

# NOAA's Colorado Basin River Forecast Center

## Calibration Extension and 2017 Outlook

Brenda Alcorn  
*Senior Hydrologist*

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# CALIBRATION EXTENSION AND FUTURE PLANS



# 2016 Calibration Update

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- Add 5 years to calibration record (2011-2015)
  - ESP will use 35 traces instead of 30
  - NOT updating official averages (still 1981-2010)
  - Upper Colorado River Basin will be ready for WY2017 water supply season (hopefully December 1, 2016)
    - Lower Colorado and Great Basin to follow
- Identify precipitation/temperature gage issues
  - Double mass analysis
  - Corrections applied if necessary
- Make note of poor model performance in the 2011-2015 period
  - Not updating model parameters now unless absolutely necessary
    - to be addressed in 2017



# 2017 Re-Calibration Plans

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- Consider adding additional forecast points
  - North Fork Gunnison above Mouth, near Lazear
- Add diversions where real-time data has become available
  - replace ‘unmeasured diversions’
  - Upper Green, Duchesne
- SNOW-17 and SAC-SMA improvements:
  - use GIS to help determine parameters more consistently
  - investigate/resolve evaporation issues
- Plan for a transition from lumped to gridded hydrology:
  - Calculate 30 years of 3 hourly temperature and precipitation on 800m grid
    - calculate MAT/MAP directly from these grids (for Upper Basin)
      - Investigate using similar method for Lower Basin
  - This would ensure consistent forcings for lumped and gridded techniques





# 2016 Calibration Results

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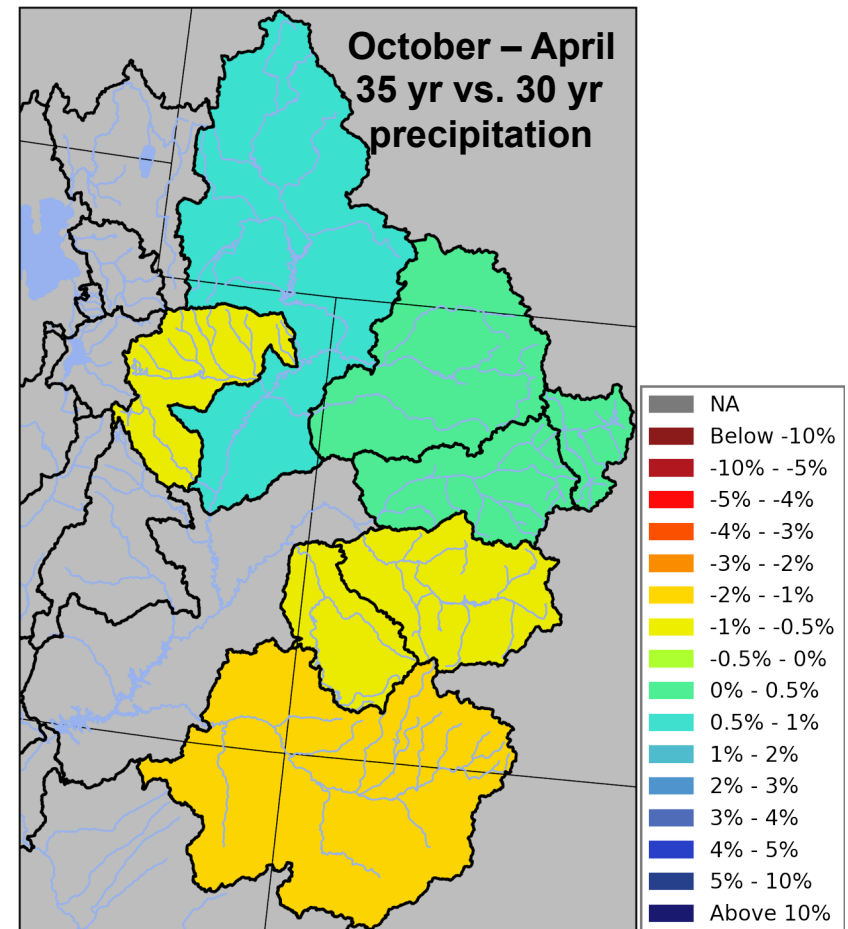
- Analysis of 30 year vs. 35 year record so far:
  - **Observed Precipitation**
    - San Juan, Gunnison, Dolores, Duchesne
      - Drier October – April (especially January – April)
      - Little change May – September overall
        - » variable month to month
    - Upper Green, Yampa, Upper Colorado mainstem
      - Little difference between 30 and 35 year averages
  - **Observed April-July Unregulated Flow**
    - Similar to winter precipitation results



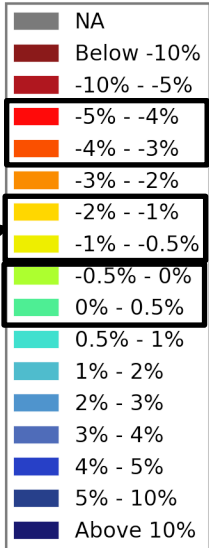
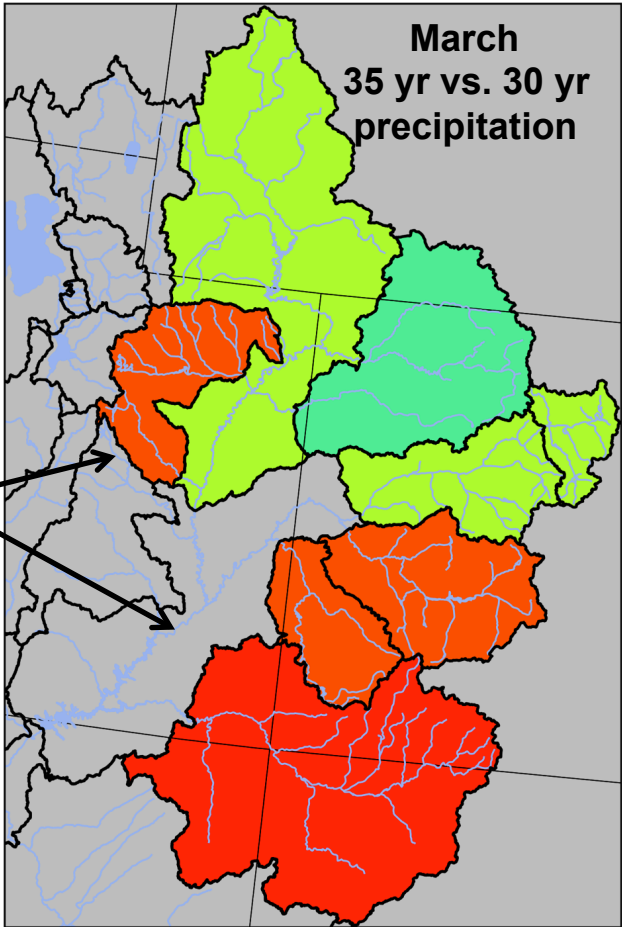
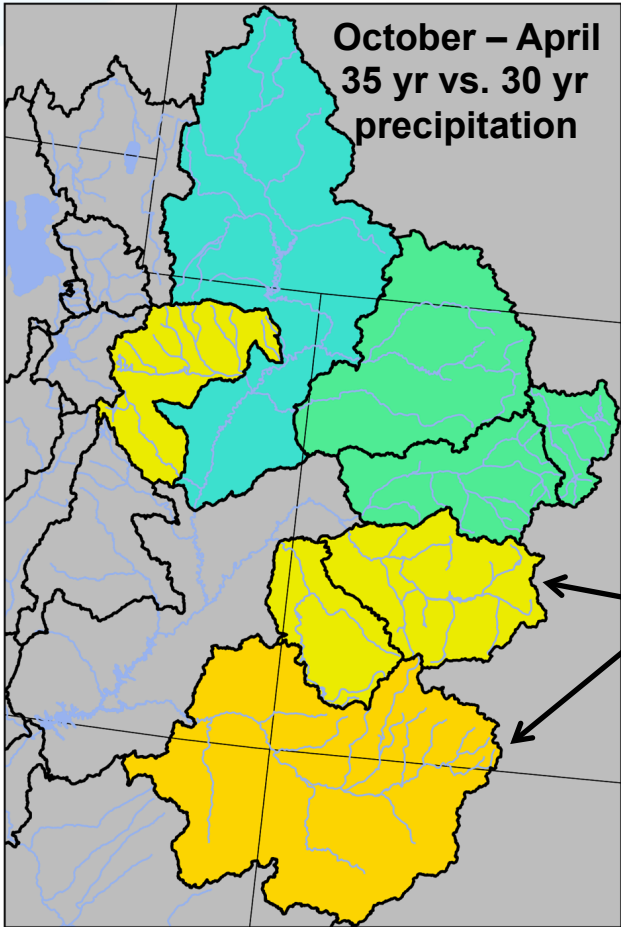
# 1981-2015 Precipitation

