



Great Dam Removal Feasibility and Impact Analysis



Public Meeting
September 14, 2011
Exeter Town Hall, 9 Front Street, Exeter



Agenda

Time	Item	Presenter
7:00	Welcome and Introductions	Lionel Ingram Chair, Exeter River Study Committee
7:05	Meeting Goals and Roles	Dr. Mimi Larsen Becker Co-Chair, Exeter River Study Working Group
7:10	Exeter's Approach to the Study	Paul Vlasich, PE Town Engineer and Project Manager
7:20	Presentation: Study Overview	Peter J. Walker VHB Project Manager
8:00	Information Stations	Small Group Discussions on Specific Topics
8:45	Public Comments & Questions	Mimi Becker (Facilitator) with Town, Agency and Consultant Personnel
9:20	Summary & Action Items	Peter J. Walker, VHB
9:30	ADJOURN	



Meeting Objectives

- To familiarize the public with the **context, work plan, and schedule** for the Great Dam Removal Feasibility and Impact Analysis.
- To solicit the **public's assistance to identify resources** of concern such as recreational use of the river, the locations of private wells, the presence of wildlife and their habitats, cultural and historical resources, and other important issues.



Project Funding



**Gulf of Maine
Council on the
Marine Environment**



Exeter River Study Committee - Working Group

Member	Representing
Mimi Larson Becker, Co-Chair	Exeter River Study Committee
Rod Bourdon	Exeter River Study Committee
Phyllis Duffy	Town of Exeter Engineering Dept.
Eric Hutchins	NOAA Restoration Center
Deborah Loiselle, Co-Chair	NHDES Dam Bureau
Kristen Murphy	Town of Exeter Planning Dept.
Peter Richardson	Exeter Rive Local Advisory Comm.
Sally Soule	NHDES Watershed Assistance
Paul Vlasich	Town of Exeter Engineering Dept.
Roger Wakeman	Exeter River Study Committee



Consulting Team Members

Attending Tonight:

- Peter Walker, VHB – Project Manager
- Bill Arcieri, VHB – Water and Sediment Quality
- Rita Walsh, VHB – Cultural Resources/Preservation Planner
- Joyce Clements, VHB - Archaeologist
- Brian Goetz, W&S – Water Supply
- Kevin MacKinnon, W&S – Hydrology and Hydraulics

Others:

- Randy Sewell, VHB - River Engineer
- Mike Hansen, VHB – Hydraulic Engineer
- Dale Abbott, VHB – GIS Analyst
- John Field, PhD, Field Geology Services - Geomorphologist
- Brandon Kulik, Kleinschmidt Assoc. – Fisheries Biologist
- Andrew Walker, W&S – Hydrology and Hydraulics



Project History – Previous Activities

- 1981 • Town Takes Ownership of the Dam
- 2000-2009 • NHDES Dam Bureau Issues Letter of Deficiency and Amendments
- 2005-2007 • Phase 1 Final Report for the Town of Exeter (Wright-Pierce)
- 2008 • Riverbank Scour/Design Impacts to Water Quality (Wright-Pierce)
- 2009 • Geomorphic Assessment (Bear Creek Environmental/Fitzgerald)
- 2010 • Water Supply Alternatives Study – Final Report (Weston & Sampson)
- 2011 • Hydropower Feasibility Review (Weston & Sampson)



Project History – Why Another Study?

- Previous studies addressed **dam modifications**, but did not analyze all of the issues associated with **dam removal**
- This study will focus on **dam removal**
- Will consider the “**current condition**” and “**modification**” alternatives for comparison
- This study will complement previous studies and, when taken together, will provide a **complete picture of alternatives**
- The scope of the current study is a result of the feedback received at an **April 29, 2010** public meeting

