USGS Water Data

Collection, Application and Delivery

Flood Warning User Forum Delaware River Basin

Narrowsburg, New York
September 28, 2010

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USGS science for a changing world

Providing reliable, impartial, and timely data to assess the quantity and quality of our nation's water resources

History of Streamgaging???

- The first systematic stream gages in New York were daily record in 1835 on Eaton and Madison Brooks in Madison County by private interests.*
- The earliest known streamflow measurement in New York was made in 1851 on Long Island by a private group.*
- Director John Wesley Powell establishes first gaging station in 1887. (Rio Grand River, NM)
- The oldest USGS gage in the Delaware River basin of New York is Delaware River at Port Jervis, 1903

USGS

*Research by A.J Finch and R.C. Heath

Why does USGS measure streamflow?

- To provide Nat'l Weather Service with data for flood forecasting and for flood warning
- To compute flood frequencies for designing bridges, dams, flood control structures, flood plain designation, and flood insurance studies
- For issuing discharge permits to point sources & withdrawal permits to purveyors
- Water supply planning & drought management
- Compute loadings to develop water quality standards and TMDL's
- Study trends
- Boaters and fishermen use data to plan activities

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How in streamflow computed?

- Measure water depth in gage pool (Stage)
- Measure streamflow at various water levels
- Develop stage – discharge relationship (Rating)
- Record and transmit stage data to office and apply rating to compute discharge

USGS

Streamgages in Delaware River Basin, New York

26 Discharge streamgages

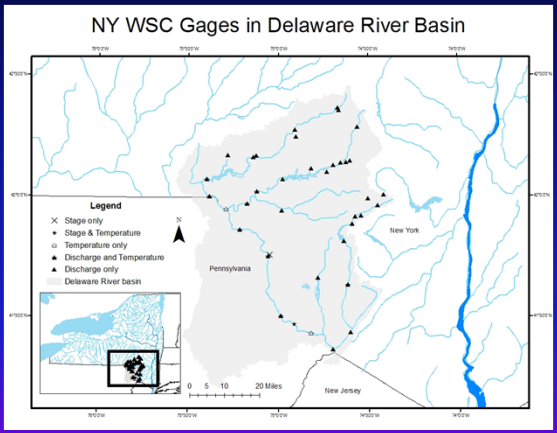
8 Discharge and Water Temp.

2 Water Temp only

1 Stage only

1 Stage and Water Temp.

Total of 38 USGS gages



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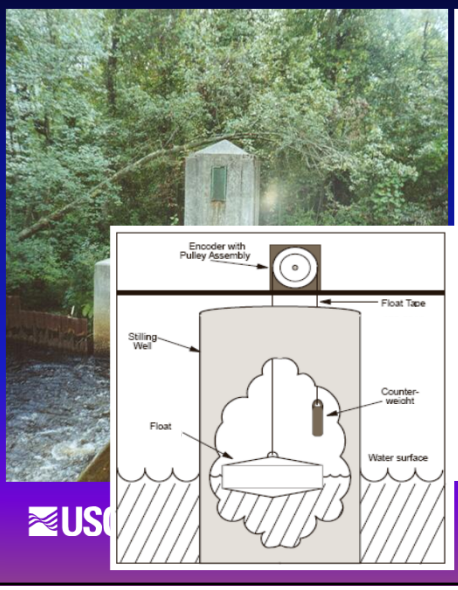
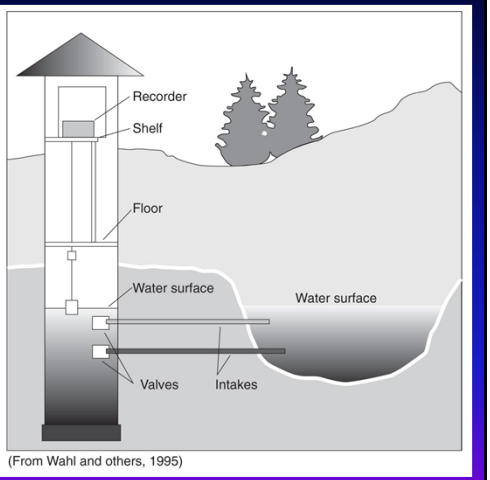
Gaging Station Design





(From Wahl and others, 1995)

