
inter·fluve
inc.

THE ECOLOGY OF DAM REMOVAL – A NATIONAL LOOK AT ECOSYSTEM RESTORATION CHALLENGES AND OPPORTUNITIES FOR REMOVAL OF RIVER BARRIERS

September 21, 2018

Nick Nelson & Marty Melchior

inter·fluve inc.

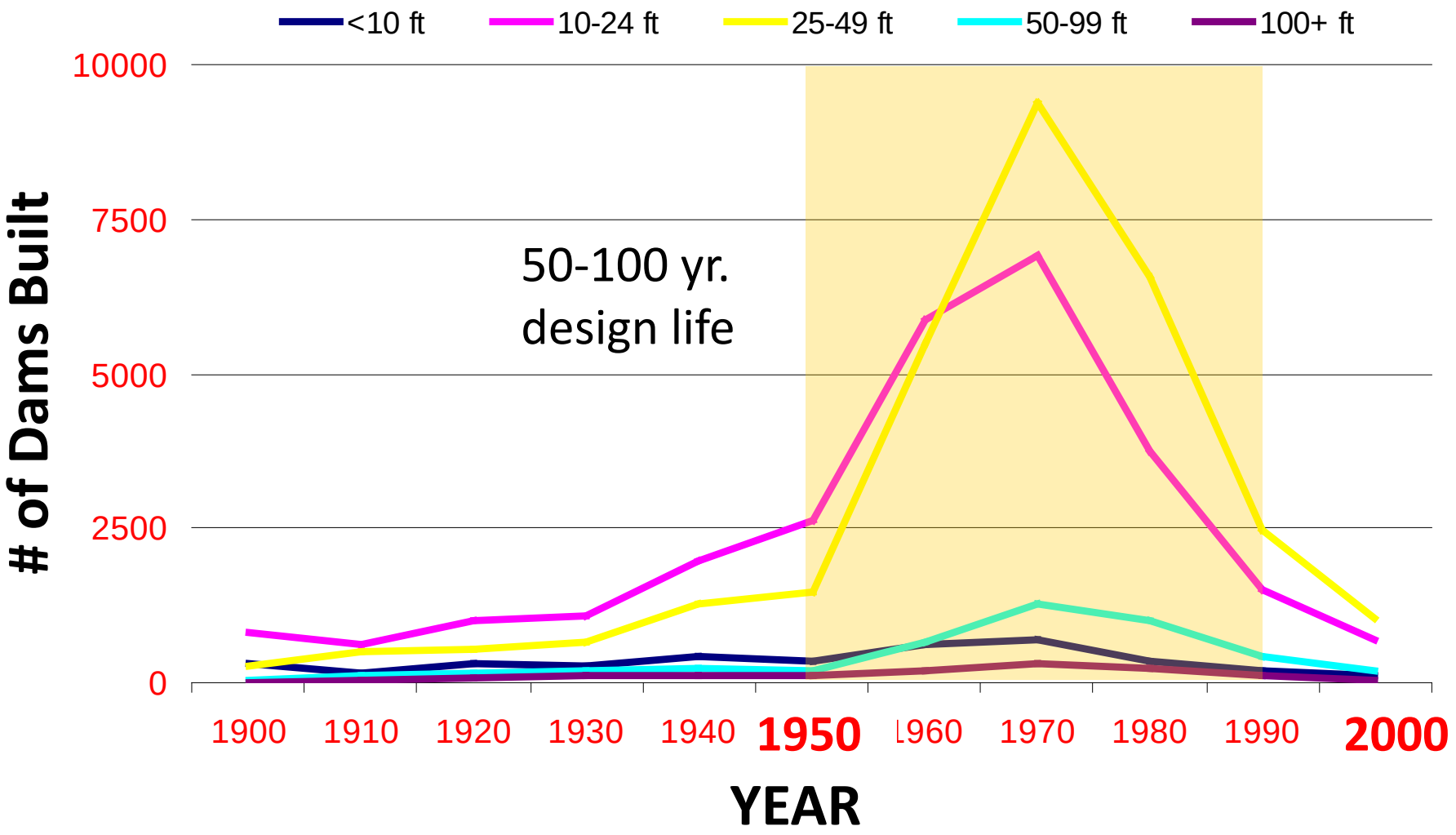
Inter-fluve.com

Balmoral Dam, Shawsheen River, Andover, MA

Wellingsley Brook Dam Removal, Plymouth, MA

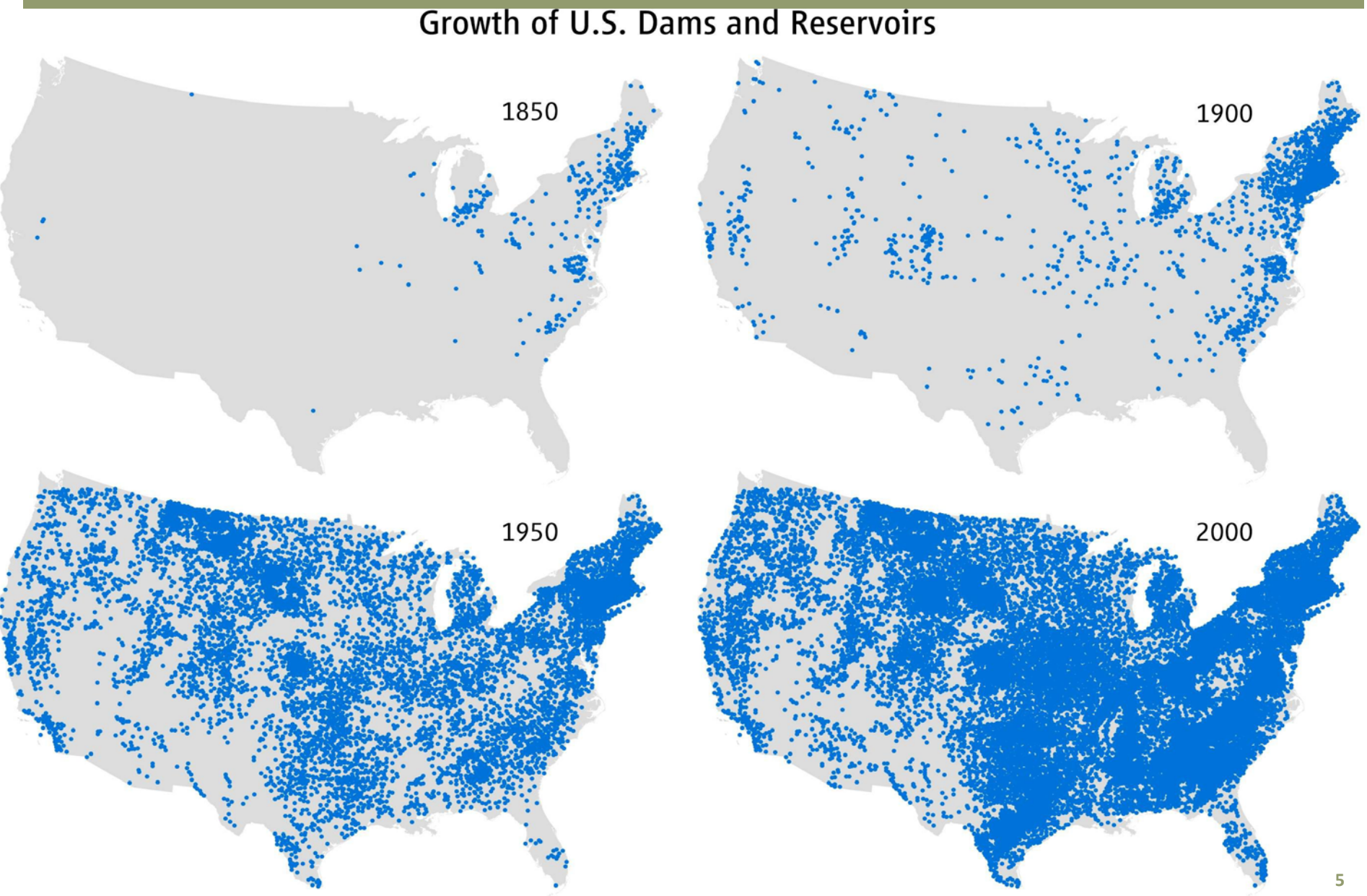
Table of contents:

Dam Construction in U.S.



