



# Maryland Benefits from Successful Collaboration

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A Public/Private partnership between FEMA, Maryland  
Department of the Environment, the USACE, and AECOM

Oct 22, 2009

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# Agenda

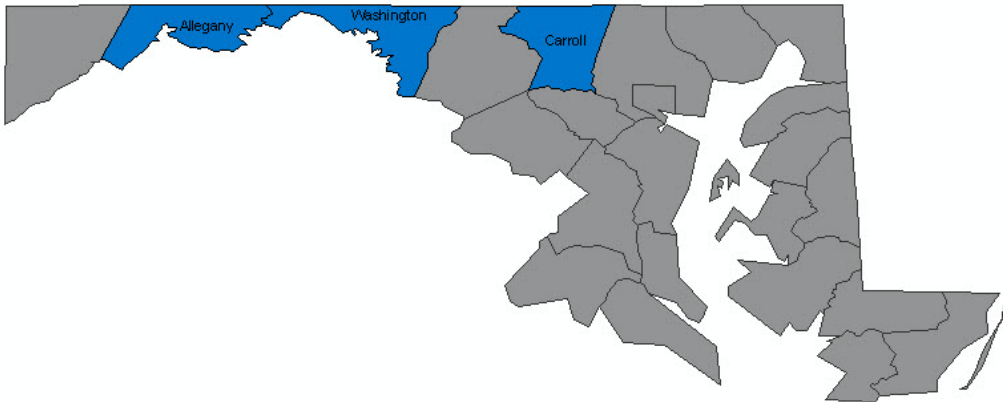
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Topic	Speaker
Introduction	Andy & Chris
Study Overview & Area	Andy
Study Team & Responsibilities	Andy & Chris
USACE Tasks	Chris
AECOM Tasks	Andy
Study Status Update	Andy & Chris
Closing, Q&A	Andy & Chris



# Study Overview and Area

- Three Counties in Maryland
  - Allegany County
  - Carroll County
  - Washington County



Study Task	Combined Value
Detailed Study	268 Miles
Limited Detailed Study	834 Miles
Approximate A	30 Miles
DFIRM Panels	233



# Study Team and Responsibilities

- State of Maryland
  - Survey Data Collection
  - Cooperating Technical Partner
  - NFIP Program Management
  - GIS Hydro based calculations
- FEMA
  - General Oversight
  - Technical Review
- USACE
  - Detailed Study
  - Limited Detailed Study
  - FIS Report
- AECOM
  - Engineering data transfer
  - Approximate Zone A modeling (30 Miles)
  - Boundary Delineation (Approx 1150 miles)
  - DFIRM Production



