Operationalizing the Hydrologic Ensemble Forecast Service (HEFS) at the CNRFC: Guidance for Forecasters

HEPEX Workshop

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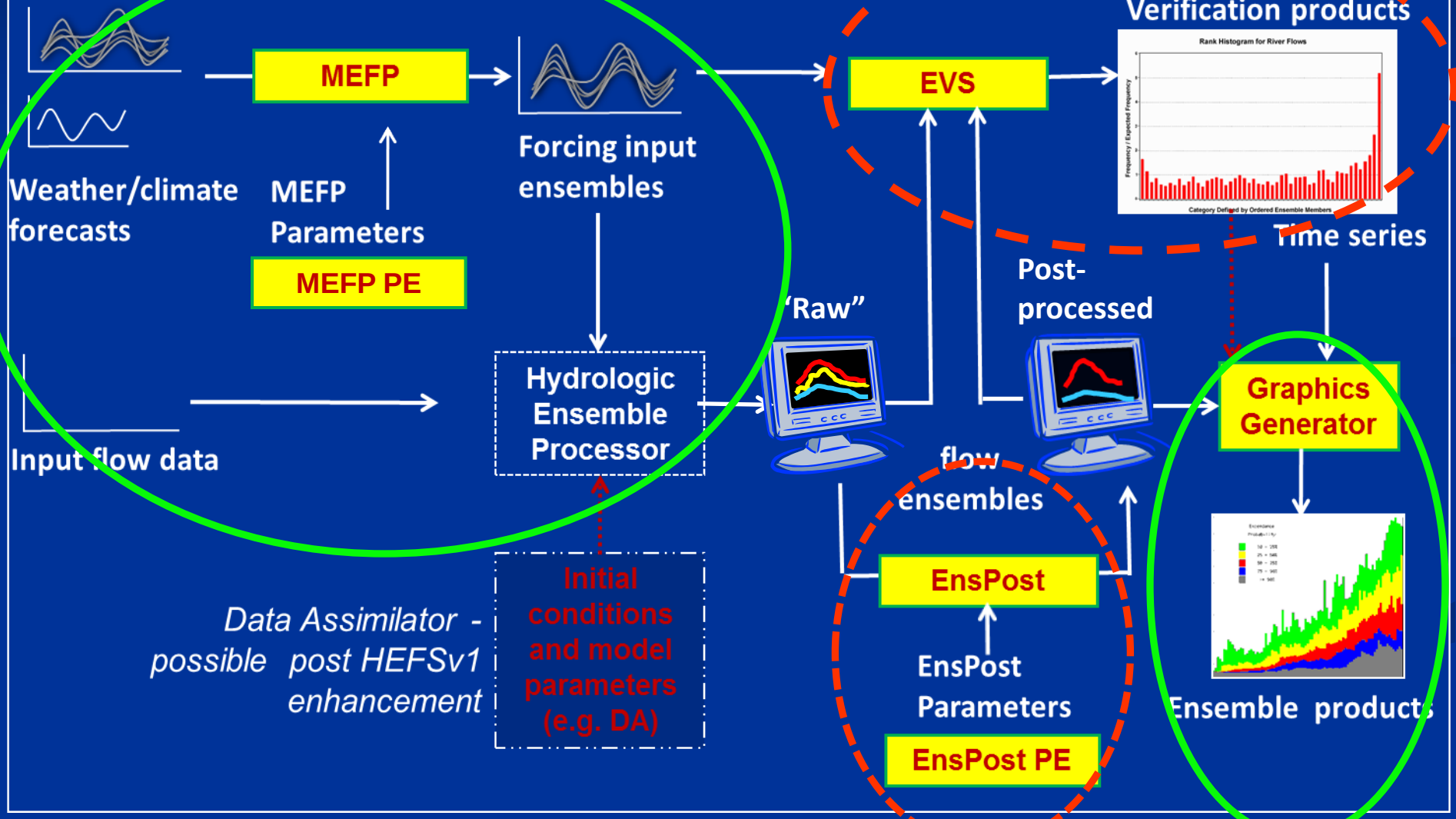
(Thanks to Brett Whitin, Chris Mayo at CNRFC)

HEFS - A Work in Progress



HEFS in CNRFC Operations

Challenge #1 - Ownership

- Paradigm Shift

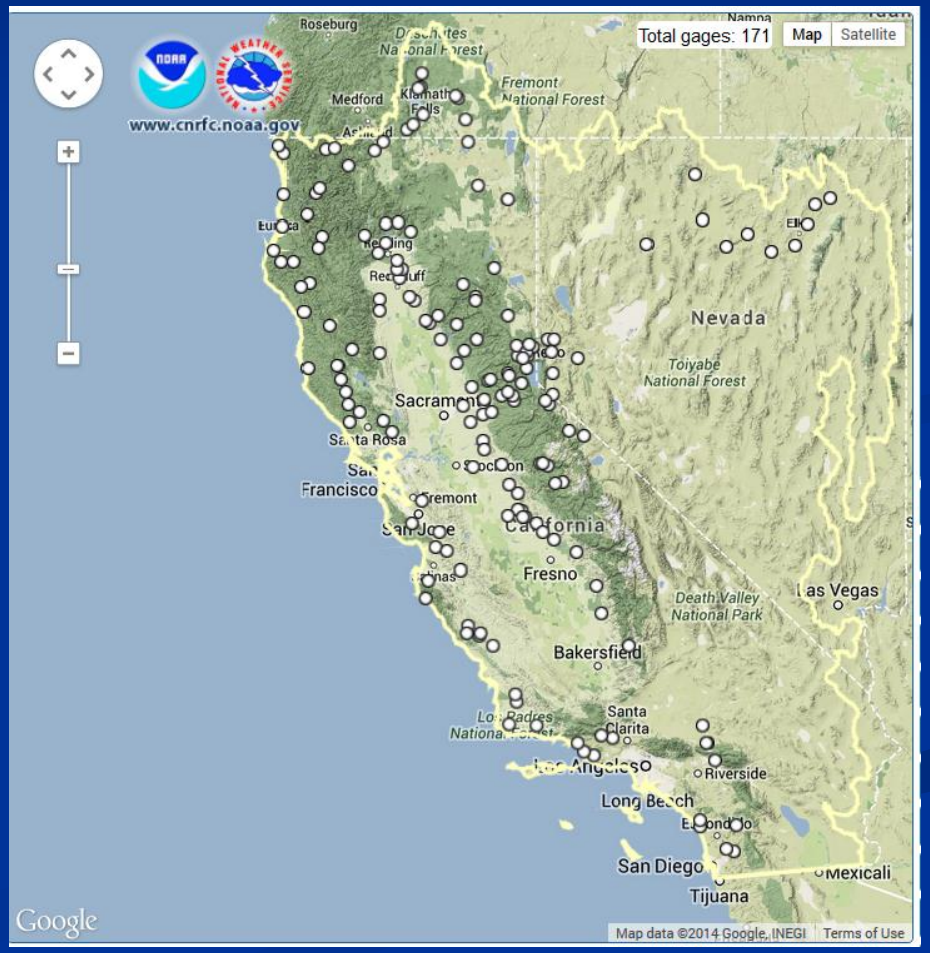
Old ➔
- Deterministic – High Level of Forecaster Involvement
  - Run-Time Modifications
  - High Experiential Knowledge (“pencil in” forecasts)

New➔
- HEFS/Probabilistic – Black Box
  - Forecasts are automated
  - How to “add value” to forecasts?

