

FEMA's Map Modernization

Mid-Atlantic Chapter of URISA

May 11, 2005



FEMA

MAC URISA Spring Meeting

Contents-1

- National Flood Insurance Program
- Maps and map products
 - why FEMA makes maps
 - printed maps
 - digital map products
- DFIRM



MAC URISA Spring Meeting

Contents-2

- Planning Map Modernization
 - purposes
 - objectives
- Implementing Map Modernization
 - NSP, MOD, or the “Map Mod Team”
 - the MOD Solution
 - MIP, Multi-hazard Information Platform
 - KPI goals





National Flood Insurance Program

Congressional action

- Pre-NFIP
- National Flood Insurance Act of 1968
- Flood Disaster Protection Act of 1973
- National Flood Insurance Reform Act of 1994
- Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264)



National Flood Insurance Program

What is the NFIP?

- An insurance program
- A land use program
- Based on the 1%-annual-chance flood, the Base Flood
- Federal–community partnership
- 20,055 communities (April 2005)
- Federal–individual relationship
- 4,579,443 policies in effect (February 2005)
- \$ 756,668,180,400 insurance in force (February 2005)



National Flood Insurance Program

Loss Statistics Jan 1, 1978 through Dec 31, 2004

State -----	Total losses -----	Total payments \$ -----
Delaware	3,358	43,940,045
Dist. Columbia	78	924,702
Maryland	13,398	220,071,222
New Jersey	70,026	598,246,555
New York	68,030	373,056,458
Pennsylvania	46,985	473,352,231
Puerto Rico	21,234	103,512,856
Virgin Islands	2,702	38,763,686
Virginia	28,049	384,416,631
West Virginia	22,333	235,094,130



National Flood Insurance Program

Insurance program stakeholders

- Condominium Associations
- Consumers
- Lenders
- Insurance Professionals
- Claims Adjusters
- Surveyors
- State & Local Officials



National Flood Insurance Program

Land use program stakeholders

- State & Local Officials
- Developers
- Architects and Engineers
- Surveyors
- Property owners



National Flood Insurance Program

Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004

SEC. 107. GEOSPATIAL DIGITAL FLOOD HAZARD DATA.

For the purposes of flood insurance and floodplain management activities conducted pursuant to the National Flood Insurance Program under the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.), **geospatial digital flood hazard data** distributed by the Federal Emergency Management Agency, or its designee, or the printed products derived from that data, **are interchangeable and legally equivalent for the determination of the location of 1 in 100 year and 1 in 500 year flood planes**, provided that all other geospatial data shown on the printed product meets or exceeds any accuracy standard promulgated by the Federal Emergency Management Agency.



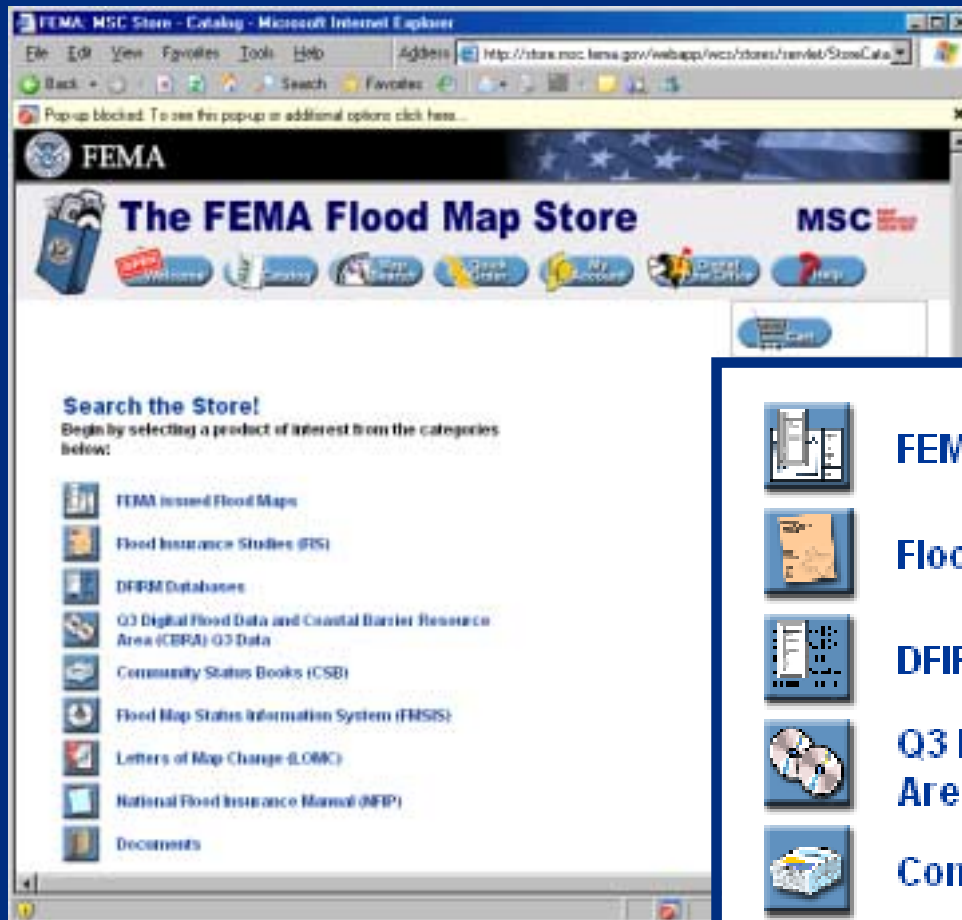


Maps and Map Products

- Why does FEMA make maps?
- Printed maps
 - Flood hazard boundary map, FHBM
 - Flood boundary floodway map, FBFM
 - Flood insurance rate map, FIRM
- Digital map products
 - scanned .tiff's
 - Q3
 - CAD FIRMs
 - DFIRM



<http://store.msc.fema.gov>



FEMA issued Flood Maps



Flood Insurance Studies (FIS)



DFIRM Databases



Q3 Digital Flood Data and Coastal Barrier Resource Area (CBRA) Q3 Data



Community Status Books (CSB)



Flood Map Status Information System (FMSIS)



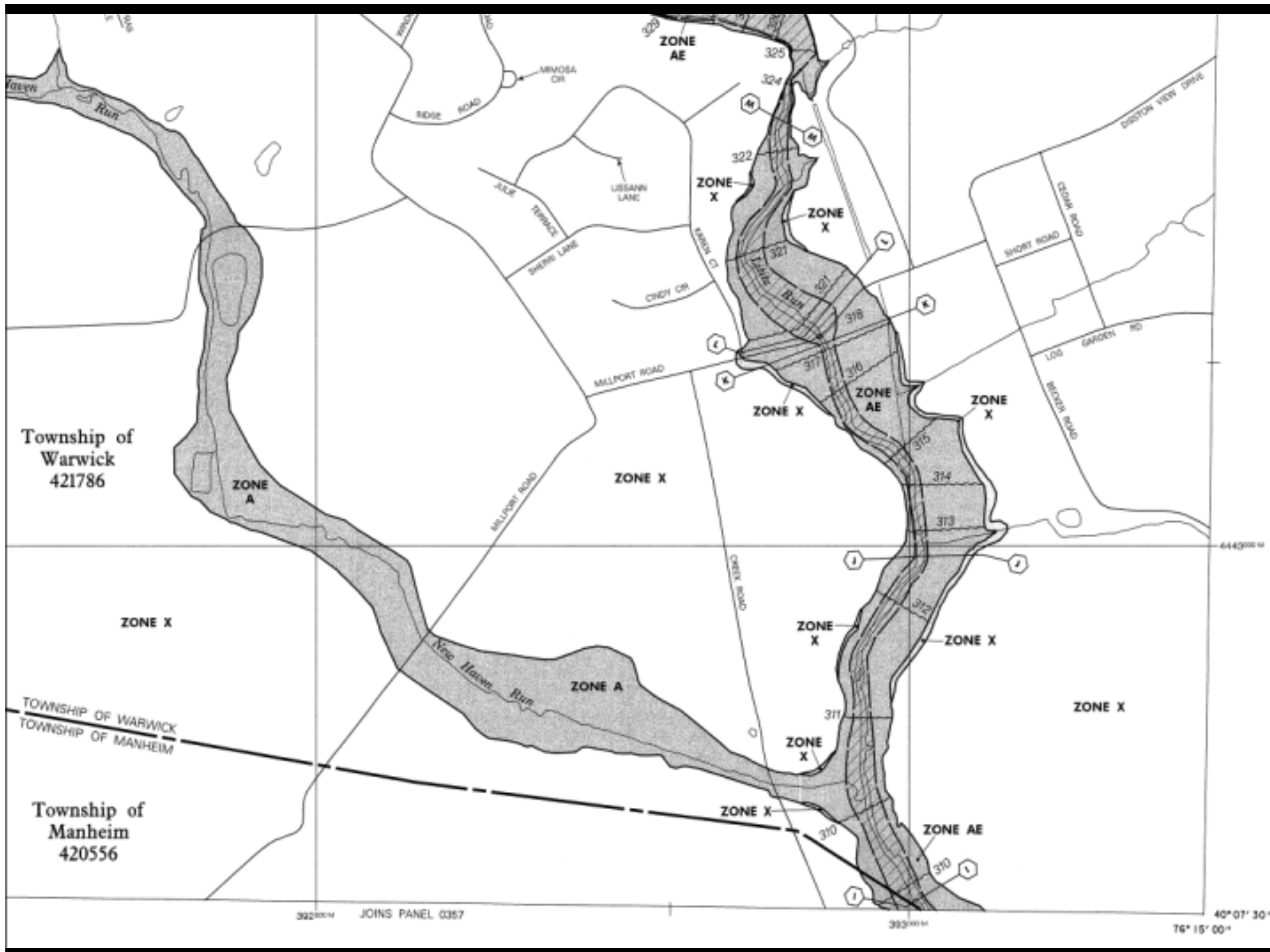
Letters of Map Change (LOMC)

