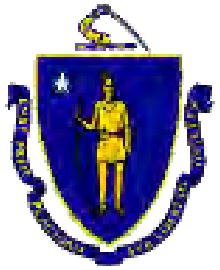


Commonwealth of Massachusetts

Governor

Maura Healey

Lieutenant Governor

Kim Driscoll

Energy and Environmental Secretary

Rebecca Tepper

Department of Conservation and Recreation Commissioner

Brian Arrigo

dcr MASSACHUSETTS DEPARTMENT OF CONSERVATION AND RECREATION

- To protect, promote and enhance our common wealth of natural, cultural and recreational resources for the well-being of all.

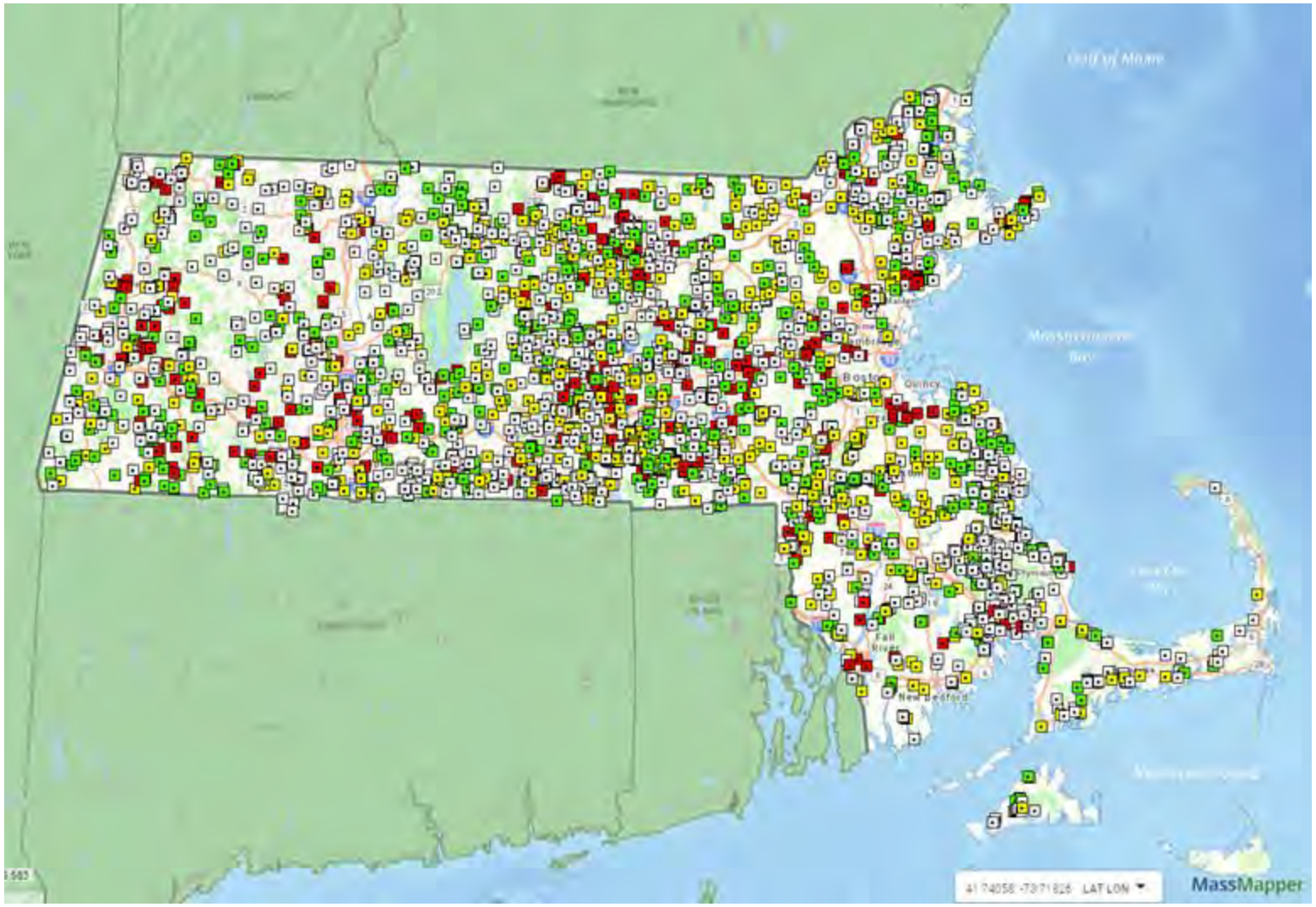
Meeting Agenda

1. Introduction to Dams
2. Overview of Watertown Dam
3. Project Background & Purpose
4. Why Remove the Dam?
5. Questions and Comments

dcr
Massachusetts

Introduction to Dams

dcr Massachusetts



- 3,000+ dams in Massachusetts
- More than 300 owned by the Commonwealth
- Dams have benefits but also environmental impacts
- Many dams are legacy structures and do not serve their original purpose

Dams (by Hazard Code)

- High Hazard
- Significant Hazard
- Low Hazard
- N/A

Known for excellence. Built on trust.

