City of Ithaca
Flood Mapping and Mitigation Study

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INTRODUCTION

- Flood Risks in Ithaca
  - More stormwater entering creeks:
    - Increased precipitation/intensity since original design and construction of existing stormwater infrastructure
    - Increased impervious surfaces throughout watersheds since original design and construction of infrastructure
  - Less capacity to convey stormwater
    - Sediment buildup in creeks from upstream erosion
    - Age of infrastructure (collapsed pipes, collapsing creek walls, etc.)

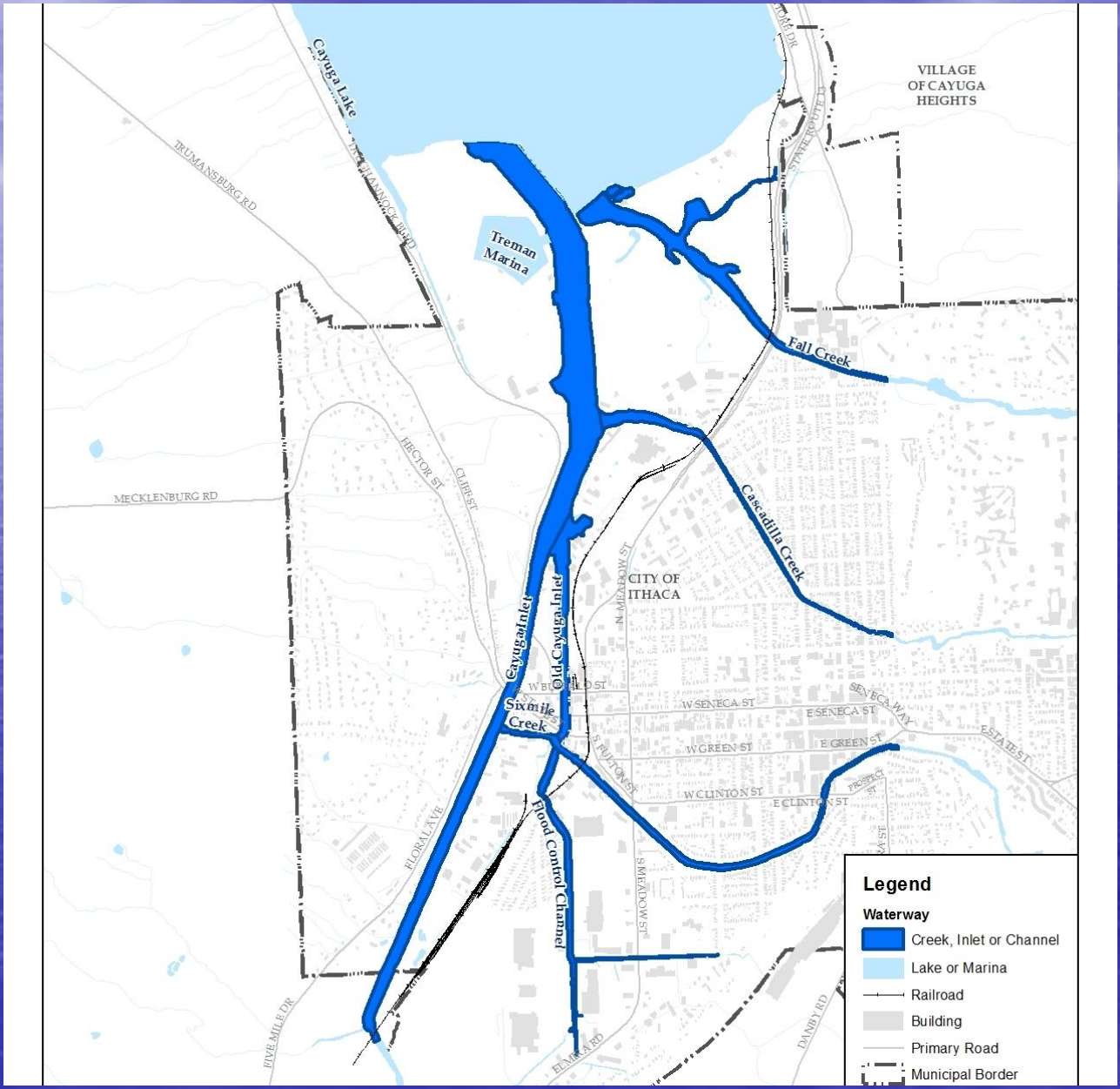
INTRODUCTION (continued)

- Need to:
  - slow down or reduce runoff from watersheds
  - reduce erosion and sediment loads in watersheds
  - Restore and/or increase capacity of stormwater system
- Limited Funding for Repair and Capital Improvements
  - Where are the weak links in our drainage system?
  - Where do we apply limited funding to get the "most bang for the buck?"
  - What should be the design basis for new or replacement infrastructure?

