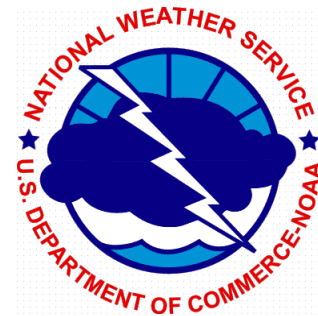


Preliminary results of the implementation of the Hydrologic Ensemble Forecast System (HEFS) at the Arkansas-Red Basin River Forecast Center

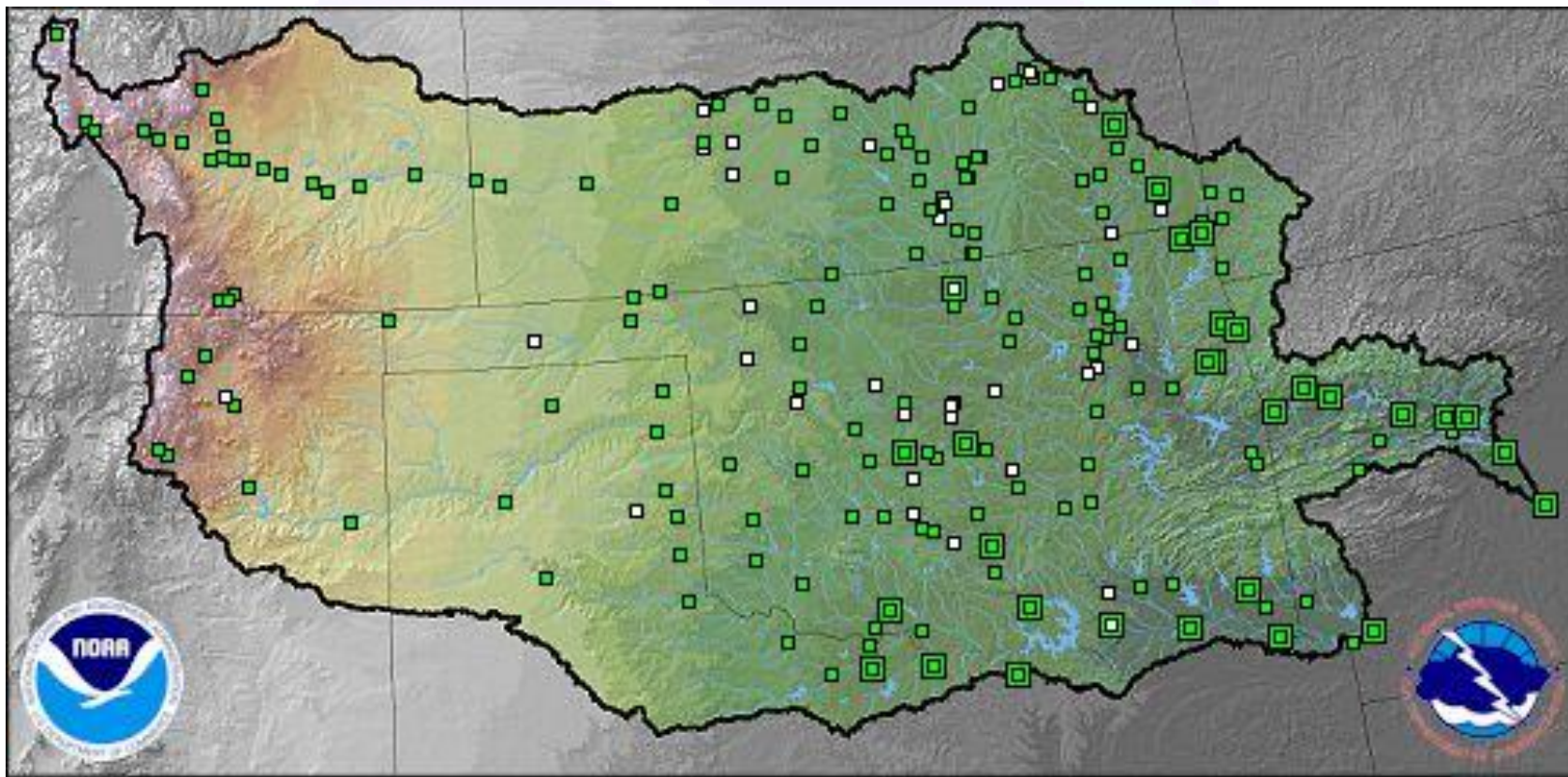
**Eric Jones
DOH NWS ABRFC
10th Annual HEPEX Conference
June 24, 2014**



ABRFC Background

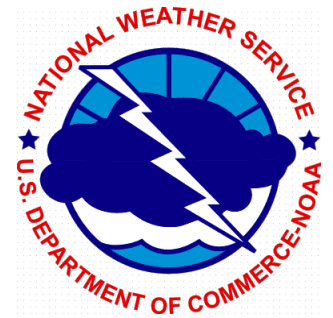


- Forecasting responsibility for the Arkansas and Upper Red Rivers





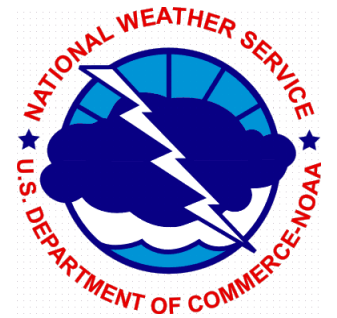
HEFS



- Complete for entire forecast area
 - Over 400 basins calibrated for Meteorological Ensemble Forecast Processor(MEFP)
 - Over 200 river points forecasted
 - Ensemble Postprocessor (EnsPost) calibrated for over 100 points to try to deal with hydrologic uncertainty
- Day 0-2 uses RFC QPF as input
- Day 3-16 uses GFS mean ensemble as input
- Day 17-250 uses CFSv2 as input
- Import forcings 4 times/day
- Total run only for 12Z. Takes about 40 min.
 - 20 min for MEFS
 - 20 min for HEFS run
- Export graphics from GraphGen
- Graphics sent to AHPS Dev website



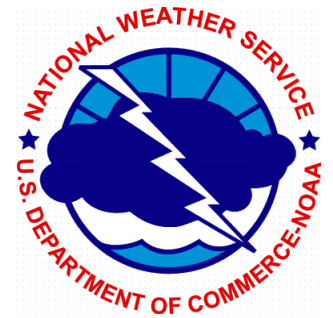
ABRFC HEFS Uses



- Forecast short term daily precipitation and streamflow uncertainties
- Water Supply in Colorado and New Mexico
 - Forecast native flows only
- Uncertainties in long range reservoir inflow (possible)



