

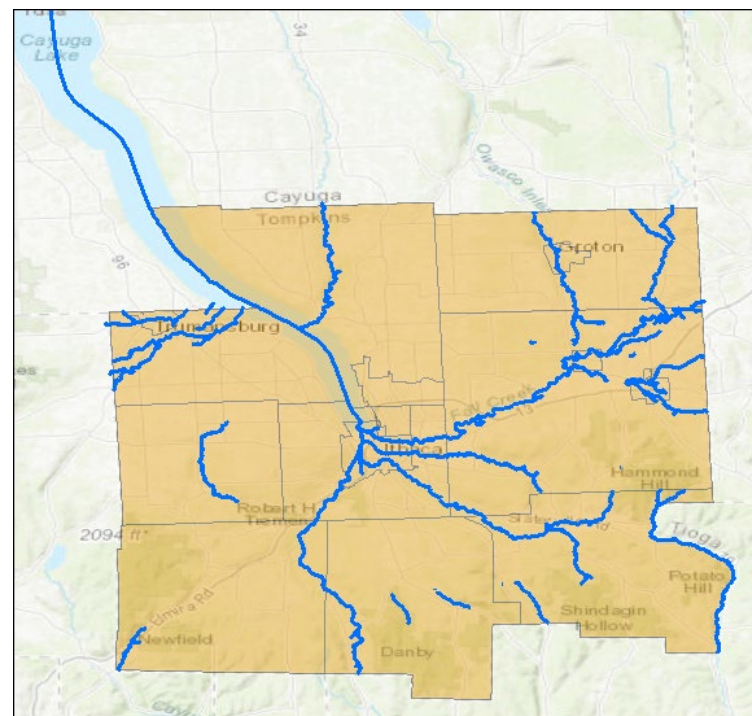


Flood Risk Project

Tompkins County, New York
Project Kick Off Meeting
March 13, 2019



FEMA



Please Introduce Yourself



- ▶ **Name**
- ▶ **Role**
- ▶ **Organization**

As partners with FEMA, it's important we create dialogue about your needs for flood risk information.

Also, what do you hope to gain from our meeting today?



Please sign in!



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Today's Goals

1

The value of updated flood maps for your community

2

Recap of Flood Risk Study history, including Discovery and Seneca Watershed study

3

Review county-wide study scope, products and outreach process

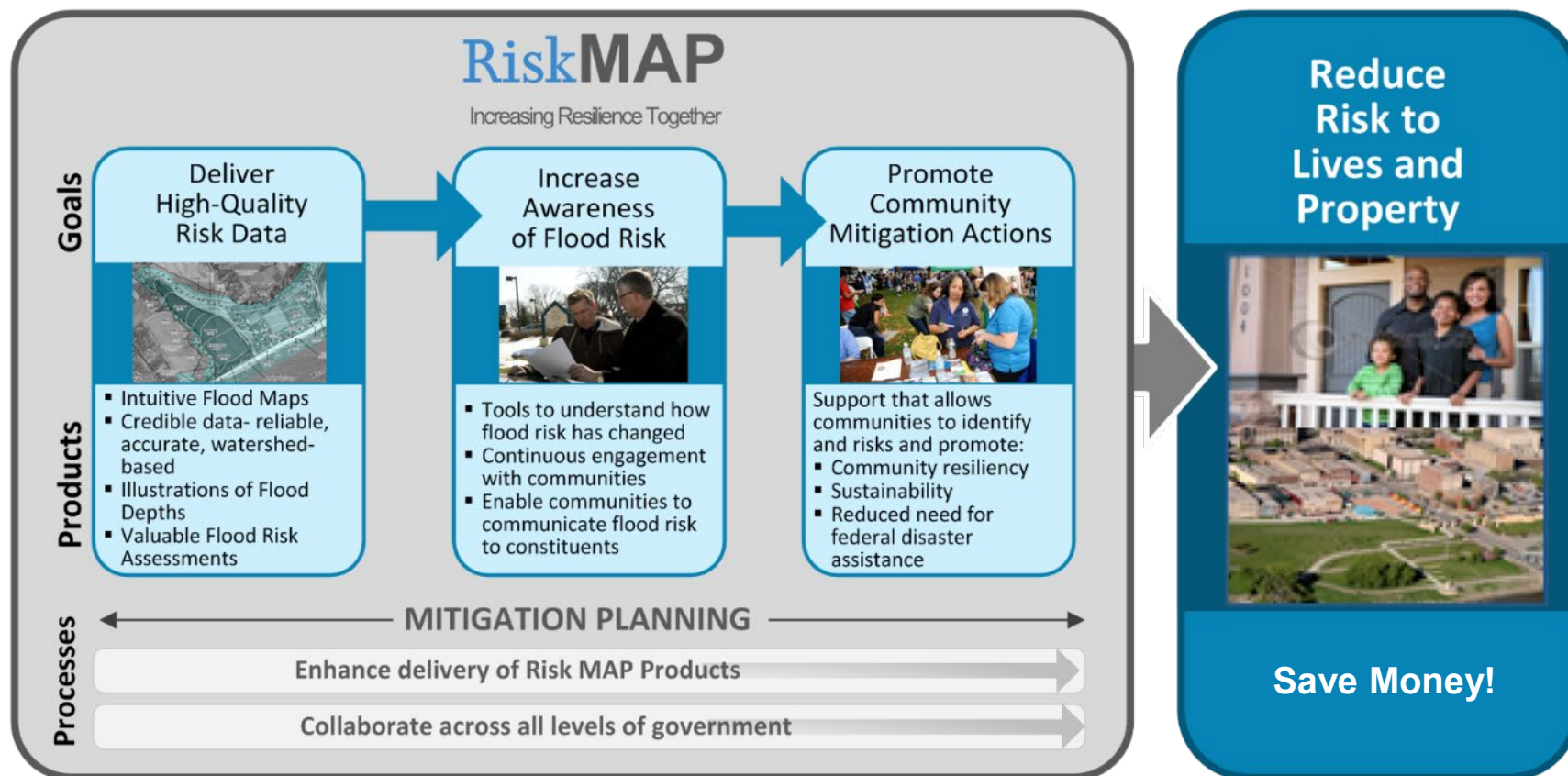


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FEMA Mitigation Division

Risk Analysis Branch

Goal: Stronger and Safer Communities



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The Value of Updated Flood Maps for Local Communities

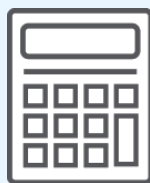


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Flood Maps Guide Progress By:



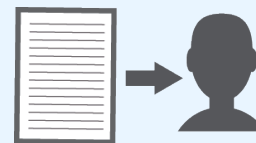
**Identifying
and
Assessing
Flood Risk**



**Establishing
Flood
Insurance
Rates**



**Determining
Local Land
Use**



**Informing
Engineers
and
Developers**



**Equipping
Emergency
Managers**

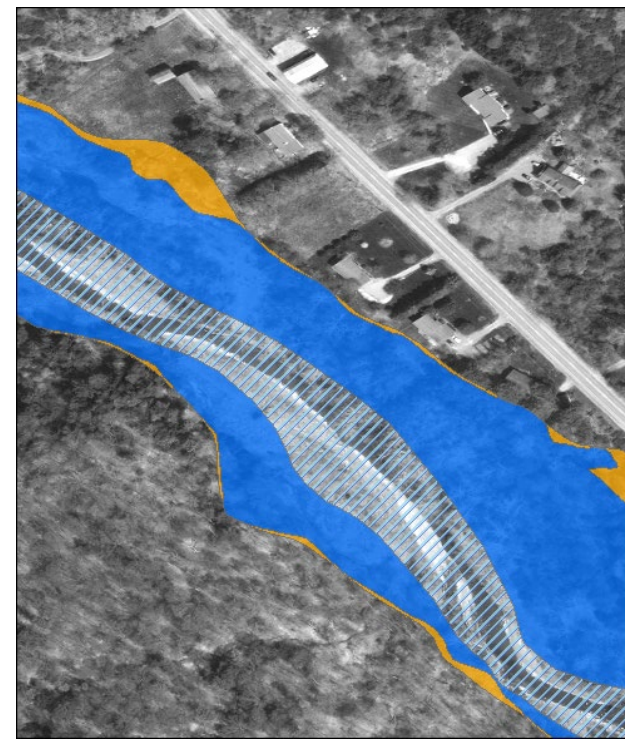
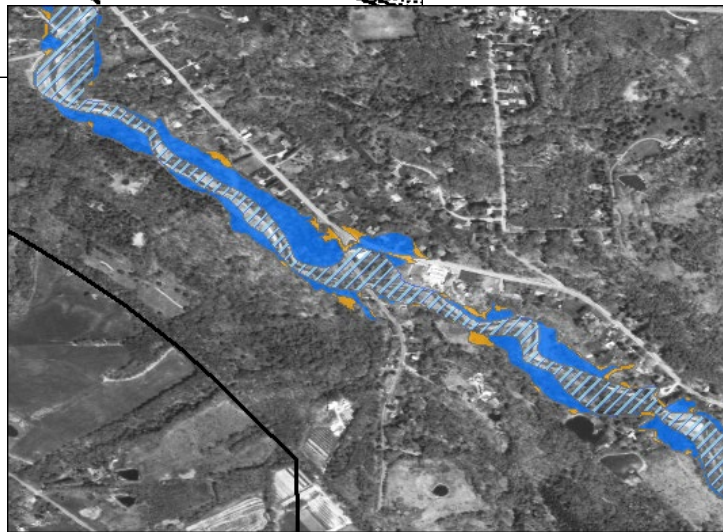


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Why Update Flood Maps?