APPROACH

- Flood Mapping based on current conditions
  - Hydraulic study
    - Calibration of Existing Creeks to determine channel characteristics under existing conditions—measure streamflow and water surface elevations when creeks are running at least "half-full"
    - HEC-RAS Model—determine water surface profiles and "flood footprints" for various flow events and lake levels
    - Map extent of flood boundaries and depths for each event

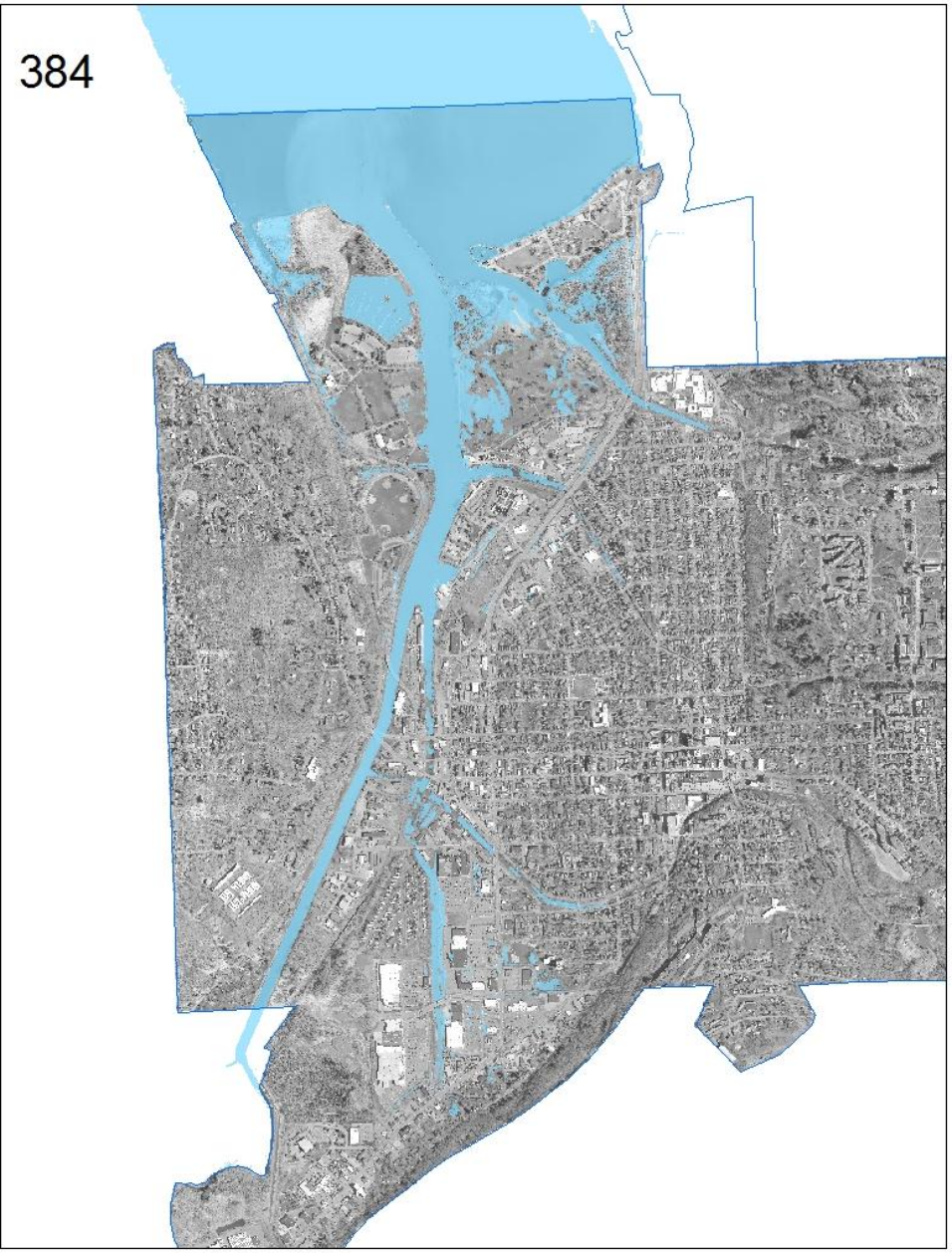
HYDRAULIC STUDY AREAS

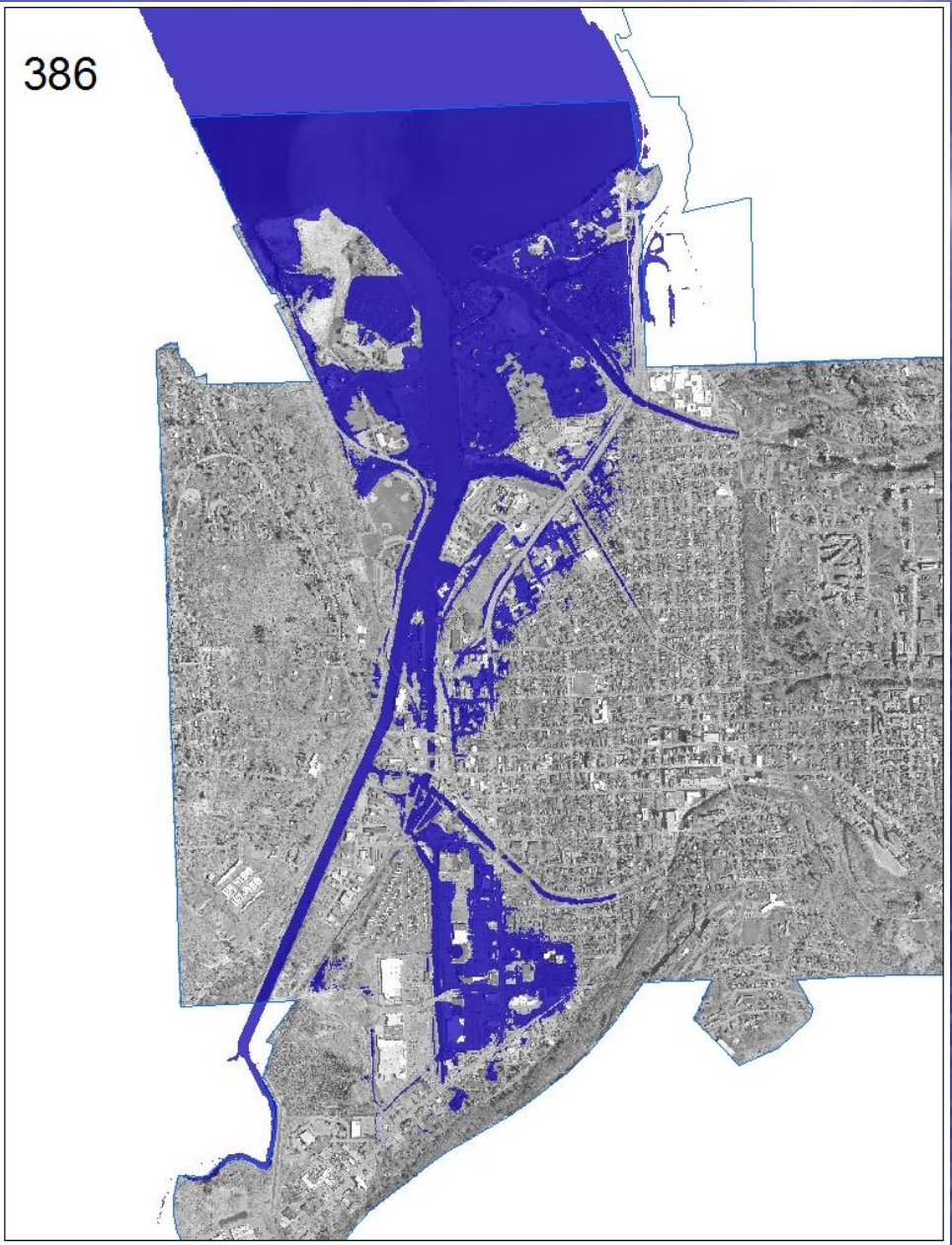


HYDRAULIC STUDY AREAS

- Hydraulic models based on current conditions
  - Create flood maps for 2, 10, 50, 100 and 500 year flows
  - Use of historic streamflow data rather than precipitation data
  - Evaluate the effect of lake levels on flood risk
    - Wintertime lake level 381
    - Summertime lake level 384
    - 100-year lake level 386.5

