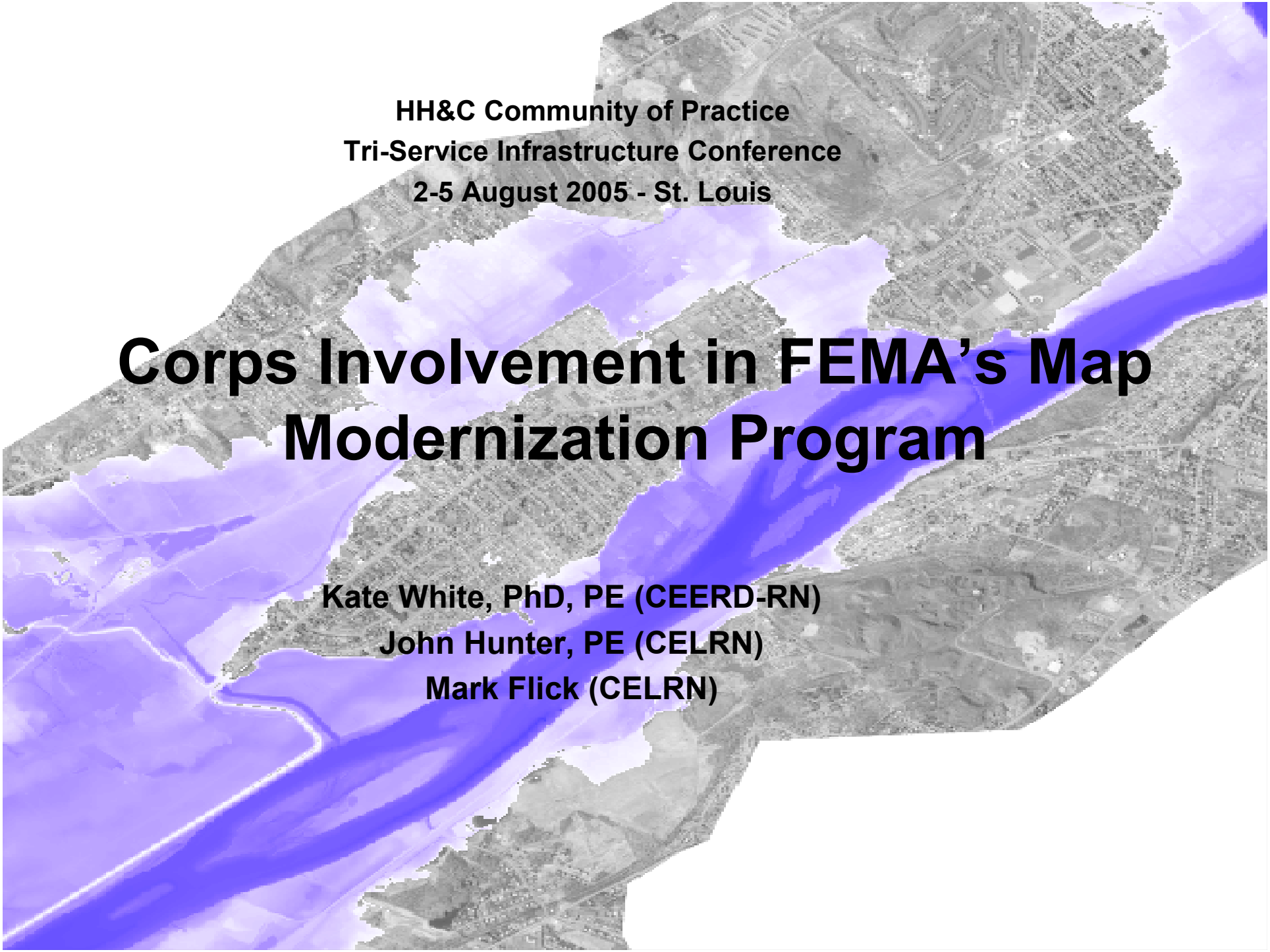
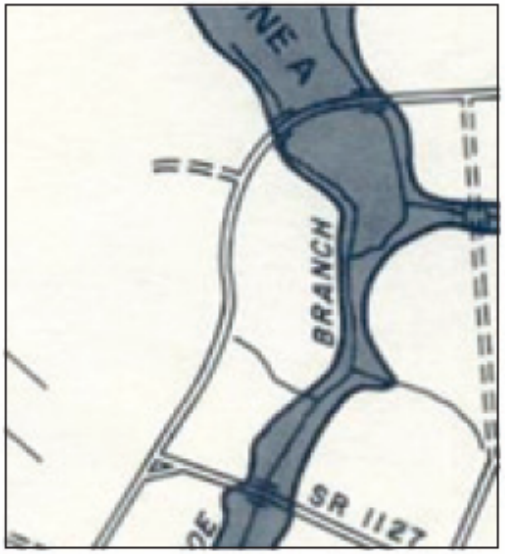


