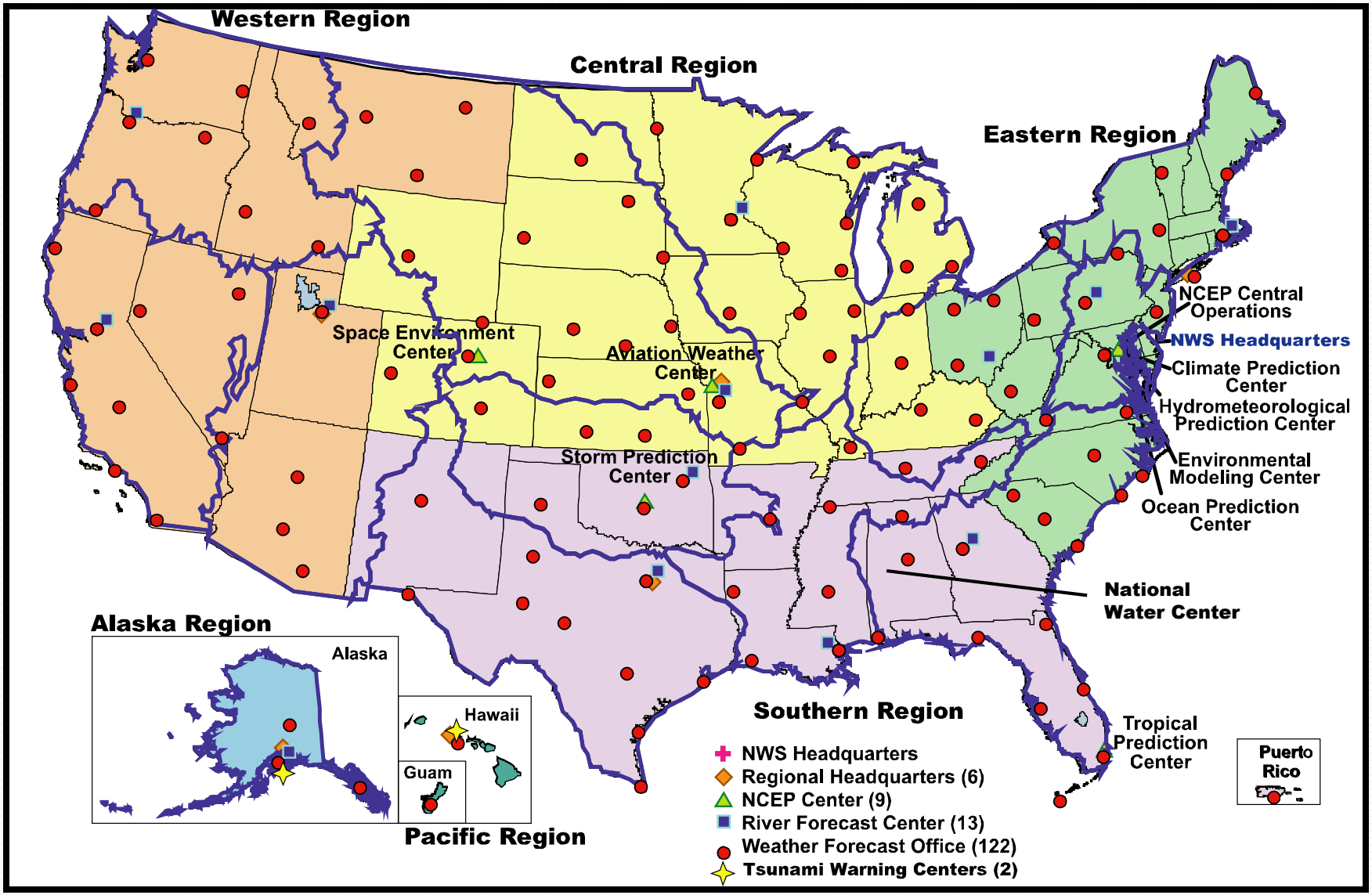
SERFC Operations Forecasting in SC

South Carolina Meeting

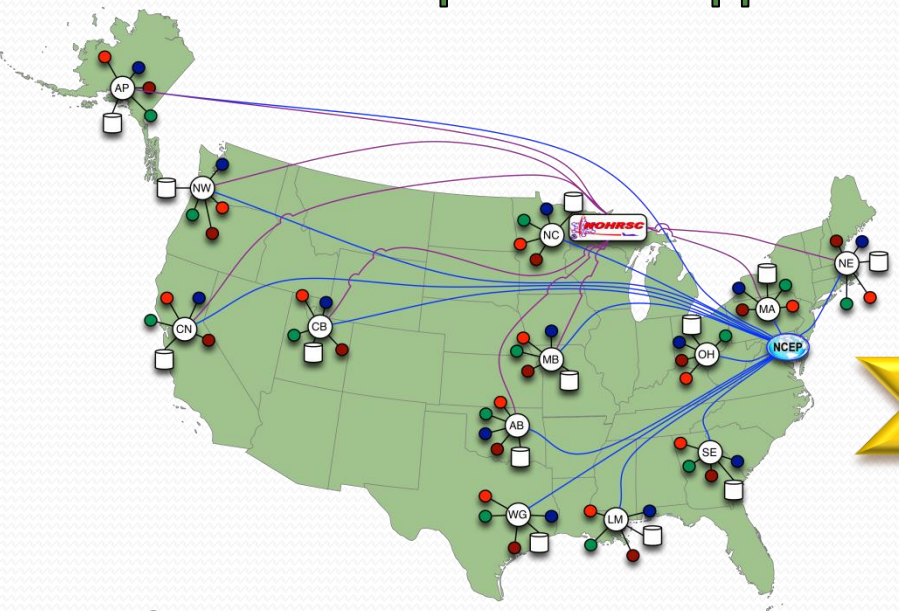
February 3rd , 2016

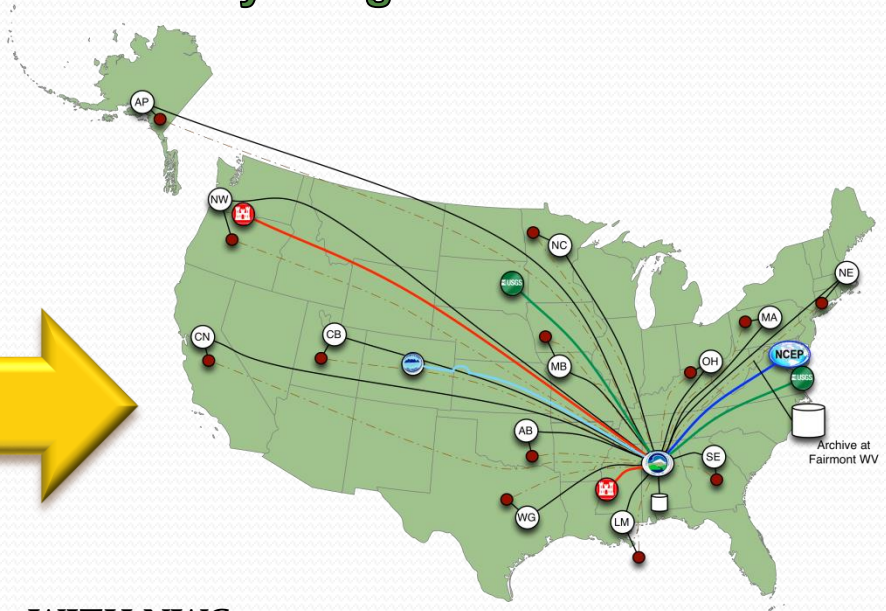
NWS operational Infrastructure



Hydrology Program Data Flow

To enable NWC-provided support and ensure a fully integrated field structure





TODAY

- *Each RFC responsible for all data acquisition, QA/QC, modeling, post-processing, archival and service backup*

Archive
State/Local Data
National External Data
Regional External Data
Geospatial Data