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- Simple ratio of 35 year average to 30 year average
  - $> 0$  = 35 year wetter than 30 year
  - $< 0$  = 35 year drier than 30 year
- Used groups of SNOTEL sites within each basin
  - no station weighting
  - had to have 35 years of record
  - Gunnison and Dolores treated as one area
  - Colorado mainstem treated as one area

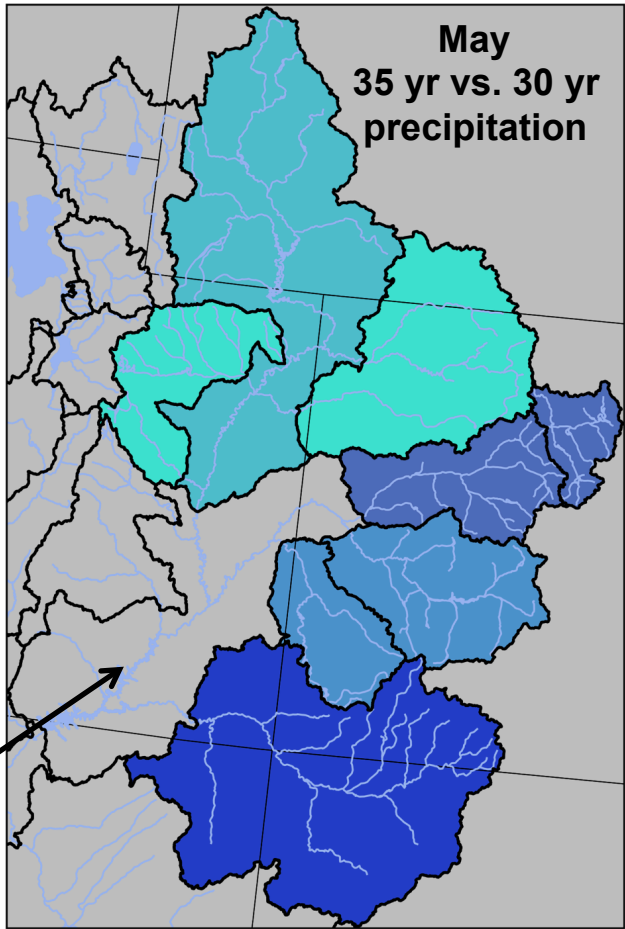
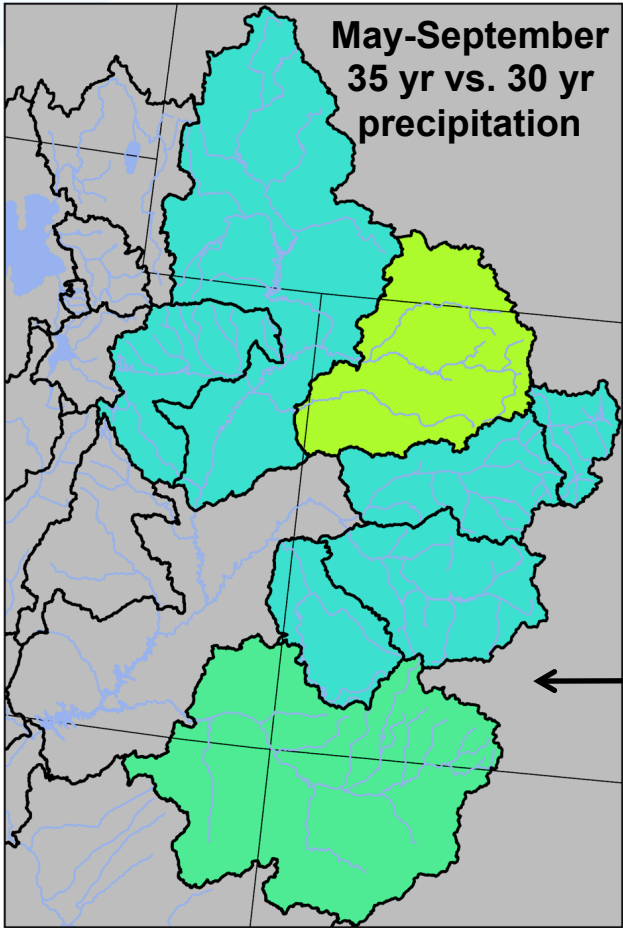