HH&C Community of Practice
Tri-Service Infrastructure Conference
2-5 August 2005 - St. Louis

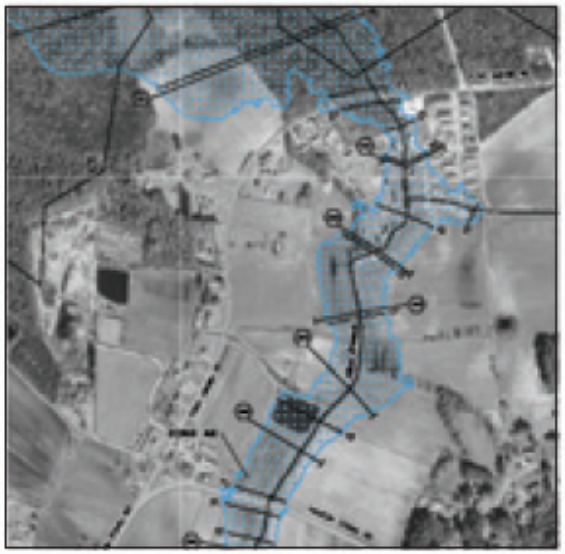
Corps Involvement in FEMA's Map Modernization Program

Kate White, PhD, PE (CEERD-RN)
John Hunter, PE (CELRN)
Mark Flick (CELRN)

FEMA Map Modernization Program



Paper flood map section



Digital flood map section

FEMA Map Modernization Program

- >90K Flood Insurance Rate Map panels
- ~70% FIRM > 10 years old by 2005
- GAO recommended FEMA align funding to flood risk
- MMP details in Multi-year flood Hazard Identification Plan (MHIP) - living document
  - Studies for > 1/3 of counties started by FY05
  - ~ 40% of population will have digital maps by FY05
  - MHIP FY02-05 $\rightarrow$08 with completion by FY10
  - FY05-09 sequence for DFIRM production
  - Dynamic scheduling for projects scheduled through FY08 (completion through FY10)
  - Risk-based method to establish appropriate level of detail, accuracy, and analysis for reliable maps

