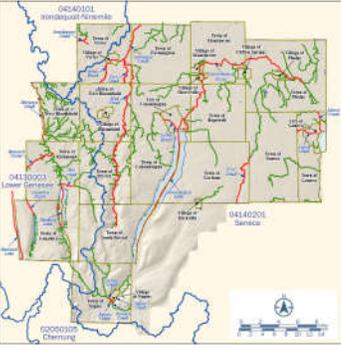


RiskMAP
Increasing Resilience Together



Flood Risk Project

Ontario County, New York,
Hydraulics Results Discussion
September 2020



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Agenda



Recap/Refresh



Hydraulics
Analysis Review



Path Forward



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RiskMAP
Increasing Resilience Together



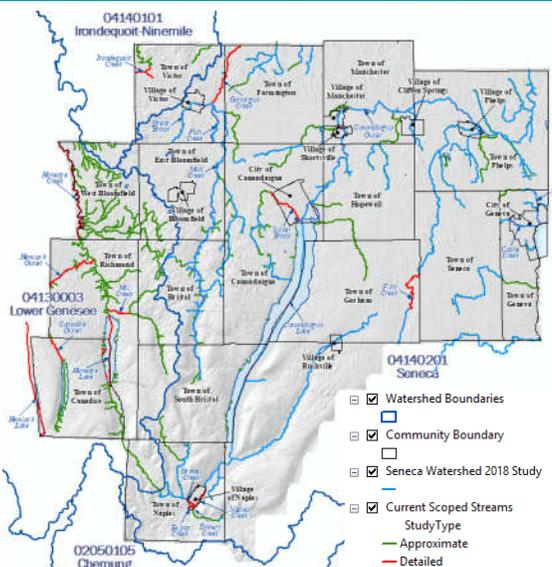
What Have We Done So Far? Recap/Refresh



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Countywide Flood Risk Study *Stream Study Scope*

- ▶ **First time digital countywide maps**
- ▶ **Additional flooding sources analyzed**
 - 41.5 miles - Detailed (AE) streams
 - 187 miles – Approximate (A) streams
 - 12 miles - Lake Gage Analysis
- ▶ **Includes Seneca Watershed study**
- ▶ **29 affected communities**
- ▶ **134 map panels**
- ▶ **Multiple touchpoints**




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Hydrologic Analysis *Detailed Studies*

- ▶ 29 Flooding Sources
- ▶ Hydrologic Analyses
 - Stage-Discharge relationship
 - Hemlock Lake
 - Honeoye Lake
 - Rainfall-Runoff modeling
 - 41 miles
 - USACE's HEC-HMS Program
 - Discharges developed for
 - 10%, 4%, 2%, 1%, 1%+, 1%-, 0.2%

FEMA

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Hydrologic Analysis *Approximate Studies*

- ▶ 290 Flooding Sources
- ▶ Hydrologic Analyses
 - State of New York Region 5 Regression Equations
 - Streamstats – GIS web based application @ <https://streamstats.usgs.gov/ss/>
 - Discharges developed for
 - 10%, 4%, 2%, 1%, 1%+, 1%-, 0.2%

FEMA

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RiskMAP
Increasing Resilience Together

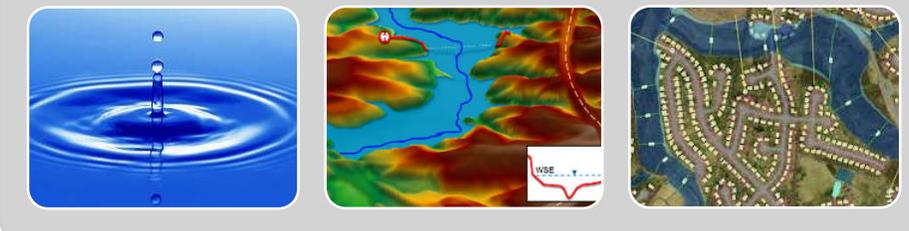


Where are we now?
Hydraulics Analysis Review



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Flood Hazard Analysis



<p>Hydrology</p> <p>Volume of water? Peak Flows?</p> <p>When will storm water or runoff make it to the stream?</p>	<p>Hydraulics</p> <p>Will the stream in question be able to convey all storm water or runoff that arrives?</p>	<p>Floodplain Mapping</p> <p>What areas of a community will be inundated based on engineering analysis?</p>
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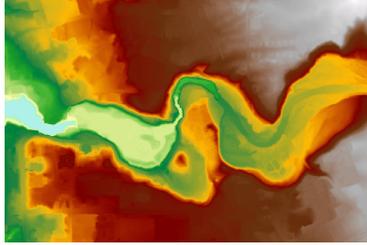
Data Sources – Base maps

▸ Topography

- 5-meter Digital Elevation Model from New York State (2006) and 2ft contours
- Shared comparison of LiDAR and survey in December 2019

▸ Aerial Imagery

- New York Statewide Digital Orthoimagery Database (2019)





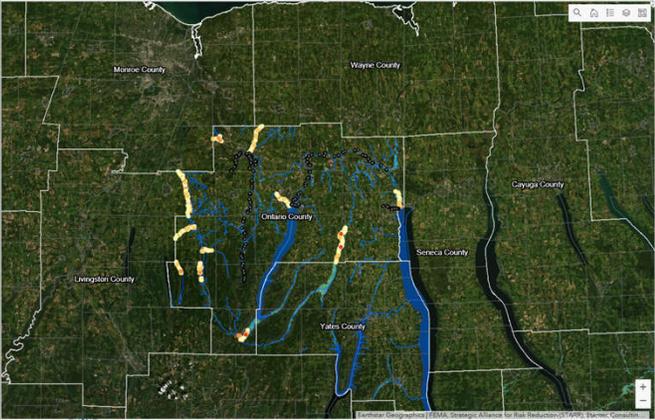
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LiDAR vs Survey Data Comparison

<https://region2-fema.opendata.arcgis.com/>

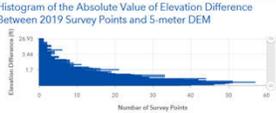
Survey Point & DEM Elevation Comparison - Ontario County, NY



2019 Survey Points and 5-meter DEM

Number of Visible 2019 Survey Points: 5,583

Average Difference: 1.102



Histogram of the Absolute Value of Elevation Difference Between 2019 Survey Points and 5-meter DEM

Click on a bar to see the associated points on the map. Use the scroll bar on the right to zoom in on parts of the graph.

Statistical Comparison of 2019 Survey Points Against 2006 LiDAR 5-Meter DEM Elevations

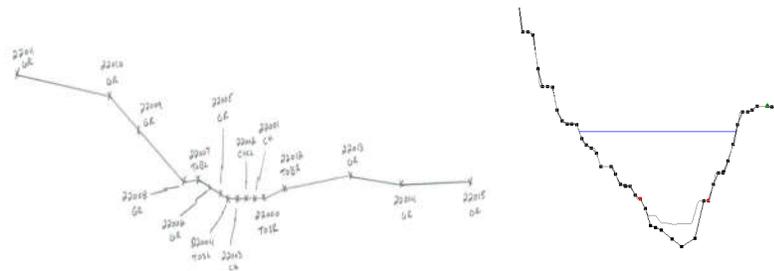
Survey Point	Count	Minimum	Maximum	Mean	Std. Dev.
Ground	3,302	-26.93	+7.37	-0.36	1.34
Road Centerline	432	-15.23	+0.27	-0.91	1.75
Top of Bank	12	-0.97	+0.19	-0.62	0.35
Top of Bank Left	454	-19.76	+3.89	-1.04	1.68
Top of Bank Right	454	-8.66	+5.43	-0.88	1.36
Toe of Slope	16	-1.27	+2.58	+0.66	0.93
Toe of Slope Left	461	-3.69	+10.87	+1.81	1.52
Toe of Slope Right	452	-1.12	+8.56	+1.95	1.51
All Points	5,583	-26.93	+10.87	-0.13	1.70


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Data Sources - Survey

- ▶ **Channel and floodplain geometry**
 - For approximate reaches, extracted from LiDAR data
 - Updated with field reconnaissance measurements
 - For detailed reaches, survey data incorporated



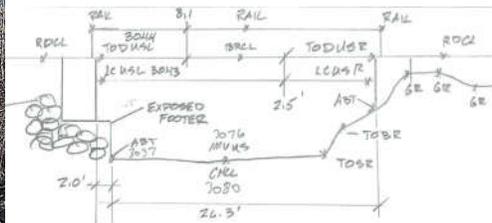
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Data Sources - Structures

- ▶ **Bridges, culverts, and dams**
 - New York State's Inventory of Dams (approximate reaches)
 - NYDOT Bridge Inventory (approximate reaches)
 - Field reconnaissance (approximate reaches)
 - Survey (detailed reaches)



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Data Sources - Field Reconnaissance

- 3 days of field visits in December 2019
- Site conditions observations
 - Roadway deck thickness
 - Channel – brush, grass, river cobbles?
 - Floodplain – grass, development, trees?



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Data Sources – Field Reconnaissance

- **Field Reconnaissance**
 - Identified 31 most “critical” bridges or culverts and lakes and outlets
 - In proximity to homes, schools, or other buildings
 - Preliminary modeling shows that structures affect flooding elevations



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Data Sources

► Mannings “n”

- For approximate reaches, land use from National Land Cover Database (2016)
- For detailed reaches, further refined using aerial imagery/ Survey data and field visit

NLCD Grid code	NLCD Description	N-Value (Channel)	N-Value (Overbank)
11	Open Water	0.030-0.050	0.030-0.050
71	Herbaceous Grassland	0.030	0.020-0.100
31	Barren (Rock/Sand/Clay)	0.035	0.020-0.100
81	Pasture/Hay	0.035	0.040-0.150
82	Cultivated Crops	0.035	0.035-0.100
21	Developed open space (lawn, <20% impervious)	0.050	0.035-0.150
22	Developed, Low Intensity (20-49% impervious)	0.050	0.020-0.150
52	Shrub/Scrub	0.050	0.070-0.140
95	Emergent Herbaceous Wetlands	0.070	0.035-0.150
23	Developed, Med Intensity (50-79% impervious)	0.035	0.020-0.110
90	Woody Wetlands	0.070	0.035-0.015
24	Developed, High Intensity (80-100% impervious)	0.035	0.020-0.140
41	Deciduous Forest (tall trees >20% of cover)	0.050	0.045-0.150
43	Mixed Forest (tall trees >20% of cover)	0.050	0.035-0.150
42	Evergreen Forest (tall trees >20% of cover)	0.050	0.110-0.150



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Modeling Approaches



► USACE’s HEC-RAS 5.0.7

► Boundary Conditions

- 1D – Known water surface elevation (to tie-in to adjacent studies) or normal depth slope



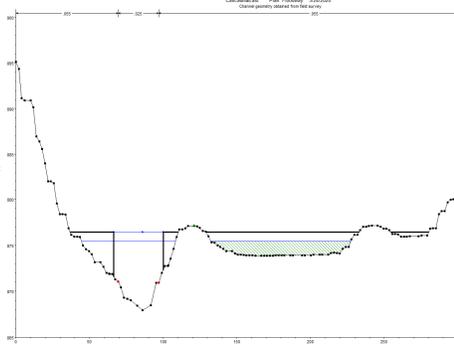
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Floodway Analysis

- ▶ Detailed Streams only
- ▶ Encroachments placed to achieve target 1.0' rise



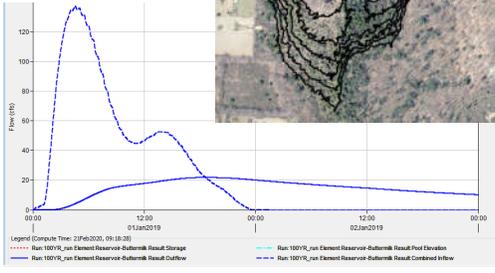


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Volumetric Analysis

- ▶ Pond-Like / Storage Areas
 - Use topography data to find volume that basin can hold
 - Use hydrology to find the volume of runoff entering basin
 - Create a stage-storage curve to find elevation within basin


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Hydraulics Report

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Results of the Study

- ▶ **New countywide floodplains data**
 - Expanded floodplain coverage
 - Added additional streams with Base Flood Elevations
 - Continuous modeling and mapping outside of community boundaries
 - To support future community development
 - Includes 500-year floodplain

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Floodplain Mapping Comparisons

- ▶ **New countywide digital data**
 - Previous maps produced in 1970s-1980s
 - Reason for changes in Floodplains and Base Flood Elevations (BFEs)
 - New Topography
 - Channel and Structure Survey
 - Changes to Land Use
 - Changes to Rainfall
 - Detailed Hydrologic and Hydraulic Analysis


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Summary at Community level

Current Study

CID *	POL_NAME1
360597	City of Canandaigua
360599	City of Geneva
361414	Town of Bristol
361297	Town of Canadice
360598	Town of Canandaigua
361298	Town of East Bloomfield
361299	Town of Farmington
360600	Town of Geneva
360601	Town of Gorham
361300	Town of Hopewell
361301	Town of Manchester
360602	Town of Naples
361302	Town of Phelps
360604	Town of Richmond
361248	Town of Seneca
360606	Town of South Bristol
361249	Town of Victor
360607	Town of West Bloomfield
361450	Village of Clifton Springs
361014	Village of Manchester
360603	Village of Naples
360605	Village of Shortsville

Studied in 2018

CID *	POL_NAME1
361850	Village of Bloomfield
361450	Village of Clifton Springs
361050	Village of Phelps
360964	Village of Rushville
360964	Village of Rushville
361648	Village of Victor

★ Minor Updates only


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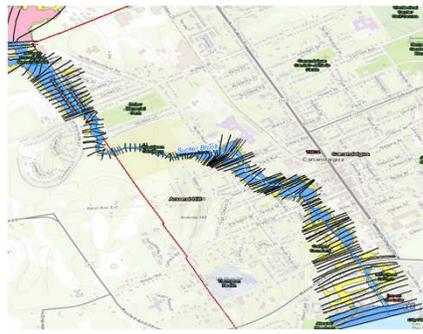

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City of Canandaigua – Sucker Book

Effective Maps



New Maps



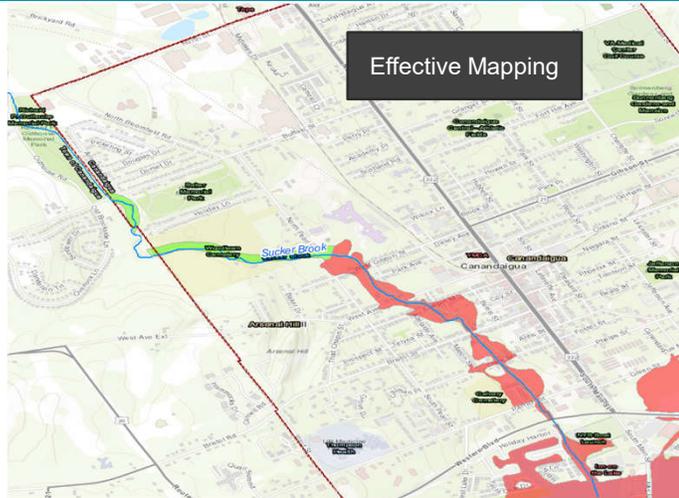
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City of Canandaigua

