The Life History and Management of Alewife (*Alosa pseudoharengus*)

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The Biology and Management of Alewife (*Alosa psuedoharengus*)

- Natural history of herring
- Population status & possible causes of declines
- Nature-like fishway research
- Agencies that manage alewife
- New management plan!
- Situation at Herring River, Wellfleet

Anadromous and Catadromous Species

Atlantic Sturgeon

Shortnose Sturgeon

American Shad

Alabama Shad

Hickory Shad

Alewife

Blueback Herring

Skipjack Herring

Gizzard Shad

Sea Lamprey

Atlantic Salmon

Sea-run Brown Trout

Sea-run Brook Trout

Striped Bass

Rainbow Smelt

White Perch

American Eel

Anadromous and Catadromous Species of Wellfleet

Striped Bass

Alewife

Blueback Herring

White Perch

American Eel

Range of Alewife (Alosa pseudoharengus)

Alewife (*Alosa pseudoharengus)*

Upstream spawning migration to natal river

Ocean

Estuary

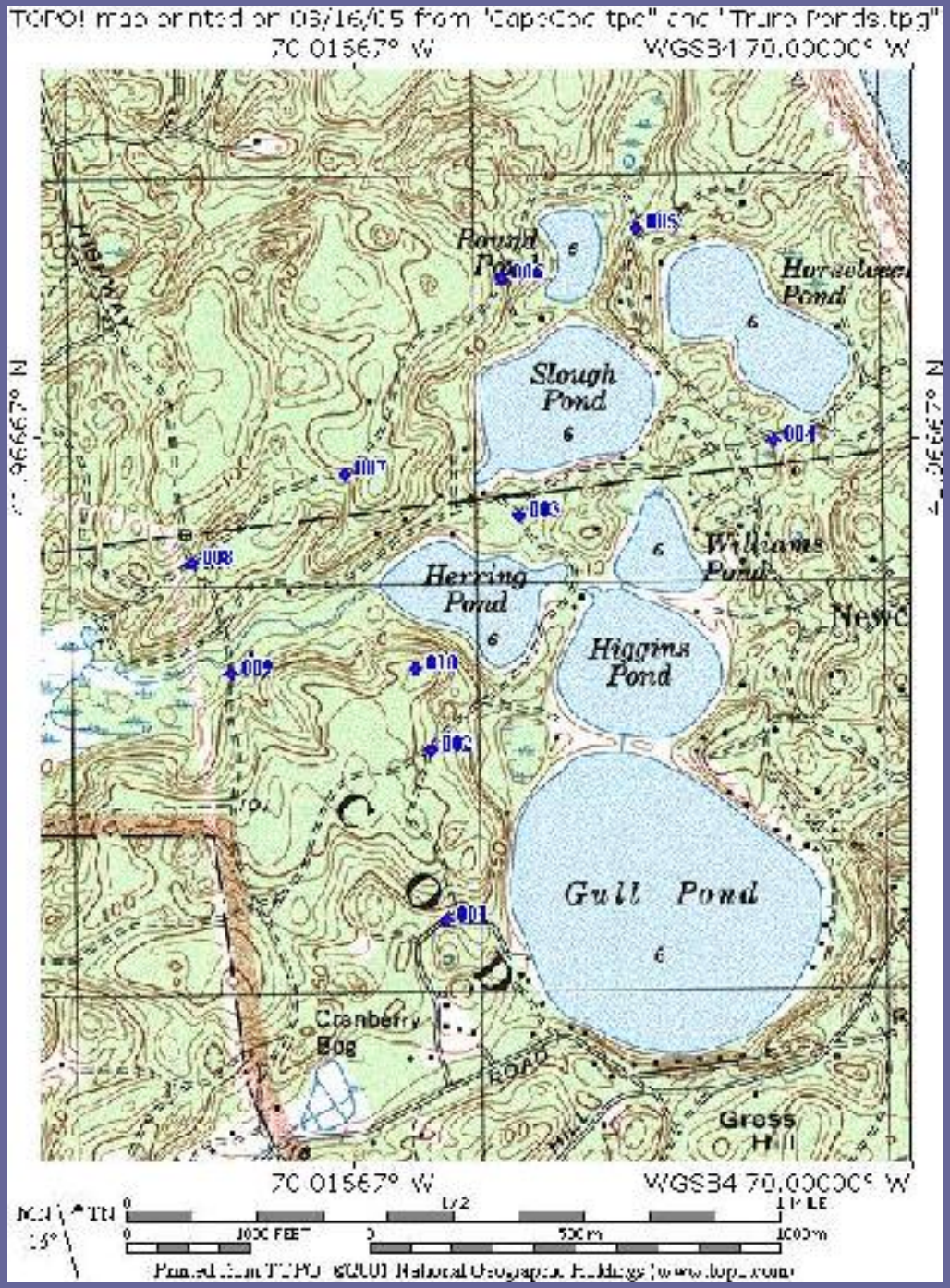
River

Spawning in ponds

Downstream migration

Eggs

- 0.80-1.27mm
- Hatch in 2-5 days
- Larvae form schools 2 weeks after hatching

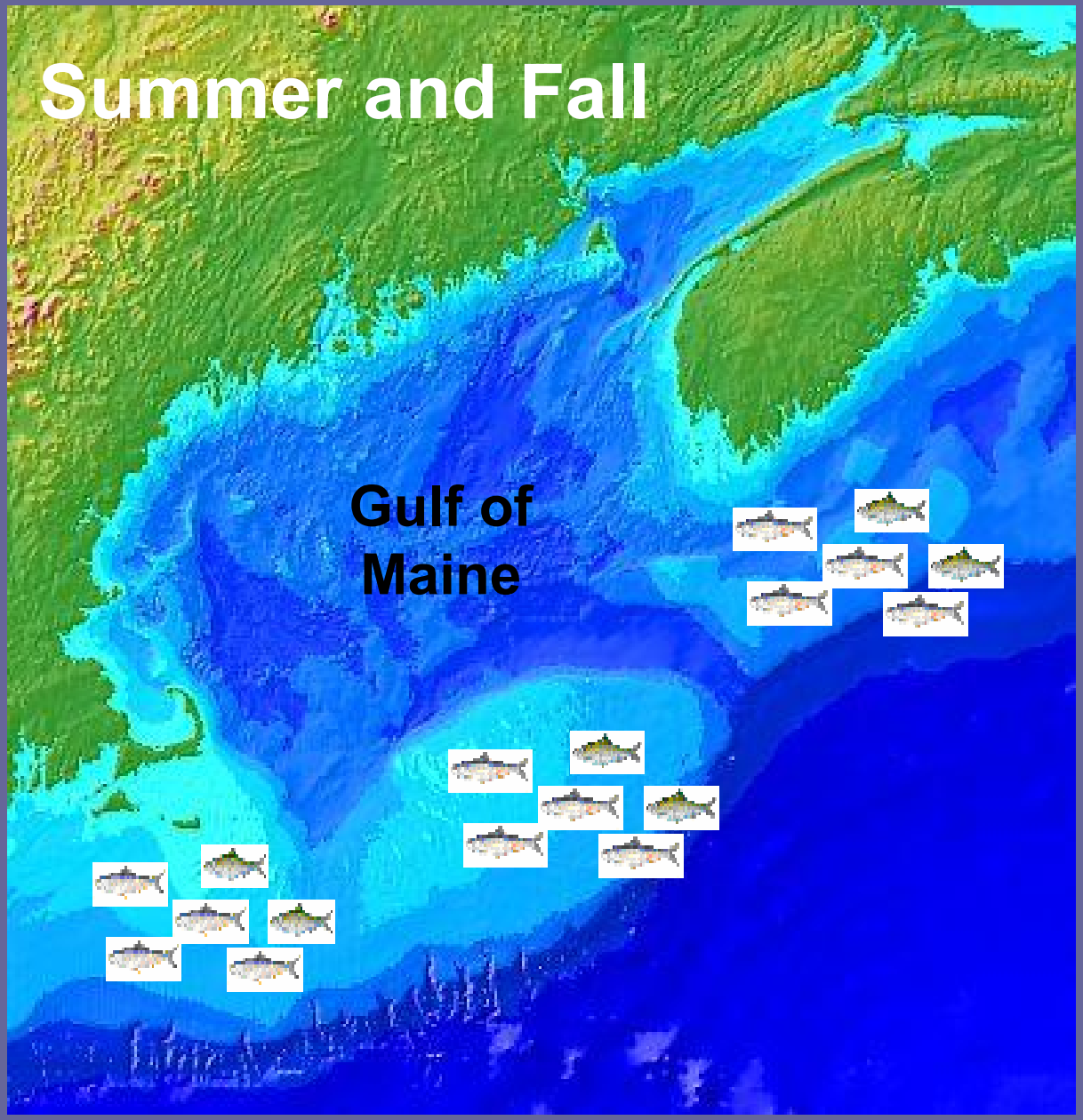


Juvenile alewife research

- Yako, Mather, & Juanes 2001

- Not just temperature
- Migrate July-November
- Migration is complex
- First to leave are smaller
- Peak migrations correspond to low food
- Migrate during new moon