FEMA



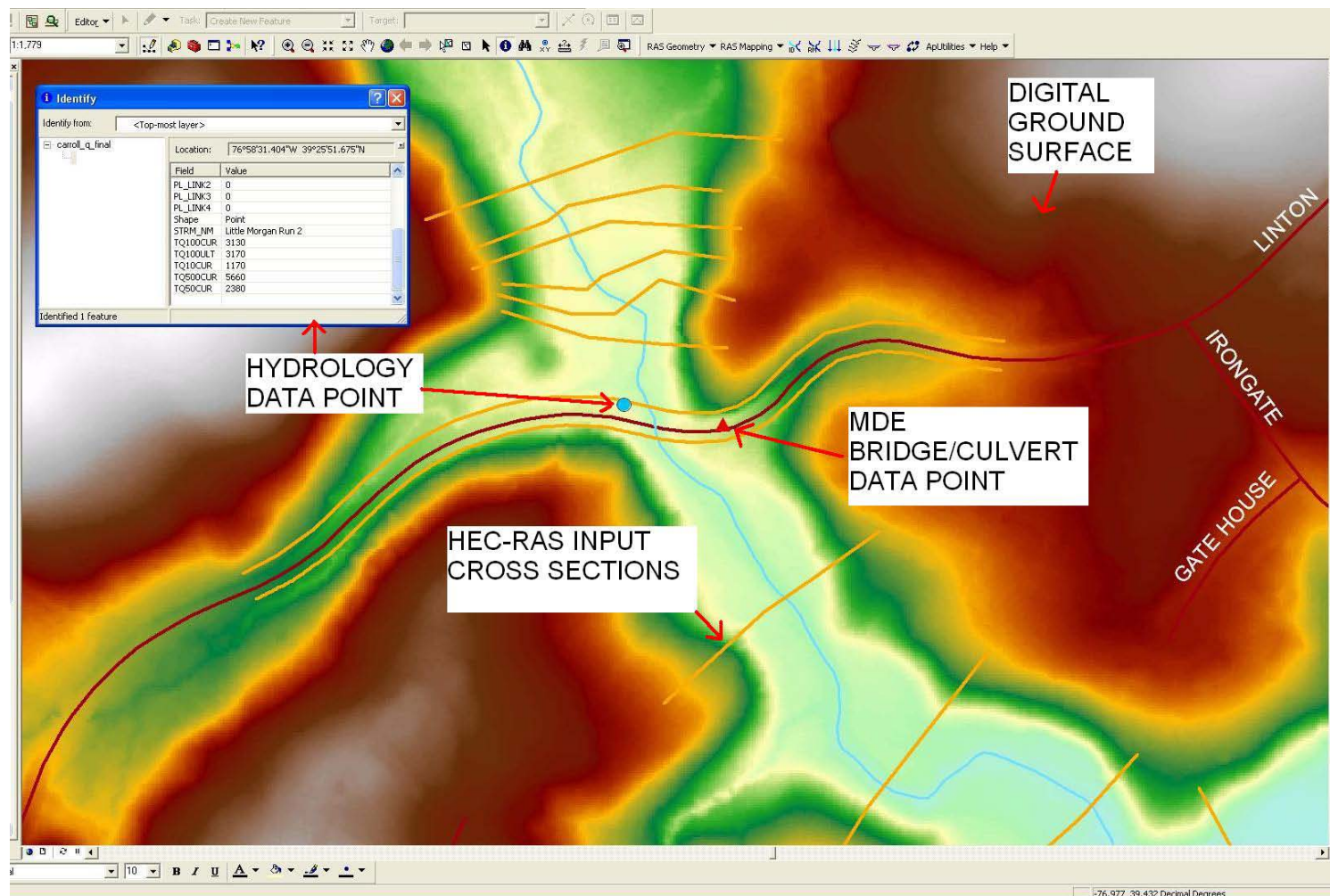
# USACE Hydraulic Modeling Tasks

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- Update all effective HEC-2 models to georeferenced HEC-RAS models
- Establish HEC-RAS models for effective Zone A areas, while incorporating MDE survey data
- Takes advantage of latest modeling and GIS technology (HEC-RAS 4.0 and GeoRAS)
- Incorporate data from LOMR's when applicable



# HEC RAS input data





# MDE Bridge/Culvert data

The screenshot displays a web application interface for bridge data entry. The left pane contains several data entry sections:

- Road Information:**
  - Out to Out Width (ft): 20
  - Curb to Curb Width (ft): 20
  - Median Width (ft): 0
  - Railing Length (ft): 50
  - Railing Height (ft): 2 (From Road to Top)
  - Railing Type: Guard Rail
  - Railing Location(s): Upstream  Downstream
- Stream Measurements:**
  - Channel Type: Earth Embankment
  - Distance to downstream control (ft): 125
  - Distance to upstream control (ft): 35
- Control Measurements:**

Upstream Control		At Structure		Downstream Control	
Top Bank Width (ft)	18	Top Bank Width (ft)	45	Top Bank Width (ft)	50
Flow Width (ft)	16	Flow Width (ft)	21	Flow Width (ft)	16
Bottom Width (ft)	16	Bottom Width (ft)	21	Bottom Width (ft)	16
Channel Depth (ft)	4	Channel Depth (ft)	7	Channel Depth (ft)	7
Flow Depth (ft)	1	Flow Depth (ft)	0.5	Flow Depth (ft)	1
- Comments:** (marsh, bay, etc. up/downstream):  [Click for Reference](#)

The right pane shows a photo of a bridge deck with the text "DECK FROM UPSTREAM" overlaid. The photo shows a concrete bridge with a metal railing crossing a stream in a wooded area.

At the bottom of the application, there is a download notification: "Downloading (1.96 MB of 3.64 MB) : http://tsprod.lci.com/mesndebridge/reports/CR091608F5.8.pdf".