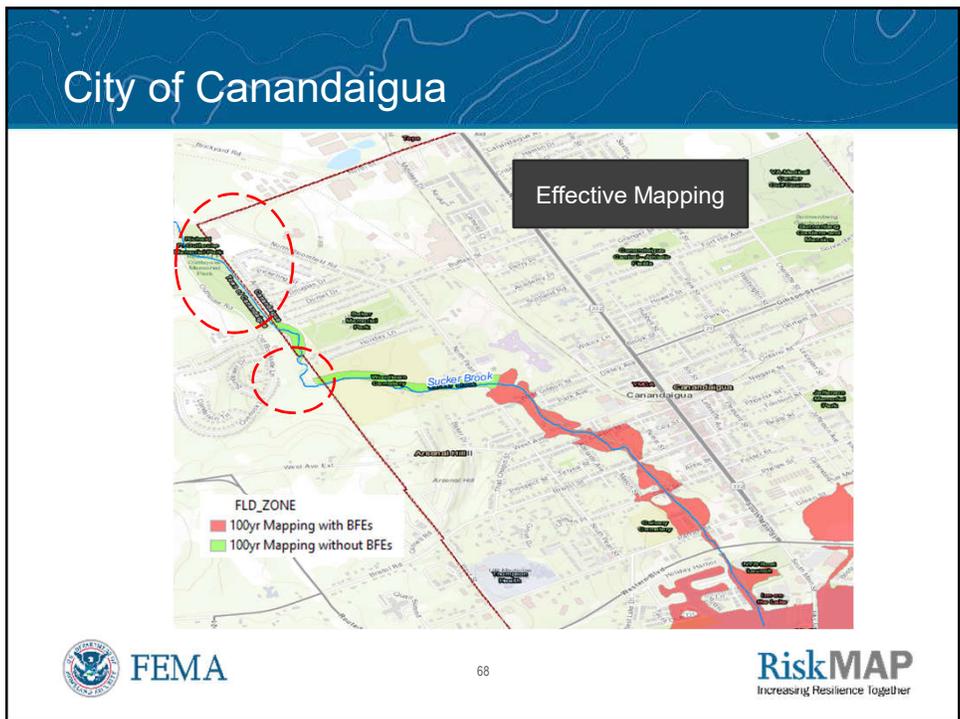
Effective Mapping



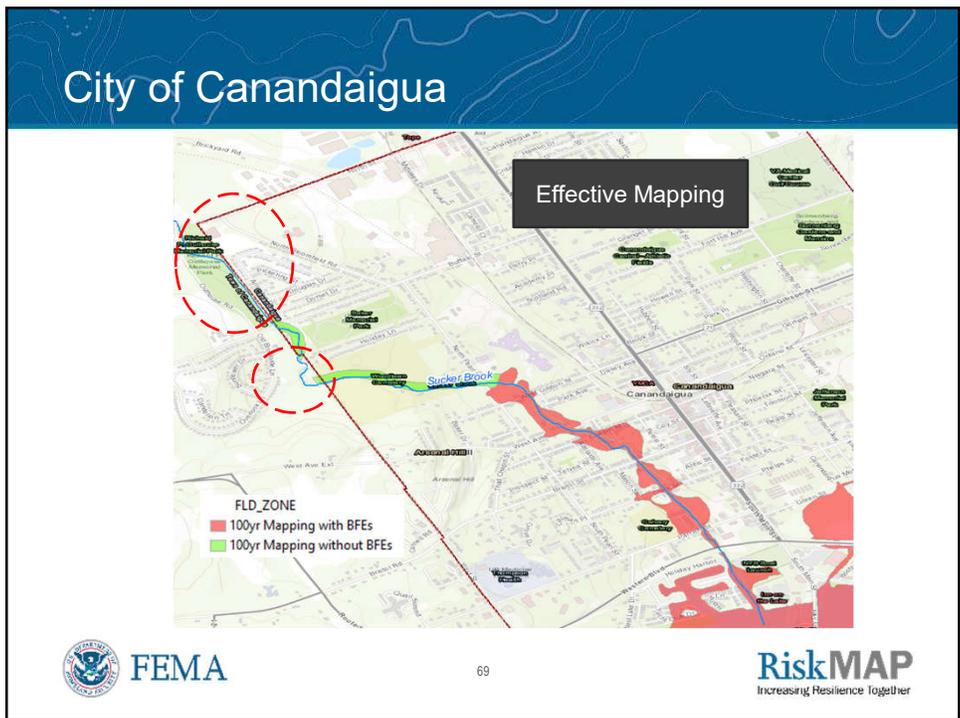
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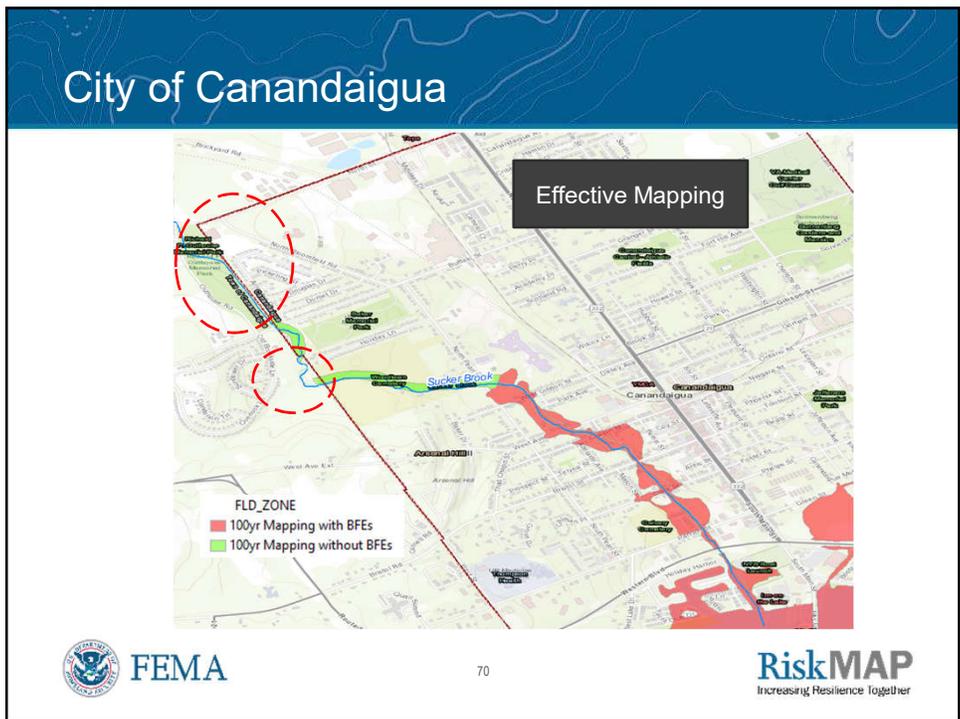
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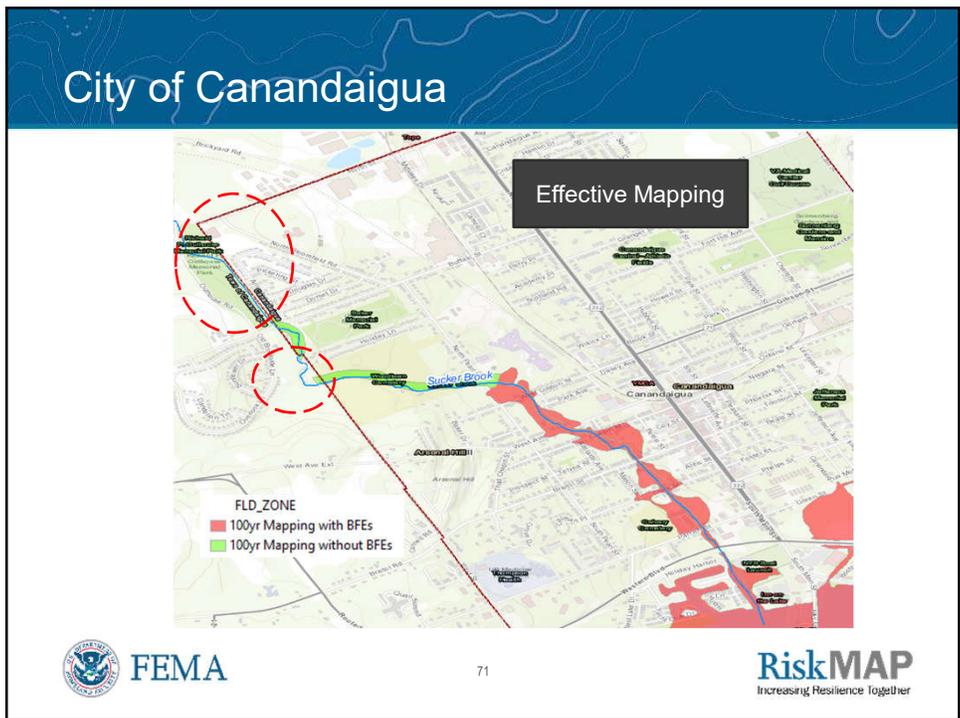
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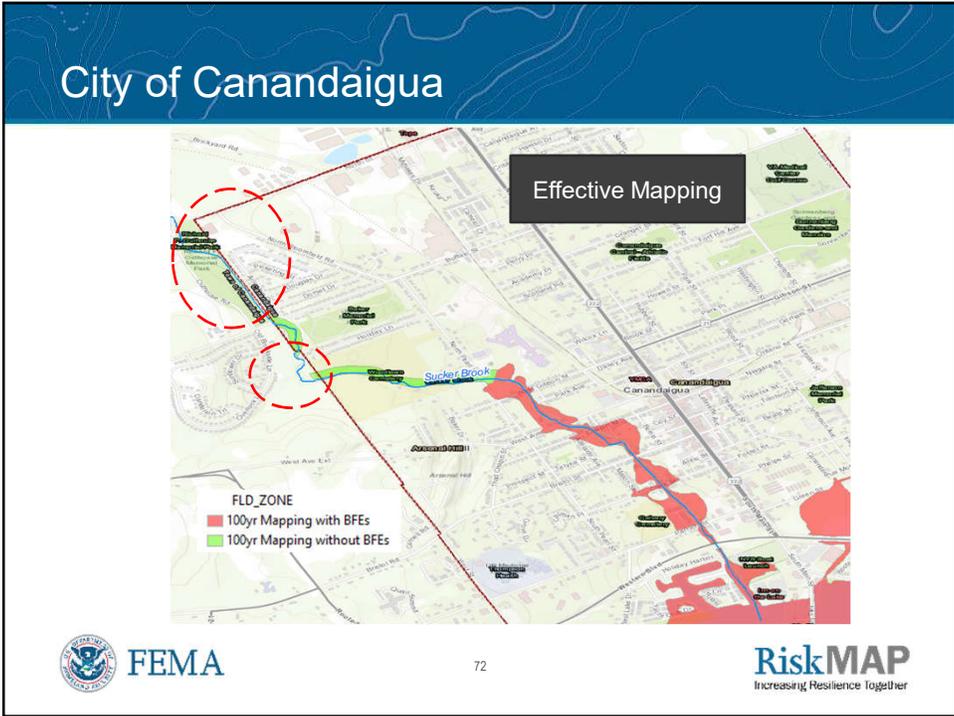
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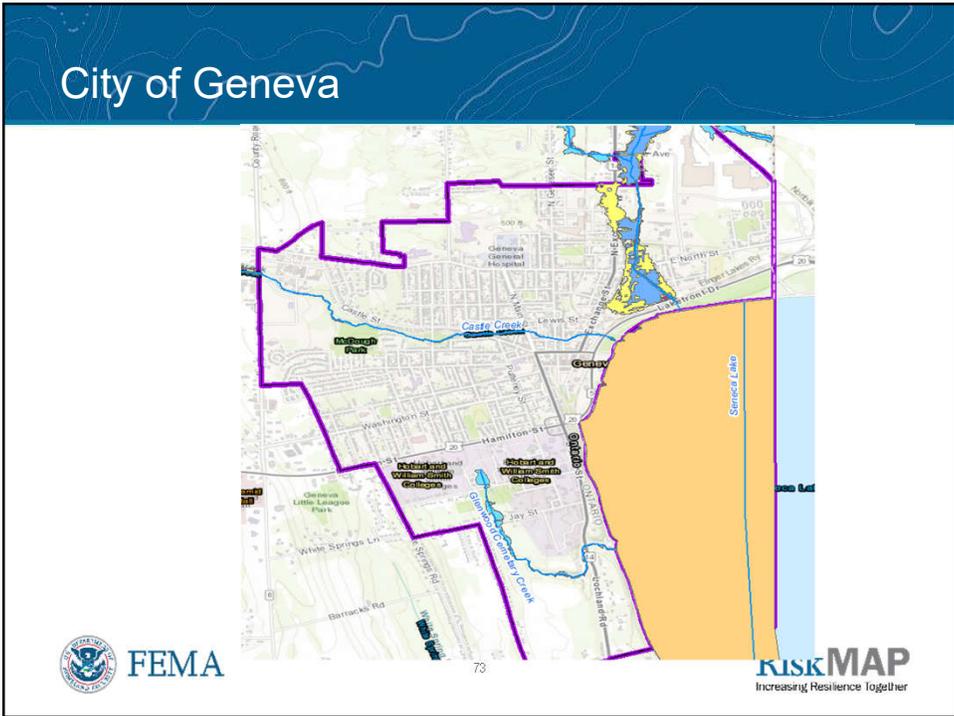
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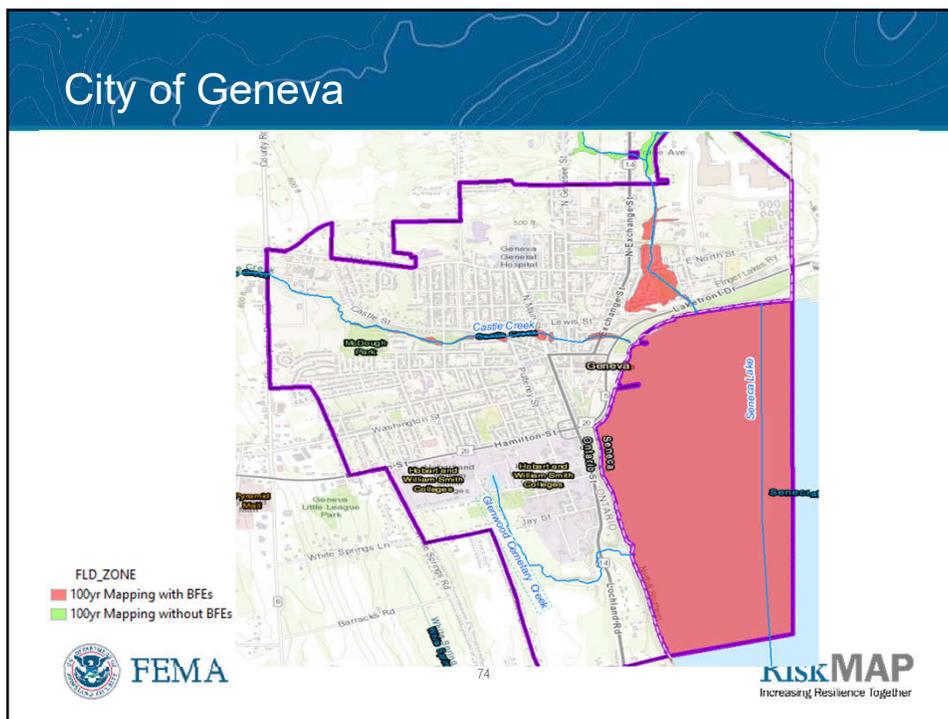
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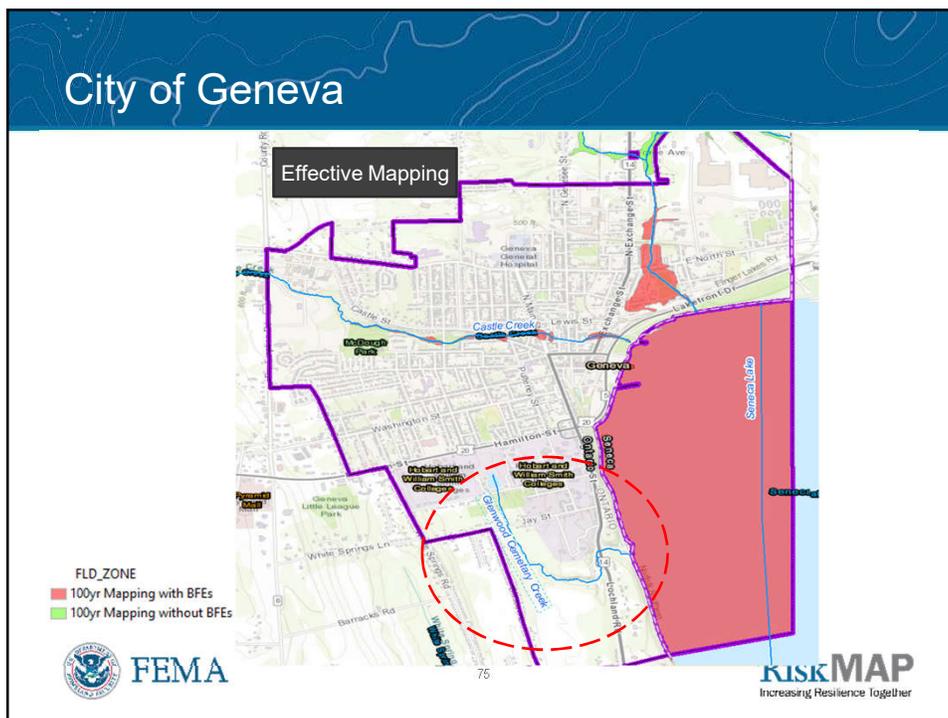
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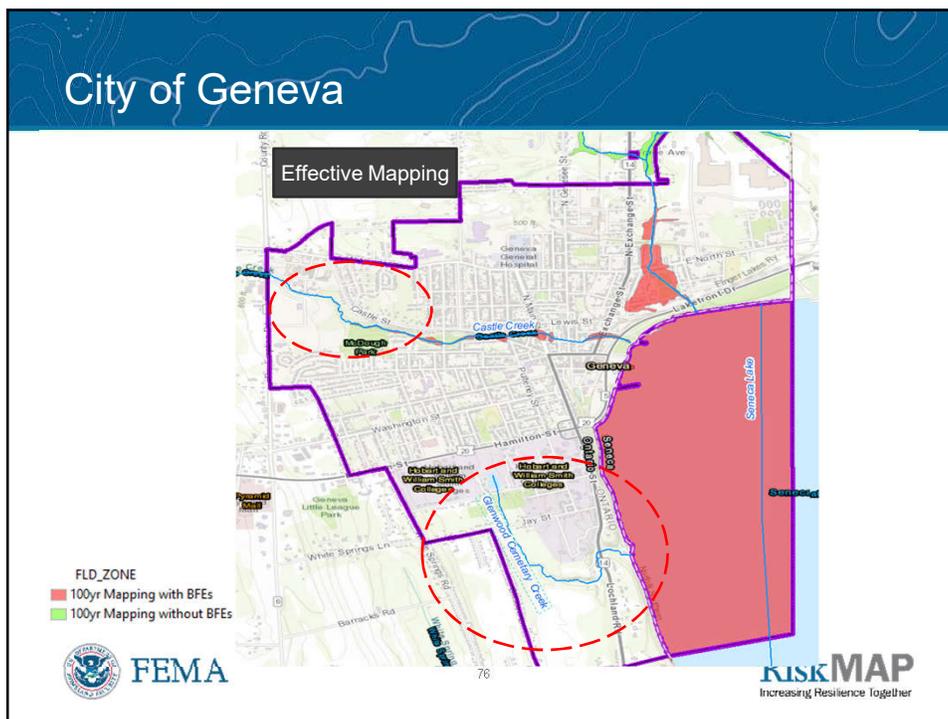
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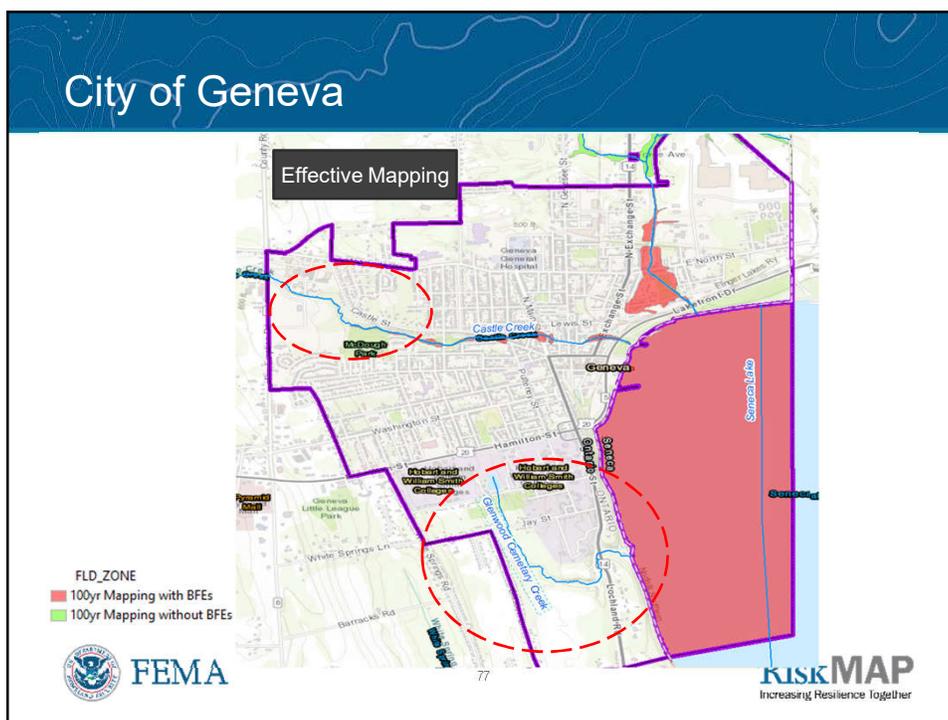
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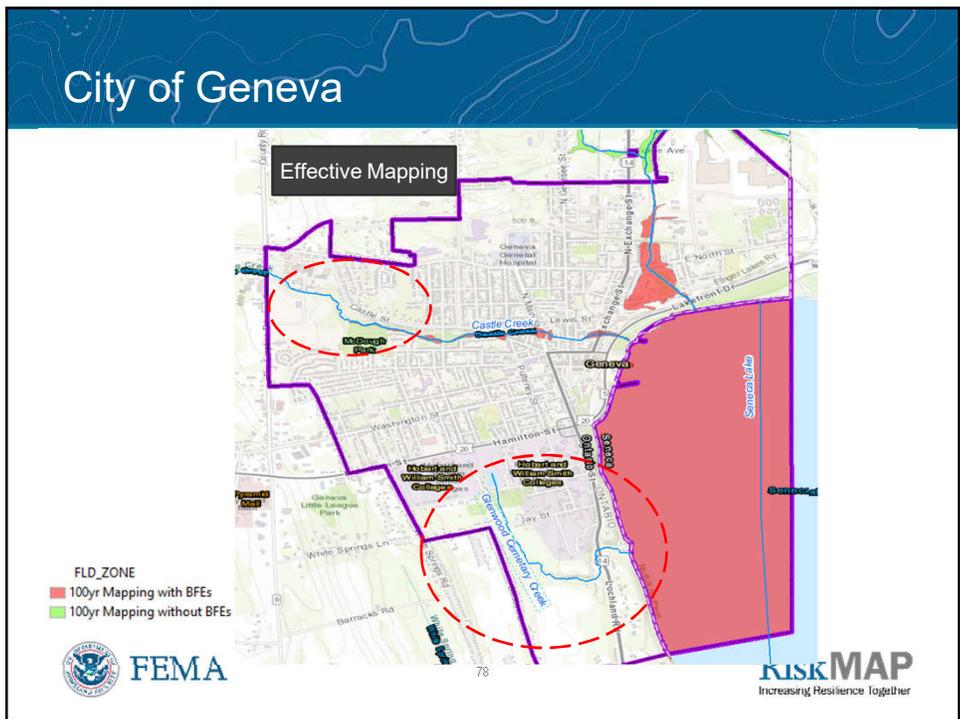
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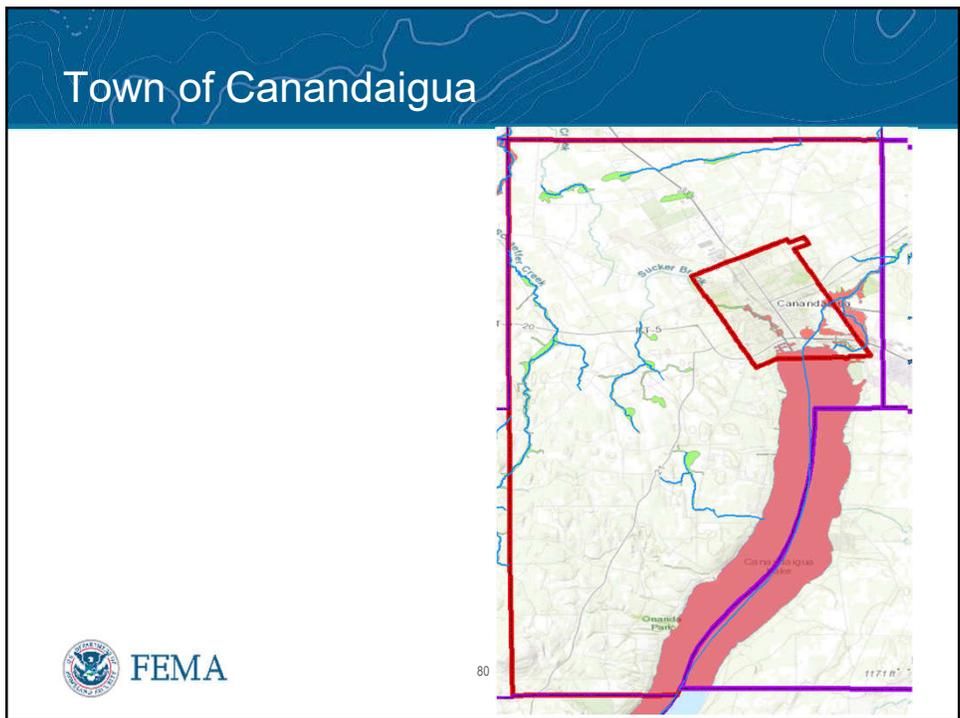
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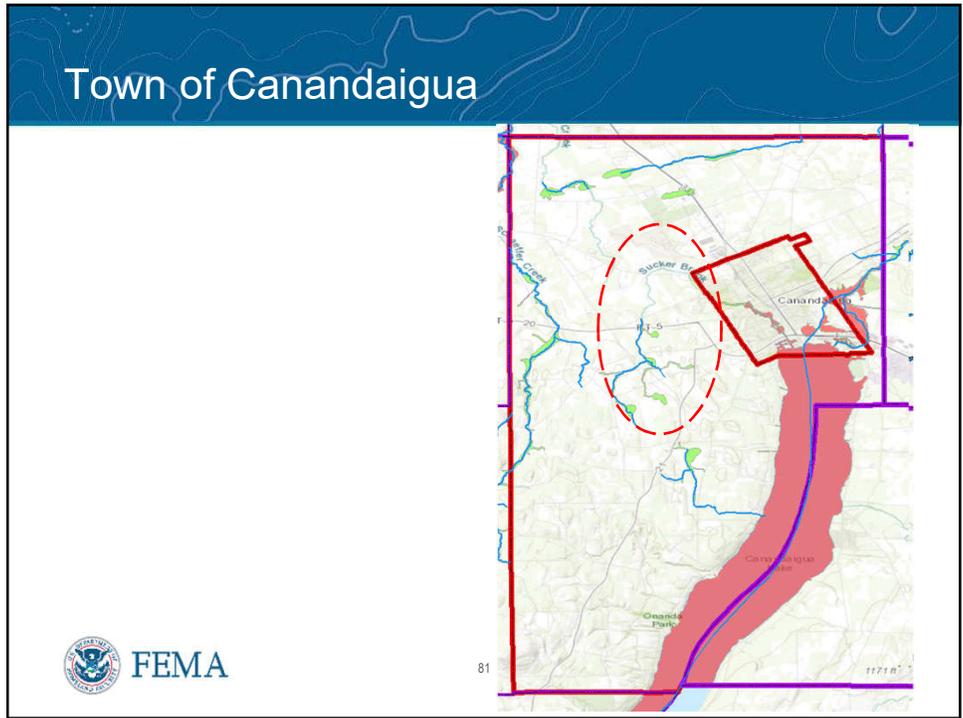
