



# WaterFALL Metrics across NC

Michele C. Eddy

2/19/13

NC Ecoflow SAB

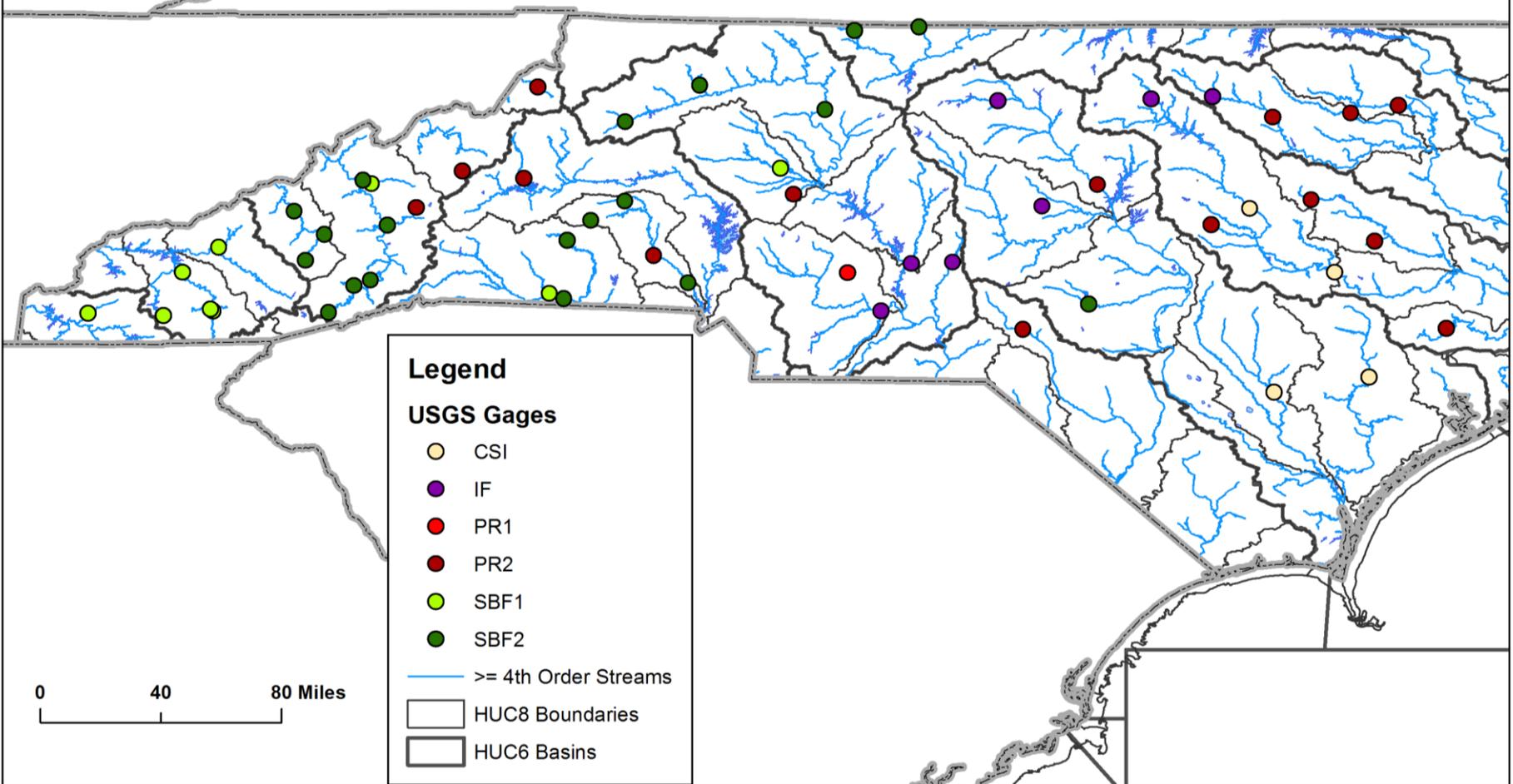
# Model Comparison Workshop

- Organized by USFS
  - Grant from Southeast Climate Science Center
  - Working with USGS
- 195 sites over 8 states
- “Unregulated” flows
- 5 – 17,200 mi<sup>2</sup> drainage area (mean 560 mi<sup>2</sup>)
- Participated by providing WaterFALL results from 24 gages from western NC to northern GA
- Results show WaterFALL has similar performance to other models (9 applications in total) in terms of model efficiency and bias in monthly and annual metrics