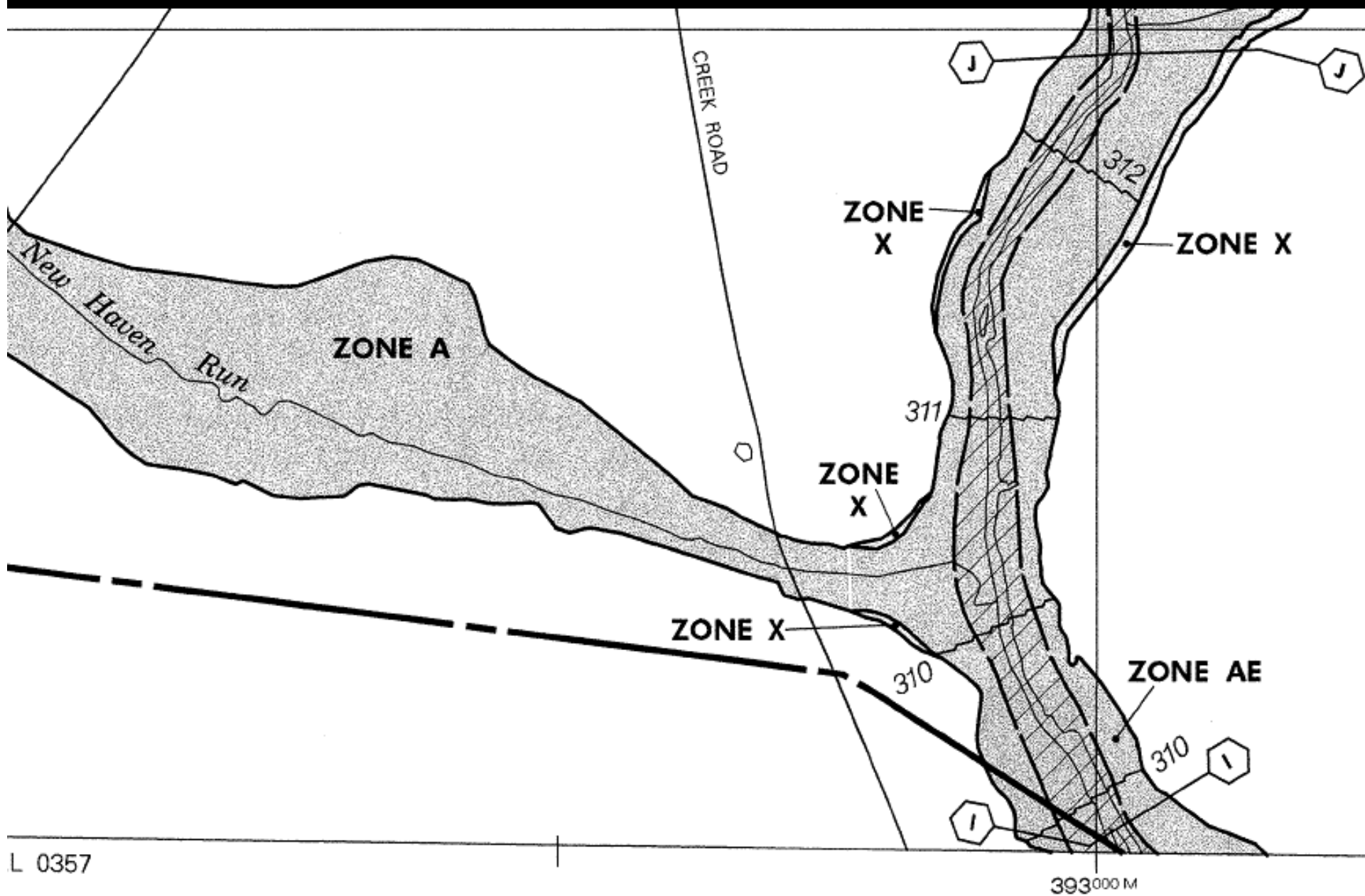


National Flood Insurance Manual (NFIP)



Documents





L 0357

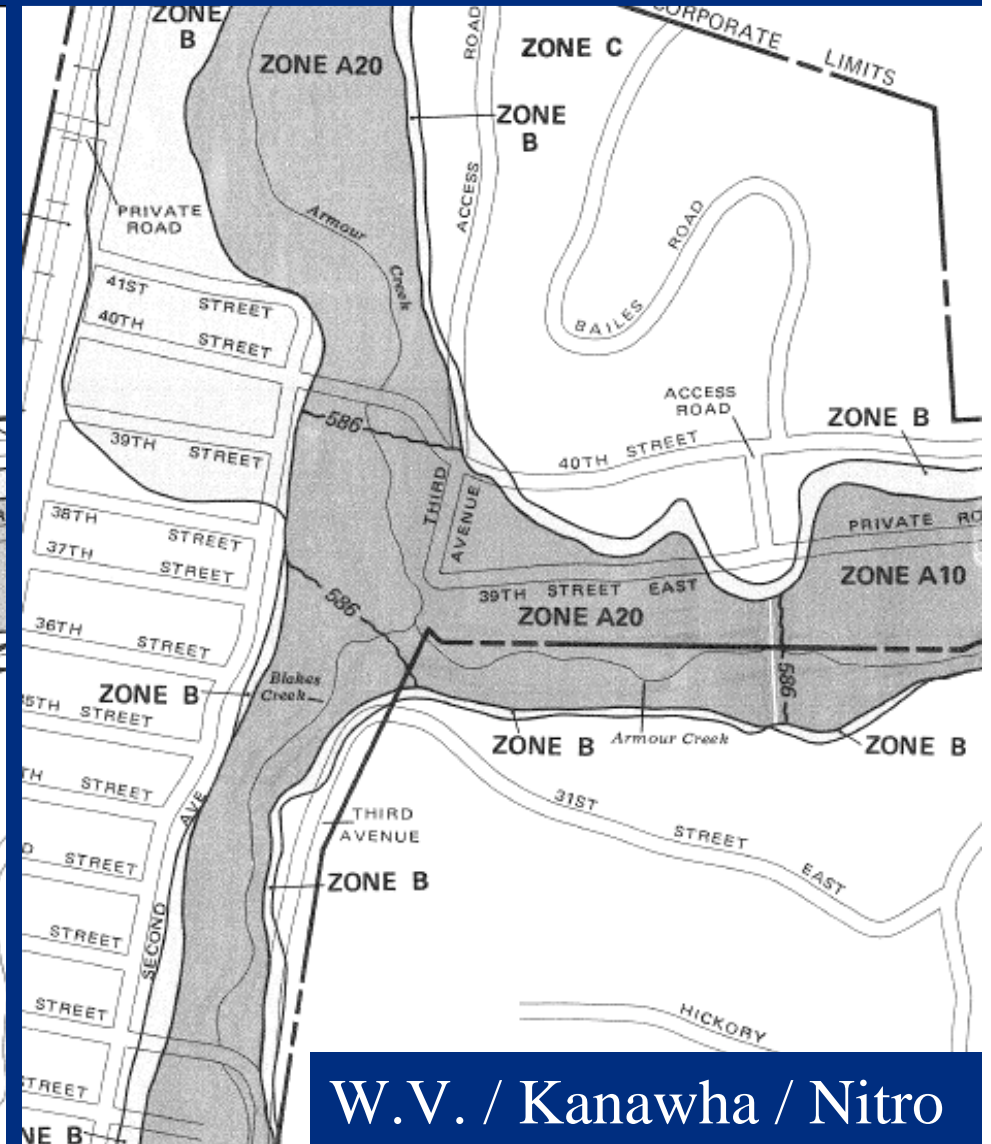
FBFM

Flood Boundary Floodway Map

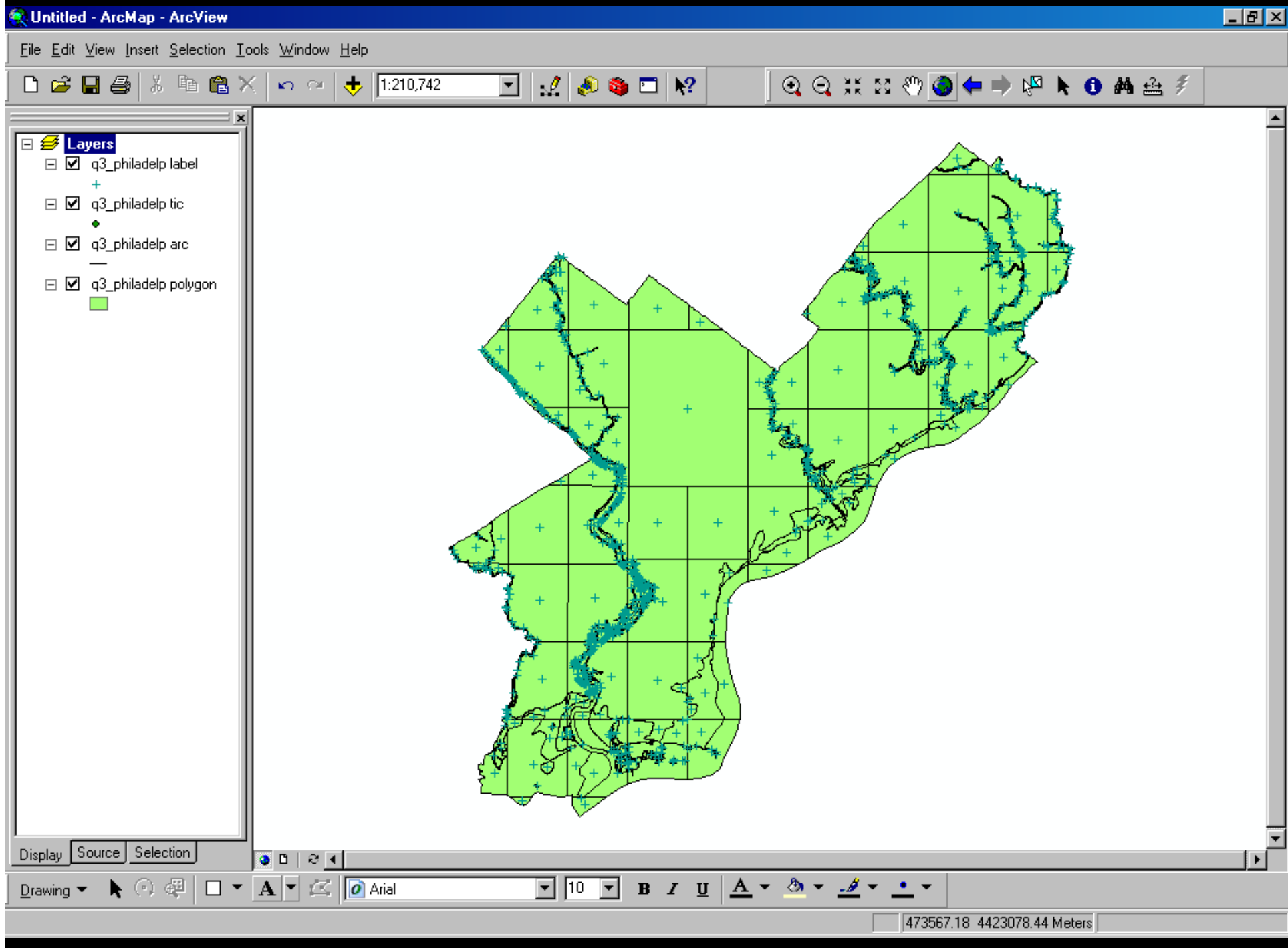


FIRM

Flood Insurance Rate Map



W.V. / Kanawha / Nitro



Maps and Map Products

Q3 vector files

- 1% and 0.2% annual chance floodplain areas, including Zone V areas, certain floodways, and zone designations
- Coastal Barrier Resources Act (COBRA) areas
- Political areas, including community identification number
- FIRM panel areas, including panel number and suffix
- 7.5-minute quadrangle areas
- Mappable Letters of Map Change (LOMCs)



