



Dam Removal: When Less is More

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DAM REMOVAL WHEN LESS IS MORE

*Guiding a river
on a course to
restore itself*

LESS IS MORE. Ludwig Mies van der Rohe



A black and white photograph of a winding river in a mountain valley. The river flows from the upper left towards the lower right, curving around a central island. The surrounding landscape is dark, with dense evergreen forests on the slopes. In the background, a range of jagged, snow-capped mountains rises against a sky filled with dramatic, dark clouds. The overall mood is serene and majestic.

LESS IS MORE. Ansel Easton Adams



Weave by Nancy L Carlsen

Depicting the numerous paths of the Missouri River Channel between 1860-2004

“ENGINEERED” vs “LESS IS MORE”

San Clemente Dam Removal, CA



Tannery Dam Removal, NH



ACTIVE or “ENGINEERED” RESTORATION

San Clemente Dam Removal, CA



(Left) step pools were engineered in 2015 to last for decades



(Right) the same channel has become barely recognizable in the winter of 2017

Source Doug Smith

PASSIVE OR “LESS IS MORE” RESTORATION

Tannery Dam Removal, NH in 2015



PASSIVE OR “LESS IS MORE” RESTORATION

Tannery Dam Removal, NH in 2015



PASSIVE OR “LESS IS MORE” RESTORATION

Tannery Dam Removal, NH in 2015



PASSIVE OR “LESS IS MORE” RESTORATION

Tannery Dam Removal, NH in 2015



“ENGINEERED” for What Reason? Puddin’Head Branch Dam Removal, FL



“ENGINEERED” for What Reason? Puddin’Head Branch Dam Removal, FL



CRITICAL ISSUES

THAT CONTROL HOW YOU RESTORE A SITE POST DAM REMOVAL

1. **Riverbed Profile** (quasi-equilibrium slope)
2. **Impounded Sediment Characteristics** (quality & quantity)