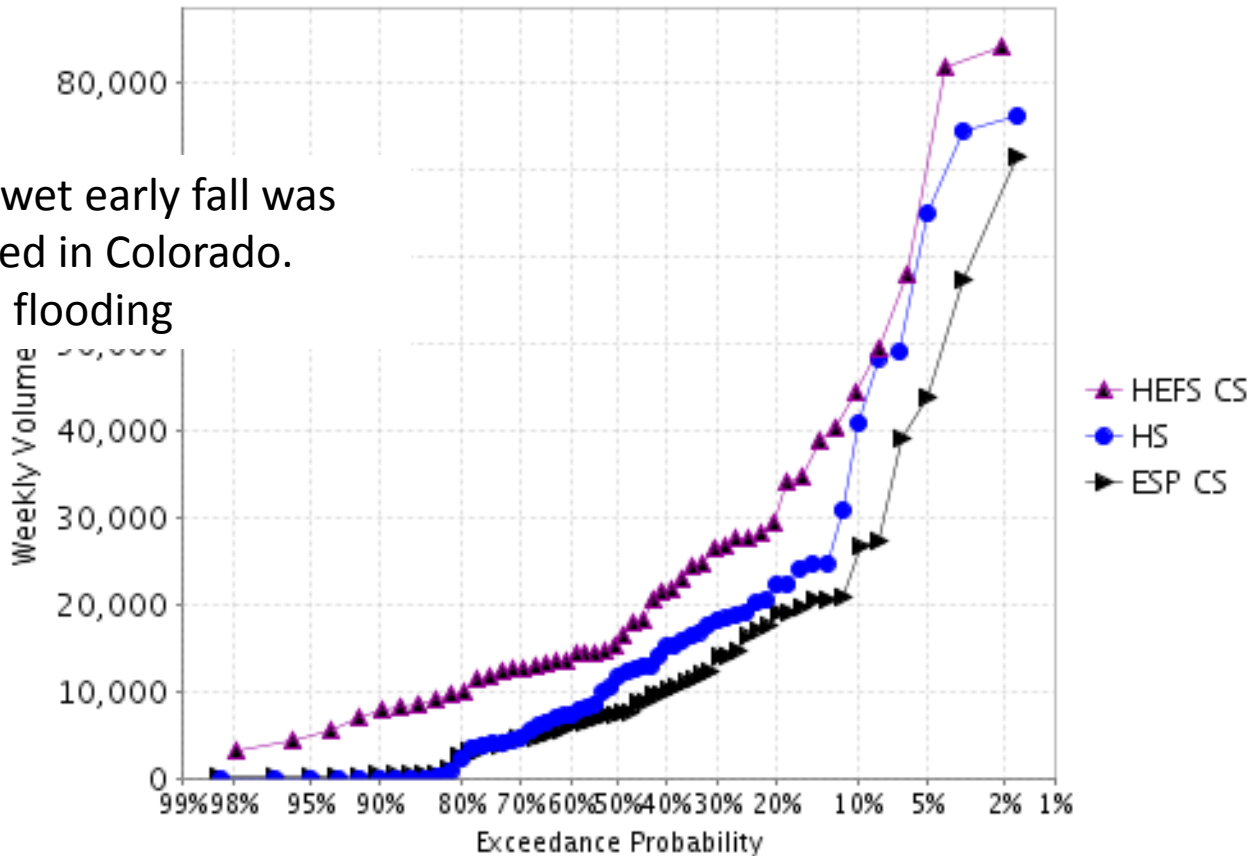
HEFS- Water Supply Forecasts



HEFS TEST PRODUCT: Chances of Exceeding Volumes on the PNNC2
Latitude: 38.439724 Longitude: -104.593056
Forecast for the period 07/27/2013 - 10/25/2013

This is a conditional simulation based on the current conditions as of 07/27/2013

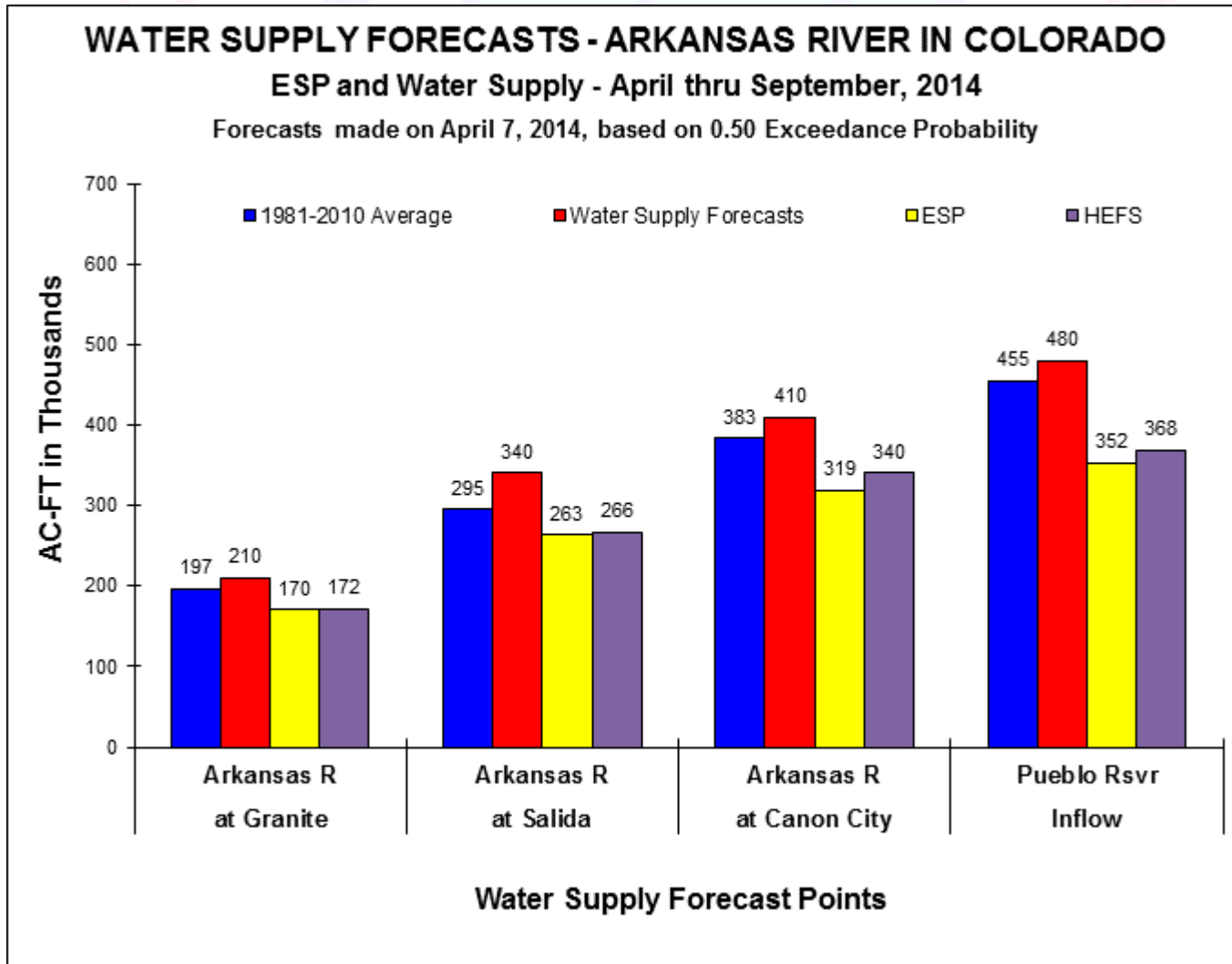
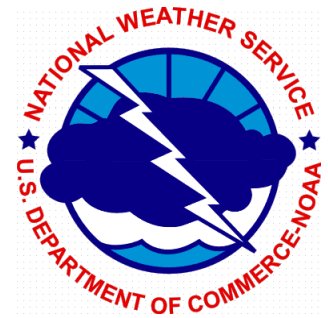
- A very wet early fall was observed in Colorado.
- Record flooding