Effect of Lake Level on Flooding

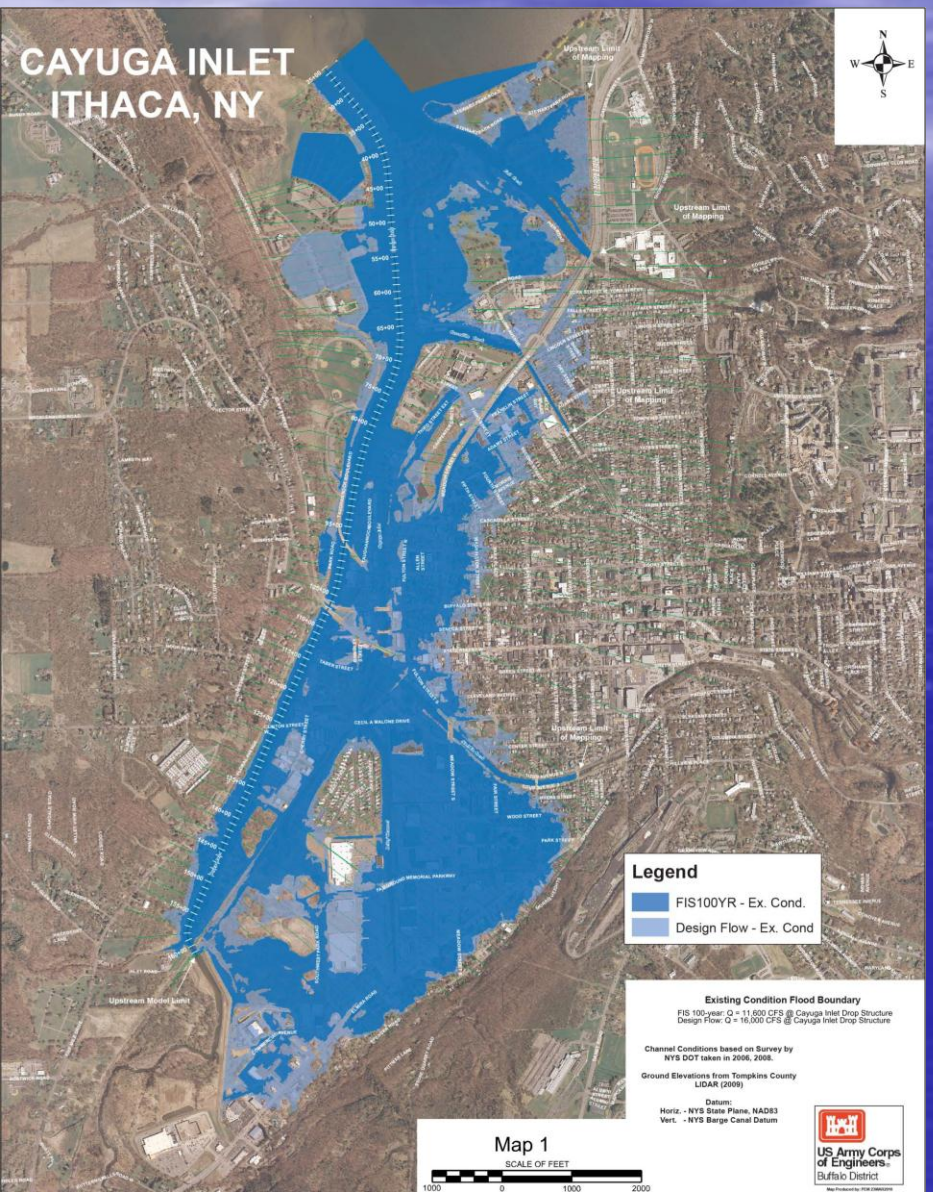


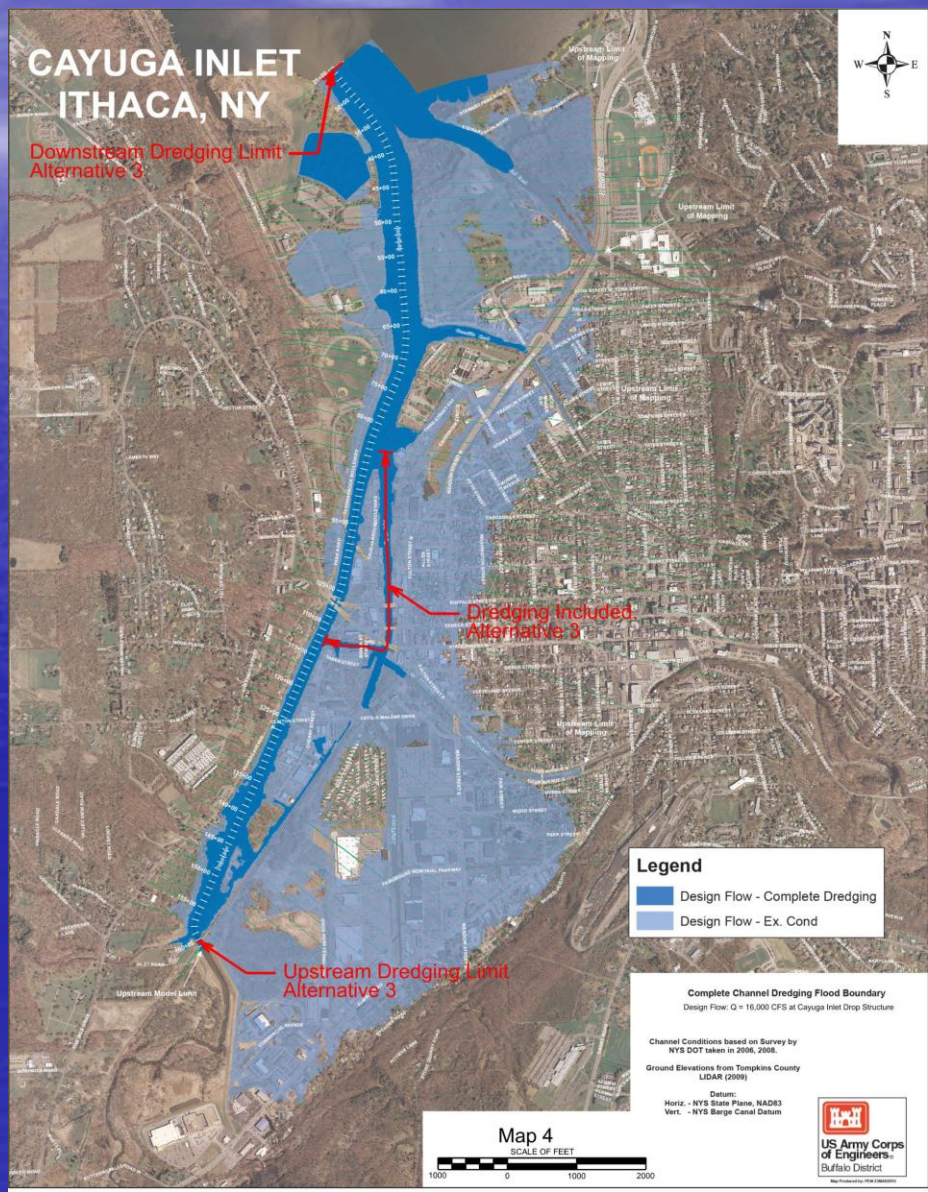


HYDRAULIC STUDY AREAS

- Identify problem areas and causes
- Identify and model possible mitigation measures
  - Within City of Ithaca:
    - Dredging
    - Check valves
    - Higher creek walls, etc.
  - Watershed:
    - Regional detention
    - Regional sediment traps
    - Policies to reduce runoff and erosion
    - Use of 30 foot dam for flood control?

