



ILLINOIS STATE
WATER SURVEY
PRAIRIE RESEARCH INSTITUTE



Enhancing Regulatory Data to Generate Flood Forecast Inundation Maps

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Coordinated Hazard Assessment and Mapping Program



- FEMA Region V CTP
- 75 Countywide DFIRMs since 2004
- Statewide MT-2 Review Delegation
- 14 PMR Updates to DFIRMs
 - FEMA funded re-study of the Pecatonica River in Stephenson and Winnebago Counties



FEMA

Freeport, IL

1869 Flooded Freeport with PRETZELS!



Welcome to Freeport, Illinois

Welcome to the official Freeport, Illinois website. We're happy that you're visiting us!

Freeport is a wonderful mix of old and new. Fortune 500 companies like Newell Rubbermaid occupy some of the oldest buildings downtown, while antique stores and mom-and-pop restaurants enjoy software developers as neighbors. Turn-of-the-century Victorian homes co-exist with modern senior-living facilities. We have a leading-edge hospital and cancer center, but our history of quality healthcare extends back into the 1800's. Our excellent schools, from preschool to community college, offer both traditional and up-to-the-minute tools needed to excel in the future, and our state-of-the-art library is located in the heart of our historic city center.

Freeport boasts more than 800 acres of parks, with activities from an old-fashioned carousel to just enjoying the beauty of Yellow Creek from a paddle boat. We have a 35-hole golf course and driving range, as well as an aquatic center, nature preserve and center, boat rental operation, a skate park and an athletic complex.

In the arts, Winneshek Theater is the country's oldest continuously running amateur theater, and we're especially proud that Freeport High School has a Grammy Award Winning music program. We have concerts in the park on summer evenings, a children's choir and theater group, a wonderful Arts Center and an impressive historical museum.

Freeport is home to several large manufacturers including Newell Rubbermaid, Honeywell, and Titan Tire Company, as well as a number of mid-size manufacturers. Both our Industrial and Business parks have space for expansion. Several insurance firms have significant offices in Freeport, including, QBE, Sentry Insurance, and MetLife. Many service and retail businesses round out the business picture for our City, some of them supporting the agricultural heritage of our County.

Freeport is centrally located, less than 30 minutes from a major UPS hub, 90 minutes from international airports and two hours from four major metropolitan areas.

Thank you for visiting us online – enjoy your "trip" through Freeport!

Mayor James L. Gity



Pretzel City, USA

The pretzel became the trademark for Freeport when the Billerbeck Bakery, which was established in 1869, flooded Freeport with pretzels!



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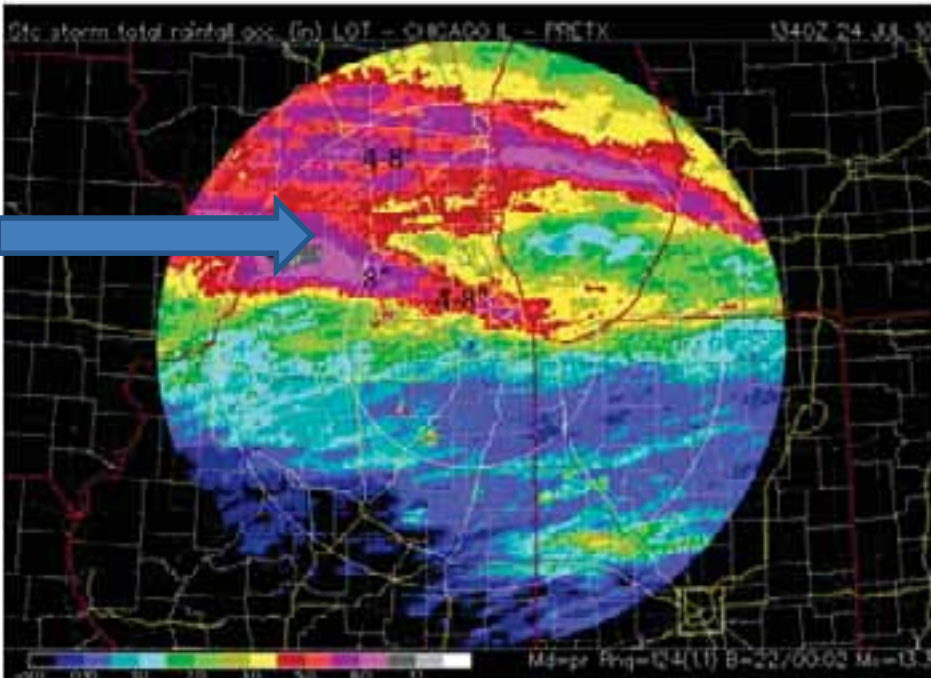
Freeport, IL