Older maps done in 1980-1985
Digital data



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How did we get here?

Review past activities



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Discovery/Post-Discovery Process *Recap*

- ▶ Discovery Meetings held January 2014 and Discovery completed 2016
- ▶ Work maps shared and FEMA reviewed local community input to determine needs in April 2018
- ▶ First countywide issuance – will combine current studies with Compass Studies for countywide issuance



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What is being studied now?

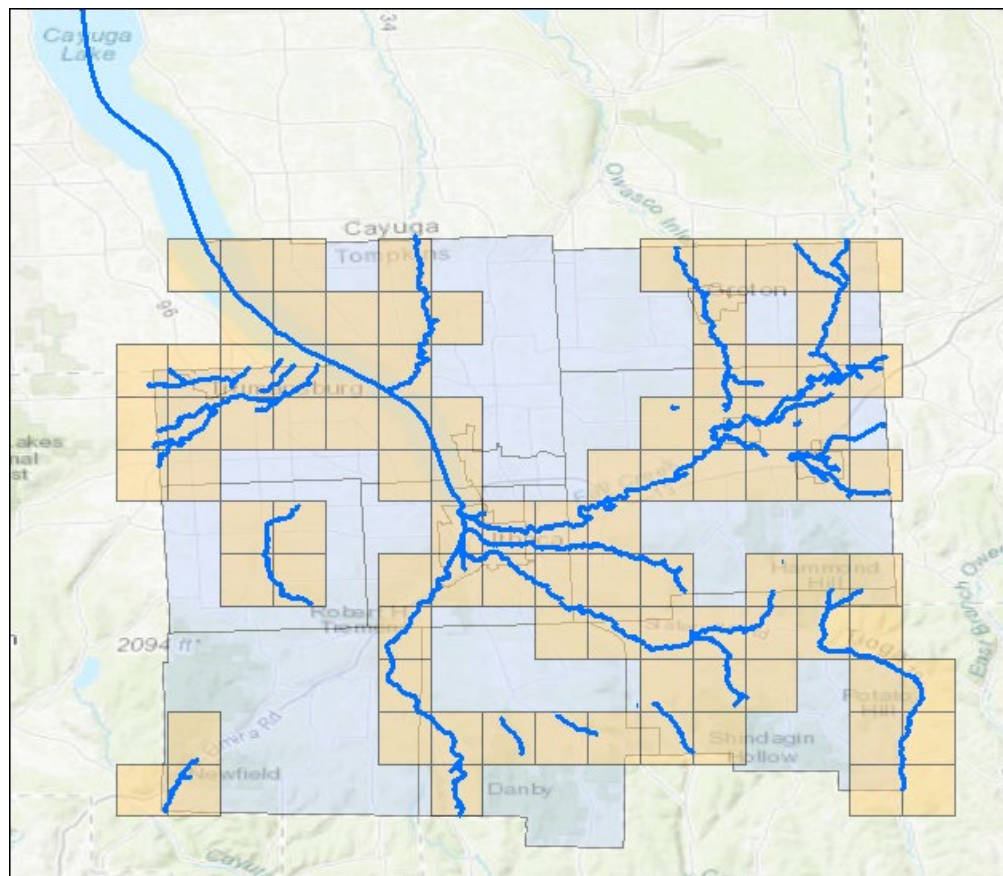
Discuss scope of new study



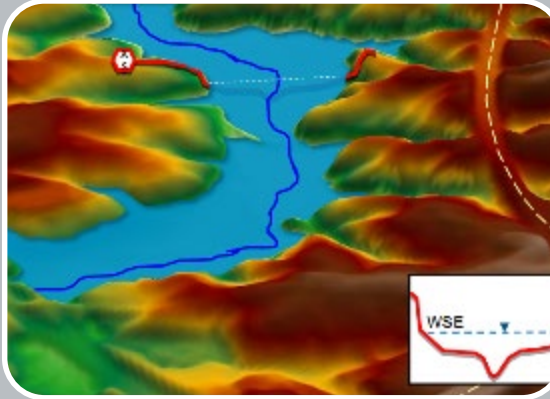
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Tompkins County, Countywide Flood Risk Study - Scope

- First time digital countywide maps
- Flooding sources analyzed:
 - Cayuga Lake - 38.1 miles
 - Detailed (AE) studies 13 streams, 49.8 miles
 - Approximate (A) studies Multiple streams, 32.3 miles
- 95 map panels (all 6K panels)
- 16 communities
- Combination of STARR II and Compass Studies



Flood Risk Study Analysis



Hydrology

Volume of water?

When will storm water or runoff make it to the stream?

Hydraulics

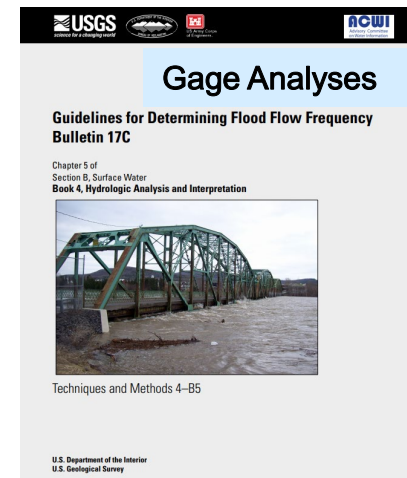
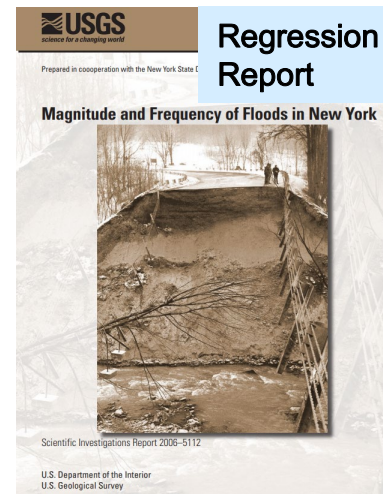
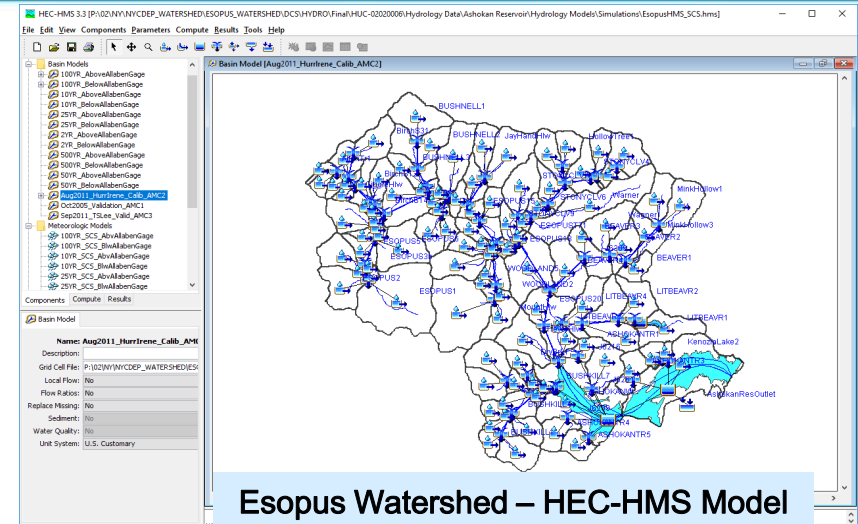
Will the stream in question be able to convey all storm water or runoff that arrives?

Floodplain Mapping

What areas of a community will be inundated based on engineering analysis?

