

January 2018 Great Basin Water Supply Briefing

Jan 8, 2018

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Weather Service
NOAA

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Please mute your phone
until ready to ask questions



Today's Presentation

Fall weather – A very dry pattern

Current snowpack conditions-Record low snowpack in many locations

Initial 2018 water supply forecasts

New forecast evolution plots

January forecast – How good are they?

Upcoming weather – potential impacts to water supply forecasts

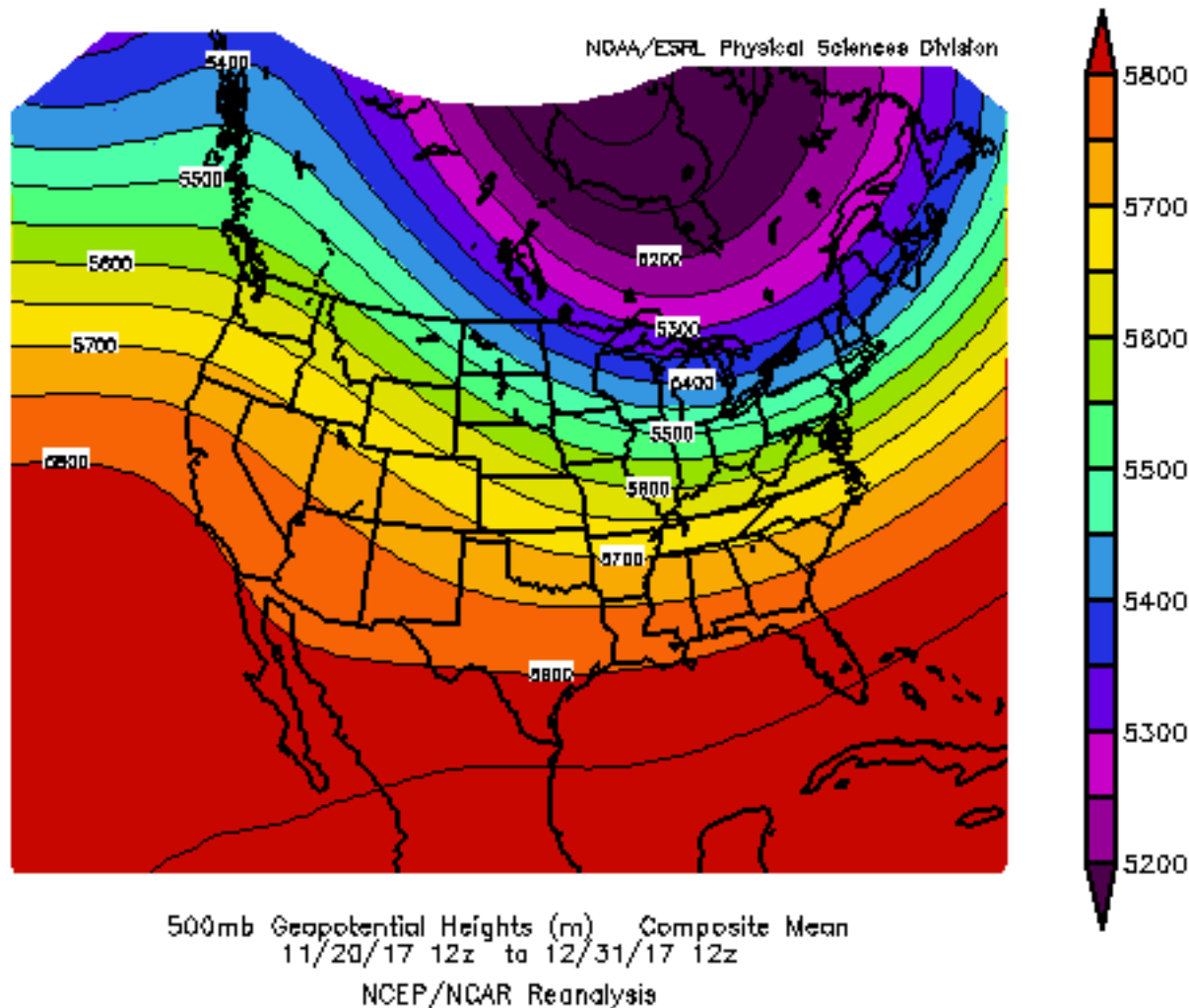
Contacts & Questions

* Please mute your phone until ready to ask questions *

Fall/Early Winter Weather Impacts

Very dry pattern becomes established

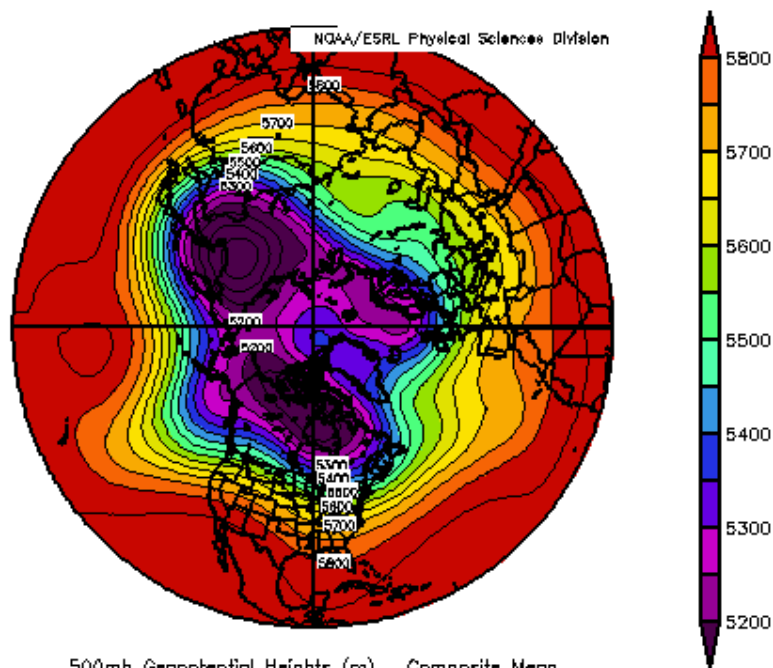
Mean Atmospheric Pattern
Mid Nov –through December



Fall Weather Impacts

Very dry pattern becomes established

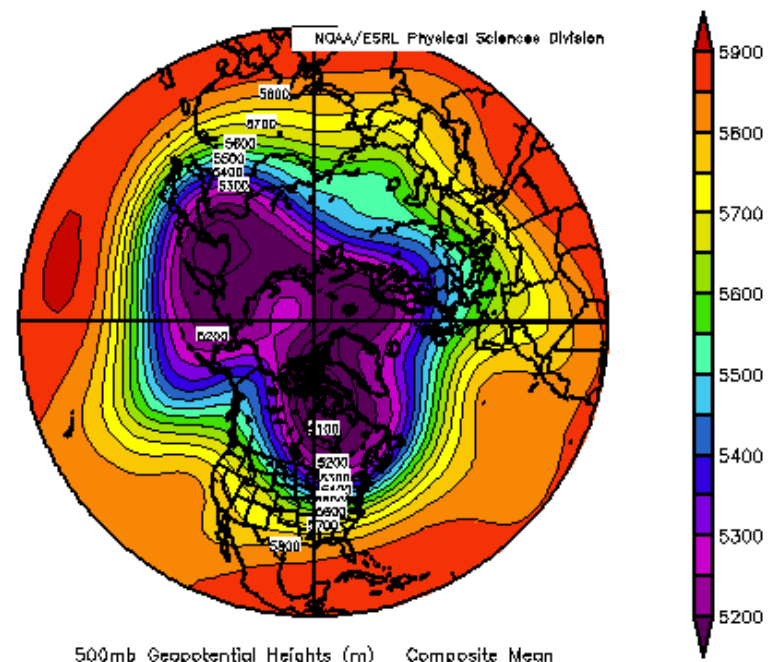
Atmospheric Pattern
Nov 15 – Nov 30



500mb Geopotential Heights (m) Composite Mean
11/15/17 12z to 11/30/17 12z
NCEP/NCAR Reanalysis

Dry conditions as a strong high pressure ridge becomes dominant feature over western U.S. / Pacific.

“Mean” Atmospheric Pattern
Dec 1 – Dec 31

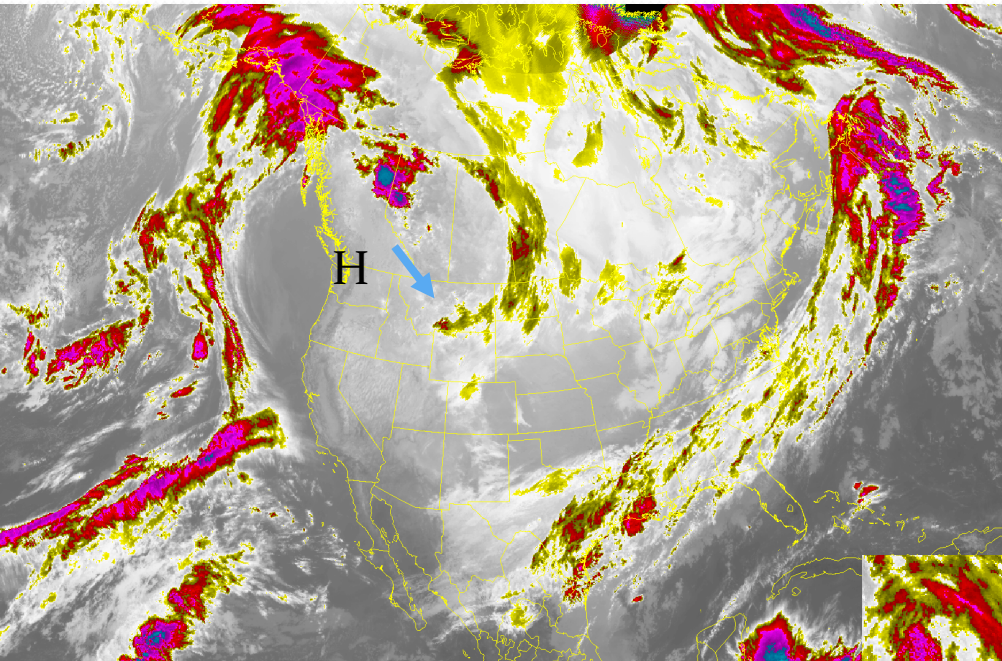


500mb Geopotential Heights (m) Composite Mean
12/1/17 12z to 12/31/17 12z
NCEP/NCAR Reanalysis

Blocking high pressure ridge firmly established

Fall Weather Impacts

Storms impacted by a persistent strong high pressure

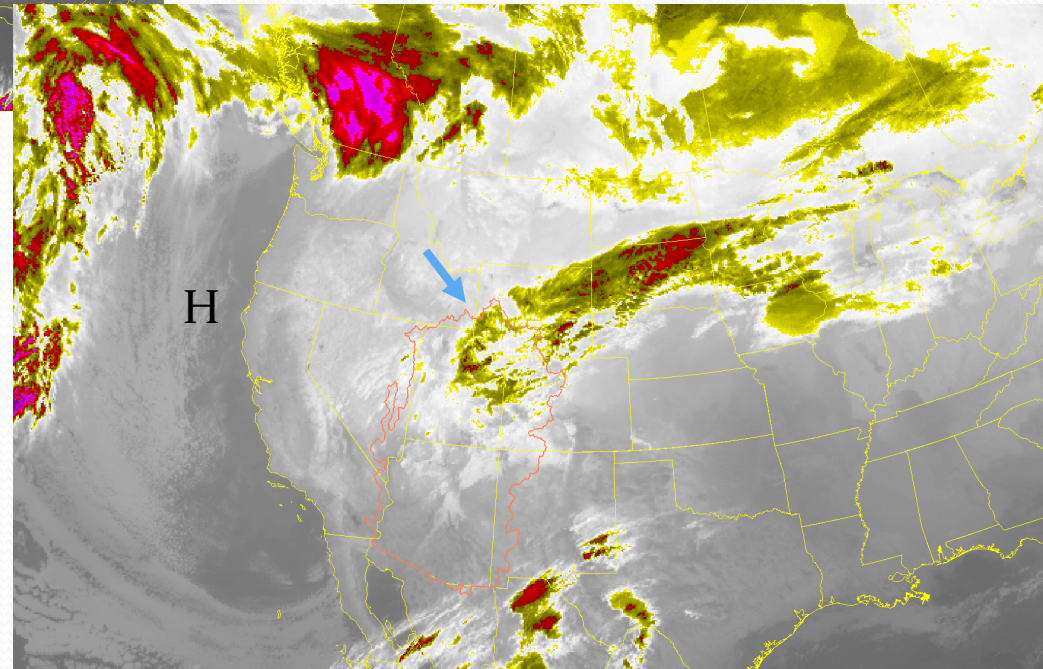


← December 7th 2017

Storm system moving around the periphery of the high pressure ridge

December 21st 2017 →

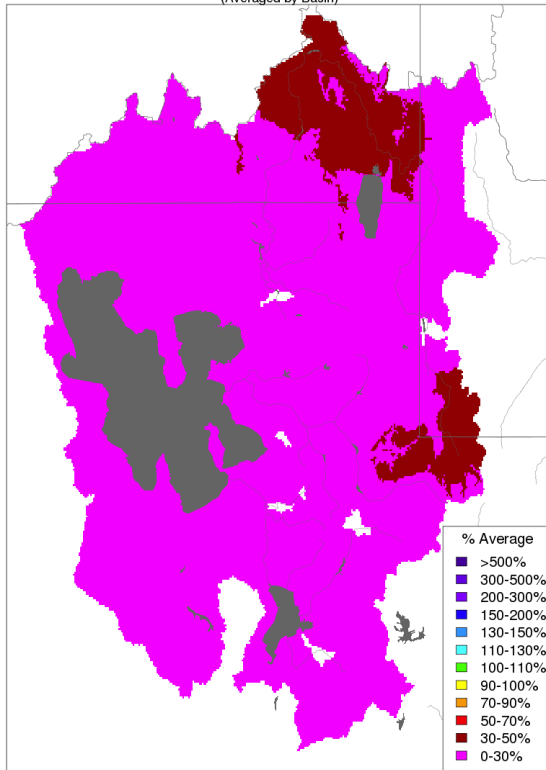
Weak storm system moving through the area with limited precipitation



Fall Weather Impacts

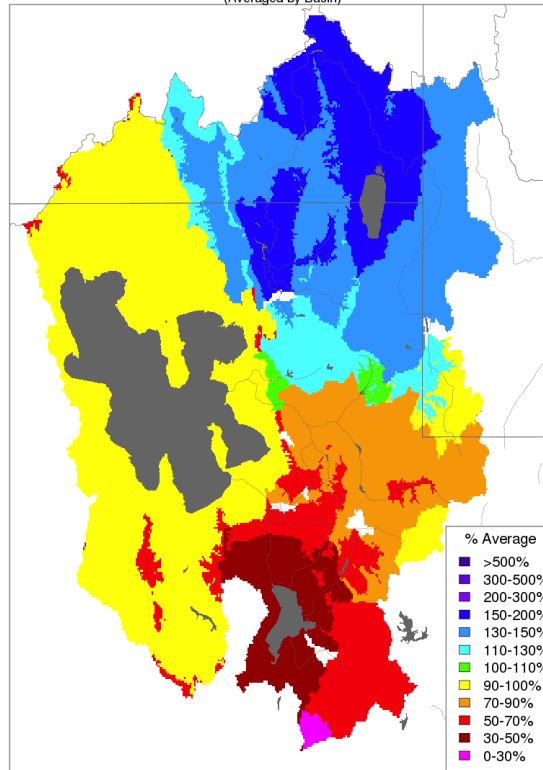
November storms brought above normal precipitation to the Bear River Basin and northern parts of the Weber River Basin; otherwise a very dry fall.

Monthly Precipitation - October 2017
(Averaged by Basin)



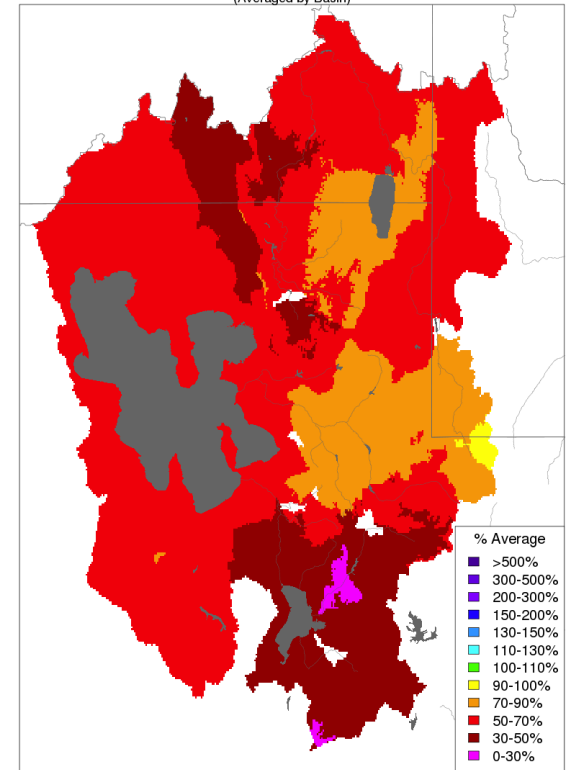
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Monthly Precipitation - November 2017
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Monthly Precipitation - December 2017
(Averaged by Basin)



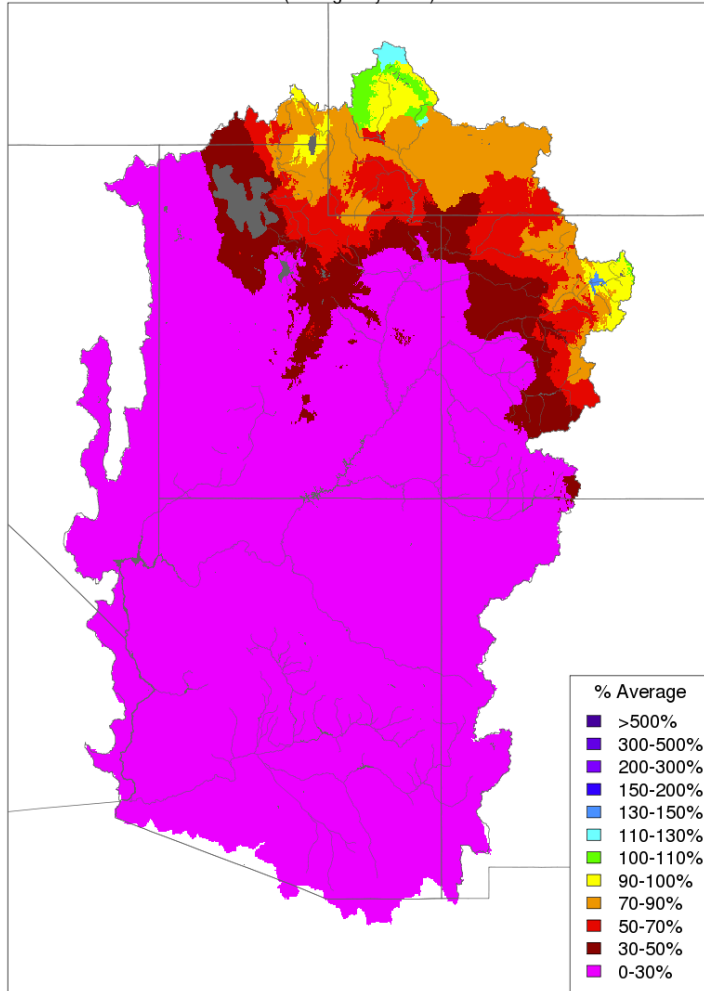
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Fall Weather Impacts

Water Year (Oct-Dec) Precipitation

Entire forecast area

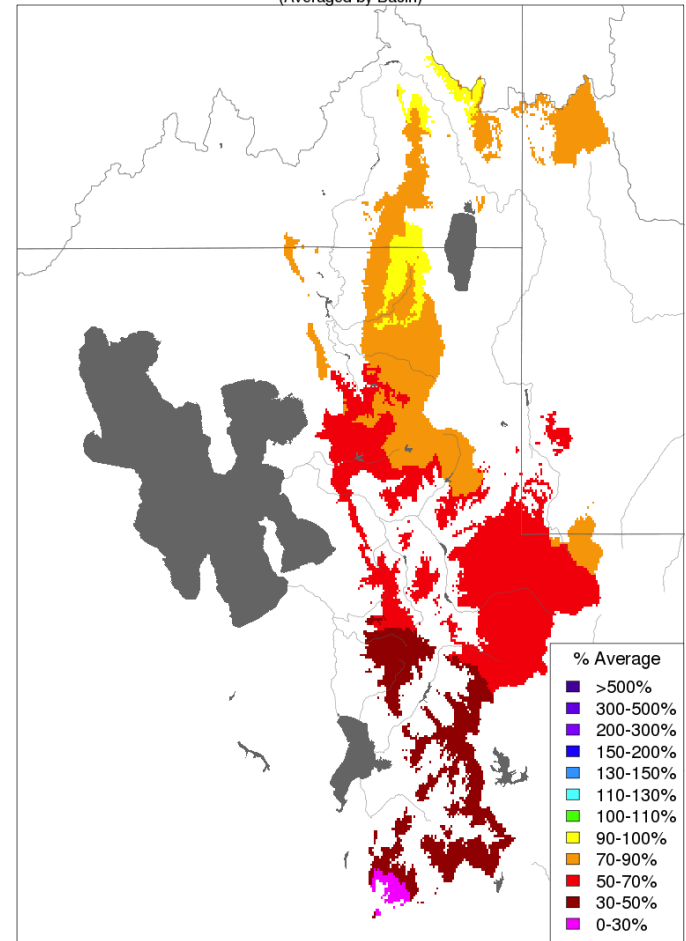
Water Year Precipitation, October 2017 - December 2017
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Great Basin Primary contributing areas to April-July snowmelt runoff