# Output data provided to AECOM

**Identify**

Field	Value
Location	77°8'27.383"W 39°34'29.867"N
FID	11
Shape	Polyline
RiverCode	WolfPiBranch
ReachCode	WolfPiBranch
ProfileElev	4235.44
LeftBank	0
RightBank	0
Interp	N
P001	132.447
P002	132.456
Shape_Leng	2119.652632

**Profile Output Table - Standard Table 1**

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Cut W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Ch #
WolfPiBranch	4932.30	1175.00	432.05	435.31	434.74	435.48	0.004176	5.11	422.47	281.71	0.56	
WolfPiBranch	4932.30	1178.00	432.05	435.31	434.74	435.48	0.004167	5.12	422.83	281.78	0.56	
WolfPiBranch	4235.44	1175.00	428.09	432.45		432.72	0.003995	5.12	365.62	197.09	0.50	
WolfPiBranch	4235.44	1178.00	428.09	432.46		432.72	0.003971	5.11	367.26	197.50	0.50	

**Cross Section Data - WolfPiBranch\_UpdatedGeometry**

River: WolfPiBranch  
 Reach: WolfPiBranch  
 River Sta: 4235.44

Cross Section Coordinates			Downstream Reach Lengths		
Station	Elevation	n Val	LOB	Channel	ROB
0	470.87	0.05	374.31	478.98	349.43
2	4.98	470.79			
3	9.96	470.7	N/A	N/A	N/A
4	14.94	470.62			
5	19.92	470.55			
6	24.9	470.46			
7	29.87	470.37			
8	34.85	470.29			
9	39.83	470.21			
10	44.81	470.12			
11	49.79	470			

**Annotations:**

- RAS Station ID**: Points to the 'River Sta' field in the Identify window and the 'River Sta' dropdown in the Cross Section Data window.
- 100 and 100 year ultimate elevations**: Points to the 'ProfileElev' field in the Identify window.
- X-Section Shapefile Attributes**: Points to the 'Shape\_Leng' field in the Identify window.
- You can pull data/reports for that cross section out of HEC-RAS, using the Station ID to locate it**: A general note about the workflow.





# AECOM Tasks

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- Boundary Delineation in WISE
  - Import GeoRAS spatial files cross-sections and streamlines into WISE format
  - Delineated Boundaries in WISE
- Merging of LDS and Detailed Study boundaries
  - Automated procedure in WISE
- Automated Approximate along the Potomac River in Allegany and Washington Counties
- DFIRM Production
  - Utilization of AECOM DFIRM Tools (Mapping Analyst Extension)

# AECOM Boundary Delineation



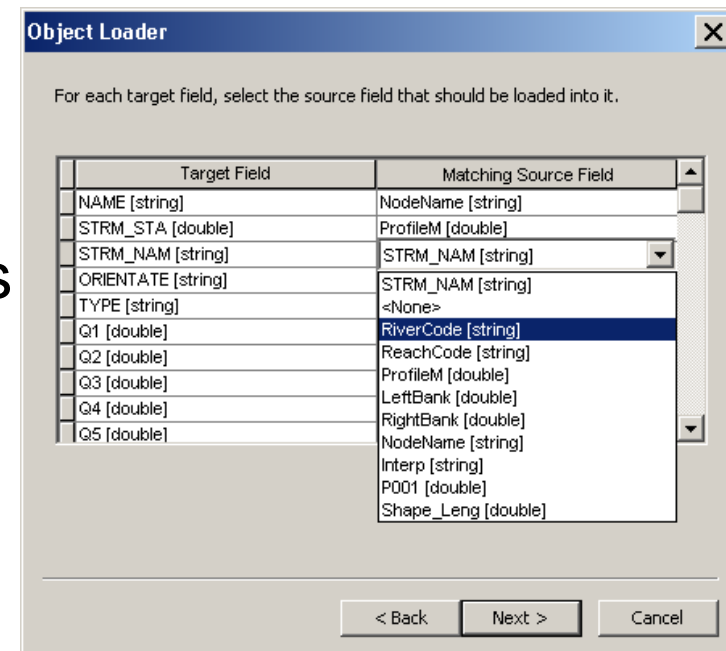
## ■ WISE

- Comprehensive software platform developed by AECOM for Water Resources

- ❖ Supports H&H modeling tasks
- ❖ Terrain data processing
- ❖ Automates floodplain delineation

