RiskMAP
Increasing Resilience Together

Flood Risk Project

Tompkins County, New York, Hydrology Meeting

October 4, 2019

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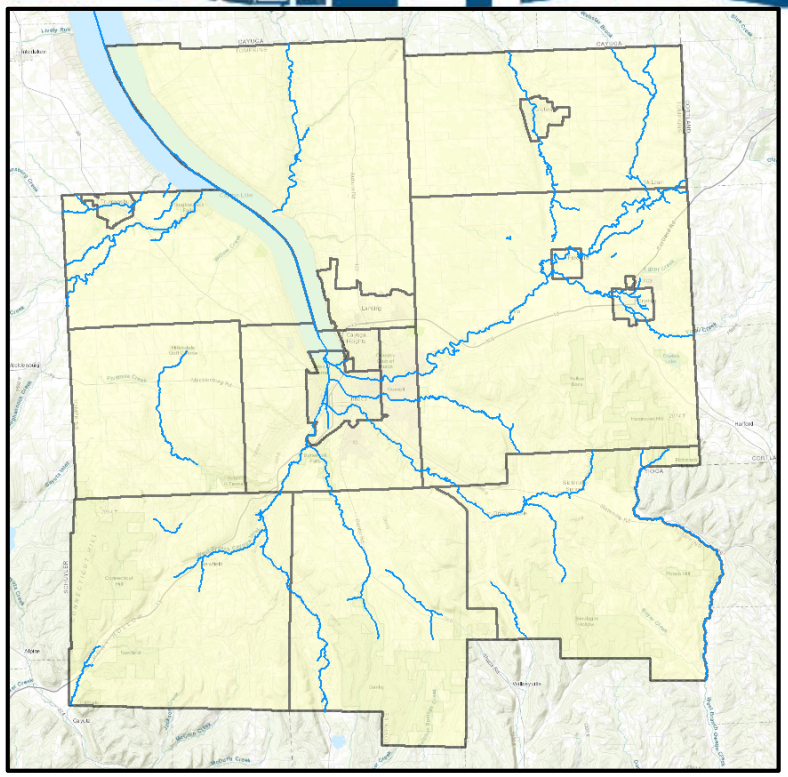


Presentation Agenda

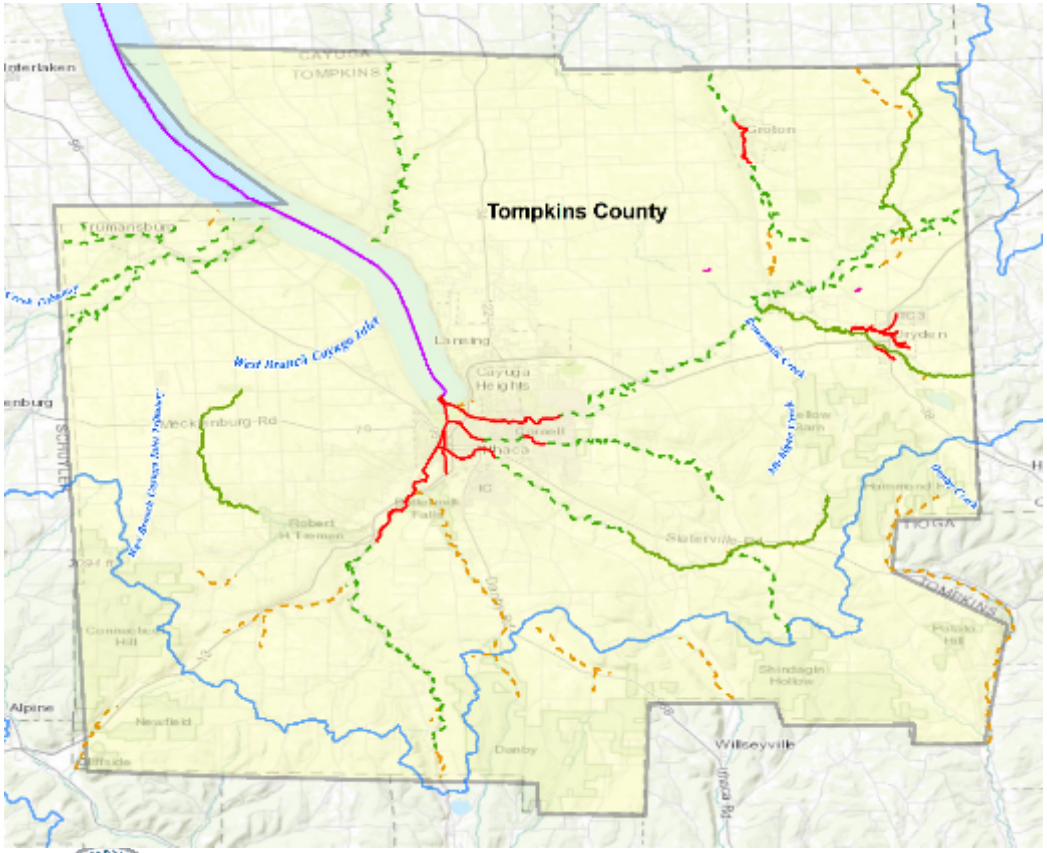
- Project Recap
  - History
  - Location and Study Streams
- Hydrology
  - Gage Analysis
  - Regression Analysis
  - Rainfall-Runoff Modeling
  - Calibration and Verification
- Next Steps

Project Recap

- **Discovery – 2015**
- **Seneca Watershed Study – 2018**
- **This Study**
  - Continuation of 2018 watershed study
  - Kickoff meeting: March 13, 2019
  - Engineering models notification to communities: April 1, 2019
  - Hydrologic analysis: April 2019 – Present
  - Field survey: April 2019 – September 2019
- **Location and Study Streams**
  - 22 miles of rainfall-runoff modeling
  - 52 miles of regression analysis (includes additional scope)