MODEL EXISTING CONDITIONS AND THE EFFECT OF MITIGATION MEASURES

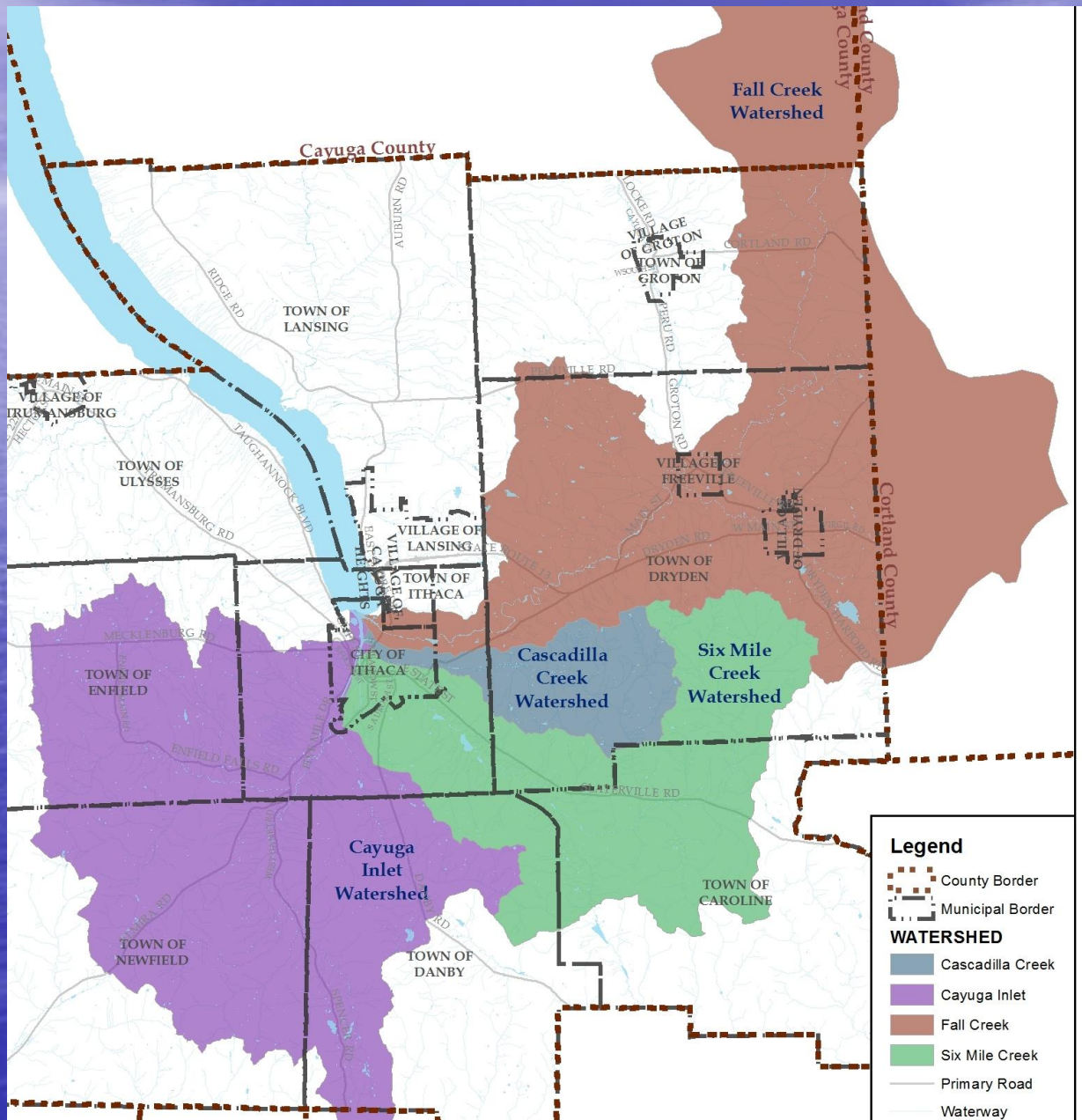




HYDROLOGY STUDY AREAS

- Hydrologic computer models based on projected conditions
  - What will land use/impervious area look like in 50 years?
  - What is the trend in rainfall intensity over the next 50 years?
  - How much more water will we need to handle 50 years from now?
  - How can we reduce or slow down the amount of runoff coming from the watershed?

HYDROLOGY STUDY AREAS



SEDIMENT TRANSPORT ISSUES

SEDIMENT MITIGATION AND DREDGING

- Sediment load creates problems:
  - Reduces capacity of creeks to convey runoff
  - Impairs water quality
- Mitigation Options:
  - Dredging—expensive, difficult to permit, lack of disposal facilities, environmental concerns, recurring maintenance
  - Watershed policies—reduce the amount of sediment that needs to be dredged. Requires intermunicipal/regional collaboration.

SEDIMENT MITIGATION AND DREDGING

- Develop Policies to Reduce Sediment Load
  - Coordinate with dredging efforts
  - Education
  - Develop and implement regional policies

Task Force

- Current Task Force Representation
  - City of Ithaca
  - Town of Ithaca
  - Tompkins County
  - TCSWCD
  - USGS
  - Cornell University
  - Cornell Coop. Extension

Task Force

- Tasks/Duties
  - Develop scope
  - Identify resources
  - Peer review

QUESTIONS?