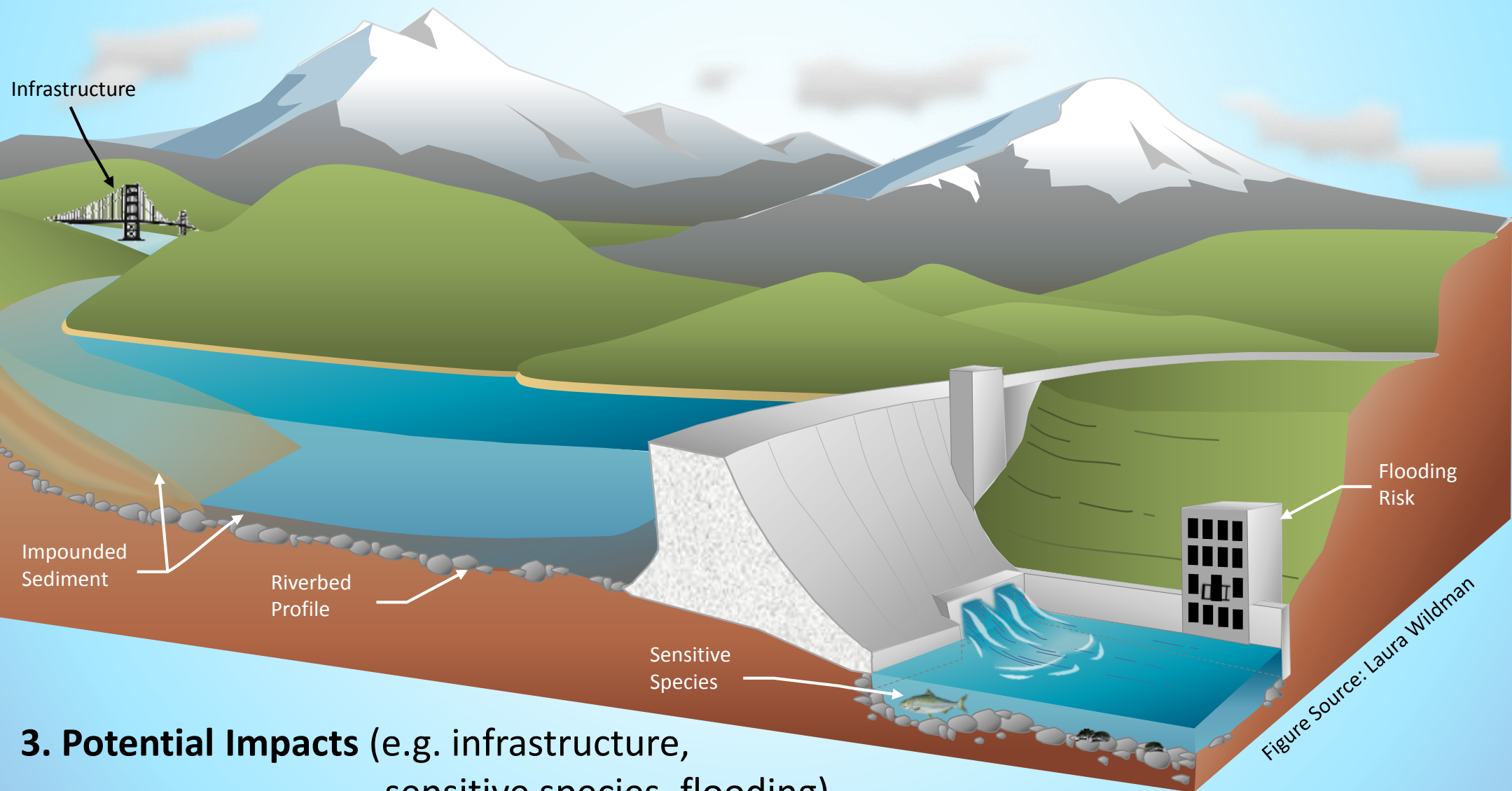
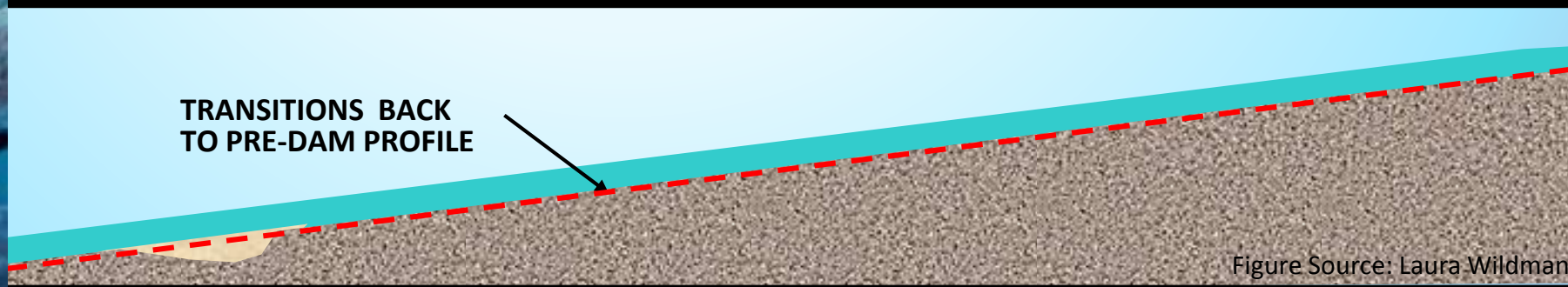
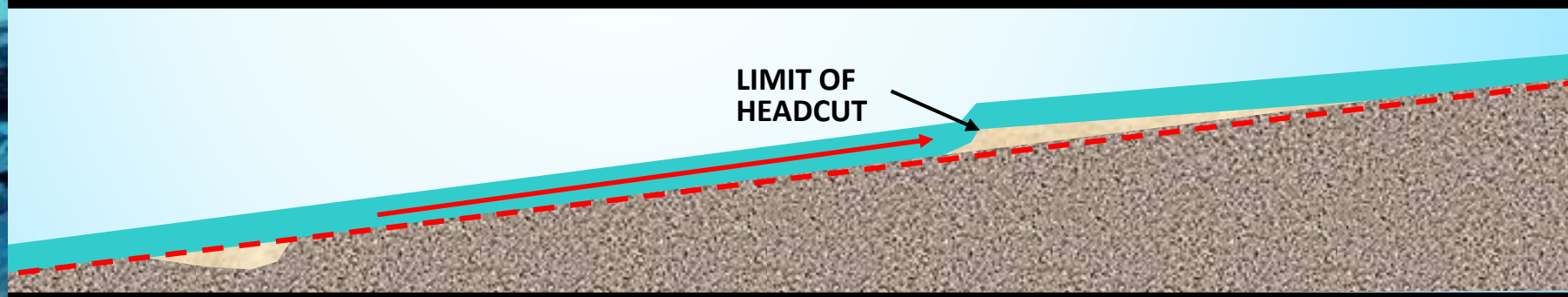