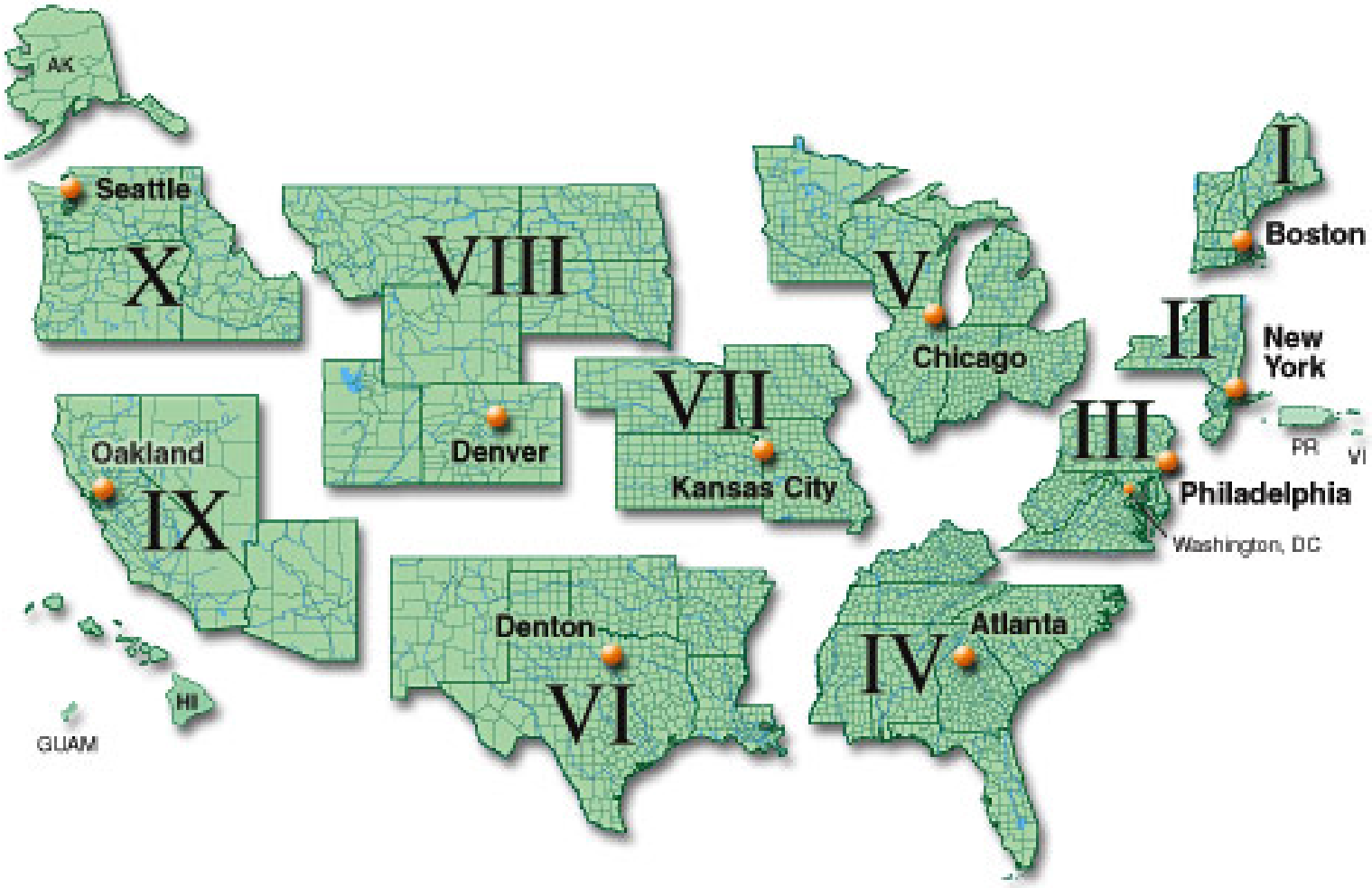
Current MHIP

Table ES-2. Map Production Funding Distribution by Region, FY04-FY08

Region	FY04 Funding[1]	FY05 Funding[1]	FY06 Funding[2]	FY07 Funding[2]	FY08 Funding[2]
1	$4,206,000	$5,315,000	$5,661,000	$5,827,500	$5,827,500
2	$9,420,000	$11,475,000	$12,087,000	$12,442,500	$12,442,500
3	$9,752,000	$12,047,000	$12,852,000	$13,230,000	$13,230,000
4	$35,722,000	$35,725,000	$38,097,000	$39,217,500	$39,217,500
5	$12,798,000	$17,222,000	$18,207,000	$18,742,500	$18,742,500
6	$17,583,000	$23,159,000	$26,775,000	$27,562,500	$27,562,500
7	$7,411,000	$10,115,000	$10,710,000	$11,025,000	$11,025,000
8	$5,432,000	$6,908,000	$7,191,000	$7,402,500	$7,402,500
9	$11,462,000	$13,517,000	$15,453,000	$15,907,500	$15,907,500
10	$4,572,000	$5,849,000	$5,967,000	$6,142,500	$6,142,500
Total	**$118,358,000**	**$141,332,000**	**$153,000,000**	**$157,500,000**	**$157,500,000**

Notes: 1 – Actual
2 – Proposed

FEMA Regions



Corps Support to FEMA

- The US Army Corps of Engineers has played a vital role in the development of Flood Insurance Studies for the FEMA since the 1970's
- Local Corps Districts
  - Local knowledge of rivers, flooding, development patterns, regulatory permits, updated hydrology, bridges
- National Corps Districts
  - Experience with latest methods, use β version of HEC and CHL models first
  - One Door to the Corps enables flexible and time-sensitive scheduling

