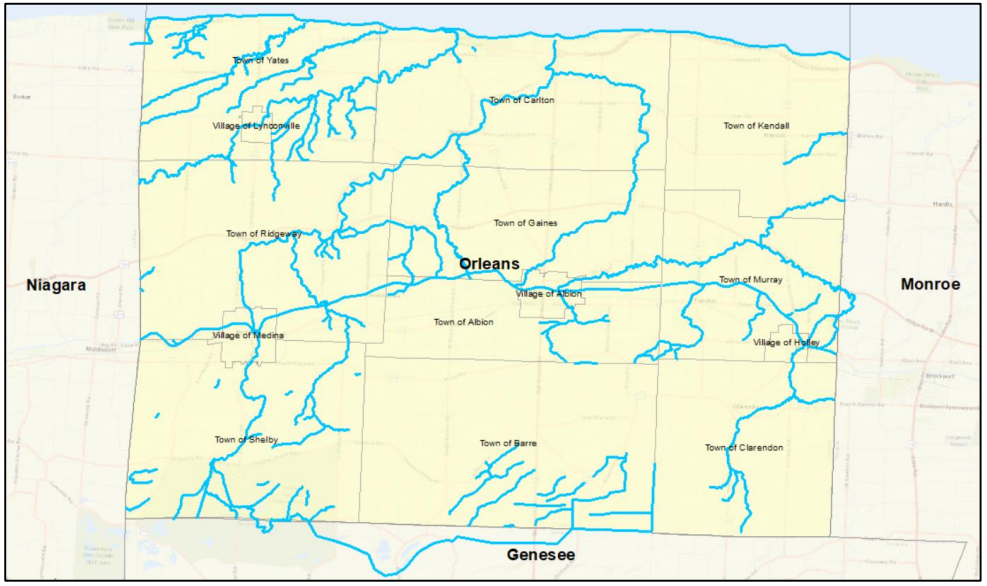
RiskMAP
Increasing Resilience Together

Flood Risk Project

Orleans County, New York
Project Kick Off Meeting

March 6, 2019



FEMA

Please Introduce Yourself

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

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

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

Please sign in!

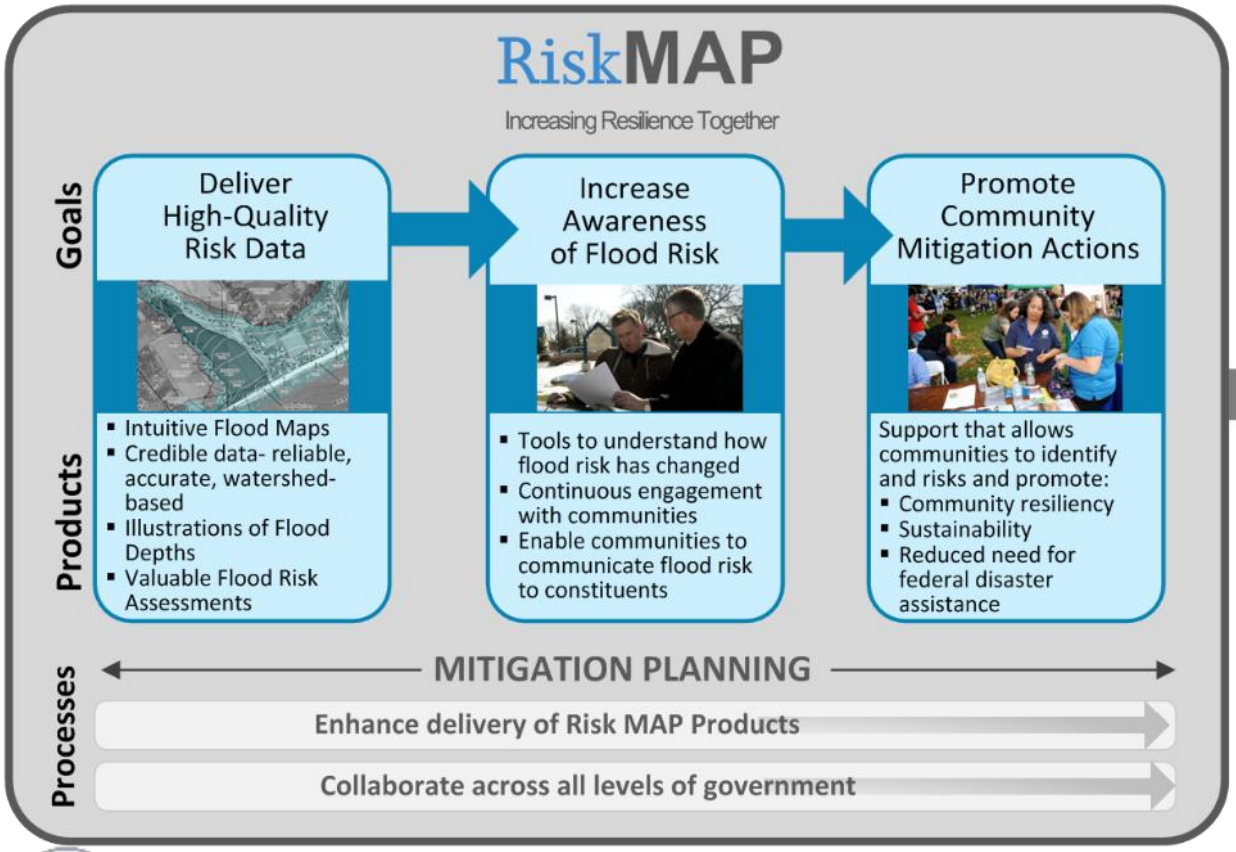
Today's Goals

1	2	3
The value of updated flood maps for your community	Recap of Flood Risk Study history, including Discovery and Seneca Watershed study	Review county-wide study scope, products and outreach process

FEMA Mitigation Division

Risk Analysis Branch

Goal: Stronger and Safer Communities



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

Why Update Flood Maps?

NFIP Policies for affected communities	NFIP Claims for affected communities	FEMA Insurance Claims Paid in affected communities	Hazard Mitigation Plan
82	46	$136,595	July 2018

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How did we get here?
Review past activities

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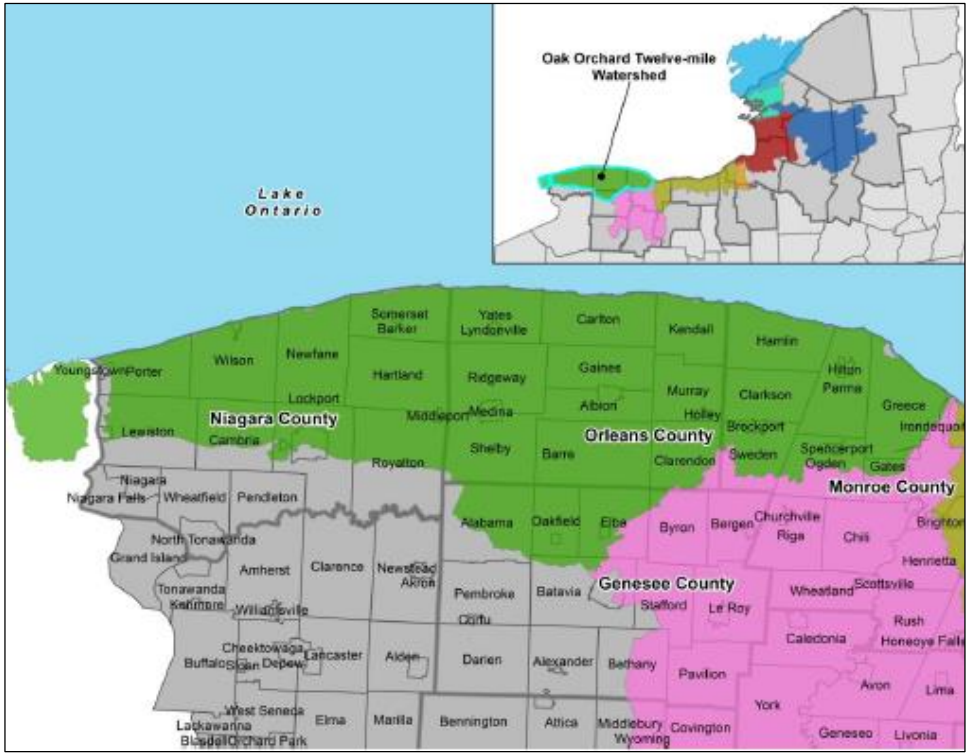
Discovery/Post-Discovery Progress
Recap

- Meetings held in November 2013
- Discovery project completed in 2016
- FEMA reviewed community input to determine priorities
- Town of Yates noted flooding issues along Johnson Creek
- Kendall and Carlton noted Lake Ontario flooding issues.



