

Arkansas-Red Basin River Forecast Center Operations

NWS Wichita Hydrology Seminar

Wichita, KS

November 9, 2011

James Paul

Service Coordination Hydrologist - ABRFC

National Weather Service River Forecast Centers

Who We Are

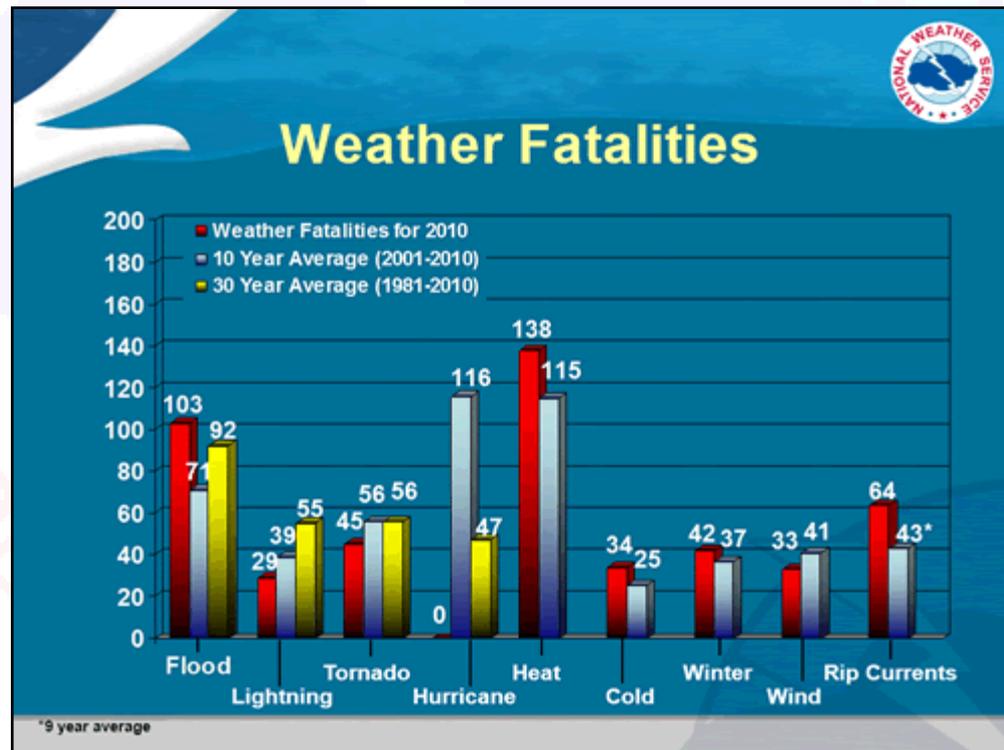


- Department of Commerce
- National Oceanic and Atmospheric Administration
- National Weather Service
 - Arkansas-Red Basin RFC – Tulsa OK
 - Missouri Basin RFC – Pleasant Hill MO

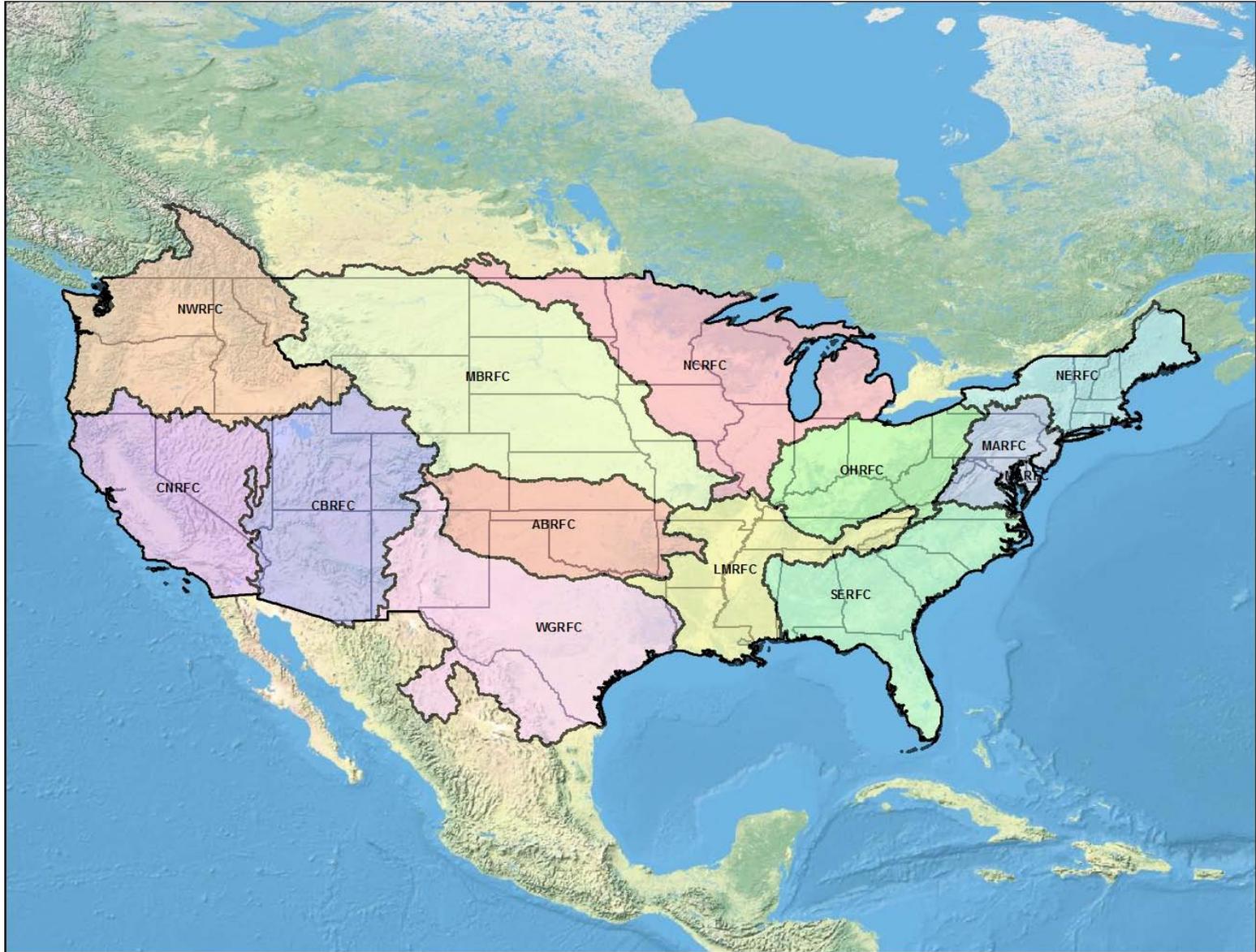
National Weather Service River Forecast Centers

Our Mission

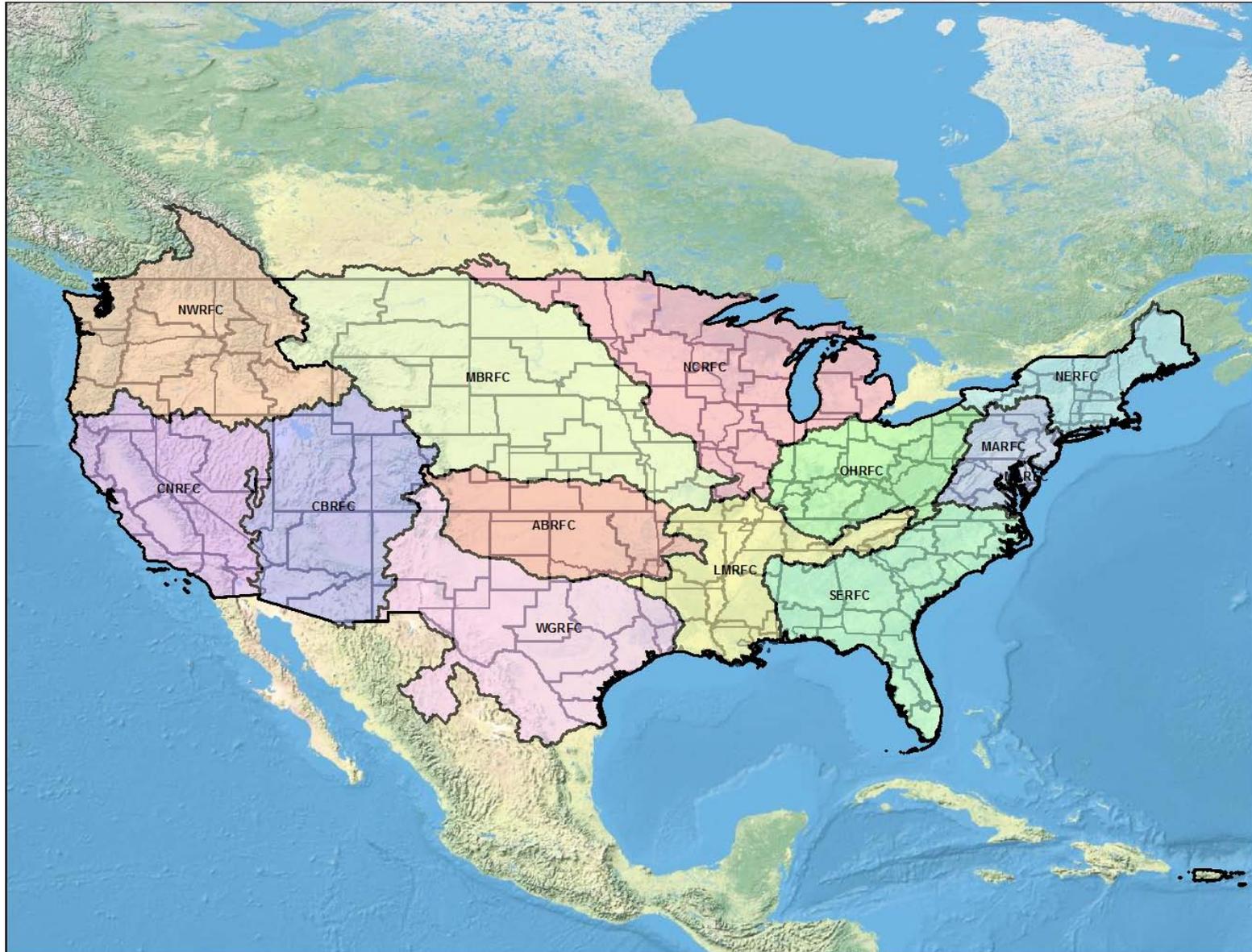
- Provide hydrologic services for the protection of life and property
- Enhance the national economy
- The Official source for river forecasts