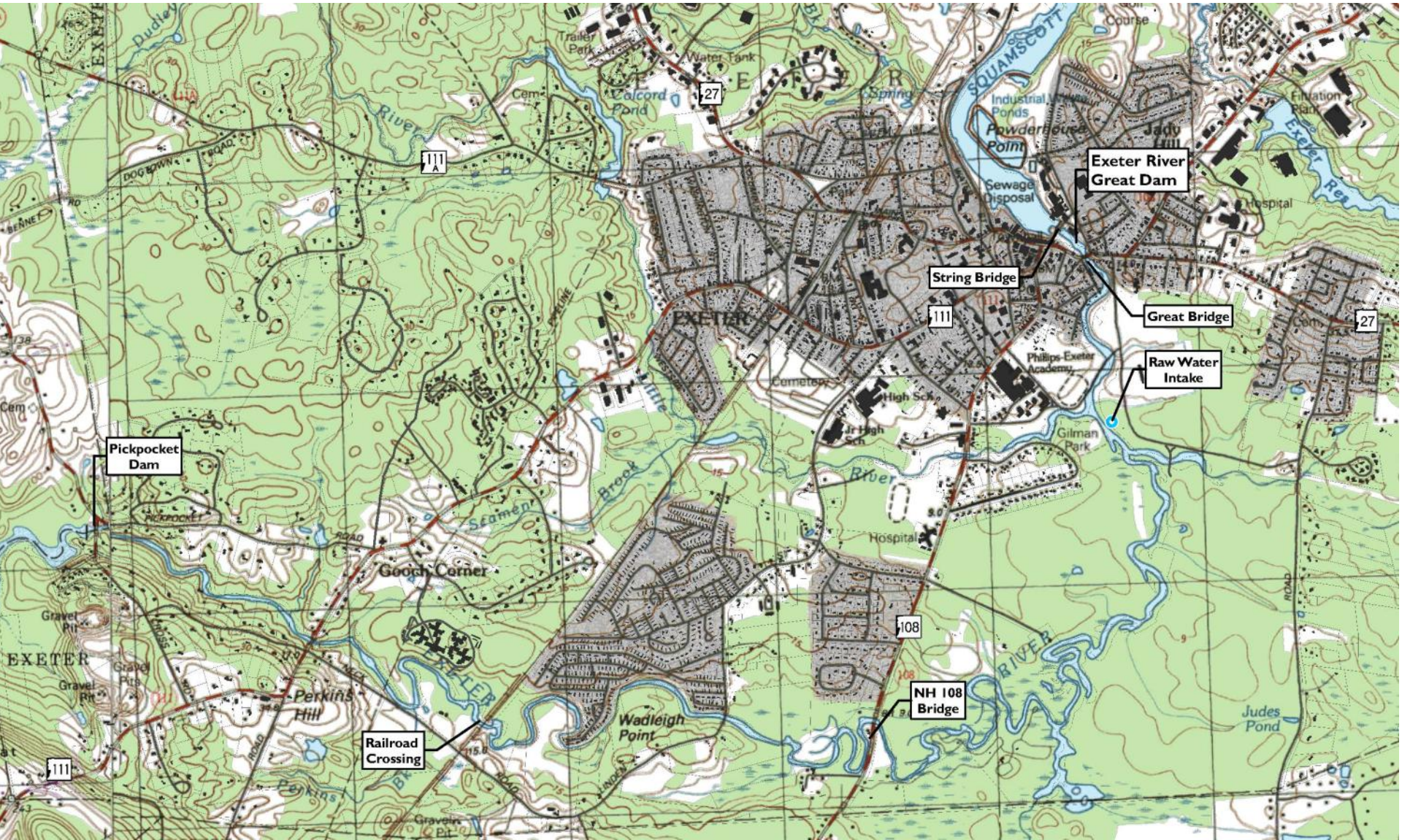


Project Schedule

Task	Timeline
Field Surveys	June – October 2011
Define Alternatives	Fall – Winter 2011-2012
Preliminary Analysis of Alternatives	Winter – Spring 2012
Public Meeting	Spring 2012
Draft Feasibility Report	Summer 2012
Final Feasibility Report Issued	Summer-Fall 2012
Public Meeting	Fall 2012