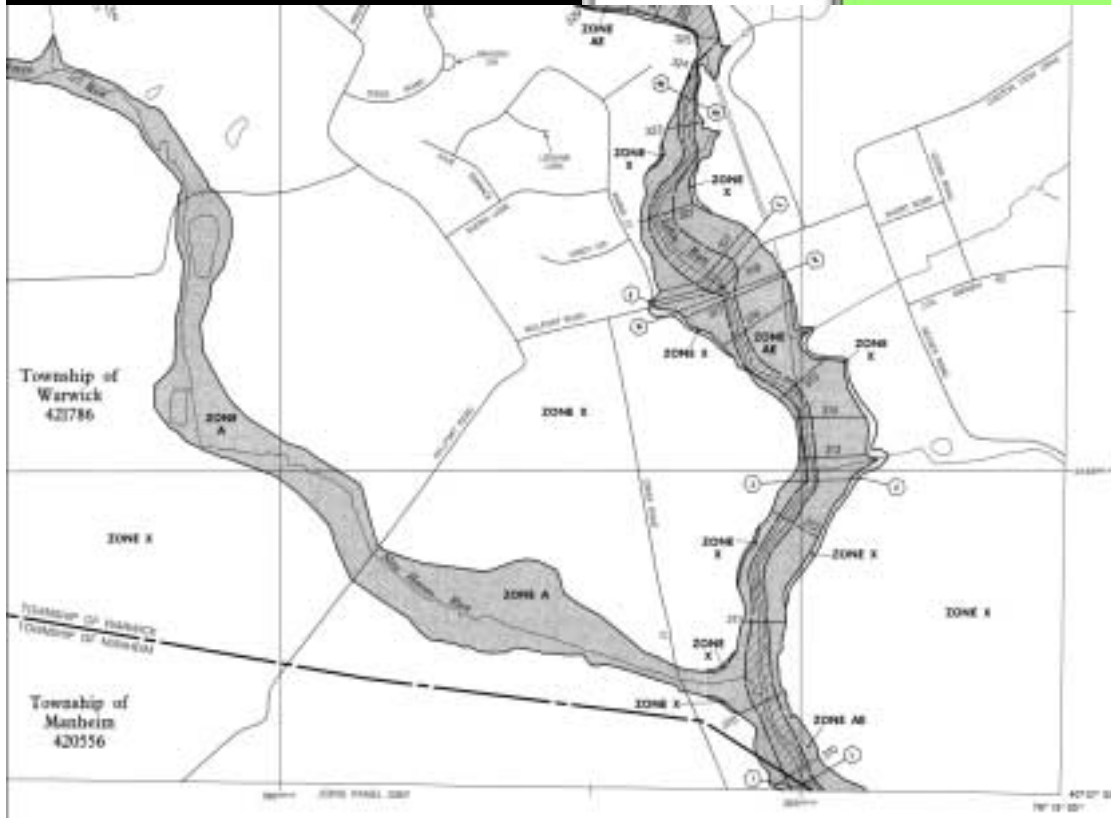
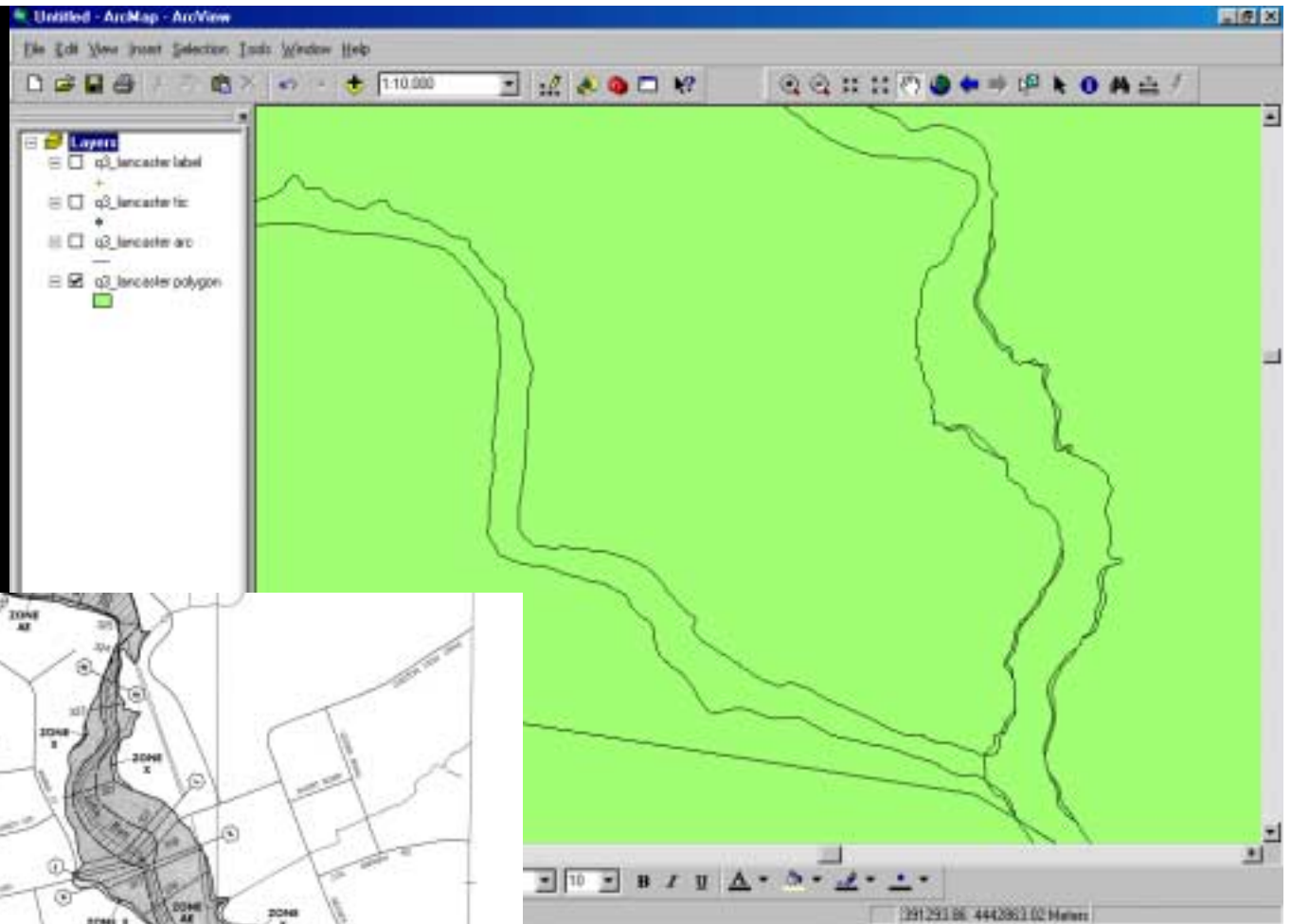
Maps and Map Products

Q3 vector files do not include:

- Base map data (streets, etc.)
- Base Flood Elevation lines and elevations
- Cross sections and letter identifiers
- Elevation reference marks and their elevations
- Floodways if not shown on the FIRM



Q3



Printed
DFIRM

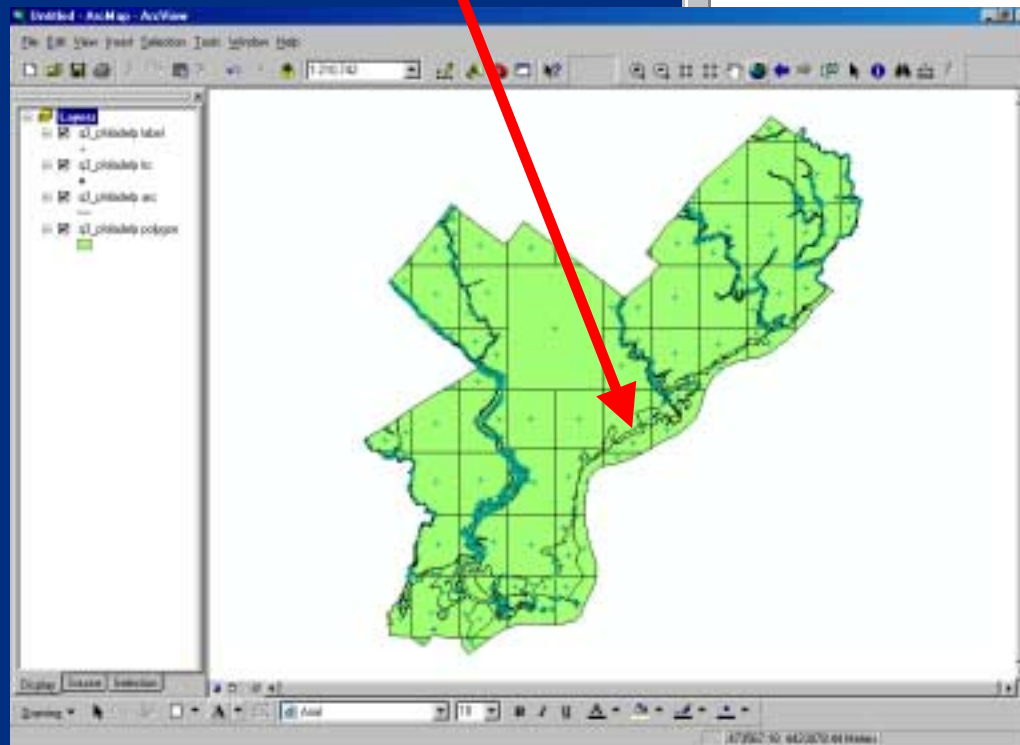
Identify Results

Layers: <Top-most layer>

[-] q3_philadelp polygon
[+] 42101

Location: (-75.098351 39.975180)