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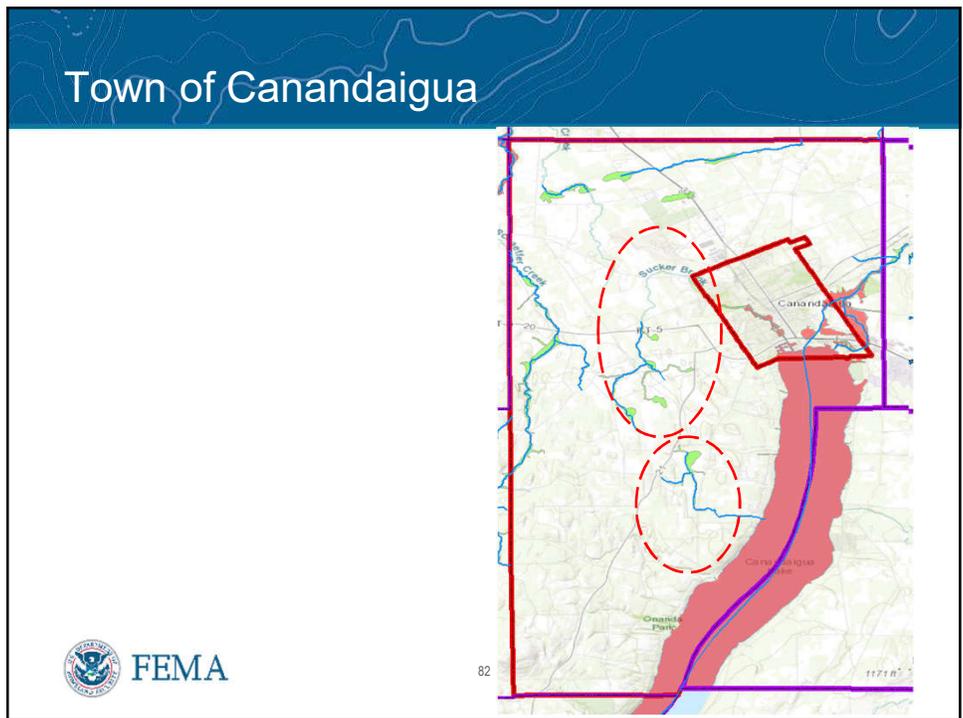
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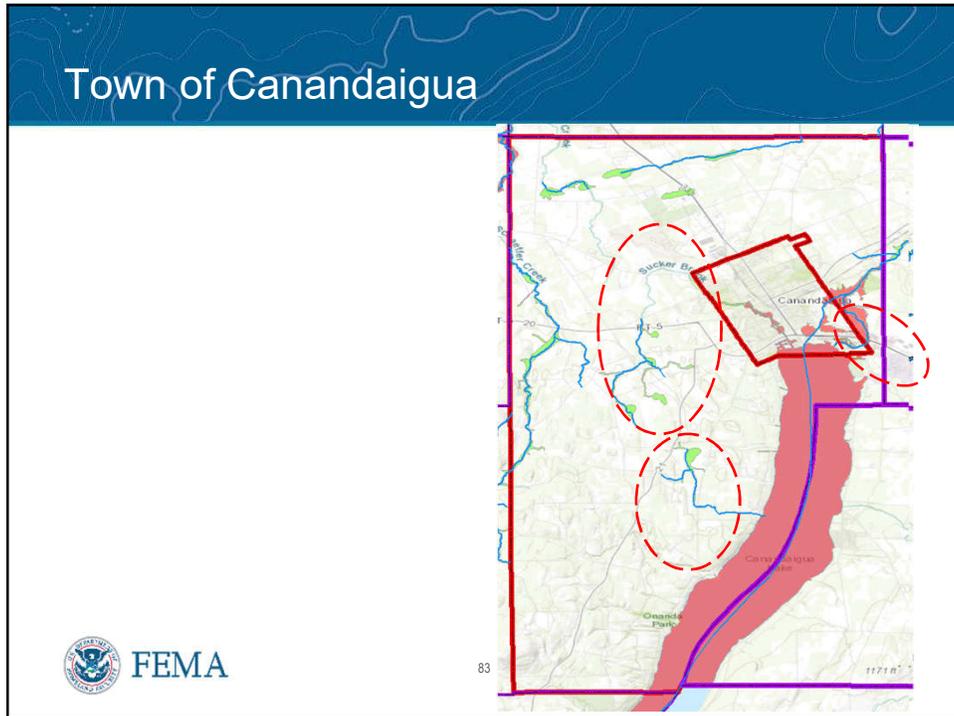
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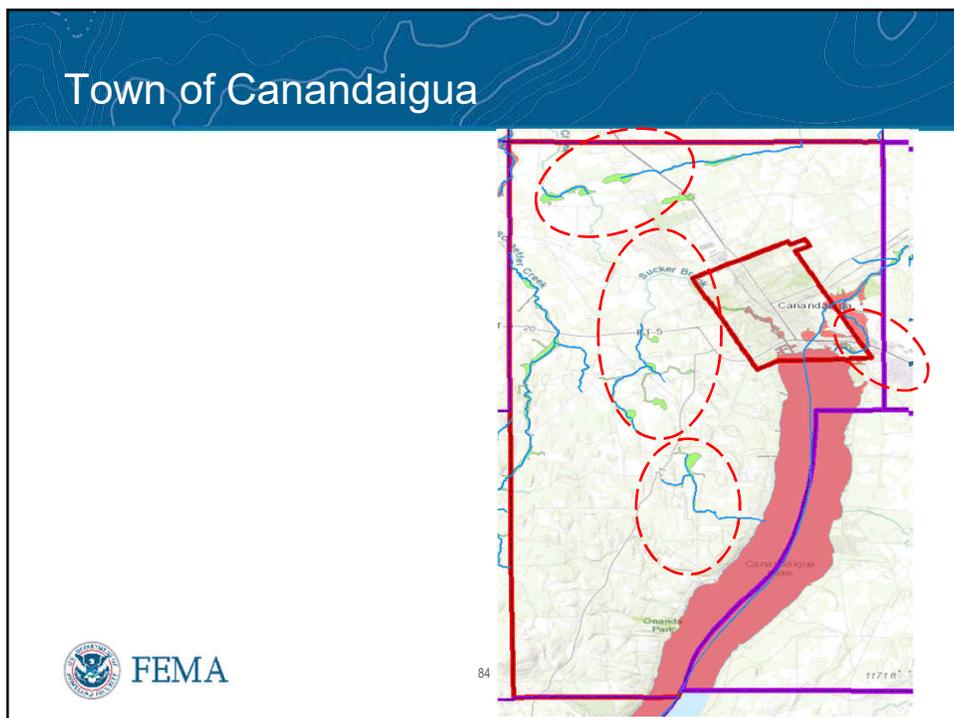
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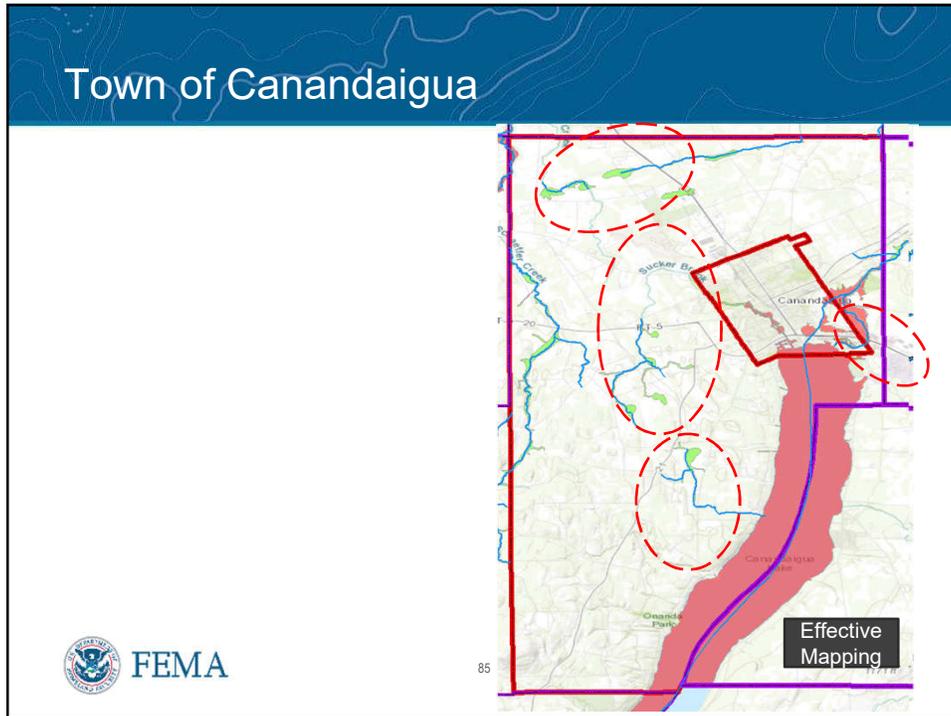
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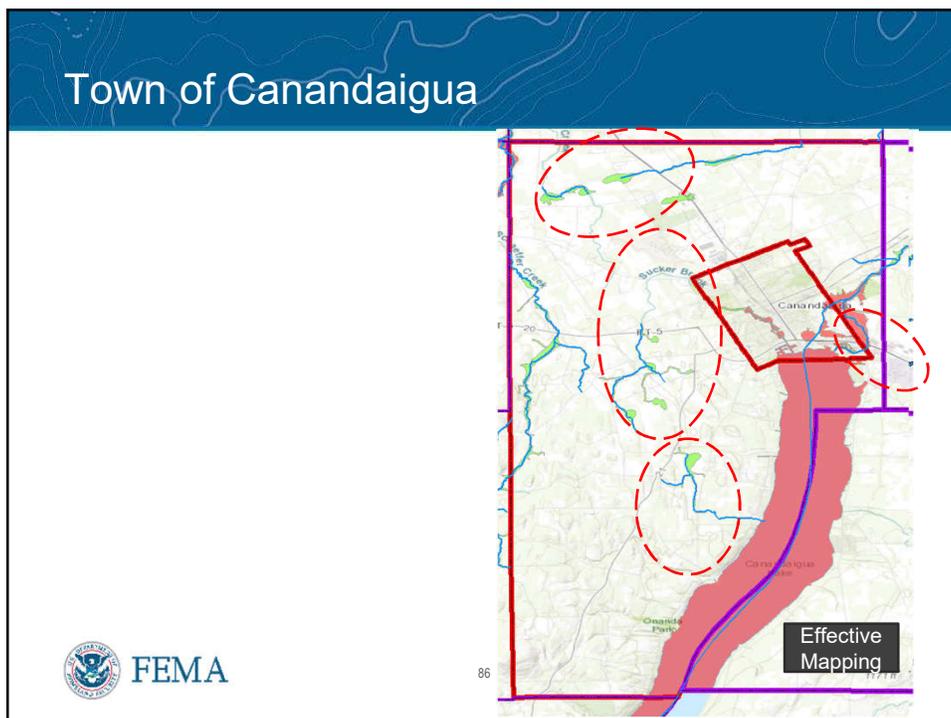
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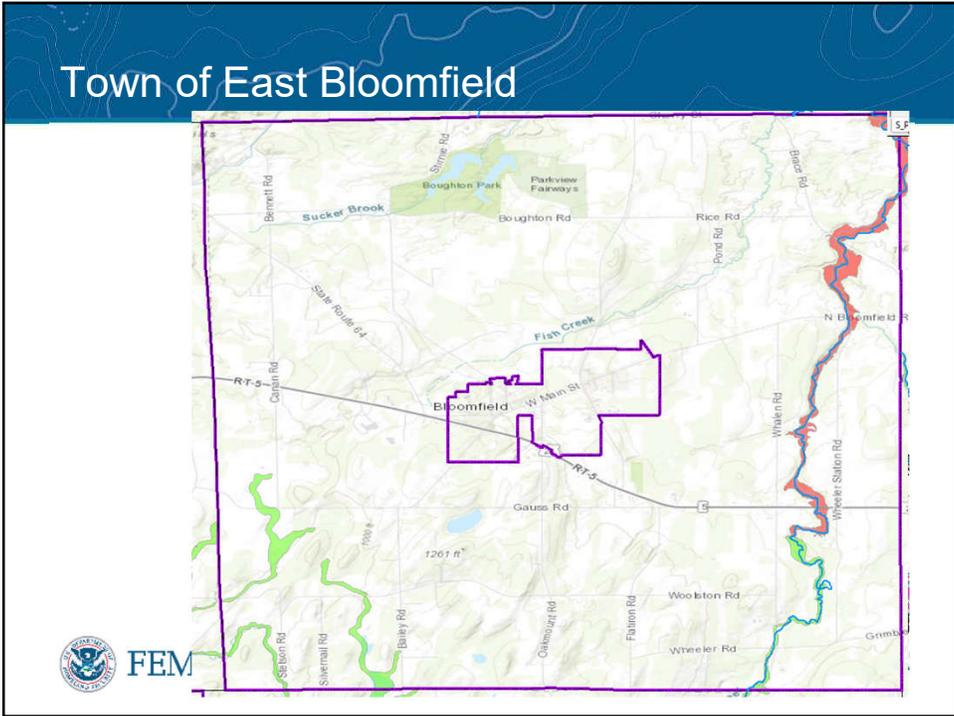
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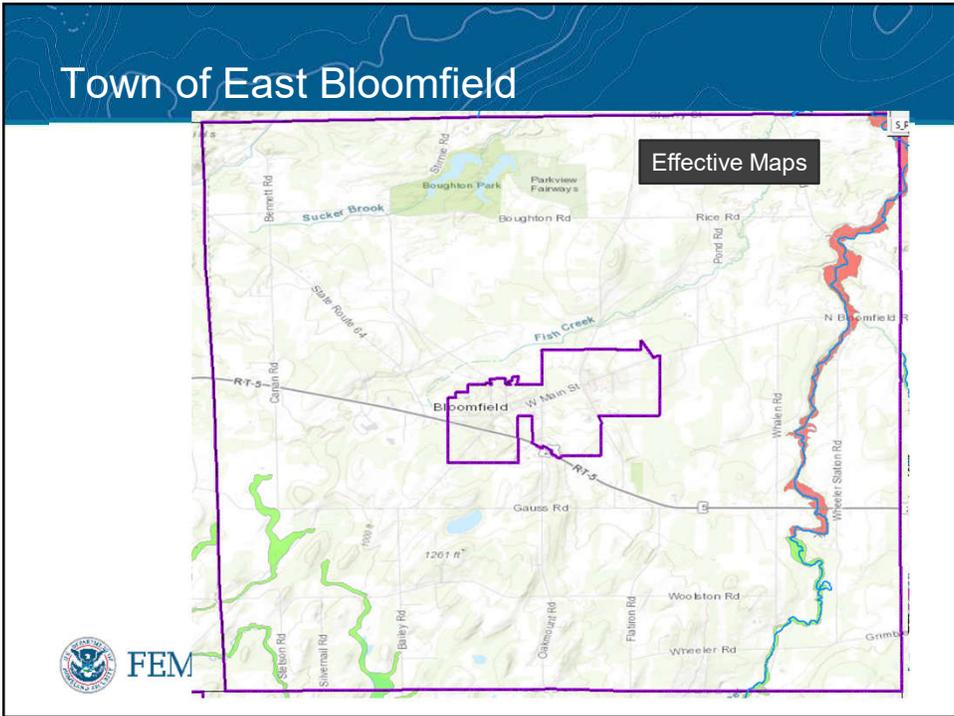
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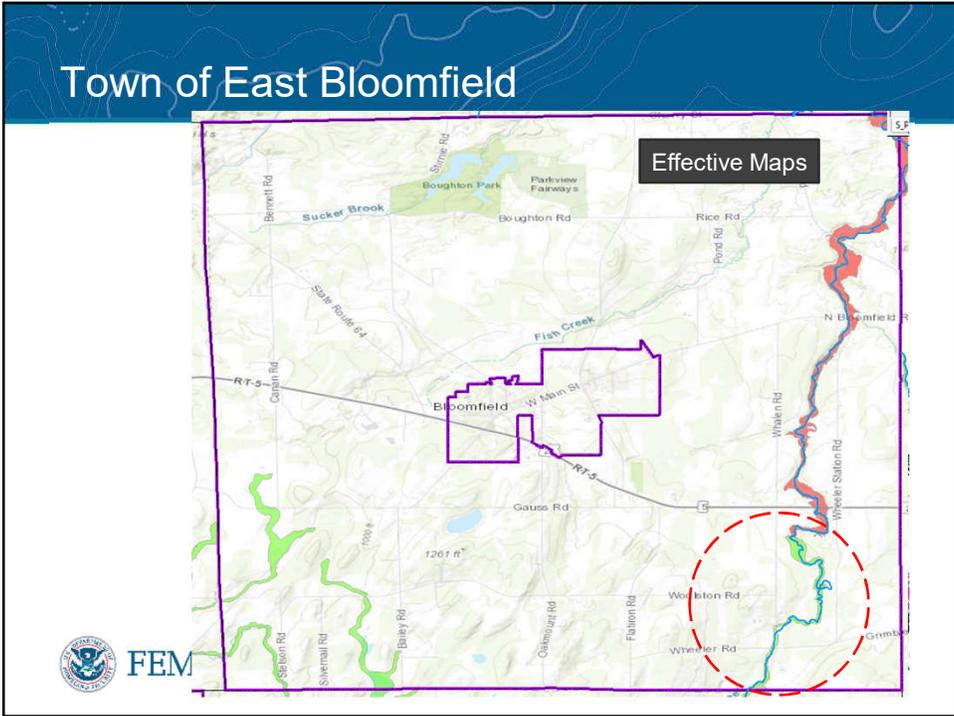
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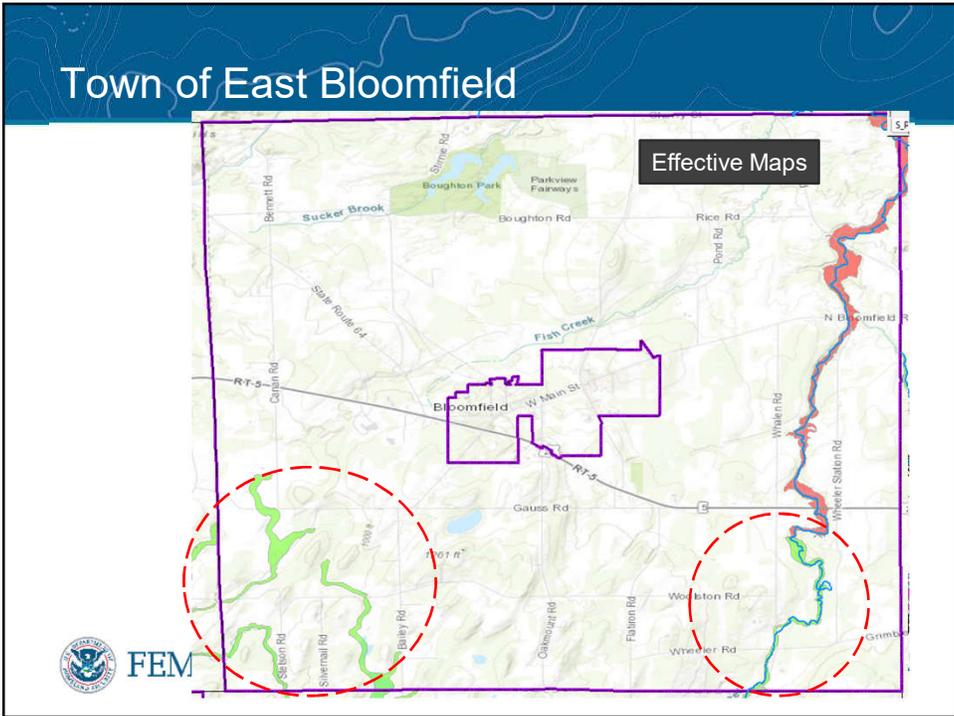
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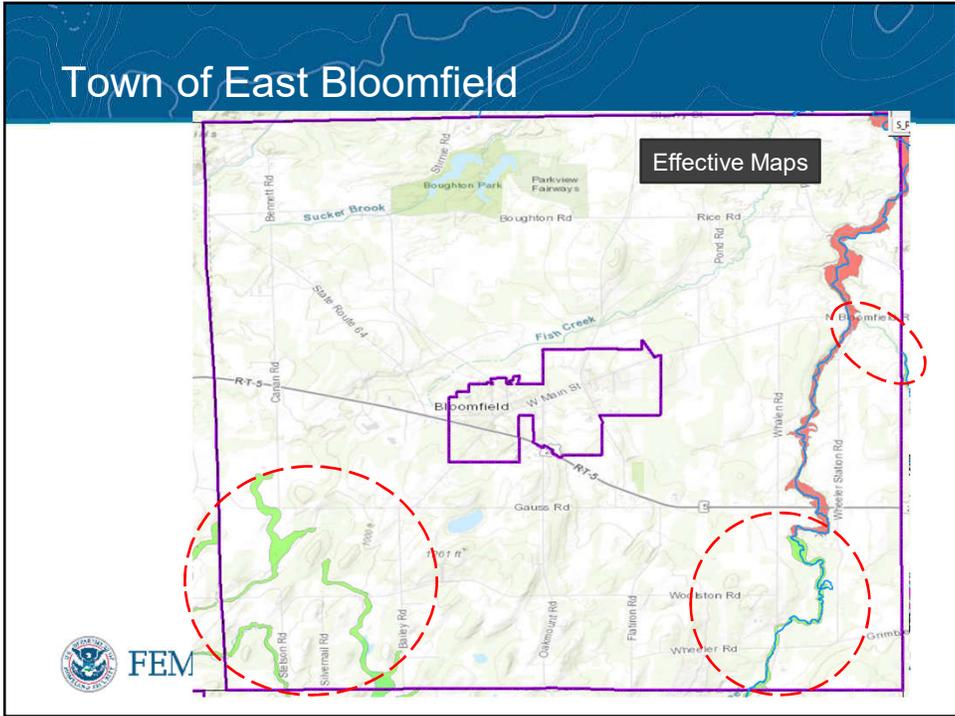
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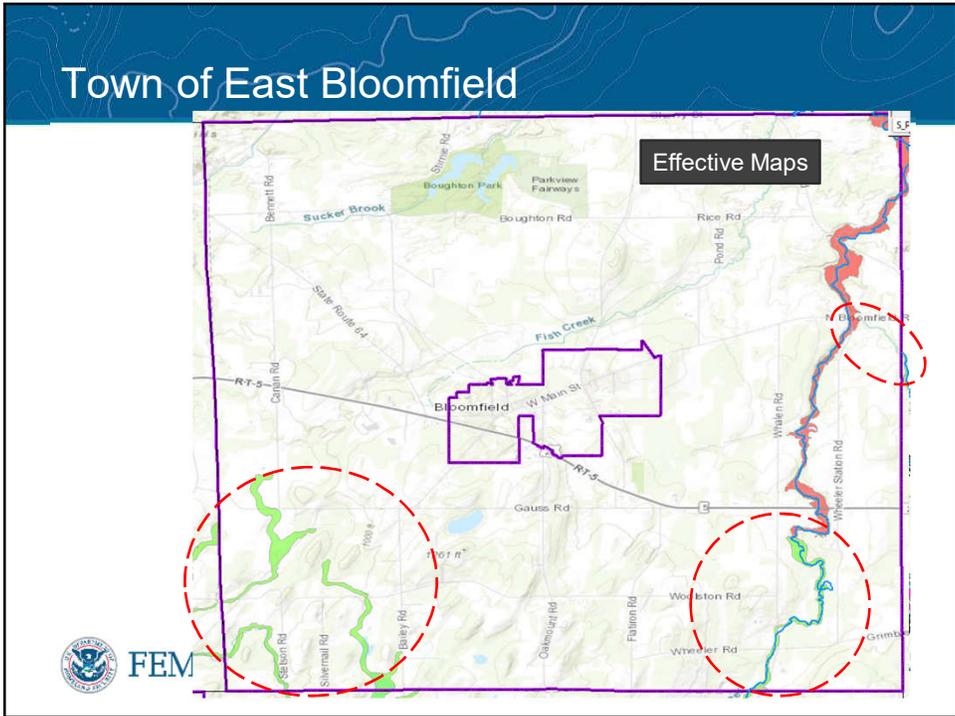
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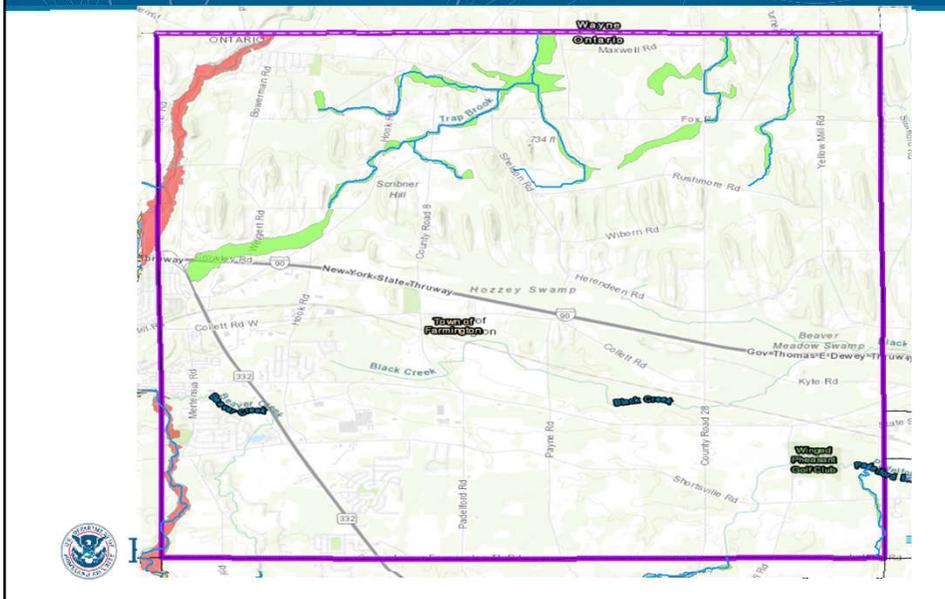