Hydrologic Analysis

- ▶ **Typical Methods FEMA utilizes**
 - Statistical Gage Analyses
 - Regression Analyses
 - Rainfall Runoff Modeling
- ▶ **Gage/Regression are based on availability stream gage data**
- ▶ **Rainfall-Runoff physical modeling chosen due to limited gage data**
 - Using USACE's HEC-HMS Program
- ▶ **Discharges developed for**
 - 10%, 4%, 2%, 1%, 1%+, 1%-, 0.2%
 - Inputs for hydraulic analyses



Hydraulic Analysis

Types of Analyses

- One Dimensional (1D) Steady State
- One Dimensional (1D) Unsteady State
- Two Dimensional (2D) Unsteady State

Modeling developed using USACE's HEC-RAS Program.

Terrain Data – 2014 LiDAR

- Provides topographic elevation information
- Supplemented by field survey

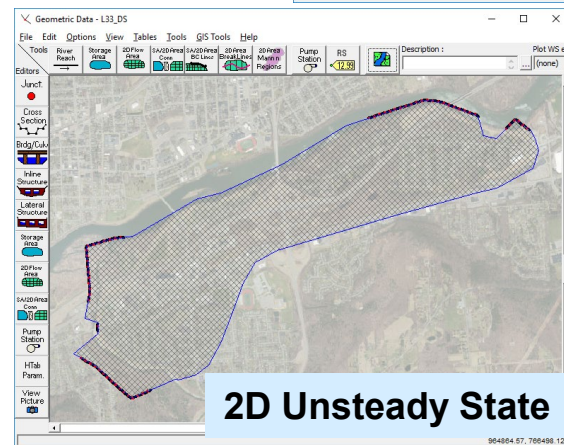
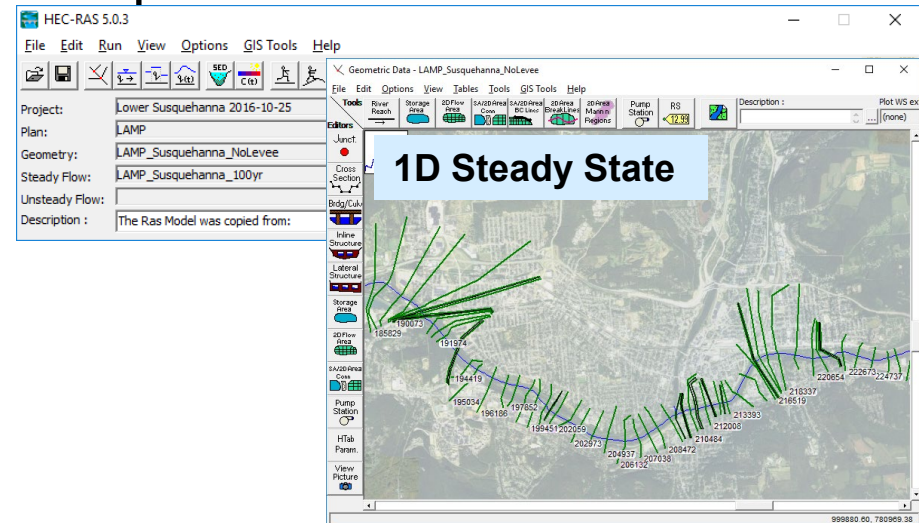
Field Survey for Detailed only

- Collection underway: 39 Bridges/206 under water channel sections

Flood hazard Data Generated

- Elevations: 10%, 4%, 2%, 1%, 1%+, 1%-, 0.2%
- Floodplain extents: 1%, 0.2%

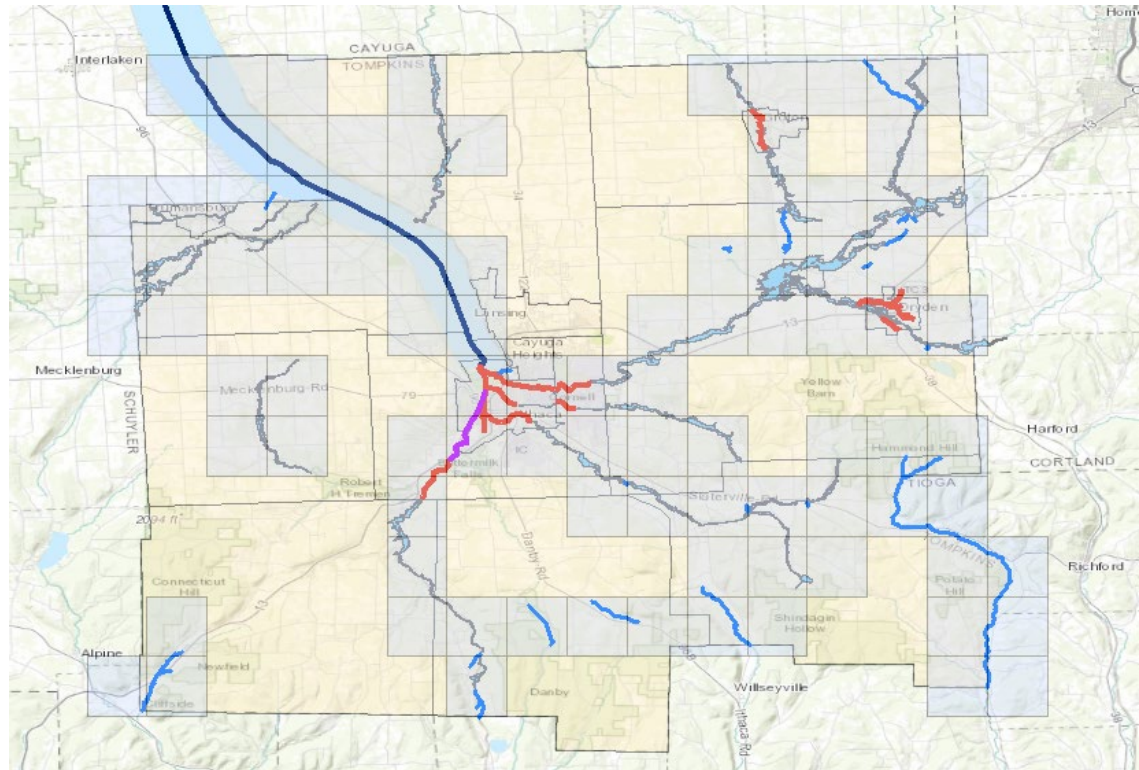
Susquehanna River – HEC-RAS Models



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Tompkins County, Countywide Flood Risk Study - Scope