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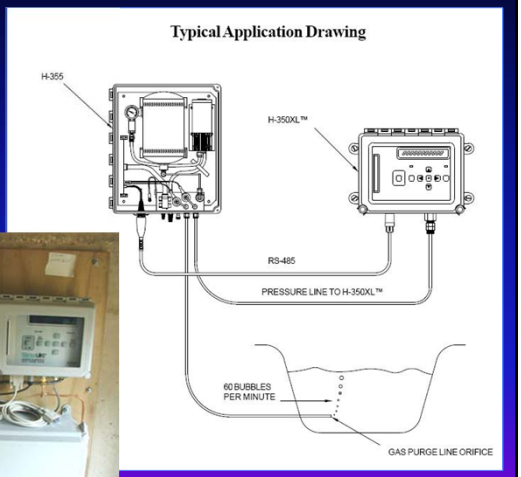
New Gaging Station Design



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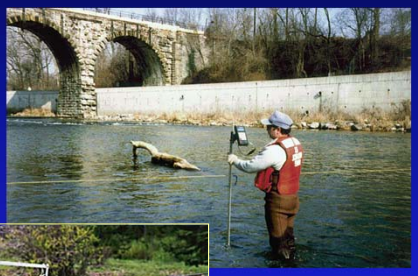
Streamflow Data Collection

Transitioning from mechanical means ……



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Streamflow Data Collection

To acoustic means ……

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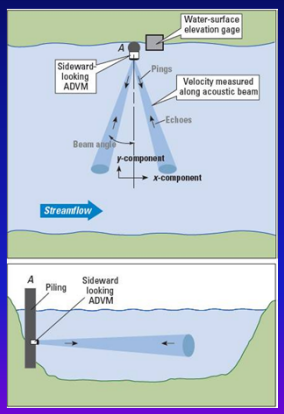
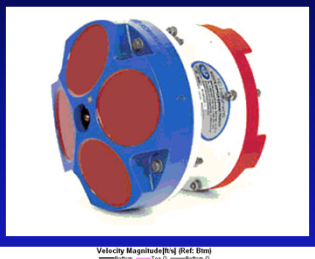
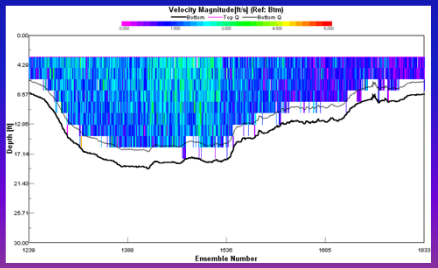
Streamflow Data Collection

Using acoustic technology







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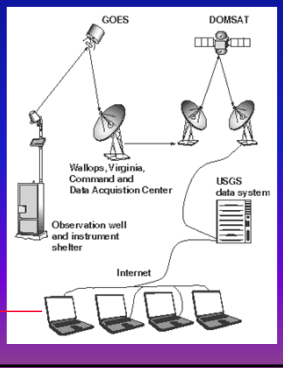
Satellite Telemetry

- Geostationary Operational Environmental Satellite (GOES)
  - Operated by NOAA (National Oceanic and Atmospheric Administration)
  - Reliable
  - Automatic switchover during primary failure
- Timed transmissions every hour
- Random transmissions when thresholds are exceeded
  - Stream reaches exceeds flood stage
- Data transmitted to computer base stations and USGS archival database



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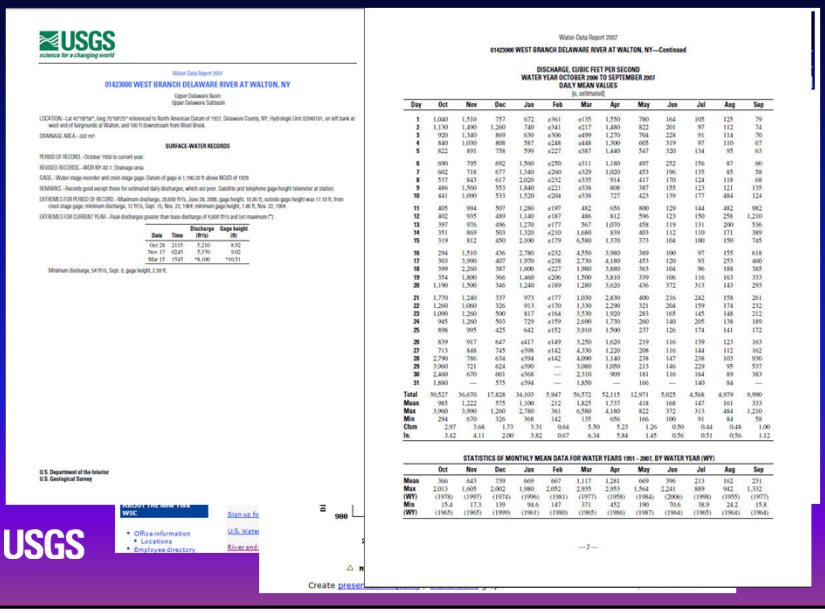
ny.water.usgs.gov