# 1981-2015 Precipitation





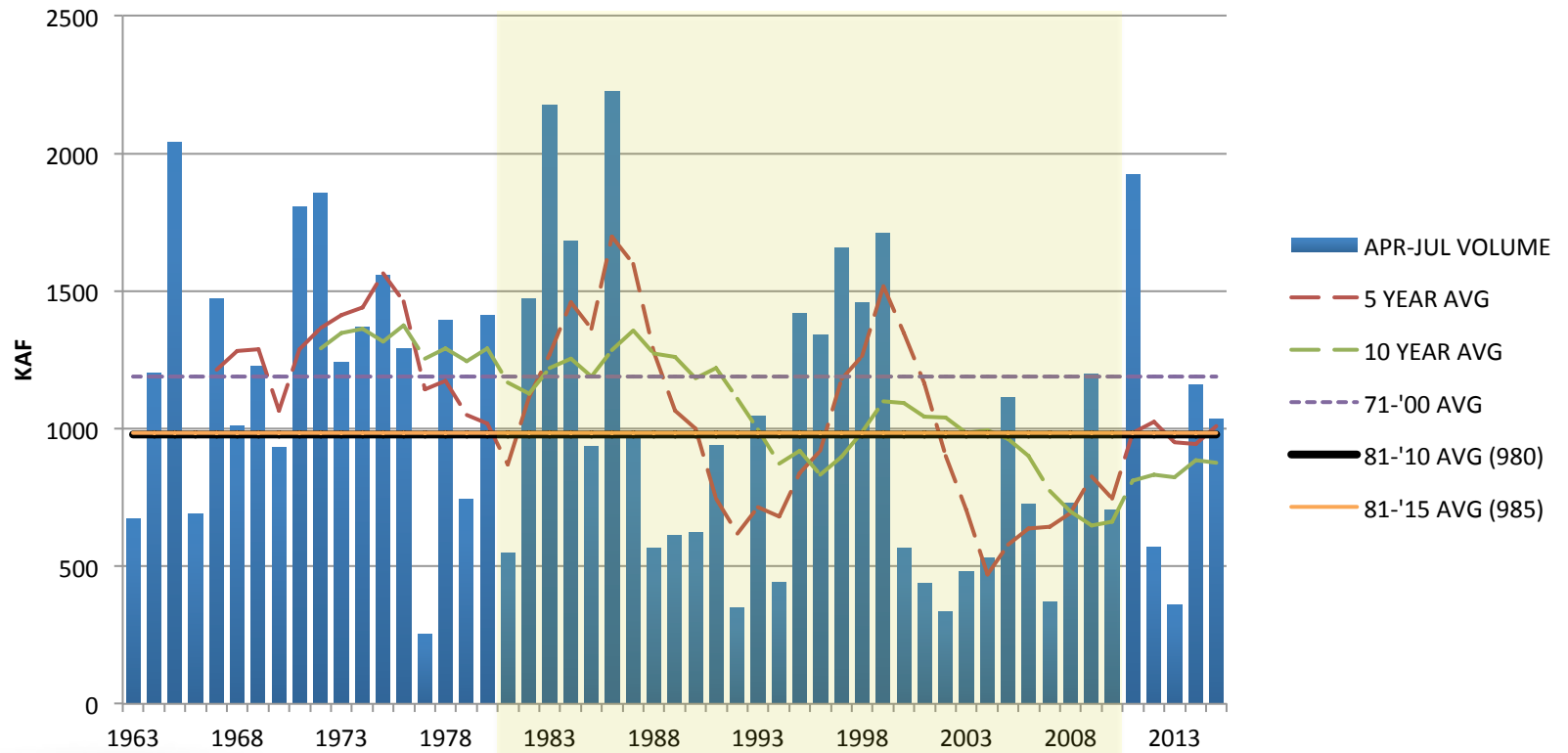
# 1981-2015 Precipitation





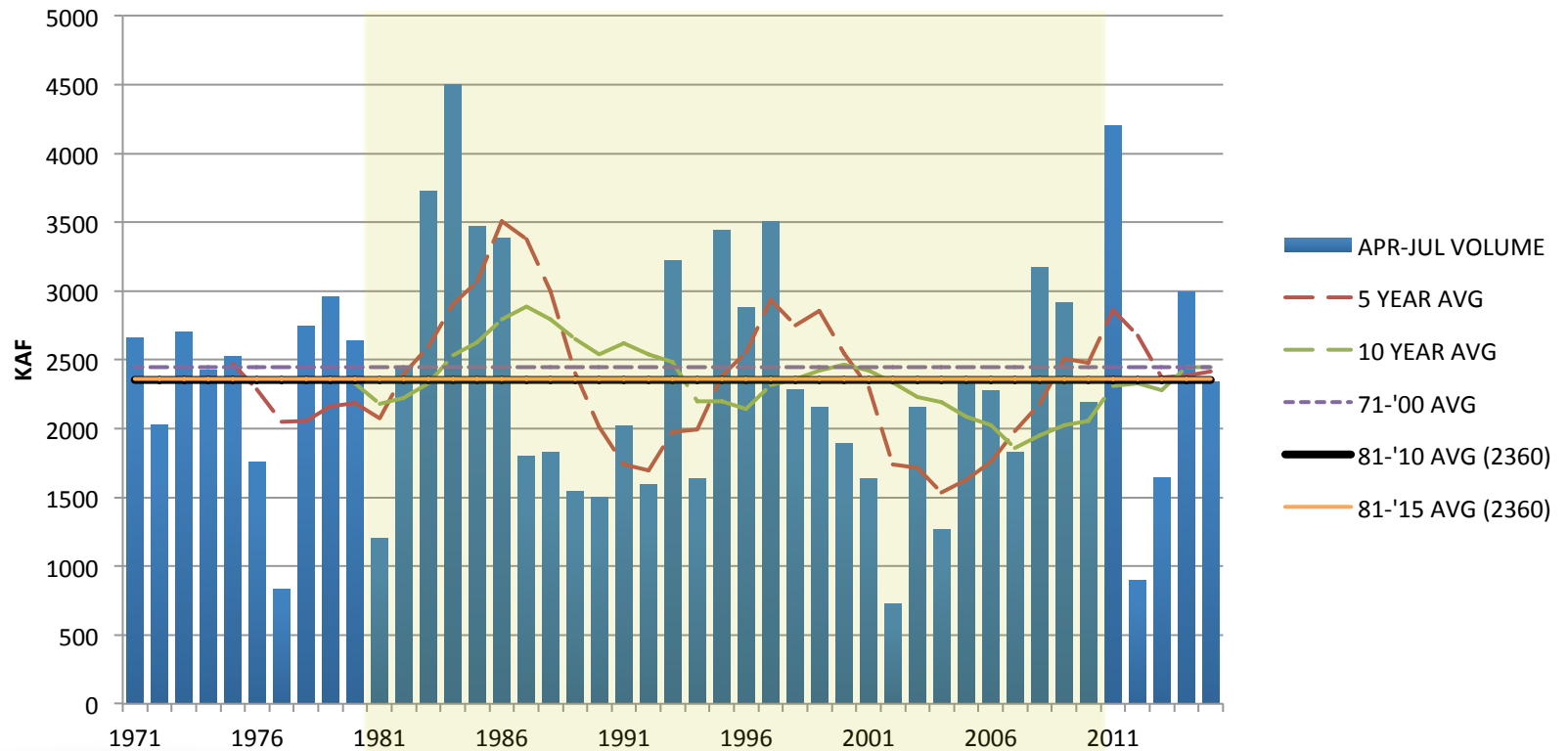
# 1981-2015 Unregulated Flow

## FLAMING GORGE APR-JUL UNREG INFLOW



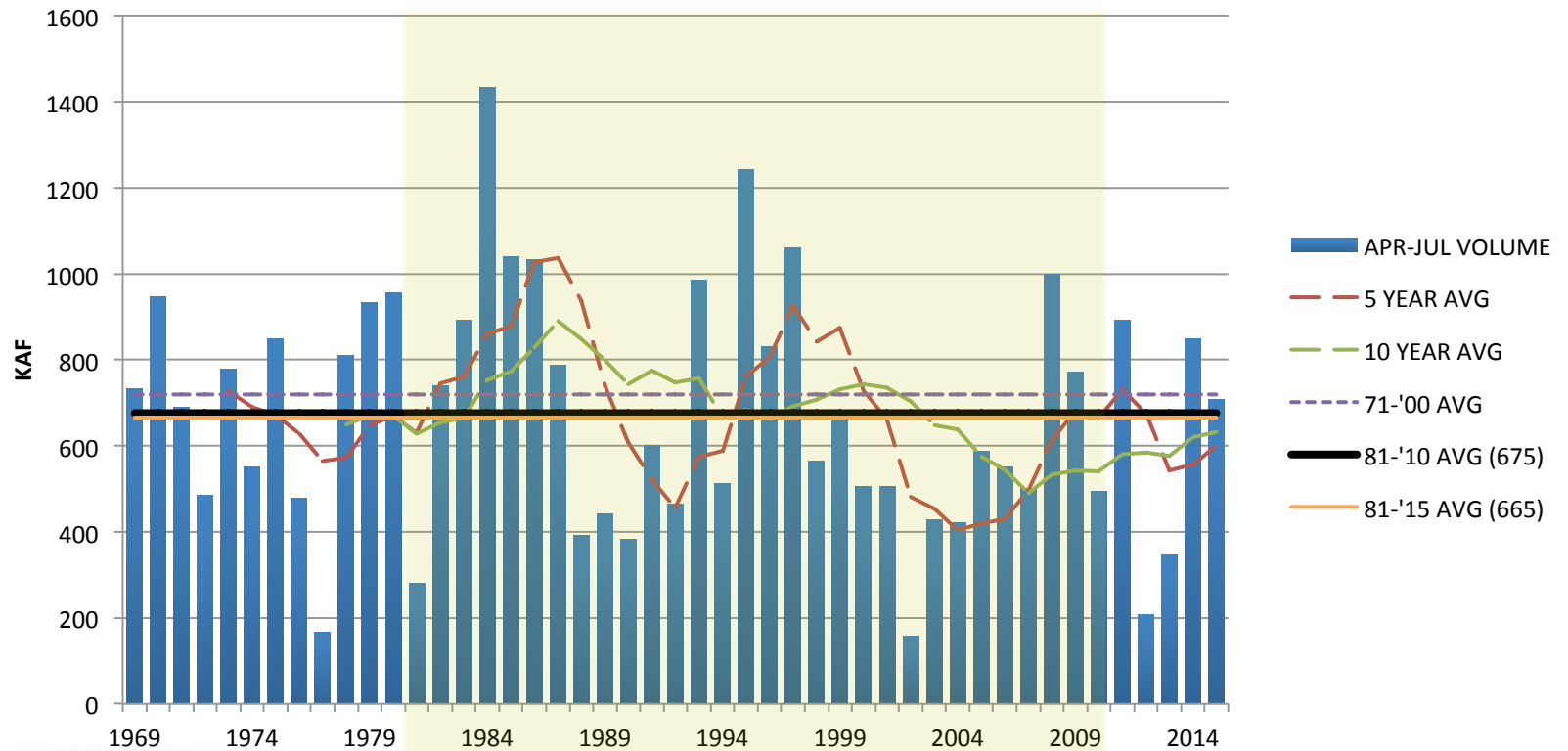
