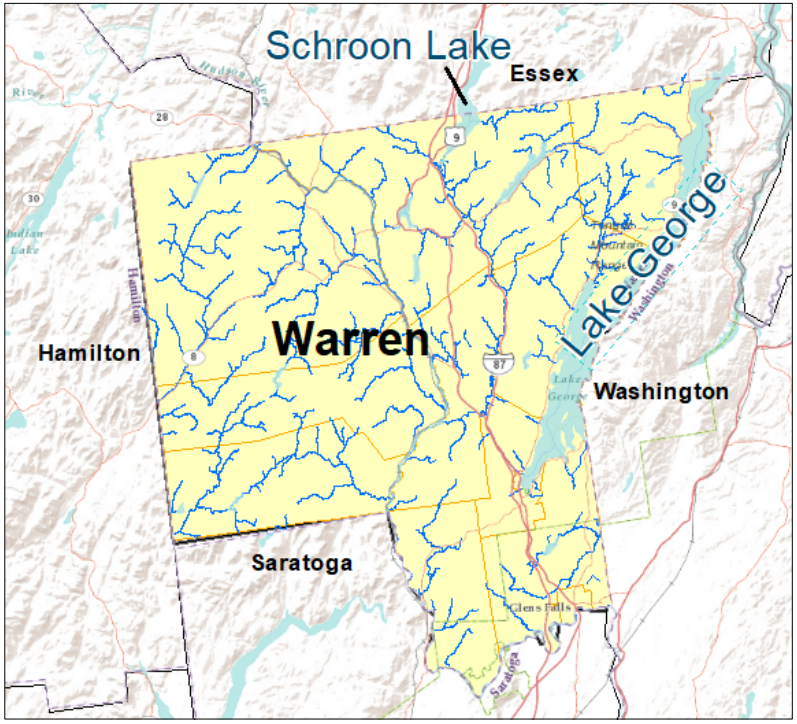
RiskMAP
Increasing Resilience Together

Flood Risk Project

Warren County, NY
Project Kick Off Meeting

May 5, 2020

FEMA



Please introduce yourself

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

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

Also, what do Warren County communities aspire to accomplish using today's meeting?

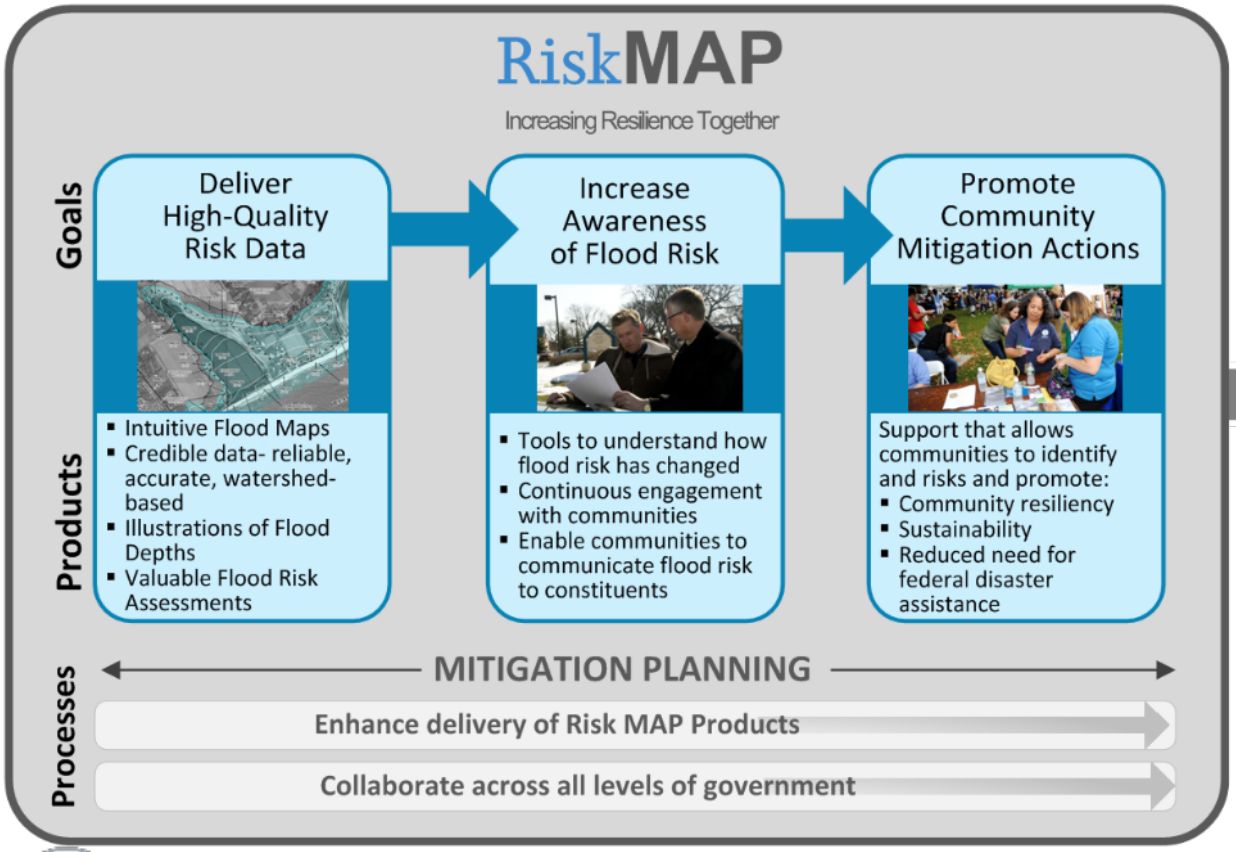
Today's Goals

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

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

Why We are Here

We want to help communities understand flood risk and take action to reduce it because…

Risk Changes Over Time

- All floods are different. Nature and communities change.

Flooding Happens

- Communities may face flooding. Is your community active or reactive to flood risk?

Mitigation is Possible

- Proactive communities plan to reduce flood impacts and other hazards.

Why Update Flood Maps?

NFIP Policies for Warren County communities	NFIP Claims for affected communities	FEMA Insurance Claims Paid in affected communities	Hazard Mitigation Plan
204	162	$2,347,805	Released in December 2016

The Federal Emergency Management Agency (FEMA) manages the National Flood Insurance Program (NFIP)

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How did we get here?
Review past activities

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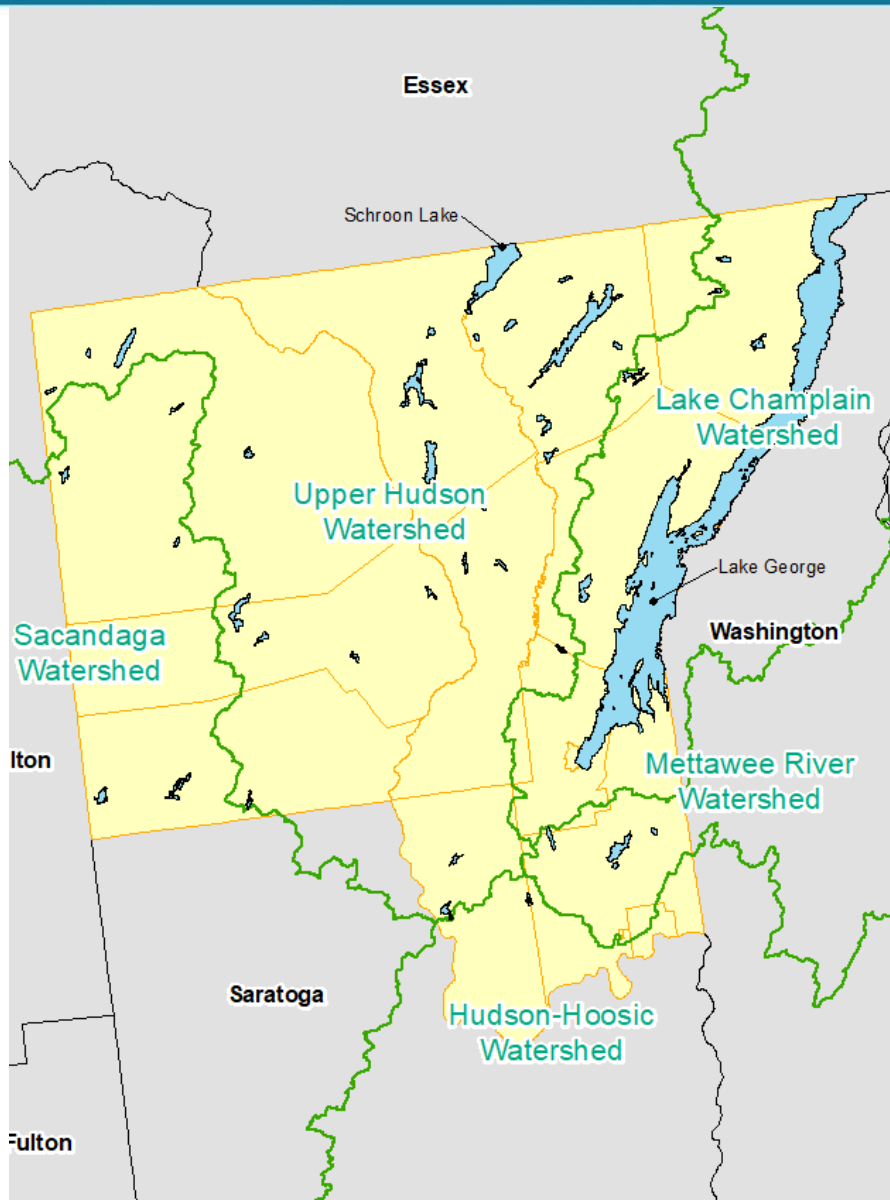
Discovery/Post-Discovery Progress Recap

- Risk MAP Discovery meetings
  - Hudson-Hoosic Watershed- March 31, 2014
  - Lake Champlain Watershed and Portions of the Mettawee River Watershed -September 14, 2016
  - Sacandaga Watershed – March 2019
  - Upper Hudson Watershed – March 2019
- Community input guided FEMA priorities



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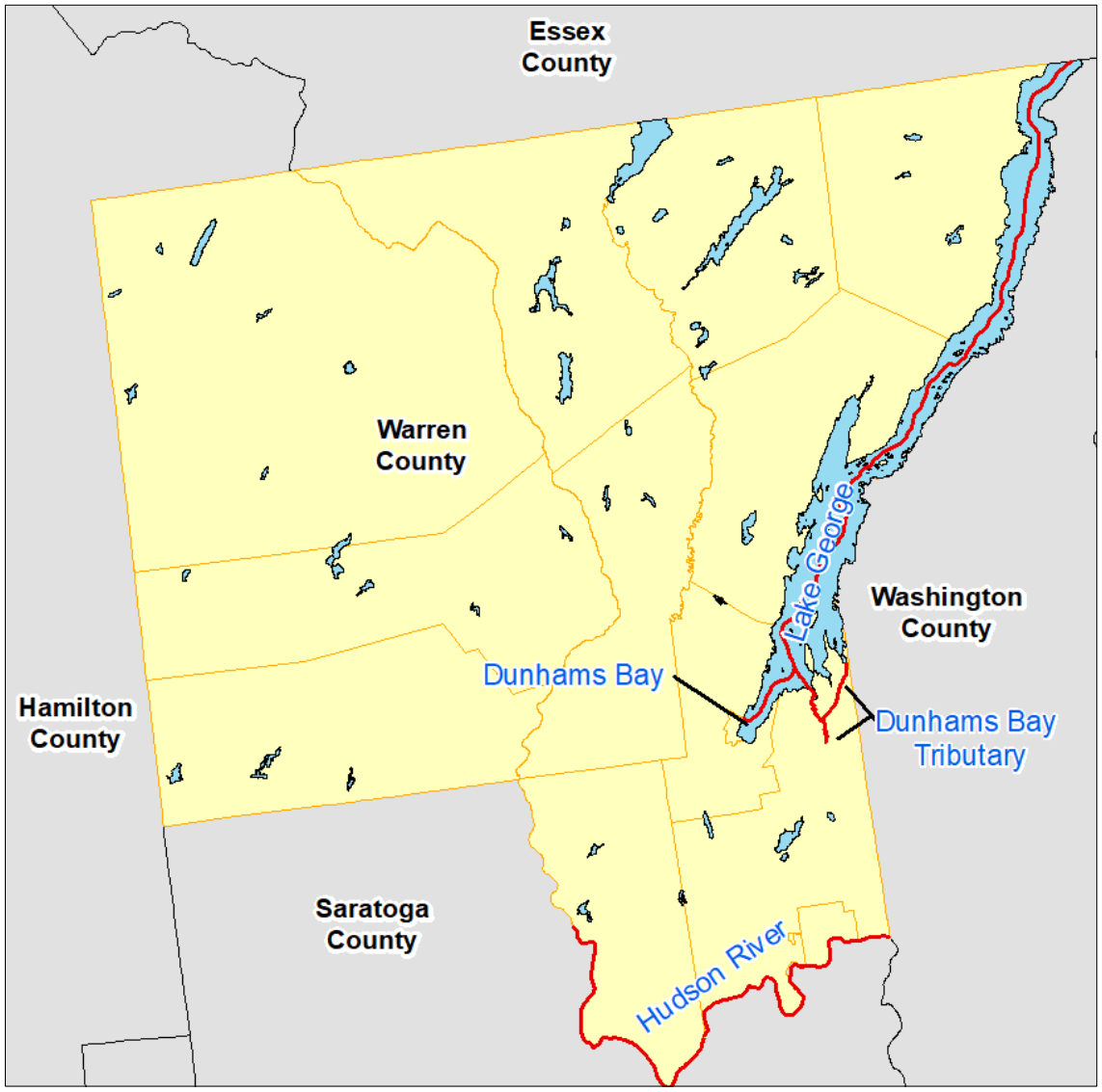
Leveraged Data Recap

- Portion of Hudson River
  - FY2016 Study (~33 mi)
- Dunhams Bay Tributary
  - Ongoing 2018 Study (~5.5 mi)
- Lake George
  - Ongoing 2018 Study
- Any local flood studies FEMA should be aware of?