STUDY AREA ORIENTATION





REVIEW OF PROJECT SCOPE





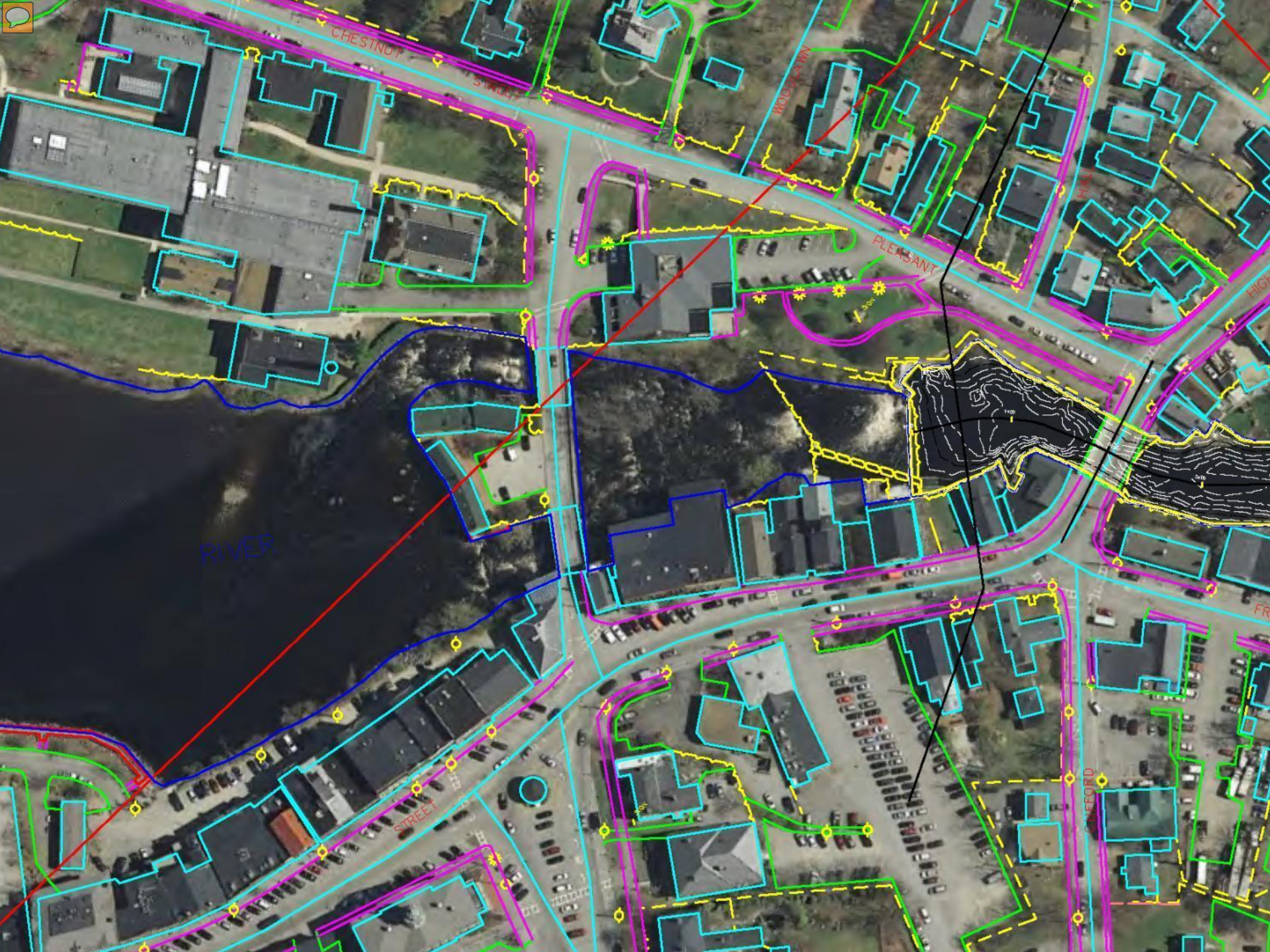
List of Issues to be Addressed

- Survey, Deed & Title Research
- Potential Sediment Contamination
- Sediment Quantity
- Hydrology and Hydraulics (e.g., flooding and erosion)
- Historic/Archaeological Resources
- Wetlands
- Wildlife
- Fish Passage
- Bridge and Infrastructure Impacts
- River Ice Dynamics
- Water Quality
- Groundwater Supplies
- Surface Water Withdrawals
- Recreation
- Invasive Species
- Aesthetics



Field Survey and Base Mapping

- Dam Structure Topographic Survey
- River/Impoundment Survey
- Deed and Title Research
- Existing Conditions Plan



CHESTNUT STREET

PLEASANT

RIVER

STREET

WOODS CANYON

HICKORY

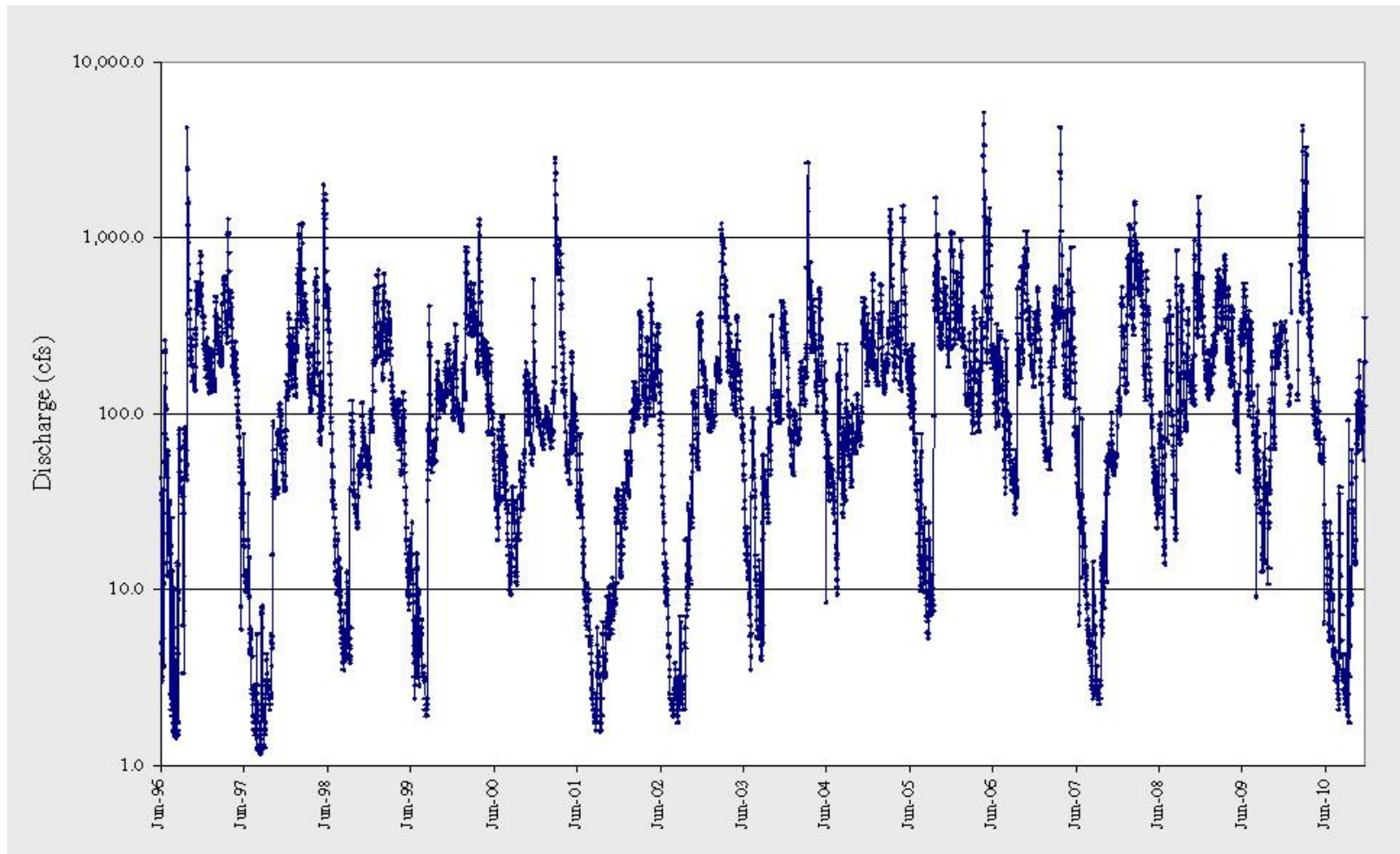
STREET



Hydrological Analysis

- Hydrological analysis will analyze flows in the river – **how much water** is carried by the river
- Relies on **statistical analysis** of river gage information
- Will consider most recent data and methods to adjust for the likely effects of **climate change**