Corps Support to FEMA

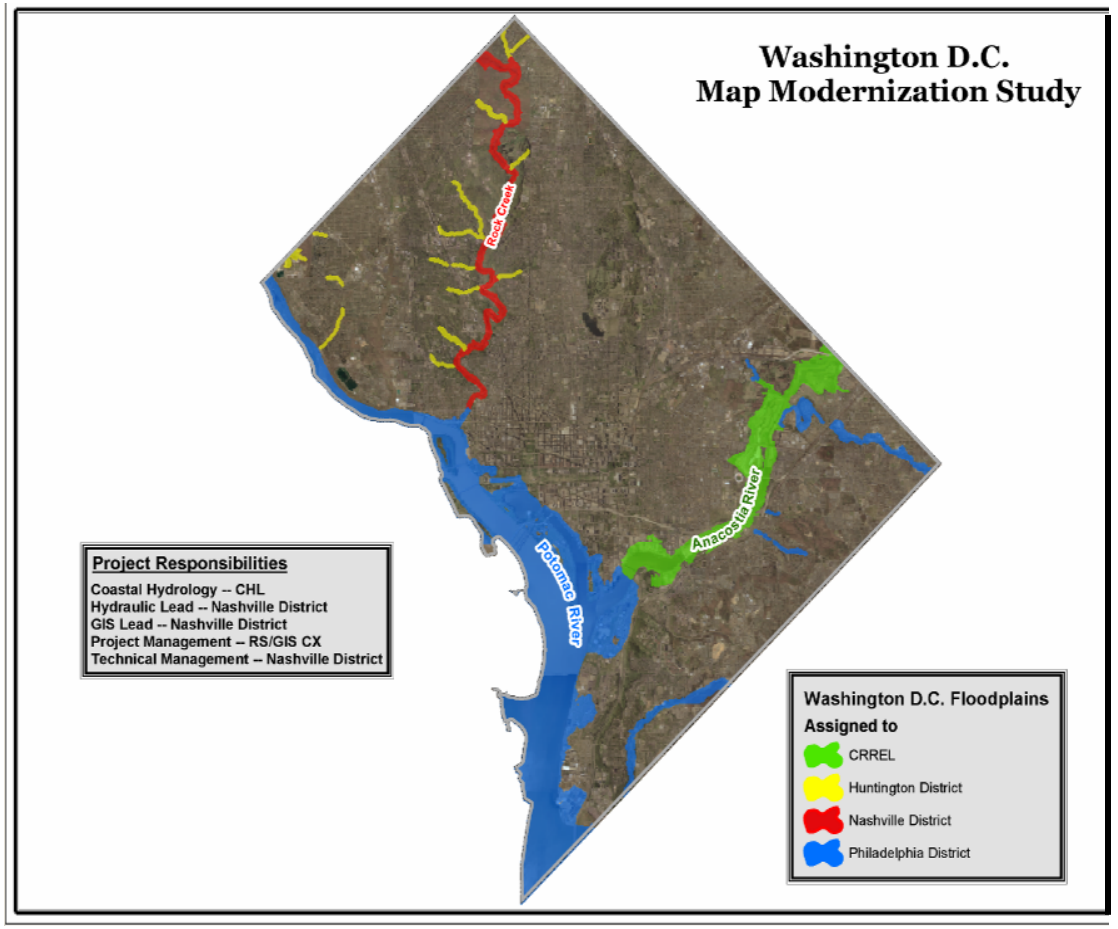
- Corps Centers
  - Hydrologic Engineering Center
    - Develops the HEC-RAS, GeoHEC-RAS, HMS, GeoHMS, and flood frequency analysis models used by Districts and others
  - Remote Sensing/GIS Center of Expertise
    - Develops local, regional, and national geospatial databases and supports Corps AIS for Emergency Management, O&M, and regulatory (in process)
- Corps Laboratories
  - Coastal and Hydraulics Laboratory
    - Develops the coastal models for local and regional wave and surge modeling (STWAVE, ADCIRC, WISWAVE)
    - Has access to LIDAR bathymetry, soundings, and other data collected for coastal studies
  - Cold Regions Research and Engineering Laboratory
    - Supports HEC in snowmelt and ice jam code for models
    - Develops geospatially enabled local and regional hydrology