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What is being studied now?
Discuss scope of new study

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Warren County, Countywide Flood Risk Study Scope

- **First time digital maps**
- **Flooding sources analyzed**
  - 56 miles - Detailed (AE Zone)
  - 606 miles – Approximate (A)
- **Includes incorporation of previously completed analysis** (67 mi AE and 6 mi A)
- **Redelineation of Glenn Lake**
- **13 updated communities**
- **Review Meetings**
  - Hydrology Meeting
  - Hydraulics Meeting
  - Flood Risk Review Meeting

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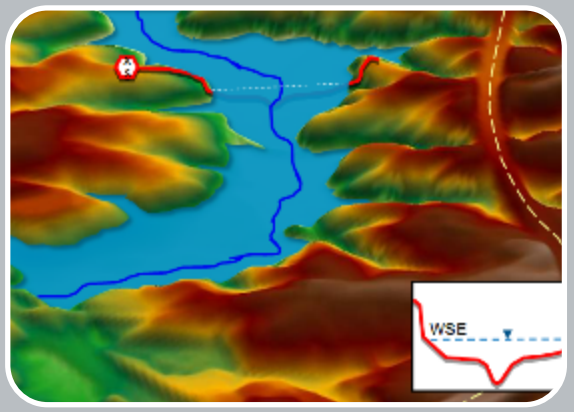
Flood Risk Study Analysis



Hydrology

Volume of water?

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

Hydraulics

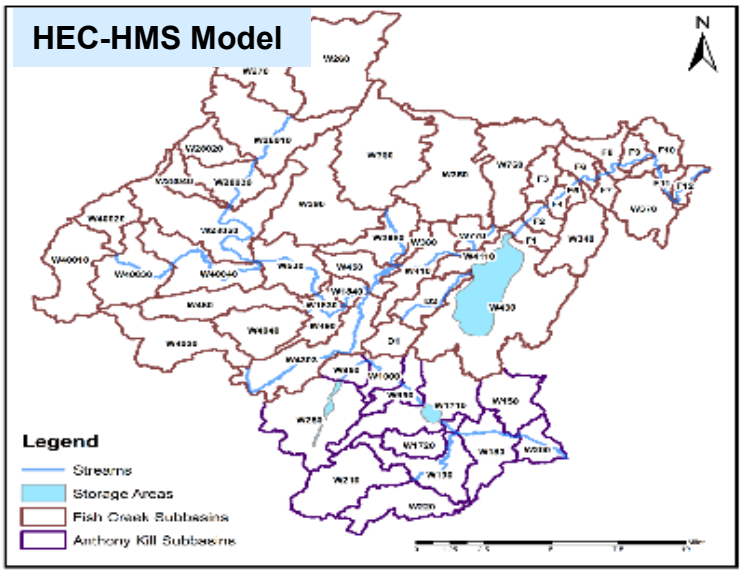
Will the stream in question be able to convey all storm water or runoff that arrives?

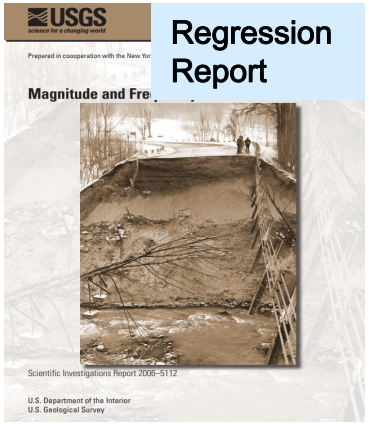
Floodplain Mapping

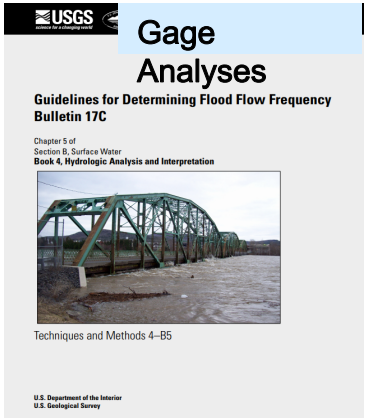
What areas of a community will be inundated based on engineering analysis?

Engineering Methods - Hydrologic Analysis

- **Typical Methods FEMA utilizes**
  - Statistical Gage Analyses
  - Regression Analyses (StreamStats)
  - Rainfall Runoff Modeling
- **Gage/Regression are based on availability of stream gage data**
- **Rainfall-Runoff physical modeling chosen due to limited gage data**
  - Using USACE's HEC-HMS Program
- **Special Consideration**
  - Schroon Lake may require a combination of HEC-HMS and HEC-RAS to determine lake levels
- **Discharges developed for**
  - 10%, 4%, 2%, 1%, 1%+, 1%-, 0.2%
  - Inputs for hydraulic analyses



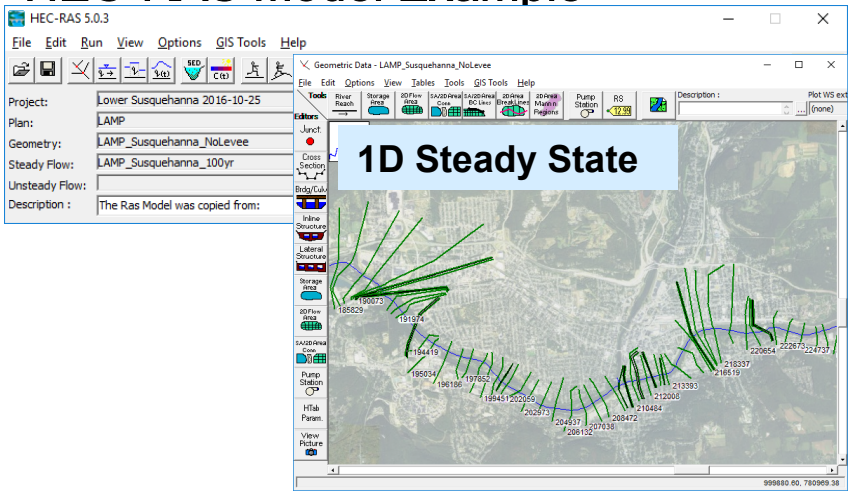


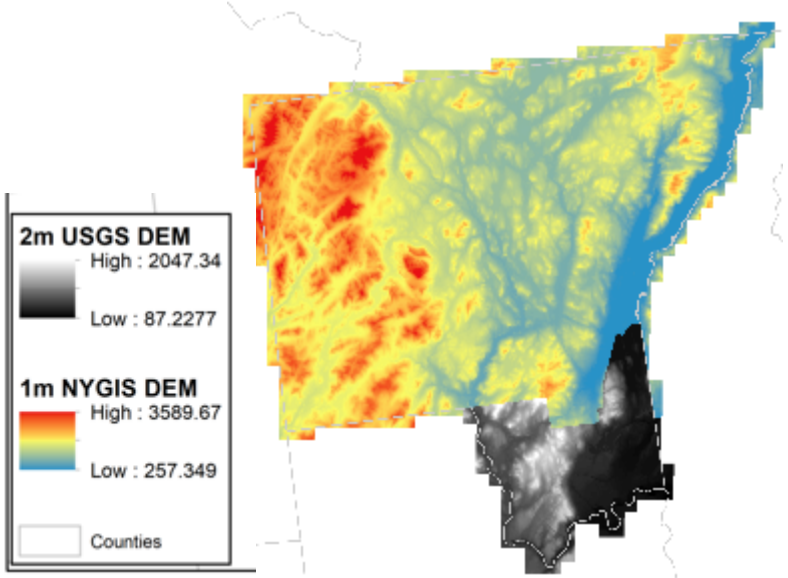


Engineering Method - Hydraulic Analysis

- **Types of Analyses**
  - One-Dimensional (1D) Steady State
  - One-Dimensional (1D) Unsteady State
- **Modeling developed using USACE's HEC-RAS Program**
- **Terrain Data – 2012 & 2015 LiDAR**
  - 2015 NYGIS 1M DEM
  - 2012 FEMA 2M DEM
- **Field Survey for AE Reaches Only**
  - Collection underway for structures and under water channel sections
- **Flood Hazard Data Generated**
  - Elevations: 10%, 4%, 2%, 1%, 1%+, 1%-, 0.2%
  - Floodplain extents: 1%, 10%, 0.2%, Floodway

HEC-RAS Model Example





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Scope of Countywide Mapping

Zone A Streams

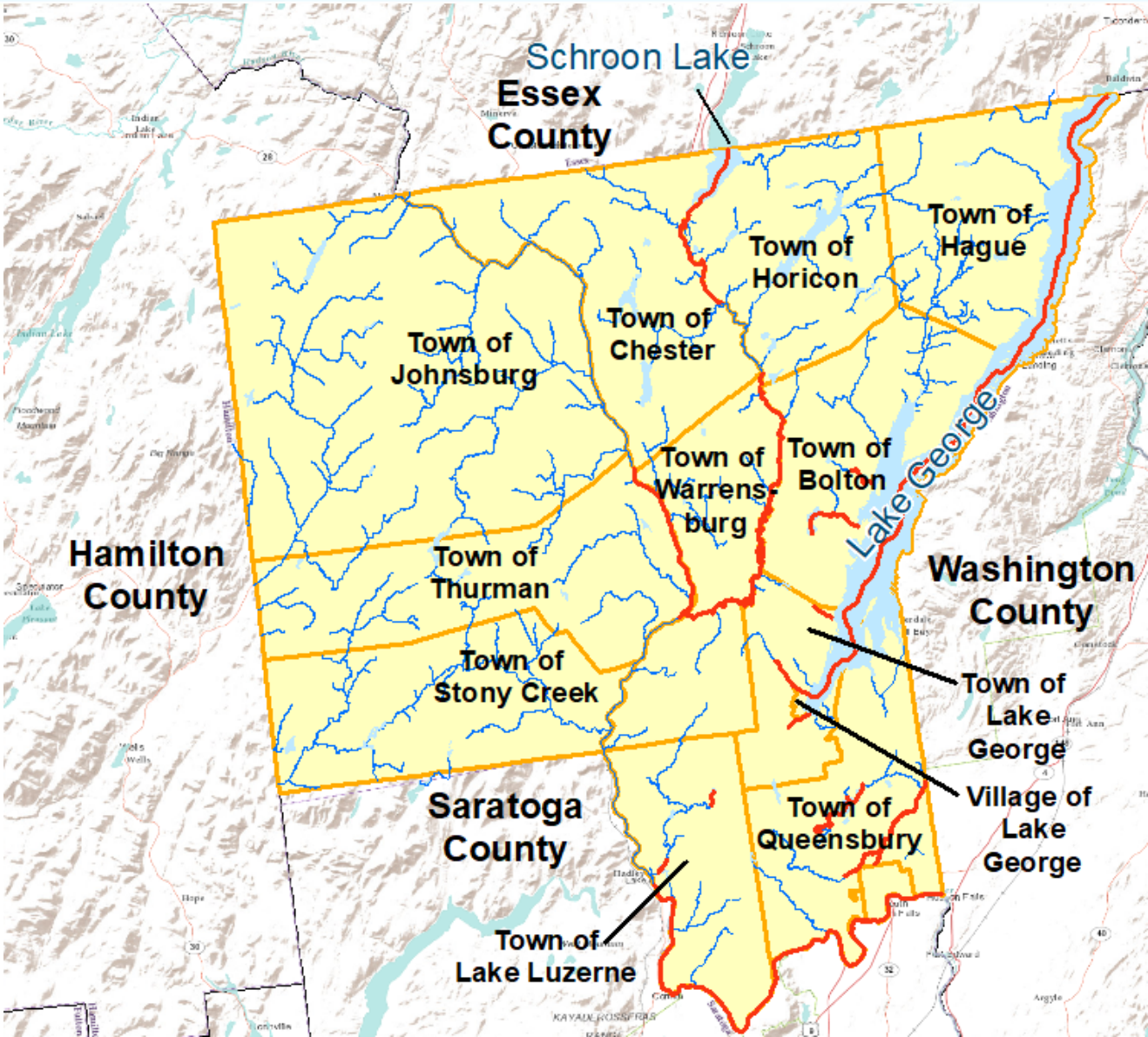
Total mileage =~ 613 miles

- **Floodplain extents for 1% and 0.2%**

Zone AE Streams

Total mileage =~ 127 miles

- **Floodplain extents for 10%, 1% and 0.2%**



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Town of Bolton - Studies

- **Zone A Studies:**
  - Alder Brook (2.5 mi)
  - Finkle Brook (1.1 mi)
  - Huddle Brook (1.6 mi)
  - Indian Brook and Tributaries (10.0 mi)
  - Northwest Bay Brook and Tributaries (13.8 mi)
  - Round Pond Brook (1.9 mi)
  - Tributaries to Lake George (0.9 mi)
- **Zone AE Studies:**
  - Trout Lake
  - Trout Lake Outlet (0.8 mi)
  - Huddle Brook (1.5 mi)
  - Finkle Brook (1.4 mi)
  - Lake George (Existing Study)
  - Schroon River (12.5 mi)