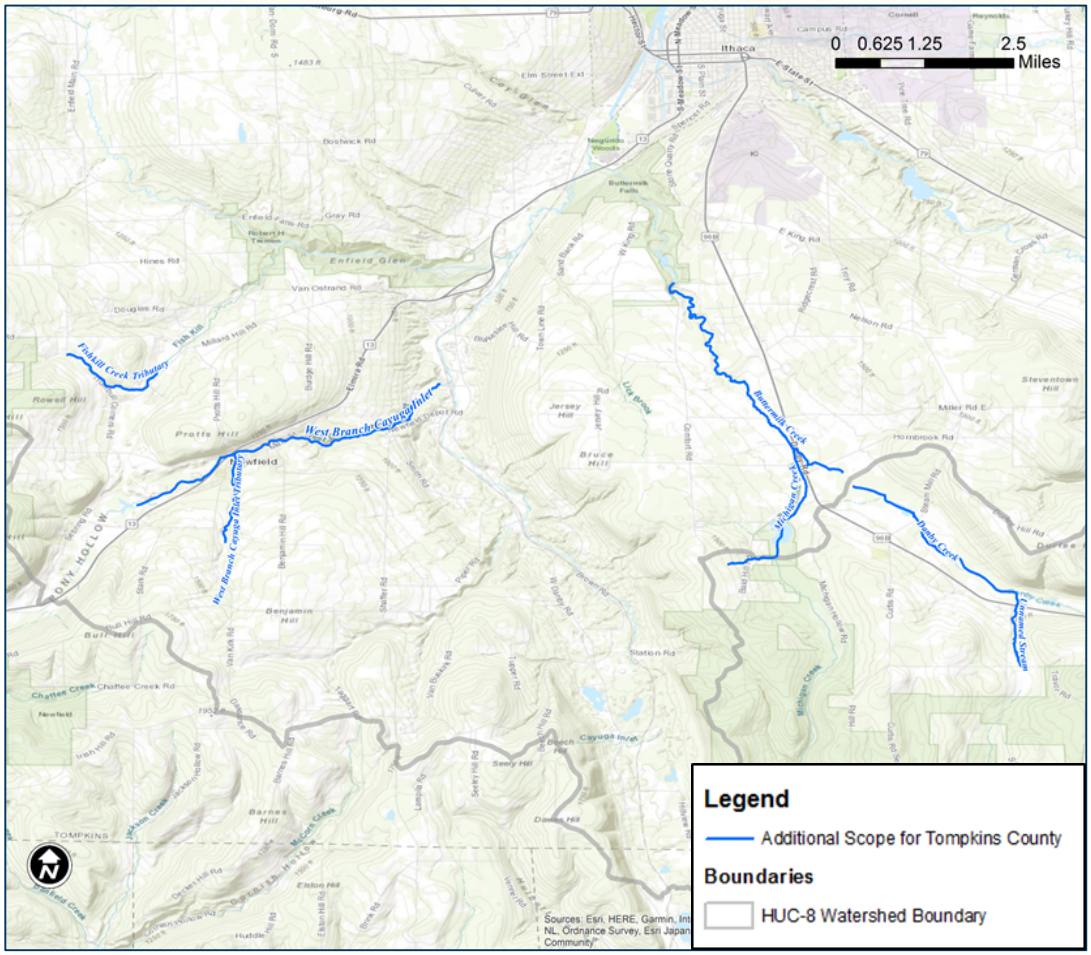
Project Scope

- **First time digital countywide maps**
- **Multiple touchpoints**



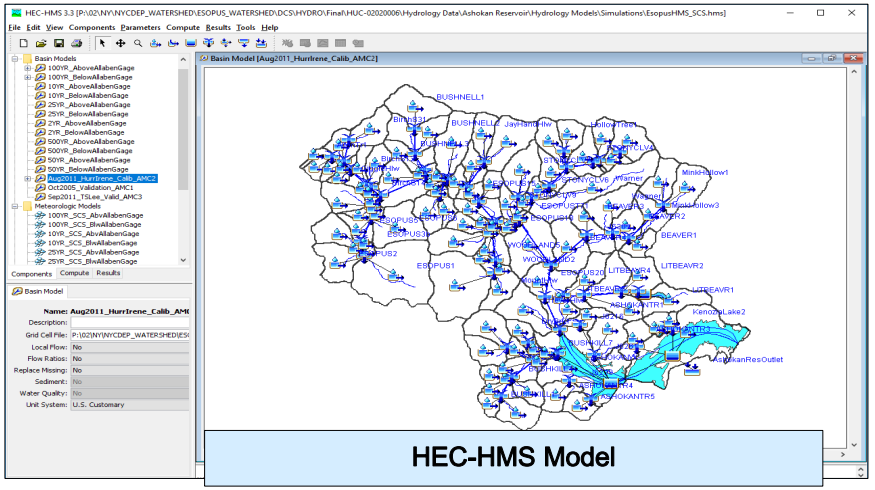
Post-Kickoff Scoped Streams
Regression Analysis

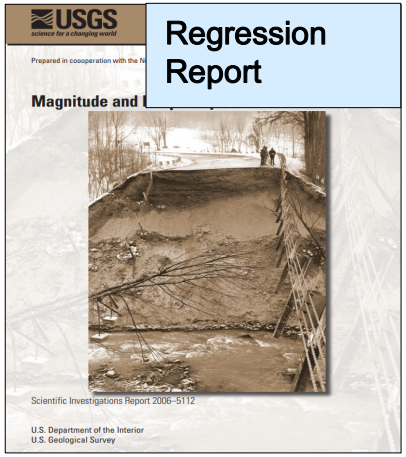
- Buttermilk Creek (3.5 miles)
- Buttermilk Creek Tributary (0.7 miles)
- Danby Creek (2.5 miles)
- Fishkill Creek Tributary (1.5 miles)
- Michigan Creek (2.1 miles)
- Unnamed Stream (1.1 miles)
- West Branch Cayuga Inlet (4.2 miles)
- West Branch Cayuga Inlet Tributary (1.4 miles)

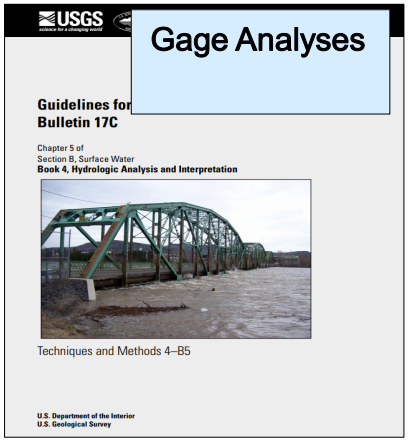


Hydrologic Analysis Methods

- **Develop inputs for hydraulic analysis**
- **Discharges developed**
  - 10%, 4%, 2%, 1% (Base Flood), 1%+, 1%-, 0.2%
- **Typical FEMA methods**
  - Rainfall runoff analyses
    - Physical modeling
    - USACE HEC-HMS program
  - Statistical gage analyses
    - Statistical analyses of flow/stage gage data
    - HEC-SSP Program
  - Regression analyses
    - Regional equations published by USGS
    - USGS StreamStats web application







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Hydrology – Gage Analysis

- **Cayuga Lake**
  - 2nd largest of New York's Finger Lakes
  - 40 miles long, 1.7 miles wide, and 435-ft deep
  - Lake levels recorded by USGS Gage No. 04233500 since 1956
- **Methodology**
  - HEC-SSP, Log-Pearson Type III Analysis
  - Annual maximum values for 1957-2018

Gage Data

Annual Peak Stillwater Levels 1957-2018

Year	Stage[1] (feet)	Year	Stage[1] (feet)	Year	Stage[1] (feet)	Year	Stage[1] (feet)	Year	Stage[1] (feet)
1957	382.75	**1970**	382.24	**1983**	384.12	**1996**	384.37	**2009**	382.27
1958	383.47	**1971**	382.67	**1984**	383.03	**1997**	382.3	**2010**	382.57
1959	382.21	**1972**	385.68	**1985**	382.11	**1998**	382.75	**2011**	384.33
1960	383.03	**1973**	382.44	**1986**	382.18	**1999**	382.18	**2012**	382.41
1961	383.27	**1974**	382.52	**1987**	382.21	**2000**	383.13	**2013**	382.56
1962	381.22	**1975**	383.71	**1988**	382.34	**2001**	383.32	**2014**	382.95
1963	382.94	**1976**	382.69	**1989**	383.02	**2002**	382.7	**2015**	383.5
1964	382.45	**1977**	383.31	**1990**	382.96	**2003**	382.68	**2016**	382.52
1965	381.98	**1978**	382.39	**1991**	382.47	**2004**	383.11	**2017**	383.58
1966	382.44	**1979**	382.22	**1992**	382.91	**2005**	383.3	**2018**	382.51
1967	382.64	**1980**	382.17	**1993**	385.74	**2006**	383.05		
1968	382.55	**1981**	383.06	**1994**	383.99	**2007**	383.9		
1969	383.05	**1982**	382.66	**1995**	382.08	**2008**	382.57		

1. Data is referenced to NAVD 1988. To convert from NAVD 1988 to NGVD 1929, add 0.62 feet (Nystrom, 2018).

Gage Analysis Results

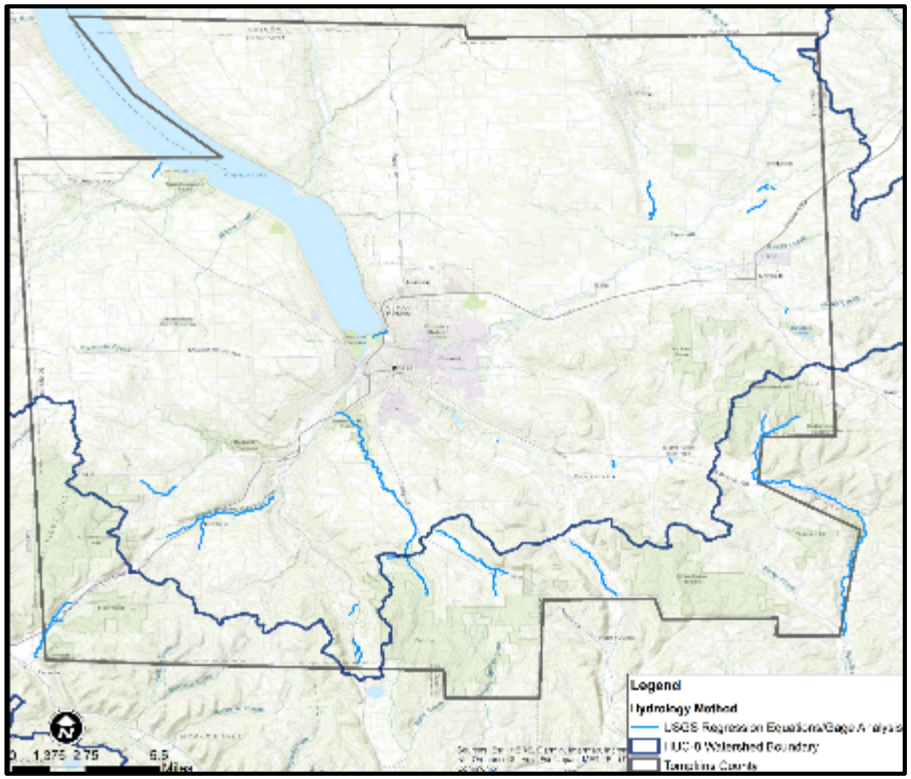
Cayuga Lake Results and Comparison to Previous Studies

Flood Event	Cayuga Lake Maximum Stillwater Level (feet NAVD 1988)[1,2]			
	STARR II Estimate	Previous FIS (City and Town of Ithaca)	USGS Study (Nystrom, 2018)	New York Canal Corporation[3]
10%-annual chance	384.0	384.2	-	-
4%-annual chance	384.6	-	-	-
2%-annual chance	385.1	385.2	-	-
1% plus-annual chance **1% minus-annual chance**	386.0 384.8	-	-	-
1%-annual chance	385.6	385.7	385.7	385.6
0.2%-annual chance	386.7	386.6	-	-