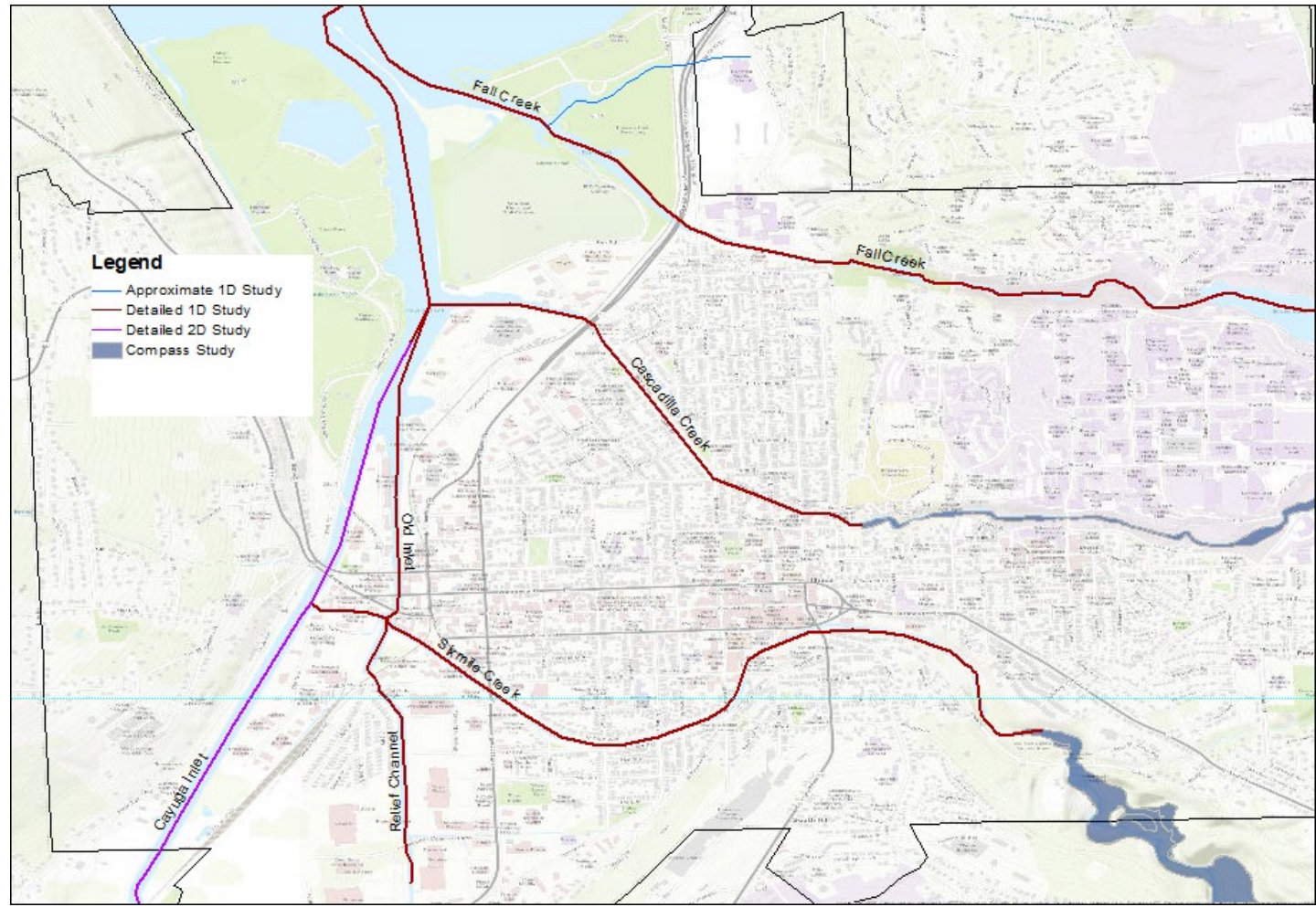
- ▶ **First time digital countywide maps**
- ▶ **STARR II flooding sources analyzed**
 - Cayuga Lake – Lake levels based on Dam operator or gage data
 - 13 streams of Detailed studies 49.8 miles 1D and 3 miles 2D
 - Approximate (A) studies – multiple streams, 32.3 miles
- ▶ **16 affected communities**
- ▶ **95 map panels**



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Tompkins County, Countywide Flood Risk Study - Scope

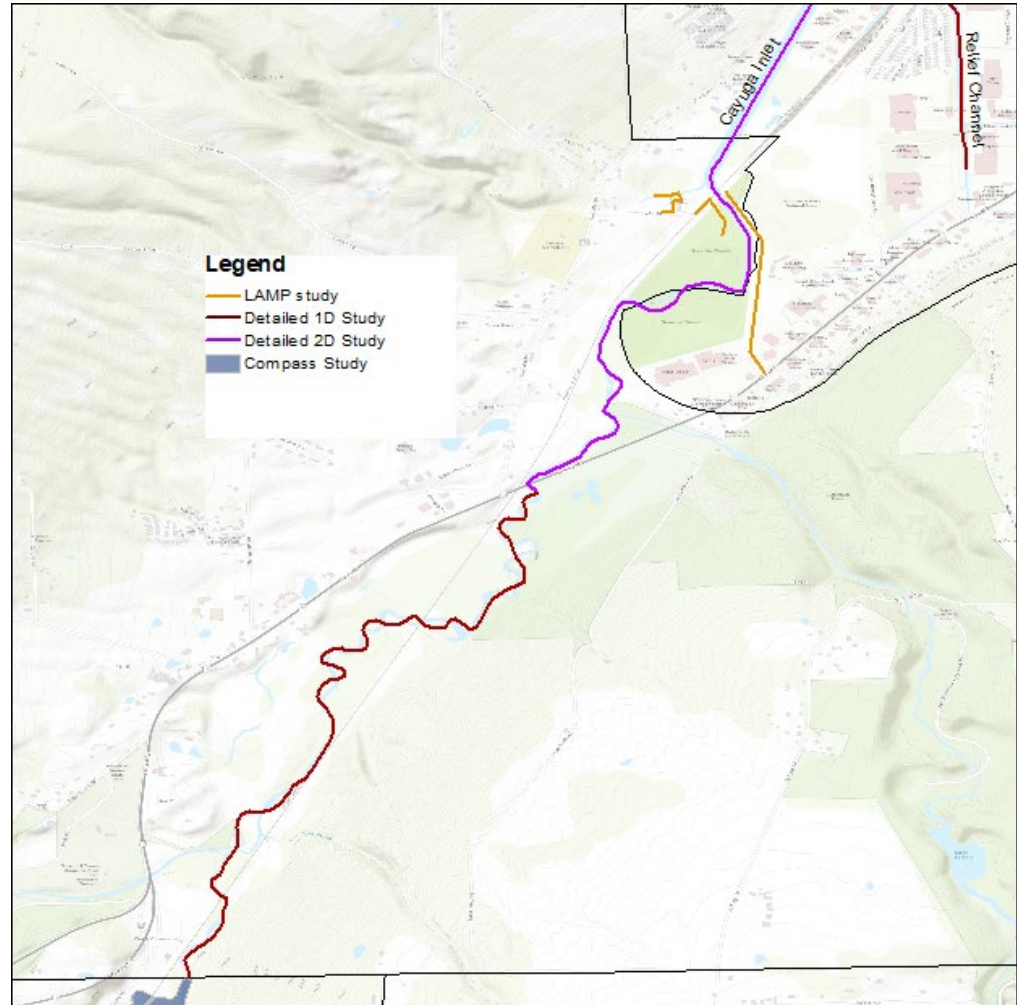
- ▶ **Detailed Studies in City of Ithaca**
- ▶ Cascadilla Creek
- ▶ Cayuga Inlet
- ▶ Fall Creek
- ▶ Old Inlet
- ▶ Relief Channel
- ▶ Sixmile Creek
- ▶ **USGS Study**



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Tompkins County, Countywide Flood Risk Study - Scope

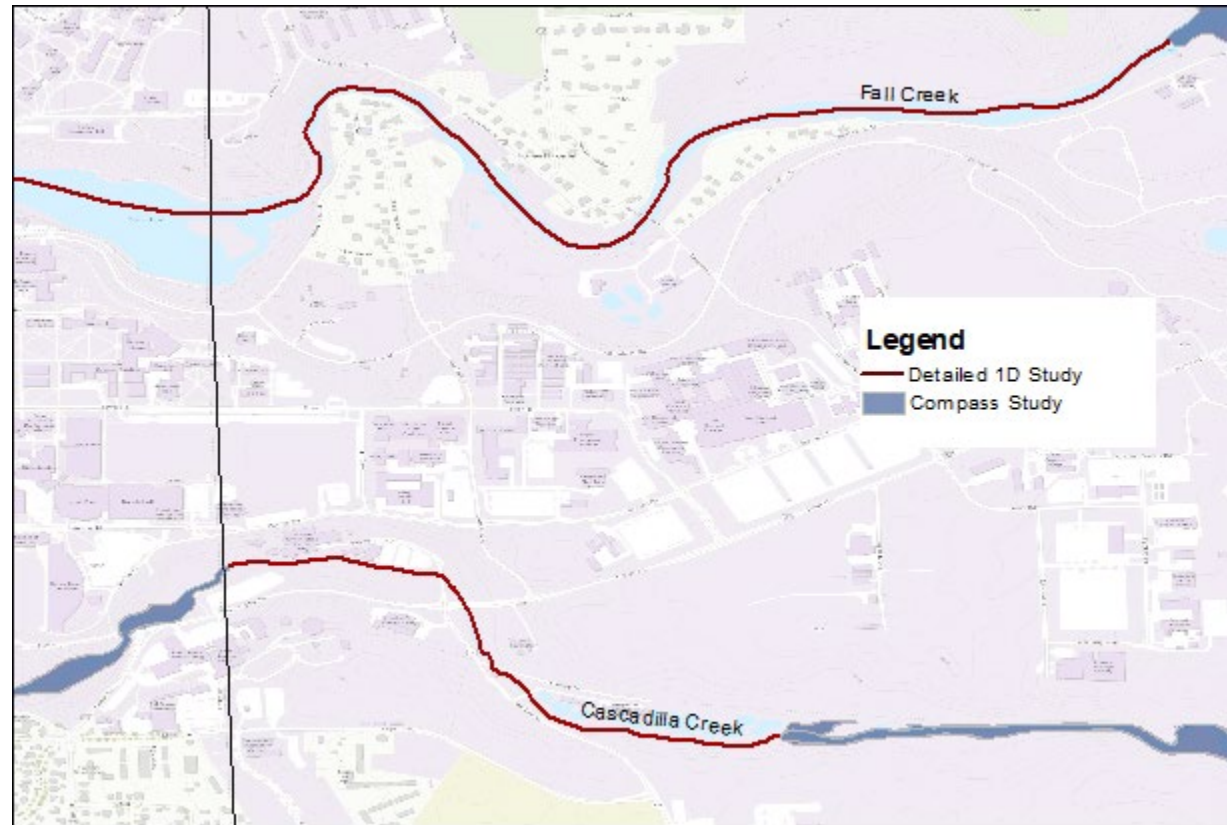
- ▶ **Detailed 2D study in City of Ithaca and Town of Ithaca**
- ▶ Ithaca Levee Plan – LAMP project



