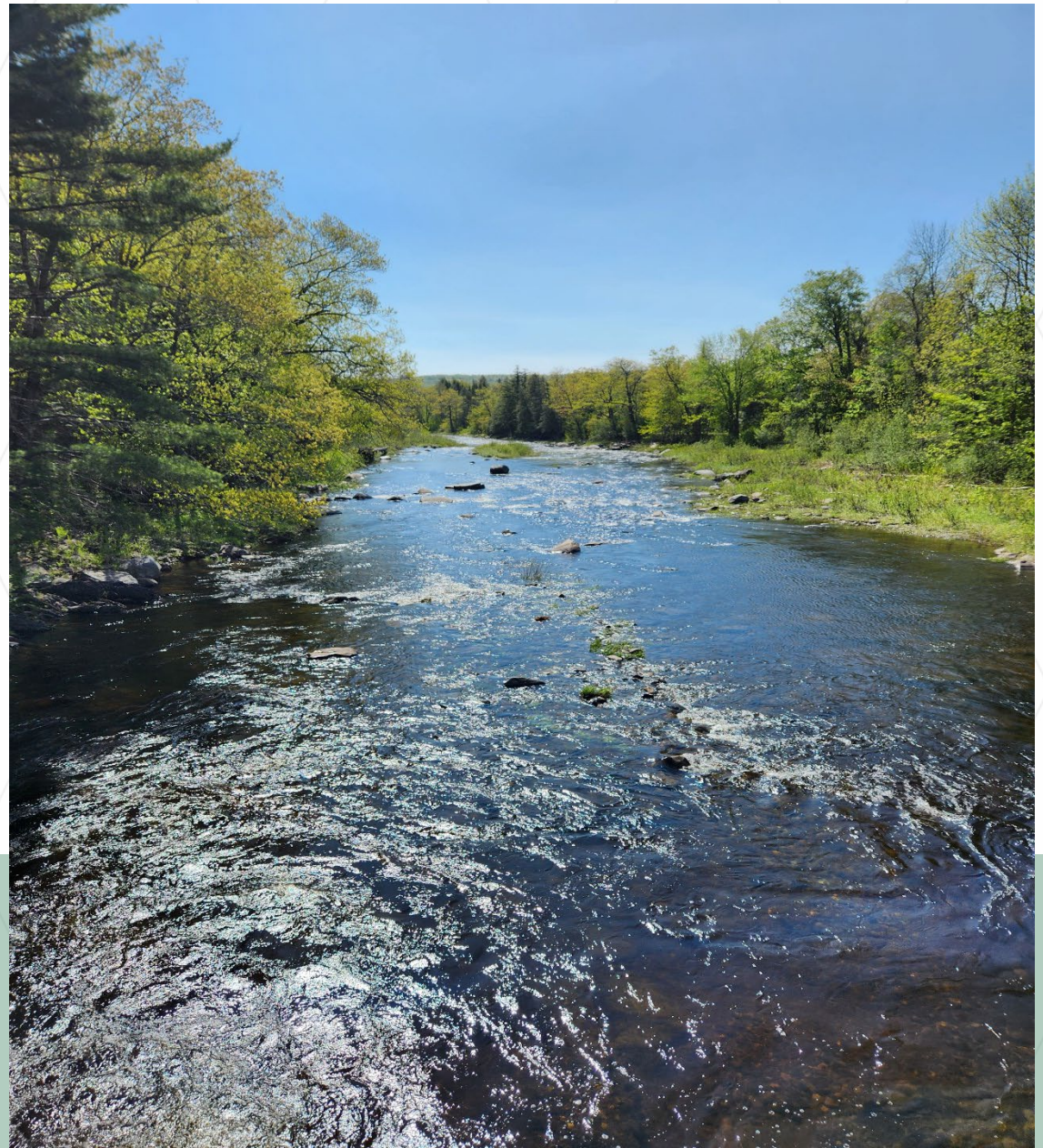
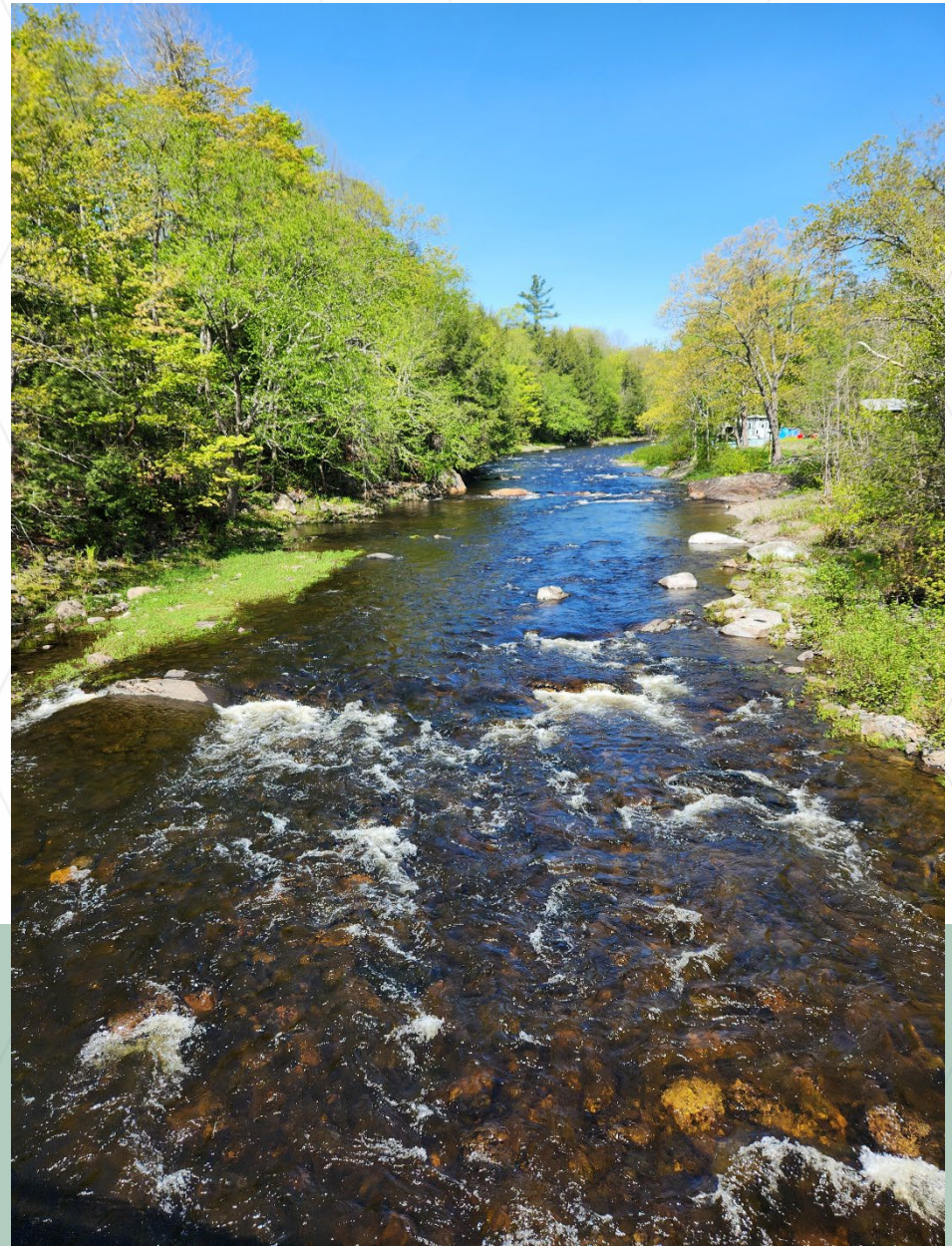
May 23 Fry Stocking in Kingsbury Stream