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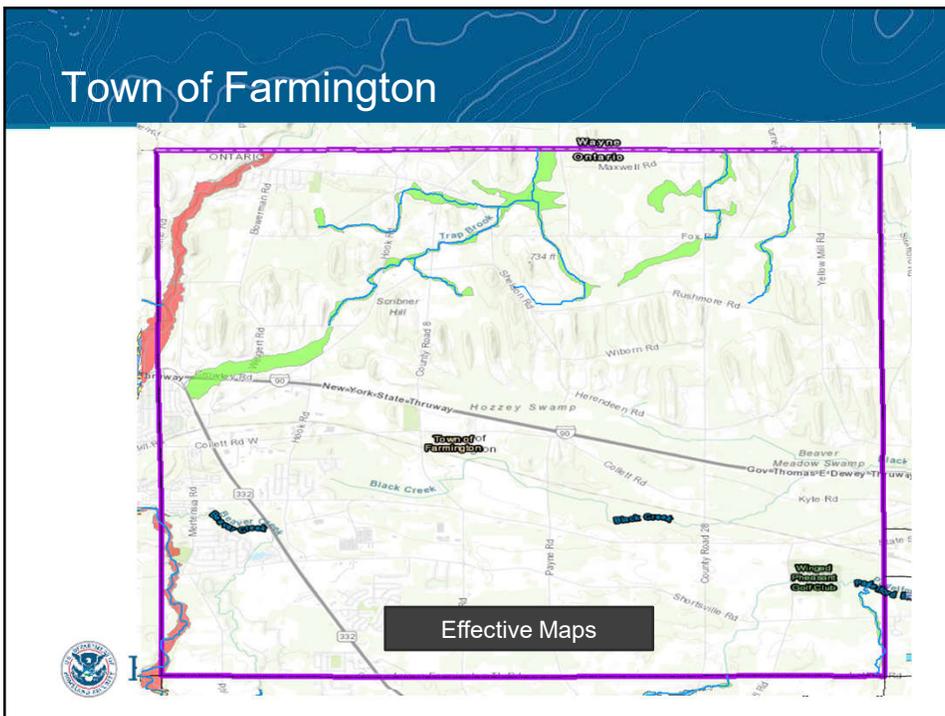
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Town of Farmington