Where do they go in the ocean?



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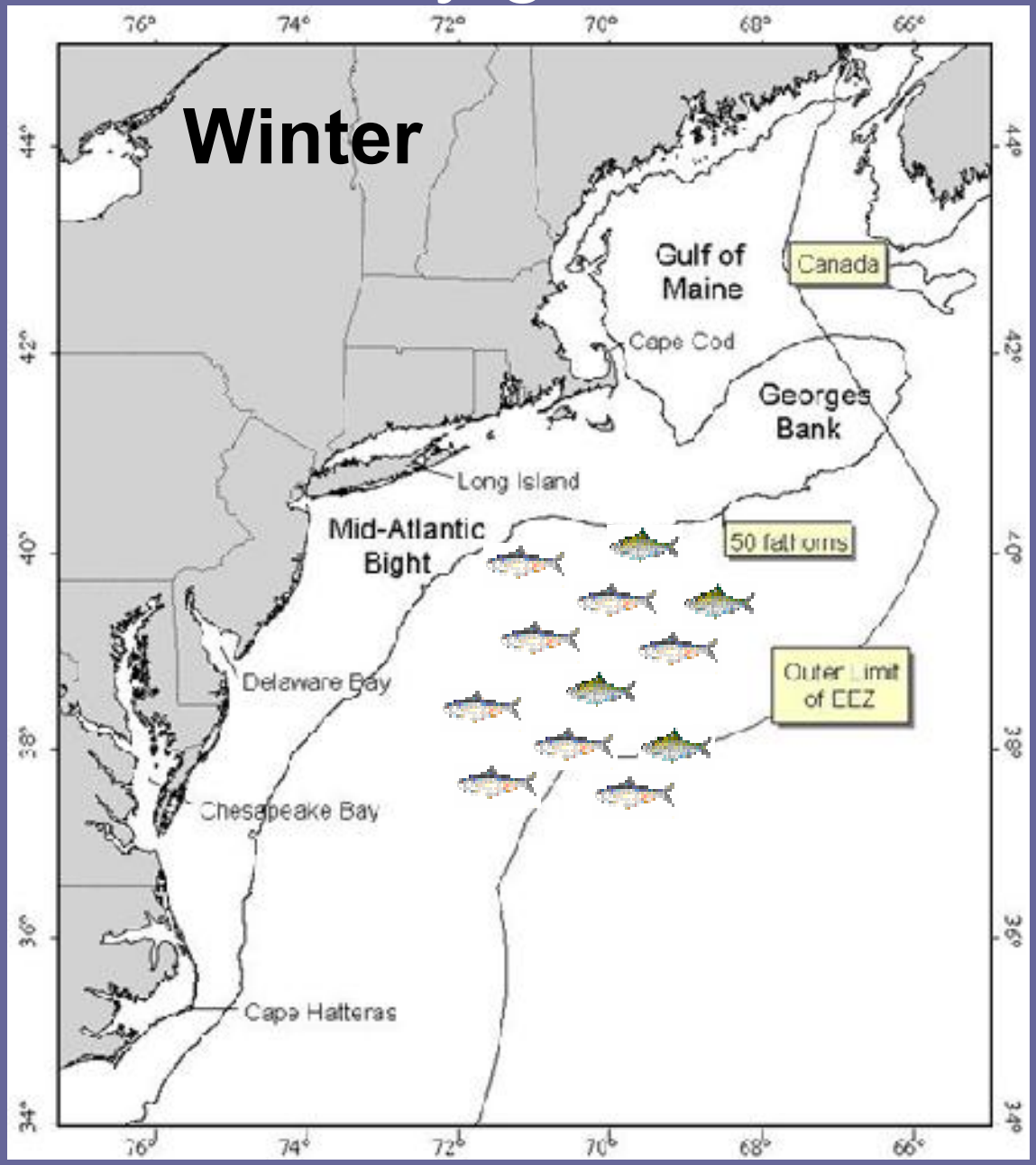