Water Supply Forecast

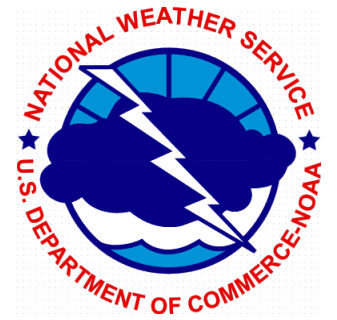


HEFS- Water Supply Forecasts

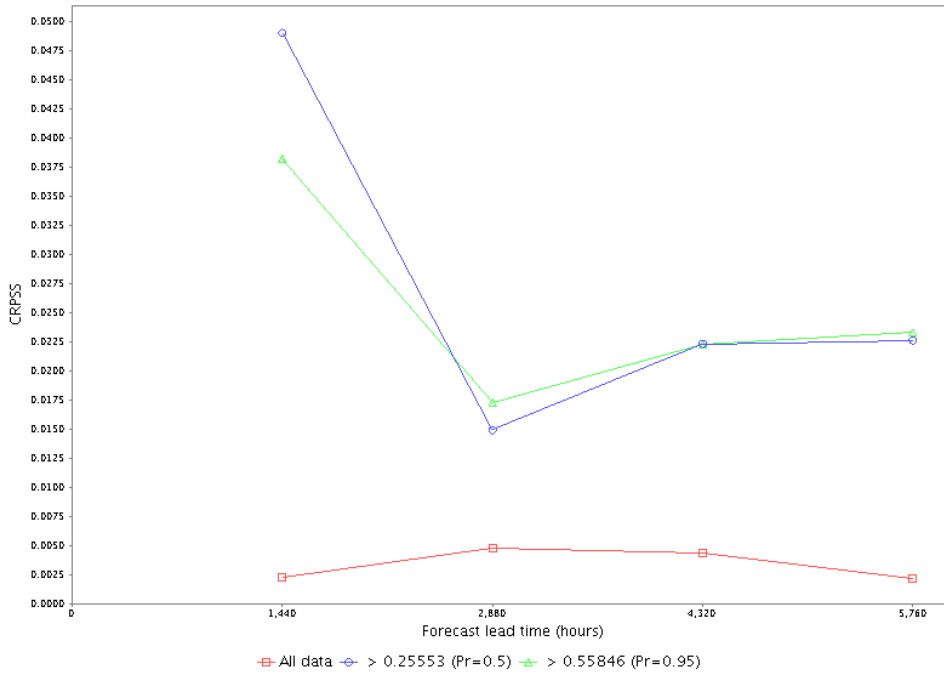




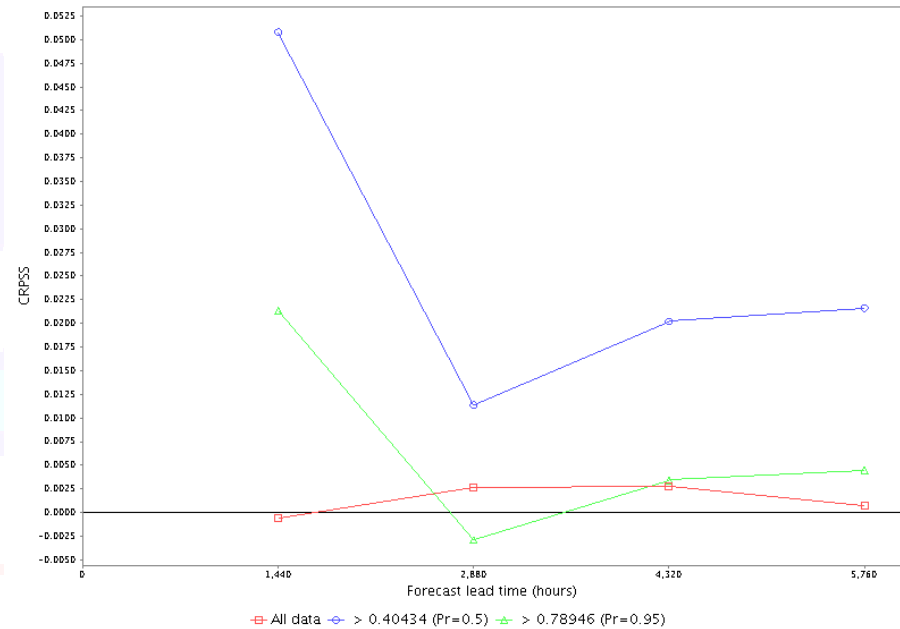
HEFS Verification



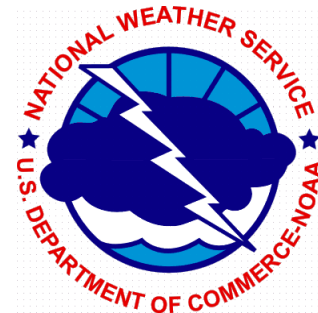
Continuous Ranked Probability Skill Score (CRPSS) by forecast lead time.
ARGC2L.FMAP.MEFP (reference forecast: ARGC2L.FMAP.RCLIM)



Continuous Ranked Probability Skill Score (CRPSS) by forecast lead time.
ARGC2U.FMAP.MEFP (reference forecast: ARGC2U.FMAP.RCLIM)