Watertown Dam Removal Alternatives Analysis Study
First Community Meeting

dcr Massachusetts

Tuesday, July 9th, 2024

Massachusetts Department of Conservation and Recreation (DCR)

Introduction to Dams

dcr Massachusetts

- 3,000+ dams in Massachusetts
- More than 300 owned by the Commonwealth
- Dams have benefits but also environmental impacts
- Many dams are legacy structures and do not serve their original purpose

SIZE CLASSIFICATION TABLE

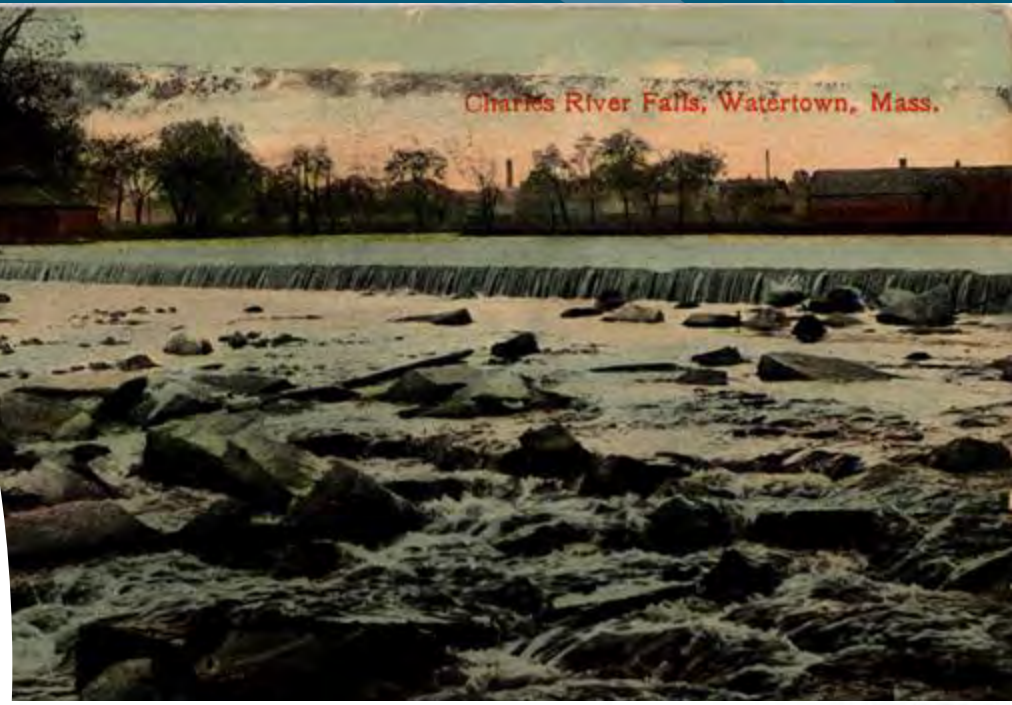
Category	Storage (acre-feet)	Height (feet)
Non-jurisdictional*	Not in excess of 15 regardless of height	Not in excess of six regardless of storage capacity
Small	≥15 and <50	≥ 6 and <15
Intermediate	≥ 50 and <1000	≥ 15 and <40
Large	≥ 1000	≥ 40

HAZARD POTENTIAL CLASSIFICATION TABLE

High Hazard Potential (Class I)	Dams located where failure will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).
Significant Hazard Potential (Class II)	Dams located where failure may cause loss of life and damage to home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.
Low Hazard Potential (Class III)	Dams located where failure may cause minimal property damage to others. Loss of life is not expected.

History of Watertown Dam

- Pre-1600s - Location on the Charles River included a fish weir by indigenous peoples
- 1634 - Stone dam constructed and used to directly power grist & paper mills
- Early 1900s – Active use of dam for hydropower generation comes to an end.
- 1966 - Dam rebuilt with current concrete spillway
- 1972 - Fish ladder constructed by MDC
- Dam currently Owned and Operated by the Massachusetts Department of Conservation and Recreation.