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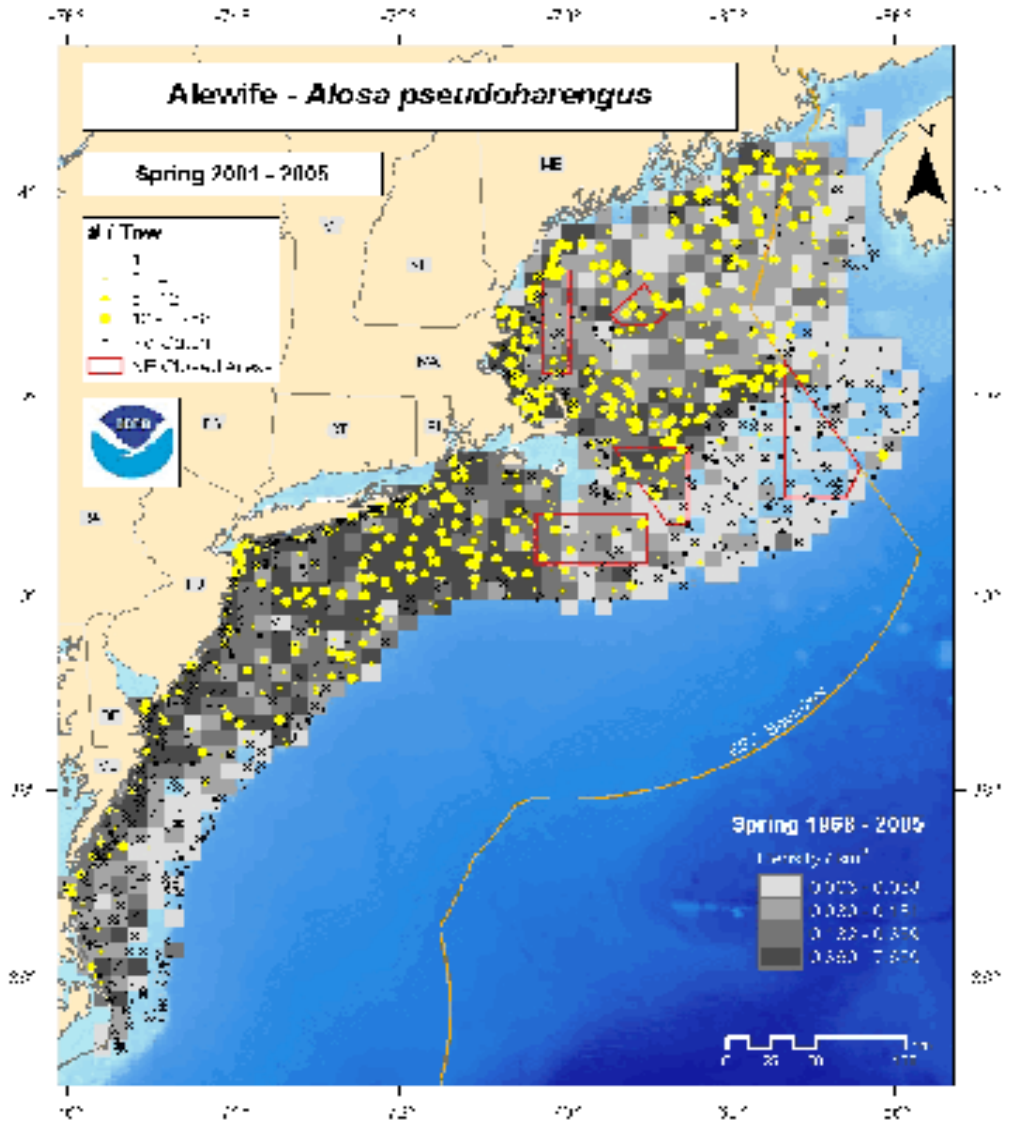