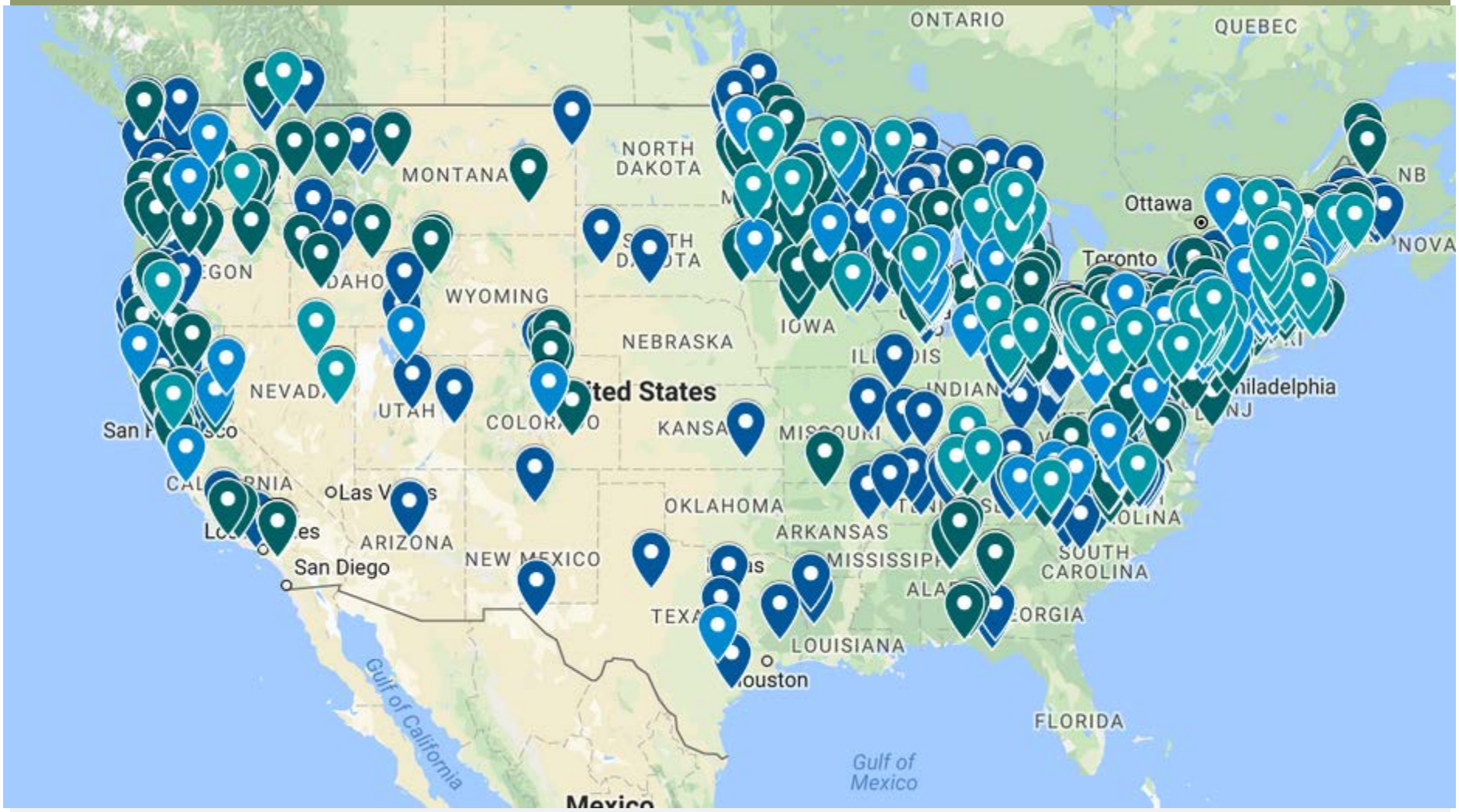
Dam Construction = Dam Removal

NID: >90,500 registered dams; likely >2 million small dams



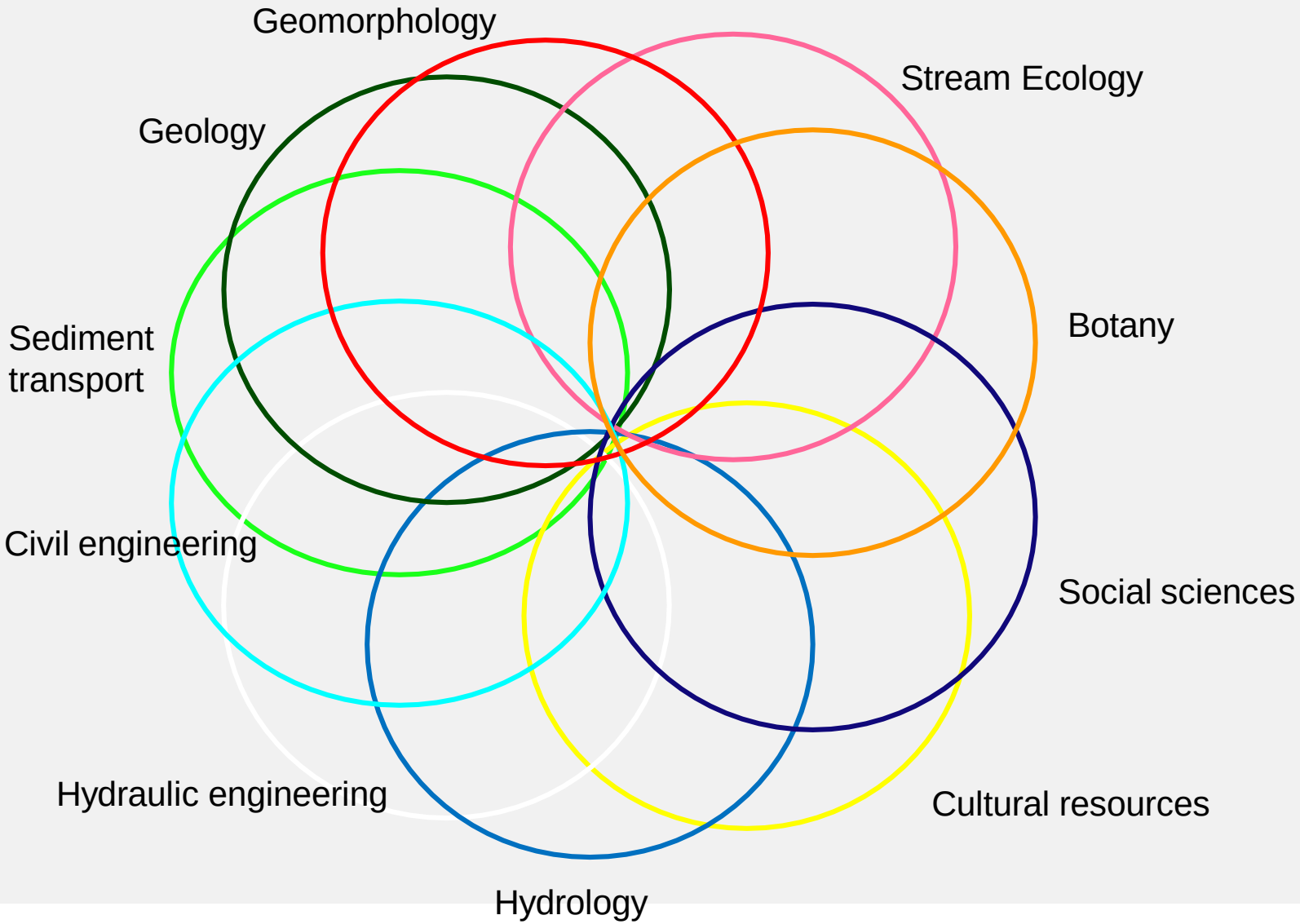
SOURCE: JAMES P. M. SYVITSKI *ET AL.*, *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A* **369**, (2011)

