

Sediment Transport Characterization and Flood Recovery Mapping of the Suncook River in Epsom, Pembroke and Allenstown, New Hampshire



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Suncook River Study Discussion Points

- What USGS is and does
- Characterize the 2006 and 2007 floods on the Suncook River
- Sediment Collection
- Flood Recovery Mapping



USGS Mission

The USGS serves the Nation by providing reliable scientific information to:

- describe and understand the Earth;
- minimize loss of life and property from natural disasters;
- manage water, biological, energy, and mineral resources; and
- enhance and protect our quality of life.

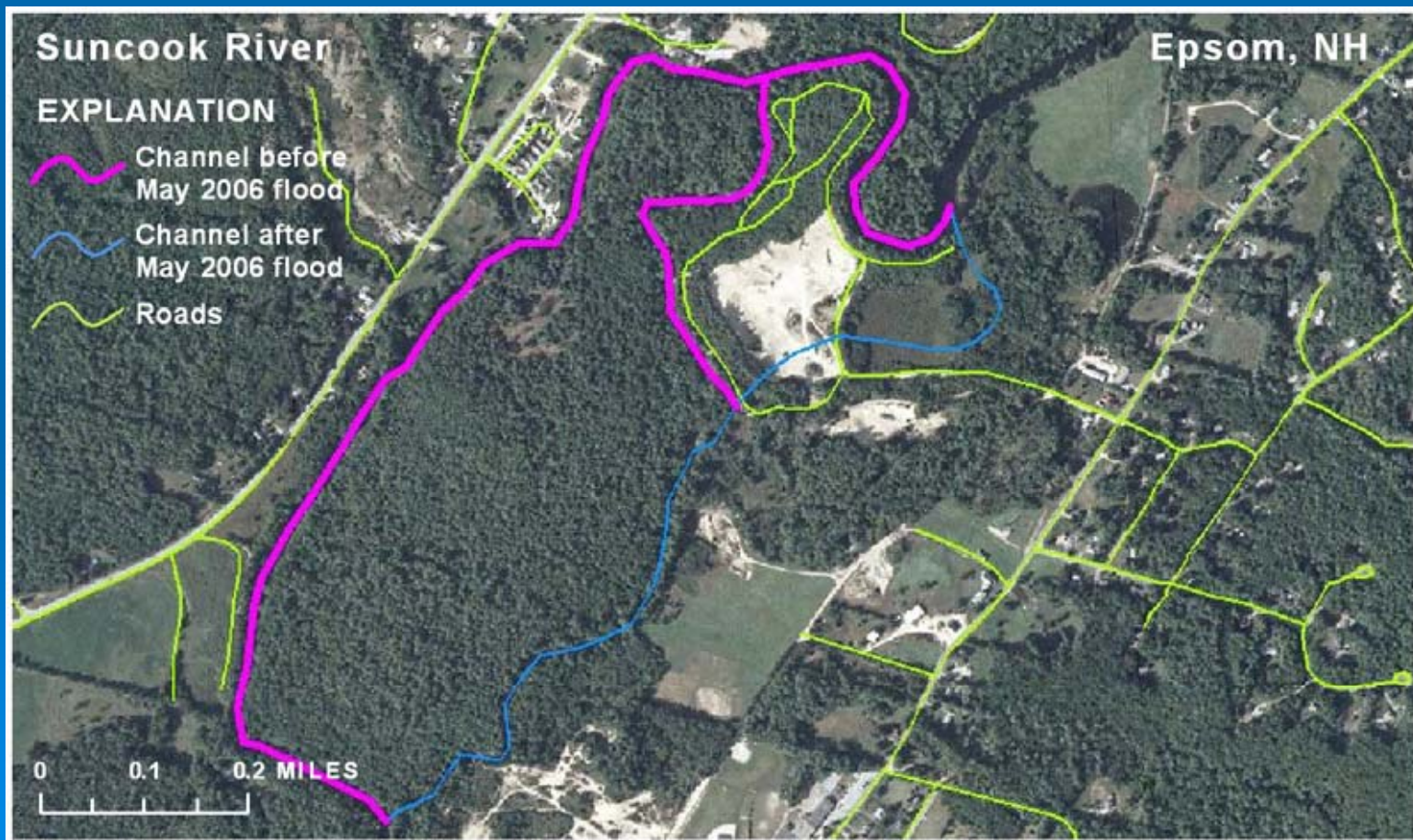


Flows in the Suncook River 2006 and 2007 Floods

- Based on high-water marks at the streamgage on the Suncook River in North Chichester and other locations
- May 2006 flood estimated at 7,600 cfs with a recurrence interval of between 50 and 100 years.
- April 2007 flood estimated at 10,600 cfs with a recurrence interval of greater than 100 years.
- 12,900 cfs peak flow of record (1936)