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Tompkins County, Countywide Flood Risk Study - Scope

- ▶ **Detailed studies**
– **Town of Ithaca**
- ▶ Cayuga Inlet,
Cascadilla Creek,
Fall Creek

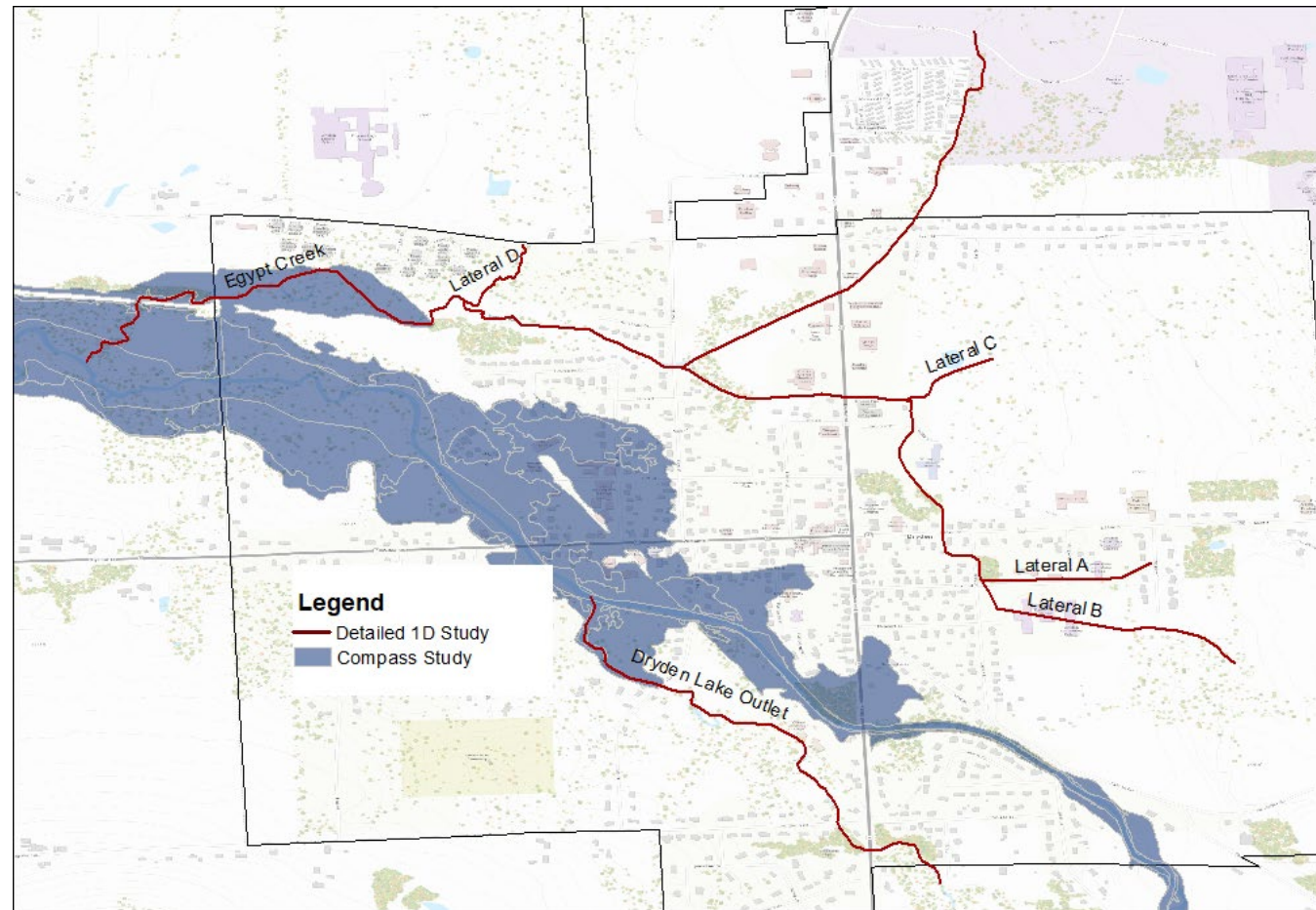


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Tompkins County, Countywide Flood Risk Study - Scope

► Village of Dryden – Detailed Studies

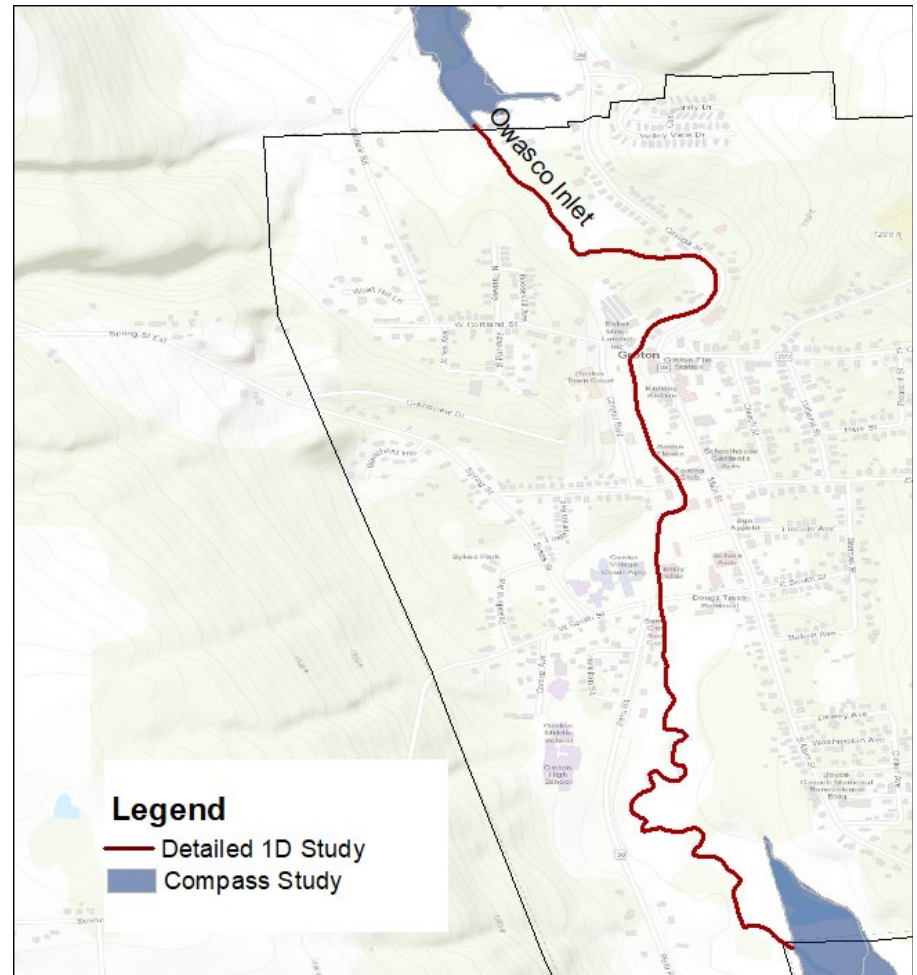
- Dryden Lake Outlet
- Egypt Creek
- Lateral A
- Lateral B
- Lateral C
- Lateral D



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Tompkins County, Countywide Flood Risk Study - Scope