# 1981-2015 Unregulated Flow

## COLORADO - CAMEO APR-JUL UNREG FLOW



# 1981-2015 Unregulated Flow

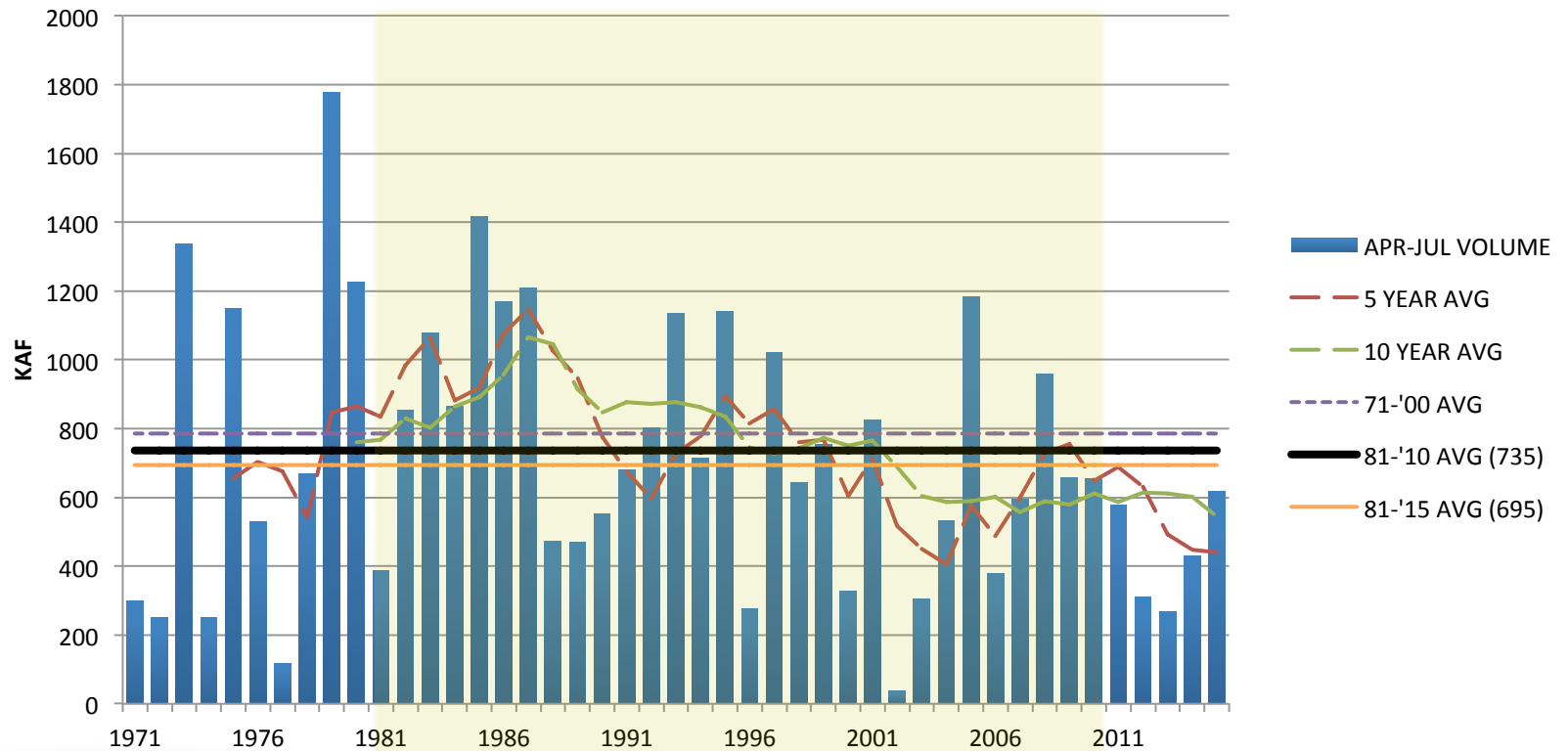
## BLUE MESA APR-JUL UNREG INFLOW





# 1981-2015 