Streamgage-linked Inundation Mapping Websites in Illinois

Elizabeth Murphy

Joint meeting of River Coordinating Councils

February 6, 2012

Overview

- USGS Flood Inundation Mapping Initiative
- Gage-linked flood inundation mapping on the web in Illinois
- Demonstration of Saline River inundation website

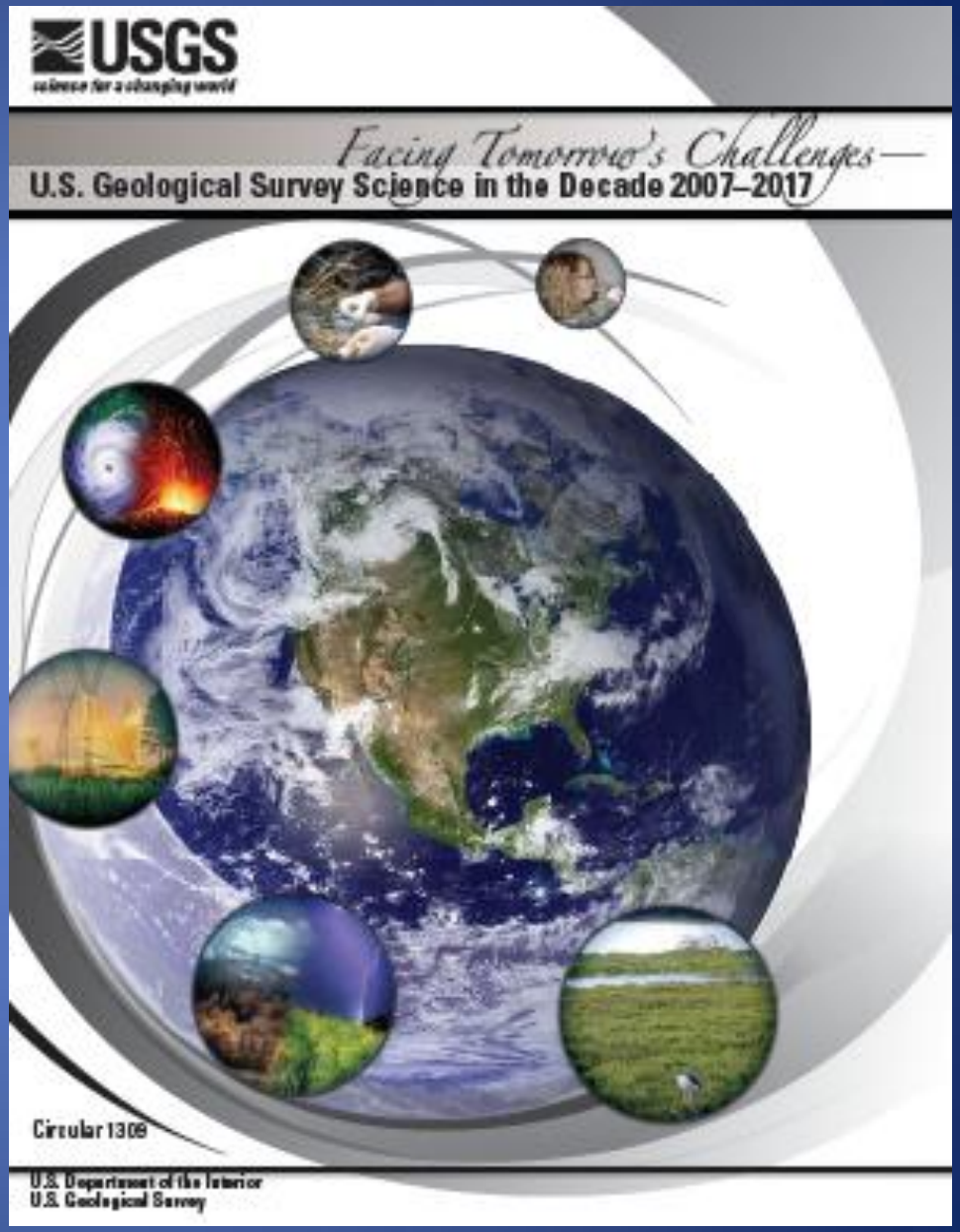
USGS FIMI

- Flood Inundation Mapping Initiative (FIMI) is a group within the USGS to provide support and guidelines to the Science Centers doing gage-linked inundation mapping
- FIMI provides a point of contact for interaction with our partners in the National Weather Service, U.S. Army Corps of Engineers, and FEMA

USGS Hazards

A National Hazards Risk and Resilience Assessment Program

- Enhance our ability to collect and deliver real-time info from earth-observation networks
- With our partners, assess the vulnerability of cities and ecosystems
- Ensure science is effectively applied to reduce losses



Facing Tomorrow's Challenges, USGS Science in the Decade 2007—2017, Circular 1309

Benefits of warnings and forecasts

"…loss of life to floods during the past half-century has declined, mostly because of improved warning systems…"[1]

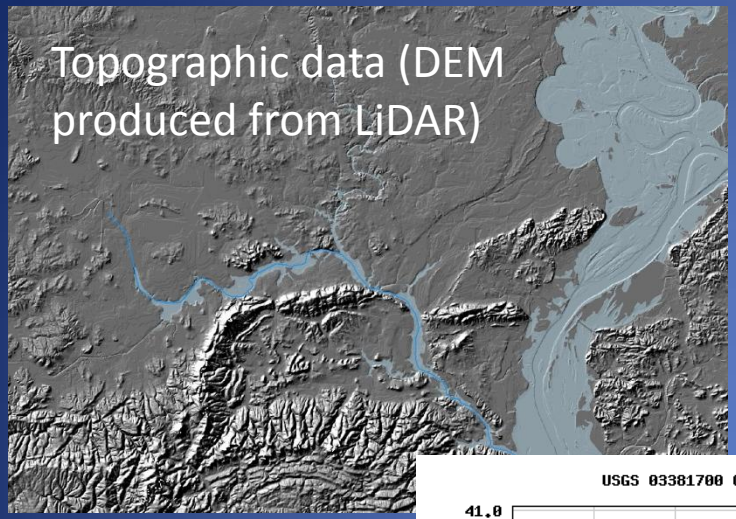
- Evacuations
- Road closures
  - > half of fatalities

  are auto related[1]

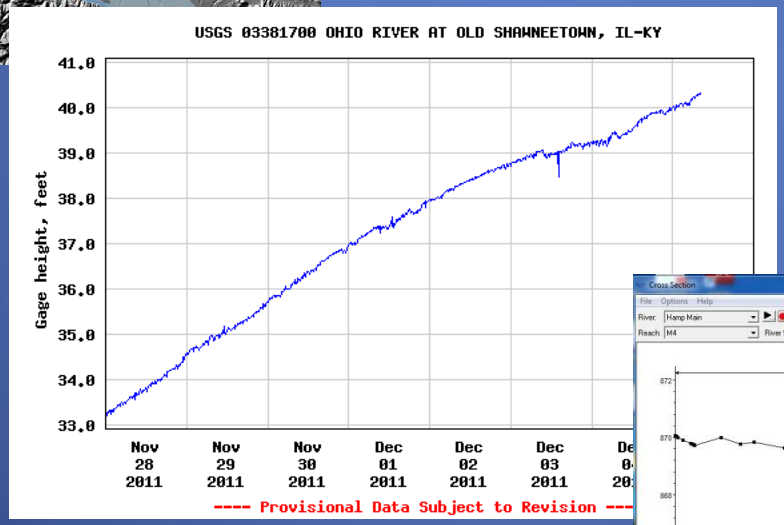
Flooded underpass, Beaumont, TX (photo courtesy of L. Roll/FEMA)

[1]Flood Hazards—A National Threat, USGS Fact Sheet 2006-3026, January 2006

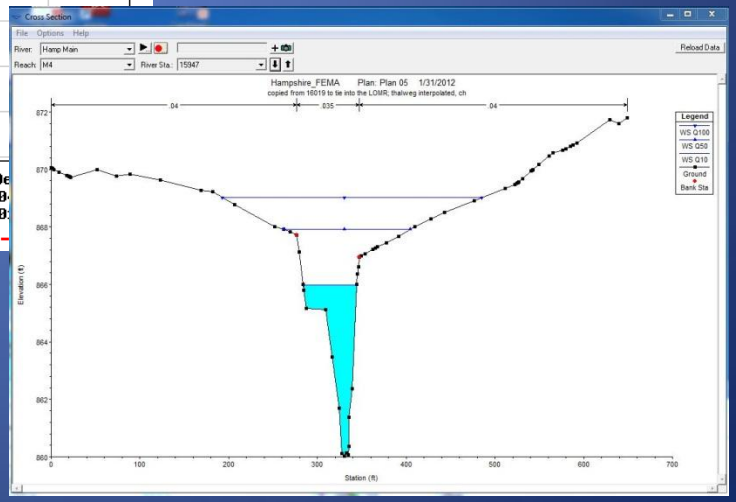
How are inundation maps produced?