Great Lakes Coastal Study
Recap

- Flood hazard analyses completed in Fall of 2017
- 24 miles of shoreline scoped in Orleans
- Flood Risk Review meeting conducted in November, 2017
- Work map products shared with the communities

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What is being studied now?
Discuss scope of new study

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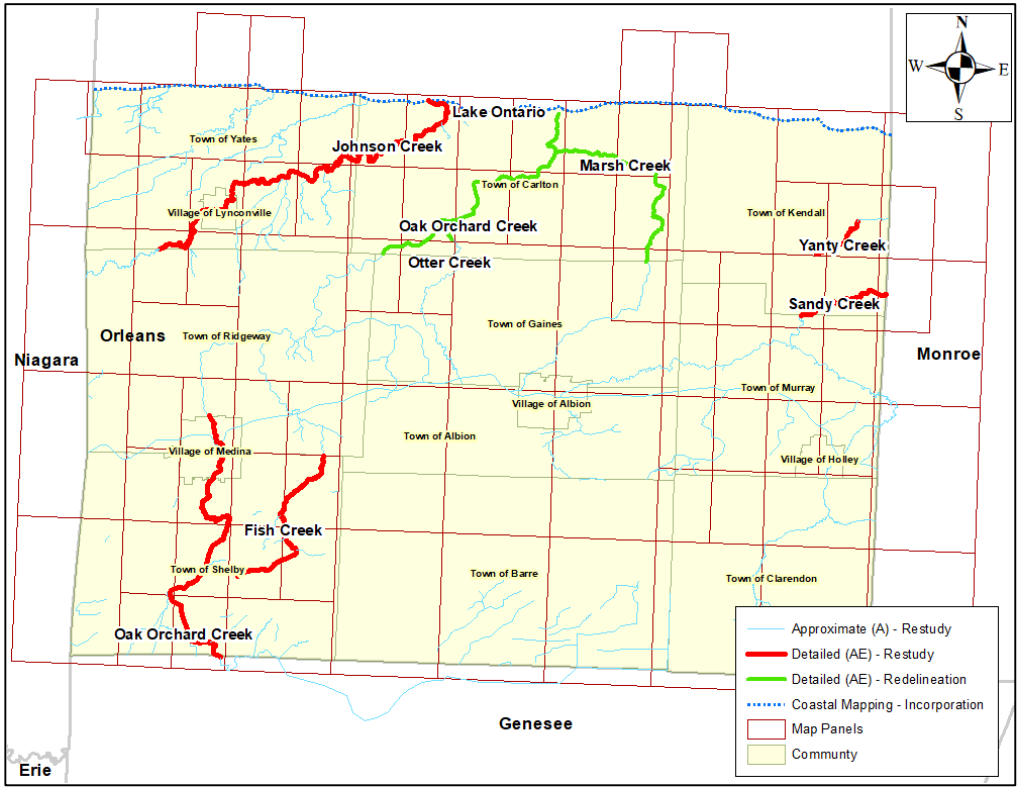
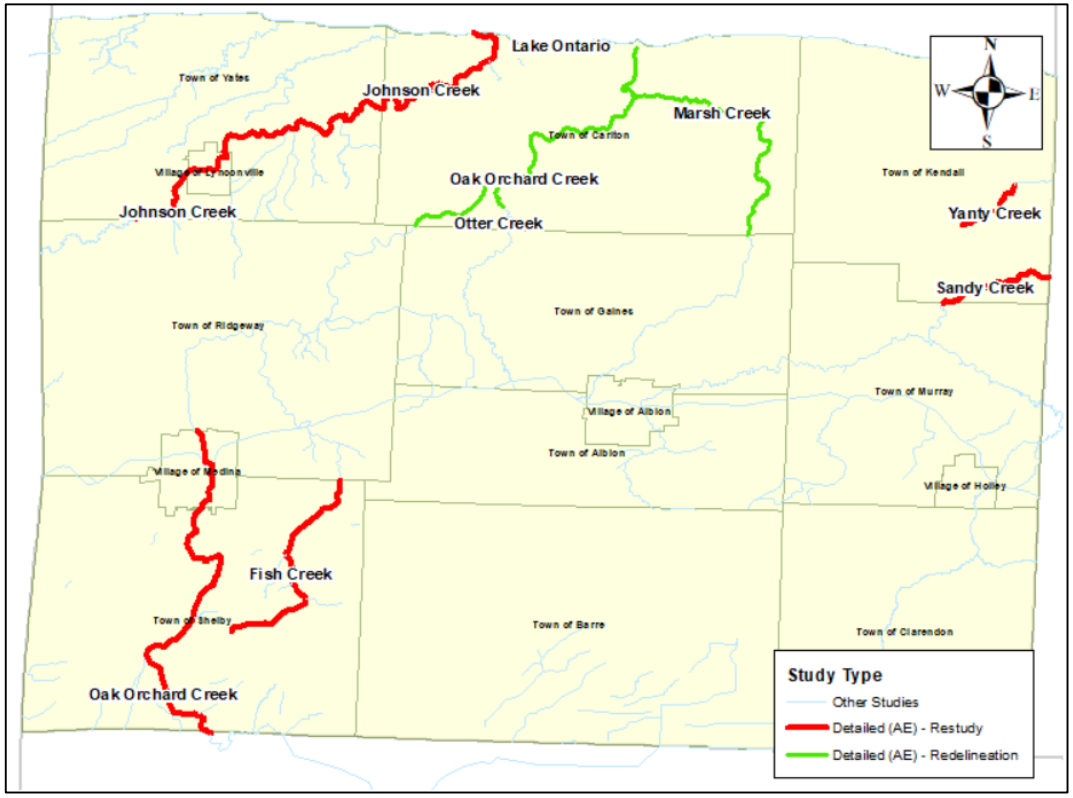
Orleans County, Countywide Flood Risk Study - *Scope*

- **First time digital countywide maps**
- **Additional flooding sources analyzed**
  - Detailed (AE) studies – 5 streams, 36 miles
  - Approximate (A) studies – multiple streams, 241 miles
  - Redelineation (AE) – 3 streams, 17 miles
- **Incorporates coastal mapping**
- **14 affected communities**
- **86 map panels**
- **Multiple touchpoints**