1914 East Side Flood



Freeport, IL

July 2010 rain event



Freeport, IL

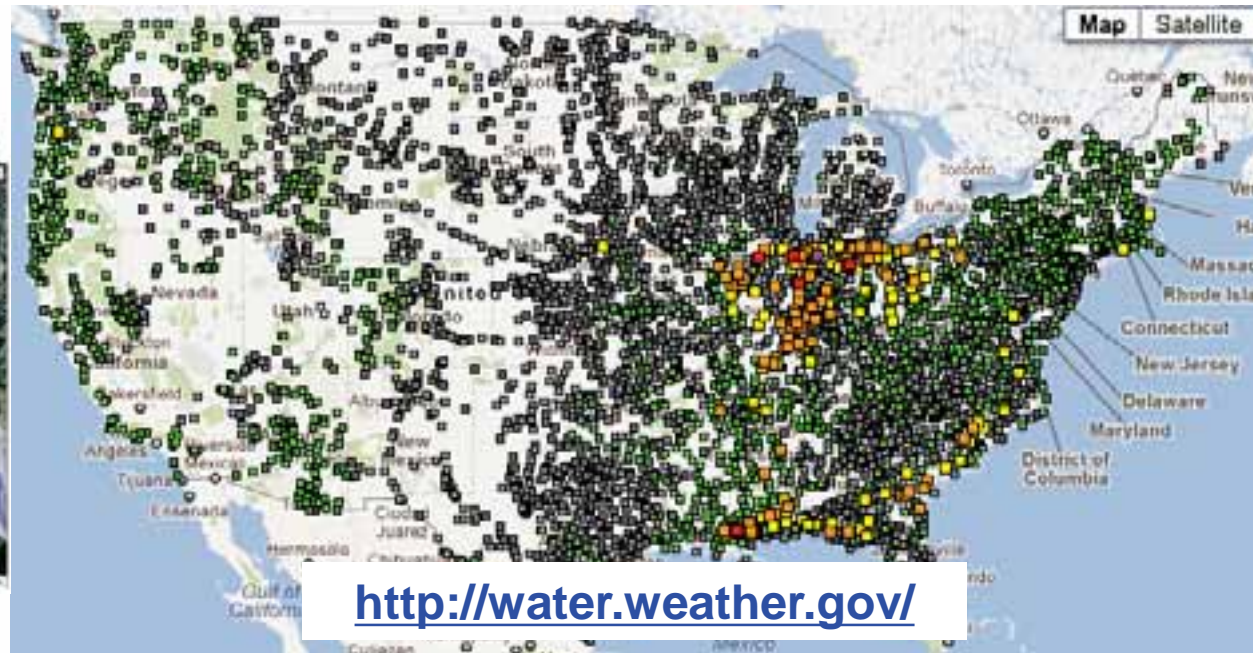
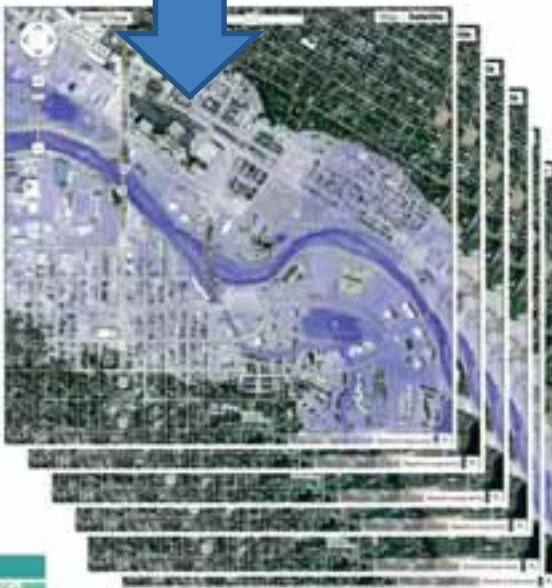
Leveraging Data to Meet Community Needs



