

# Fundamentals of Dam Removal

*A webinar supported by the MA Division of Ecological Restoration*



Welcome to our program. We will begin at 12pm.

Attendees today will be in “Listen and View Only” mode, so your audio is muted and your video is turned off.

Questions may be submitted through the Q&A panel at any time, and will be answered after the presentations.

Thank you!

# Welcome

Today's Presentations Will Cover:

- Benefits of Dam Removal with Susie Bresney
- Permitting with Kristopher Houle
- Funding with William Hinkley
- Public Outreach with Neil Shea

# Benefits of Dam Removal

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12/05/2023

NASHUA RIVER WATERSHED ASSOCIATION  
DAM REMOVAL WEBINAR

Susie Bresney, Dam Removal Project Manager, [Susie.Bresney@mass.gov](mailto:Susie.Bresney@mass.gov)



*Massachusetts Department of Fish and Game*

**Division of  
Ecological  
Restoration**

*Invested in Nature and Community*

# Ecological Benefits of Dam removal



# Healthy stream system: free flowing

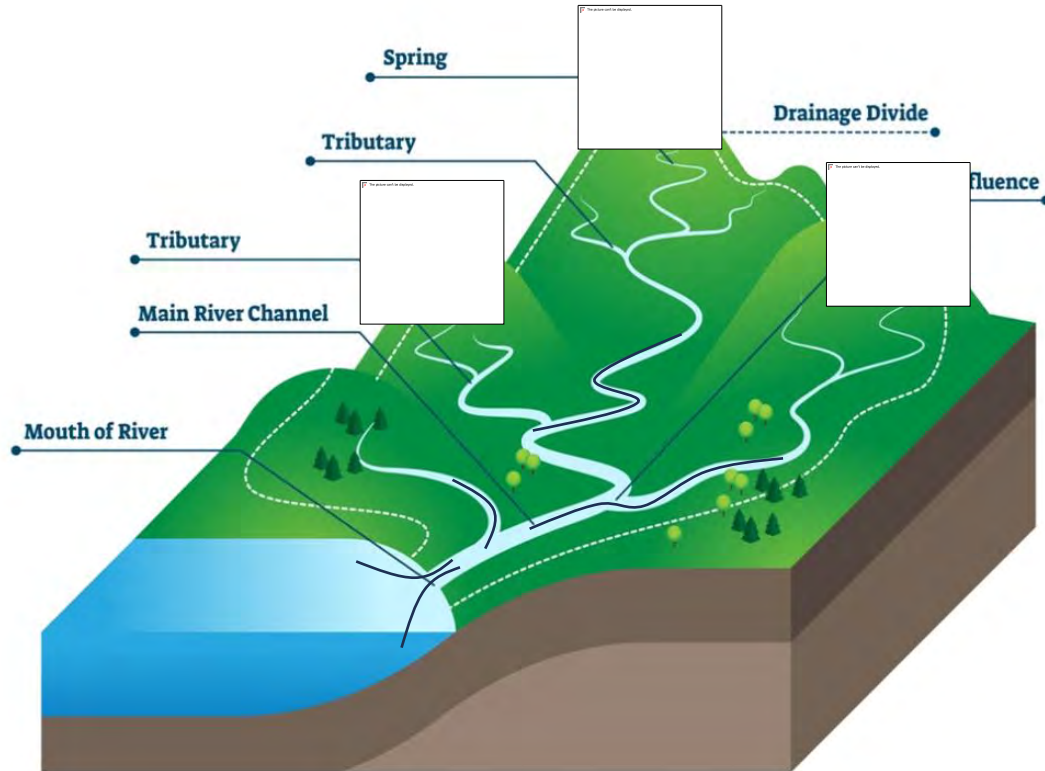


Image credit: Hydrology Studio

# Healthy stream system: lower temps, high DO



Image credit: Hydrology Studio

# Healthy stream system: sediment transport



Image credit: Hydrology Studio

# Healthy stream system: nutrient transport



Image credit: Hydrology Studio

# Healthy stream system: wetlands and floodplains



Image credit: Hydrology Studio

# Healthy stream system: fish passage upstream



Image credit: Hydrology Studio

# Healthy stream system: fish passage downstream

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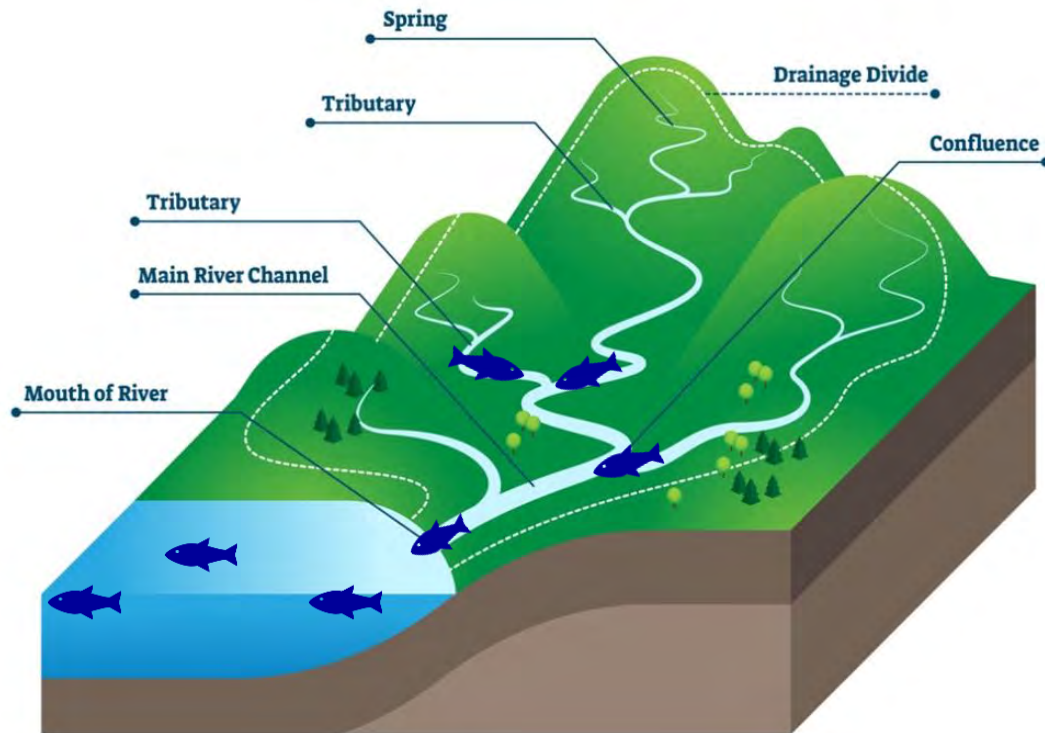