1. **To convert from NAVD of 1988 to NGVD of 1929, add 0.62 feet.**
2. **To convert from NAVD of 1988 to the New York Barge Canal Datum, add 2.05 feet.**
3. **Flood event value retrieved August, 2019 from http://www.canals.ny.gov/waterlevels/oswego/index.html#rule**

Hydrology – Regression Analysis

- Beaver Creek Unnamed Tributaries 1, 1.1, and 2 (0.8 miles total)
- Buttermilk Creek (8 miles)
- Cayuga Inlet (1.2 miles) and Cayuga Inlet Unnamed Tributaries (1.6 miles total)
- Chaffee Creek (0.4 miles)
- Danby Creek (3.1 miles) and Danby Creek Unnamed Tributary (1.1 miles)
- Fall Creek Unnamed Tributary (0.5 miles)
- Fishkill Creek Tributary (1.5 miles)
- Michigan Creek (1.8 miles)
- Mud Creek (0.8 miles)
- Owasco Inlet Tributaries 3 and 3.1 (2.1 miles total)
- Pony Hollow Creek (3 miles)
- Sixmile Creek Unnamed Tributaries 1-3 (0.6 miles total)
- Tributary 1 to West Branch Owego Creek (1.4 miles)
- Virgil Creek Unnamed Tributary (0.2 miles)
- Webster Brook (2.9 miles)
- West Branch Cayuga Inlet (4 miles)
- West Branch Cayuga Inlet Tributary (1.4 miles)
- West Branch Owego Creek (12.6 miles)
- Willseyville Creek (3 miles)



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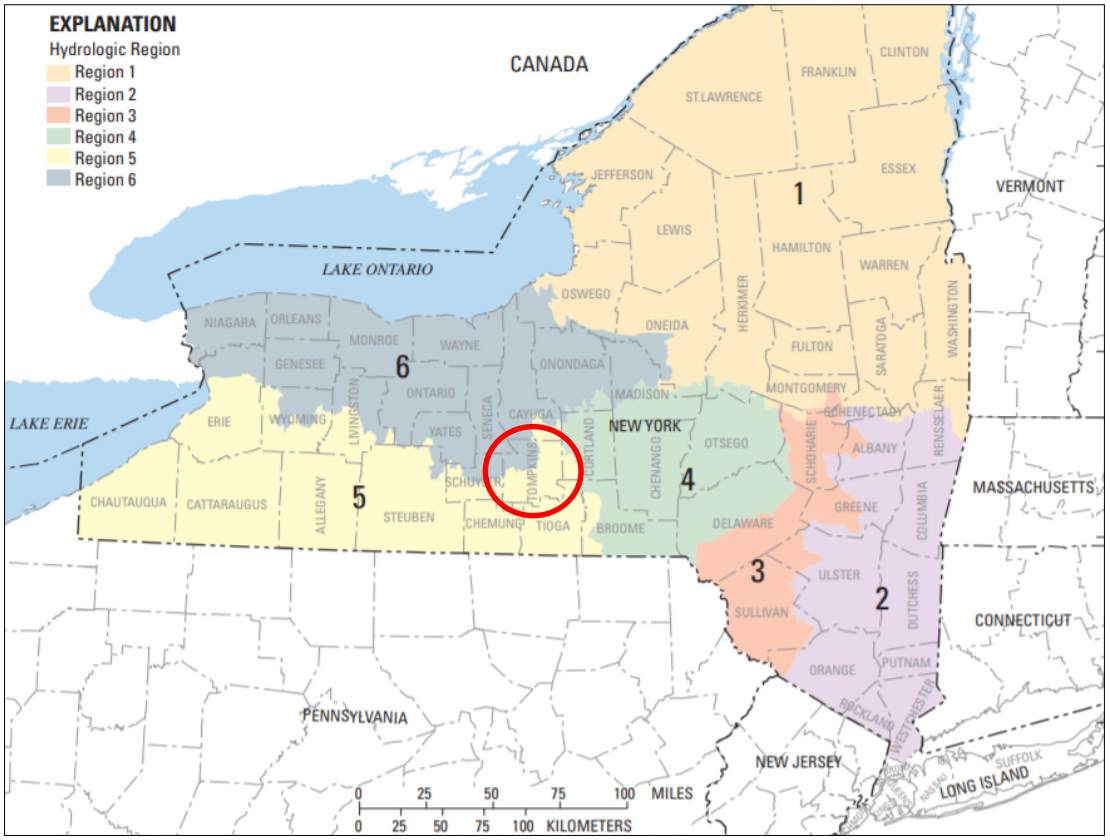
Regional Regression Equations and Analysis

- USGS New York regression equation: SIR 2006-5112
- Study area falls within USGS NY regression Region 5
- USGS StreamStats v 4.3.8 web application employed
- Primary method for Zone A streams



Summary of Regression Equations

USGS NYS Hydrologic Region 5

$$Q_5 = 0.322A^{0.965}SL^{0.498}P^{0.995}$$

$$Q_{10} = 0.597A^{0.967}SL^{0.538}P^{0.853}$$

$$Q_{25} = 1.05A^{0.972}SL^{0.581}P^{0.724}$$

$$Q_{50} = 1.49A^{0.976}SL^{0.610}P^{0.651}$$

$$Q_{100} = 1.91A^{0.980}SL^{0.636}P^{0.590}$$

$$Q_{500} = 3.22A^{0.989}SL^{0.688}P^{0.473}$$

Where:

Q_x = peak flow for x-year storm event (cubic feet per second)

A = drainage area (square miles)

SL = main channel slope (feet per mile)

P = mean annual precipitation (inches)

Manual Basin Adjustments

- Reviewed StreamStats basin delineations against project DEM
- Reviewed StreamStats basin delineations against available storm sewer data
  - City of Ithaca
  - Town of Ithaca
  - Town of Dryden
- Adjusted basin boundaries as necessary
- Peak flow calculations were manually adjusted using NY Region 5 equations

Urban Adjustment Factor Equations

- Base regression equations not applicable to urban areas
- Peak flows must be adjusted for basins with >15% urban land use
- Determined urban land use % from aerial imagery
- Sub-basins were adjusted for urban land use for one stream

$$UQ_5 = 10.6A^{0.17}(13 - BDF)^{-0.39}RQ_5{}^{0.78}$$

$$UQ_{10} = 9.51A^{0.16}(13 - BDF)^{-0.36}RQ_{10}{}^{0.79}$$

$$UQ_{25} = 8.68A^{0.15}(13 - BDF)^{-0.34}RQ_{25}{}^{0.80}$$

$$UQ_{50} = 8.04A^{0.15}(13 - BDF)^{-0.32}RQ_{50}{}^{0.81}$$

$$UQ_{100} = 7.70A^{0.15}(13 - BDF)^{-0.32}RQ_{100}{}^{0.82}$$

$$UQ_{500} = 7.47A^{0.16}(13 - BDF)^{-0.30}RQ_{500}{}^{0.82}$$

Where:

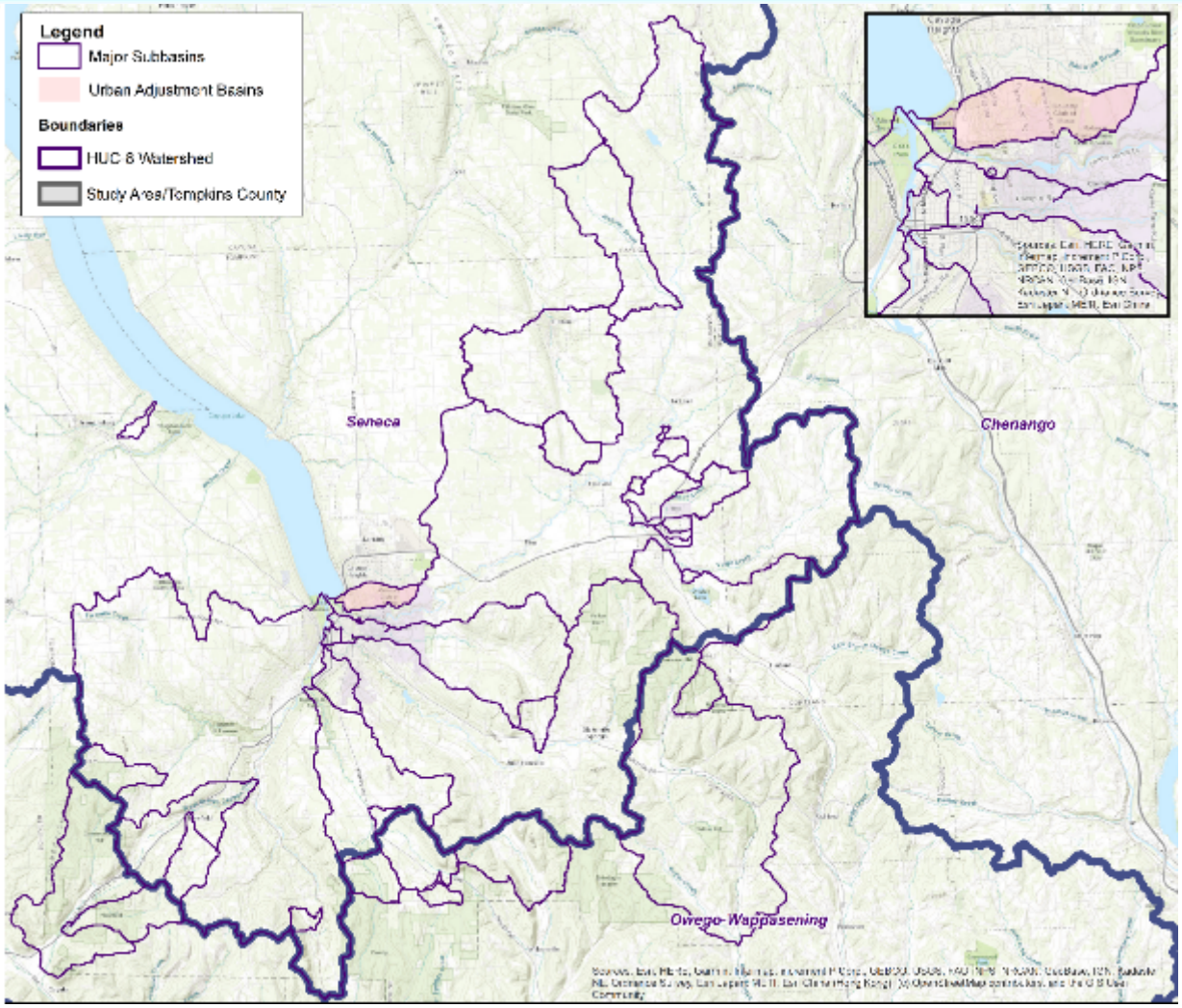
UQx = urban-adjusted peak flow for x-year storm event (cubic feet per second)

