

# USGS HDDS Remote Sensing Mississippi Flooding 2015-16



**Brenda Jones, USGS**

# Midwest Floods – HDDS Timeline

- Support of NGB and USGS began on 28 December 2015
- Charter activation request for FEMA was submitted on 3 January 2016
- Appointed Chaohui Guo, a visiting scientist to USGS EROS from China, as Charter Project Manager on 4 January 2016
- Began receiving and ingesting data on 28 December 2015
- Have some map/vector products from NGA, UTCSR, and NASA but few products from all of the SAR data collections
- Still waiting to get images released from CBP SAR collection
- Checking with USACE to determine if they have additional imagery



# Midwest Floods

- **HDDS Event ID:**
- **201512\_Flood\_Midwest\_US**
  - **Aerial imagery**
    - Civil Air Patrol (CAP) (3,282 images)
    - NOAA (5708 images)
    - USACE (4 Mosaics) - *Restricted*
  - **Moderate-resolution Optical Satellite Imagery**
    - ASTER (16 images)
    - EO-1 ALI (9 images)
    - Radarsat-2 (17 images - SAR) *Restricted*
    - Landsat 7/8 (91 images) – *Public Charter*
    - SPOT 6/7 (15 images) – *Restricted Charter*
    - DMCii (7 images) – *Public Charter*
    - Sentinel-1 (16 images) - *Public Charter*
    - KANOPUS –V (2 images) *Restricted – Charter*
    - RESURS-P (14 images) *Restricted – Charter*
  - **High-resolution Optical Satellite Imagery**
    - WorldView-2/3 (3582 images) – *Restricted*

# Midwest Floods Charter

- **HDDS Event ID:**
- **201512\_Flood\_Midwest\_US\_Charter**
  - Moderate-resolution Optical Satellite Imagery
  - High-resolution Optical Satellite Imagery
    - RapidEye-3 (27 images) – *Restricted – Charter*
  - SAR imagery
    - Sentinel-2 (2 images) - *Public Charter*
    - ALOS-2 (26 images) *Restricted – Charter*
    - RISAT1 (10 images) *Restricted – Charter*
    - TerraSAR-X (9 images) – *Restricted - Charter*

# Midwest Floods Charter

- **Data Downloads by Agency**
  - Bureau of Land Management (BLM)
  - Department of Army
  - Department of Army – Corps of Engineers (USACE)
  - Department of Veteran Affairs (VA)
  - Environmental Protection Agency (EPA)
  - Federal Emergency Management Agency (FEMA)
  - Foreign Agricultural Service (USDA FAS)
  - United States Geological Survey (USGS)
  - National Aeronautics and Space Administration (NASA)
  - National Guard Bureau (NGB)
  - National Weather Service (NOAA)
  - Natural Resources Conservation Service (NRCS)
  - Risk Management Agency
  - United States Coast Guard (USCG)
  - Local governments
  - State governments
  