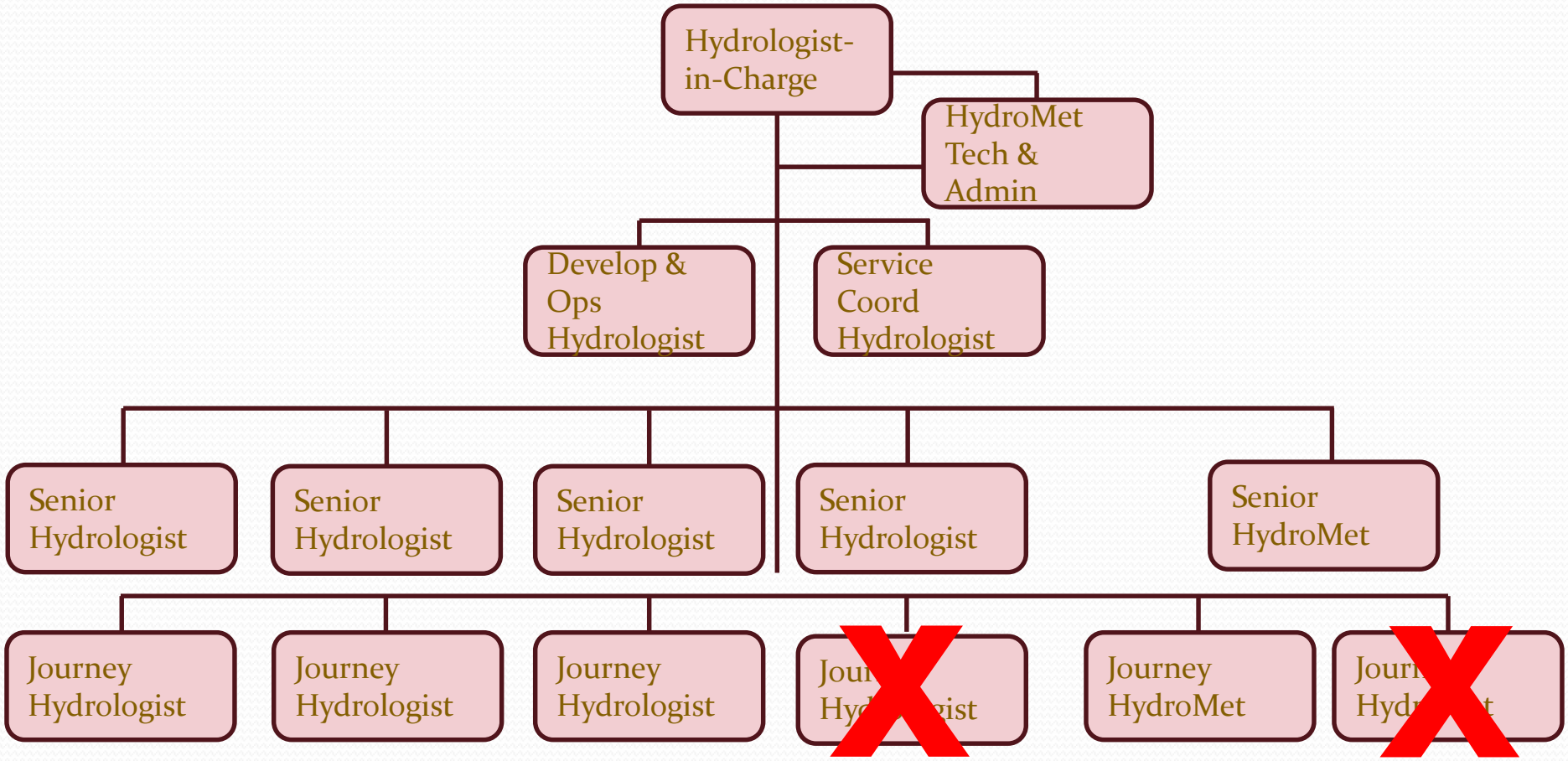
WITH NWC

- *NWC centralizes data acquisition, processing, archival and service backup*
- *RFCs acquire local data, especially anthropogenic, and QA/QC*
- *NWC provides centralized forecast guidance for full spectrum of water parameters*
- *Focal point for threading global-regional-local modeling, forecasting and situational awareness to ensure consistency in products and services*

NWS National Water Center

NOAA's National Weather Service

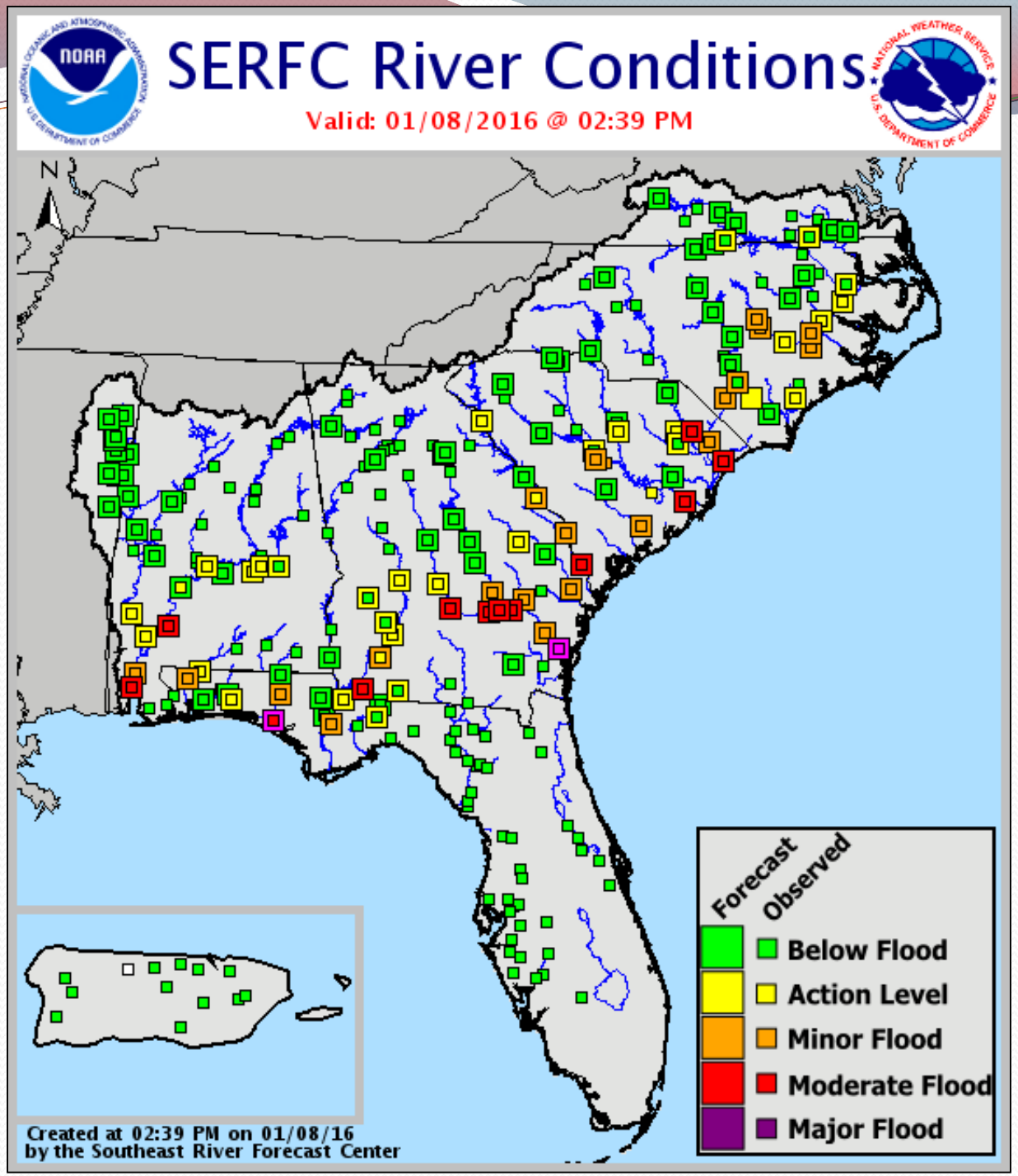
Staffing Profile



3 civil engineers
1 Hydrology major
8 Meteorologists

University of Oklahoma
Penn State
Georgia Tech
Iowa State
Universidad de Chile

University of Colorado
University of Arizona
THE Ohio State University
SUNY Oneonta


SERFC River Conditions
Valid: 01/08/2016 @ 02:39 PM
N
Forecast
Observed
Below Flood
Action Level
Minor Flood
Moderate Flood
Major Flood
Created at 02:39 PM on 01/08/16
by the Southeast River Forecast Center

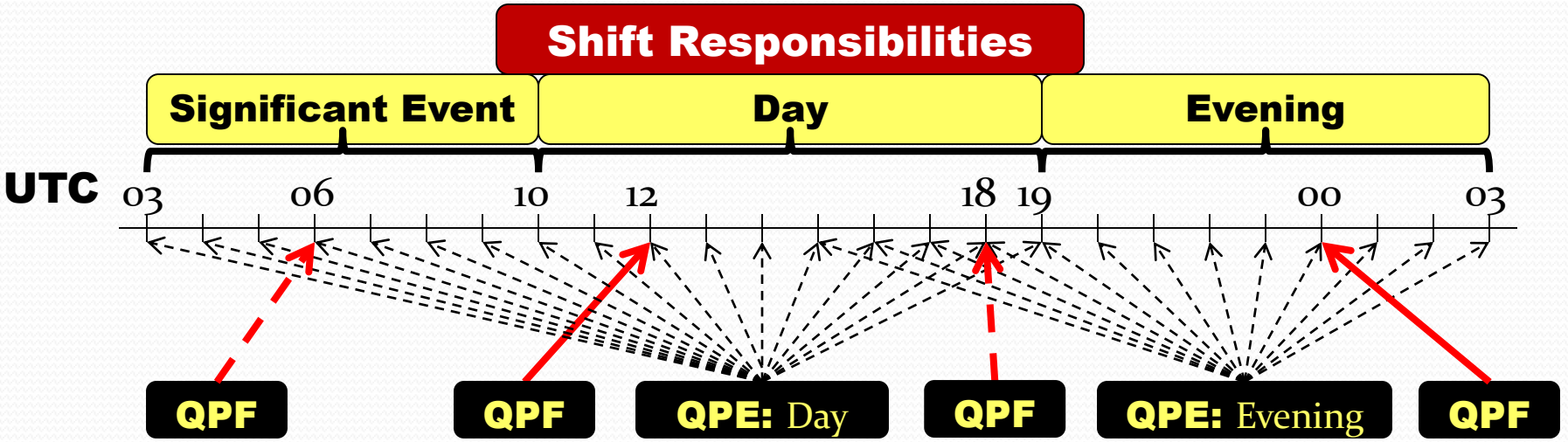
Hydrometeorology Function at the SERFC

Quantitative Precipitation Estimates (QPEs)

- **Radar** — 28 Dual-Polarization Doppler Radars
- **Rain-Gauge** — Hundreds of Sub-Hourly, Hourly, and Daily Rain-Gauges
- **Satellite** — Only if Radar and Rain-Gauge Data Unavailable