HEFS in CNRFC Operations

Challenge #2 - Timeliness

- California Hydrology
  - Many fast reacting streams
  - 171 HEFS points
  - 60 minutes if we run HEFS linearly
- Multiple HEFS runs
  - 9 FSS's
  - 12 forecast groups
  - 25 minutes run-time

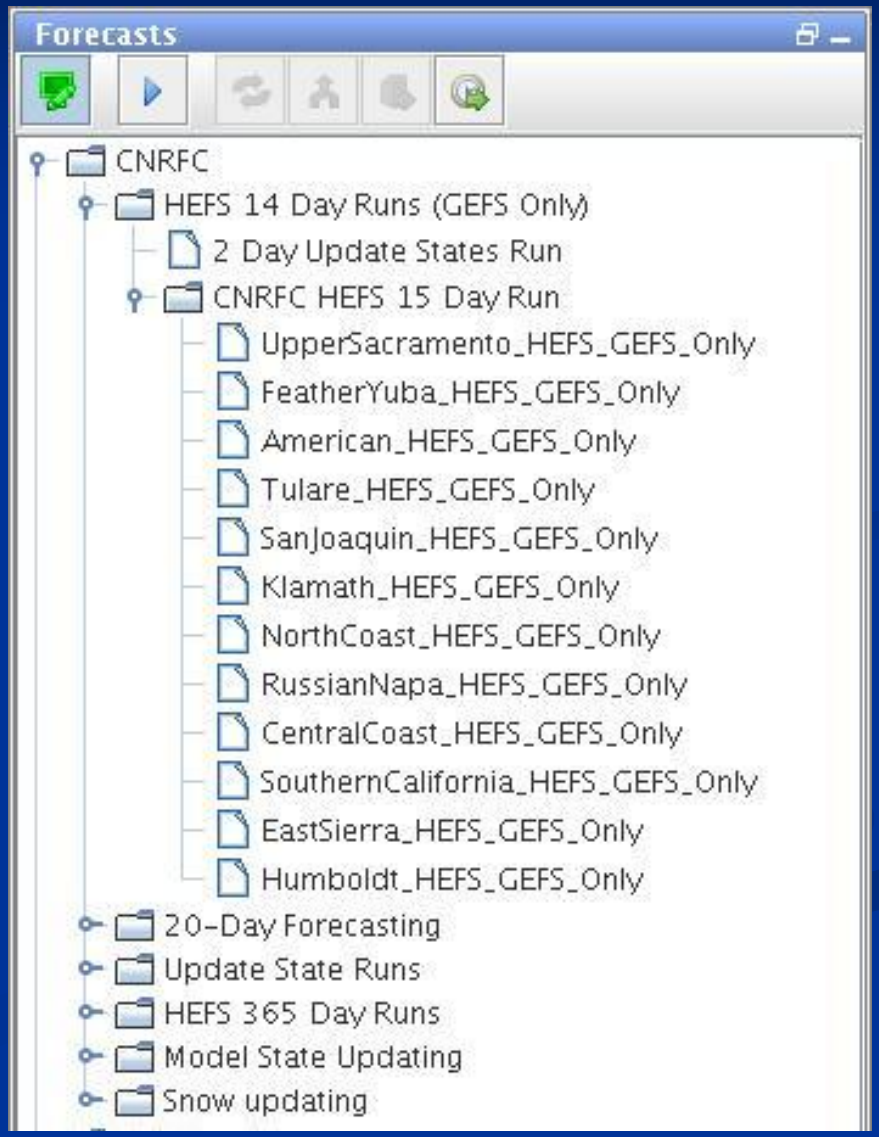


HEFS in CNRFC Operations

Challenge #2 - Timeliness

- How do we make HEFS output available for forecasters?

- GEFS runs only
  - 15-day run
  - Quick (5-7 minutes)
  - Drawback – no HAS QPF, mods