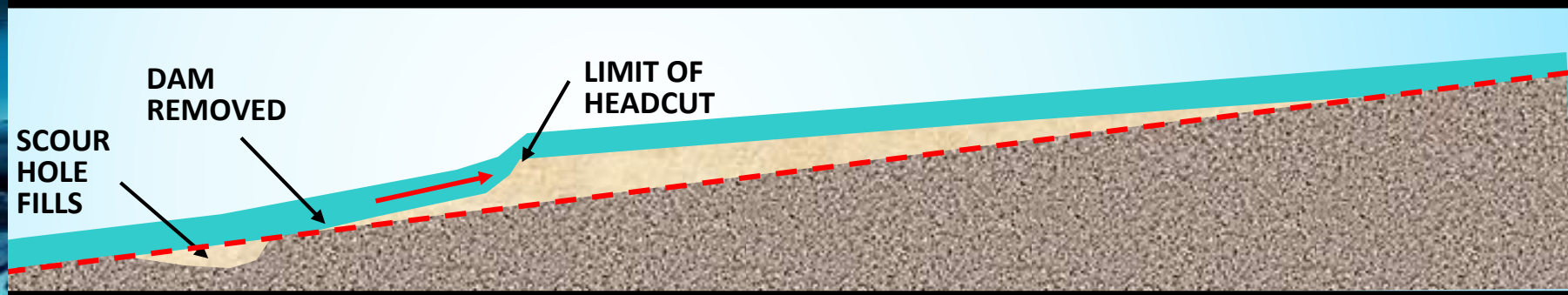
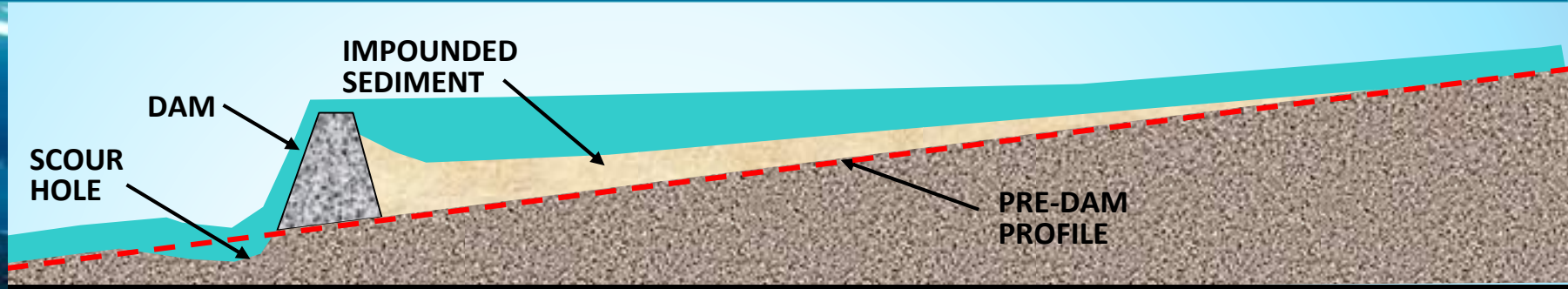