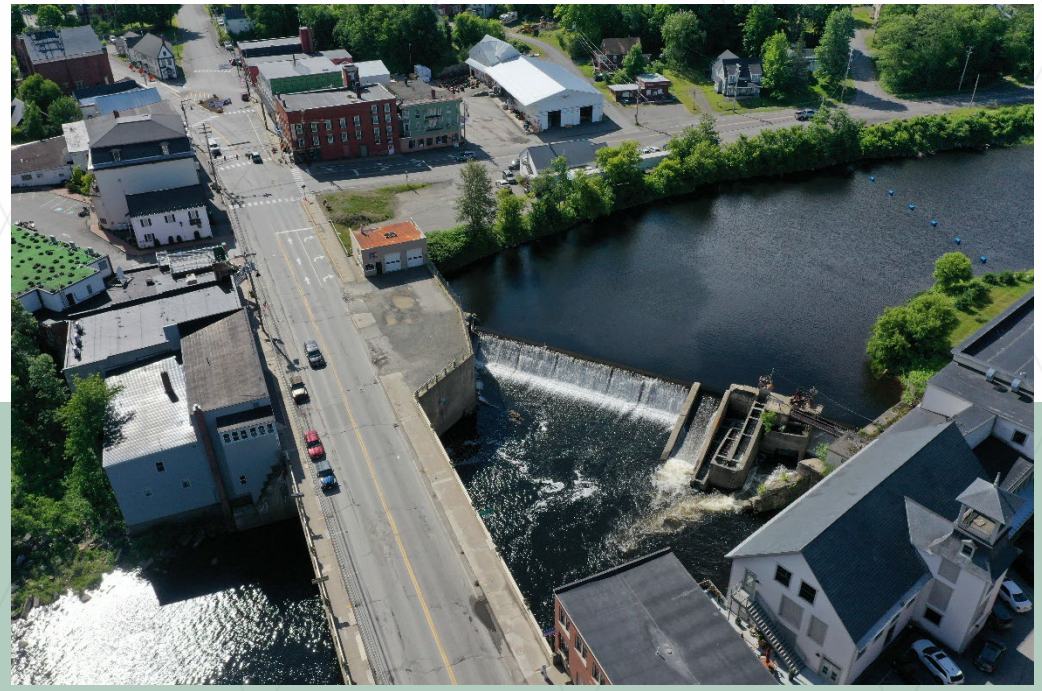

Wild Atlantic Salmon
OCEAN
Predators
Life Cycle
FRESH WATER
Prey

Mayo Mill Dam and Appurtenant Facilities Feasibility & Alternatives Study

for the Town of Dover-Foxcroft

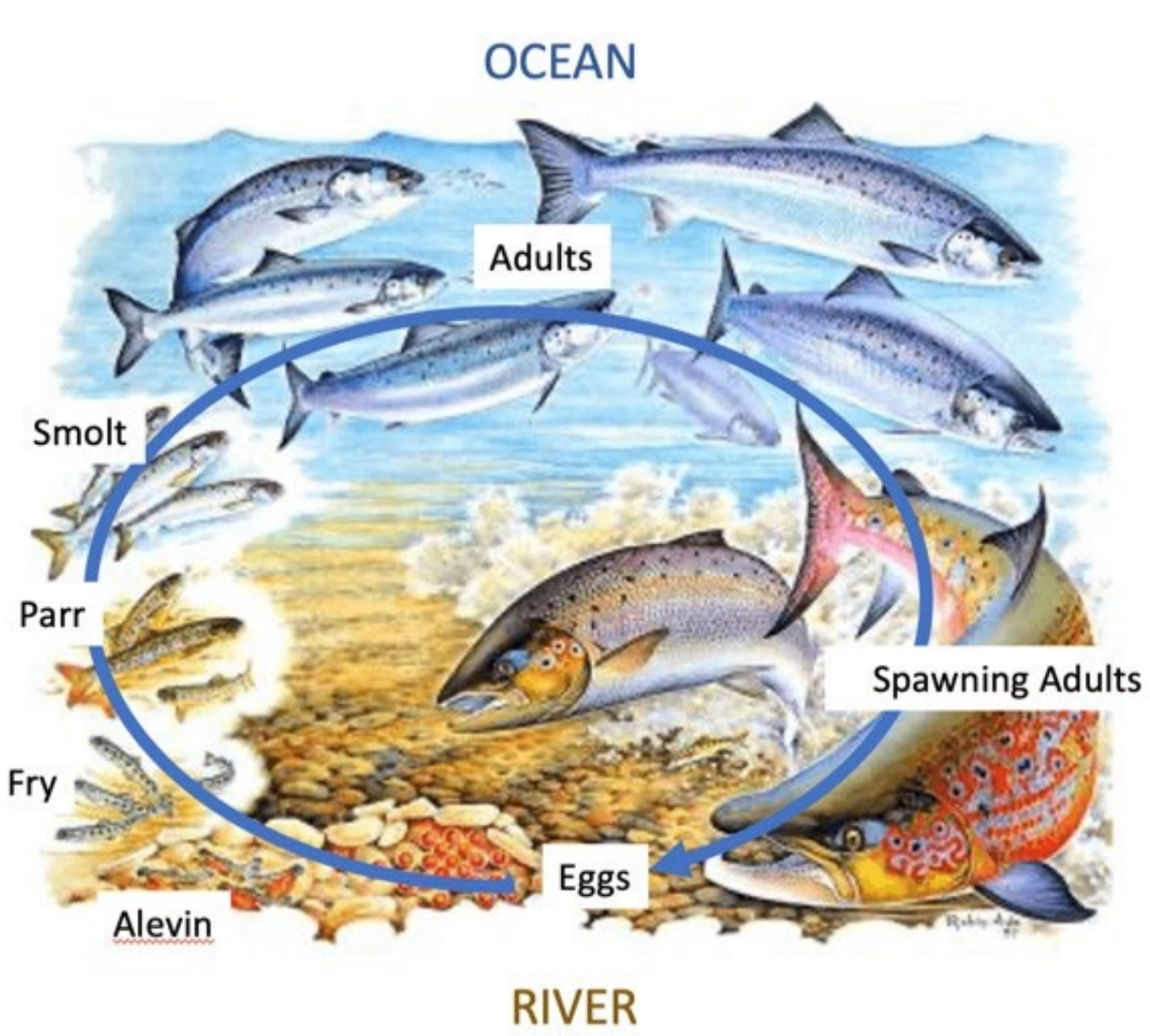
Presentation Overview: May 25, 2023

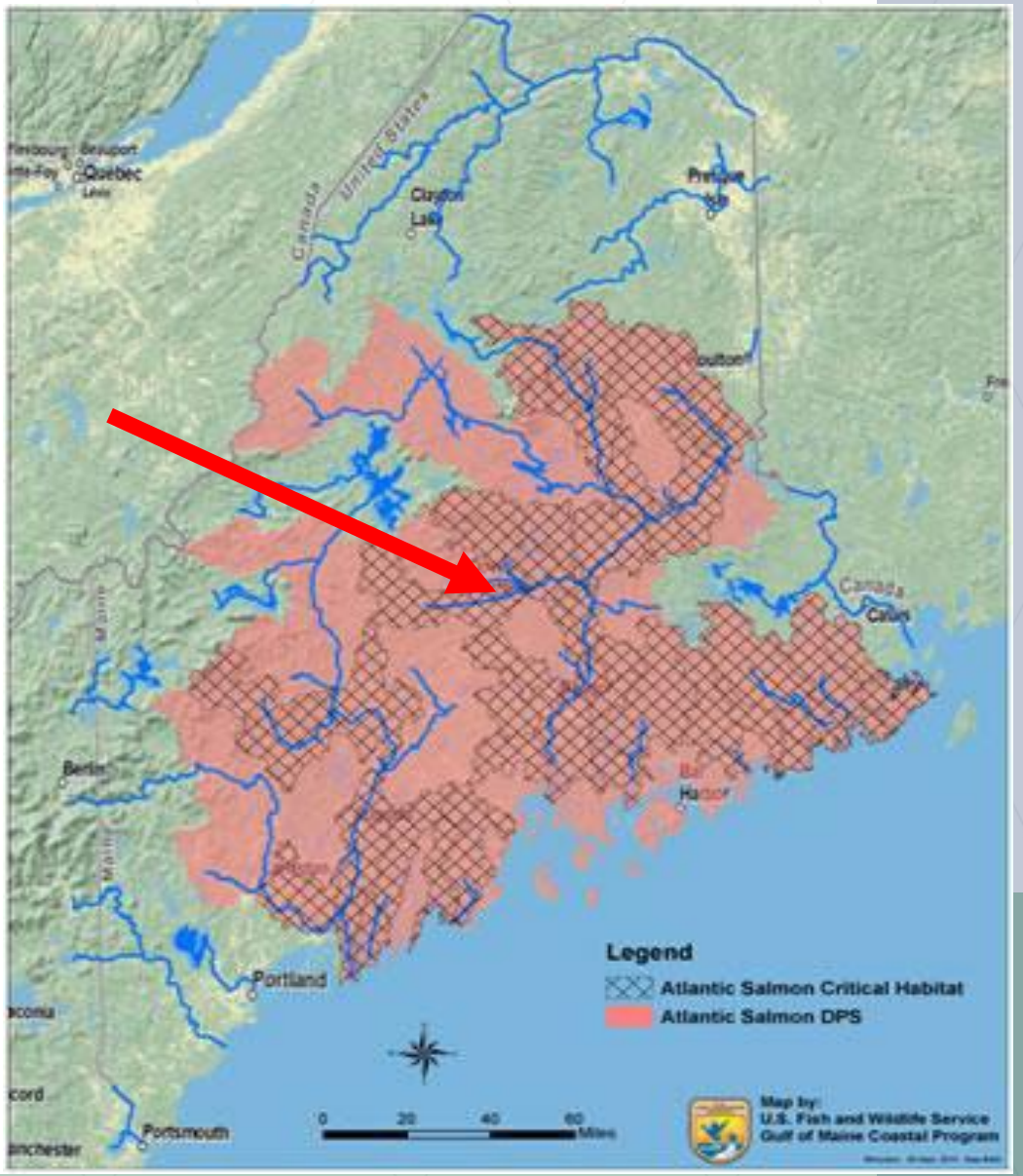
- Why is fish passage a factor?
- What is fish passage?
- What are the types of fish passage options?



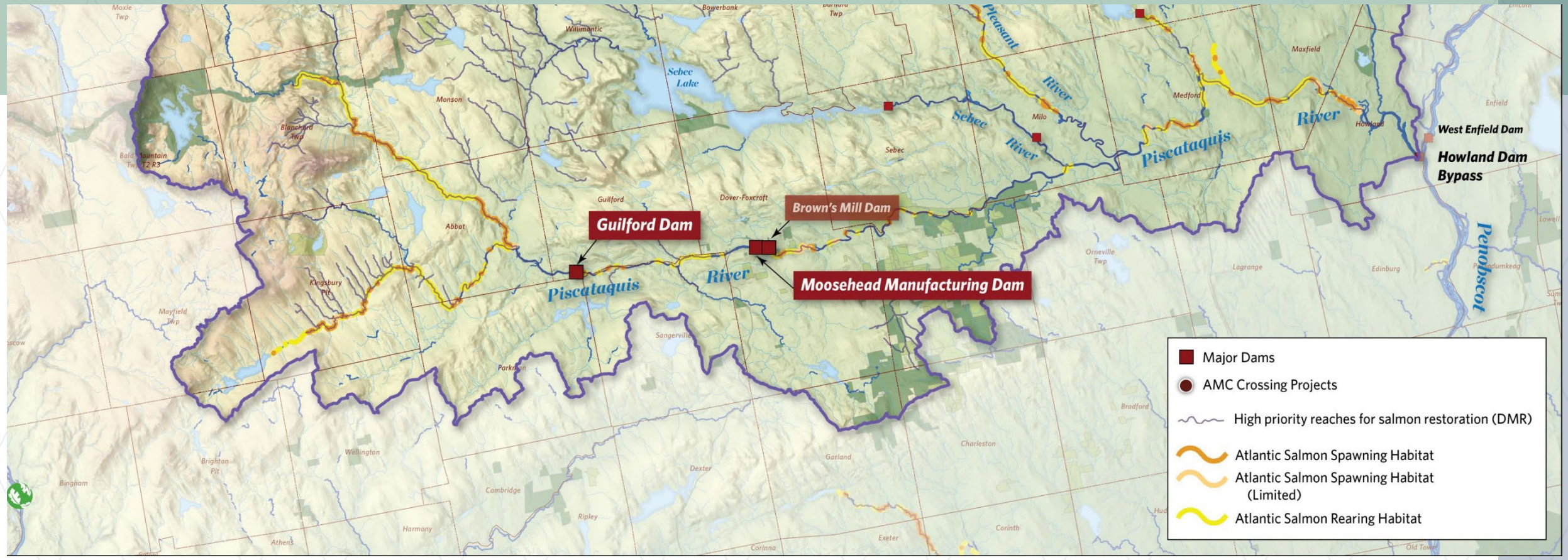
Funding for this work is provided by NOAA Fisheries through the Infrastructure and Investment Jobs Act.

Why is fish passage an important factor to consider at Mayo Mill Dam?


OCEAN
Adults
Smolt
Parr
Fry
Alevin
Eggs
Spawning Adults
RIVER


Legend
Atlantic Salmon Critical Habitat
Atlantic Salmon DPS
Portland
Portsmouth
Berlin
Map by:
U.S. Fish and Wildlife Service
Gulf of Maine Coastal Program

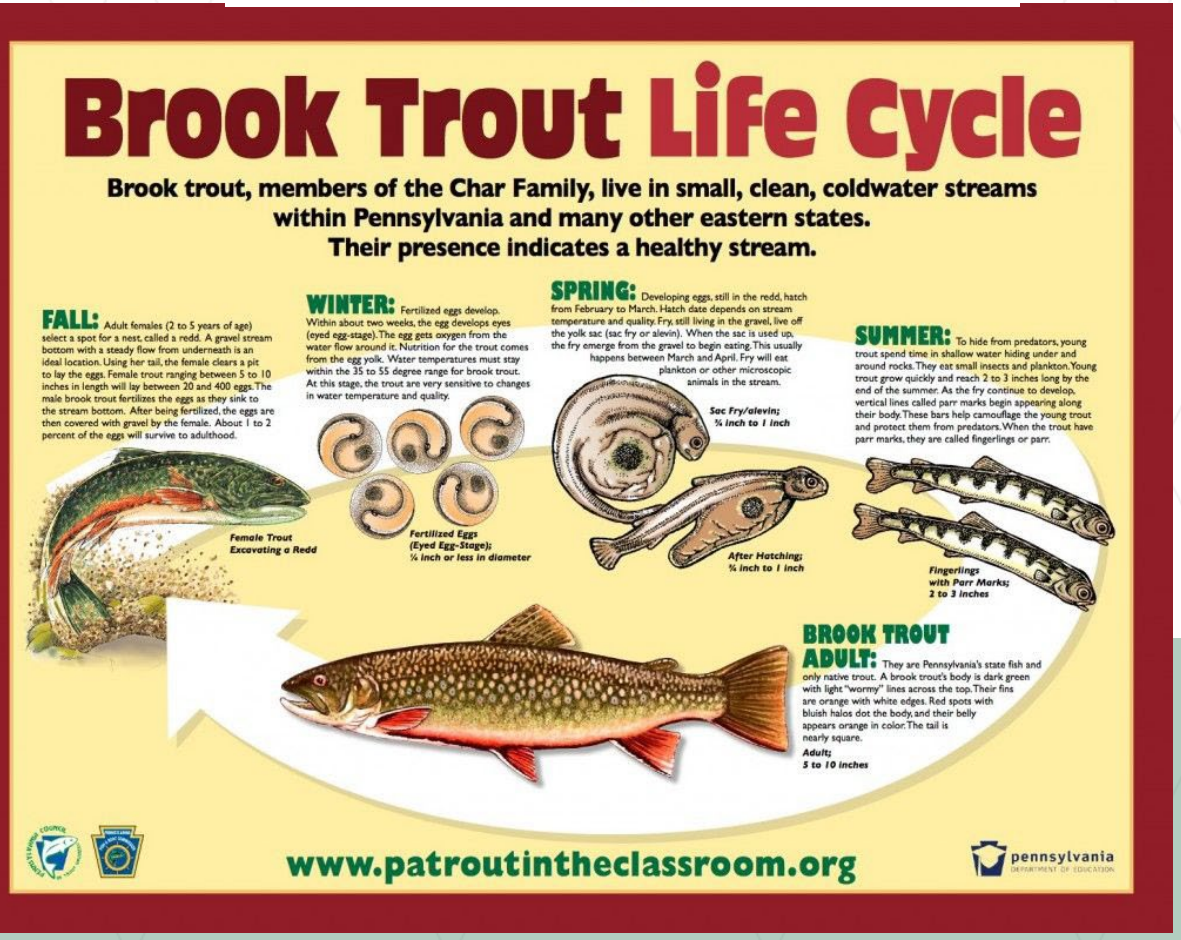
4 of the 124 Atlantic salmon that have migrated past Milford to date.

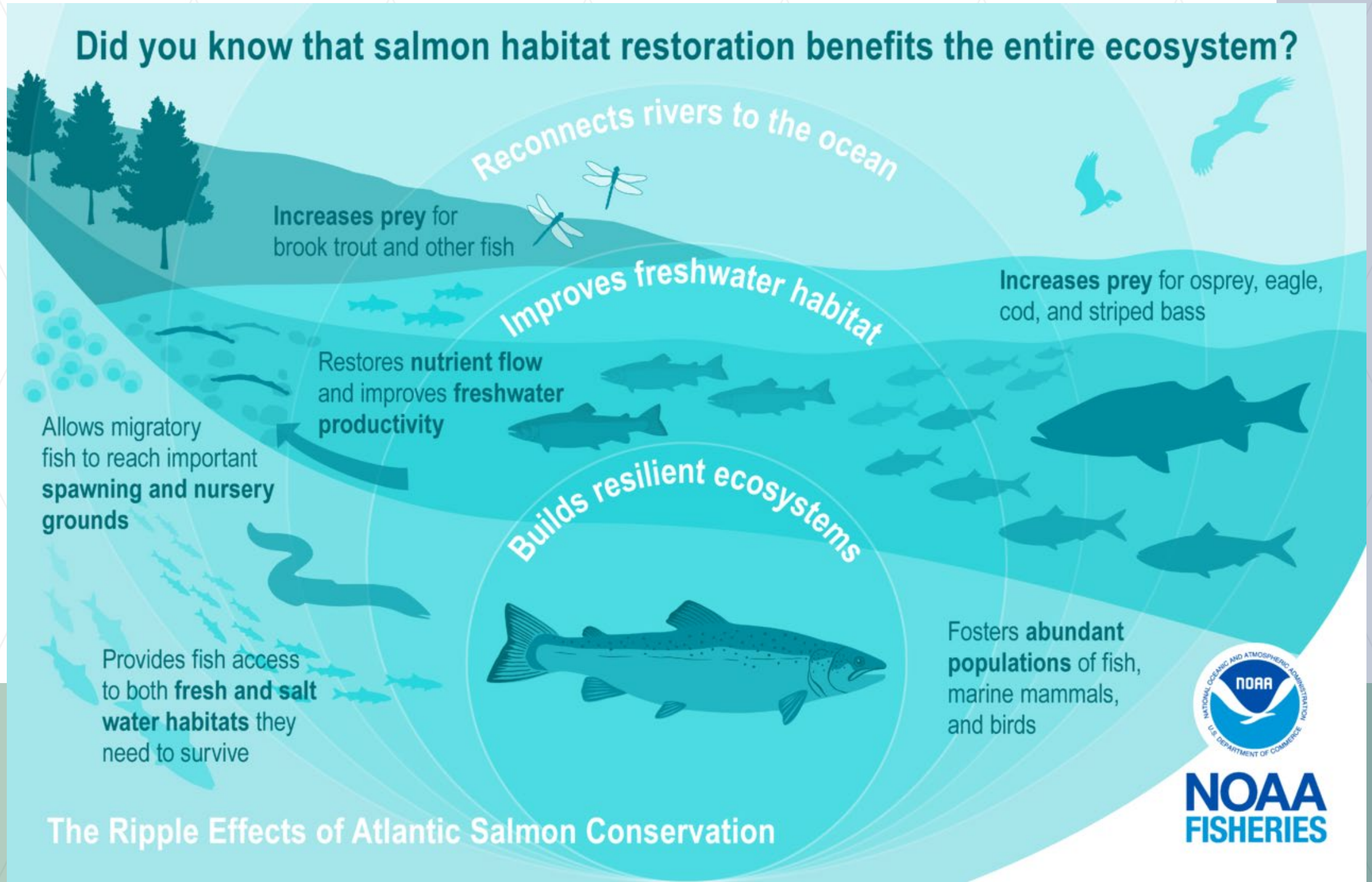


Above both Guilford and Dover-Foxcroft is 280 river miles of climate resilient Atlantic salmon habitat.