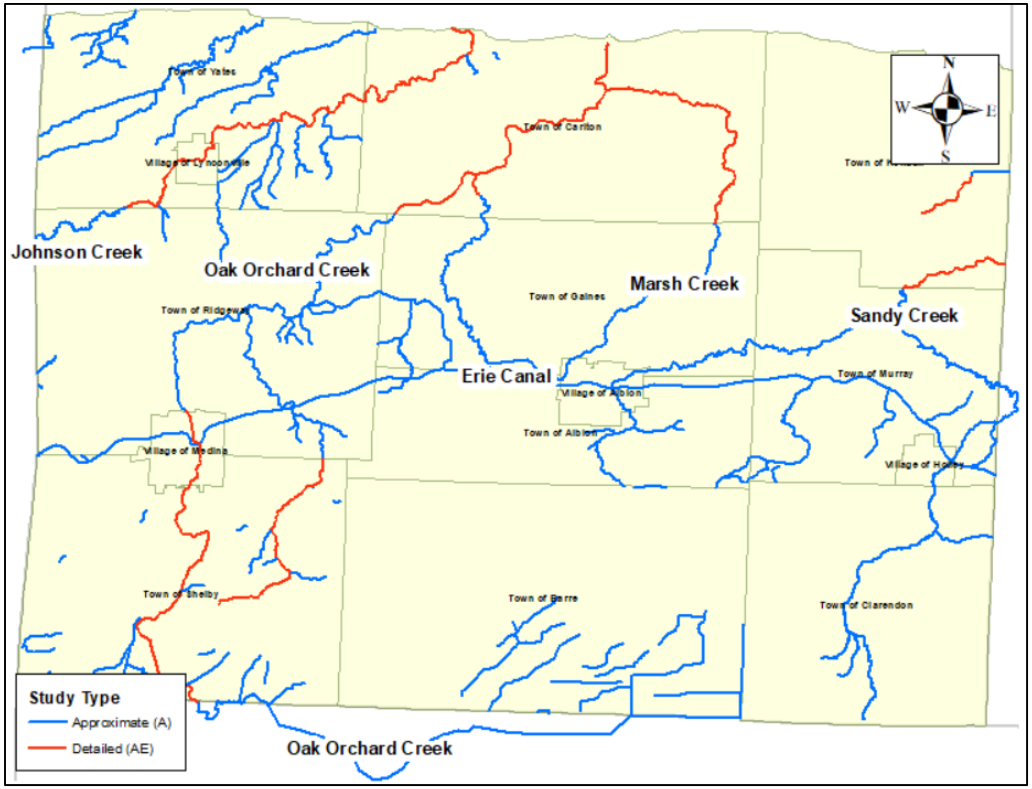
Detailed (AE) Study - *Scope*

- **5 Restudy Streams – 36 miles total**
  - Oak Orchard Creek – 10.5 miles
  - Fish Creek – 5.8 miles
  - Johnson Creek – 14.7 miles
  - Sandy Creek – 3 miles
  - Yanty Creek – 1.8 miles
- **3 Redelineation (AE) – 3 streams, 17 miles**
  - Oak Orchard Creek – 9 miles
  - Marsh Creek – 7.2 miles
  - Otter Creek – 0.7 miles

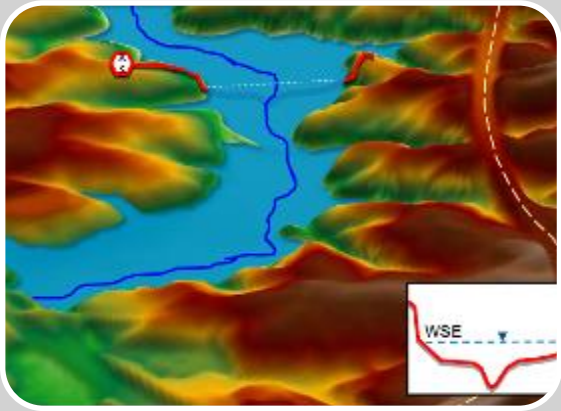


Approximate (A) Study - *Scope*

- **Completes countywide stream coverage**
- **~200 miles of streams**
- **26 miles of Erie Canal**
- **Notable streams include**
  - Oak Orchard Creek – 16 miles
  - Johnson Creek – 4 miles
  - Marsh Creek – 7 miles
  - Otter Creek – 6.7 miles
  - Sandy Creek – 2 miles
  - Yanty Creek – 1 miles
  - East Branch Sandy Creek – 17.2 miles
  - West Branch Sandy Creek – 14.6 miles



Flood Hazard Analysis



Hydrology

Volume of water?

Peak Flows?

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

Hydraulics

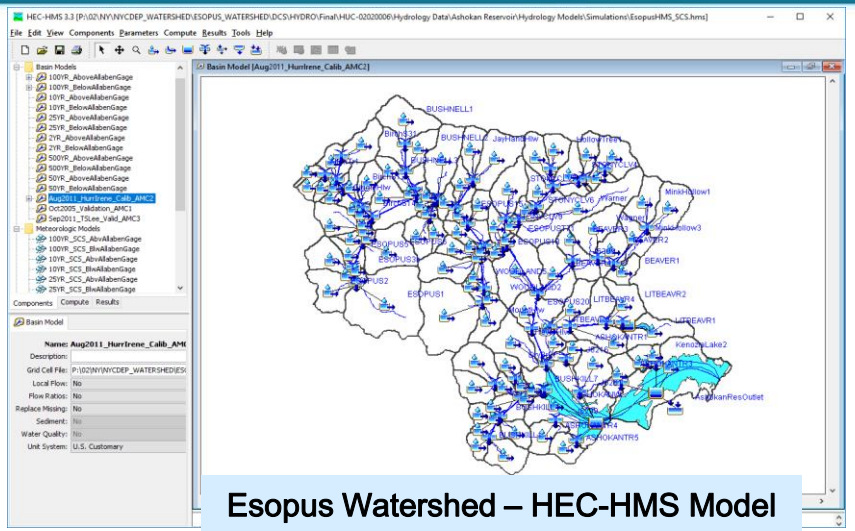
Will the stream in question be able to convey all storm water or runoff that arrives?

Floodplain Mapping

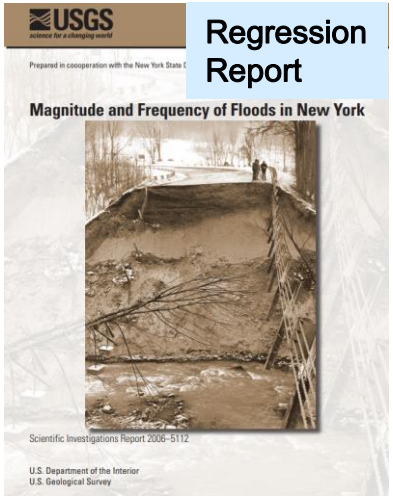
What areas of a community will be inundated based on engineering analysis?