## ■ Merging of LDS and Detailed Studies

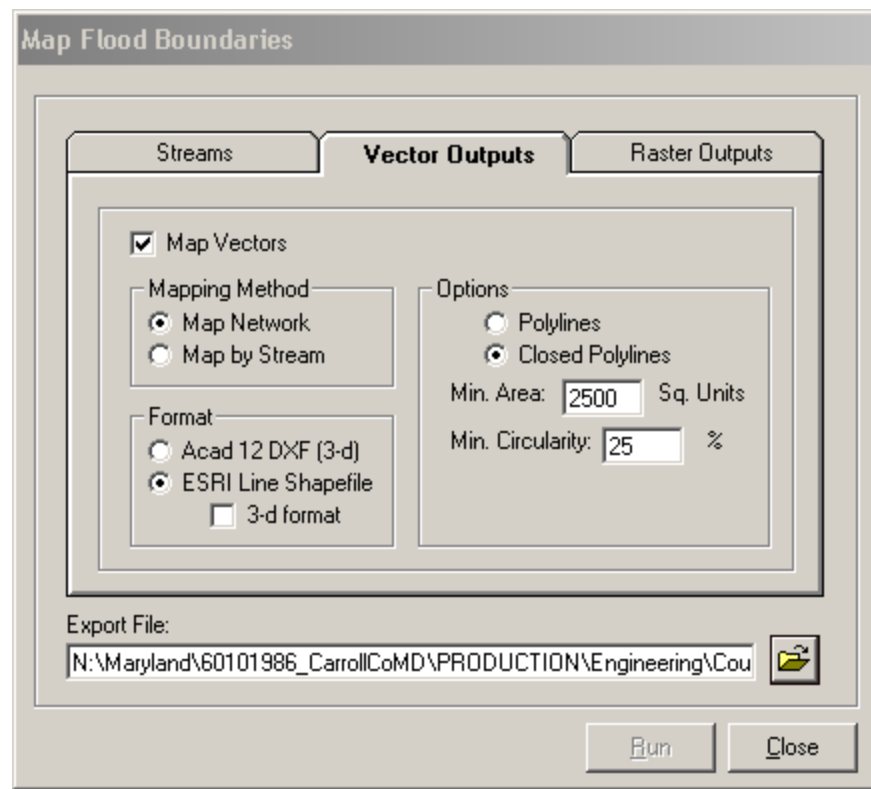
- Automated procedure in WISE
- Import GeoRAS spatial files into WISE format
  - ❖ Geodatabase Template files
  - ❖ Load Objects – Set Source and Target fields