Brook Trout (Salvelinus fontinalis)

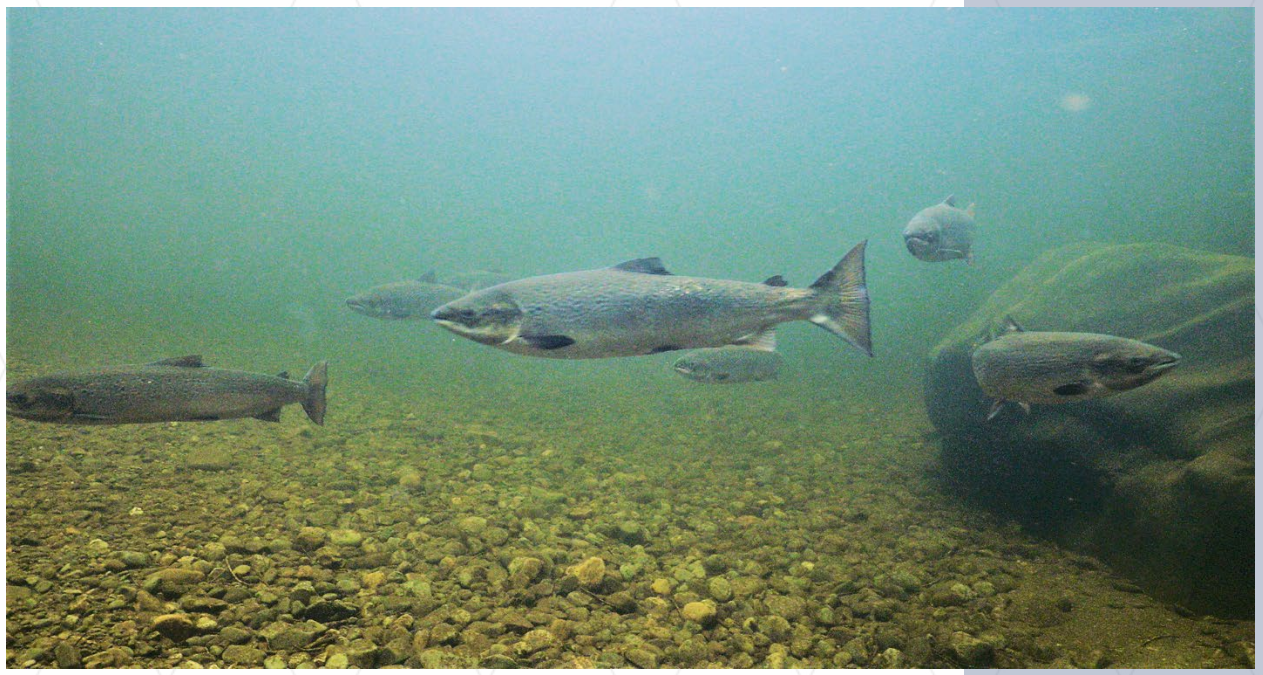
Family Salmonidae, Trouts




Did you know that salmon habitat restoration benefits the entire ecosystem?
Reconnects rivers to the ocean
Increases prey for brook trout and other fish
Improves freshwater habitat
Increases prey for osprey, eagle, cod, and striped bass
Restores nutrient flow and improves freshwater productivity
Allows migratory fish to reach important spawning and nursery grounds
Builds resilient ecosystems
Provides fish access to both fresh and salt water habitats they need to survive
Fosters abundant populations of fish, marine mammals, and birds
The Ripple Effects of Atlantic Salmon Conservation
NOAA FISHERIES

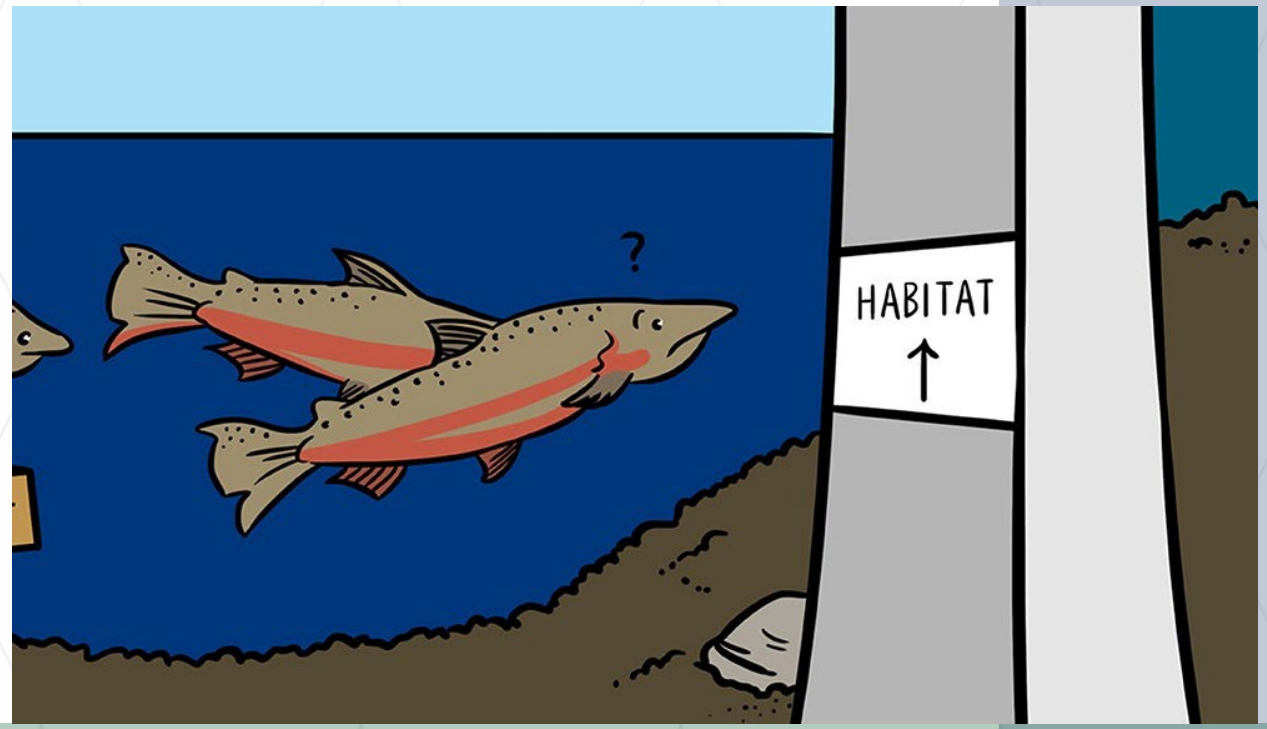
What is fish passage?

Fish passage is providing safe, timely, and effective upstream and downstream movement of fish past a barrier.



Safe

- No death of the fish
- No delayed mortality or a physical condition that impairs subsequent migratory behavior, growth, or reproduction

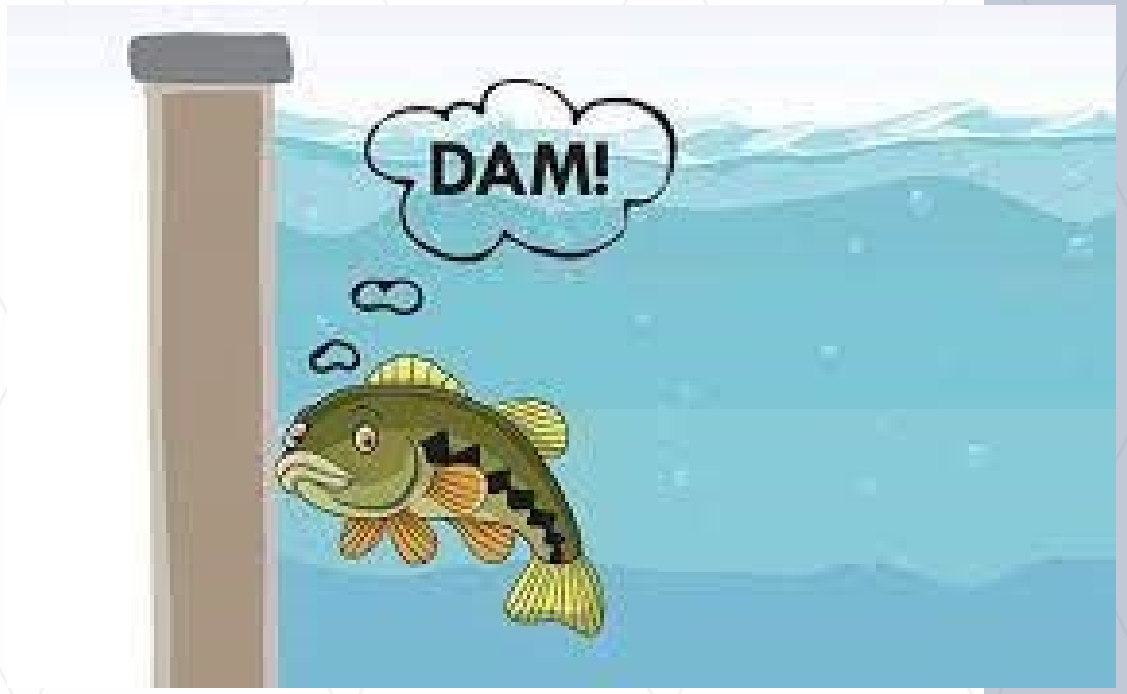


Timely

- No significant delay

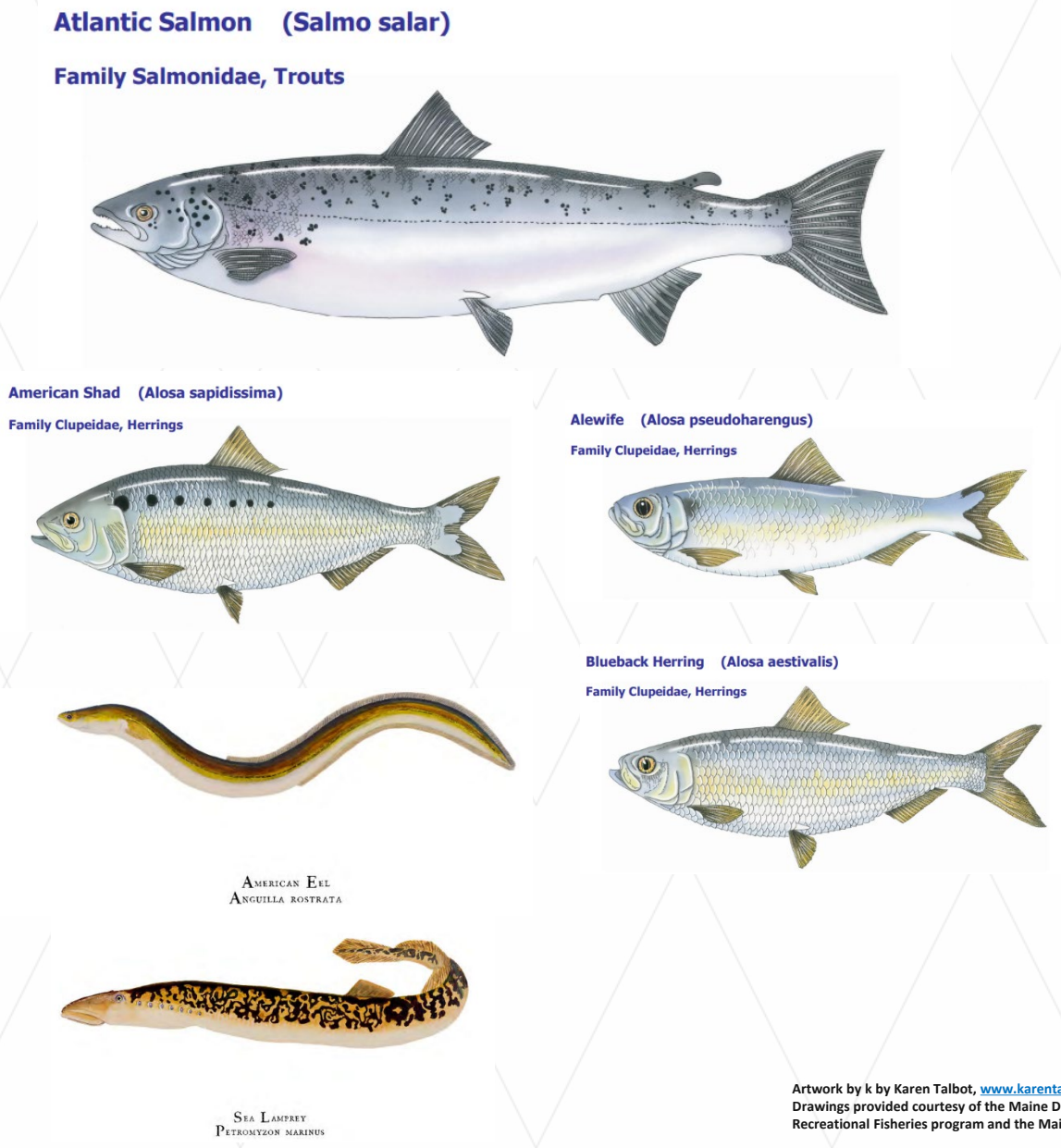
Effective

- Attraction to entrance
- Biological capacity
- Actual passage success
  - NMFS has set a performance standard of 95%