A = drainage area (square miles)

BDF = basin development factor, calculated using the methods described in Sauer and Others (Sauer, 1983).

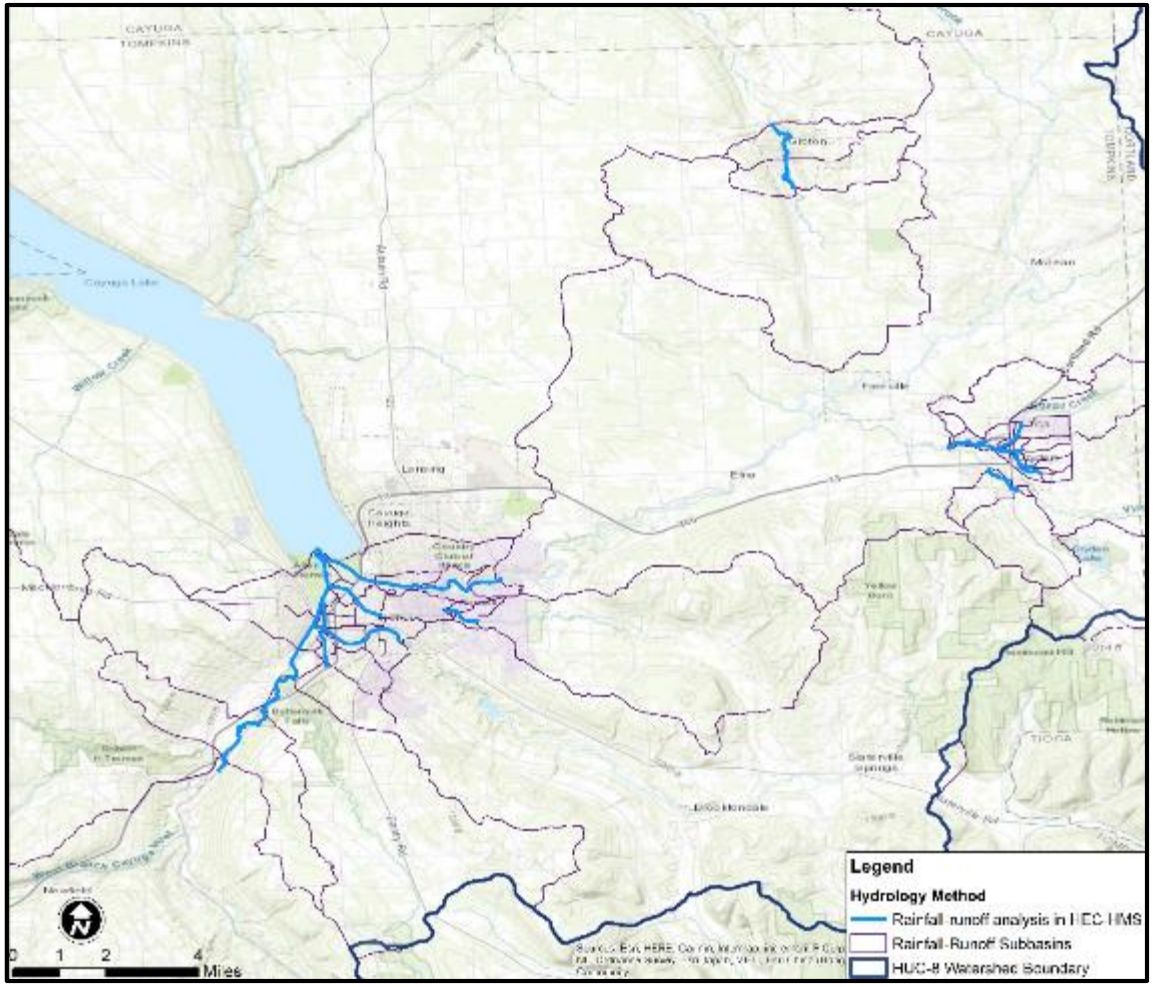
RQx = regression peak flow for x-year storm event (cubic feet per second)

Urban Adjustment Factor Basins



Hydrology – Rainfall-Runoff Modeling

- Cayuga Inlet (6.1 miles)
- Fall Creek (3.7 miles)
  - Egypt Creek (1.8 miles)
  - Laterals A, B, C, & D (1.7 miles)
  - Dryden Lake Outlet (0.9 miles)
- Cascadilla Creek (1.8 miles)
- Sixmile Creek (1.8 miles)
- Old Inlet and Old Inlet Diversion Channel (0.8 miles)
- Relief Channel (0.8 miles)
- Owasco Inlet (2.0 miles)



Rainfall-Runoff Methodology

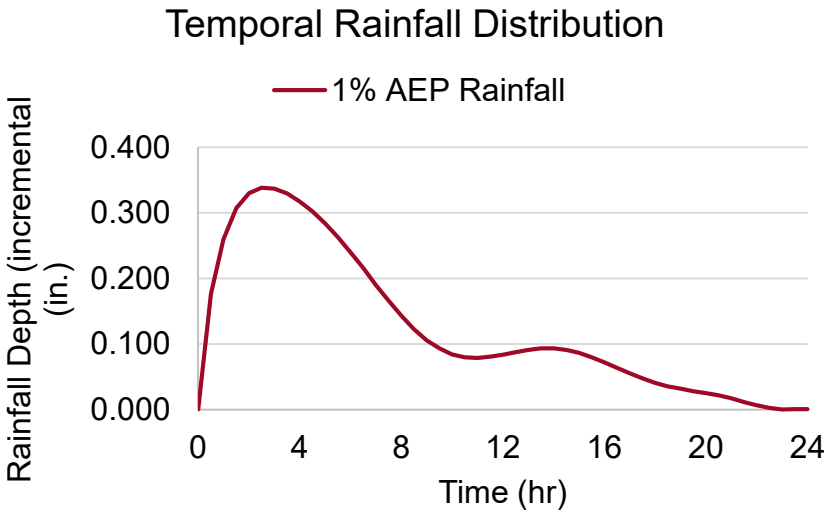
- Software Program: HEC-HMS 4.3
- Rainfall: NOAA point rainfall and temporal distribution, 24-hours, 1st quartile (most common), 50th percentile
- Loss Methodology: SCS Curve Number, Antecedent Moisture Condition = 2
- Hydrograph Methodology: SCS Unit Hydrograph
  - Standard Peak Rate Factor (484)
  - Lag Time (60% of Time of Concentration)
- Channel Routing: Muskingum-Cunge using 8-point cross-sections
- 1-minute time step for hydrographs

Rainfall-Runoff Modeling
Rainfall Data

- NOAA Atlas 14 Rainfall Data for Ithaca, New York, at Cornell Monitoring Station

Point Rainfall Amounts at Select Monitoring Stations		
Storm Frequency	Ithaca-Cornell	Freeville
50% AEP	2.47	2.48
10% AEP	3.84	3.82
4% AEP	4.69	4.66
2% AEP	5.32	5.28
1% AEP	6.01	5.95
0.2% AEP	8.14	7.84