dcr Massachusetts

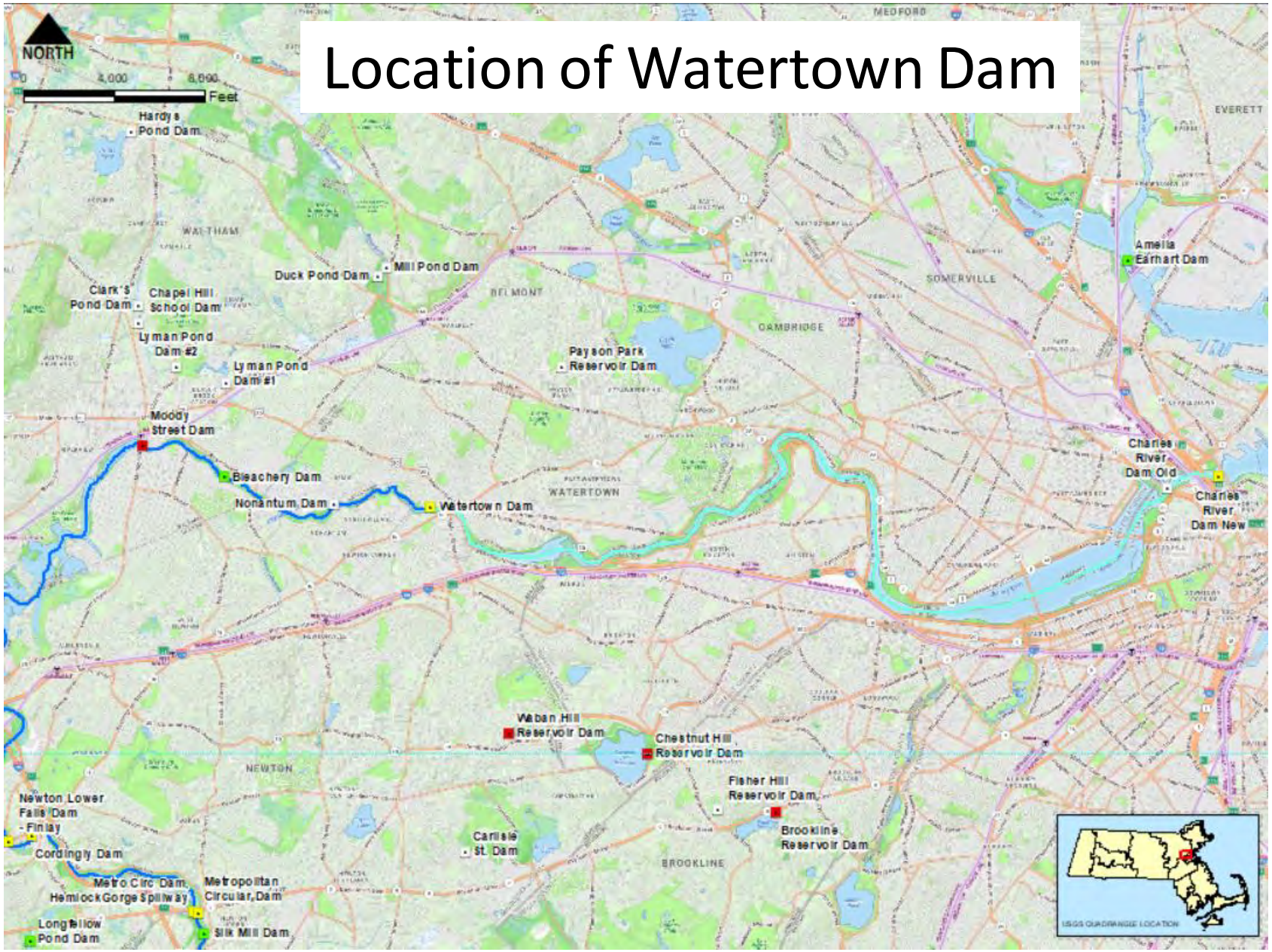
Images of Watertown Dam from Digital Commonwealth 1913 Above, 1866 Below

Overview of Watertown Dam

- Current Configuration:
  - Spillway (180 feet)
  - North (Left) Earth Embankment
  - South (Right) Earth Embankment Dike
  - Fish Ladder
- Current Purpose:
  - Aesthetic
  - Recreation
  - Flood Control?

dcr Massachusetts

Location of Watertown Dam



LEGEND

Dam Hazard Potential

- High Hazard
- Significant Hazard
- Low Hazard
- N/A
- Charles River
- Charles River Basin

dcr Massachusetts

Condition of Watertown Dam

- Classification:
  - Size – Intermediate
  - Hazard **Potential** - Significant

"Dams located where failure may cause loss of life and damage to home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities."

