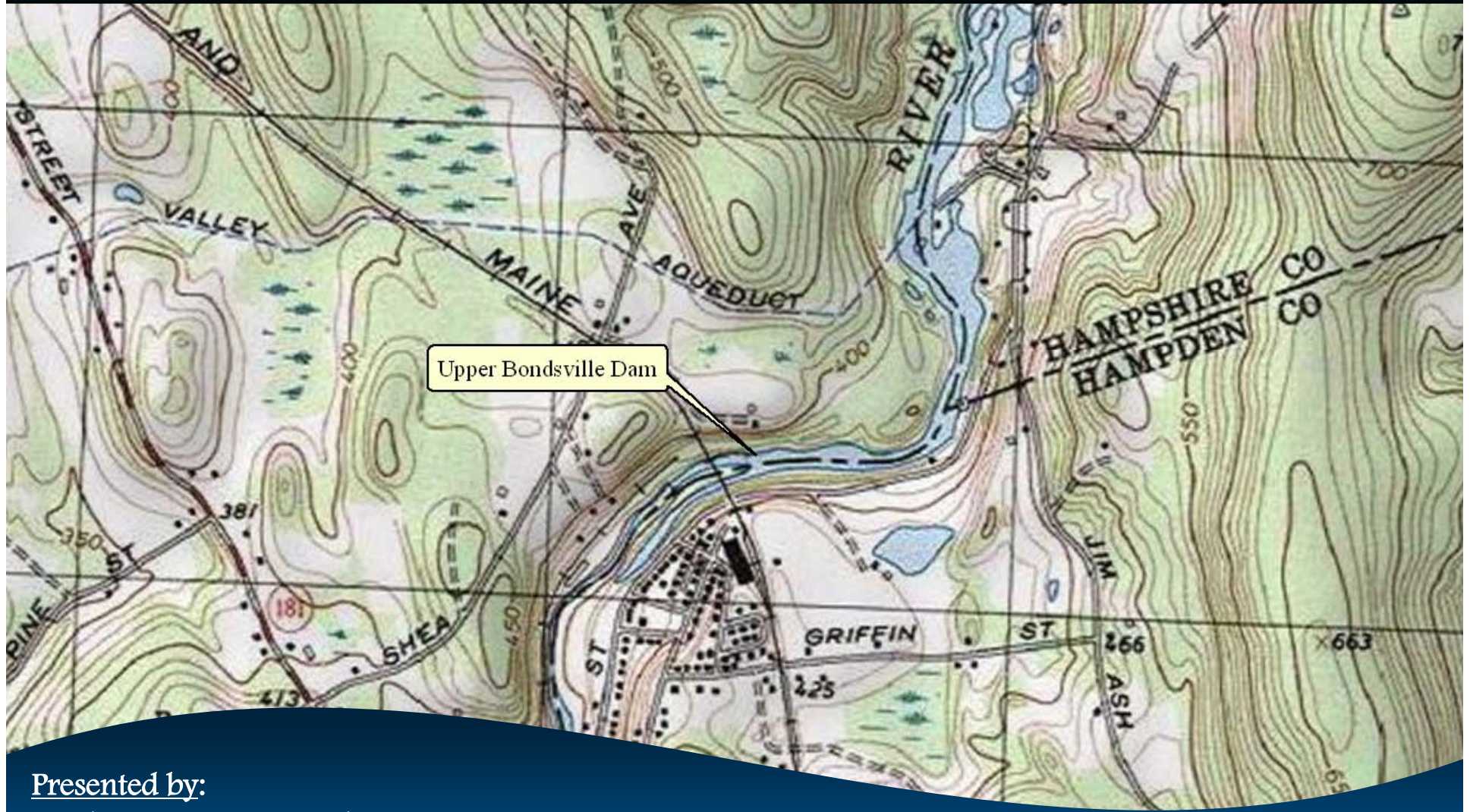


# PRESENTATION

## Assessment of the Upper Bondsville Dam, Swift River Belchertown, Massachusetts



Presented by:

Jeanine Armstrong Gouin, P.E. – Vice President

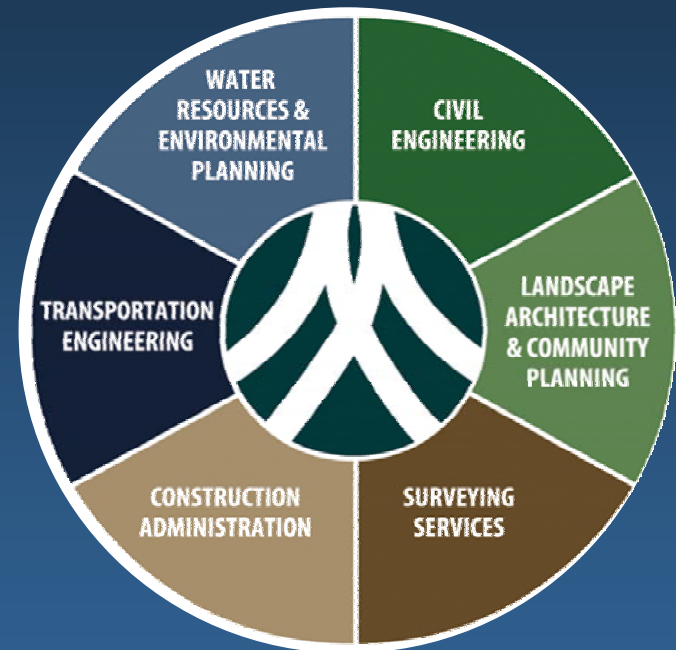
W. Andrew Greene, P.E. ~ Associate



MILONE & MACBROOM®  
September 30, 2010

# Milone & MacBroom, Inc. Background

- Multidisciplinary Engineering Consulting Firm
- Founded in 1984
- New England Offices:
  - Springfield, MA
  - Cheshire, CT
  - South Burlington, VT
  - Freeport, ME
- Expertise in Dam Design and Rehabilitation
- Expertise in Dam Removal Analysis and Design



# Scope of Work

- Review of Existing Data & Reports
- Delineate Upstream Extent of Impoundment
- Assess Feasibility and Cost of Dam Rehabilitation
- Assess Feasibility and Cost of Dam Removal
- Characterize Physical Quality of Sediment
- Present Results to Land Trust & Public



# Site Location



# Upper Bondsville Dam

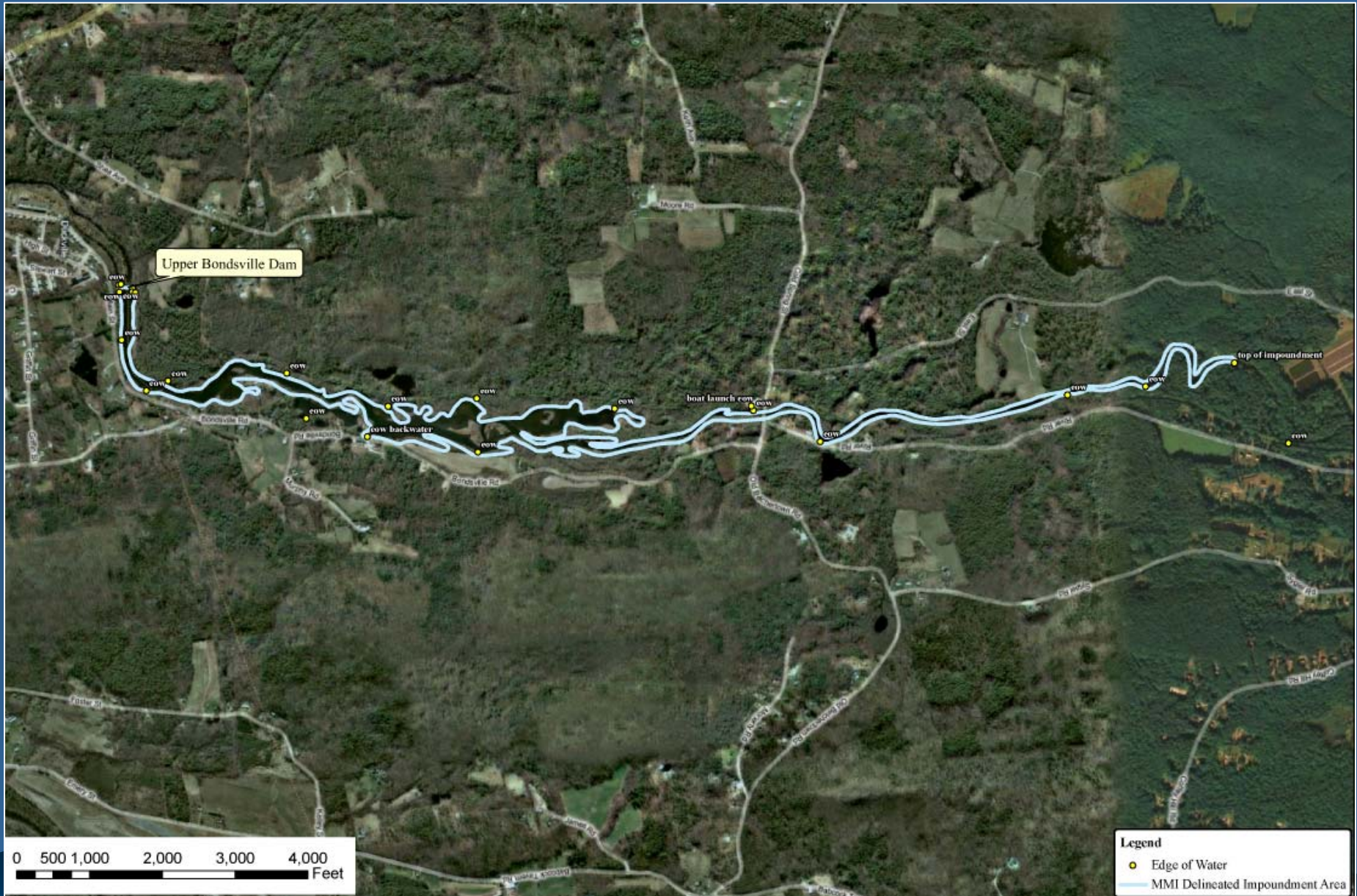
- Located – 5.5 Miles Downstream of Quabbin Reservoir
- Run-of-the-River Dam – No Flood Storage
- Originally Constructed to Serve Textile Manufacturing Operations
- Dam Constructed Circa. 1900
- Canal Remnant on River Left, ~ 1,000 Feet Long