Hydrological Analysis – Exeter River Flow Data





Hydrological Analysis

- **Recurrence Interval** – How likely is it that a flow of a specific volume will occur?
 - 100-year Flood = 6,090 cubic feet per second
 - Bankfull Discharge = 994 cubic feet per second
 - Average Annual Flow = 105 cubic feet per second
- **Exeter River** - Haigh Road Gage - 1996 to Present
- **Parker River** – Byfield, MA – 1945 to Present

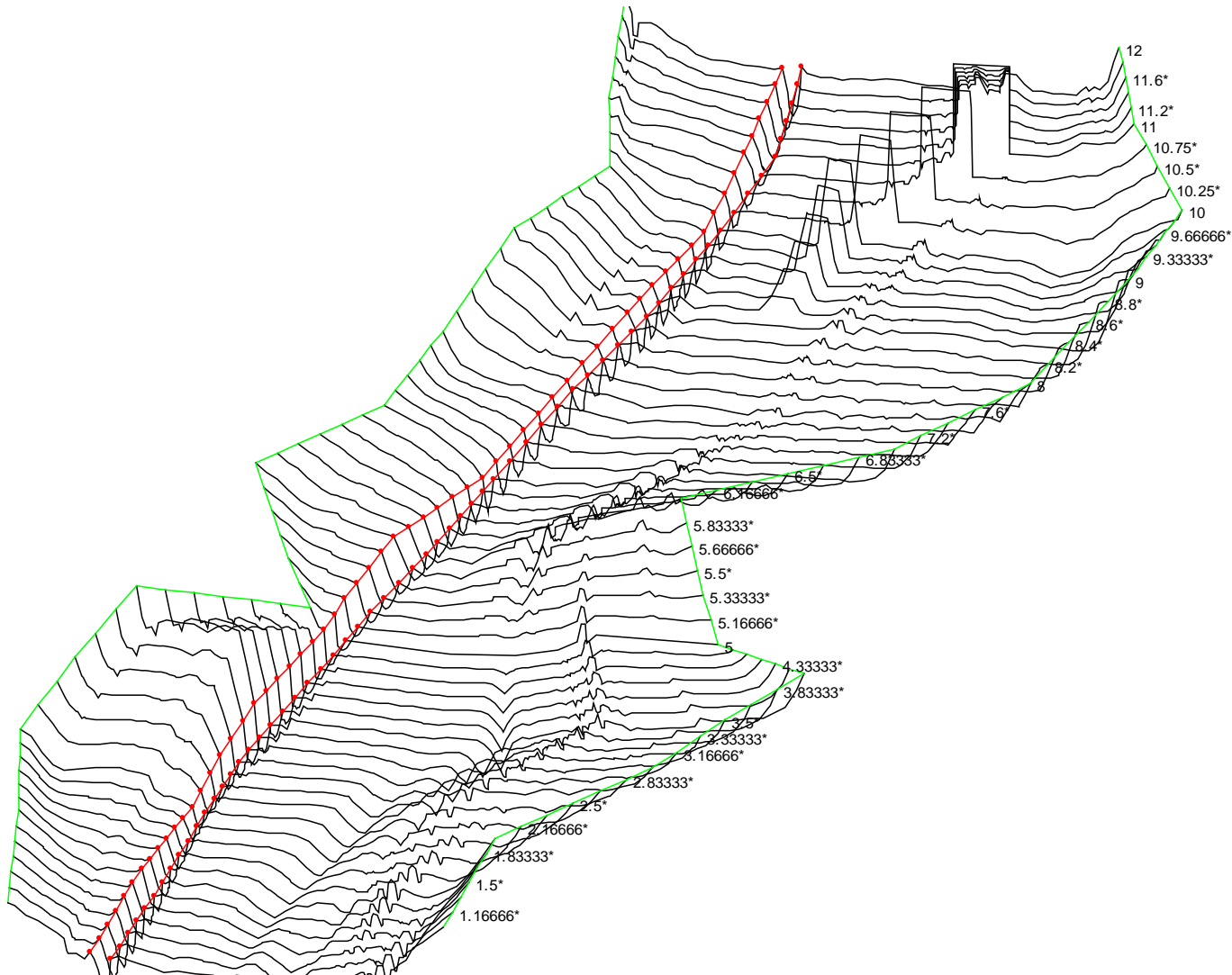


Hydraulic Modeling (HEC-RAS)

- Hydrology tells us about **flows**; Hydraulics tells us water **elevation, velocities and forces**
- Hydraulics is based on engineering calculations considering the **properties of water** and the **shape of the channel**