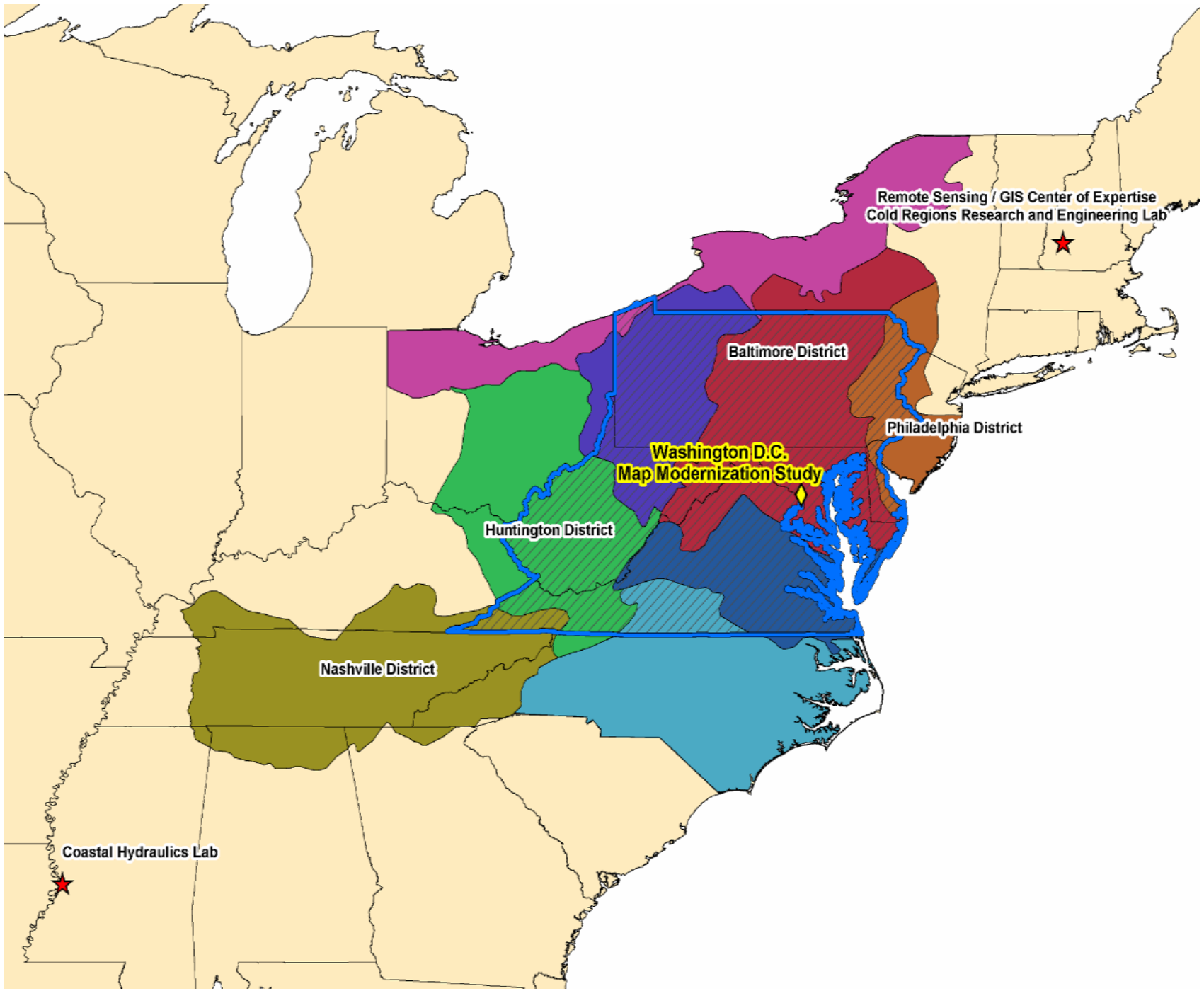
Corps Support for FEMA

- **Regional Efforts Developing**
  - National PDT (RS/GIS CX)
  - Gulf Coast (CEMVN)
  - Upper Mississippi (CEMVR)
  - Policy and Corporate Issues (IWR)
  - Hydrologic Studies (HQUSACE)
  - National-level MOU (HQUSACE)
- **Corps expertise in the watersheds brings unique perspective to FEMA partners**
  - Evaluating level of detail required for updates
  - Leveraging updates with other floodplain management outcomes (e.g. cumulative impacts)

National FEMA PDT

- **Formed to work with FEMA Region 3**
  - **One Door to the Corps**
- **First project: Washington DC**
  - **4 Districts (NAB, NAP, LRH, LRN)**
  - **2 labs (ERDC CHL and CRREL)**
  - **Developed bridge data collection format**
  - **Leveraged development of approximate study method**




Remote Sensing / GIS Center of Expertise
Cold Regions Research and Engineering Lab
Baltimore District
Philadelphia District
Washington D.C.
Map Modernization Study
Huntington District
Nashville District
Coastal Hydraulics Lab