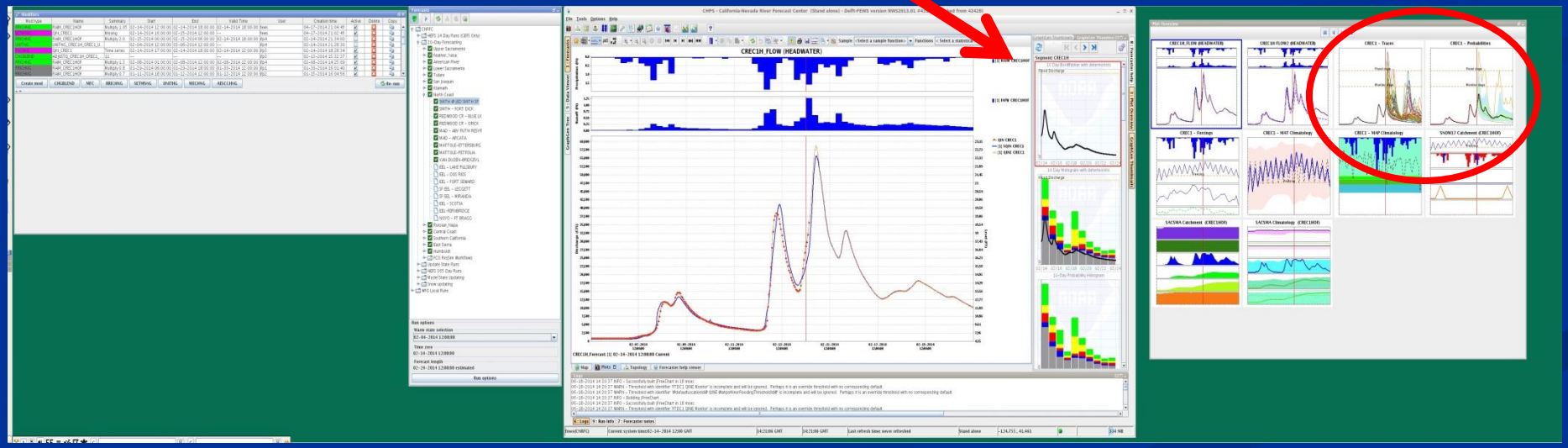
HEFS in CNRFC Operations

CHPS Internal Displays

Modifier window

Forecast window with GraphGen

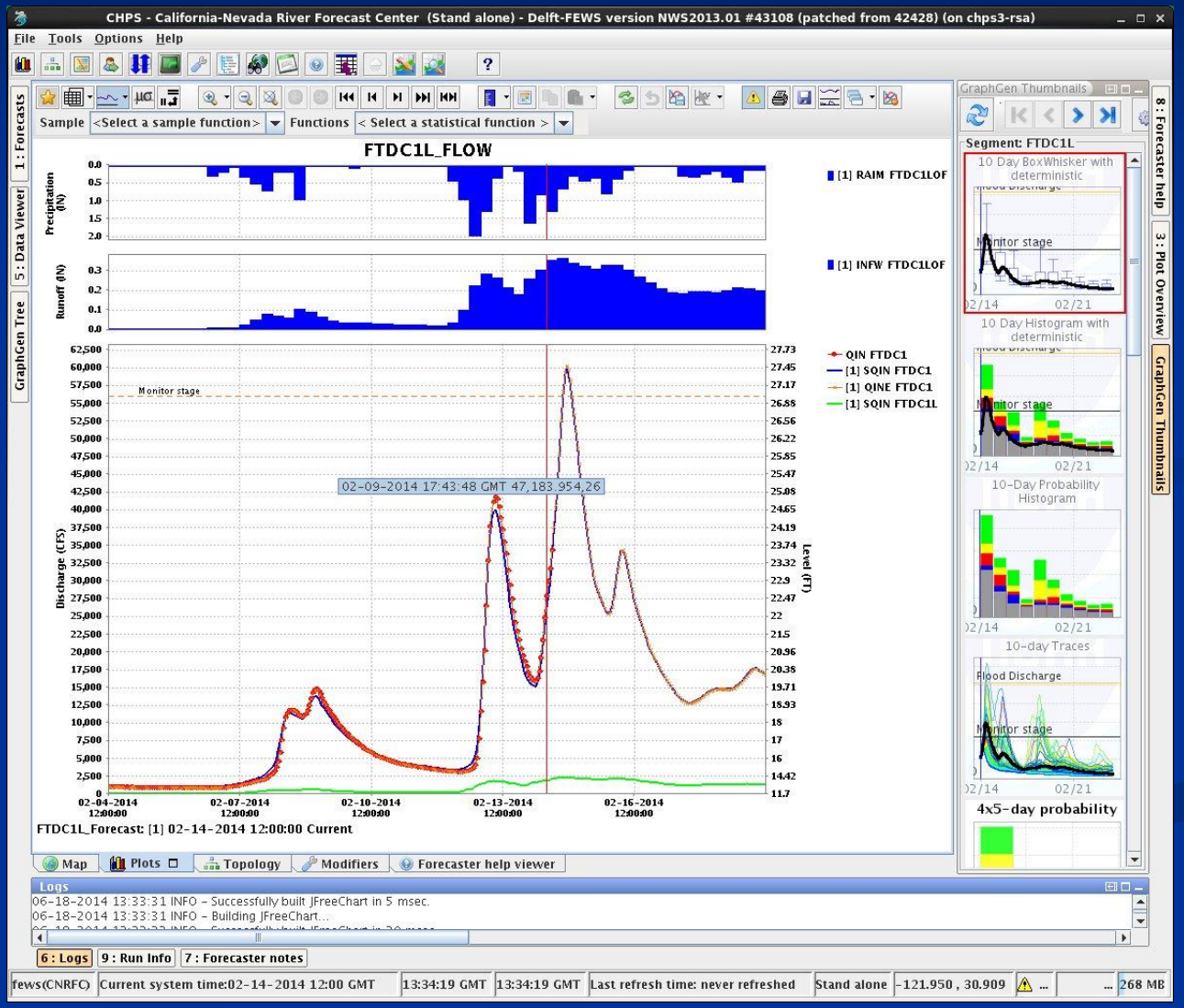
Plot Overview window



HEFS in CNRFC Operations

Internal Displays

- Graphgen



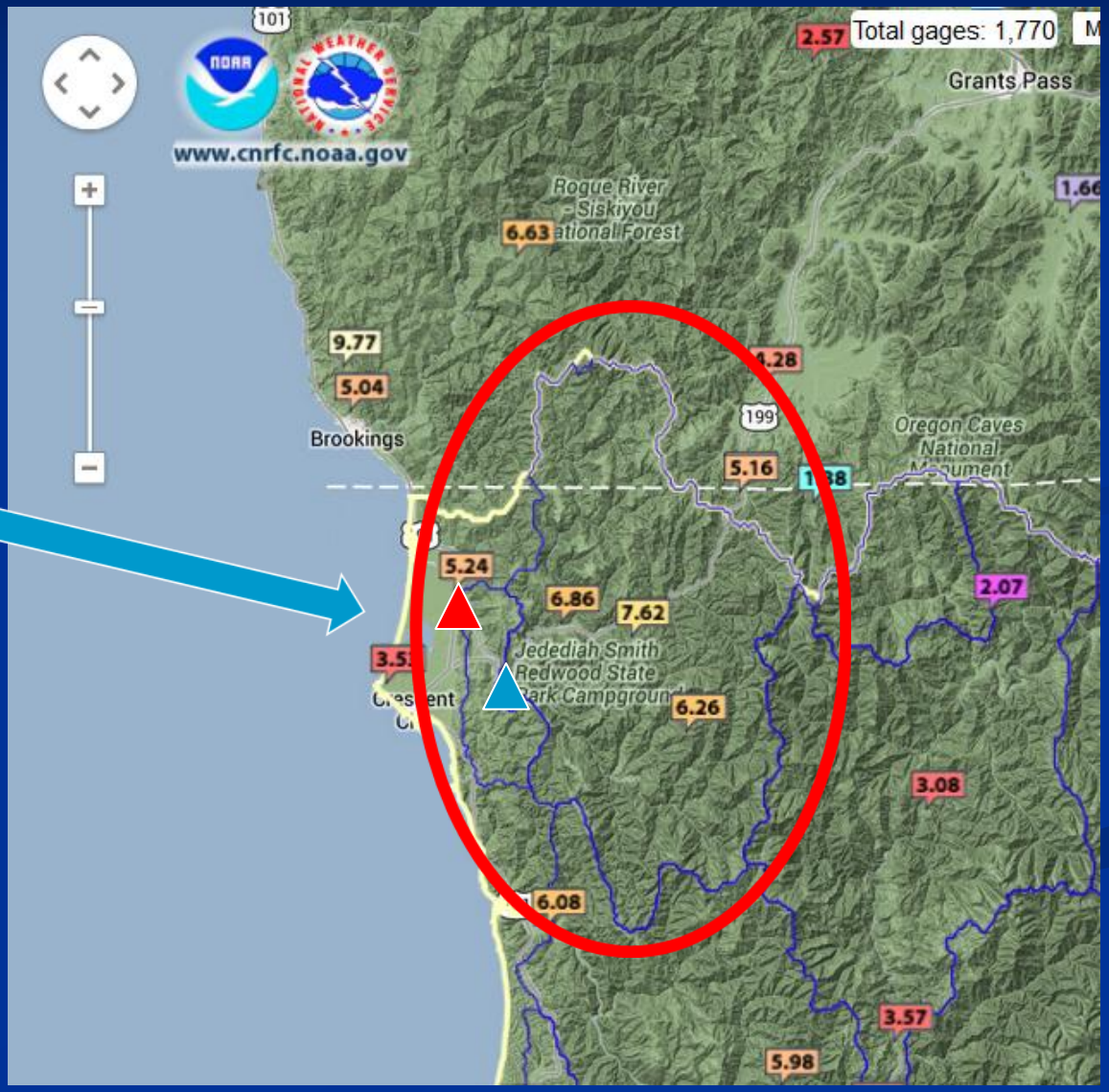
Case Study – Feb. 14, 2014

- 48-hour Precipitation

(2/12 – 2/14 - 0400 PLT)