Unregulated Flow

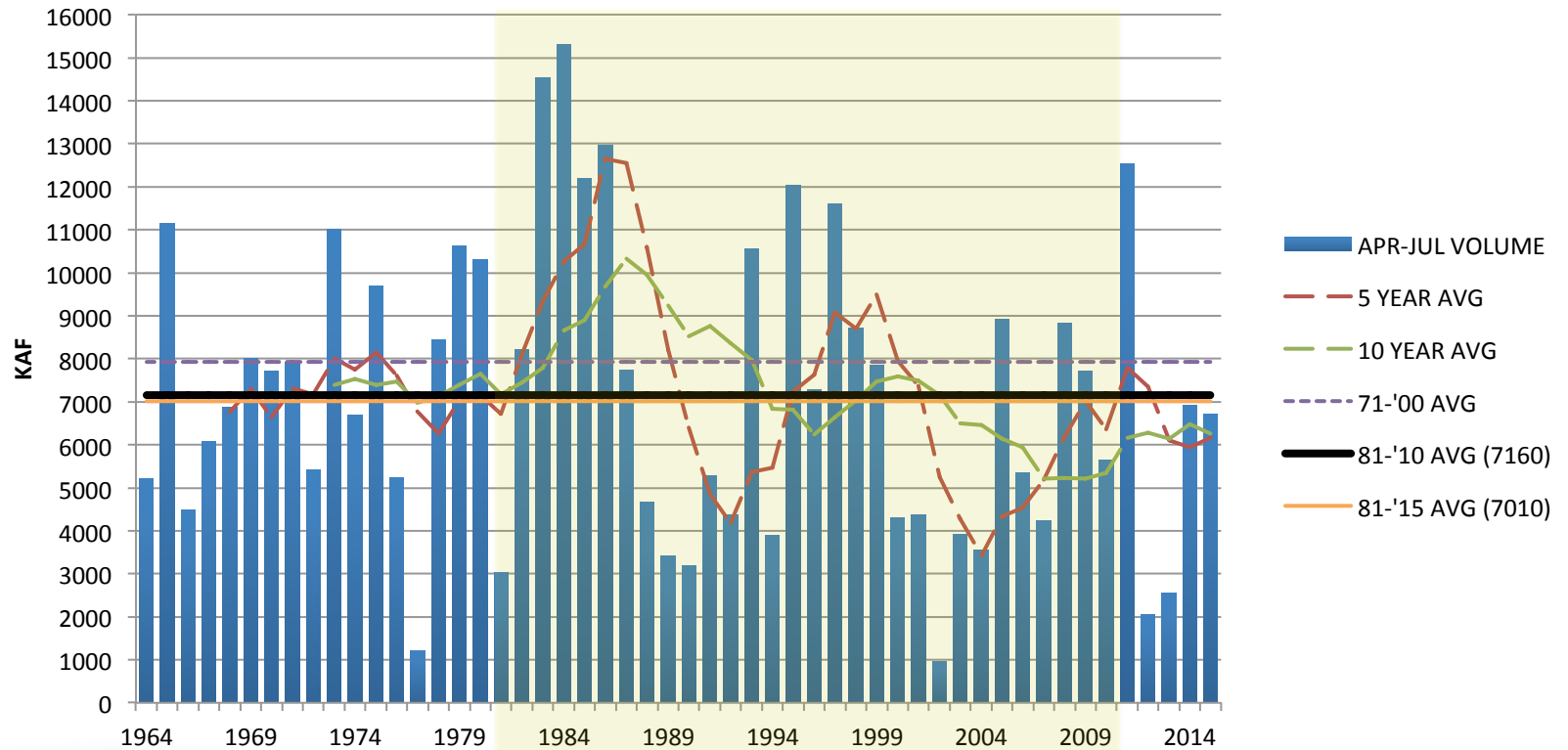
## NAVAJO APR-JUL MOD-UNREG INFLOW



# 1981-2015 Unregulated Flow

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## LAKE POWELL APR-JUL UNREG INFLOW