Sea-run fish as required by fishery agencies:

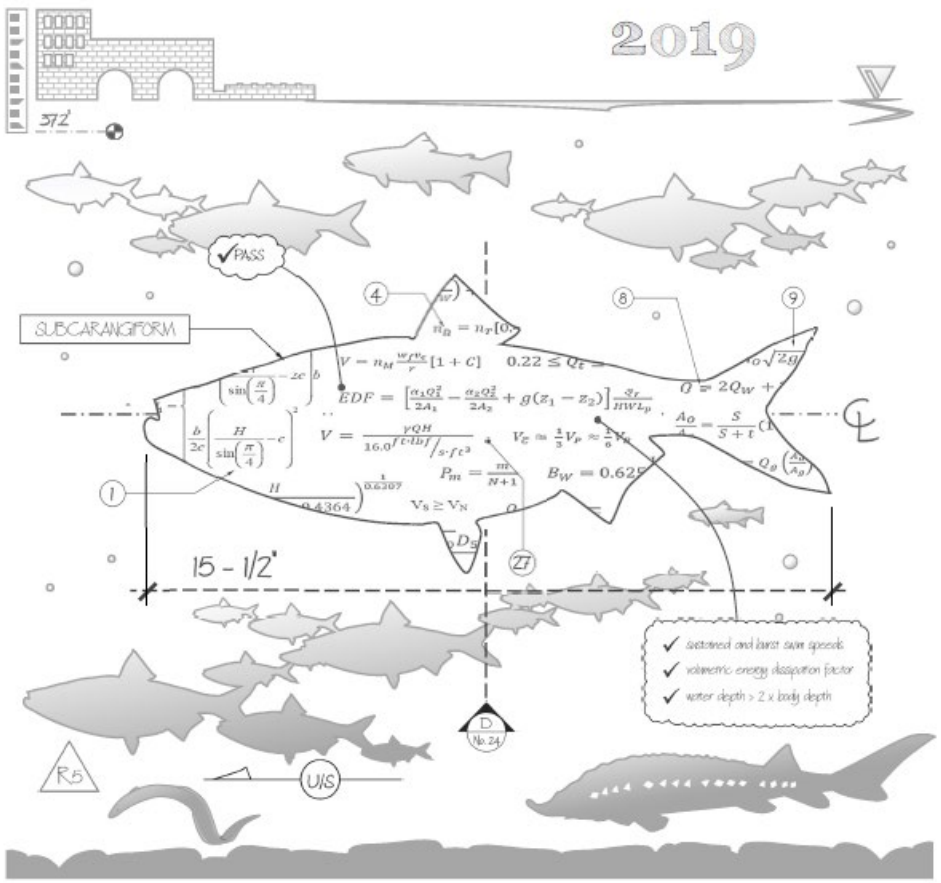
- Current:
  - Atlantic salmon
  - American eel
  - Sea lamprey
- Potential future:
  - Blueback herring
  - Alewife
  - American shad



Artwork by k by Karen Talbot, www.karentalbotart.com
Drawings provided courtesy of the Maine Department of Marine Resources Recreational Fisheries program and the Maine Outdoor Heritage Fund

FISH PASSAGE ENGINEERING DESIGN CRITERIA

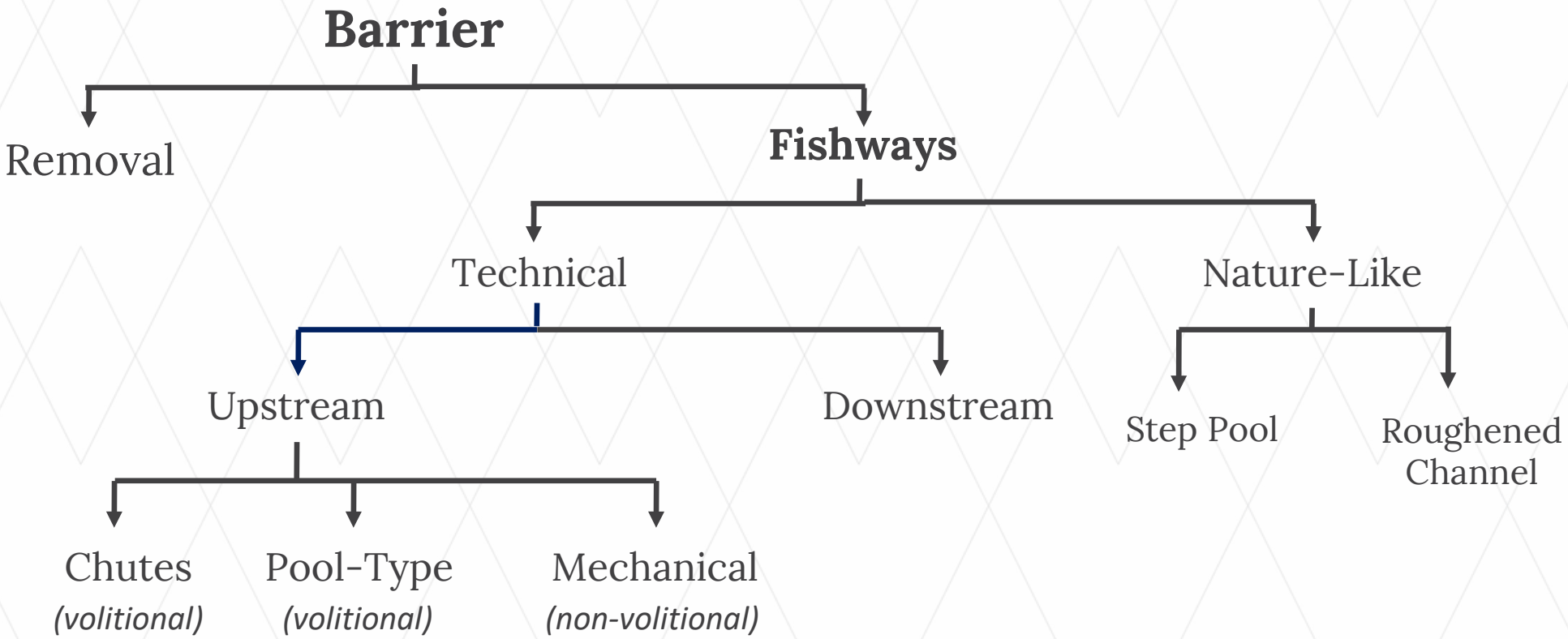
2019



U.S. Fish and Wildlife Service Northeast Region June 2019

Fish and Aquatic Conservation, Fish Passage Engineering
Ecological Services, Conservation Planning Assistance

Fish Passage Options



Attraction

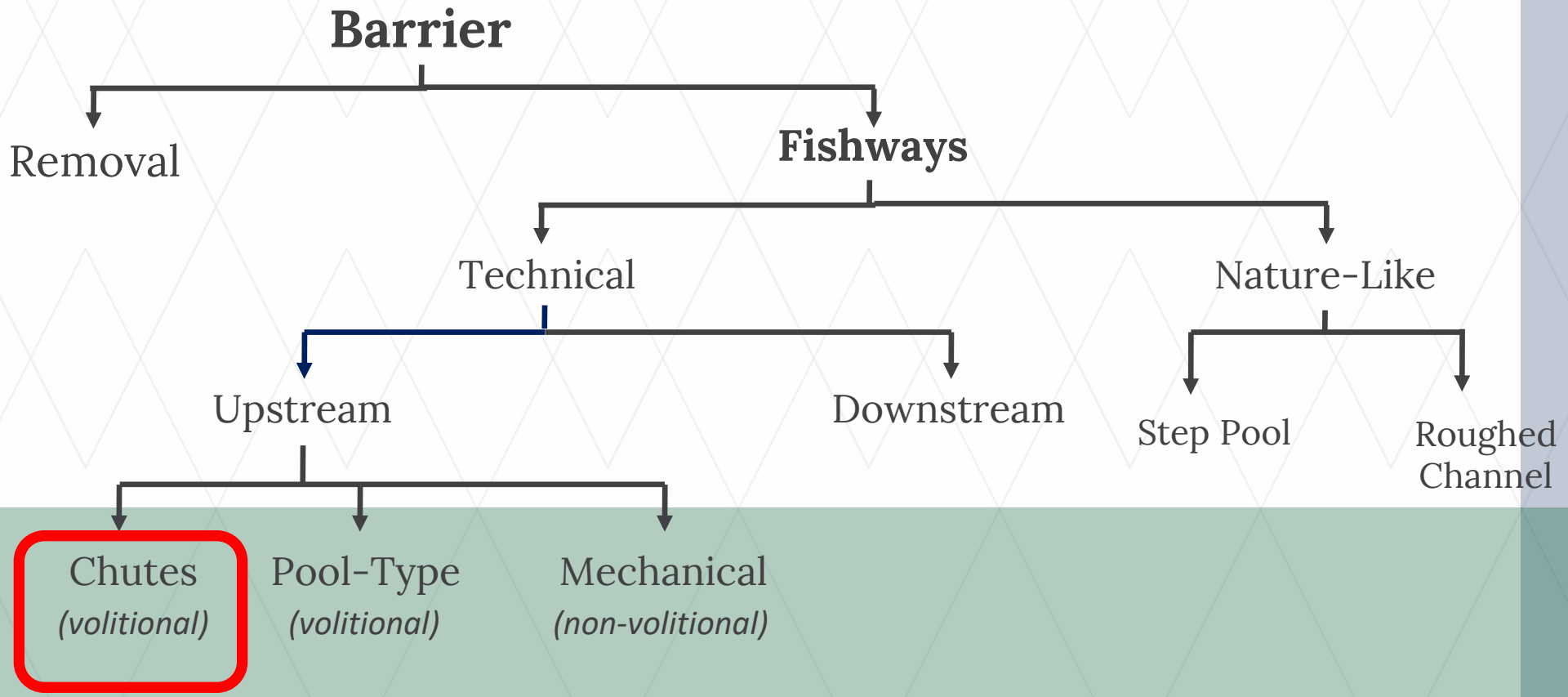

8/2013
Howland
Willow St
Dawes St
Water St
Ring St
River Rd
Coffin St
Lagrange Rd
Keith St
Westside Ln
Right-Of-Way
Old County Rd N
Bridge St
County Rd
Terrio St
6
155
116
Google Earth
Imagery Date: 8/23/2013 45°14'21.53" N 68°39'23.02" W elev 136 ft eye alt 3503 ft

Attraction

Technical fish passage

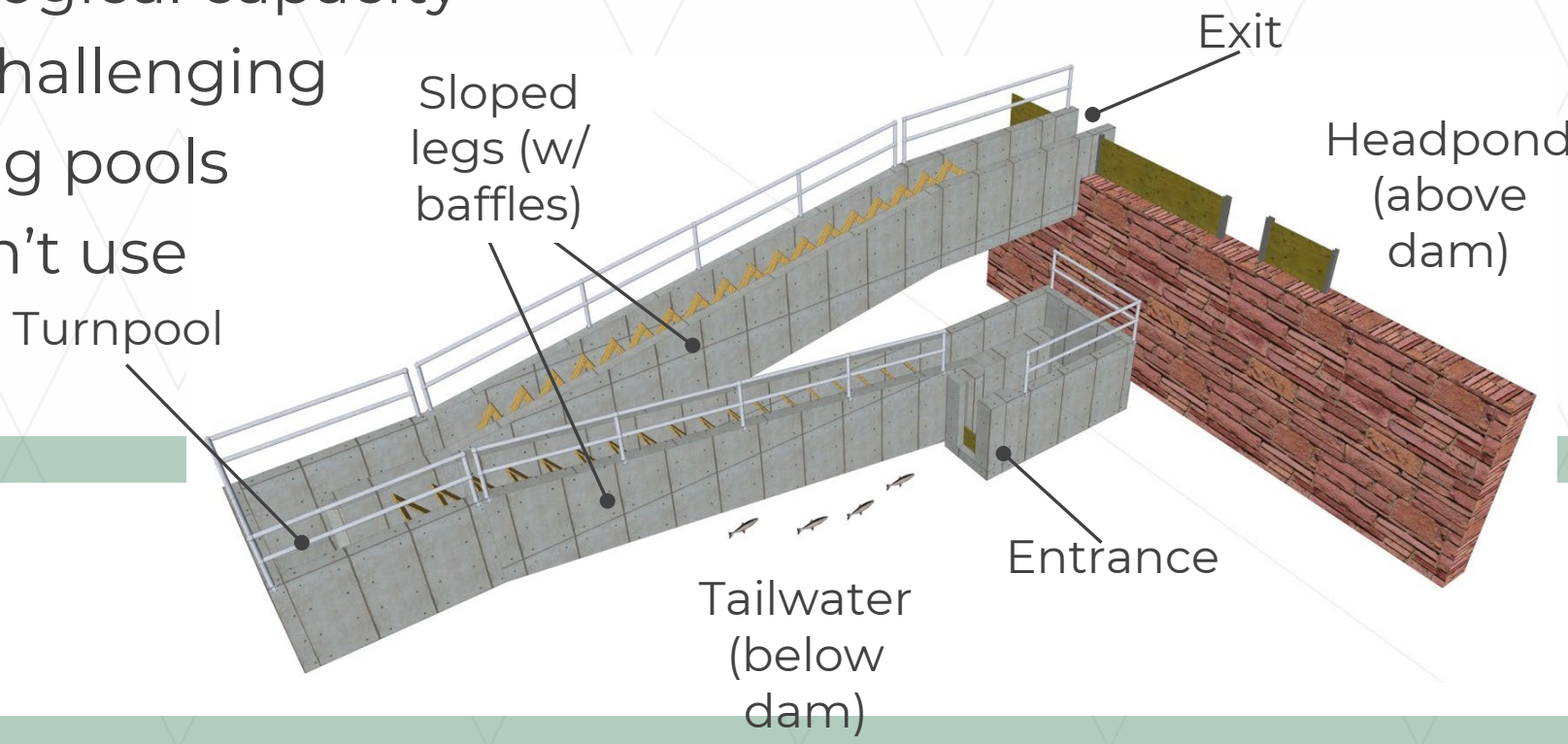
- Made from concrete, steel or wood often comprised of uniform pools, channels, and moving parts
- Upstream and downstream are often separate fishways.
- Requires annual operation maintenance
- Ongoing assessments for standards compliance (safe, timely, effective)