American Rivers:
Dam Removals Since 1916: >1,400



- 2016: 72 dams removed in 21 states
- PA is the leader – 311 dams removed

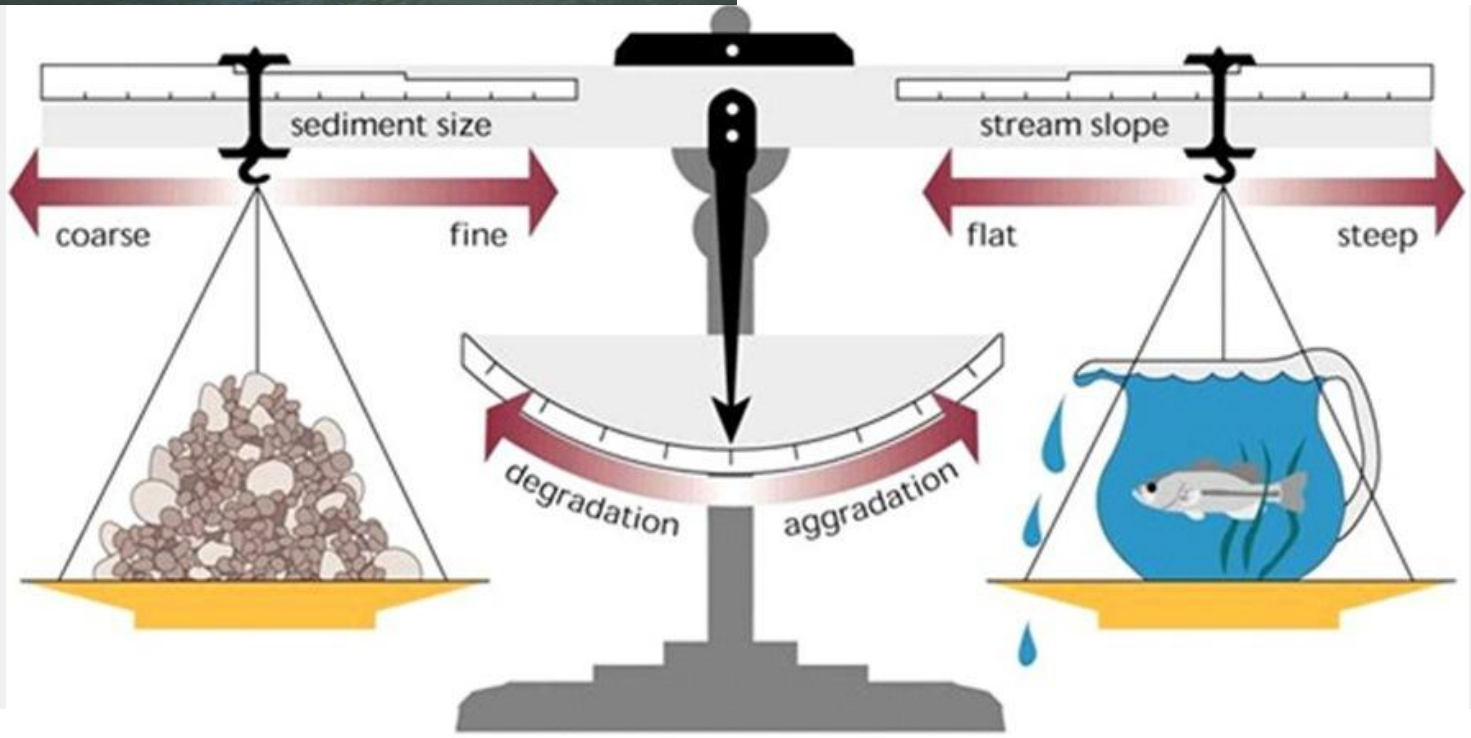
THE MANY FACETS OF RIVER RESTORATION AND DAM REMOVAL




San Clemente Dam, CA

More to dam removal than salmon passage: ECOSYSTEM RESTORATION

- River form/function/process
- Hydrology
- Sediment
- Floodplain reconnection
- Salt marsh restoration
- Liability/Costs



Impounded Sediment National Trends

- East coast dams have contaminated sediment
- Midwest dams have lots of fine sediment
- West coast dams are large and have lots of gravel

Hopewell Mills Dam, Mill River, Taunton, MA

Active vs Passive Sediment Management

- Active
  - Active channel construction
  - Extensive design and bio-engineering
  - Can be costly
  - Instant habitat is possible
  - Species-specific complex habitat