Field	Value
FID	557
Shape	Polygon
AREA	0.000219
PERIMETER	0.084000
Q3_PHILADELP#	557
Q3_PHILADELP-ID	556
FIPS	42101
COMMUNITY	0757
FIRM_PANEL	4207570201F
QUAD	39075-H1
ZONE	AE
FLOODWAY	
COBRA	COBRA_OUT
SFHA	IN
SYMBOL	4
PANEL_TYP	CBPP
ST-FIPS	42
CO-FIPS	101
STATE	42
PCOMM	0757
PANEL	0201F
LAT	39
LONG	075
QUAD_UNIT	H1



Maps and Map Products

Q3 problems and limitations:

- Don't have all features from the existing hardcopy FIRM
- Geo-referenced to 1:24,000 7½-minute USGS quads
- Designed for disaster response activities
- Suitable for planning activities, resource assessment
- Suitable for insurance marketing, mortgage portfolio review
- Limited applications for engineering
- Not suitable for absolute determination of SFHA
- Not for rating of flood insurance policies
- Almost certainly out of date (newer FIRM, LOMR)



Map
MODERNIZATION
Federal Emergency Management Agency

FEMA's Flood Hazard Mapping Program

**Guidelines and
Specifications**
for
**Flood Hazard
Mapping Partners**

*Appendix K: Format and Specifications
for Flood Insurance Rate Maps*



FEDERAL EMERGENCY MANAGEMENT AGENCY

www.fema.gov/fhm/di_cgs.shtml

April 2003

www.fema.gov/pdf/fhm/frm_gsak.pdf

Map
MODERNIZATION
Federal Emergency Management Agency

FEMA's Flood Hazard Mapping Program

**Guidelines and
Specifications**
for
**Flood Hazard
Mapping Partners**

*Appendix L: Guidance for Preparing
Draft Digital Data and DFIRM Databases*



FEDERAL EMERGENCY MANAGEMENT AGENCY

http://www.fema.gov/fhm/di_cgs.shtml

April 2003

www.fema.gov/pdf/fhm/frm_gsal.pdf

Index map overlays

Base_Index FIRM_Pan
Quad_Index

Political boundaries & PLSS

Pol_Ar PLSAr
Pol_Ln PLSLn

Other cartographic features

Trnsport_Ln Perm_Bmk
Wtr_Ln Water_Gage
Wtr_Ar Precip_Gage
Gen_Struct Riv_Mrk

Special Flood Hazard Areas

Fld_Haz_Ar LOMR
Fld_Haz_Ln

SFHA references

BFE XS
Label_Pt Label_Ld

H&H modeling elements

Nodes Ovrbnkln
Stn_Start Profil_Basln
Subbasins

Coastal stuff

CBRS Shore_Ln
PFD_Ln Cst_Gage
Cst_Tsct_Ln

Table: S_XS

Field	R/A	S/E	MS Access					ESRI Shapefile			ESRI Coverage				MapInfo		
			type	field size	dec	format	input mask	type	width	dec	type	item width	output width	dec	type	width	dec
XS_LN_ID	R	S	text	11				string	11		character	11	11		character	11	
XS_LTR	A	S	text	12				string	12		character	12	12		character	12	
START_ID	R	S	text	11				string	11		character	11	11		character	11	
STREAM_STN	R	S	text	12				string	12		character	12	12		character	12	
XS_LN_TYP	R	S	text	20				string	20		character	20	20		character	20	
WTR_NM	R	S	text	100				string	100		character	100	100		character	100	
WSEL_REG	R	S	number (double)	8	2			number	13	2	numeric	8	13	2	decimal	15	2
LEN_UNIT	R	S	text	20				string	20		character	20	20		character	20	
V_DATUM	R	S	text	6				string	6		character	6	6		character	6	
SOURCE_CIT	R	S	text	11				string	11		character	11	11		character	11	
BED_ELEV	R	E	number (double)	8	2			number	13	2	numeric	8	13	2	decimal	15	2
TOP_WIDTH	R	E	number (double)	8	2			number	13	2	numeric	8	13	2	decimal	15	2
XS_AREA	R	E	number (double)	8	2			number	13	2	numeric	8	13	2	decimal	15	2
AREA_UNIT	R	E	text	20				string	20		character	20	20		character	20	
VELOCITY	R	E	number (double)	8	2			number	13	2	numeric	8	13	2	decimal	15	2
VEL_UNIT	R	E	text	20				string	20		character	20	20		character	20	

Table: S_Fld_Haz_Ar

Field	R/A	S/E	MS Access					ESRI Shapefile			ESRI Coverage				Mapinfo			
			type	field size	dec	format	input mask	type	width	dec	type	item width	output width	dec	type	width	dec	
FLD_AR_ID	R	S	text	11				string	11		character	11	11		character	11		
FLD_ZONE	R	S	text	55				string	55		character	55	55		character	55		
FLOODWAY	A	S	text	30				string	30		character	30	30		character	30		
SFHA_TF	R	S	text	1				string	1		character	1	1		character	1		
STATIC_BFE	A	S	number (double)	8	2			number	13	2	ZONE_LID	FLD_ZONE						
V_DATUM	A	S	text	6				string	6		1000	A						
DEPTH	A	S	number (double)	8	2			number	13	2	1001	AE						
LEN_UNIT	A	S	text	20				string	20		1002	AH						
VELOCITY	A	S	number (double)	8	2			number	13	2	1003	AO						
VEL_UNIT	A	S	text	20				string	20		1004	AR						
AR_REVERT	A	S	text	6				string	6		1005	1 PCT ANNUAL CHANCE FLOOD						
BFE_REVERT	A	S	number (double)	8	2			number	13	2	1006	1 PCT FUTURE CONDITIONS						
DEP_REVERT	A	S	number (double)	8	2			number	13	2	1007	A99						
SOURCE_CIT	R	S	text	11				string	11		1008	V						
HYDRO_ID	A	E	text	11				string	11		1009	VE						
CST_MDL_ID	A	E	text	11				string	11		2000	0.2 PCT ANNUAL CHANCE FLOOD						
											2001	0.2 PCT ANNUAL CHANCE FLOOD						
											3000	AREA NOT INCLUDED						

ZONE_LID	FLD_ZONE
1000	A
1001	AE
1002	AH
1003	AO
1004	AR
1005	1 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL
1006	1 PCT FUTURE CONDITIONS
1007	A99
1008	V
1009	VE
2000	0.2 PCT ANNUAL CHANCE FLOOD HAZARD
2001	0.2 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL
3000	AREA NOT INCLUDED
4000	D

Table K-10. Base Map Features: Hydrographic

*Font specifications that cannot be matched may be approximated


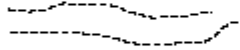
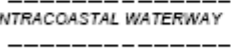






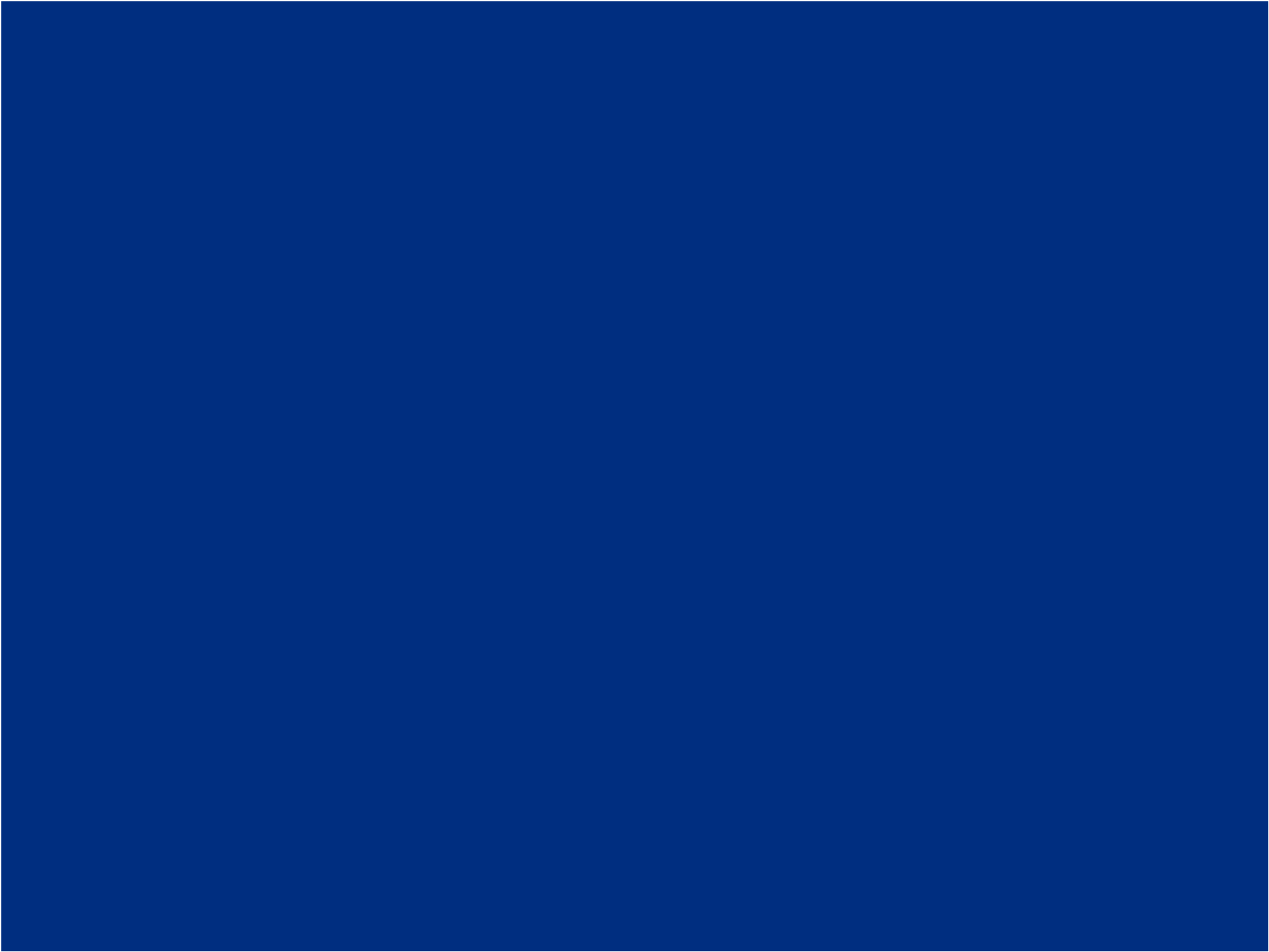
Example	Feature	Specification
	River, Stream, or Other Hydrographic Feature	(Orthophoto) Line weight .010" (Vector) Line weight .008"
Eighteen Mile Creek <i>Utah Lake</i>	Name of River, Stream, or Other Hydrographic Feature	7 – 24 Pt. Times New Roman CLC
<i>Unnamed Tributary</i> <i>Tributary No. 1</i>	Unnamed Stream, Unnamed Tributary Label	7 – 11 Pt. Times New Roman CLC
 <i>Century Wash</i>	Wash or Glacier and Name	Dash .050", space .010" 7 – 11 Pt. Times New Roman CLC (Orthophoto) Line weight .010" (Vector) Line weight .008"
 <i>INTRACOASTAL WATERWAY</i>	Intracoastal Waterway and Label	Line weight .010" Dash .070", space .020" 8 – 10 Pt. Arial Italic CAPS
<i>Canal</i> <i>Ditch</i> <i>Pond</i> <i>Wash</i> <i>Glacier</i> <i>Swamp</i> <i>Marsh</i> <i>Cranberry Bog</i>	Unnamed Hydrographic Feature Label	8 Pt. Arial Italics CLC