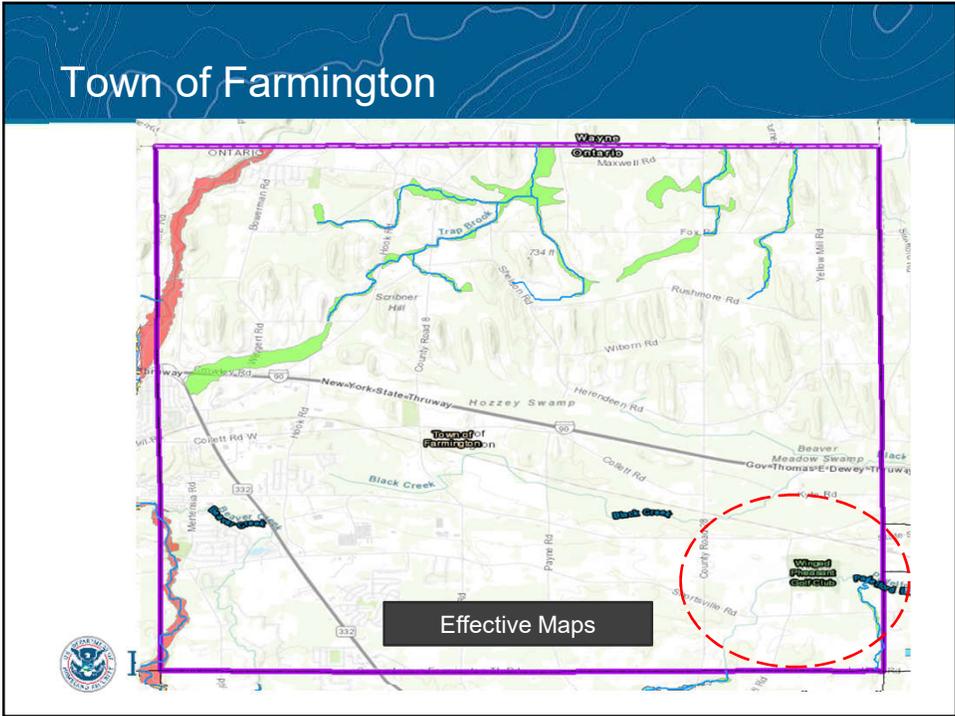


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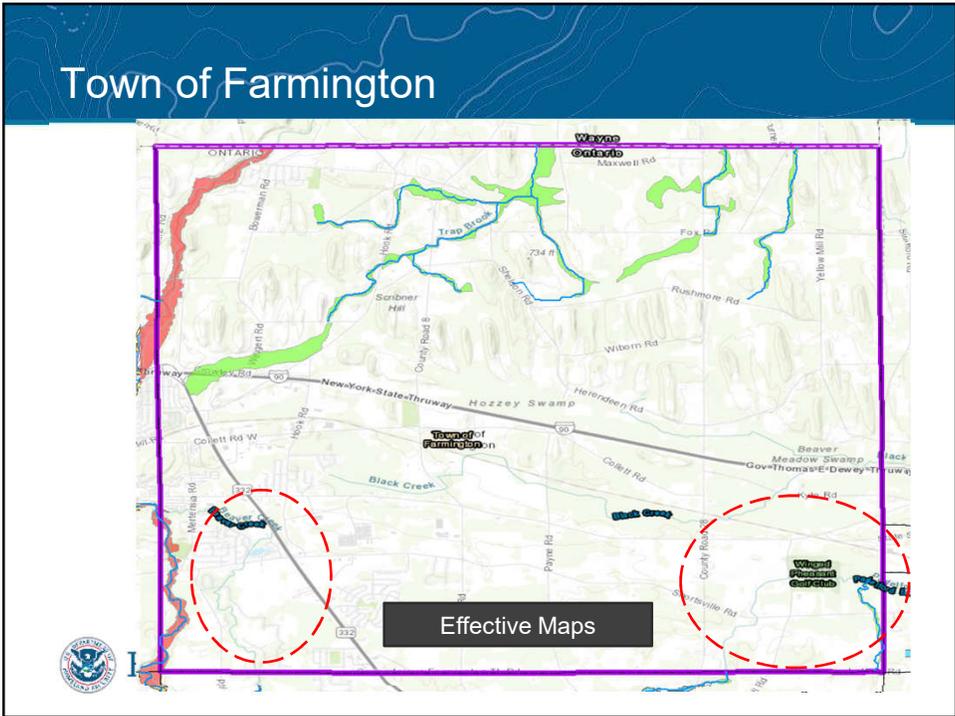
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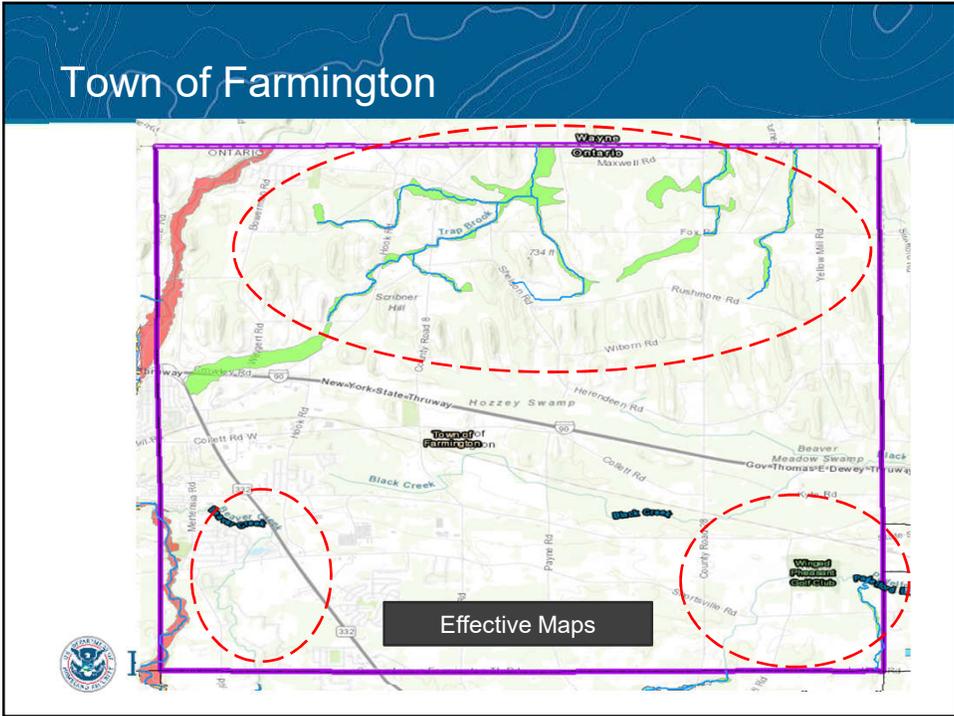
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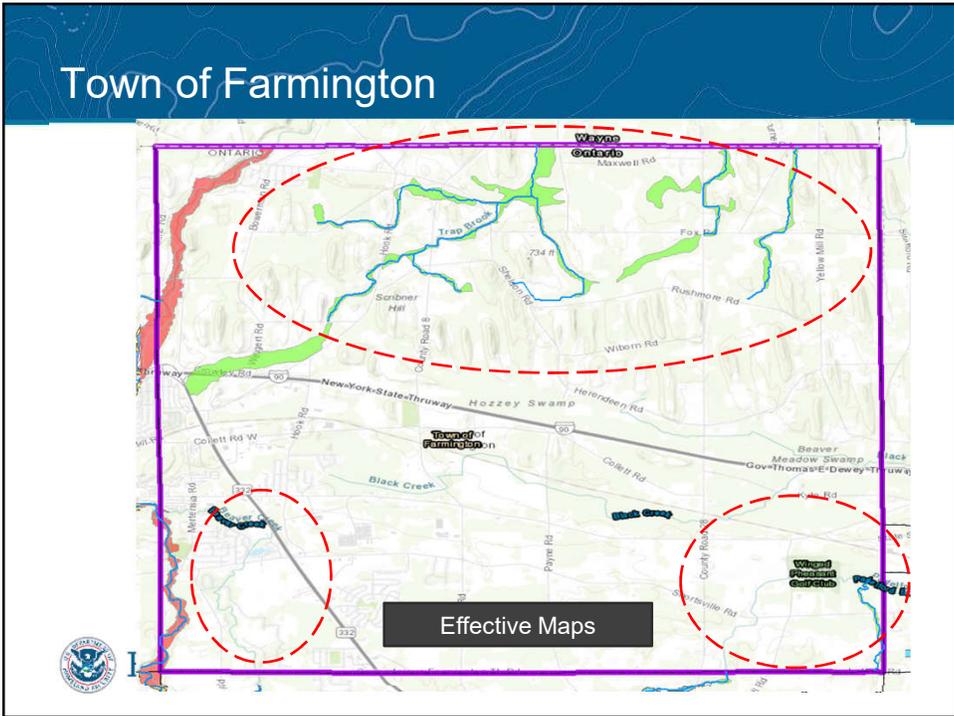
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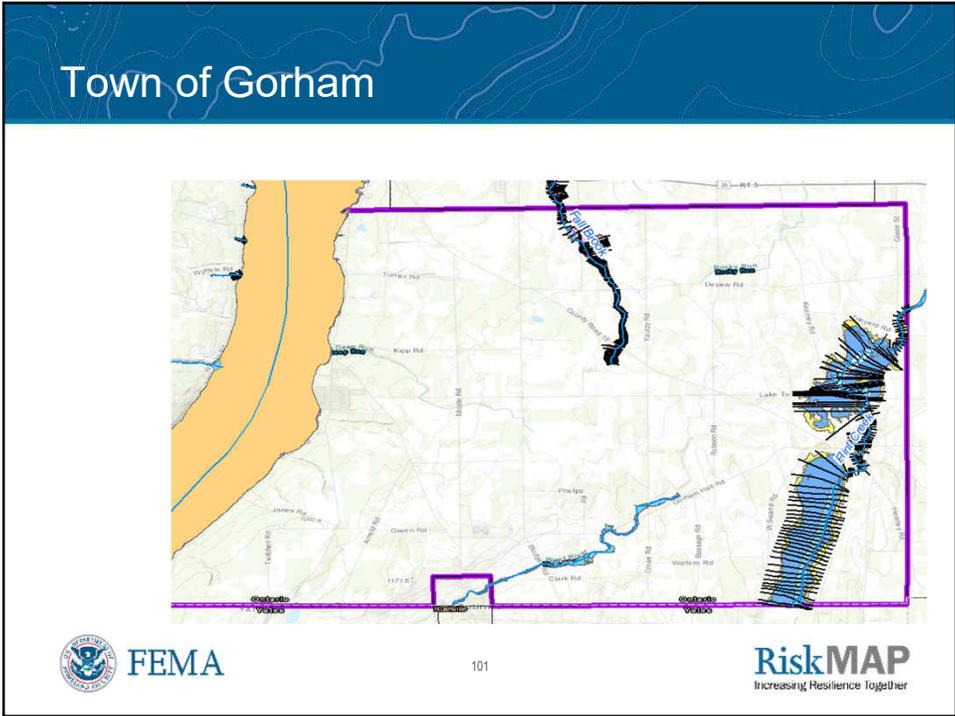
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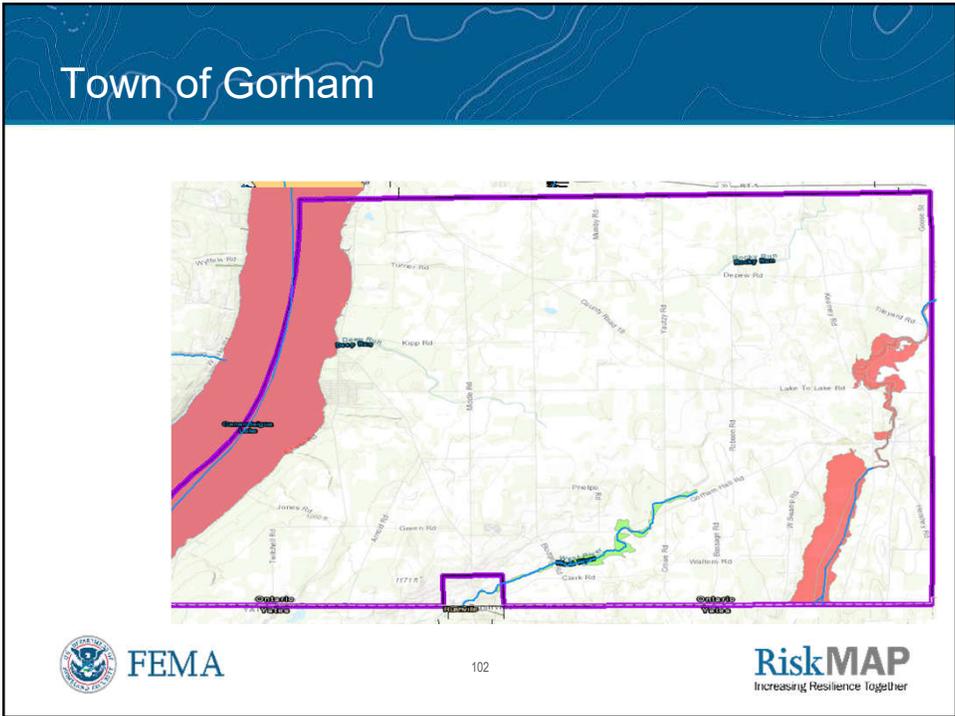
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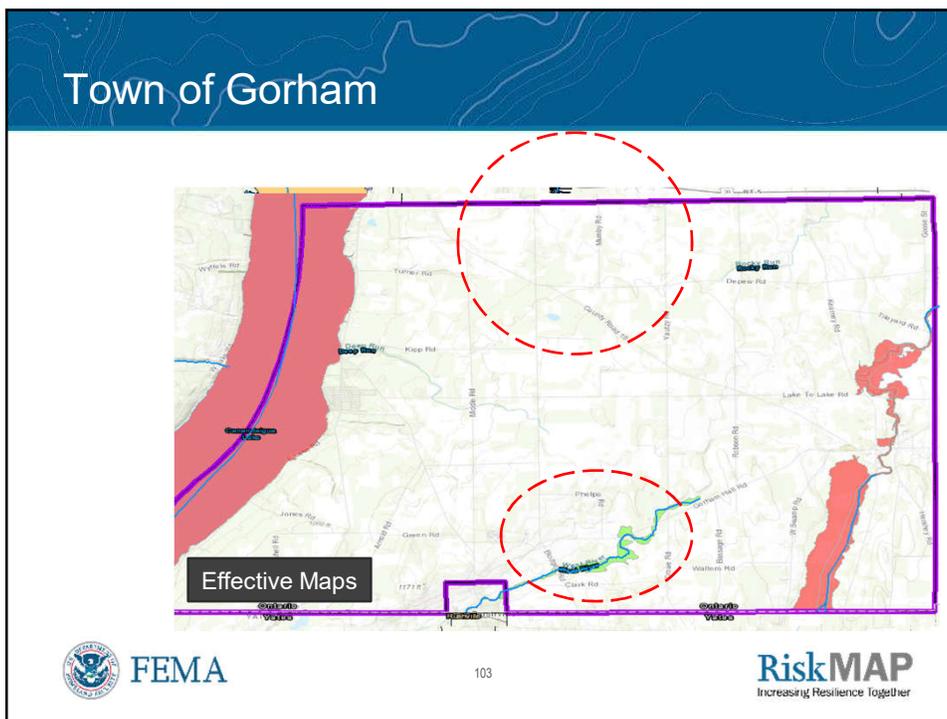
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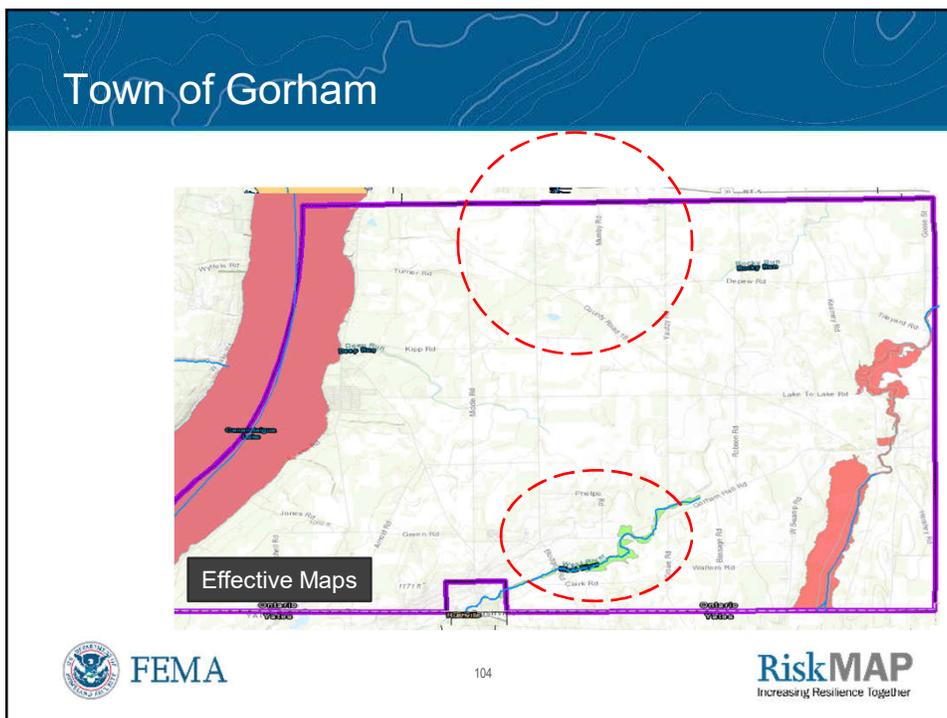
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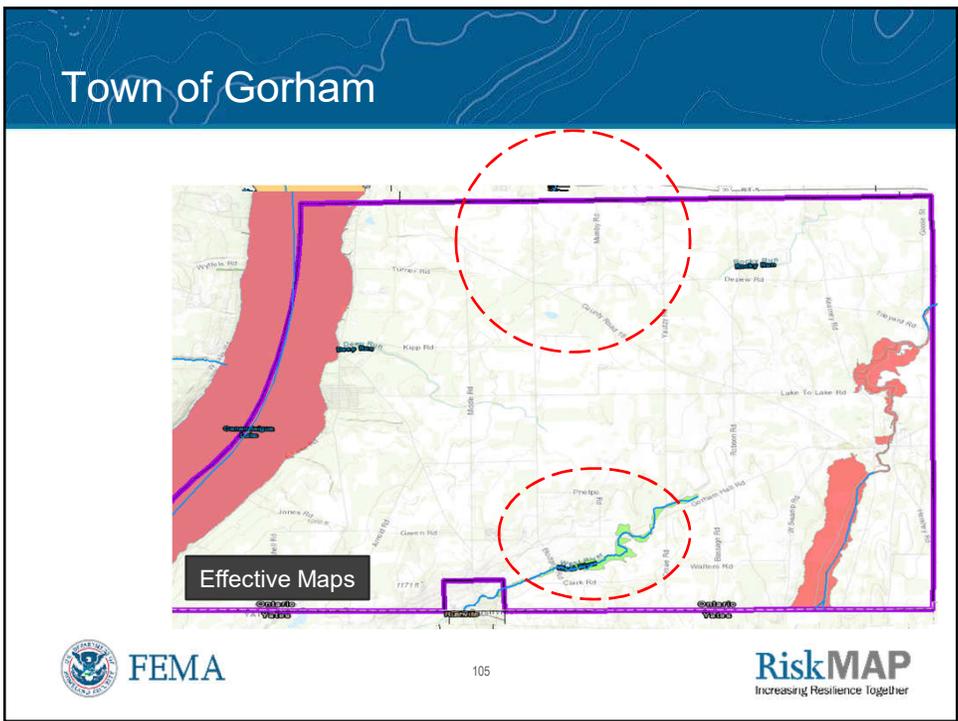
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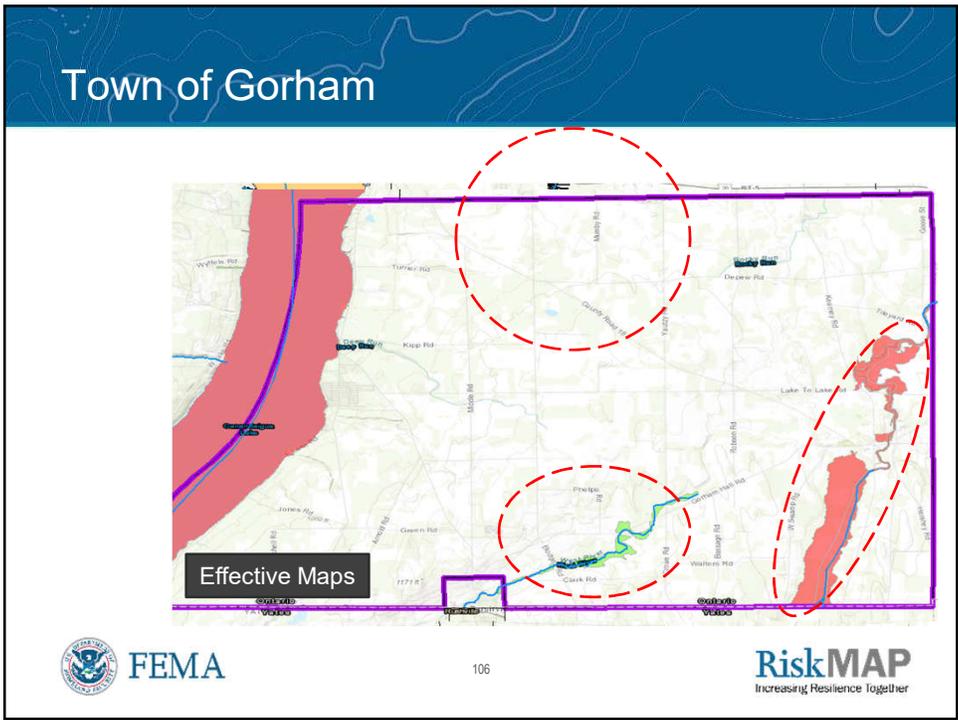
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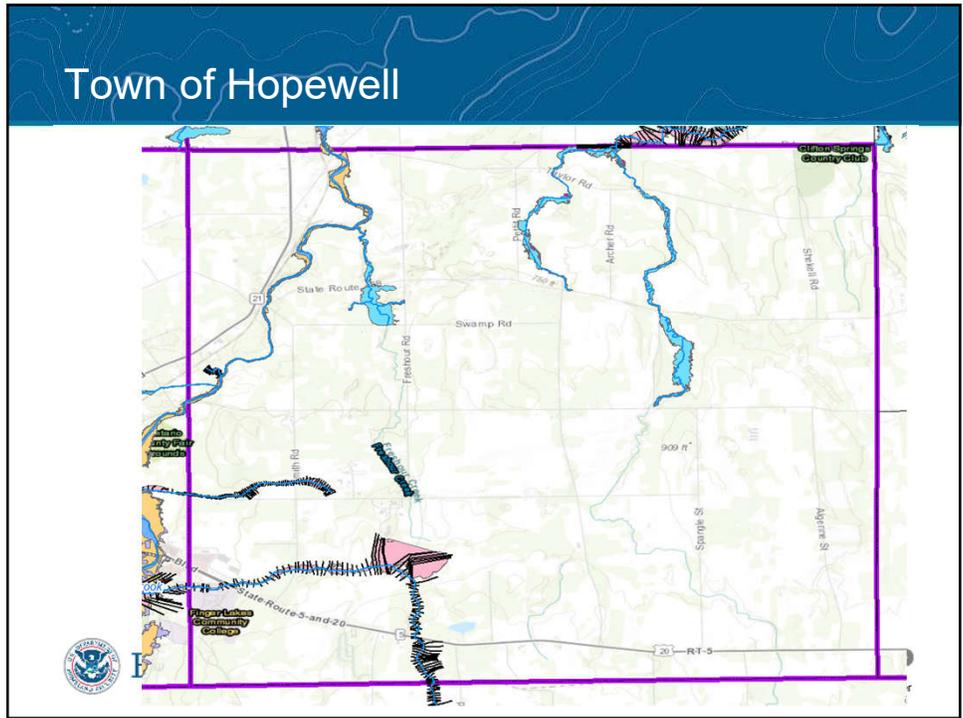
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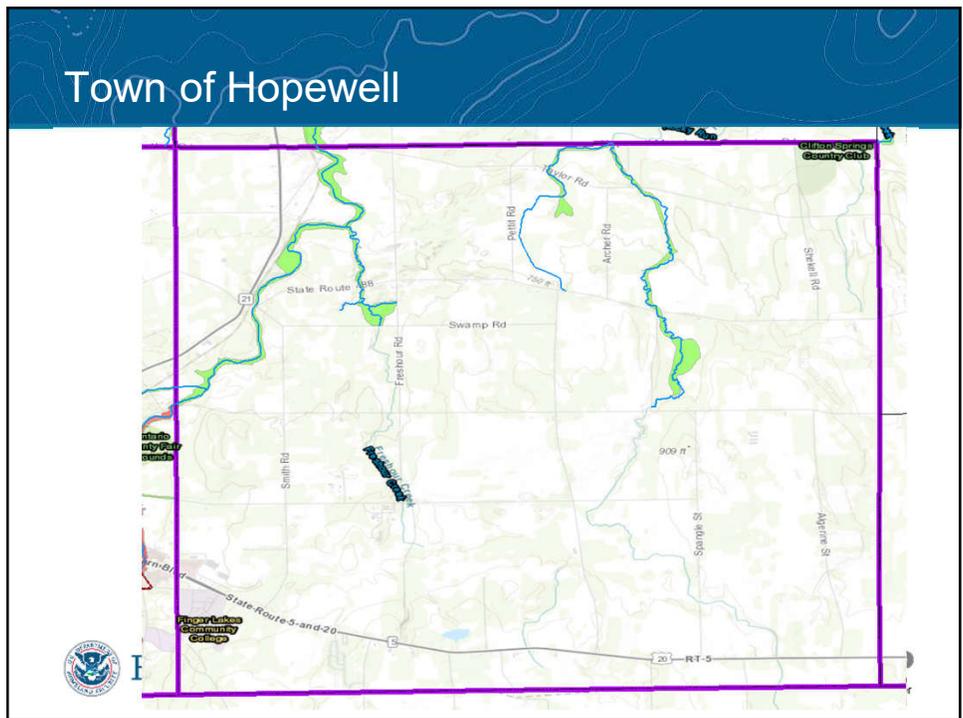
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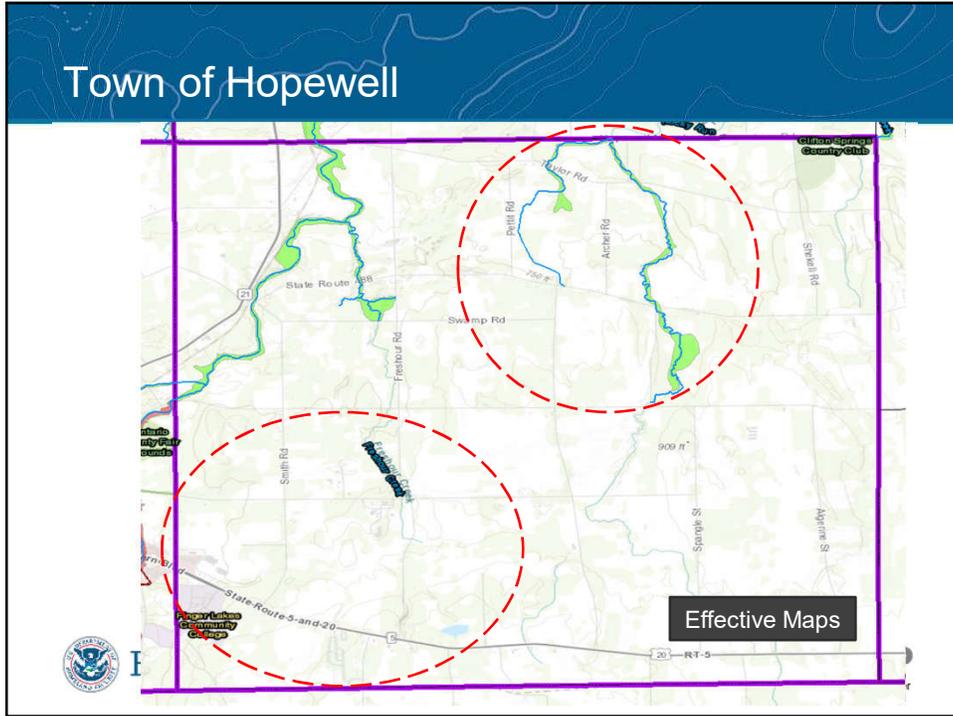
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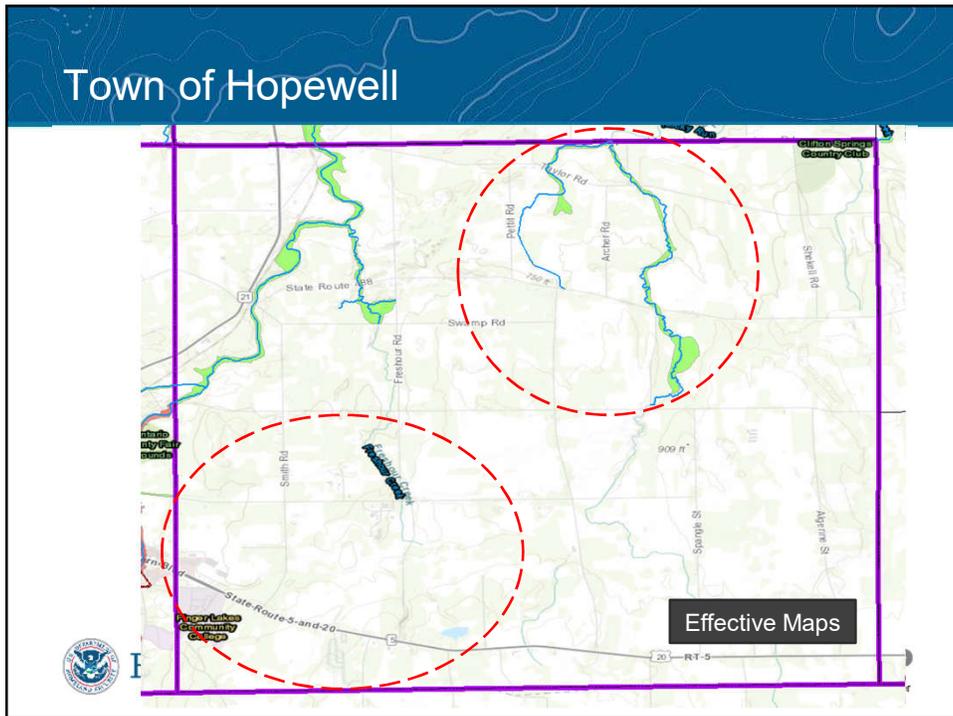