May 2006 Floods – Suncook River Avulsion

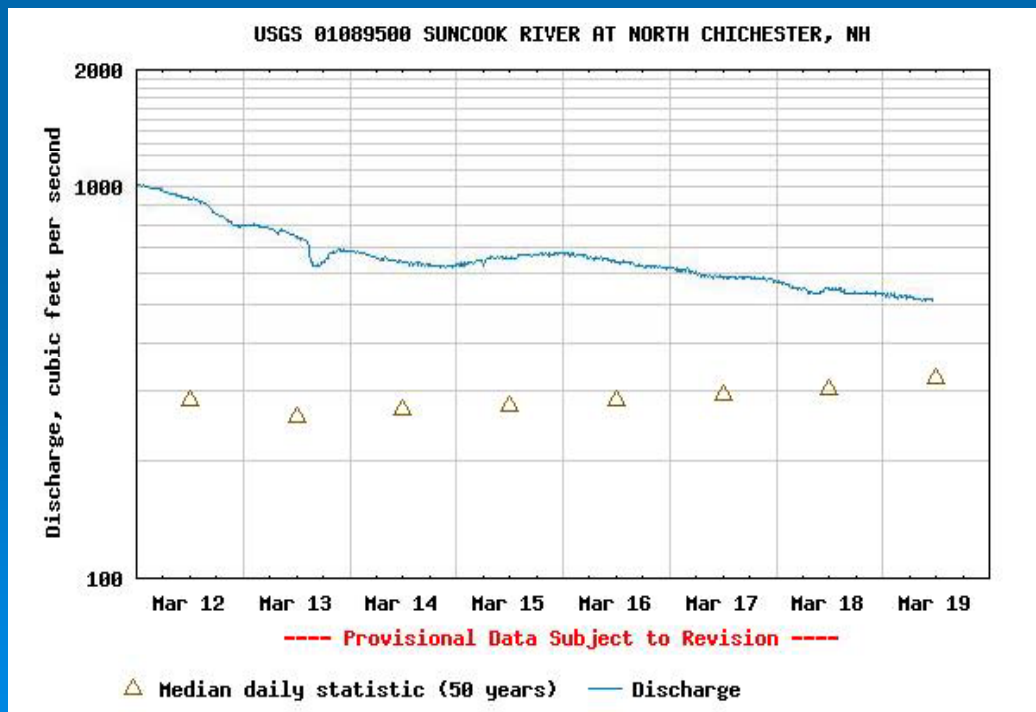
- River channel shortened by 1/2 mile
- 150,000 yd³ of sediment introduced into river
- Steeper channel bed, increased velocities
- Downstream effects on residences, businesses and infrastructure



USGS Suncook River Streamflow Data (Streamgage 01089500)

Available in “near” real-time (1 hour delay) on the USGS webpage:

<http://waterdata.usgs.gov/nh/nwis/rt>



Web pages display discharge (flow) and stage (height of water) as well as water and air temperature.


Suncook River Sediment Characterization Study

- May 2006 avulsion reduced the total length of the river and resulting in increased stream velocities due to the new, steeper channel.
- FEMA is funding the US Geological Survey to assess characteristics and movement of sediments in the Suncook River from Epsom to the Merrimack River confluence so that predictions on riverbed stability, sediment movement and affects on flood stage can be made.
- This study will aid in restoration efforts by furthering the understanding of the impact of the transported sediment on the surrounding environment.