Table K-16. Standard Flood Hazard Features and Notes

*Font specifications that cannot be matched may be approximated

Example	Feature/Usage	Specification
(Orthophoto)  (Vector) 	1% annual chance Flood Hazard Area (Zones A, AE, AO, AH, AR, A99, V, and VE)	(Orthophoto) Area fill pattern Dot Diameter .020" Spacing .030" Offset between rows .025" Color: Cyan (Vector) 50% 133 lines-per-inch screen tint or equivalent area fill pattern
(Orthophoto)  (Vector) 	1% annual chance Flood Hazard Boundary Line	(Orthophoto) Line weight .020" Color: Cyan (Vector) Line weight .015"
LIMIT OF STUDY LIMIT OF DETAILED STUDY	The Limit of Study note is used to identify the truncated terminus of a 1% annual chance floodplain of a stream or backwater area that has not been independently studied by detailed analyses (e.g., no flood profile is associated with this location). The Limit of Detailed Study note is used to identify the terminus of a 1% annual chance floodplain of a stream that has been studied by detailed methods. The stream name may also be added to this note for clarity.	(Label) 8 Pt. Arial CAPS
(Orthophoto)  (Vector) 	The Limit of Study/Limit of Detailed Study line is used to indicate the terminus of a 1% annual chance floodplain of a stream or backwater area that has not been independently studied by detailed analyses or of a stream that has been studied by detailed methods.	(Line - Orthophoto) Line weight .004" Color: Cyan (Line - Vector) Line weight .004" - .006" Color: Black



Planning Map Modernization

The lead up to Map Modernization

- Nationwide, approximately 75 percent of the FEMA flood maps are more than 10 years old. (2002)
- Most of the maps were produced using antiquated manual cartographic techniques.
- The primary reason for the existing backlog of outdated maps has been inadequate program funding.



Planning Map Modernization

Initial Proposals for Map Modernization

- Convert the maps to a digital format
- Upgrade existing digitally produced map panels to the new digital FIRM specifications
- When feasible, cost-effectively enhance the flood theme (e.g., redelineation, or limited detailed studies to update approximate flood zones)
- Incorporate updated detailed flood data through studies and restudies



Planning Map Modernization

Initial Proposals for Map Modernization

- Create flood maps for communities without maps
- Integrate communities, States, and regional agencies into the mapping process (CTP)
- Convert to metric and to the North American Vertical Datum of 1988
- Make the maps easier to obtain and use, including electronic and digital printing and distribution



Planning Map Modernization

The SOO for Map Modernization, April 2003

1. Establish and maintain a premier flood-hazard data collection and delivery system
2. Build and maintain mutually beneficial partnerships
3. Achieve effective program management
4. Expand and better inform the user community



Planning Map Modernization

Objective 1: Establish and maintain a premier flood-hazard data collection and delivery system

FEMA will create a state-of-the-art, geospatial system that collects and maintains the best data available, integrates it into a national flood-layer theme, and provides easy access to reliable flood-hazard data and other information to support risk management applications and operations.

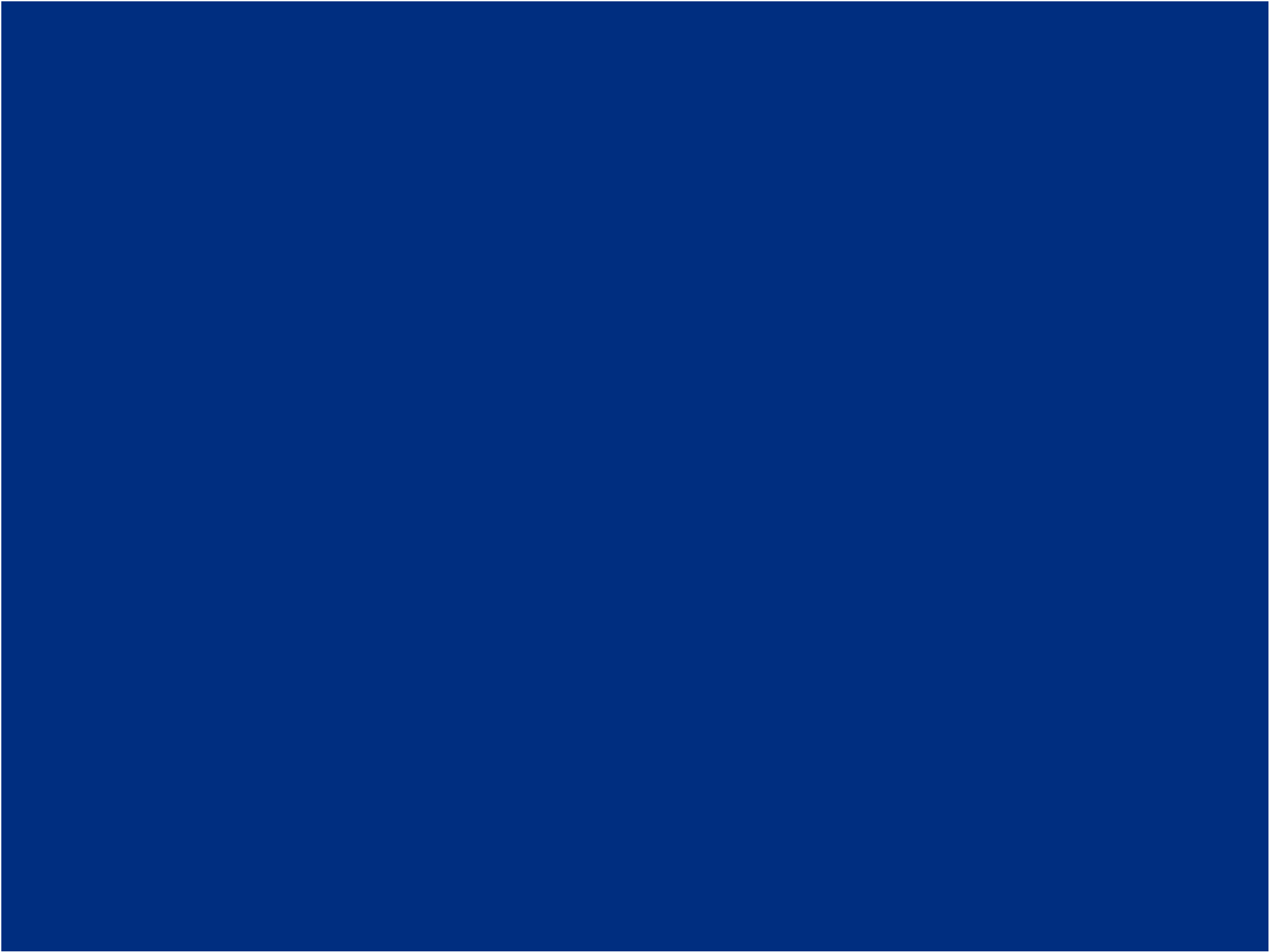


Planning Map Modernization

Objective 2: Build and maintain mutually beneficial partnerships

- Cooperating Technical Partners
 - Cooperating Technical Communities
 - Integrate local groups into the mapping process
 - Funded and unfunded
 - Cities, counties, states
 - Regional planning commissions, universities
- Map Modernization Management Support, MMMS





“NSP”, “Map Mod Team”, “MOD”