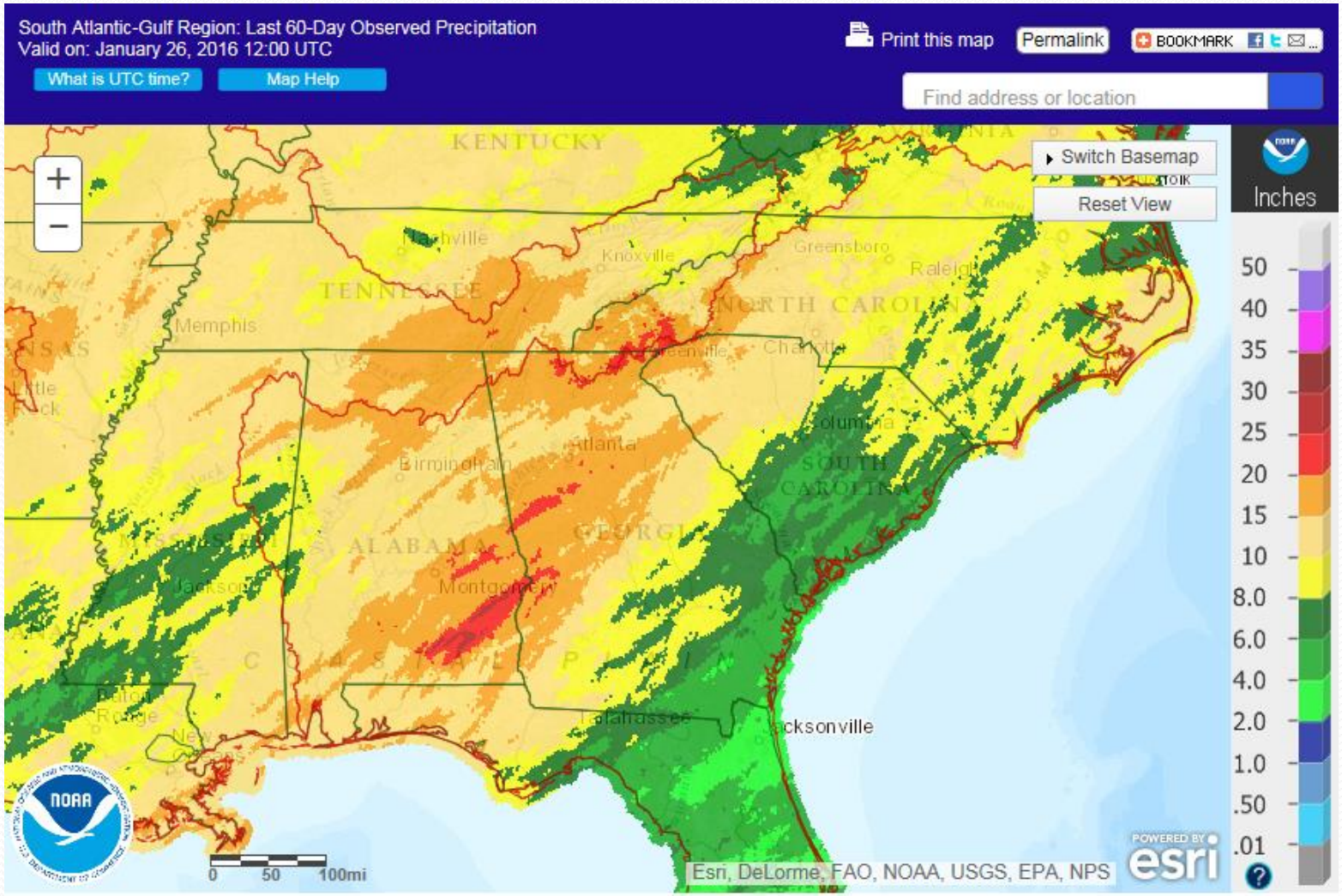
Multisensor Precipitation Estimate (MPE) Editor

- ~20 QPE Gridded Fields
- \+ Mean-Field Bias Correction → **QPE**
- \+ Manual Editing



Quantitative Precipitation Estimates (QPE)

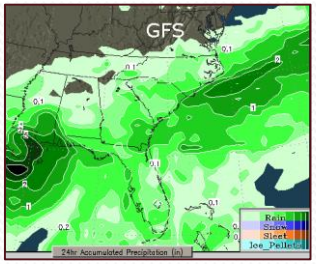
- **Daily+**
- **water.weather.gov/precip**



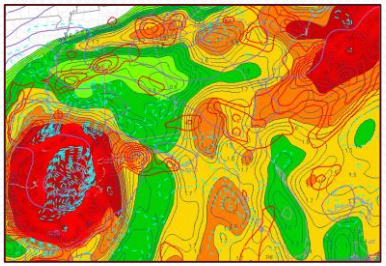
Hourly+
www.srh.noaa.gov/ridge2/RFC_Precip