- **Charter Data Downloads**
  - FEMA
  - NASA
  - USGS
  - State governments

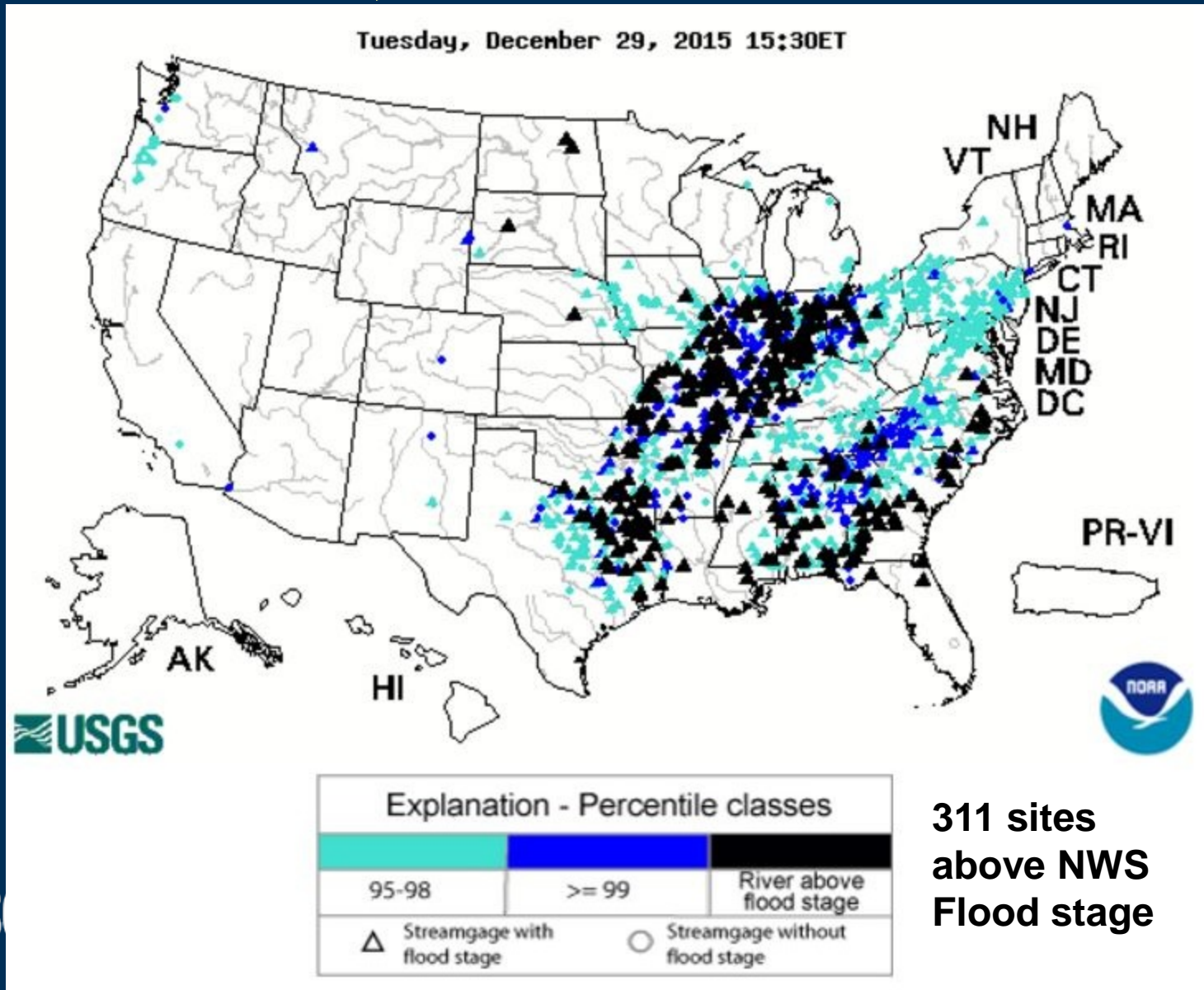
# USGS Recent Flood Response Activities

**Marie C. Pepler**  
**Office of Surface Water**  
**Reston, VA**

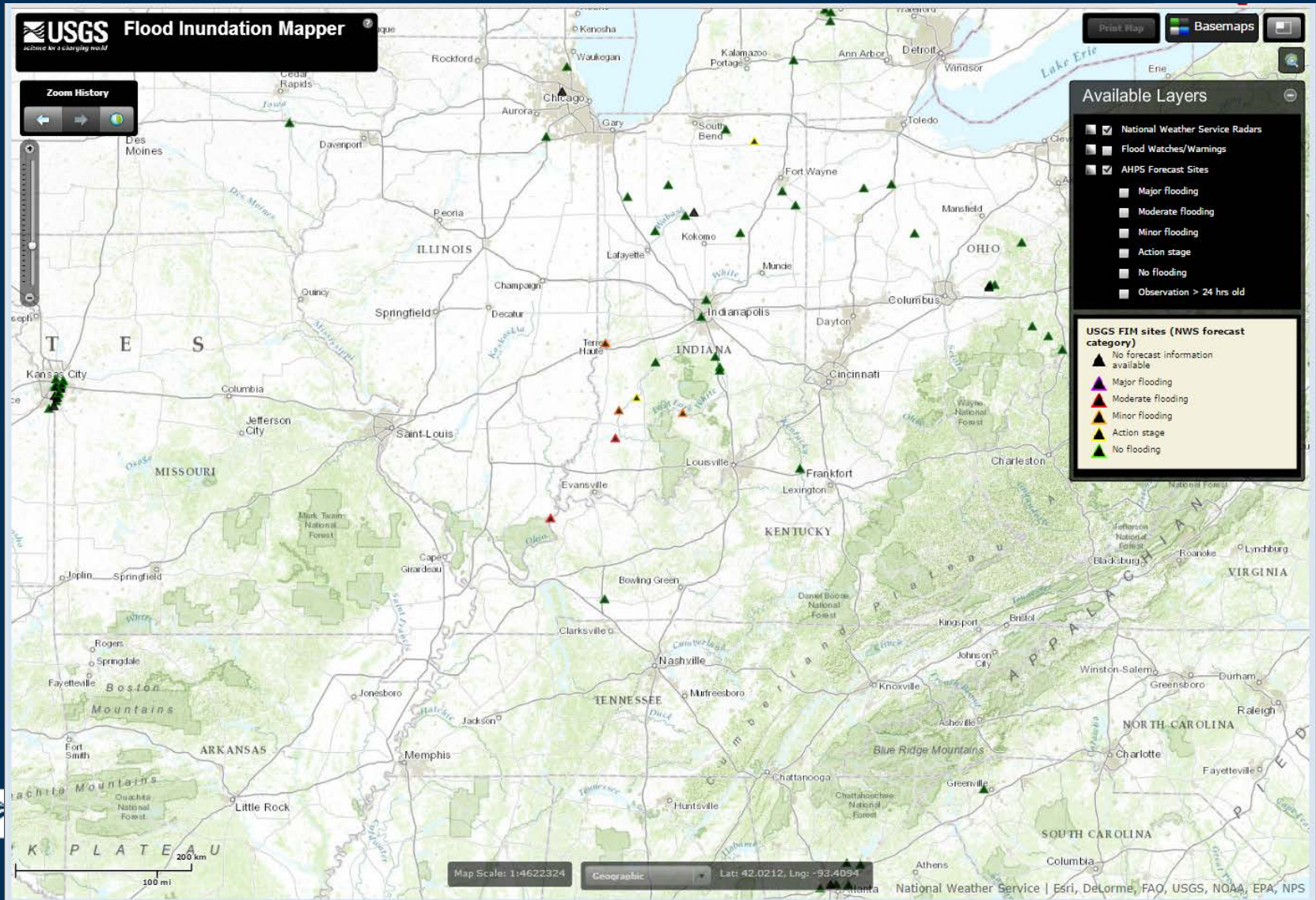




# December 29, 2015



# Flood Inundation Mapping verification





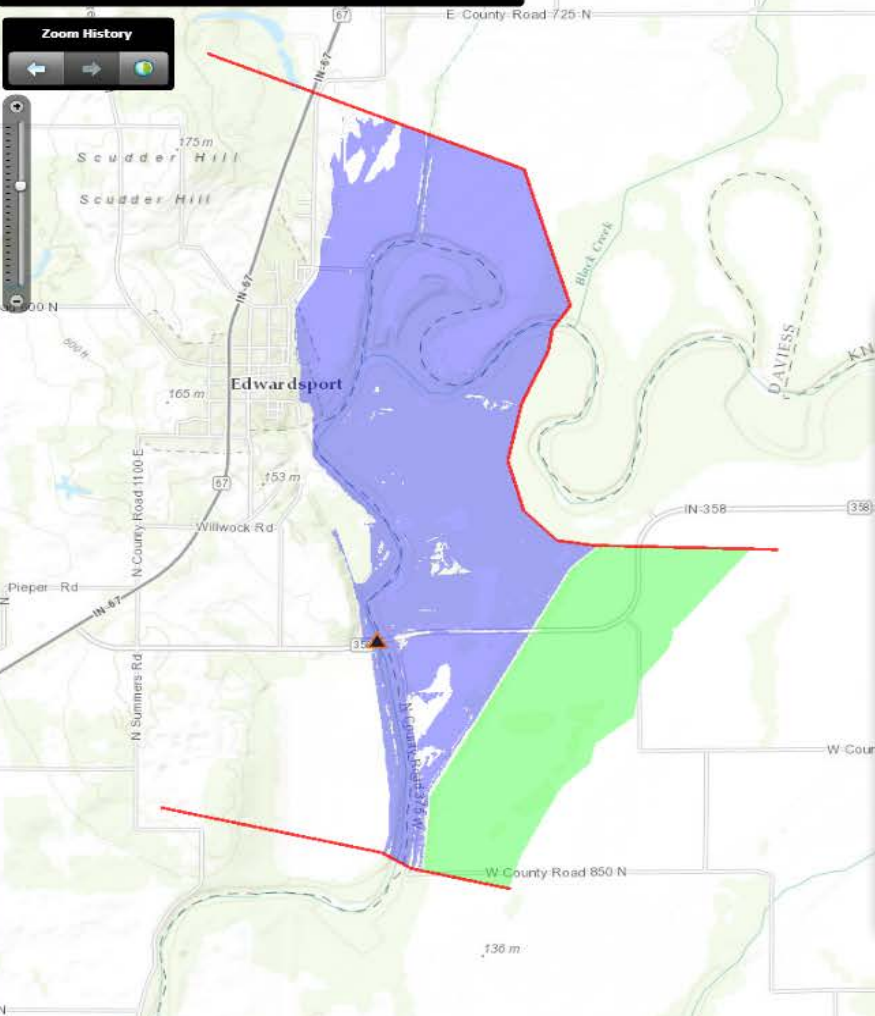
Available Layers