Hydrologic Analysis

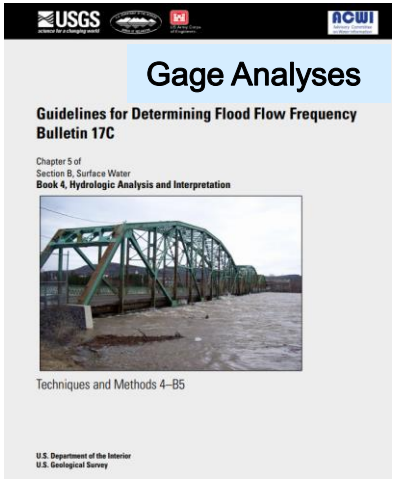
- **Typical Methods FEMA utilizes**
  - Statistical Gage Analyses
  - Regression Analyses
  - Rainfall Runoff Modeling
- **Gage/Regression are based on availability stream gage data**
- **Rainfall-Runoff physical modeling chosen due to limited gage data**
  - Using USACE's HEC-HMS Program
- **Discharges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



Esopus Watershed – HEC-HMS Model



Regression Report



Gage Analyses

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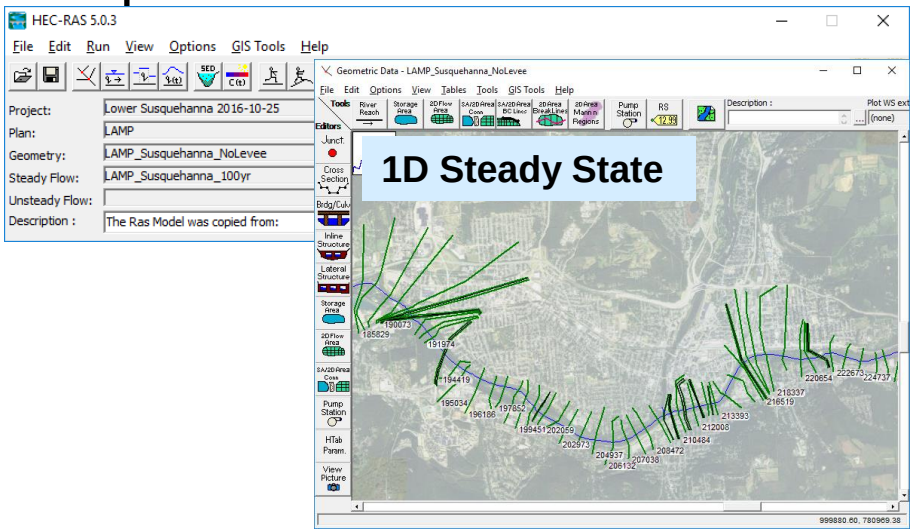
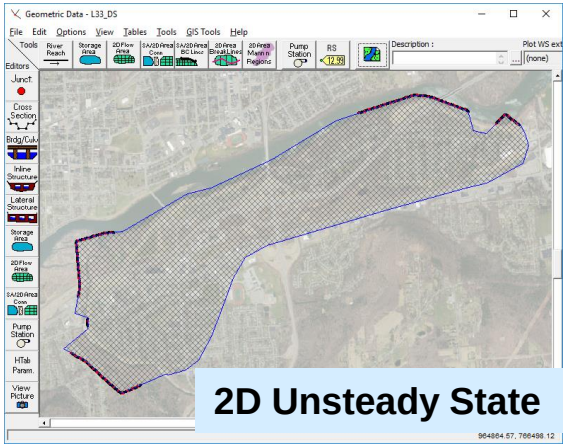
Hydraulic Analysis

- **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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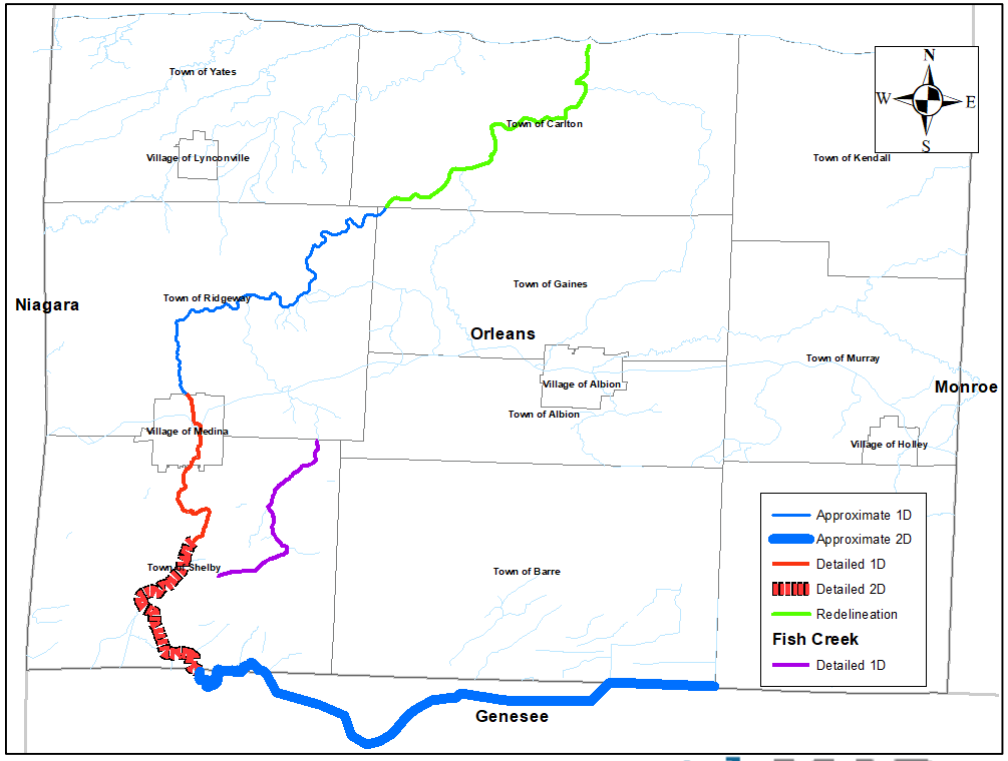
Oak Orchard Creek/Fish Creek

Oak Orchard Creek

- **Total Mileage: 46.4 miles**
- **Study Limits: From origin to outlet into Lake Ontario**
- **Detailed Restudy:**
  - 10.5 miles within Town of Shelby and Village of Medina
  - 2D modeling within Shelby, rest 1D
- **Detailed Redelineation:**
  - 9 miles within Town of Carlton
- **Approximate Restudy:**
  - 2D for 16 mile reach bordering Genesee County
  - 1D for 11 miles reach within Town of Ridgeway

Fish Creek

- **Detailed Restudy:**
  - 5.8 miles within Town of Shelby
  - 1D modeling for entire study reach



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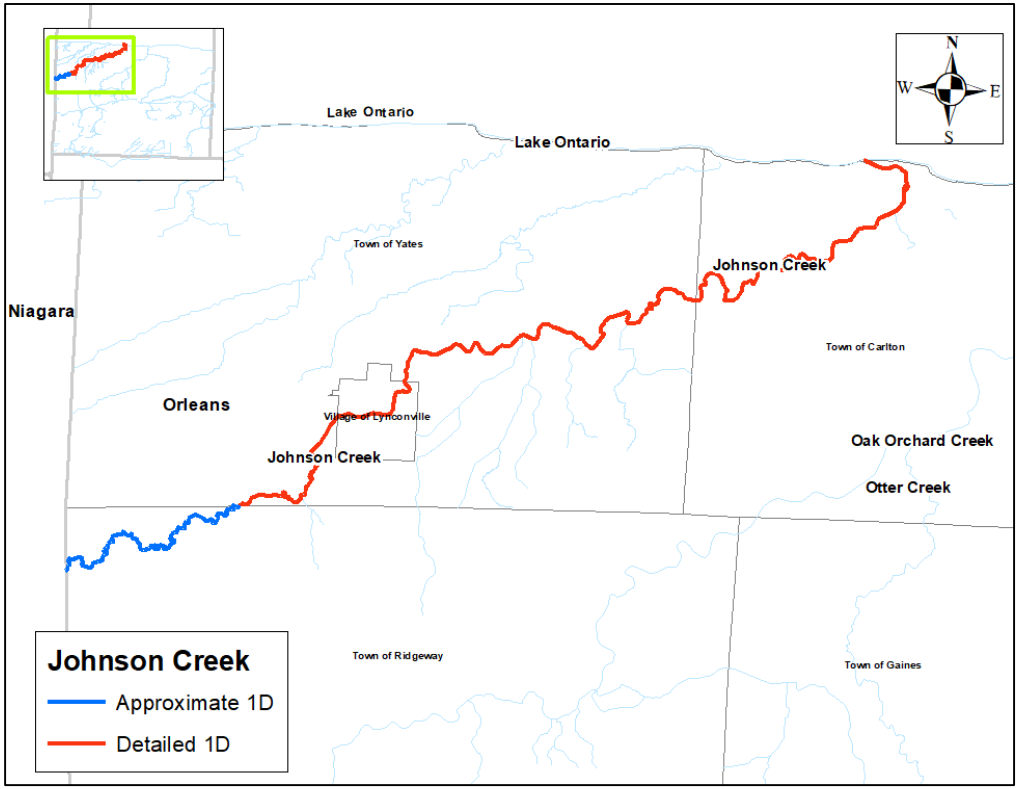
Johnson Creek