~14,000 cubic yards of impounded sediment


Active sediment removal and channel construction
DEERE

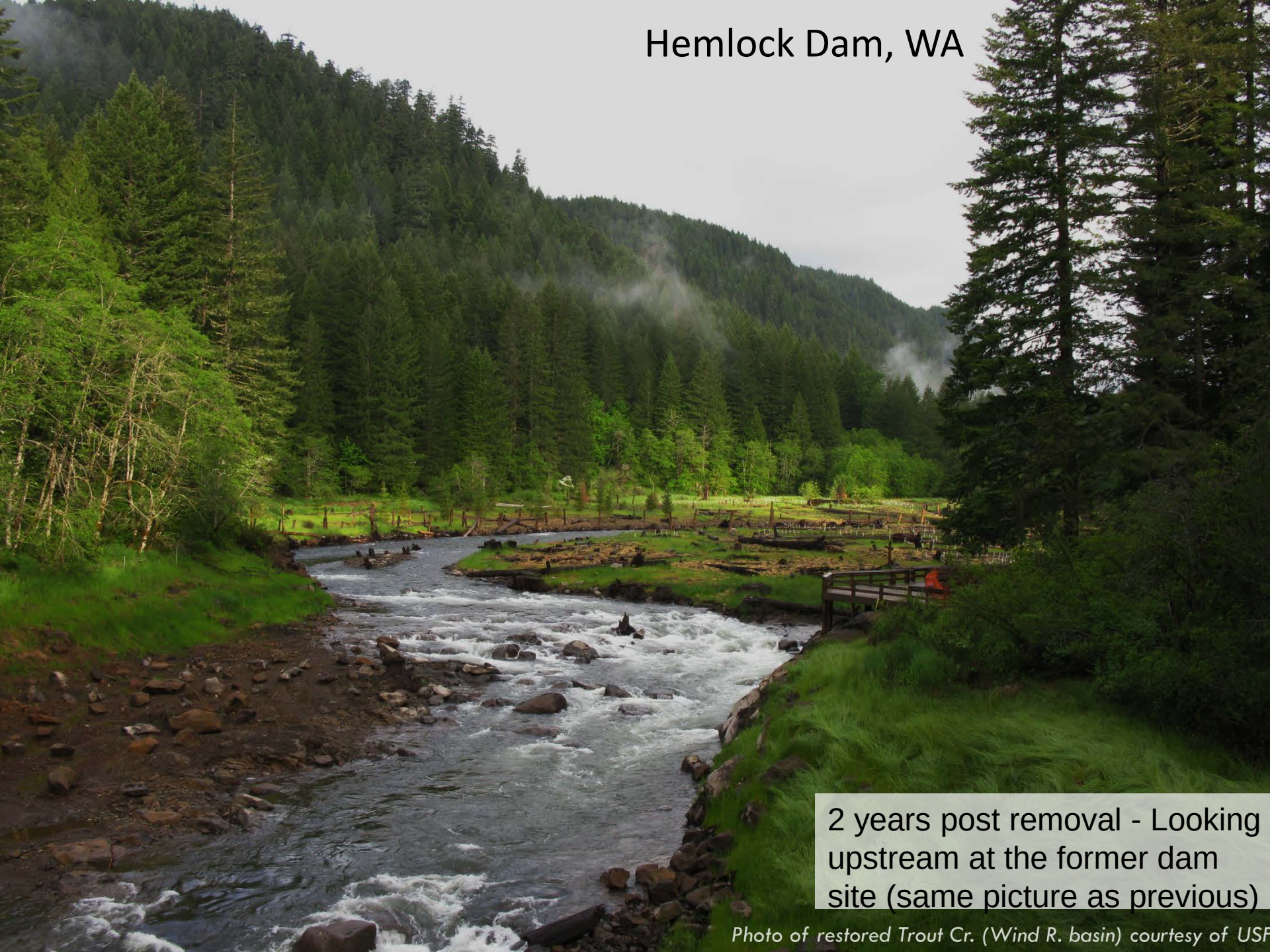
Constructed geomorphology and habitat = ecosystem restoration