Advanced Hydrologic Prediction Service (AHPS)



- Community Familiarity with NWS Flood Severity
- Couples USGS Gages and NWS Forecasts
- >100 AHPS Inundation Mapping Locations Nationwide
- 1st application in Illinois



Flood Inundation Mapping Tool

Marker Info

Depth: 1.6 - 3.6 ft
 Lat: 42.301477
 Lon: -89.604735

Nearest geolocated address:
 34 South Hooker Avenue, Freeport, IL 61032, USA

Remove this marker.

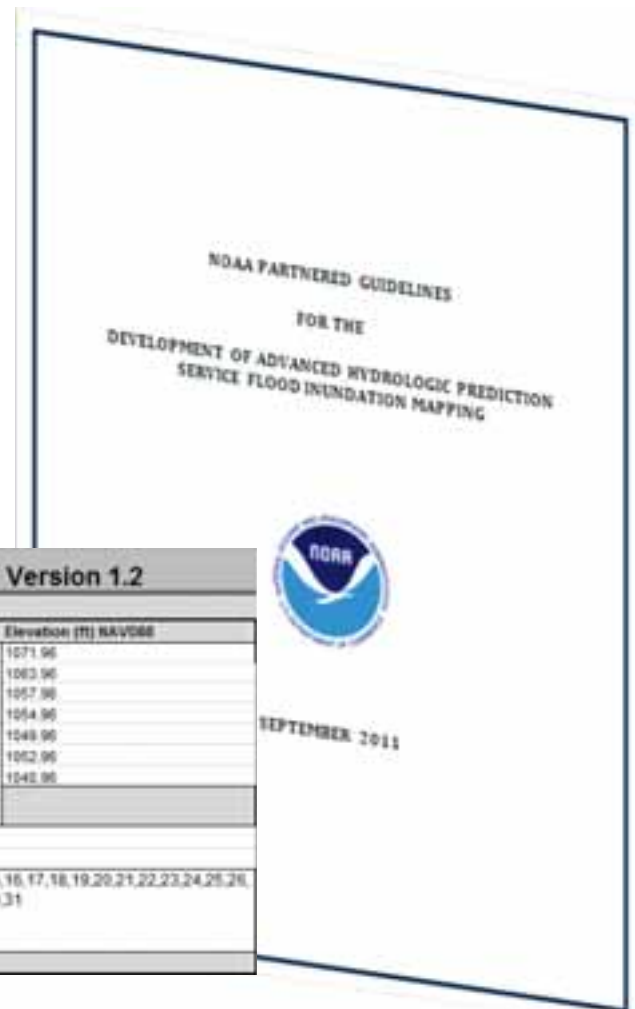
Flood Inundation Mapping Tool

Flood Categories (in feet)	
Major Flood Stage:	16
Moderate Flood Stage:	14
Flood Stage:	13
Action Stage:	11.5



NWS Flood Mapping Standards & QC

- NOAA Partnered Guidelines:
 - Best Practices
- Project Development Template:
 - Standards
 - Project Framework
 - Roles