# WaterFALL Ecoflow Metrics in 6 Clicks

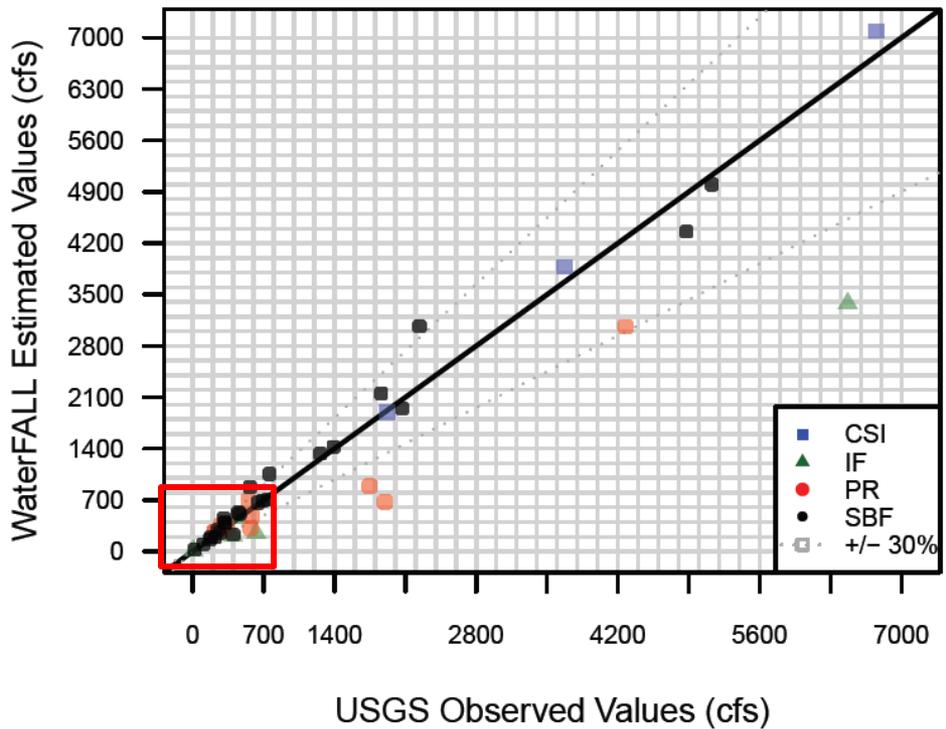
- 55 sites across the state
- 30-year POR
- 9 to 6,223 sq km (3.5 to 2,400 sq mi)
- 42% of gages were considered “reference” gages by USGS GAGES II assessment
- 53% of locations were calibrated against USGS observations
- Sites cover all McManamay classifications
- Metrics:
  - 10th percentile: extreme low flows
  - 25th percentile: low flows
  - 50th percentile: average flows
  - 75th percentile: high flows
  - 90th percentile: very high flows

