Overview

• National USGS Flood Inundation Mapping (FIM) Program

• Integrated Water Resources Science and Services (IWRSS)

• USGS gage-linked inundation sites in Illinois
USGS and NWS Data Networks

Over 9,000 USGS Gages reporting current stream conditions in NWIS

Over 4,000 NWS Flood Forecast/Warning locations in AHPS
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
USGS FIM Program

• USGS Flood Inundation Mapping Program (FIM) provides support and guidelines for gage-linked inundation mapping

• FIM group interacts with our partners in the NWS, USACE, and FEMA through the Integrated Water Resources Science and Services consortium (IWRSS)
FIM becomes a tool for flood…..

• Preparedness
  – “What-if” scenarios
• Response
  – Tied to gage & forecast data
• Recovery
  – Damage assessment
• Mitigation & planning
  – Flood risk analyses
• Environmental & ecological assessments
Environmental Aspects

• Ecological studies of floodplains
  – E.g. frequency of inundation
• Riparian wetland applications
  – 7-day inundation areas for Wetland Reserve Program
• Hazardous substance spills
  – MI Kalamazoo River Oil Spill
SALT CREEK AT WOOD DALE, IL

Current Gage Height: 6.95 feet
Discharge: n/a
USGS Site Number: 05531175  Provisional Data, Subject to Revision
Please visit the full USGS NWIS Site page for full site information.

05528100 DES PLAINES RIVER AT LINCOLNSHIRE, IL

- Current Stage 7.13 feet on 2013-03-04 21:45:00 (provisional)
- Recent Maximum Stage (previous 365 days) 10.85 feet on 2012-04-16 (provisional)
- Highest Recorded Peak Stages Unavailable
- National Weather Service Flood Stage 12.5 feet
Sign up for WaterAlert for this site
Water information texted directly to you... simply subscribe to WaterAlert!

Project Contacts for more information
Maps created by
Illinois Water Science Center

Maps reviewed by
New Mexico Water Science Center
Maine Water Science Center

Data Downloads
Download Data

References
Download Report
FIM Program project activities

• Testing boundaries/Methods development:
  – Archived images
  – Hazus hydraulic models
  – FEMA Flood Insurance Rate Map (FIRM)
Next steps for the FIM program

• Continue to enhance the mapping application
  – Discharge as primary variable option
  – Incorporate Flood Impacts and other consequences information
  – Enhance the Historical tab to include the full POR

• Create a database and submission method for libraries and all supporting information

• Continue to add communities and work with the other federal, state and local agencies
IWRSS

• Designed to bring together Federal agencies working on water resources and natural hazards

• National Water Center being built in Tuscaloosa, AL

• First priority is interoperability and data transfer
IWRSS-Requirements Team

• Define technical specifications for flood inundation mapping products and services

• Define the role of each agency in flood-mapping to leverage each agency’s strength

• Specify requirements for the modeling and information services framework to support the flood mapping
ILWSC Flood Inundation websites

• Salt Creek near Wood Dale, IL
  – 1.6 mile reach developed with FEQ modeling
  – Depth grids to be added

• Des Plaines River at Lincolnshire, IL
  – 9 mile reach developed with Hec-2 modeling
  – Updates made to structures from as-built plans
  – Surfaces generated including depths

• Saline and Wabash Rivers—referenced to Ohio River at Old Shawneetown, IL
  – Backwater from Ohio River controls flooding
Scientific Investigations Report 2012-5227

Prepared in cooperation with the Lake County, Ohio, Office of Emergency Management and Coordination, and the Lake County Department of Public Health.

Flood-Inundation Map, Riverwoods to Mettawa

By Elizabeth A. Murphy, David T. Germano, and Jennifer A. Gunter

This report provides detailed information about flood-inundation mapping and modeling for Riverwoods to Mettawa, Illinois. It includes a description of the methods used, the data collected, and the results of the modeling. The report also contains a flood-inundation map and other visual aids to help understand the flood risk in the area.

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Next steps in Illinois?

- DuPage River between Plainfield and Shorewood in Will County
- Continue to build program cooperatively with communities
- Work with Illinois Flood Response Management Team on how USGS gages and inundation maps can improve response and help reduce risk
Questions?

http://il.water.usgs.gov/ifhp/
Flood Inundation Map of Saline River

- Flood Inundation study of Saline River brought about by the extreme flooding in Southern Illinois Spring 2011.
- 30-mile stretch from confluence with the Ohio River up to Harrisburg
- Backwater from the Ohio River is usually the source of the flooding

Inundation surface at WSE of 365 ft
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.
Saline River Inundation Verification

March 16, 2011 - gage WSE 357.6’
Inundation shown in light blue is 355’
Saline River Inundation Verification

May 3, 2011 - gage WSE 364.7’
Inundation shown in light blue is 365’
This house above water is the house on the right in the photo — the HWM is the lower orange mark on the electrical box, indicating that the parking lot to the left was inundated as shown in the map.

GPS-enabled camera data uploaded to Google Earth on upper right.

July 24, 2010 HWM
How are inundation maps produced?

Topographic data (DEM produced from LiDAR)

USGS gage data provides water-surface elevation

Hydraulic modeling simulates water-surface elevation away from gage