USGS gage data provides water-surface elevation



Hydraulic modeling simulates water-surface elevation away from gage



Illinois Inundation websites

- Salt Creek at Wood Dale in DuPage County (http://il.water.usgs.gov/ifhp/dupage/)
- Des Plaines River at Lincolnshire in Lake County (http://il.water.usgs.gov/ifhp/lake/)
- Middle Fork Saline River at Harrisburg in Saline County

Salt Creek at Wood Dale, IL -- Provisional Inundation Map Subject to Revision

Elevation & Gage Height

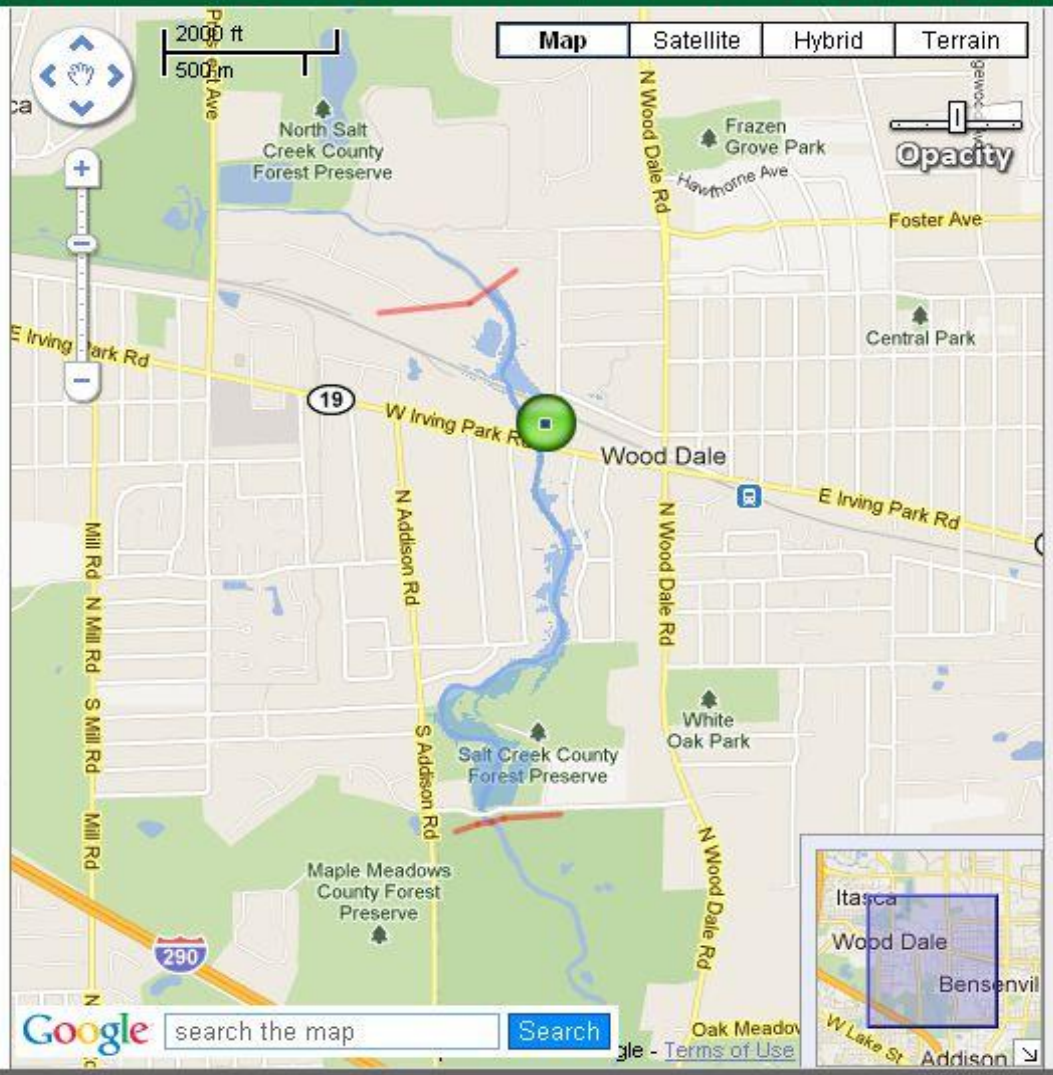
674.0 (11.0)
674.5 (11.5)
675.0 (12.0)
675.5 (12.5)
676.0 (13.0)
676.5 (13.5)
677.0 (14.0)
677.5 (14.5)
678.0 (15.0)
678.5 (15.5)
679.0 (16.0)
679.5 (16.5)
680.0 (17.0)
680.5 (17.5)

NWS Precip Estimations

- 1 Hour
- Storm Total

(zoom out to view)

Disclaimer



This site is operated in cooperation with the

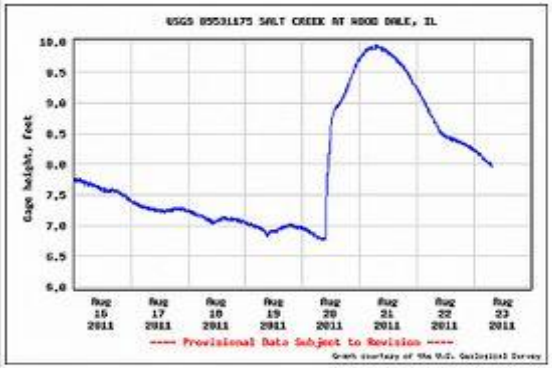
Du Page County, Illinois
Department of Economic Development & Planning

Explanation

- Salt Creek at Wood Dale, IL
- Extent of Study
- Other Inundation Mapping Gages

Gage Data

Hydrograph | Cam 1 | Cam 2



Most Recent Gage Height: 7.96 ft.
Date: 2011-08-23 08:00

USGS - Illinois Flood Hazards Program - Des Plaines River at Lincolnshire, Illinois - Windows Internet Explorer

http://il.water.usgs.gov/ifhp/lake/

USGS Lake County inundation maps

File Edit View Favorites Tools Help

Convert Select Google USGS Lake County inundation maps Search Share Check

USGS - Illinois Flood Hazards Program - Des Plaines Ri... Page

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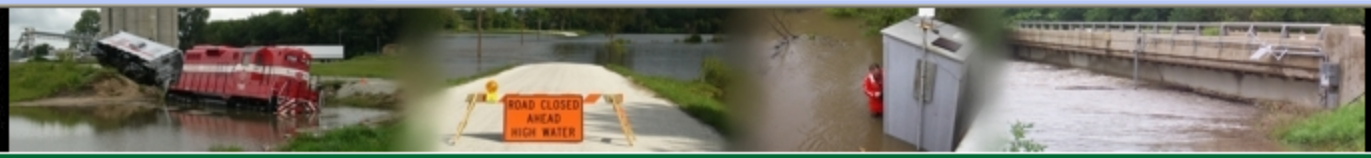

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Des Plaines River at Lincolnshire, IL -- Provisional Inundation Map Subject to Revision

Elevation & Gage Height

643.2 (13.2)
643.5 (13.5)
644.0 (14.0)
644.5 (14.5)
644.9 (15.0)
645.5 (15.5)
646.0 (16.0)
646.5 (16.5)
647.0 (17.0)
647.5 (17.5)
648.0 (18.0)
648.8 (18.9)
649.1 (19.1)

NWS Precip Estimations

- 1 Hour
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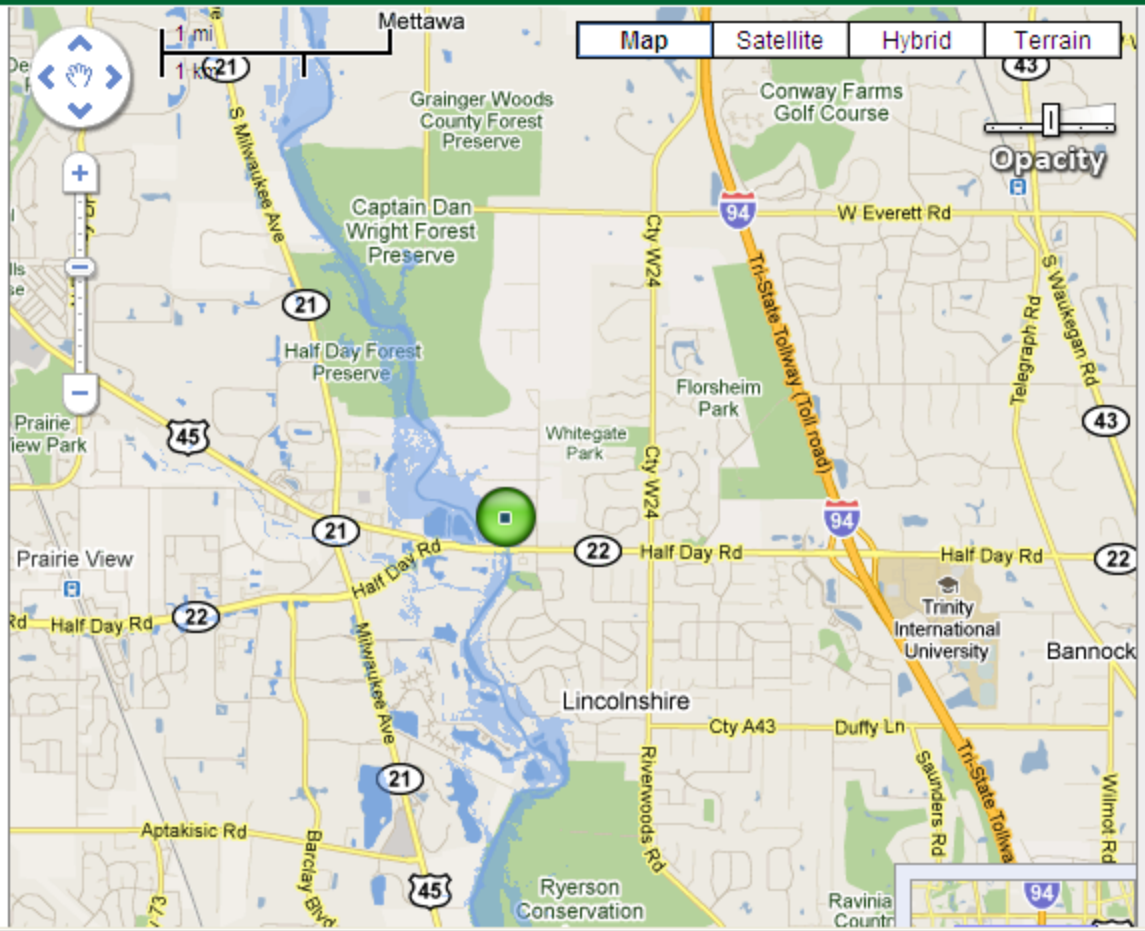
(zoom out to view)