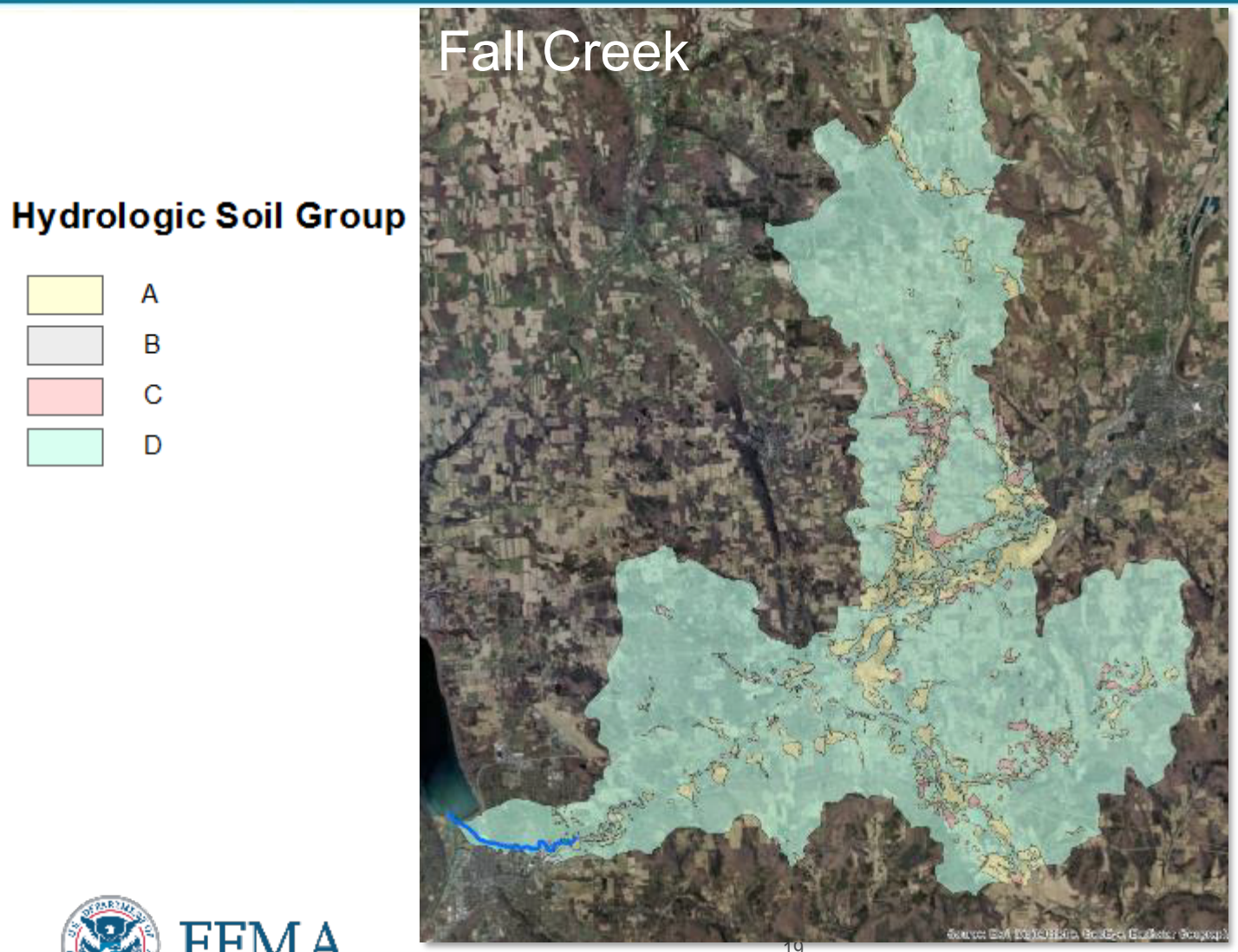
- Temporal distribution for Northeastern Region 1
  - 1st Quartile
  - 50th Percentile Occurrence



Rainfall-Runoff Modeling
SCS Curve Numbers

- Curve Numbers developed using TR-55 Methodology
- Soil Data from USGS SSURGO database
  - Dual Hydrologic Soil Group (HSG) assigned worst case HSG
  - Example: B/D soil is classified as D
- Land use data from National Land Use Database (NLCD)
- Composite CN calculated for each sub-basin
- Land use compared to recent aerial imagery to confirm
- Manual adjustments to land use made as necessary
- Calculated composite Curve Numbers range from 70-90

Rainfall-Runoff Modeling
Hydrologic Soil Groups



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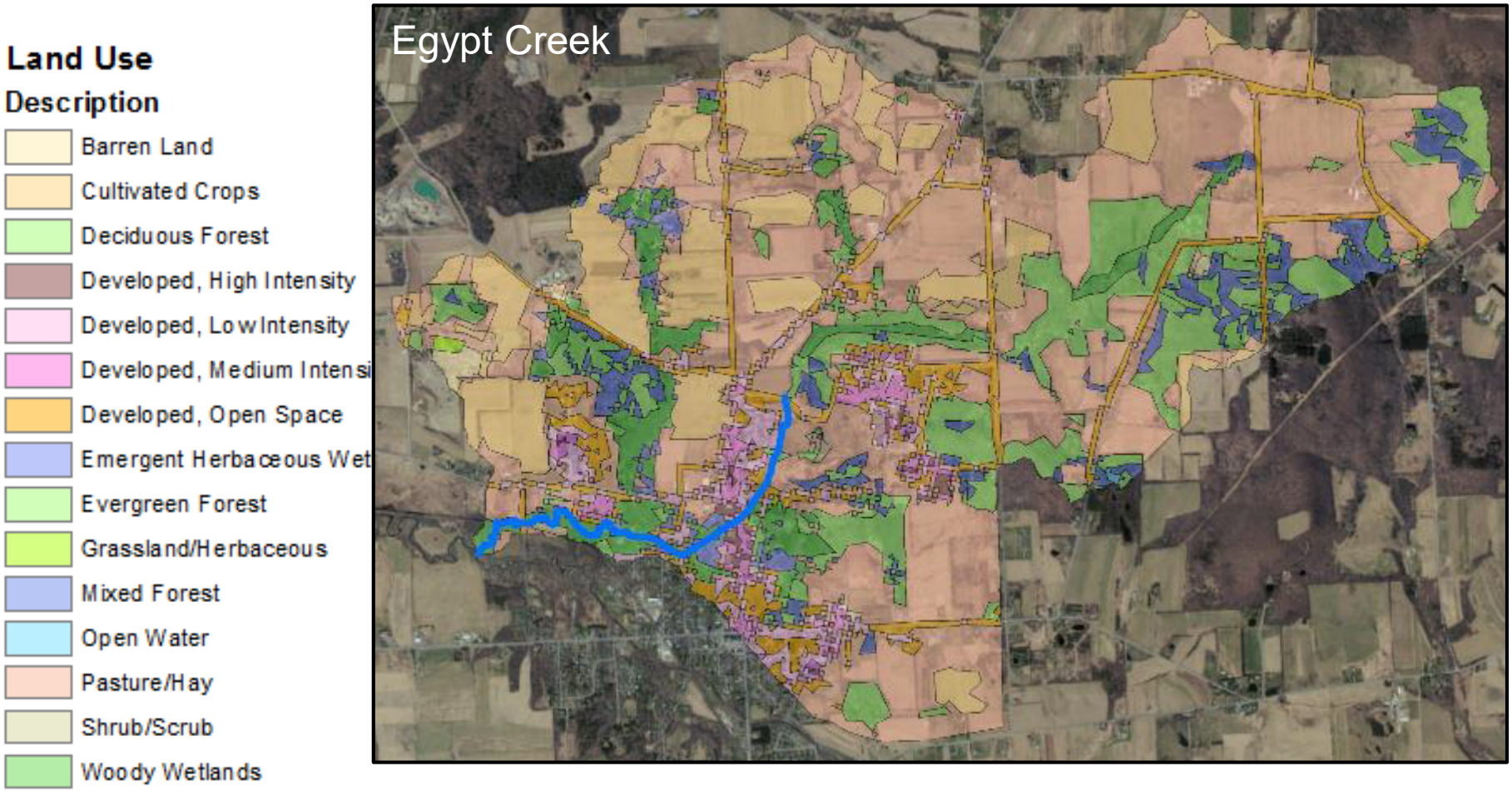
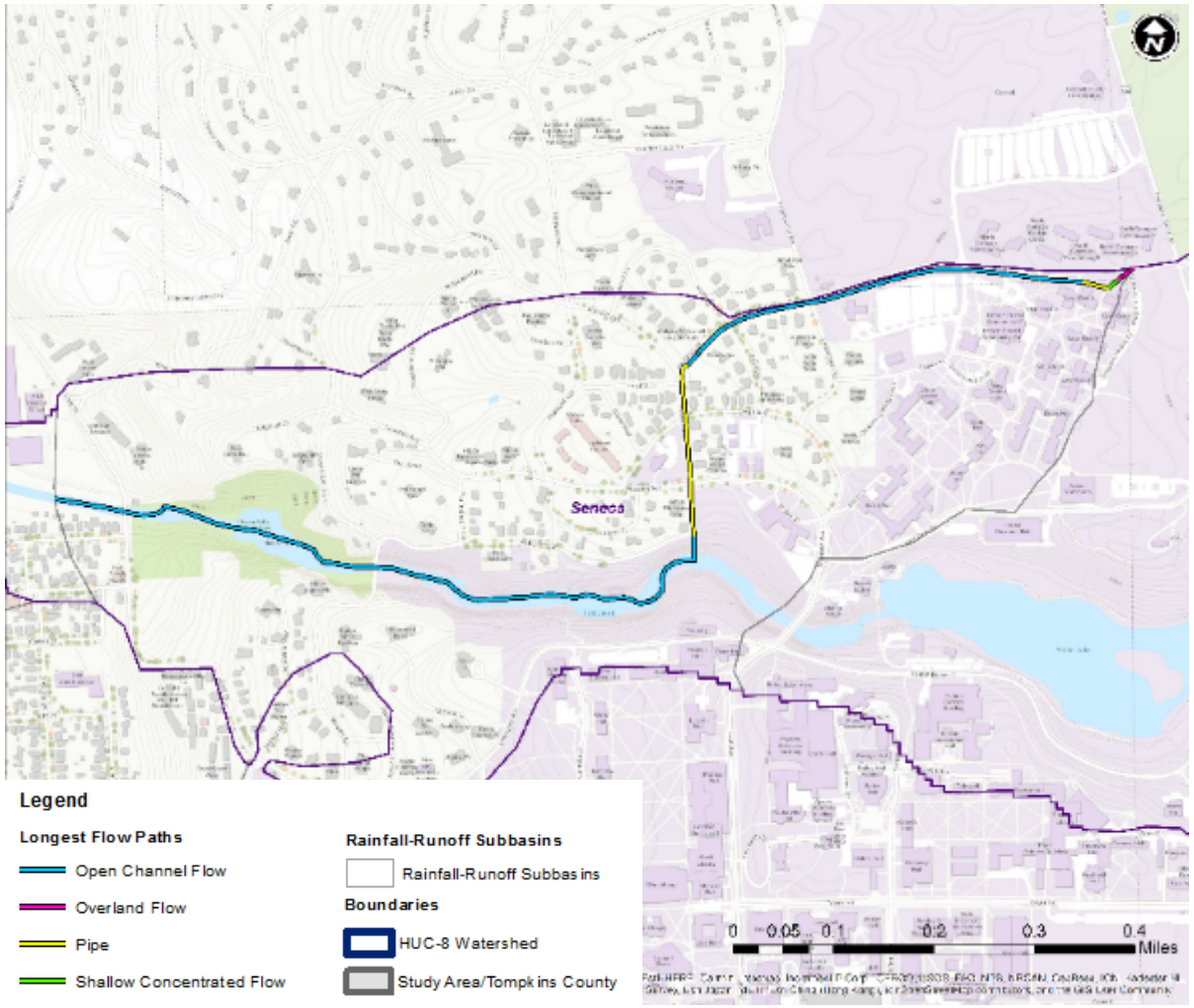
Rainfall-Runoff Modeling
Land Use