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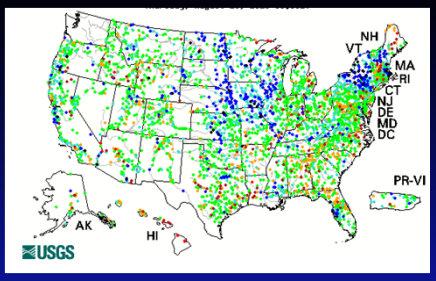
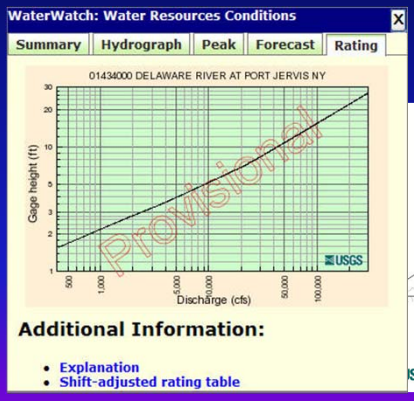
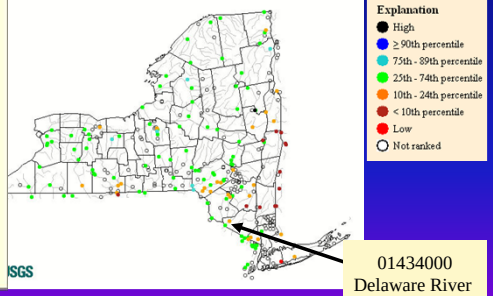
Water Watch Real-time Surface Water Data



http://water.usgs.gov/water watch





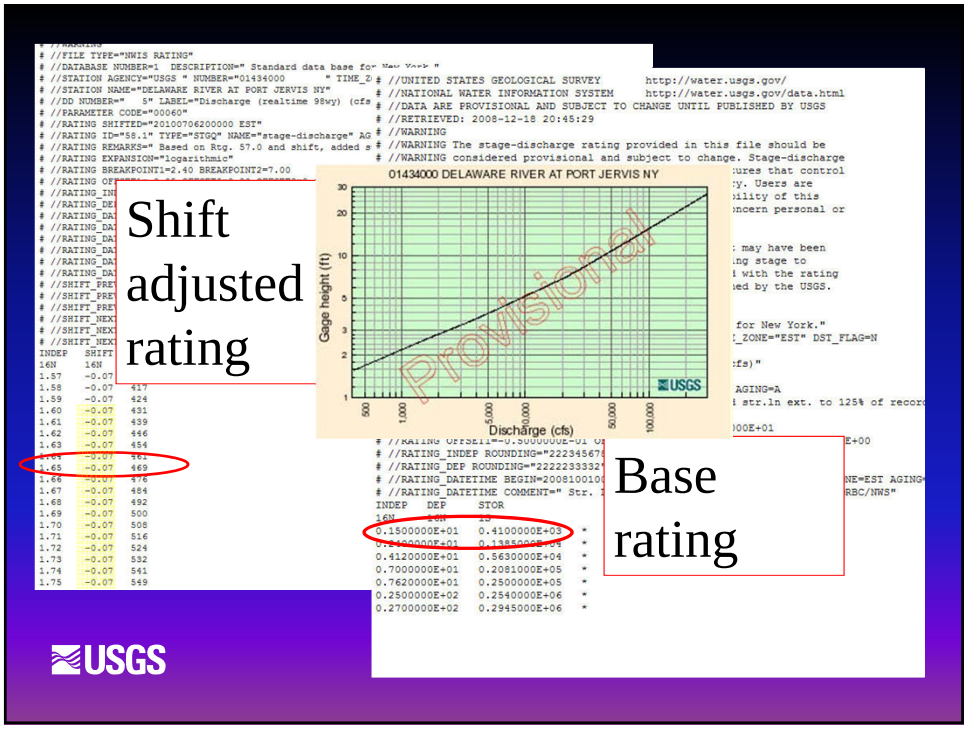
01434000
Delaware River
at Port Jervis

USGS

Ratings Depot

- Expanded Base ratings, and latest shift-adjusted rating retrieved from all stage-discharge sites at 8 PM local time
- Available on web by site:
  http://nwis.waterdata.usgs.gov/nwisweb/data/exsa_rat/01434000.rdb
- Tab delimited (rdb) format
- Detailed information on current variable stage shifts included

USGS



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StreaMail

- Request, by email, the most recent USGS river stage and streamflow data for streams in the United States.
- To use the system, send an email to "streamail@usgs.gov" and in the "Subject" line, put in a USGS station (site) number.
- An email will be sent back to you with the most recent stream stage and flow.