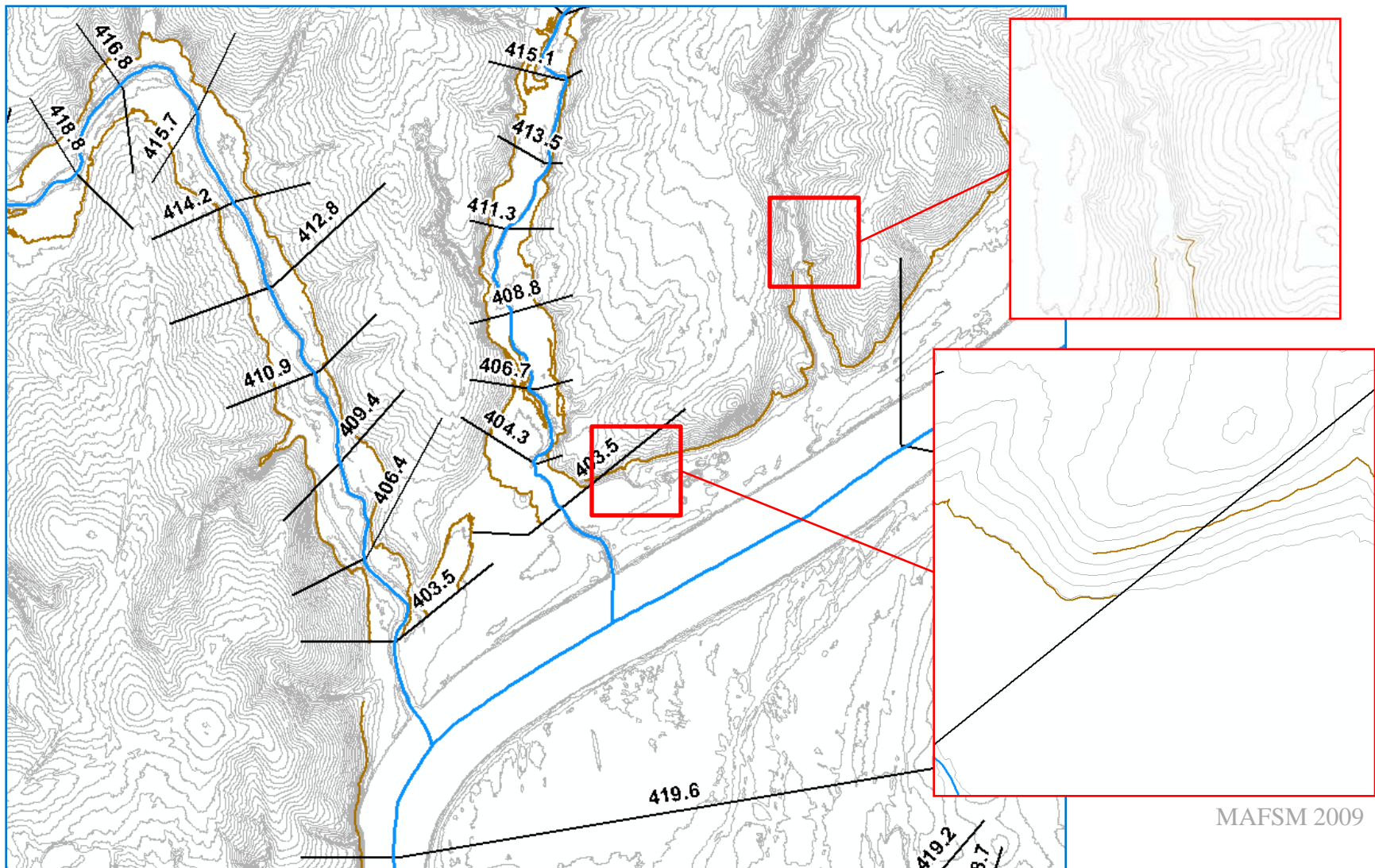


# Boundary Delineation cont.

- Utilize Network Mapping in WISE
  - Automatically 'merges' LDS and Detailed study boundaries
    - ❖ Not stream by stream
    - ❖ Stream network mapping
  - Automatically delineates backwater areas
  - Attributes data – ready to load into DFIRM database schema