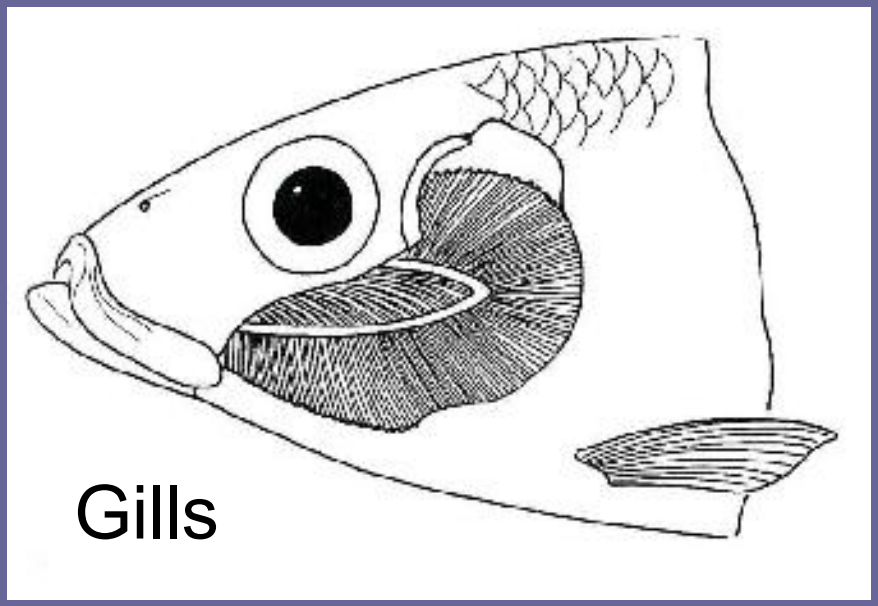
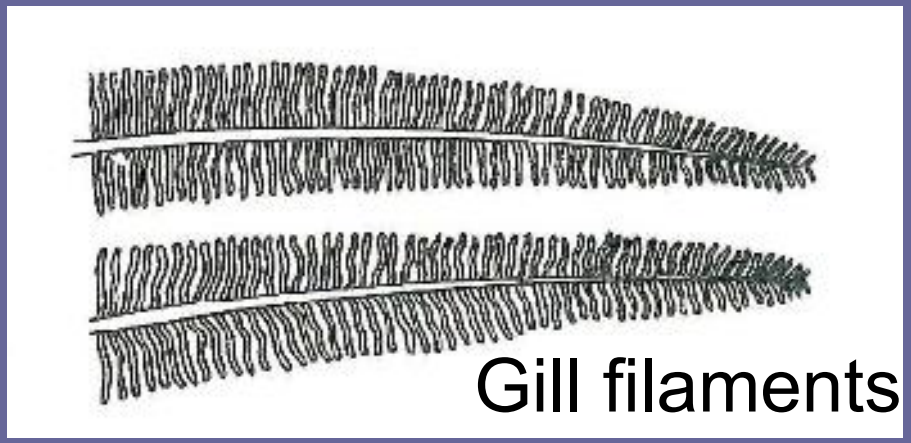