This site is operated in cooperation with th

Lake County, Illinois
Stormwater Management Commission

Explanation

- Des Plaines River at Lincolnshire,
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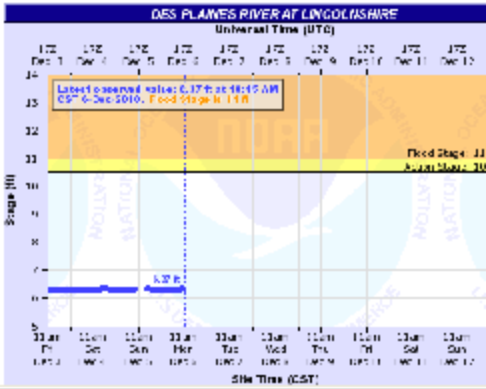
- Other Inundation Mapping Gages

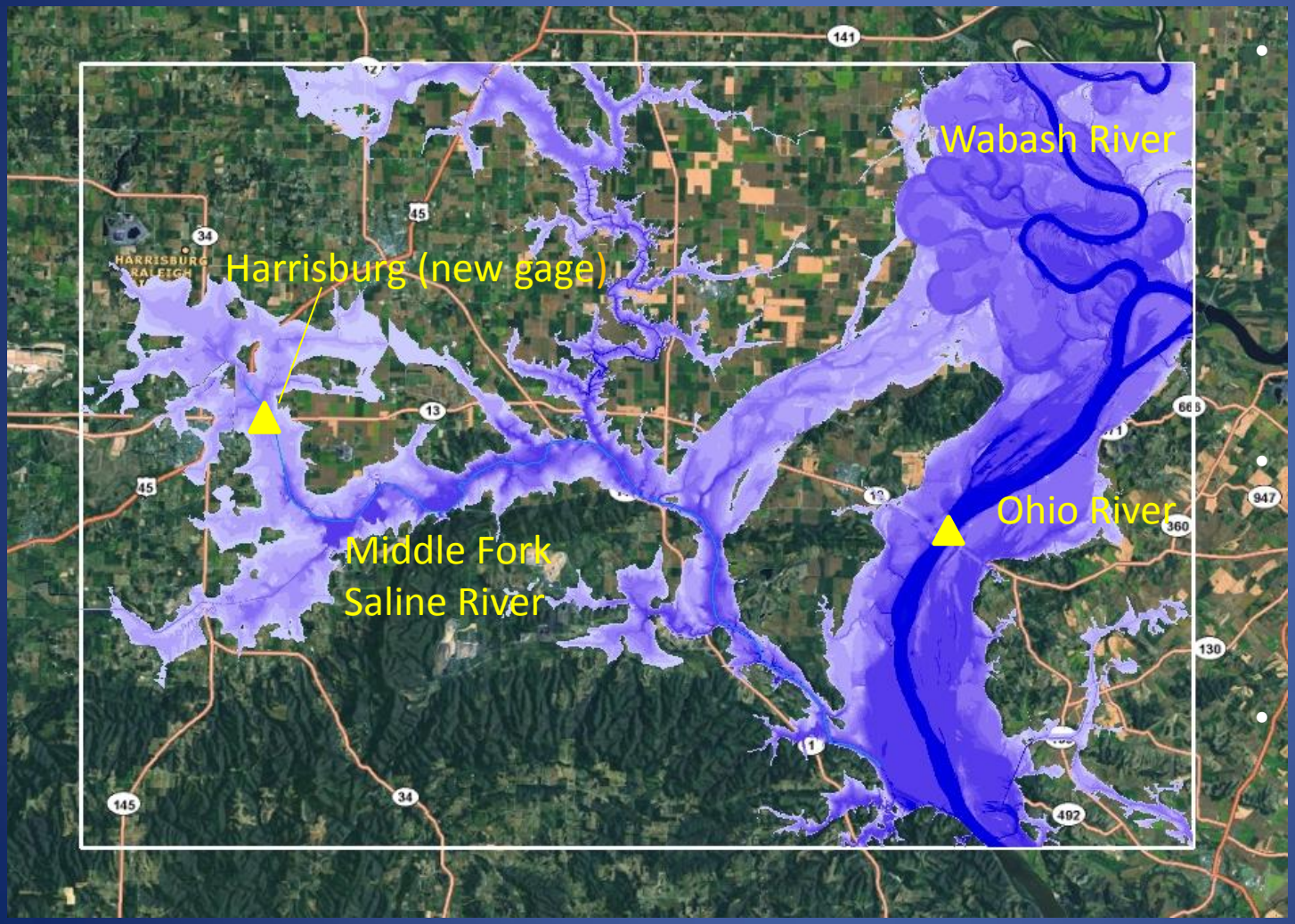
Gage Data

Hydrograph | Forecast



Where is the Saline River system?

Flood Inundation Map of Saline River



Inundation surface at WSE of 365 ft

- Flood Inundation study of Saline River brought about by the extreme flooding in Southern Illinois this spring.
- 30-mile stretch from confluence with the Ohio River up to Harrisburg
- Backwater from the Ohio River is usually the source of the flooding

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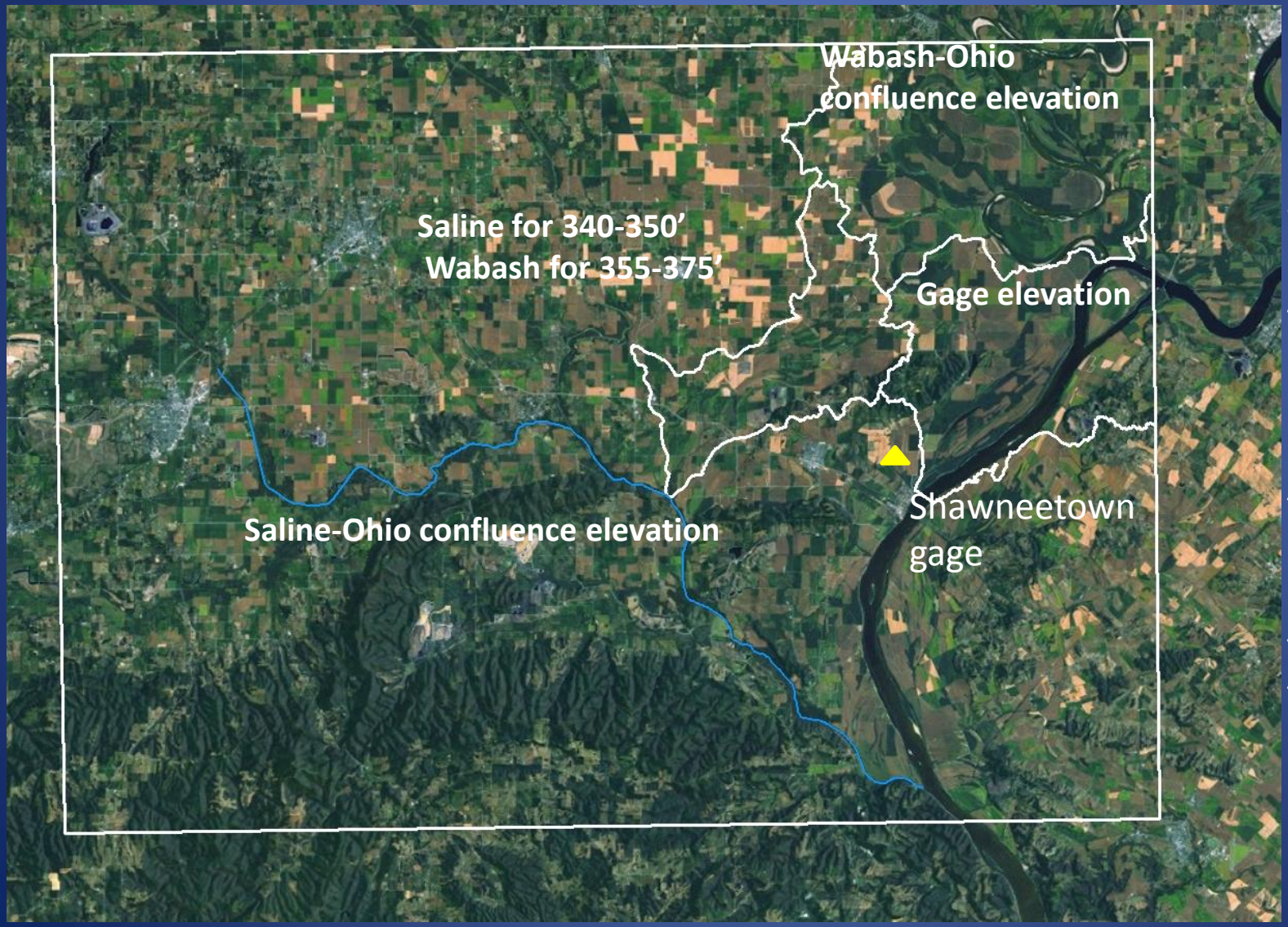
Inundation Development

- Linked to the Ohio River at Old Shawneetown
- Mapped on the NED (10 m resolution)
- No model available for the Saline
- Subtracted the land surface from the water surface to derive inundation extent
- Referencing all elevations to common datum was key (NGVD29 vs NAVD88 vs. Ohio River datum)

Inundation Surface generation for the Saline



Used slope of Ohio River WSE calculated from the Corps Ohio River HEC-2 model to vary the water-surface elevation over the study area for inundation mapping