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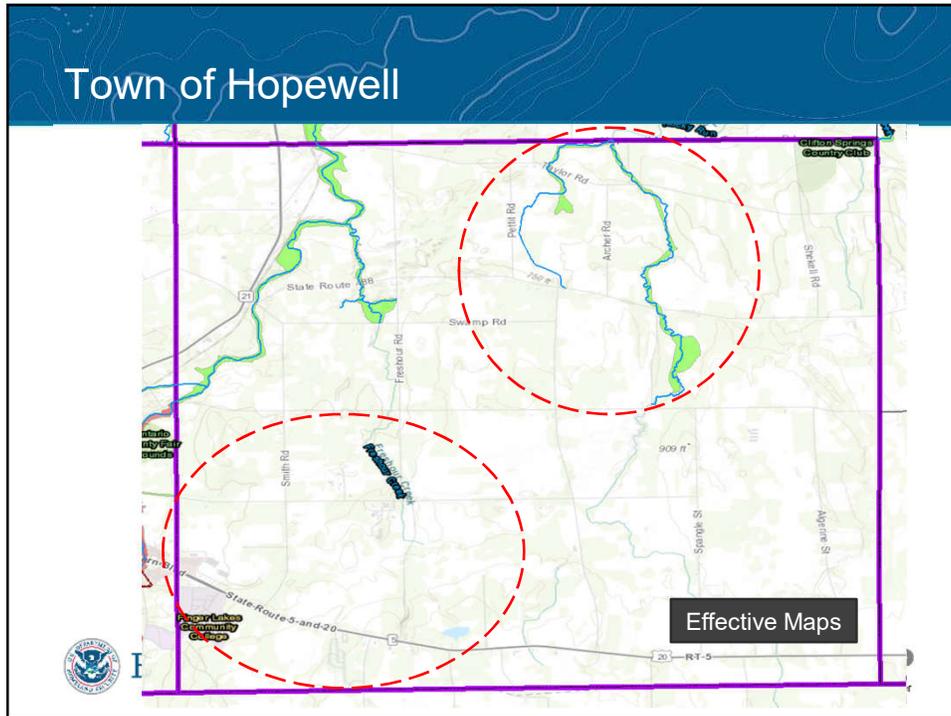
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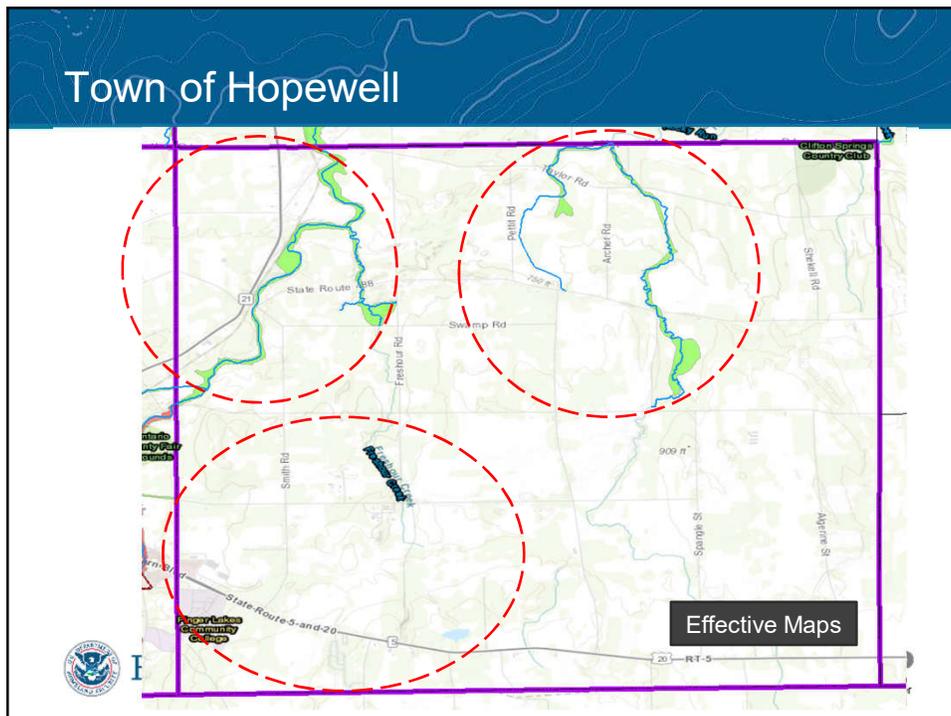
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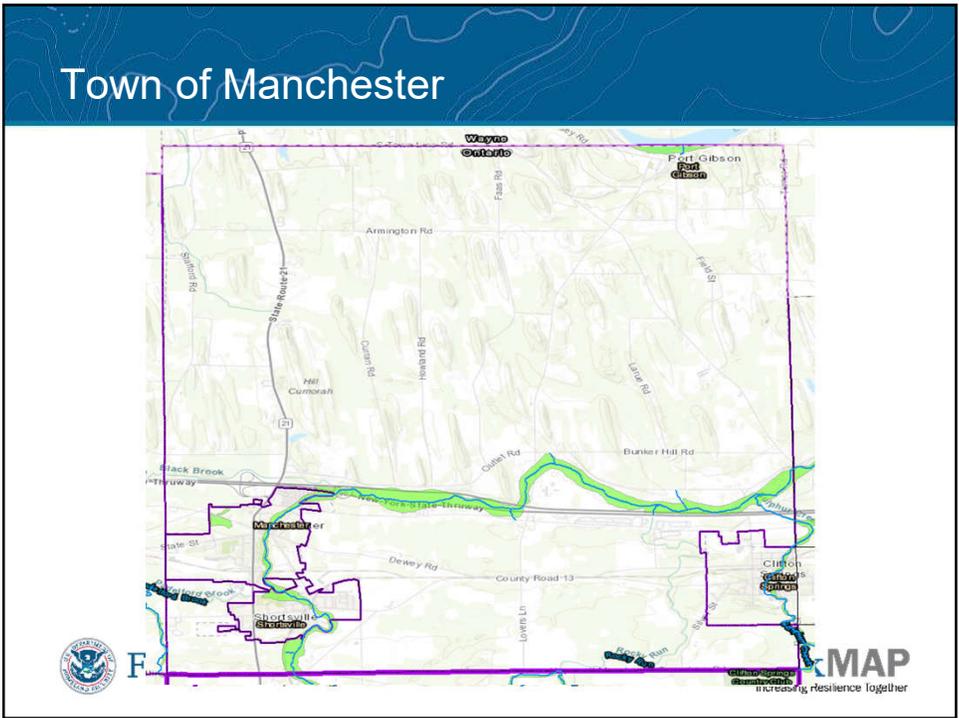
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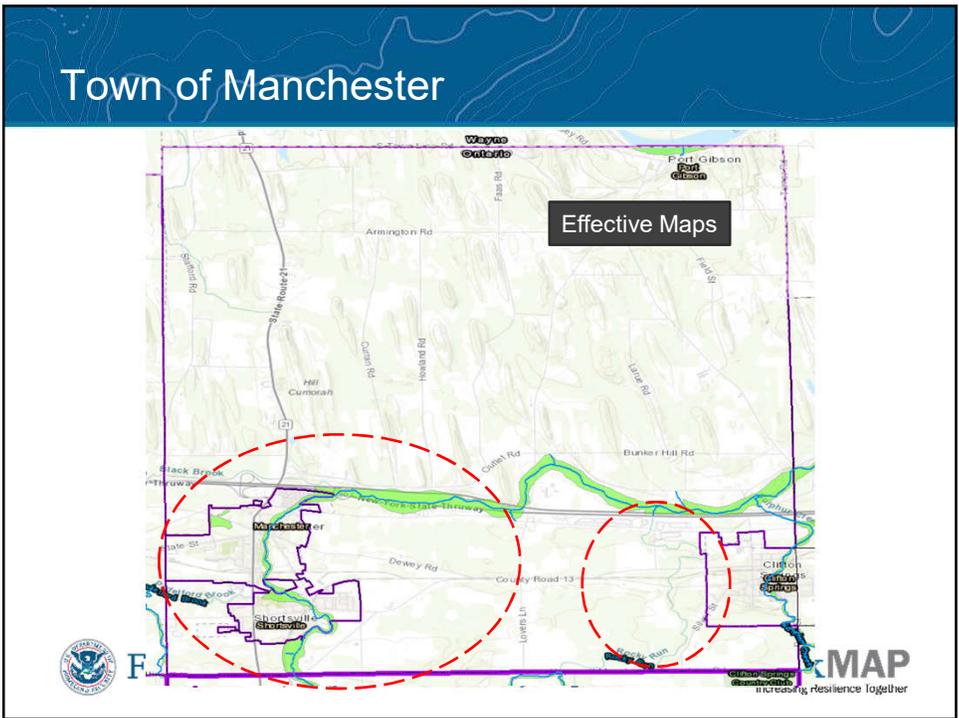
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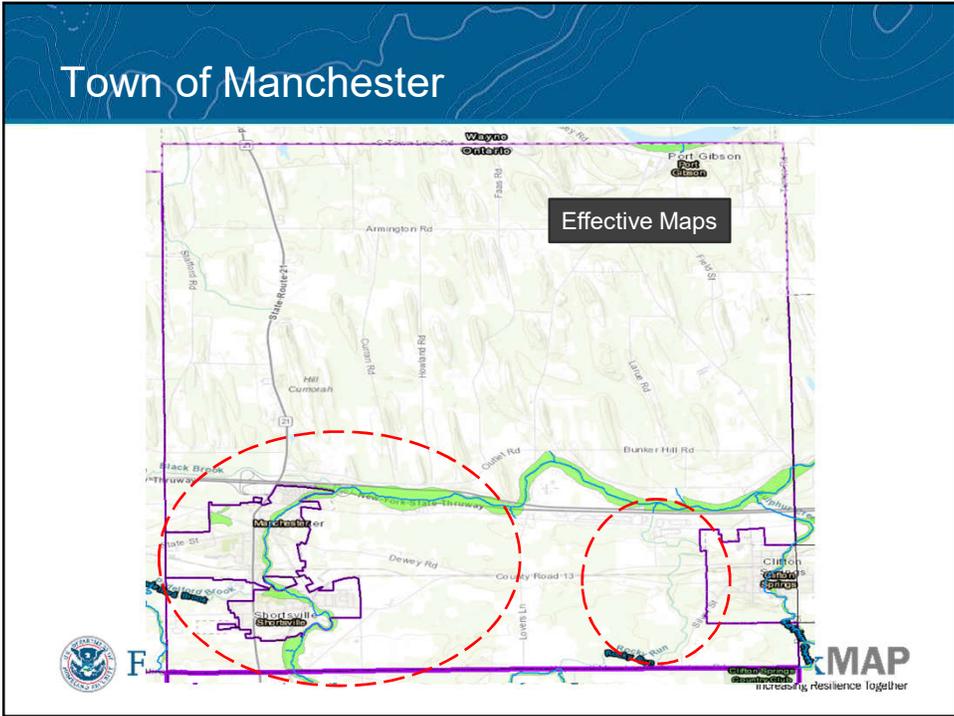
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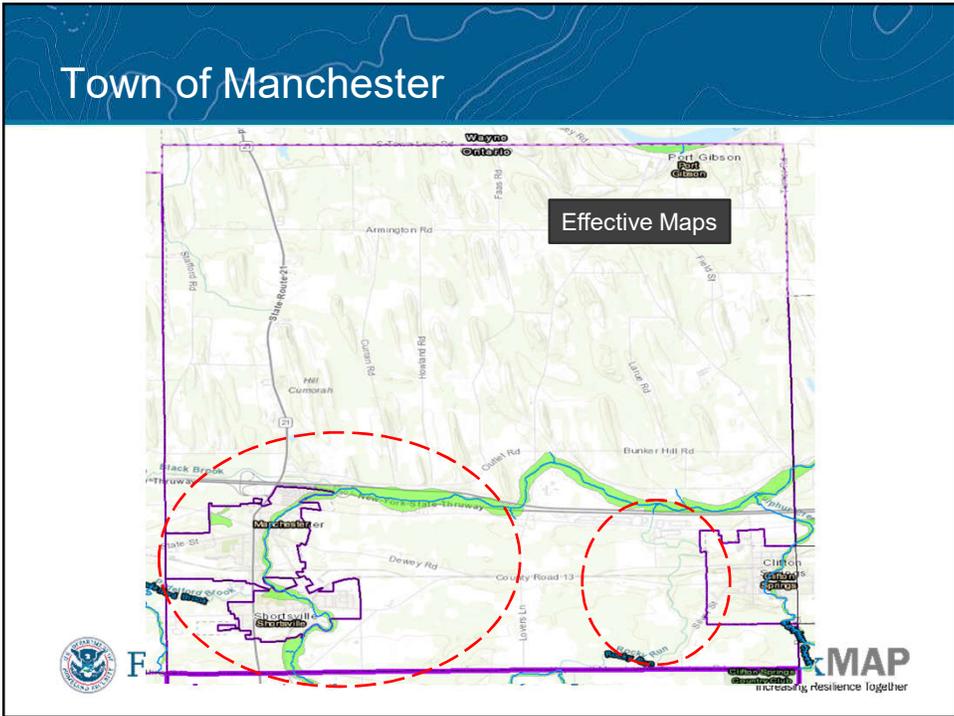
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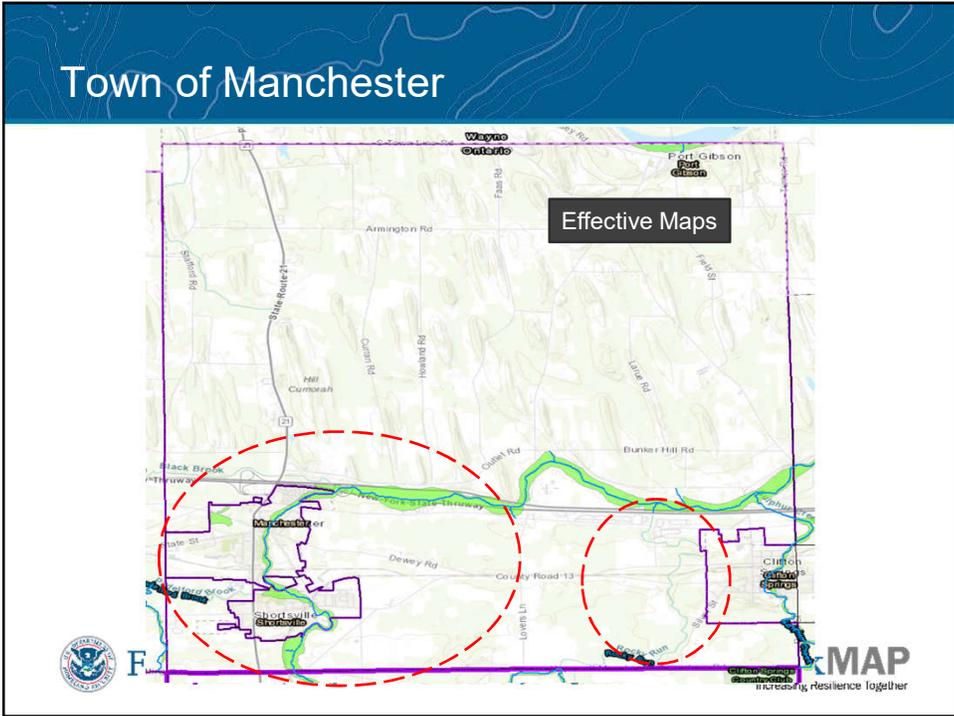
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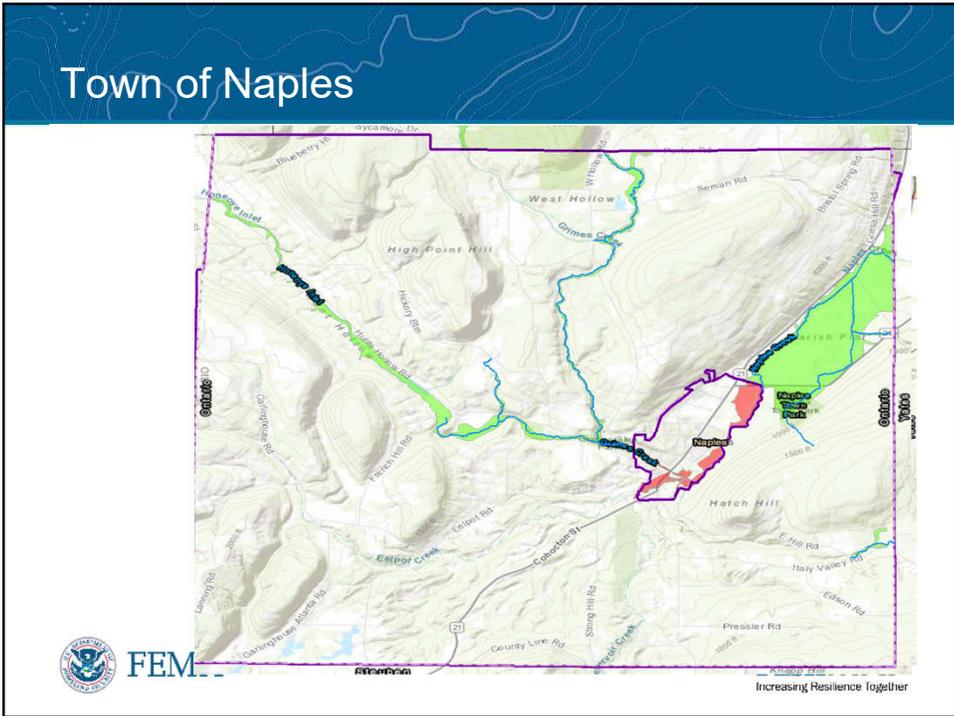
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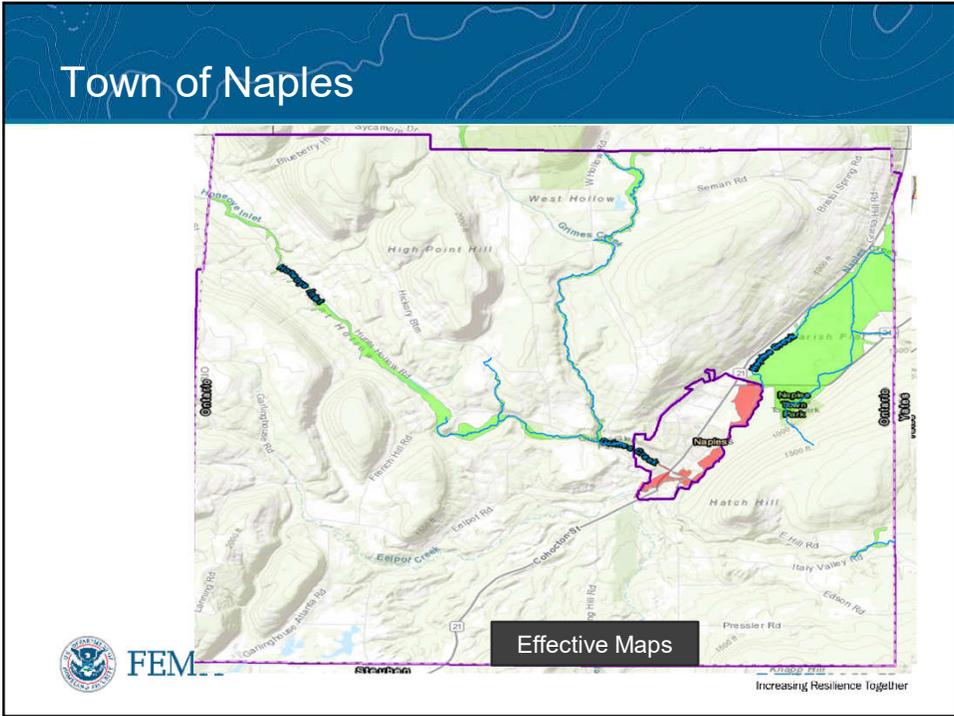
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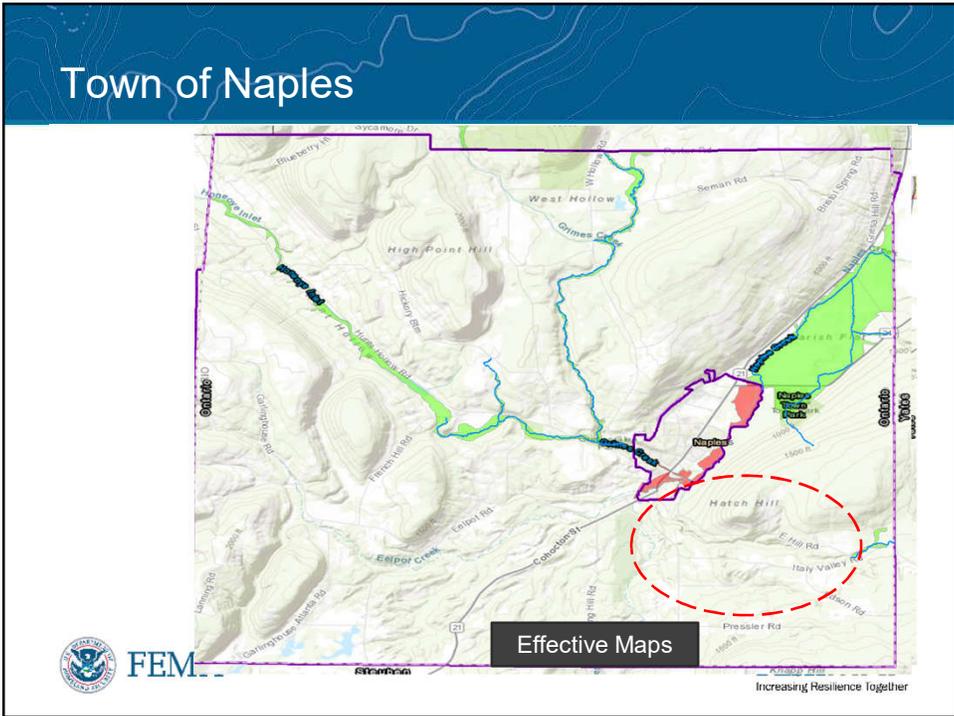
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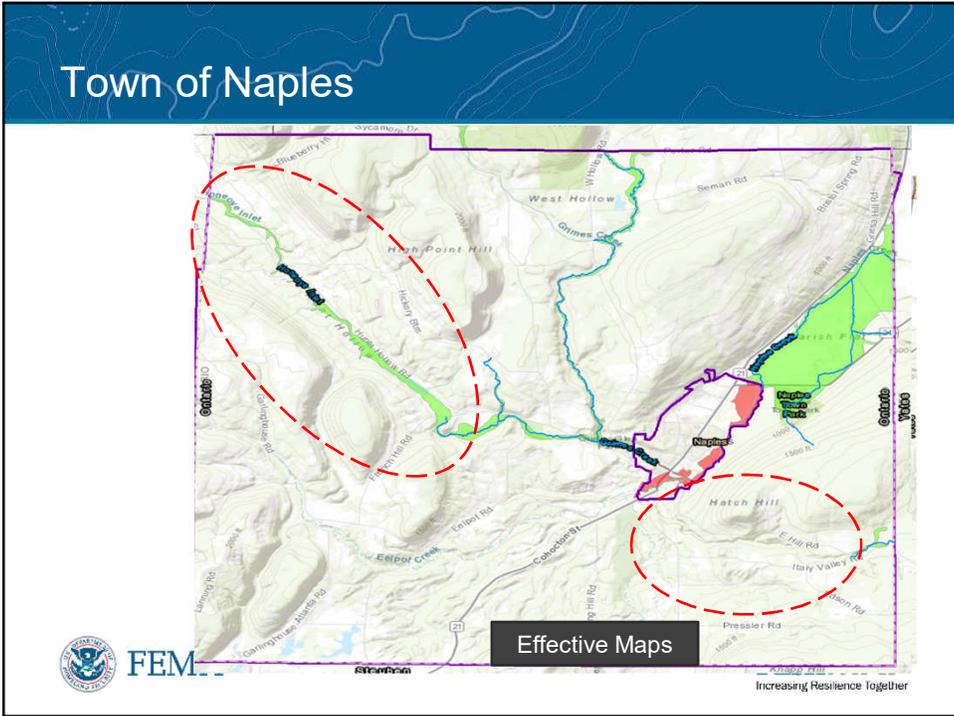
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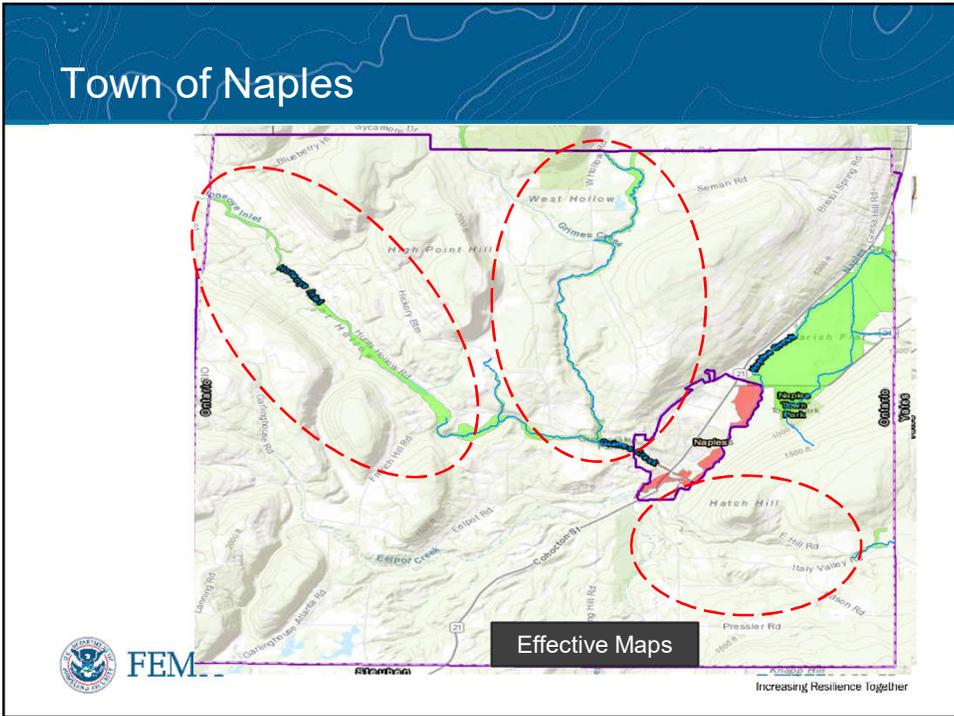
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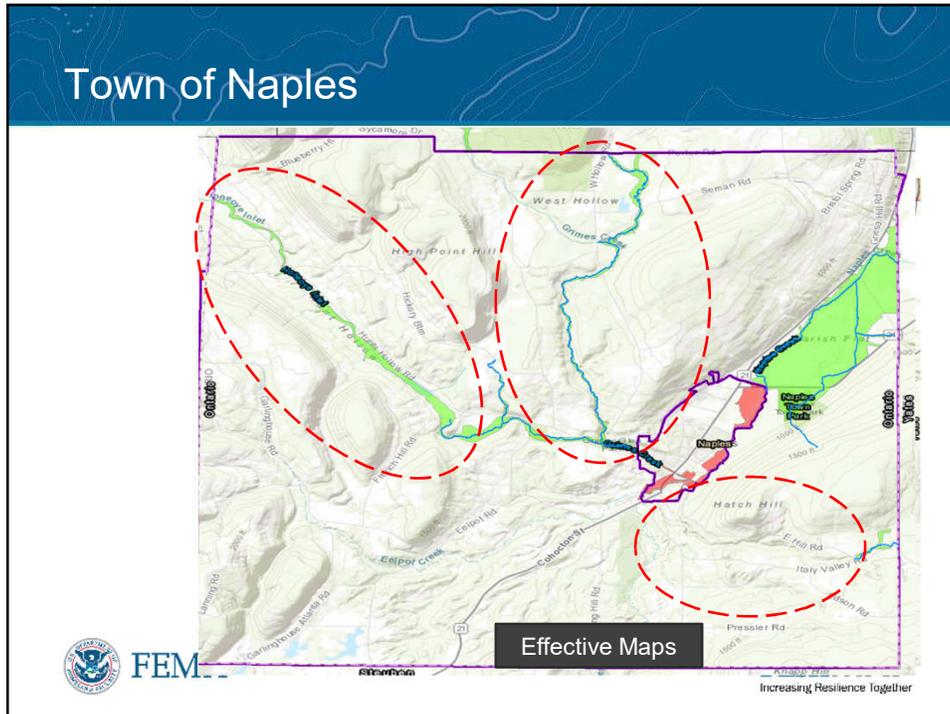
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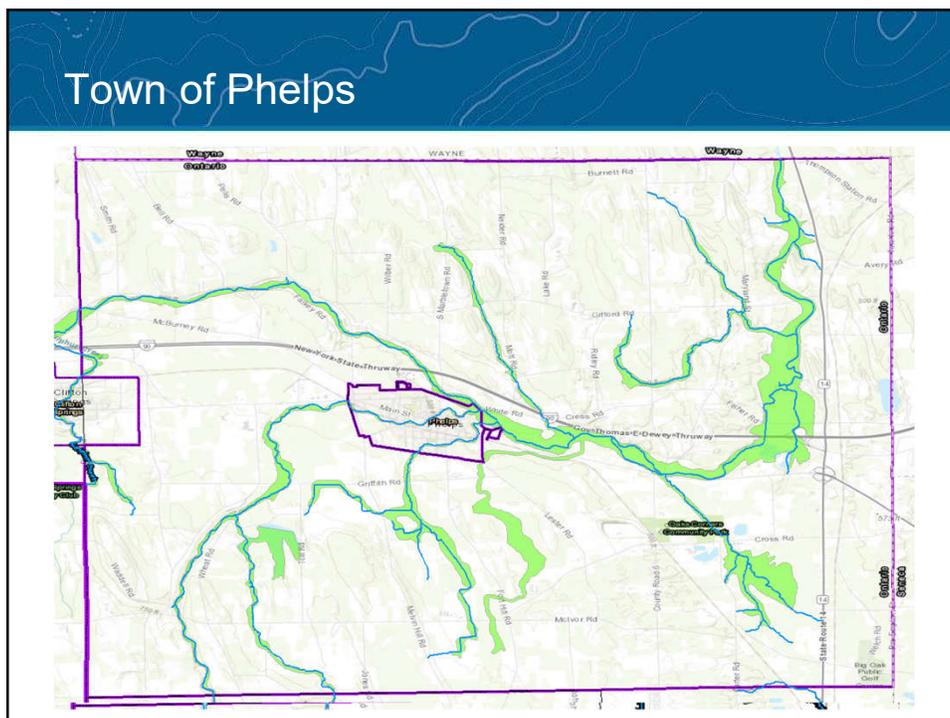