Image credit: Hydrology Studio

# Dammed stream system:

~~free flowing~~

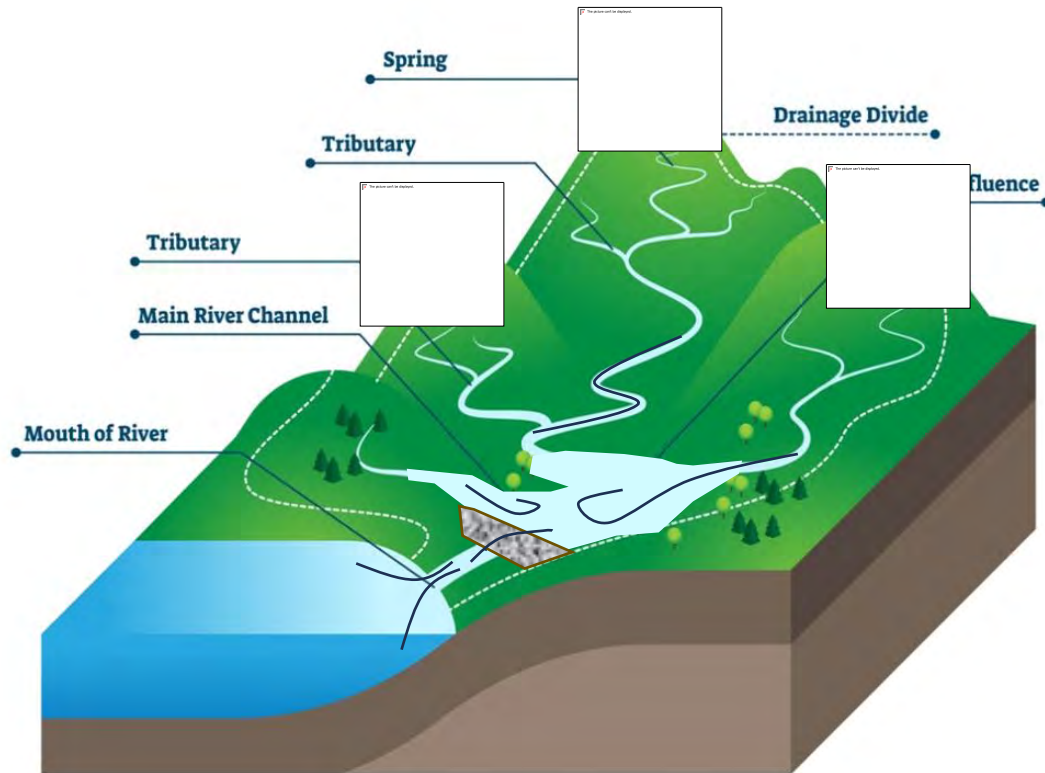


Image credit: Hydrology Studio

# Dammed stream system: higher temps, low DO

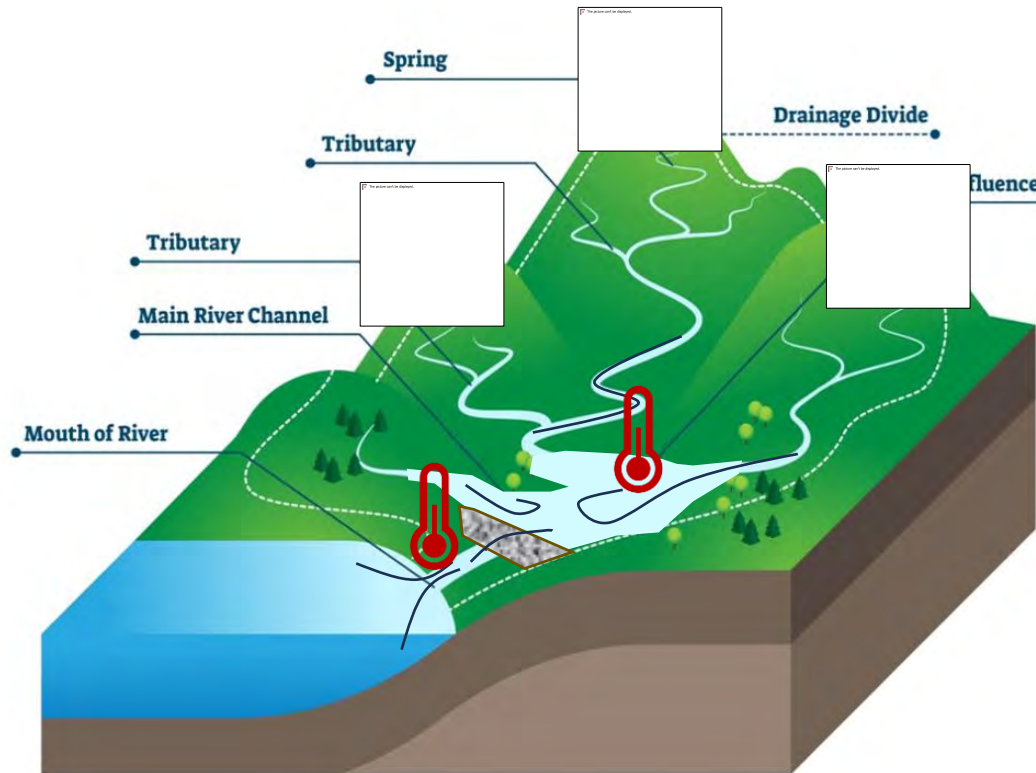


Image credit: Hydrology Studio

# Dammed stream system: ~~sediment transport~~

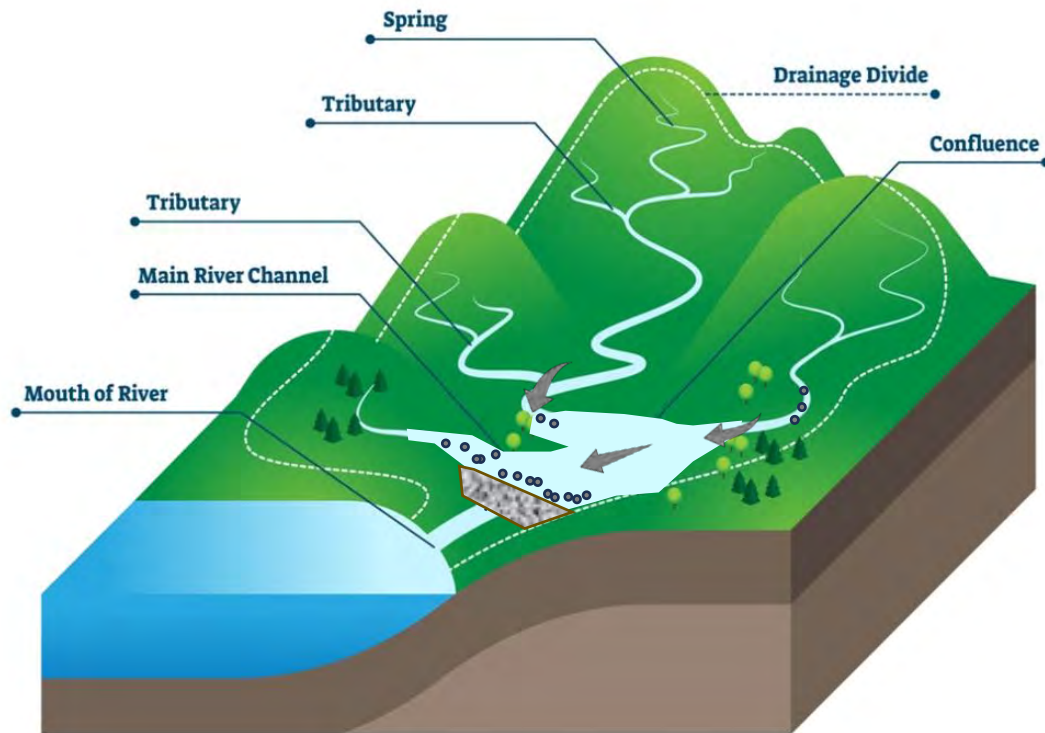


Image credit: Hydrology Studio

# Dammed stream system: ~~nutrient transport~~

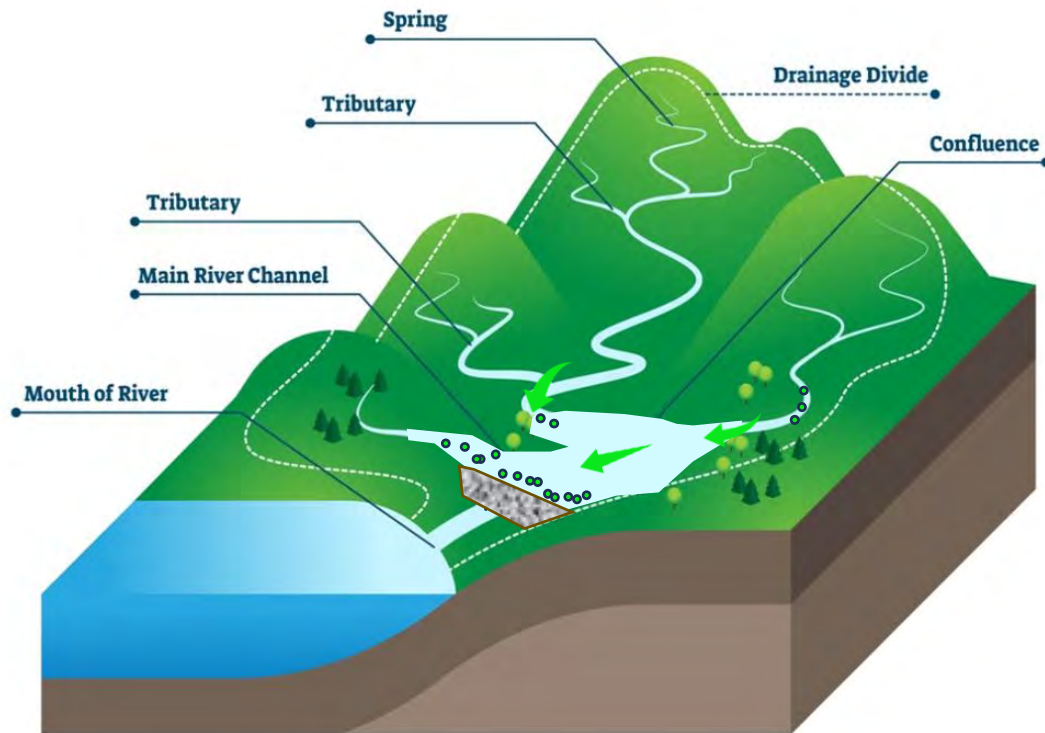


Image credit: Hydrology Studio

# Dammed stream system: ~~wetlands and floodplains~~

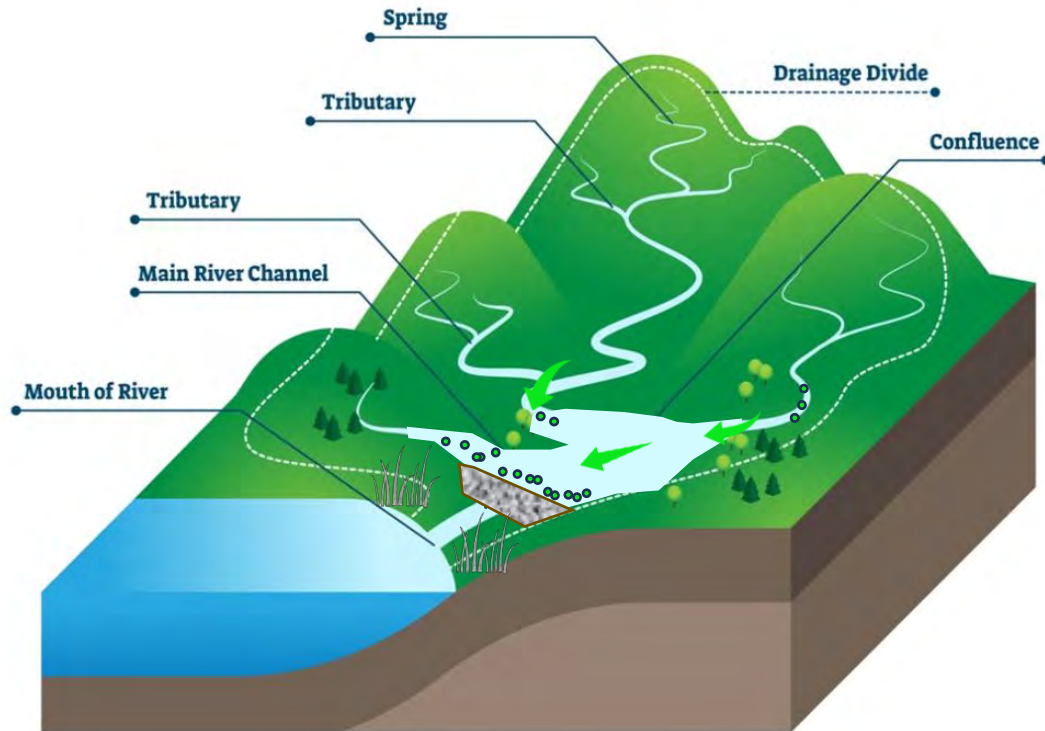


Image credit: Hydrology Studio

# Dammed stream system: ~~fish passage~~ ~~upstream~~

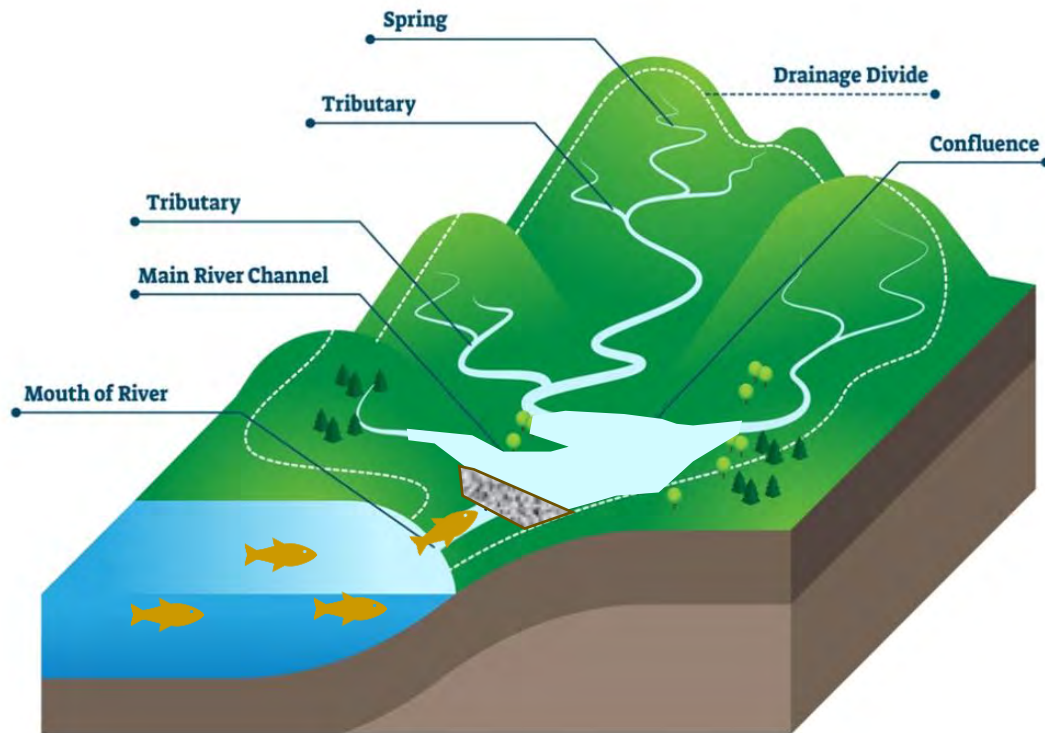


Image credit: Hydrology Studio

# Dammed stream system: ~~fish passage~~ ~~downstream~~



Image credit: Hydrology Studio