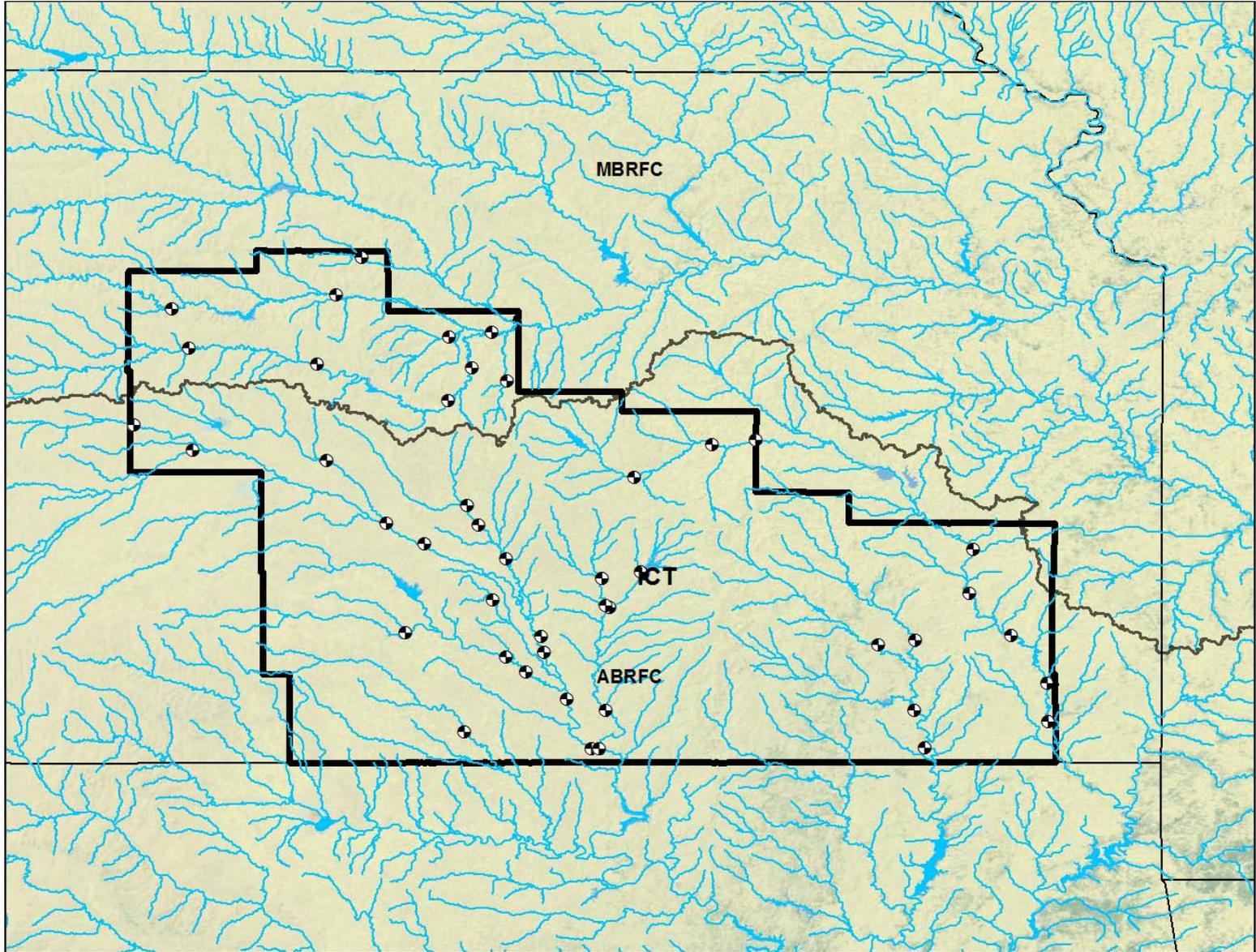
NWS River Forecast Centers



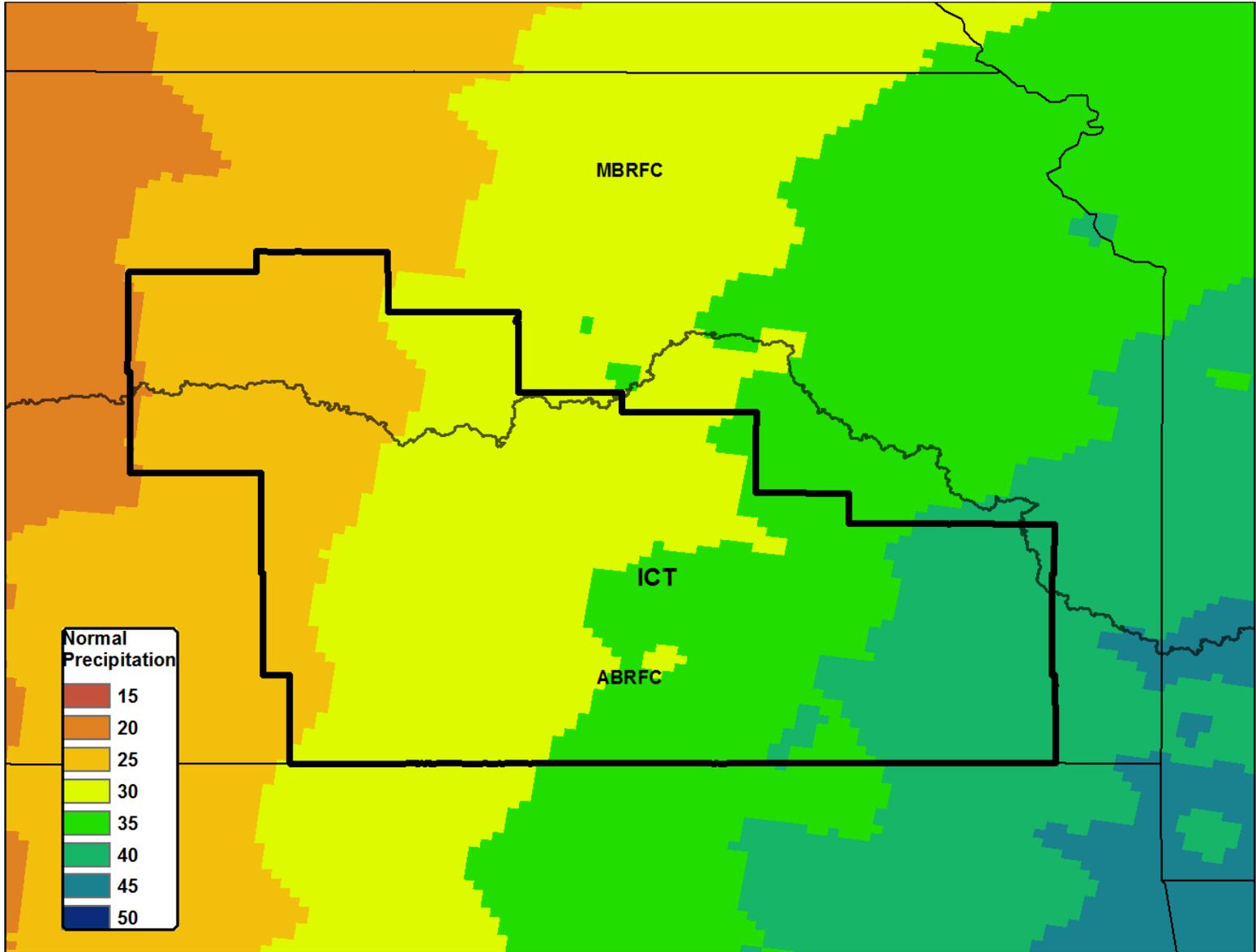
NWS Weather Forecast Offices



NWS Wichita KS



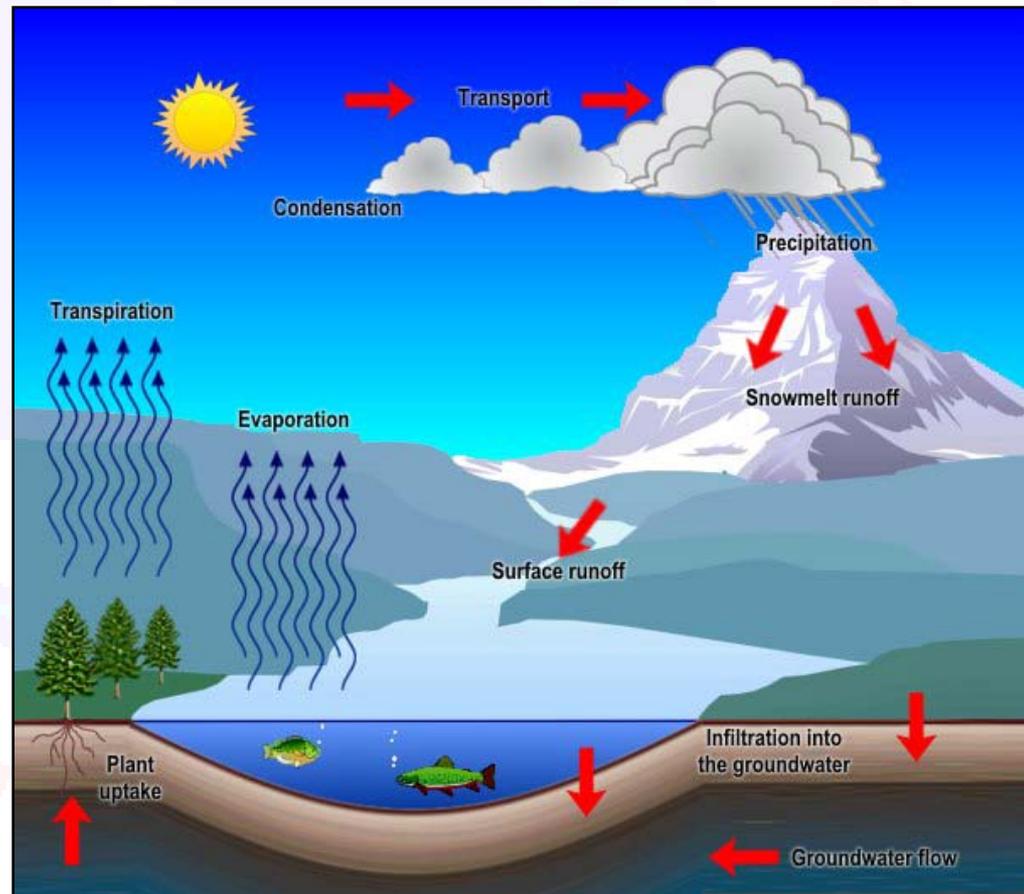
NWS Wichita KS



ABRFC Operations

Staffing and Operations

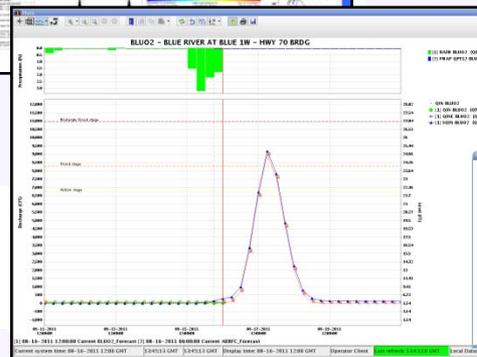
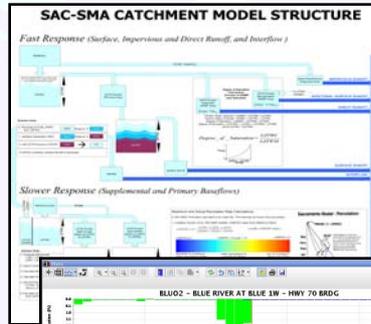
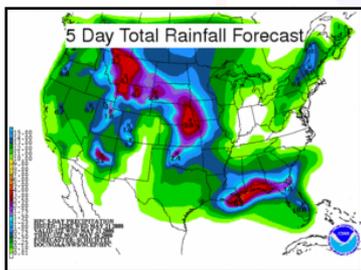
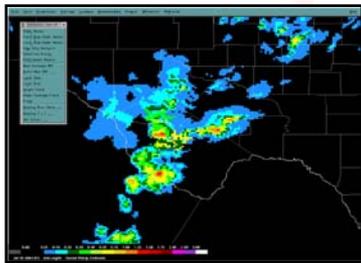
- Routinely open from 6AM – 10PM 7 days a week
- Open 24 hours during flooding
- Typically employ 14-18 hydrologists and hydro-meteorologists



ABRFC Operations

Forecast Process

1. Hydrometeorology operations - Precipitation data and forecasts
2. Hydrologic operations – River data and forecasts



Precipitation estimates and forecasts merged into continuous dataset

Precipitation dataset ingested into hydrologic model.
Forecasters adjust model parameters in real time

River forecast guidance sent to WFO and then to public

ABRFC

HAS Operations

Hydrometeorology Operations

HAS Unit

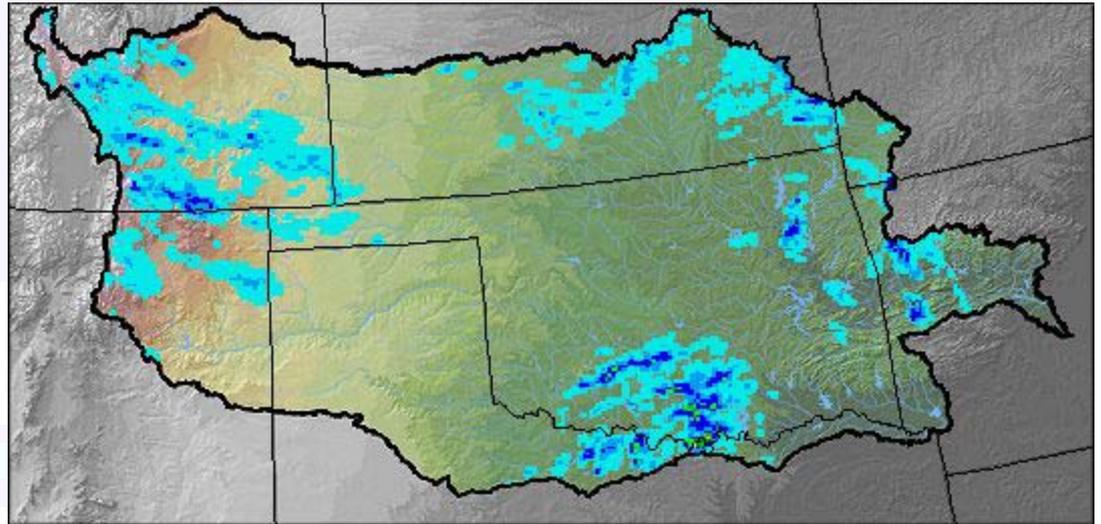
(Hydro-meteorological Analysis and Support)

- HAS Unit – 3 forecasters
- Create meteorological forcing fields for input into hydrologic model (T, QPE, QPF)
 - **Best estimates of past precipitation**
 - **Forecast precipitation**
- Data QC
- Text and graphical products (HMD)
- Weather briefings and discussions – in house and with NWS WFOs and public partners

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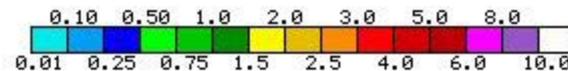
Multi-Sensor Quantitative Precipitation Estimates (QPE)