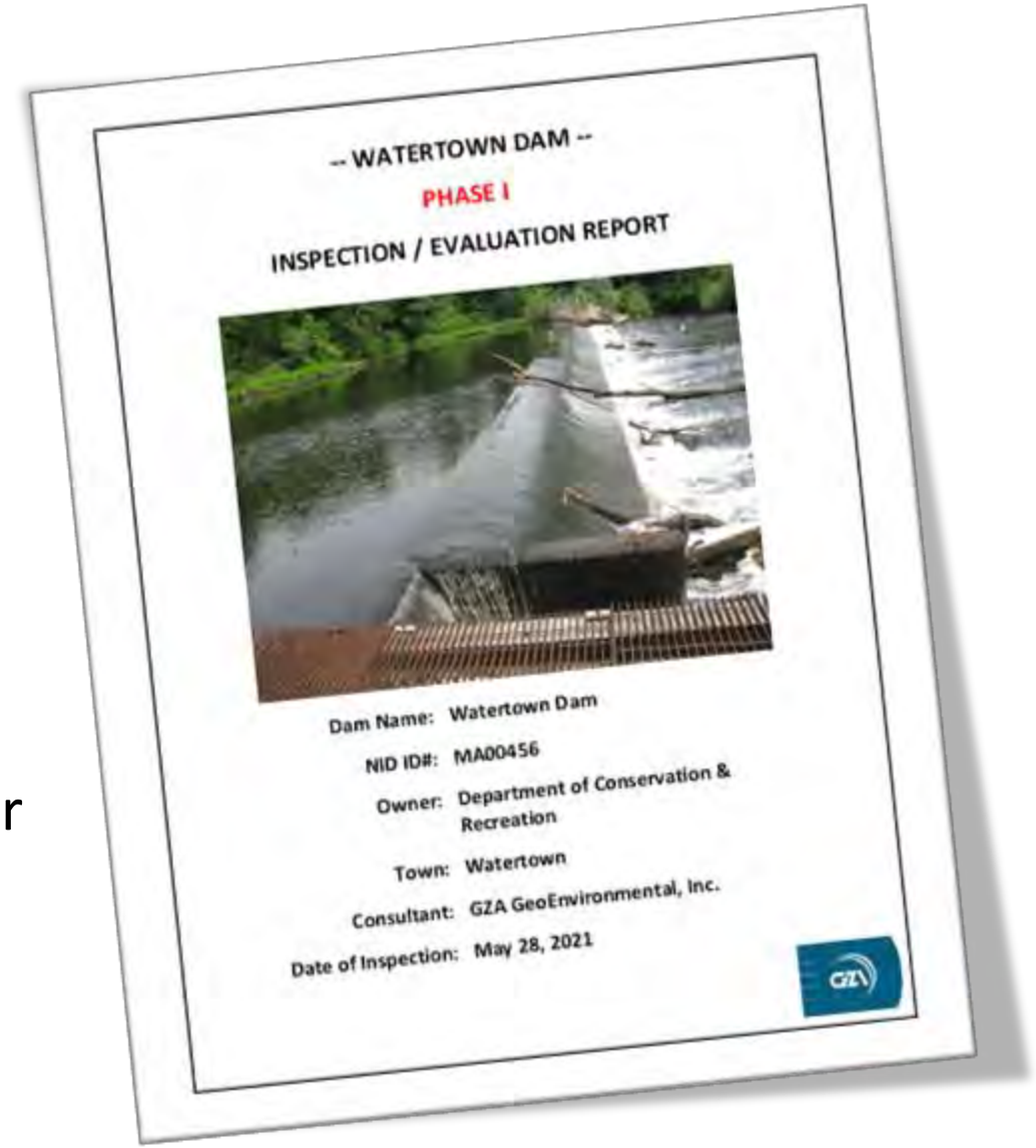
  - Condition – **FAIR**

"Significant operational and maintenance deficiencies, no structural deficiencies. Potential deficiencies exist under unusual loading conditions that may realistically occur. Can be used when uncertainties exist as to critical parameters."

dcr Massachusetts

Condition of Watertown Dam

- Current Dam Safety Deficiencies:
  - Mature trees on the right embankment
  - Inadequate slope protection on left embankment
  - No formal Operations and Maintenance Manual
  - Lack of refined hydrology and hydraulic study
  - Lack of slope stability analysis
- Fish passage concerns: Effectiveness of fish ladder is questionable



dcr Massachusetts

Alternatives Analyses Project Purpose & Scope

Purpose:

Develop conceptual design alternatives to breach, lower and/or remove the dam

Scope of Services:

- Field Survey and Underwater Inspection
- Sediment Contamination Assessment
- Hydrologic and Hydraulic Analysis
- Dam Stability Analysis
- Groundwater Analysis
- Preliminary Designs & Renderings

dcr Massachusetts

Recent Milestones

- 2016 Inspection Report deemed dam “poor” due to presence of trees on left embankment. Dam now rated a “fair” condition after removal of trees.
- Massachusetts Division of Ecological Restoration (DER) funded dam removal feasibility study in 2018-2021 in partnership with Charles River Watershed Association.
- Draft Feasibility Study released in June 2021
- Funding provided to DCR in FY24 which allowed for Watertown Dam Removal Alternatives Analysis Study
- Current project awarded to GZA GeoEnvironmental, Inc. in April 2024, with anticipated completion in fall 2024

Massachusetts Department of Fish and Game
Division of Ecological Restoration
Invested in Nature and Community

Charles River Watershed Association

dcr Massachusetts

Dam Removal Considerations & Items Assessed In This Study

1. Sediment Exposure Issues
2. Sediment Removal (Cost)
3. Sediment Accumulation Downstream
4. Impact to Flood Control
5. Changes to Scenery / Aesthetic
6. Functionality of Existing Dam

Field Survey and Underwater Inspection (1,2,3,6)

Sediment Contamination Assessment (1,2)

Hydrologic and Hydraulic Analysis (1,3,4,6)

Preliminary Designs & Renderings (5)