<u>Smith River</u>

- △ Jed Smith
- ▲ Fort Dick



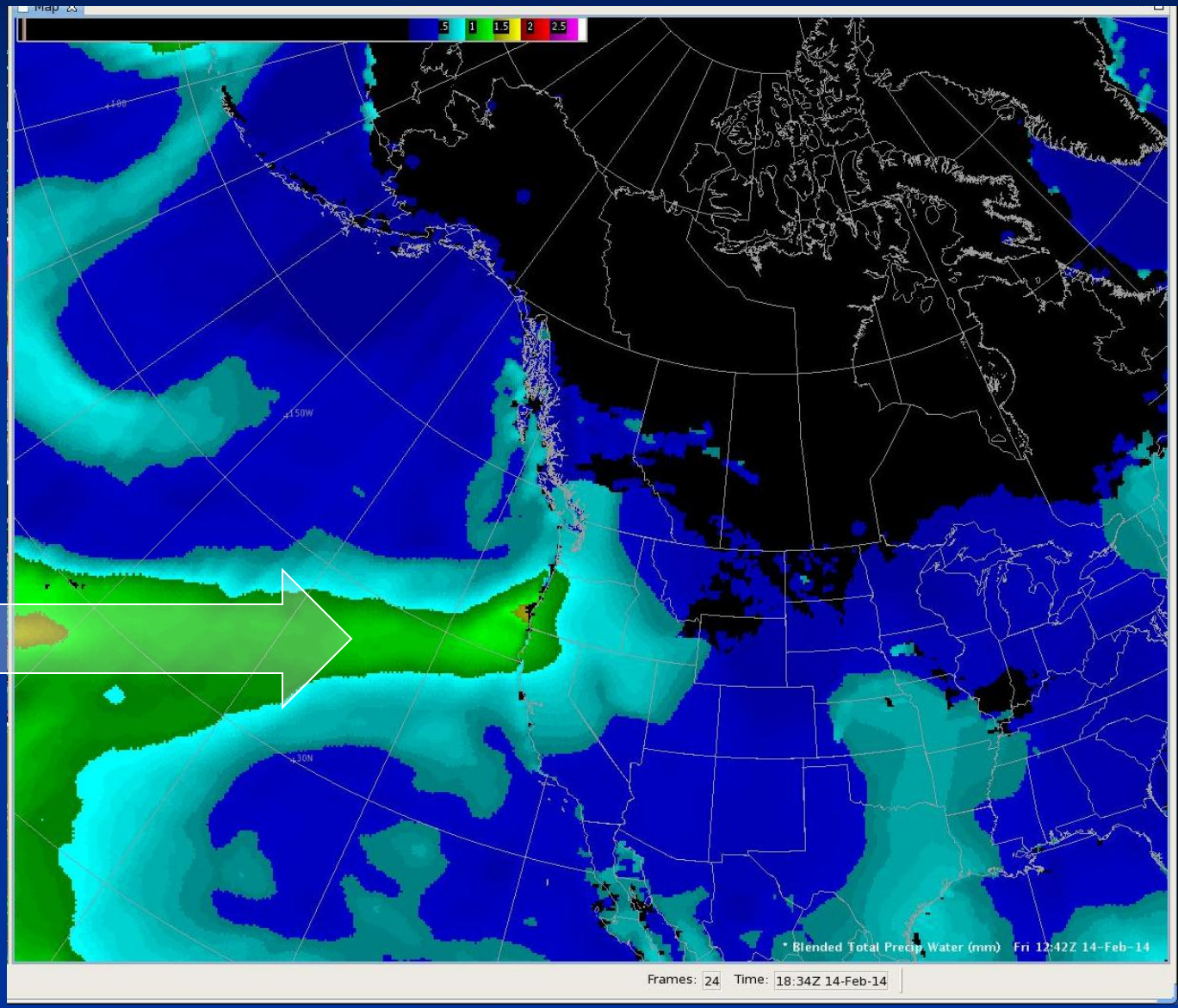
Case Study – Feb. 14, 2014

TPW Satellite

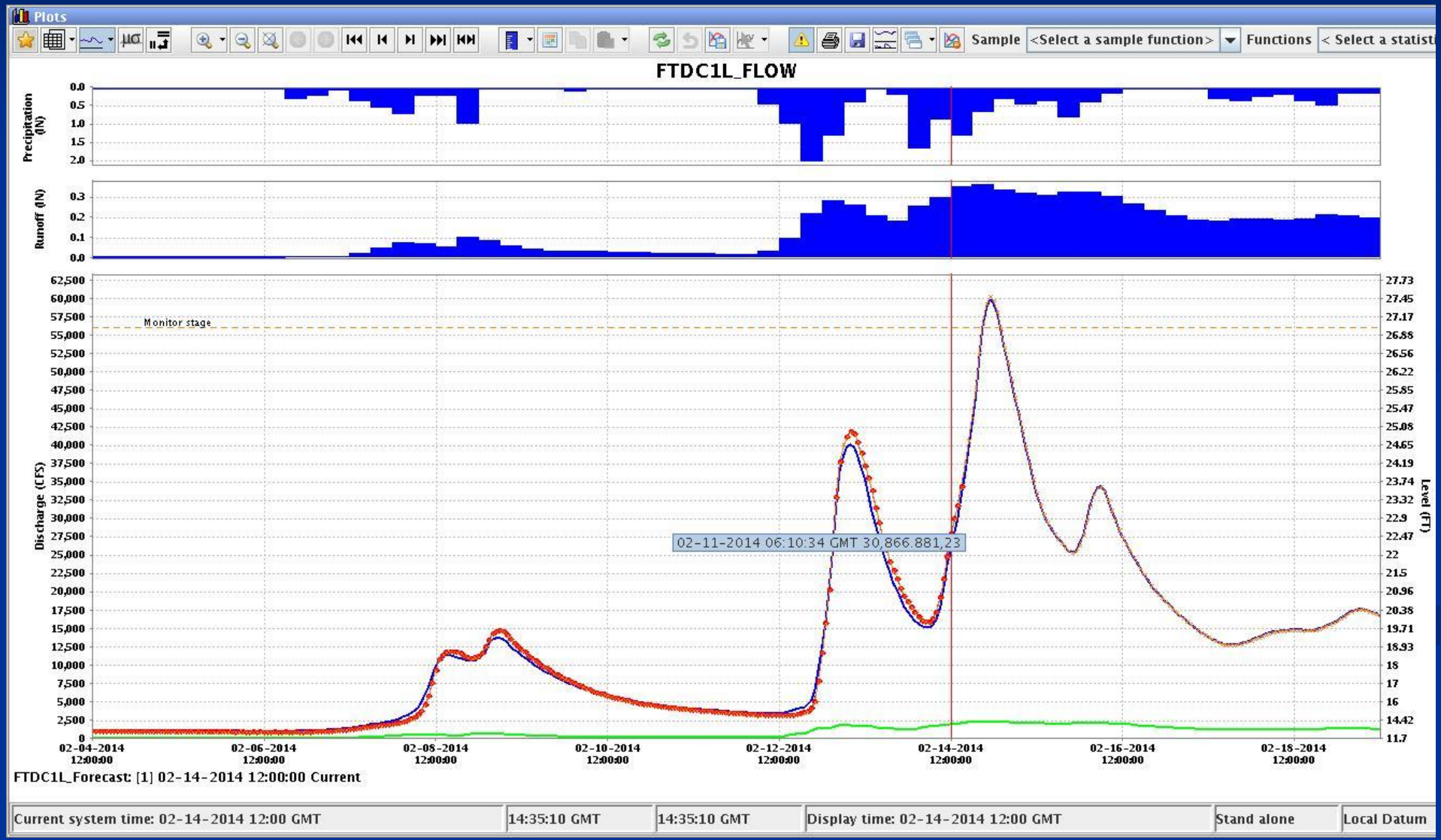
Feb 14th

10:00 am

1-1.5” TPW plume

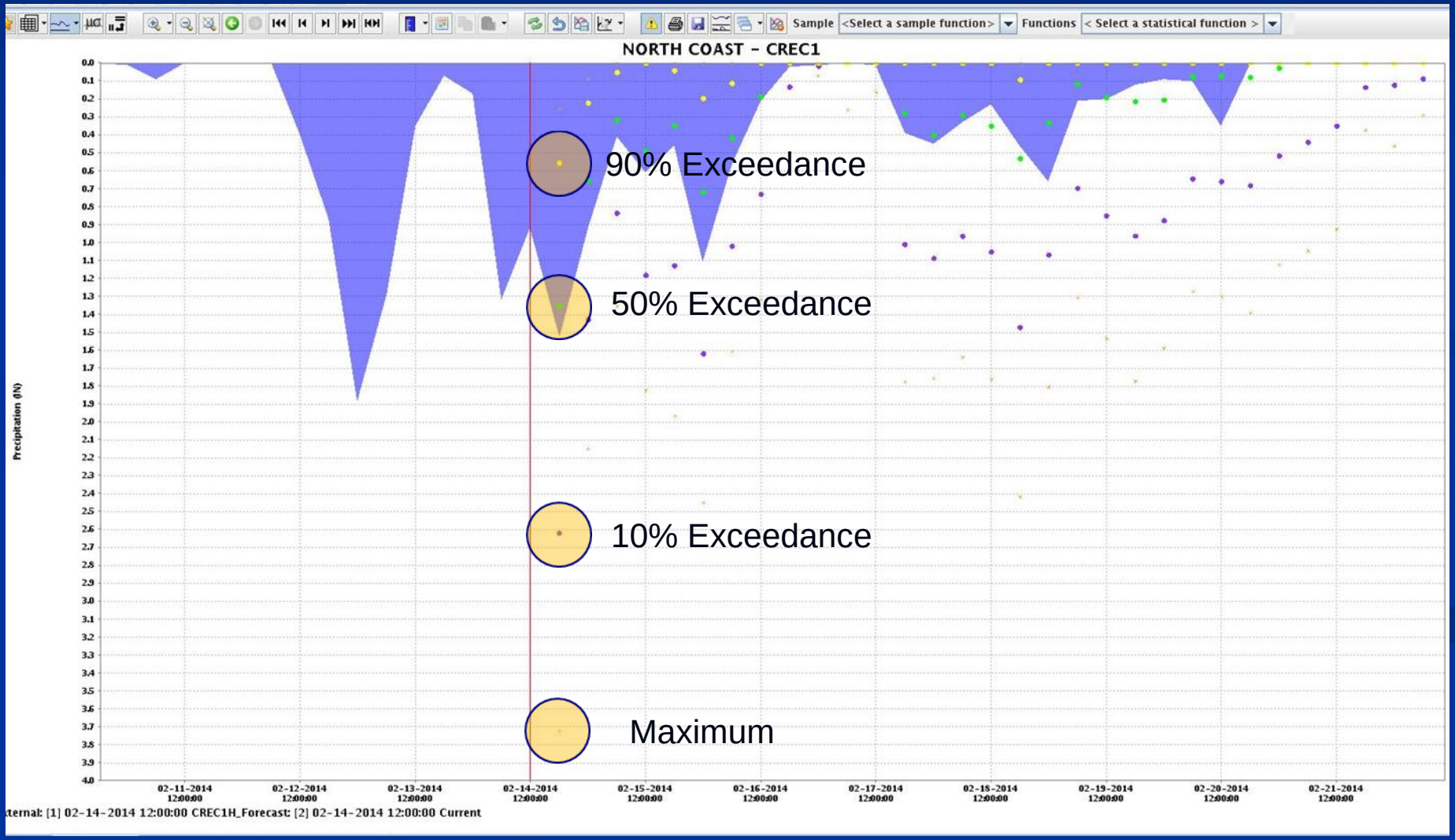


Case Study – Feb. 14, 2014



