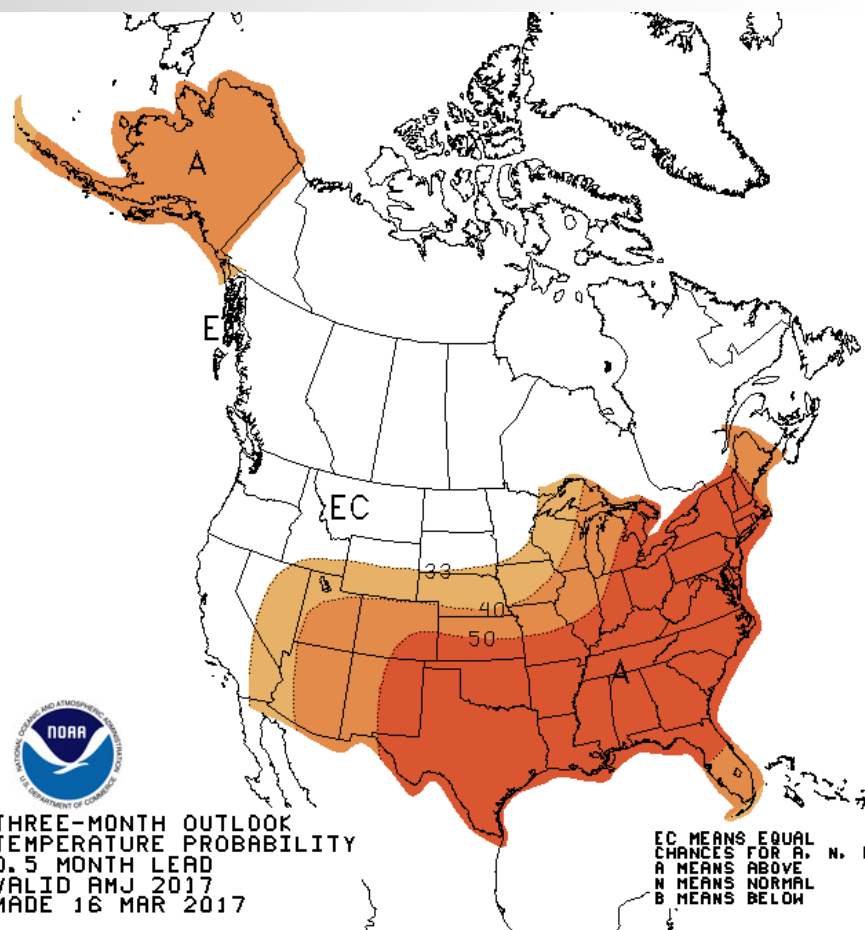


Building a Weather-Ready Nation



Rest of Spring – 90 Days

Trend for near normal Temperatures, with above normal Precipitation

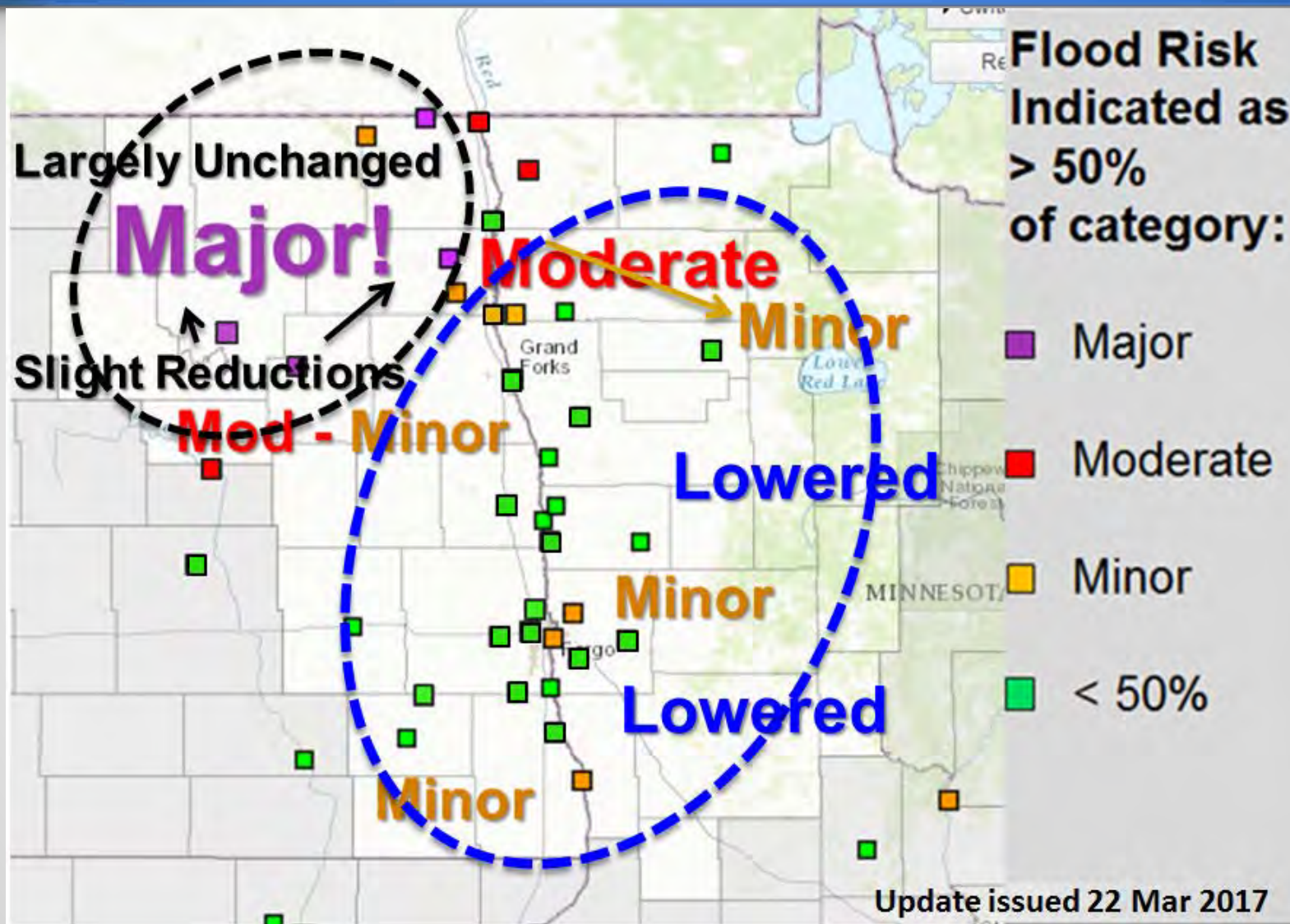


Building a Weather-Ready Nation



Spring Flood Risk by Category

Outlook issued on 22 Mar 2017



Building a Weather-Ready Nation



2017 Spring Flood Outlook – March 22nd Update *for the Red River and Devils Lake Basins*



No more outlooks... rest of water will be flowing!



Greg Gust - NOAA/NWS Grand Forks ND



Building a Weather-Ready Nation