dcr Massachusetts

Dam Removal Considerations – General

Dam Benefits

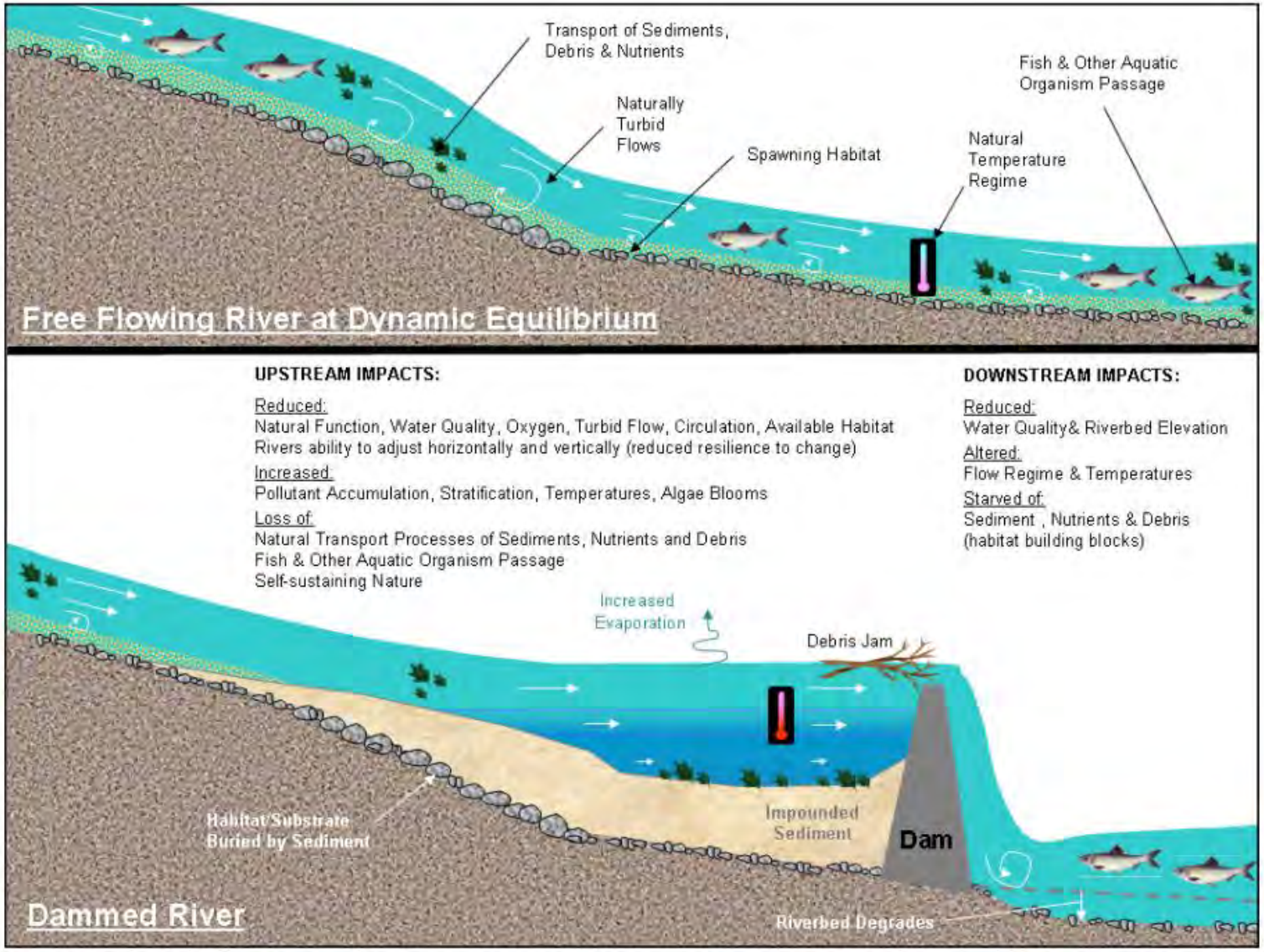
- Recreational Uses
- Aesthetic Enhancement
- Flood Control Benefits
- Power Generation Potential
  Drinking/Irrigation Water Storage
- River Navigability / Shipping

Dam Drawbacks

- Fish Passage Barrier
- Habitat Alteration
- Water Quality Impacts
- Interruption of Sediment Movement
- Risk of Failure
- Elevated upstream flooding
- Boating Barrier
- Recreational Hazard
- Maintenance Costs
- Disruption of Natural Flows

dcr Massachusetts

Why Remove the Dam? – Habitat Restoration



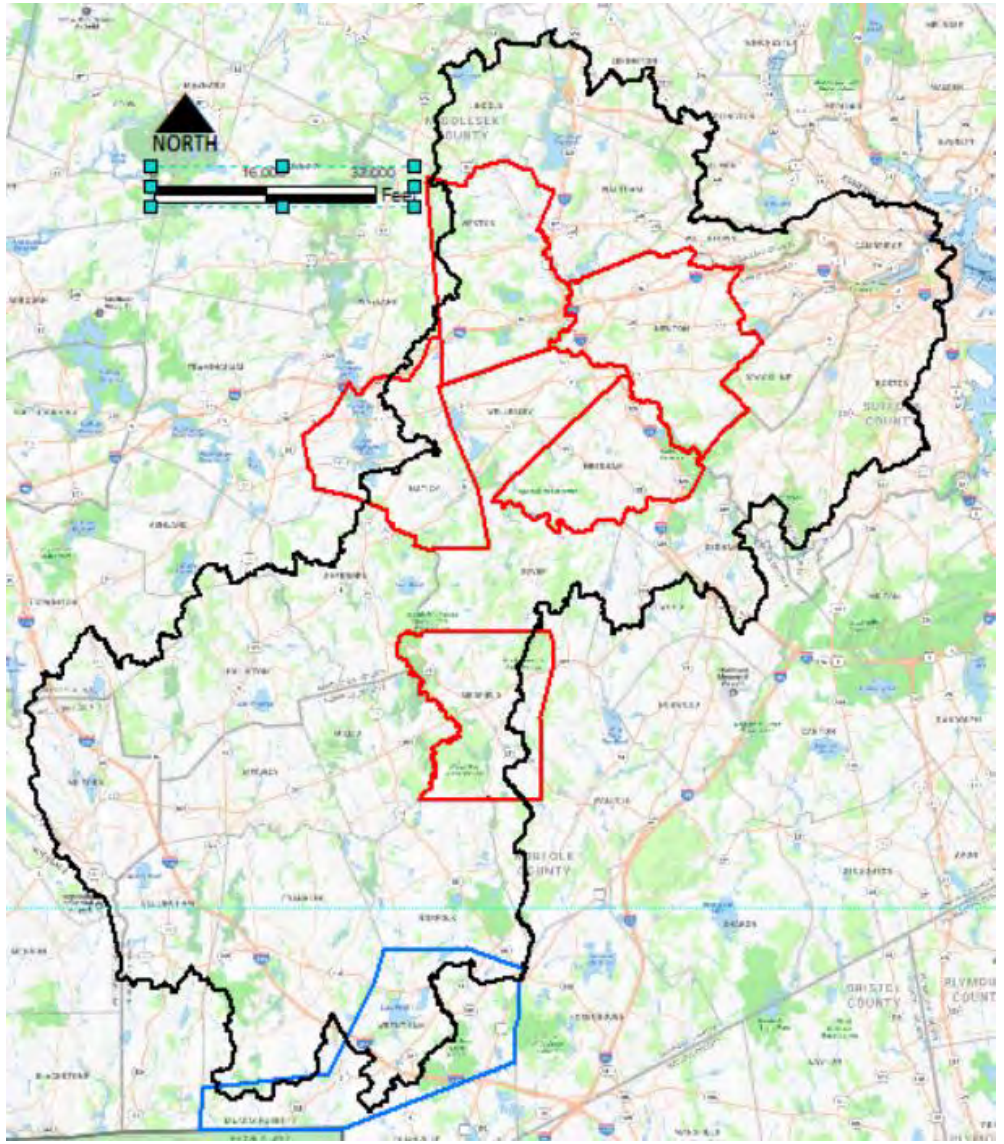
Restoration of original thread of the river and adjoining bordering vegetated wetlands and associated habitats.