Water Year Precipitation, October 2017 - December 2017
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Oct-Dec 2017 Precipitation Ranking

NRCS SNOTEL Network

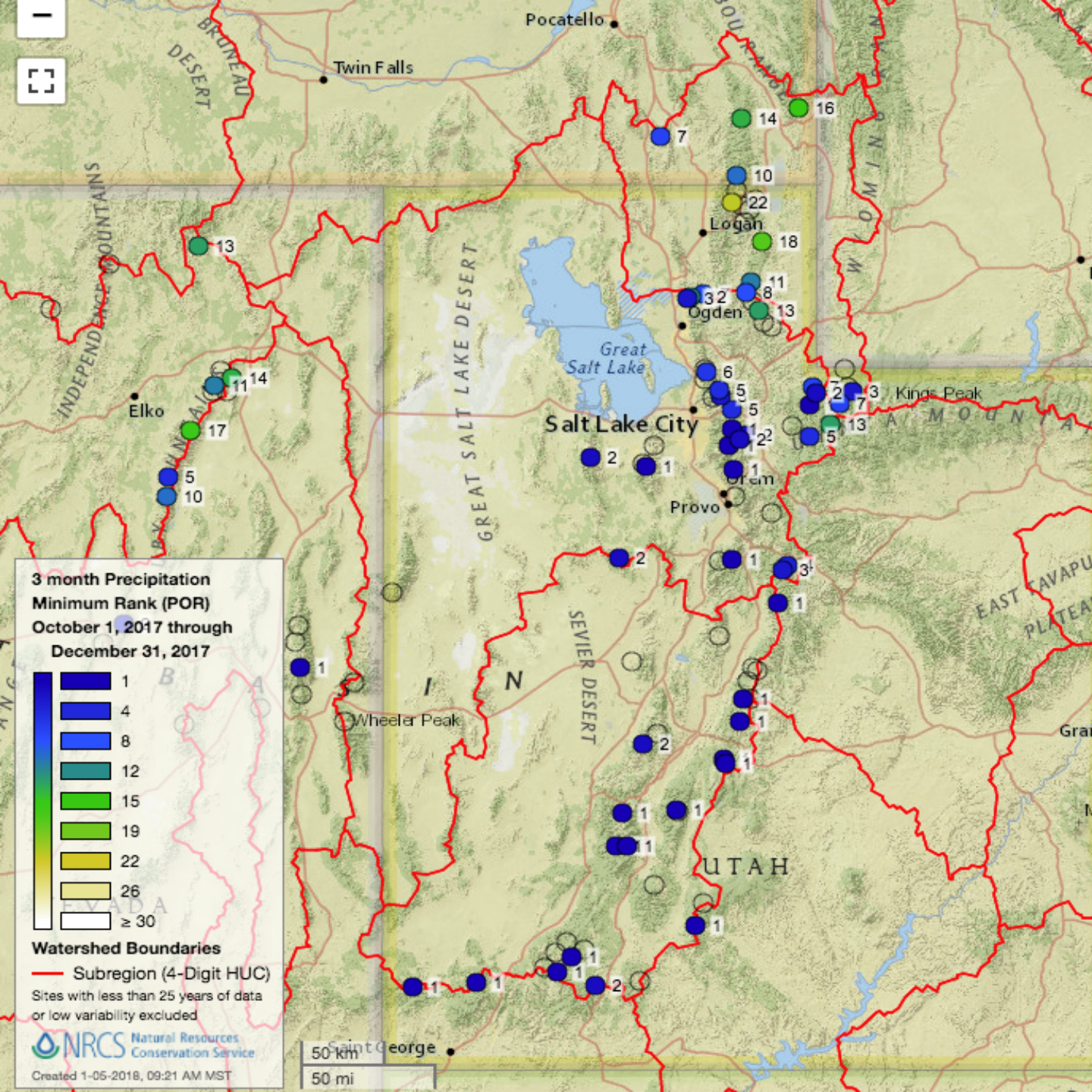
Minimum 25 years of
record displayed

Most sites have a 32-40
year period of record

Many sites in the
bottom 3 of record

Exceptions:

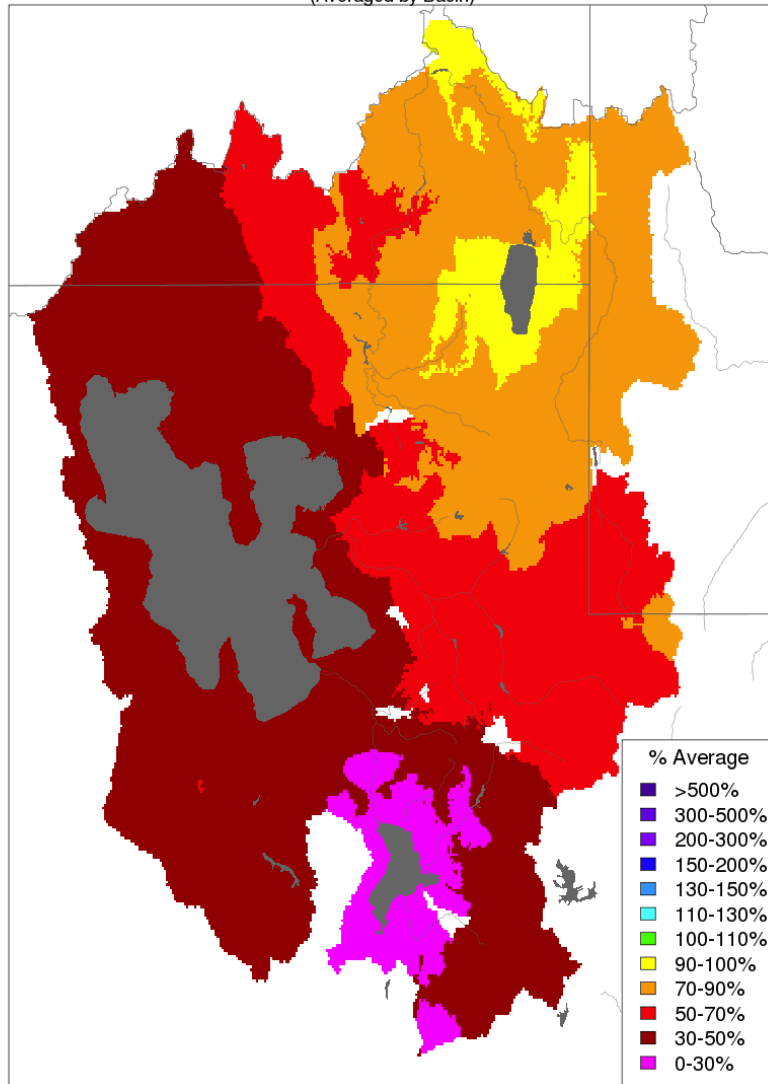
Bear River Basin



Fall Weather Impacts

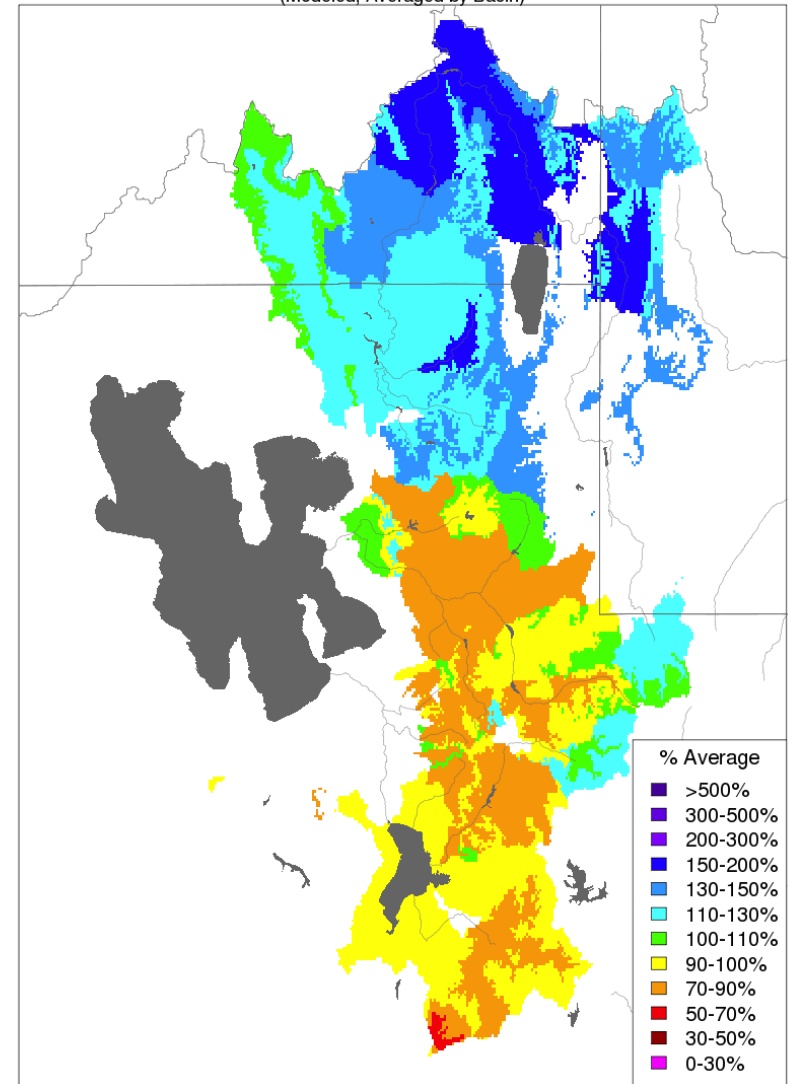
Seasonal Precipitation / Soil Moisture Conditions

Water Year Precipitation, October 2017 - December 2017
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Soil Moisture - November 16 2017
(Modeled, Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Snow Conditions

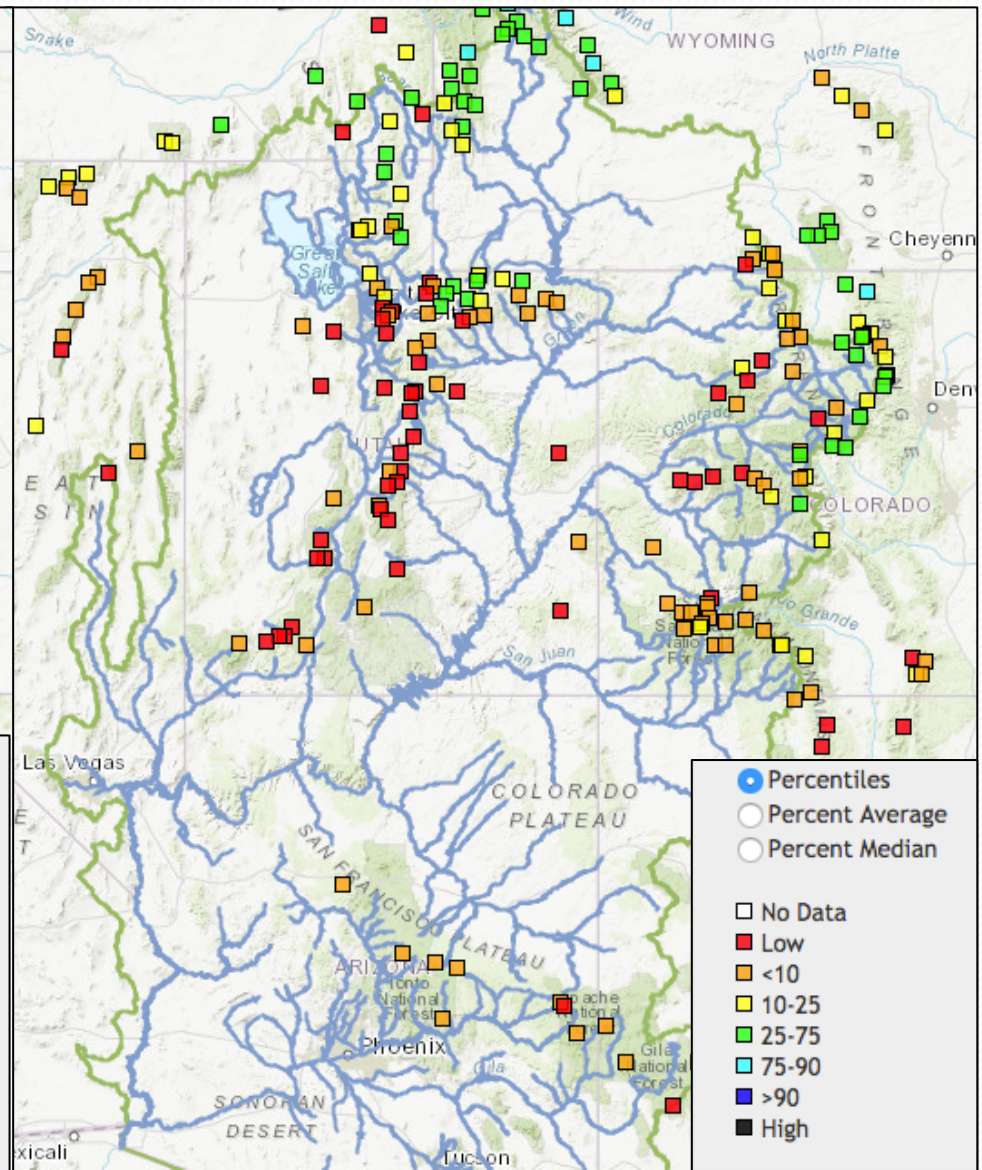
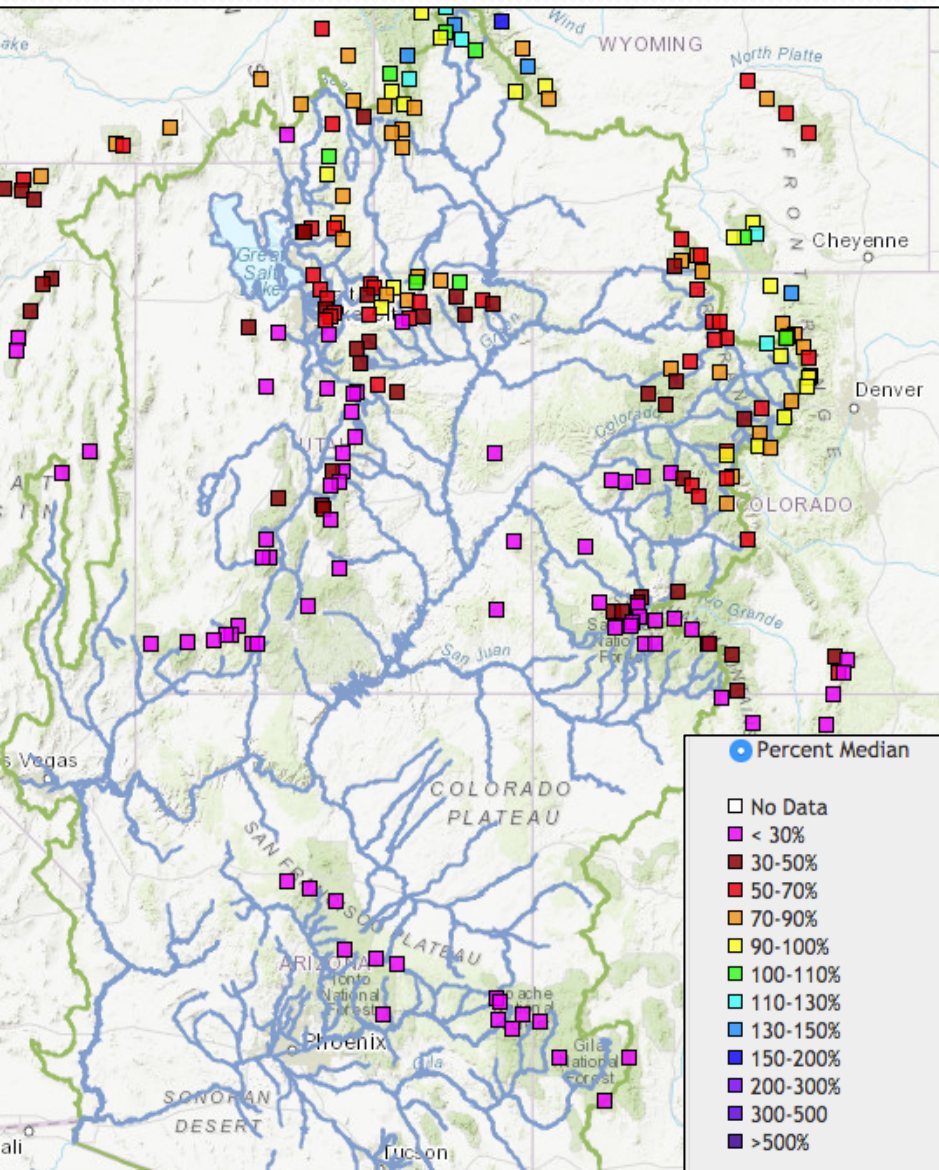
January 8 2018

Snow Water Equivalent (% median)

SWE historical ranking

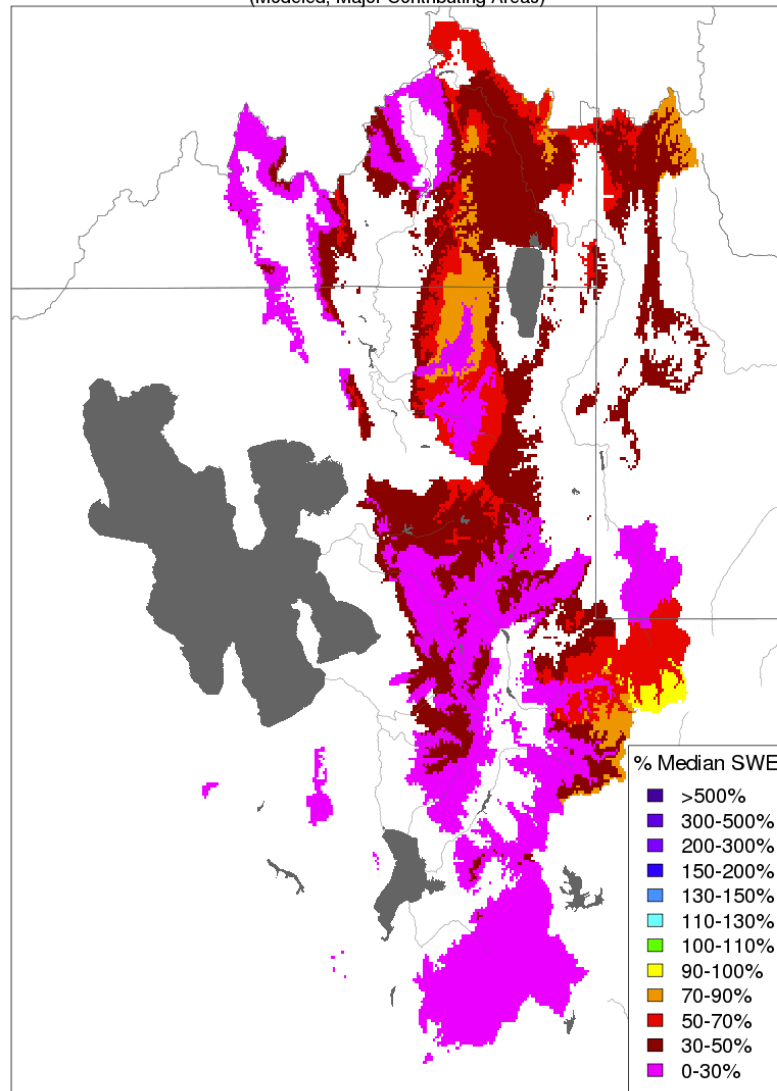
Red – Lowest on record

Orange - Many in bottom 3 of record



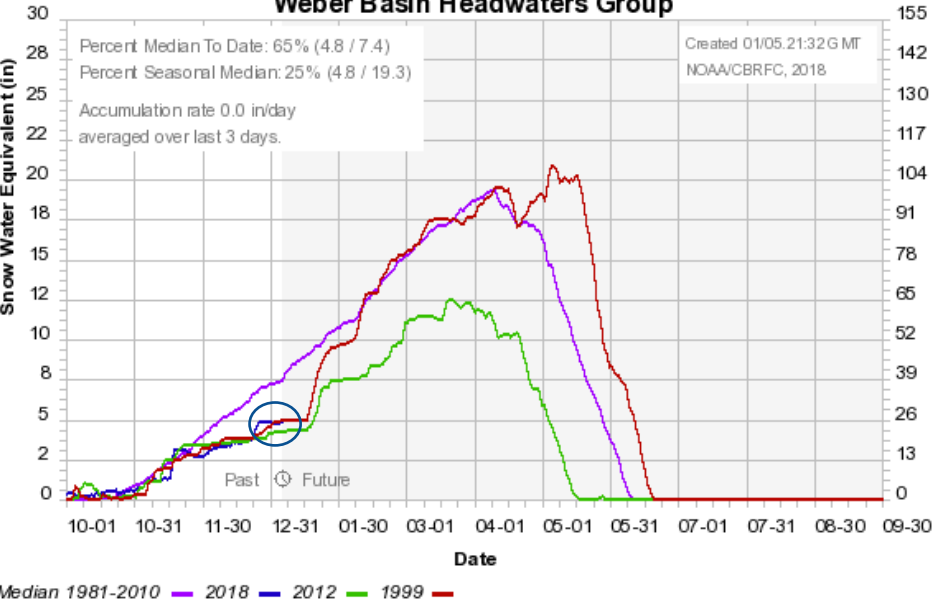
Snow Conditions (Hydrologic Model) January 8 2018