- Hourly
- 4km x 4km grid
- QC of inputs

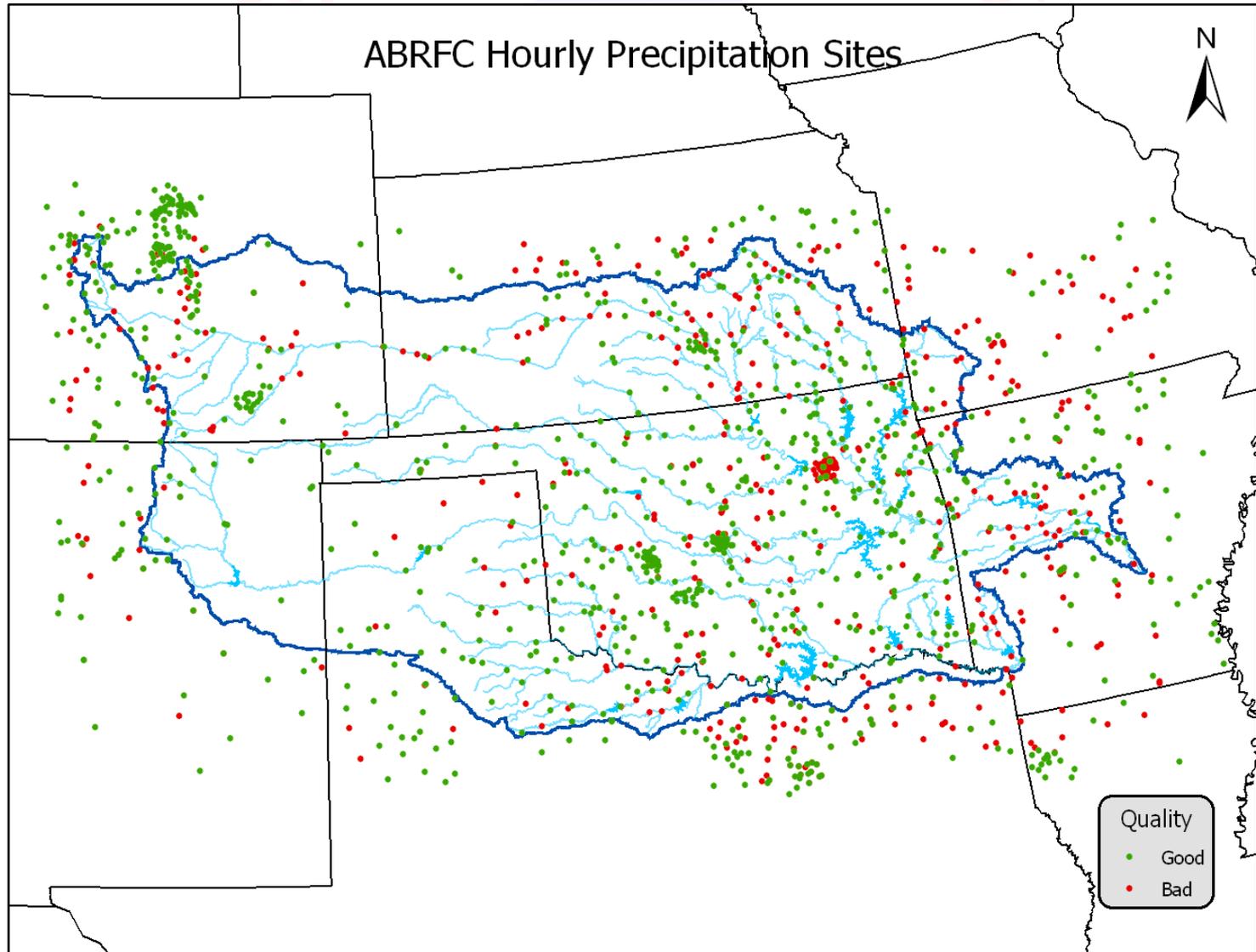


National Weather Service - ABRFC - Tulsa OK

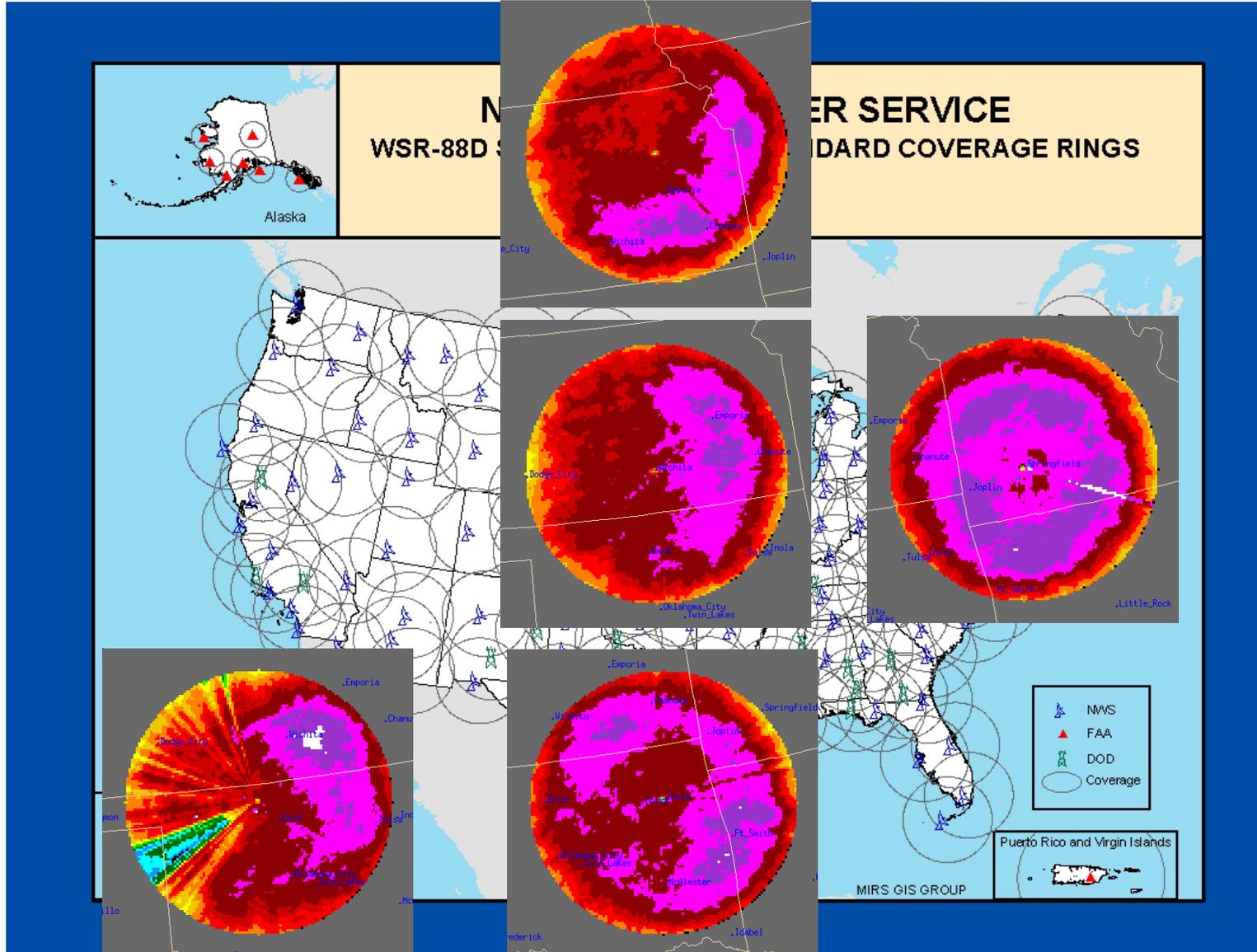
24 Hour Precipitation Ending at 12Z on Tuesday Aug 16 2011



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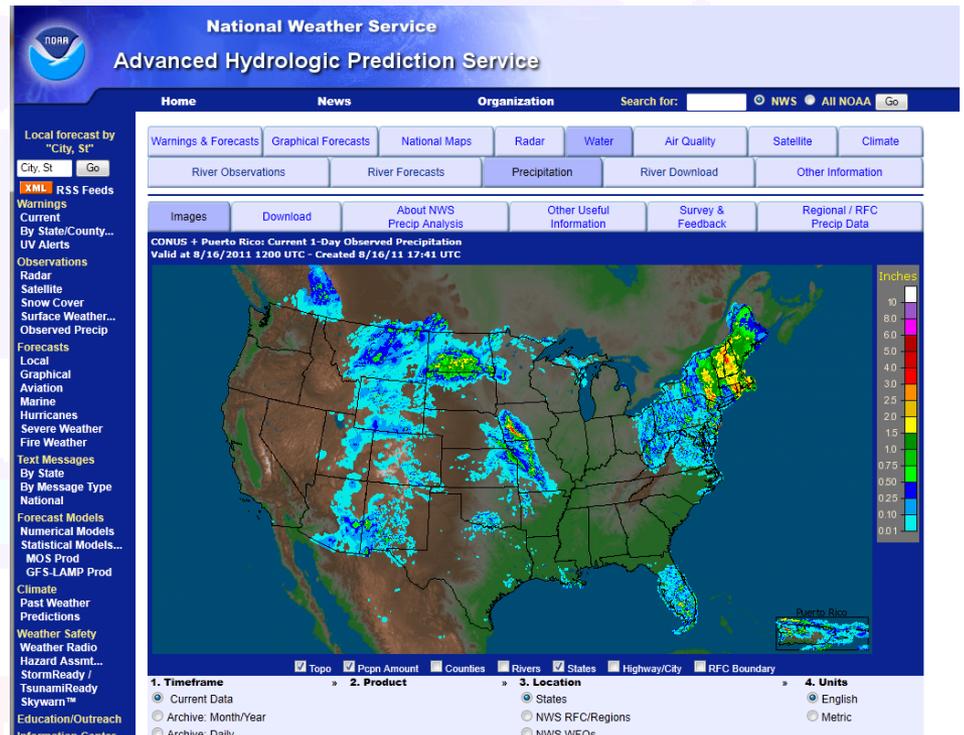


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Quantitative Precipitation Estimates (QPE)



Hourly:
http://www.srh.noaa.gov/ridge2/RFC_Precip/

Daily:
<http://water.weather.gov/precip/>

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<http://www.cocorahs.org>

CoCoRaHS COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK
"Because every drop counts"

Home | States | View Data | Maps My Data | My Account | Logout

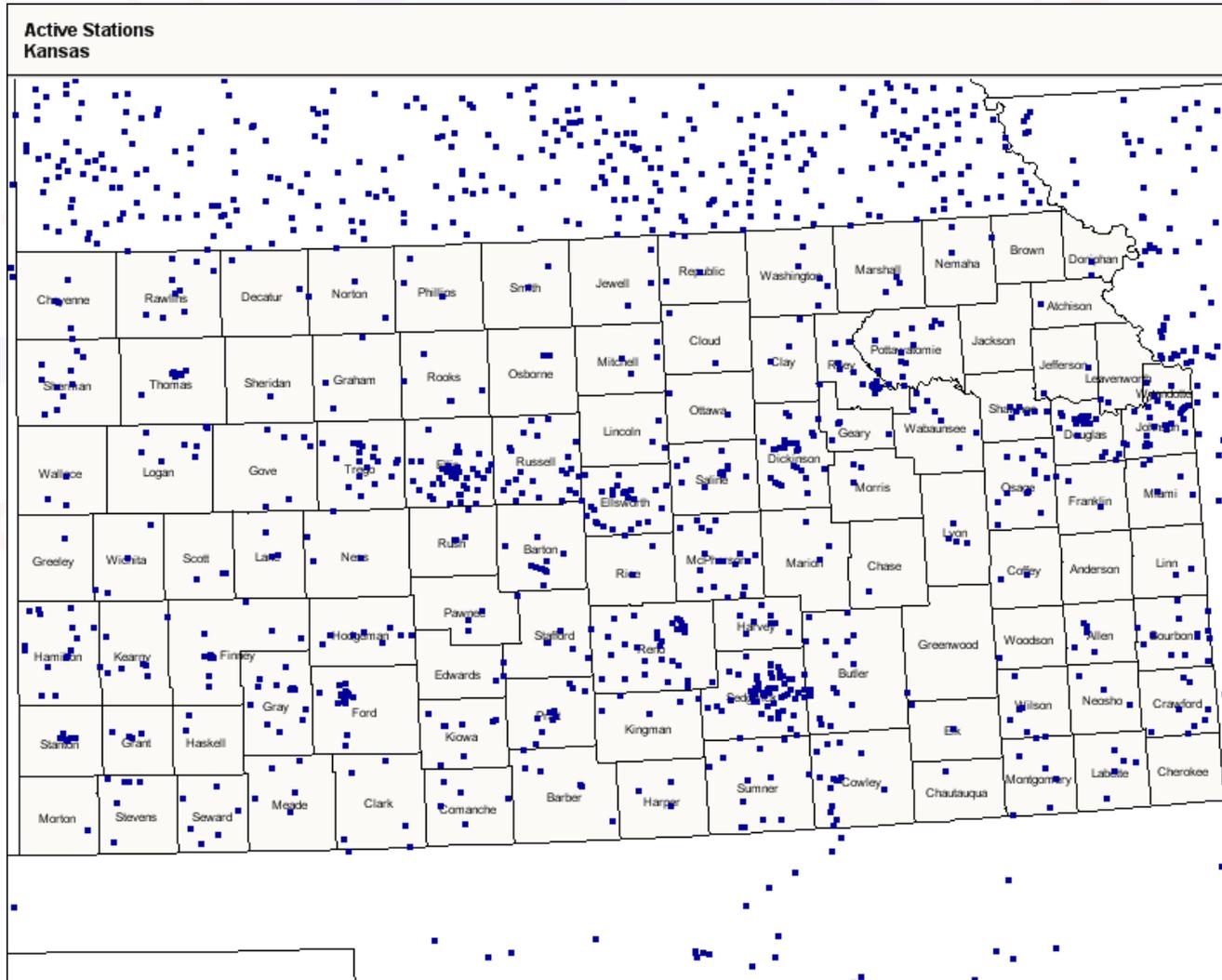
Become a CoCoRaHS Observer

Observer Information	Postal Address
First Name: <input type="text"/> Last Name: <input type="text"/> Home: <input type="text"/> Phone: <input type="text"/> Day Phone: <input type="text"/> Email: <input type="text"/>	Address: <input type="text"/> State: Alabama County: Select County City: <input type="text"/> Zip: <input type="text"/>
Daily Internet Access: <input type="radio"/> Yes <input type="radio"/> No	
Station Location Information	Station Address
Location Description: (example: Gauge located at the 3rd house South of Fifth Ave on Vine.) <input type="text"/> Location Coordinates: (If available) in decimal degrees. Latitude (40.5993) : <input type="text"/> Longitude (105.1152) : <input type="text"/>	<input type="checkbox"/> Same as Postal Address Address: <input type="text"/> State: Alabama County: Select County City: <input type="text"/> Zip: <input type="text"/>
Additional Information	