# Dammed stream system

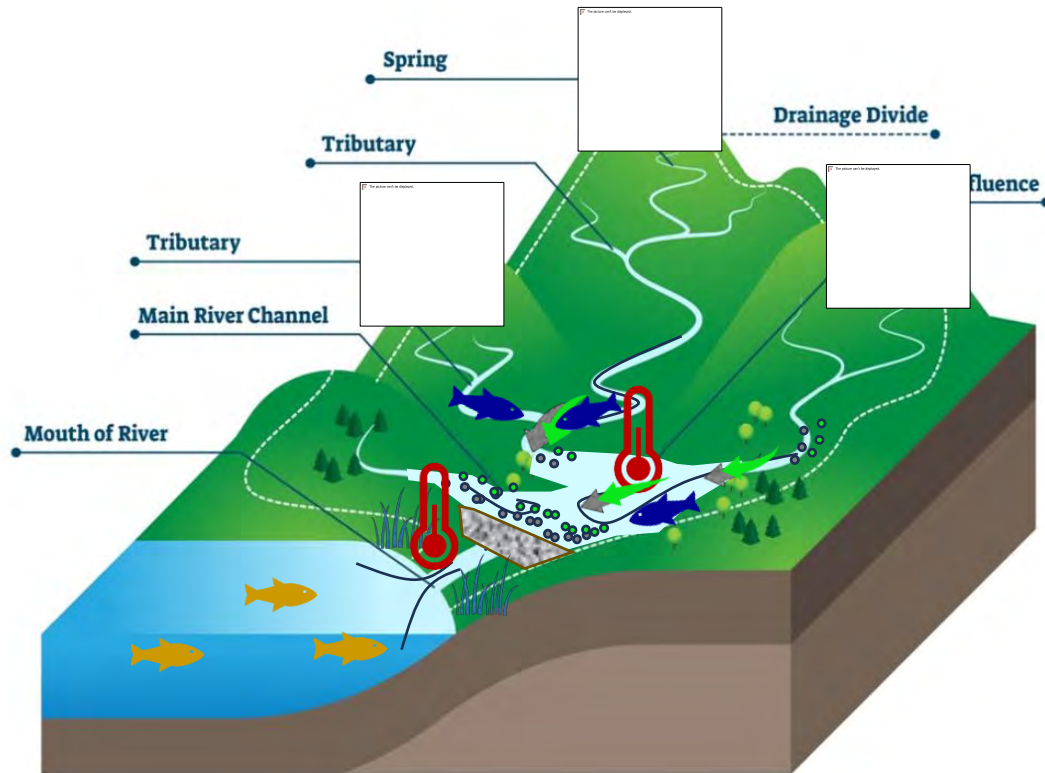


Image credit: Hydrology Studio

# Ecological Benefits of Dam Removal



RESTORES NATURAL  
THERMO-  
REGULATION



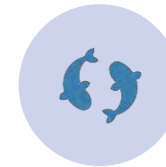
IMPROVES WATER  
QUALITY AND  
DISSOLVED OXYGEN



RESTORES NATURAL  
SEDIMENT AND  
NUTRIENT  
TRANSPORT REGIME



RESTORES HEALTHY  
FLOODPLAINS AND  
WETLANDS



INCREASES HABITAT  
CONNECTIVITY

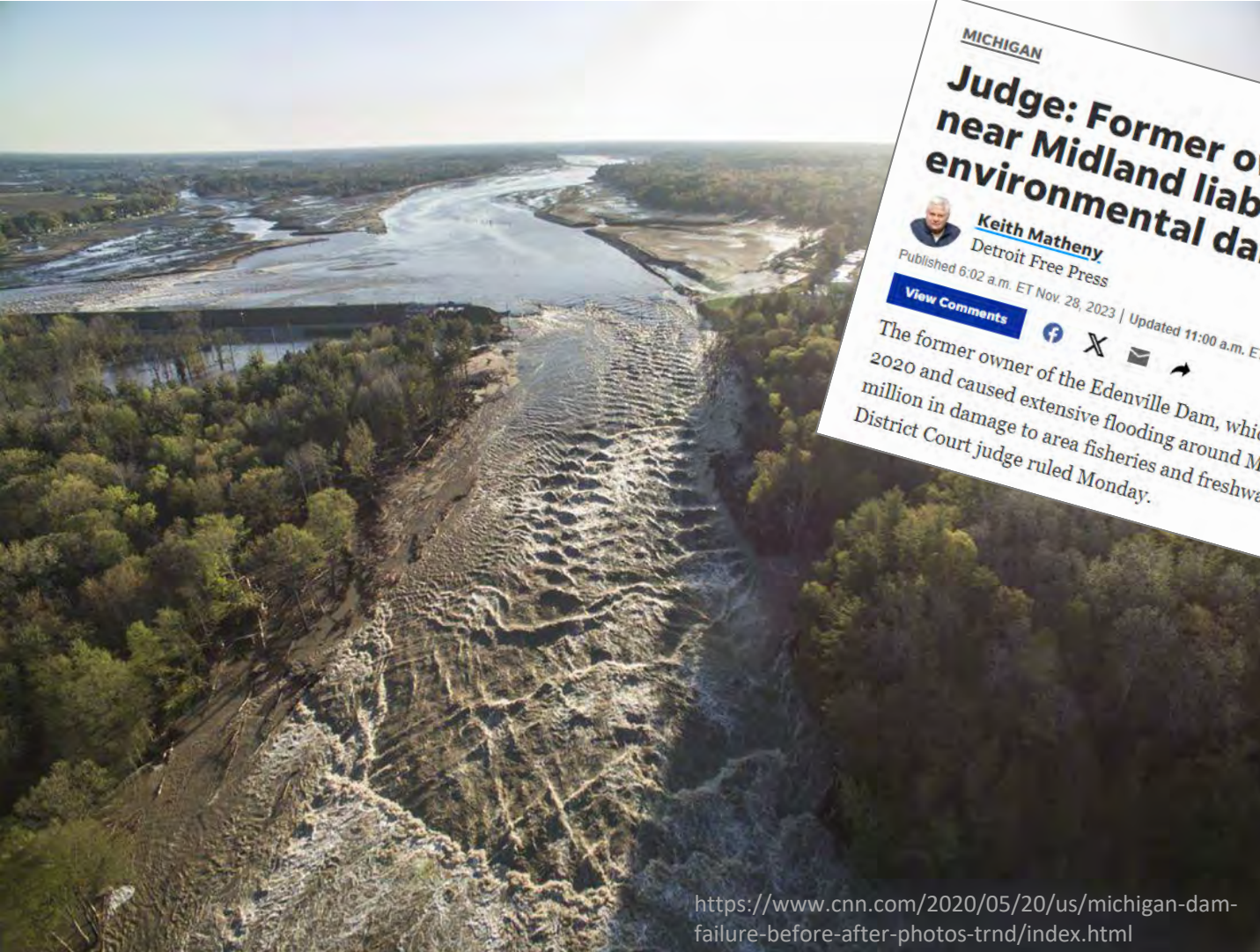


INCREASES BENTHIC  
AND OTHER  
BIODIVERSITY IN THE  
STREAM

# Financial and Public Safety Benefits of Dam Removal







MICHIGAN

## Judge: Former owner of failed dams near Midland liable for \$119M in environmental damage



**Keith Matheny**

Detroit Free Press

Published 6:02 a.m. ET Nov. 28, 2023

Updated 11:00 a.m. ET Nov. 28, 2023

[View Comments](#)



The former owner of the Edenville Dam, which failed in record rainfall in May 2020 and caused extensive flooding around Midland, is liable for nearly \$120 million in damage to area fisheries and freshwater mussel populations, a U.S. District Court judge ruled Monday.

<https://www.cnn.com/2020/05/20/us/michigan-dam-failure-before-after-photos-trnd/index.html>

# Dam break in Hinsdale drains pond and damages property on George Schnopp Road

By Tony Dotzowski, The Berkshire Eagle Oct 15, 2022 2 min to read

UPDATE: [Answers sought after the weekend failure of an earthen dam on private land in Hinsdale](#)

HINSDALE — When Bill and Denise Hill went to bed early Saturday morning, their dock was attached, their property was uncluttered and their shed was on their lawn.