Snow Conditions - January 08 2018
(Modeled, Major Contributing Areas)

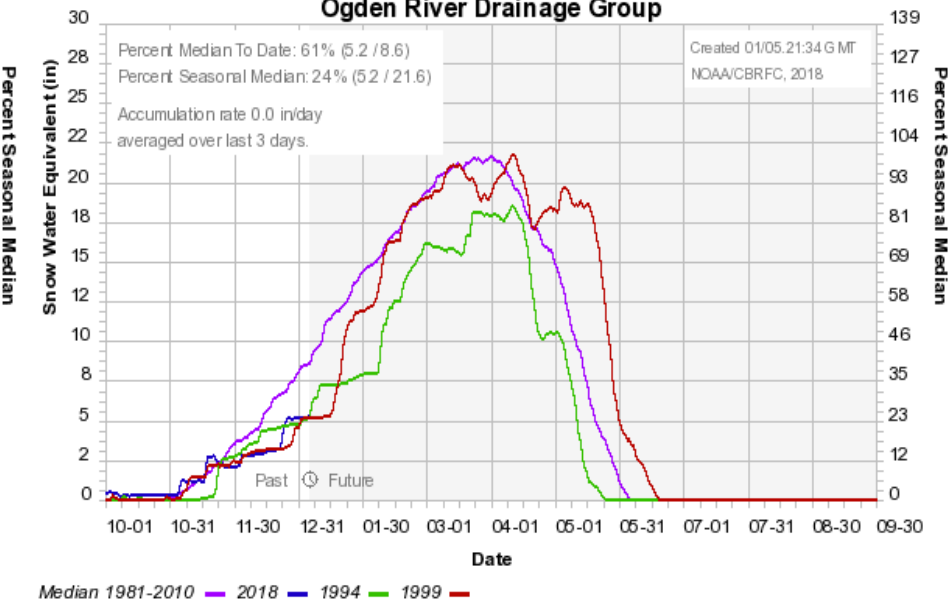


Snow Conditions: SNOTEL Snow Groups

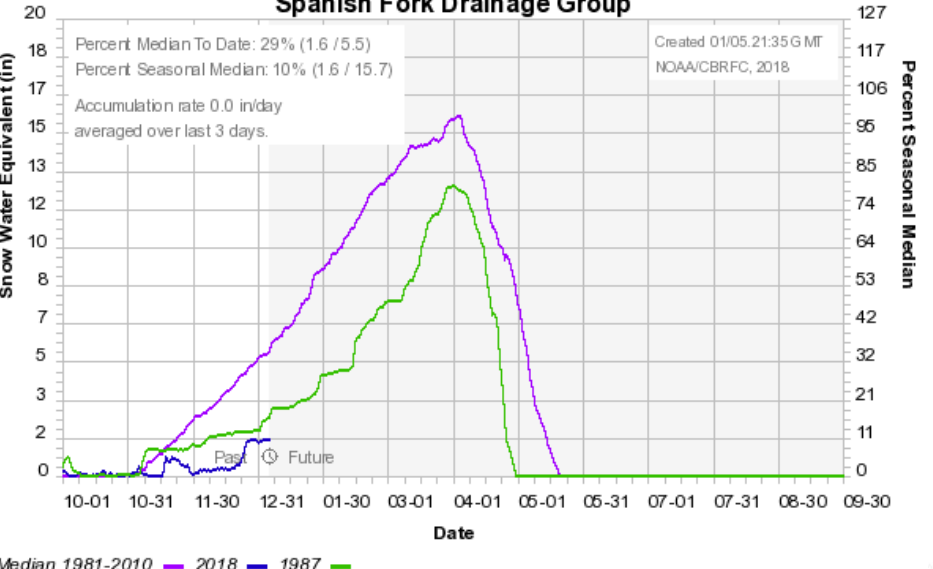
Colorado Basin River Forecast Center
Weber Basin Headwaters Group



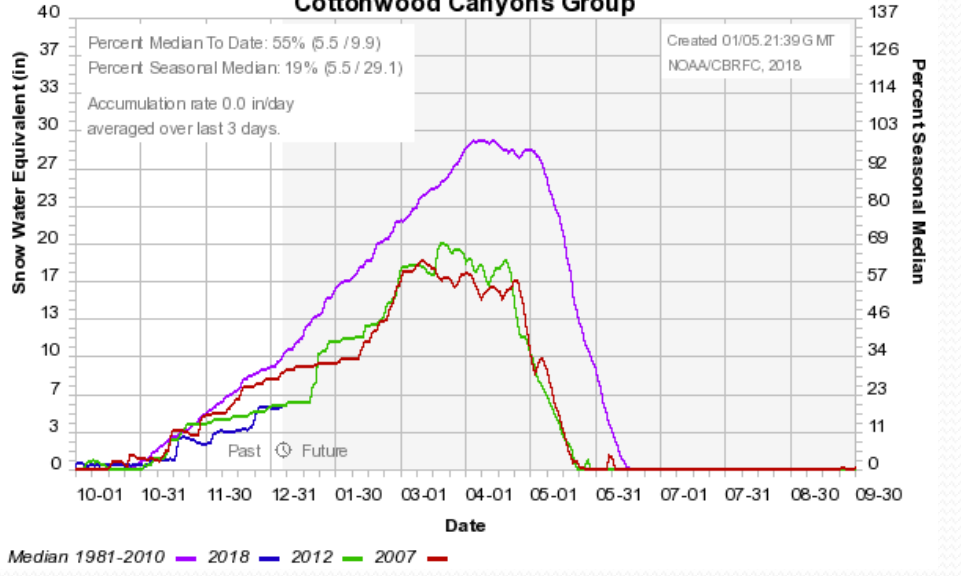
Colorado Basin River Forecast Center
Ogden River Drainage Group



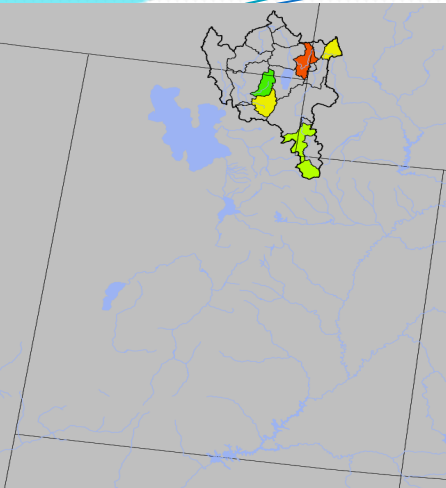
Colorado Basin River Forecast Center
Spanish Fork Drainage Group



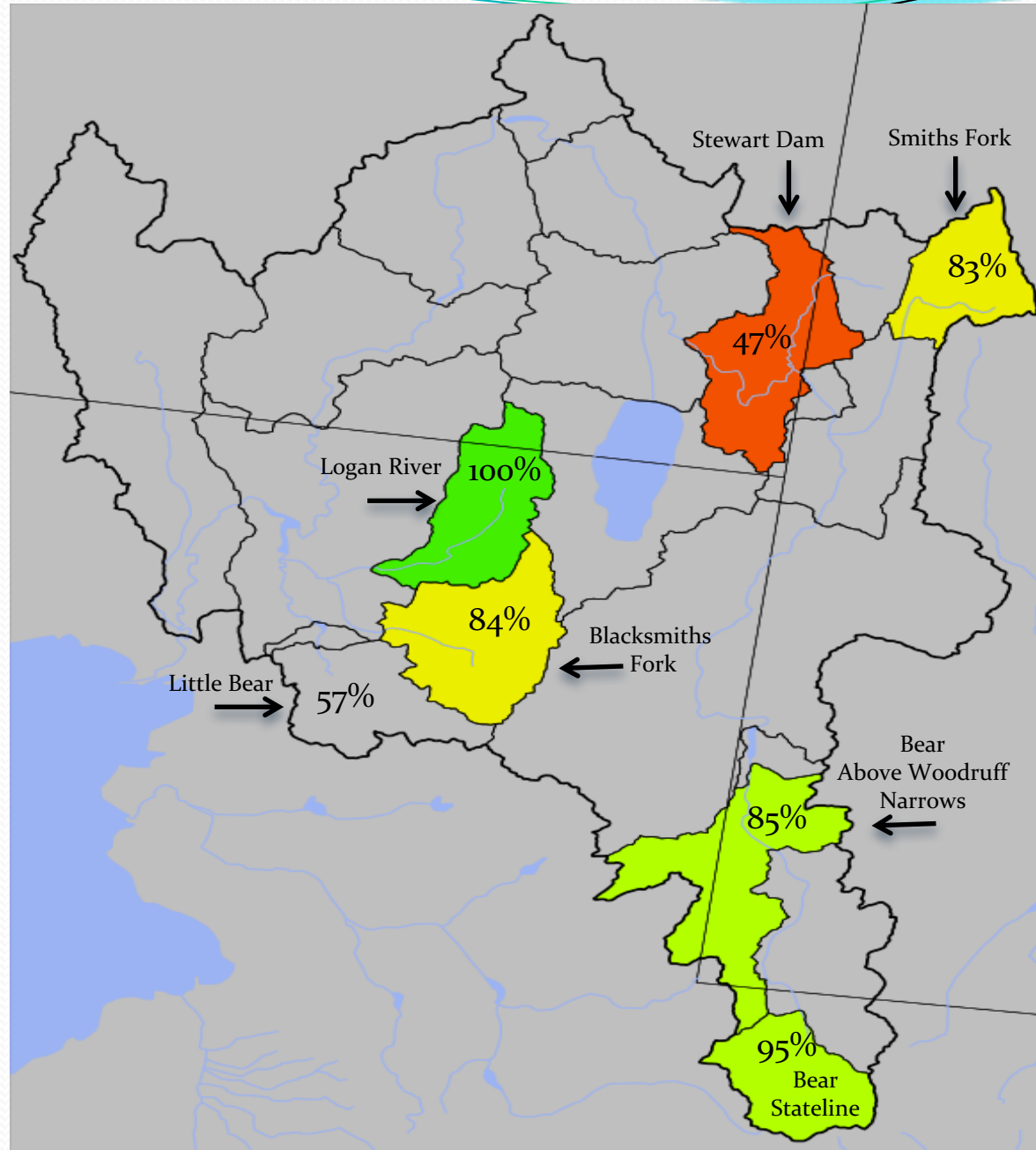
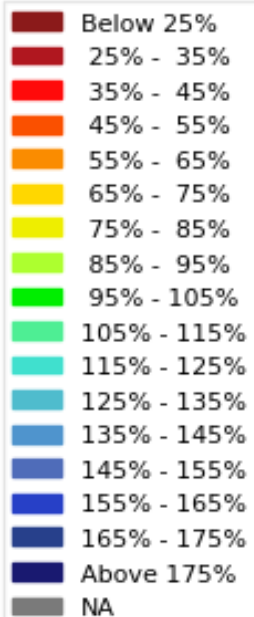
Colorado Basin River Forecast Center
Cottonwood Canyons Group



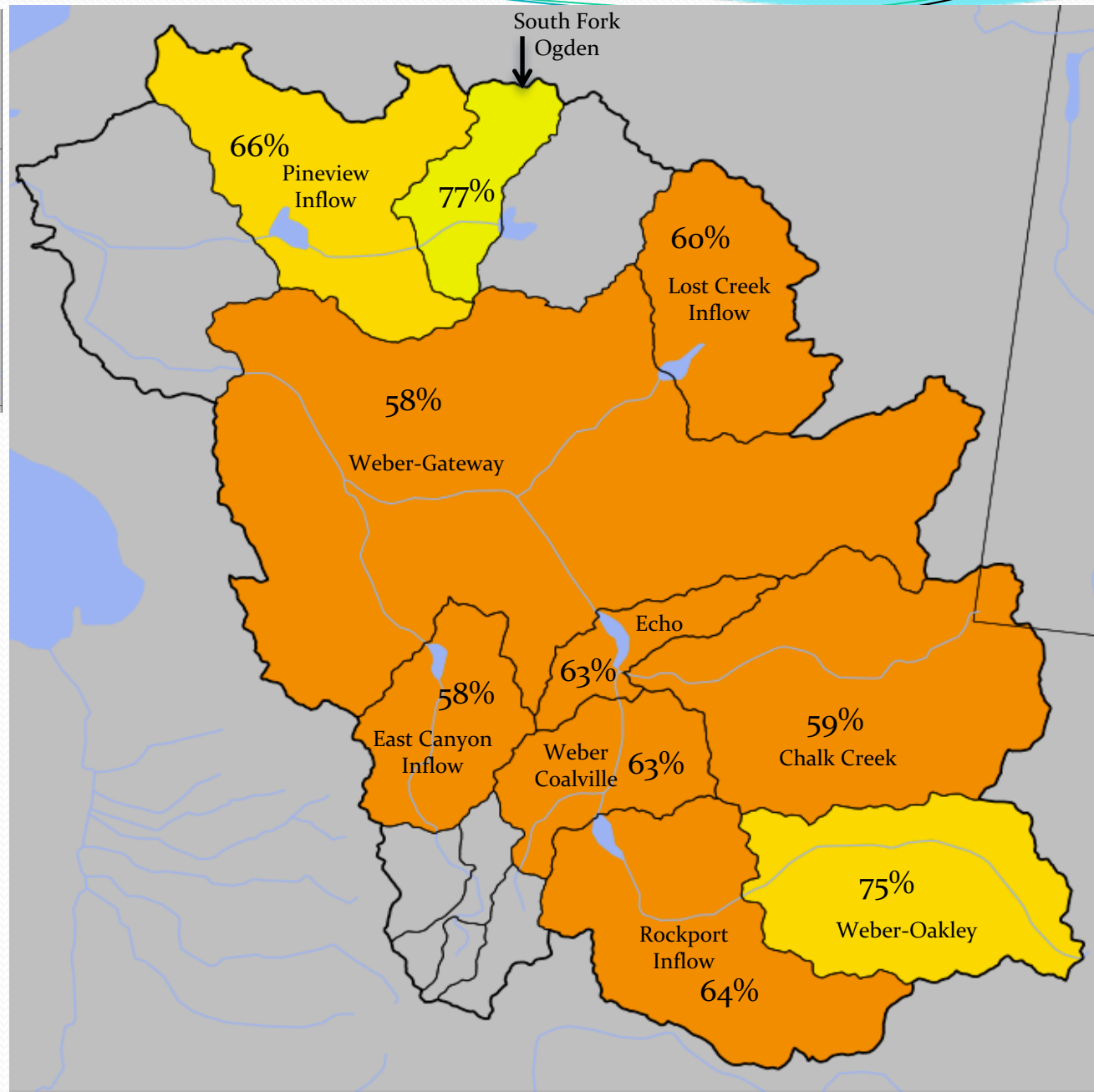
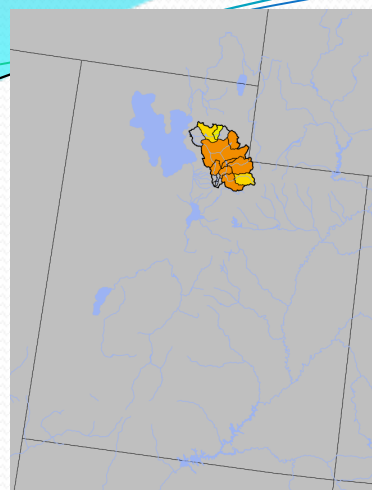
January 1st Water Supply Forecasts – Bear River Basin



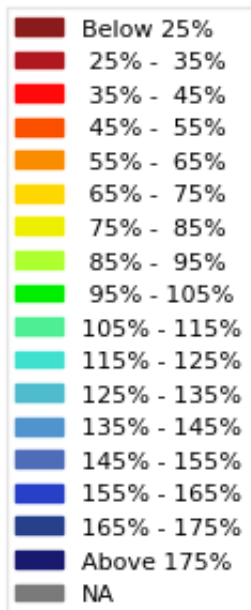
April-July
Forecast
Streamflow Volumes
(% of 1981-2010 average)



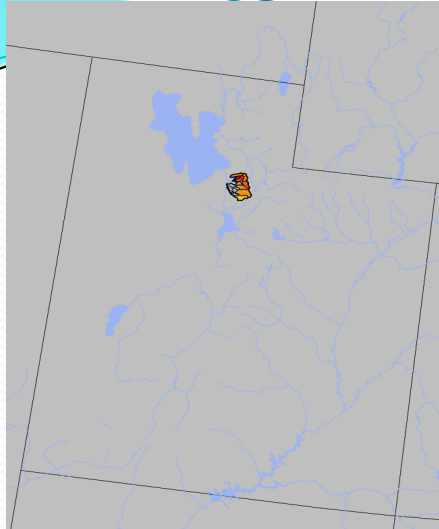
January 1st Water Supply Forecasts – Weber River Basin



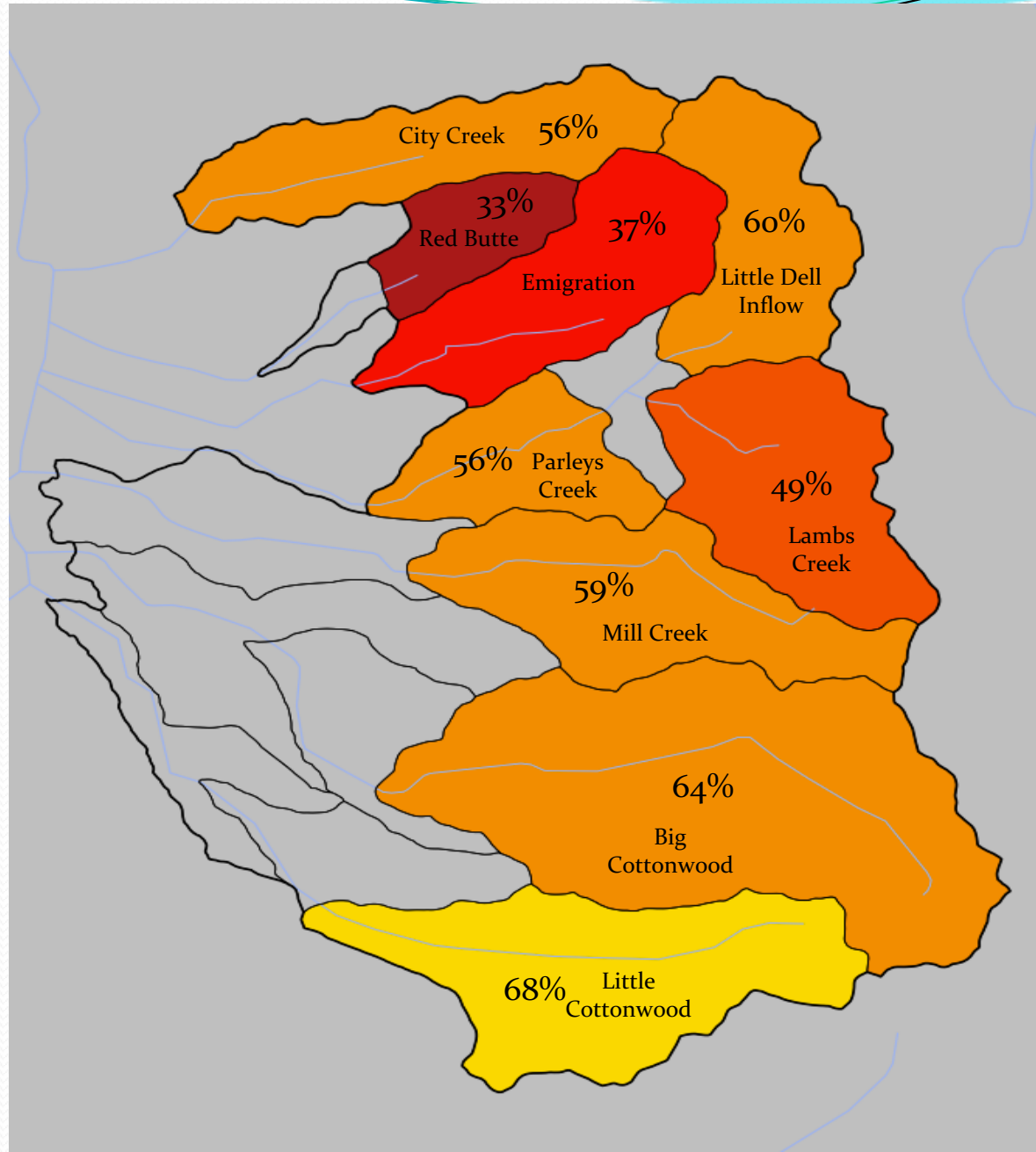
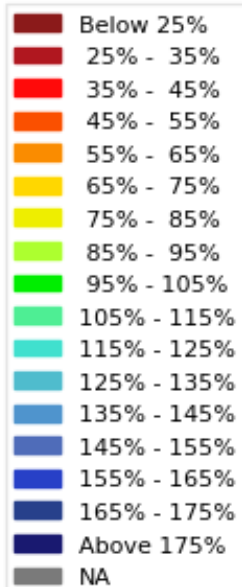
April-July Forecast
Streamflow Volumes
(% of 1981-2010 average)