Hydraulic Modeling





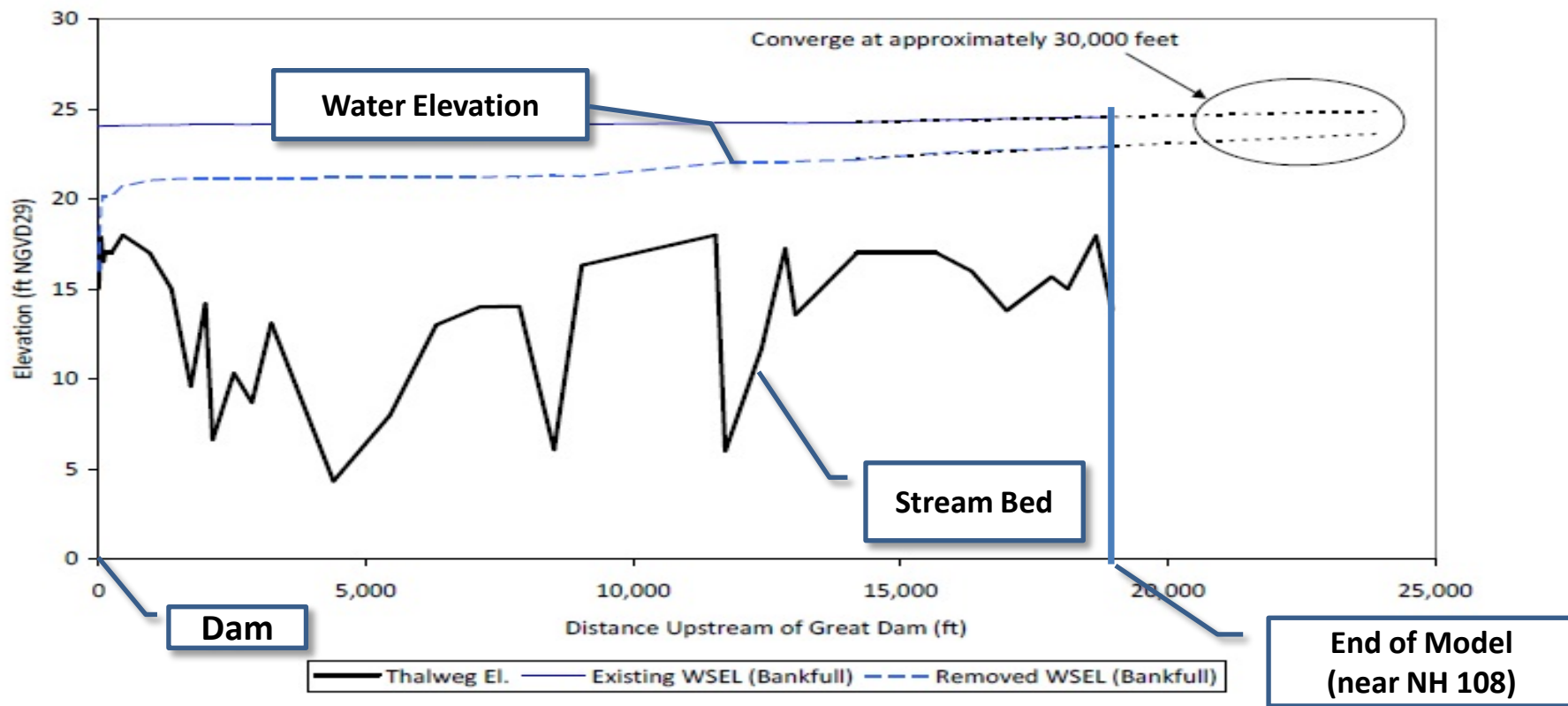
Hydraulic Modeling

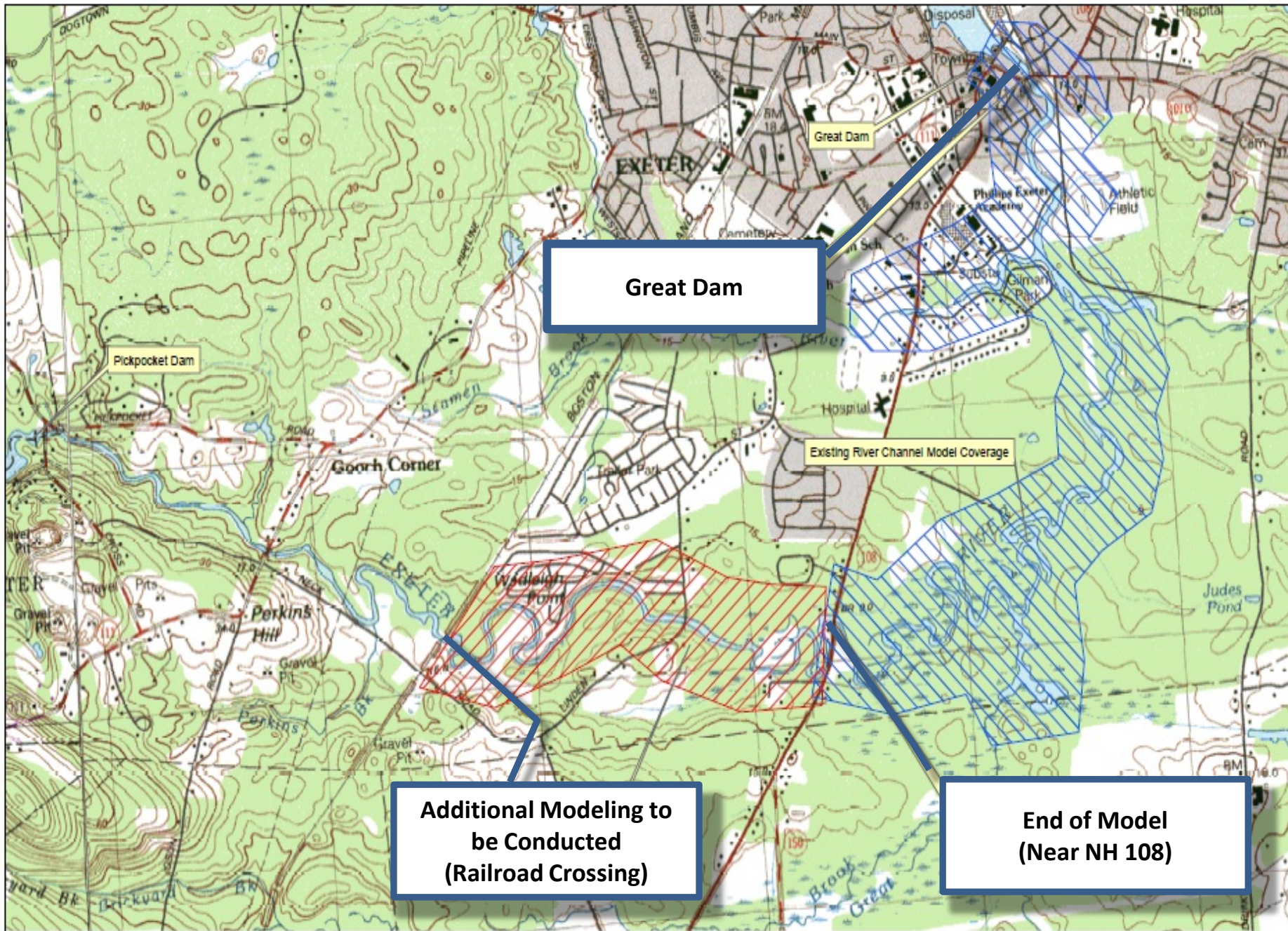
- Original Model Created for Exeter River Study
 - Woodlot Associates (2007)
- Model Updated for Water Supply Alternatives Study
 - Weston & Sampson (2009/2010)
 - Updates include:
 - Design Flow Statistics (extended period of record)
 - Channel Geometry (extended into floodplain)
- This Study
 - Updated Channel Geometry (new survey data and Little River model)
 - Updated Hydrological Analysis (primarily considering climate change)
 - Predict Water Surface Elevations under “Dam Out” Alternative