When they woke up a few hours later, their dock was dislodged, their property was strewn with rocks, tree limbs and dirt, and their shed was floating in Ashmere Lake.

Floodwaters dump 5 to 10 million gallons of water, plus debris, into Ashmere Lake



[https://www.berkshireeagle.com/news/local/dam-break-in-hinsdale-damages-property-on-george-schnopp-road/article\\_50ba581a-4cc4-11ed-a8ba-77d3a467e9f3.html](https://www.berkshireeagle.com/news/local/dam-break-in-hinsdale-damages-property-on-george-schnopp-road/article_50ba581a-4cc4-11ed-a8ba-77d3a467e9f3.html)





U.S. NEWS

# Recent floods heighten concerns that New England dams may not be built for climate-induced storms



BY MICHAEL CASEY

Updated 12:01 AM EST, September 15, 2023

Share

BOSTON (AP) — The [floods this week in Massachusetts](#) that put a few dams at risk have raised concern the structures may increasingly be at risk as the region is hit by stronger and wetter storms.

There are thousands of dams across New England and the Northeast, many of which were built centuries ago, often to help power textile mills and farms. The concern is they have outlived their usefulness. As stronger and wetter storms bring storms they were never designed for, the risk of dam failure is increasing.

## LOCAL 'Wakeup call': Leominster floods show risks posed by deficient dams in Mass.



Henry Schwan

Worcester Telegram & Gazette

Published 6:08 a.m. ET Sept. 14, 2023 | Updated 9:02 a.m. ET Sept. 14, 2023

## As the climate changes, obsolete dams put Mass. at risk for flooding similar to Vermont

SHARE



A veterinarian and her husband use a canoe to transport supplies to a flood-damaged veterinary center in Montpelier, Vt., Tuesday, July 11, 2023. The supplies included orthopedic surgery on a dog. A storm that dumped two months of rain in two days brought more flooding across Vermont.

July 17, 2023

## 'Catastrophic flooding' damages hundreds of homes as a Massachusetts city engulfed in water is now at risk of dam failure



By Holly Yan and Jennifer Henderson, CNN

4 minute read · Updated 9:52 PM EDT, Tue September 12, 2023

f X e

# Financial and Public Safety Benefits of Dam Removal



ELIMINATION OF  
MAINTENANCE,  
REPAIR AND  
INSPECTION  
COSTS



ELIMINATION  
OF POTENTIAL  
FOR DAM  
FAILURE



REDUCTION OF  
UPSTREAM  
FLOODING



ELIMINATION OF  
NEED TO BUILD AND  
MAINTAIN FISH  
PASSAGE



INCREASED CLIMATE  
RESILIENCY



SAVES MONEY LONG  
TERM

# Community Benefits of Dam Removal





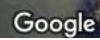


For Information

<https://braintreema.gov/310/River-Fisheries-Restoration>

OR CALL 781-794-8233

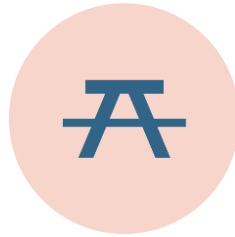




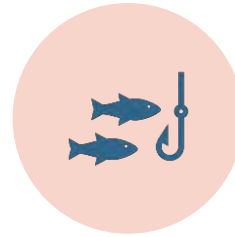
# Community Benefits of Dam Removal



OPPORTUNITIES FOR  
PUBLIC ACCESS



OPPORTUNITIES FOR  
PARK AND  
FLOODPLAIN  
IMPROVEMENTS



IMPROVED FISHING  
AND BOATING



RESTORED  
NATURAL  
BEAUTY

# Sucker Brook Restoration Pepperell, MA



# Manhan River Restoration, Southampton, MA



# Traphole Brook Restoration Norwood, MA



# Thank you!

Susie Bresney  
Dam Removal Project Manager,  
Division of Ecological Restoration  
[Susie.Bresney@mass.gov](mailto:Susie.Bresney@mass.gov)

Email me to join our dam  
removal email list!

# It's Complicated...

## Dam Removal Permitting in Massachusetts



# Today you will learn...

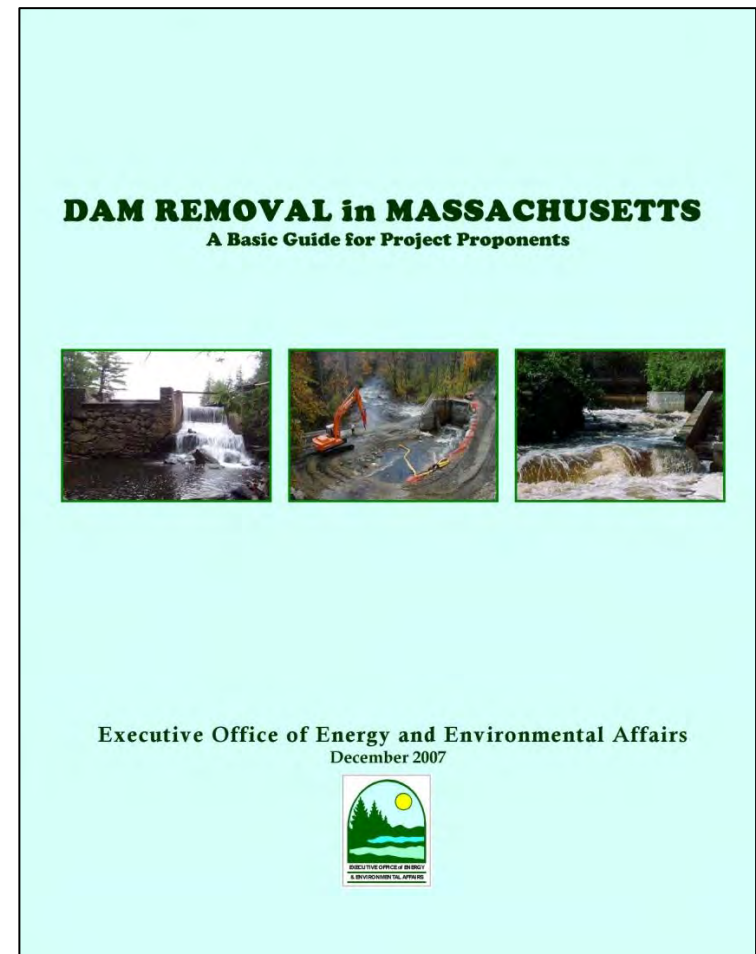
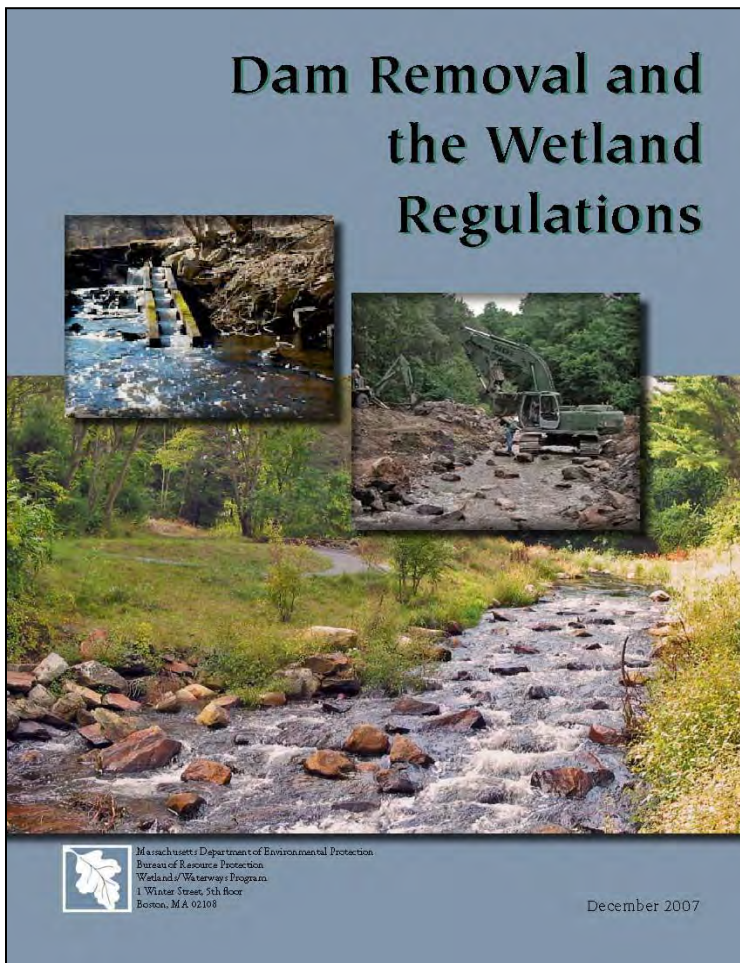
- How permitting for dam removal works in Massachusetts
- That the design and permitting processes are linked
- That permitting can be time consuming and costly...but doesn't have to be. Early planning & coordination is key!