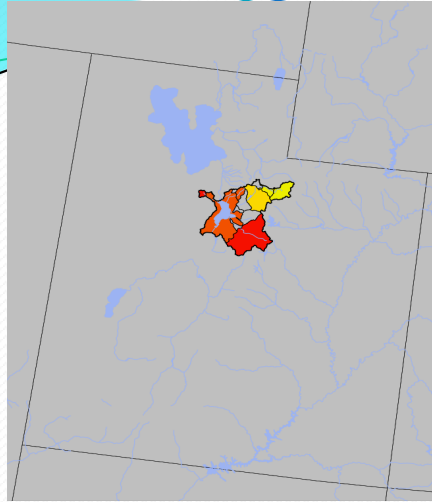
January 1st Water Supply Forecasts – Six Creeks



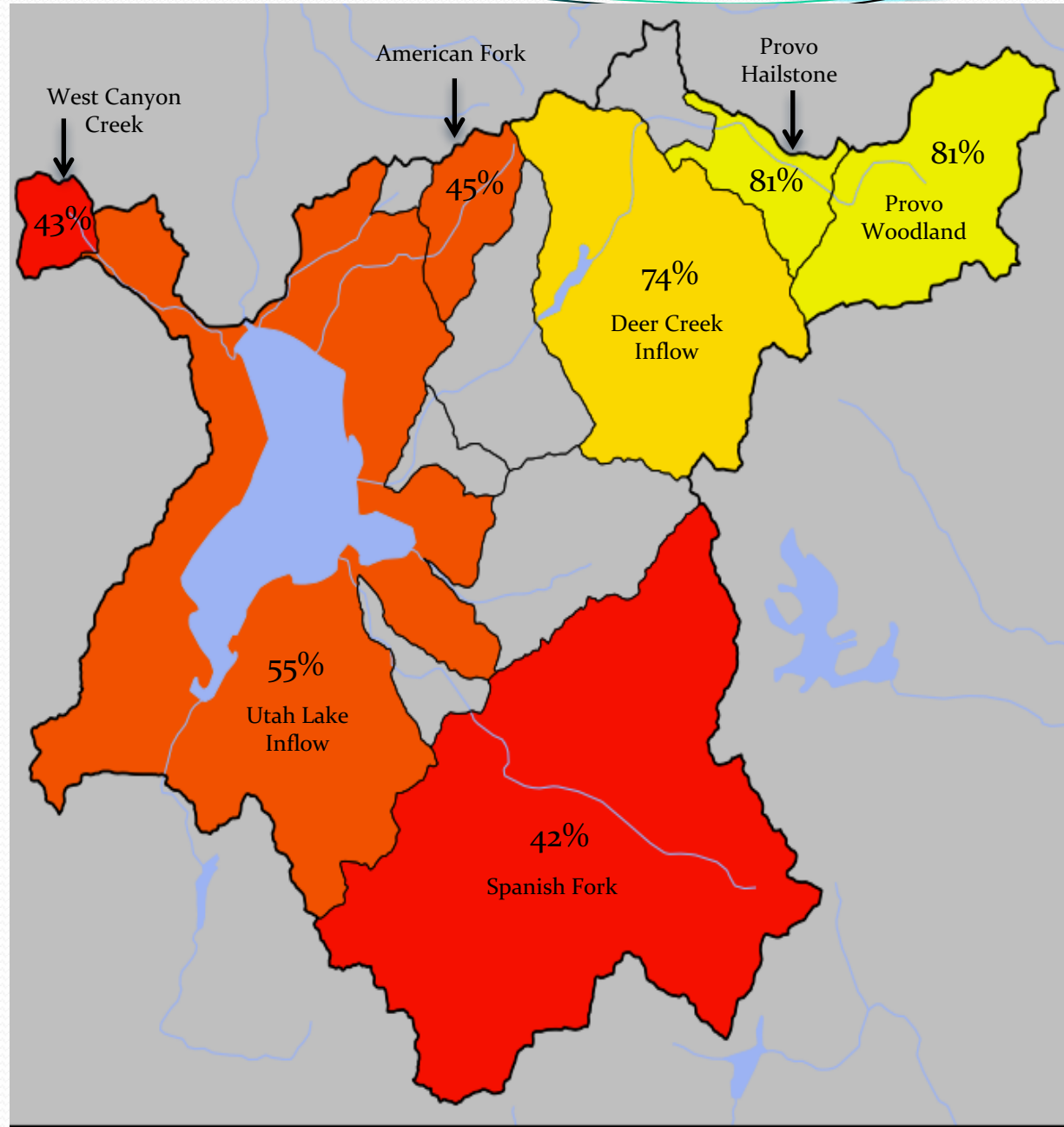
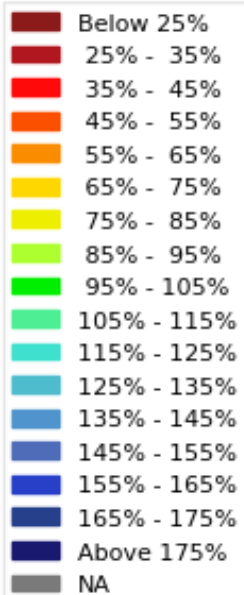
April-July
Forecast
Streamflow Volumes
(% of 1981-2010 average)



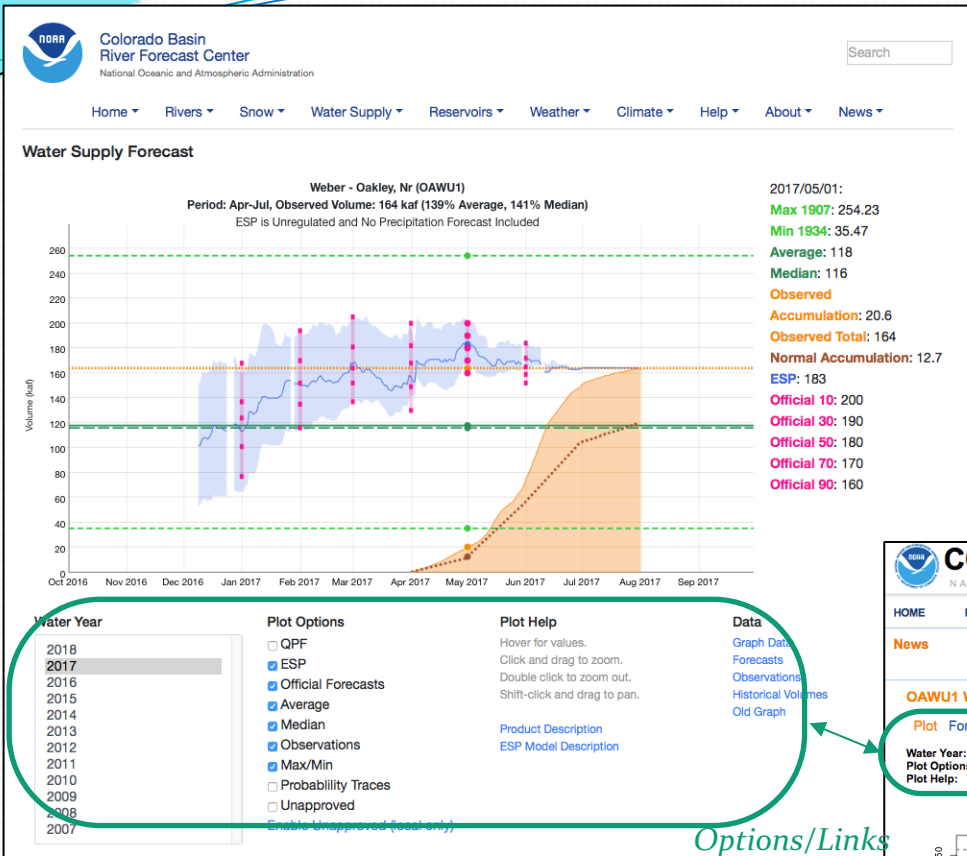
January 1st Water Supply Forecasts – Provo River / Utah Lake



April-July
Forecast
Streamflow Volumes
(% of 1981-2010 average)

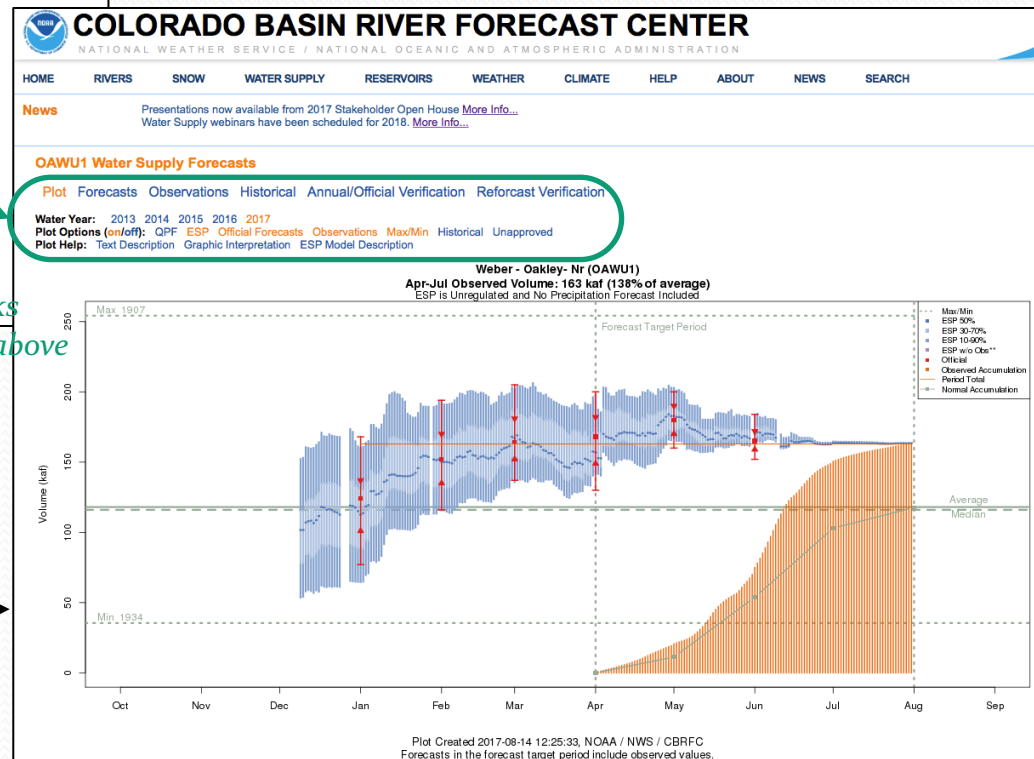


Updated Forecast Evolution Plots – Similar Look, New Features



New:

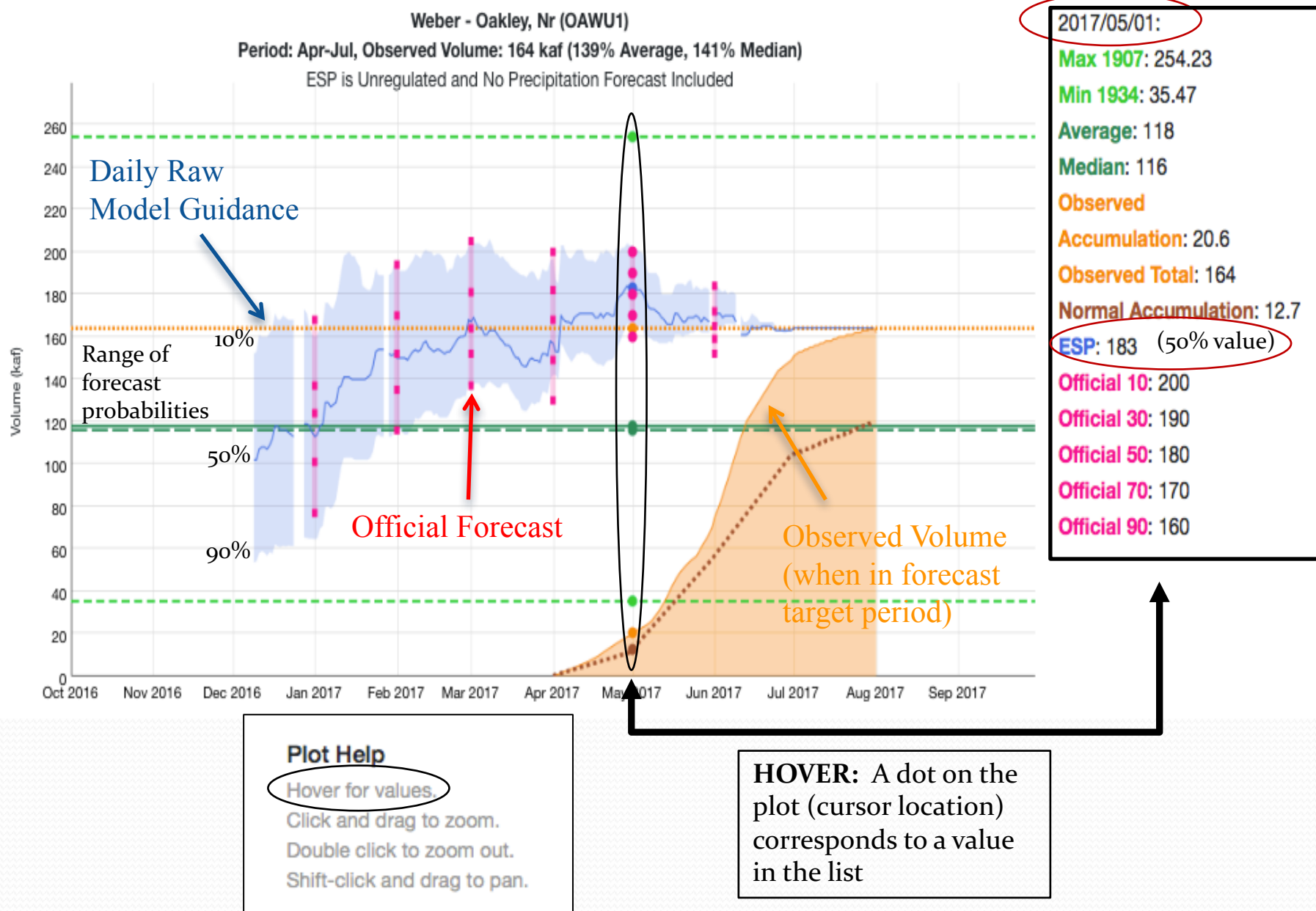
- Dynamic (built on the fly)
 - Updates immediately available
- Interactive
 - Hover for any day's values
 - Zoom ability
- Other
 - Does not have Raw Model (ESP) 30%/70% on this plot
 - Use Probability Traces plot
 - Forecast Target Period not delineated
 - Use Normal Accumulation line



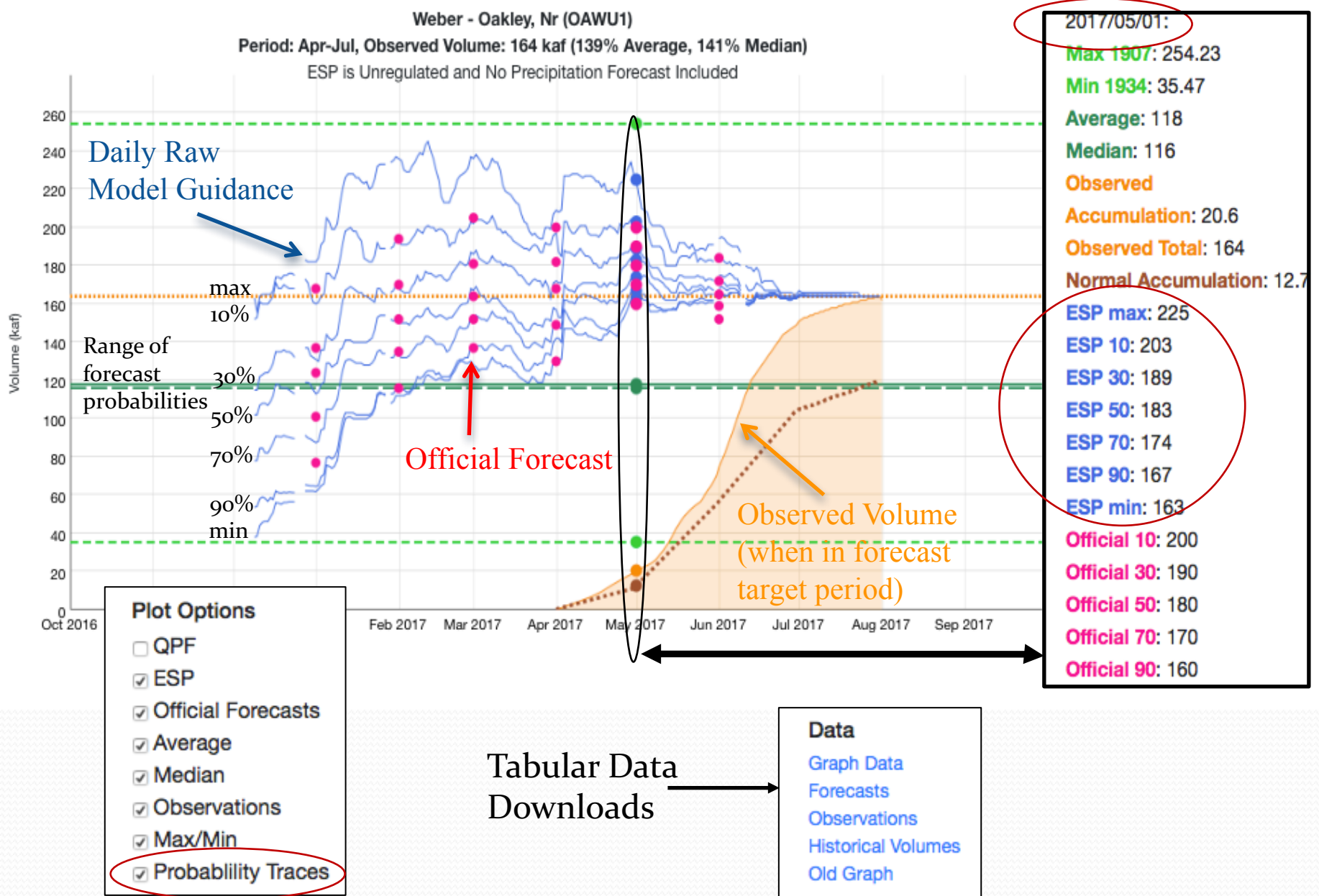
Old:

- Static (pre-built images)
 - Updates only available after slow manual process
- Not interactive
 - Only latest values easily accessible