Figure Source: Laura Wildman

3. **Potential Impacts** (e.g. infrastructure, sensitive species, flooding)

RIVERBED PROFILE

SIMPLE EXAMPLE



LEGACY THALWEG

LESS IS MORE (RAKES POND DAM, PA)



2011 – Rakes Pond



2012 – Post Dam Removal

Design: Princeton Hydro



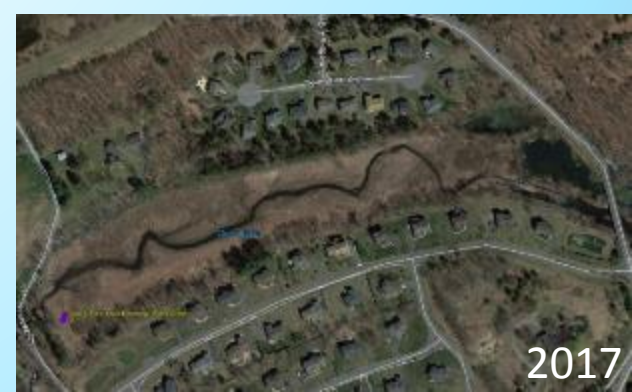
2006



2010



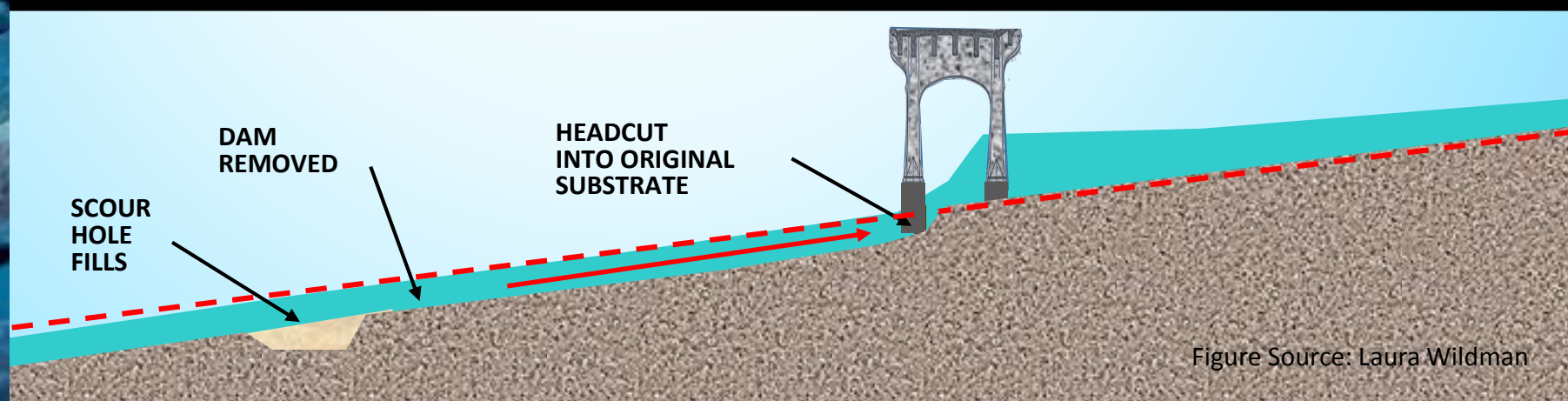
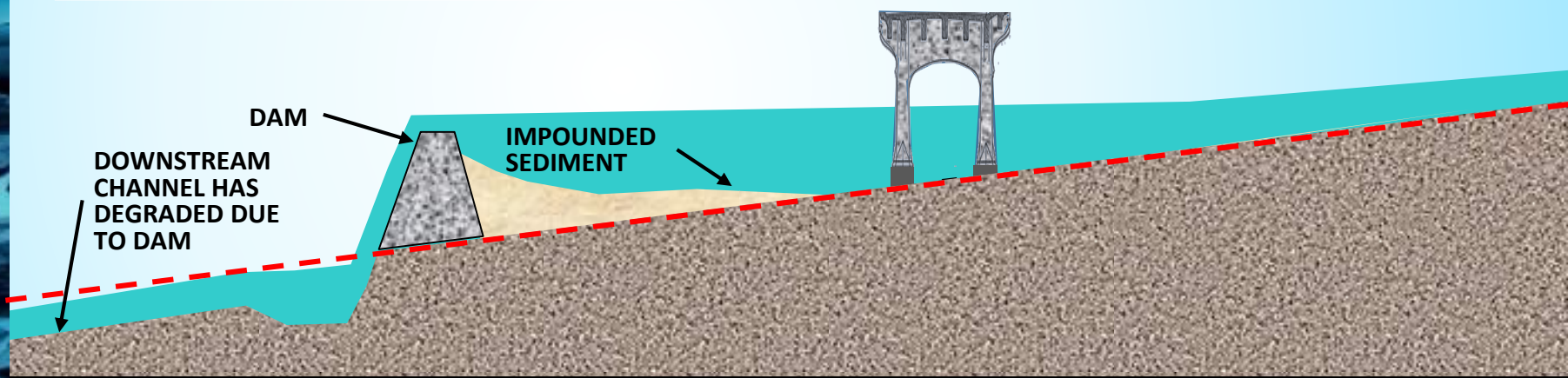
2012



2017

RIVERBED PROFILE

D/S DEGRADATION EXAMPLE (Goldsborough Dam)



EXTREME OVER “ENGINEERED” APPROACH

Goldsborough Dam Removal, WA



Comes with price tag for the next generation



RIVERBED PROFILE

EXCAVATED POND EXAMPLE (Heminway Dam, CT)