Relative species abundance and distribution from NEFSC bottom trawl survey by time block and relative species density for the full time series.

How do they switch from salt to freshwater?





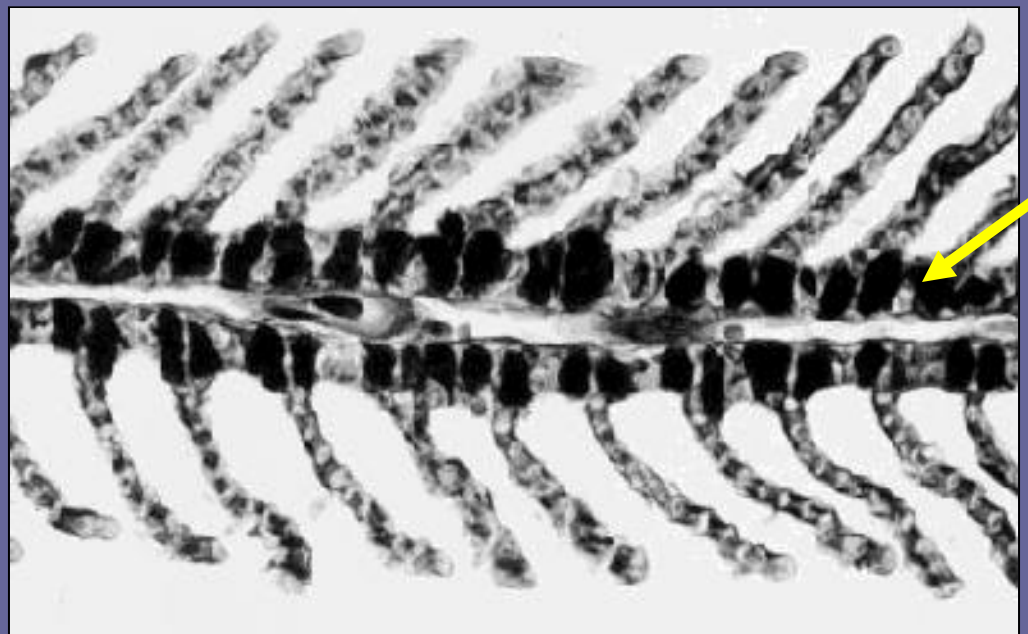
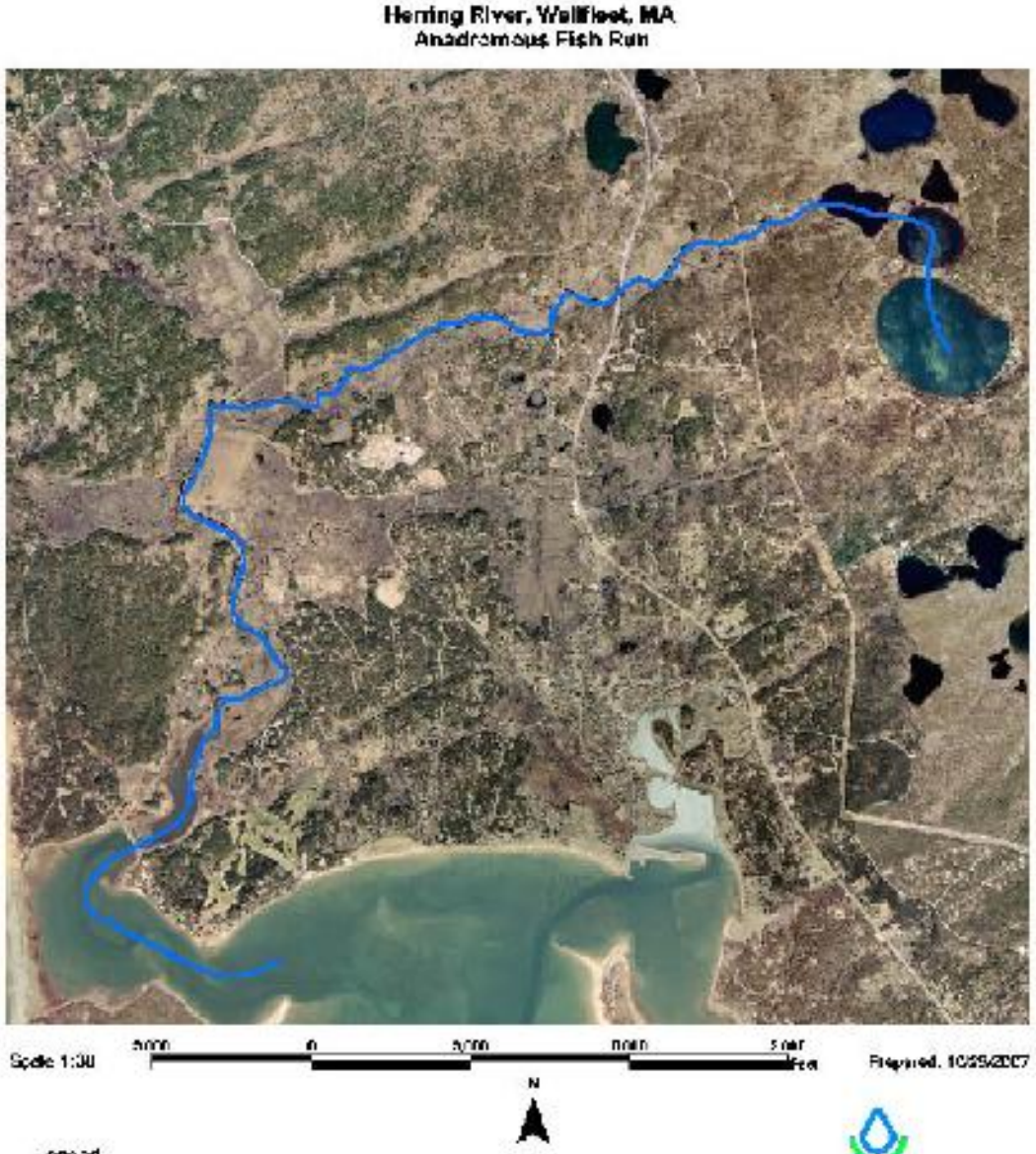
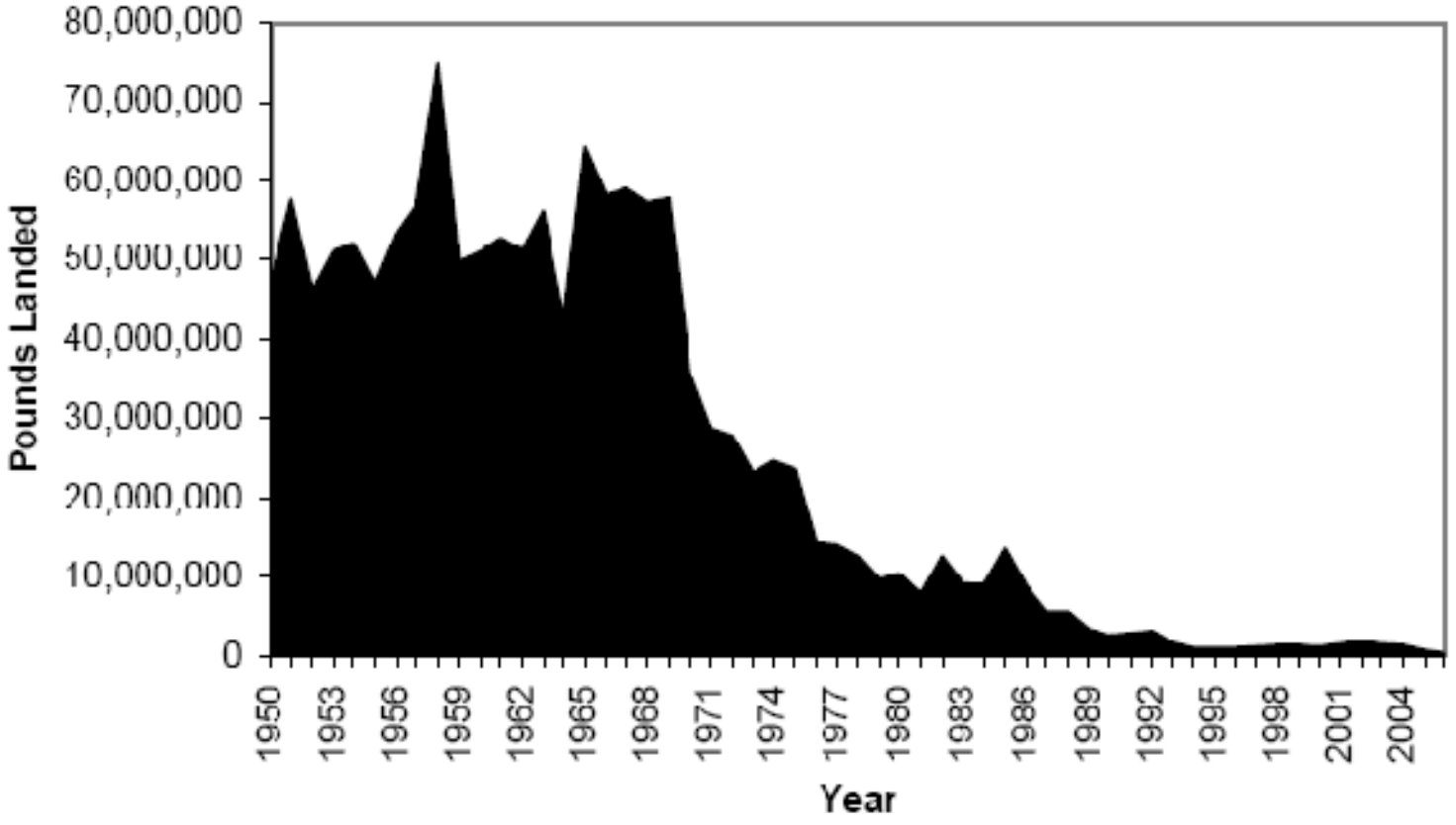