Fish Passage Options



Technical Denil Fishways

- Baffled-chute type fish ladder
- Typically 2-4 foot wide concrete, steel or wood channels
- Typical slopes 10-12.5%
- Flow Range – 5 to 40 cfs
- Moderate biological capacity
- Attraction is challenging
- Require resting pools
- Some fish won't use




Mayo Mill Dam, ME

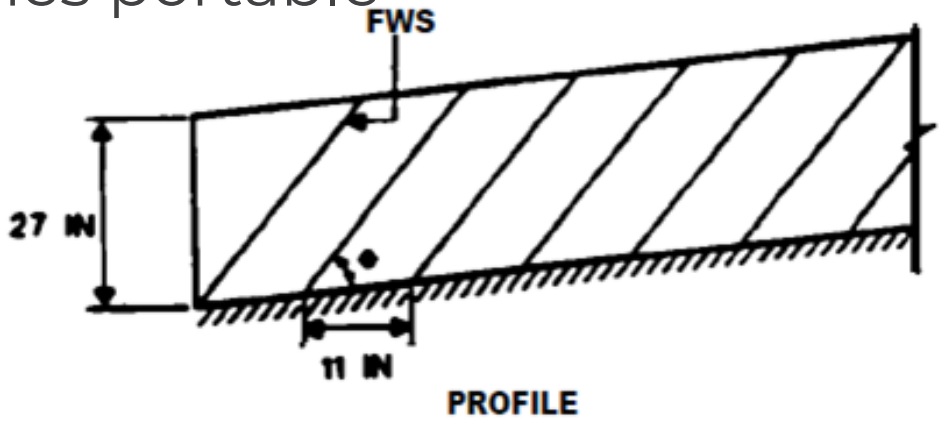
Mayo Mill Dam, ME

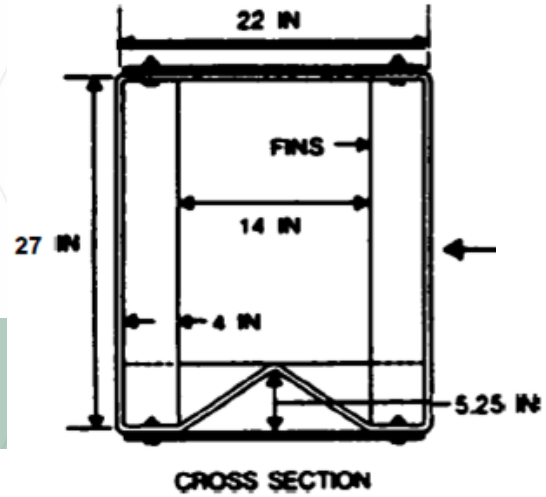
Browns Mills Dam, ME

Pushaw Lake
Hudson, ME

Alaska Steeppass

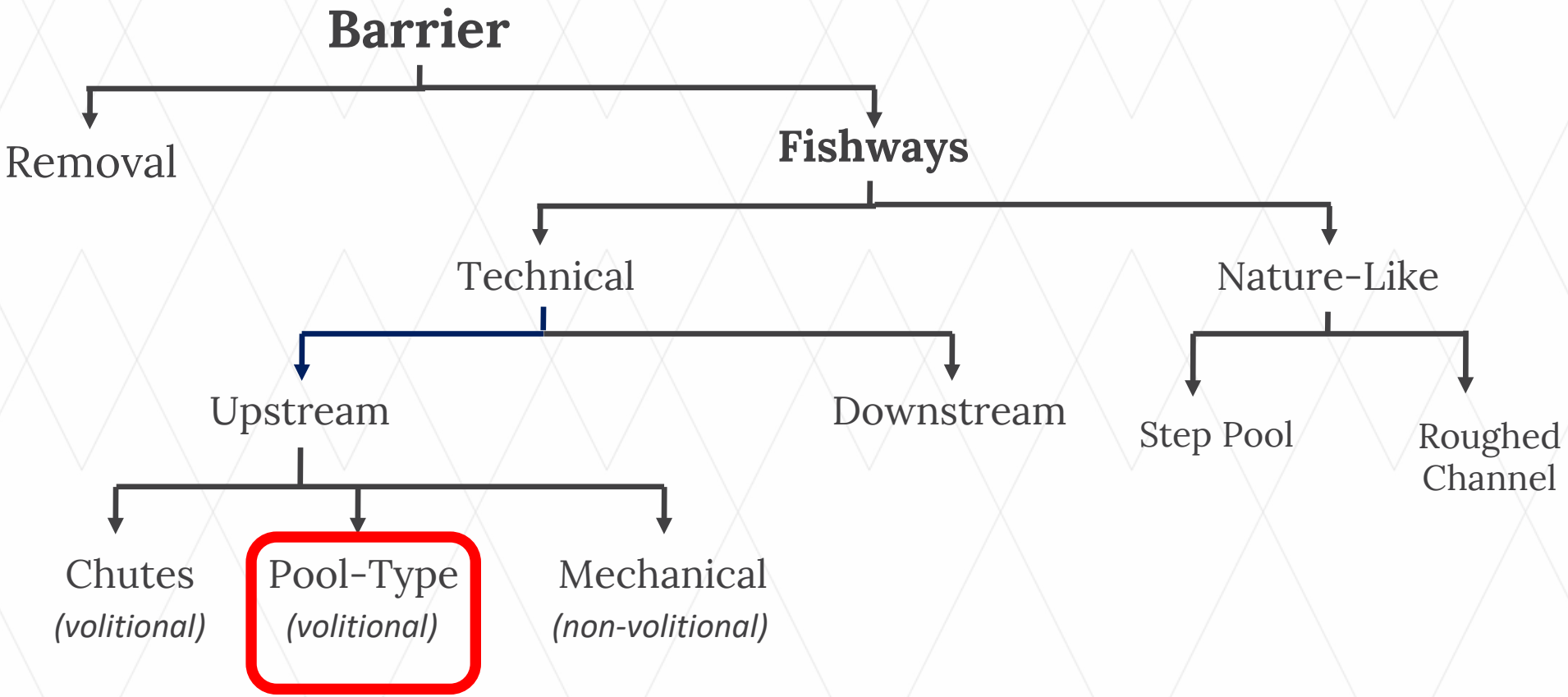
- Baffled-chute type fish ladder
- Similar to but smaller than Denil
- Roughly 2 ft wide by 2-3 ft tall
- Typical for steep slopes (up to 25%)
- Flow Range – 3 to 15 cfs
- Lower biological capacity
- Sometimes portable






Video
Davis Pond
Eddington, ME

Fish Passage Options



Pool-Type (Technical)

- Category of technical fishways
- Provides resting areas between hydraulic drops
- Typically larger footprint than baffled chutes
- Max headpond swing and flows vary

Pool and weir fishway

Damariscotta, ME

Pool and weir fishway
Maine Logging Museum, Bradley, ME

Pool and weir fishway

Togus Pond, ME

Pool and weir fishway

Togus Pond, ME

Pool and weir fishway

Bristol Mills, ME

Pool-and-chute

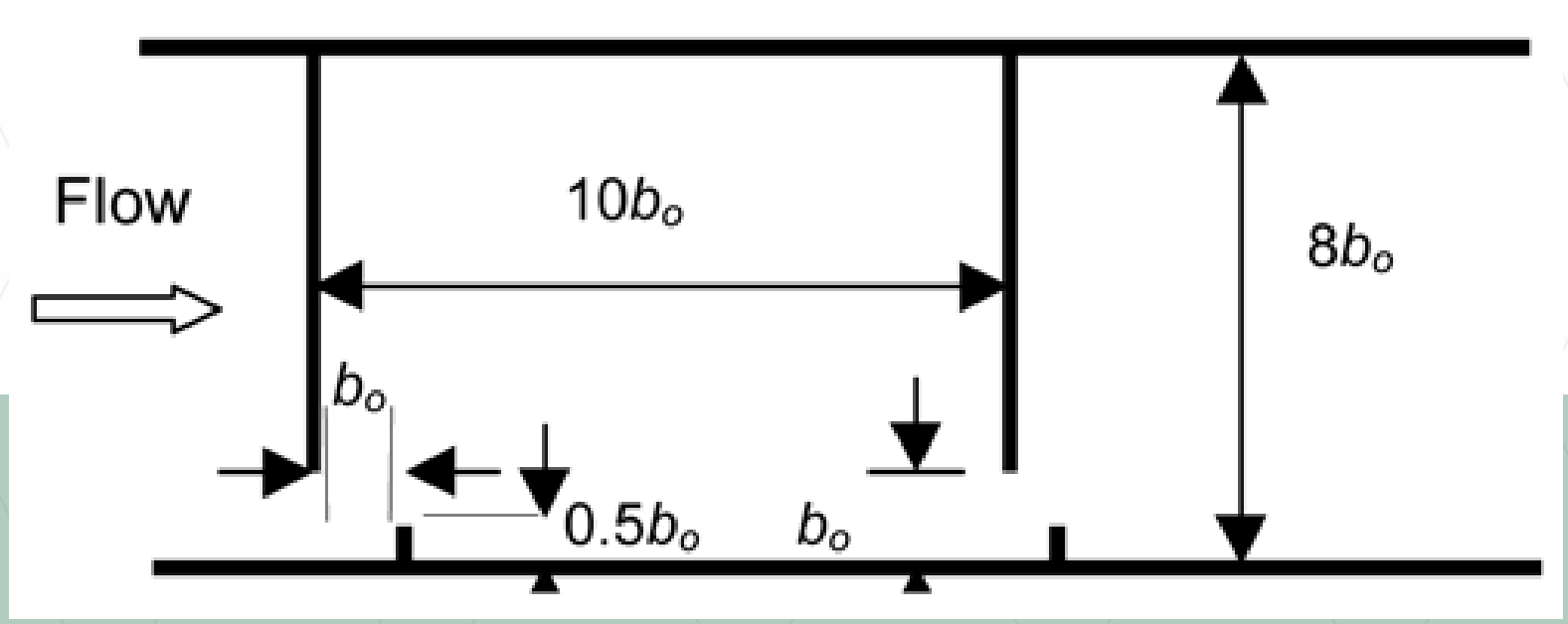
- Typical slopes (5-10%)
- Flow Range – 1-5 cfs


Woolwich, ME


Sebasticook Lake, ME

Vertical Slot Fishway

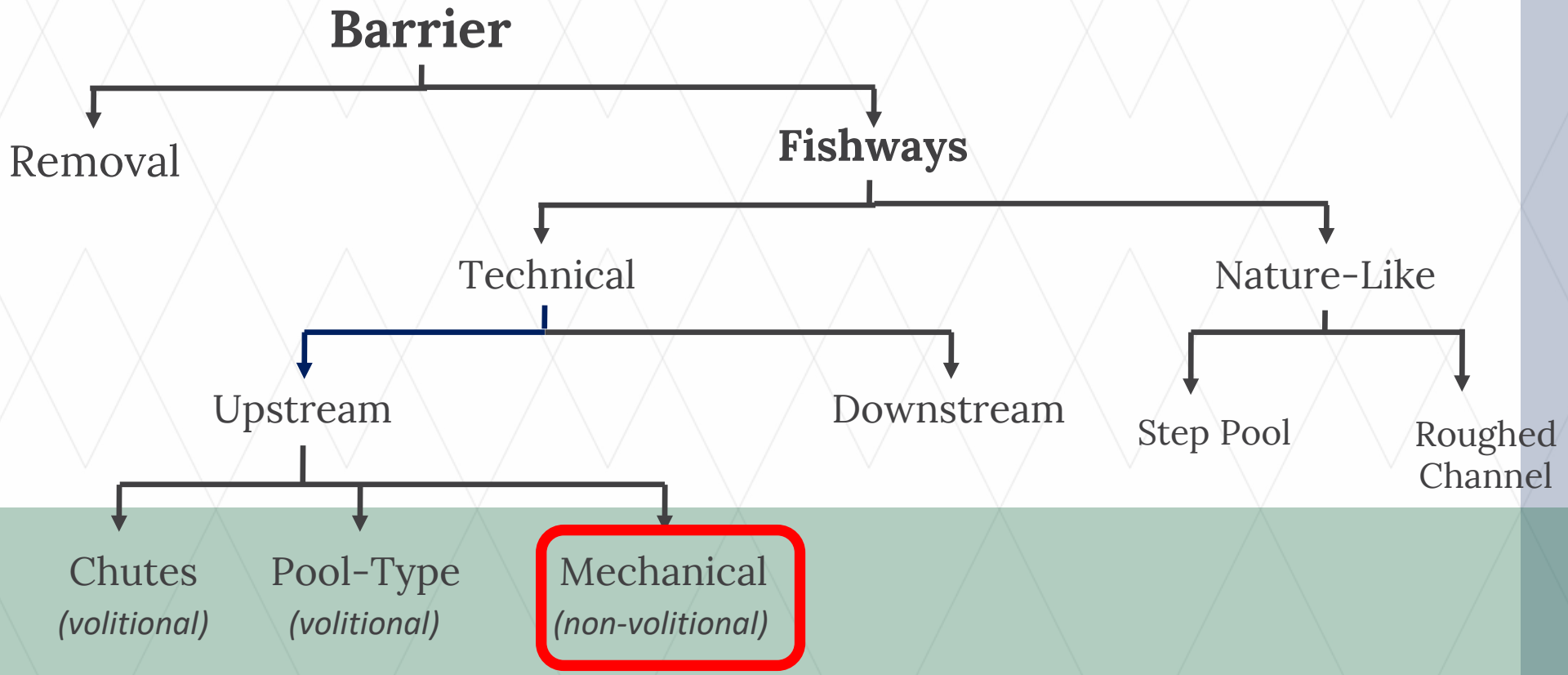
- Typical slopes (10%)
- Typical Flow Range – 20 to 40 cfs (can go higher)
- Maximum headpond swing - unlimited (if you have the money of course)