Hydraulic Modeling

Extent of Impoundment (Q_{bkf})

Water Surface Elevation, Existing vs. Dam Removed Conditions





Great Dam

Existing River Channel Model Coverage

Additional Modeling to be Conducted (Railroad Crossing)

End of Model (Near NH 108)



Hydraulic Modeling – What will this tell us?

- How will **Flooding** change adjacent to river (horizontal and vertical)?
- How would **Wetlands and Wildlife** be affected?
- How would **Water Intakes** and **Groundwater** conditions be affected?
- How would **Sediment Transport** (i.e., erosion and deposition) change?
- Will bridges and foundations be more susceptible to **Scour**?
- Will **River Ice** dynamics change?

Sediment Sampling and Analysis





Sediment Sampling and Analysis

- Quality Assurance Plan
 - Developed to ensure reliable data is collected
- Sediment Evaluation
 - Chemical analysis of sediment from 6 sites
 - Sampling in Sept/October
 - Results in early winter.
- Sediment Toxicity Testing (if needed)
 - Biological testing performed by exposing aquatic organisms to sediments
- Community Assessment (if needed)
 - Sampling of streambed organism populations

Sediment Transport and Scour





Sediment Transport

- **Grain size analysis & hydrological model** to determine potential for migration of river sediments
- **Scour Calculations** at bridges and foundations near dam site
- A **Landscape/Geological** Perspective
- Estimate **probable volume and location of sediment likely to move or settle** (erosion and deposition)
- Identify **options for managing** sediment movement