Collection of Data to determine Sediment load



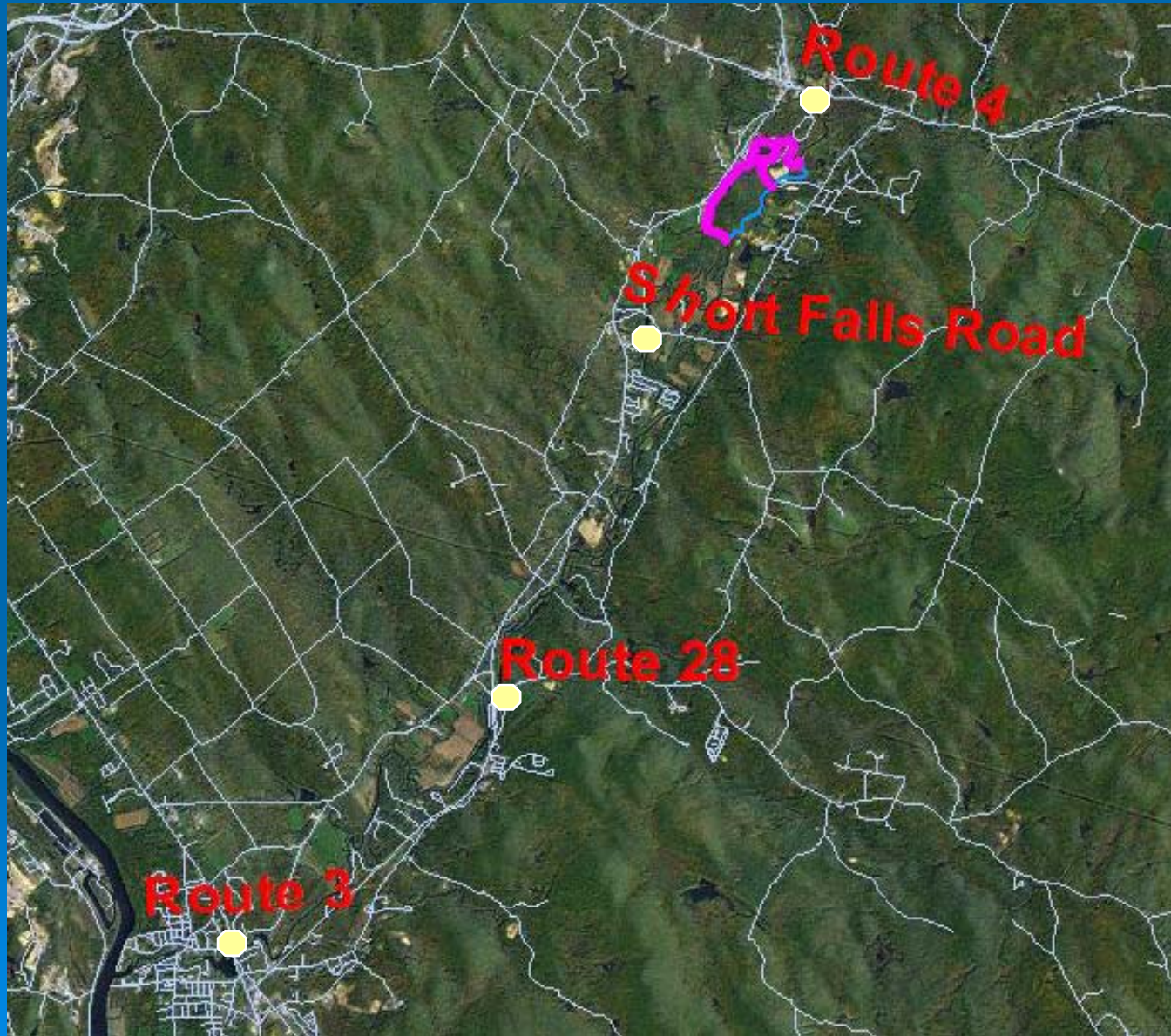
Sediment Terminology

- Suspended Sediment Load: That part of the sediment load which is in suspension
 - Bed Load: Material moving on or near the stream bed by rolling, sliding, and skipping. In strict sense, material finer than about 0.2 mm in diameter is rarely part of the bed load.
 - Total Sediment Load: Suspended Sediment plus bed load
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Sediment Data Collection

- Suspended sediment and bed load sediment data being collected every 2-4 weeks from Fall 2007 – Summer 2008
- At four sites along the Suncook River:
 - Route 4 in Epsom, NH
 - Short Falls Road Bridge in Epsom, NH
 - State Route 28 – Allenstown/Pembroke townline
 - U.S. Route 3 in Allenstown/Pembroke townline