USGS

Example of StreaMail Response

- U.S. Geological Survey (USGS) StreaMail:
  The latest river stage and streamflow values you requested from StreaMail. Site: 01434000
  Station name: Delaware River at Port Jervis, NY
  Date: 09/23/2010
  Time: 08:45:00
  Stage: 2.67 feet
  Streamflow: 1710 cubic feet per second (cfs)
- Link to charts for 01434000:
  Stage:
  http://waterwatch.usgs.gov/wwapps/zchart.php?i=nwis2&vt=uv&cd=00065&site_no=01434000
  Streamflow:
  http://waterwatch.usgs.gov/wwapps/zchart.php?i=nwis2&vt=uv&cd=00060&site_no=01463500
- The U.S. Geological Survey's (USGS) StreaMail system allows you to request, by email, the most recent USGS river stage and streamflow data for streams in the United States. To use the system, send an email to "streamail@usgs.gov" and in the "Subject" line, put in a USGS station (site) number. An email will be sent back to you with the most recent stream stage and flow.
- If you need help, contact Howard Perlman (hperlman@usgs.gov)

USGS

Water Alert

- Threshold notification system
- User selects station & desired notification settings; i.e. data type, threshold condition, and frequency
- Interactive map with search options
- Subscription form and Confirmation
- Text message or email sent to subscriber
- http://water.usgs.gov/wateralert/

USGS

Water Alert's Email Response when threshold reached

- Streamflow of 1710 cfs is below subscriber threshold of 1750 at 2010-09-23 08:15:00 EDT
  01434000 00060 Delaware River at Port Jervis, NY
  Notification interval, no more often than: Daily
- For Realtime Data at this station:
  http://waterdata.usgs.gov/nwis/uv/?site_no=01463500
- To Delete this Specific Alert
  reply with Subject: SIGNOFF hni-CrY2s
  To Pause this Specific Alert for 5 days
  reply with Subject: PAUSE hni-CrY2s 5
- To List Settings
  reply with Subject: LIST hni-CrY2s
  To List Settings for all Notifications of the Same Address reply with Subject: LIST ALL hni-CrY2s
- For Help
  reply with Subject: HELP hni-CrY2s
- To Sign up for New Notifications
  http://water.usgs.gov/wateralert

To Modify a threshold, set a "new" notification with the same email address, site number and parameter

USGS

Send Questions to: GS-W_RT-HNS_Feedback@usgs.gov

Reply to Request for settings Email Subject: LIST hni-CrY2s

Your USGS WaterAlert request has been processed.

Site Number: 01434000
Station Name: Delaware River at Port Jervis, NY
Parameter Code: 00065
Parameter Name: Gage height
Agency Code: USGS
Notify when value exceeds subscriber threshold of 20.00 ft
Notification interval, no more often than: Daily
Address: tsuro@usgs.gov
Message type (e=email, t=text msg): e
Notification id: hni-Q6Lhb
For Help: http://water.usgs.gov/hns?hni-Q6Lhb:01434000

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National Water Information System (NWIS WEB)

- Much of the hydrologic data collected by the USGS is available through the NWIS Web interface
- Surface water - Water flow and levels in streams, lakes, and springs ,
- Ground water - Water levels in wells
- Water quality data - Chemical and physical data for streams, lakes, springs, and wells
- http://waterdata.usgs.gov

USGS

Instantaneous Data Archive

- Time-series discharge data now available online at the Instantaneous Data Archive (IDA)
    - http://ida.water.usgs.gov/
- Enter station # or get a list of gages by state

USGS

Preparing for the future…

- Flood hardening streamgages
- Extending Ratings
- Increased data transmit interval
- Documented high-water-marks
- Flood inundation mapping

USGS

Flood Hardened Gages

01427510 Delaware River at Callicoon, NY

USGS

Flood Hardened Gages

01428500 Delaware River abv. Lackawaxen River near Barryville, NY

USGS

Major Flooding in New York

- USGS documented high-water-marks (HWMs) at hundreds of study sites.
- HWMs are used to evaluate current flood insurance studies and calibrate future studies.
- HWMs are used to verify areas of suspected inundation.
- HWMs are used to calculate peak discharges at ungaged sites to improve infrastructure design and FEMA FIS.
- Reports available online as a reference for designers, planners and the local community.