- **Total Mileage: 18.7 miles**
- **Study Limits: County boundary to outlet into Lake Ontario**
- **Detailed Restudy:**
  - 14.7 miles within Town of Yates, Village of Lynconville and Town of Carlton
  - 1D modeling for entire study reach
- **Approximate Restudy:**
  - 4 mile reach within Town of Ridgeway
  - 1D modeling for entire study reach



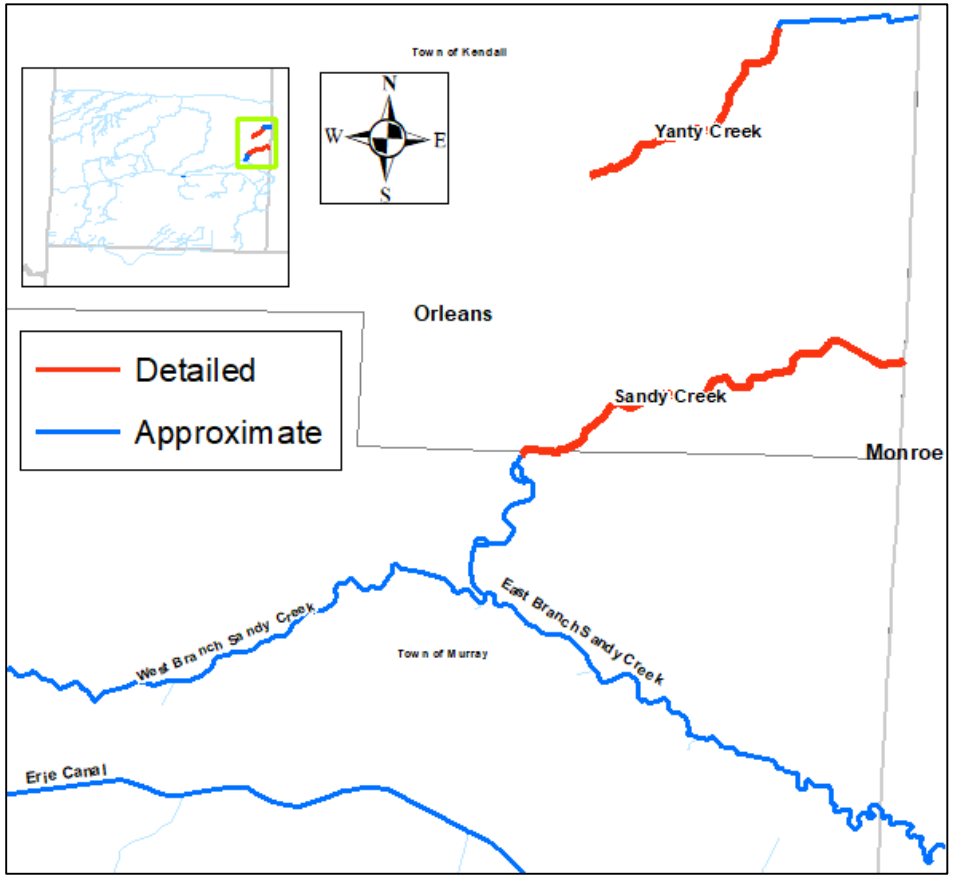
Yanty Creek/Sandy Creek

Yanty Creek

- Total Mileage: 2.8 miles
- All miles within Town Of Kendall
- Detailed Restudy: 1.8 miles
- Approximate Restudy: 1.0 mile
- 1D modeling for entire study reach

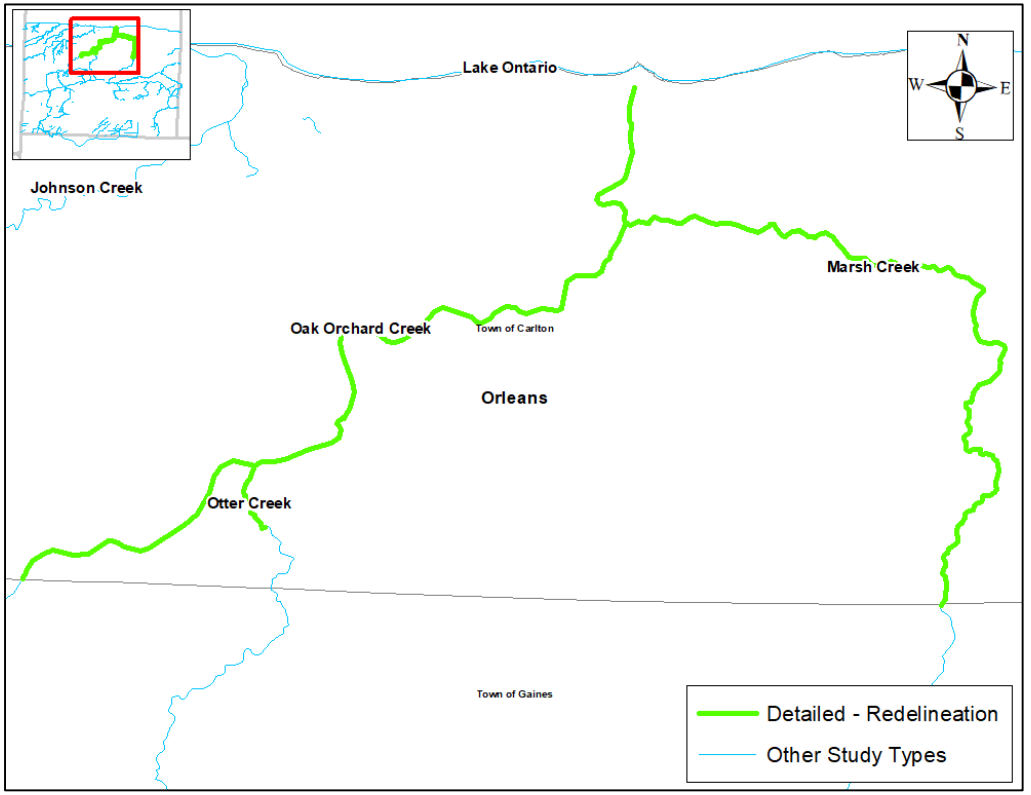
Sandy Creek

- Total Mileage: 4.8 miles
- Detailed Restudy: 3.0 miles, all within Town Of Kendall
- Approximate Restudy: 1.0 mile within Town of Murray
- 1D modeling for entire study reach