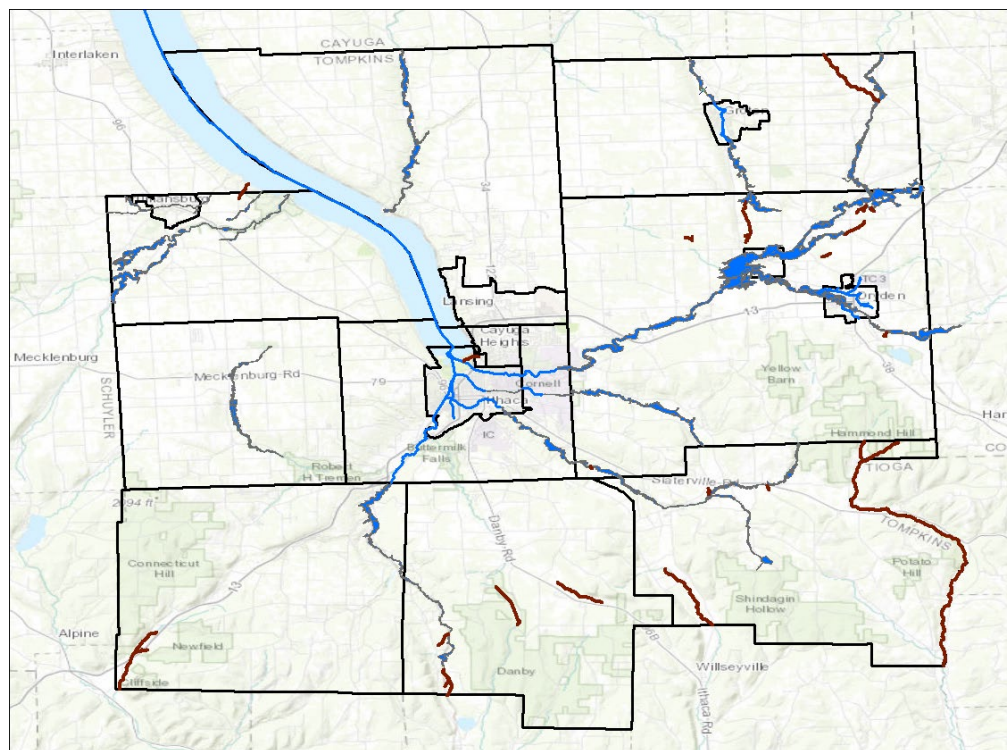
- ▶ **Village of Groton**
 - **Detailed Study**
- ▶ **Owasco Inlet**



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Other Approximate Streams

- ▶ **Approximate streams using 1D Steady State Hydraulic Modeling**
- ▶ **Some ponding areas - volumetric calculations assuming no outflow**
- ▶ **Notable streams**
 - Pony Hollow Creek – 2.5 miles
 - Webster Brook – 2.8 miles
 - West Branch Owego Creek – 11.5 miles
 - Willseyville Creek 5.6 miles





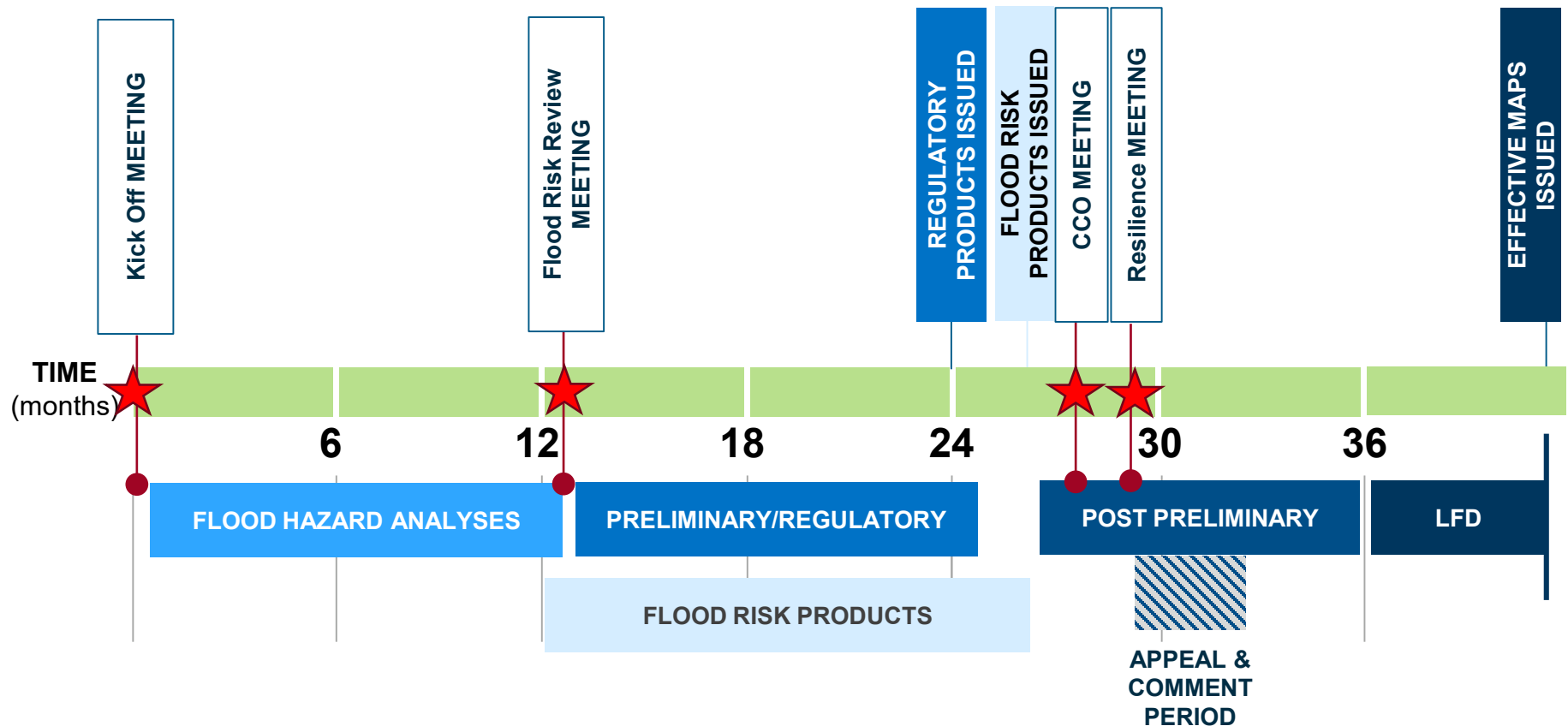
Where are we now and what is next?

Discuss next steps



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Overall Flood Risk Project Timeline



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Major Study Milestones

- ▶ **Data Development (12 months)**
 - Terrain processing
 - Field reconnaissance and survey
 - Hydrologic modeling (620 letters)
 - Hydraulic modeling (620 letters)
 - Floodplain mapping (workmaps)
- ▶ **Flood Risk Review Meeting**
 - Work map products (14 months)
- ▶ **Regulatory Product Update (FIRM & FIS)**
 - Preliminary issuance (24 months)
- ▶ **Resilience Meeting**
 - Flood risk products (28 months)



What will communities receive?