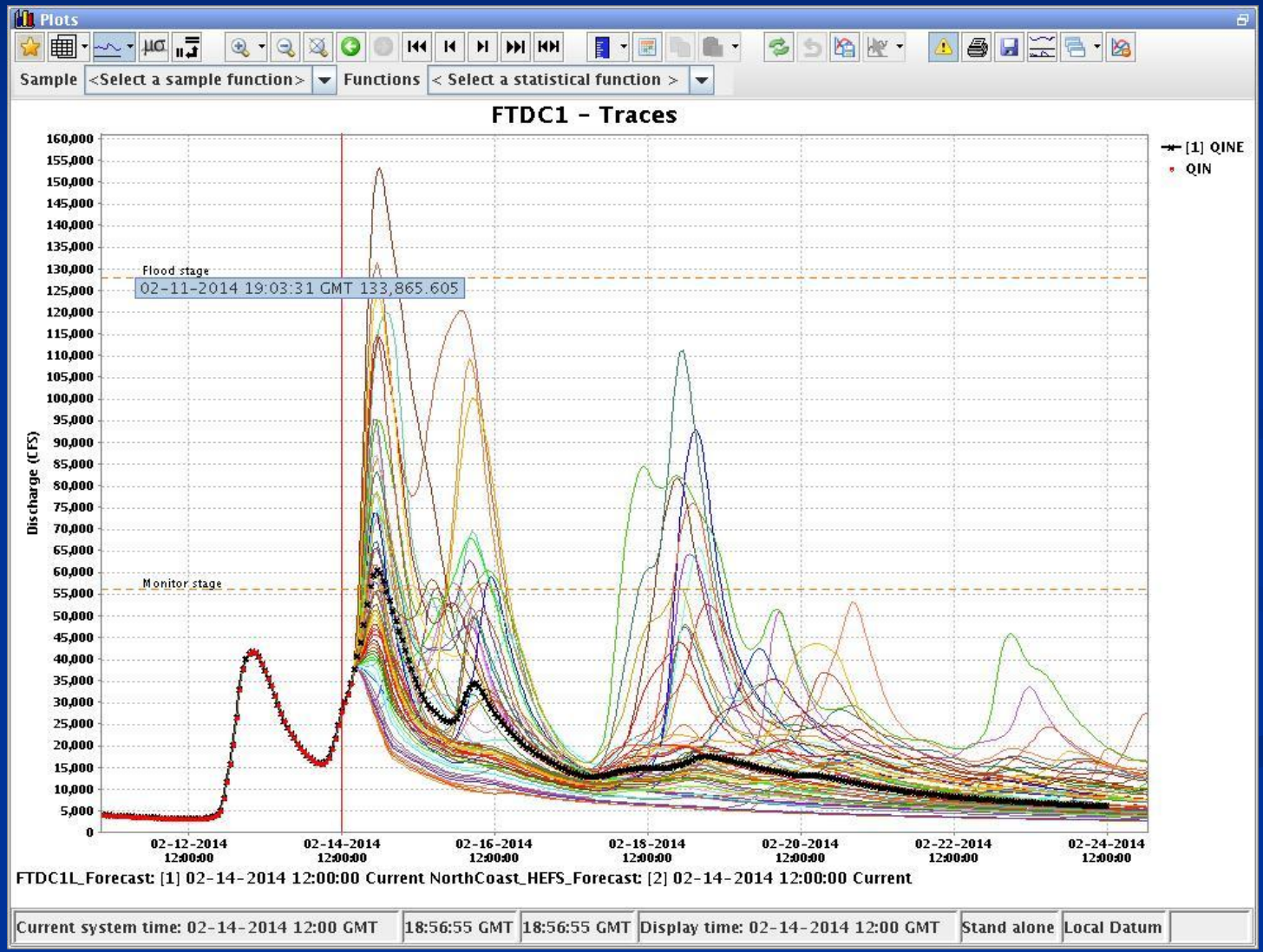
Case Study – Internal Displays

MEFP Output Display – Feb 14th



Case Study – Internal Displays

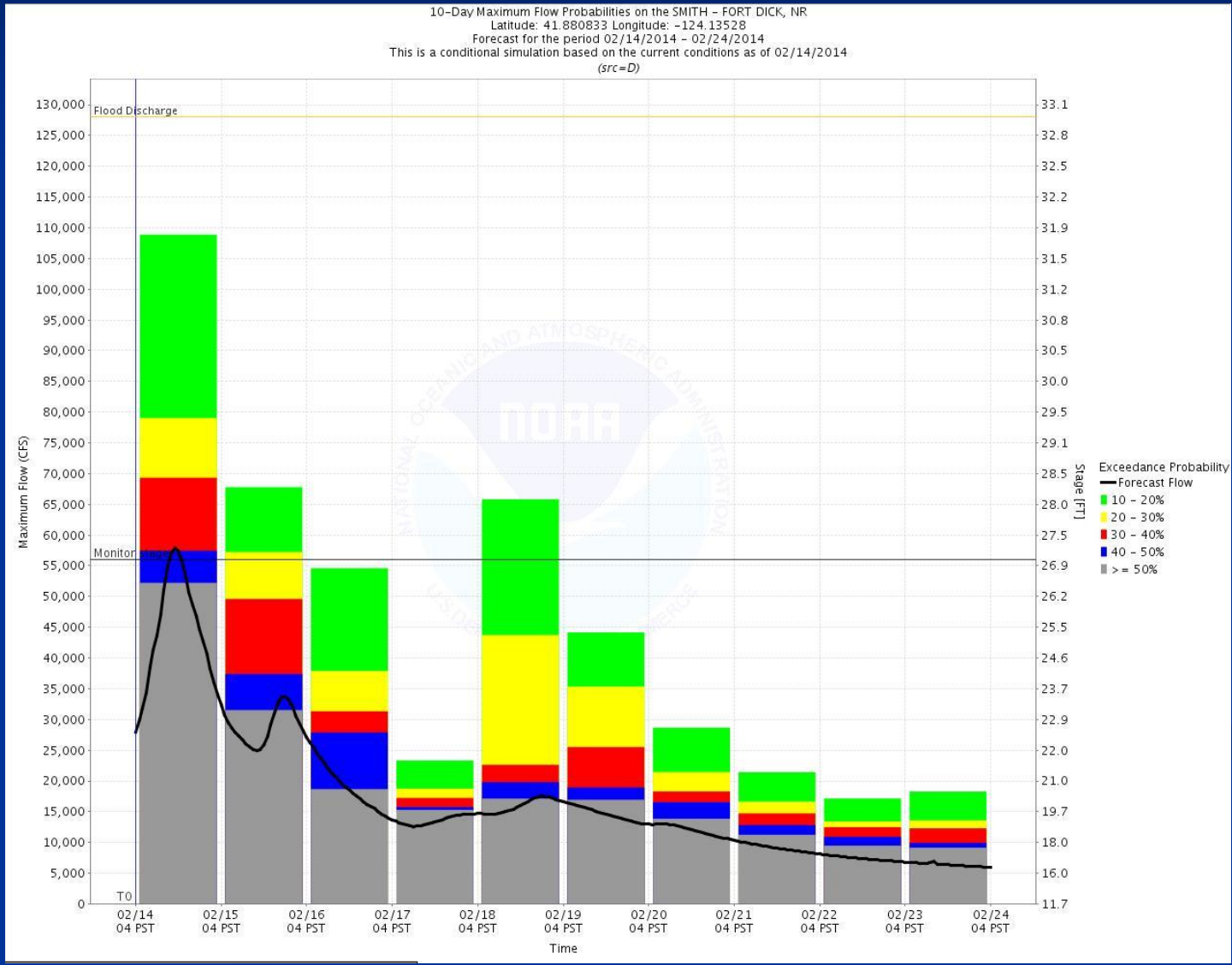
Traces with Deterministic – Feb 14th



Case Study – Internal Displays

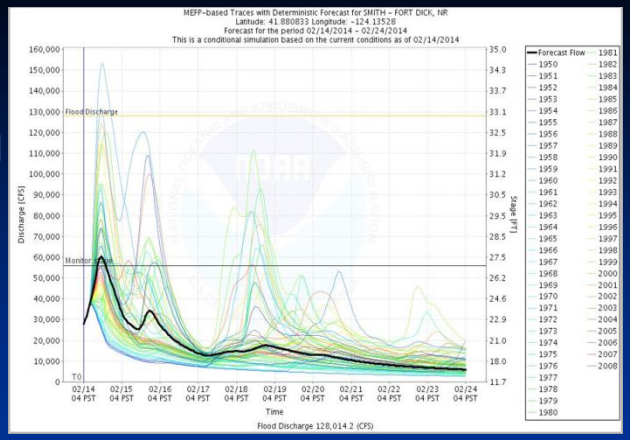