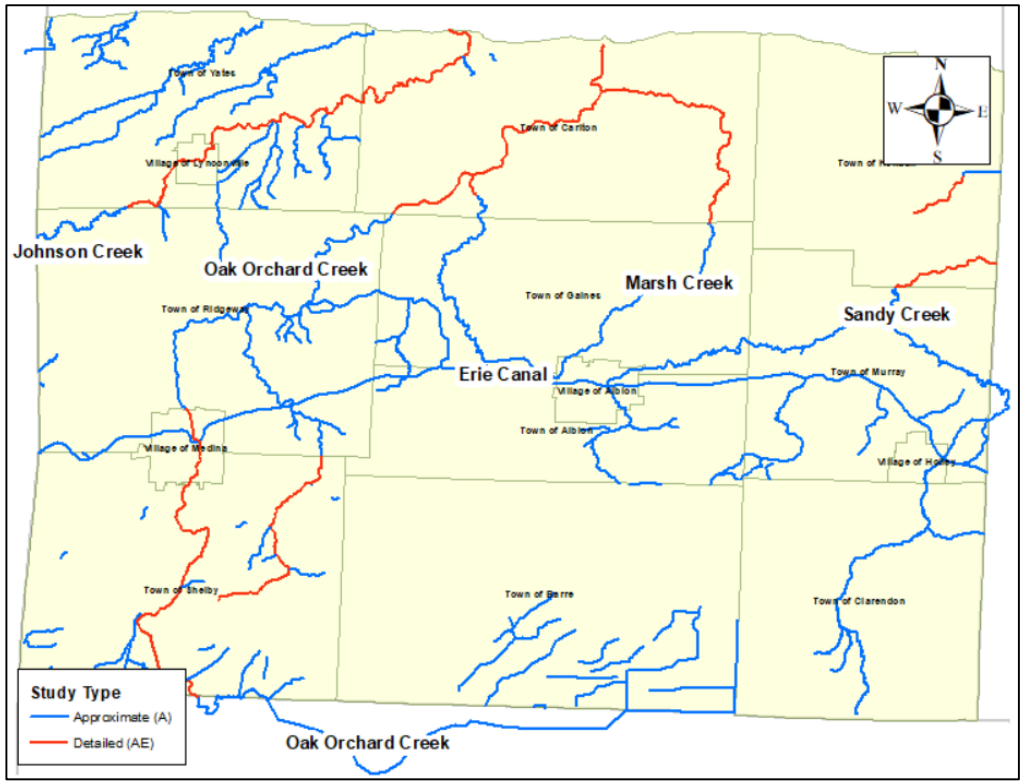
Redelineated Streams

- **3 streams, totaling 17 miles**
  - Oak Orchard Creek – 9 miles
  - Marsh Creek – 7.2 miles
  - Otter Creek – 0.7 miles
- **All miles are located within Town of Carlton**
- **No hydrology or hydraulic analyses conducted**
- **Flood extents are redelineated using latest 2014 LiDAR topographic data**
- **Vertical Datum Conversion conducted**
- **Existing flood elevations converted from NGVD29 to NAVD88 datum**



Other Approximate Streams

- **Erie Canal**
  - 26 miles, affecting 8 communities
  - 1D Unsteady State Hydraulic Modeling
  - Coordination with NYS Canal Corp for data collection
- **Hydrology developed using HEC-HMS model**
- **Other approximate streams using 1D Steady State Hydraulic Modeling**
- **Other notables streams**
  - Marsh Creek – 7 miles
  - Otter Creek – 6.7 miles
  - East Branch Sandy Creek – 17.2 miles
  - West Branch Sandy Creek – 14.6 miles
  - Remaining reaches account for 135+ miles
- **Floodplain extents for 1% and 0.2%**



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Where are we now and what is next?
Discuss next steps

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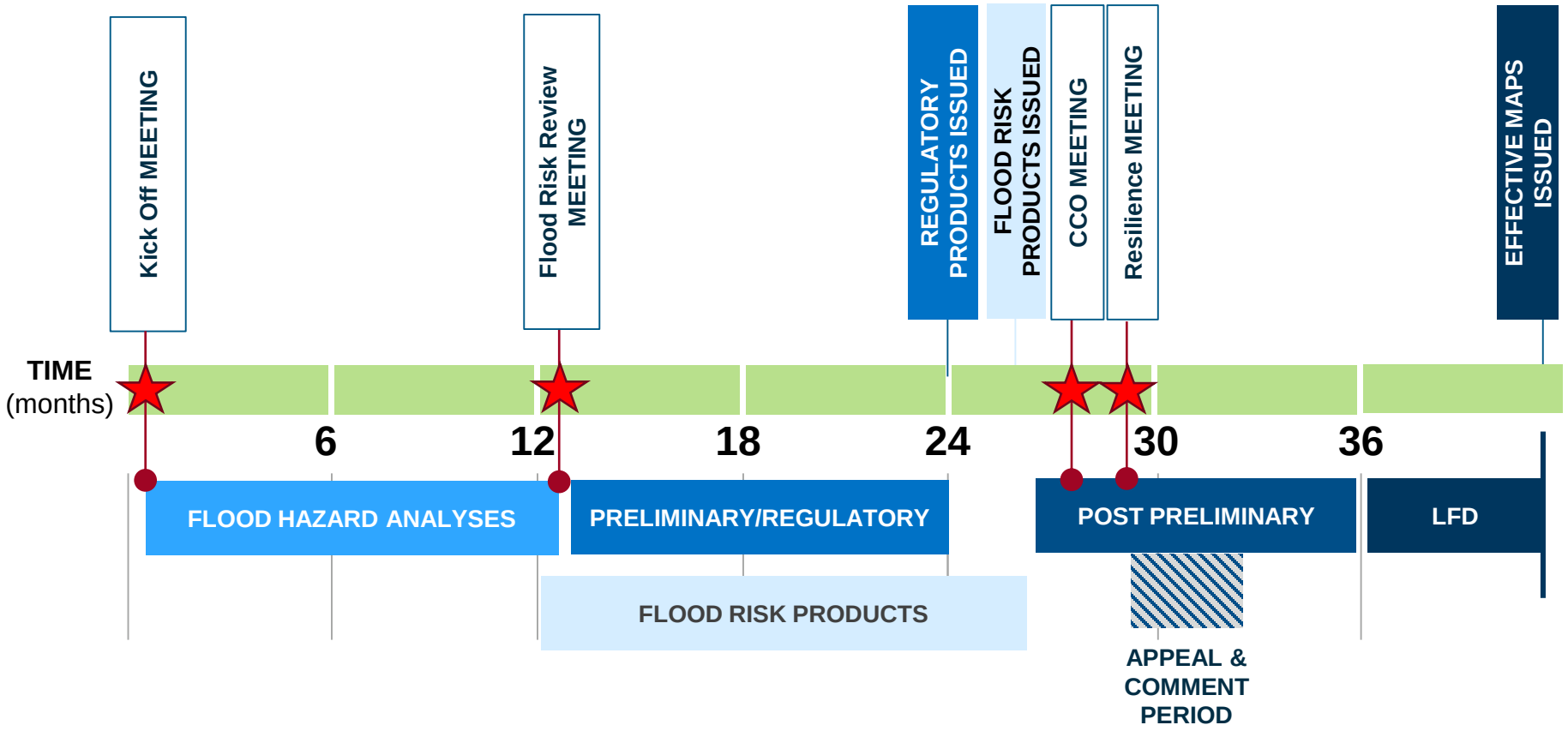
Overall Flood Risk Project Timeline



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)

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What will communities receive?
Regulatory Products