Michael Baker Jr. — Program Mgmt, Engg., Mapping, Outreach, Communication

IBM — Program Mgmt, Business Mgmt, Enterprise Architecture, IT, Training

Watershed Concepts — Engineering, Mapping, IT, Regional Support, WISE

Harvard Design & Mapping (HDM) — Multi-hazard GIS apps., QC/QA

SAIC — QA, Risk Communication, Public Outreach, Technological Hazards

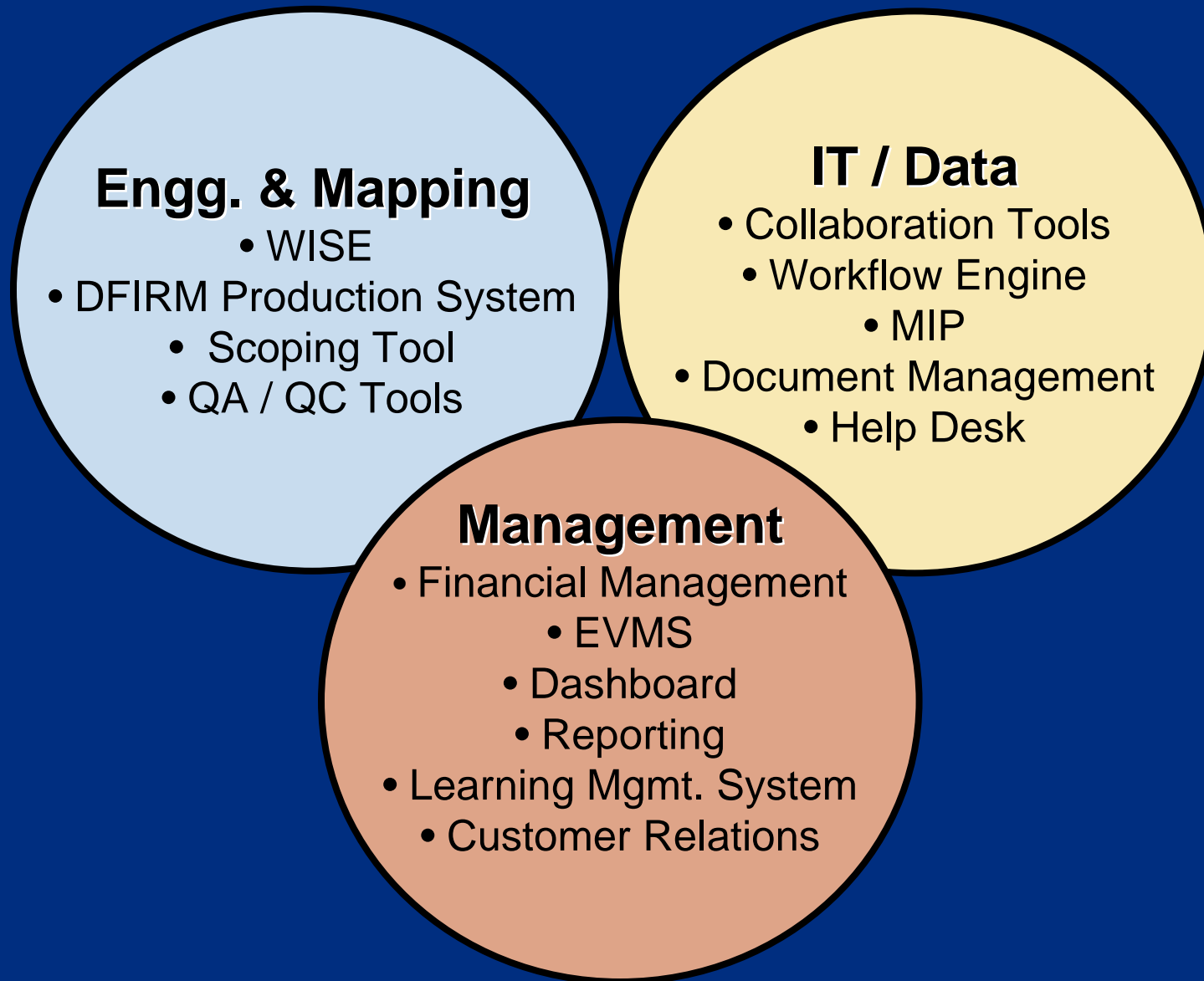
BAE Systems — Enterprise Geospatial, Data Mgmt/Development, LIDAR

Black & Veatch — Engineering, Project Management, Regional Support

ESRI — IT Application Development, GIS, DFIRM Production

S&DBE — NFIP Compliance, Flood Engg., Building Sciences, Library Services

The MOD Solution



Multihazard Information Platform

[Home](#) | [Map Modernization](#) | [News & Events](#) | [Tools & Links](#) | [Learning](#) | [Map Viewer](#)

Tips and Tutorials

- » [How to Read a Flood Map](#)
- » [Read a Flood Insurance Study](#)
- » [Become a Cooperating Technical Partner](#)

[More Tips and Tutorials](#)

Tools For Professionals

- » [DFIRM Production Tools](#)
- » [WISE \(includes Scoping Tools\)](#)

[More Tools](#)

Questions?

For General Support of this website and tools, contact a Technical Support Specialist by calling 1-877-FEMA-MAP (1-877-336-2627) and then select Option 3 or via [email](#).

For questions related to Flood Hazard Mapping, contact a Map Specialist by calling 1-877-FEMA-MAP or via [email](#).

your source for hazard info

Multi-Hazard Flood Map Modernization is a powerful tool for multi-hazard risk management. [Learn More](#)

- » [Program FAQs](#)
- » [National Program Metrics](#)

News and Highlights

- » [DFIRM Production Tools Now Online!](#)
- » [Expanded WISE Modules Available](#)

[More News and Highlights](#)

Upcoming Events

- » **Apr 24 - Apr 27** - North Carolina Association of Floodplain Managers Conference - Boone, NC
- » **May 5 - May 6** - ASFPM Spring Meeting - Safford, AZ
- » **May 9 - May 13** - Annual Florida Governor's Hurricane Conference - Tampa, FL

[More Events](#)

Grant Opportunities



To help communities prepare for and respond to disasters, FEMA has three mitigation grant programs: the Hazards Mitigation Grant Program, the Pre-Disaster Mitigation program, and the Flood Mitigation Assistance program.

[More Grant Opportunities](#)

Map Viewer

Street

City

State

ZIP Code

[Create Map](#)[» Proceed to Map Viewer](#)

Contact Center

- » [Contact Center Main Page](#)
- » [Application Assistance](#)
- » [Flood Map Knowledge \(MSC\)](#)
- » [Community Information](#)
- » [FAQ's](#)

MIP WISE Tools

Watershed Information System

Scoping Module — collects data and helps with prioritization

Terrain Module — imports terrain data, allows edits and error correction, creates hydrologically correct DEMs

Hydrology — delineates basins, calculates time of concentration, generates hydrographs, preprocesses data

Hydraulics — integrates data to build hydraulic models, interfaces with HEC-RAS, maps floodplain boundaries



MIP DFIRM Production Tools

Release 2.1.1, May 2005

Job Tracking Extension — workflow manager

GeoPop Pro — helps create Appendix L compliant GIS data

Workmap Pro — prints engineering work maps

GIS Data ReViewer — QA/QC tools and validation checks

Label-EZ — reads DFIRM database and auto places labels

Label-Edit — edit the labels placed by Label-EZ

Map Production Pro — plots maps to FEMA specifications

DFIRM Annotation Tool — text notes that are not from DB

Digital FIRM Index Tool Pro — creates index sheets



Implementing Map Modernization

Key Performance Indicators

Key Performance Indicators	Targets					
	FY04	FY05	FY06	FY07	FY08	FY09
% of population with digital GIS flood data available on-line	20%	50%	65%	75%	85%	97%
% of population with adopted maps that meet quality standards	10%	20%	35%	50%	70%	90%
Leveraged digital GIS flood data	20%	20%	20%	20%	20%	20%
% of appropriated funds sent to CTPs	20%	25%	33% *	33% *	33% *	33% *



FEMA

Map Modernization in Region III

Mid-Atlantic Chapter of URISA

May 11, 2005



FEMA

Map Modernization in Region III

Region III objectives

- Digital coverage of our entire region
- Redelineate SFHA when improved data is available
- Repair flood studies where required
- Broaden the base of NFIP knowledge
- CTP strategy
 - states
 - multi-jurisdictional partners
- Move to an E-system for flood hazard information



Map Modernization in Region III

Minor Adjustment #1



Two Mile Creek - Redelineation Example #2



Map Modernization in Region III

DFIRM projects initiated

Fiscal Year

Pre-03 (45-45-285)

2003

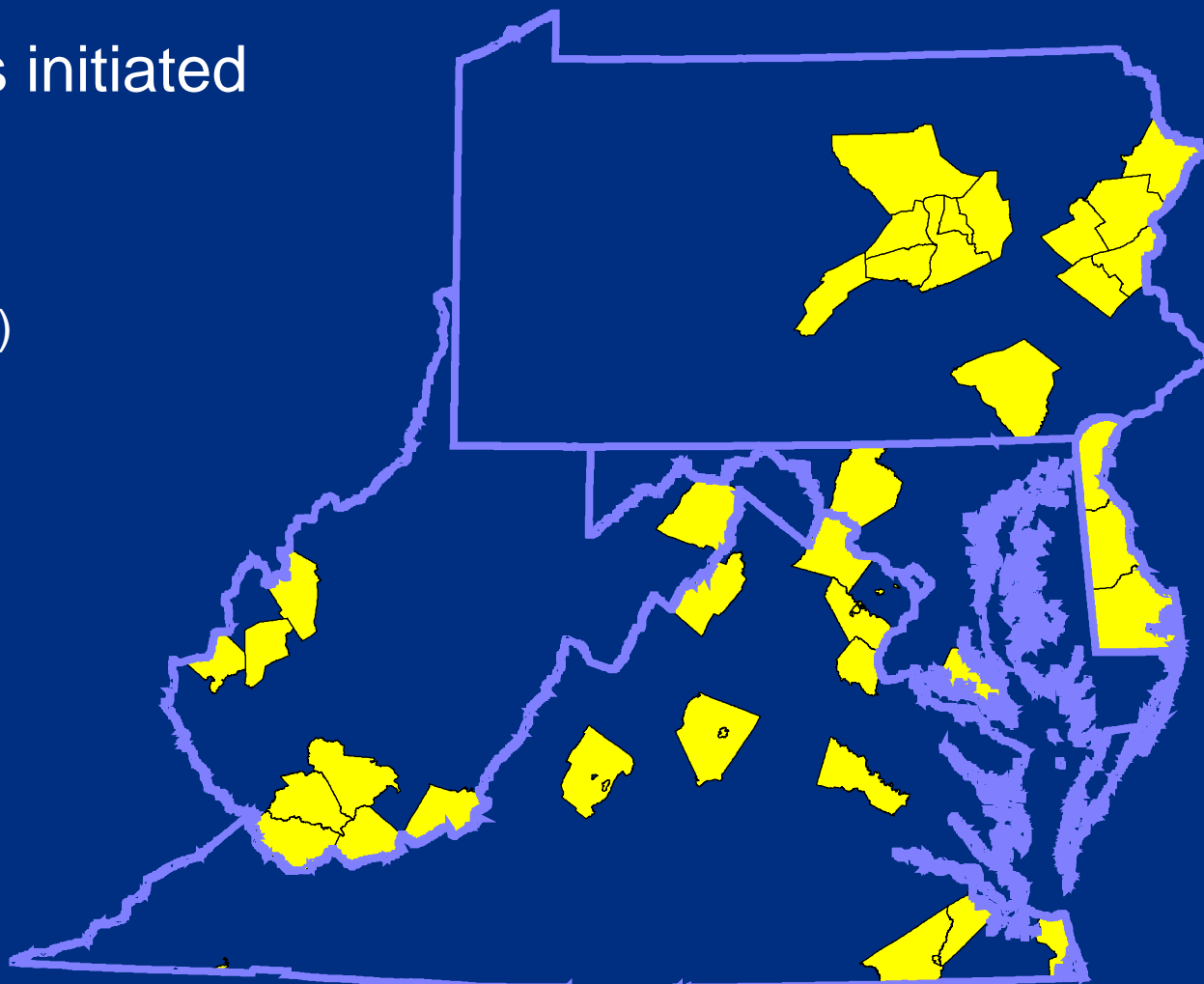
2004

2005

2006

2007

2008



FEMA

Map Modernization in Region III

DFIRM projects initiated

Fiscal Year

Pre-03 (45-45-285)