# WATER YEAR 2017 OUTLOOK

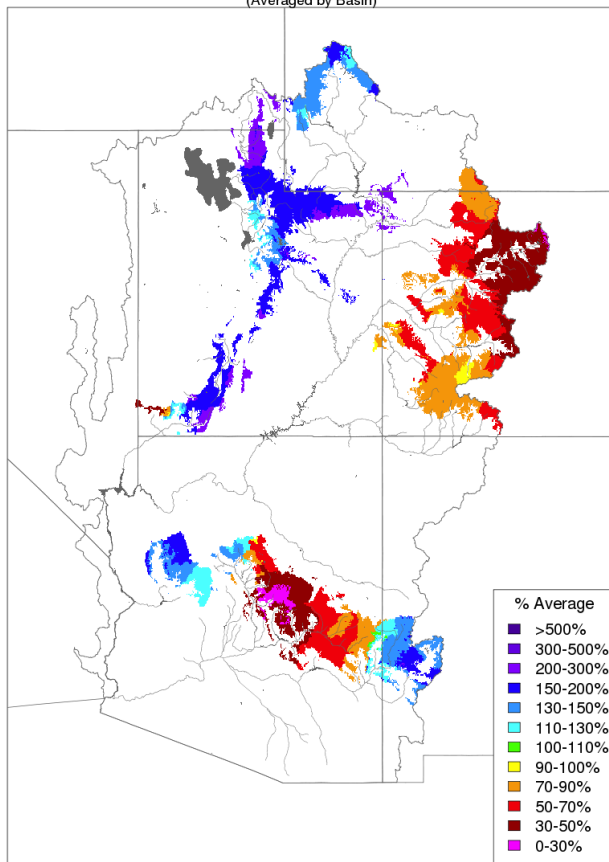




# Observed Fall Precipitation

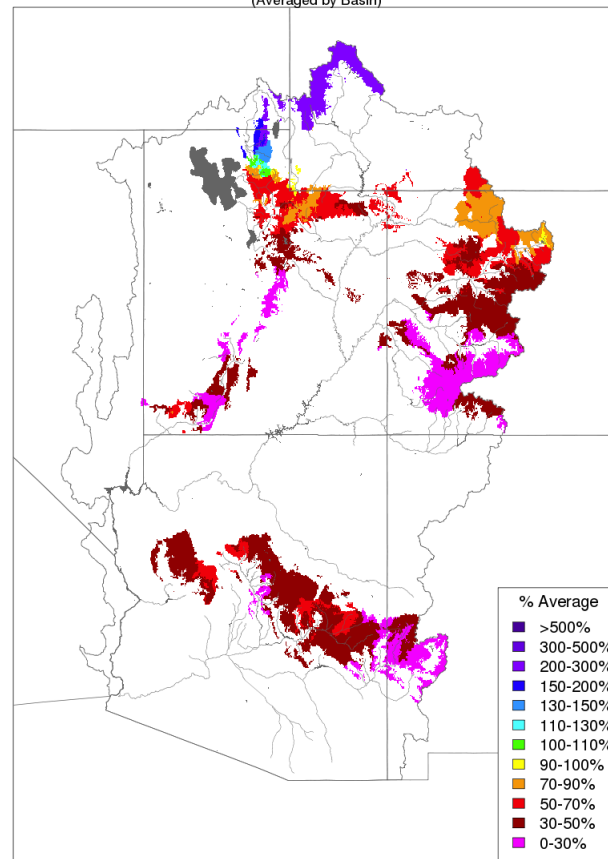
15

Monthly Precipitation - September 2016  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Month to Date Precipitation - October 26 2016  
(Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

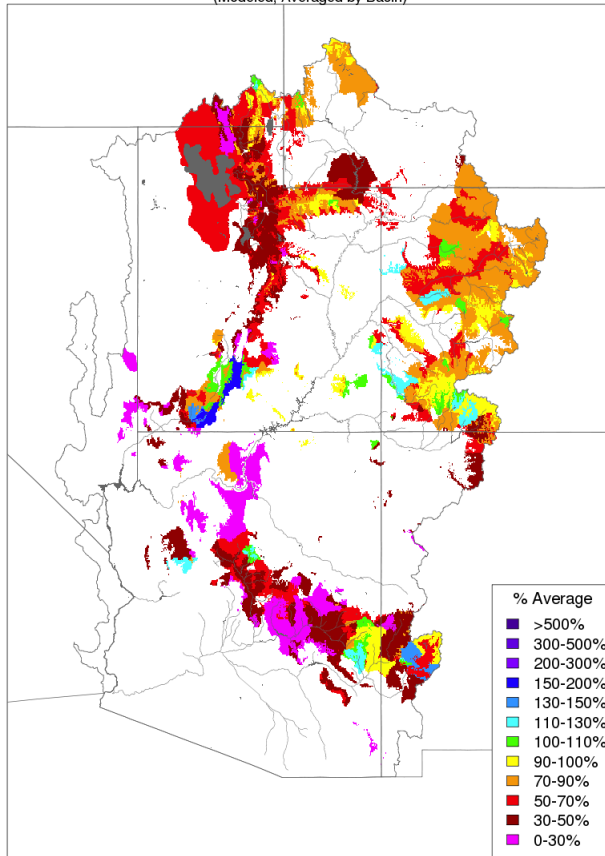


# Model Soil Moisture

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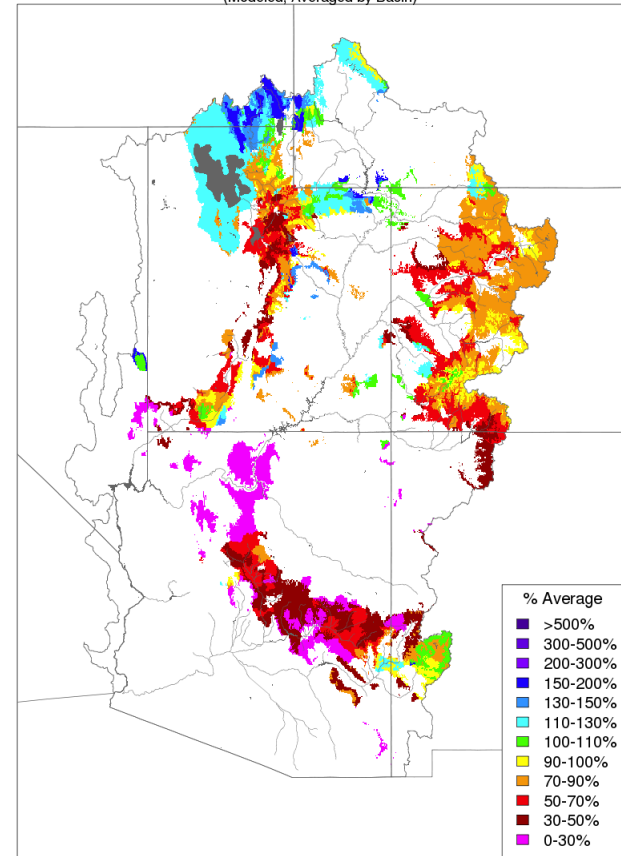
- ❖ 2016 fall soil moisture model parameter update not yet completed.
- ❖ *should be done by mid-November*

Soil Moisture - November 15 2015  
(Modeled, Averaged by Basin)



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

Soil Moisture - October 26 2016  
(Modeled, Averaged by Basin)