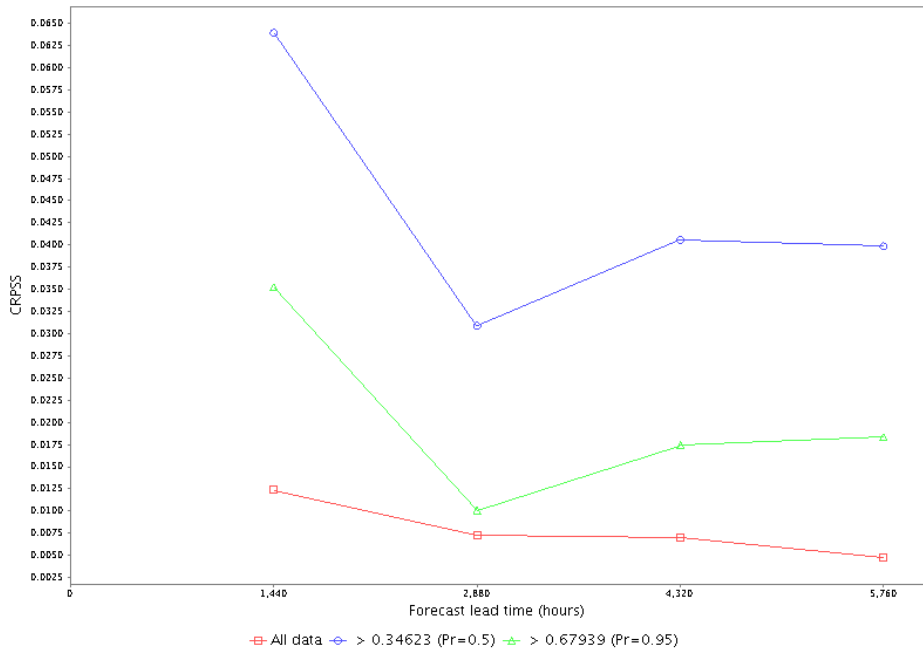


CFSv2 runs 1983-1999

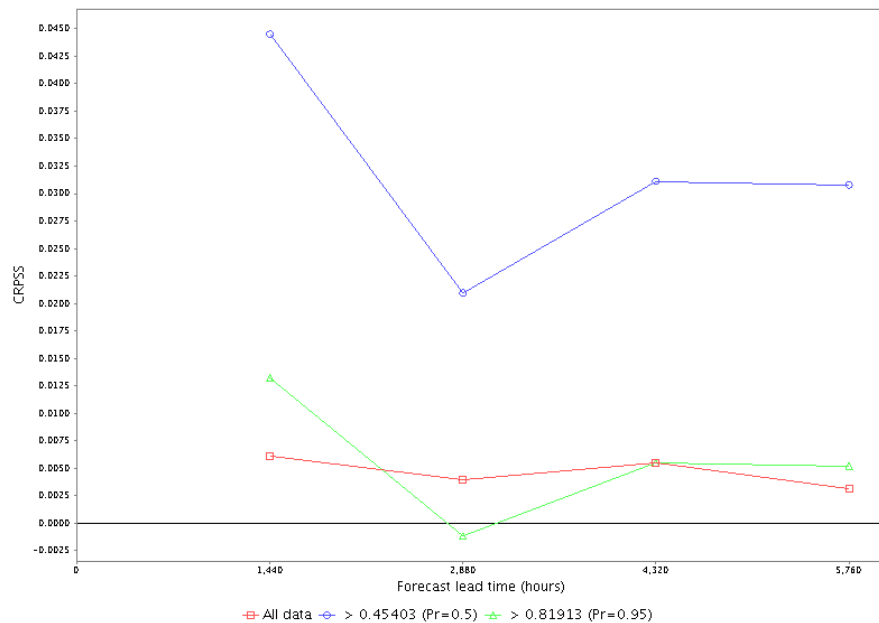


HEFS Verification

Continuous Ranked Probability Skill Score (CRPS) by forecast lead time.
LEDC2L.FMAP.MEFP (reference forecast: LEDC2L.FMAP.RCLIM)



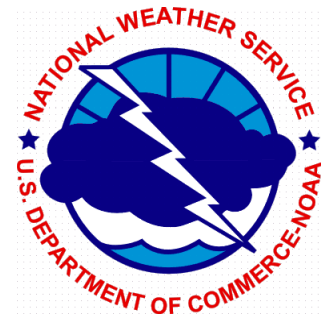
Continuous Ranked Probability Skill Score (CRPS) by forecast lead time.
LEDC2U.FMAP.MEFP (reference forecast: LEDC2U.FMAP.RCLIM)



CFSv2 runs 1983-1999



HEFS – Short Range Ensembles

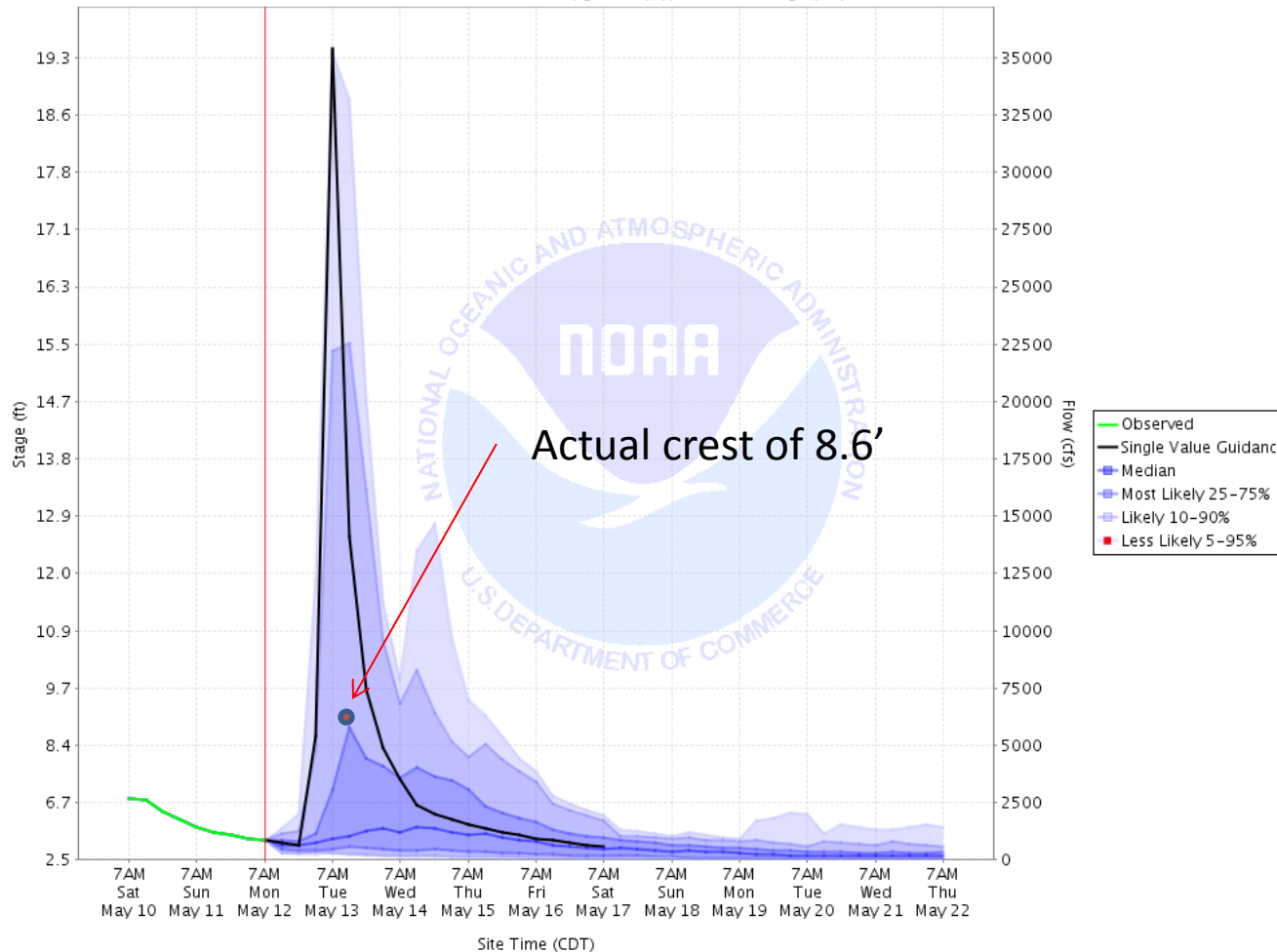


Short-term Probabilistic Guidance (Experimental)