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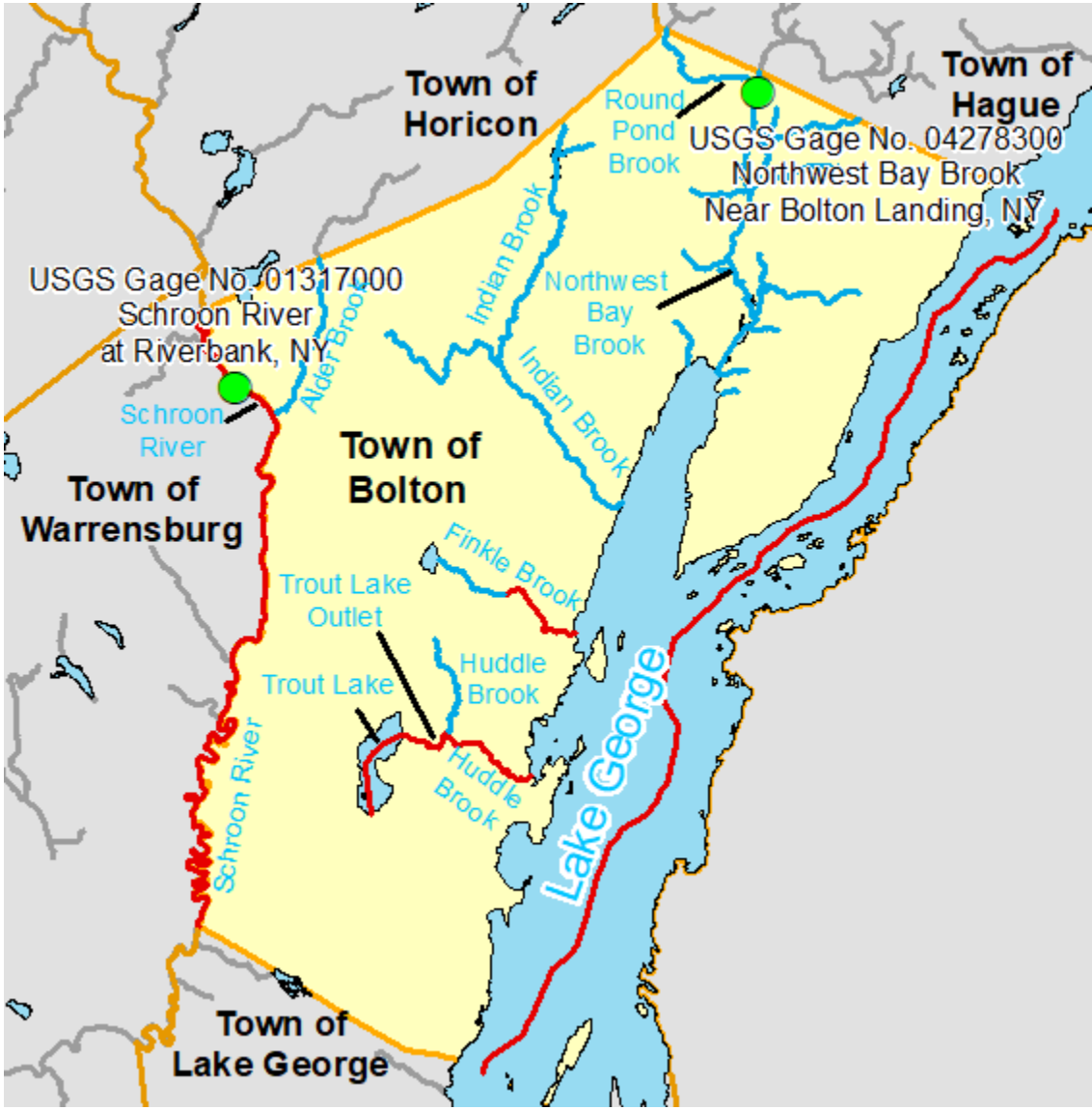
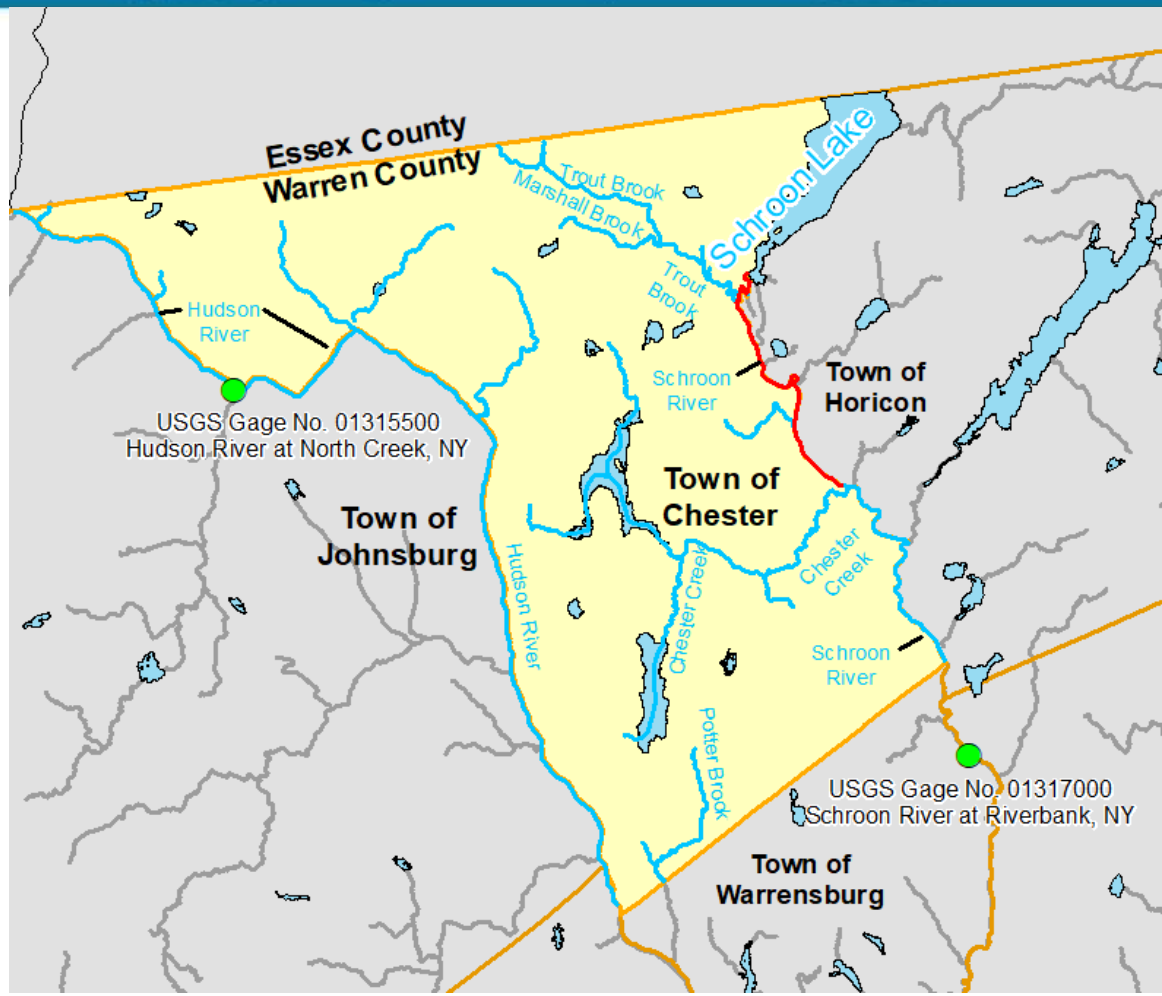


Town of Chester - Studies

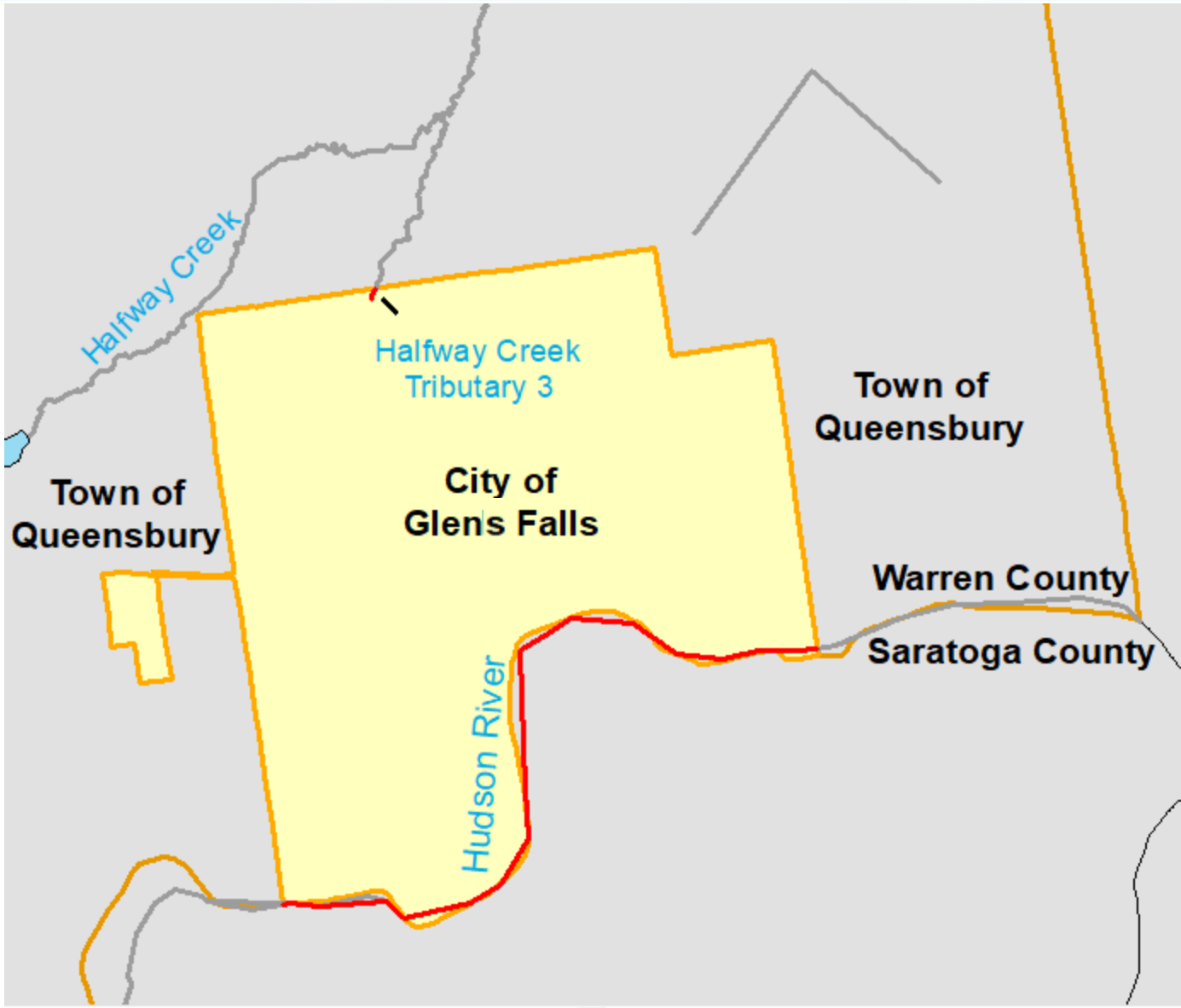
- **Zone A Studies:**
  - Chester Creek (9.2 mi)
  - Chester Creek Tributaries (9.1 mi)
  - Hudson River (19.7 mi)
  - Hudson River Tributaries (11.6 mi)
  - Marshall Brook (2.5 mi)
  - Schroon River (4.2 mi)
  - Schroon River Tributaries (2.2 mi)
  - Potter Brook and Tributary (4.2 mi)
  - Trout Brook (6.2 mi)
  - Trout Brook Tributaries (1.2 mi)

- **Zone AE Studies:**
  - Schroon Lake
  - Schroon River (5.2 mi)



City of Glens Falls- Studies

- **Zone AE Studies:**
  - Hudson River (3.3 mi-Existing Study)
  - Halfway Creek Tributary 3 (small segment)