National FEMA PDT

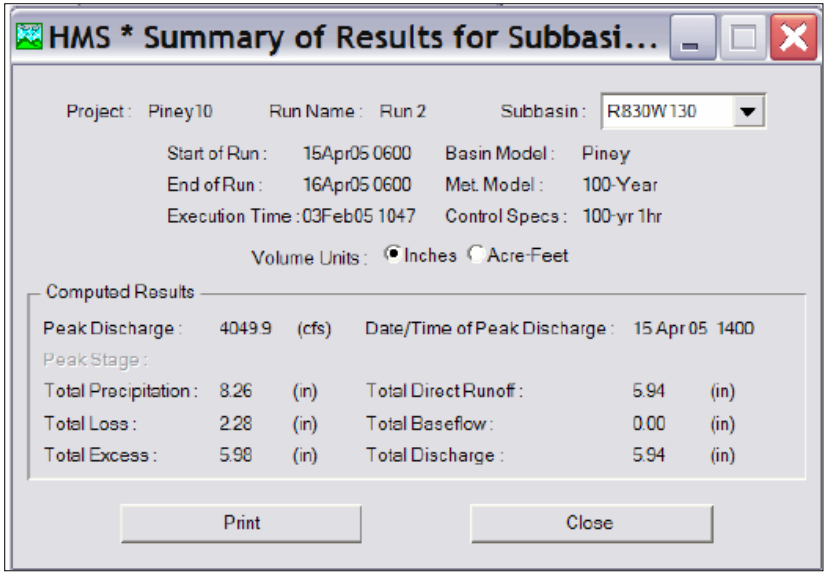
- **Networking:**
  - National PDT spreadsheet (NAB, NAE, NAO, NAP, LRB, LRH, LRN, MVN, MVP, MVS, NWS, NWP, SPA, ERDC, HEC)
  - Experience with Coastal, GIS, H&H, and PM aspects
- **Capacity Building DFIRM Tools Training**
  - Facilitated 3-day virtual training session for Corps, USGS, Michael Baker, contractors
- **Next Project:**
  - Coastal surge analysis for Chesapeake Bay
    - 2 Districts (NAB, NAP)
    - 1 lab (ERDC CHL)
  - Chesapeake Bay interagency workshop to maximize use and leveraging of map updates
- **More to come…..**

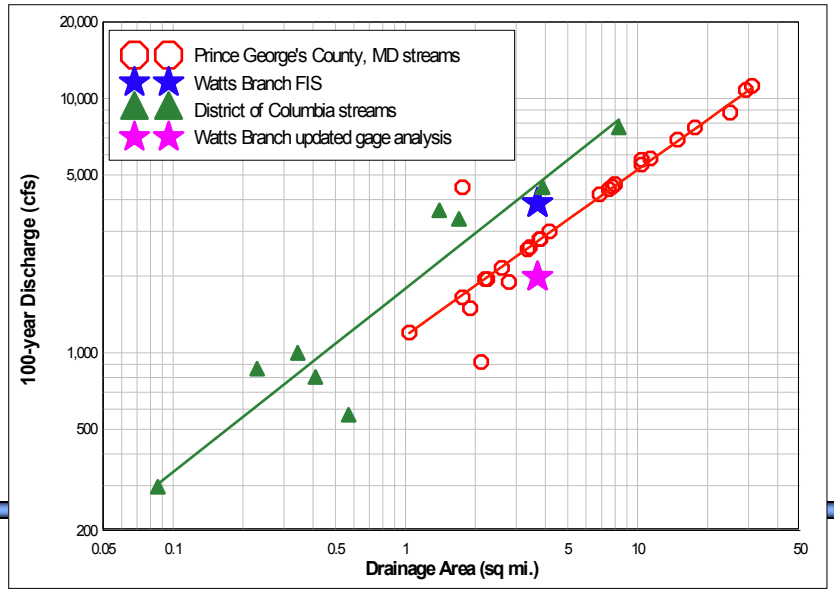
Example: District of Columbia Map Modernization Project

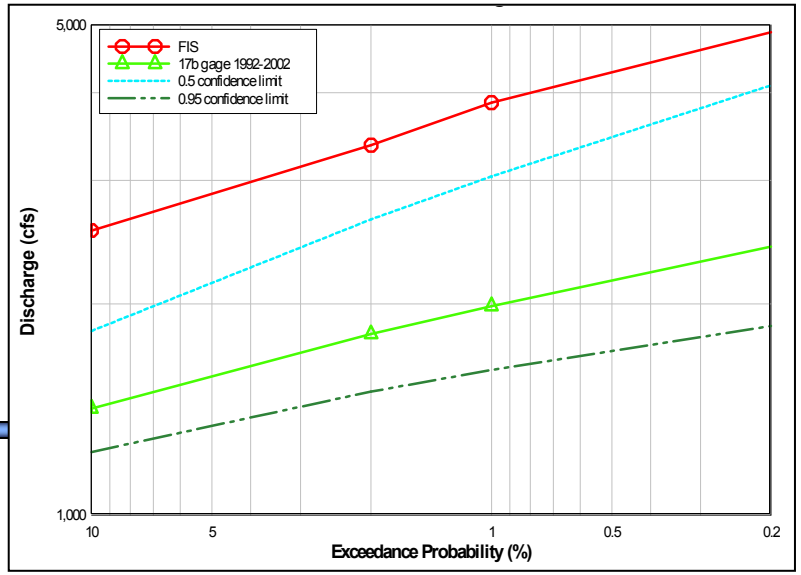
- **Base Mapping**
  - 1m contours for DC area (minus blackout areas)
  - Planimetrics (vector data for roads, etc)
  - Aerial photography (incorporated special DC dataset, except blackout areas)
- **Manipulation**
  - Vertical datum adjustments
  - Combining DEMS created from higher resolution data inside DC with DEMS created from other data outside to capture watershed areas