Sediment Data Collection Sites



Suspended Sediment Sampler



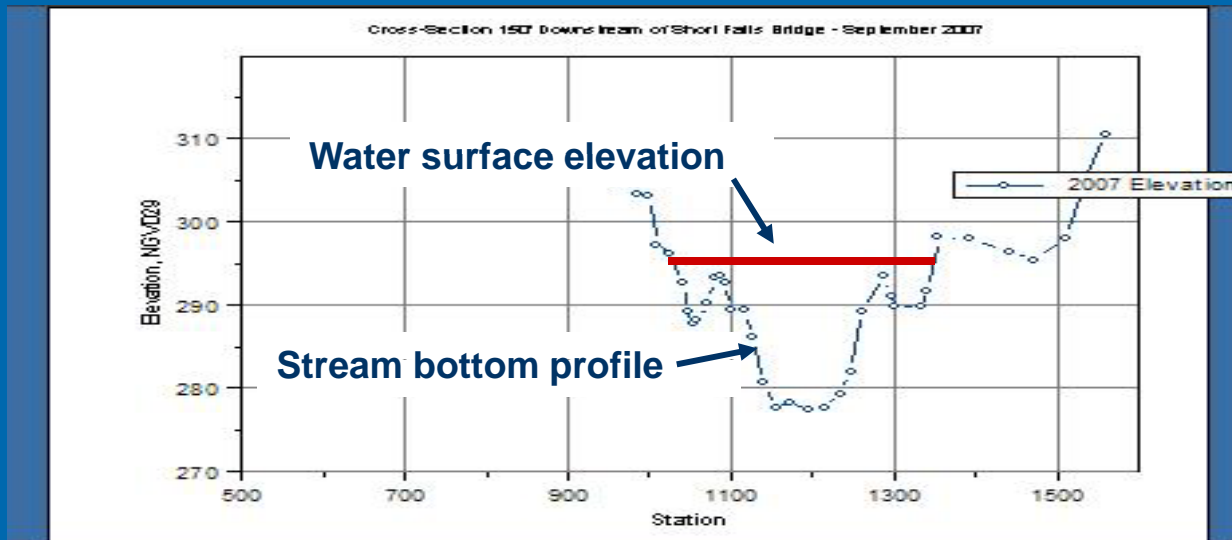
Bedload Sampler



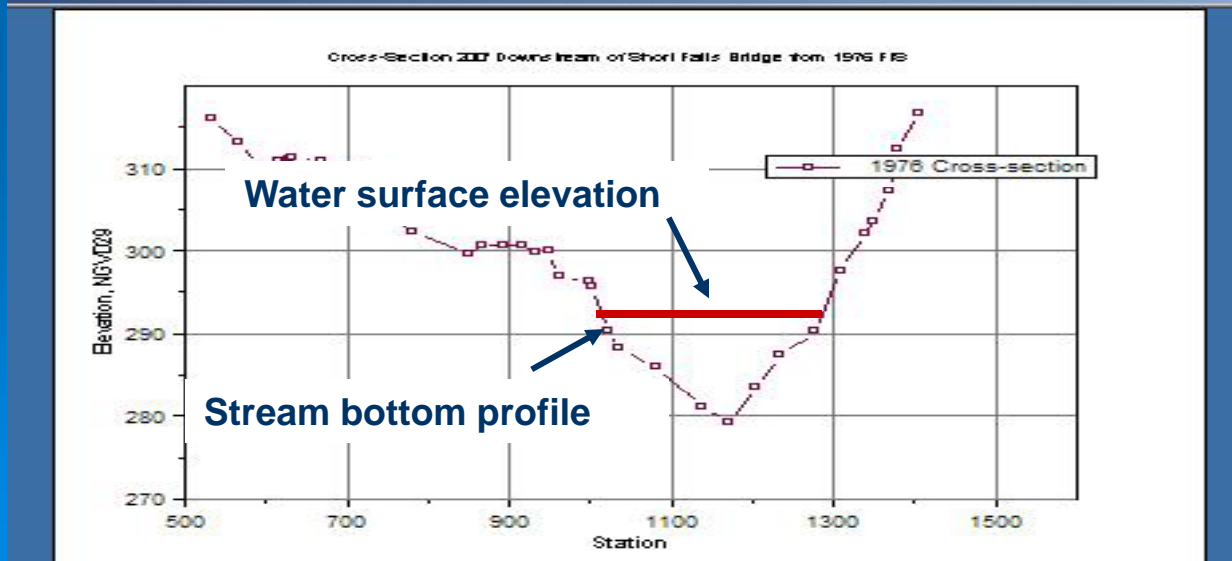
Sediment Model

- Will use sediment and stream flow data to predict sediment movement and deposition
- Produce water surface and stream bed profiles
- HEC-RAS model developed by the Army Corp of Engineers
- Calculated for various amounts of stream flow (2-year to 500-year flow events)