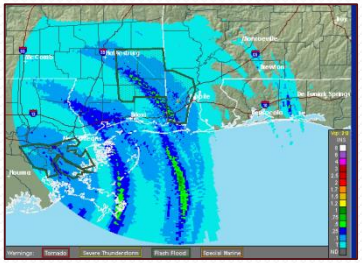
Daily+
water.weather.gov/precip

Quantitative Precipitation Forecast

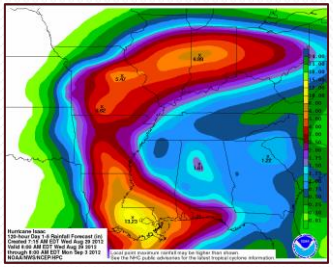


Model Output

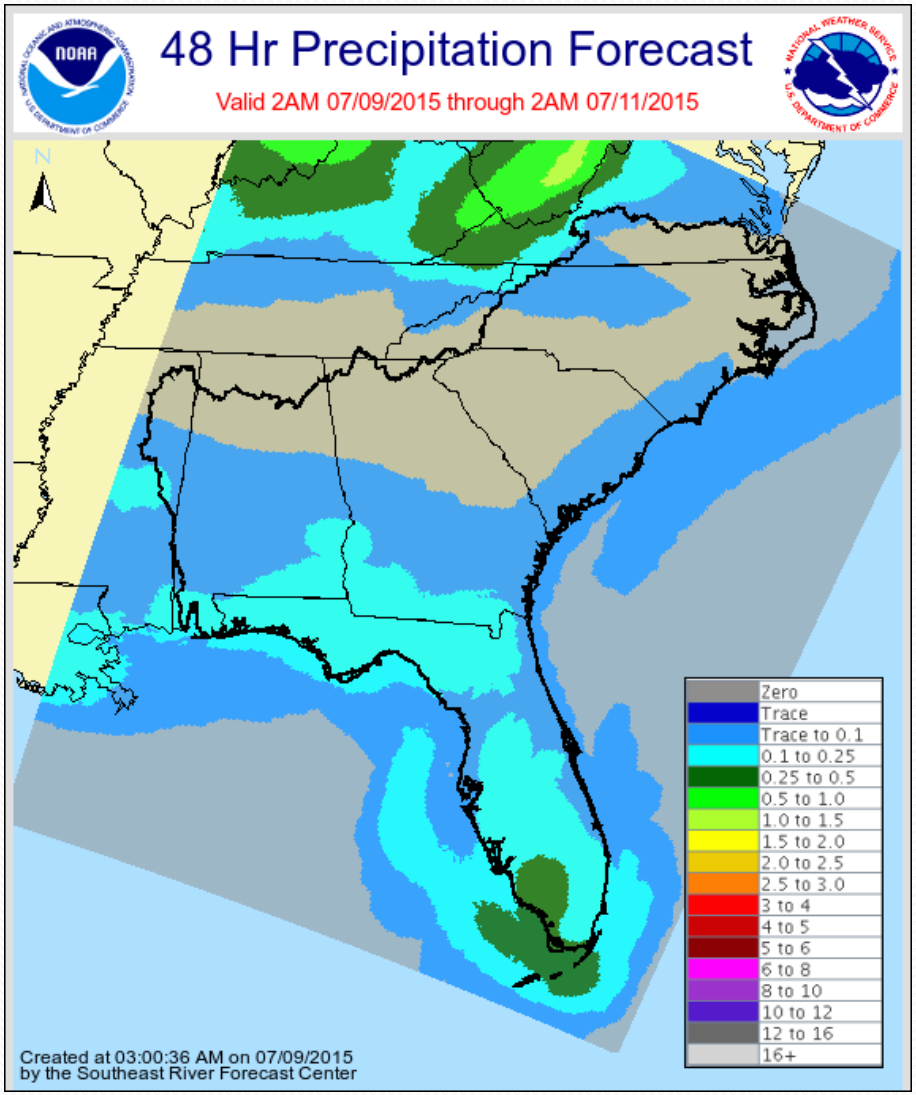




Current Hourly Rainfall



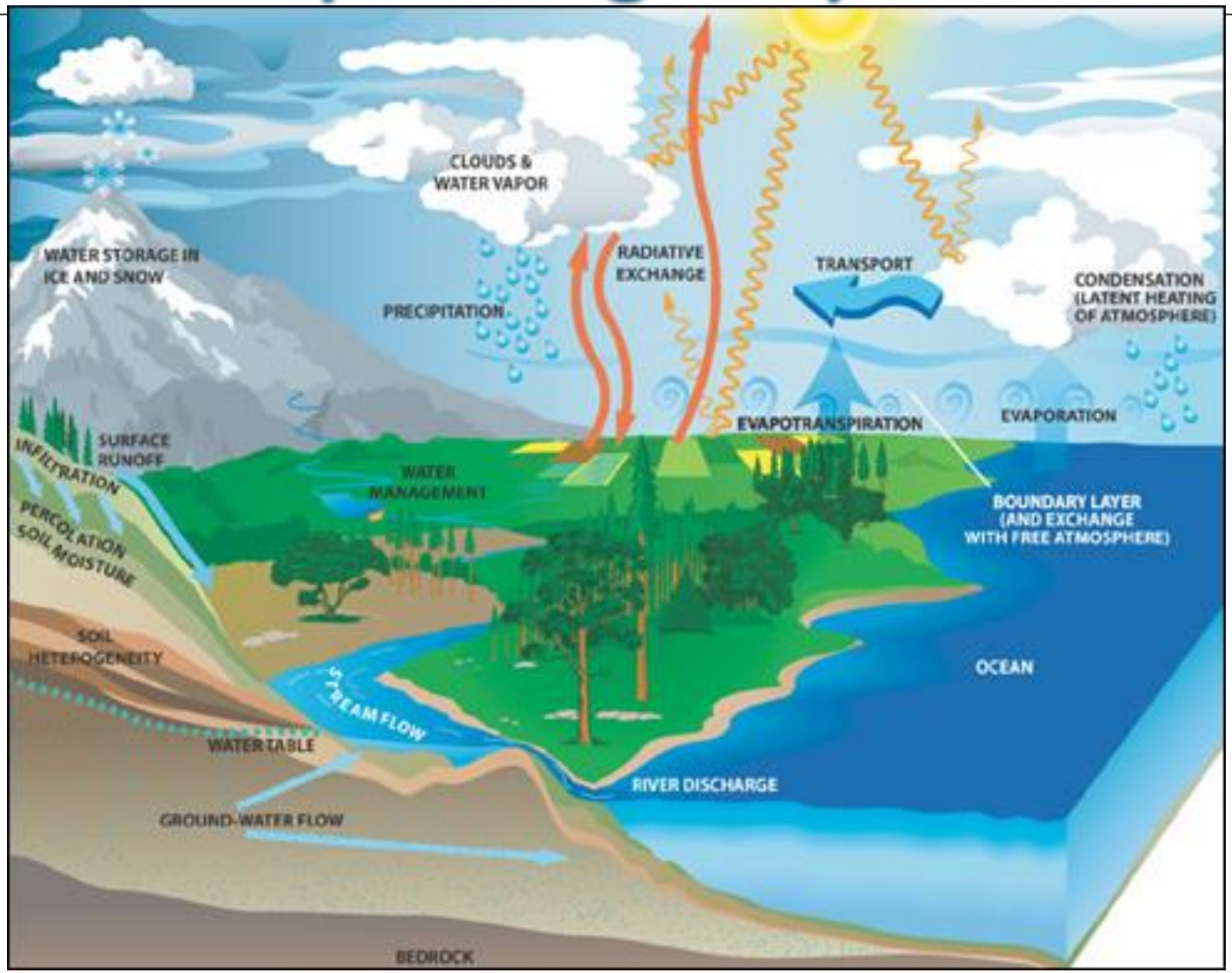
WPC Rainfall Forecast



Hydrologic Forecast Operation Role

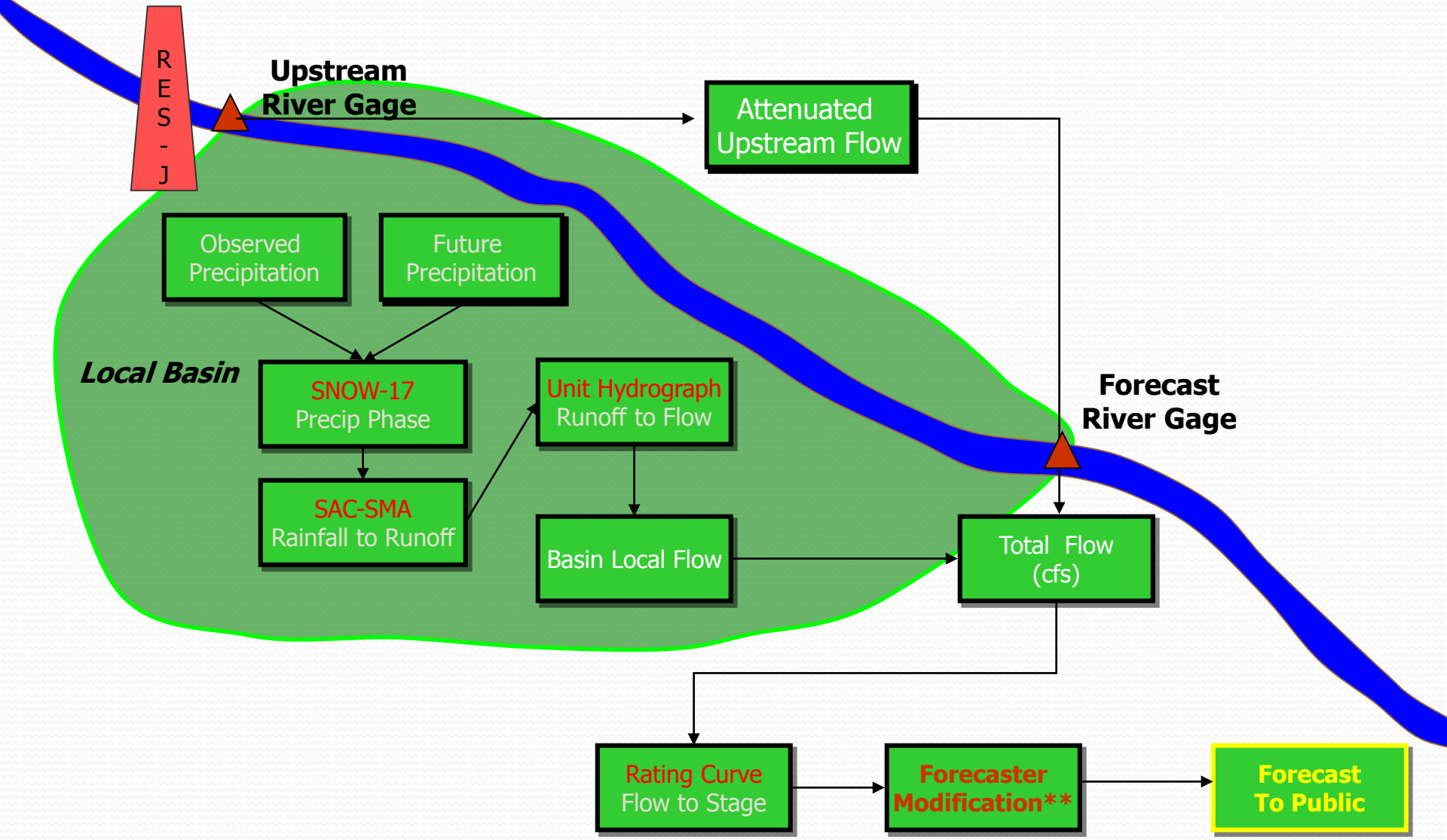
- **SERFC models…**
  - ***Rainfall-runoff processes*** **exclusively with the Sacramento Soil Moisture Accounting Model (SAC-SMA). It is continuous, conceptual, lumped-parameter*, and calibrated to streamflow.**
  - ***Precipitation phase*** **exclusively with the SNOW-17 model.**
  - ***Major reservoirs*** **exclusively with the RES-SNGL/RES-J model.**
  - ***Basin-to-basin hydrograph routing*** **with the LAG/K model and a stray HEC-RAS hydraulic model or two.**
- **SERFC hydrologic forecasters are also modelers. The operational forecaster knows the assumptions and limitations of these models and makes modifications when they are violated to generate "forecasts".**

Hydrologic Cycle



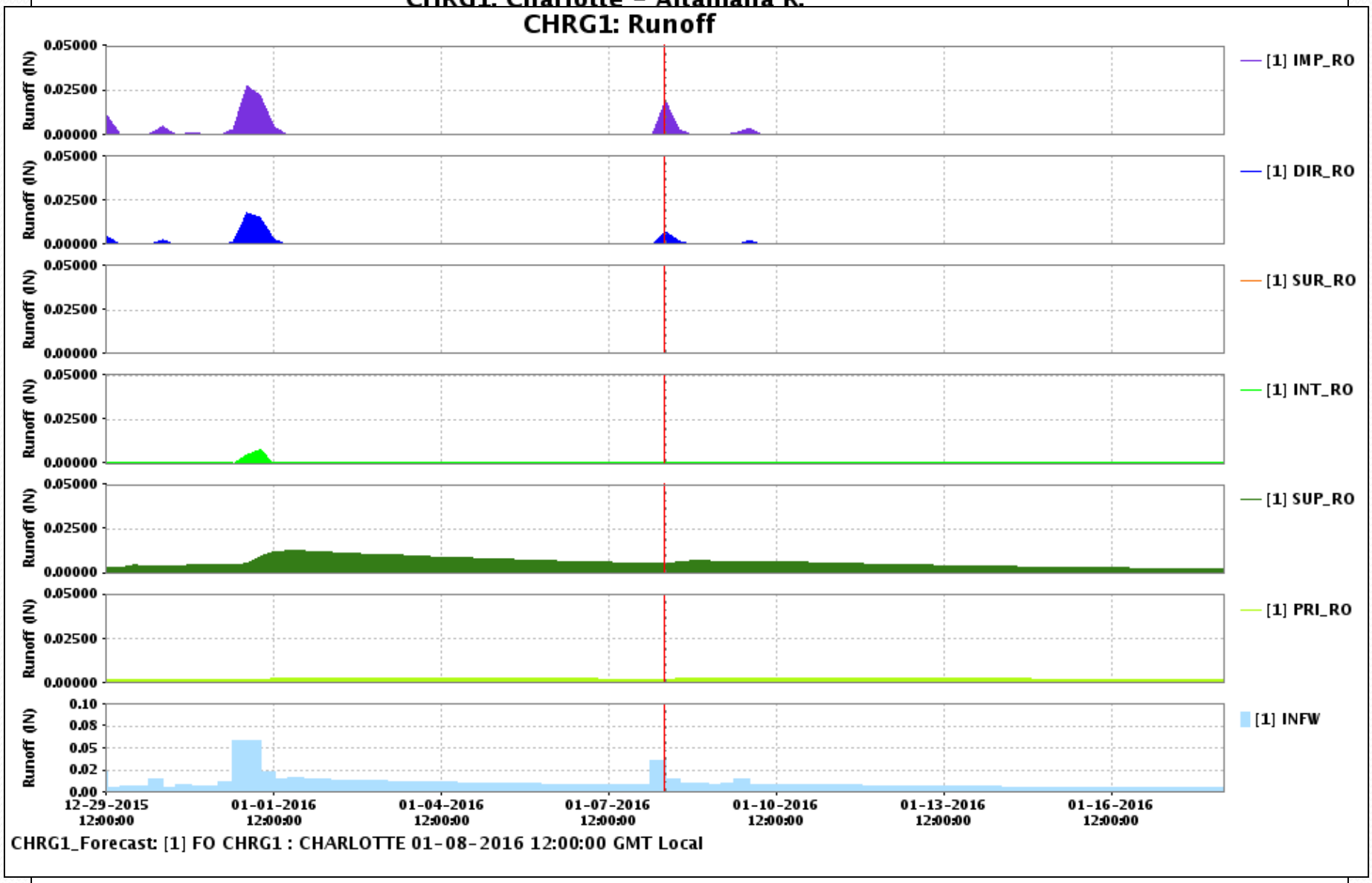
NOAA's National Weather Service

Deterministic River Forecasts
How are they created?