# USGS Streamflow Gages Selected for Ecoflow Metric Comparison between WaterFALL and USGS



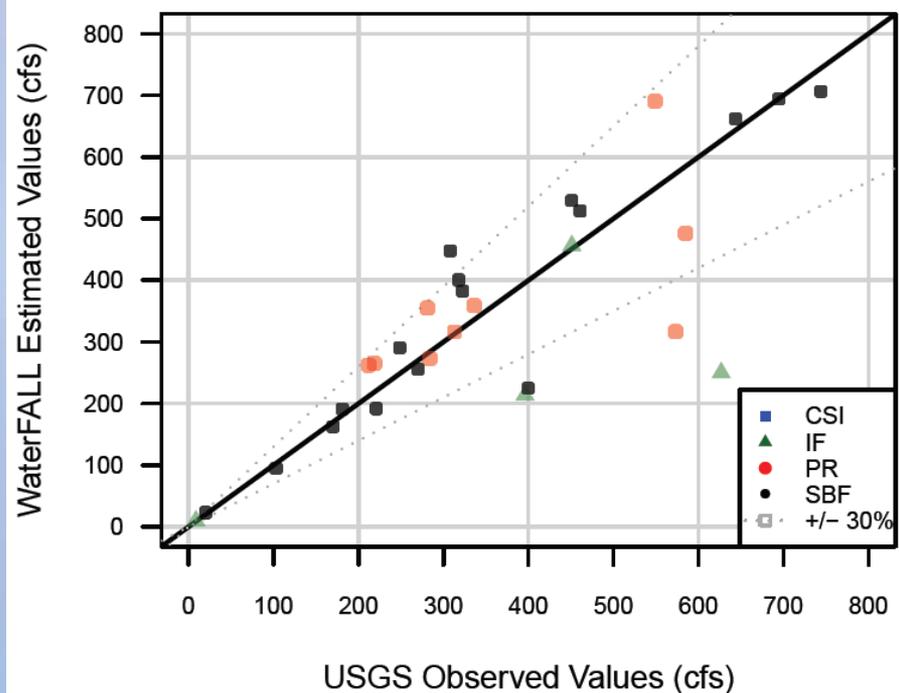
# January Extreme High Flows

Jan 90th Percentile Flow



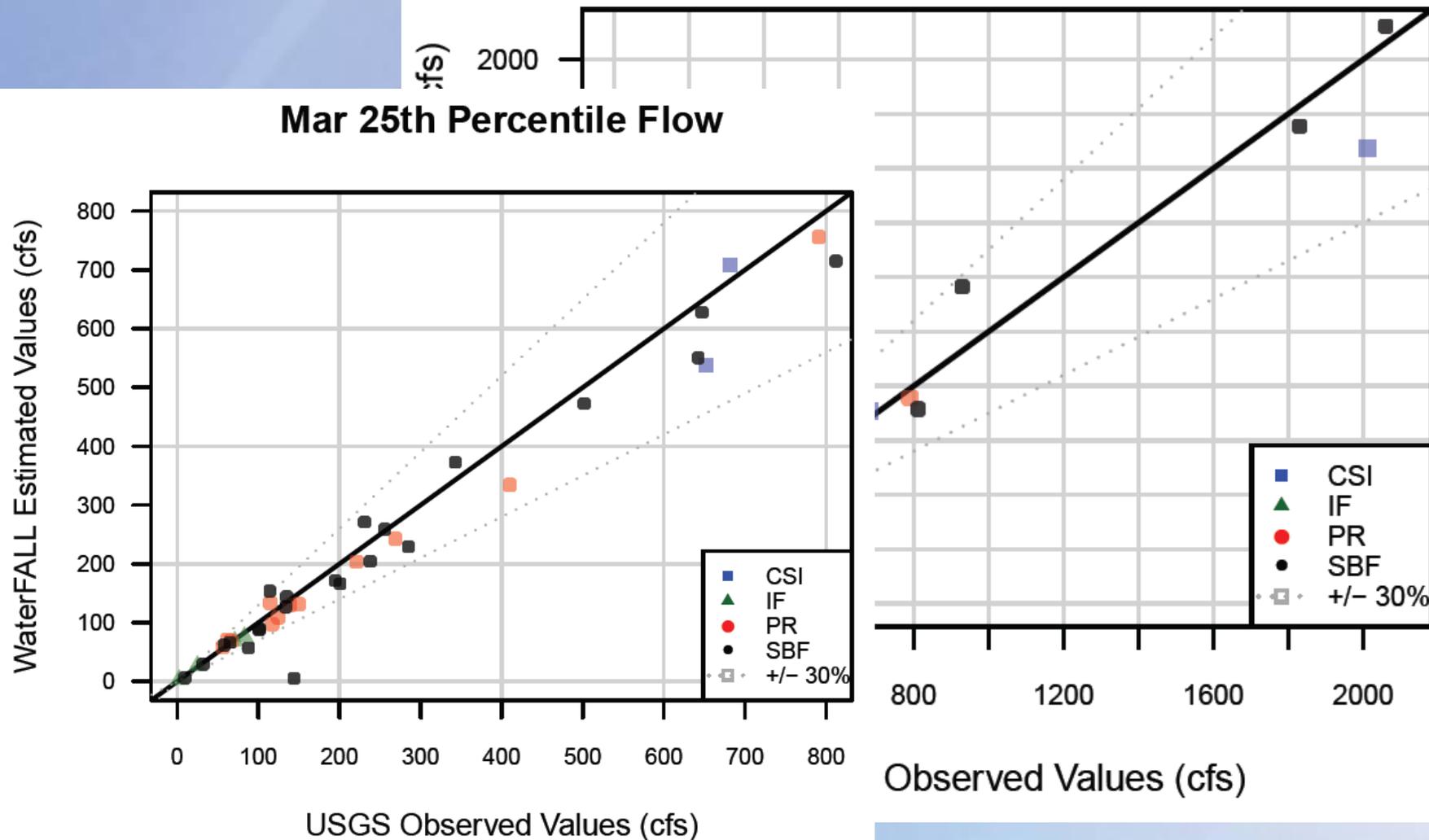
Close up for smaller streams:

Jan 90th Percentile Flow



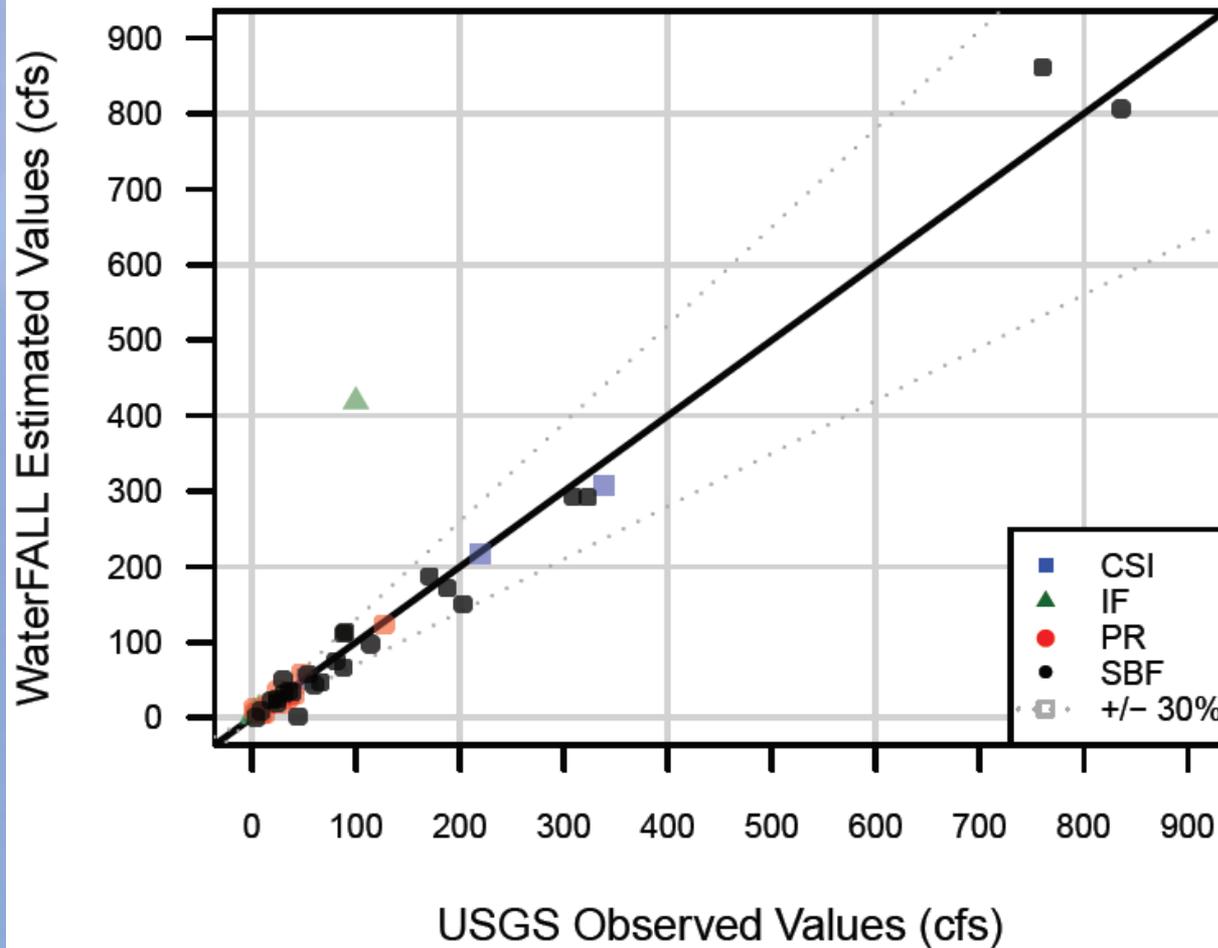
# March Low Flows

## Mar 25th Percentile Flow



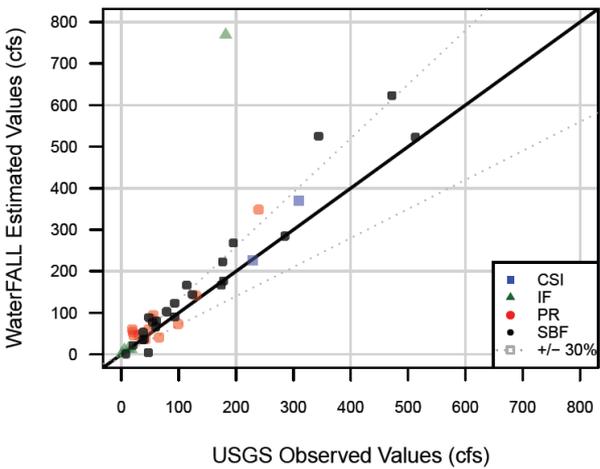
# July Extreme Low Flows

## Jul 10th Percentile Flow

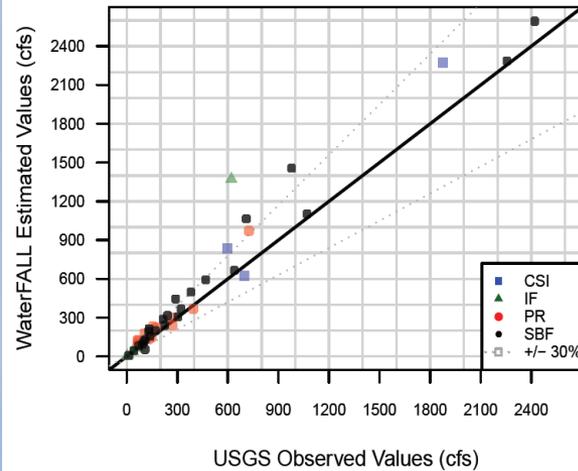


# Fall / Winter

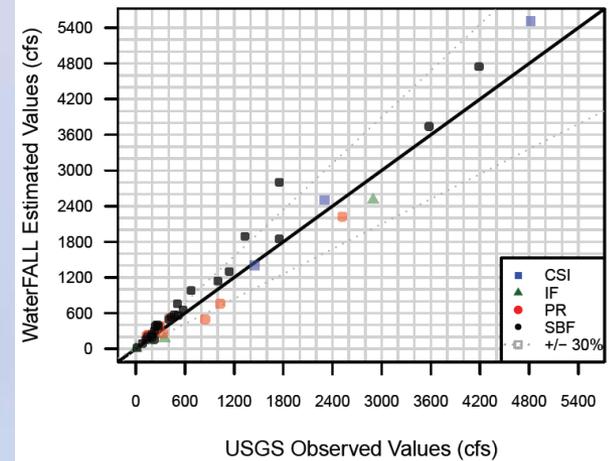
Oct 50th Percentile Flow



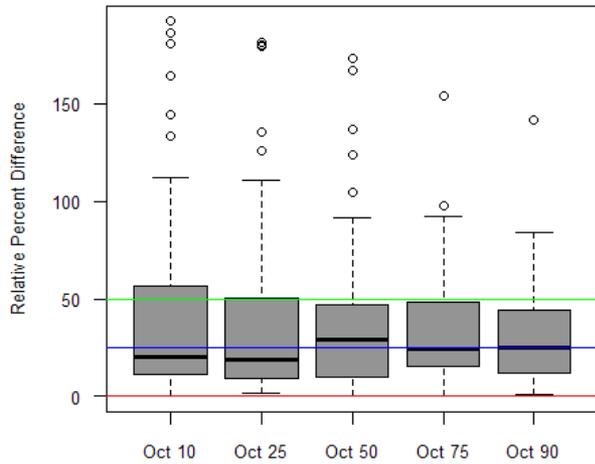
Nov 75th Percentile Flow