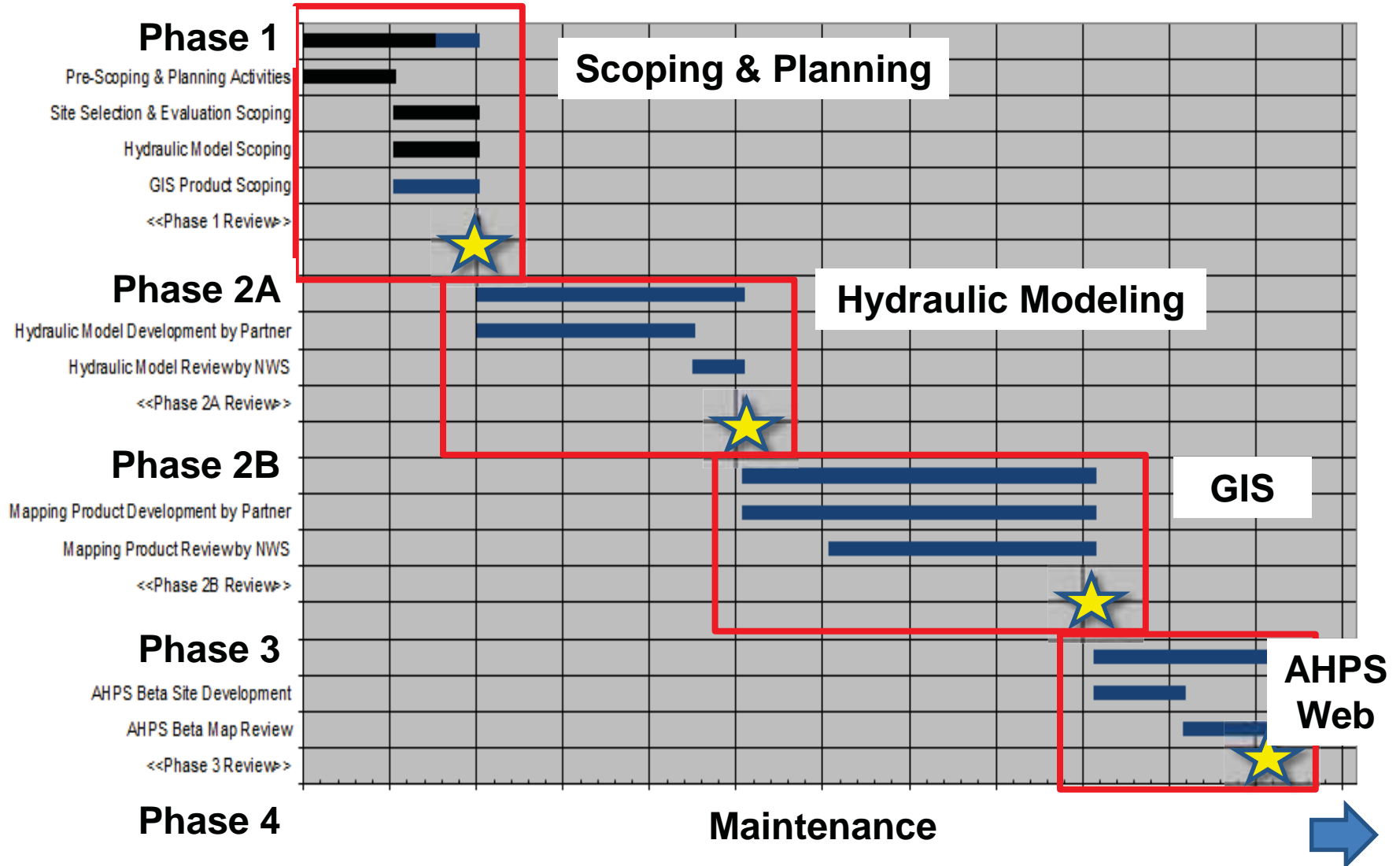
PROJECT INFORMATION		Stage (ft)		Elevation (ft) NAVD83	
Project Name:	Wildcat Creek	Highest Inundation Stage:	31	1071.96	
River:	Wildcat Creek	Major Flood Stage:	23	1063.96	
NWS Site Description:	Wildcat Creek at Manhattan Scenic Drive	Moderate Flood Stage:	17	1057.96	
USGS Site Description:	WILDCAT C AT SCENIC DRIVE, MANHATTAN, KS	Flood Stage:	14	1054.96	
Gage County, State:	Riley County, Kansas, Hydrologic Unit 10270101	Action Stage:	9	1049.96	
AKPS Gage NWSLID:	NW031	Lowest Inundation Stage:	12	1062.96	
USGS Gage ID:	16879822	Gage 0 Datum:	0	1042.96	
NWS WFD:	TOP	Mapping Interval (ft):	1		
NWS MFC:	MRRFC	NGVD29 to NAVD83 Offset Value (ft):	0.443		
US Reach Length (mi):	3.5 (KS T1400.9)	Gage Latitude (DMS NAD83):	39°11'12.20"		
KS Reach Length (mi):	6 (KS 12030)	Gage Longitude (DMS NAD83):	96°30'23.20"		
Map Display Scale:	1:2000 (±18)	List of Modeled Stages:	12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31		
FEMA FIS Date & Type:	FIS AND OFRM 07/06/2010				
IMA Elev @ (10, 2, 1, 0.2%):	10% = 1059.9 ft, 2% = 1062.9 ft, 1% = 1063.7 ft, 0.2 % = 1065.9 ft				