Website DEMO

Verification Efforts

- Comparison to satellite imagery during flood events

Saline River Inundation Verification

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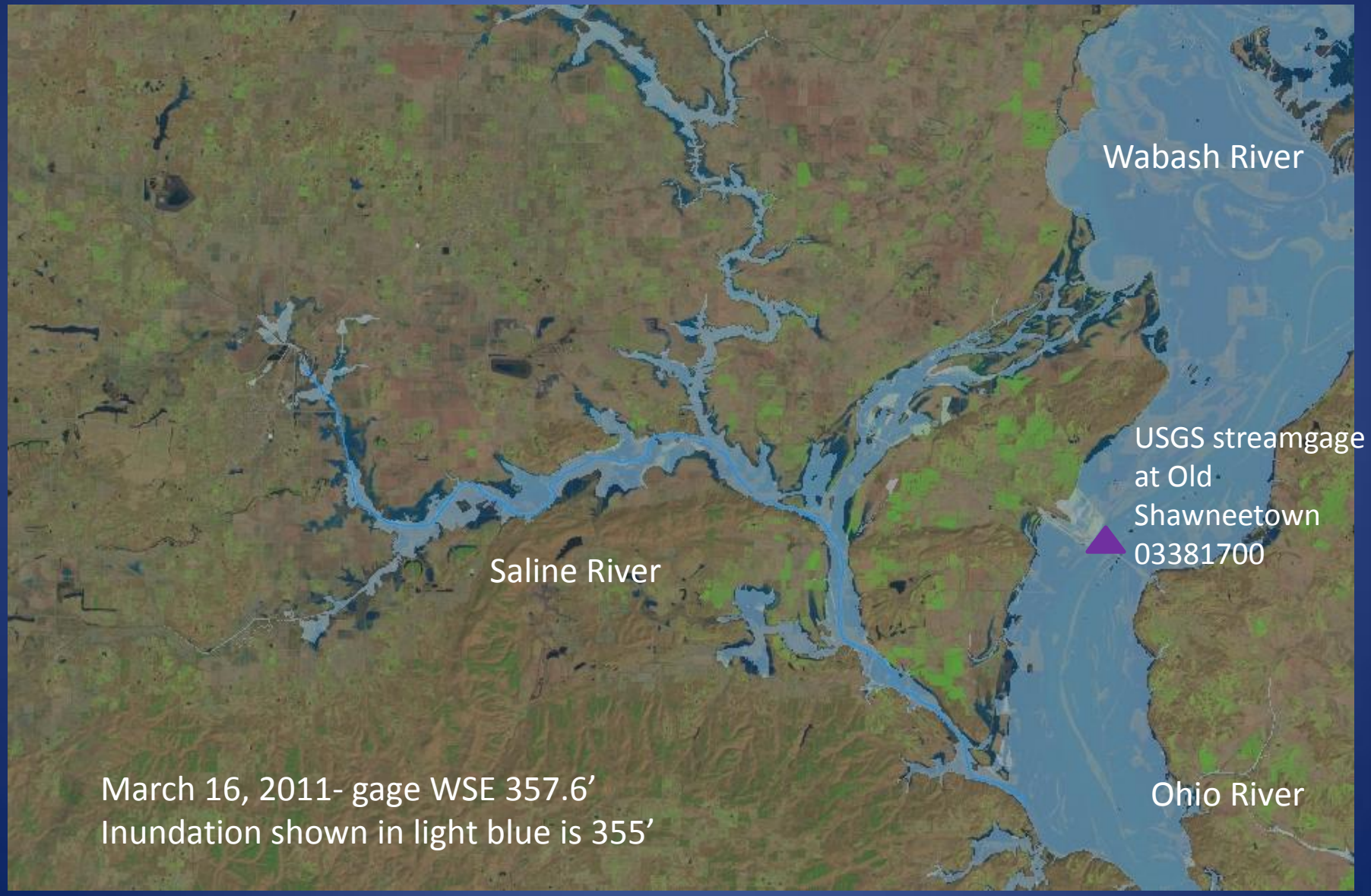

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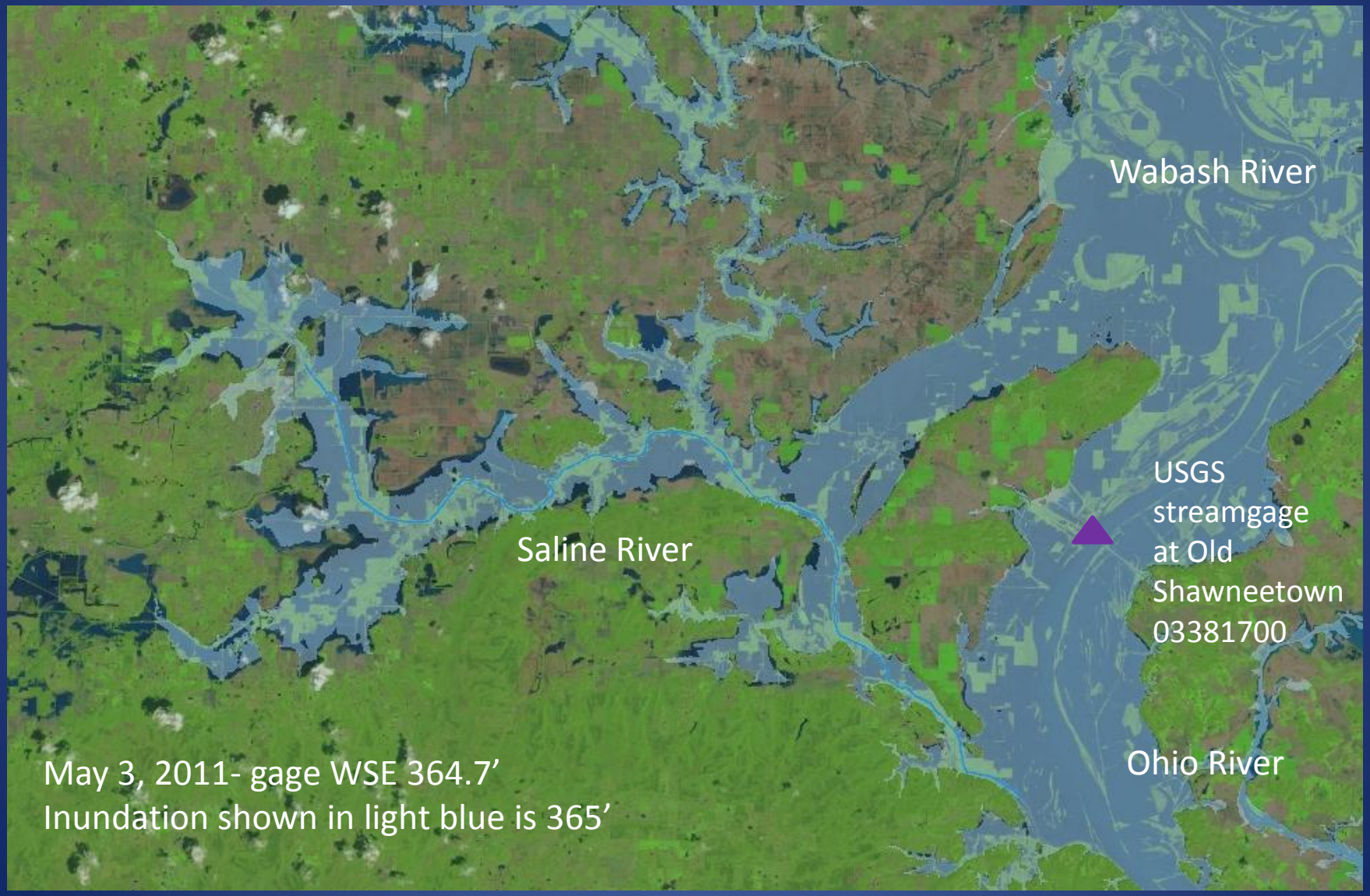

Next steps

- Working with Saline County EMA to continue gage and inundation mapping support
- Prepare a report for the inundation mapping website
- Improve the inundation surfaces when the LiDAR topographic information available (projected to be Nov 2012)

Questions

Extra slides

Ohio River at Old Shawneetown, IL-KY--Provisional Inundation Map Subject to Revision

Elevation & Gage Height
for Ohio River at Old Shawneetown, Il-KY (03381700)

- 340 (31)
- 345 (36)
- 350 (41)
- 355 (46)
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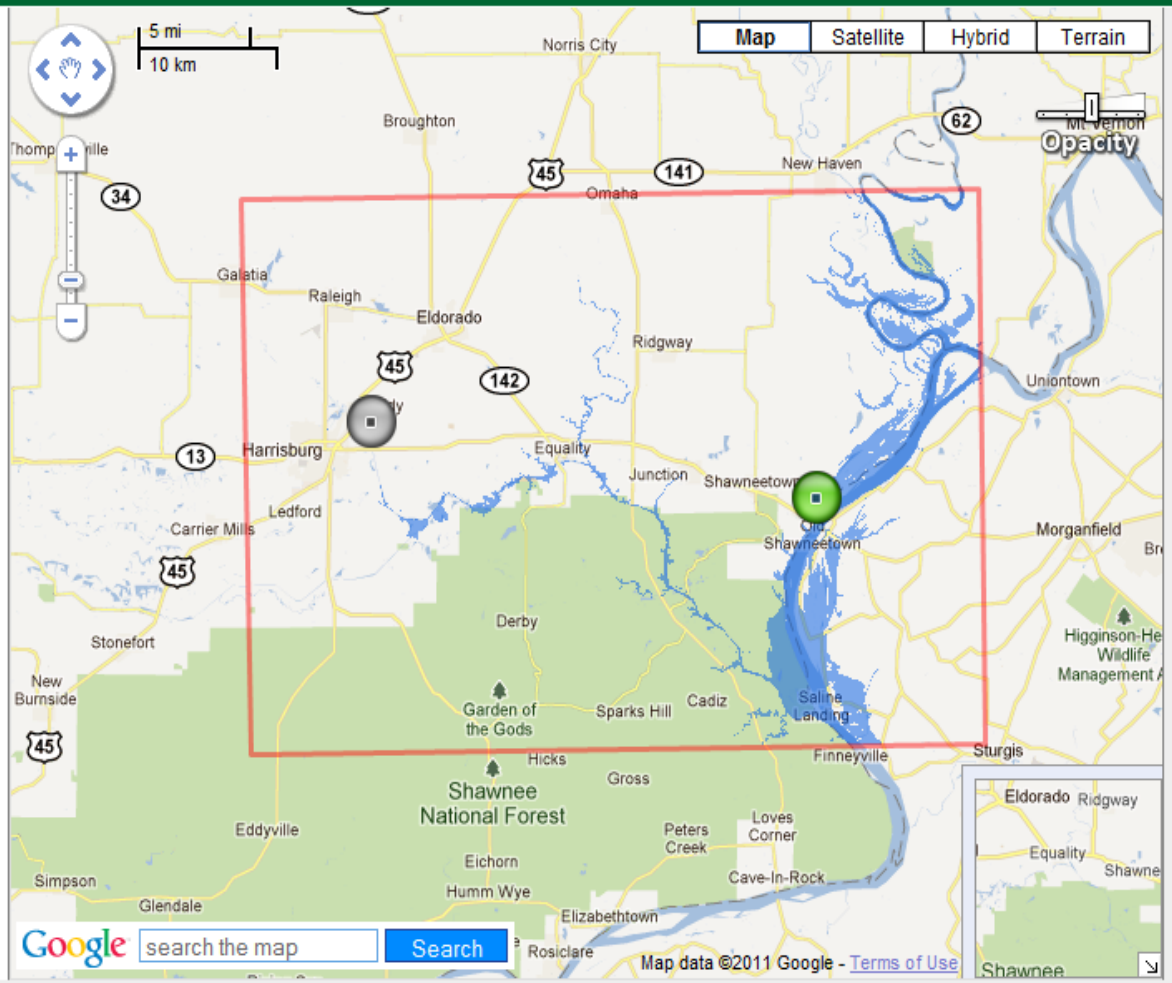
NWS Precip Estimations