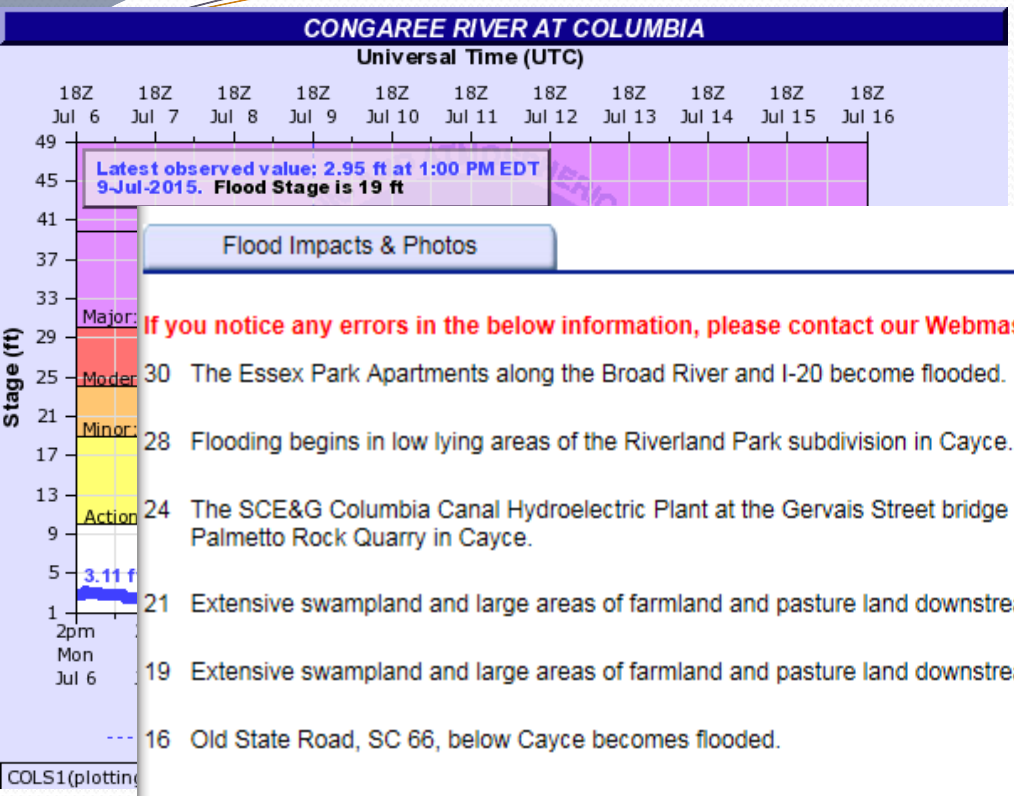


** Forecaster Modification can also happen at any step in the process!

What the Forecaster Sees



What the Public Sees



Flood Impacts & Photos

Collapse

If you notice any errors in the below information, please contact our Webmaster

30 The Essex Park Apartments along the Broad River and I-20 become flooded.

28 Flooding begins in low lying areas of the Riverland Park subdivision in Cayce.

24 The SCE&G Columbia Canal Hydroelectric Plant at the Gervais Street bridge becomes flooded. Flooding also occurs in the Palmetto Rock Quarry in Cayce.

21 Extensive swampland and large areas of farmland and pasture land downstream from Columbia are flooded.

19 Extensive swampland and large areas of farmland and pasture land downstream from Columbia become flooded.

16 Old State Road, SC 66, below Cayce becomes flooded.

14 Roads in low lying areas and swampland downstream from Columbia become flooded. Most of the Cayce and West Columbia river walk is flooded.

13 Flooding occurs in flood prone areas near and downstream from Columbia. Flooding also occurs over much of the Cayce and West Columbia river walk.

10 At 10 feet, flooding occurs in flood prone areas near and downstream from Columbia. Flooding also occurs on parts of the Cayce and West Columbia river walk.

Low Water Records
(1) -2.10 ft on 09/08/1925
(2) -1.90 ft on 10/21/1923
(3) -1.70 ft on 08/30/1931
(4) -1.30 ft on 11/25/1934
(5) -1.30 ft on 12/10/1933
Show More Low Water Records

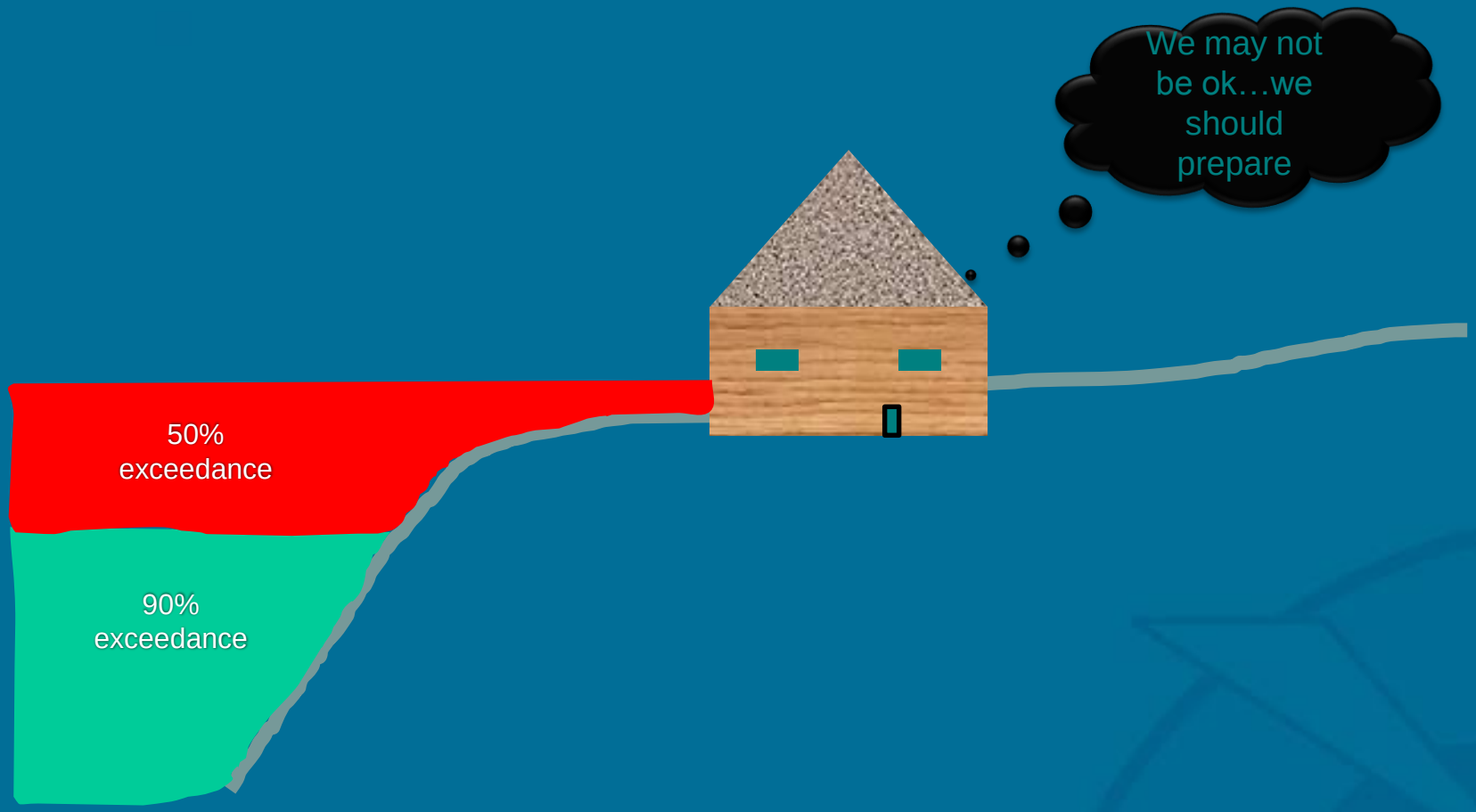
KML

Gauge Location

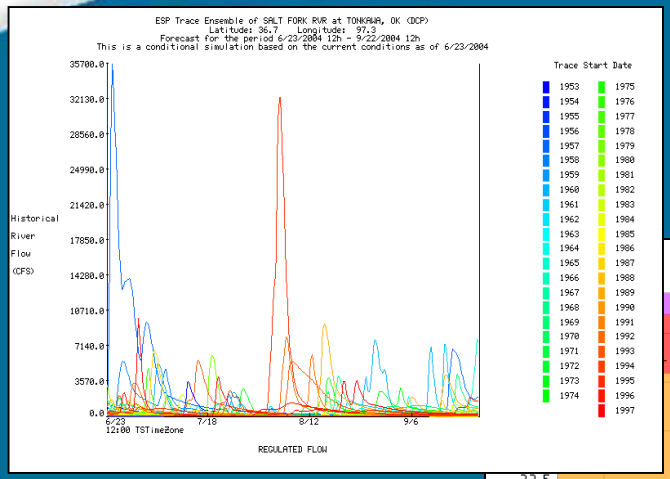
Disclain

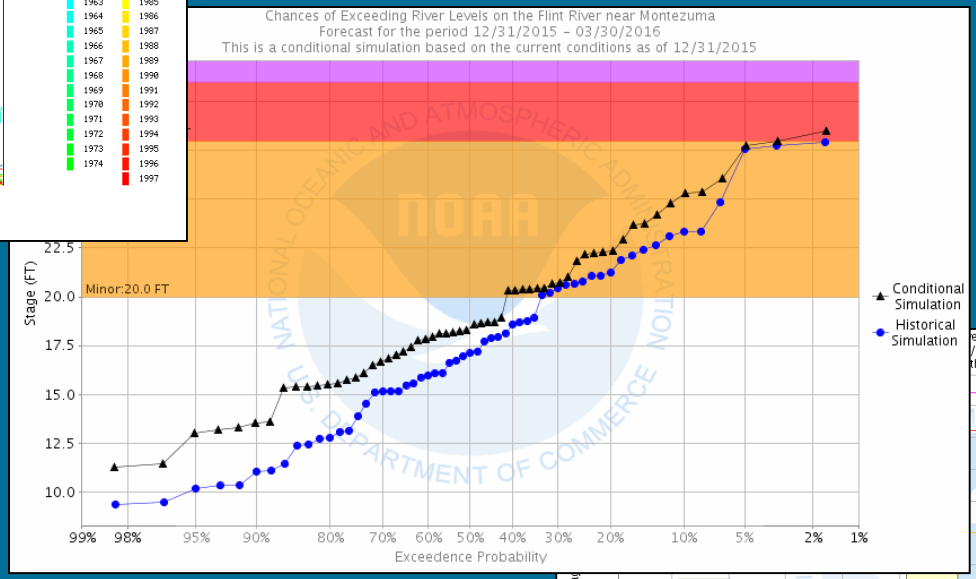
Latitude/Longitude Disclaimer: The gauge location shown in the above map is the approximate location based on the latitude/longitude coordinates provided to the NWS by the gauge owner.