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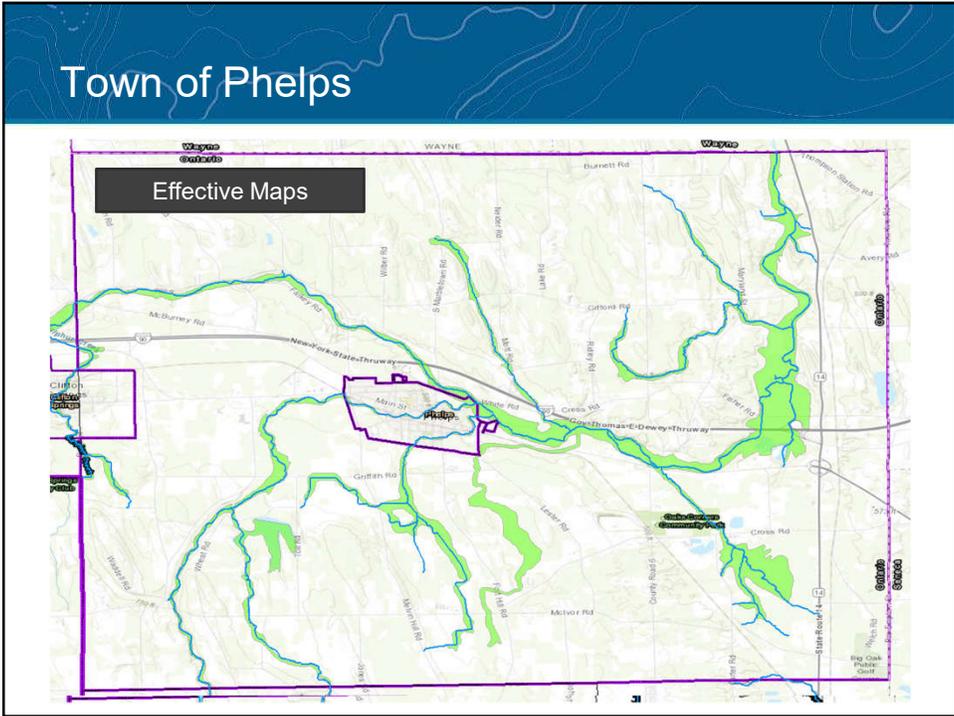
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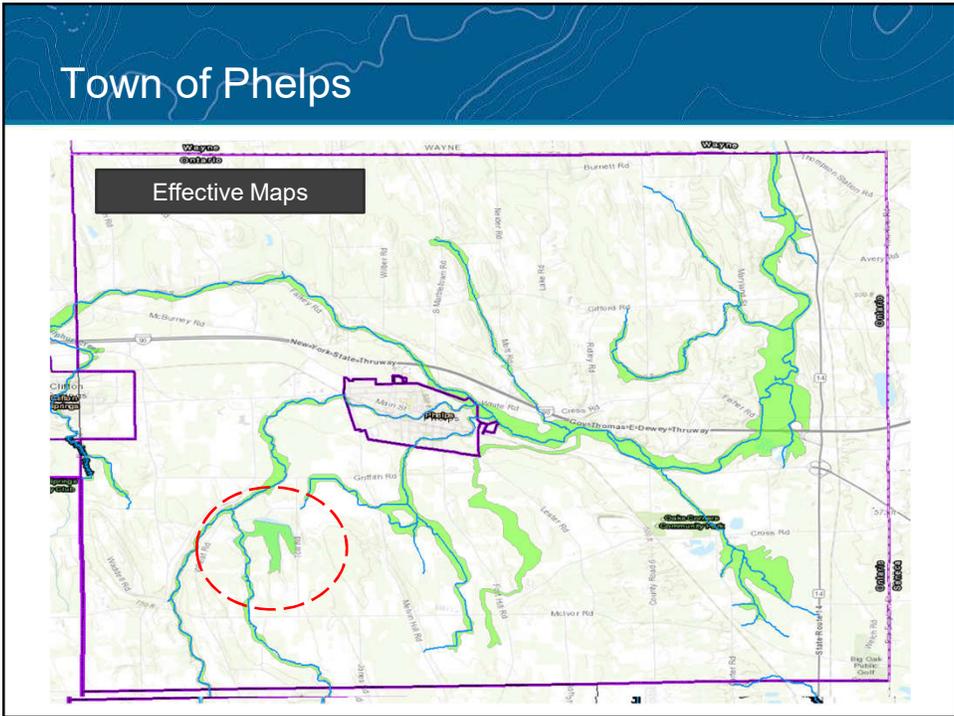
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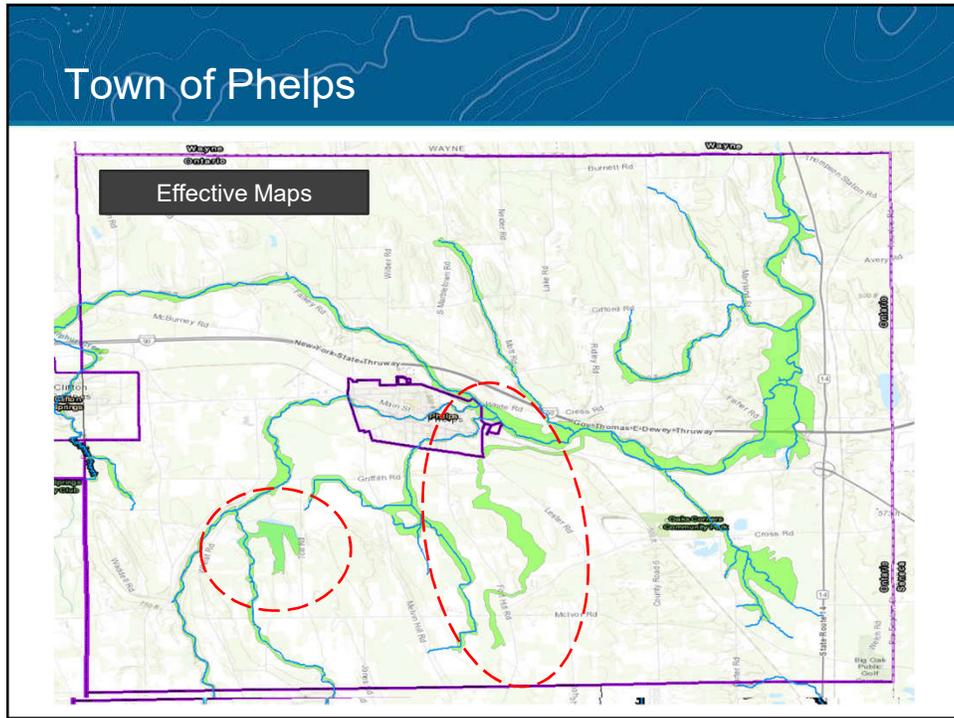
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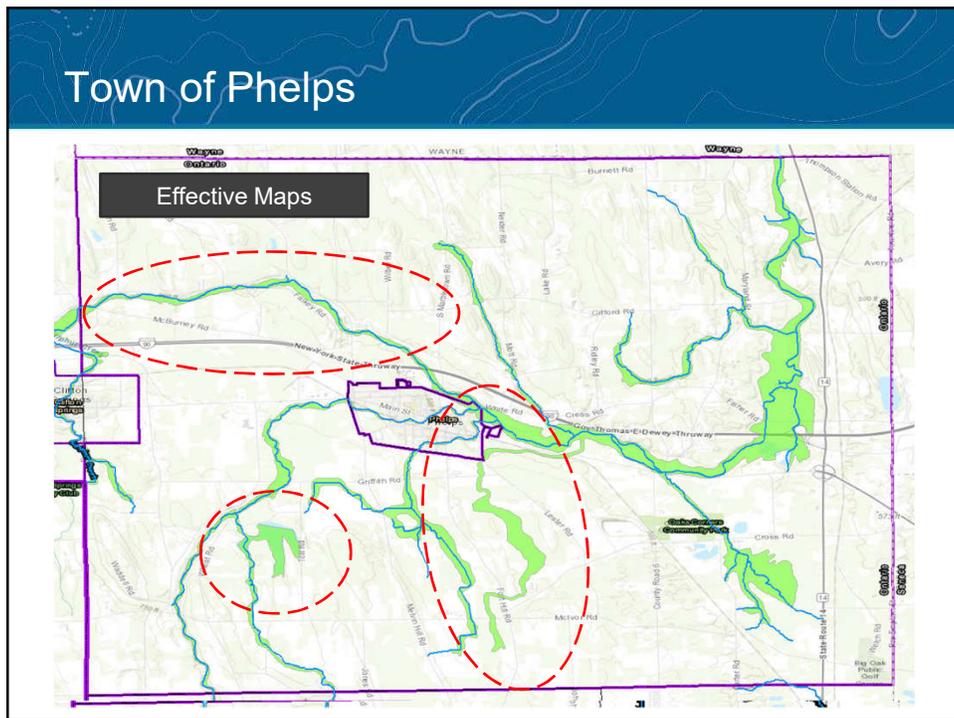
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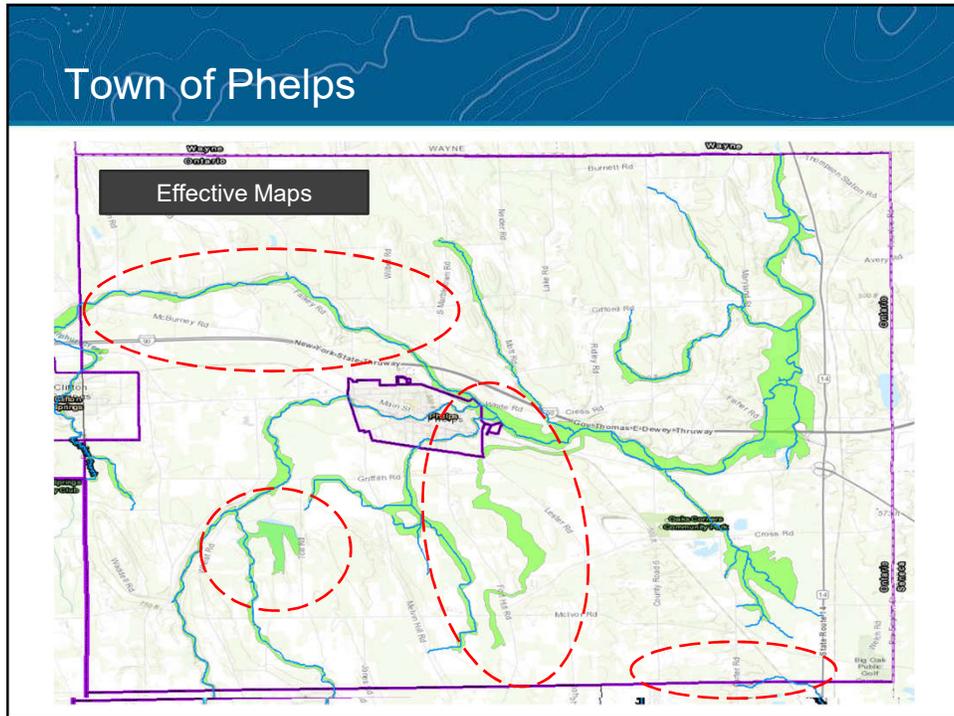
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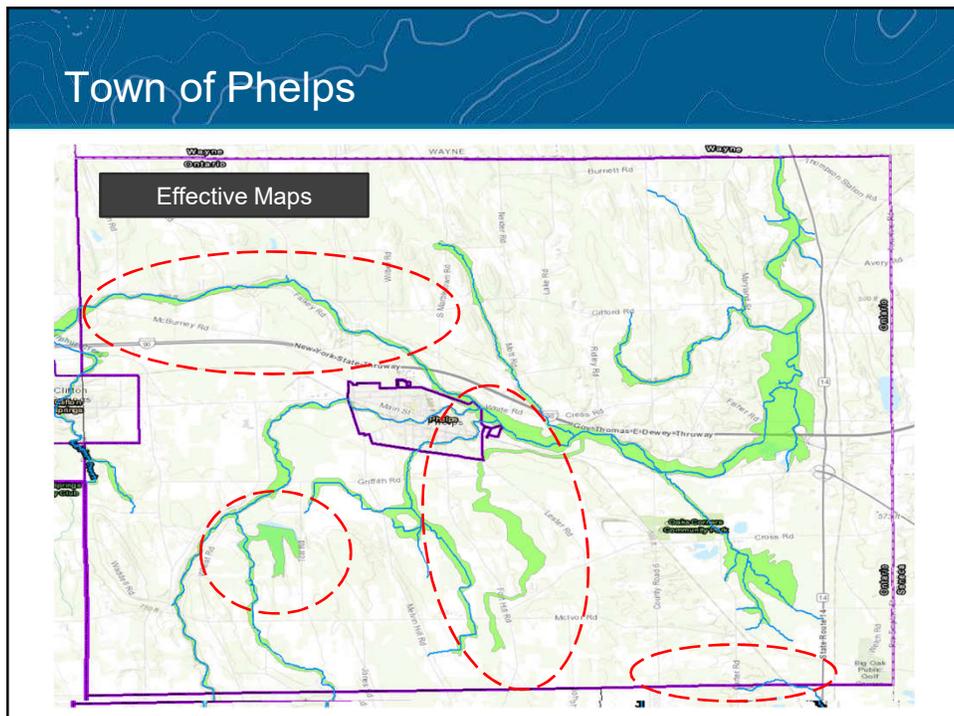
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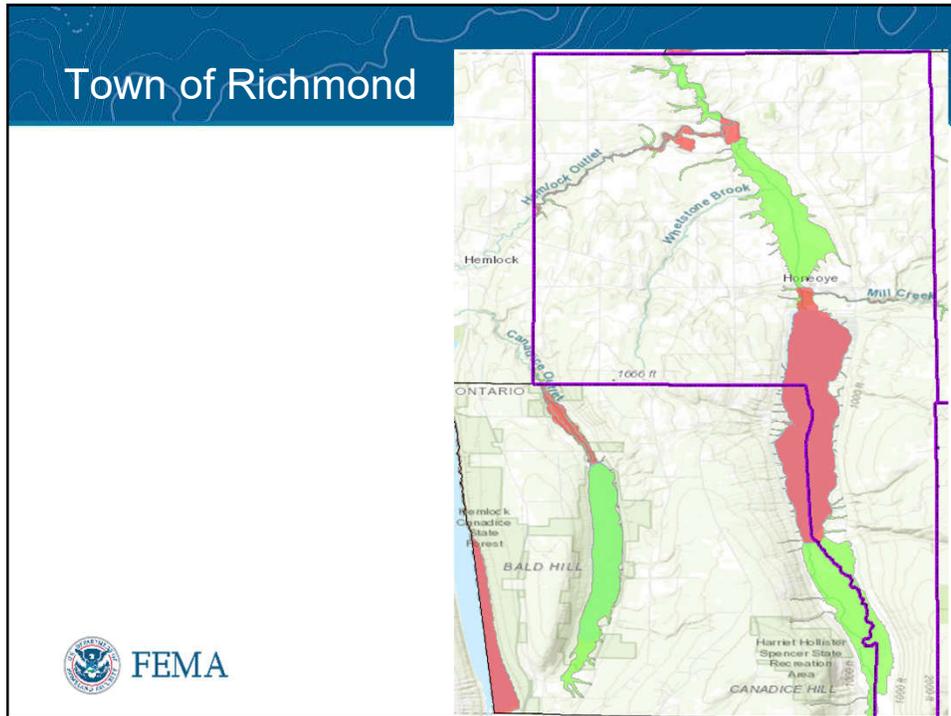
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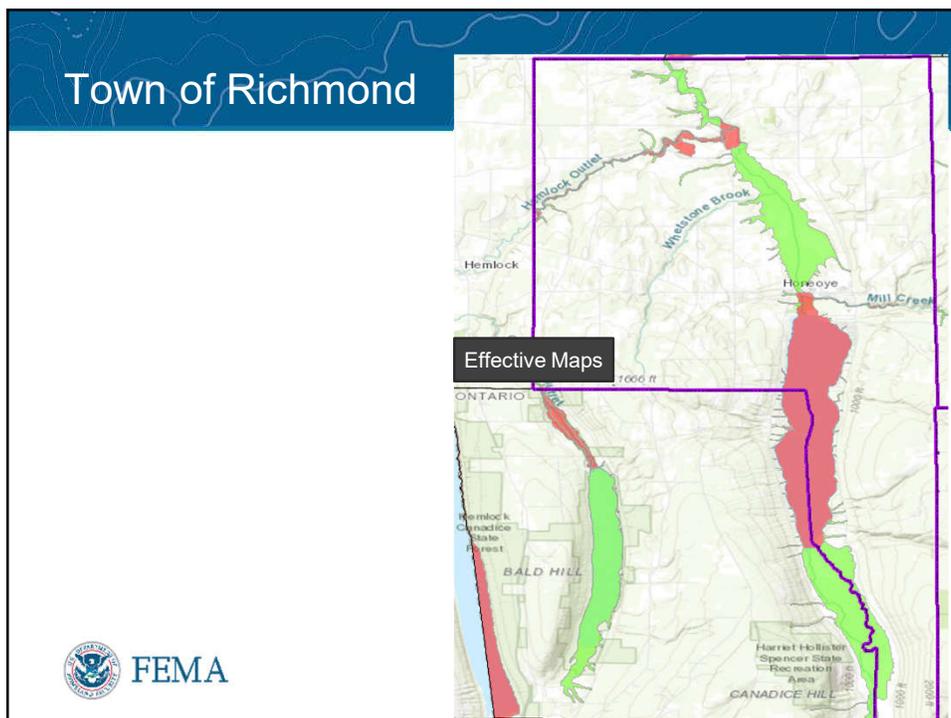
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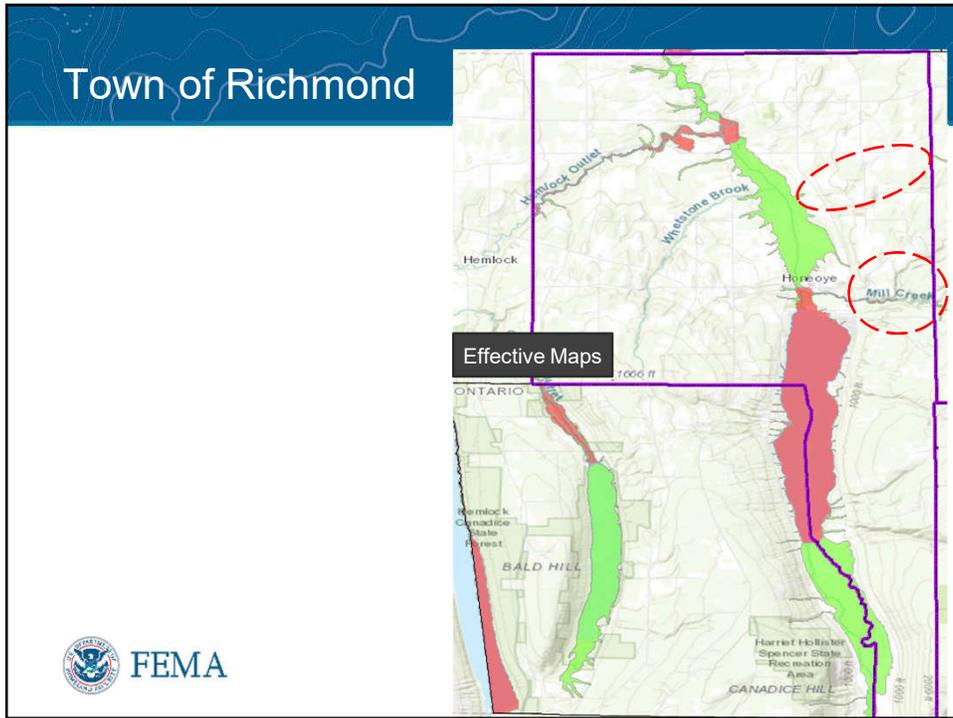
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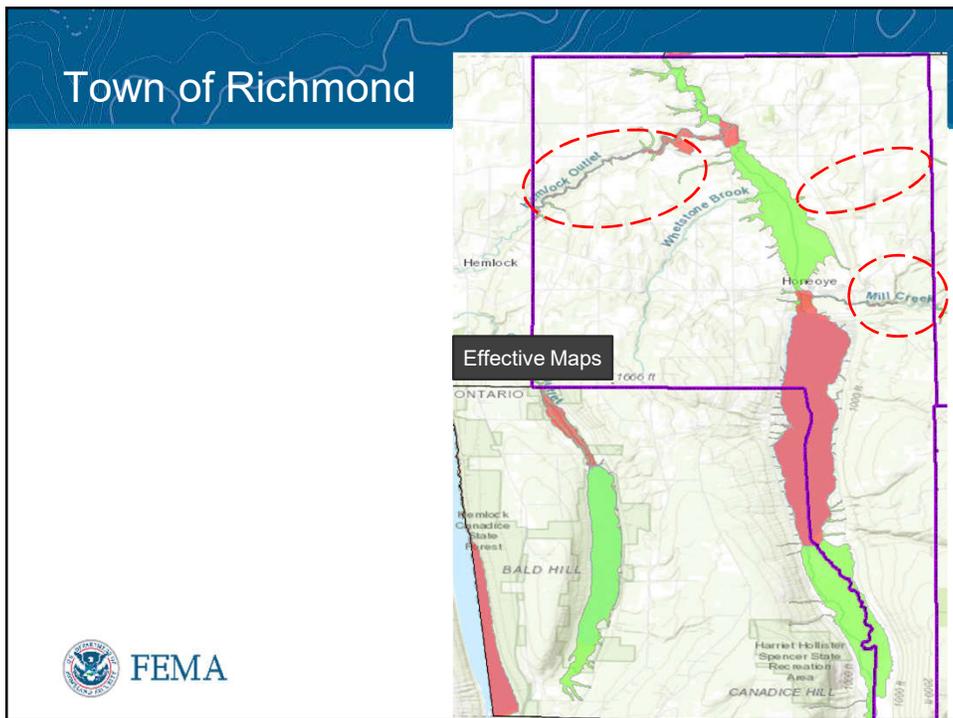
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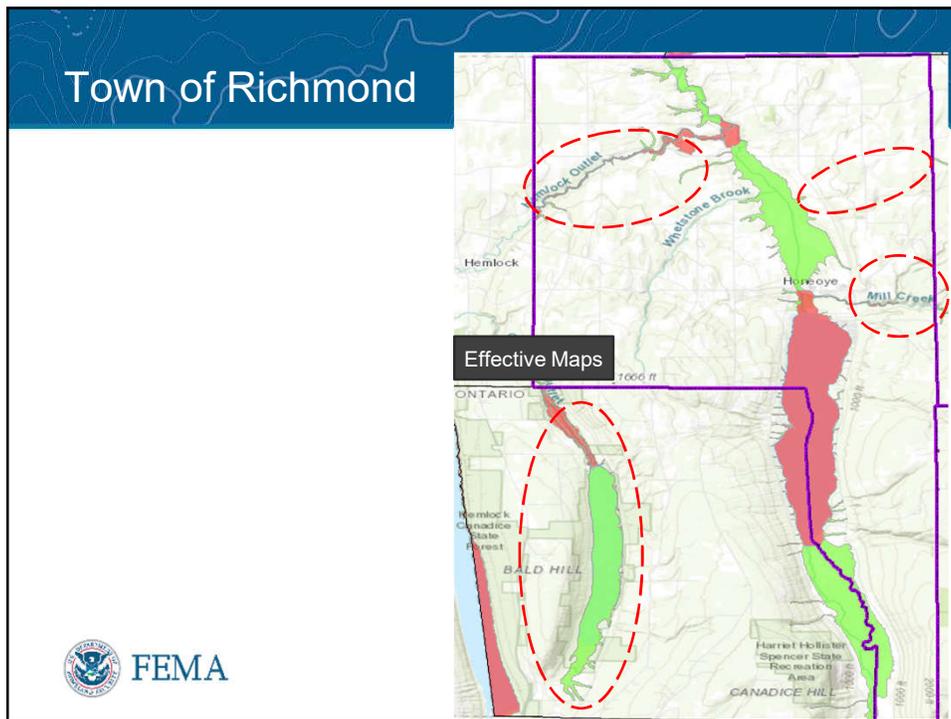
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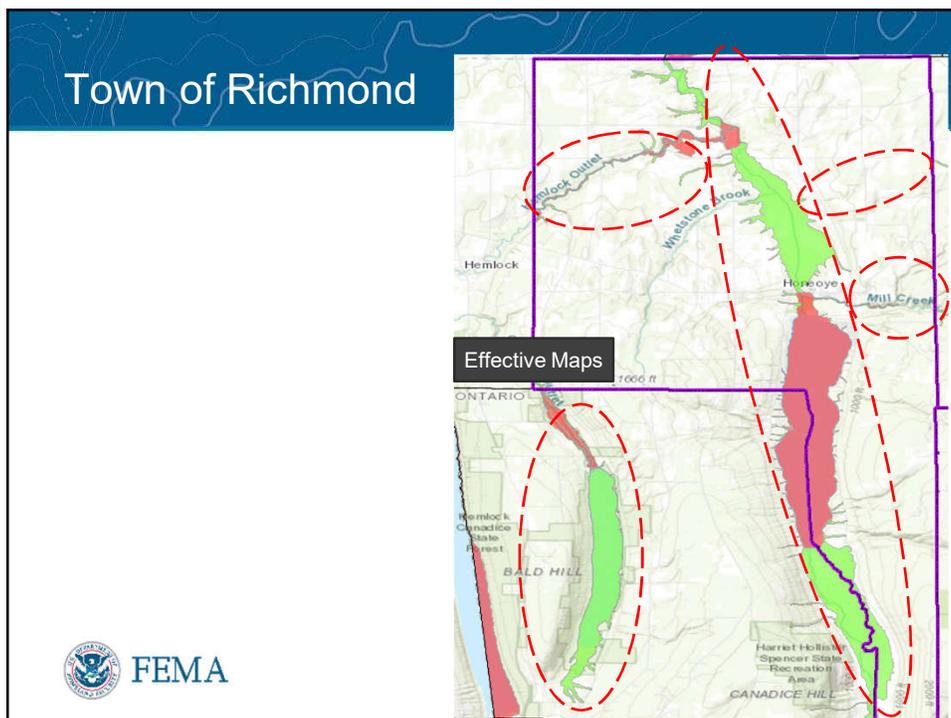
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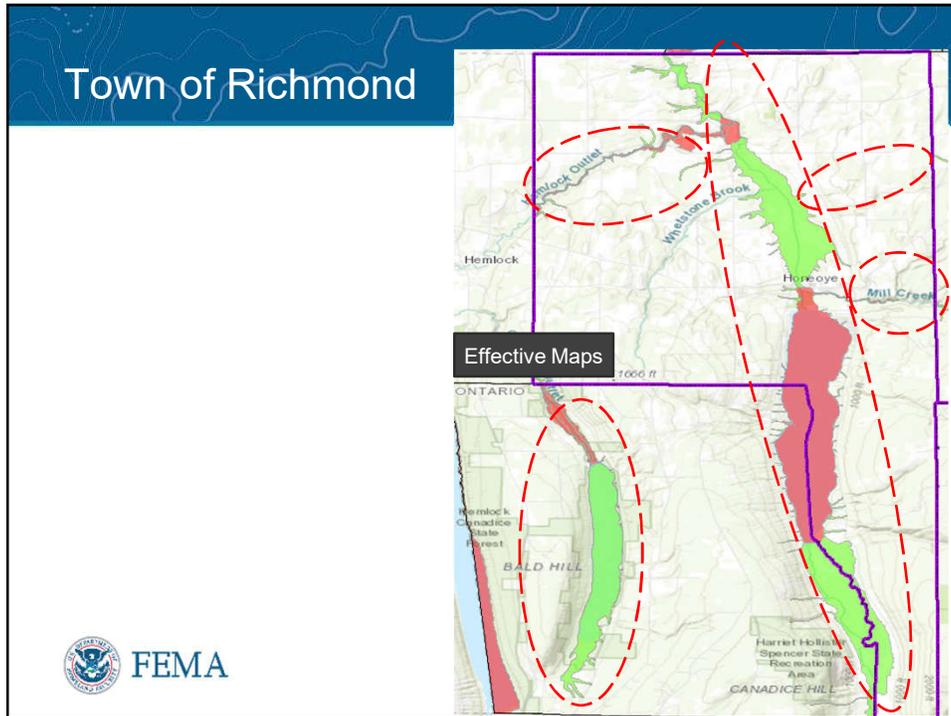
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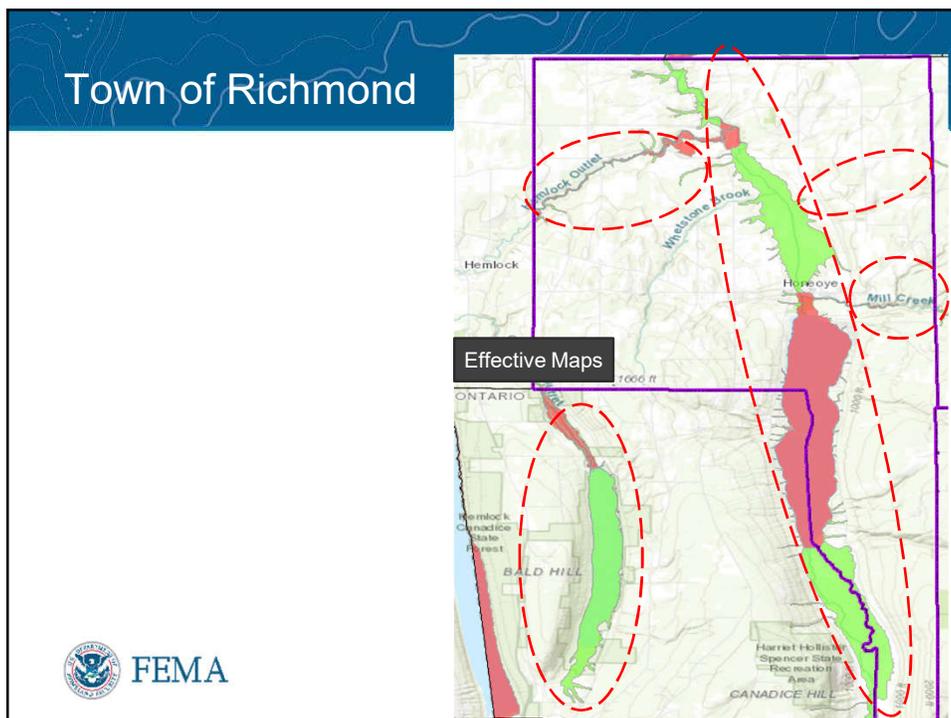