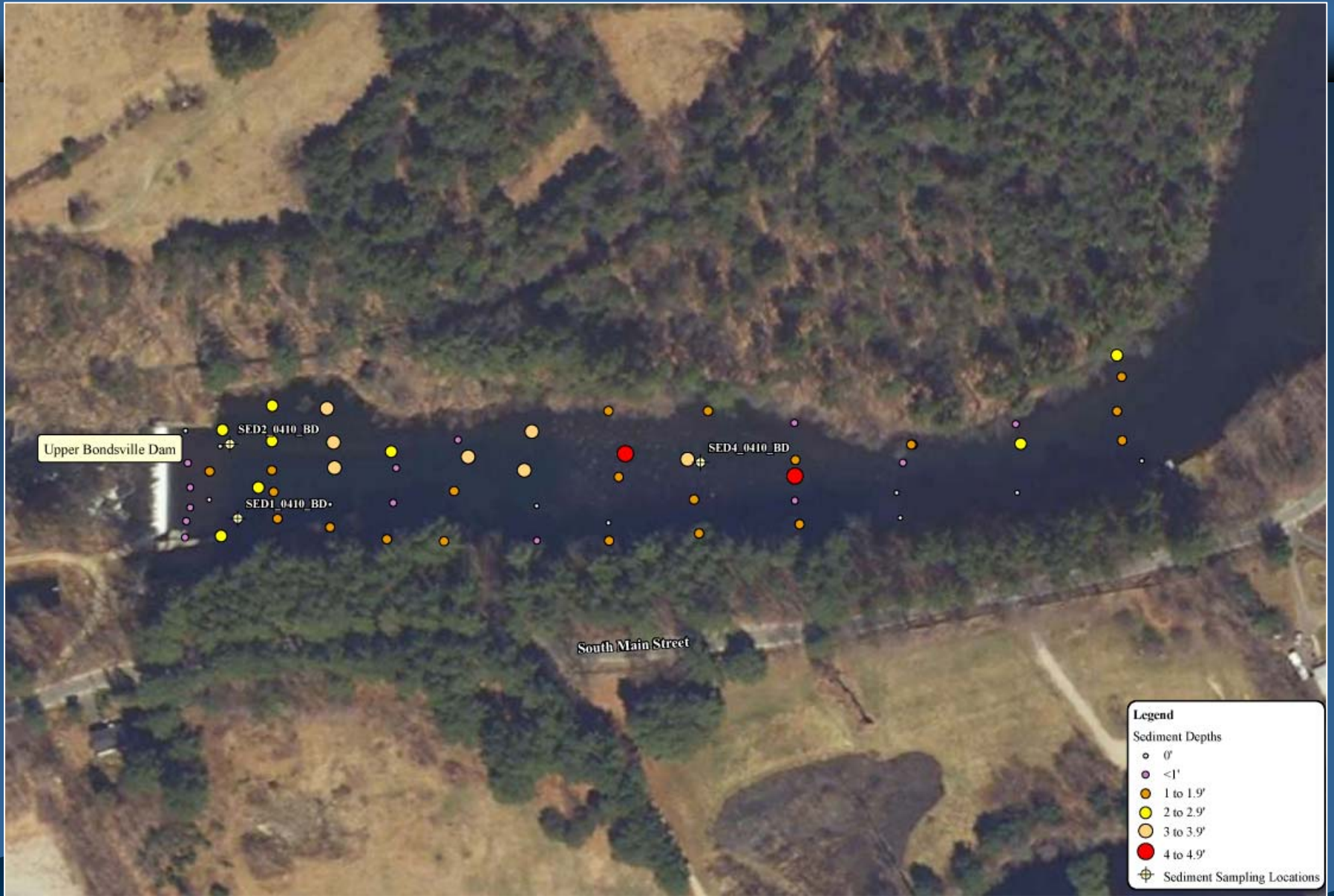


# Impoundment Delineation

- Previous Reports Identify Impoundment Extending 8,000 Upstream of Dam
- MMI Conducted Independent Investigation
- Observed Transition from Calm Pool to Faster Moving Riffles
- Global Positioning System Used to Map Impoundment Extent
- Lower vs. Upper Impoundment
- Hydraulic Modeling Would be Needed to Refine the Delineation







# Dam Repair Assessment

- Predominantly Stone Masonry Construction with Earthen Embankments
- Primary Spillway ~ 133 Feet Wide
- Canal Spillway ~ 51 Feet Wide
- Dam is a Significant Hazard (Class II) Dam
- Classified as a “Large” Dam Due to Volume of Impounded Water
- Reported Condition Varies, Actual Condition is Poor



# Identified Deficiencies

- Excessive Leakage
- Cracks and Settlement on Right Training Wall
- Erosion on Right Embankment
- Displaced Riprap Armorment
- Deteriorated and Leaking Headgates on the Canal
- Inoperable Low Level Outlets
- Insufficient Spillway Capacity



# Spillway Capacity

- Spillway Design Flood Design Storm
- Large – Significant Hazard Dam SDF = 500 Year
- Previous Reports SDF~Assume 5' of Water Over Spillway
- Change in Dam Geometry