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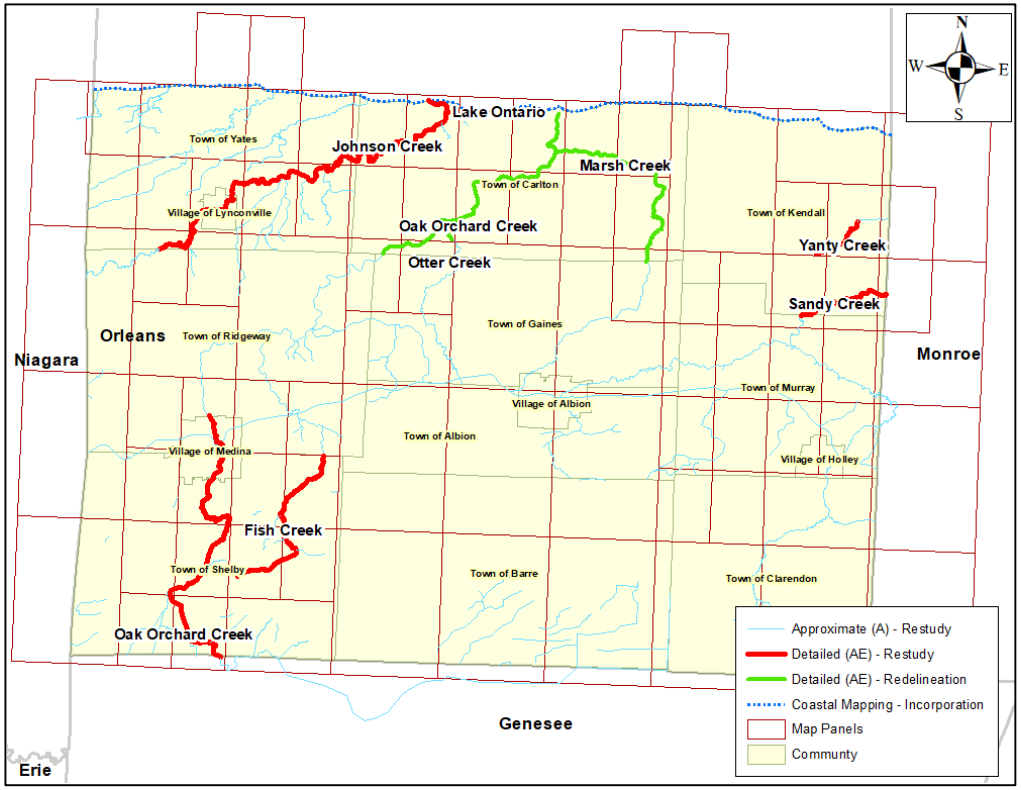
Work Maps

- **Draft floodplain mapping shared using work maps**
- **Flood Risk Review meeting provides a review of the new engineering analysis results, allowing communities to:**
  - Identify potential updates for Hazard Mitigation Plans
  - Provide insight and input on hydrology and hydraulic results in updated study area
  - Seek local buy-in and review possible use of analysis
  - Identify areas of large changes and potential opportunities for risk reduction
  - Identify risk communications needs and options

Regulatory Products

- **Regulatory product development commences after work map comment period**
- **Seamless countywide mapping produced**
  - Lake Ontario Coastal Study
  - This Countywide Riverine Study
- **Digital Flood Insurance Rate Map (DFIRM) Database**
- **86 FIRM Panels**
- **Flood Insurance Study (FIS) Report**



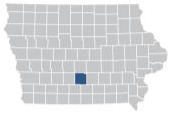
Flood Insurance Rate Map (FIRM)
Example

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_Trnsport_Ln.shp	Shapefile
S_Wtr_Ln.shp	Shapefile
S_XS.shp	Shapefile
Study_Info.dbf	dBASE Table

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



WARREN COUNTY, IOWA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ACKWORTH, CITY OF	190945
BEVINGTON, CITY OF	190273
CARLISLE, CITY OF	190274
CUMMING, CITY OF	190946
DES MOINES, CITY OF	190227
HARTFORD, CITY OF	190589
INDIANOLA, CITY OF	190275
LACONA, CITY OF	190752
MARTENSDALE, CITY OF	190524
MILO, CITY OF [1]	190618
NEW VIRGINIA, CITY OF [1]	190787
NORWALK, CITY OF	190631
SANDYVILLE, CITY OF [1]	190947
SPRING HILL, CITY OF	190949
ST. MARYS, CITY OF [1]	190948
WARREN COUNTY, UNINCORPORATED AREAS	190912

[1]No Special Flood Hazard Areas Identified

REVISED:
NOVEMBER 16, 2018

FLOOD INSURANCE STUDY NUMBER
19181CV000C
Version Number 2.3.3.2

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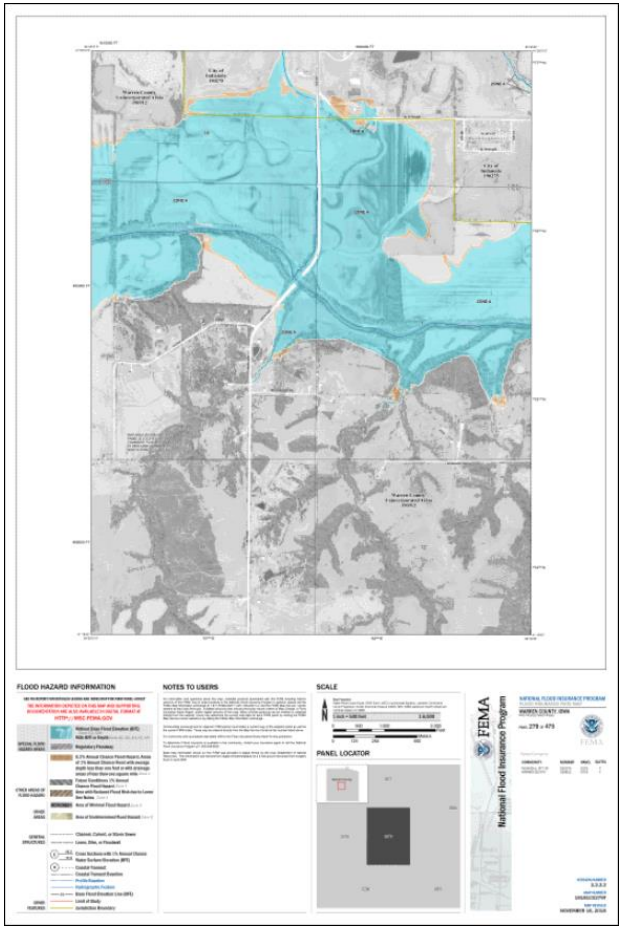

FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

PANEL LOCATOR

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National Flood Insurance Program

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What will communities receive?
Flood Risk Products