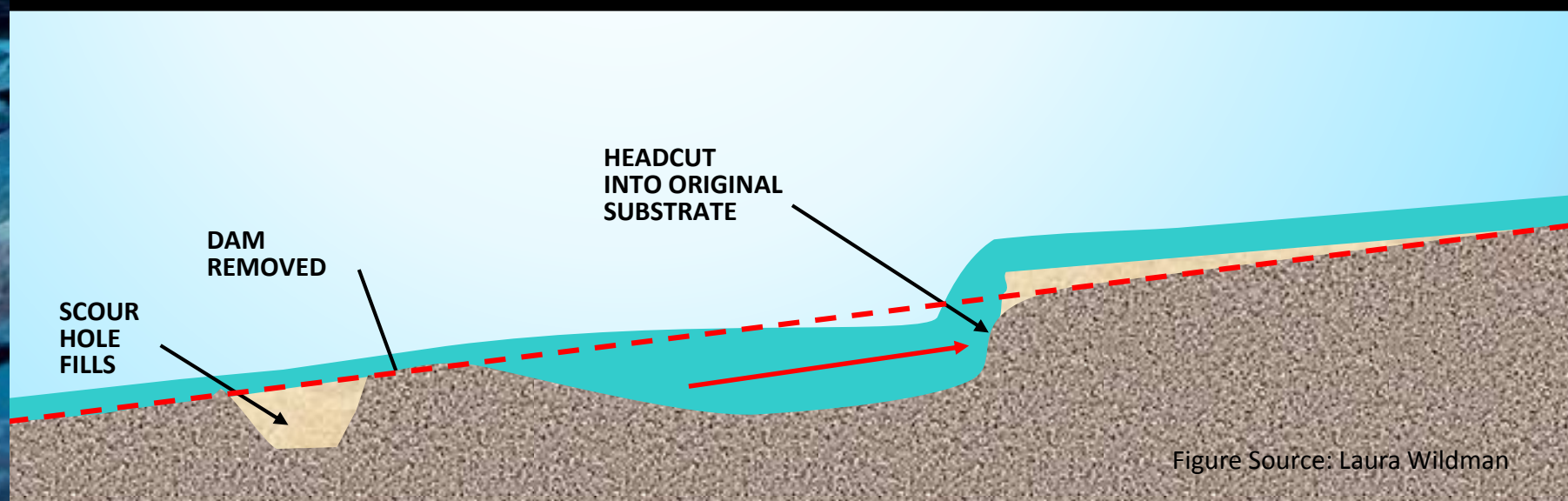
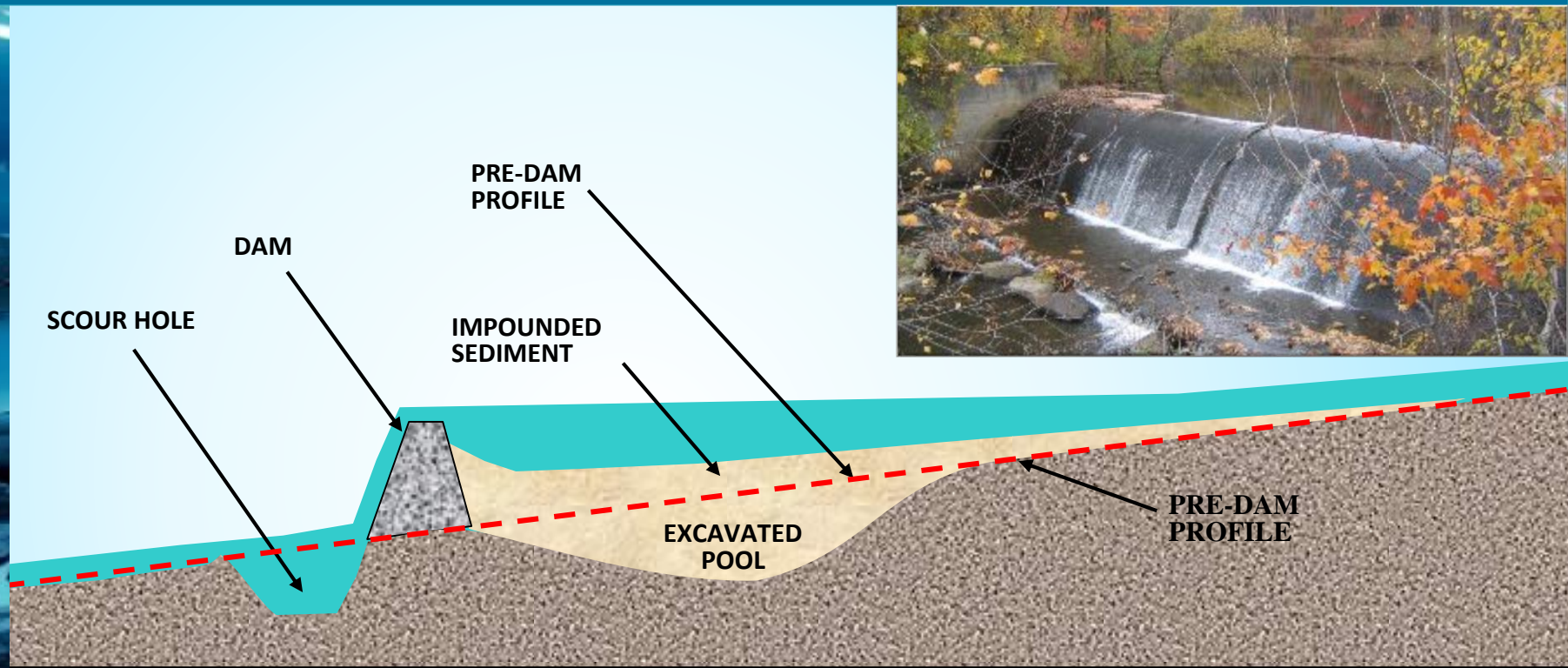


Figure Source: Laura Wildman

RIVERBED PROFILE

EXCAVATED POND EXAMPLE (Heminway Dam, CT)