- Spillway Capacity Limited to 2.5'
- Training Wall will Overtop Causing Possible Unraveling or Failure
- Dam Safety Recommends Freeboard Above SDF



# Spillway Capacity



# Anticipated Dam Repair Costs

- Engineering Costs ~ \$122,500
- Construction Costs ~ \$ 355,000
- Annualized Maintenance Costs ~ \$ 6,300

# Dam Removal Assessment

- Factors Affecting Removal
  - Size and Construction Material
  - Water Control
  - Quantity and Quality of Sediment
  - Adjacent Land Ownership
  - Site Access
  - Adjacent Land Uses
  - Extent and Use of Upstream Impoundment
  - Potential Utility Conflicts
  - Historical Resources
  - Potential Impacts on Nearby Water Supply Wells



# Anticipated Dam Removal Costs

- Engineering Costs ~ \$160,000
- Construction Costs ~ \$305,000
- Annualized Maintenance Costs ~ \$ 0

# Comparison of Alternatives

	Dam Repair	Dam Removal
Anticipated Engineering Costs	\$122,500	\$160,000
Anticipated Construction Costs	\$355,000	\$305,000
Anticipated Annual Maintenance Costs	\$ 6,300	\$ 0
Ongoing Liability	Yes	No
Public Safety Concerns	Yes	No
Flooding Impacts	No	Improved U/S Conditions
Improved Ecological Conditions	No	Yes
Impacts to Upstream Recreational Use	No	Likely Impacts