How did you find out about CoCoRaHS? <input type="text"/>	
Are you 18 years old or younger? <input type="radio"/> Yes <input type="radio"/> No Age: <input type="text"/> Parent or Guardian Name: <input type="text"/> Grade: <input type="text"/>	
Rain gauge You will need a high capacity 4" diameter rain gauge to participate in this network <small>(why we don't use standard gauges)</small> <input type="radio"/> I already have this particular type of gauge. <input type="radio"/> I will need to obtain this type of gauge. Ways to obtain a high capacity 4" rain gauge: <ul style="list-style-type: none"> Order from www.weatherunway.com/cocorahs (\$25.00 + shipping and handling) Contact your local area coordinator (coordinator info will be sent out via e-mail. See Coordinates) Qualify for a complimentary gauge (Indiana only) <small>For more info on possible sponsored gauges in other states contact your state coordinator</small>	
Rain gauge will be emptied daily at: <input type="radio"/> 7:00 a.m. (highly recommended) <input type="radio"/> 6:00 a.m. <input type="radio"/> 8:00 a.m. <input type="radio"/> Other Time <input type="text"/> PM	
It is important to the CoCoRaHS that your rain gauge is read and emptied at the same time each day.	
Would you or a family member like to volunteer for additional project duties? <input type="checkbox"/> YES, I would like to help. Please give the names and ages of others who will help you take rain & hail measurements: Name/Age: <input type="text"/> Name/Age: <input type="text"/>	
Training Preference: <input type="radio"/> Train On-line <input type="radio"/> Attend a Training Session <input type="radio"/> Walk-in Training	
<input type="button" value="Submit Application"/> <input type="button" value="Reset"/>	