- [ ] 1 Hour
- [ ] Storm Total(zoom out to view)

Disclaimer



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Office of Surface Water

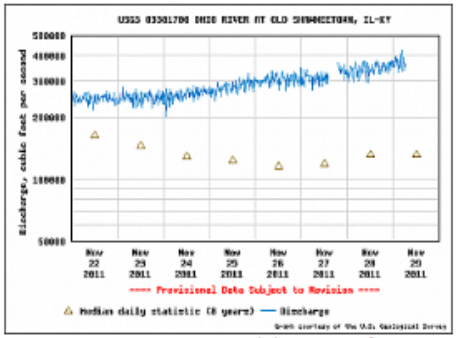
Explanation

- Ohio River at Old Shawneetown, Il-KY (03381700)
- Extent of Study
- Middle Fork Saline River near Harrisburg, IL (03382200)

Gage Data

Hydrograph | Forecast

03381700



Most Recent Gage Height: 34.83 feet.
Date: 2011-11-29 06:30

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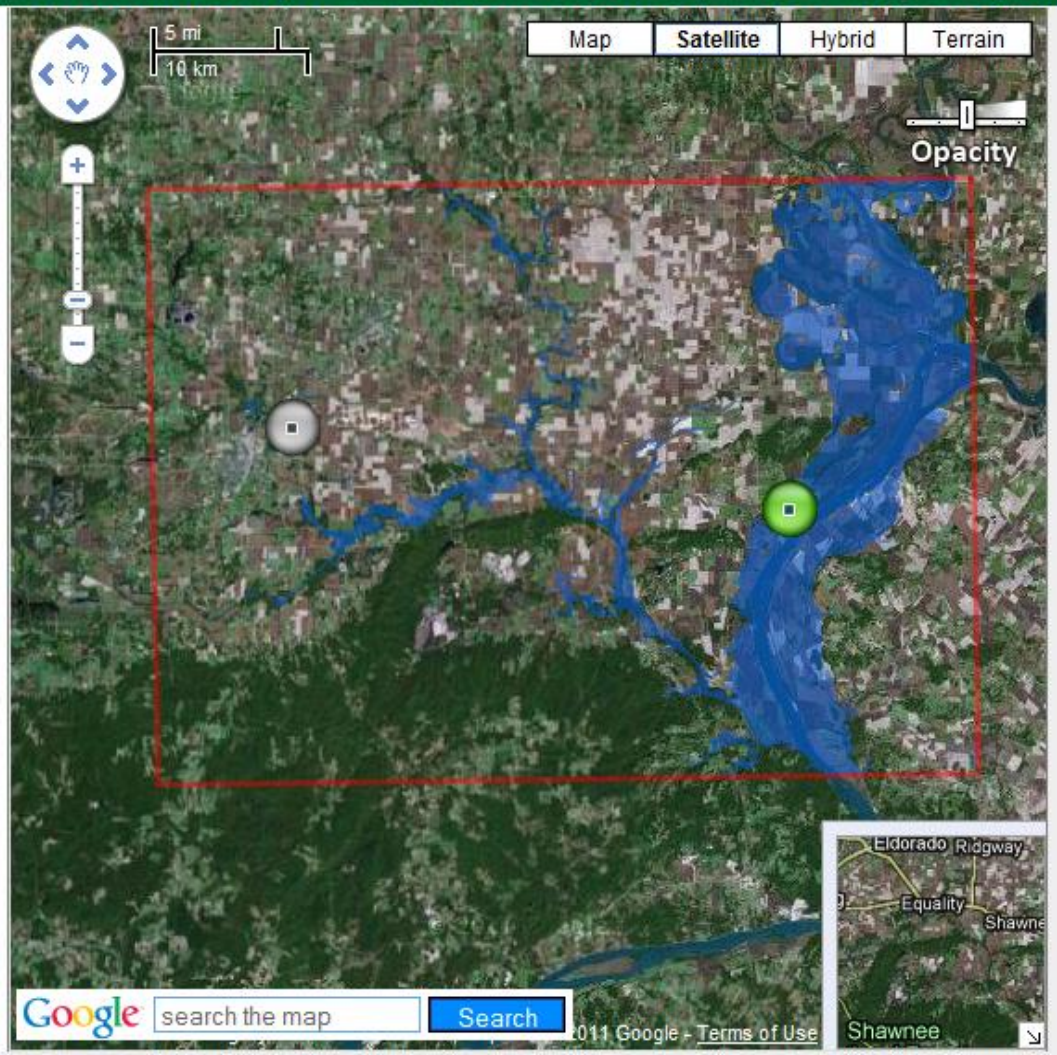

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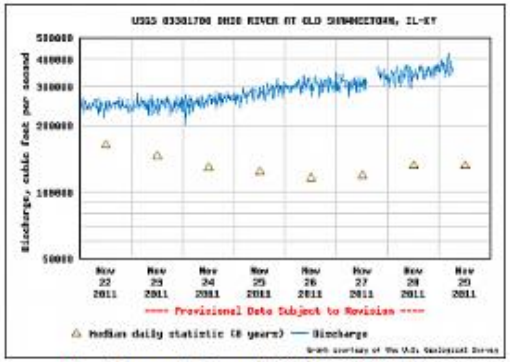

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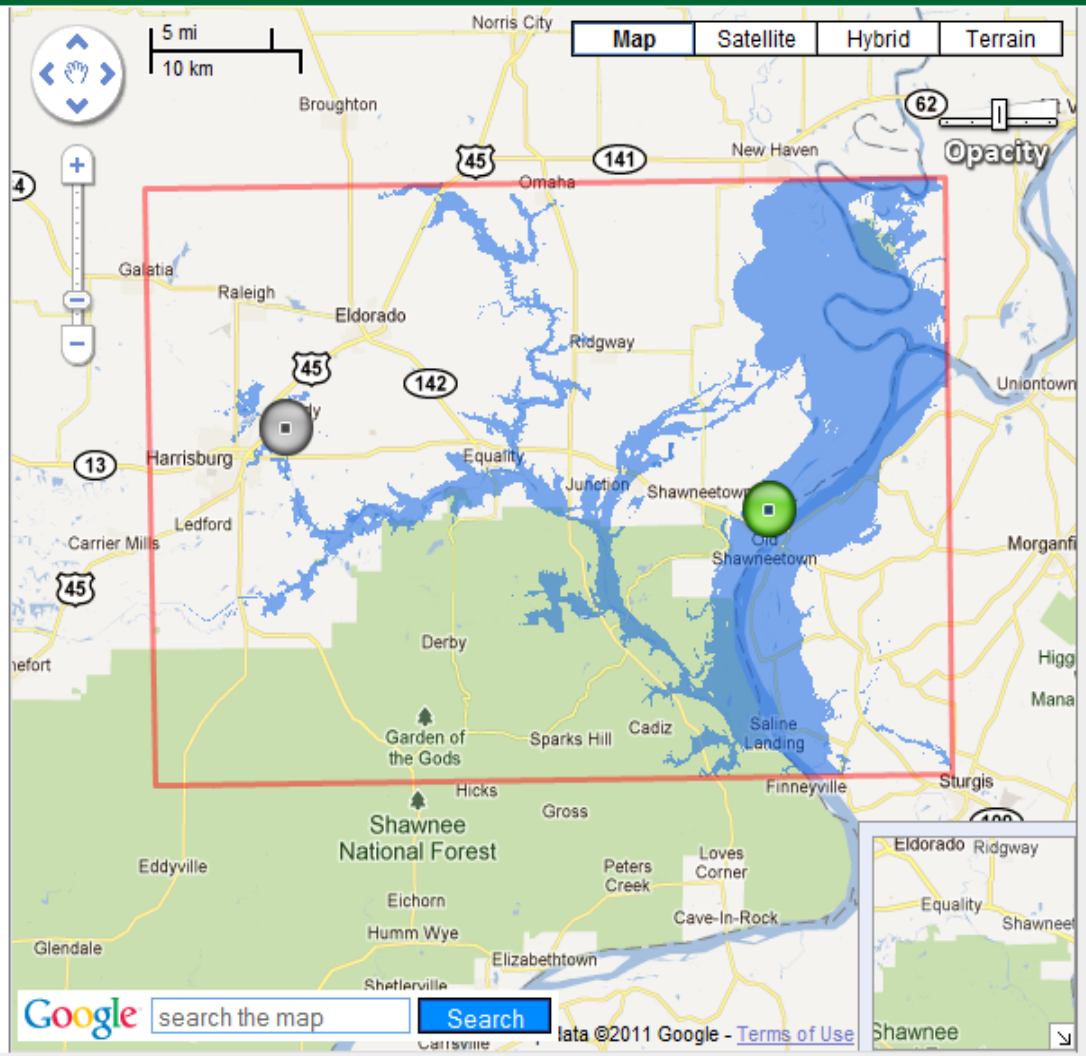