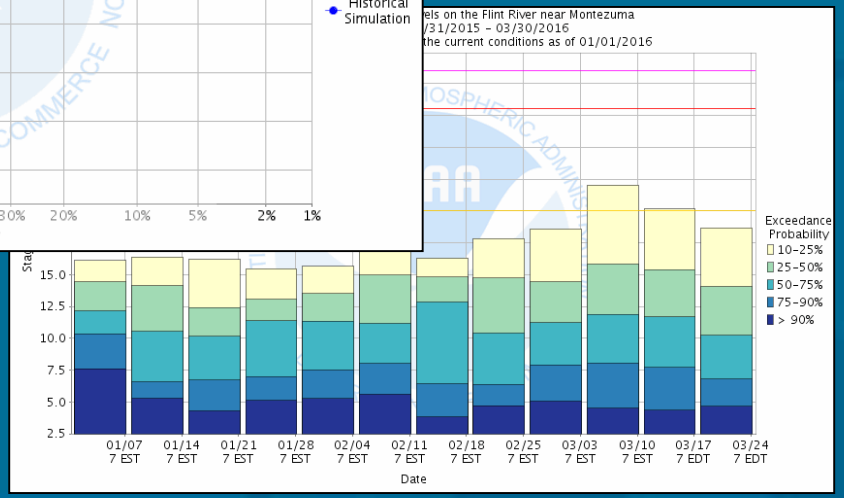
Probabilistic Forecasting



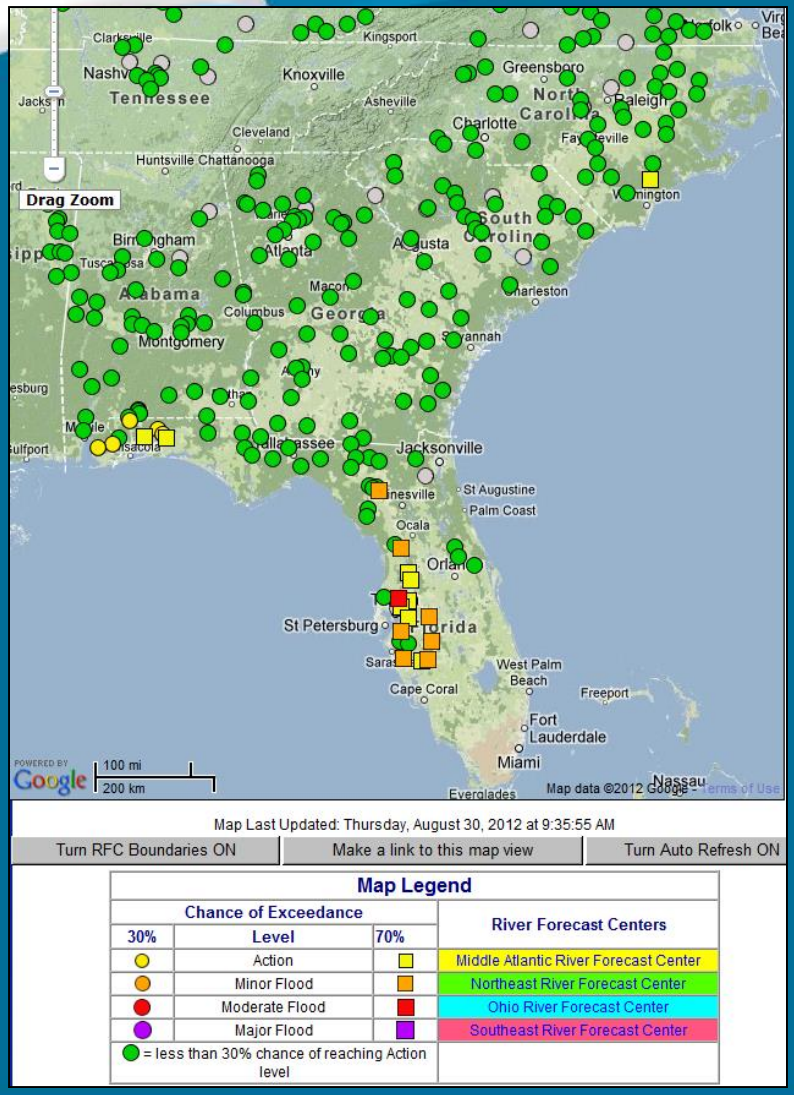
Probabilistic Forecasting: ESP

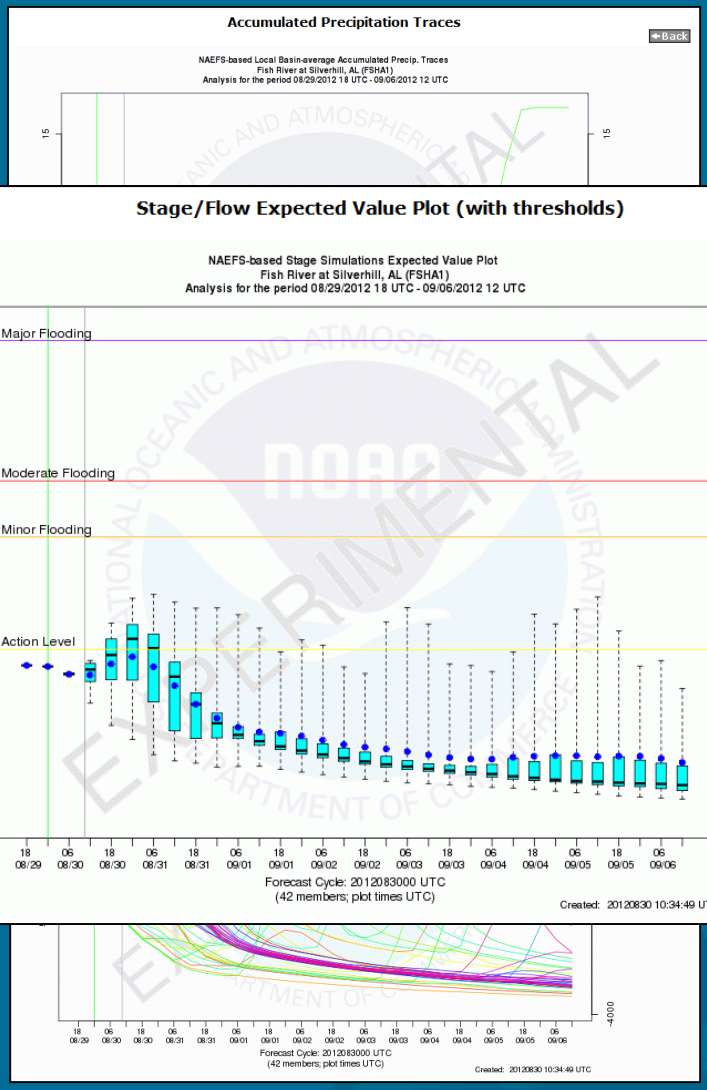






Probabilistic Forecasting: MMEFS





Probabilistic Forecasting: PQPF

6-Hour Forecasts

Probability of Precipitation of at Least a Specific Amount | Precipitation Amount by Percentile

24-Hour Forecasts

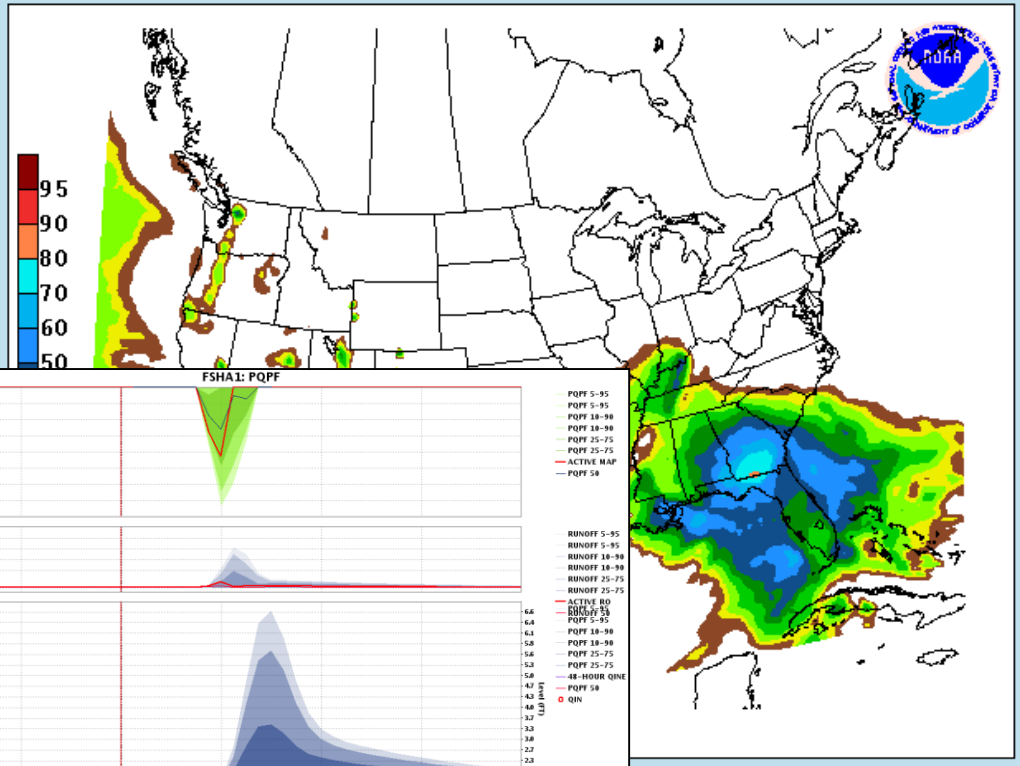
Probability of Precipitation of at Least a Specific Amount | Precipitation Amount by Percentile