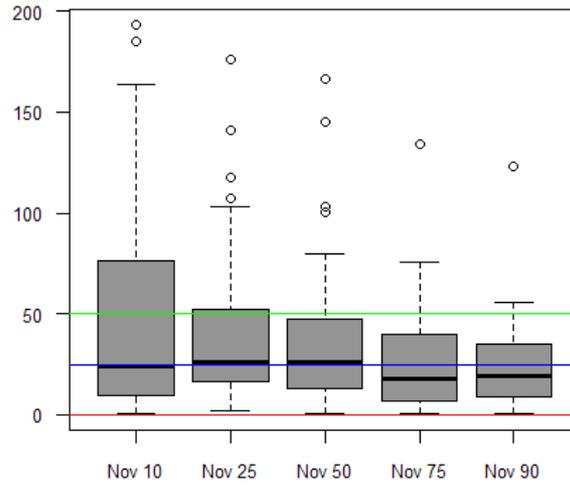
Dec 90th Percentile Flow



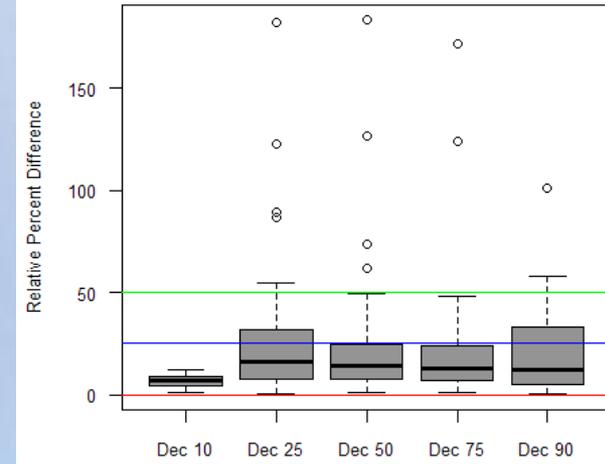
WaterFALL Percentile Flow Metrics - Oct



WaterFALL Percentile Flow Metrics - Nov



WaterFALL Percentile Flow Metrics - Dec



# Summary

- Largest variation is not by percentile but by month
  - Most variation in fall (measured by relative percent difference, RPD): *September, October, and November*
  - Always a couple outliers in each percentile in each month
- Some tendency to overestimate Median to Extreme High flows in September through November yet.....
- Across the 51 sites the median RPD between the gage and model is <25% for all months and all percentiles except:
  - Median to Extreme High flows in October (<30%)
  - Extreme Low to Median flows in November (<30%)

Note:

$$RPD = \frac{|Obs - Model|}{\left(\frac{Obs + Model}{2}\right)} \times 100$$