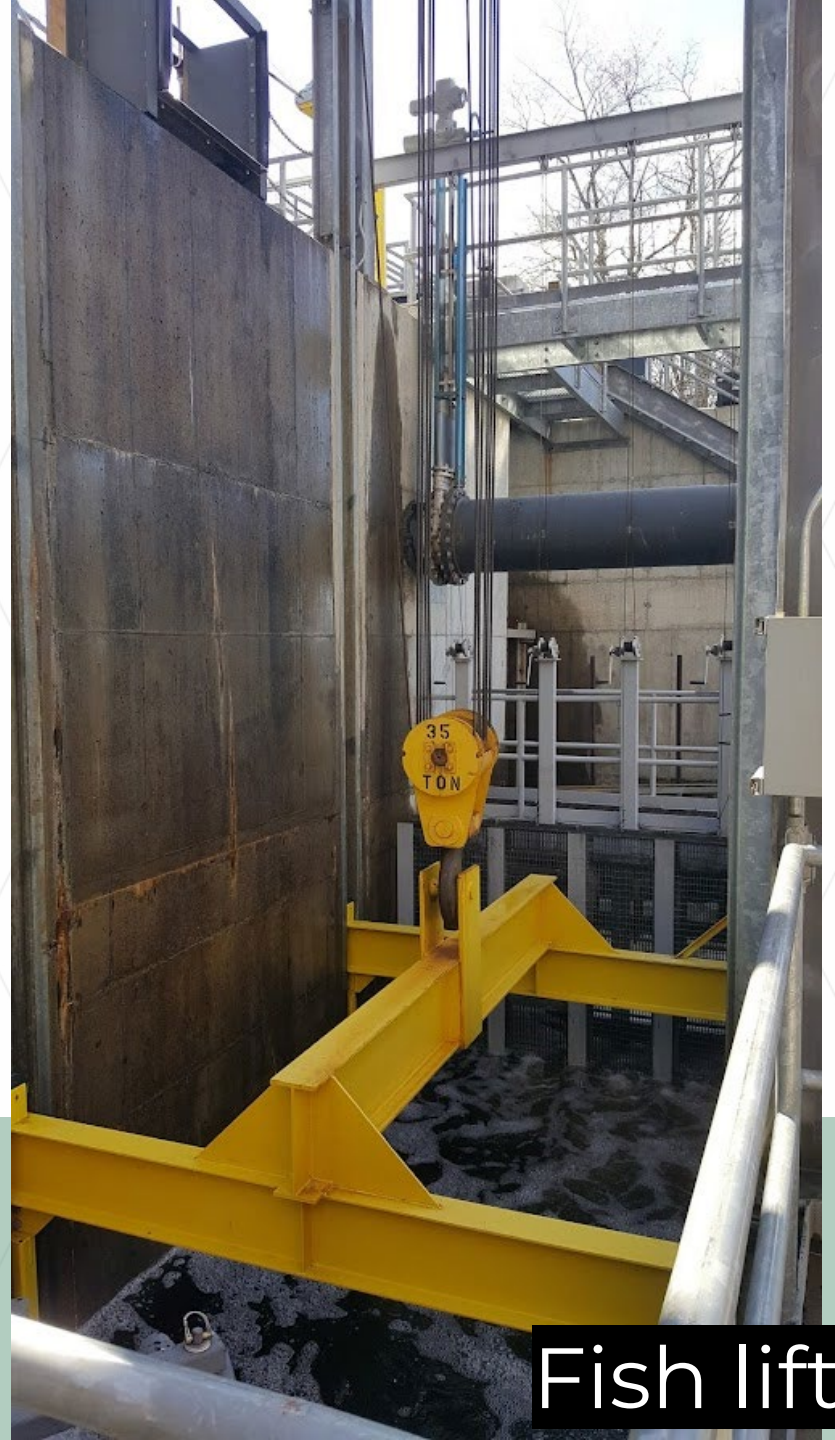
Vertical Slot Fishway (West Enfield, ME)