1970

2011



100 feet

25

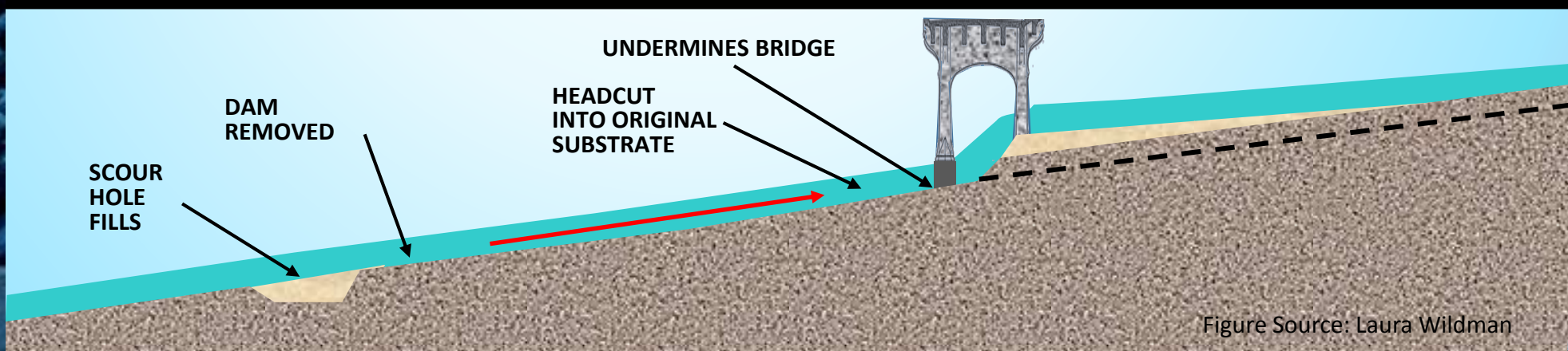
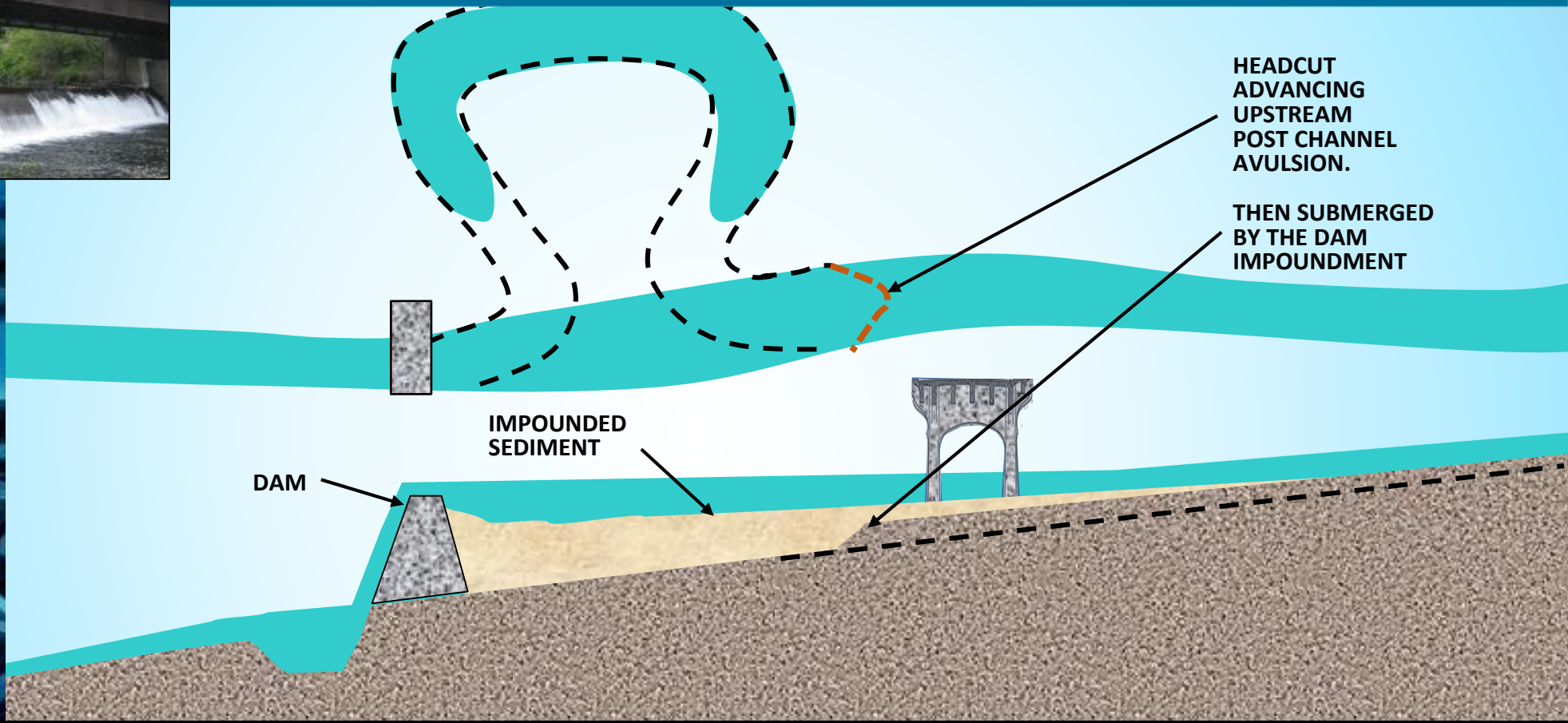
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Porter St

North

RIVERBED PROFILE

SUBMERGED KNICKPOINT (Mill Street Dam, MA)



RIVERBED PROFILE

ADVANTAGEOUS GRADE BREAK (Columbia Dam, NJ)