NWS HAS Operations

<http://www.cocorahs.org>



ABRFC HAS Operations

5 Day Flood Outlook Potential

- Available on left-hand menu
- Once per day (morning)
- <http://www.srh.noaa.gov/abrfc>

NWS - Mozilla Firefox
http://www.srh.noaa.gov/abrfc/

National Weather Service River Forecast Center
Arkansas-Red Basin

Local forecast by "City, ST" or Zip Code

RSS Feeds
Rivers and Hydrology
Observed and Forecast River Conditions
Forecasts & Info
5 Day Flood Outlook
Flash Flood Guidance
Map Alert Page
Water Supply
Stages On Line
Forecast
Lower Arkansas River
Short-term Ensembles
Forecasts
Precip & Weather
Observed Precip
Forecast Precip
Radar
Soil Snow Cover
Soil Moist
Monthly/Annual Precip
Flash Flood
5 Day 15 Day
Climate & History
Map Drought Info
Local Drought Info
Weather Data
About the Basin
Precip Climatology
Floods

Additional Info
Related Links
Forecast Method
Precip Processing
Flood Verification
River Flow
About Our RFC
Contact Us
About Our Office

5-Day Flood Outlook
Flash Flood Guidance

Nat'l AHPs Page
Precip & Weather

NATIONAL WEATHER SERVICE
Significant River Flood Outlook
Click a region on the national map below to access more detailed RFC data.

View the River Flood Outlook for [Alaska](#)

Legend:
Occurring or Imminent
Likely
Possible

Significant River Flood Outlook
Valid Thru Sat Aug 20, 2011
Issued Mon Aug 15 2011 at 1938Z
NOAA/NWS/HPC & RFCs

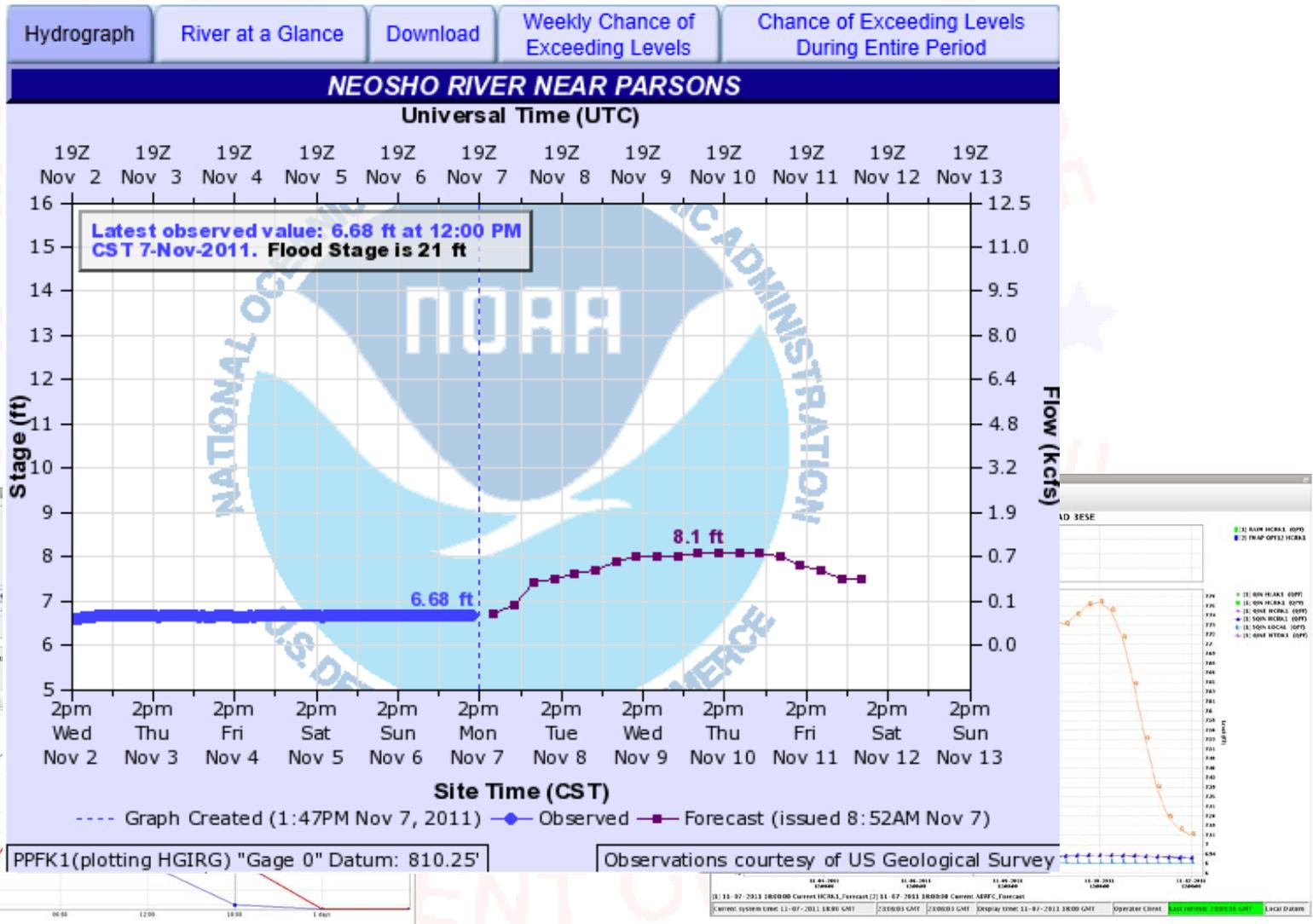
Show RFC Boundaries

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Hydrologic Operations

- 8 to 10 forecasters at each River Forecast Center
- Create River Forecasts
 - Apply local expertise to adjust model output
 - Daily forecasts vs. flood forecasts
- Issue Flash Flood Guidance
- Development work
 - Calibrate hydrologic model
 - Model new basins and forecast points
 - Develop new operational techniques and procedures

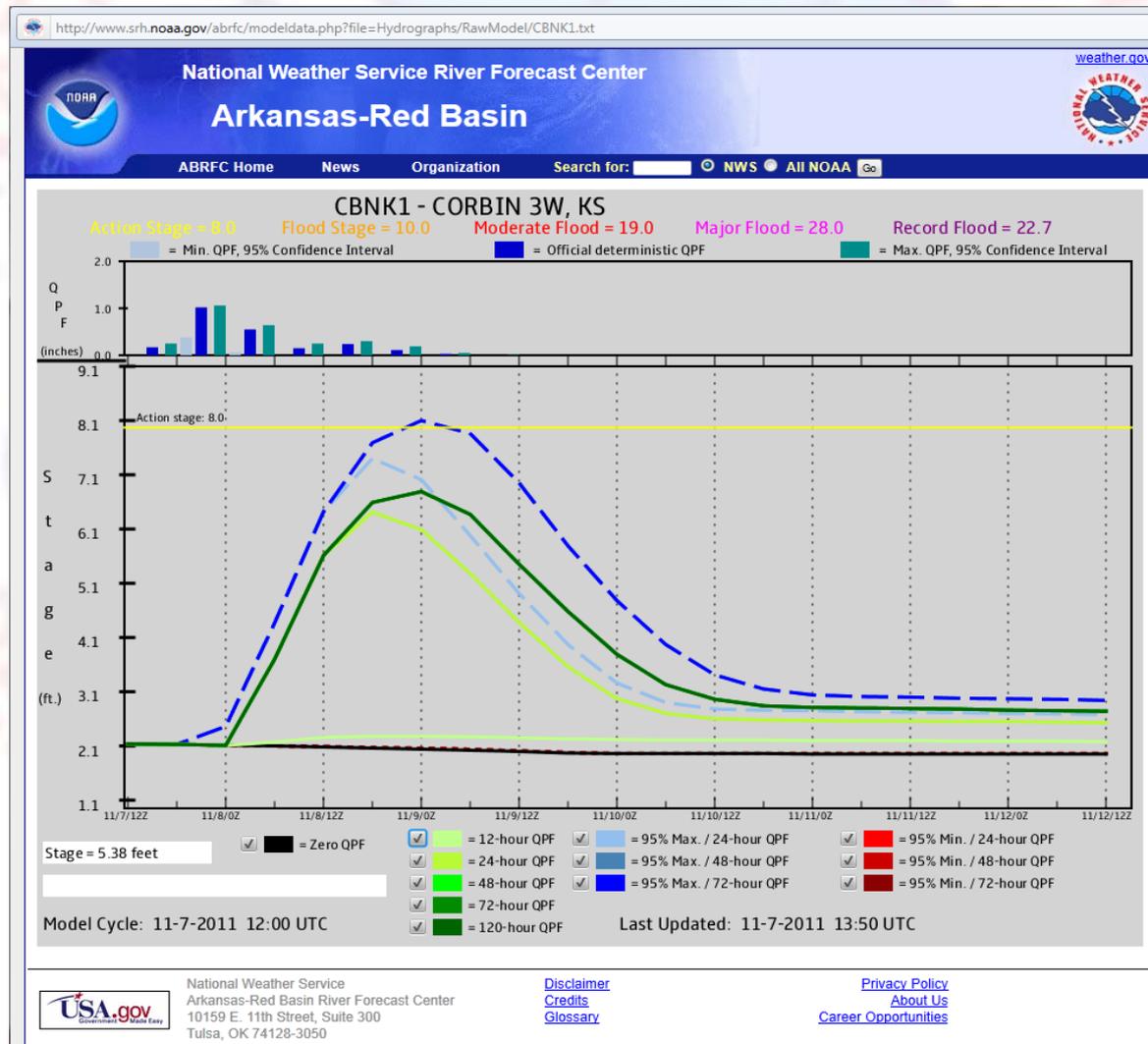
ABRFC Hydrologic Operations River and Flood Forecasts