Holistic ecosystem restoration benefits many species

Photos: Mike Bednarski and Mike Trainor, Mass. Division of Marine Fisheries

Hemlock Dam, WA - salmon restoration, canoe/kayak passage

Hemlock Dam, WA

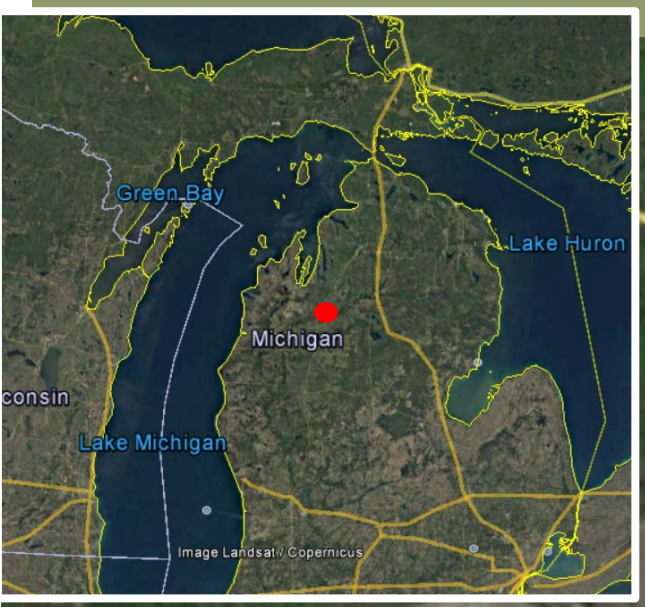


2 years post removal - Looking upstream at the former dam site (same picture as previous)