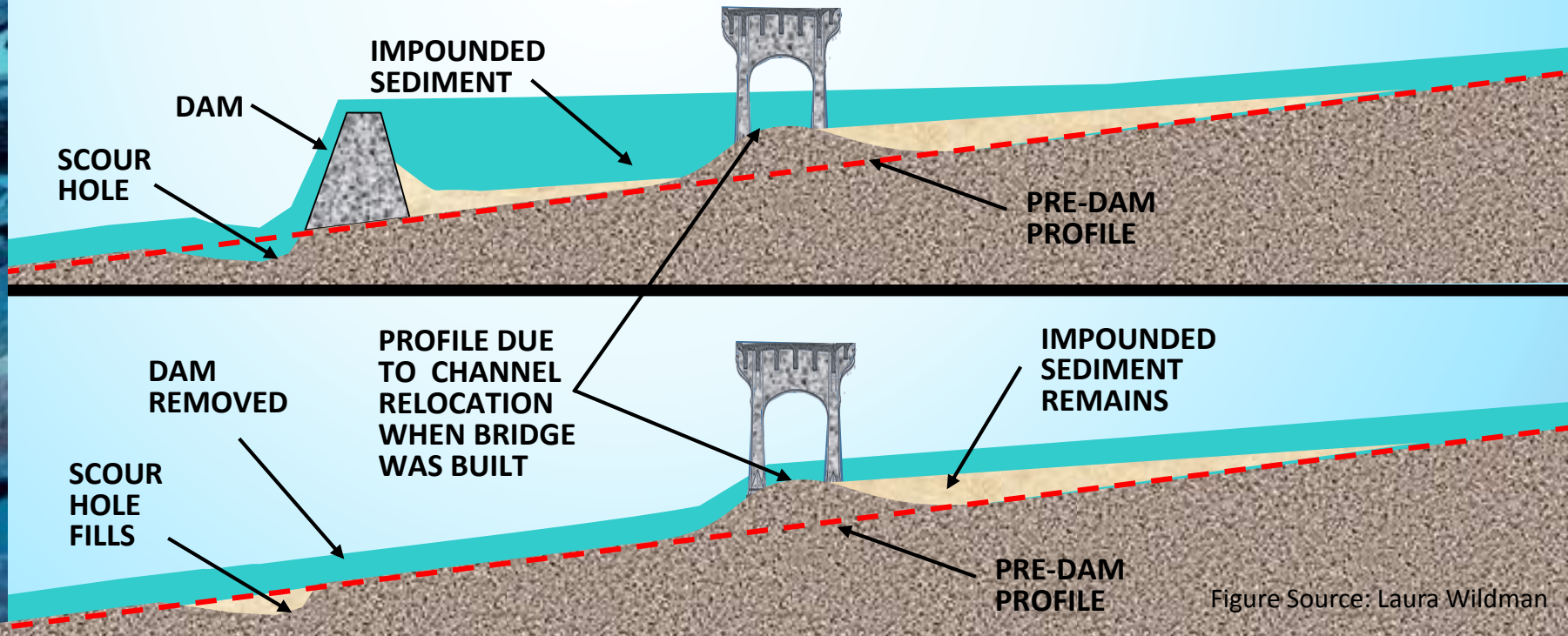


Figure Source: Laura Wildman



RIVERBED PROFILE

BEDROCK PROFILE (SPOONVILLE DAM, CT)



Design: Princeton Hydro

RIVERBED PROFILE

LESS IS MORE (KAMRATH BIG POND DAM, WI)