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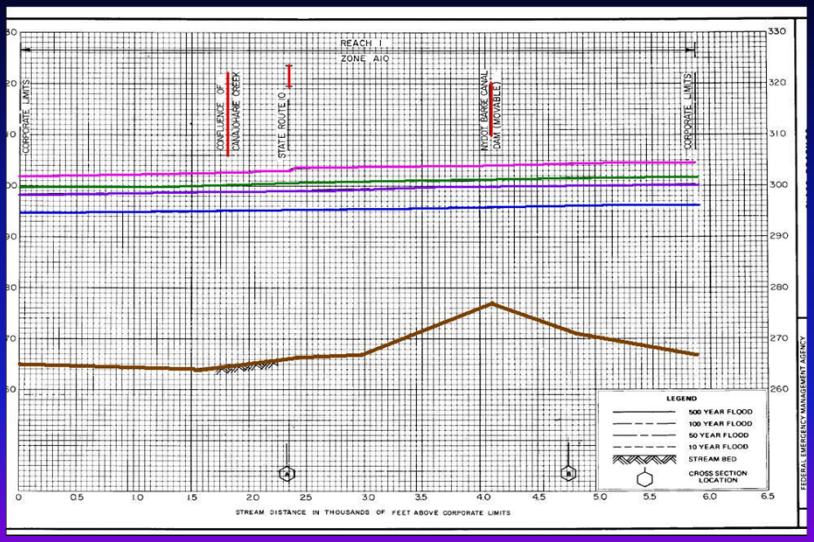
Recent USGS Flood Reports in NY

USGS http://ny.water.usgs.gov/publications/

Flood Insurance Study Flood Profile



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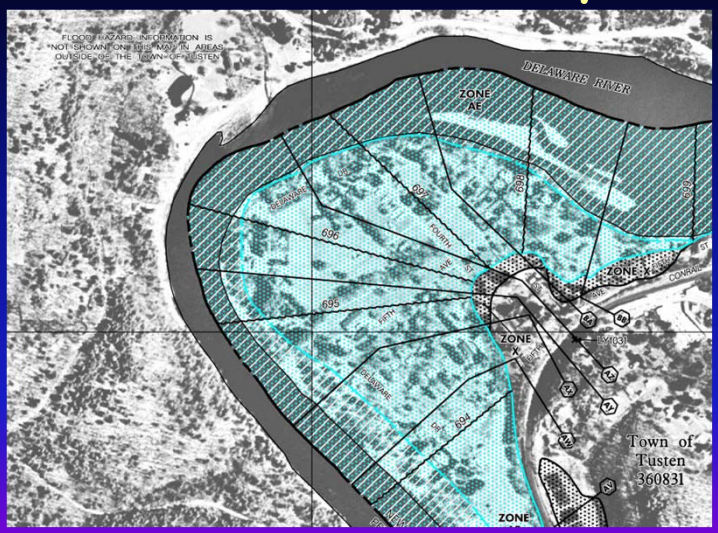
Flood studies and USGS Reports



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Floods are the most costly natural disaster, in terms of lives lost and property damaged

Since 1903 almost 9,000 flood-related deaths in the U.S. Average about 100 deaths a year

From: NWS Flood Estimates http://www.nws.noaa.gov/oh/hic/flood_stats/recent_individual_deaths.shtml

USGS

Advanced warning saves lives and reduces property damage

New York received $227 Million for June 2006 flood damages

10 percent is
$22.7 Million

USGS

Day, H.J. (1970). "Flood warning benefit evaluation-Susquehanna River Basin (urban residences)." ESSA technical memorandum WBTM Hydro-10. National Weather Service. Silver Spring, MD.