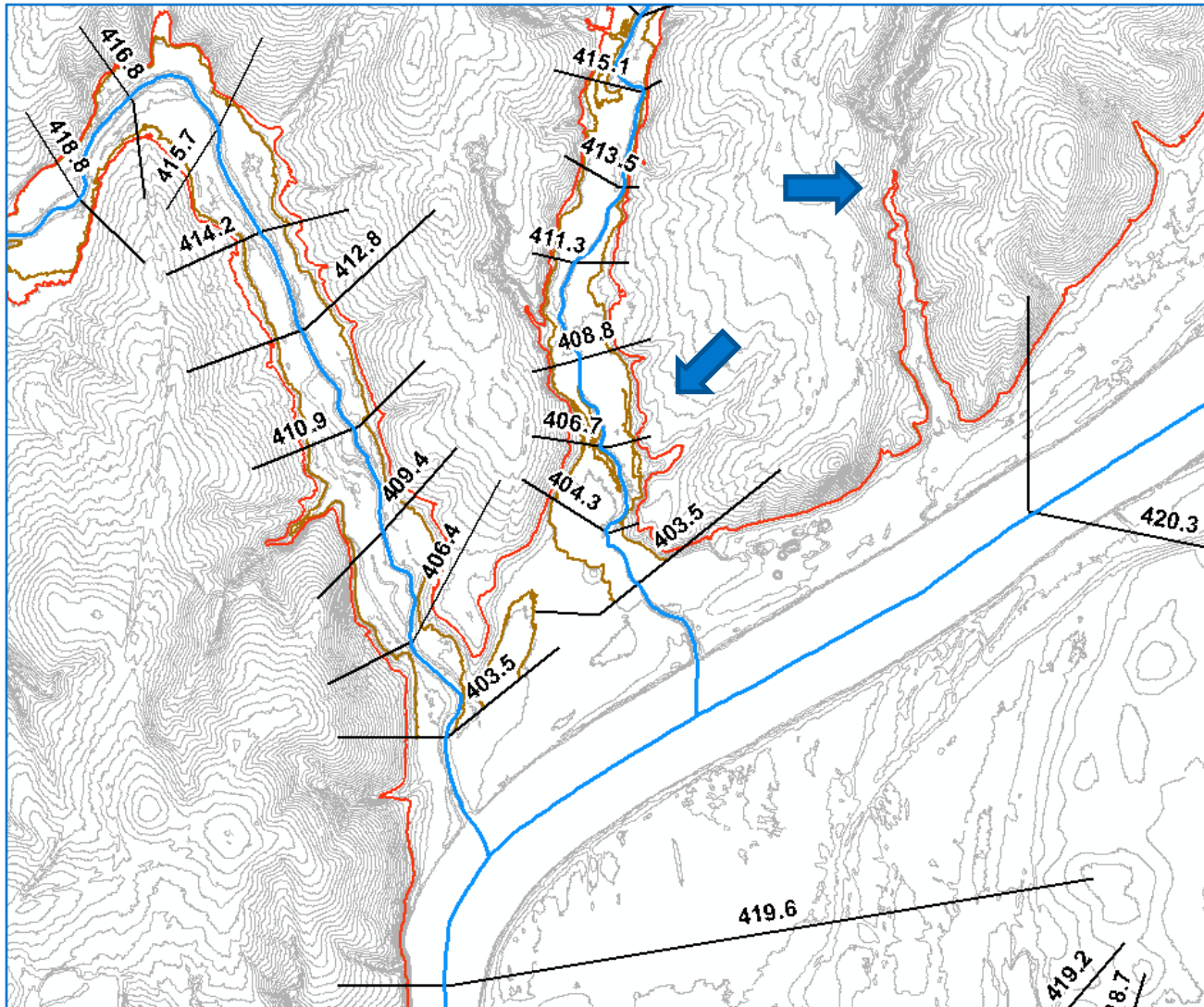


# Traditionally Mapped Boundaries





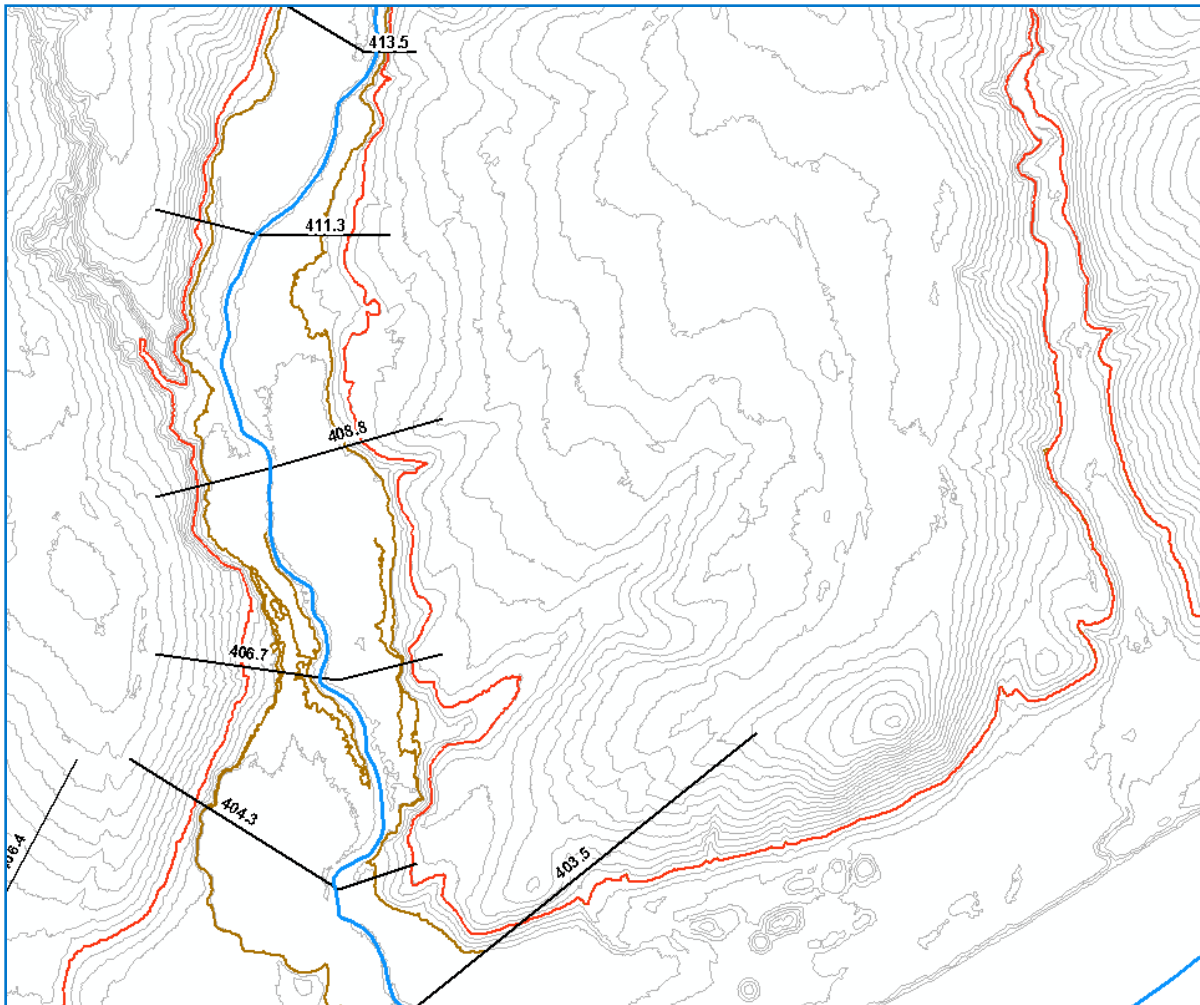
# WISE Network Mapping







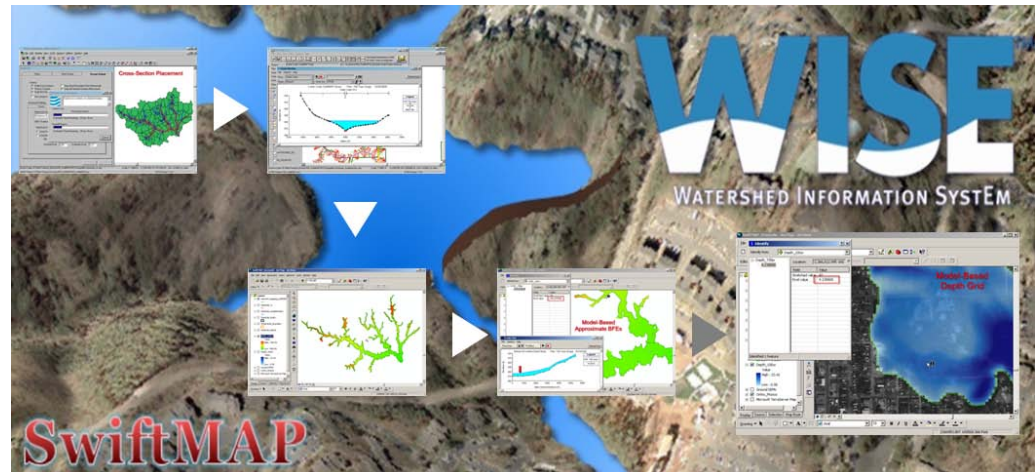
# WISE Network Mapping Cont.





# Automated Approx. Studies

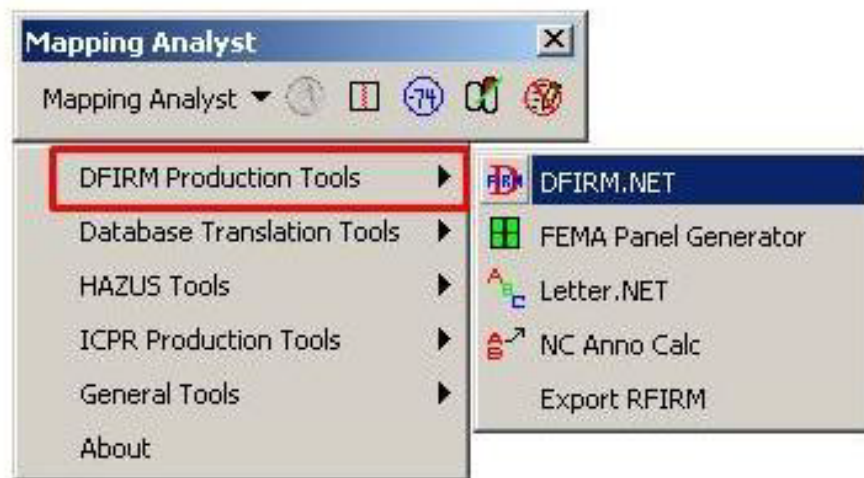
- Approximately 30 miles of the Potomac River in Allegany and Washington Counties
- Utilize discharge values provided by USACE
- WISE SwiftMAP procedure
  - Batch XS lay out and take offs
  - Automated basin delineation
  - Automated creation of HEC RAS models
  - Engineering review
  - Delineation of boundaries