Rainfall-Runoff Modeling
Time of Concentration (Tc) / Lag Time

- **Longest flow path for runoff to travel developed from project DEM and/or bathymetry data (where available)**
- **Flow paths split into different types:**
  - Sheet flow maximum = 100 ft
  - Shallow concentrated flow: from end of sheet flow segment to visual open channel
  - Channel flow: begins at end of shallow concentrated flow segment and ends at sub-basin outlet
  - Pipe flow: intermittent segments where the longest flow path enters storm sewer systems
- **Lag times = 60% of Time of Concentration**
  - Calculated Lag Times range from 6 minutes to 287 minutes

Longest Flow Path Example



Rainfall-Runoff Modeling
Verification: Comparison to Effective Flows

Stream	Location	10-year Flows (cfs)			50-year Flows (cfs)			100-year Flows (cfs)			500-year Flows (cfs)		
		Model	*Effective*	*Difference*	*Model*	*Effective*	*Difference*	*Model*	*Effective*	*Difference*	*Model*	*Effective*	*Difference*
Cayuga Inlet	Confluence with Cayuga Lake	14727	8600	71%	26336	14650	80%	**32199**	**17700**	**82%**	51371	26300	95%
Cayuga Inlet	Above confluence with Cascadilla Creek	13792	8000	72%	24401	13550	80%	**29757**	**16400**	**81%**	47218	24350	94%
Cayuga Inlet	Above confluence with Old Inlet (upstream)	7026	5650	24%	13251	9600	38%	**16456**	**11600**	**42%**	27065	17250	57%
Cayuga Inlet	Above confluence with Old Inlet (downstream)	9499	5650	68%	17224	9600	79%	**21206**	**11600**	**83%**	34284	17250	99%
Cayuga Inlet	Upstream of Buttermilk Creek	5358	4625	16%	10186	7382	38%	**12673**	**8718**	**45%**	20922	12195	72%
Cayuga Inlet	Upstream of Enfield Creek	2338	2827	-17%	4541	4513	1%	**5685**	**5329**	**7%**	9502	7455	27%
Cascadilla Creek	Confluence with Cayuga Inlet	1111	1210	-8%	2132	1640	30%	**2661**	**1800**	**48%**	4420	2250	96%
Cascadilla Creek	Downstream corporate limits	1005	1262	-20%	1945	2007	-3%	**2432**	**2390**	**2%**	4057	3300	23%
Fall Creek	Confluence with Cayuga Lake	4590	8600	-47%	9296	14650	-37%	**11834**	**17700**	**-33%**	20566	26300	-22%
Fall Creek	Dam upstream of Forest Home Drive	4428	6110	-28%	8979	9730	-8%	**11440**	**11600**	**-1%**	19917	16900	18%
Old Inlet	Confluence with Cayuga Inlet (downstream)	4526	2750	65%	7525	4000	88%	**8938**	**5300**	**69%**	13426	7000	92%
Relief Channel	Confluence with Old Inlet	162	460	-65%	306	680	-55%	**381**	**780**	**-51%**	627	1020	-39%
Sixmile Creek	Confluence with Old Inlet	6959	3180	119%	11318	4300	163%	**13426**	**4800**	**180%**	20106	1020	1871%
Dryden Creek	Mouth	702	1200	-42%	1386	1500	-8%	**1724**	**1800**	**-4%**	2741	2200	25%
Egypt Creek	Downstream corporate limit	436	900	-52%	846	1200	-30%	**1056**	**1400**	**-25%**	1693	1700	0%
Lateral A	Mouth	67	330	-80%	130	440	-70%	**163**	**520**	**-69%**	261	660	-61%
Lateral B	Mouth	12	130	-91%	24	180	-87%	**31**	**220**	**-86%**	51	270	-81%
Lateral C	Mouth	31	200	-84%	60	270	-78%	**74**	**320**	**-77%**	118	400	-70%
Lateral D	Mouth	155	470	-67%	298	630	-53%	**371**	**750**	**-51%**	592	920	-36%
Owasco Inlet	Downstream corporate limit	870.7	1500	-42%	1737	2350	-26%	**2191**	**2700**	**-19%**	3599	3700	-3%

Rainfall-Runoff Modeling
Model Calibration and Verification

- Active USGS gages within study area(s)
- Gage analysis for calibration and verification purposes only
- Compared model flows to area-weighted gage flows
- Adjusted sub-basin parameters for CN and Lag Time to produce flows within ±20% of 1% AEP gage flows
  - CN adjusted by an average of 8 points
  - Lag times adjusted on case-by-case basis, with an average adjustment of 15.4 minutes