2003 (31-76-285)

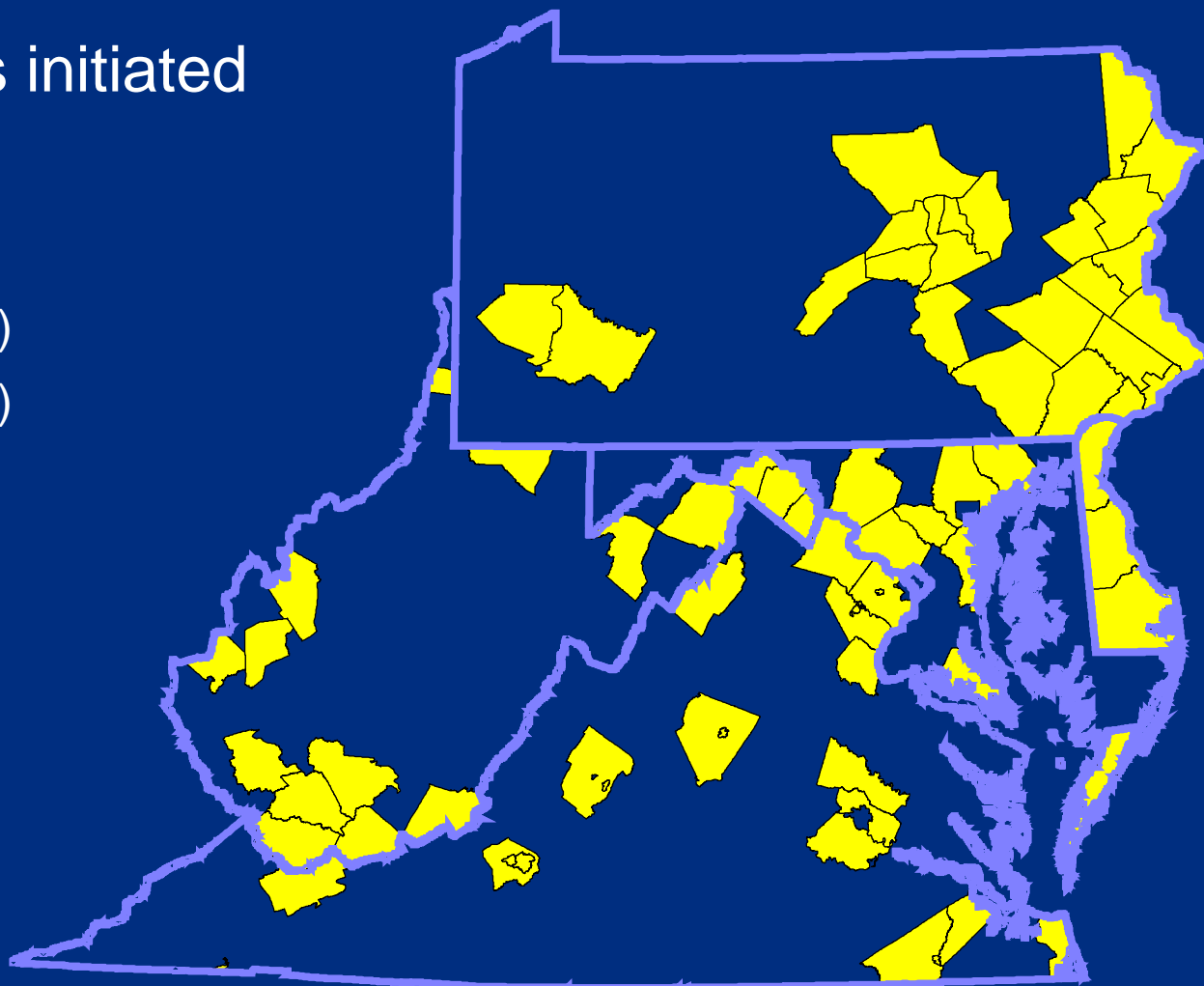
2004

2005

2006

2007

2008



FEMA

Map Modernization in Region III

DFIRM projects initiated

Fiscal Year

Pre-03 (45-45-285)

2003 (31-76-285)

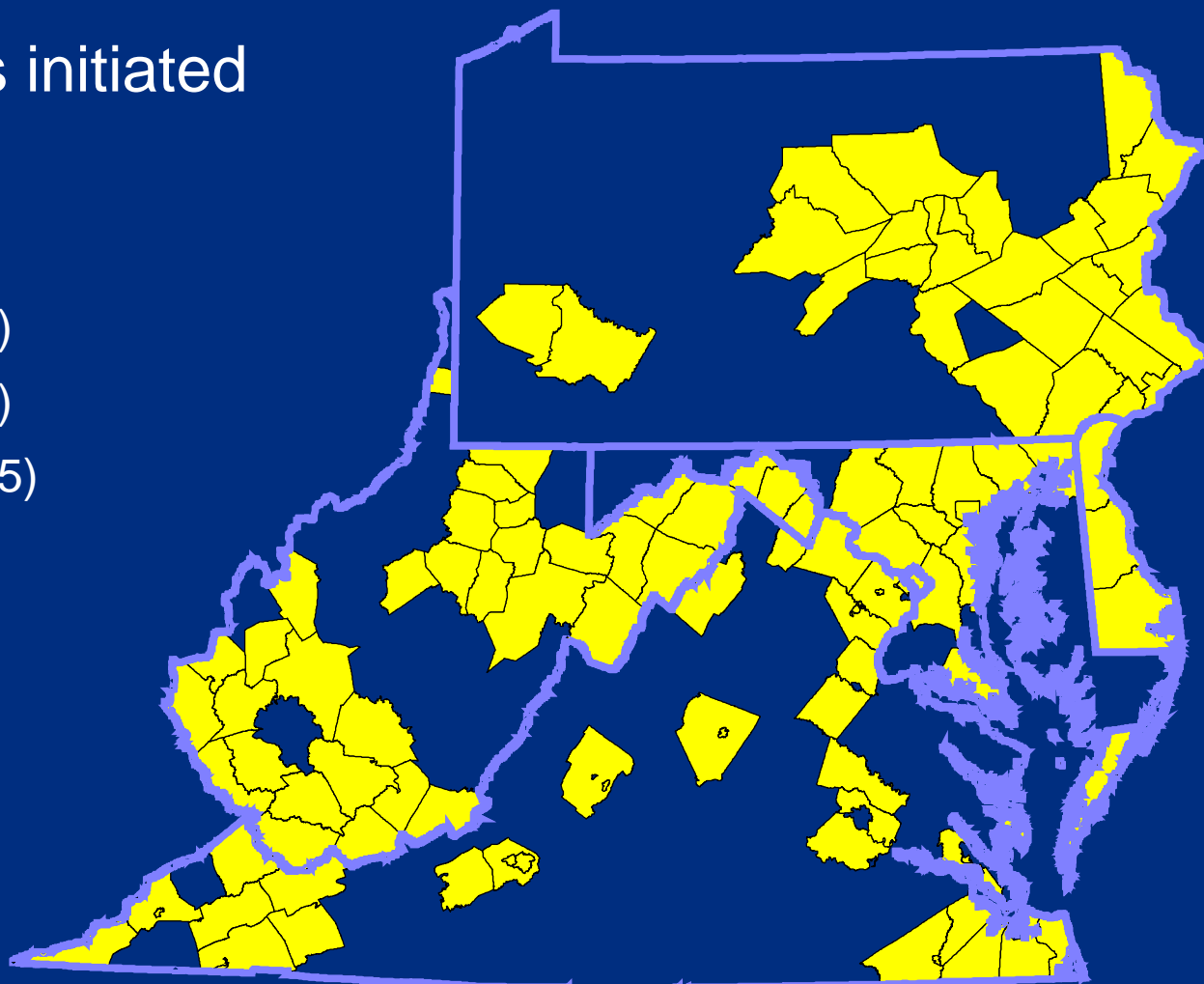
2004 (44-120-285)