- National Weather Service Radars
- Flood Watches/Warnings
- AHPS Forecast Sites
  - Major flooding
  - Moderate flooding
  - Minor flooding
  - Action stage
  - No flooding

Zoom History

← → ↻

Vertical zoom slider



INDIANA: White River near Edwardsport

Estimated Flood Conditions

29.90  
12.00

Adjust flood opacity

Selected Gage Height: 20.00 feet  
Selected NAVD83 Altitude: 451.56 feet

Include area of uncertainty due to levee

Click on map for estimated water depth

**USGS**  
*advance by a changing world*

Flood Tools Historical Flooding Web Cam Services and Data

**WHITE RIVER NEAR EDWARDSPORT, IN**

USGS Observation at: 2016-01-04 09:30  
Gage Height: 20.42

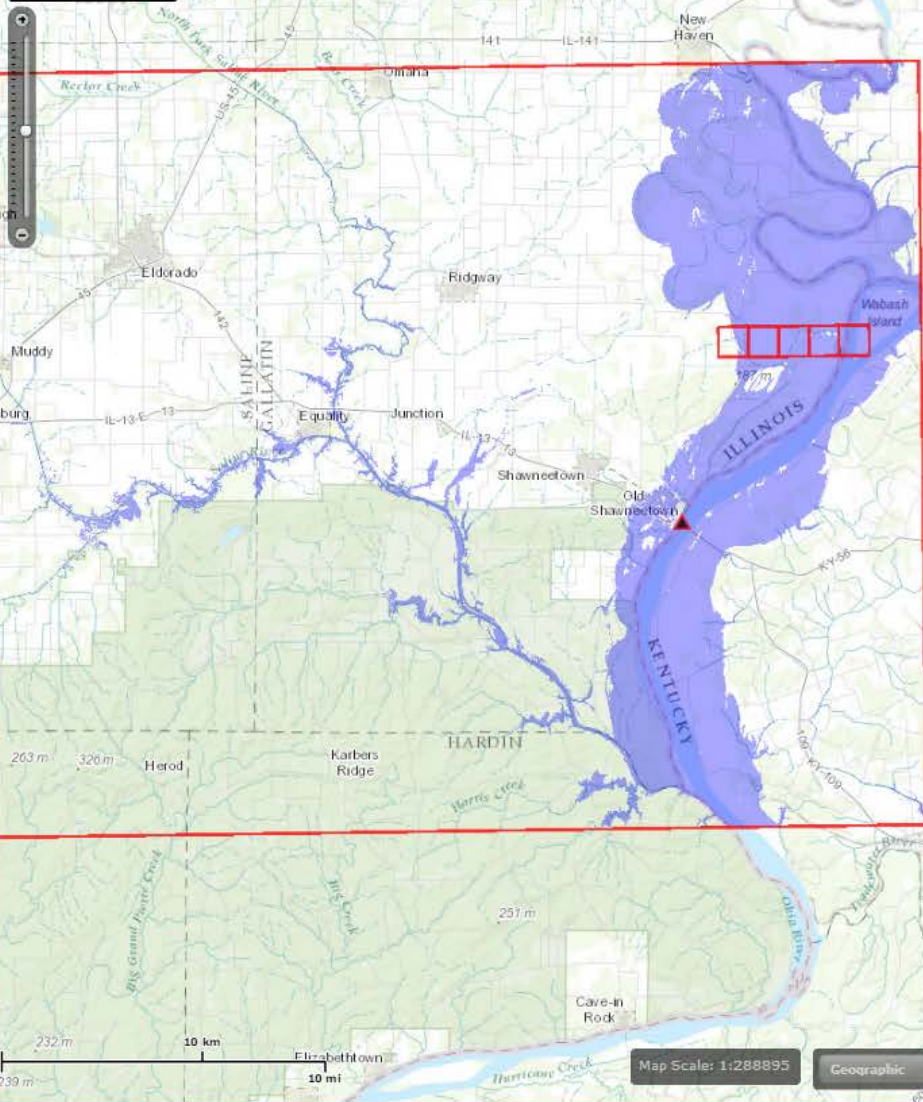
NWS Prediction for: 2016-01-04 13:00  
Gage Height: 20.2