Updated Forecast Evolution Plots – Default Plot

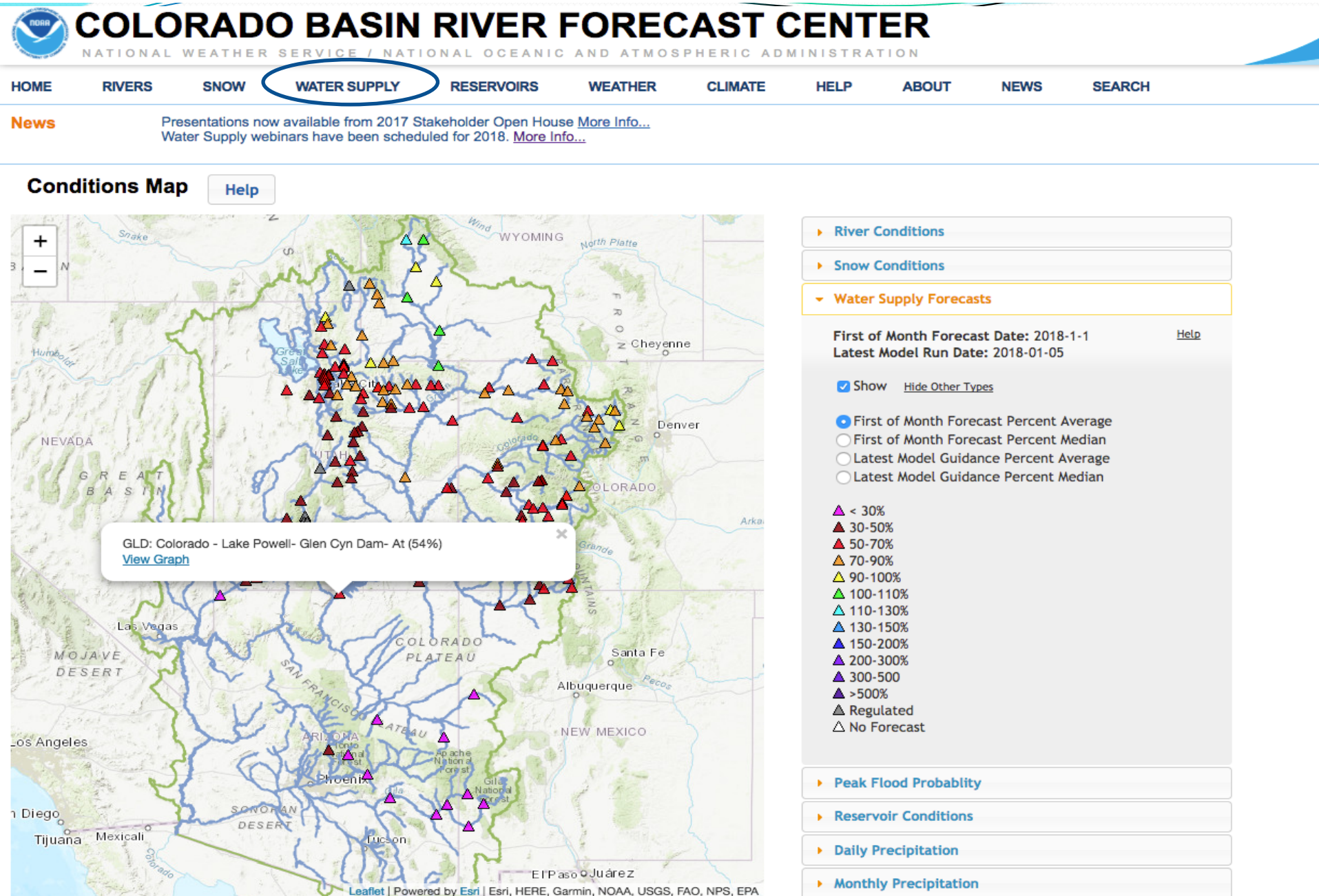


Updated Forecast Evolution Plots – Probability Traces



Forecast Evolution Plot – Where do you find them?

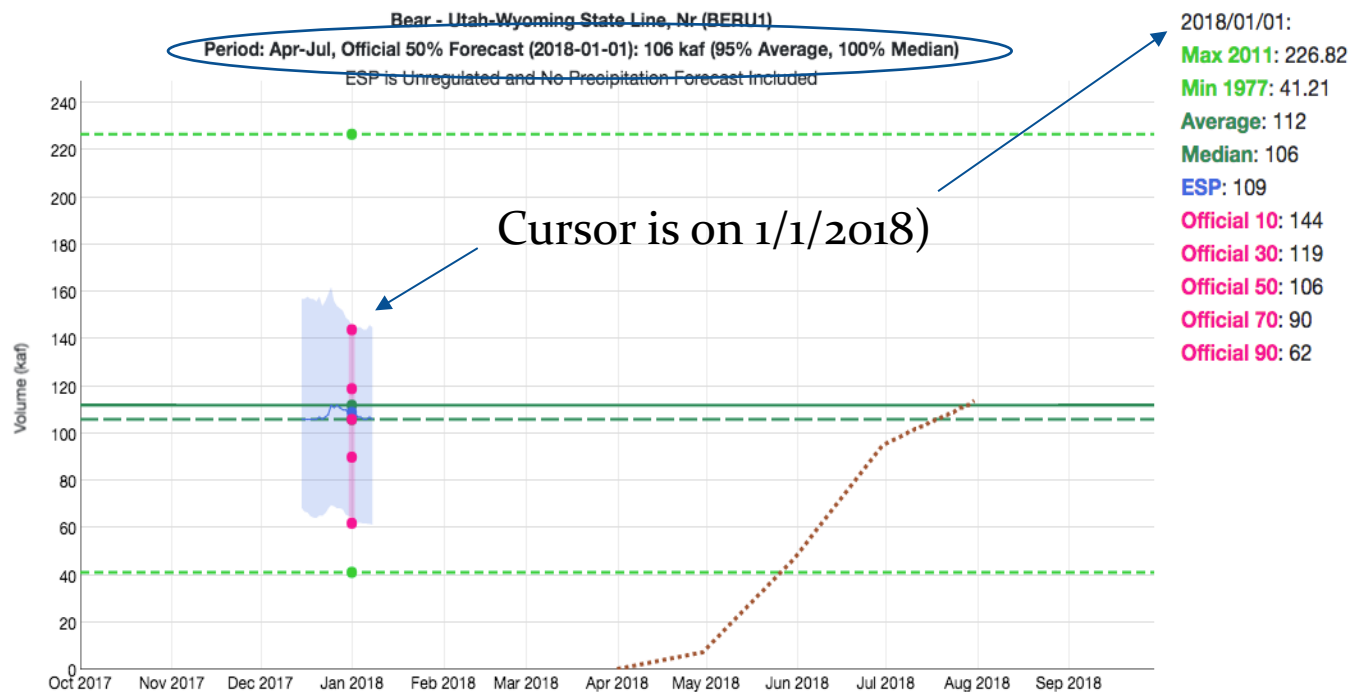
CBRFC Web Page: www.cbrfc.noaa.gov



Forecast Evolution Plot

Bear River Utah/Wyoming Stateline 106 kaf / 95% avg

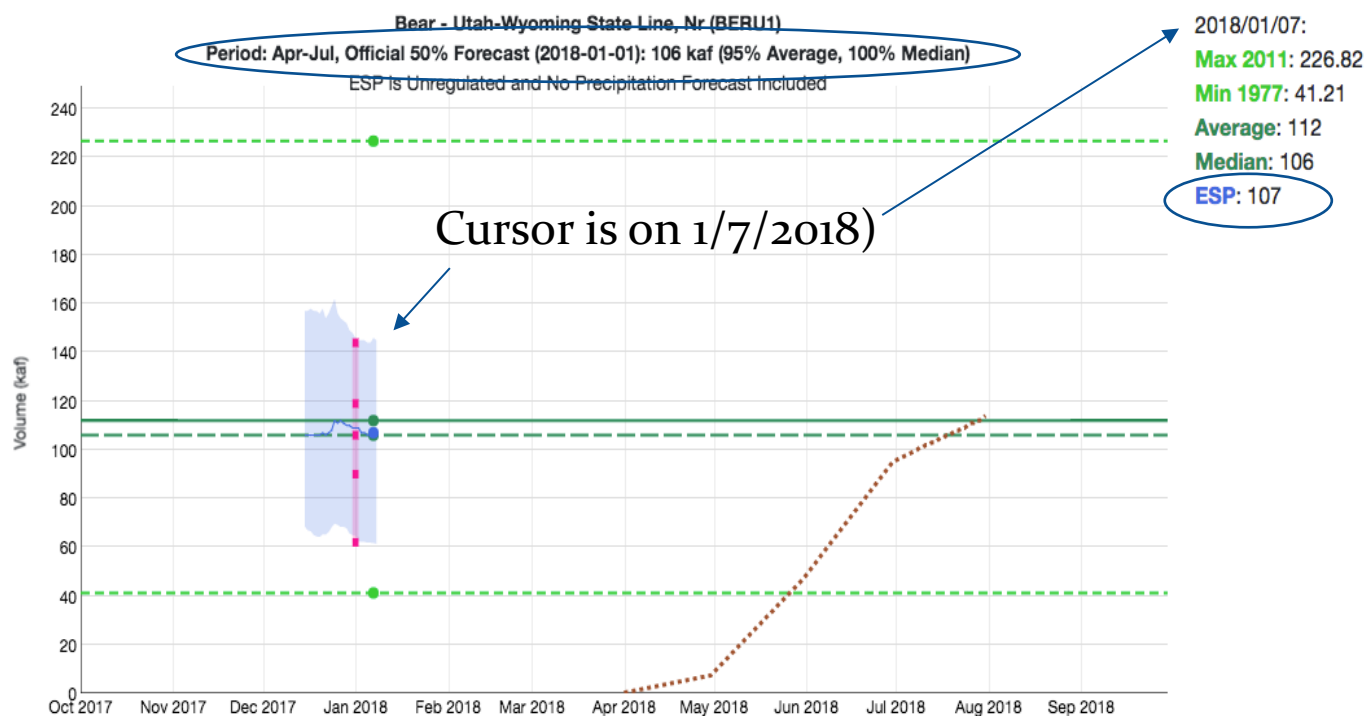
Water Supply Forecast



Forecast Evolution Plot

Bear River Utah/Wyoming Stateline 106 kaf / 95% avg

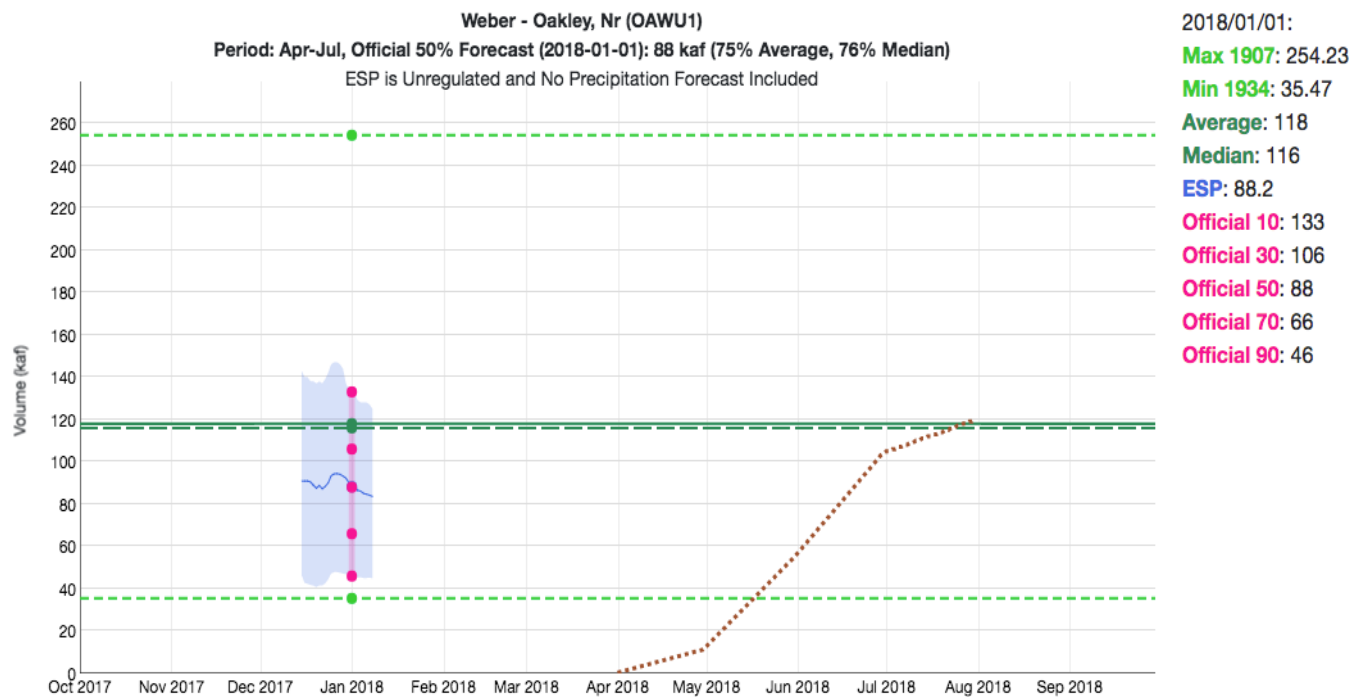
Water Supply Forecast



Forecast Evolution Plot

Weber River at Oakley 88 kaf / 75% avg

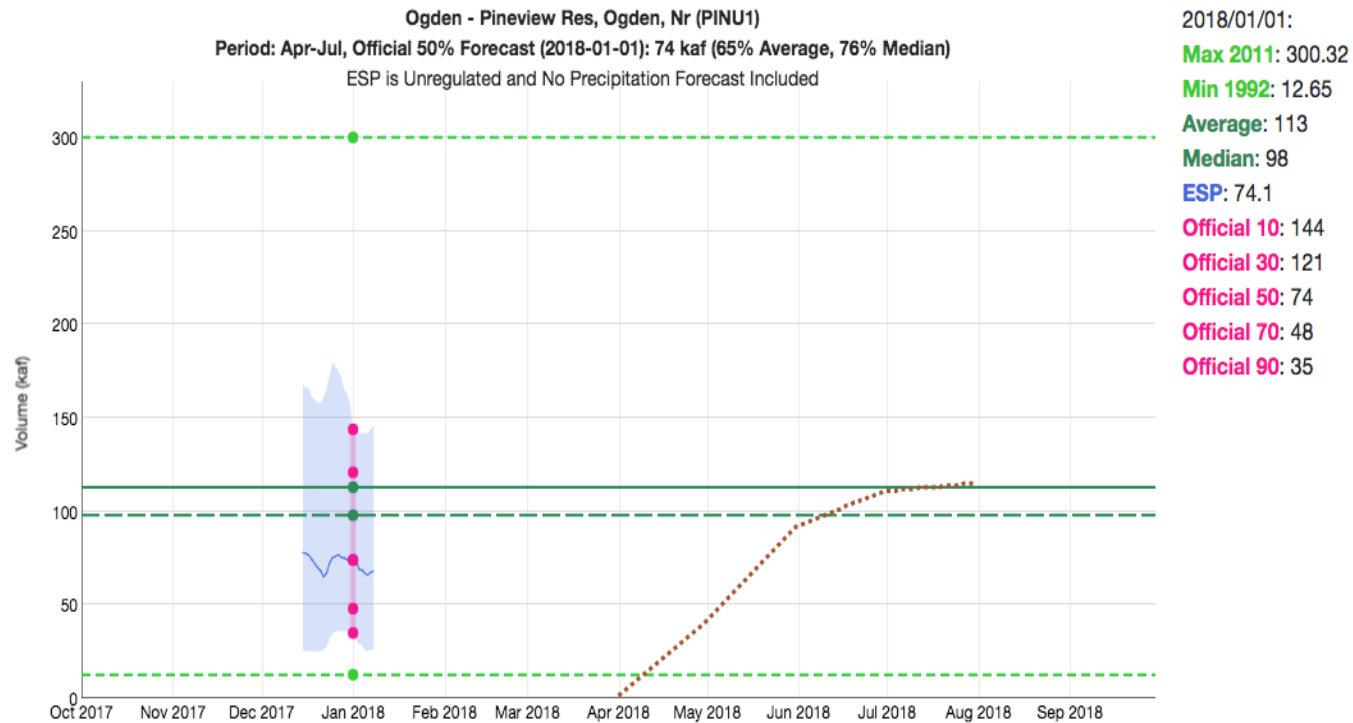
Water Supply Forecast



Forecast Evolution Plot

Pineview Reservoir Inflow 74 kaf / 66% avg

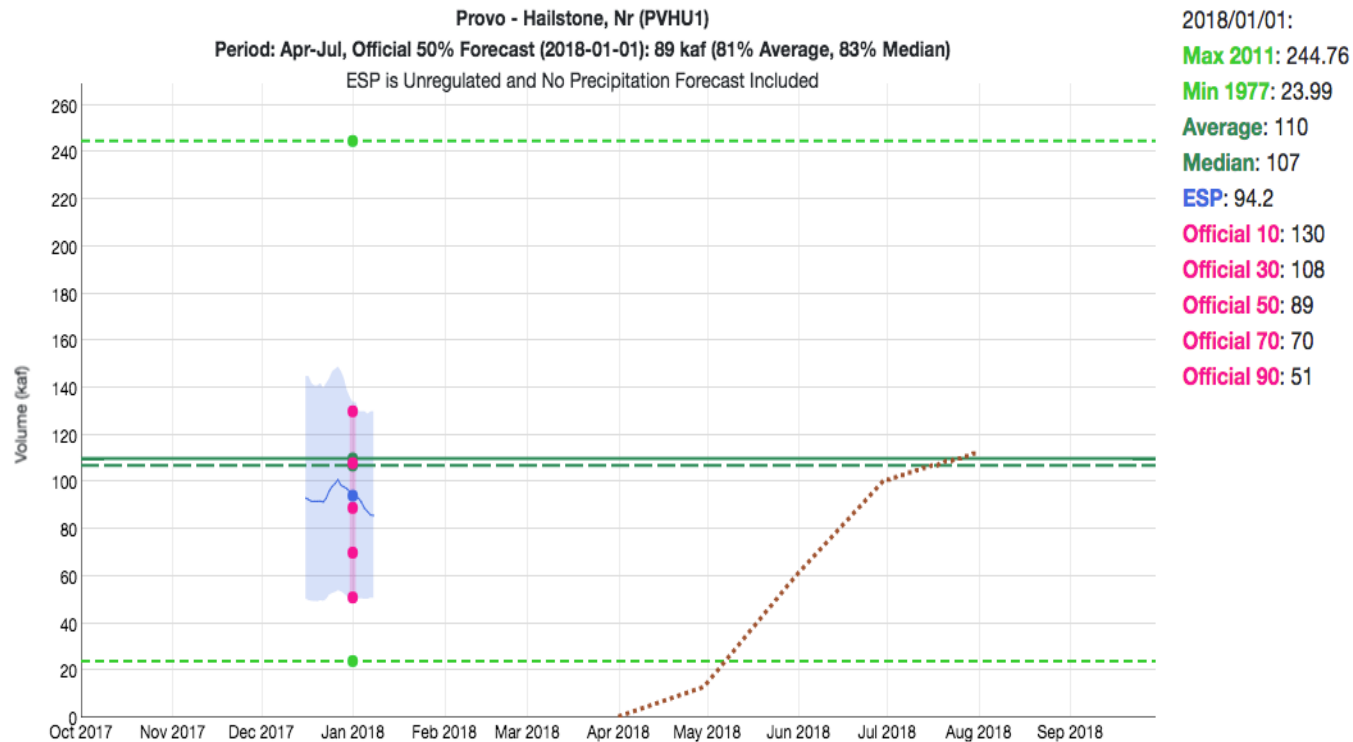
Water Supply Forecast



Forecast Evolution Plot

Provo Hailstone (Jordanelle) 81 kaf / 81 % avg

Water Supply Forecast

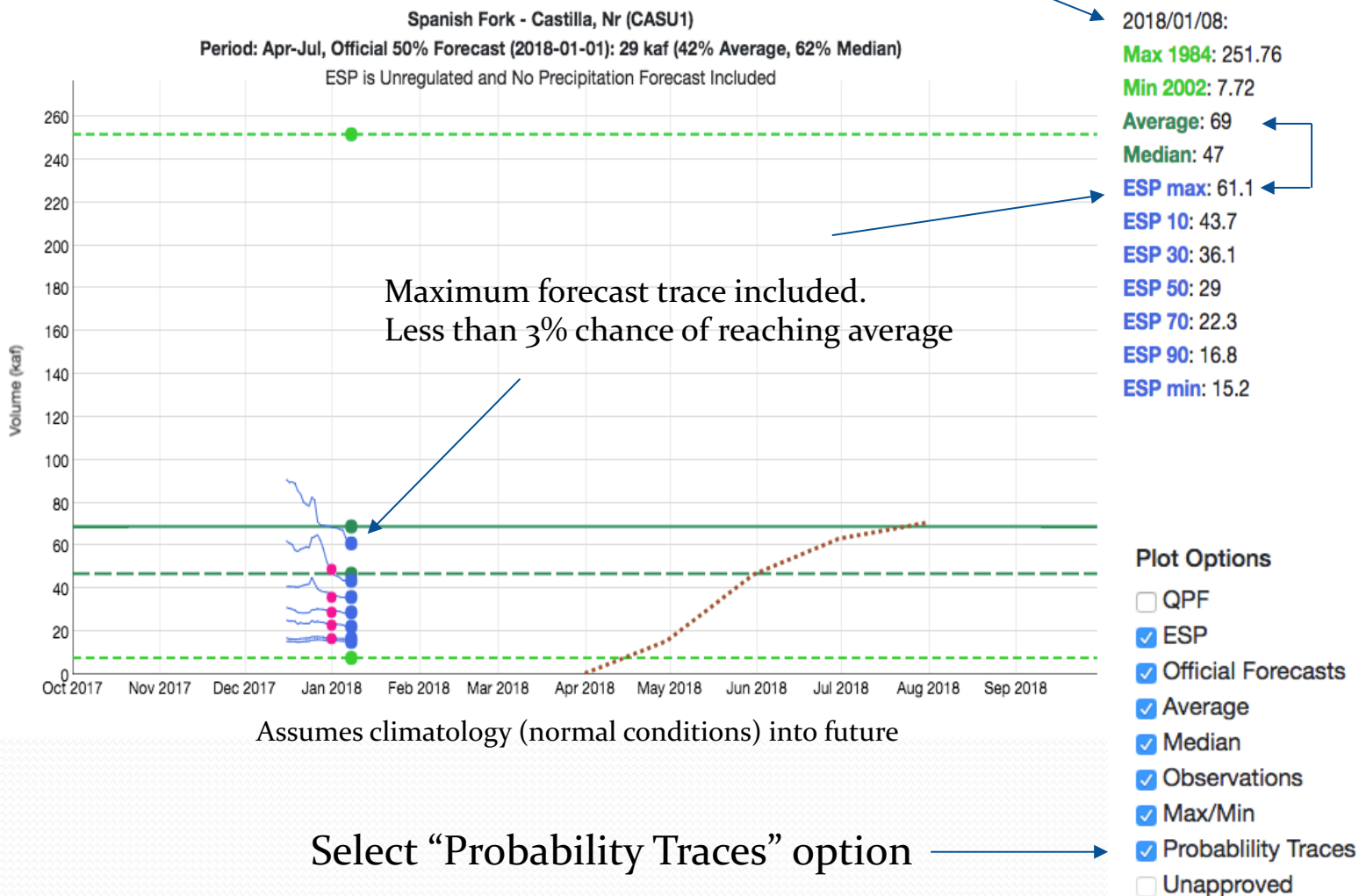


Forecast Evolution Plot

Spanish Fork - Castilla 29 kaf / 42 % avg

Water Supply Forecast

Today's model run



Forecast Validation: How good are forecasts in January ?