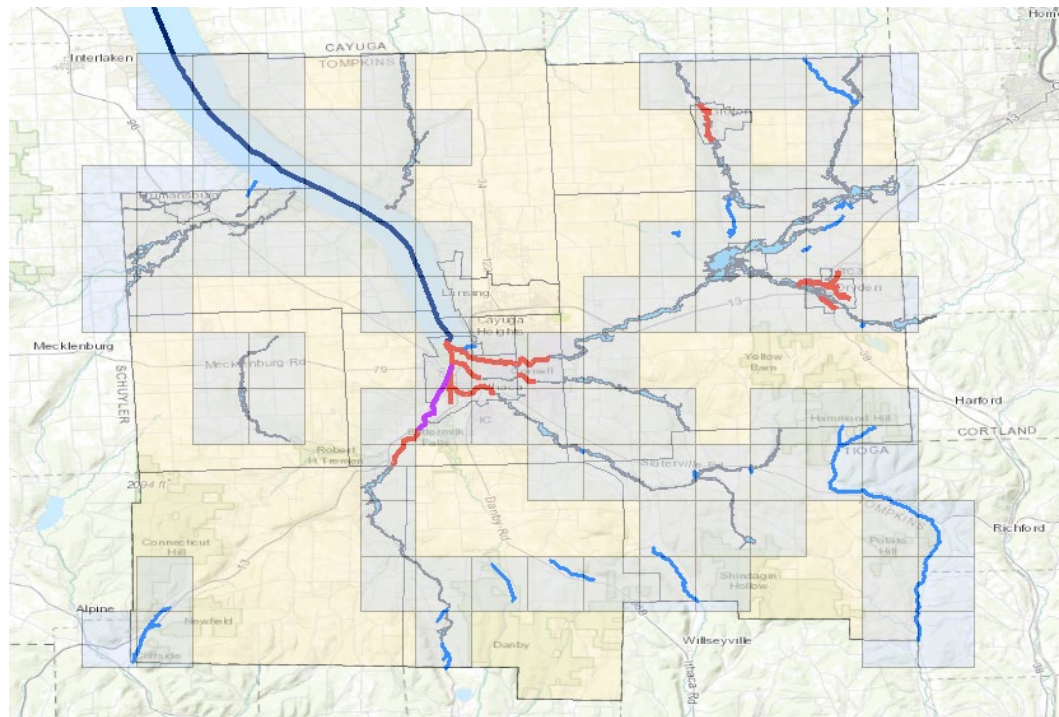
Regulatory Products



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Regulatory Products

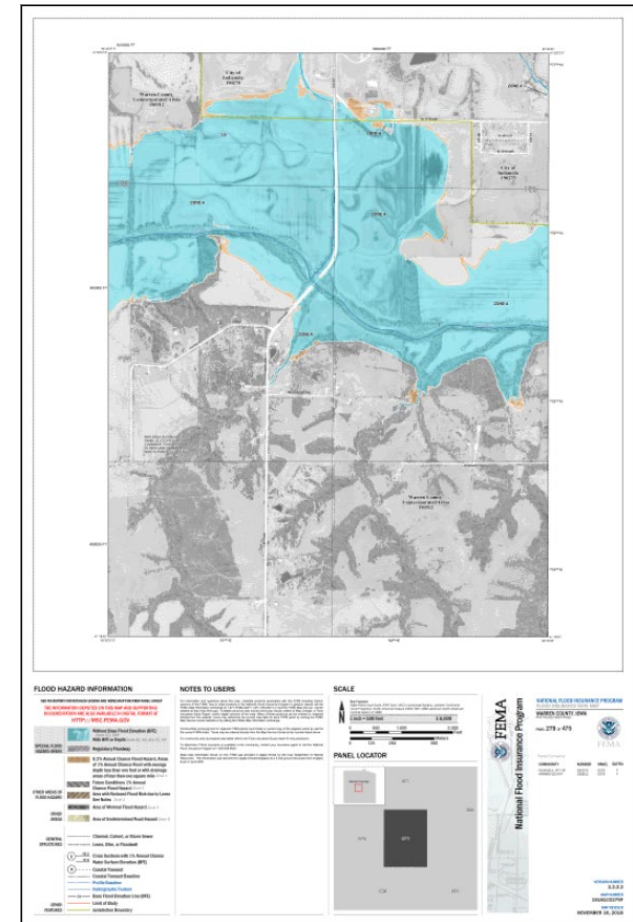
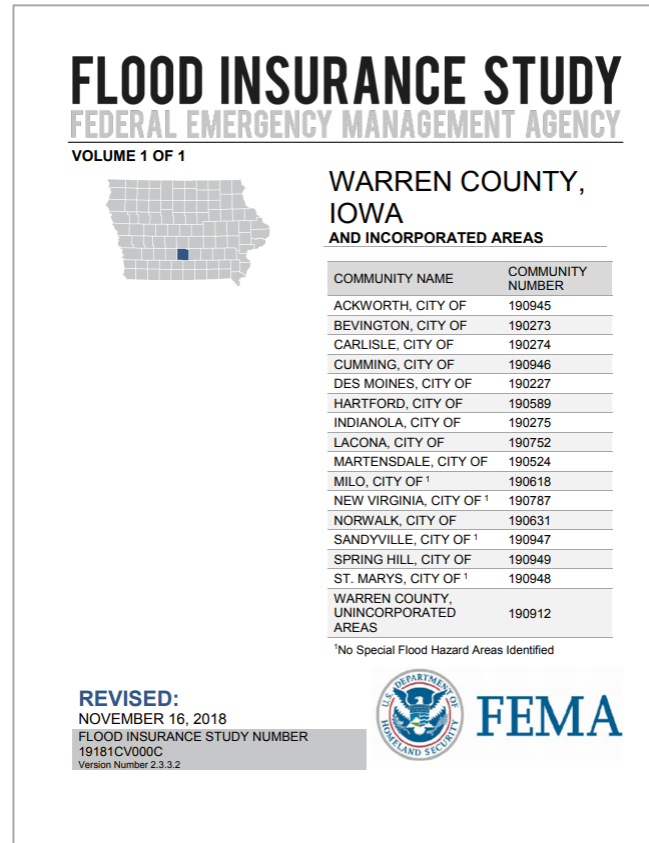
- ▶ Regulatory product development commences after work map comment period
- ▶ Seamless countywide mapping produced
- ▶ Digital Flood Insurance Rate Map (DFIRM) Database
- ▶ 95 FIRM Panels
- ▶ Flood Insurance Study (FIS) Report



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Flood Insurance Rate Map (FIRM) Example

19181C_PRELIM_metadata.xml	XML Document
L_Comm_Info.dbf	dBASE Table
L_Comm_Revis.dbf	dBASE Table
L_ManningsN.dbf	dBASE Table
L_Meetings.dbf	dBASE Table
L_Mtg_POC.dbf	dBASE Table
L_Pol_FHBM.dbf	dBASE Table
L_Source_Cit.dbf	dBASE Table
L_Summary_Discharges.dbf	dBASE Table
L_XS_Elev.dbf	dBASE Table
L_XS_Struct.dbf	dBASE Table
S_Base_Index.shp	Shapefile
S_BFE.shp	Shapefile
S_FIRM_Pan.shp	Shapefile
S_Fld_Haz_Ar.shp	Shapefile
S_Fld_Haz_Ln.shp	Shapefile
S_Gen_Struct.shp	Shapefile
S_Hydro_Reach.shp	Shapefile
S_Label_Ld.shp	Shapefile
S_Label_Pt.shp	Shapefile
S_Nodes.shp	Shapefile
S_PLSS_Ar.shp	Shapefile
S_Pol_Ar.shp	Shapefile
S_Profil_Basln.shp	Shapefile
S_Stn_Start.shp	Shapefile
S_Subbasins.shp	Shapefile
S_Submittal_Info.shp	Shapefile
S_Tnsp_Ln.shp	Shapefile
S_Wtr_Ln.shp	Shapefile
S_XS.shp	Shapefile
Study_Info.dbf	dBASE Table



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What will communities receive?

Flood Risk Products



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Knowing the Risk

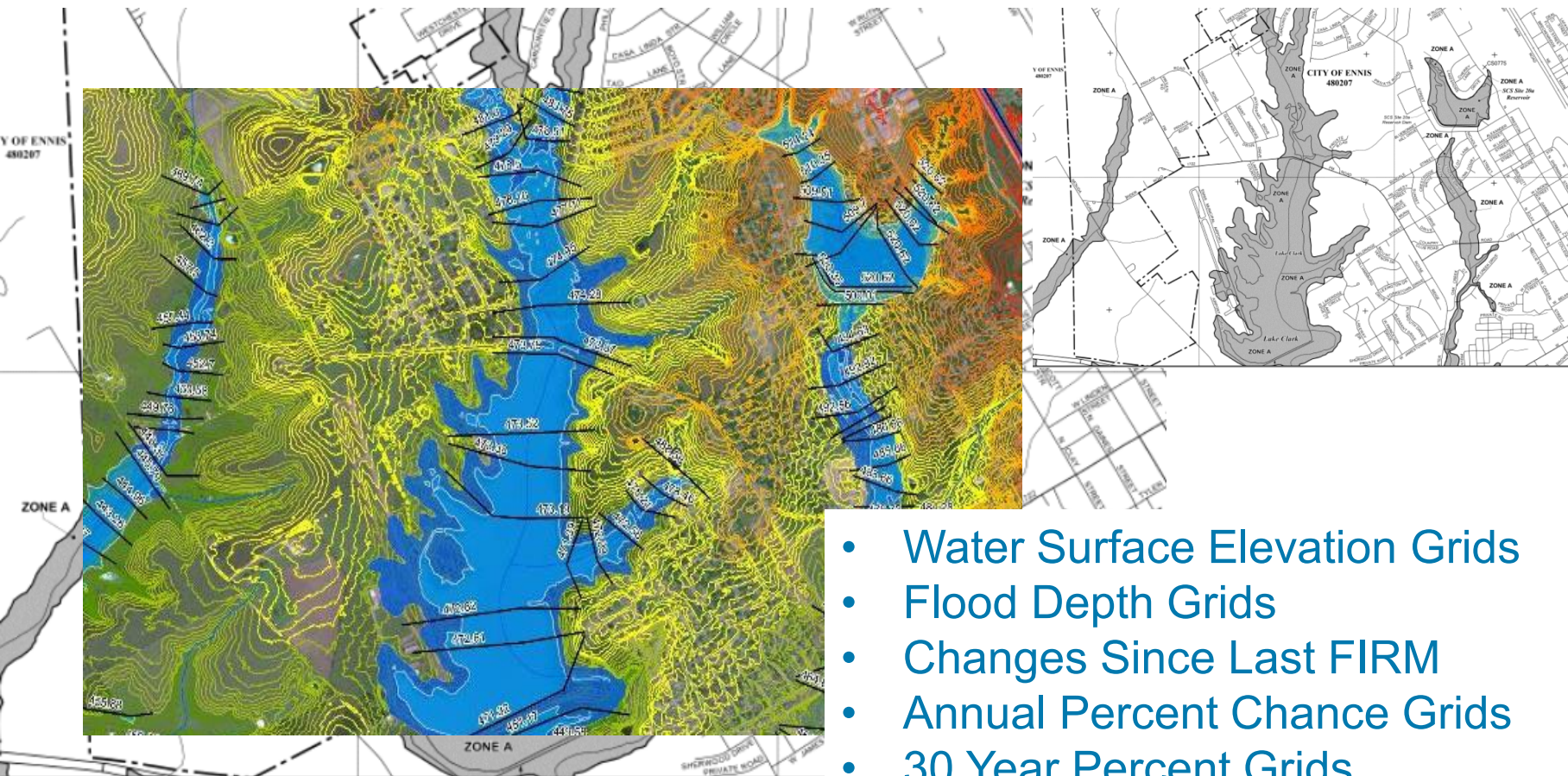
If a community does not know or understand their risk, they may struggle to....