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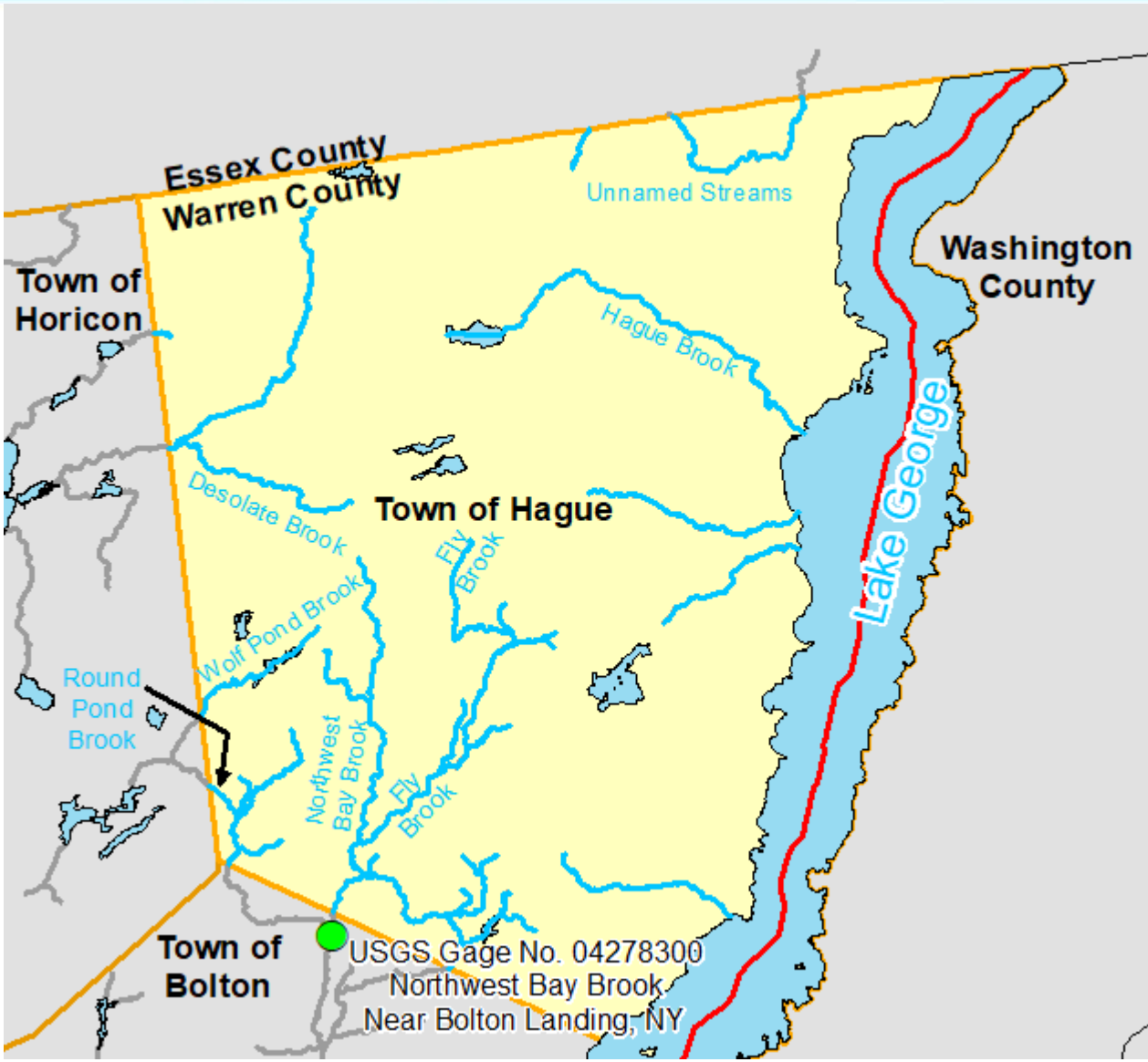
Town of Hague - Studies

- **Zone A Studies:**
  - Desolate Brook (2.9 mi)
  - Desolate Brook Tribs. (4.3 mi)
  - Fly Brook (5.9 mi)
  - Fly Brook Tributaries (2.9 mi)
  - Hague Brook (5.7 mi)
  - Lake George Tributaries (7.6 mi)
  - Northwest Bay Brook (5.2 mi)
  - Northwest Bay Brook Tributaries (7.1 mi)
  - Round Pond Brook (1.3 mi)
  - Round Pond Brook Tributaries (2.6 mi)
  - Unnamed Streams (3.6 mi)
  - Wolf Pond Brook (2.0 mi)
- **Zone AE Studies:**
  - Lake George Existing Study



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Town of Horicon - Studies

- **Zone A Studies:**
  - Alder Brook (2.4 mi)
  - Desolate Brook (9.8 mi)
  - Desolate Brook Tributaries (11.5 mi)
  - Lily Pond Brook (2.9 mi)
  - Mill Brook (9.8 mi)
  - Mill Brook Tributaries (2.5 mi)
  - Red Fin Brook (2.5 mi)
  - Round Pond Brook (3.3 mi)
  - Red Pond Brook Tributary (0.4 mi)
  - Schroon Lake Tributaries (2.0 mi)
  - Schroon River (4.5 mi)
  - Schroon River Tributaries (9.6 mi)
  - Valentine Pond (0.7 mi)
  - Valentine Pond Tributary 1 (2.9 mi)
  - Wolf Pond Brook (0.7 mi)
- **Zone AE Studies:**
  - Schroon Lake
  - Schroon River (5.2 mi)

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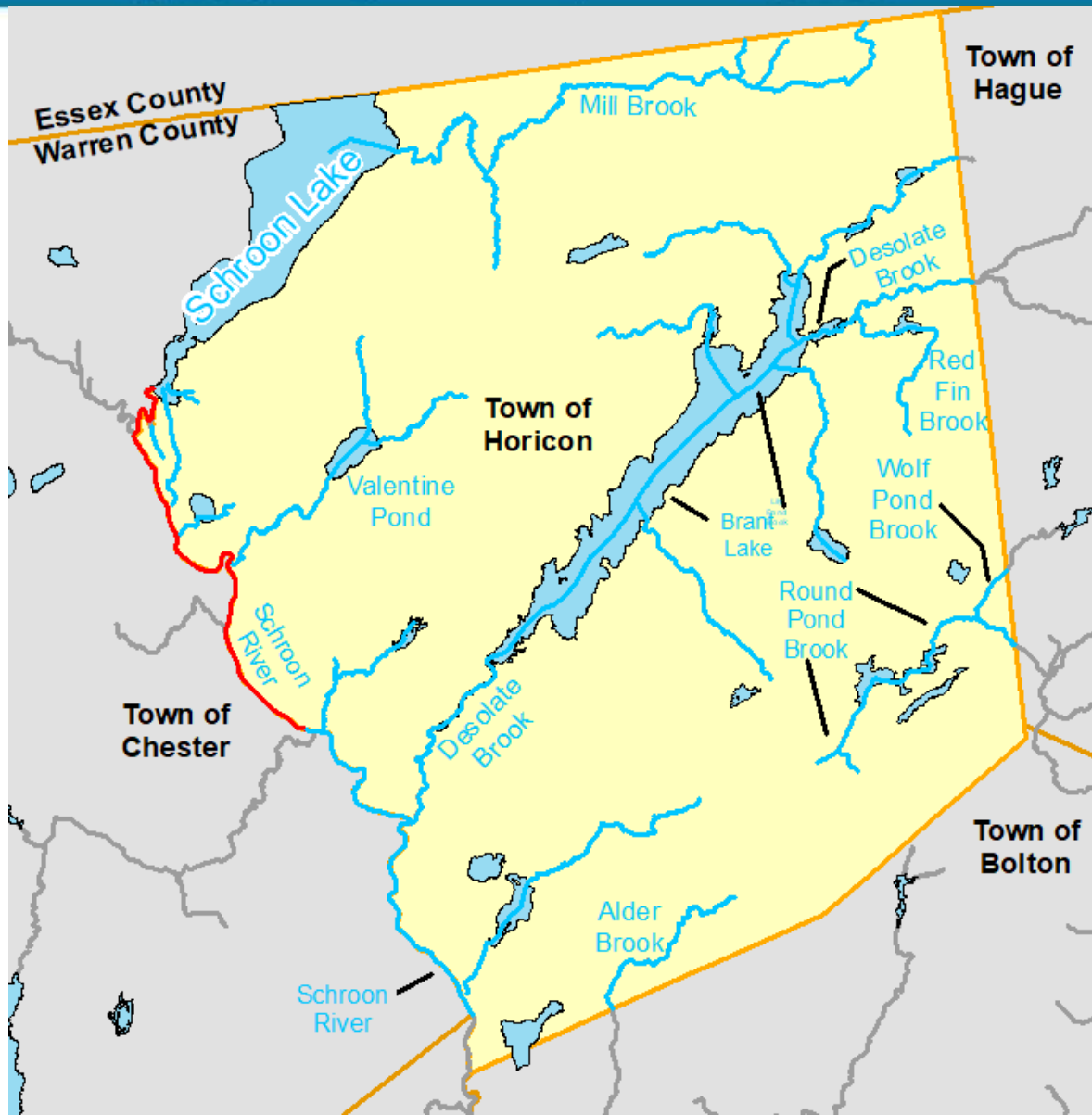
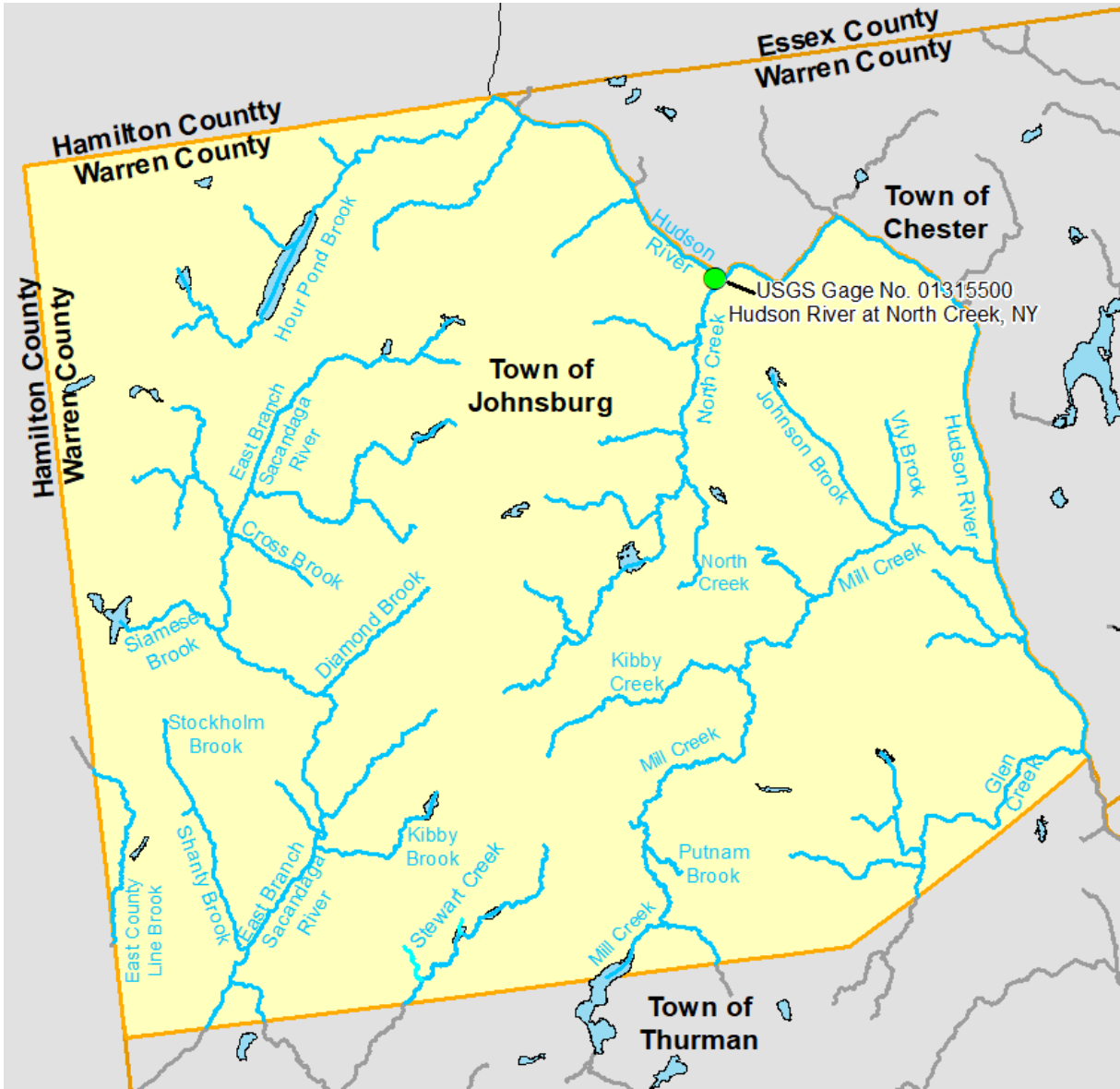