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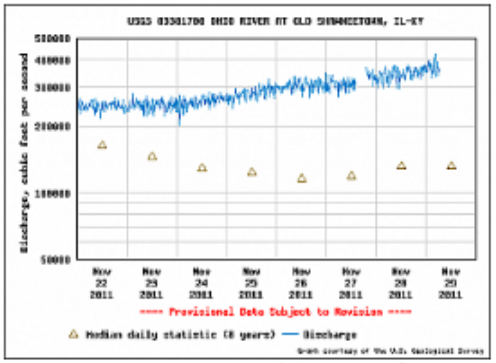

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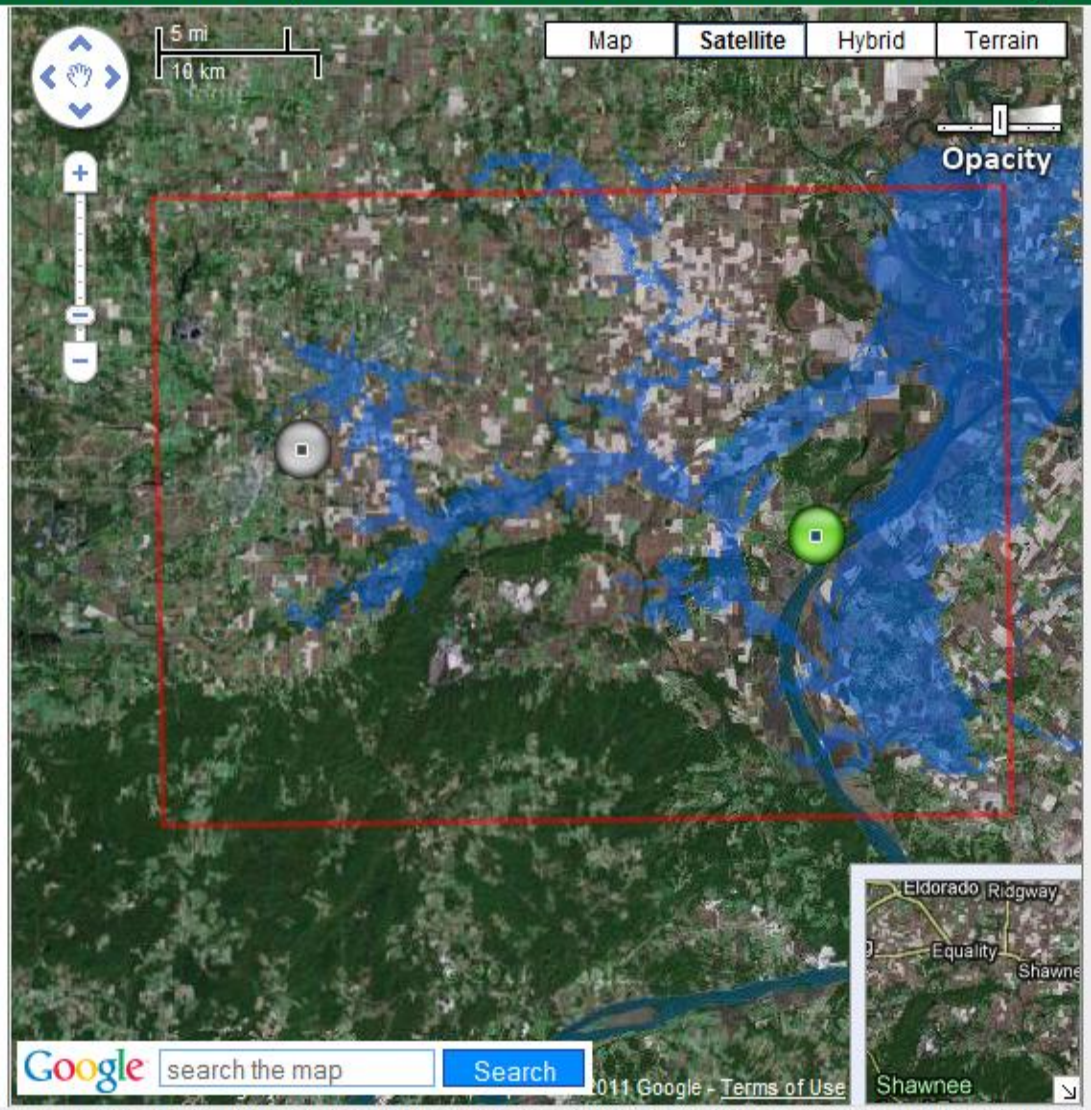

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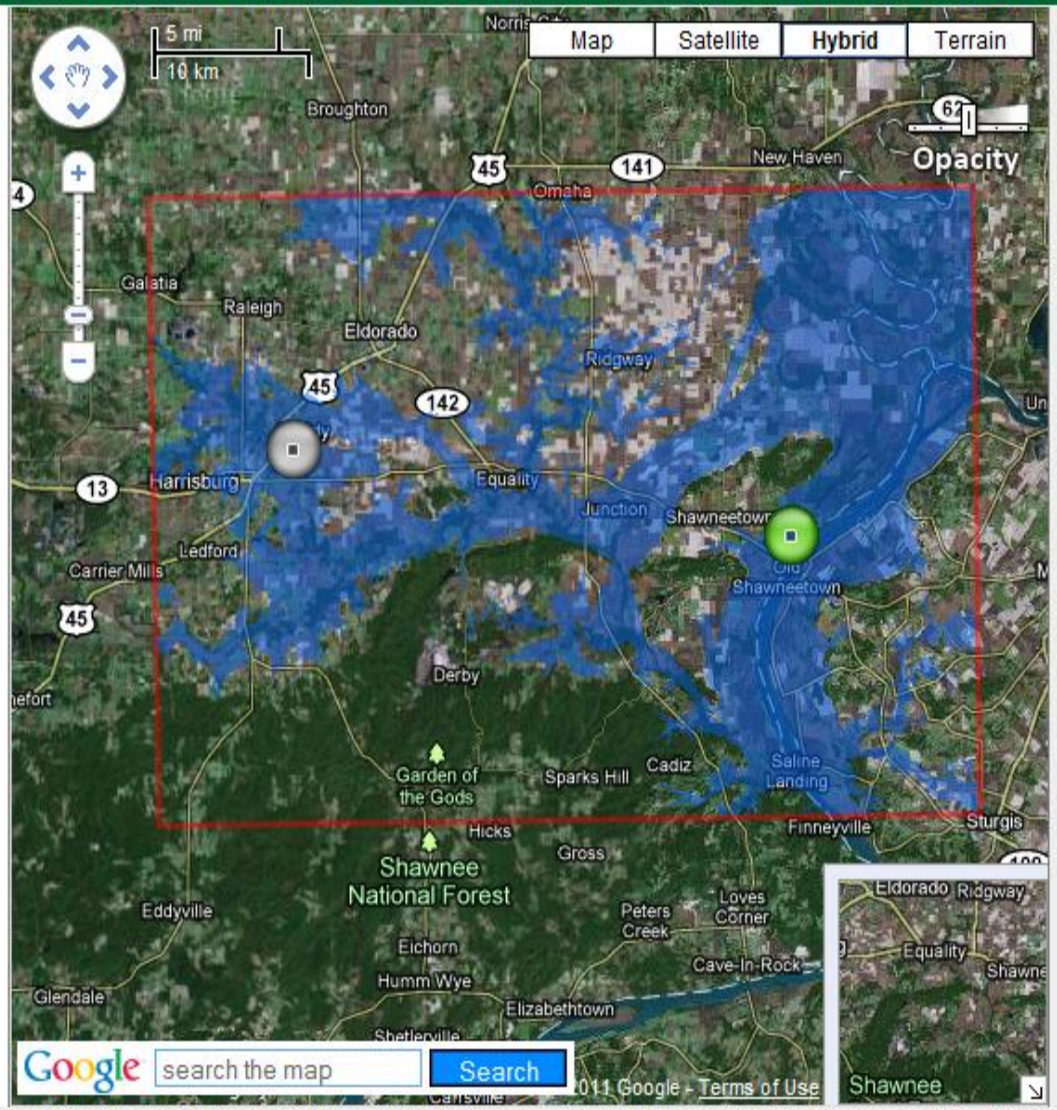