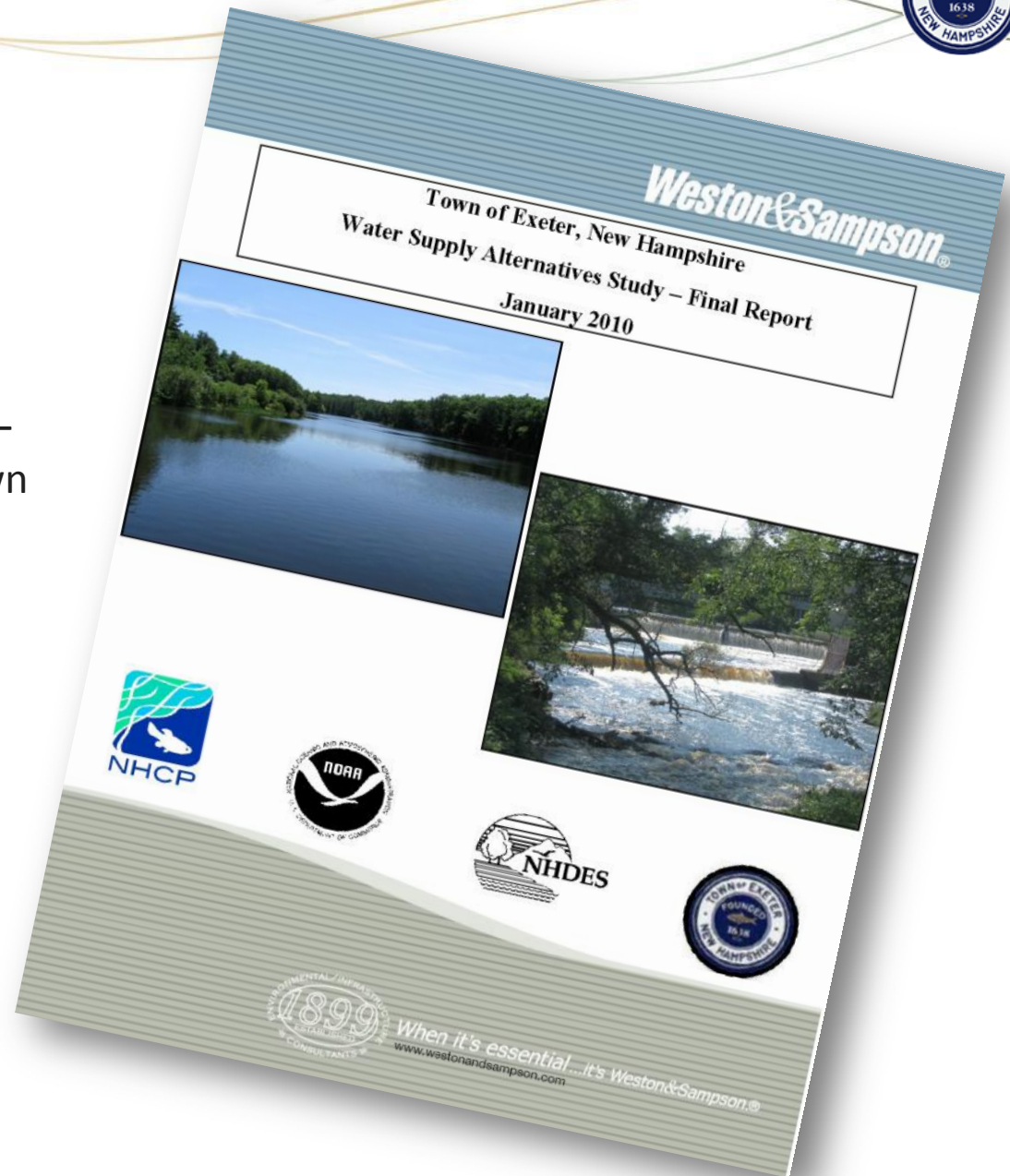
River Ice Coordination and Surveys

- **Change in river hydraulics** can change river ice dynamics
- Coordination with the **US Army Corps of Engineers Cold Regions Laboratory**, Lyme, NH
- **Field survey** to assess probable effects (if needed)



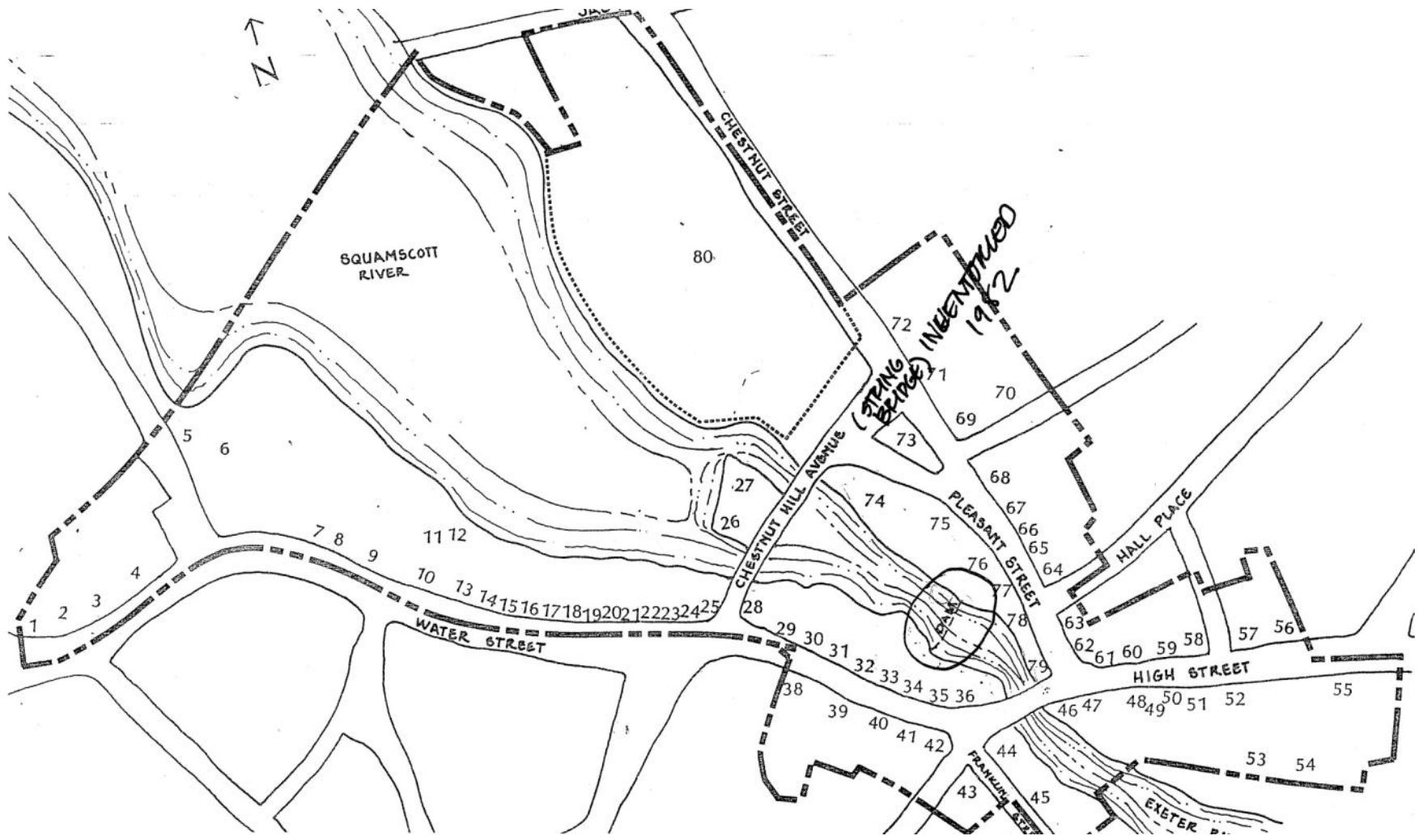
Water Supplies – Surface and Groundwater