6-Hour PQPFs ≥ 0.25"

Forecasts valid 12Z January 13, 2016 - 12Z January 16, 2016

	Day 1				Day 2				Day 3			
Valid:	18Z Jan 13	00Z Jan 14	06Z Jan 14	12Z Jan 14	18Z Jan 14	00Z Jan 15	06Z Jan 15	12Z Jan 15	18Z Jan 15	00Z Jan 16	06Z Jan 16	12Z Jan 16

6-hour forecast valid 12Z January 15, 2016 through 18Z January 15, 2016



Viewing Options

Choose an amount for the specified time:

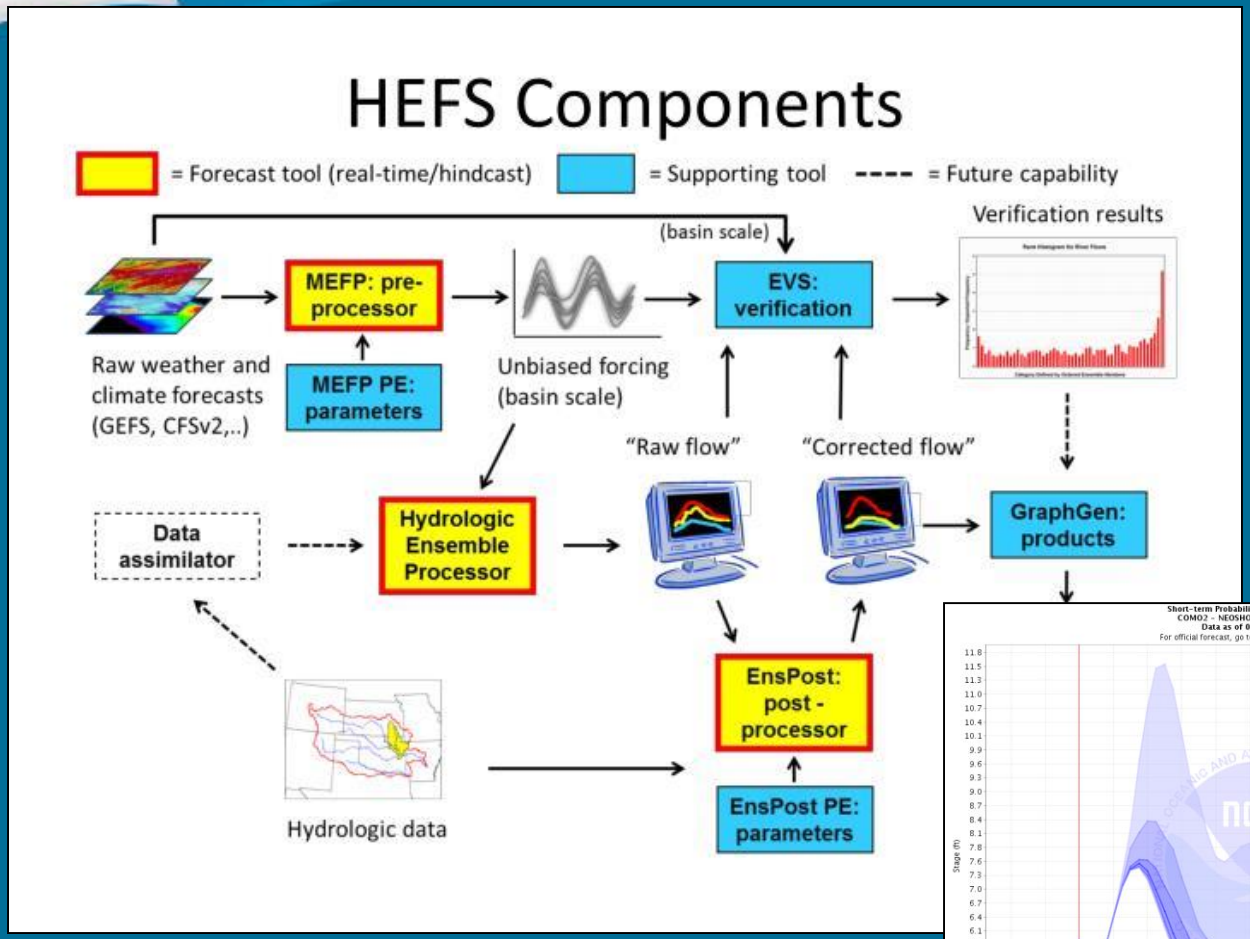
- ≥ 0.01"
- ≥ 0.10"
- ≥ 0.25"
- ≥ 0.50"
- ≥ 0.75"
- ≥ 1.00"
- ≥ 1.50"
- ≥ 2.00"
- ≥ 2.50"
- ≥ 3.00"

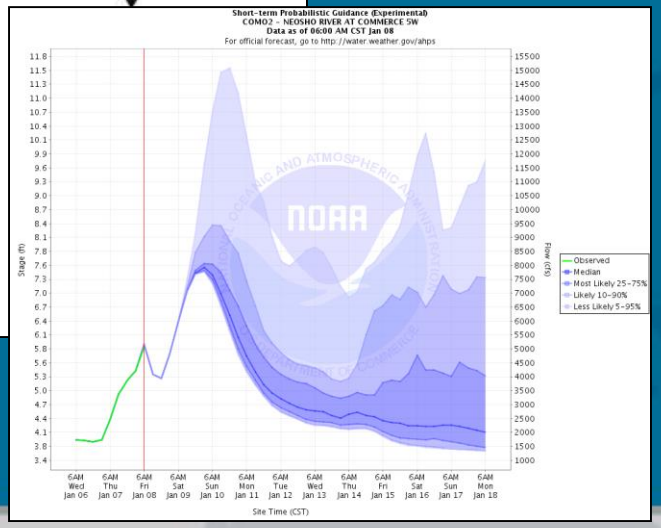
OR

Choose a time for the specified amount:

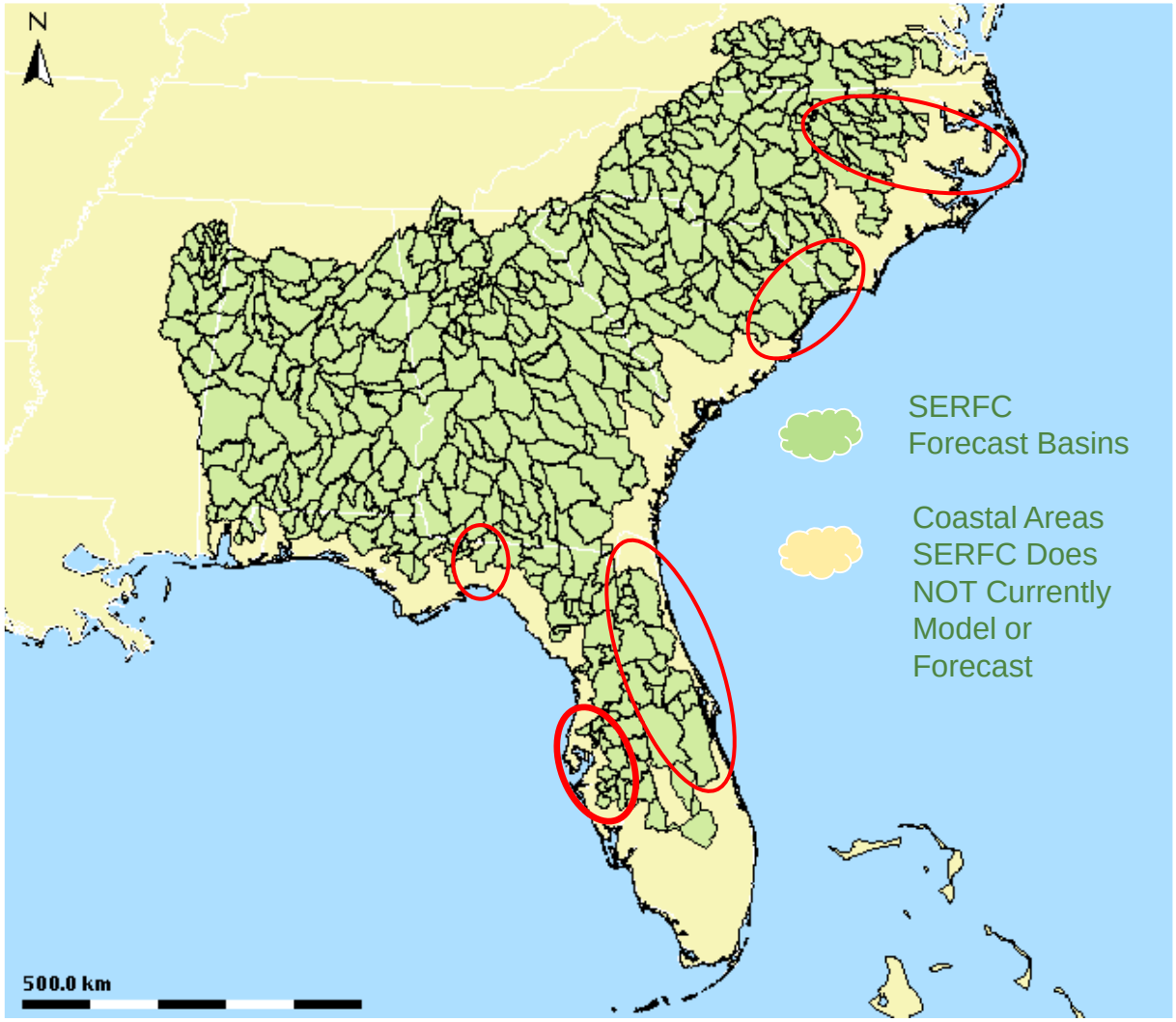
- 18Z Jan 13
- 00Z Jan 14
- 06Z Jan 14
- 12Z Jan 14
- 18Z Jan 14
- 00Z Jan 15
- 06Z Jan 15
- 12Z Jan 15
- 18Z Jan 15
- 00Z Jan 16
- 06Z Jan 16
- 12Z Jan 16