Photo of restored Trout Cr. (Wind R. basin) courtesy of USF

In-Stream Habitat and Bank Stability

Active and Passive Management: Brownbridge Dam, Boardman River, MI



Ranch Rudolf Rd

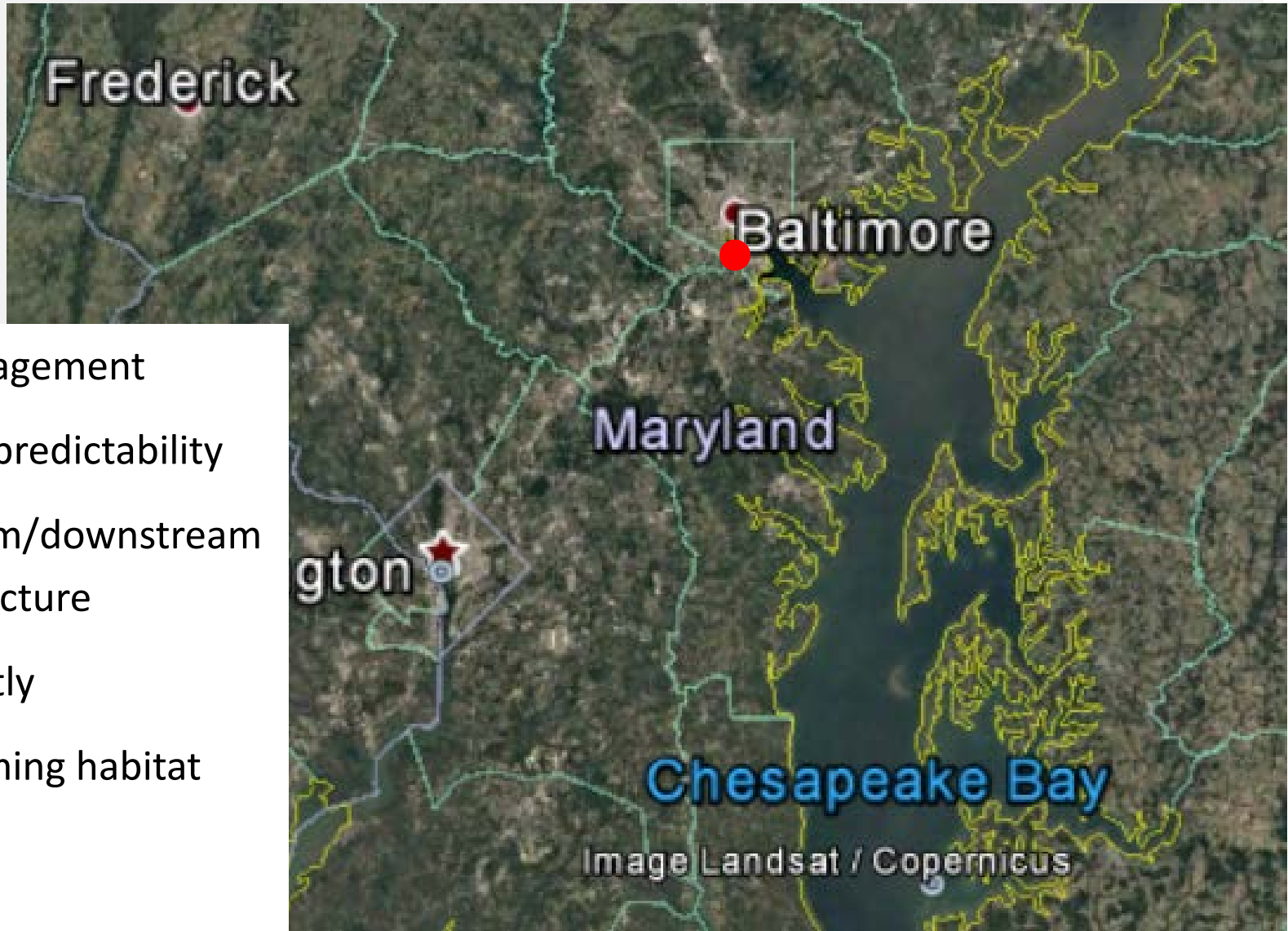
Brown Bridge Pond

Google Earth

Large Wood Installations - 2016

Passive Sediment Management: Patapsco River, MD – Simkins and Bloede Dams

- Passive Management
  - Limited predictability
  - Upstream/downstream infrastructure
  - Less costly
  - Self-forming habitat



Simkins former impoundment after construction

Patapsco River immediately downstream of Simkins Dam after removal