Historical Model Error 1981-2010

January has the highest model/forecast errors
significant snow accumulation period remains

Forecasts are better than just going with average

Error tends to decrease each month into the spring

Where We Do Better:

- Headwaters
- Primarily snow melt basins
- Known diversions / demands

Where We Do Worse:

- Lower elevations (rain or early melt)
- Downstream of diversions / irrigation
- Little is known about diversions / demands

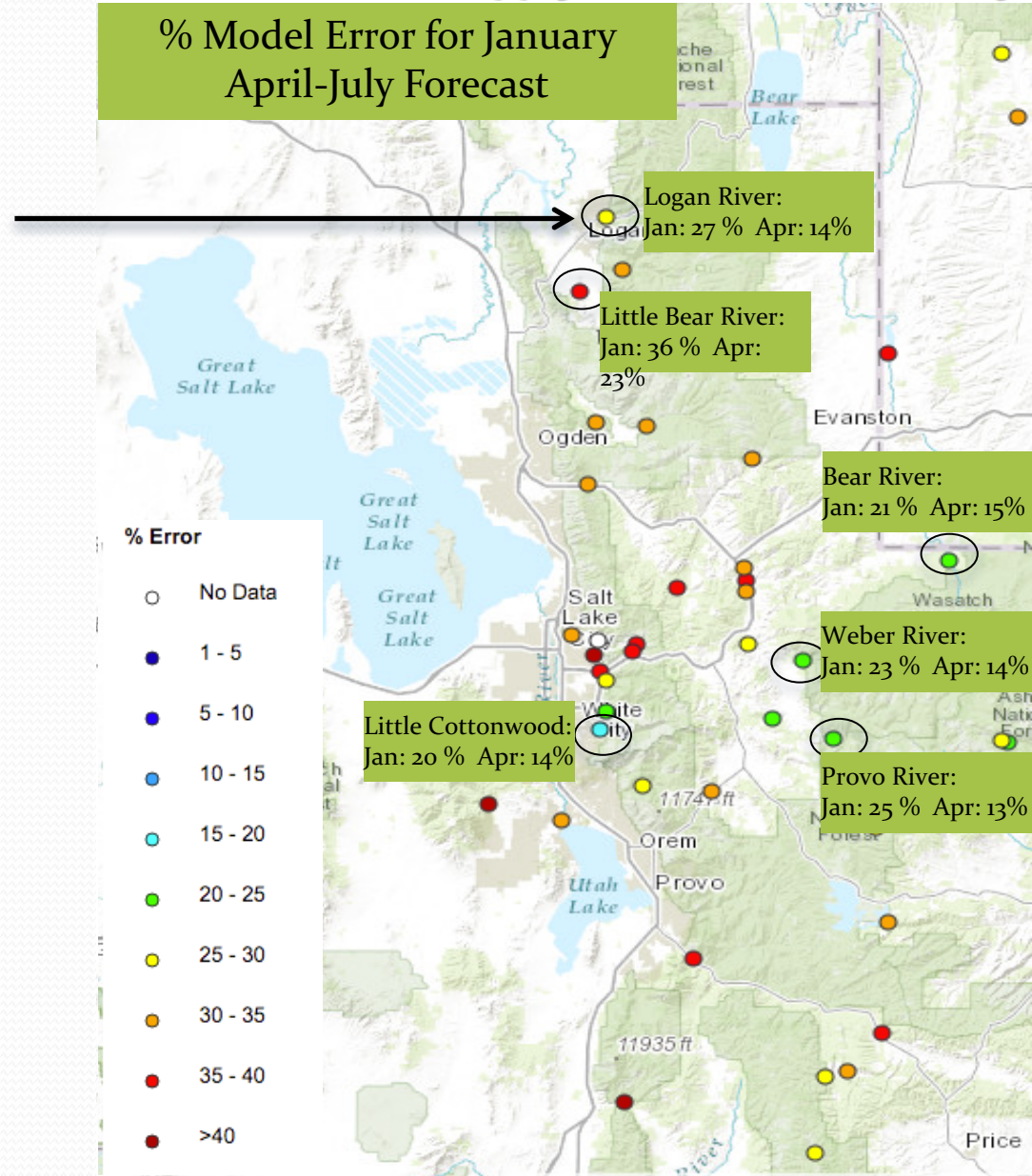
Map is available at:

<https://www.cbrfc.noaa.gov/arc/verif/verif.php>

From Water Supply drop down menu
→ select Historical Verification Map

Historical Water Supply Verification - January

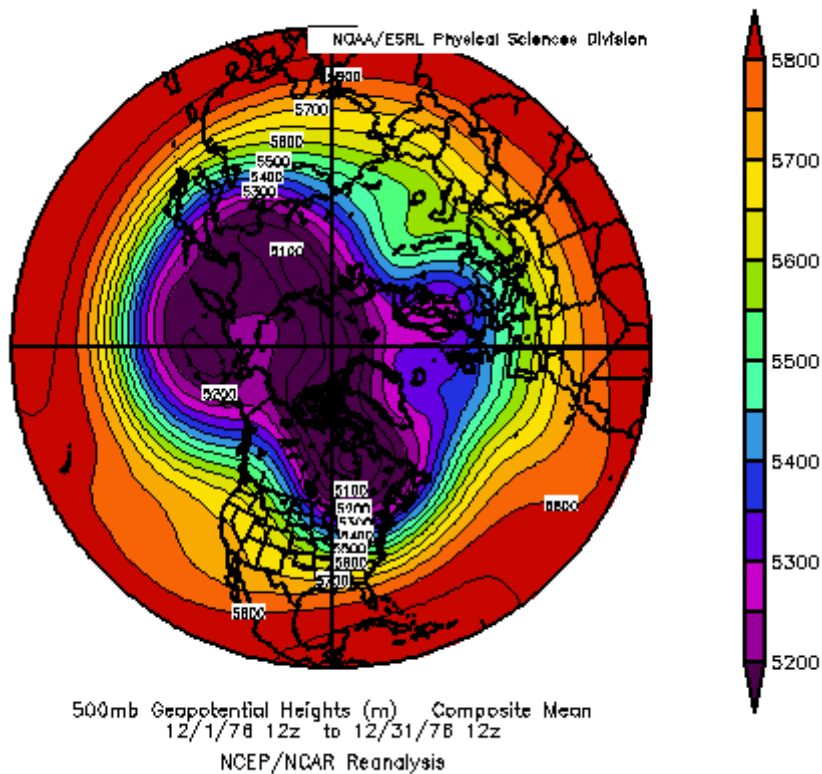
% Model Error for January April-July Forecast



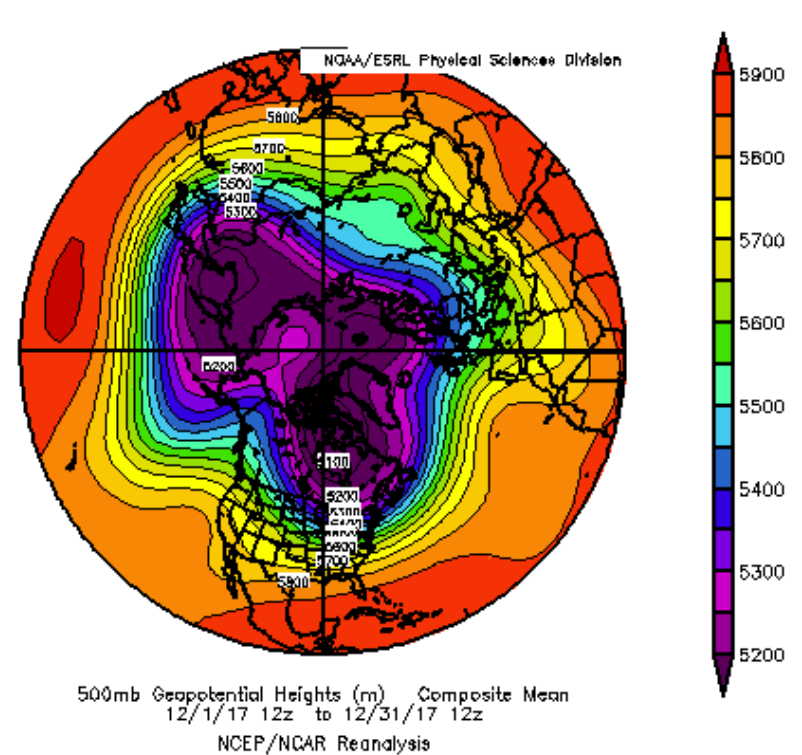
Fall Weather Impacts

Started the 2018 water year very dry most areas

Atmospheric Pattern
December 1976



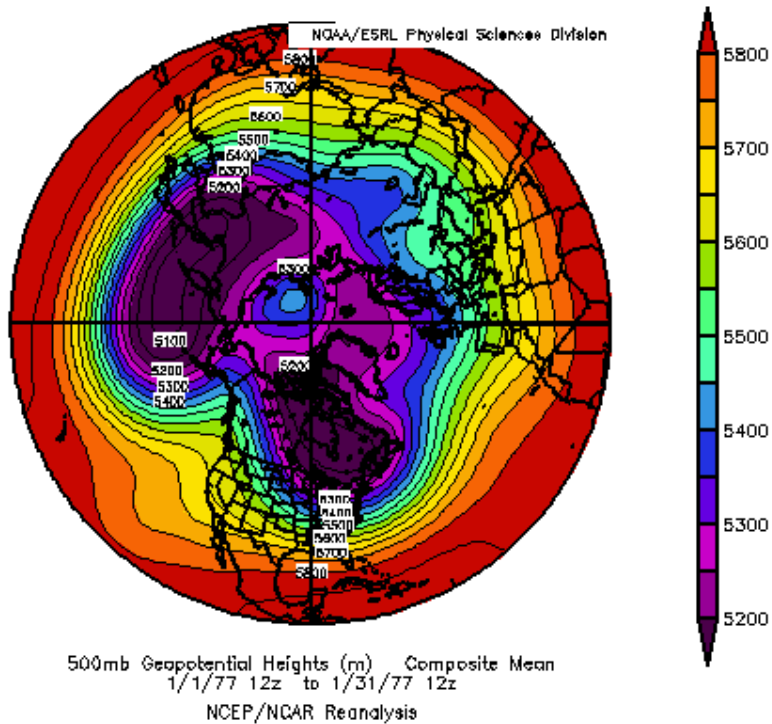
Atmospheric Pattern
December 2017



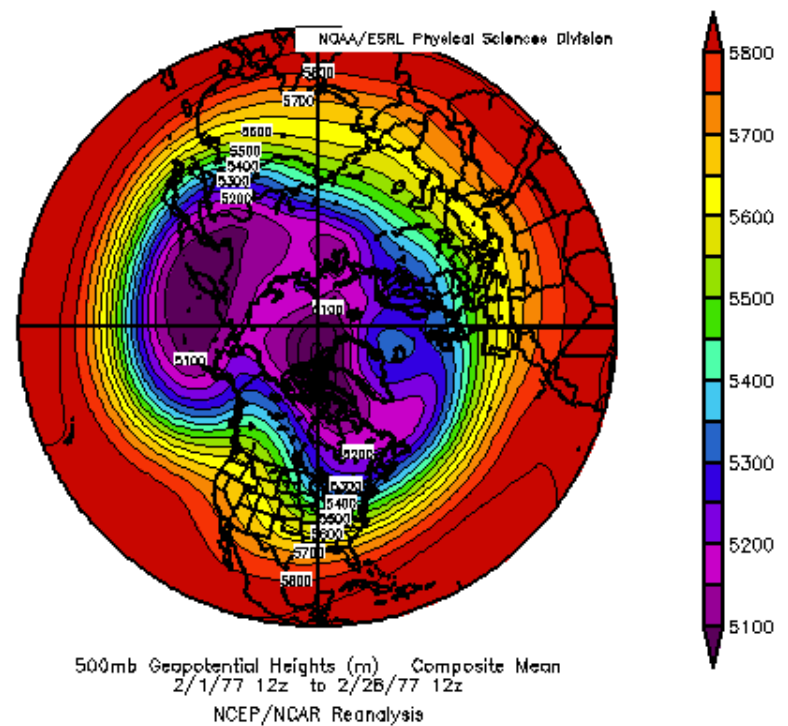
Future Weather

What happened that winter/spring?

Atmospheric Pattern
January 1977



Atmospheric Pattern
February 1977

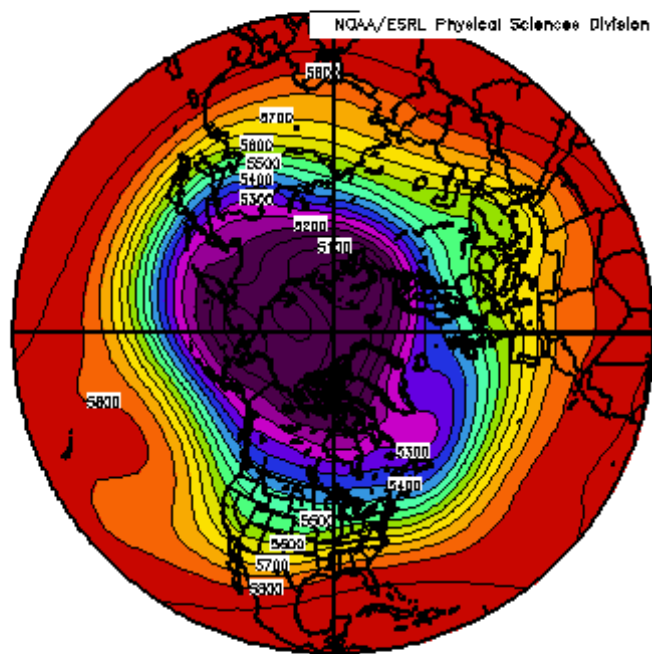


Future Weather

What happened that winter/spring?

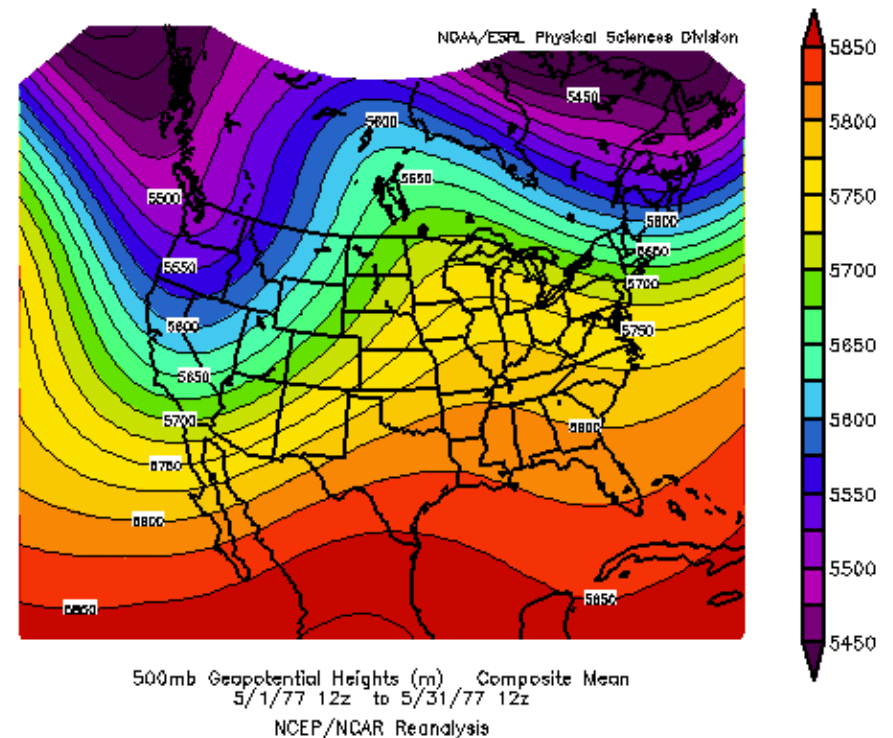
The Pattern Did Break !