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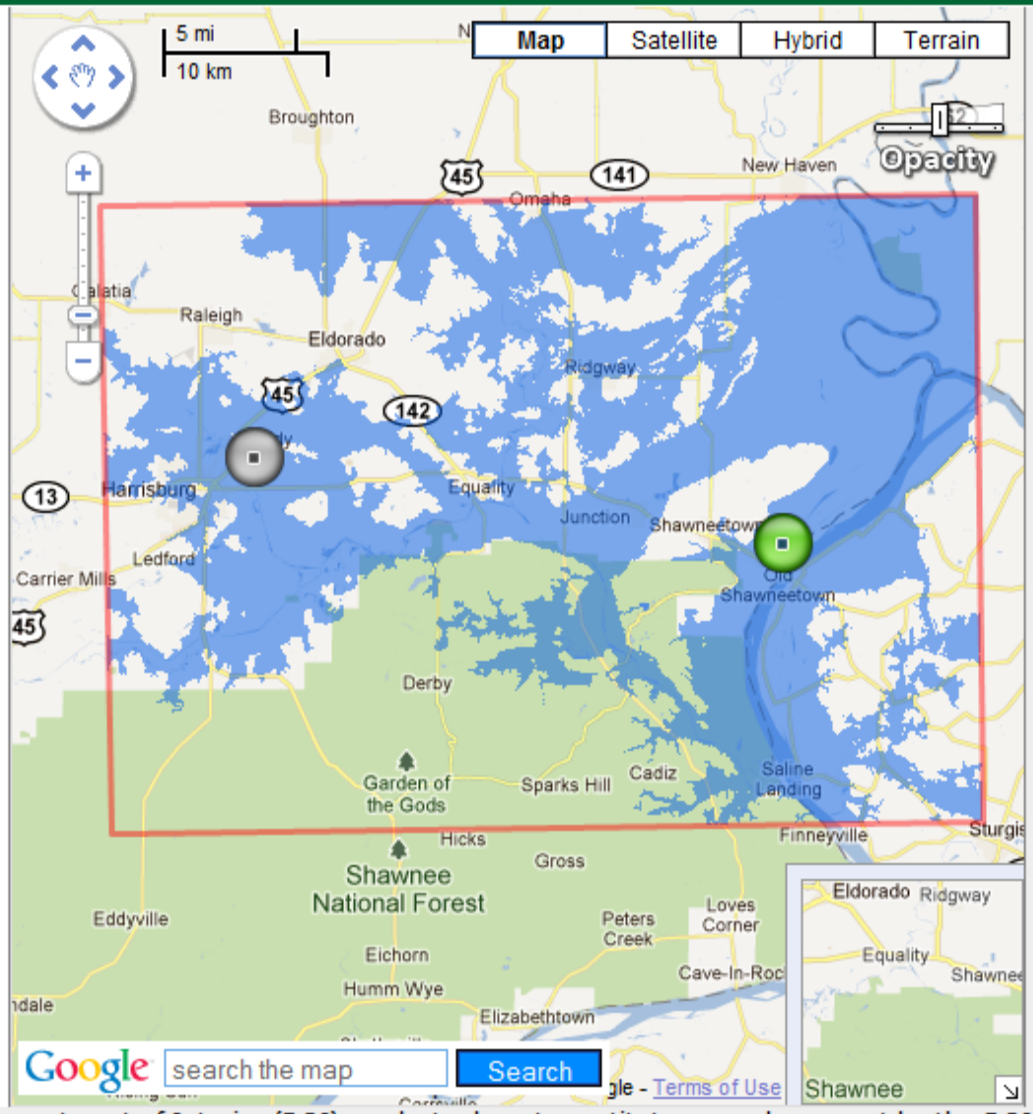

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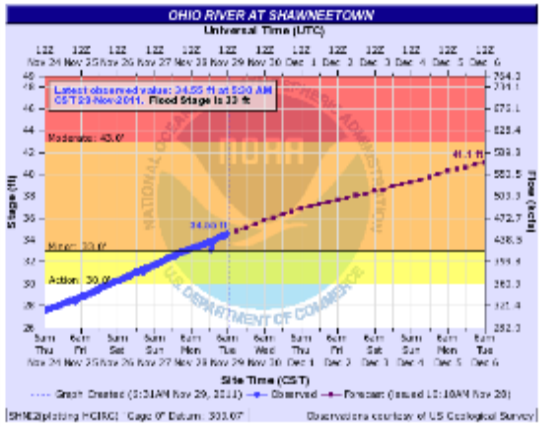

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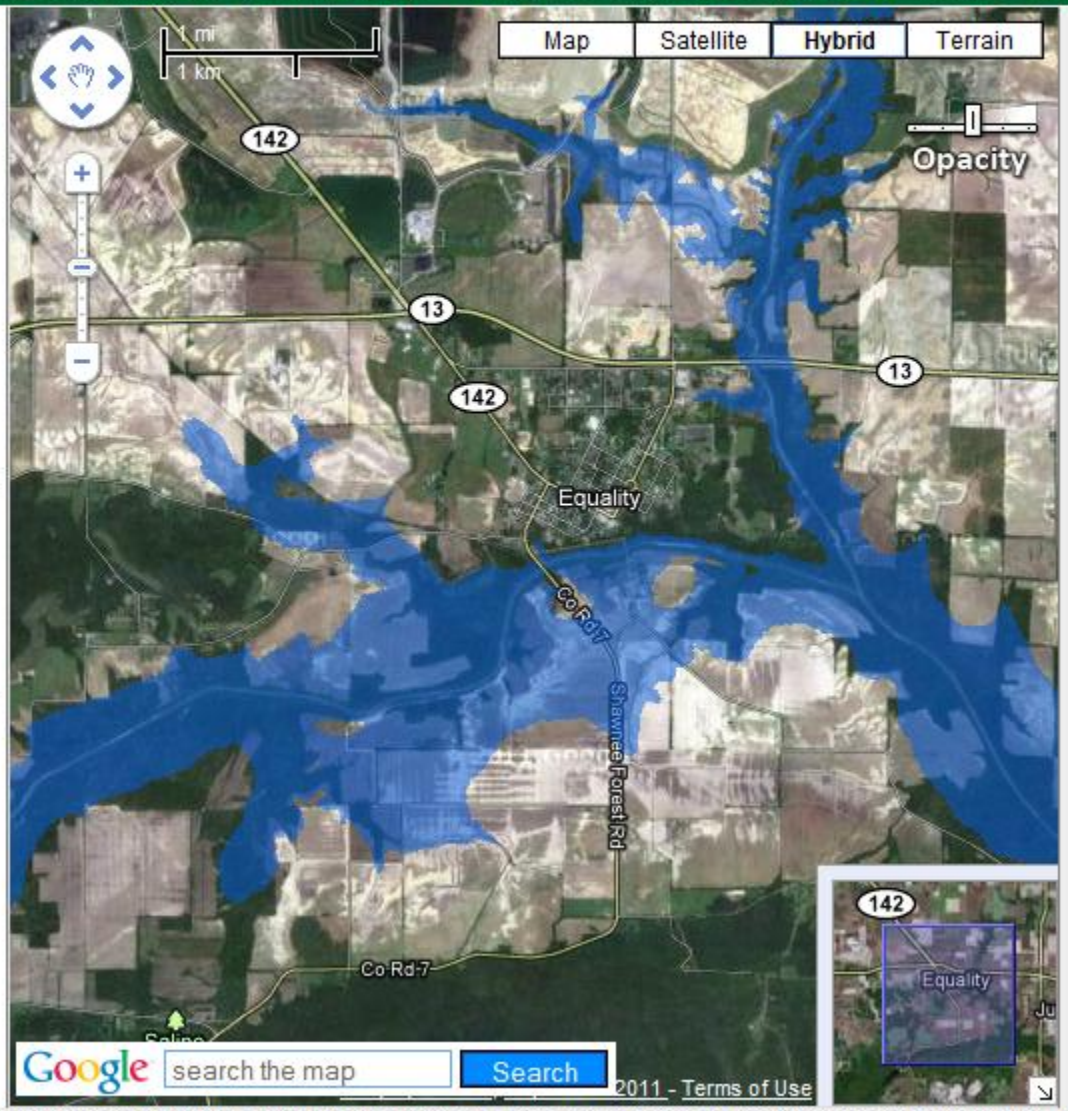

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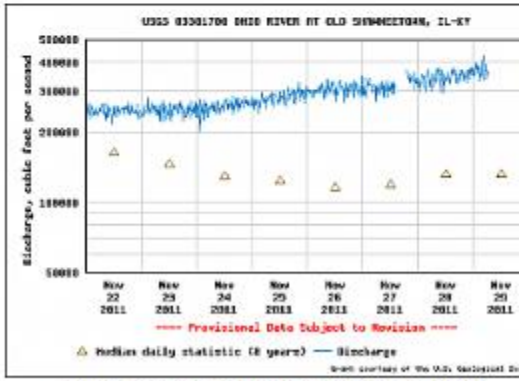

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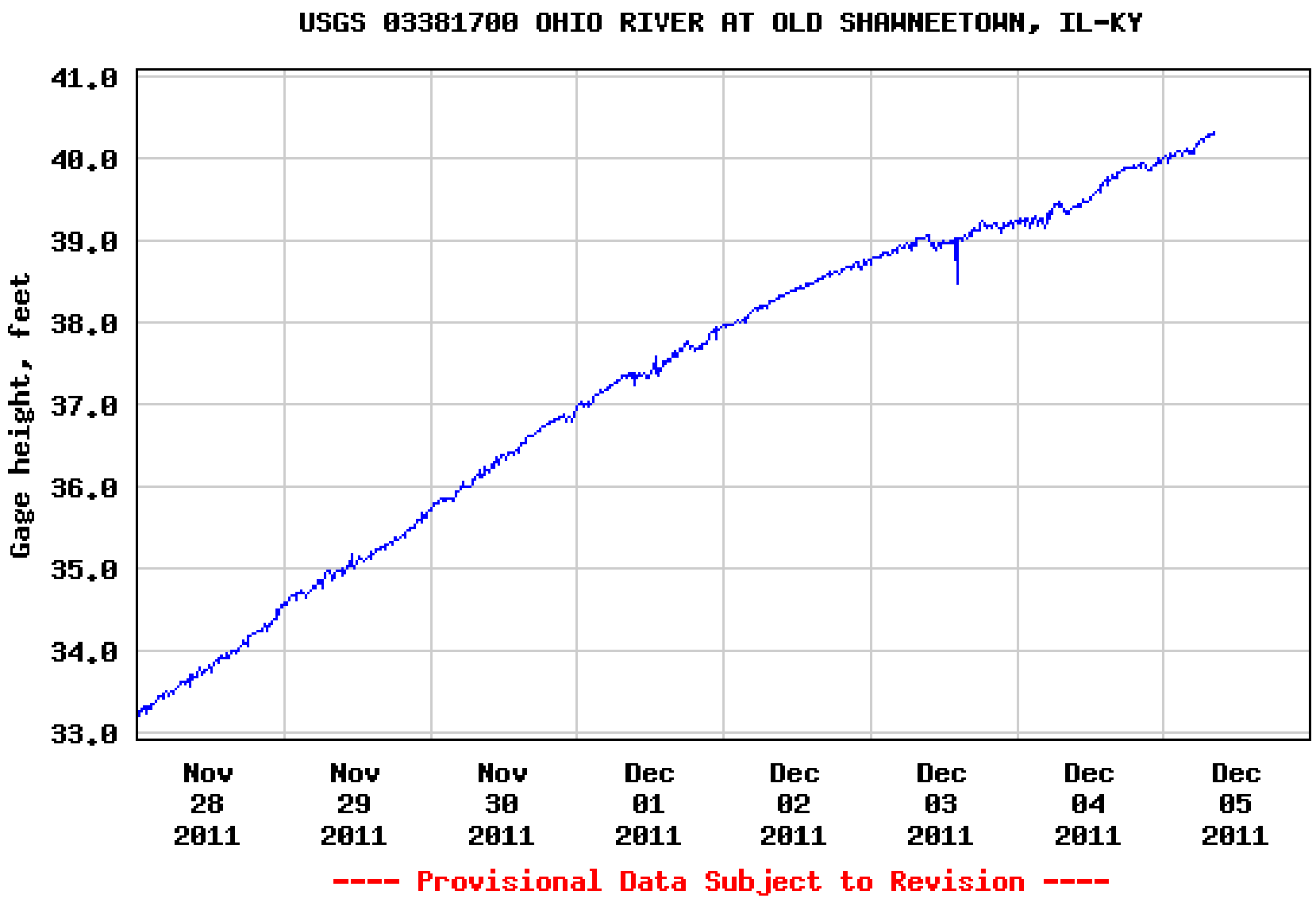
USGS 03381700 OHIO RIVER AT OLD SHAWNEETOWN, IL-KY
Gage height, feet
41.0
40.0
39.0
38.0
37.0
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35.0
34.0
33.0
Nov 28 2011
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Dec 02 2011
Dec 03 2011
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---- Provisional Data Subject to Revision ----