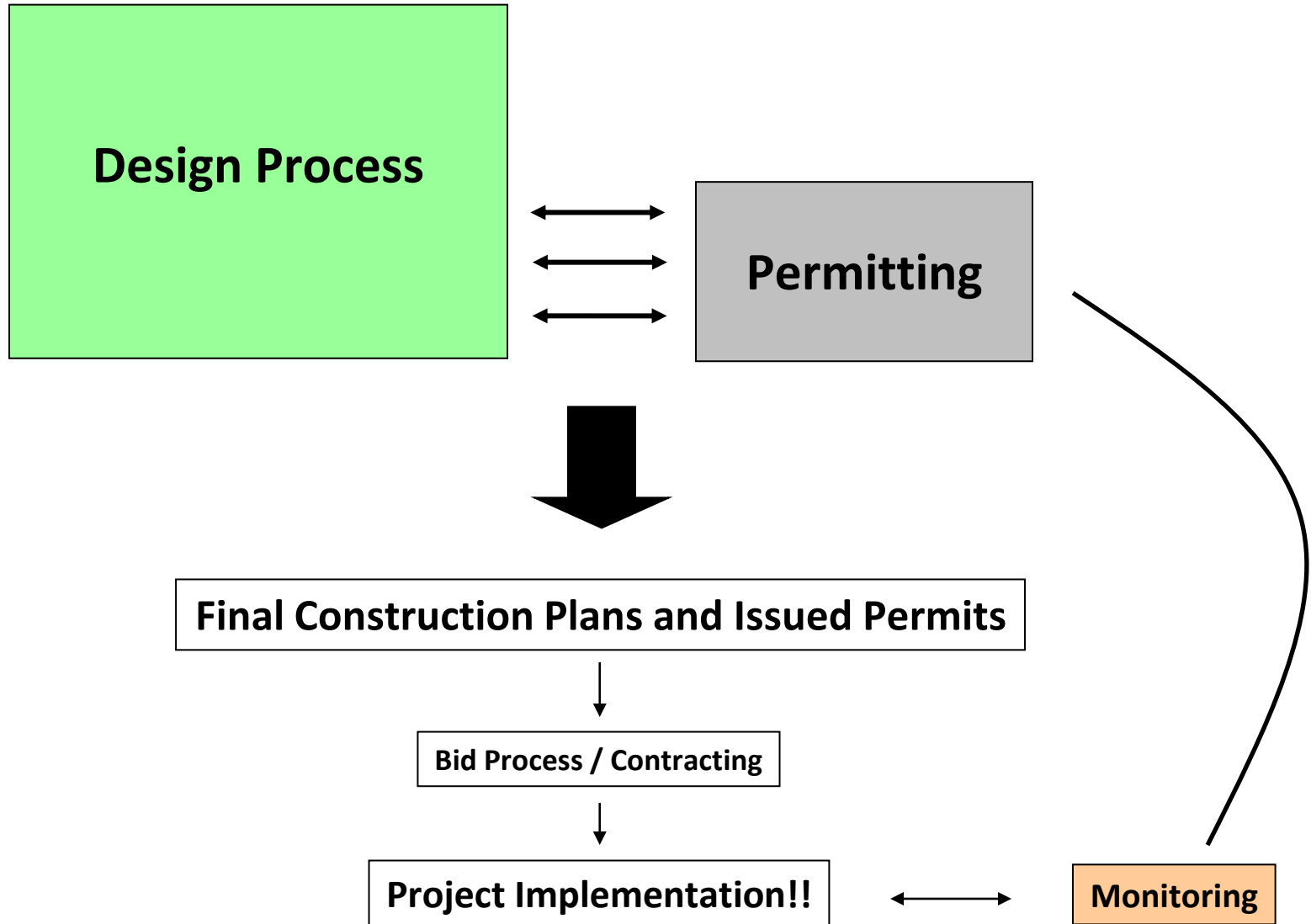


# Regulatory Climate

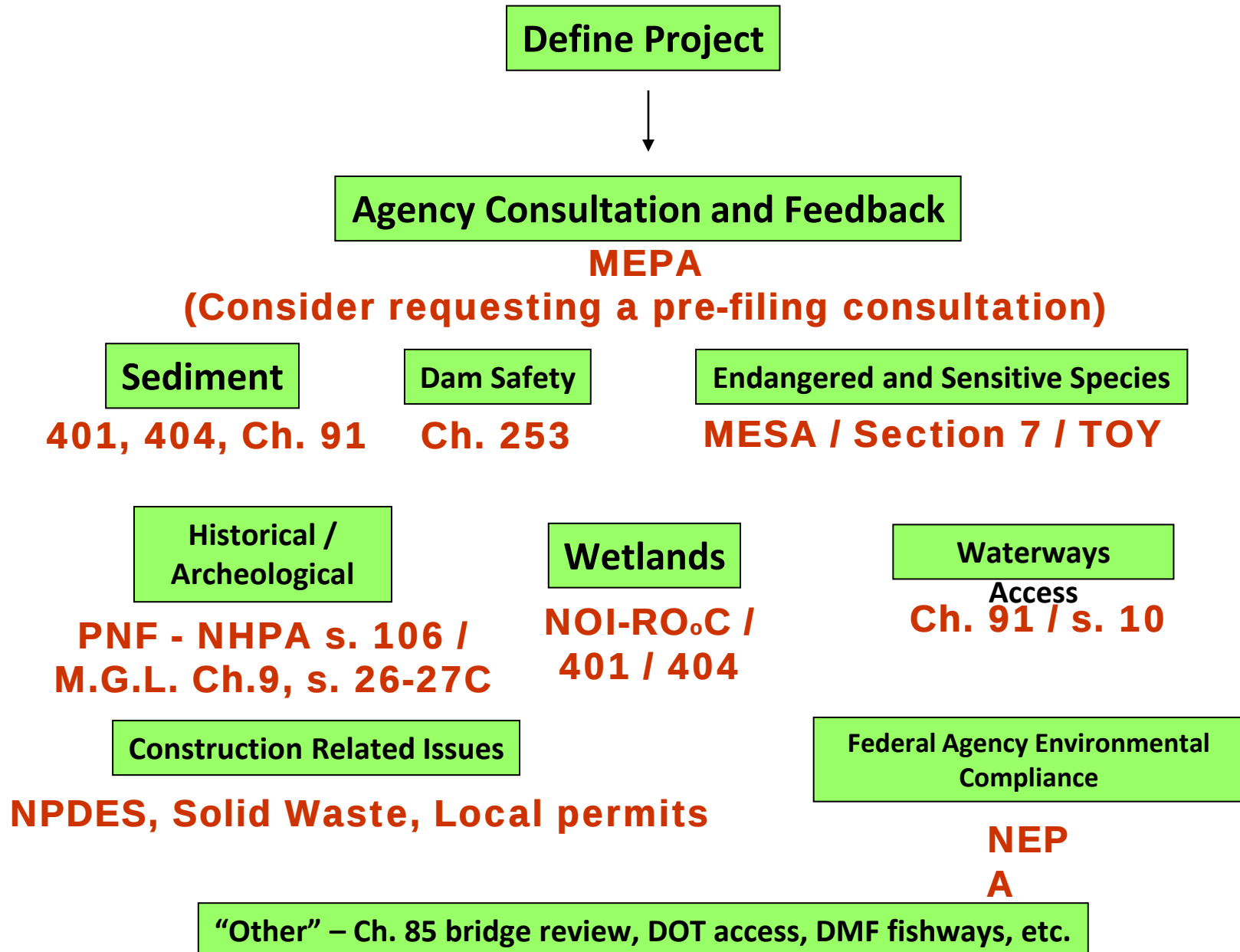
Over the past decade, there has been significant improvement in the climate & culture for dam removal permitting.