Example: District of Columbia Map Modernization Project

- **Hydrology**
  - FIS provides very little data (e.g., skews)
  - Updated gage analyses
  - Verified Q's
  - Performed uncertainty analysis
  - Investigated flood history







US Army Corps of Engineers

Example: District of Columbia Map Modernization Project

- **Hydraulics**
  - Hard copy scans of HEC-2 output
  - Scan and digitize data
  - Update HEC2 to HEC-RAS
  - Develop automated inundation areas for approximate studies using GeoHEC-RAS
  - Bridge data/NPS/quick surveys/tied to GIS database

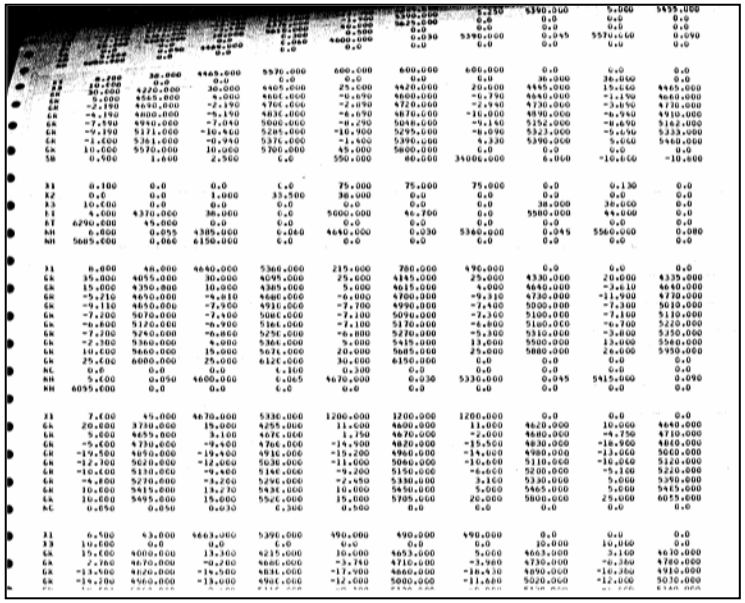
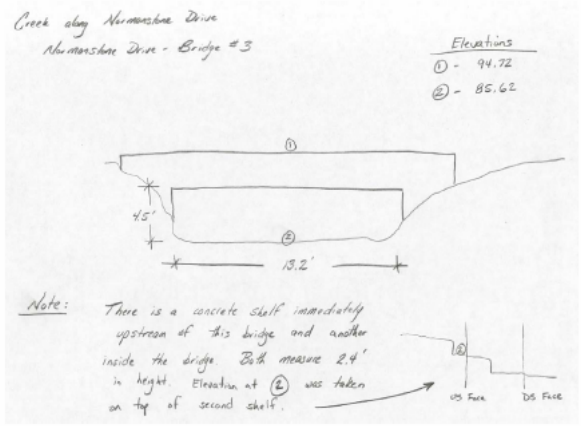


Photo below shows the downstream face of the Normanstone Drive - Bridge #3 over the Creek along Normanstone Drive.

The following sketch provides general dimensions and elevation data for the Normanstone Drive - Bridge #3 on the Creek along Normanstone Drive.