ABRFC Hydrologic Operations

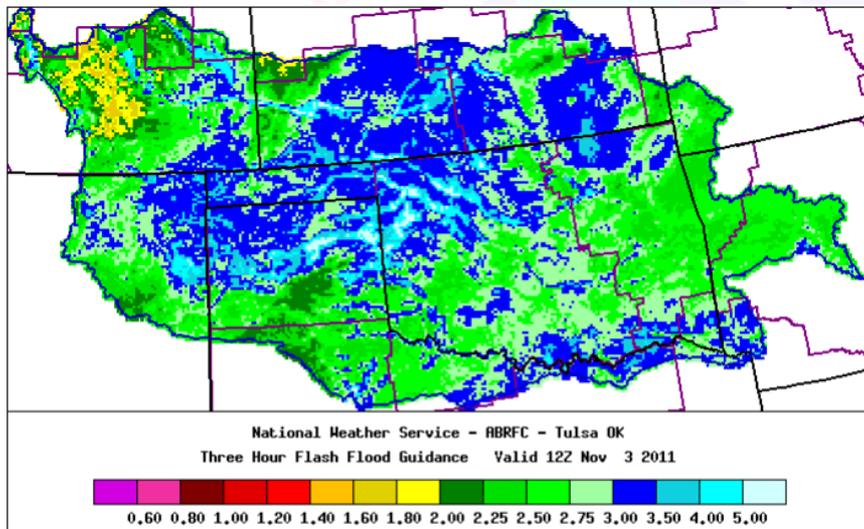
Ensemble Forecasts

<http://www.srh.noaa.gov/abrfc/Hydrographs/RawModel/index.php>

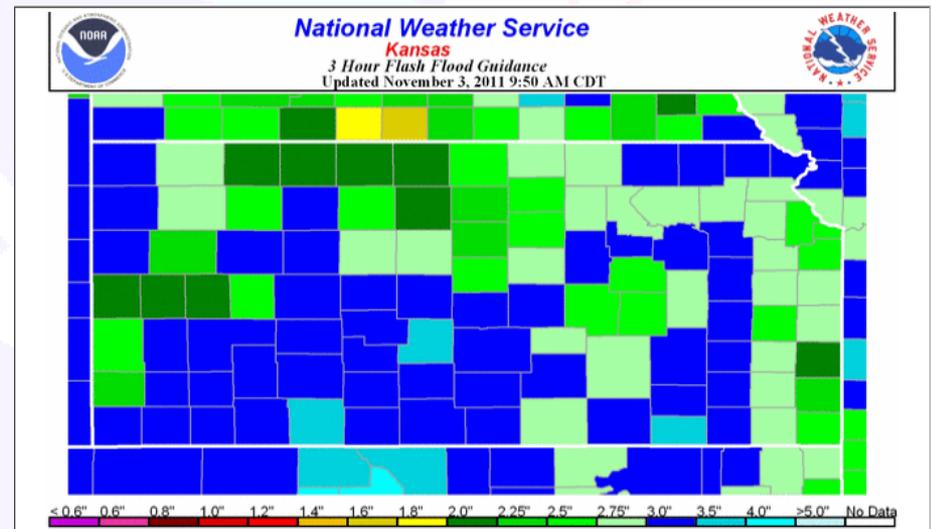


ABRFC Hydrologic Operations

Flash Flood Guidance



Gridded



County

ABRFC Hydrologic Operations

Illinois River Recreational Forecast Partnered with Oklahoma Scenic Rivers Commission



Upper Illinois River 48-Hour Recreation Forecast

Latest Stage.... 4.79 ft on Thursday, 11/3 9:00AM CDT
 Max 48-Hour Forecast.... 4.8 ft on Thursday, 11/3 1:00PM CDT
 Forecast issued on Thursday, 11/3 9:41AM CDT



Upper River*	Lower River*	River Status	** Illinois River Association recommends ...
✓	✓		that children 10 and under go in canoes or rafts.
			that children 10 and under not go in canoes and switch to rafts.
			that all switch to rafts.
			that children 10 and under not go in rafts.
			that all floating cease.

Get latest [Illinois River @ Tahlequah, OK](#) river forecast.

Get latest [Illinois River @ Tahlequah, OK](#) latest stage from the USGS.

National Weather Service river forecasts contain error. For more information on the forecast process, [click here](#).

Forecasts are updated daily, except during times of flooding when they are updated at least 3 times daily.

*"Upper River" and "Lower River" are defined as above and below Diamondhead Resort.

**This information was provided by the Illinois River Association on April 19, 1993, as to their [recommended guidelines to canoeing and rafting on the Illinois River](#). These guidelines are for those with average or less experience and skills. These recommendations are meant to provide a general guide for the floating public. There are many factors involved and it is best to discuss your floating plans with your [livery operator](#).

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Hydrologic Operations

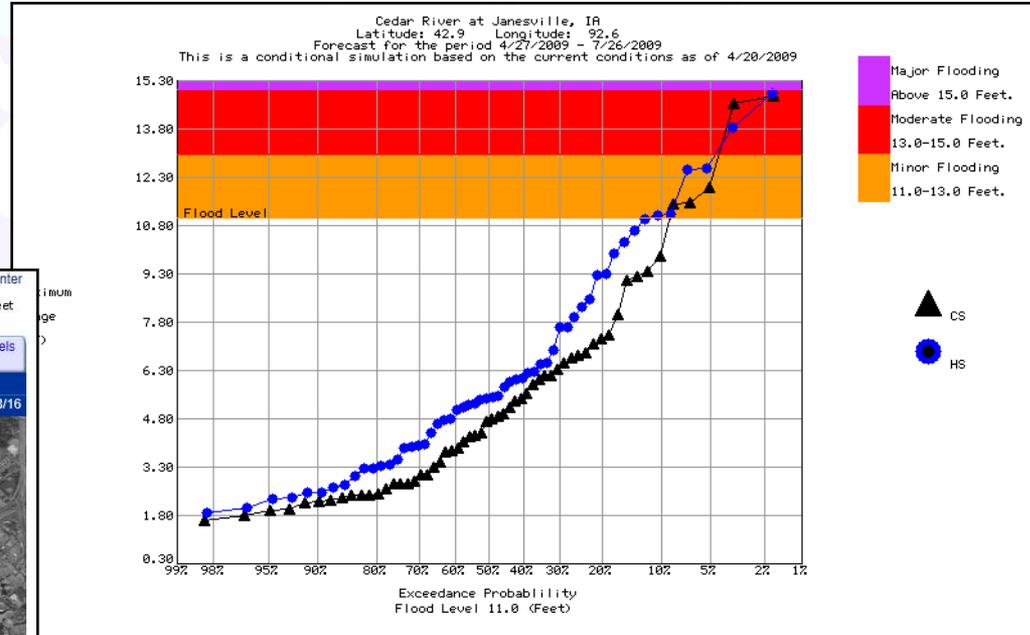
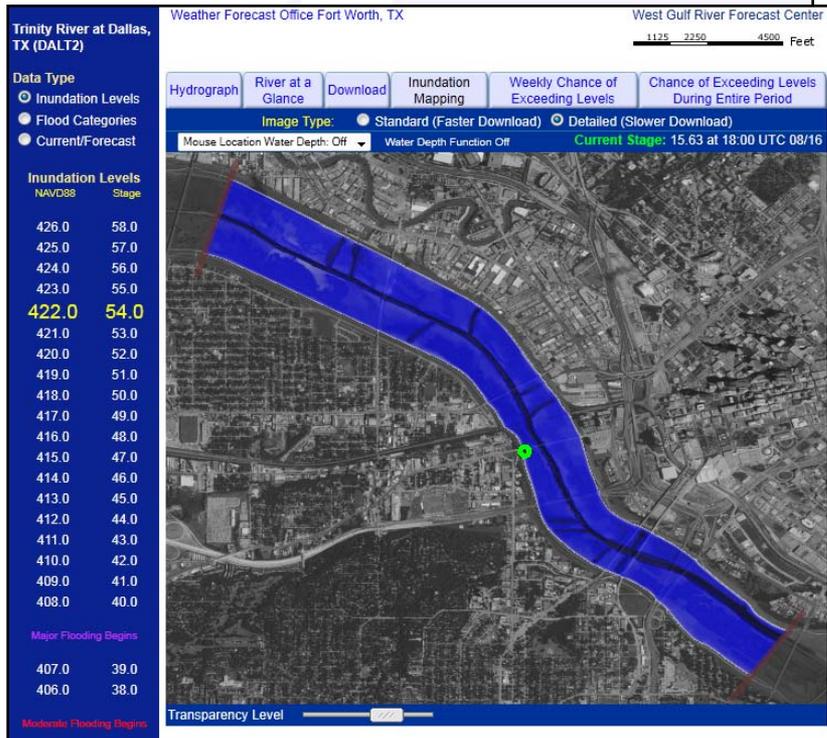
Forecast and Warning Process

- RFCs issue river forecast guidance
- WFOs issue river flood watches and warnings
- RFCs issue flash flood guidance
- WFOs issue flash flood warnings
- WFOs (Service Hydrologist) are local experts on the hydrology in their area
- Issue areal flood warnings, urban and small stream flood advisories

ABRFC Hydrologic Operations

AHPS Products

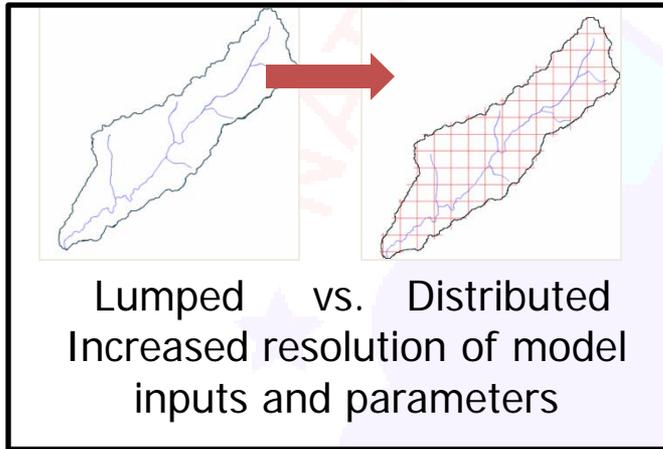
Inundation mapping



Up to 90 day probabilistic forecasts for snowmelt situations and water supply users