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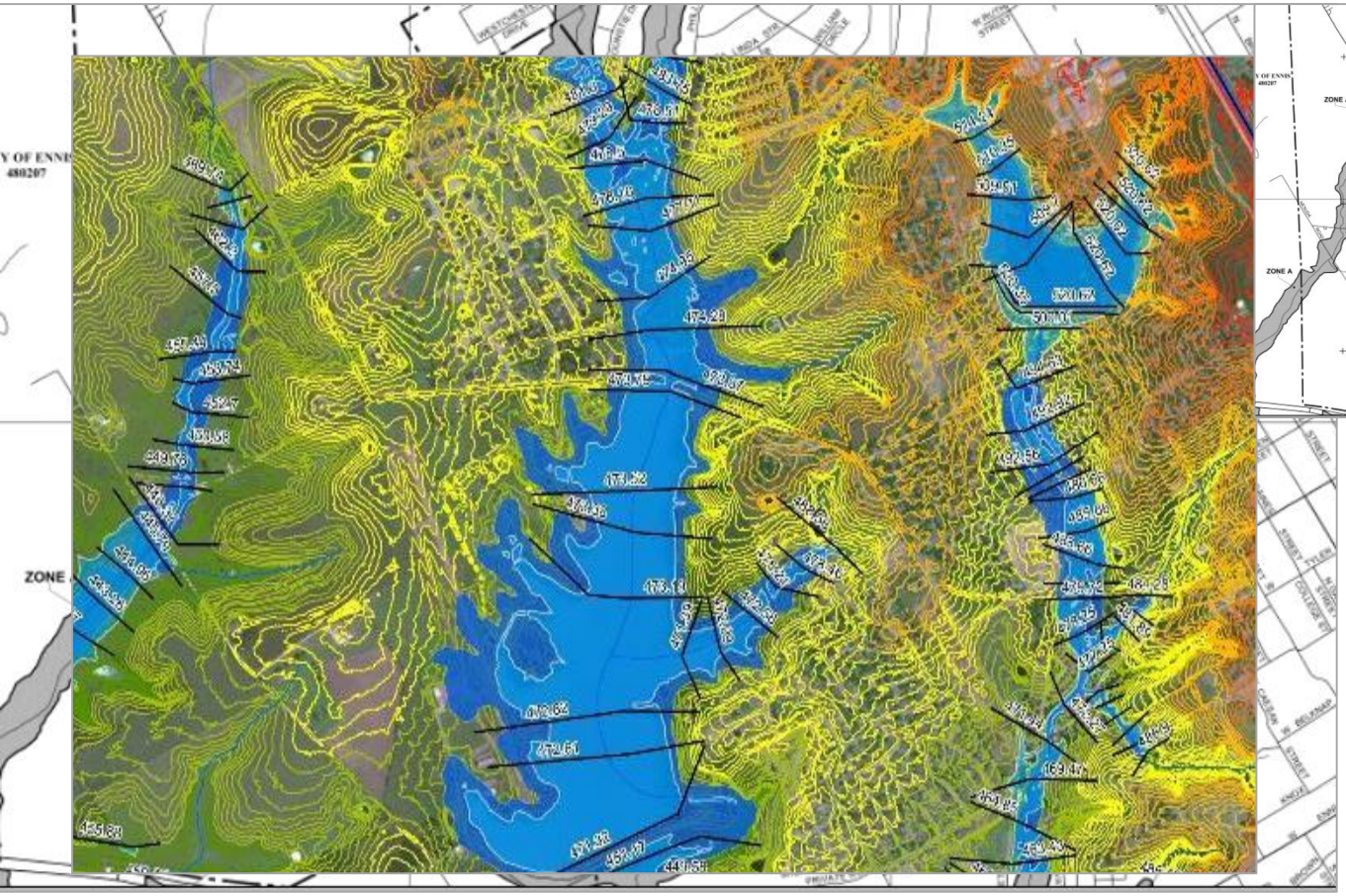
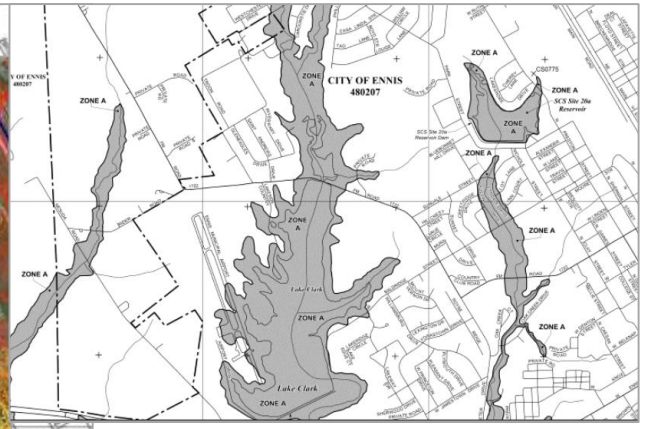
Knowing the Risk

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.

Flood Risk Datasets

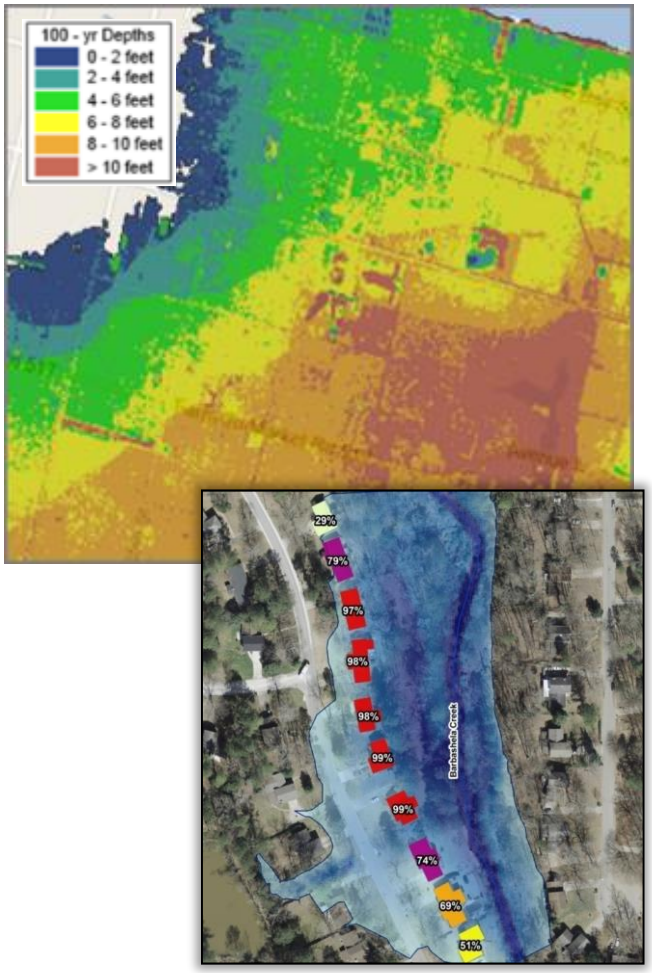




- Water Surface Elevation (WSEL) Grids
- Flood Depth Grids
- Freeboard WSEL Grids
- Annual Percent Chance Grids
- 30 Year Percent Grids
- Flood Risk Assessment

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

- Flood risk products are stored and delivered in GIS format - Geodatabase
- Includes spatial & tabular data
- Facilitates infusion into local GIS systems and analyses

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[2]	Dollar Losses[1]	Loss Ratio[2]	Dollar Losses[1]	Loss Ratio[2]	Dollar Losses[1]	Loss Ratio[2]	Dollar Losses[1]	Loss Ratio[2]
Residential Building and Contents Losses	$422,000,000	71%	$2,500,000	1%	$3,800,000	1%	$4,500,000	1%	$6,200,000	1%	$300,000	N/A
Commercial Building and Contents Losses	$122,800,000	21%	$2,300,000	2%	$3,700,000	3%	$4,200,000	3%	$5,600,000	5%	$300,000	N/A
Other Building and Contents Losses	$45,500,000	8%	$70,000	N/A	$100,000	N/A	$200,000	N/A	$200,000	N/A	$10,000	N/A
Total Building and Contents Losses[3]	$590,300,000	100%	$4,800,000	1%	$7,600,000	1%	$8,800,000	1%	$12,100,000	2%	$700,000	N/A
Business Disruption[4]	$0	N/A	$200,000	N/A	$200,000	N/A	$200,000	N/A	$200,000	N/A	$20,000	N/A
TOTAL[5]	$590,300,000	N/A	$4,900,000	1%	$7,700,000	1%	$8,900,000	2%	$12,100,000	2%	$700,000	N/A

Dam Breach Analysis

- **Up to 5 Medium/High Hazard Dams analyzed**
  - 6 medium hazard,
  - 2 high hazard Dams.
- **Engineering analyses developed for FIRM will be leveraged**
- **Flood Inundation Maps will be developed**

Contacts

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  - 646-490-3929
  - curtis.smith@stantec.com

Questions? Comments?

Thank you!

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