Patapsco River between Simkins and Bloede Dams after Simkins removal

Bloede Dam

Humans and Infrastructure Challenges to Ecosystem Restoration

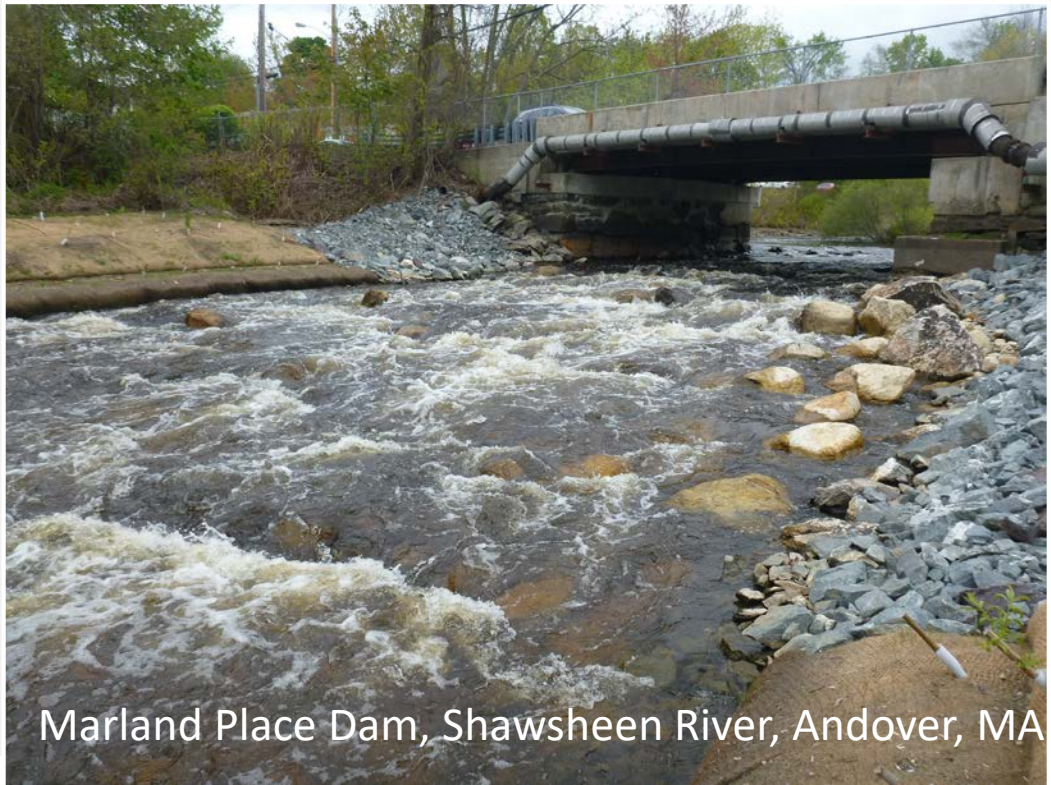
Access
Infrastructure
Historical Resources
Aesthetics
Attachment to the past

Balmoral Dam, Shawsheen River, Andover, MA. Photo Credit: Kris Houle, MA DER

Abutter participation

Take Home Messages

- Rivers are complex
- Dam removal = opportunity for holistic ecosystem restoration
- Need creativity in planning, design and construction



Marland Place Dam, Shawsheen River, Andover, MA

Nick Nelson

(617) 714-5537

nnelson@interfluve.com

inter·fluve inc.

Inter-fluve.com