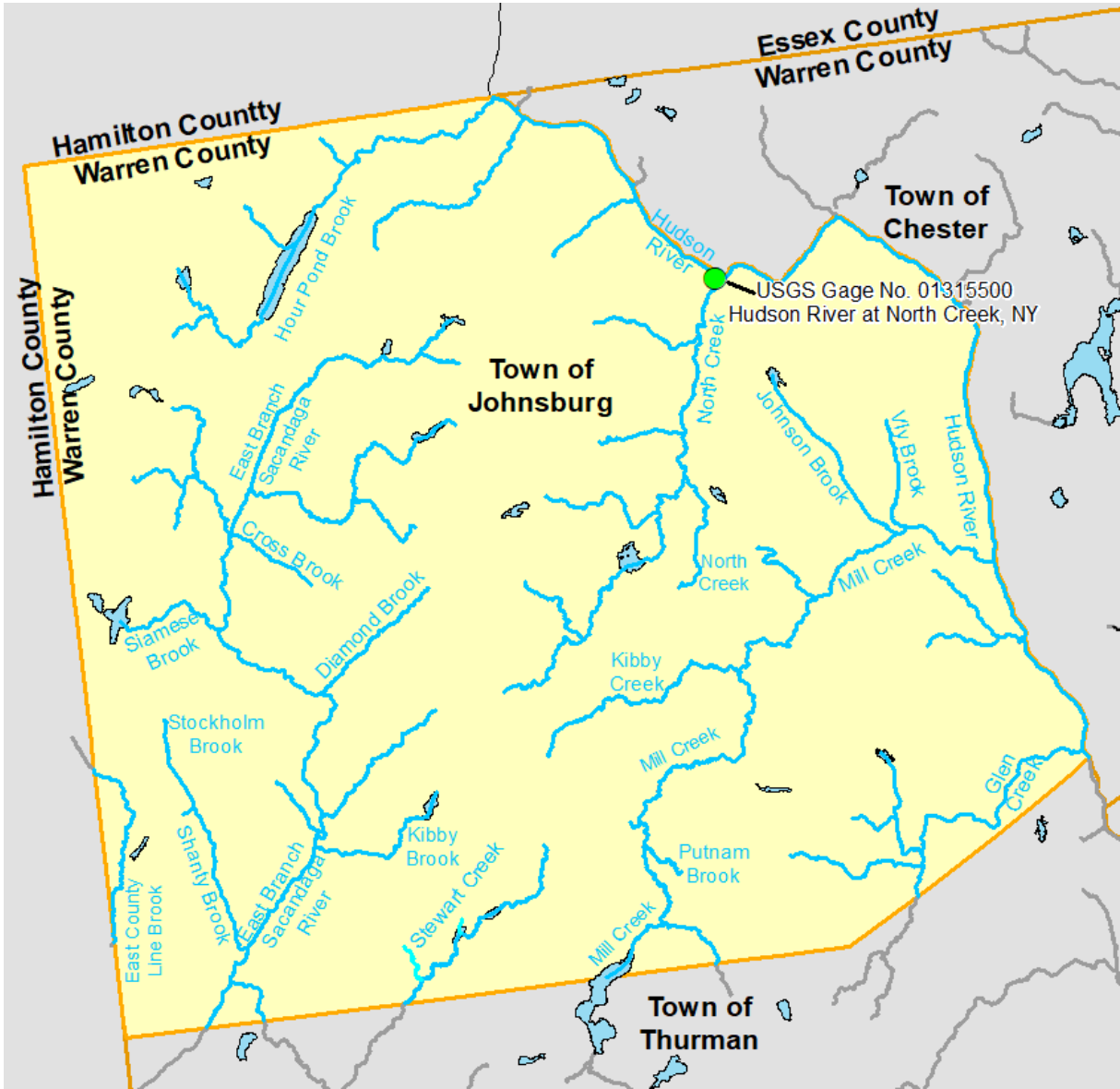
Town of Johnsburg - Studies

- **Zone A Studies:**
  - Cook Brook (1.5 mi)
  - Cross Brook (1.9 mi)
  - Diamond Brook (2.9 mi)
  - East Branch County Line Brook (3.9 mi)
  - East Branch Sacandaga River (18.3 mi)
  - East Branch Sacandaga River Tributaries (9.7 mi)
  - Glen Creek (5.4 mi)
  - Glen Creek Tributaries (6.4 mi)
  - Hour Pond Brook (9.6 mi)
  - Hour Pond Brook Tributaries (3.0 mi)
  - Hudson River (18.9 mi)
  - Hudson River Tributaries (10.8 mi)
  - Johnson Brook (3.8 mi)
  - Kibby Brook (3.1 mi)
  - Kibby Creek (5.1 mi)
  - Mill Creek (16.1 mi)
  - Mill Creek Tributary (2.3 mi)
  - North Creek (7.1 mi)
  - North Creek Tributary (16.2 mi)
  - Pine Ridge Brook (1.6 mi)



Town of Johnsburg – Studies (Cont.)

- **Zone A Studies:**
  - Putnam Creek (1.6 mi)
  - Second Pond Brook (6.1 mi)
  - Second Pond Brook Tributary (1.9 mi)
  - Shanty Brook (3.1 mi)
  - Siamese Brook (2.4 mi)
  - Stewart Creek (6.0 mi)
  - Steward Creek (1.2 mi)
  - Stockholm Brook (1.7 mi)
  - Vly Brook (2.2 mi)



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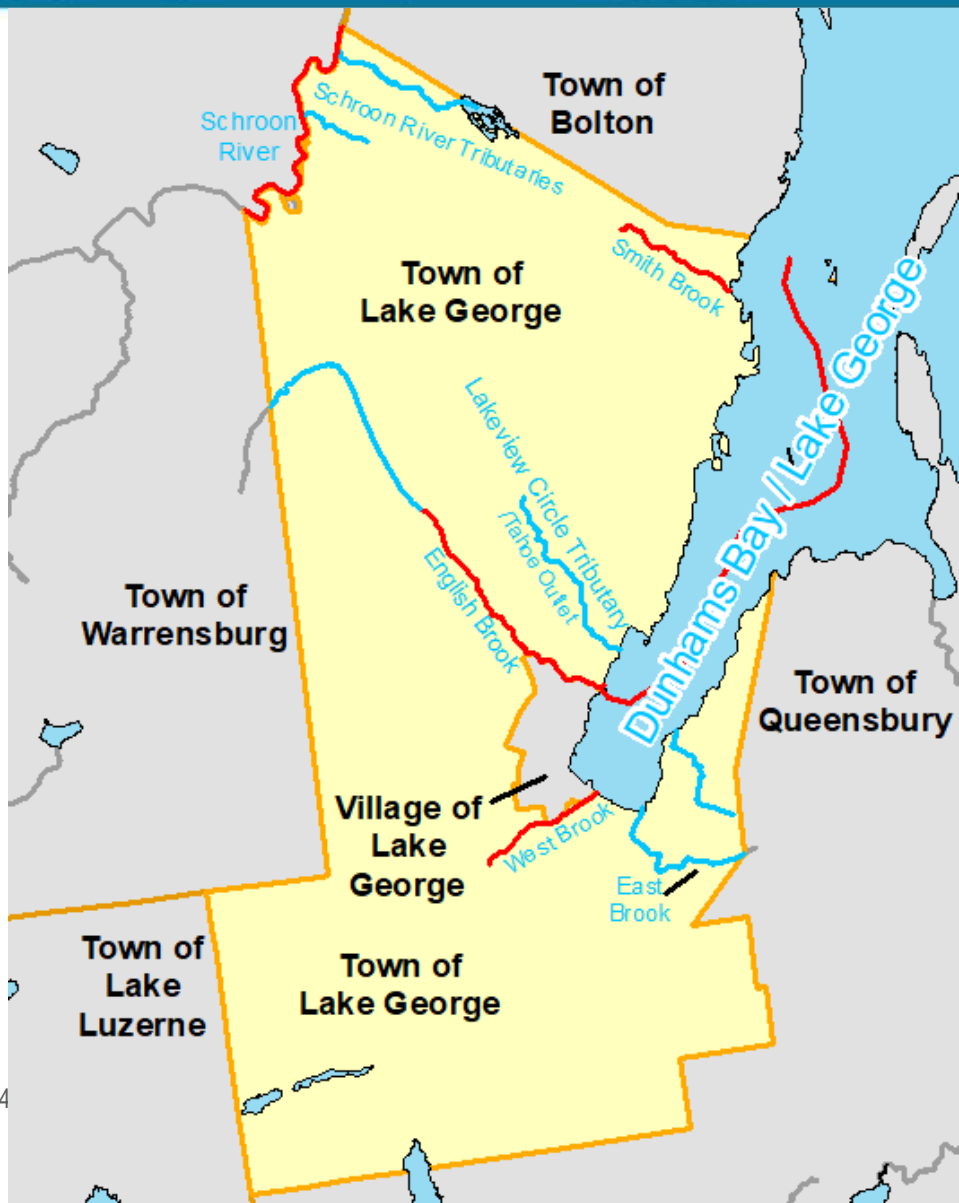
Town of Lake George - Studies

- **Zone A Studies:**
  - East Brook (1.5 mi)
  - English Brook (2.2 mi)
  - Lake George Tributary 1 (1.1 mi)
  - Lakeview Circle Tributary/Tahoe Outlet (1.7 mi)
  - Schroon River Tributaries (2.1 mi)

- **Zone AE Studies:**
  - Dunhams Bay/Lake George (Existing Study)
  - English Brook (2.3 mi)
  - Schroon River (2.7 mi)
  - Smith Brook (1.2 mi)
  - West Brook (1.1 mi)



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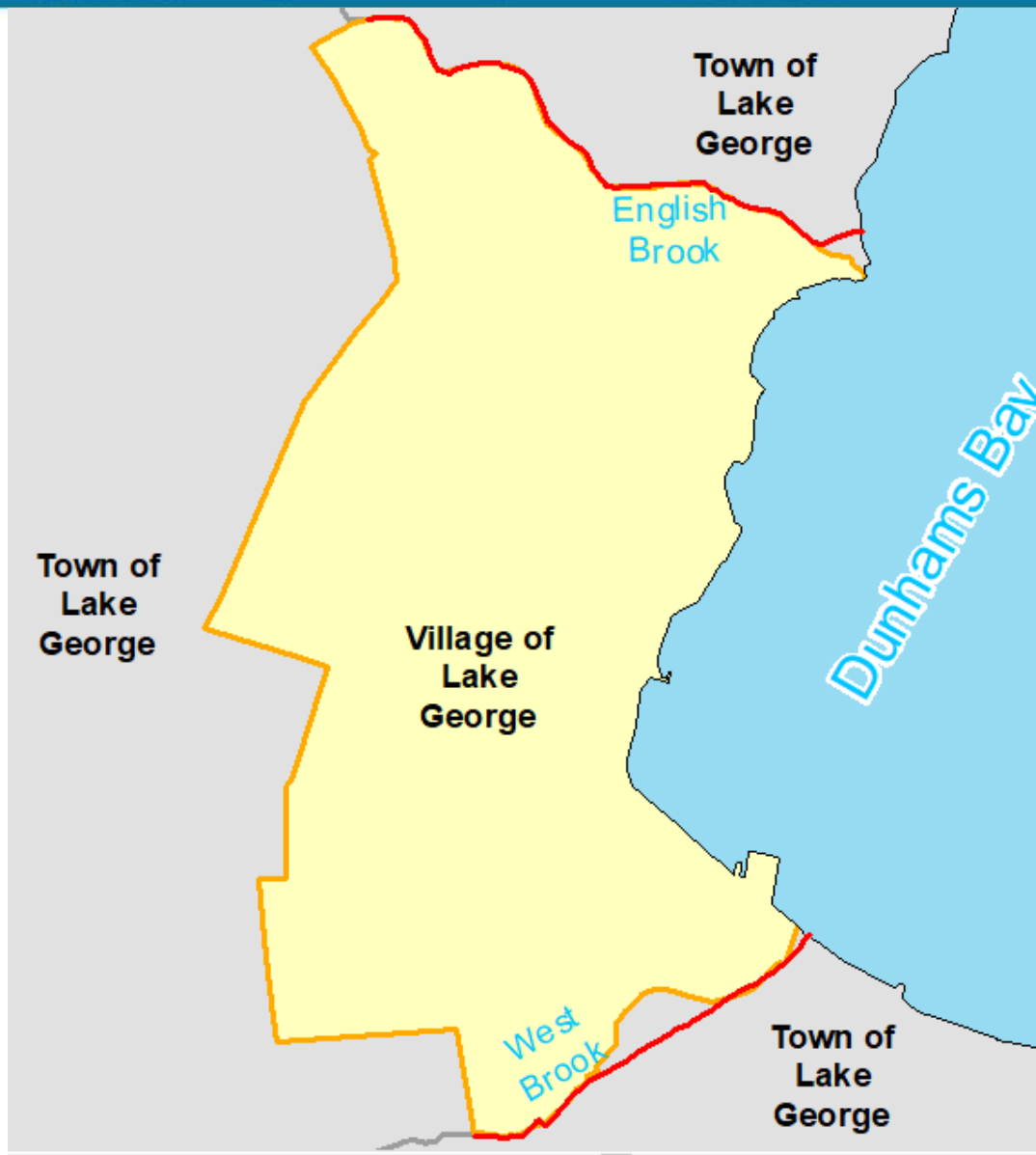
Village of Lake George - Studies

- **Zone AE Studies:**
  - Dunhams Bay (Existing Study)
  - West Brook (0.5 mi) – Detailed Study
  - English Brook (0.8 mi) – Detailed Study



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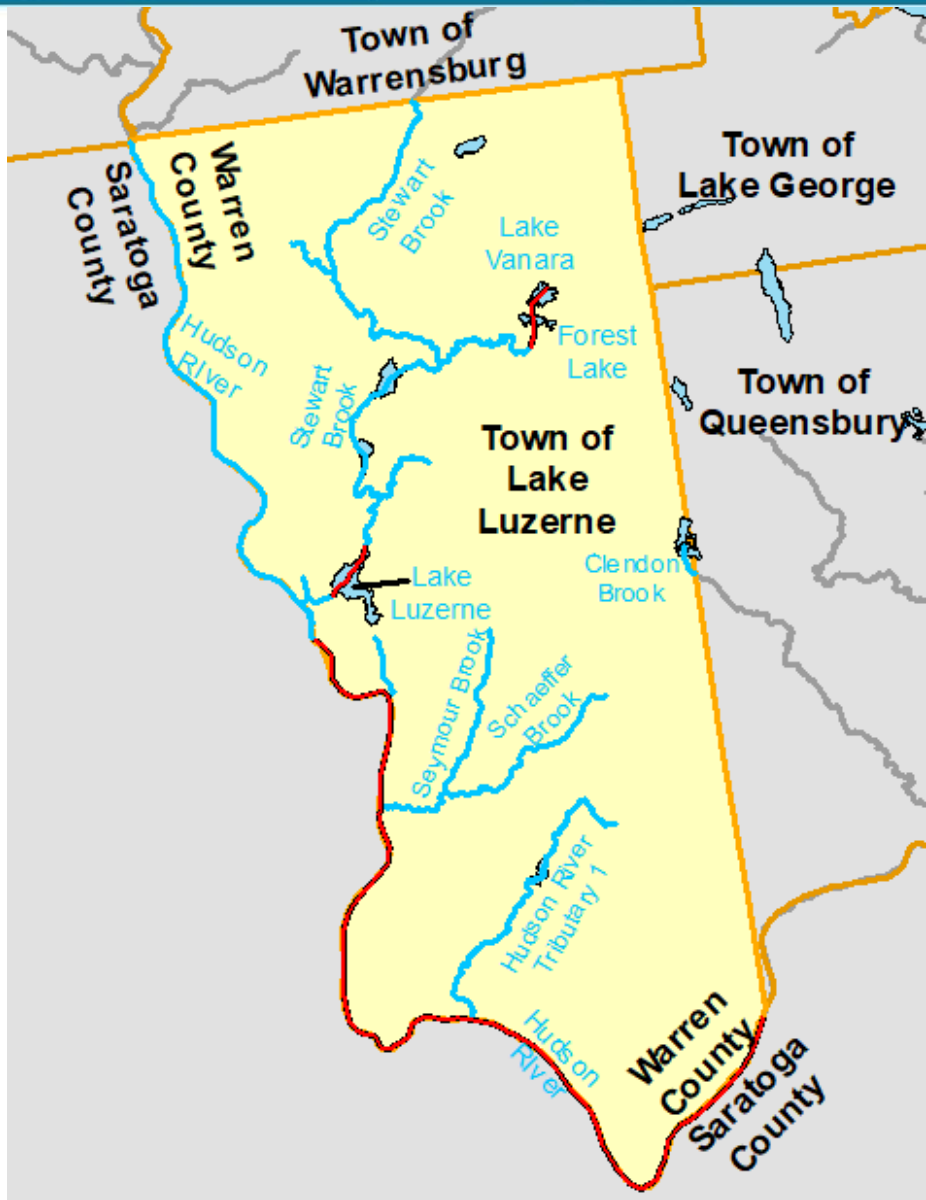
Town of Lake Luzerne - Studies