GLOO2 - GLOVER RIVER AT GLOVER 2N

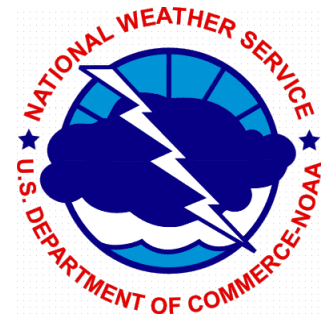
Data as of 07:00 AM CDT May 12

For official forecast, go to <http://water.weather.gov/ahps>



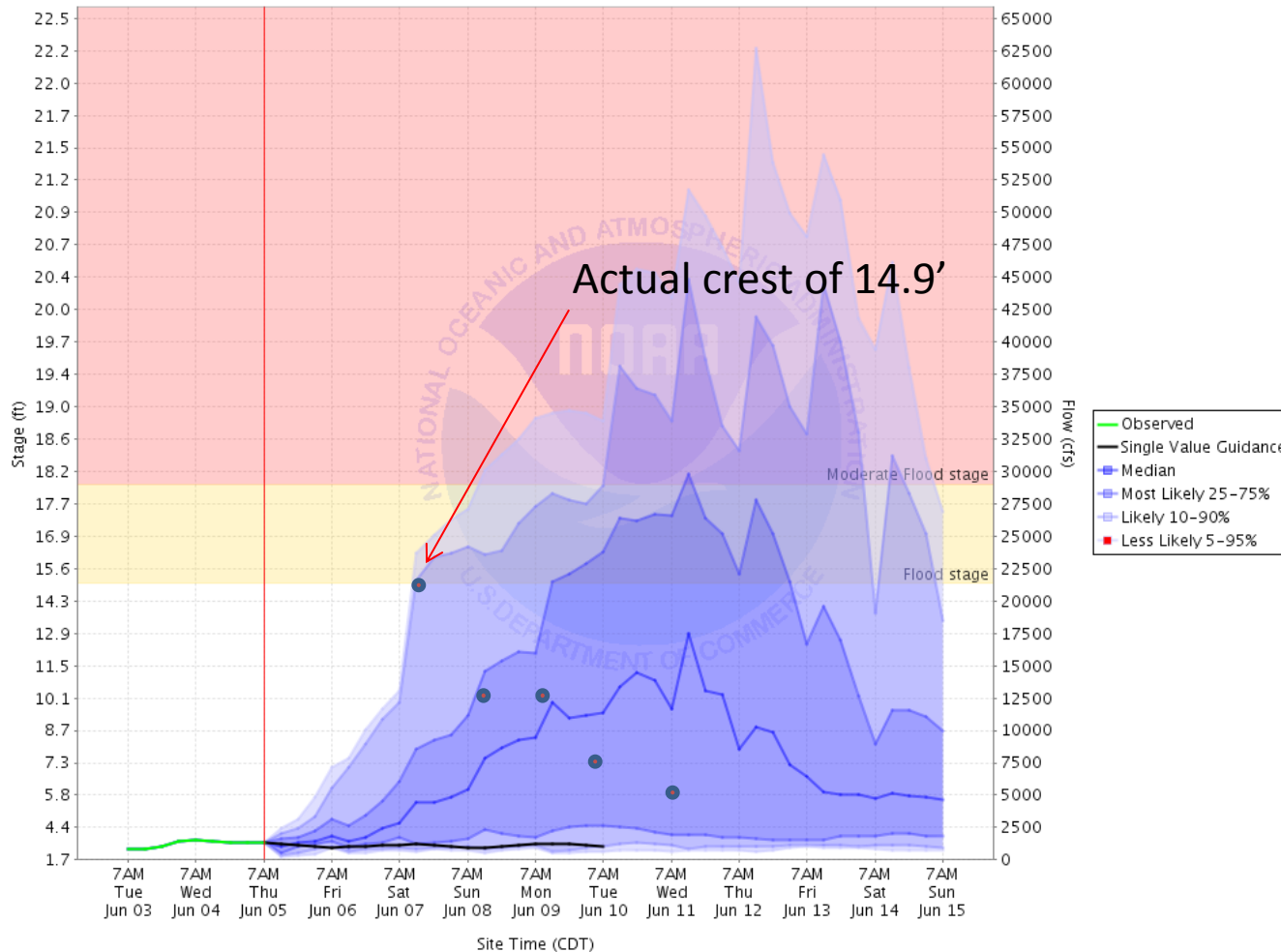


HEFS – Short Range Ensembles



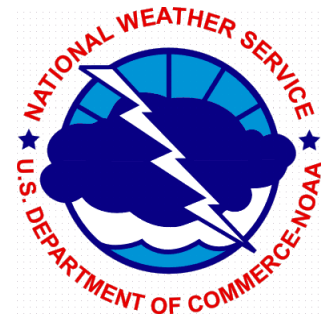
Short-term Probabilistic Guidance (Experimental)
COMO2 – NEOSHO RIVER AT COMMERCE 5W
Data as of 07:00 AM CDT Jun 05