Project Phases

- Phase 1: Planning
- Phase 2: Inundation Mapping Production
- Phase 3: AHPS Implementation
- Phase 4: Mapping Maintenance



AHPS FIM Development Process



Phase 1: Planning

Site Selection

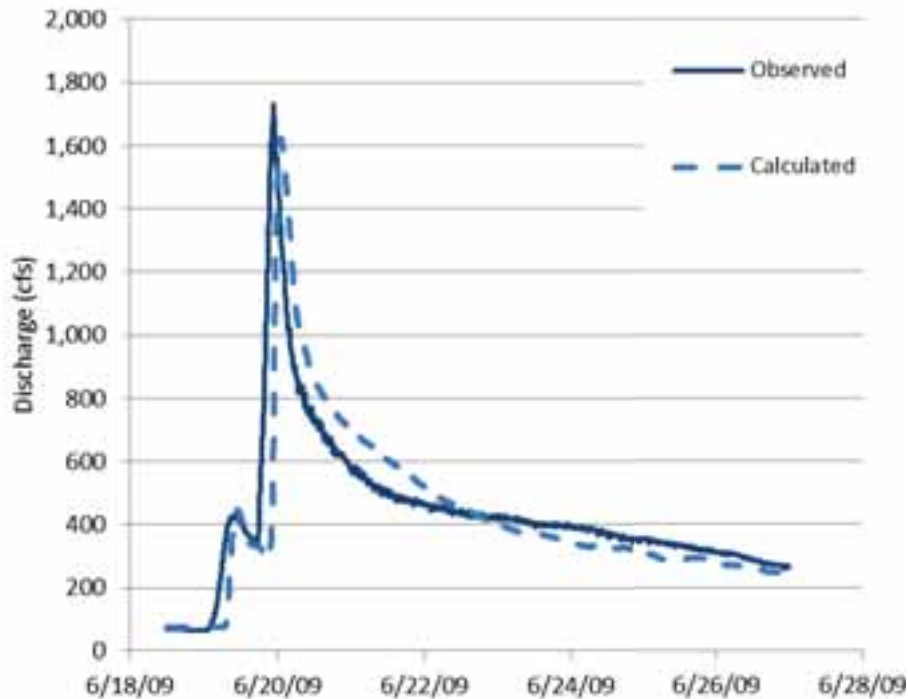
- AHPS Gage Availability
- Significant Confluences
- Representative Reach
- Detailed Topography
- Flooding Impacts