➤ MassDEP “streamlining” in 2014 / MEPA streamlining in 2023





## Permitting...Major Steps and Approvals



Define Project

Consultation

Sediment

Dam Safety

Sensitive Species

Wetlands

Waterways

Access

Historical /  
Archeological

Federal Agency Impacts

Construction

*To make permitting easier....*

- Establish clear **goals** – future desired outcomes (e.g., provide fish passage, improve WQ, eliminate risks)
- Establish clear **objectives** – actions to achieve goals (e.g., remove the full vertical extent of the dam, dredge sediment, stabilize infrastructure)
- Describe **existing and proposed conditions** – identity resources and predict anticipated changes (via surveys, base mapping, delineations)
- Define **construction methods, best practices, and sequence of work** – how will the work get done (e.g., construction sequence, staging, access, erosion control, water control, dewatering)
- Quantify **impacts** to resource areas – (e.g., permanent, temporary, direct, indirect)
- Read and understand the **regulations**

*The regulatory process is iterative. It will evolve and be refined as the project & design advances.*

# Promote Project Benefits!



1. Restore River Processes
2. Provide Fish Passage
3. Improve Water Quality
4. Improve Habitat Conditions
5. Eliminate Risks (Public Safety / Infrastructure / Sediment)
6. Maintain or Improve Aesthetics
7. Community Benefits / Public Access
8. Environmental Legacy

*Note: These are all things environmental regulations and regulators support too!!*

# Typical Permitting Roadmap

|    |                                                                                                                                                                        |                                                                                     |               |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|
| 1. | MHC Project Notification Form /<br>MA Environmental Policy Act (MEPA) EENF                                                                                             | Regulatory coordination &<br>notice, public notice                                  | 3 - 6+ mo.    |
| 2. | 401 Water Quality Certification to MassDEP                                                                                                                             | Sediment quality & quantity,<br>dredge impacts to wetlands                          | 9 – 12<br>mo. |
| 3. | US ACOE coverage under MA General Permit (404)<br>(Will be last permit to be issued)                                                                                   | Sediment, temp. & perm.<br>impacts to jur. waterways,<br>cultural & envirn. impacts | 9 – 12<br>mo. |
| 4. | Chapter 253 Dam Removal to MassDCR Office of<br>Dam Safety                                                                                                             | Modification of jurisdictional<br>dam structure                                     | ~3 mo.        |
| 5. | Ecological Restoration Notice of Intent (NOI) to local<br>Conservation Commission & MassDEP                                                                            | Wetland Protection Act and<br>resource area impacts                                 | 3 – 4 mo.     |
| 6. | Chapter 91 Waterways permit and/or license to<br>MassDEP                                                                                                               | Dredge and impacts to<br>navigability                                               | 6 – 12<br>mo. |
| 7. | National Environmental Policy Act (NEPA) by <i>Lead<br/>Federal Agency</i> (if applicable).<br>Other project specific applicable approvals<br>(MassDOT, MassDMF, etc.) | Federal environmental<br>compliance.<br><br>Local/state specialized<br>review.      | 3 – 6 mo.     |
| 8. | NPDES to U.S. EPA (often by contractor)                                                                                                                                | Construction site (>1 acre)<br>erosion & sediment control                           | ~1 mo.        |

# Thank You!

A full version of this presentation is available here:  
[https://drive.google.com/file/d/1sULN8vCMD0DE4KQkbvli3vDGbS83DaeH/view?usp=drive\\_link](https://drive.google.com/file/d/1sULN8vCMD0DE4KQkbvli3vDGbS83DaeH/view?usp=drive_link)



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**m. 413-552-6066**

2017/01/26

Balmoral Dam, Andover, MA

**Tighe & Bond**

# Funding Options for Dam Removals

William Hinkley

Director of Grants Administration at the  
Executive Office of Energy and  
Environmental Affairs



We think of dam removal projects in three major categories:

**Safety** – Dams that do not comply with safety regulations. Dam owners are required to be in compliance. This may include repair or removal of the structure.

**Resiliency** – May increase flooding not related to overtopping and failure. May involve a culvert. May exacerbate low-flow conditions in drought.

**Ecology** – Regardless of size or hazard. A dam in top condition disrupts river functions as much as a failing one. Some riverine habitats and species are more threatened than others.



# Potential Funding Sources

## Safety

- EEA Dam and Seawall Program
- FEMA High Hazard Potential Dam Program

## Resiliency

- EEA Municipal Vulnerability Preparedness
- FEMA BRIC

## Ecological Benefit

- DER Priority Projects
- EEA Massachusetts Environmental Trust
- NOAA Restoration Center
- U.S. Fish and Wildlife Service
- National Fish and Wildlife Foundation
- Private Foundations
- DFG Fee-in-lieu program
- U.S. Army Corps of Engineers Section 206 - Aquatic Ecosystem Restoration
- Natural Resources Conservation Service



## Infrastructure

- RPO/MassDOT TIP Listing
- MassDOT Small Bridge Program
- Exec. Office of Economic Development One Stop
- Federal Highway Administration National Culvert Removal, Replacement, and Restoration Grants

# Cost Drivers for Dam Removal Projects

## Expensive Things We Know About

- Bridges
- Culverts
- Utilities
- HazMat/Contaminated Sediment
- Poor Site Access
- Railroads
- Dams in Series
- Fish Ladders

## Additional Factors That May Be Expensive

- Ownership or Abandonment
- Abutters and Abutting Structures
- Roads Over Dams
- MEPA and Permit Timelines
- Mitigation
- Active vs. Passive Sediment Management
- Construction Market Cost
- Surprises in the Impoundment



# Getting Public Support: Defining Goals for Successful Outreach & Buy In

*Dam Removal/Eco Restoration 101 Training*

Neil Shea, *Restoration Program  
Director*  
Ipswich River Watershed  
Association



# Why Care about Public Support?

## RESEARCH ARTICLE

### I'll be dammed! Public preferences regarding dam removal in New Hampshire

Natallia Leuchanka Diessner<sup>1,\*</sup>, Catherine M. Ashcraft<sup>2</sup>, Kevin H. Gardner<sup>3</sup>, and Lawrence C. Hamilton<sup>4</sup>

WaA

### Competing Ideas of 'Natural' in a Dam Removal Controversy

**Dolly Jørgensen**

University of Stavanger, Stavanger, Norway; dolly@jorgensenweb.net

### "You kill the dam, you are killing a part of me": Dam removal and the environmental politics of river restoration

Coleen A. Fox,<sup>1\*</sup> Francis J. Magilligan,<sup>2</sup> and Christopher S. Sneddon<sup>3</sup>

## So...why work for buyoff?

Every dam project is different and offers its own unique set of challenges. But there is one common link:

***The more support a project has, the less resistance it will encounter***

Research shows that in general, people are in support of dam removals. BUT the margins narrow when the dam has a real (or perceived) function.