Rainfall-Runoff Modeling
Model Calibration and Verification

Curve Number Comparison

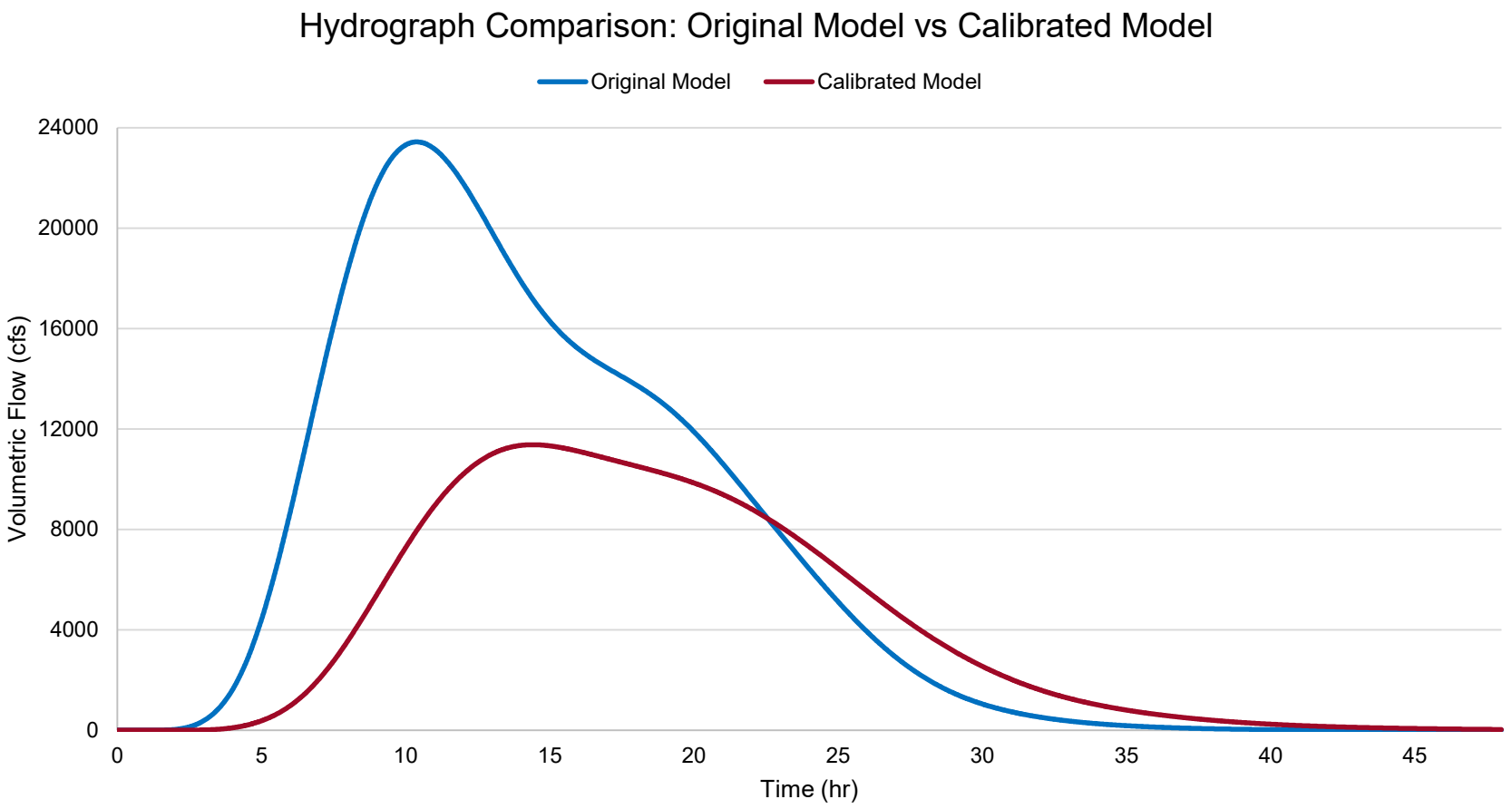
Sub-basin Name	Composite CN	Calibrated CN	Sub-basin Name	Composite CN	Calibrated CN	Sub-basin Name	Composite CN	Calibrated CN
Cascadilla-1	88	79	Egypt_1	81	69	LateralC_1	85	70
Cascadilla-2	89	80	Egypt_2	82	70	LateralC_2	82	70
Cascadilla-3	85	77	Egypt_3	88	75	LateralD_1	80	68
Cascadilla-4	79	71	Egypt_4	80	68	LateralD_2	83	70
Cascadilla-5	79	71	Egypt_5	81	69	Old_Inlet-1	89	89
Cascadilla-6	78	70	Egypt_6	81	69	Old_Inlet-2	90	90
Cayuga-1	81	80	Fall-1	82	70	Owasco_1	86	73
Cayuga-2	78	78	Fall-2	84	71	Owasco_2	86	73
Cayuga-3	76	72	Fall-3	80	68	Owasco_3	80	67
Cayuga-4	79	75	Fall-4	80	68	Relief-1	91	80
Cayuga-5	74	70	Fall-5	80	65	Relief-2	82	72
Cayuga-6	77	73	LateralA_1	85	72	Relief-3	79	70
Cayuga-7	74	70	LateralA_2	84	71	Sixmile-1	88	88
Dryden_1	79	79	LateralA_3	84	71	Sixmile-2	87	87
Dryden_2	75	75	LateralA_4	83	70	Sixmile-3	84	84
Dryden_3	78	78	LateralB_1	70	60	Sixmile-4	76	84
			LateralB_2	84	70			

Rainfall-Runoff Modeling
Model Calibration and Verification

Lag Time Comparison

Sub-basin Name	Lag Time	Calibrated Lag Time	Sub-basin Name	Lag Time	Calibrated Lag Time	Sub-basin Name	Lag Time	Calibrated Lag Time
Cascadilla-1	13	18	Egypt_1	15	30	LateralC_1	19	40
Cascadilla-2	9	15	Egypt_2	8	30	LateralC_2	32	40
Cascadilla-3	13	14	Egypt_3	14	20	LateralD_1	10	35
Cascadilla-4	7	15	Egypt_4	14.6	25	LateralD_2	31	60
Cascadilla-5	12	13	Egypt_5	27	40	Old_Inlet-1	12	9
Cascadilla-6	92	97	Egypt_6	25	55	Old_Inlet-2	10	10
Cayuga-1	37	37	Fall-1	34	34	Owasco_1	28	32
Cayuga-2	34	34	Fall-2	7	30	Owasco_2	34	60
Cayuga-3	64	64	Fall-3	21	30	Owasco_3	76	235
Cayuga-4	115	115	Fall-4	9	30	Relief-1	18	30
Cayuga-5	42	42	Fall-5	287	420	Relief-2	30	33
Cayuga-6	103	103	LateralA_1	6	20	Relief-3	39	45
Cayuga-7	138	138	LateralA_2	6	20	Sixmile-1	10	10
Dryden_1	11	11	LateralA_3	6	45	Sixmile-2	17	17
Dryden_2	59	59	LateralA_4	8	50	Sixmile-3	14	14
Dryden_3	27	27	LateralB_1	11	30	Sixmile-4	98	98
			LateralB_2	16	45			

Rainfall-Runoff Modeling
Model Calibration and Verification



Rainfall-Runoff Modeling
Calibration Results and Comparison to Gage Flows

Stream	Location	*100-year Flows (cfs)*		
		STARR II Estimated	Gage	Difference
Cayuga Inlet	Confluence with Cayuga Lake	32199	27122	**19%**
Cayuga Inlet	Downstream of Old Inlet Diversion Channel*	21271	15730	**35%**
Cayuga Inlet	Downstream of Drop Structure (Cayuga-3)	16614	15577	**7%**
Cayuga Inlet	Confluence with Buttermilk Creek	15366	14462	**6%**
Cayuga Inlet	Upstream of Elmira Road	12825	12229	**5%**
Cayuga Inlet	Confluence with Enfield Creek	11930	11423	**4%**
Cascadilla Creek	Confluence with Cayuga Inlet	2661	2538	**5%**
Cascadilla Creek	Downstream of Hancock Street	2608	2502	**4%**
Cascadilla Creek	Downstream of Linn Street	2542	2445	**4%**
Cascadilla Creek	Downstream of Synchrotron Drive	2429	2340	**4%**
Cascadilla Creek	Intersection of Synchrotron Drive and Dryden Road	2417	2327	**4%**
Cascadilla Creek	Upstream of Dryden Road	2380	2288	**4%**
Fall Creek	Confluence with Cayuga Lake	11834	9910	**19%**
Fall Creek	Downstream of Lake Street	11470	9767	**17%**
Fall Creek	Downstream of Thurston Avenue	11440	9742	**17%**
Fall Creek	Downstream of Forest Home Drive (Caldwell Drive)	11399	9706	**17%**
Fall Creek	Downstream of Flat Rock	11371	9681	**17%**
Old Inlet	Confluence with Cayuga Inlet	8938	8605	**4%**
Old Inlet	~1,200 feet upstream of the confluence with Cayuga Inlet	8923	8581	**4%**
Relief Channel	Confluence with Old Inlet and Sixmile Creek	381	330	**15%**
Relief Channel	Downstream of Fairgrounds Memorial Parkway	354	310	**14%**
Relief Channel	Upstream of Fairgrounds Memorial Parkway	226	204	**11%**
Sixmile Creek	Confluence with Old Inlet and Relief Channel	13426	15771	**-15%**
Sixmile Creek	Downstream of South Cayuga Street	13335	15681	**-15%**