Atmospheric Pattern
March 1977



500mb Geopotential Heights (m) Composite Mean
3/1/77 12z to 3/31/77 12z
NCEP/NCAR Reanalysis

Above average precipitation in March

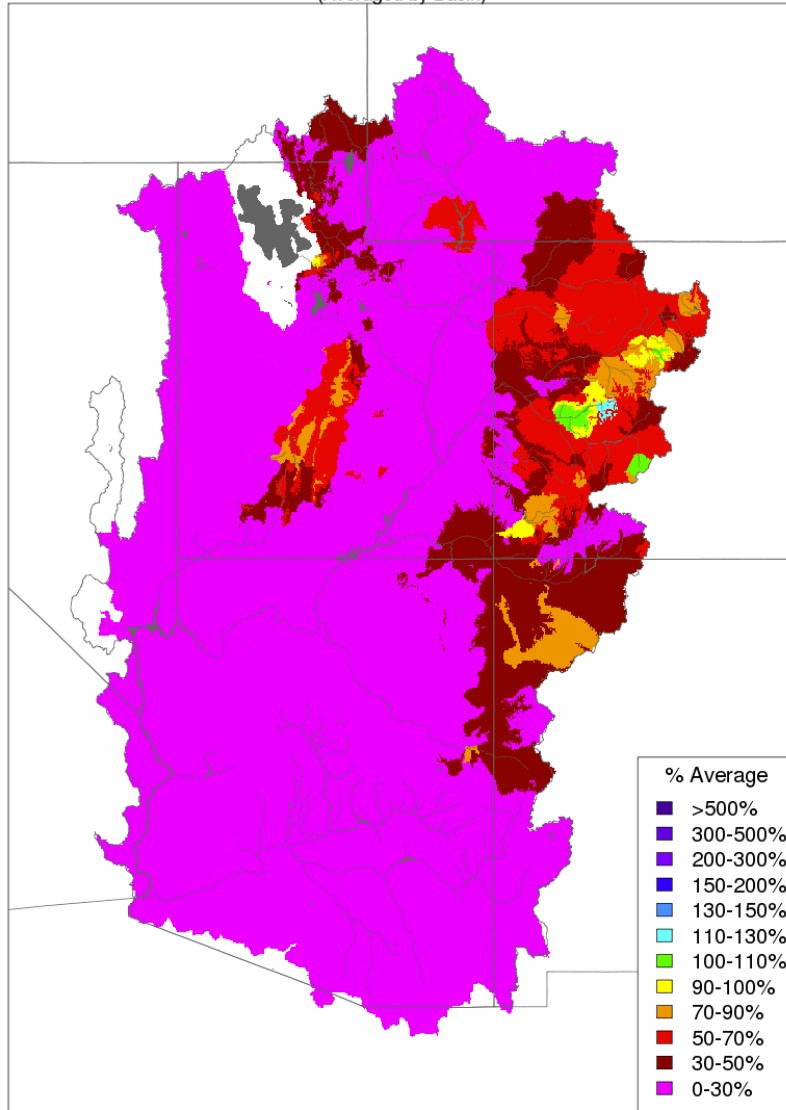


500mb Geopotential Heights (m) Composite Mean
5/1/77 12z to 5/31/77 12z
NCEP/NCAR Reanalysis

January Precipitation (first 7 days)

Month to Date Precipitation - January 07 2018

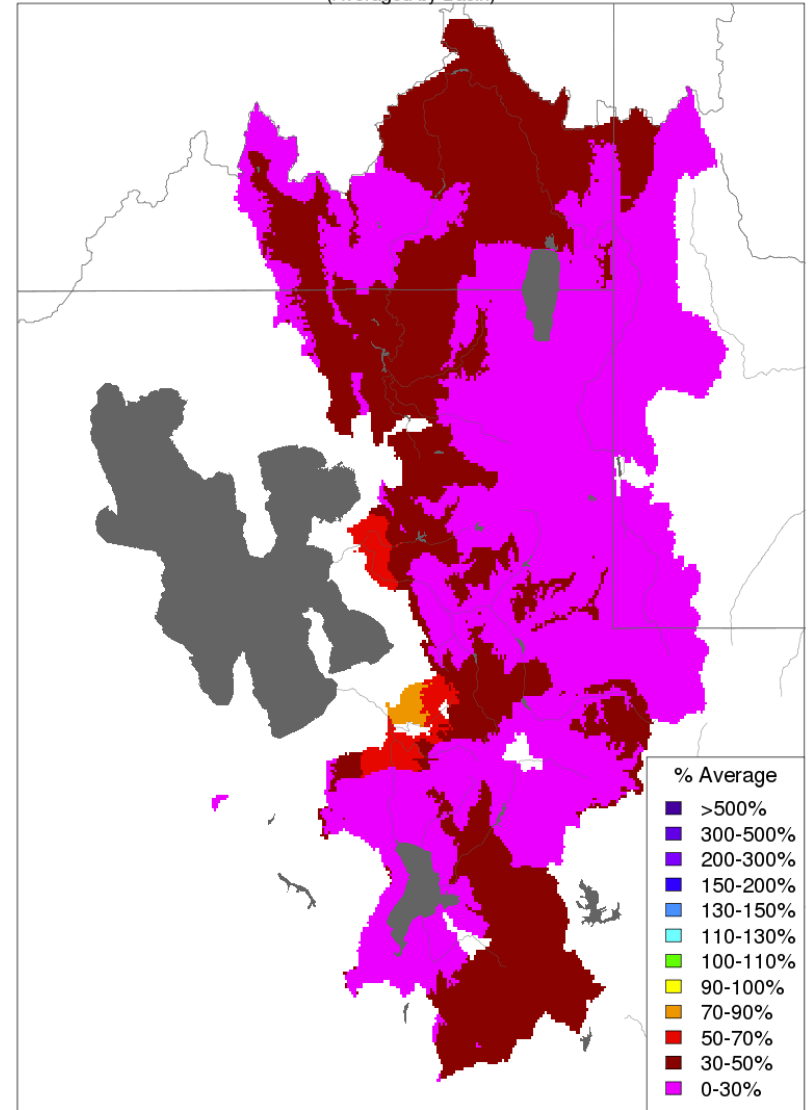
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

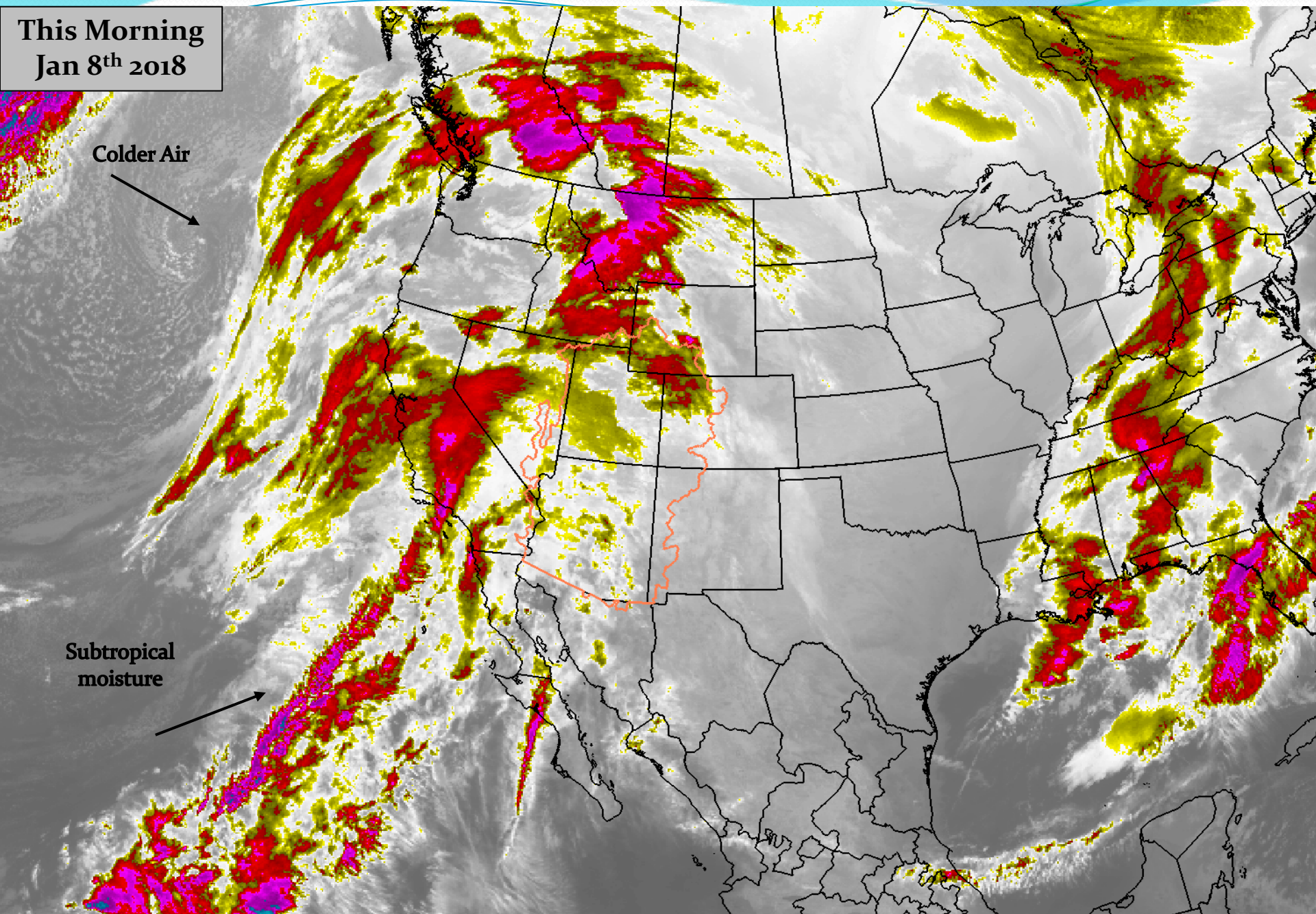
Month to Date Precipitation - January 08 2018

(Averaged by Basin)



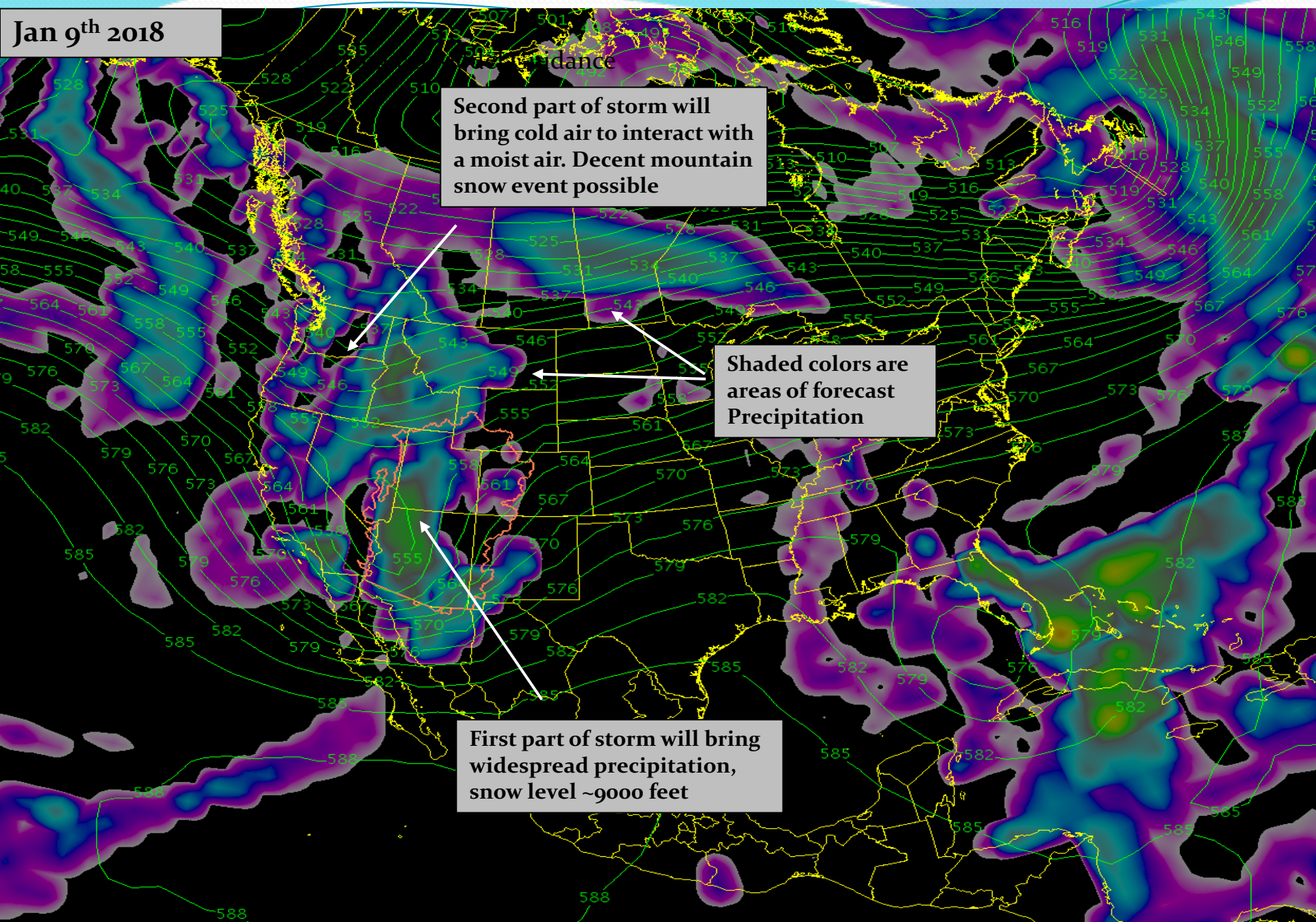
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

Upcoming Weather and Impacts to Water Supply Forecasts



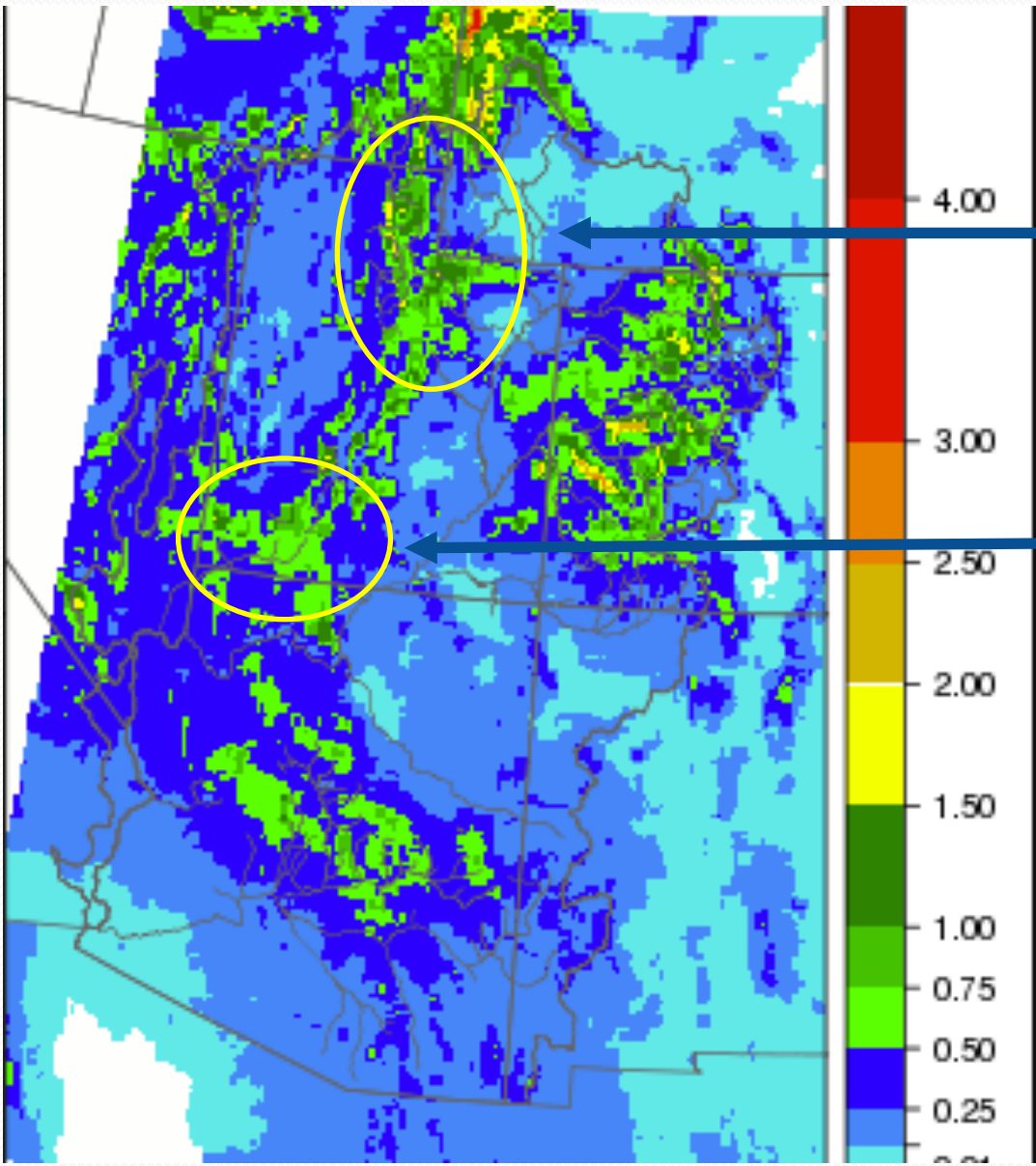
Upcoming Weather and Impacts to Water Supply Forecasts

Jan 9th 2018



Upcoming Weather and Impacts to Water Supply Forecasts

Precipitation the next 72 hours



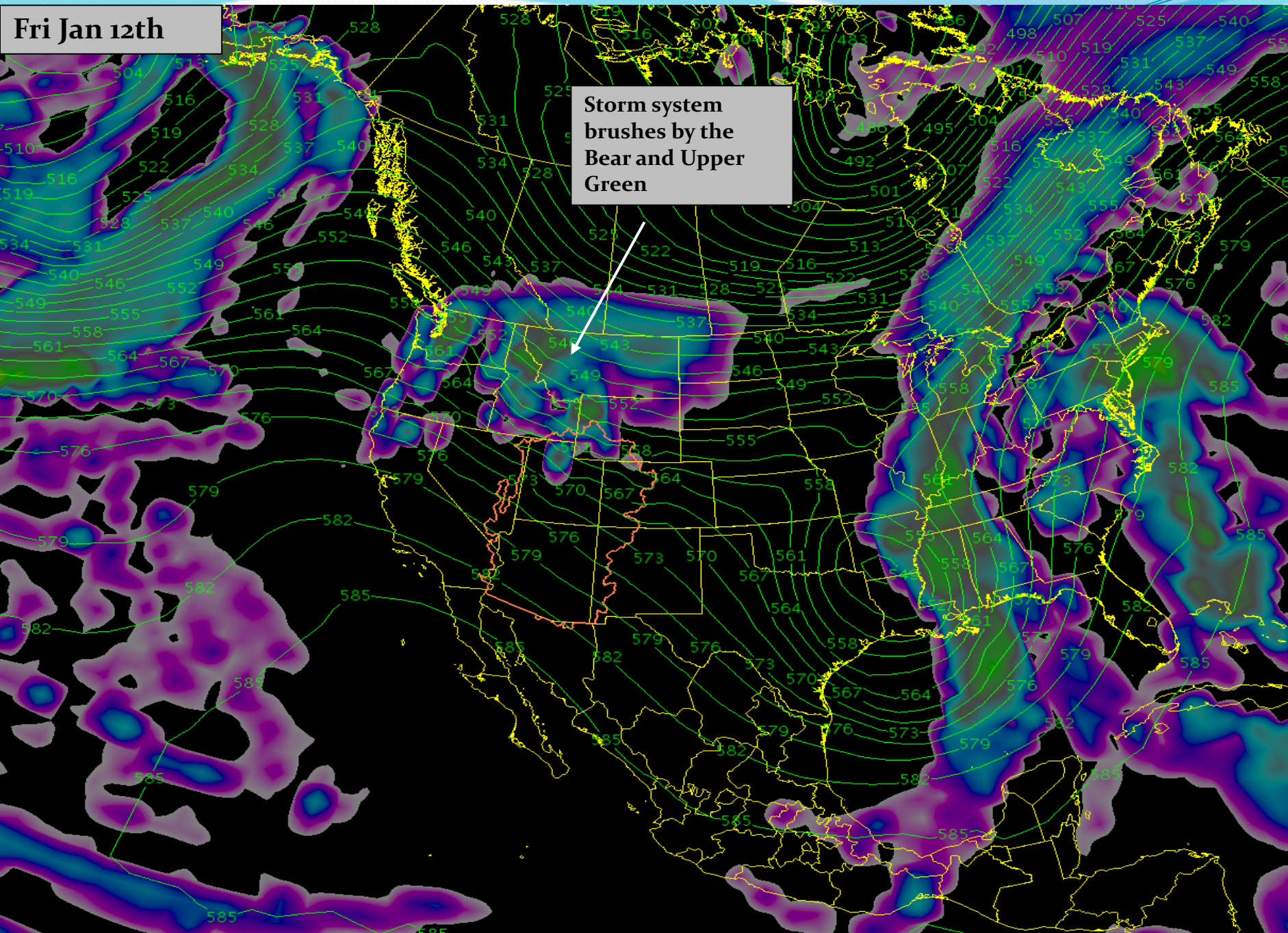
Around .75-1.5 inches
favored mountain
locations northern Utah