ABRFC Hydrologic Operations

Development Work



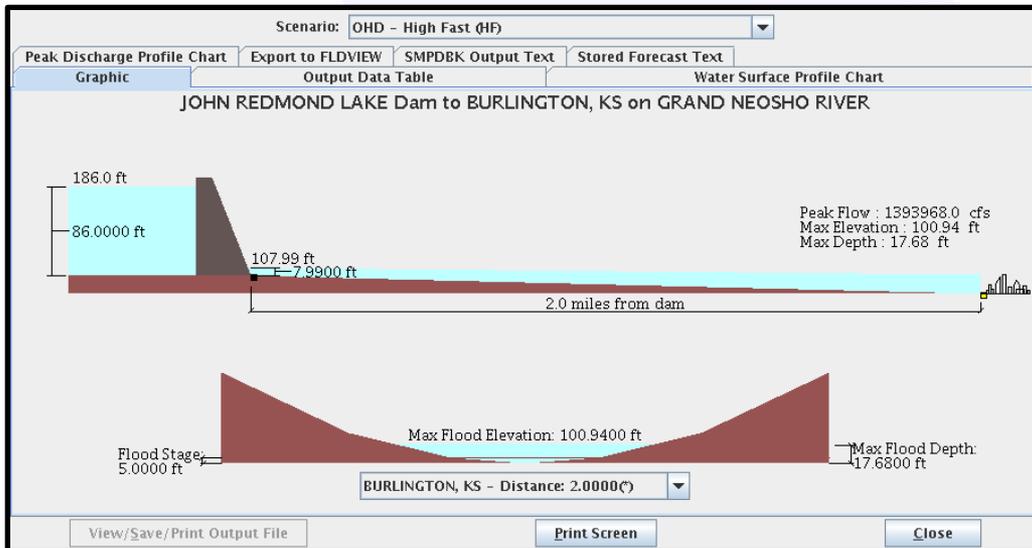
Probabilistic Forecasts
Seamless suite from 1 hour to 2 years

CHPS/FEWS
New modern software architecture

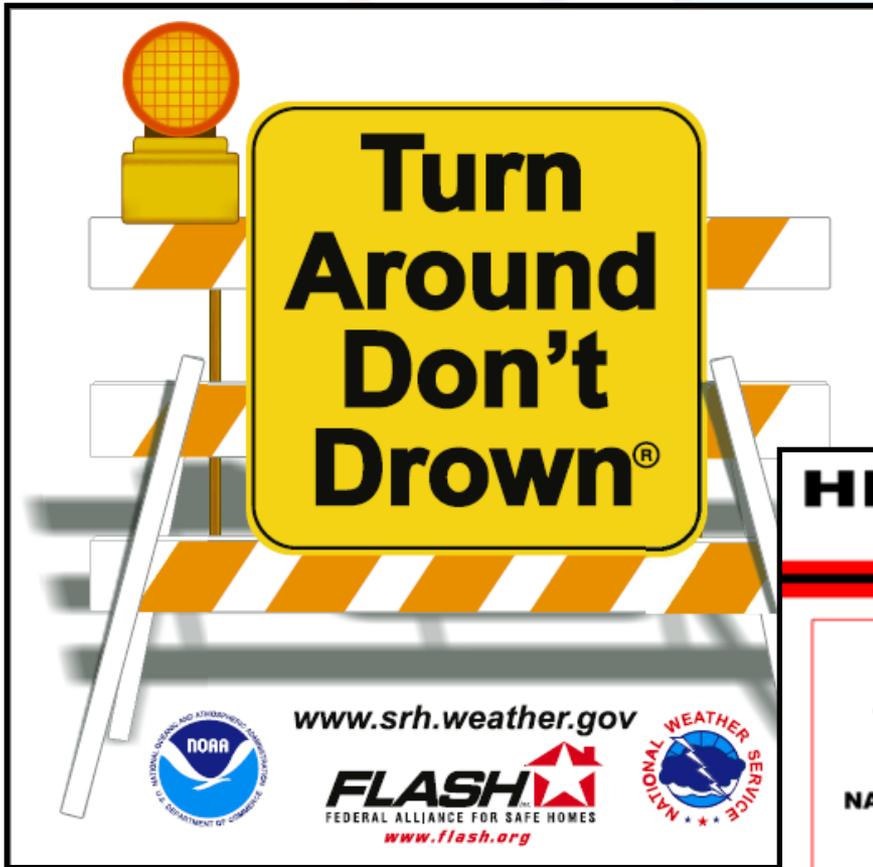
Distributed Hydrologic Modeling
Increased resolution of model parameters and
precipitation inputs
Forecast possible at any grid location

Hydraulic Modeling
Improved routing in complex environments
Integral in Flood Inundation Mapping

GIS



ABRFC Outreach and Preparedness



HIGH WATER MARK
40.29 Feet (15.29 Feet above Flood Stage)

APRIL 1, 1886

ON THIS DAY, WATER FROM THE OOSTANAULA RIVER ROSE TO THIS LEVEL AT THIS LOCATION. FOR MORE INFORMATION, CONTACT:

NATIONAL WEATHER SERVICE PEACHTREE CITY, GA
www.srh.noaa.gov/ffc

SOUTHEAST RIVER FORECAST CENTER
www.srh.noaa.gov/serfc

USGS GEORGIA WATER SCIENCE CENTER
ga.water.usgs.gov



ABRFC

Outreach and Preparedness

Decision Support



- Support for emergency responders
- National and regional partnerships
- Remote briefings and staff deployments

Video teleconference between National Hurricane Center and Federal Agencies



US Army Corps
of Engineers ®



Briefing between NWS and partners

ABRFC Operations

Questions?

- Service Coordination Hydrologist: James Paul James.Paul@noaa.gov
- Hydrologist-in-Charge: Bill Lawrence Bill.Lawrence@noaa.gov
- 918 832 4109
- <http://www.srh.noaa.gov/abrfc>
- <http://www.facebook.com/US.NationalWeatherService.ABRFC.gov>

NWS AHPS Flood Inundation Mapping Program

NWS is partnering with other federal, state, and local agencies to provide web based inundation maps at Forecast Points.

Data Type

- Inundation Levels
- Flood Categories
- Current/Forecast

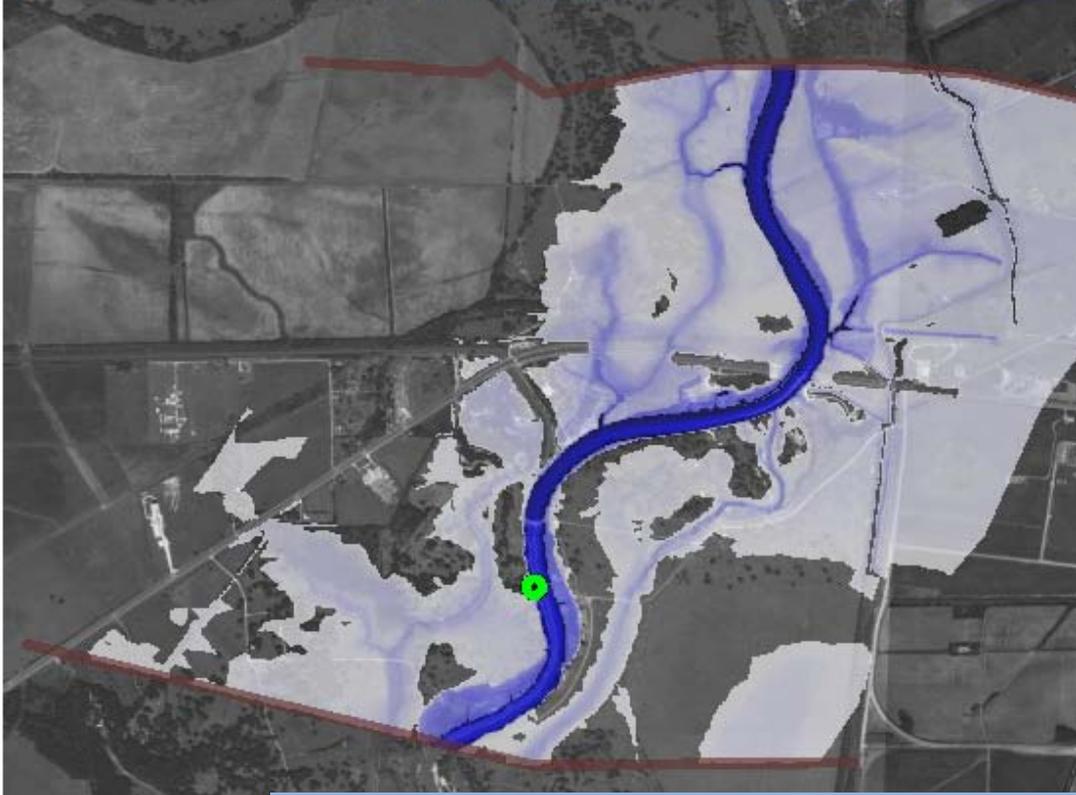
Inundation Levels

NAVD88	Stage
55.5	51.5
54.5	50.5
53.5	49.5
52.5	48.5
51.5	47.5
50.5	46.5
Major Flooding Begins	
49.5	45.5
Moderate Flooding Begins	
48.5	44.5
Minor Flooding Begins	
47.5	43.5
46.5	42.5
45.5	41.5
44.5	40.5
43.5	39.5
42.5	38.5
41.5	37.5
40.5	36.5

Hydrograph | River at a Glance | Download | Inundation Mapping | Weekly Chance of Exceeding Levels | Chance of Exceeding During Entire Pe

Image Type: Standard (Faster Download) Detailed (Slower Download)

Mouse Location Water Depth: Off | Water Depth Function Off | **Current Stage: 2.3 at 13:15 U**