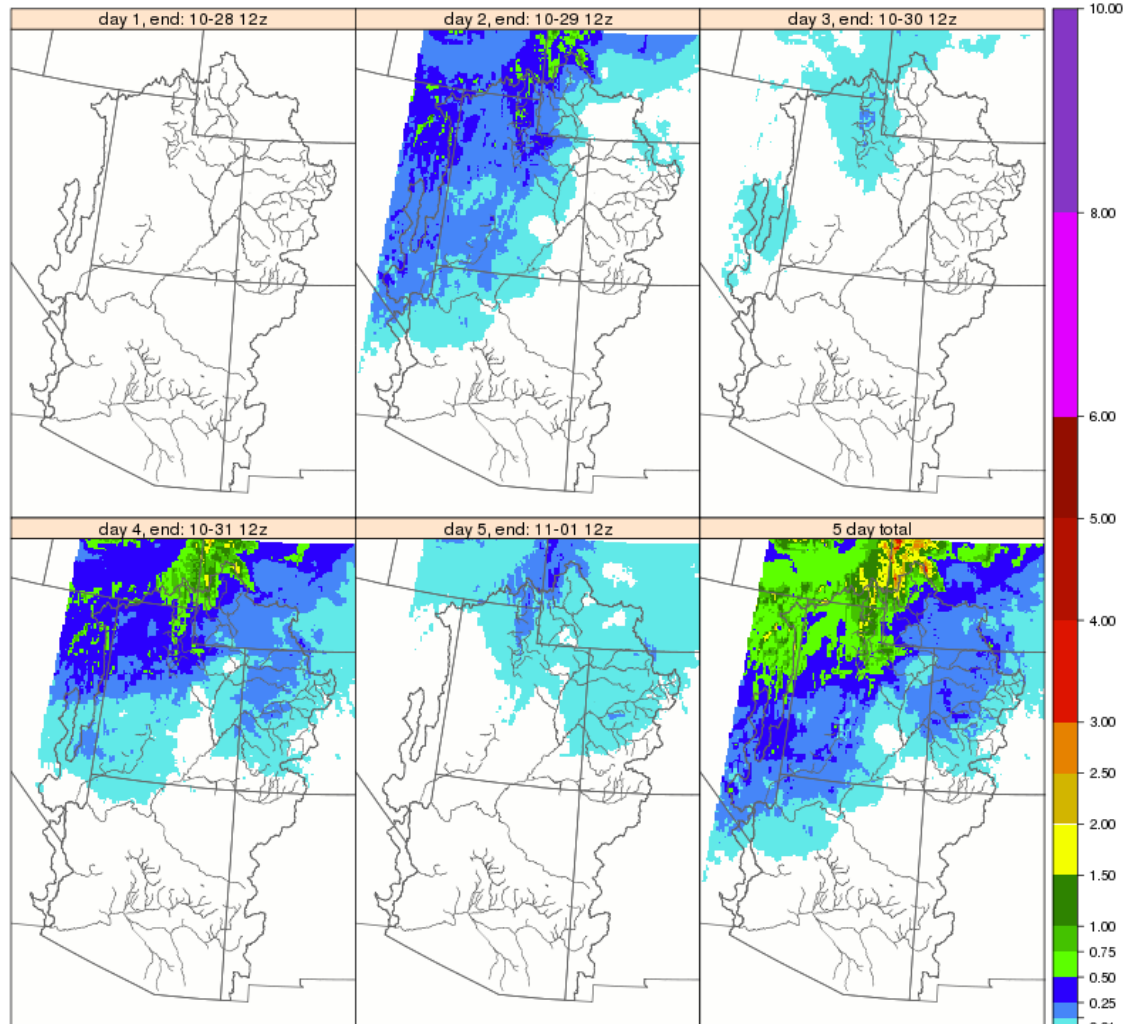


Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

# 5 Day QPF

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QPF Daily Totals (inches), issued: 10-27-2016 12z

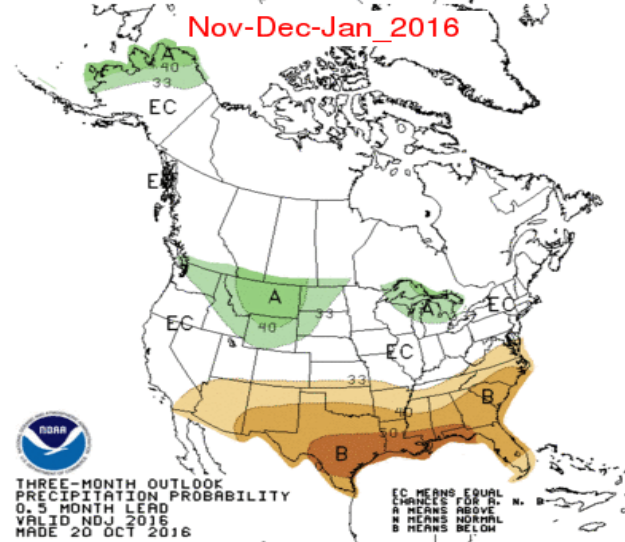
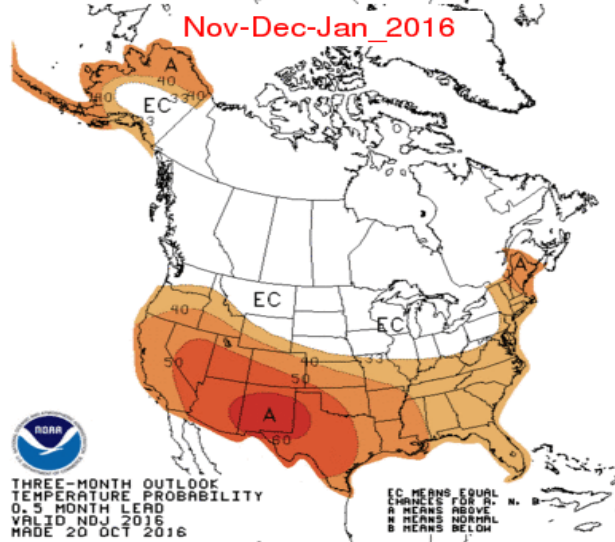
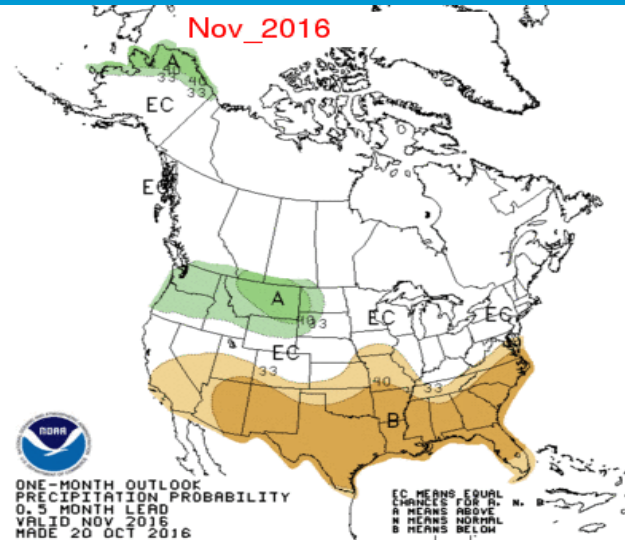
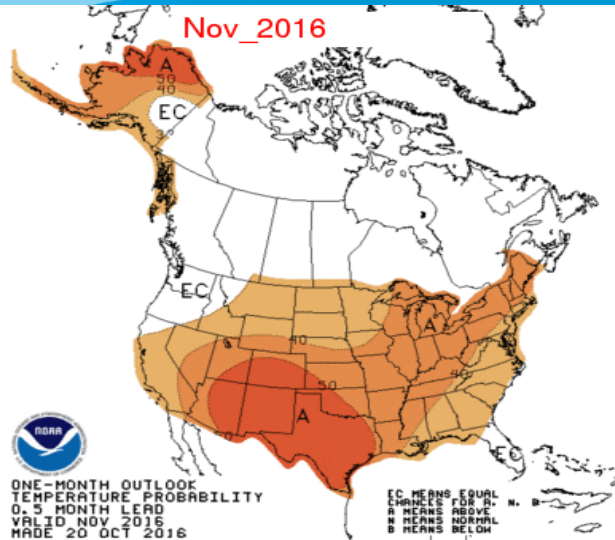