# DFIRM Production

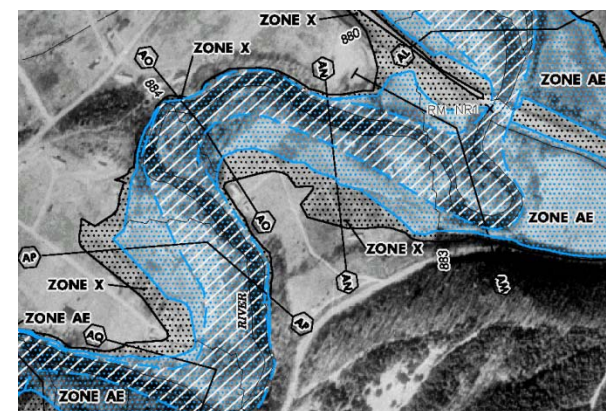
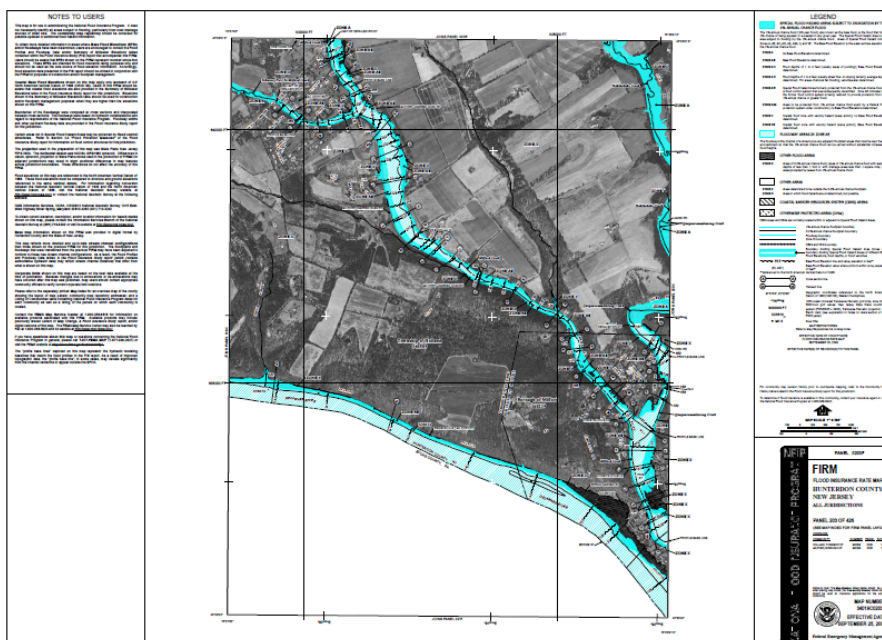
- Citrix / SDE Enterprise production environment
  - Versioning workflow
  - Multiuser editing
  - Remote access possible
- AECOM DFIRM Tools – Mapping Analyst
  - ArcMap Extension





# DFIRM Example

- Ortho based





# Study Status update

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- **Engineering update**
  - Carroll County 95%
  - Allegany County 40%
  - Washington County 50%
  
- **DFIRM update**
  - Base Map Setup done for all three studies
  - DFIRM Databases are setup and ready for production for all three studies
  - Carroll County – boundary delineation in progress 95% complete
  
- **Prelim Dates:**
  - Carroll (March 2010)
  - Washington (April 2010)
  - Allegany (May 2010)





# Closing

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- Questions?