<http://water.weather.gov/ahps2/inundation/inundation.php?gage=bact2>

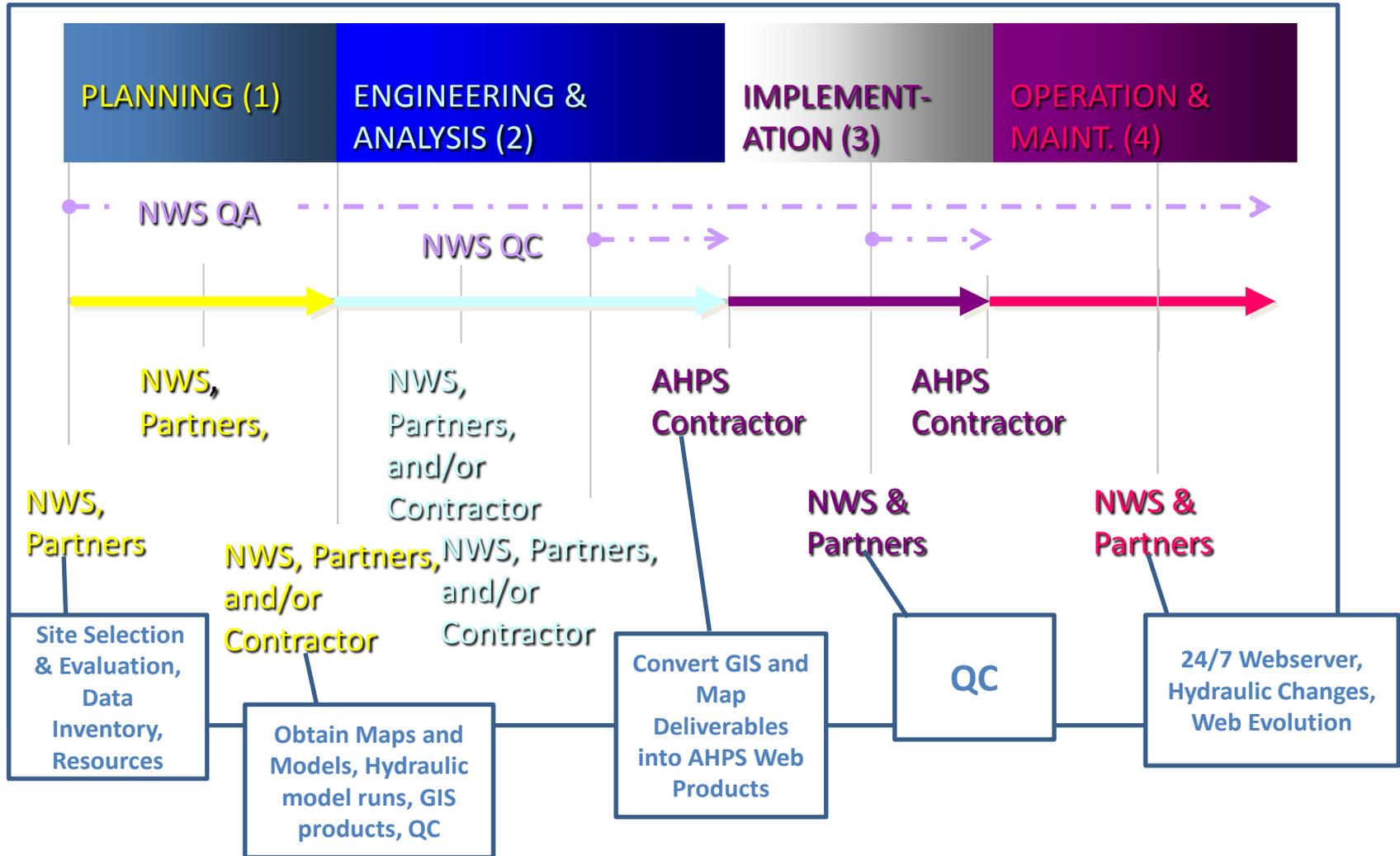
Transparency Level

Selected Inundation: NAVD88: 50.5 ft | Mouse Location*: Water Depth: Off

Flood Categories (Major Flood Stage)

NWS AHPS Flood Inundation Mapping Program

NWS AHPS 4 Phase Flood Mapping Process



NWS AHPS Flood Inundation Mapping Program

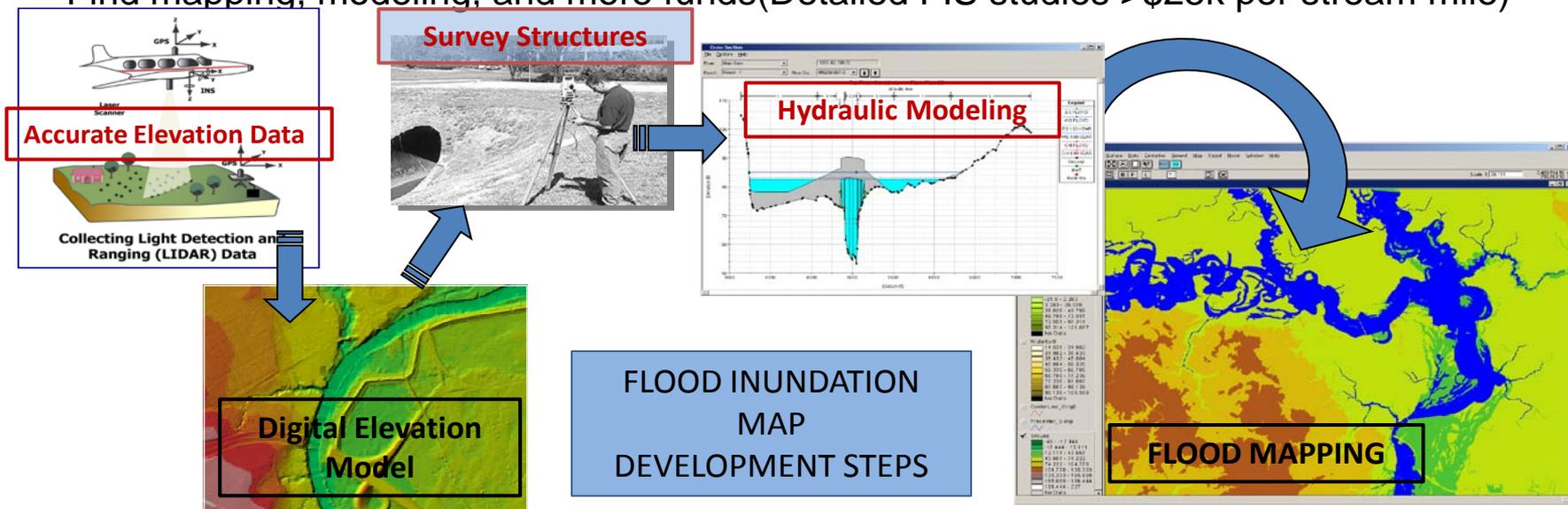
Sponsoring Partner Provides Models, Maps, Engineering and Financial Support

Partner with Detailed Flood Insurance Studies

- FEMA approved Hydraulic Models (1D, 2D, Steady vs Unsteady)
- 10M DEM for scoping
- Lidar 1.2 ft vertical accuracy (2 ft contour equiv)
- Hydroconditioning of Lidar Derived DEM
- Resource funds - Additional \$5-10K to complete one inundation map library as part of the FIS. Cost doubles to \$10-20K if map library is created after FIS is completed.

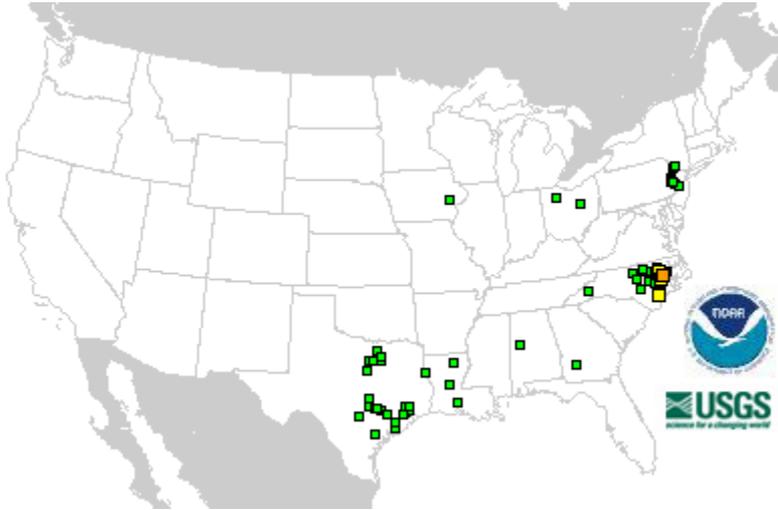
Partner without Detailed Flood Insurance Studies

- Find mapping, modeling, and more funds(Detailed FIS studies >\$25k per stream mile)

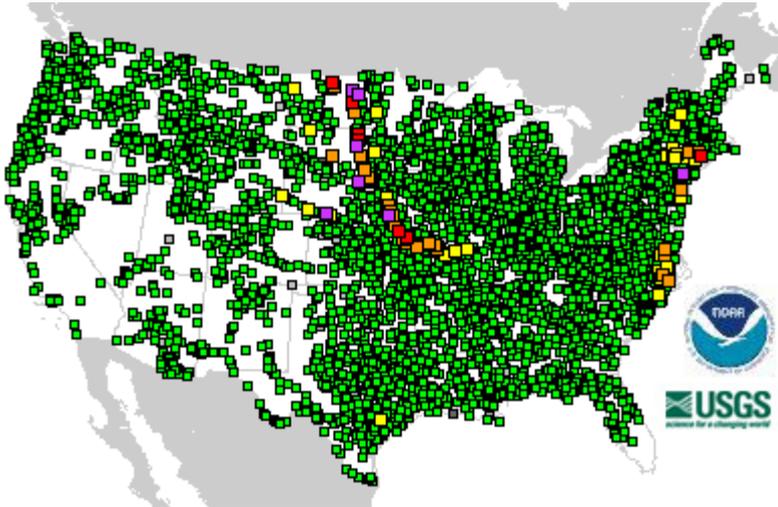


NWS AHPS Flood Inundation Mapping Program

Opportunities for Collaboration on Flood Mapping



- 61 Flood Map Libraries as of Sept. 2011
- Partners include FEMA, USGS , USACE, Lower Colorado River and San Antonio River Authorities, Susquehanna River and Delaware River Basin Commissions, Iowa, Kansas and Wisconsin (State and Academia)



- More than 4800 River Forecast Sites without Flood Map Libraries
- NWS Seeking Interested Partners