CBRFC/NWS/NOAA



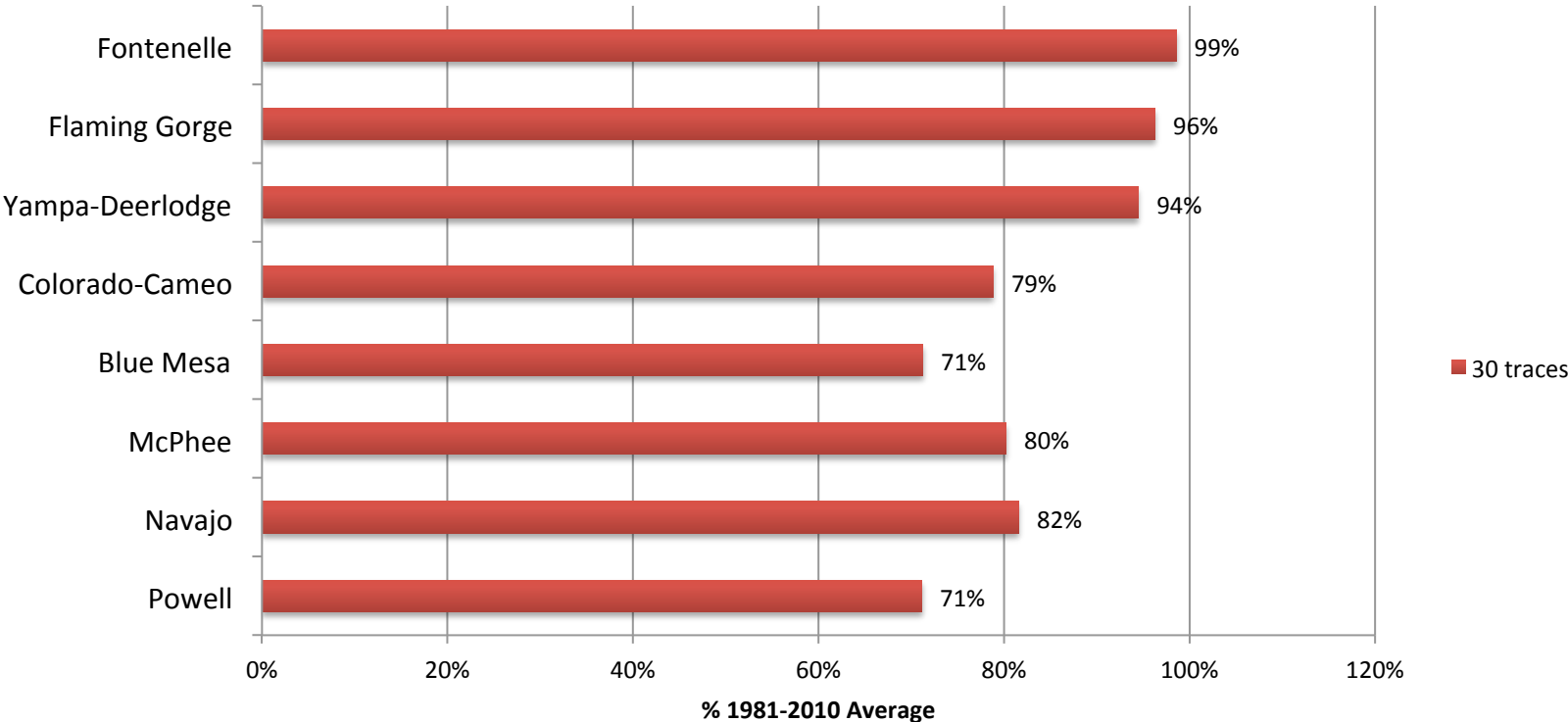


# Climate Forecasts



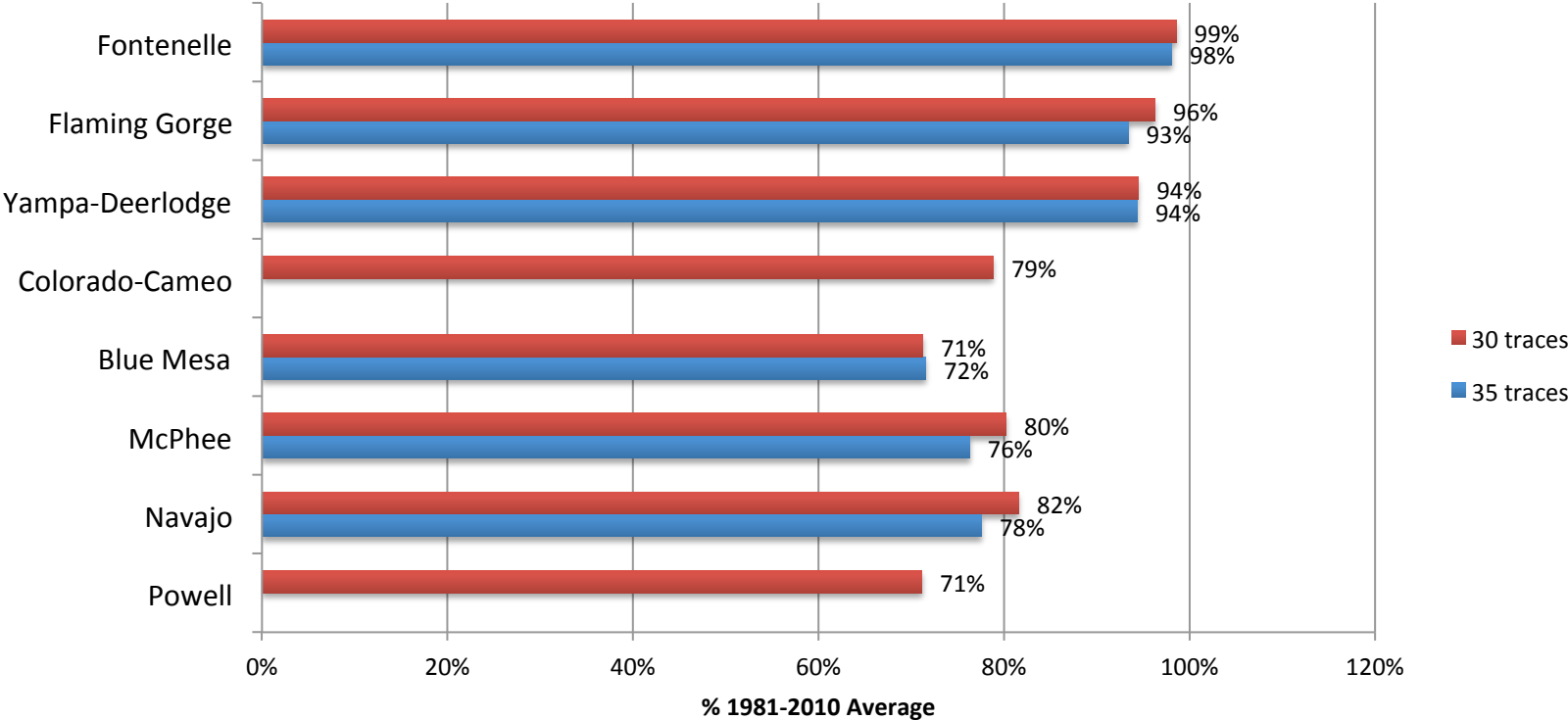
# ESP Outlooks

### April - July Unregulated Forecast Volume Percent of 1981-2010 Average



# ESP Outlooks

### April - July Unregulated Forecast Volume Percent of 1981-2010 Average



# Flaming Gorge

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- Median vs. Average
  - Observed 30 year / 35 year
    - average: 980 kaf / 985 kaf
    - median: 830 kaf / 935 kaf
  - Forecast 30 year / 35 year
    - average: 1045 kaf / 1044 kaf
    - median: 943 kaf / 915 kaf