Probabilistic Forecasting: HEFS



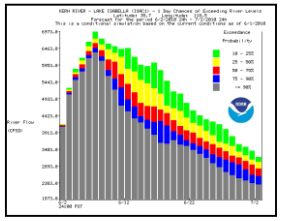


Current Hydraulic Modeling Projects @SERFC

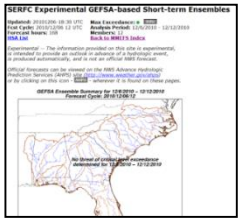


SERFC – Decision Support Services

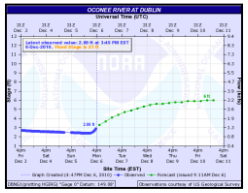
Water Resources OUTLOOK



ESP



MMEFS



FLOOD

DROUGHT

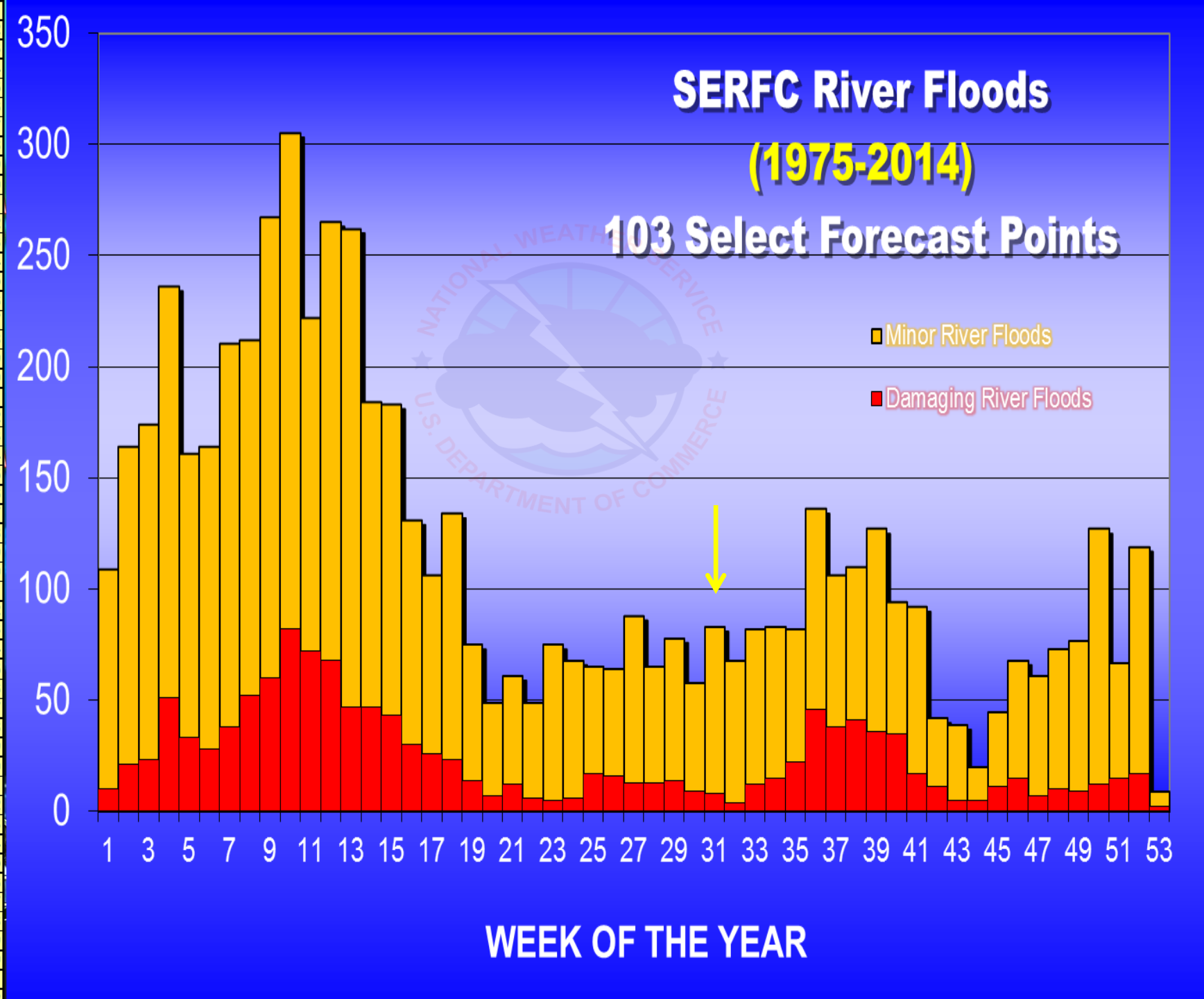
HVA

Hydrologic Vulnerability Assessment

DOSM

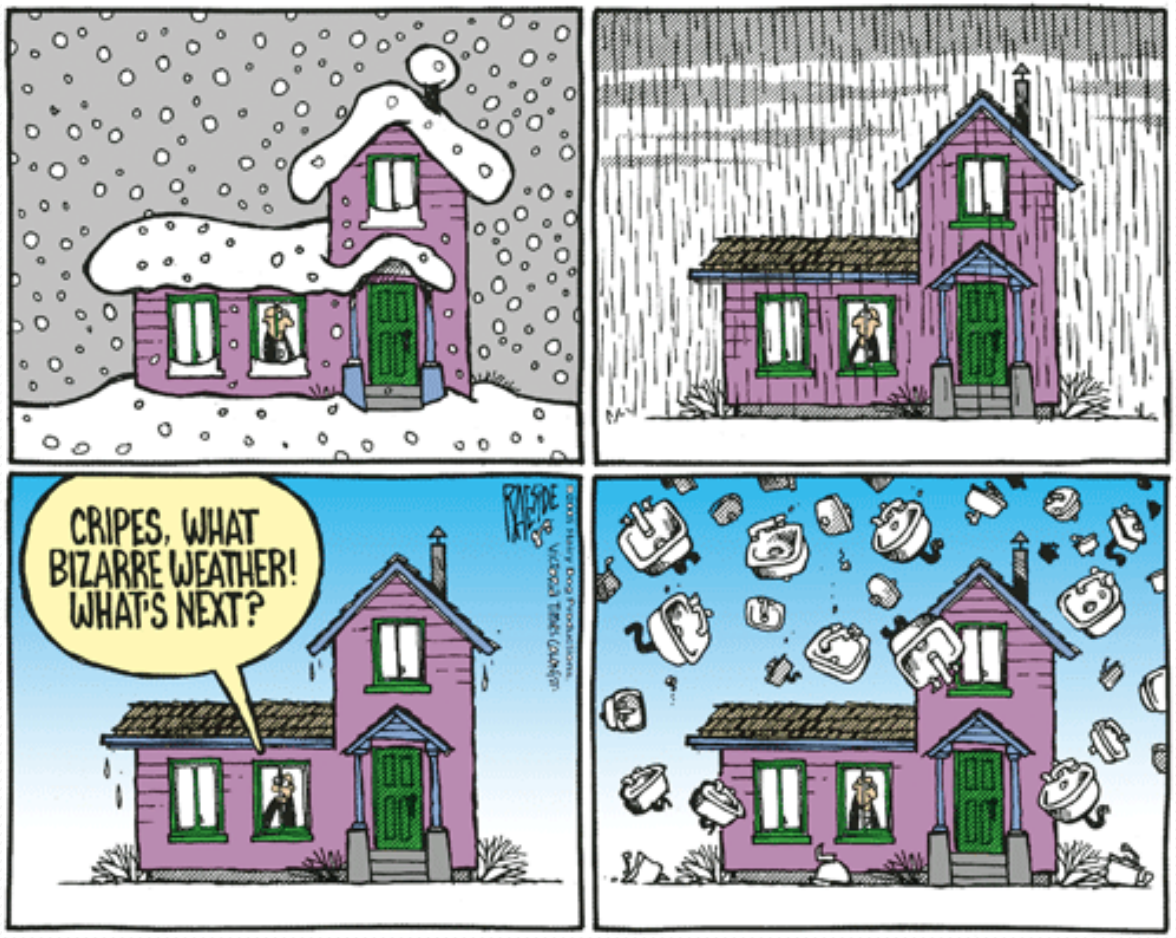
Daily Operational Support Message

Dec-Jan	1
Jan	2
Jan	3
Jan	4
Jan-Feb	5
Feb	6
Feb	7
Feb	8
Feb-Mar	9
Mar	10
Mar	11
Mar	12
Mar	13
Mar-Apr	14
Apr	15
Apr	16
Apr	17
Apr-May	18
May	19
May	20
May	21
May-June	22
June	23
June	24
June	25
June-July	26
July	27
July	28
July	29
July	30
July-Aug	31
Aug	32
Aug	33
Aug	34
Aug-Sep	35
Sep	36
Sep	37
Sep	38
Sep-Oct	39
Oct	40
Oct	41
Oct	42
Oct-Nov	43
Nov	44
Nov	45
Nov	46
Nov-Dec	47
Dec	48
Dec	49
Dec	50
Dec	51



Important Information

- SERFC Home page : www.weather.gov/serfc
- Office e-mail account : sr-alr.rivers@noaa.gov
- Facebook : https://www.facebook.com/nws.serfc
- Twitter: **@NWSSERFC**
- E-mail list additions: todd.hamill@noaa.gov

Questions or Comments?

Thanks!!