Around .25 to .75 inches
southern Utah mountains

Upcoming Weather and Impacts to Water Supply Forecasts

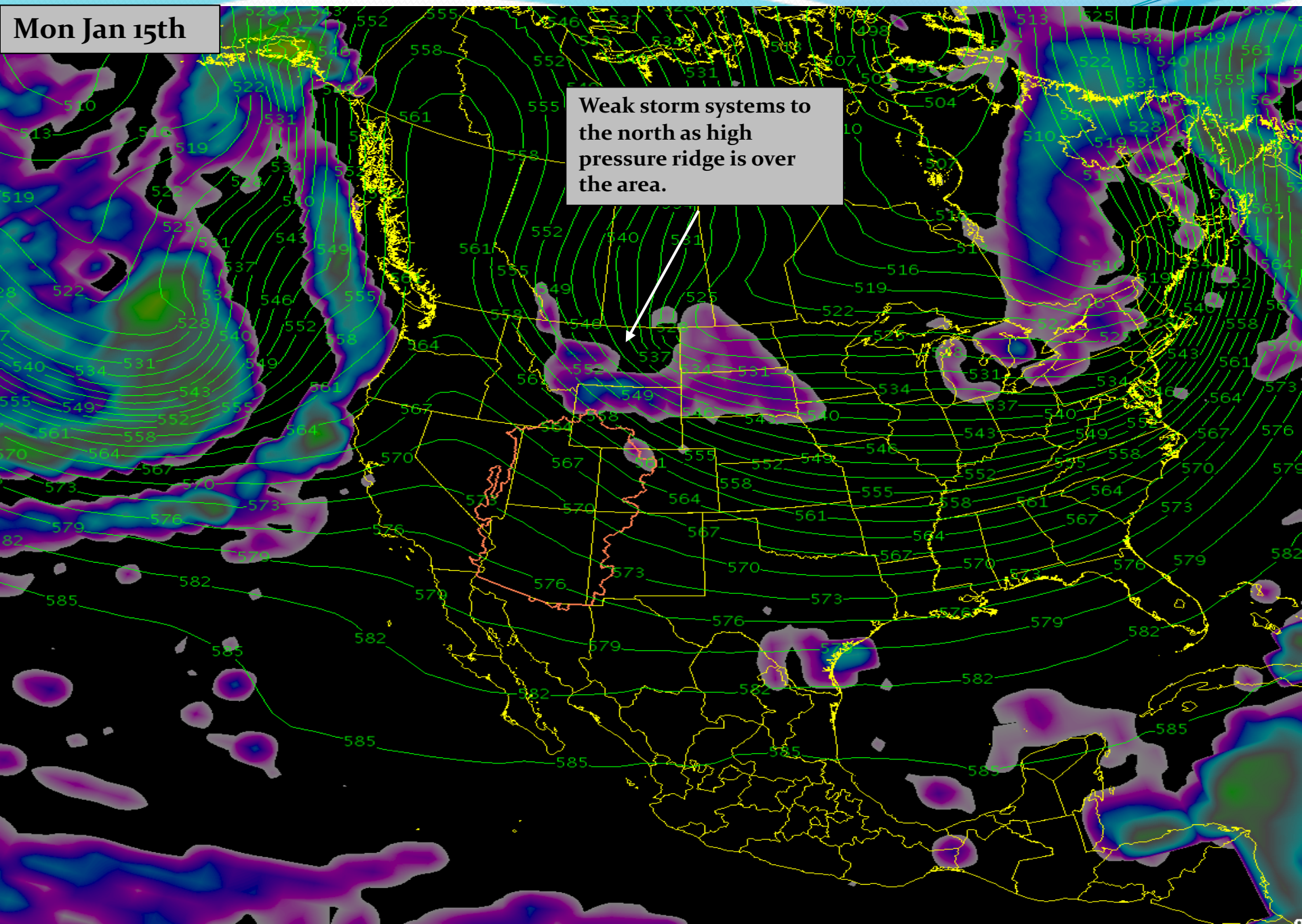
Fri Jan 12th

Storm system
brushes by the
Bear and Upper
Green



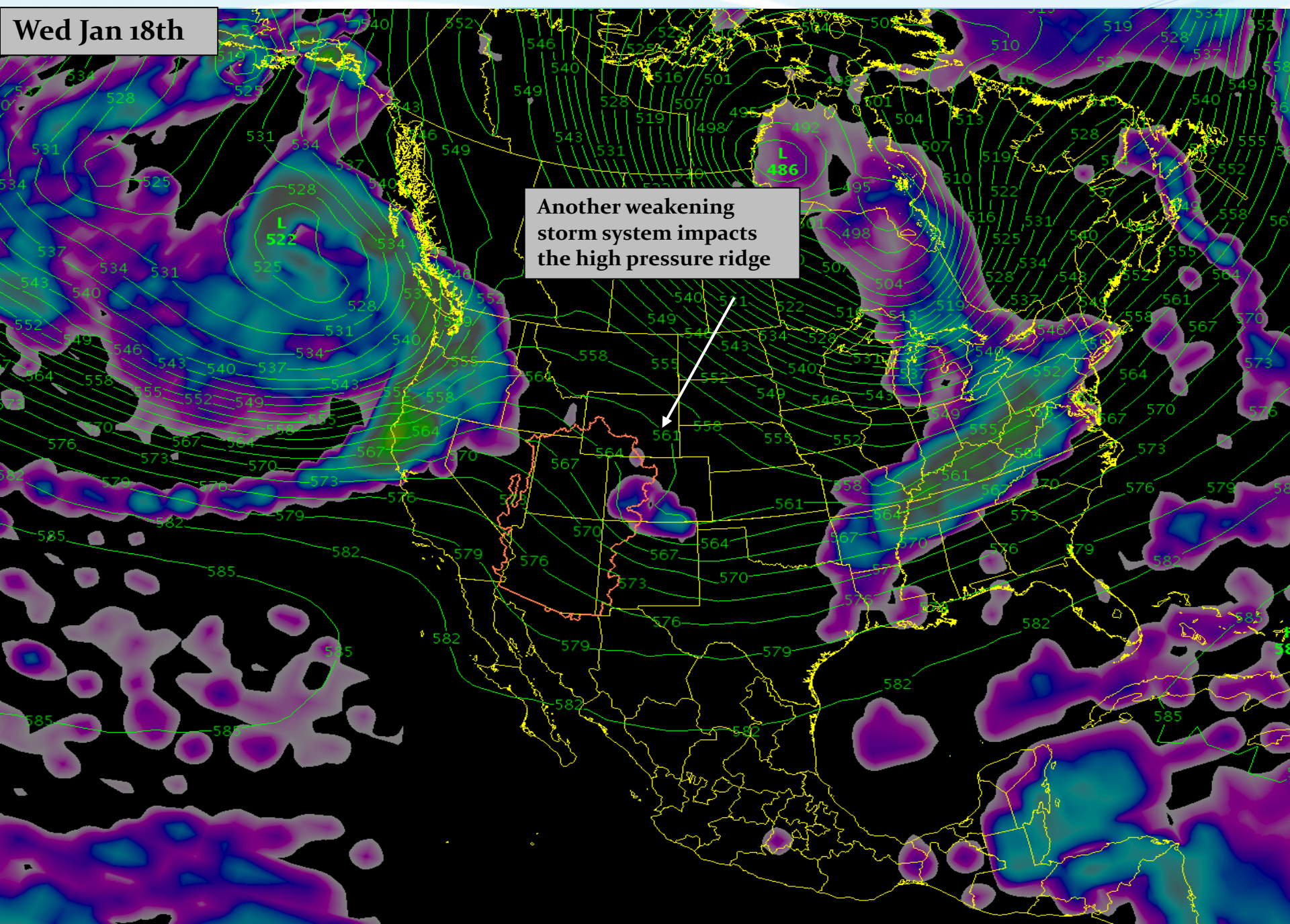
Upcoming Weather and Impacts to Water Supply Forecasts

Mon Jan 15th



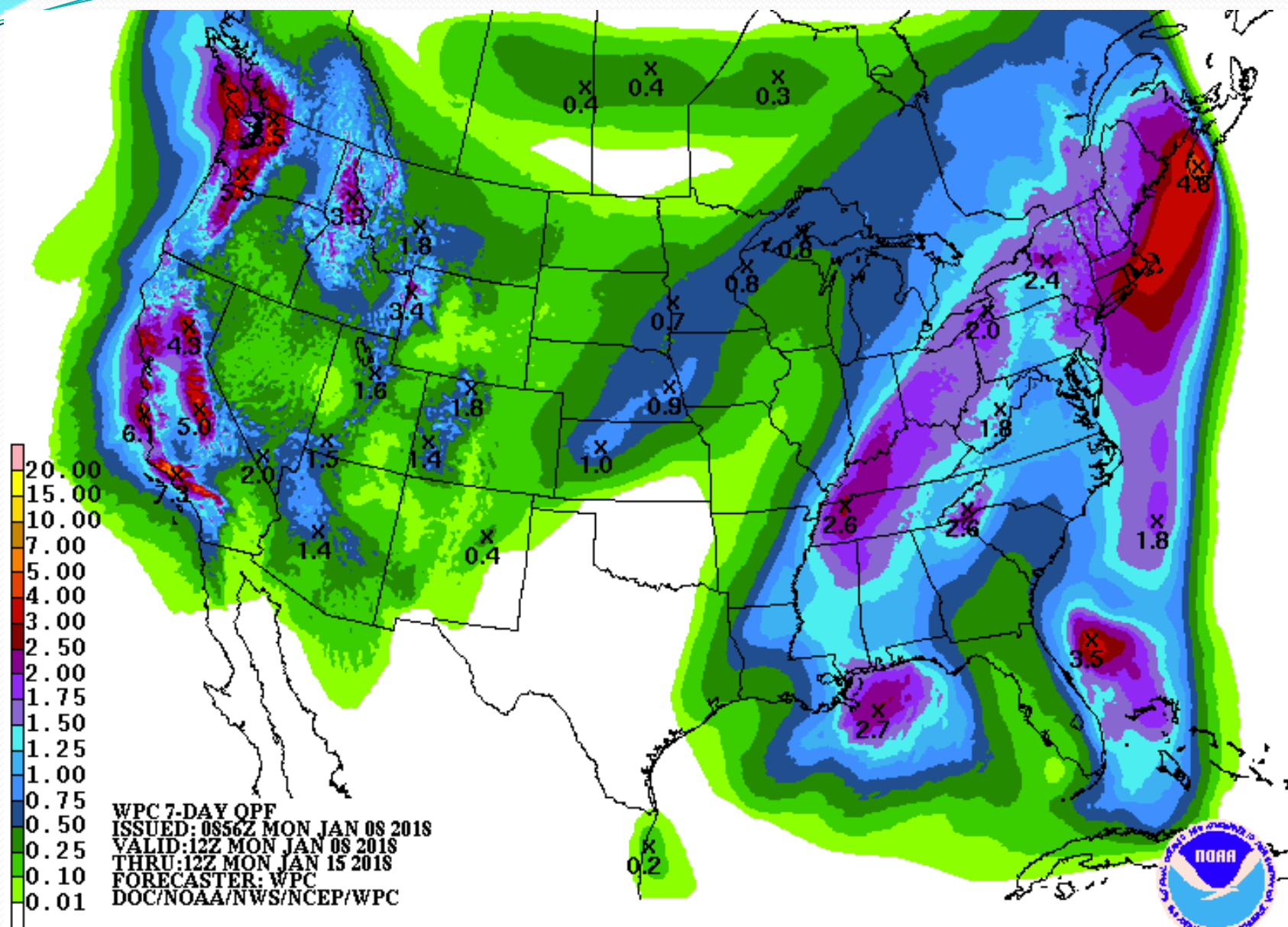
Upcoming Weather and Impacts to Water Supply Forecasts

Wed Jan 18th



Upcoming Weather and Impacts to Water Supply Forecasts

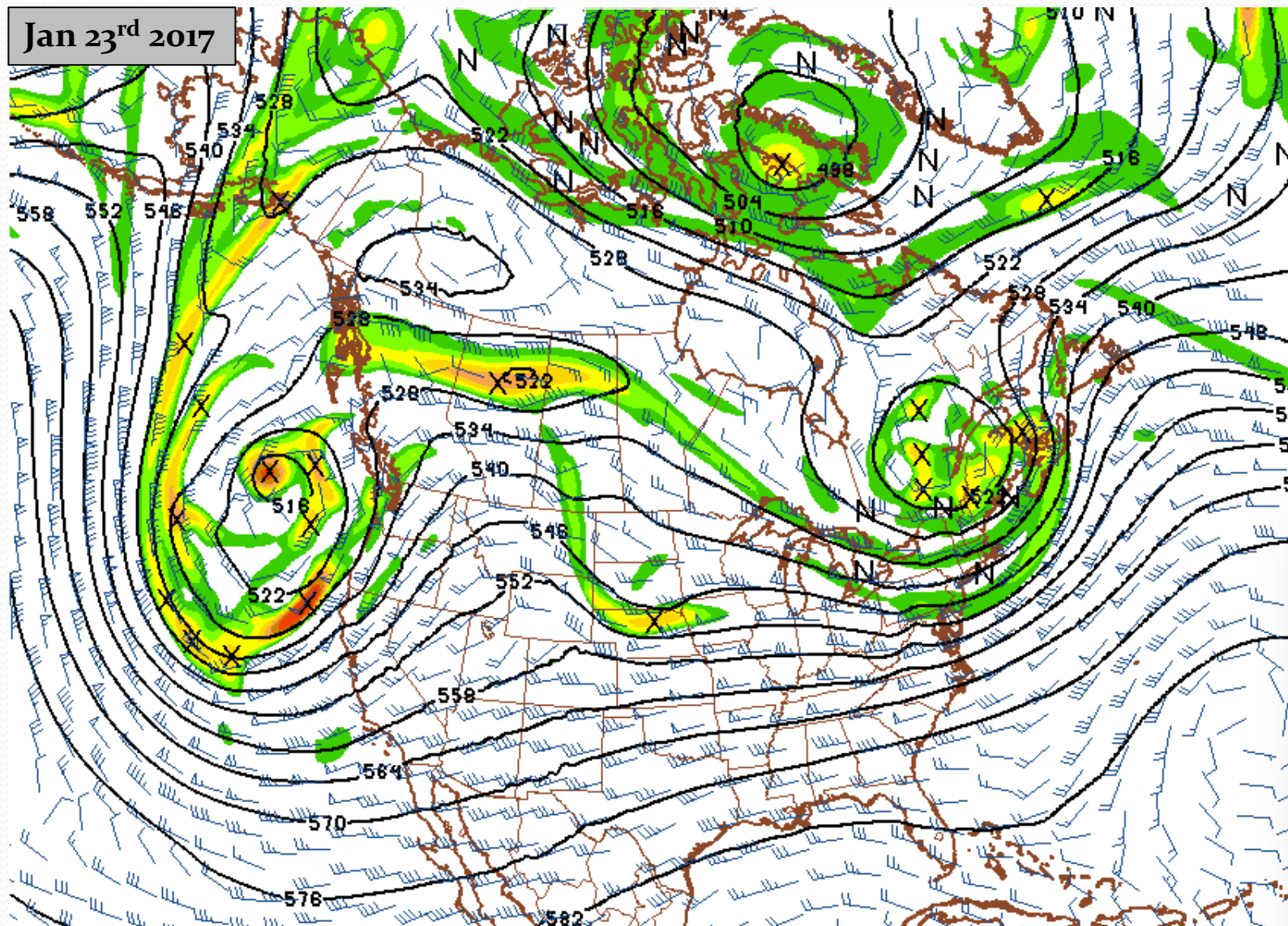
NWS Weather Prediction Center: Precipitation Forecast Jan 8 – Jan 15



Upcoming Weather and Impacts to Water Supply Forecasts

Meteorological Model : Long Range

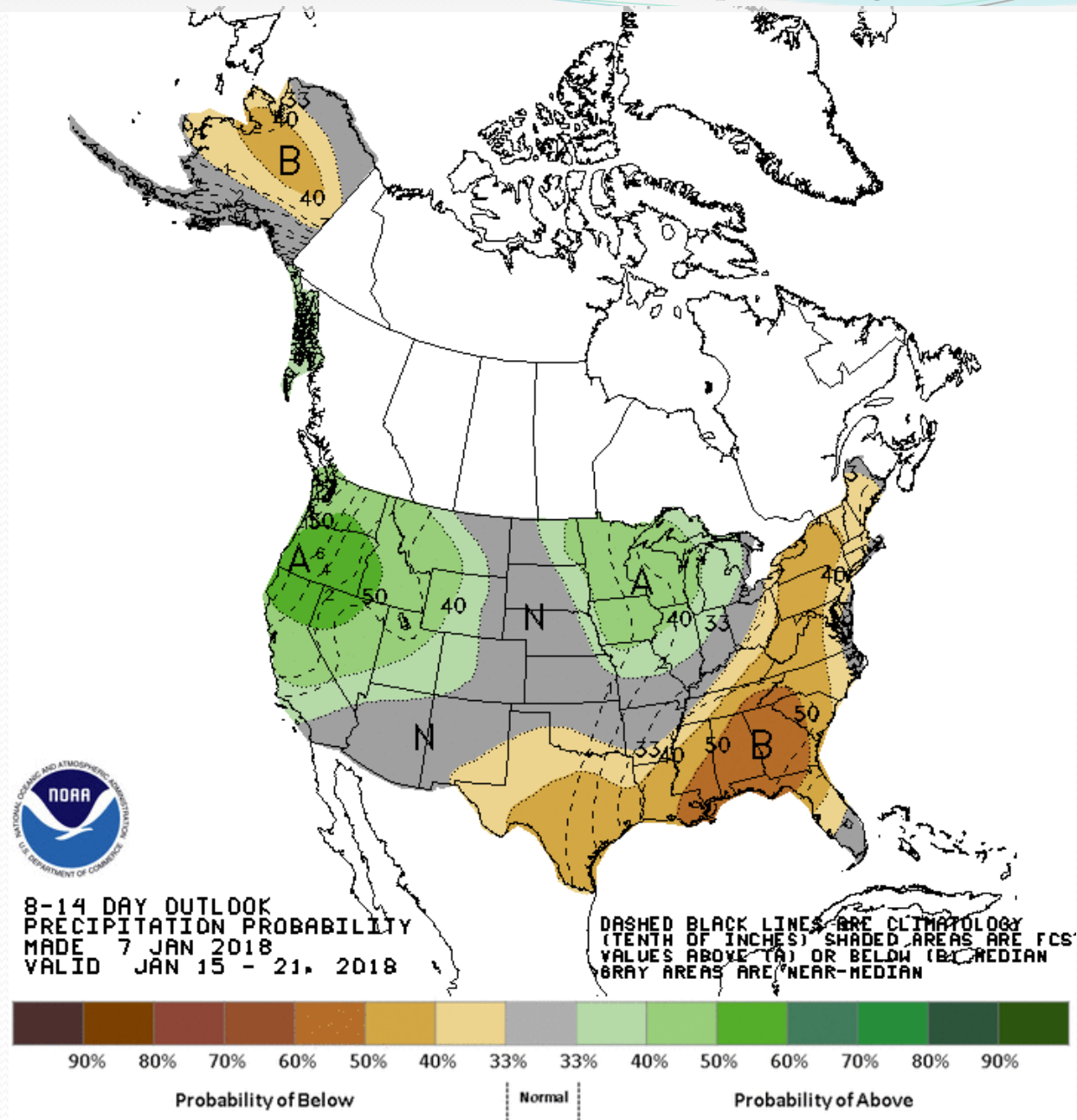
Jan 23rd 2017



Mean high pressure ridge remains dominant feature
storm impact likely on the weak side / favors north

Upcoming Weather and Impacts to Water Supply Forecasts

NWS Climate Prediction Center: Precipitation probability Jan 15 – Jan 21



Key Points

Very dry pattern through the fall and early winter.

Several areas with record low snow. Somewhat better conditions farther north (Bear River Basin).

Soil moisture conditions favorable in the Bear River Basin and higher elevations of the Weber and Provo Basins.

Initial water supply forecasts are much below average most areas except the Bear River Basin. Storm system this week should impact water supply guidance favorably in the short term. If dry conditions prevail the last 2 weeks of January guidance may end up similar to Jan 1st forecasts

There is still a large range of forecast probabilities. There is ample time to benefit from a wetter weather scenario. We've experienced extreme scenarios recently.

Long term our model uses average conditions (Climatology). A wet month in the future would result in some rebound in water supply forecasts.

2018 water supply briefing schedule

- 2018 monthly water supply briefings for the Great Basin
 - Wednesday Feb 7th @ 1:30 pm MT
 - Wednesday Mar 7th @ 1:30 pm MT
 - Thursday Apr 5th @ 1:30 pm MT
 - Monday May 7th @ 1:30 pm MT
 - Colorado River Basin webinars are same dates at 11 am MT
- Peak flow briefing early March. Additional briefings scheduled as needed.
- Date/Times are subject to change. All registration information has been posted to the CBRFC web page.

CBRFC Water Supply Contacts

Please contact us with any questions

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Paul Miller– Service Coordination Hydrologist

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Basin Focal Points (Forecasters)

Greg Smith – San Juan, Gunnison, Dolores Focal Point

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Ashley Nielson – Green River Basin, Lake Powell Focal Point

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Cody Moser – Upper Colorado Mainstem Focal Point

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Tracy Cox and Zach Finch – Lower Colorado Basin, Virgin Focal Point

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zach.finch@noaa.gov

Brent Bernard – Six Creeks, Provo , Sevier Focal Point

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Patrick Kormos – Bear, Weber Focal Point

patrick.kormos@noaa.gov