Flow Direction

Fish Passage Options

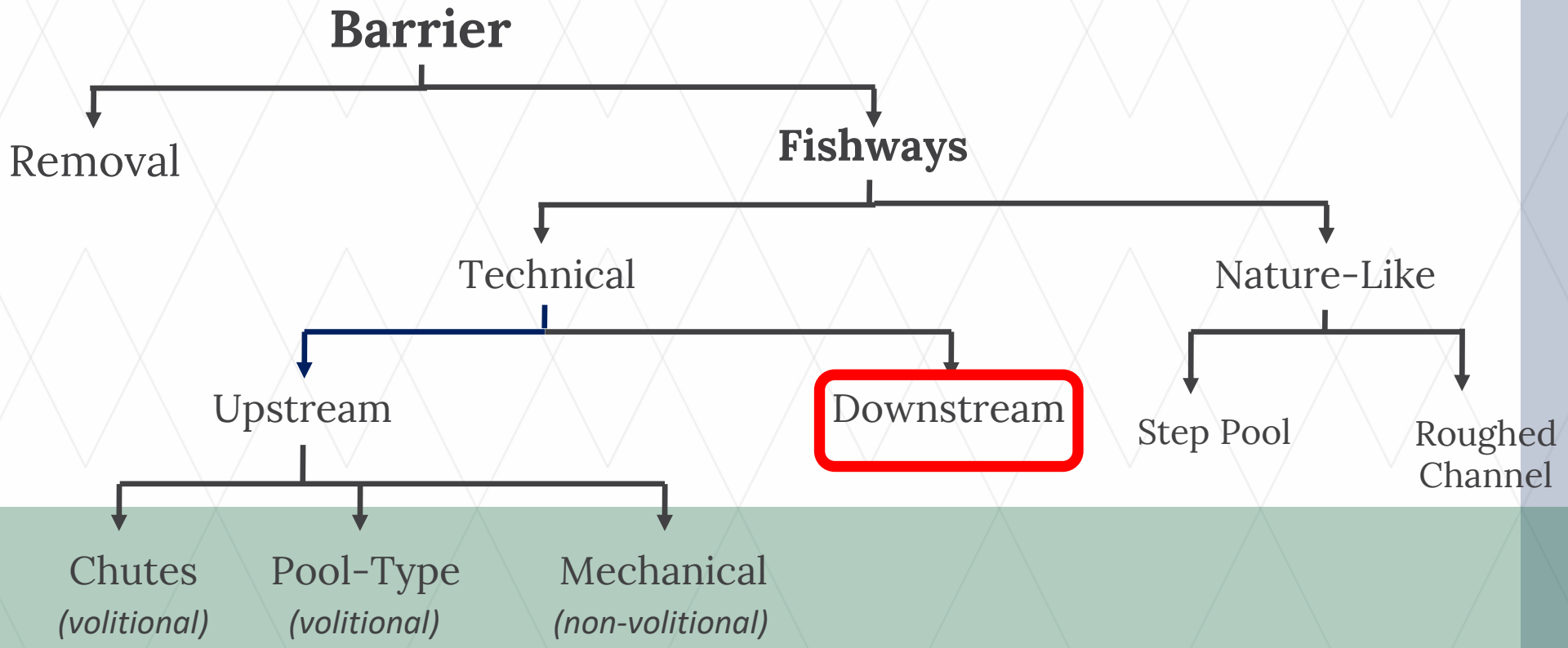


Fish Lift, Milford Dam, ME



Fish lift, Milford, ME

Fish Passage Options



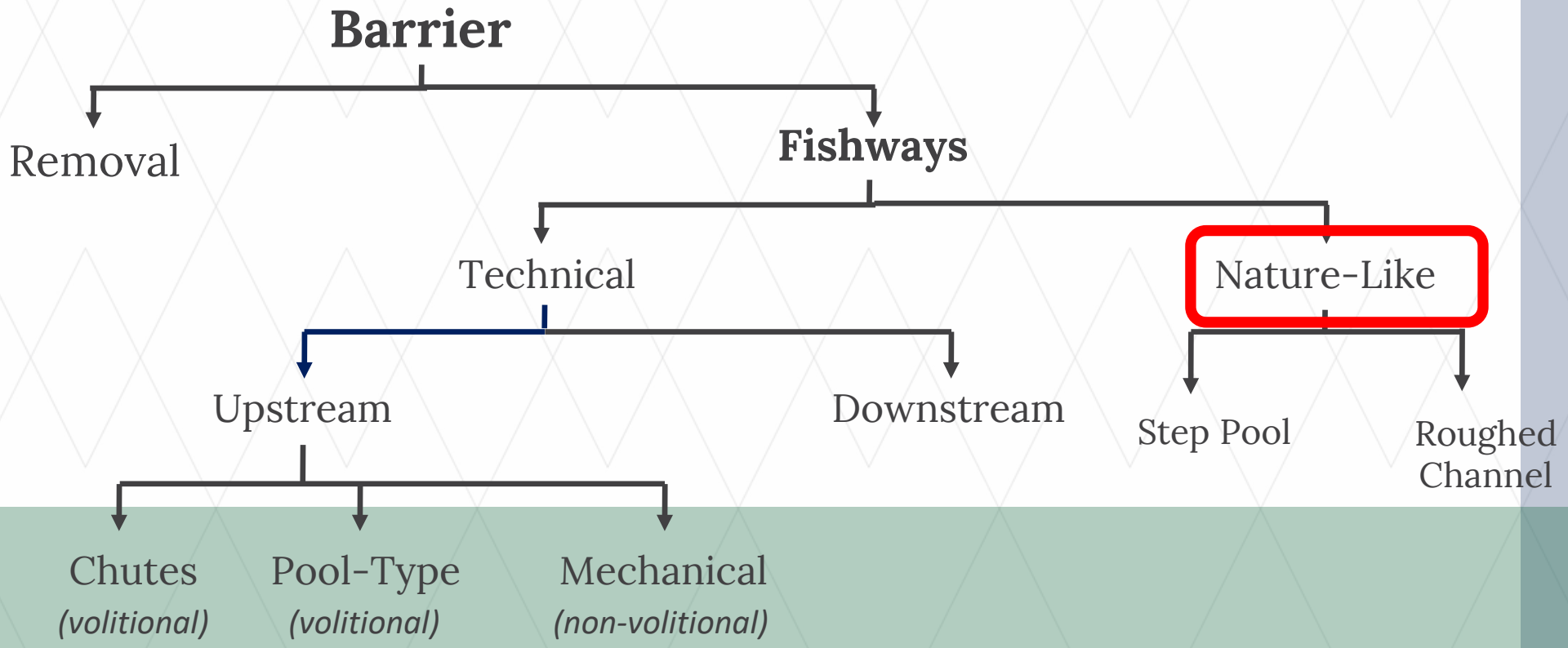
Downstream passage

Howland, ME

Downstream passage

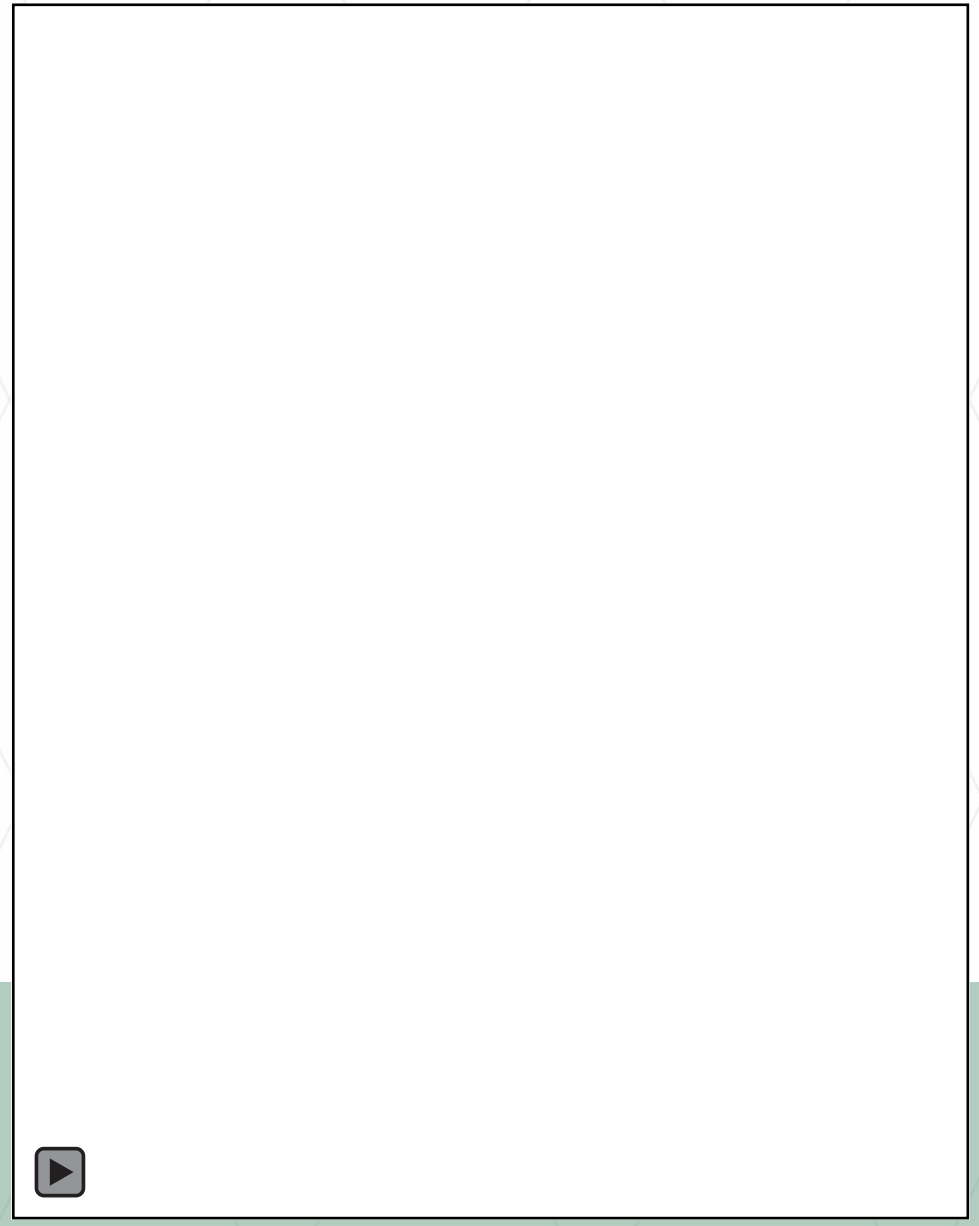

NOAA / Steve Brooke

Fish Passage Options



Nature Like Fishway – Create Intuitive Currents

Video of Step Pool Nature Like Fishway



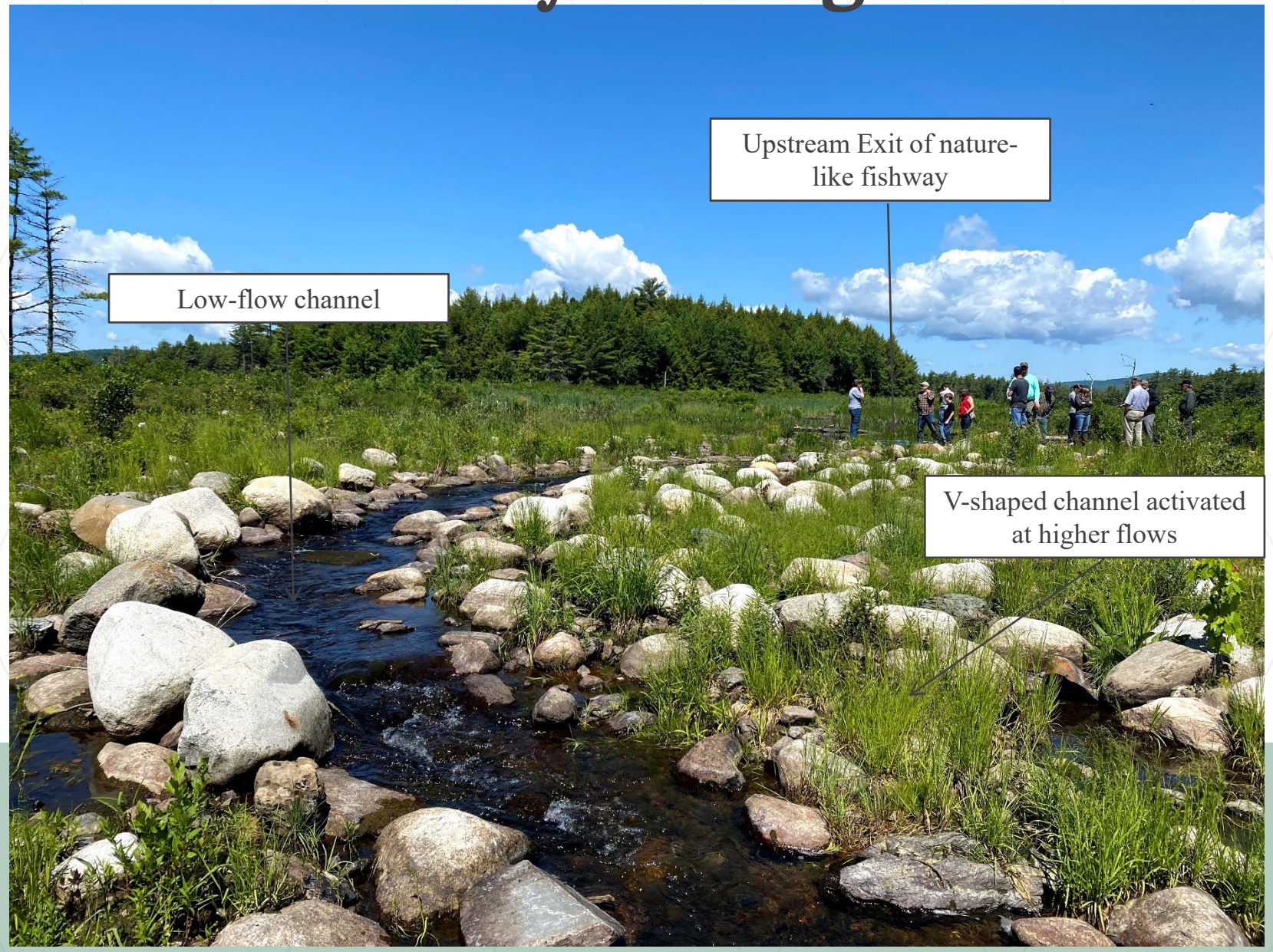
East Branch Lake, ME

Nature Like Fishway – Step Pool Examples

Nature Like Fishway – Roughened Channel

South Branch Lake, ME

Nature Like Fishway – Roughened Channel



South Branch Lake, ME

Nature Like Fishway – Roughened Channels

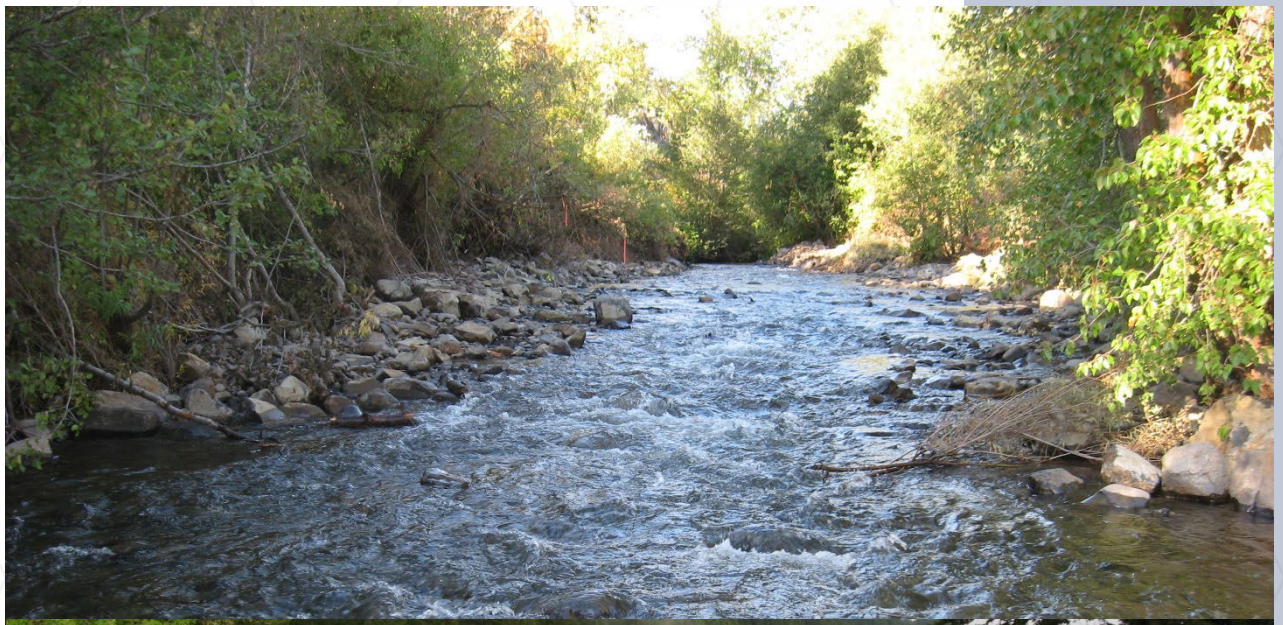
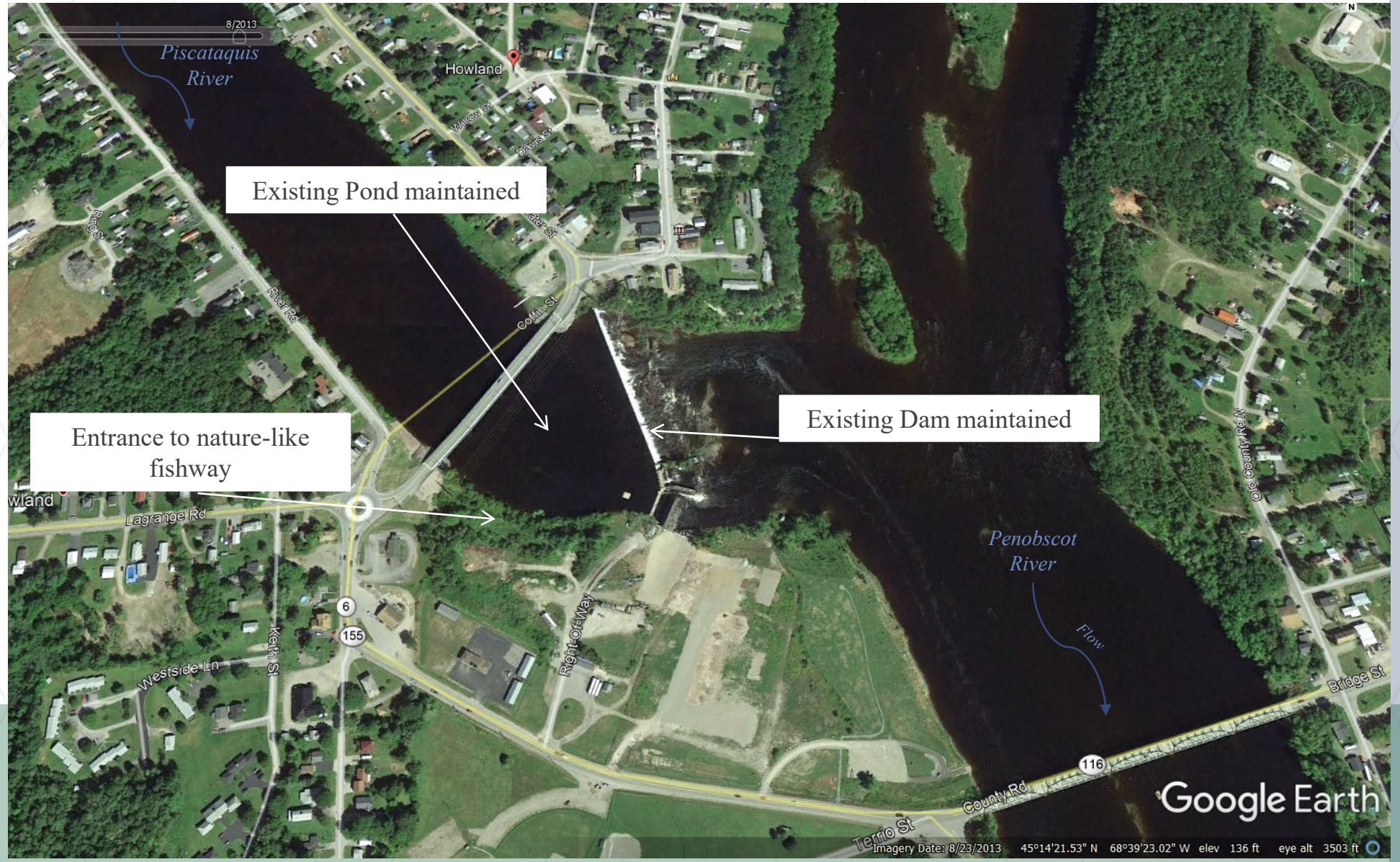
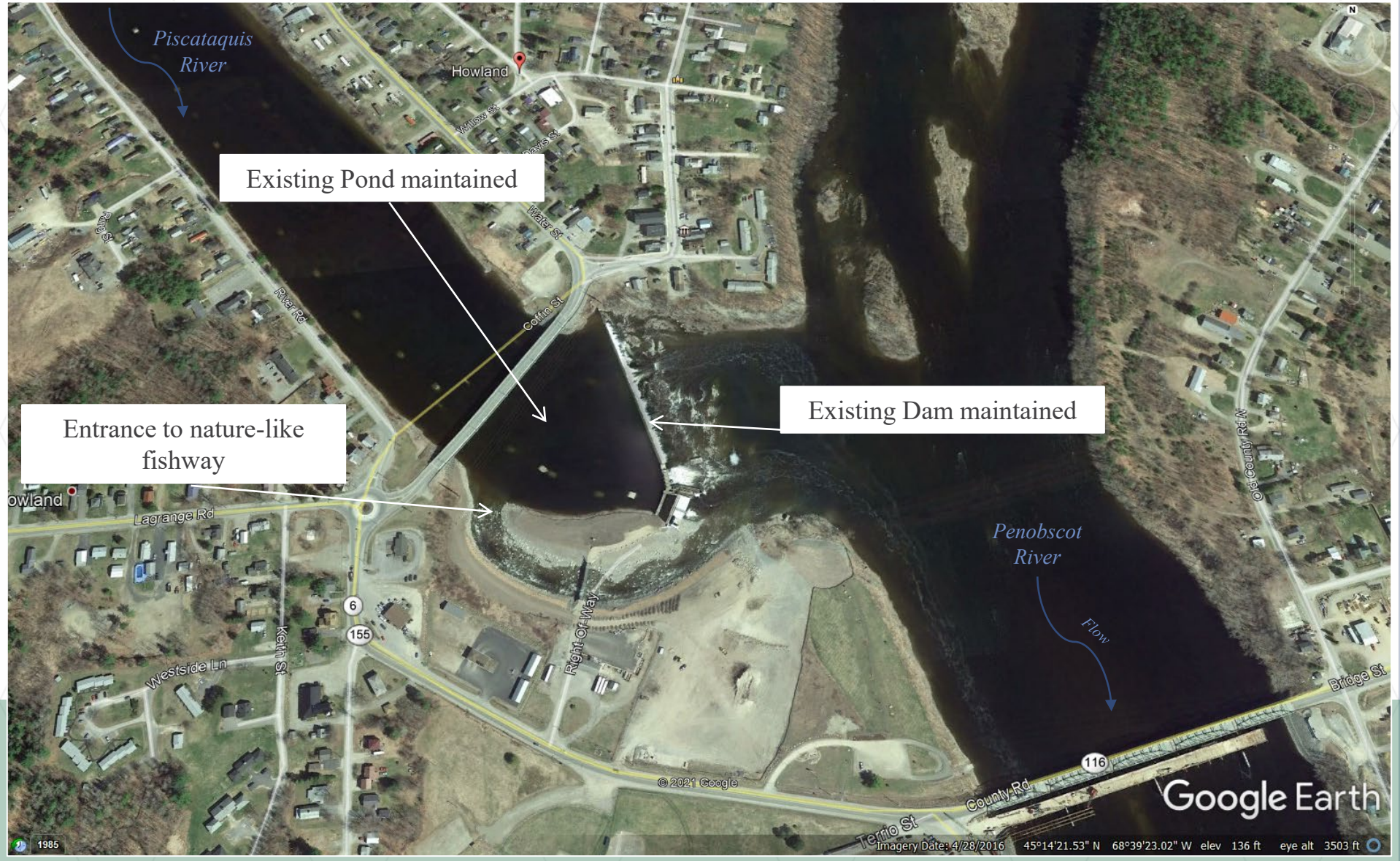