For official forecast, go to <http://water.weather.gov/ahps>





HEFS – Short Range Ensembles

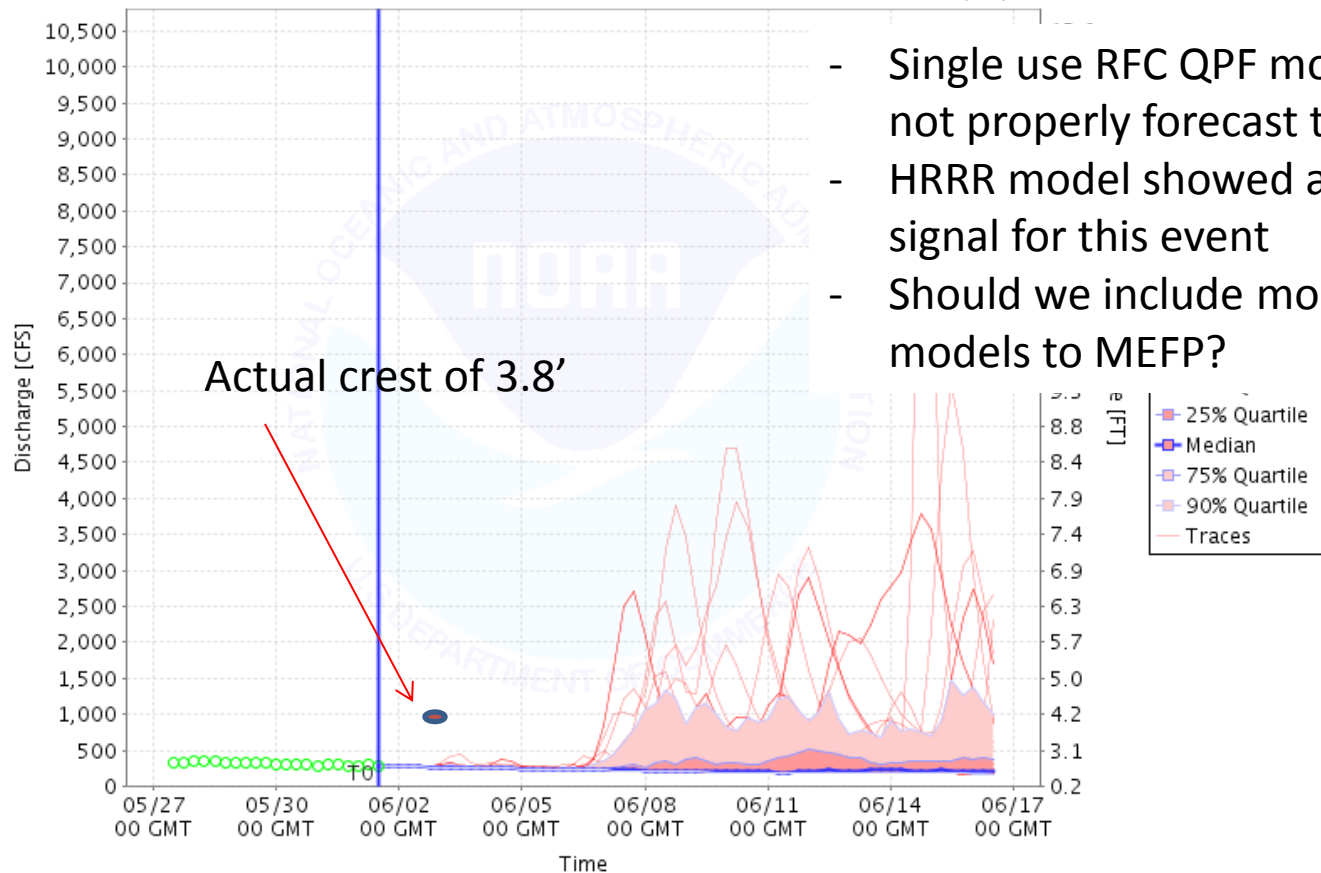


HEFS EnsPost Input Stream Flow Ensembles for WTT02

Latitude: 36.13 Longitude: -94.57

Forecast for the period 06/01/2014 - 06/16/2014

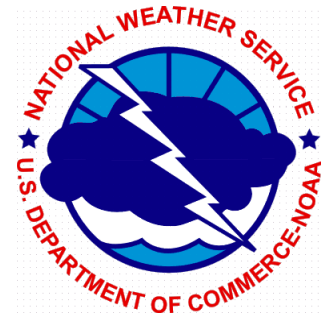
This is a conditional simulation based on the current conditions as of 06/01/2014



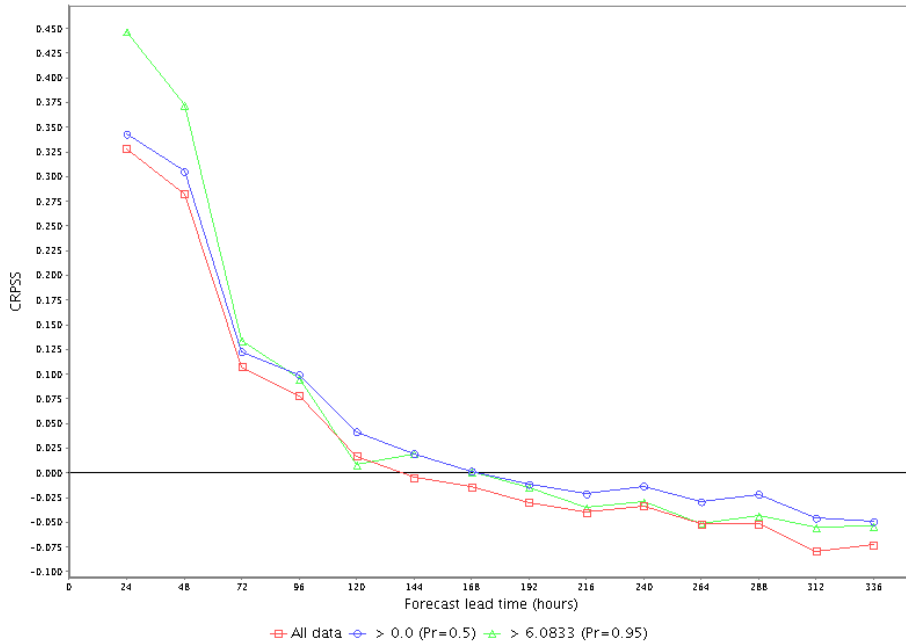
- Single use RFC QPF model did not properly forecast this
- HRRR model showed a rainfall signal for this event
- Should we include more models to MEFP?



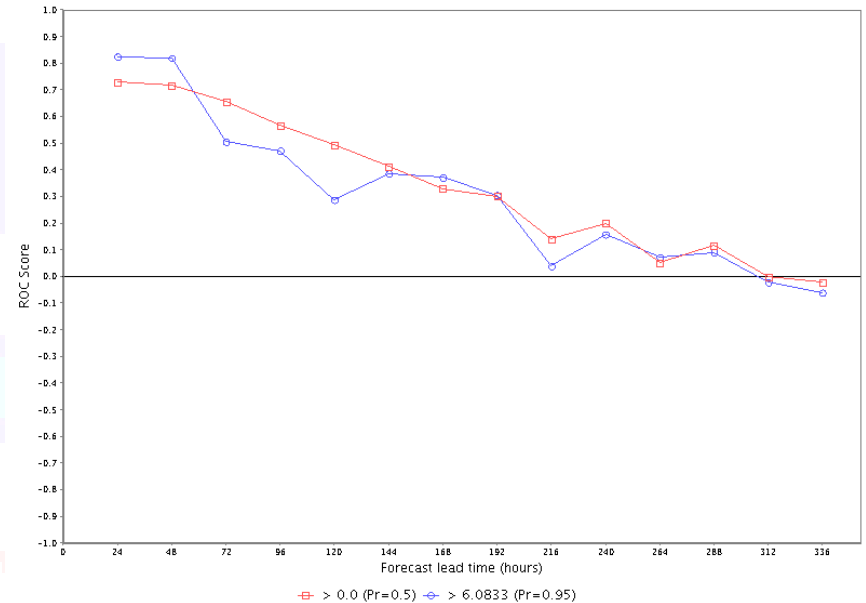
HEFS Verification MEFP



Continuous Ranked Probability Skill Score (CRPSS) by forecast lead time.
GLOO2.FMAP.MEFP (reference forecast: GLOO2.FMAP.RCLIM)



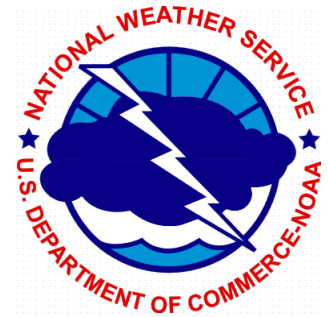
ROC Score against forecast lead time for different event probability thresholds.
GLOO2.FMAP.MEFP (reference forecast: GLOO2.FMAP.RCLIM)