(Vermont Agency of Natural Resources & American Rivers, 2009)

Why Remove the Dam? - Fisheries

- Historical records:
  - Show Atlantic Salmon migrating all the way to Eagle Brook in Wrentham, MA
  - 1738 Medfield, Natick, Needham, Newton, Sherburne, and Weston all complained to the General Court that Watertown was obstructing the passage of fish upstream

Atlantic Salmon
Image: NOAA

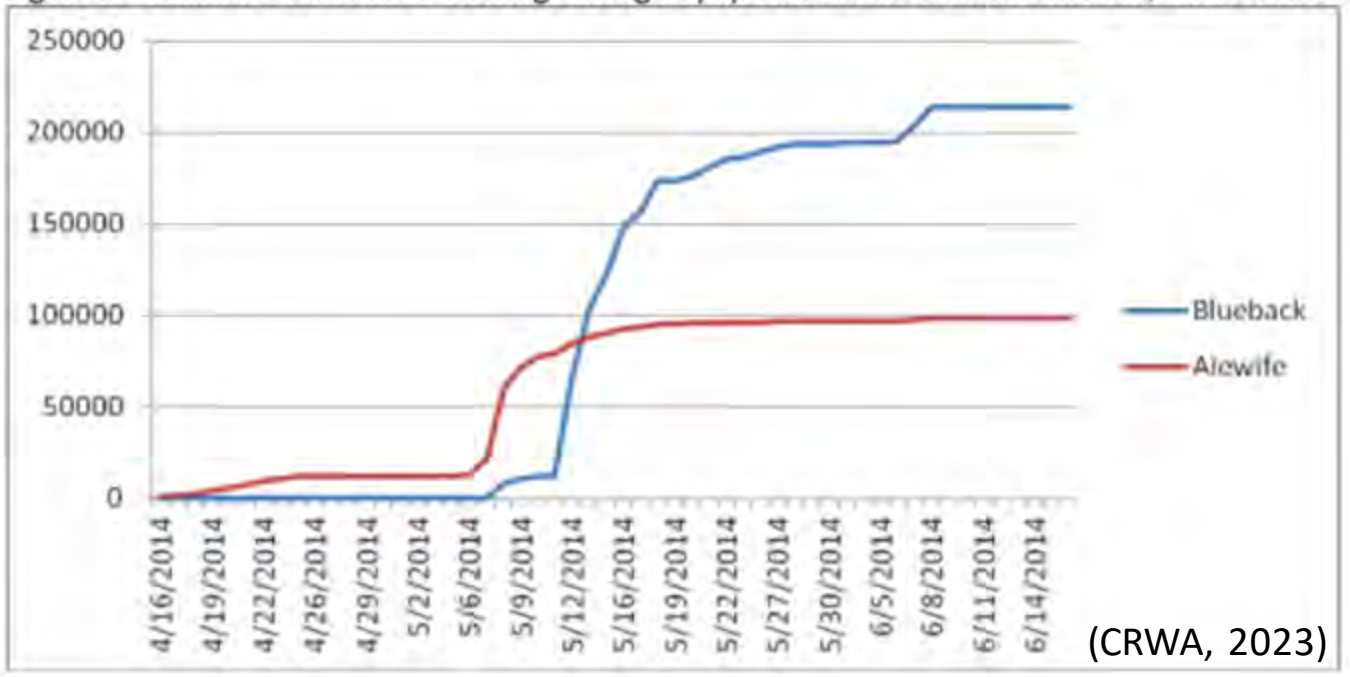


dcr Massachusetts

Why Remove the Dam? - Fisheries

- Target Species:
  - Rainbow Smelt
  - American Eel
  - American Shad
  - Alewife and Blueback Herring
- About 300,000 river herring attempt to migrate upriver annually (Division of Marine Fisheries, 2013/2014)

Figure 3. Estimated 2014 River Herring Passage by species at the Watertown Dam, Charles River.