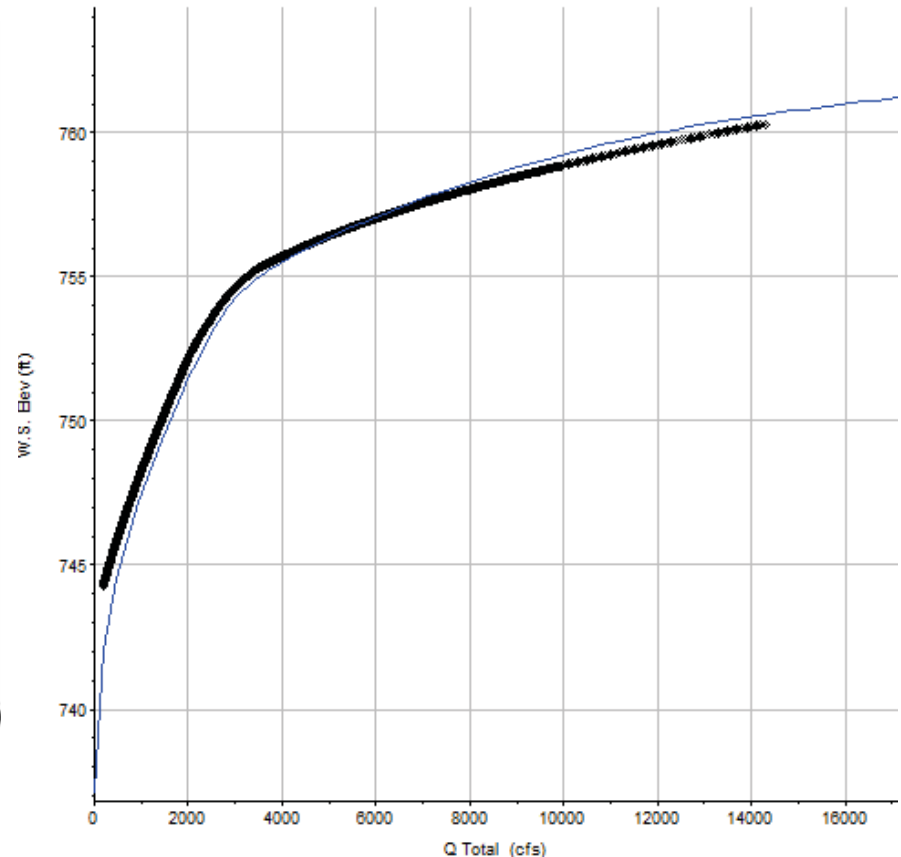
Phase 2: Inundation Mapping Production

Model Calibration

Event Calibration



Rating Curve Calibration



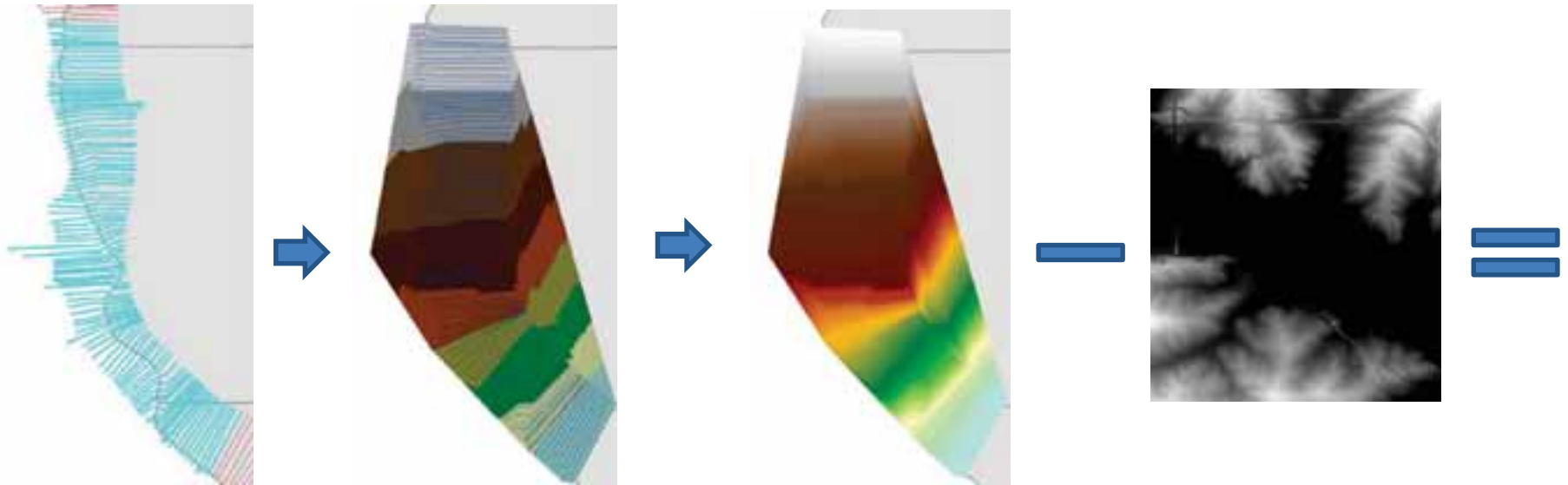
Map Library Production

- Process
 - Depth Grids
 - Bridges, overpasses, and other structures
 - Inundation Areas
 - Flood Summary Report
 - Zoom Levels



Map Library Production

1. XS to WSEL TIN (ESRI's ArcToolbox & Spatial Analyst)
2. WSEL TIN to WSEL DEM (ESRI's ArcToolbox & Spatial Analyst)
3. WSEL DEM – Terrain DEM (via Raster Calculator)