Daily Maximums Histogram

2/14 Forecast Flow ——

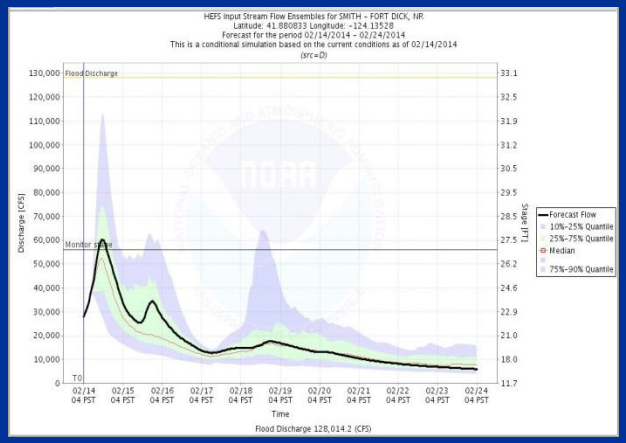


GraphGen Options

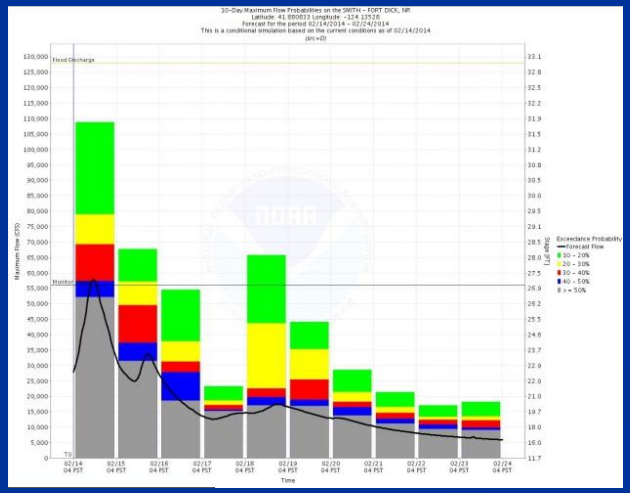
A.



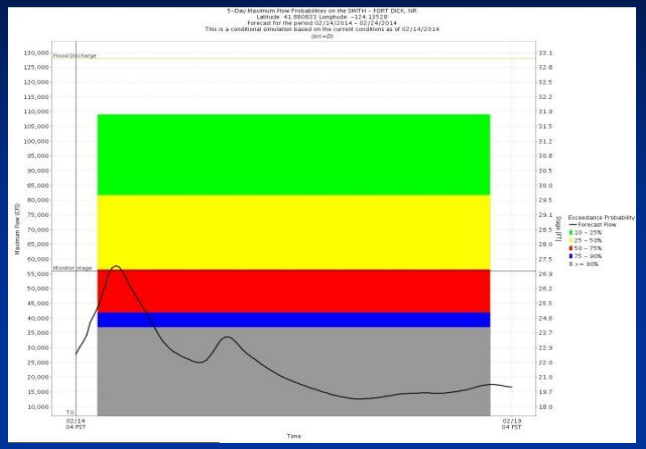
B.



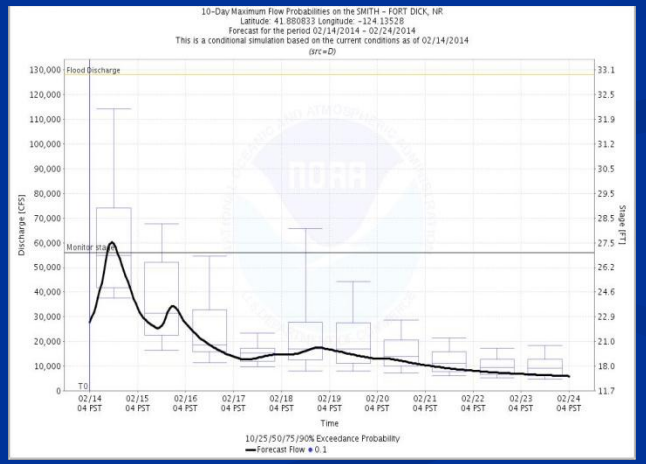
C.



D.



E.