(CRWA, 2023)

American Shad

Alewife

Blueback Herring

Rainbow Smelt

American Eel

dcr Massachusetts

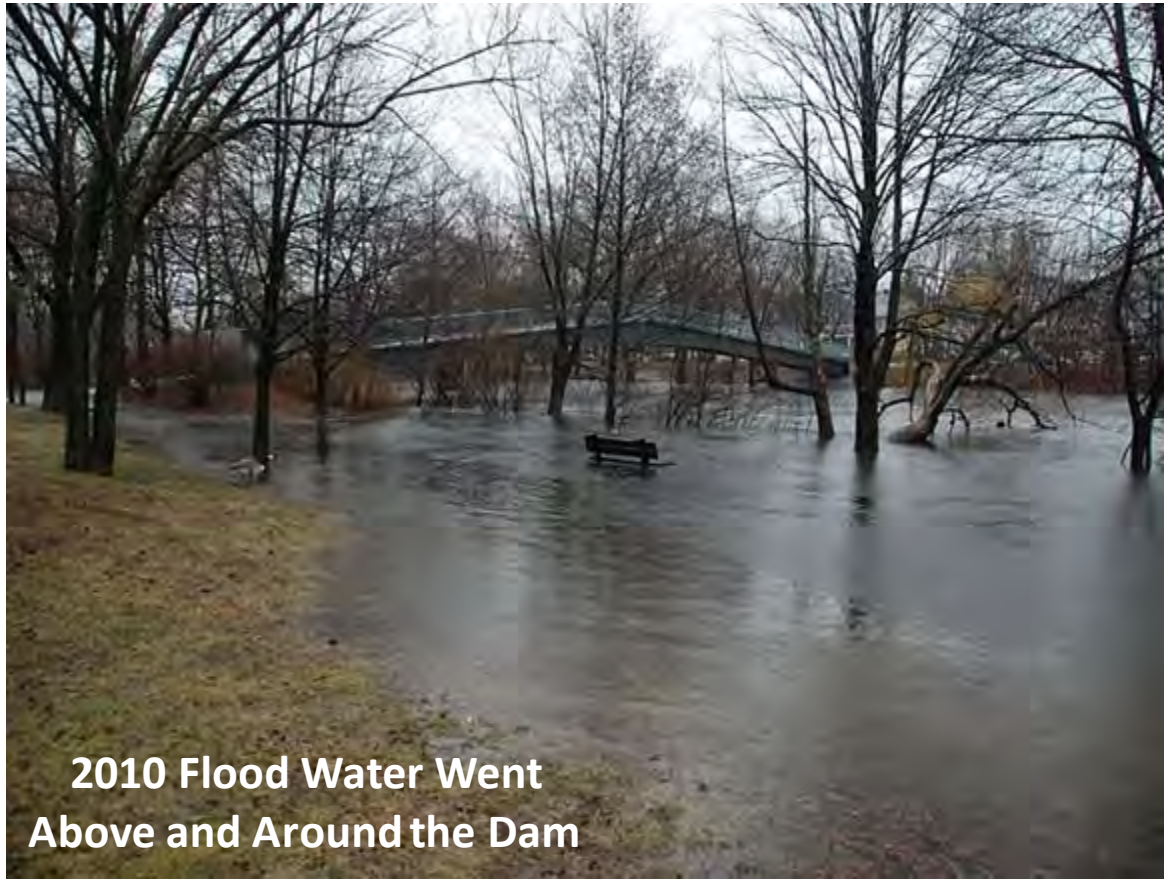
GZA

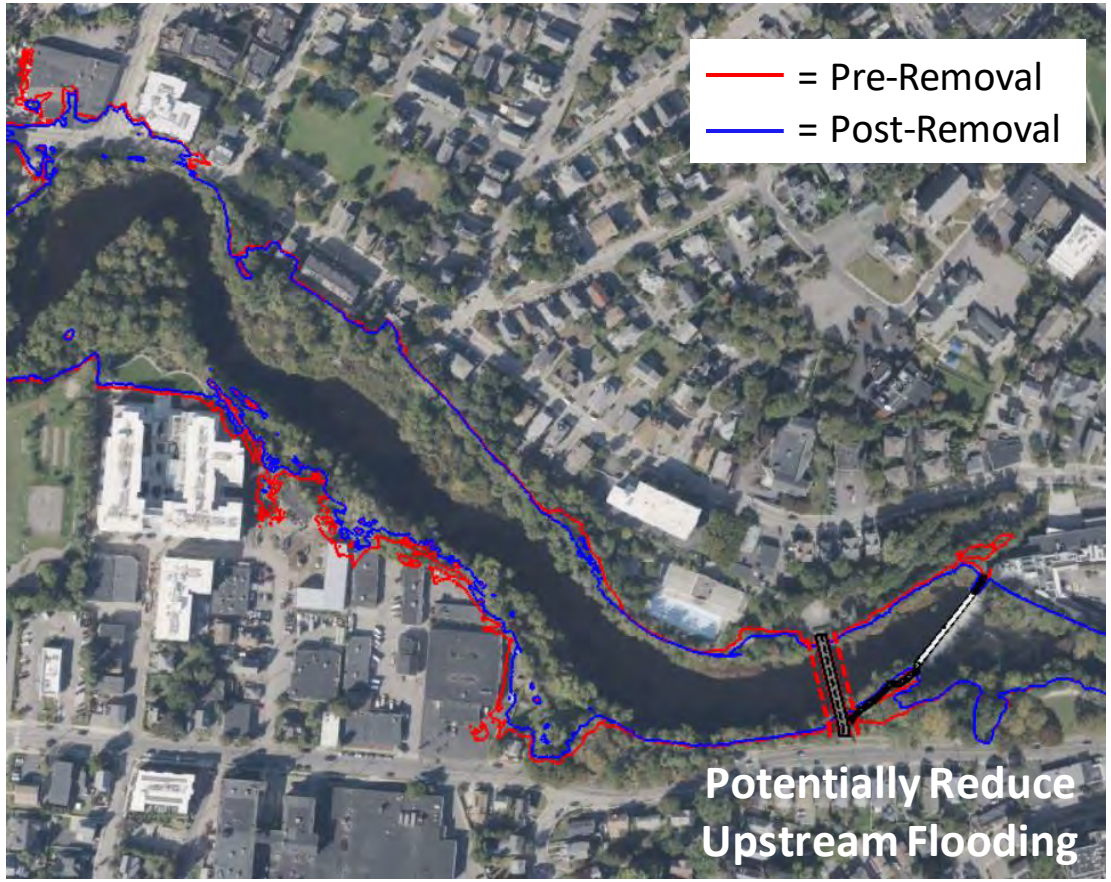
Known for excellence. Built on trust.