In A Perfect World…

- In a perfect world the public would use flood-warning information to take appropriate actions to prevent loss of life and property.
- The fact is people often do not respond to warnings and weather information.
- Inundation maps have been shown to effect public response –

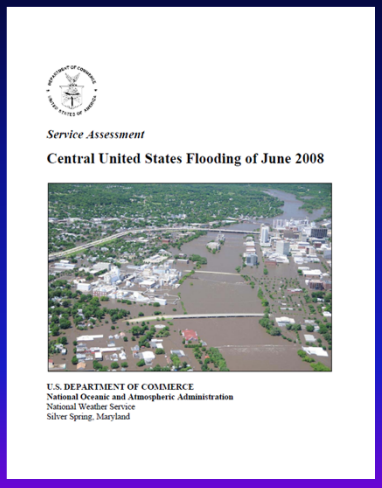
  "The forecast map showed our house under water"

  "I could see I would need to close Main Street near the river."

USGS

Central U.S. Flooding Assessment Team

- Team comprised of NWS, USACE, & USGS.
- Report contains a number of recommendations to improve customer service & interagency cooperation.



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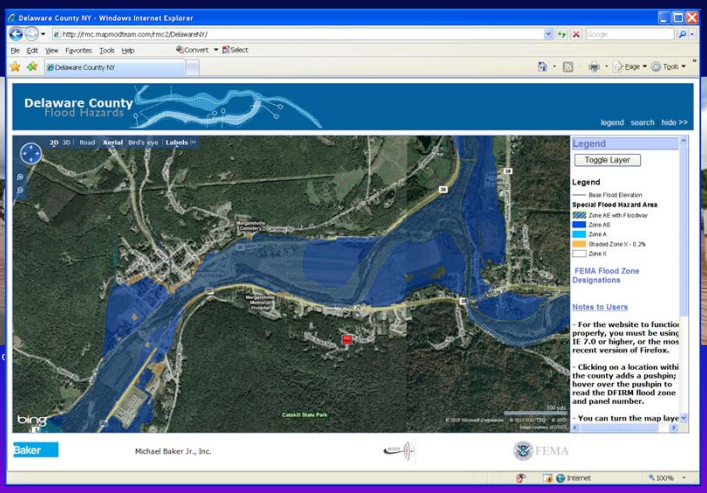
Propose pilot study of East Branch Delaware River at Margaretville, NY

Margaretville, NY, c



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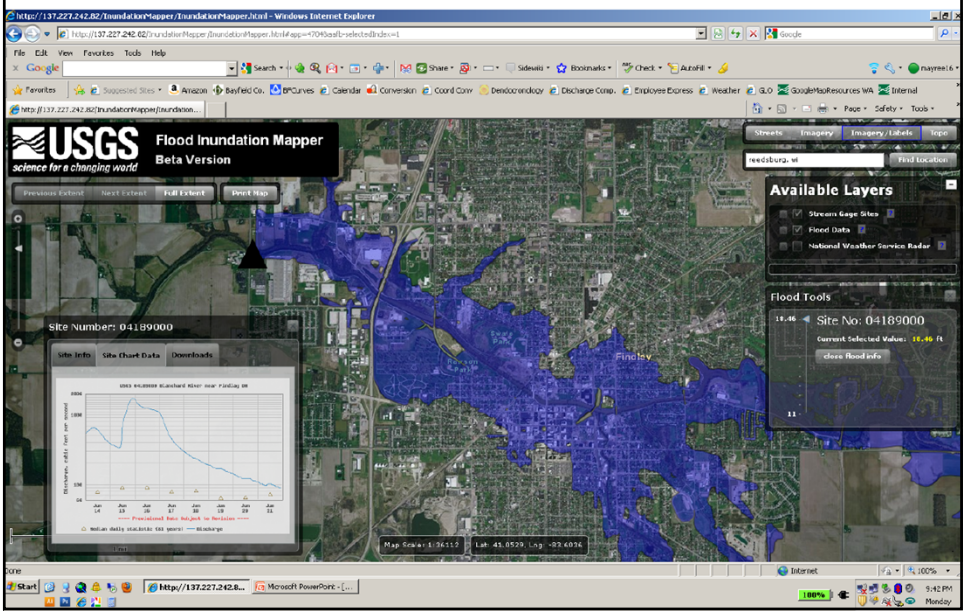
WiM Flood Inundation Map Library Demo



Short term would include:

- Ability to print paper copies of maps at selected water stages;
- Interactive web-based map viewer with ability to pinpoint depth of water at your house, access road, hospital, etc.;
- Link to AHPS site to show forecast;
- Link from AHPS to show maps; and
- Report describing methods & results.

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USGS Water Data

Collection, Application and Delivery

USGS is the Nations Science Agency

Remember… want water data ? Think USGS… put it together and get

water.usgs.gov

in New York → ny.water.usgs.gov

USGS

Contact Information

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Chief, Flood Investigations Project in New York

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