Current Gage Height: 20.42 feet  
Current Discharge: 29600 cfs

USGS Site Number: [03360730](#) Provisional Data, Subject to Revision  
NWS Site ID: [EDW13](#) Forecast Subject to Revision



**Zoom History**



Print Map Basemaps

**Available Layers**

- National Weather Service Radars
- Flood Watches/Warnings
- AHPS Forecast Sites
- Major flooding
- Moderate flooding
- Minor flooding
- Action stage

**ILLINOIS-KENTUCKY: Ohio River at Old Shawneetown** Zoom

**Flood Tools** **Historical Flooding** **Web Cam** **Services and Data** **More Info**

**Estimated Flood Conditions**

Selected Gage Height: **43.00 feet**  
Selected NAVD88 Altitude: **352.00 feet**

**OHIO RIVER AT OLD SHAWNEETOWN, IL-KY**

Category	Start Date	End Date	Gage Height
Action stage	1/3/16	1/10/16	30.00 - 33.00
Flood stage	1/3/16	1/10/16	33.00 - 37.00
Moderate stage	1/3/16	1/10/16	37.00 - 44.00

USGS Observation at: 2016-01-04 08:30 Gage Height: 43.49  
NWS Prediction for: 2016-01-04 12:00 Gage Height: 44

**Current Gage Height:** 43.49 feet  
**Current Discharge:** 637000 cfs

USGS Site Number: [03381700](#) Provisional Data, Subject to Revision  
NWS Site ID: [SHN12](#) Forecast Subject to Revision



# Mississippi River Basin Flood Response



Mississippi River at St. Louis



Meramec River near St. Louis (I-44)

- 330 special streamflow measurements in 10 states from December 22, 2015 through January 20, 2016
- Installation of 1 Rapid Deployment Gages (RDG) and 14 autonomous time series stage sensors