*NOTE: Diversion from Relief Channel/Old Inlet not reflected in gage data

Rainfall-Runoff Modeling
Calibration Results and Comparison to Gage Flows

Stream	Location	*100-year Flows (cfs)*		
		STARR II Estimated	Gage	Difference
Sixmile Creek	At Aurora Street Bridge	13284	15617	**-15%**
Sixmile Creek	Downstream of Wells Falls	13164	15457	**-15%**
Dryden Lake Outlet	Confluence with Virgil Creek	1724	1964	**-12%**
Dryden Lake Outlet	Upstream of Dryden Lake Park Trail	1609	1835	**-12%**
Dryden Lake Outlet	Downstream of Dryden Lake Dam	1203	1406	**-14%**
Egypt Creek	Confluence with Virgil Creek	1056	923	**14%**
Egypt Creek	Downstream of Spring House Road	1029	899	**14%**
Egypt Creek	Confluence with Lateral D	639	562	**14%**
Egypt Creek	Upstream of Lewis Street/Confluence with Lateral A	464	411	**13%**
Egypt Creek	Upstream of Lee Road	450	411	**9%**
Egypt Creek	Downstream of Bahar Drive	389	345	**13%**
Lateral A	Confluence with Egypt Creek/Upstream of Lewis Street	163	141	**15%**
Lateral A	Confluence with Lateral C/Downstream of Neptune Drive	77	69	**11%**
Lateral A	Upstream of James Street	33	27	**19%**
Lateral A	Downstream of Wellsley Drive	25	21	**19%**
Lateral B	James Street and Union Street intersection/Confluence with Lateral A	31	31	**-1%**
Lateral B	~2,000-ft upstream of James Street and Union Street intersection	19	16	**18%**
Lateral C	Confluence with Lateral A	74	62	**19%**
Lateral C	~600-ft upstream of confluence with Lateral A	32	27	**18%**
Lateral D	Confluence with Egypt Creek	371	319	**16%**
Lateral D	Upstream of Freeville Road	350	301	**16%**
Owasco	Downstream Corporate Limit (Groton, NY)	2191	1965	**12%**
Owasco	Downstream of South Street	2052	1794	**14%**
Owasco	Upstream Corporate Limit (Groton, NY)	1848	1569	**18%**

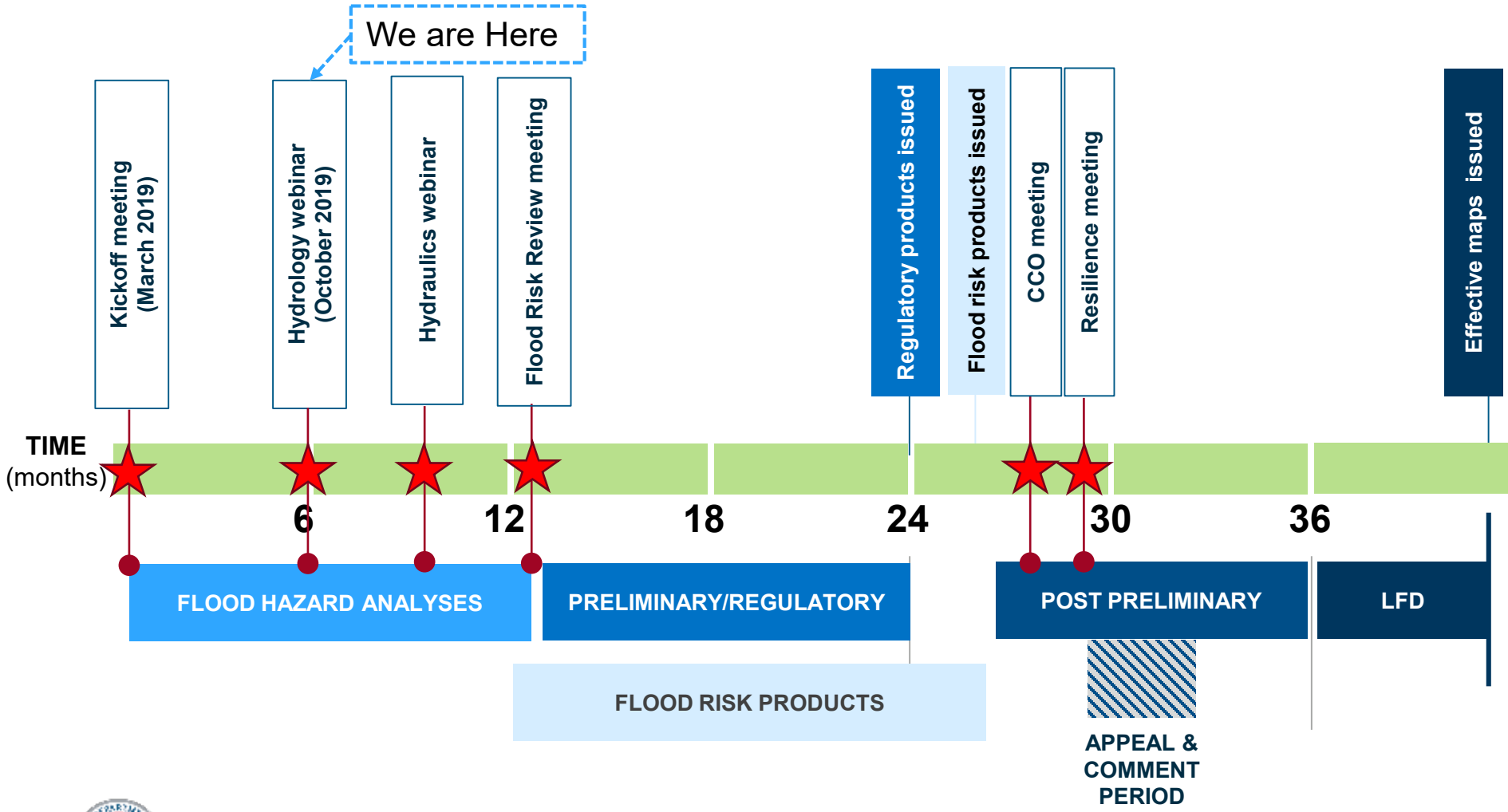
Comparison of Results

- **Regression Analysis (Zone A Streams)**
  - No previous studies for flow comparison
- **Rainfall-Runoff Modeling (Zone AE Streams)**
  - Effective flow comparison: STARRII flows generally larger near Cayuga Lake and generally smaller further away from Cayuga Lake
  - Gage flow comparison (gage flows calculated for verification only; area weighted)
    - Generally higher with a few sub-watersheds having lower flows
    - Calculated sub-basin parameters were generally too conservative
    - Calibrated results within 20% of gage flows for 1% AEP event (range varies for other events)
- **Gage Analysis for Cayuga Lake Stage**
  - STARR II results within 0.2-ft of effective data and USGS Study (2018)

Tompkins County Next Steps

- **Field reconnaissance**
- **Hydraulic analysis**
  - Hydraulic modeling/report/submittal
  - Hydraulic analysis webinar
- **Flood Risk Review meeting**
- **Dam breach analysis**
- **Mapping**

Schedule


We are Here
Kickoff meeting (March 2019)
Hydrology webinar (October 2019)
Hydraulics webinar
Flood Risk Review meeting
Regulatory products issued
Flood risk products issued
CCO meeting
Resilience meeting
Effective maps issued
TIME (months)
6
12
18
24
30
36
FLOOD HAZARD ANALYSES
PRELIMINARY/REGULATORY
POST PRELIMINARY
LFD
FLOOD RISK PRODUCTS
APPEAL & COMMENT PERIOD

Dam Breach Analyses

Dam Name	NDID	Hazard Potential	Owner Name	NID Height (ft)	NID Storage (ac-ft)	River	City
60 FOOT DAM	NY00378	High	CITY OF ITHACA	75	1290	SIXMILE CREEK	ITHACA
VIRGIL CREEK WATERSHED FLOODWATER DAM	NY14995	High	TOMPKINS COUNTY DEPARTMENT OF PLANNING;TOWN OF DRYDEN;VILLAGE OF DRYDEN	70.1	3992	VIRGIL CREEK	DRYDEN
30 FOOT DAM	NY00395	High	CITY OF ITHACA	36	397	SIXMILE CREEK	ITHACA
TREMAN LAKE DAM	NY01522	Significant	NYS PARKS & RECREATION FINGER LAKES	36	300	BUTTERMILK CREEK	ITHACA
DWYER DAM	NY01228	Low	CORNELL UNIVERSITY	36	24	CASCADILLA CREEK	ITHACA
BEEBE DAM	NY00394	Significant	CORNELL UNIVERSITY	28	75	FALL CREEK	ITHACA
ENFIELD GLEN DAM	NY00433	Low	NYS PARKS & RECREATION FINGER LAKES	25	40	ENFIELD CREEK	ITHACA
SOUTH HILL POND DAM	NY14760	Significant	ITHACA COLLEGE	20	6	TR-SIXMILE CREEK	ITHACA
JENNINGS POND DAM	NY00944	High	NYS PARKS & RECREATION FINGER LAKES	17	294	BUTTERMILK CREEK	DANBY
VAN NATTA DAM	NY11601	Significant	CITY OF ITHACA	12	9	SIX MILE CREEK	ITHACA
BEACON HILLS VILLAGE DAM	NY11624	Significant	HOSPICARE FOUNDATION	10	10	TR-SIX MILE CREEK	-
DRYDEN LAKE OUTLET DAM	NY00569	Low	NYS DEC	9	345	TR-VIRGIL CREEK	DRYDEN
CORNELL UNIVERSITY POND #2 DAM	NY00632	Low	CORNELL UNIVERSITY	8	50	TR-FALL CREEK	ITHACA
CORNELL UNIVERSITY WILDLIFE POND #1 DAM	NY01408	Low	CORNELL UNIVERSITY	7	60	TR-CAYUGA LAKE	NONE

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Questions? Comments?

Thank you!

FEMA