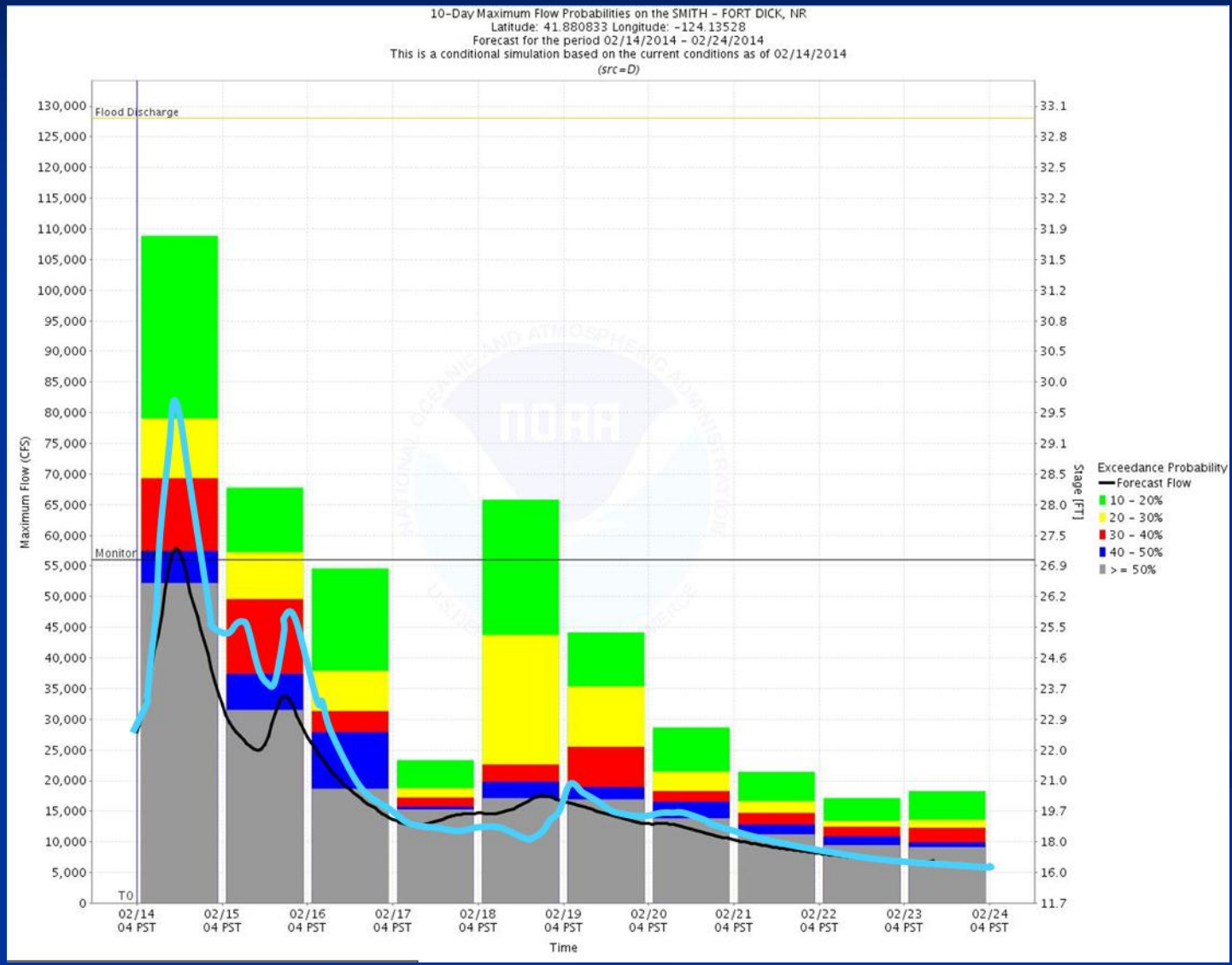


F. Suggestions ??

Case Study Verification

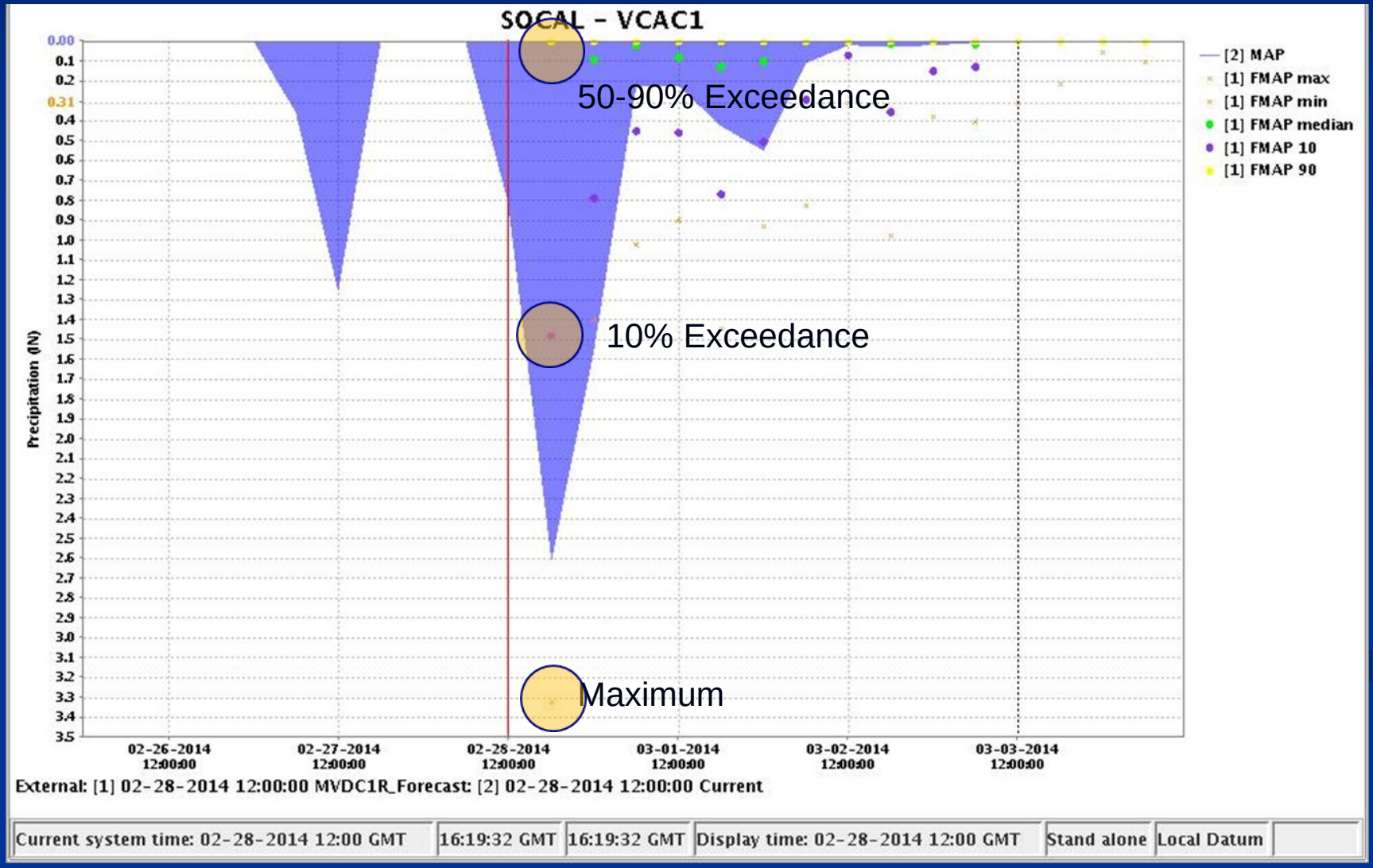
Observed Flow

2/14 Forecast Flow



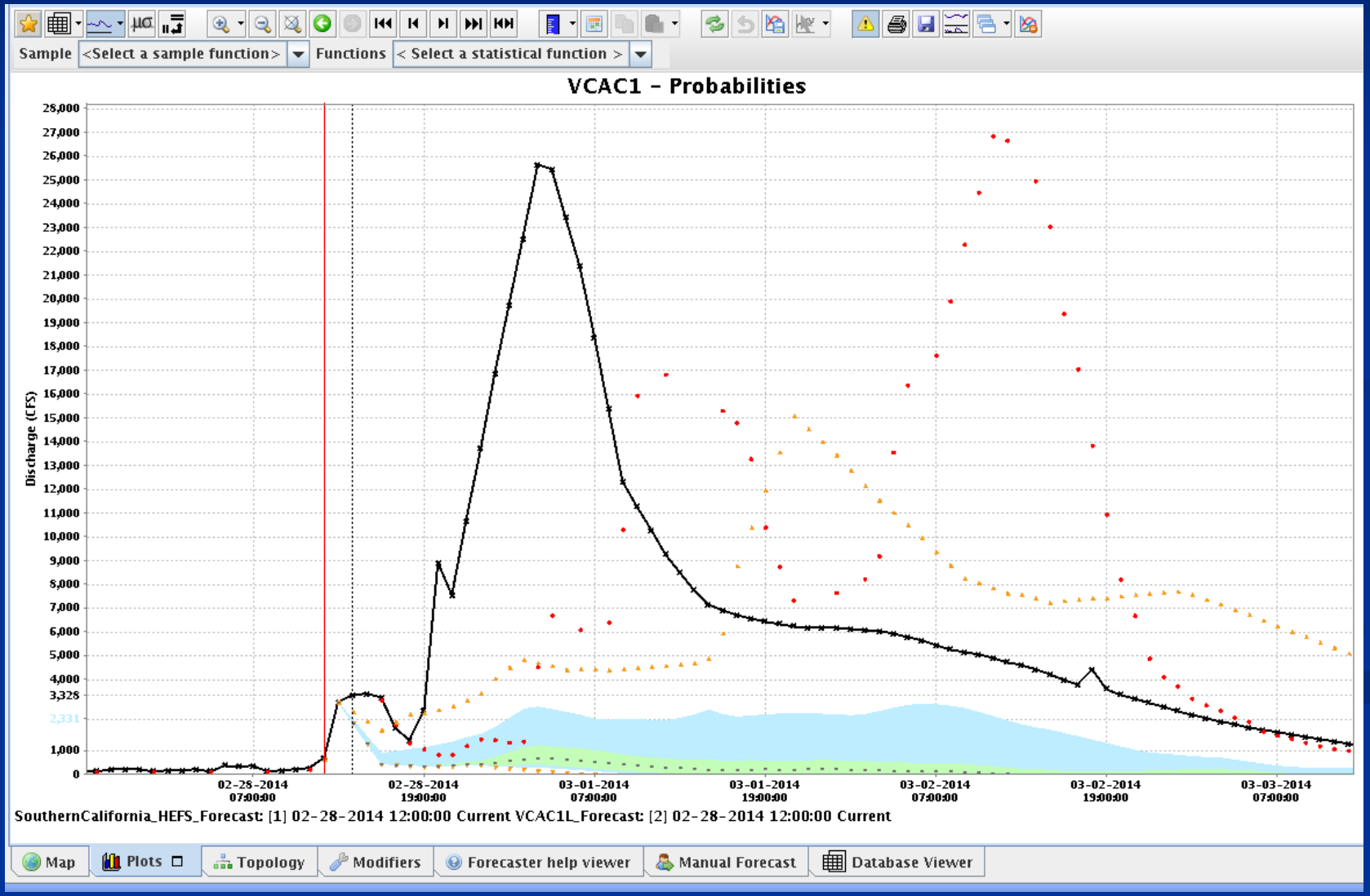
Case Study #2 – Internal Displays

MEFP Display – Feb. 28, 2014



Case Study #2 – Internal Displays

Hourly Histogram – Feb. 28, 2014



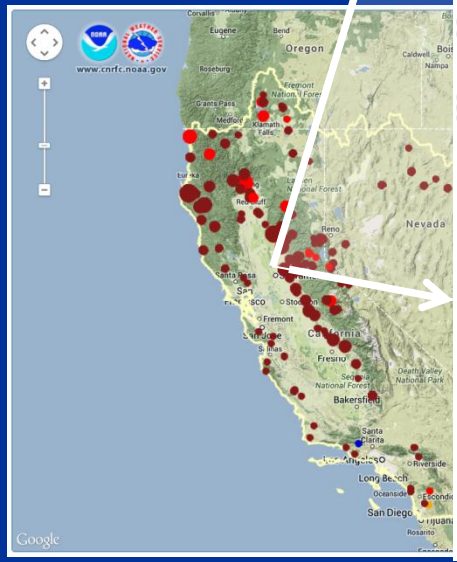
HEFS in CNRFC Operations