Photo of restored Trout Cr. (Wind R. basin) courtesy of USFS

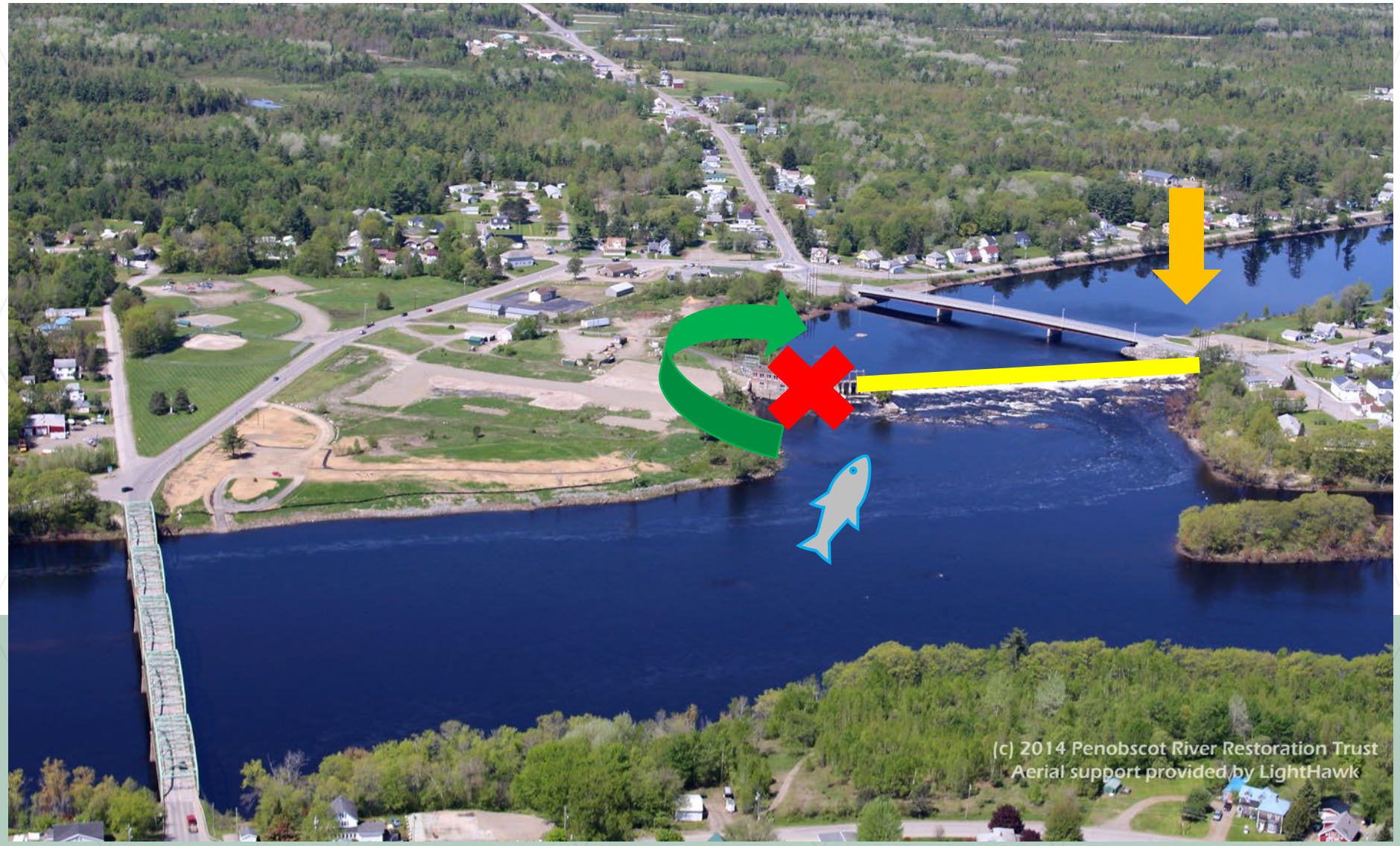
BEFORE Howland Fishway



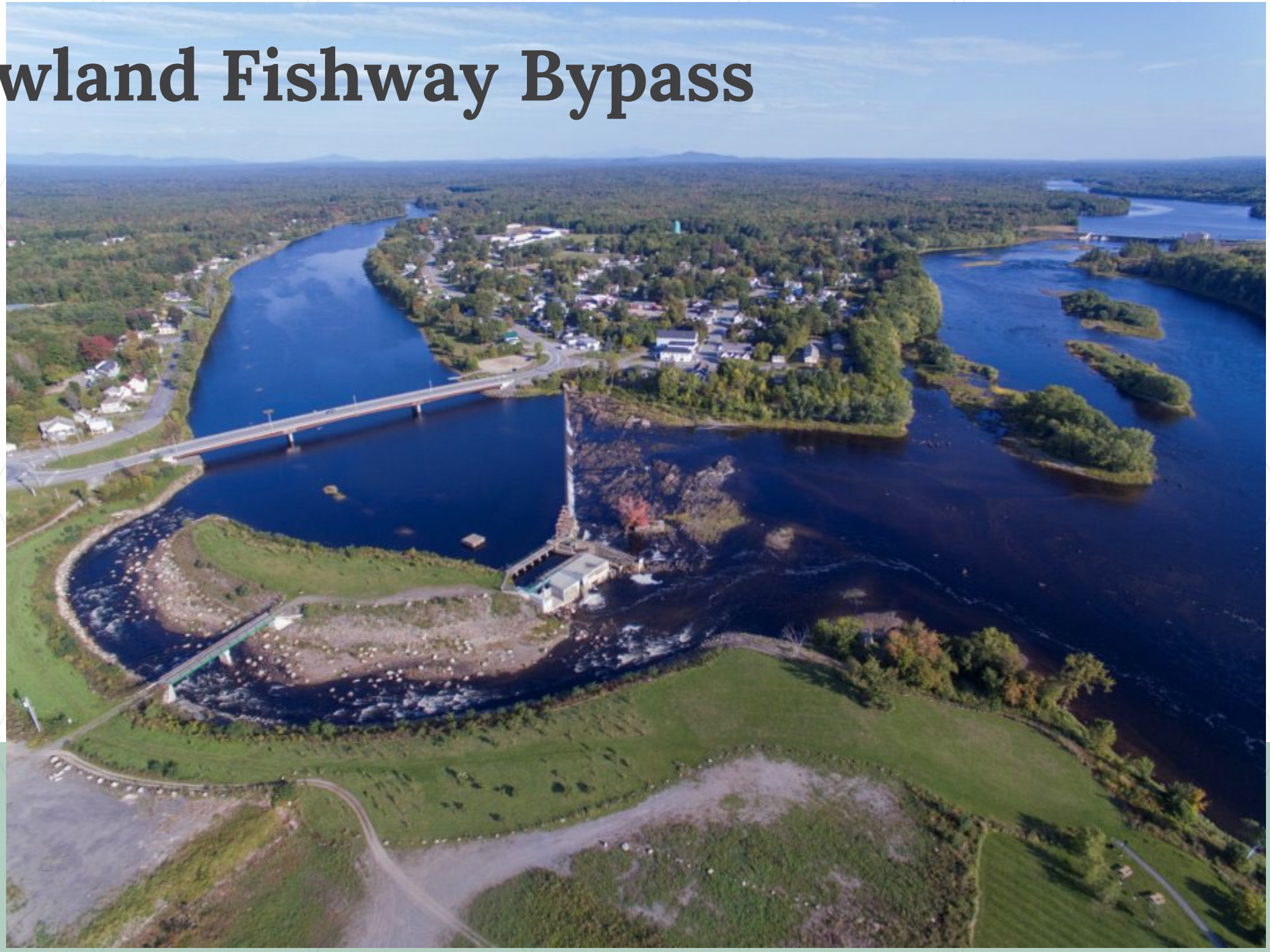
Howland Fishway – Bypass



BEFORE Howland Fishway Bypass



Howland Fishway Bypass



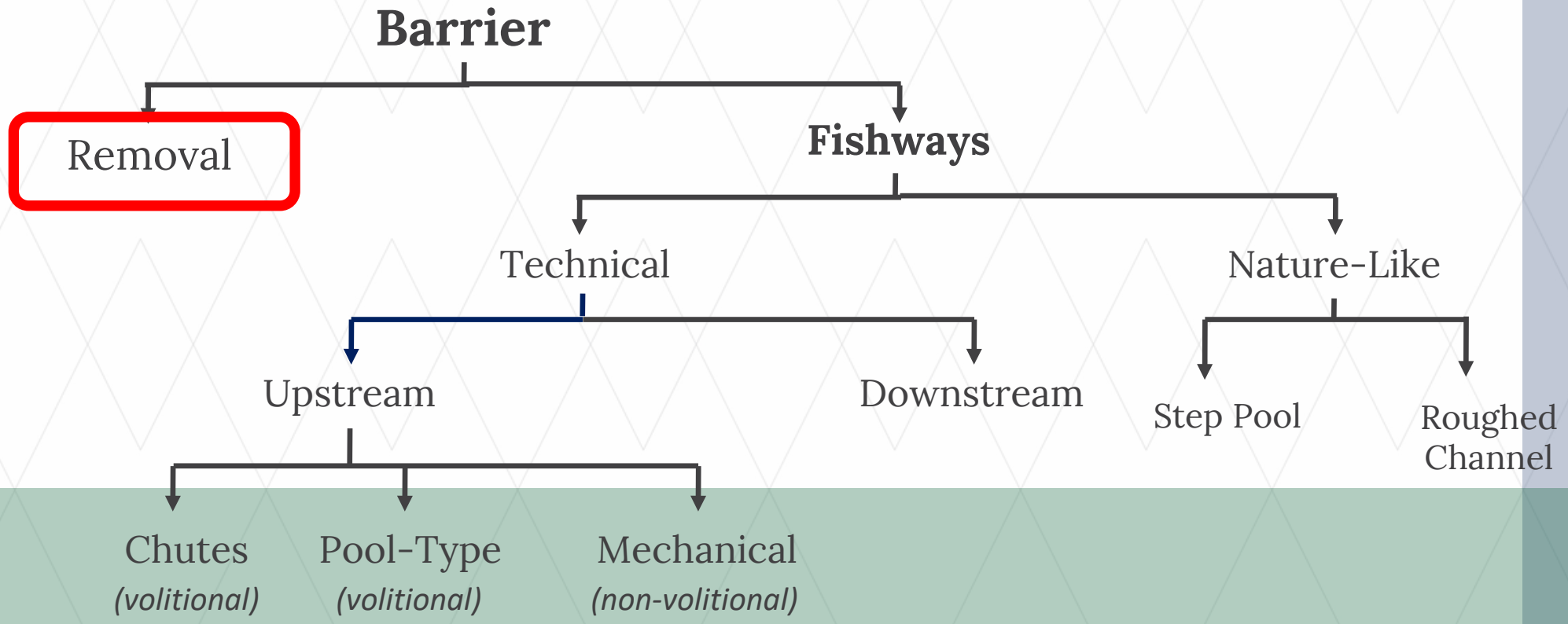
Nature Like Fishway + 2 Denil Fishways

Westbrook, ME

Table 4. Passage effectiveness rates of the double denil fishway (Denil), nature-like fishway (NLF) and the entire site.

Metric	Denil	NLF	Entire Site
Attempts	65.79%	96.00%	63.16%
Individuals	73.13%	95.92%	70.15%

Fish Passage Options




West Winterport, ME


West Winterport, ME


Farmington, ME


Farmington, ME


Coopers Mills, ME


Coopers Mills, ME


Marland Place, MA


Marland Place, MA

Sandy River, ME


Sandy River, ME

Questions?

Nature Like Fishway + 2 Denil Fishways

Westbrook, ME


Coopers Mills, ME


Coopers Mills, ME