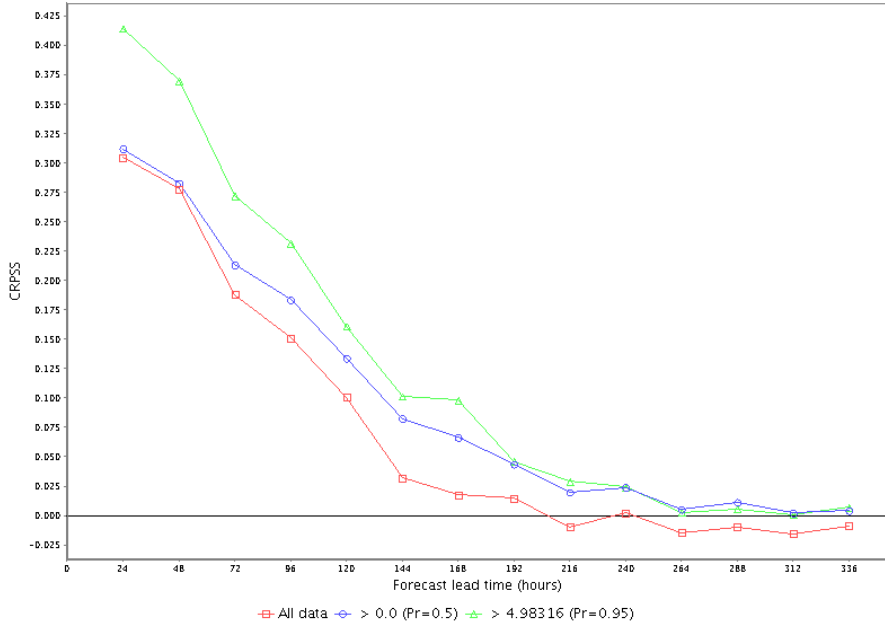
RFC runs 2007-2010



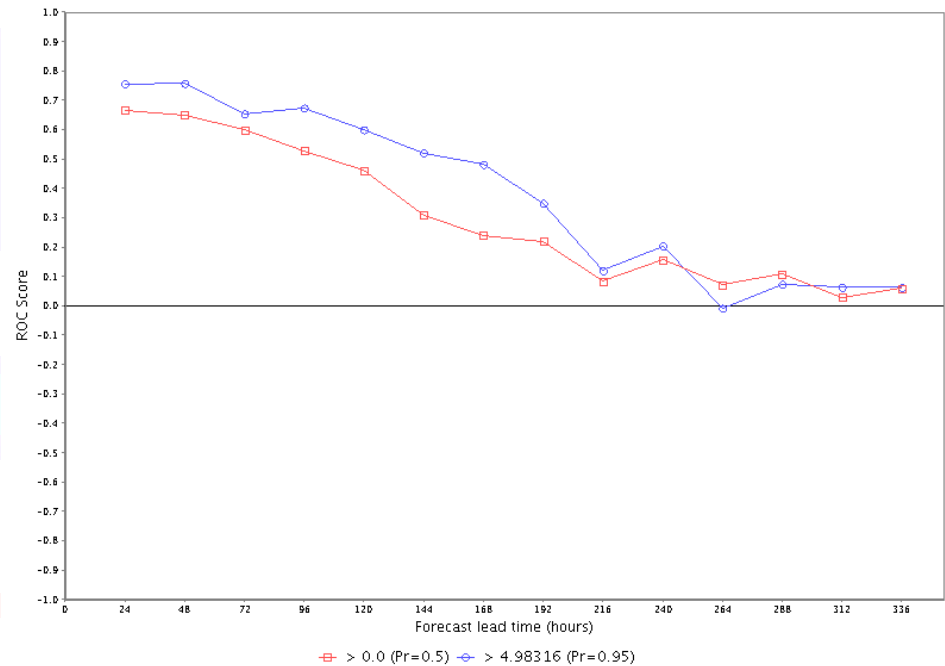
HEFS Verification MEFP



Continuous Ranked Probability Skill Score (CRPSS) by forecast lead time.
WTTO2.FMAP.MEFP (reference forecast: WTTO2.FMAP.RCLIM)



ROC Score against forecast lead time for different event probability thresholds.
WTTO2.FMAP.MEFP (reference forecast: WTTO2.FMAP.RCLIM)