Local weather forecast by "City, ST"

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Radar - Evansville
Radar - opkinsville

HPS Documentation
User Guide
User Brochure

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FLOODSMART.GOV

Over 300 real-time observations used to support river forecasts are at risk across the country. Refer to the USGS's Nationwide List of Threatened Streamgages for additional information.

Weather Forecast Office Paducah, KY

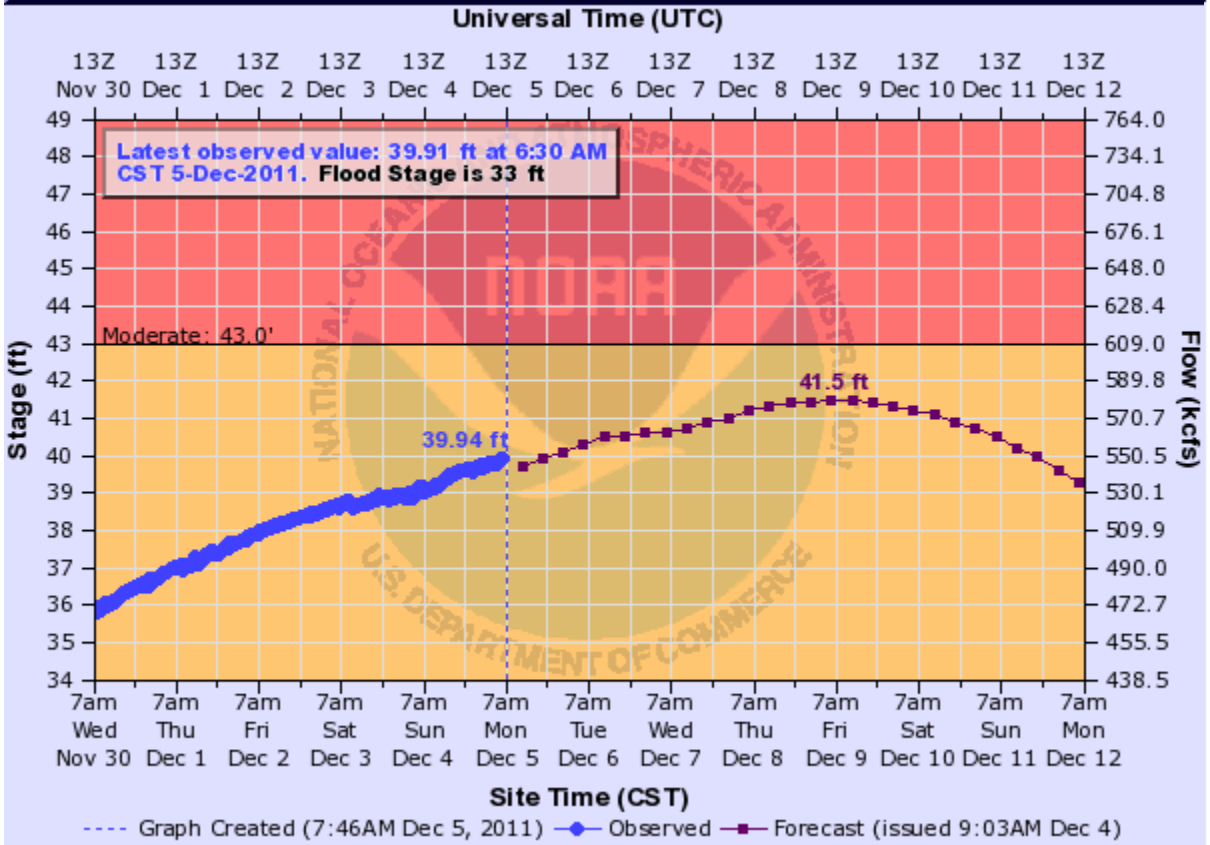
Ohio River Forecast Center

Flood Warning

View all valid statements/warnings

Hydrograph | River at a Glance | Download | Weekly Chance of Exceeding Levels | Chance of Exceeding Levels During Entire Period

OHIO RIVER AT SHAWNEETOWN



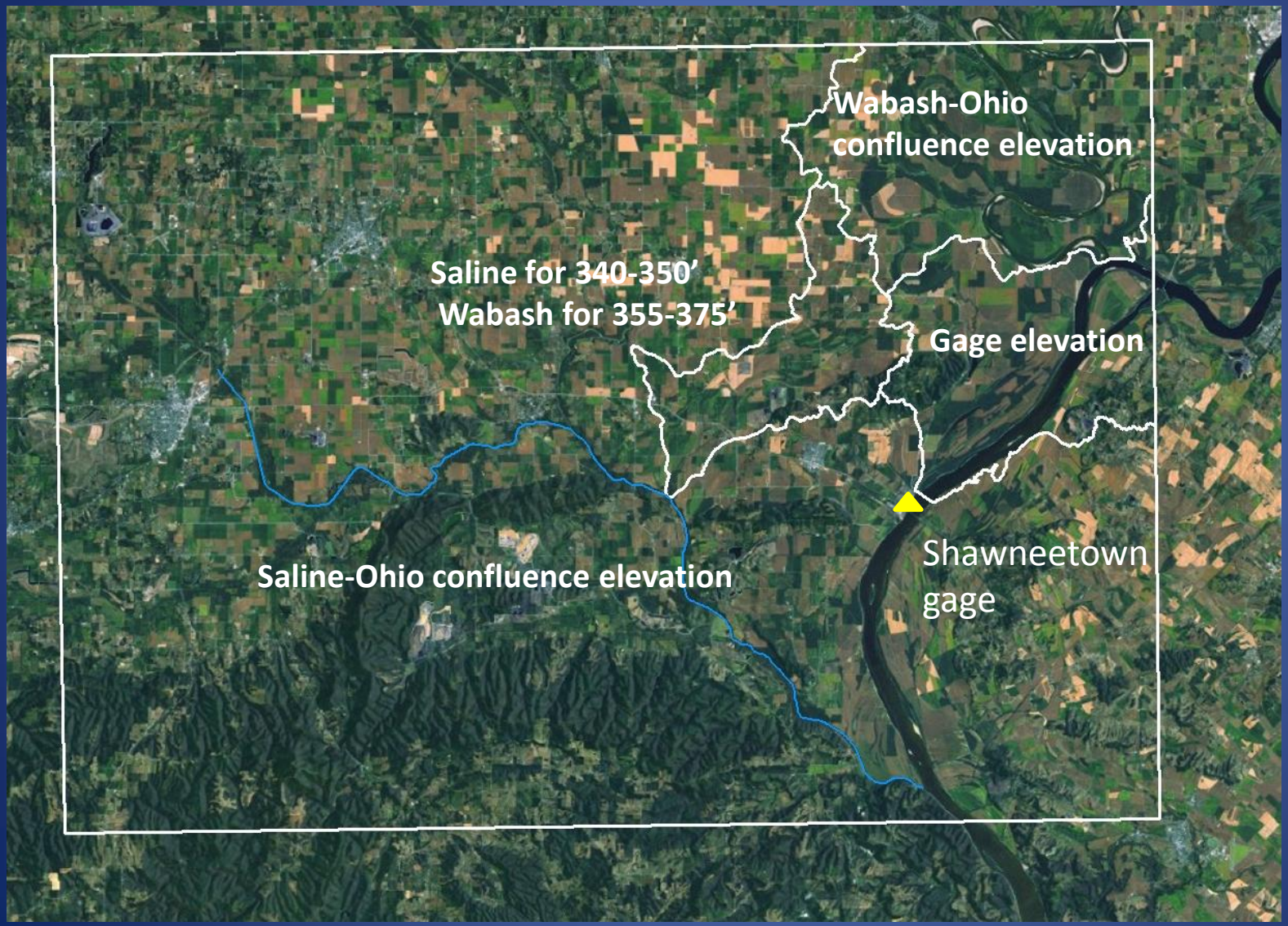
SHNI2(plotting HGIRG) "Gage 0" Datum: 309.07'

Observations courtesy of US Geological Survey

Printable Image

NOTE: Forecasts for the Ohio River at Shawneetown are issued routinely year-round

Default Hydrograph



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