- ▶ effectively plan use of resources for natural hazards and potential disasters;
- ▶ implement effective hazard mitigation projects;
- ▶ effectively regulate current and future development without increasing risk; and/or
- ▶ effectively communicate about natural hazards to its residents about personal and community mitigation projects that can reduce long-term risk.



What will communities receive?

Flood Risk Datasets to provide better interaction



- Water Surface Elevation Grids
- Flood Depth Grids
- Changes Since Last FIRM
- Annual Percent Chance Grids
- 30 Year Percent Grids
- Flood Risk Assessment (Hazus)

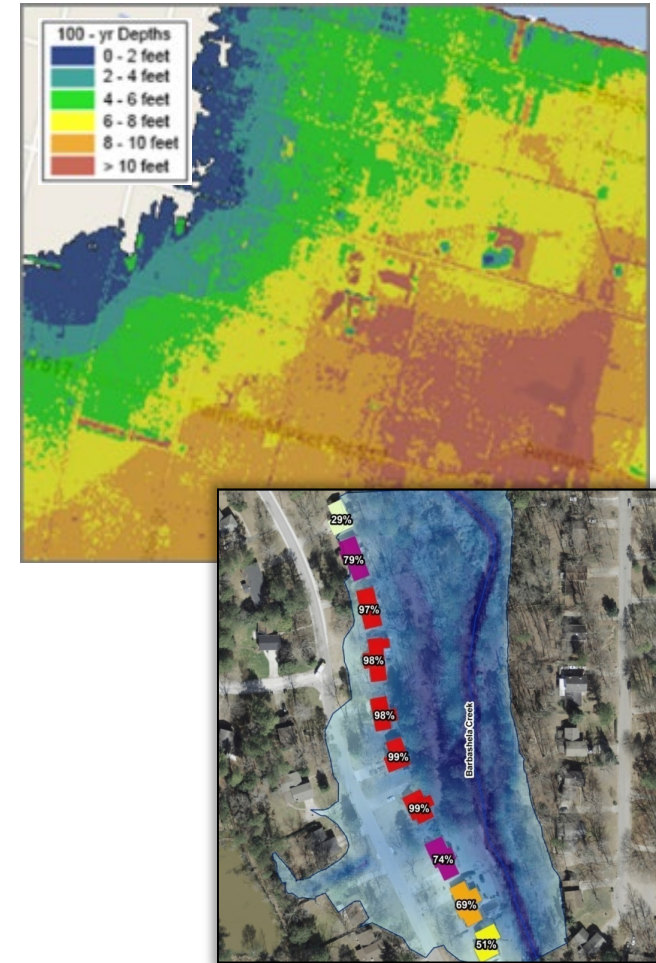


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Products & Delivery Items:

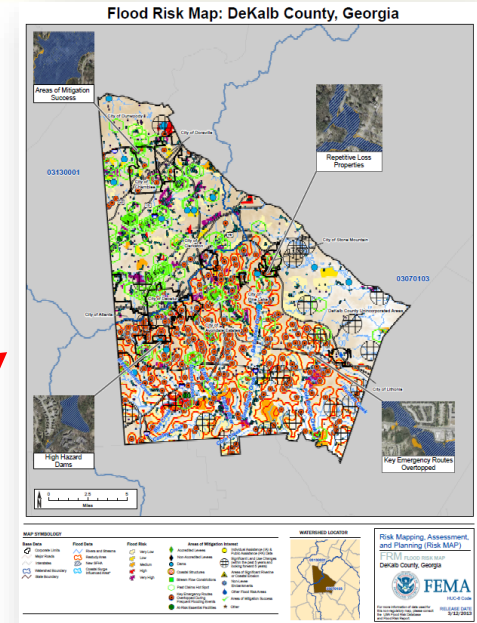
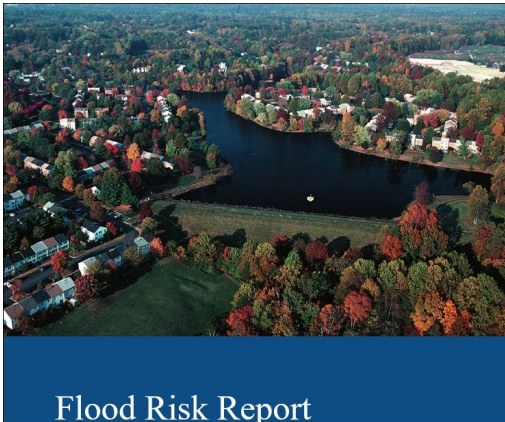
Flood Depth and Analysis Grids

- ▶ Flood hazard data backbone for these product development
- ▶ Flood Depth and Water Surface Grids
 - Frequencies: 10%, 4%, 2%, 1% and 0.2%
- ▶ Water Surface Freeboard Grids
 - +1, +2 & +3 feet over 1% water surface
- ▶ Percentage annual chance of flooding Grid
- ▶ Chance of flooding over the average mortgage (30-year) time period grid
- ▶ Flood Risk Assessment Analysis (HAZUS)
- ▶ Areas of mitigation interest (AOMI)



Flood Risk Database, Report and Map

Flood Risk Dataset



			Estimated Potential Losses for Flood Event Scenarios											
			Total Inventory		10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized (\$/yr)	
			Estimated Value	% of Total	Dollar Losses ²	Loss Ratio ^{1,*}	Dollar Losses ²	Loss Ratio ^{1,*}	Dollar Losses ²	Loss Ratio ^{1,*}	Dollar Losses ²	Loss Ratio ^{1,*}	Dollar Losses ²	Loss Ratio ^{1,*}
Residential Building/Contents	\$46,559,700,000	69%	\$194,500,000	0%	\$266,700,000	1%	\$284,600,000	1%	\$348,500,000	1%	\$24,850,000	0%		
Commercial Building/Contents	\$13,669,500,000	20%	\$80,600,000	1%	\$101,200,000	1%	\$110,300,000	1%	\$156,800,000	1%	\$9,900,000	0%		
Other Building/Contents	\$6,946,800,000	10%	\$41,700,000	1%	\$43,800,000	1%	\$43,600,000	1%	\$59,020,000	1%	\$4,740,000	0%		
Total Building/Contents ²	\$67,176,000,000	100%	\$316,800,000	N/A	\$411,700,000	N/A	\$438,500,000	N/A	\$564,320,000	N/A	\$39,490,000	N/A		
Business Disruption ⁴	N/A	N/A	\$0	N/A	\$0	N/A	\$0	N/A	\$0	N/A	N/A	N/A		
TOTAL ⁴	\$67,176,000,000	N/A	\$316,800,000	N/A	\$411,700,000	N/A	\$438,500,000	N/A	\$564,320,000	N/A	\$39,490,000	N/A		

Dam Breach Analysis

- ▶ **Up to 5 High Hazard Dams analyzed**
- ▶ 14 Total Dams In Tompkins County
- ▶ **Engineering analyses developed for FIRM will be leveraged**
- ▶ **Flood Inundation Maps will be developed**



Contacts

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■ STARR II Regional Support Center Lead

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- curtis.smith@stantec.com



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Questions? Comments?



Thank you!



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