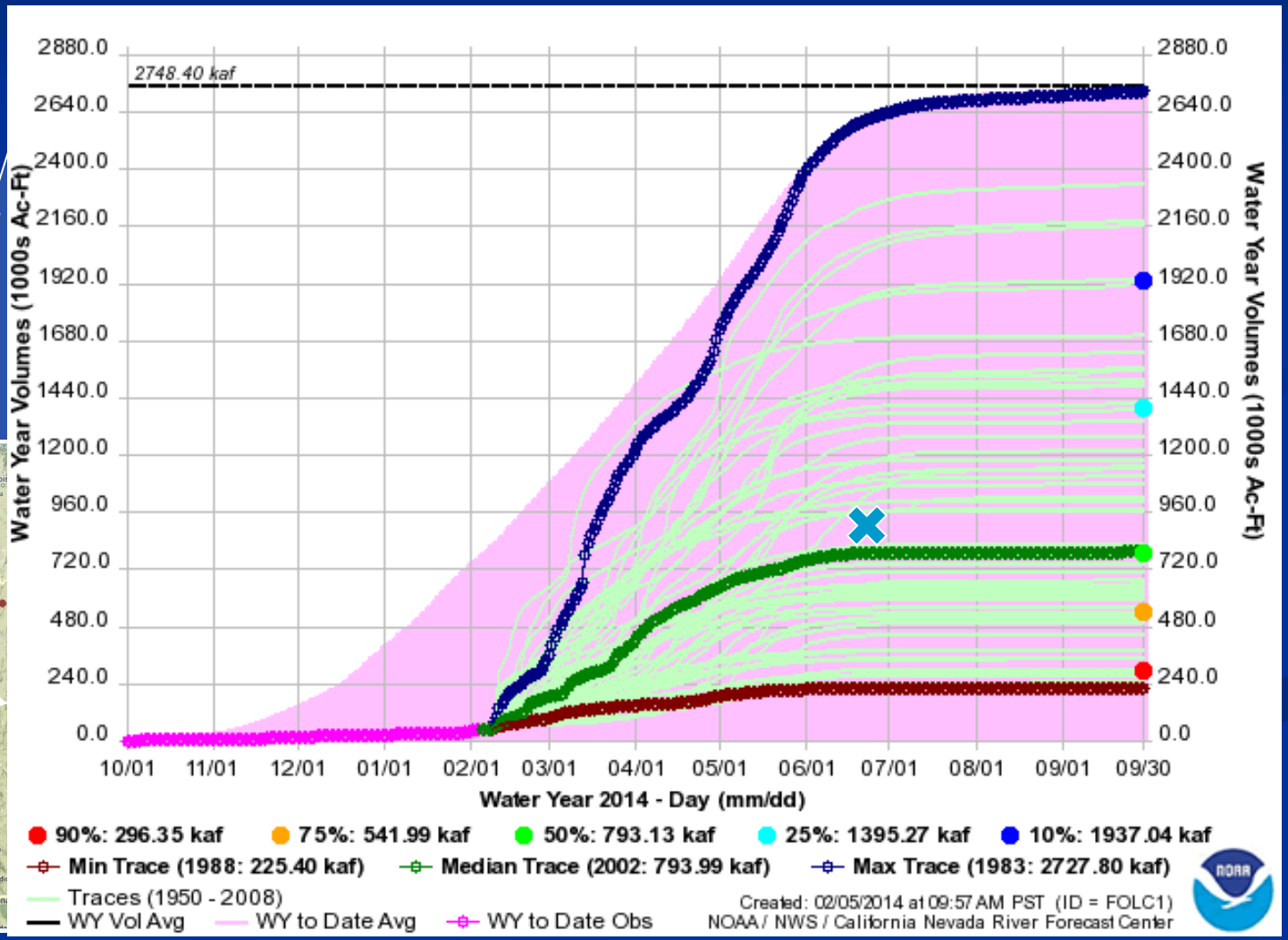
Water Year Accumulated Volume Plot

American River
At Folsom Dam

2/05/2014
forecast

✖ = 900 KAF





Summary

- HEFS short-term ensembles presents a new paradigm for CNRFC forecasters
- Timeliness in producing HEFS output for CNRFC forecasters still a challenge
- Growing appreciation of HEFS output, particularly in water supply forecasting.
- Lack of sharpness in short-term.

Questions ?