- **Zone A Studies:**
  - Clendon Brook (0.4 mi)
  - Forest Lake Outlet (1.8 mi)
  - Hudson River Tributaries (4.9 mi)
  - Schaeffers Brook (3.9 mi)
  - Seymour Brook (2.1 mi)
  - Stewart Brook (9.2 mi)
    (including Fourth Lake and Second Lake)
  - Stewart Brook Tributaries (1.9 mi)
  - Stones Pond and Stones Pond Outlet (0.2 mi)
- **Zone AE Studies:**
  - Forest Lake
  - Hudson River (12.4 mi) (Existing Study)
  - Lake Luzerne
  - Lake Vanara



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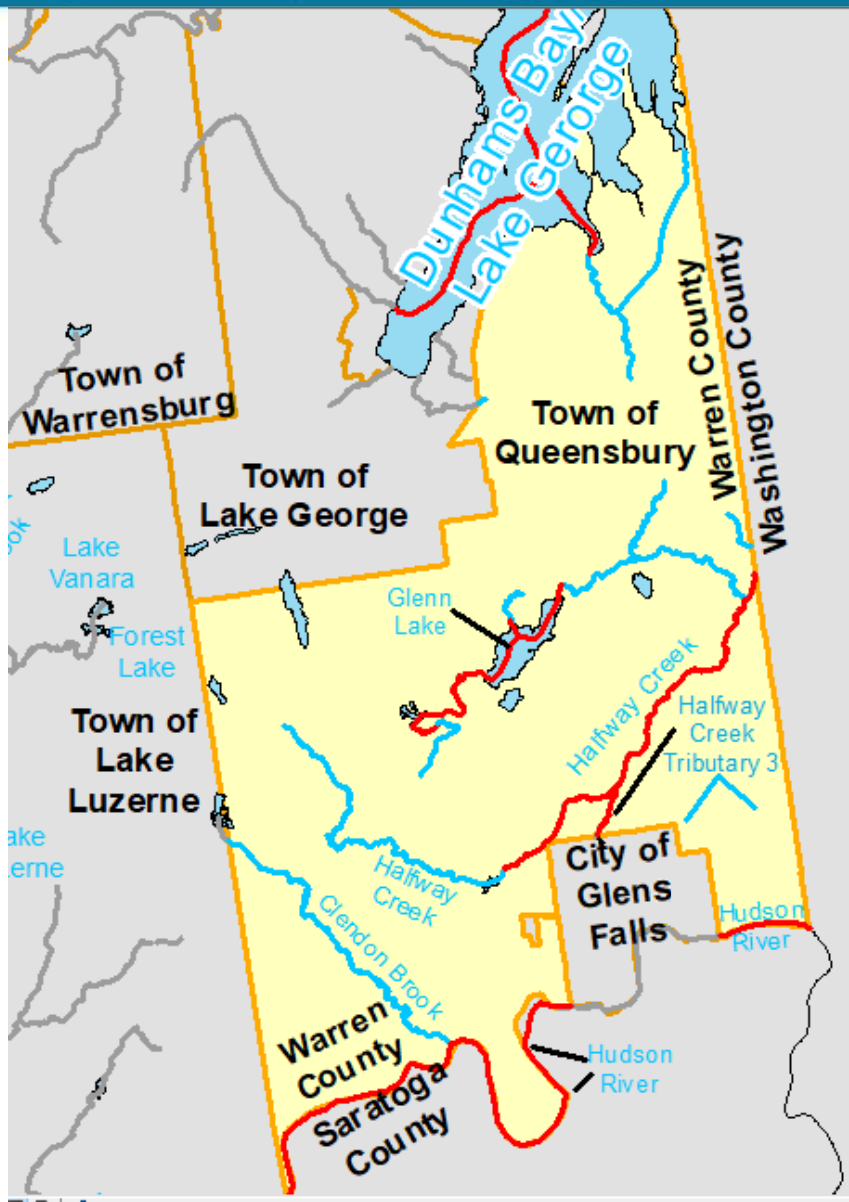
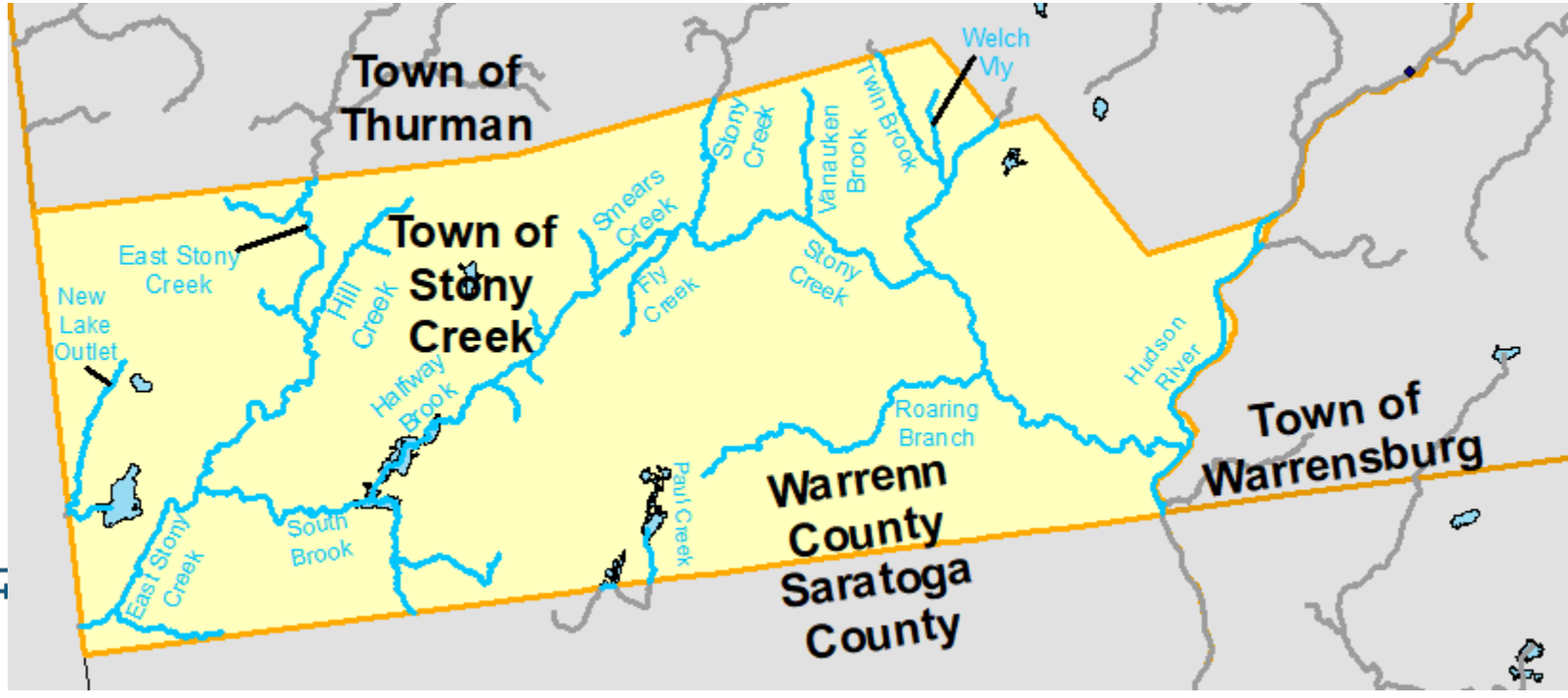
Town of Queensbury - Studies

- **Zone A Studies:**
  - Clendon Brook (6.3 mi)
  - Dunhams Bay Tributaries (5.6 mi)
  - East Brook (0.1 mi)
  - Glen lake Tributaries (2.0 mi)
  - Halfway Creek (6.7 mi)
  - Halfway Creek Tributaries (6.1 mi)
  - Unnamed Lake (1.4 mi)
- **Zone AE Studies:**
  - Glenn Lake (Redelineation)
  - Halfway Creek (7.8 mi)
  - Halfway Creek Tributary 3 (0.8 mi)
  - Hudson River (10.3 mi) (Existing Study)
  - Lake George/ Dunhams Bay (Existing Study)



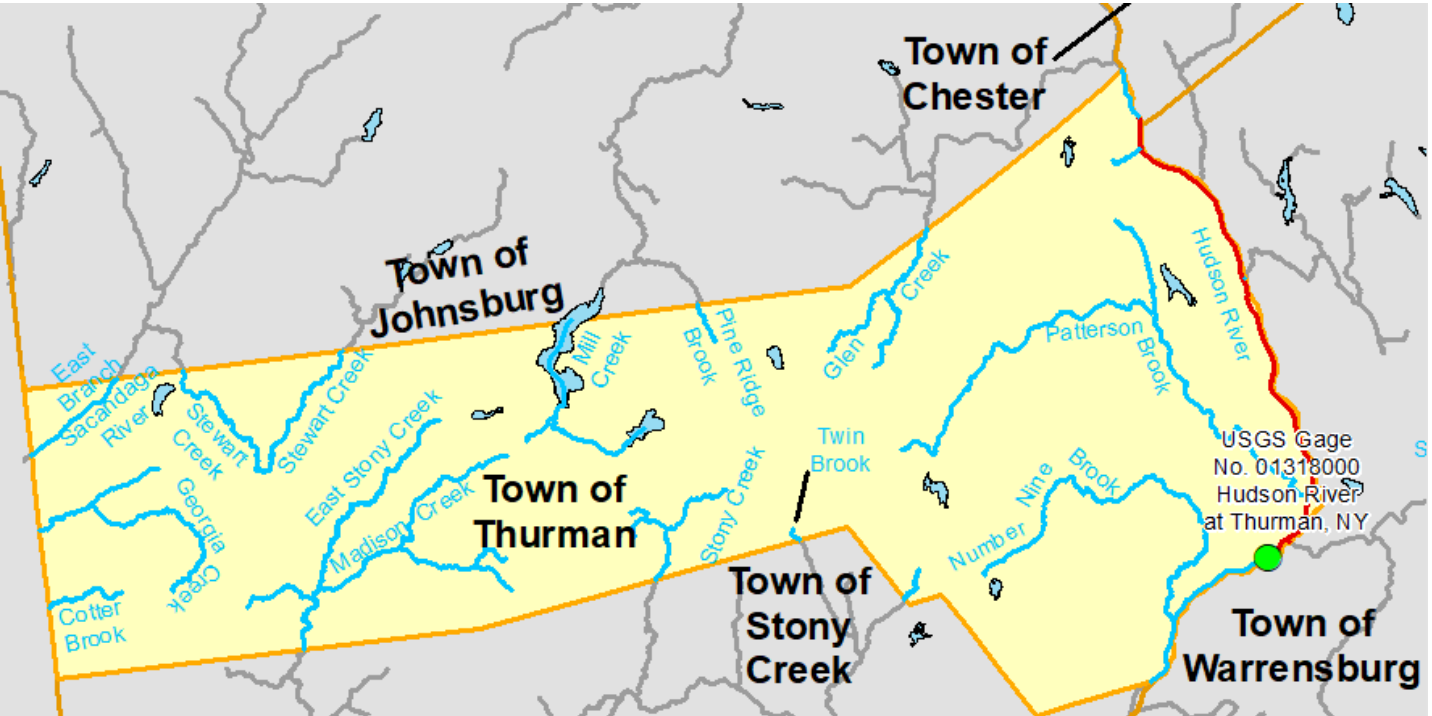
Town of Stony Creek- Studies

- **Zone A Studies:**
  - Dayton Creek (1.7 mi)
  - East Stony Creek and Tribs. (11.8 mi)
  - Ferguson Brook (0.2 mi)
  - Fly Creek (2.2 mi)
  - Halfway Brook and Tribs. (6.0 mi)
  - Hill Creek and Trib. (3.1 mi)
  - Hudson River (4.9 mi)
  - New Lake Outlet (2.5 mi)
  - Paul Creek & Trib. (1.0 mi)
  - Roaring Branch (5.4 mi)
  - Smears Creek and Trib. (3.3 mi)
  - South Brook and Trib. (7.5 mi)
  - Stony Creek and Trib. (14.8 mi)
  - Twin Brook (2.2 mi)
  - Vanuaken Brook (2.0 mi)
  - Welch Vly (1.0 mi)
  - Wilcox Outlet (0.8 mi)