**How do you talk about these projects in a way where you can make sure the margins are in your favor?**

# Why Care about Public Support?



The legacy of human efforts to control our waterways:

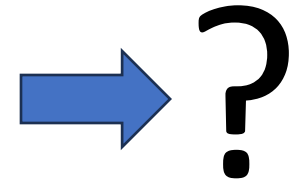
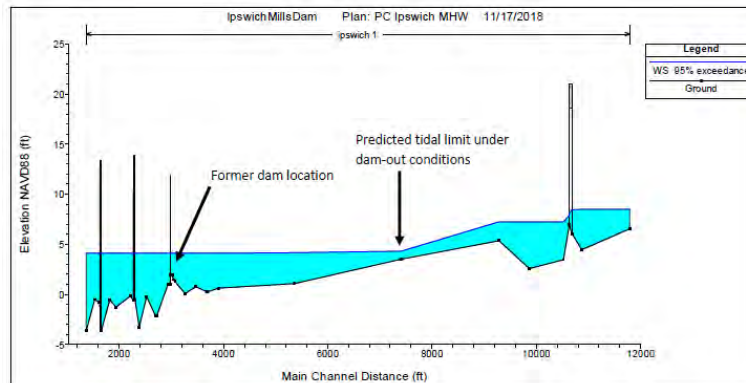
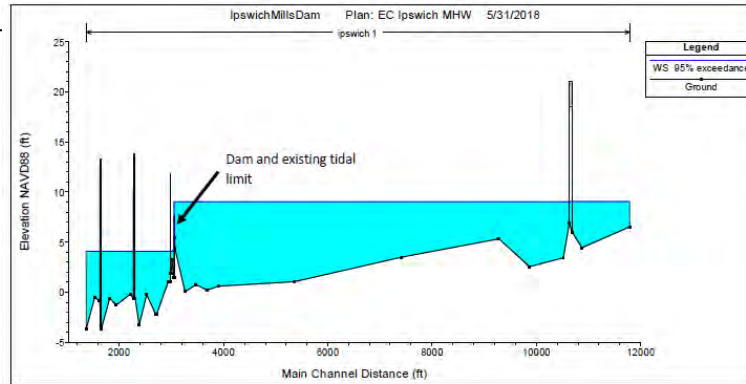
- Over 14,000 dams throughout the New England region
- Dams are linked with local history and culture
- Conservation of the environment created by dams

**The majority of dams in New England are privately owned...**  
**With a willing landowner, why not just take them out?**

- The reality is that whether a dam is privately owned or owned by a municipality, these projects are very public
- Can have wide-reaching impacts
- Input from a variety of stakeholders (abutters, businesses, water suppliers, environmental groups, etc.)
- Divisive – lots of issues



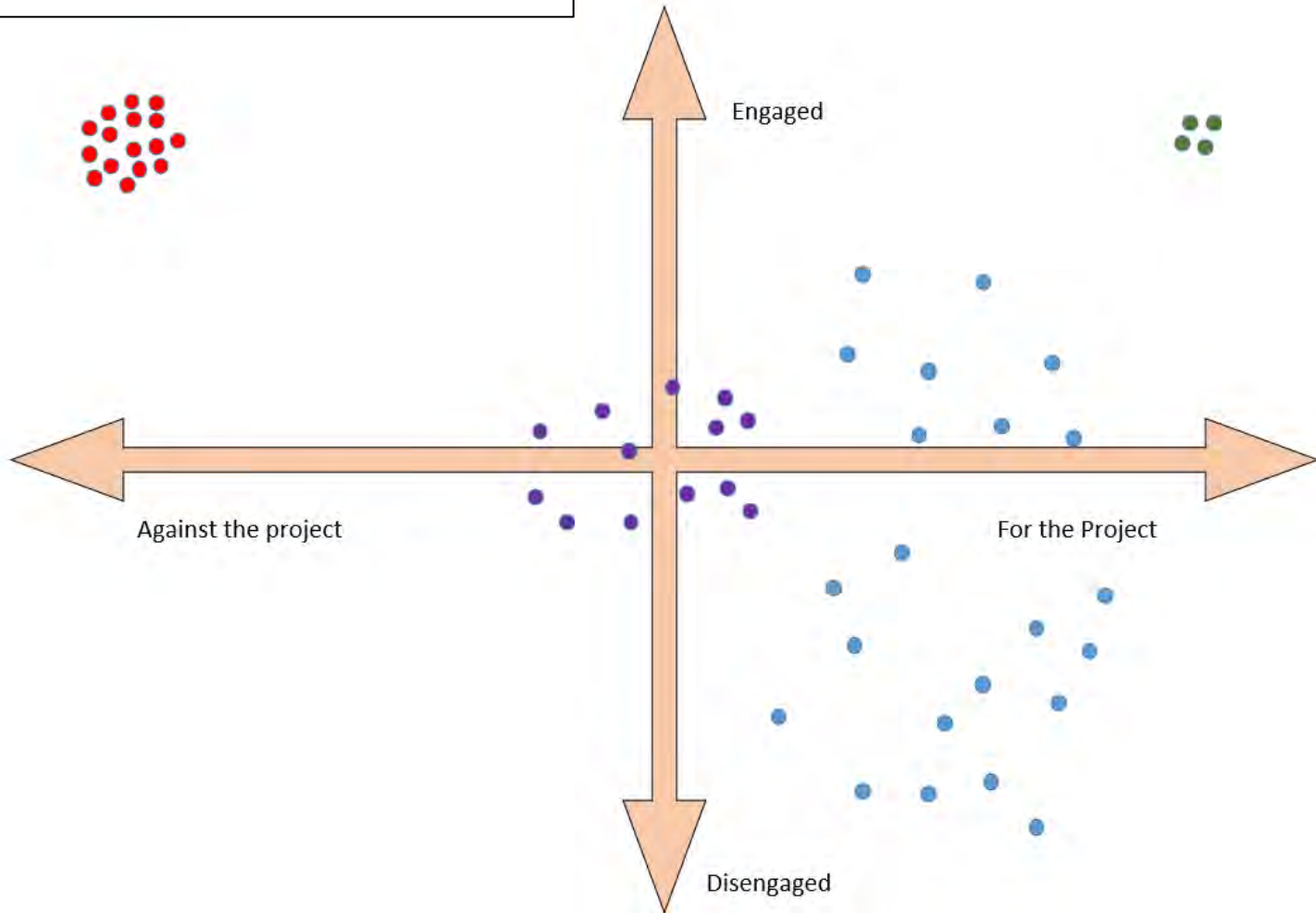
# Translating the Science



- Hydraulic and hydrologic modelling → How will water levels change?
- Sediment and water quality → What's behind the dam and where is it going to go?
- Infrastructure impacts → Will any buildings, roads, bridges, or public utilities be impacted?
- Archaeology assessment → What is the historical significance of the site?

## Strategies for People

### *The Sliding Scale of “Who Cares?”*



#### How to Garner Support

1. *Who is your audience*
2. *Figure out the pros to your specific dam removal (not just ecological)*
3. *Figure out the most popular reasons people would want to keep the dam (even if they're not based in fact)*
4. *Start having conversations*

# Thank You!

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the Nashua River Watershed,  
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Learn more about the NRWA at  
<https://www.nashuariverwatershed.org/> or call us at 978-448-0299