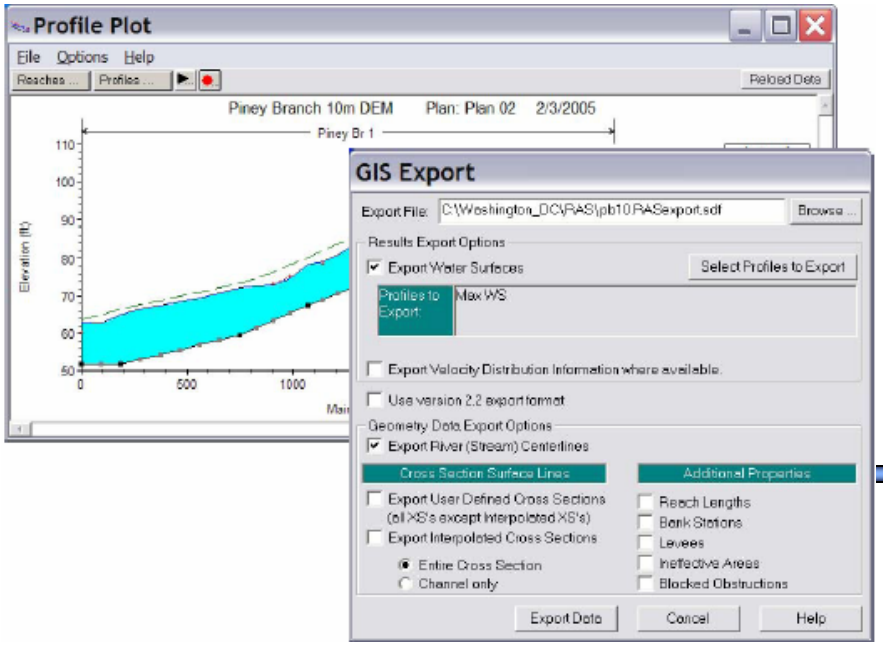


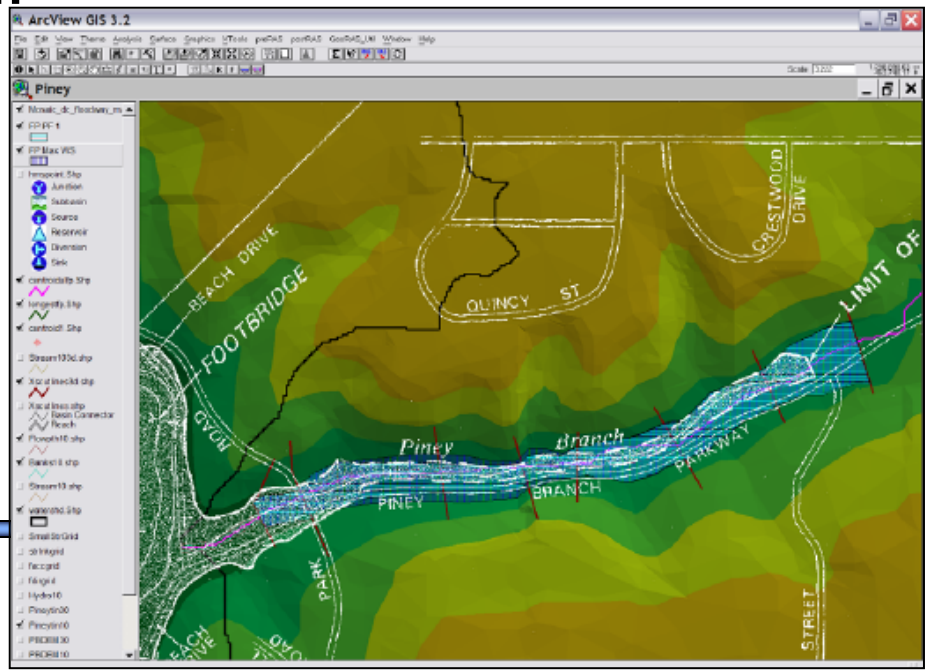
Example: District of Columbia Map Modernization Project

- **DFIRM Database and Map Graphics**
  - **Old = paper**
  - **New = digital, meets FEMA stds**
- **FIS**
  - **Old: basic, little information**
  - **New: Complete text description**

The software products that are needed to perform procedures outlined below are as follows:

- ArcMap 8.3
- Spatial Analyst for ArcMap 8.3
- 3D Analyst for ArcMap 8.3
- EZ GeoWizards for ArcMap 8.3
- Xtools for ArcMap 8.3
- ArcView 3.X
- Spatial Analyst for ArcView 3.X
- 3D Analyst for ArcView 3.X
- Xtools for ArcView 3.X
- GeoHMS for ArcView 3.X
- GeoRAS for ArcView 3.X
- MrSid Extension





Lessons Learned

- P2 structure for project management not necessarily optimal for financial management
- Bridges, bridges, bridges!
- National PDT is great example of 2012 in action:
  - Grassroots efforts lead to interested, energetic participants
  - Cross-District and cross-Division partnering enhanced
- Other efforts aligned with regional business center approach
- Thanks to:
  - GIS Lead: Mark Flick, LRN
  - Hydraulics Lead: John Hunter, LRN
  - Jerry Webb: HQUSACE support and encouragement