- Effect on residential wells? – Drinkwater Road or unknown dug wells
- Retrofit or replace other withdrawal points?
- Integrated releases from Pickpocket and/or Brentwood Dams?





Cultural Resources



Cultural Resources



Cultural Resources





Cultural Resources – Section 106

- **Section 106** of the National Historic Preservation Act
- The **NH Division of Historical Resources** acts as the State Historic Preservation Office
- For this project, the National Oceanic and Atmospheric Administration will be the **Lead Federal Agency**

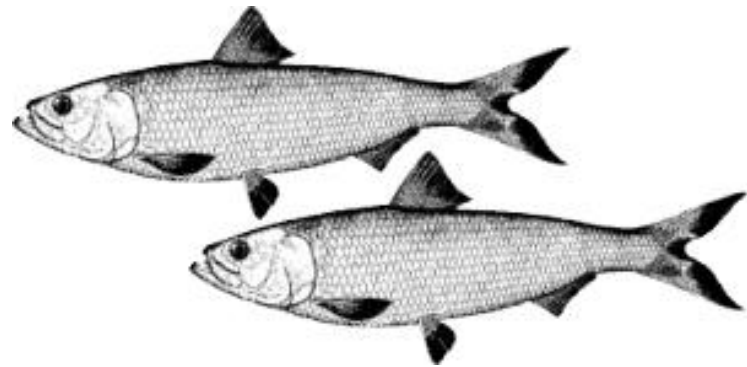
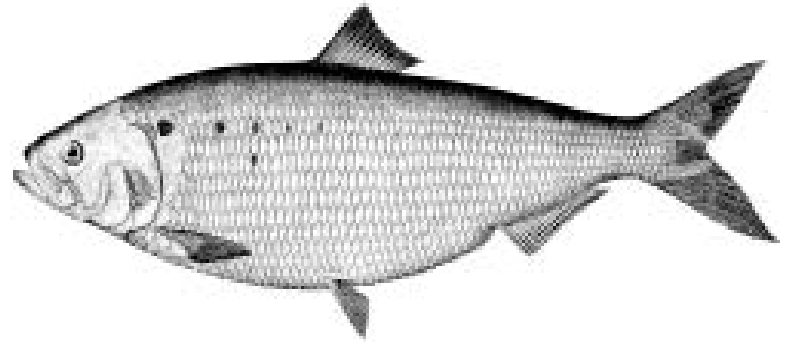


Cultural Resources – Anticipated Studies

- **Project Area Form**
 - Documents the cultural resources that may be affected by the project
 - Discusses previous survey and designation efforts
 - Provides recommendations for additional investigations, if needed
- **Great Dam Individual Inventory Form**
 - Description of the dam
 - Historic development context and individual history of the dam
 - Comparative evaluation
- **Phase IA Archaeological Survey**
 - Literature search (e.g., known sites)
 - Field review (to look for sensitive landforms)
 - Results in recommendations for further surveys if needed
- **Phase IB Archaeological Survey**
 - Systematic test pit testing at direct impact (medium or high sensitivity)

Fisheries Resources

- New hydraulic dynamics
 - Stream channel equilibrium
 - Upstream Fish Passage
- Access to spawning habitat for native aquatic species
 - Increases health of stream ecosystem
 - Improves fishery





Other Natural Resources

- Wetlands
 - How will the dam removal affect wetlands along the impoundment?
 - Will the Swamp White Oak Floodplain be affected?
- Wildlife
 - How will wildlife in the river valley be affected by the elimination of the impoundment?
- Invasive Species
 - What invasive species are found in/along the river?
 - Will the dam removal exacerbate the spread of invasive species or might it help control their spread?

Other Resources and Considerations

- Recreational Uses
 - What recreational uses exist on the impoundment?
 - How would the dam removal affect these uses?
 - What new uses might be created?





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INFORMATION STATIONS





Information Stations

- **Dam Safety** (DES, American Rivers)
- **Historical and Archeological Resources** (VHB, Exeter Heritage Commission)
- **Fisheries, Natural Resources and Recreation** (USFWS & NHF&G)
- **Water Supply** (W&S)
- **Hydrology, Hydraulics, and Flooding** (W&S, VHB)
- **Water and Sediment Quality** (VHB)



Information Stations

- **Talk one-on-one** with specialists
- **Provide information** about specific issues and resources
- **Note taker** will record comments, concerns and information
- **Reconvene at 8:45** to discuss issues as a group:
 - Open Discussion/Q&A
 - Meeting Summary and **Next Steps**
- **Adjourn** at 9:30

INFORMATION STATIONS
UNTIL 8:45



OPEN DISCUSSION/MEETING SUMMARY

ADJOURN AT 9:30



THANK YOU FOR ATTENDING!