Kamrath Big Pond Dam prior to removal



Kamrath Big Pond Dam post drawdown



May 2008 - post-removal



IMPOUNDED SEDIMENT CHARACTERISTICS

CONTAMINATED SEDIMENT - REQUIRED ENGINEERED APPROACH

Town Brook Dam, MA



Milltown Dam, MT



Design: MMI



Final Design: River Design Group and Envirocon

IMPOUNDED SEDIMENT CHARACTERISTICS

REGULATORY CONCERNS RE: QUANTITY LED TO PILOT CHANNEL APPROACH



Less is More – Passive Restoration - Natural Erosion



Engineered - Pilot Channel



IMPOUNDED SEDIMENT CHARACTERISTICS

LARGE QUANTITY with PASSIVE SEDIMENT TRANSPORT



CONDIT
DAM, WA

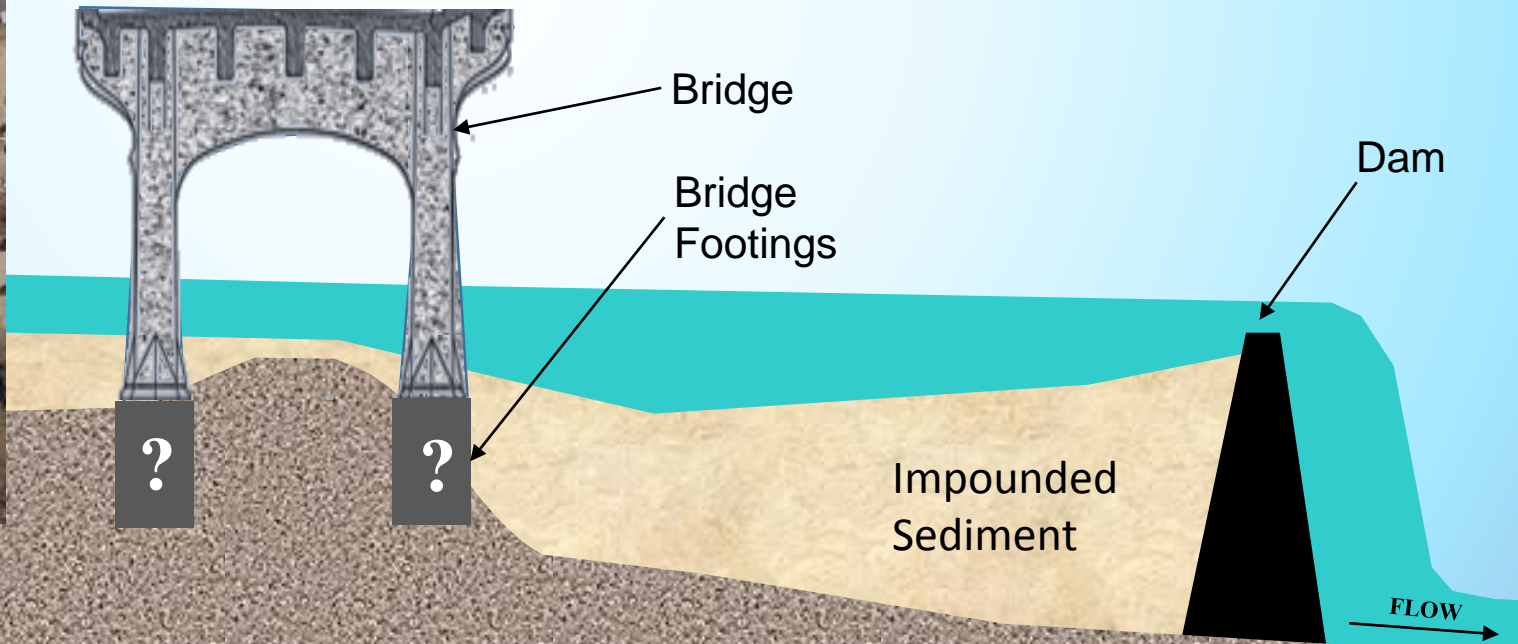


GLINES
CANYON
DAM, WA



POTENTIAL IMPACTS

INFRASTRUCTURE IMPACTS (Tel-Electric Dam, MA)



POTENTIAL IMPACTS

INFRASTRUCTURE IMPACTS (Brave Station Dam, PA)



Cooling Pipes for Gas Pumping Station Under impoundment

POTENTIAL IMPACTS

SENSITIVE SPECIES D/S (Cuddebackville Dam, NY)



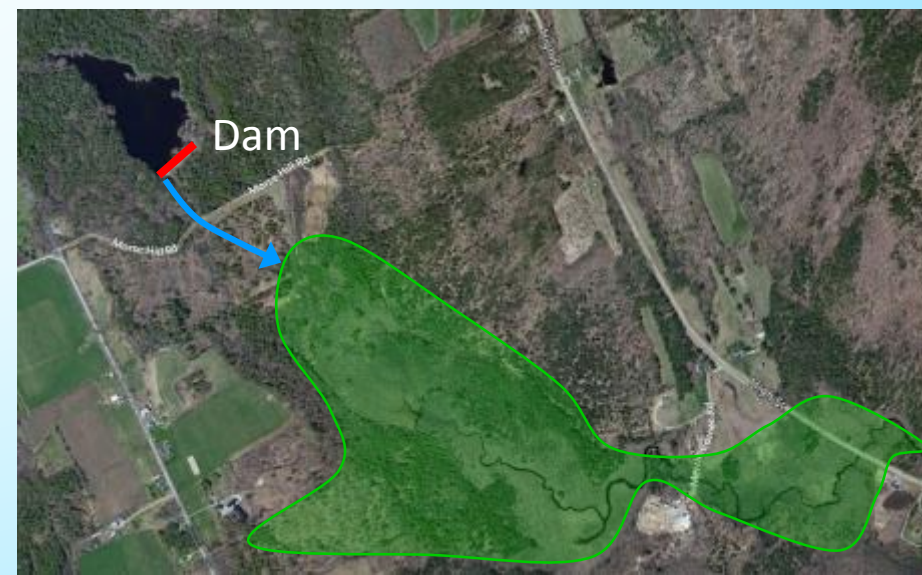
POTENTIAL IMPACTS

DOWNSTREAM FLOODING

Engineered - Heminway Pond Dam, CT



Less is More - Tannery Dam, NH



ADDING BUILDING BLOCKS PLEASANT GROVE DAM REMOVAL, NJ

Design: Princeton Hydro



Summer 2014

DAM REMOVAL

ALWAYS LOOK FOR A “LESS IS MORE” APPROACH FIRST

But make sure you first assess:

1. **Riverbed Profile**
2. **Impounded Sediment Characteristics** (quality & quantity)
3. **Potential Impacts** (infrastructure, sensitive species, flooding)



“In every deliberation, we must consider the impacts on the Seventh Generation to come.”

the Great Law of Peace of the Haudenosaunee

Six Nations Iroquois Confederacy

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