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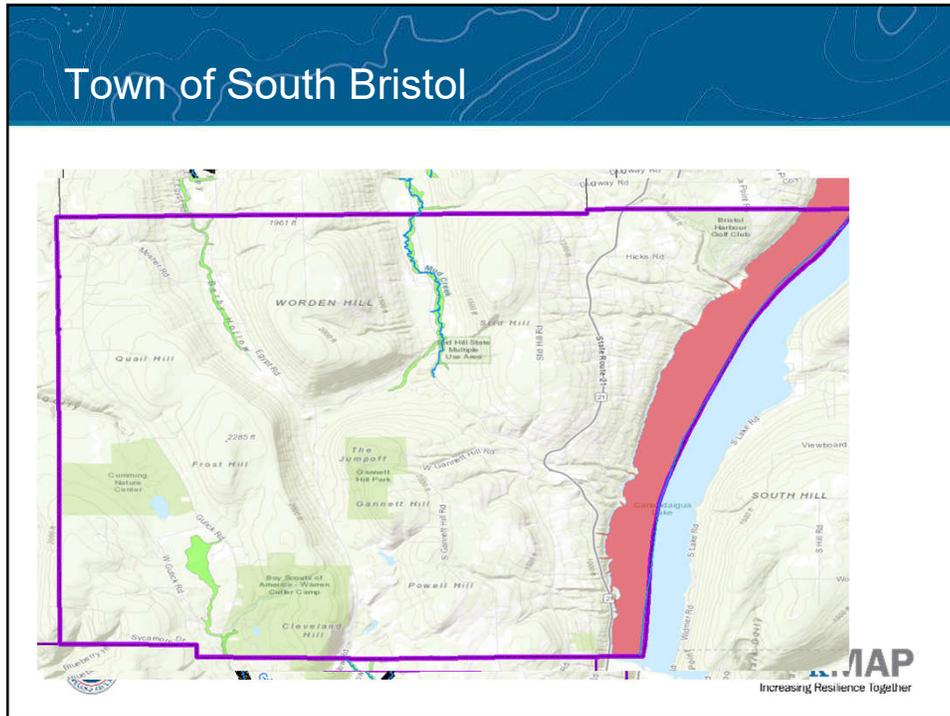
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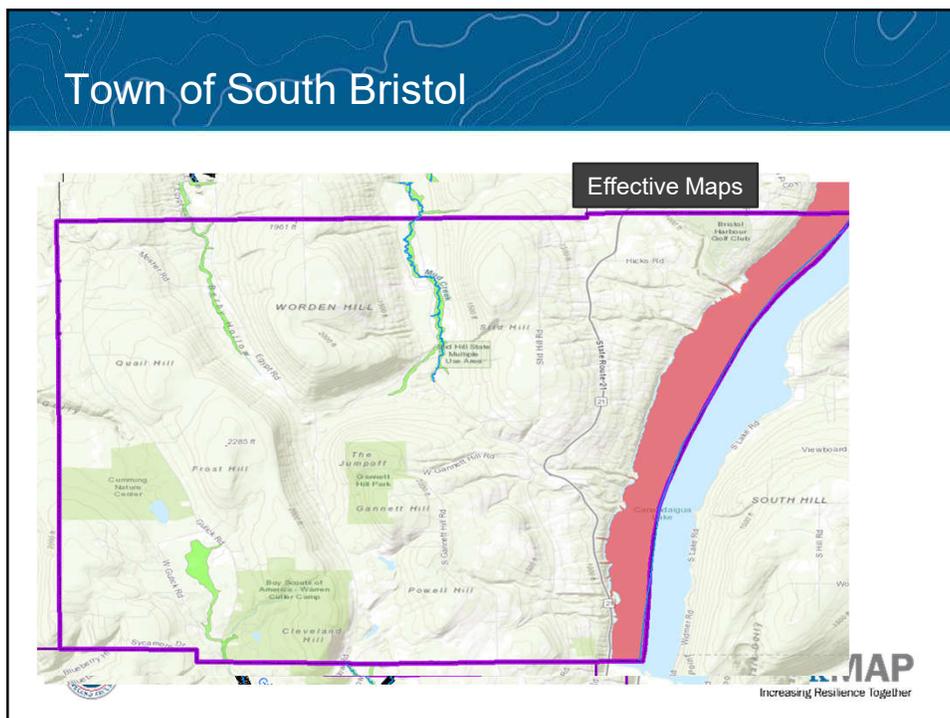
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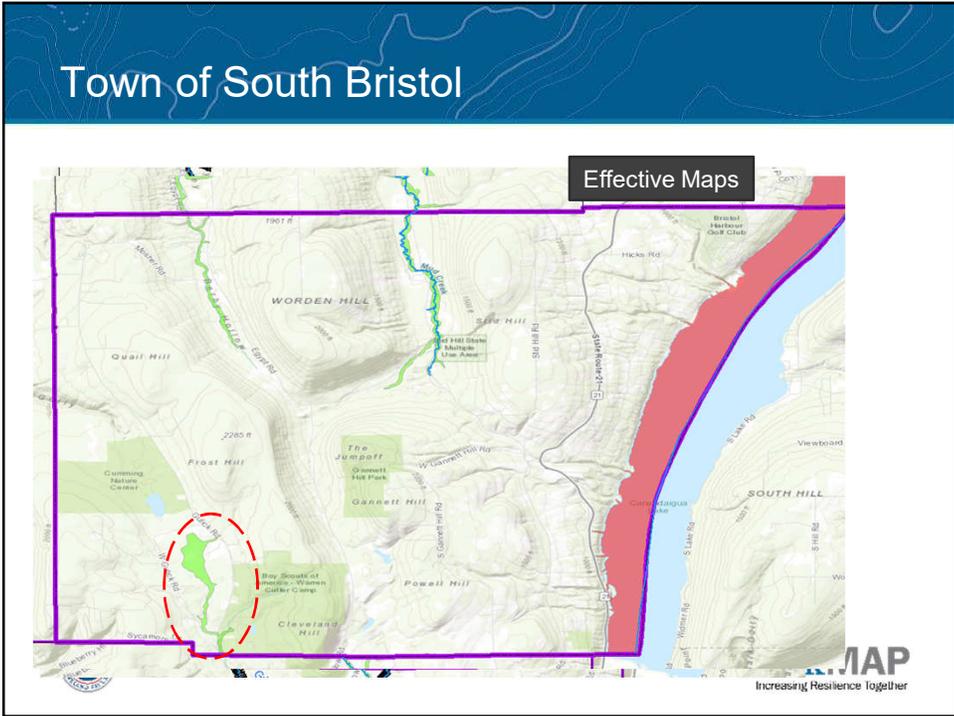
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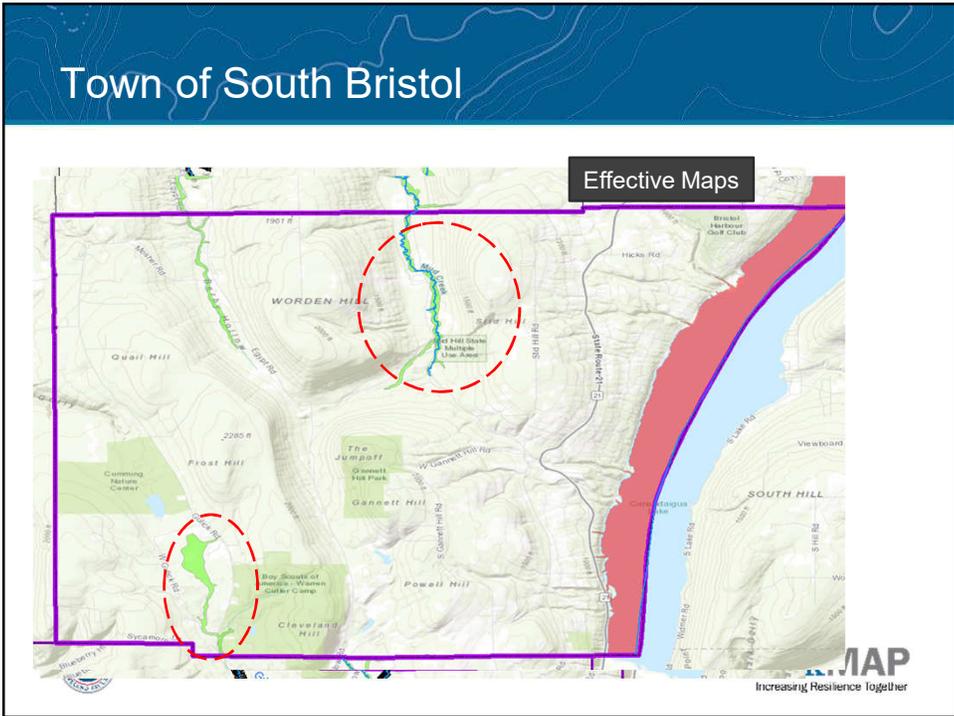
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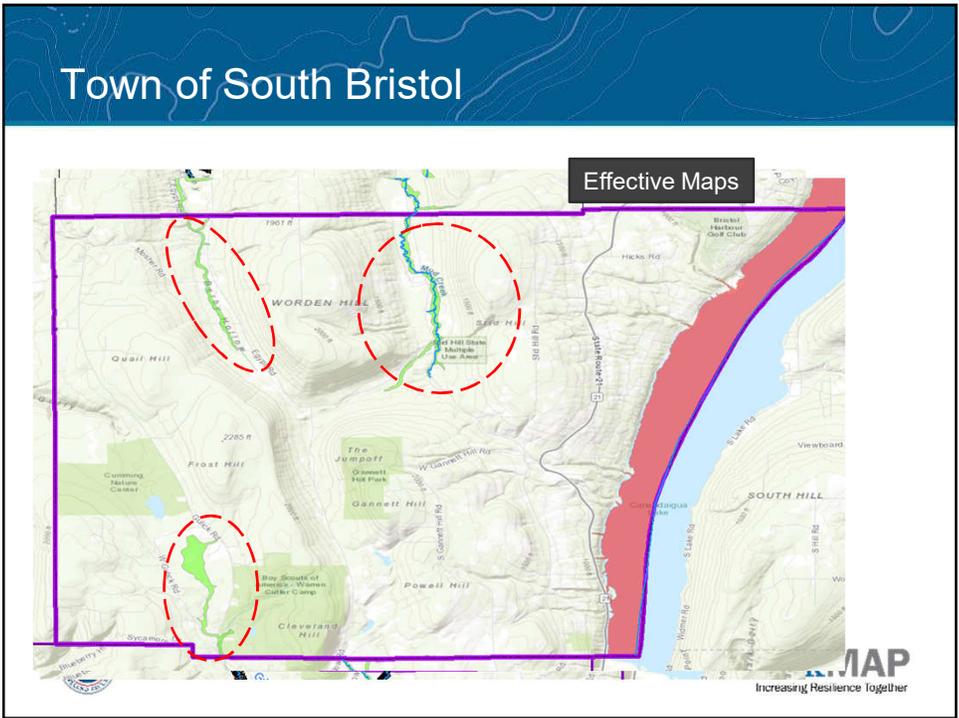
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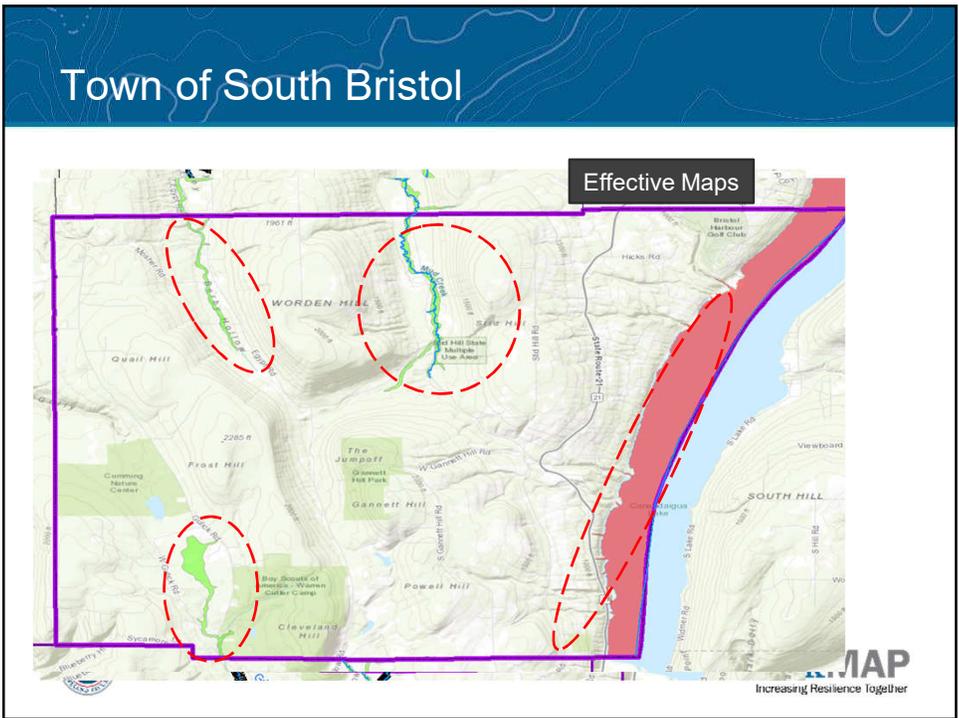
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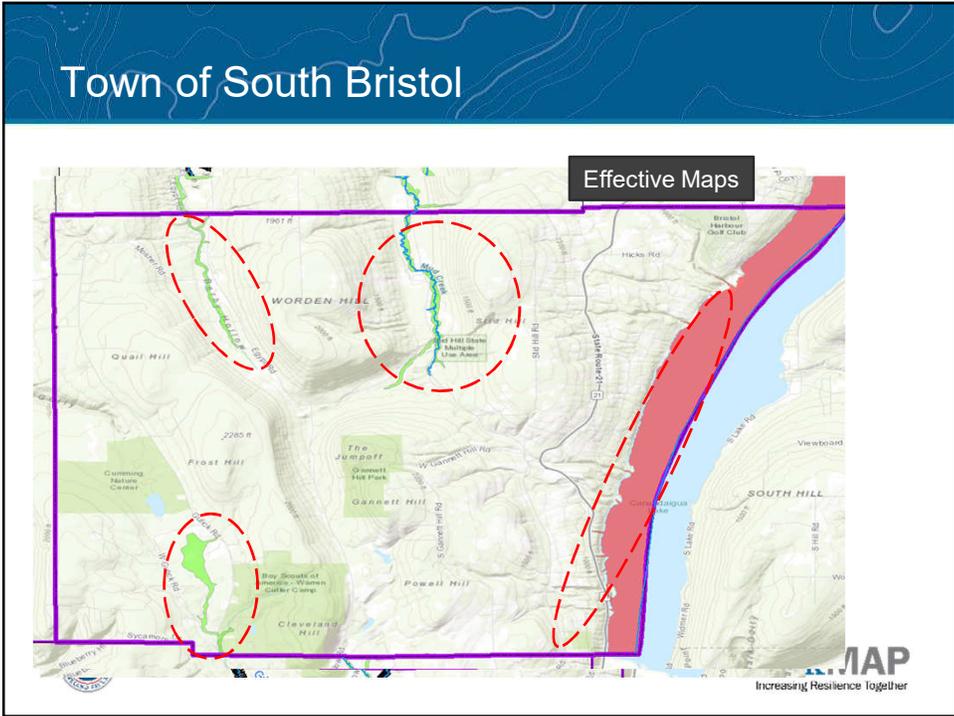
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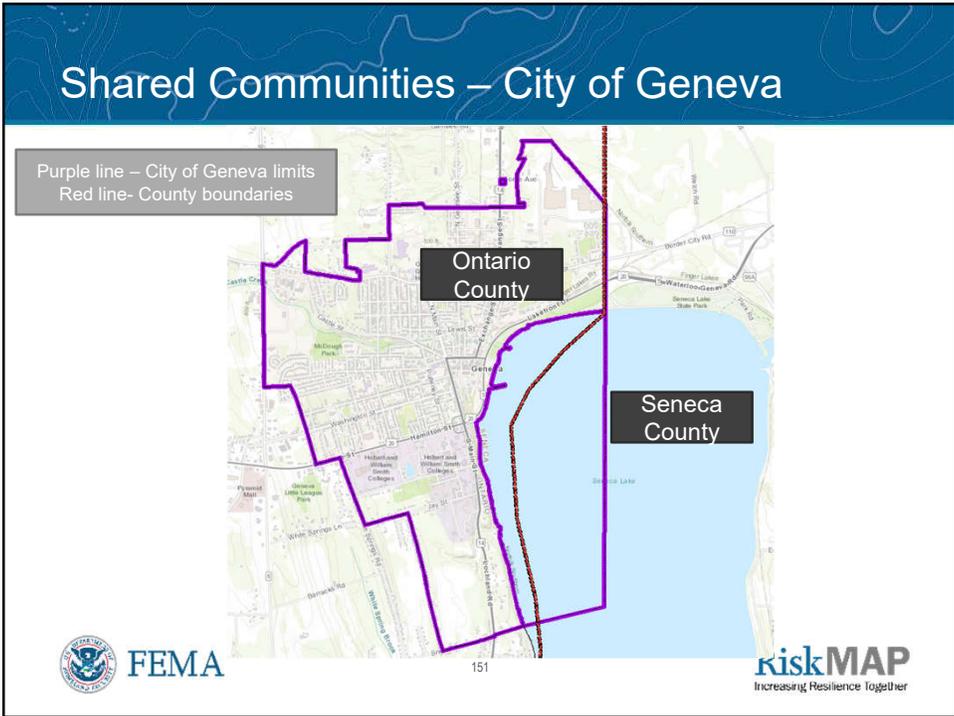
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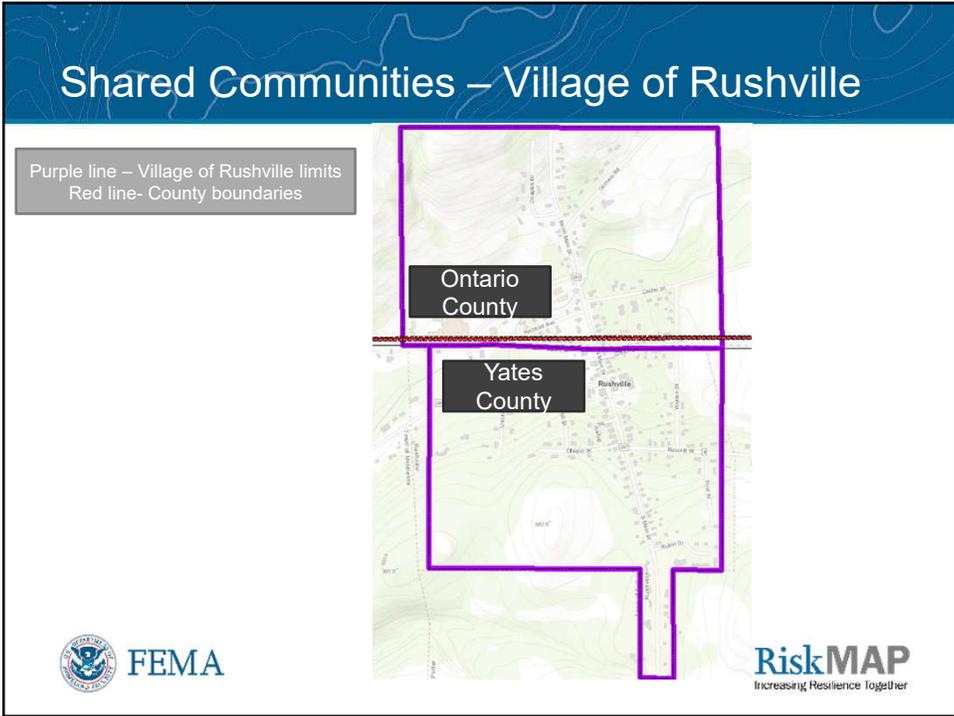
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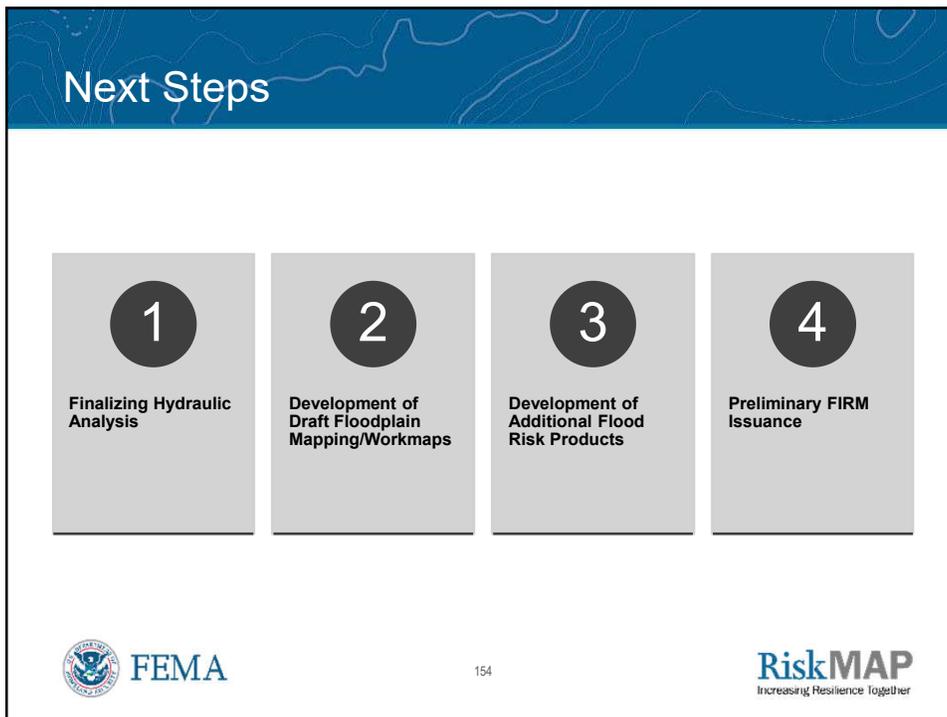
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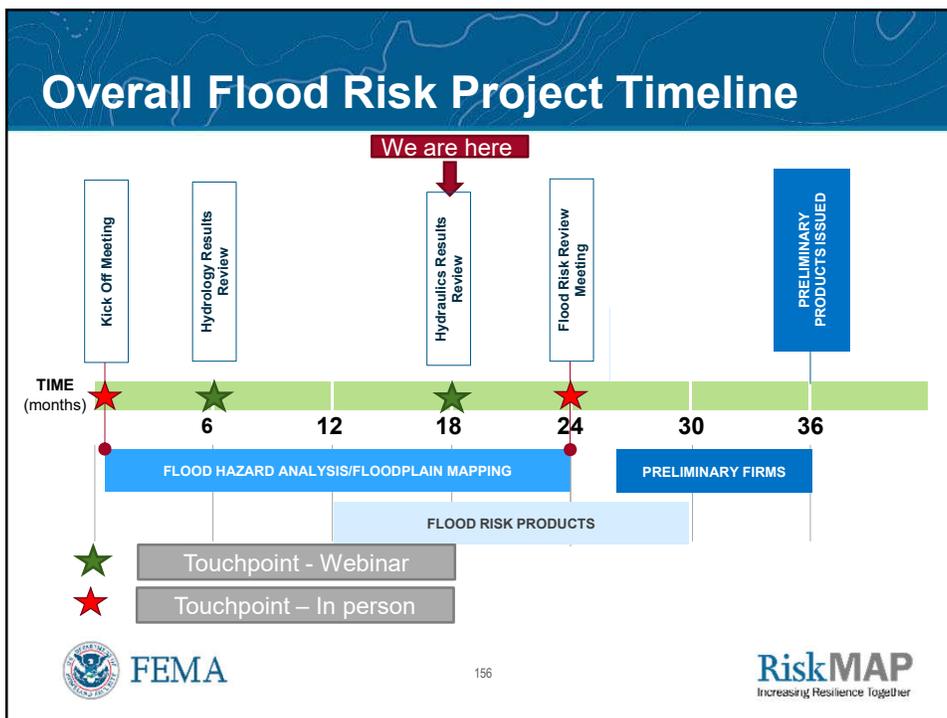
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What's Next? Path Forward

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Contacts

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Questions? Comments?



Thank you!



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