Town of Thurman - Studies

- **Zone A Studies:**
  - Cotter Brook (1.4 mi)
  - E. Branch Sacandaga River (1.8 mi)
  - East Stony Creek and Trib. (7.1 mi)
  - Georgia Creek and Trib. (6.2 mi)
  - Glen Creek and Trib. (4.8 mi)
  - Hudson River and Trib. 4 (4.1 mi)
  - Langworthy Creek and Trib. (3.0 mi)
  - Madison Creek (4.5 mi)
  - Mill Creek and Trib. (4.3 mi)
  - Number Nine Brook (7.4 mi)
  - Patterson Brook and Trib.(12.8 mi)
  - Pine Ridge Brook (1.7 mi)
  - Stony Cr. & Tribs. (4.2 mi)
  - Twin Brook (0.3 mi)



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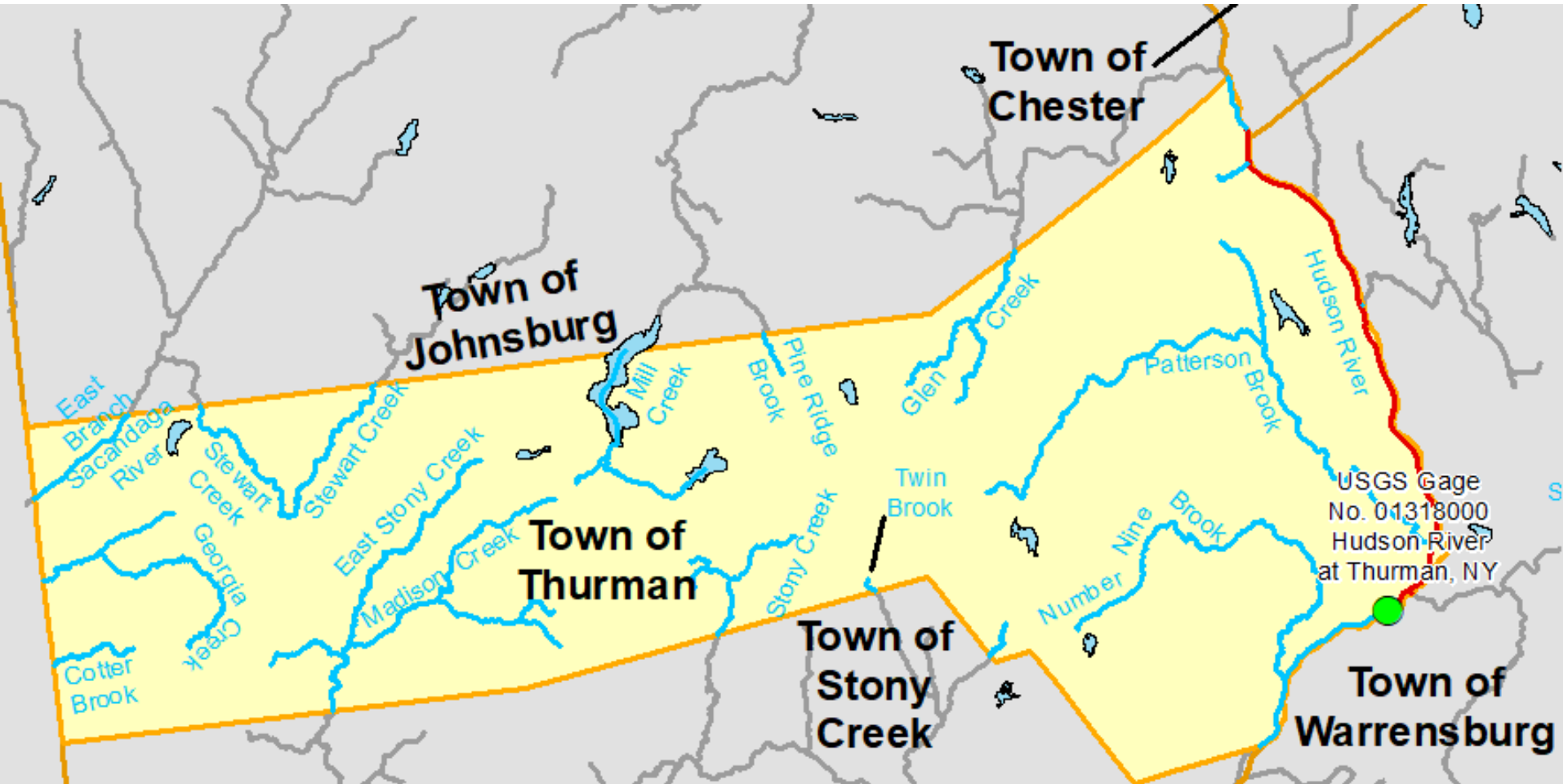
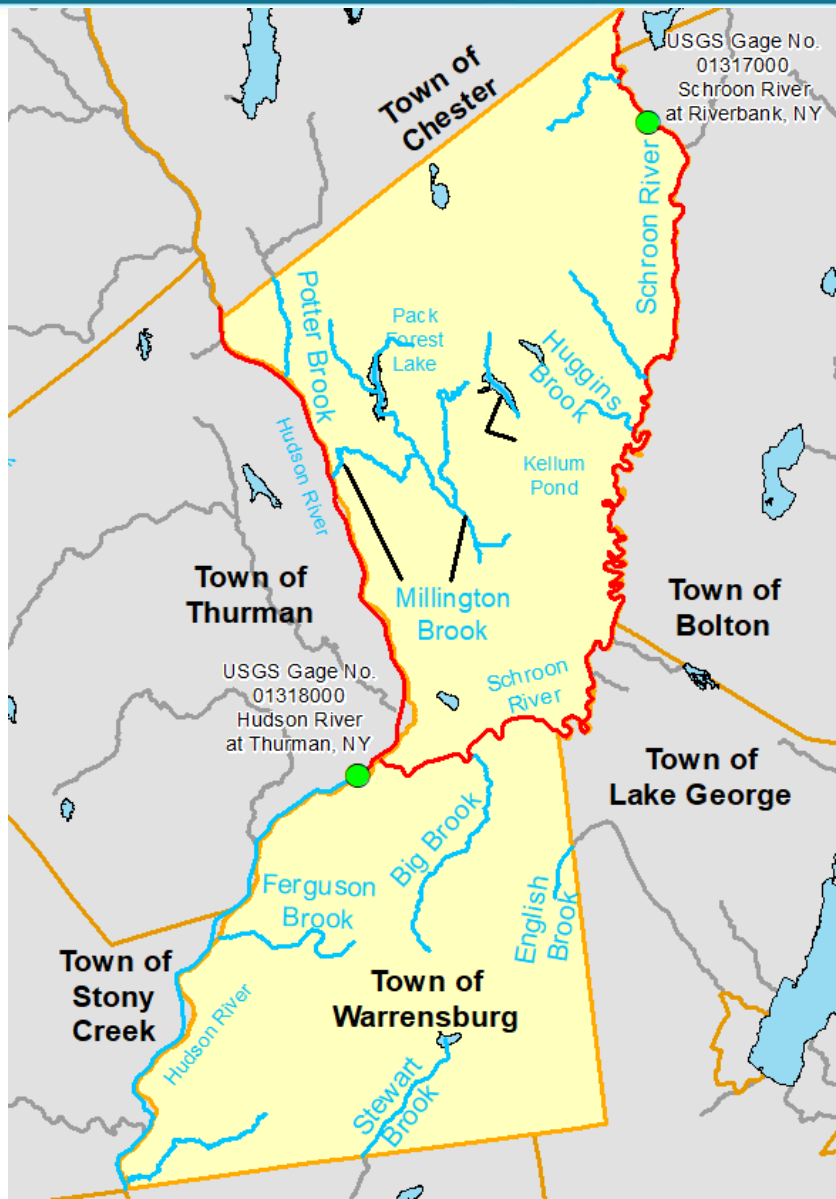
Town of Thurman – Studies (Cont.)

- **Zone AE Studies:**
  - Hudson River (7.7 mi)



Town of Warrensburg - Studies

- **Zone A Studies:**
  - Ben Wood Brook (1.5 mi)
  - Big Brook (3.8 mi)
  - Cataract Brook (1.0 mi)
  - English Brook (0.8 mi)
  - Ferguson Brook (2.6 mi)
  - Hudson River and Tributary (10.6 mi)
  - Huggins Brook (1.0 mi)
  - Kellum Pond (1.5 mi)
  - Millington Brook and Tributaries (7.7 mi)
  - Pack Forest Lake and Tributary (1.5 mi)
  - Potter Brook (1.9 mi)
  - Schroon River Tributaries (4.1 mi)
  - Stewart Brook (2.2 mi)
- **Zone AE Studies:**
  - Hudson River (7.7 mi)
  - Schroon River (19.1 mi)



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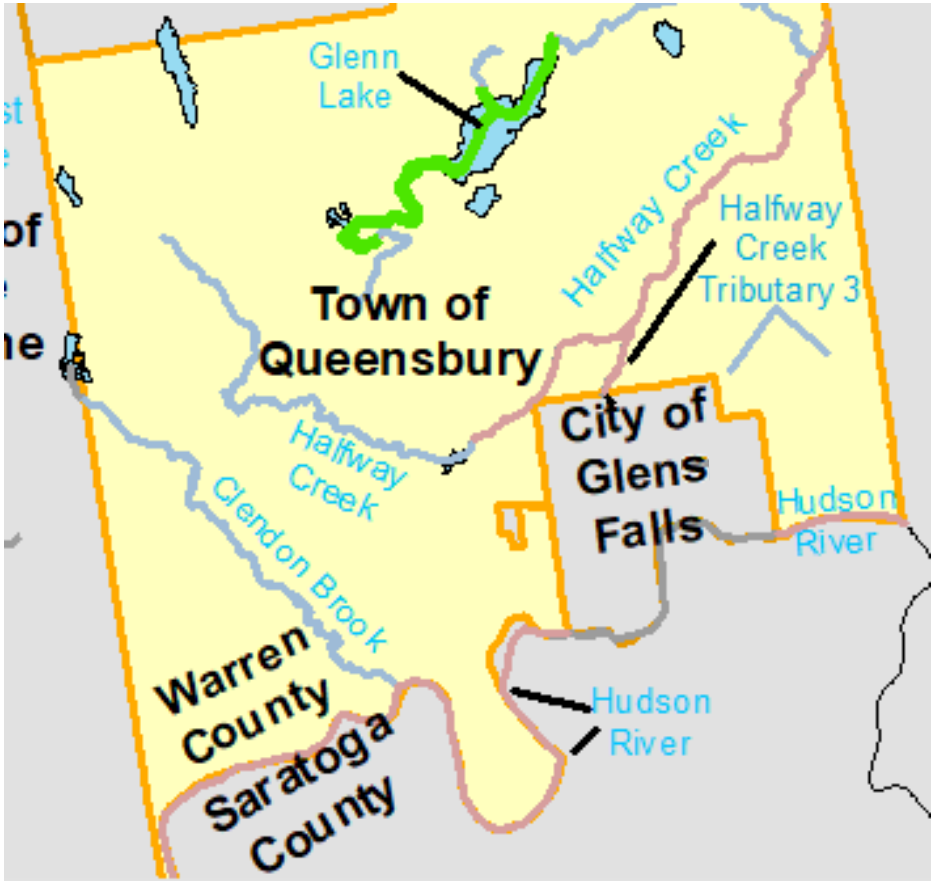
Redelineation

- 4.6 Miles of Effective AE Mapping will be Redelineated with new elevation data
- No hydrology or hydraulic analyses conducted
- Vertical Datum Conversion conducted
- Existing flood elevations converted from NGVD29 to NAVD88 datum

- Effective elevations will be converted to NAVD88 and mapped using topographic data published by FEMA in 2012