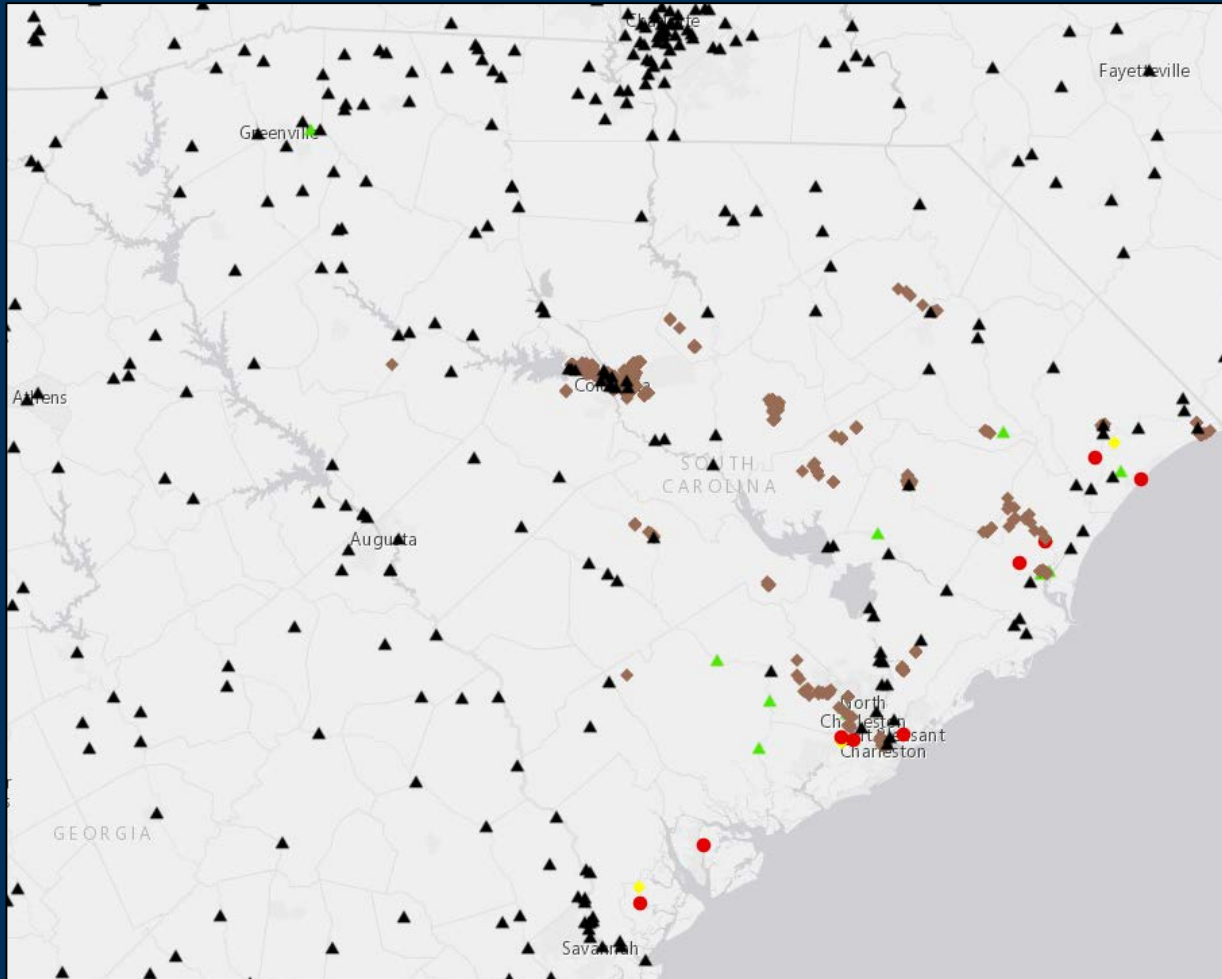
# Vicksburg Experiment

- Test Remote Discharge Measurement Methods
  - Airborne/Satellite Methods
  - Large Scale Particle Image Velocimetry (LSPIV) from land-based videography
- Collect detailed water velocity and channel bathymetry and water surface slope

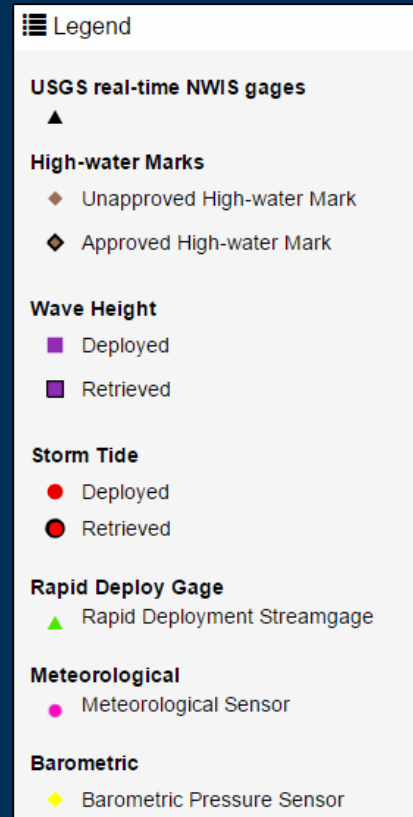




# South Carolina Flood Response



**13 Rapid Deployment Gages**  
**12 Sensors**  
**602 High-Water Marks**  
**20 Inundation Maps**



<http://water.usgs.gov/floods/events/2016/winter/>