Example of Sediment Study Results



After a 10-year storm



Now

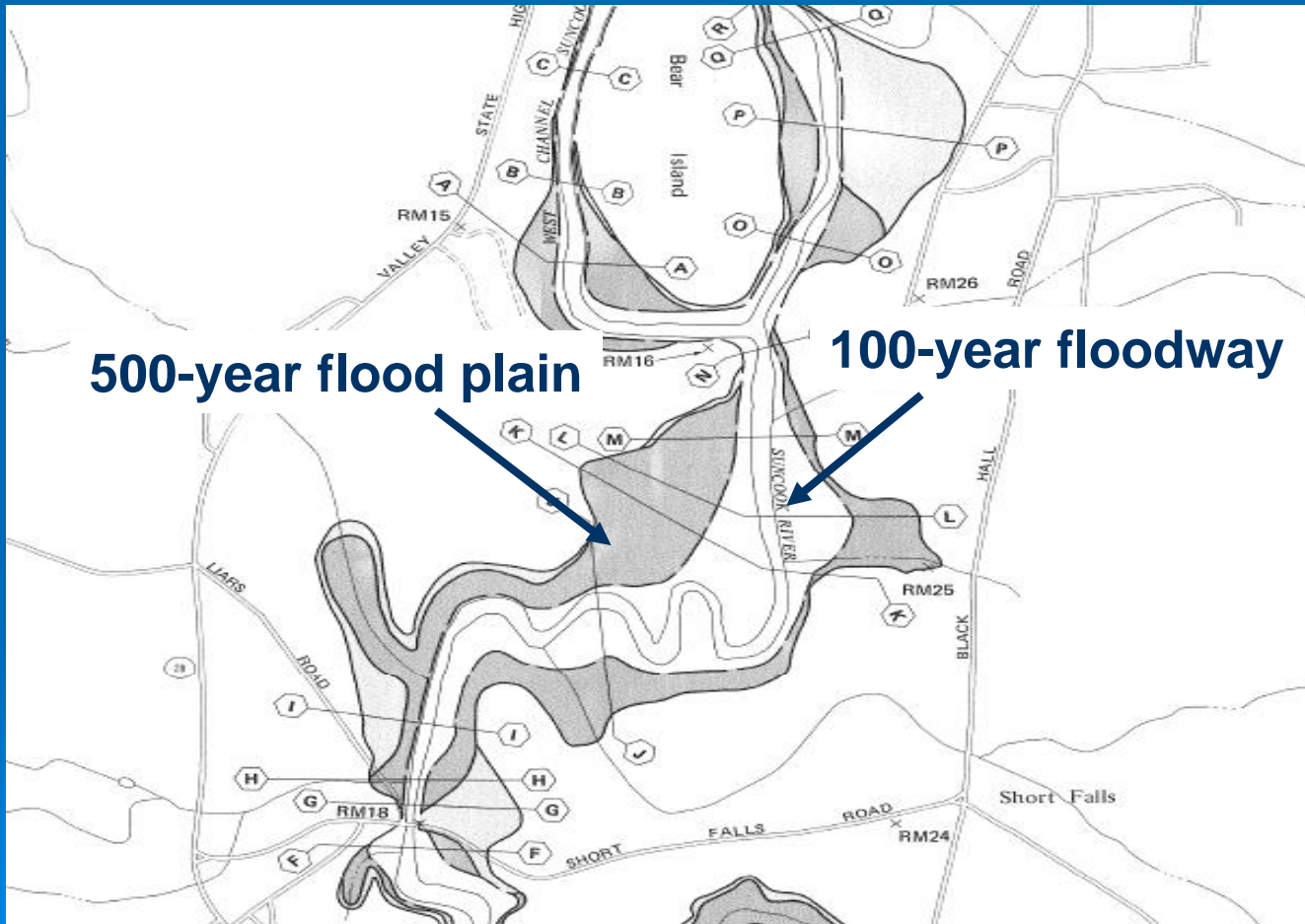
Flood Recovery Mapping



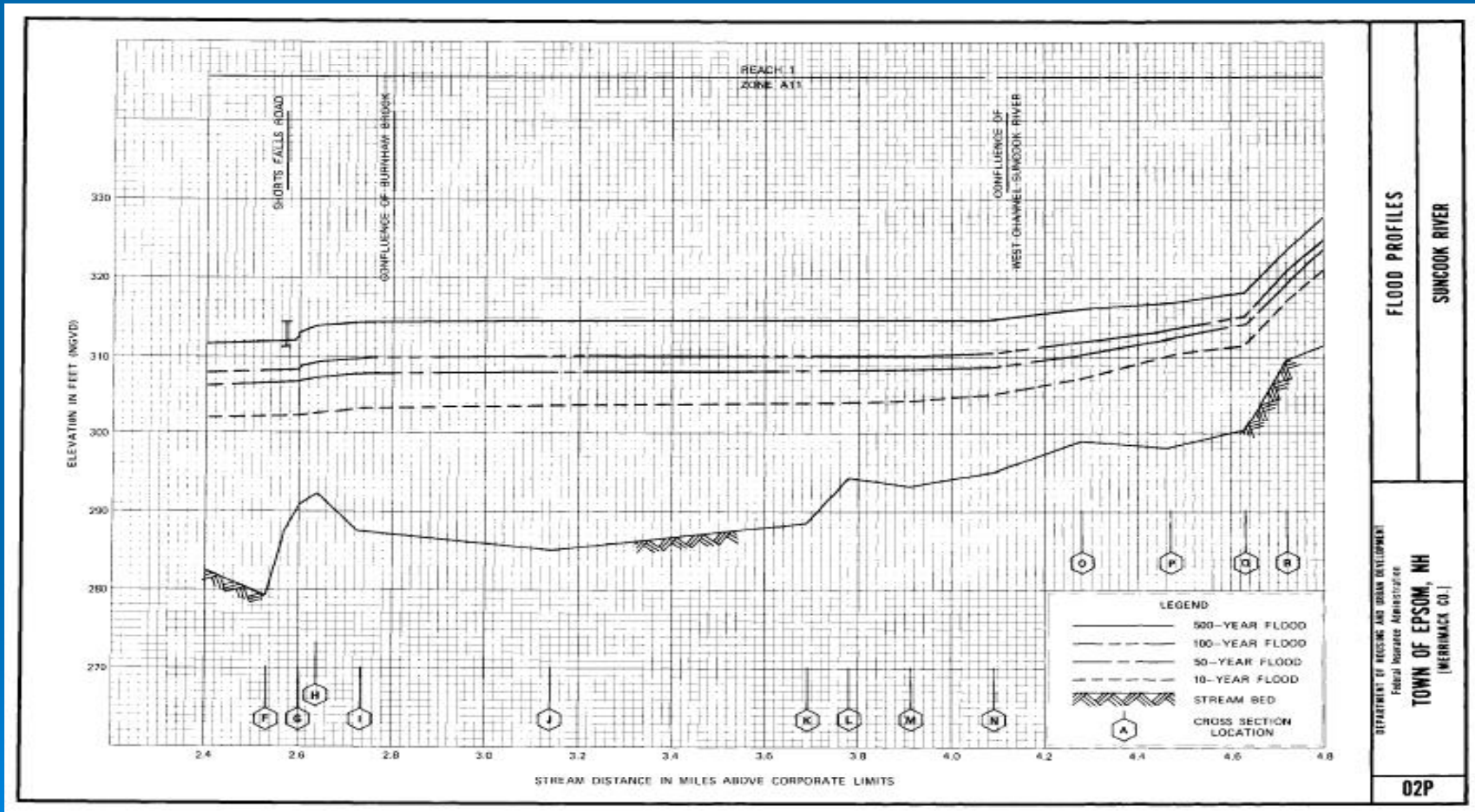
Flood Recovery Mapping

- Delineate profiles (cross-sections) of the river during 10-, 50-, 100-, and 500-year floods.
- Delineated the floodway of 100- and 500-year floods
- Mapping is from the upstream corporate limit of the town of Epsom to the downstream corporate limit of the town of Allenstown (approximately 16 miles)


Create Suncook River Floodway Maps



Create Suncook River Flood Profiles



How the Mapping is Done

- Extensive surveying of river and adjacent lands
 - Create high quality digital image of surface
 - Model water elevations and areas to be flooded during various sized storm events (2-year to 500-year storms)
 - Use HEC-RAS model
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Final Products

- **Flood Recovery Mapping** - USGS report with profile plots of the water surface elevations for the 10-, 50-, 100-, and 500-year floods along with maps containing the delineation of the 100- and 500-year floodplain and floodway. Completion scheduled for December 2008
- **Sediment Study** - USGS report describing study results with profile plots of streambed elevations along the Suncook River for the 2-, 5-, 10-, 50-, 100-, and 500-year floods. Completion scheduled for March 2009

The End