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

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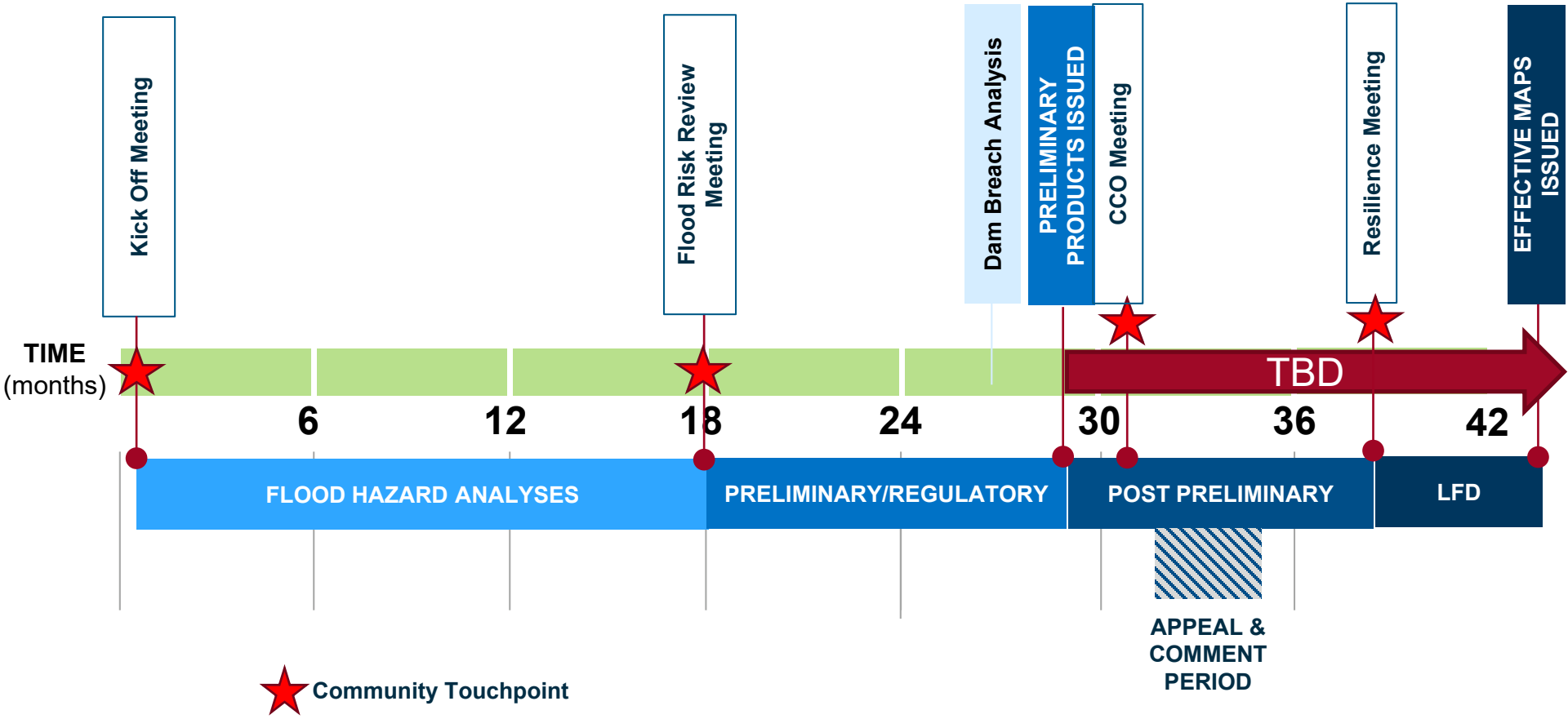
Overall Flood Risk Project Timeline



Major Study Milestones

- **Data Development (Sept. 2021)**
  - Terrain processing
  - Engineering Methods Concurrence (620 letters)
  - Field reconnaissance and survey
  - Hydrologic modeling
  - Hydraulic modeling
  - Floodplain mapping (workmaps)
- **Flood Risk Review Meeting**
  - Review work map products with communities (Nov. 2021)
- **Regulatory Product Update (FIRM & FIS)**
  - Preliminary issuance (Aug. 2022)

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What will communities receive?
Preliminary Products

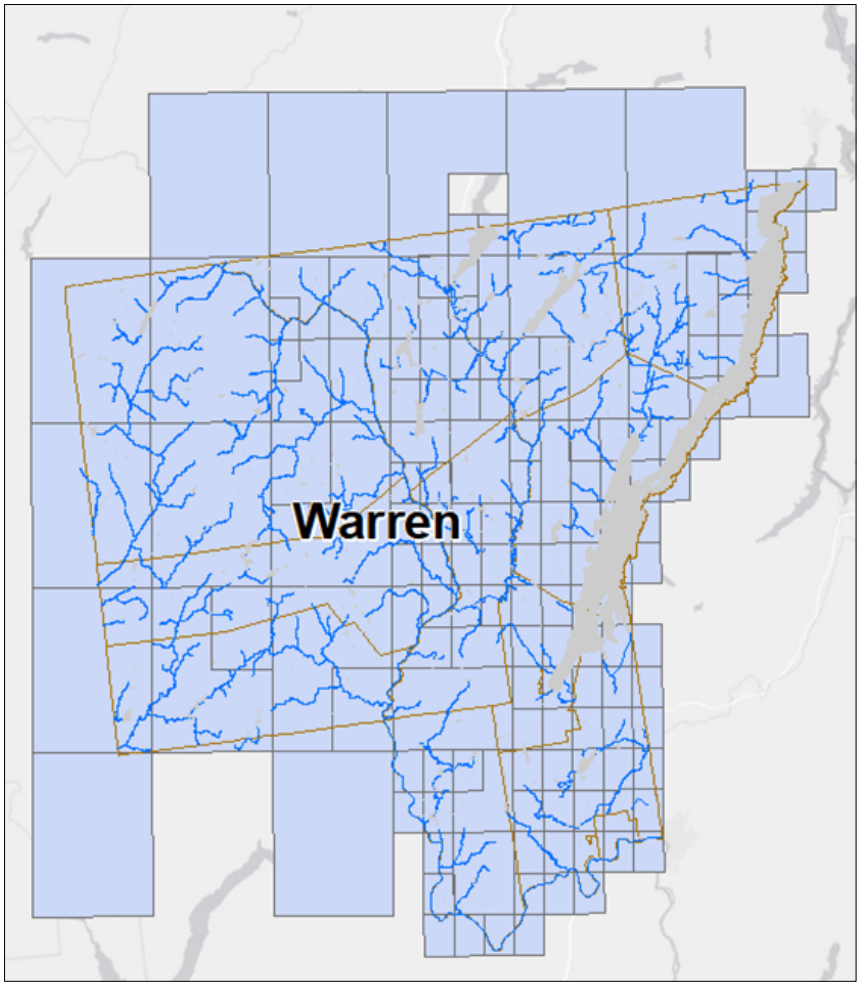
FEMA

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

Warren County, NY
Preliminary Products

- **Regulatory product development commences after work map comment period**
- **Seamless countywide mapping produced**
  - Ongoing Studies
  - This Countywide Study
  - Incorporate LOMRs
- **Digital Flood Insurance Rate Map (DFIRM) Database**
- **154 FIRM Panels**
- **Flood Insurance Study (FIS) Report**



FEMA

RiskMAP
Increasing Resilience Together

What will communities receive?

Flood Insurance Rate Maps (FIRM), FIS, Database

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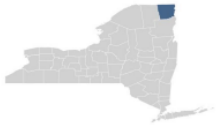
FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 2



CLINTON COUNTY, NEW YORK

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ALTONA, TOWN OF	361379
AUSABLE, TOWN OF	360165
BEEKMANTOWN, TOWN OF	360166
BLACK BROOK, TOWN OF	361309
CHAMPLAIN, TOWN OF	361311
CHAMPLAIN, VILLAGE OF	360167
CHAZY, TOWN OF	361310
CLINTON, TOWN OF	361380
DANNEMORA, TOWN OF	361381
DANNEMORA, VILLAGE OF	360024
ELLENBURG, TOWN OF	361382
MOOERS, TOWN OF	361383
PERU, TOWN OF	361384
PLATTSBURGH, CITY OF	360168
PLATTSBURGH, TOWN OF	360169
ROUSES POINT, VILLAGE OF	360170
SARANAC, TOWN OF	360171
SCHUYLER FALLS, TOWN OF	360172

PRELIMINARY
2/27/2020

REVISED:

FLOOD INSURANCE STUDY NUMBER
36019CV000B
Version Number 2.6.3.0

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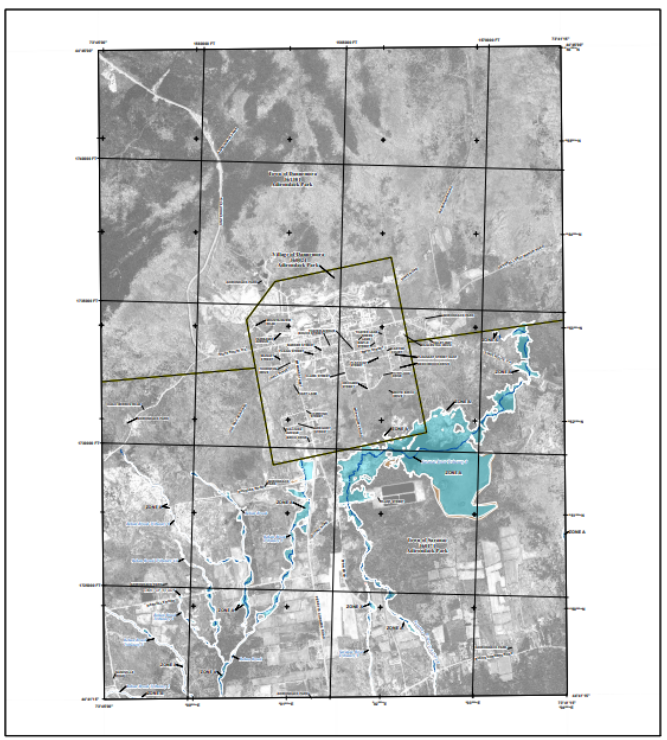

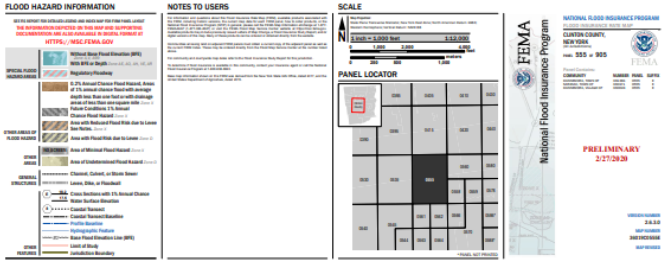

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RiskMAP
Increasing Resilience Together

RiskMAP
Increasing Resilience Together

What will communities receive?
Flood Risk Products

FEMA

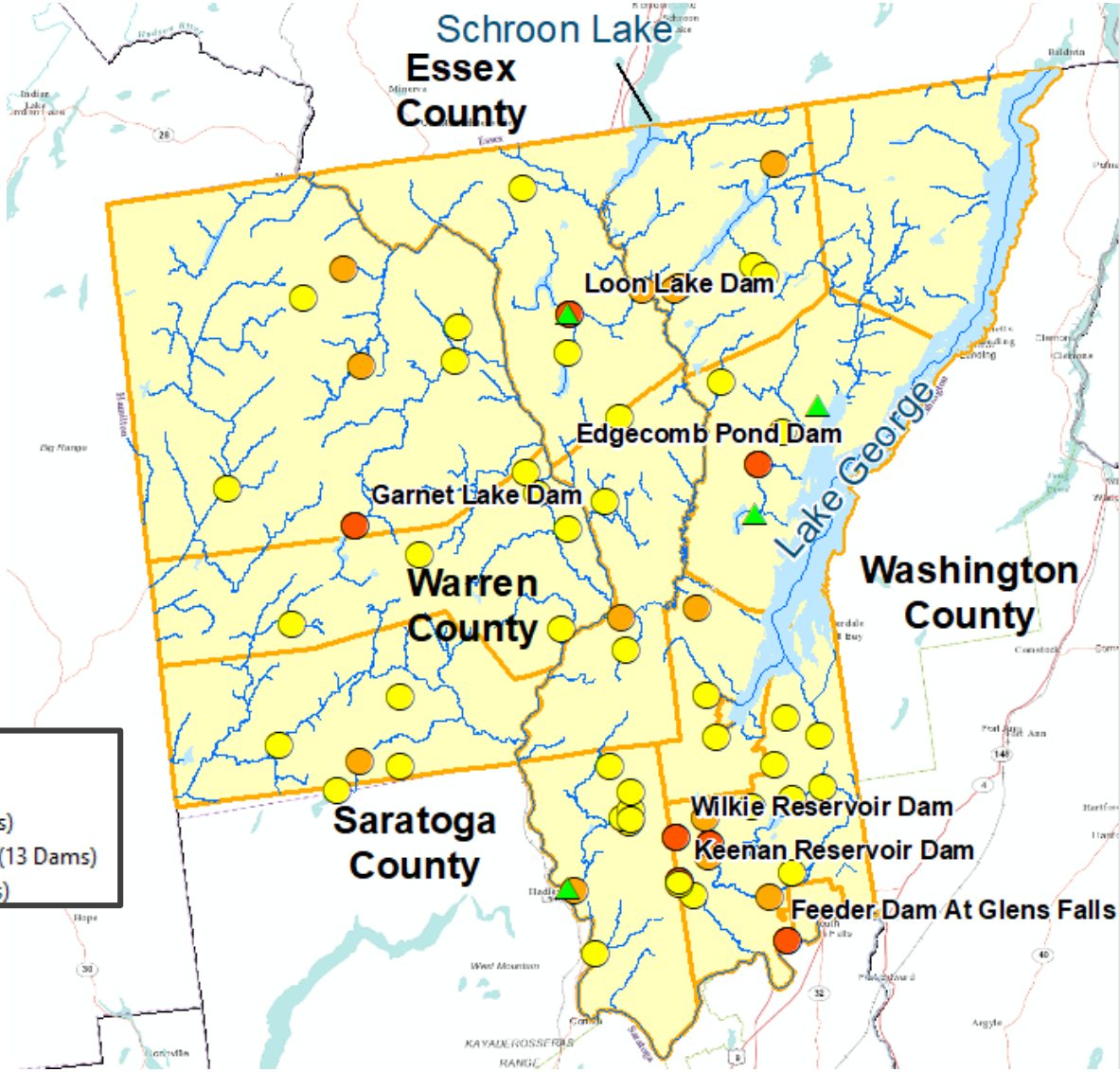
Knowing the Risk

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.

Dam Breach Analysis

- Up to 5 Medium/High Hazard Dams analyzed
- Engineering analyses developed for FIRM will be leveraged
- Existing EAP Analysis Could be Leveraged
- Flood Inundation Maps will be developed



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Questions? Comments?

Thank you!

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