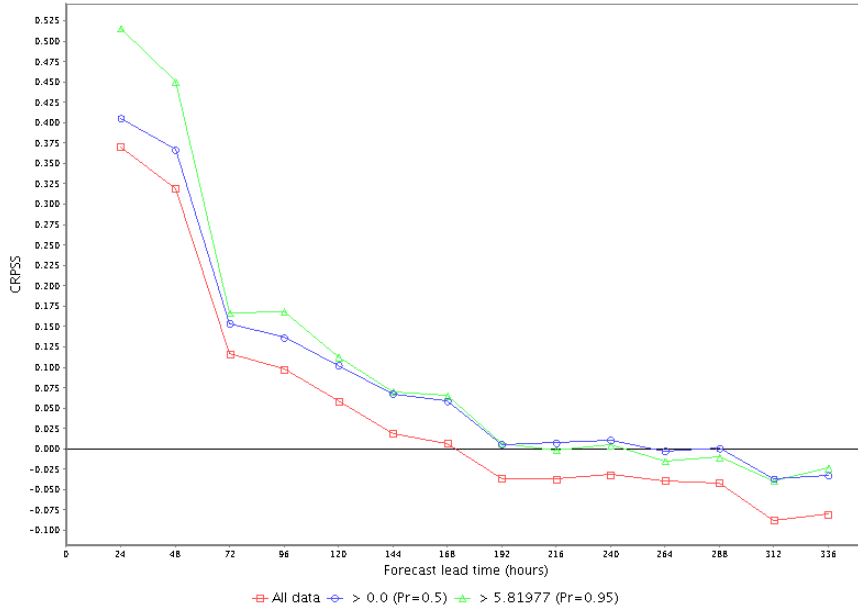
RFC runs 2007-2010



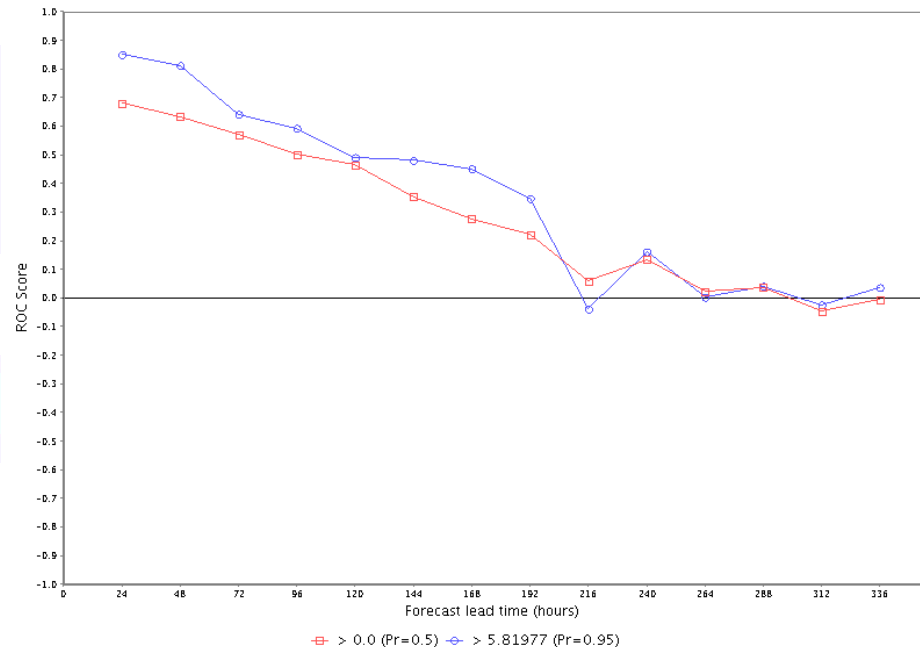
HEFS Verification MEFP



Continuous Ranked Probability Skill Score (CRPSS) by forecast lead time.
MLB44.FMAP.MEFP (reference forecast: MLB44.FMAP.RCLIM)



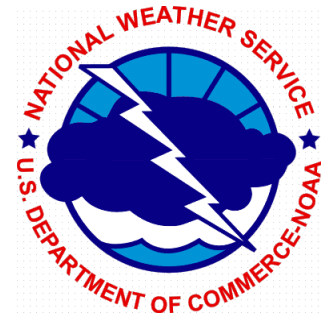
ROC Score against forecast lead time for different event probability thresholds.
MLB44.FMAP.MEFP (reference forecast: MLB44.FMAP.RCLIM)



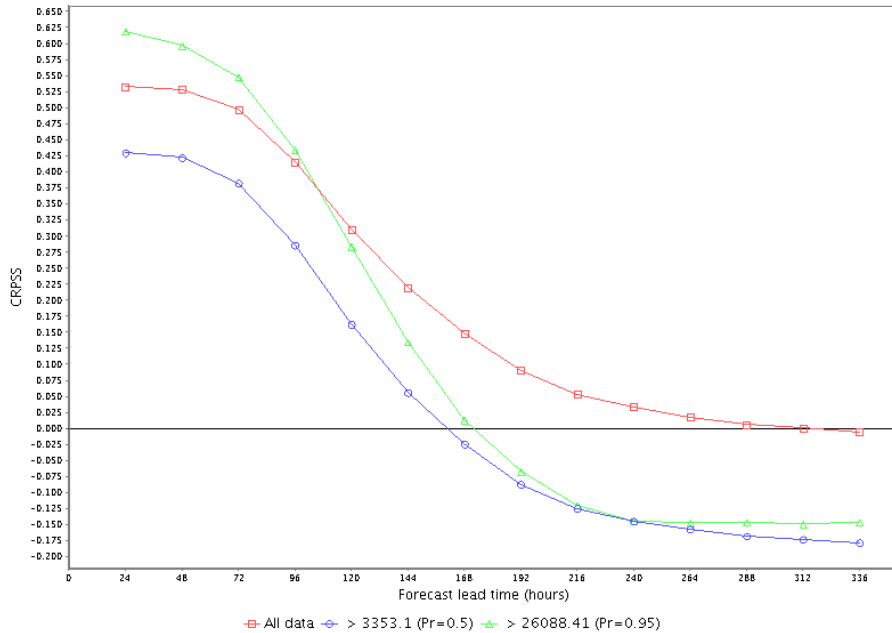
RFC runs 2007-2010



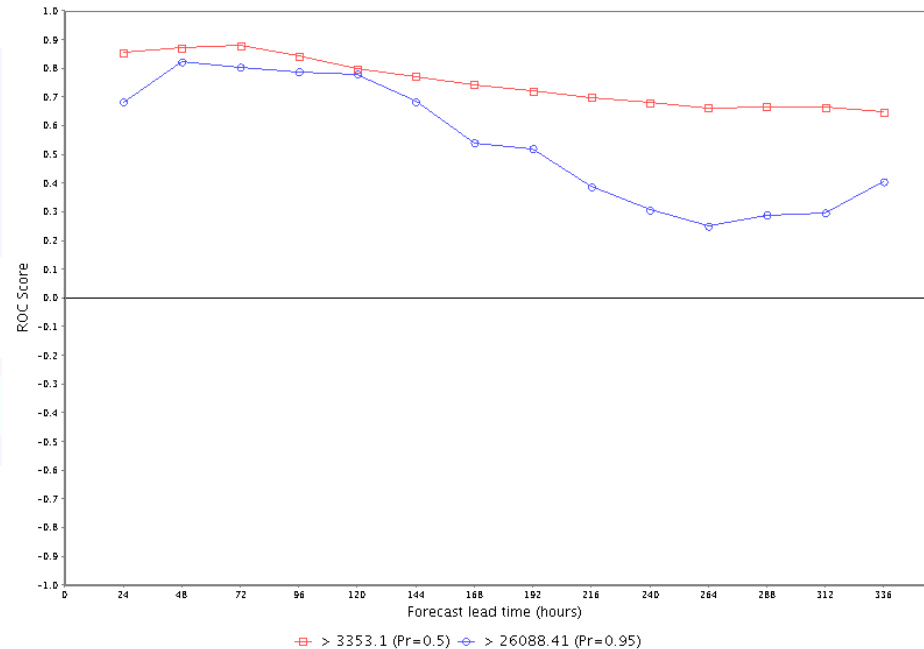
HEFS Verification FLOW



Continuous Ranked Probability Skill Score (CRPSS) by forecast lead time.
COMO2.QINE.HEFS (reference forecast: Sample climatology)



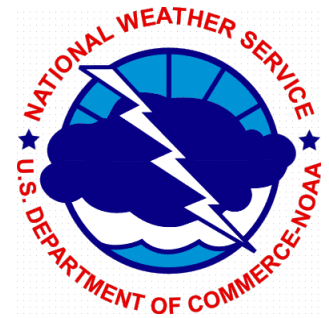
ROC Score against forecast lead time for different event probability thresholds.
COMO2.QINE.HEFS (reference forecast: Sample climatology)



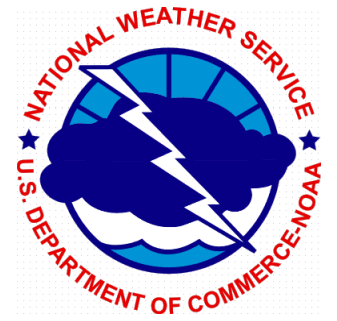
RFC runs 2007-2010



HEFS Operational Questions



- How will we use this in our daily operations?
- If our operations use only 18-30 hrs of QPF what do we show from HEFS?
 - Do we still use 16 days of QPF?
 - A run for both what was used operationally and one for longer range?
- What if official forecast falls outside of the traces?
- Add it to the operational IFD displays for forecasters to use?
- Will it run fast enough for operational use?
- Can it show major/extreme events?
- Will there be any real users?
- Will our core users be able to implement results of forecasts?
- Will the general public be able to use this?
- Reservoirs and their uncertainties?



QUESTIONS??????????