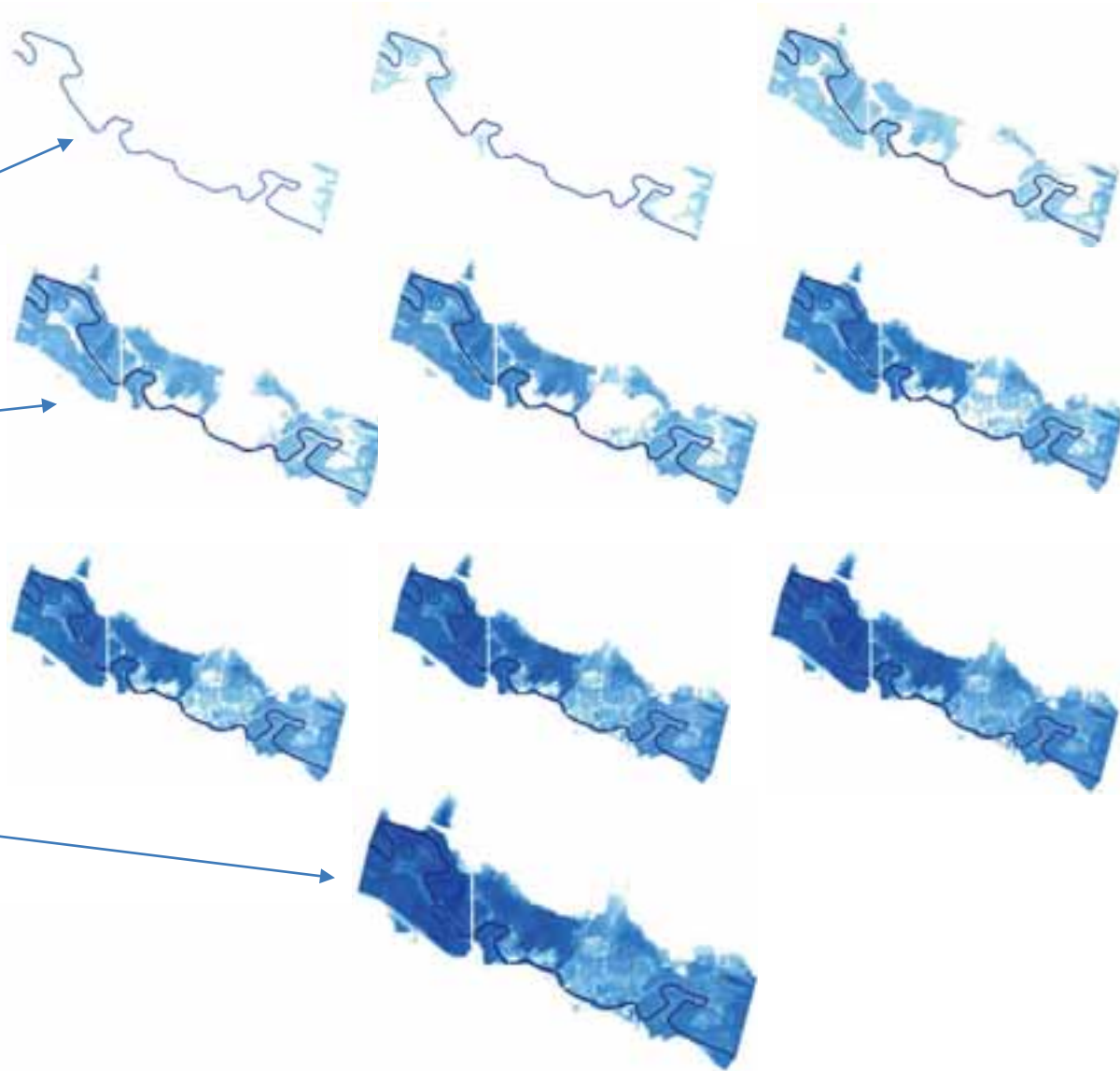


Map Library Production

- Depth Grid Library

- 10 stages / elevations mapped

- 11.5 = 754.3'
 - 12 = 754.8'
 - 13 = 755.8'
 - 14 = 756.8'
 - 15 = 757.8'
 - 16 = 758.8'
 - 17 = 759.8'
 - 18 = 760.8'
 - 19 = 761.8'
 - 19.5 = 762.3'



Map Library Production

- Process
 - Depth Grids
 - *Bridges, overpasses, and other structures*
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 - Zoom Levels

WSEL = 761.8'

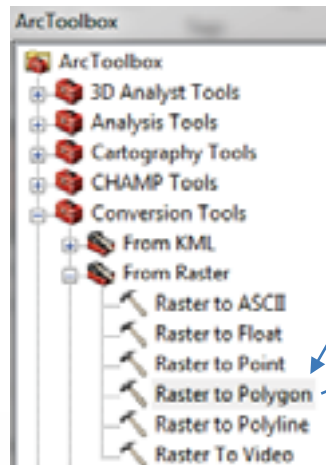


WSEL = 762.3'



Map Library Production

- Process
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 - *Inundation Areas*
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Phase 3: AHPS Implementation

Deliverables to NWS

- Inundation Boundaries
- Depth Grids
- Metadata
- Support Data
 - Base Mapping
 - Orthophotography
 - Engineering Support Data
- Effective FIRM 1% and 0.2% SFHA, Floodway, and XS

QA/QC

- Hydraulic Model Review
- Geospatial Data Review
- Data submission Review
- Preliminary, Non-public AHPS developmental web launch
 - Stakeholder Review

Data Web Hosting

- Upload Process



<http://water.weather.gov/ahps/inundation.php>

Phase 4: Mapping Maintenance

AHPS

- Ongoing Ground Truthing
- Ongoing Impact Evaluation
- Coordination with Subsequent FEMA Studies
- Impacts of land use changes and significant flood events



Summary Points

- NWS has a clear process, standards and technical support staffing established to ensure mapping projects are streamlined and successful.
- Coordinating Risk Map with AHPS FIM was extremely cost effective:
 - 100 hours of additional labor = 1% increase over FEMA RiskMap budget.
 - \$4K fee required for NWS web implementation.



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<http://water.weather.gov/ahps/inundation.php>

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