2005

2006

2007

2008



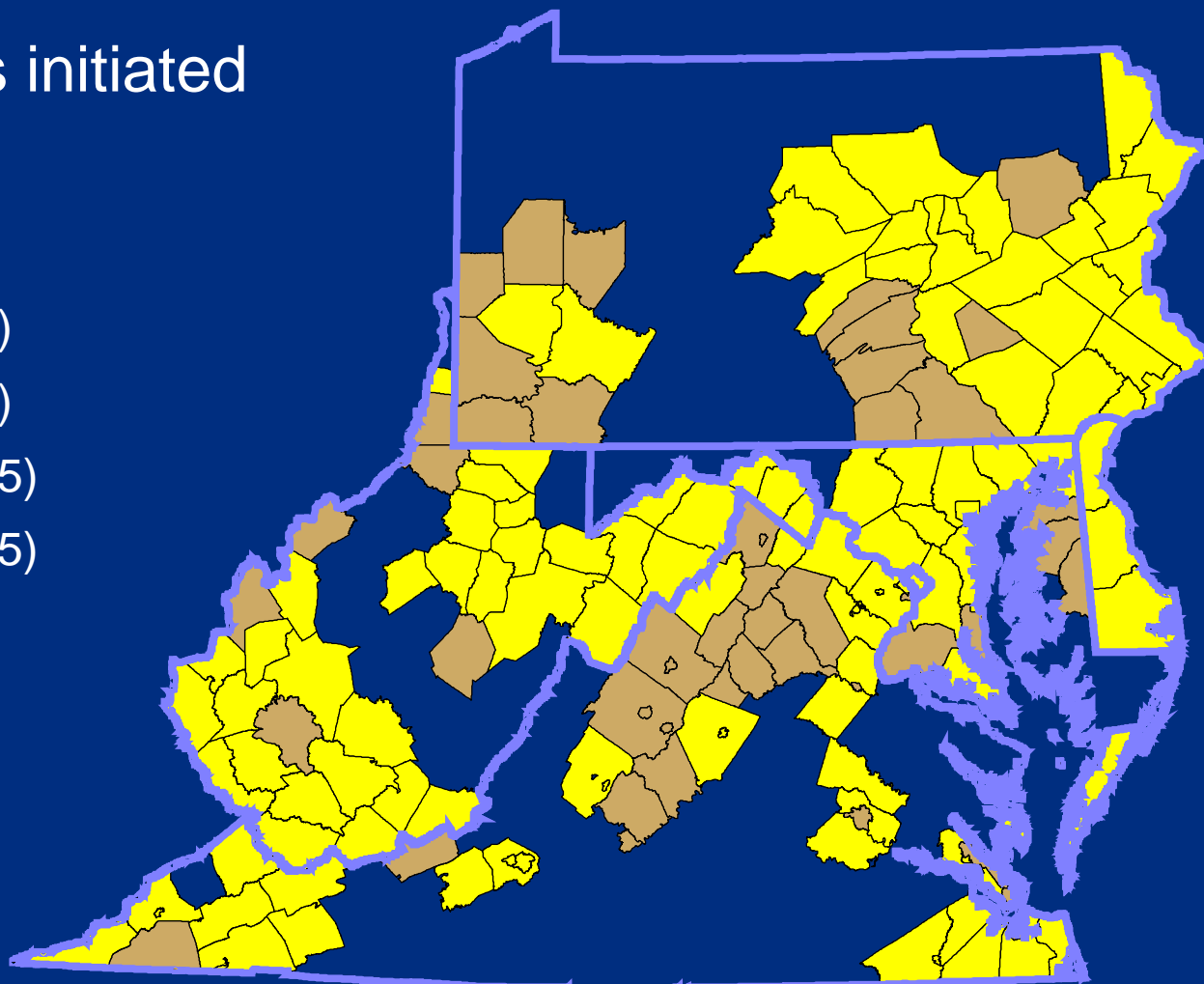
FEMA

Map Modernization in Region III

DFIRM projects initiated

Fiscal Year

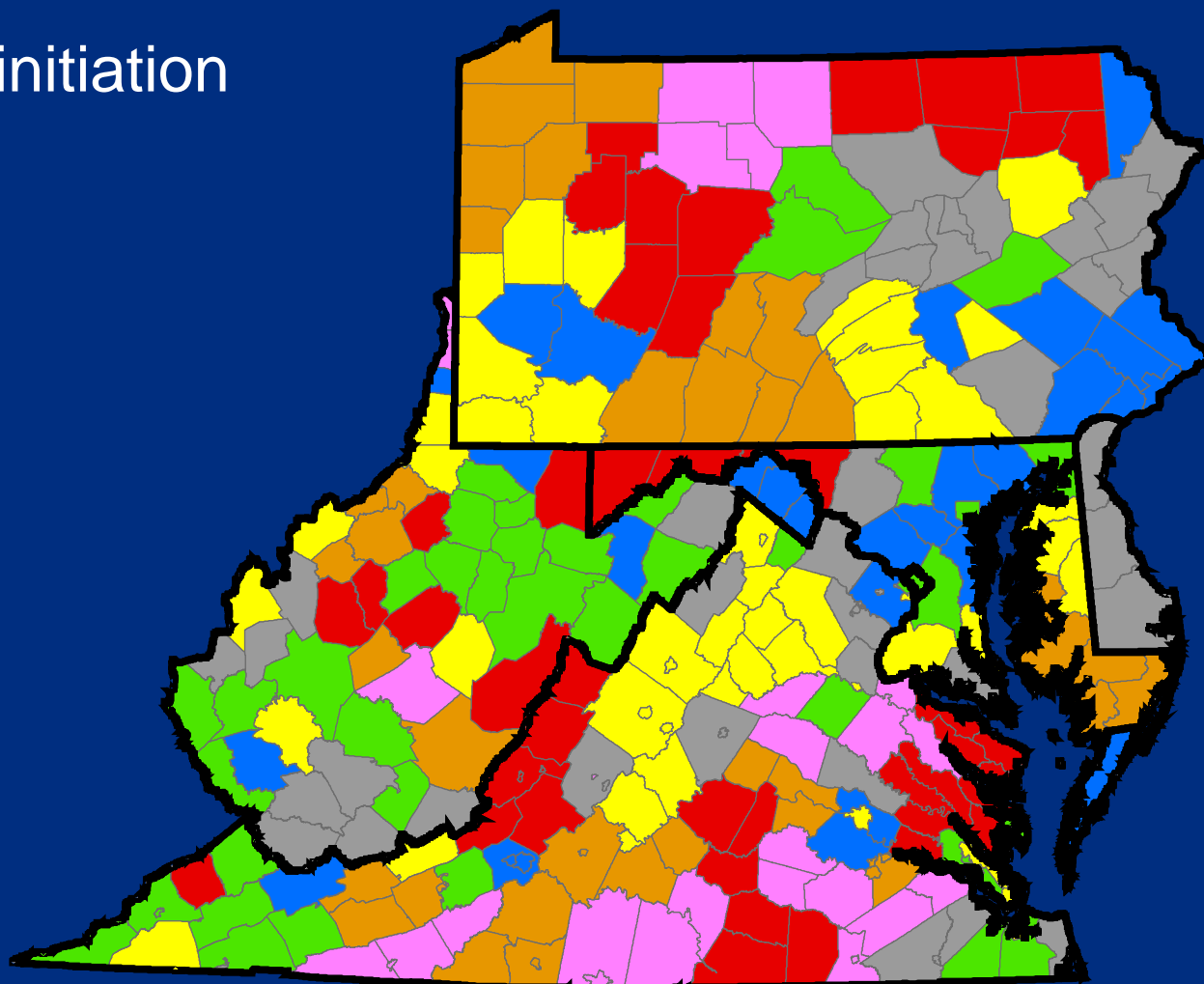
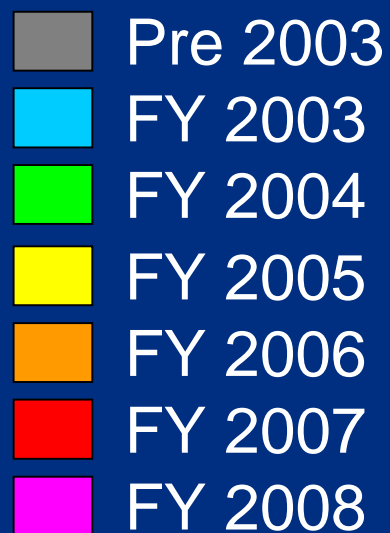
Pre-03	(45-45-285)
2003	(31-76-285)
2004	(44-120-285)
2005	(50-170-285)
2006	(42)
2007	(45)
2008	(28)



FEMA

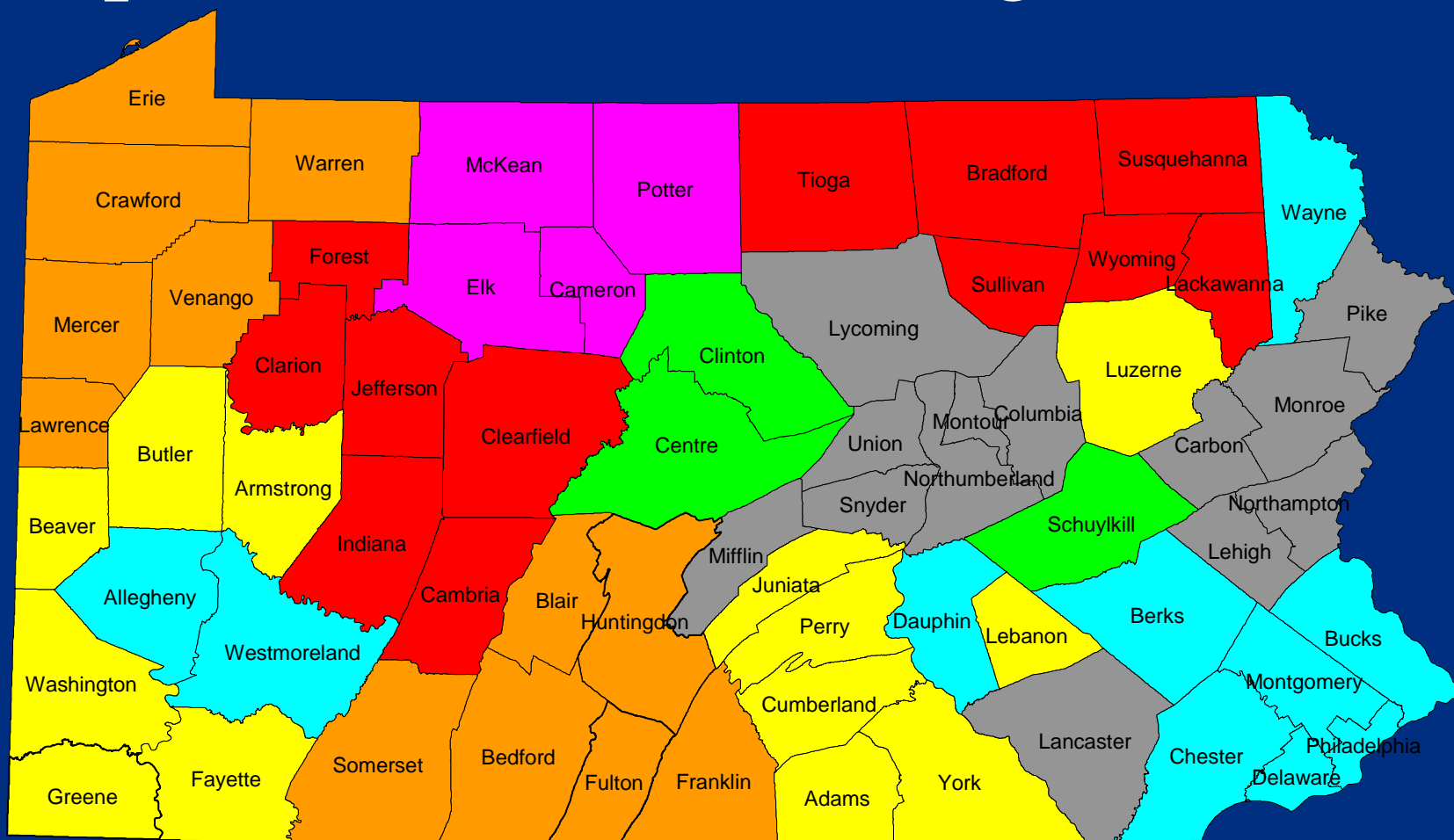
Map Modernization in Region III

DFIRM project initiation



FEMA

Map Modernization in Region III



FEMA



Pre 2003

FY 2003

FY 2004



FY 2005

FY 2006



FY 2007

FY 2008



FEMA