Why Remove the Dam? - Recreational Safety

dcr Massachusetts

Why Remove the Dam? - Upstream Flooding





dcr
Massachusetts

Why Remove the Dam? - Significance to Indigenous Peoples

- Native Americans from the Massachusetts Nation had fish weirs at the site of the dam which is the so-called “head of tide” or just upstream of the high tide mark.
- Indigenous People in Natick petitioned state legislature to stop construction of dam in 1735

June 18, 2019
By Carla Cevasco
in Food and Hunger Roundtables, Vast Early America
Tags: environmental history, fish, food history, land, Native Americans, Technology
9 Comments

Damming Fish and Indians: Starvation and Dispossession in Colonial Massachusetts

Today's post in the Roundtable on Food and Hunger in Vast Early America is by Zachary M. Bennett, who is Visiting Assistant Professor of History at Connecticut College this autumn. He is a Ph.D. candidate at Rutgers University-New Brunswick. His dissertation, "Flowing Power: Rivers, Energy, and the Making of New England," examines the political ecology of waterpower before the industrial revolution.

Compared to other Native Americans in southern New England, the Ninnimissinuok community of Natick, Massachusetts seemed to have secure footing going into the eighteenth century. Located only fifteen miles outside of Boston on the Charles River, Natick was the largest community of Native American converts to Christianity —or "Praying Indians"—in mainland New England with a population exceeding two hundred persons. These Praying Indians owned their land in corporation to safeguard their enclave against land hungry colonists. To passersby, Natick residents farmed like their English neighbors, dressed like them, and even worshipped like them too. Yet, in contrast to their English neighbors, this community steadily declined over the course of the eighteenth century.In 1753, Natick's Praying Indians had dropped to "twenty-five families, besides a few individuals." Eleven years later in 1764 there were only "eight or ten families." By the 1790s there were only twenty-some "clear blooded" Indians in Natick.[1]

Anglo observers were mistaken in thinking that Natick's Indians disappeared. Many moved, intermarried with African Americans, or became itinerants that were harder to track down.

dcr Massachusetts

Dam Removal Considerations – Specific to Watertown Dam

Dam Benefits

- Recreational Uses - Upper Charles River Reservation Greenway
- Aesthetic Enhancement
- ~~Flood Control Benefits~~ (Likely Minimal)
- ~~Power Generation Potential~~ (minimal and not cost effective)
- ~~Drinking/Irrigation Water Storage~~ (None)
- ~~River Navigability / Shipping~~ (None)

Dam Drawbacks

- Fish Passage Barrier
- Habitat Alteration
- Water Quality Impacts
- Interruption of Sediment Movement
- Risk of Failure
- Elevated upstream flooding
- Boating Barrier
- Recreational Hazard
- Maintenance Cost
- ~~Disruption of Natural Flows~~ (minimal: run-of-the-river)

dcr Massachusetts

Dam Removal Process (Typical)

- Timing typically targets low-flow season outside of periods critical to fisheries
- Site secured and sediment and erosion controls installed
- Water control established to divert water around initial work area.
- First portion of dam mechanically removed.
- Sediment repositioned to create pilot channel
- Water diverted to new channel
- Remaining portion of dam removed.
- Balance of site stabilized and restored, including seeding and plantings.
- Post-construction monitoring

dcr Massachusetts

Dam Removal Renderings – Northern Platform View

dcr Massachusetts

Dam Removal Renderings – Footbridge View

dcr Massachusetts

MASSACHUSETTS DEPARTMENT OF CONSERVATION AND RECREATION

Questions?

DCR Public Outreach

- Tonight's slide deck will be available at:
  - www.mass.gov/dcr/past-public-meetings
- If you have comments on this project:
  - Submit online: www.mass.gov/dcr/public-comment
  - Deadline: Tuesday, July 23rd, 2024

    Please note: the contents of comments submitted to DCR, including your name, town and zip code, will be posted on DCR's website. Additional contact information provided, notably email address, will only be used for outreach on future updates to the subject project or property.
- If you wish to subscribe to a DCR general information or project-related listserv: contact DCR's Office of Community Relations via email at mass.parks@mass.gov or call 617-626-4973.