Figure 12. Herring River Anadromous Fish Run



Population Status

Pounds of River Herring Landed 1950-2004
River Intercept Fisheries



Data from National Marine Fisheries Service

Who cares if herring populations are declining? So what?

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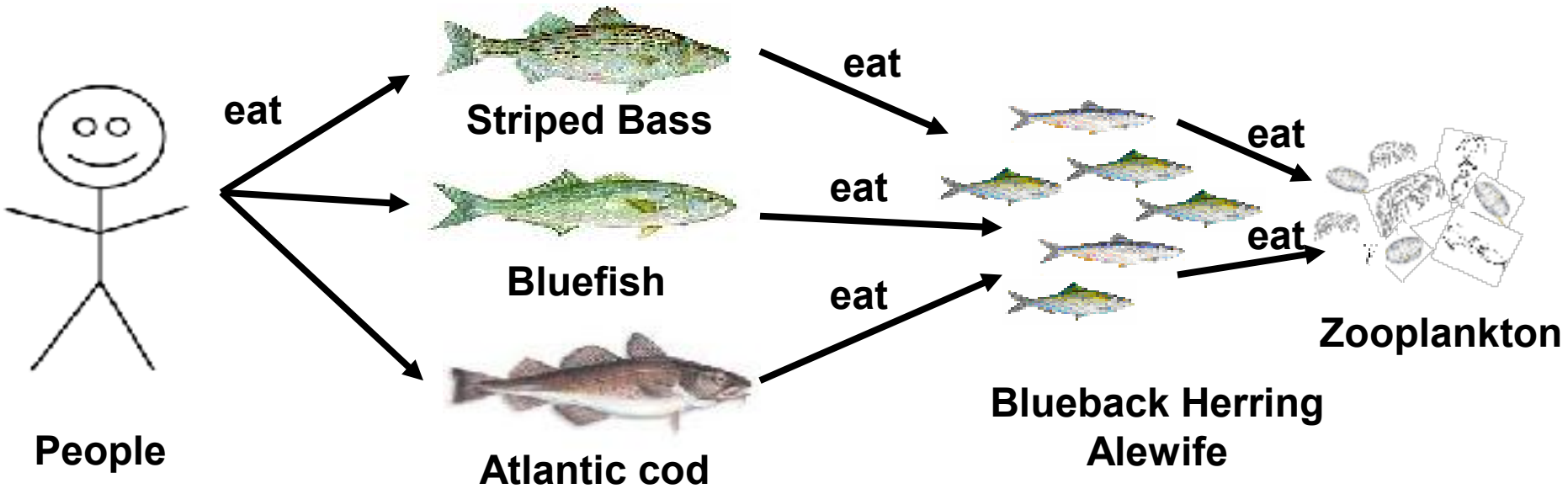


Who cares if herring populations are declining? So what?

THREAT	Riverine Waters	Territorial Waters	EEZ
Chemical			
Acid/aluminum pulses	P	NIF	NIF
Sedimentation	P	NIF	NIF
Suspended particles	P	NIF	NIF
Inorganic inputs	P	P	NII
Organic chemicals	P	P	NIF
Thermal effluent	P	P	NP
Urban stormwater pollution	P	P	NII
Sewage/animal waste	P	P	NIF
Non-point source pollution	P	P	NIF
Physical			
Dams/spillways	P	NP	NP
Other man-made blockages (e.g., tide gates)	P	P	NP
Non-anthropogenic blockages (e.g., vegetative debris)	P	NP	NP
Culverts	P	NP	NP
Inadequate fishways/fish-lifts	P	NP	NP
Water releases from reservoirs	P	P	NP
Non hydropower water withdrawal facilities (e.g., irrigation, cooling)	P	P	NP
Channelization	P	NIF	NP
Dredge and fill	P	P	NP
Urban and suburban sprawl	P	NII	NP
Land-based disturbances (e.g., de forestation)	P	NII	NP
Jetties	NP	P	NP
Overharvesting	P	P	P
Biological			
Excessive striped bass predation	P	P	NIF
Nuisance/toxic algae	P	NIF	NIF

Cause of declines?

- Blocked access to spawning grounds
- Water quality
- Fishing mortality

United States Geological Survey

Silvio O. Conte Anadromous Fish Research Center

One Migratory Way, Turners Falls, MA

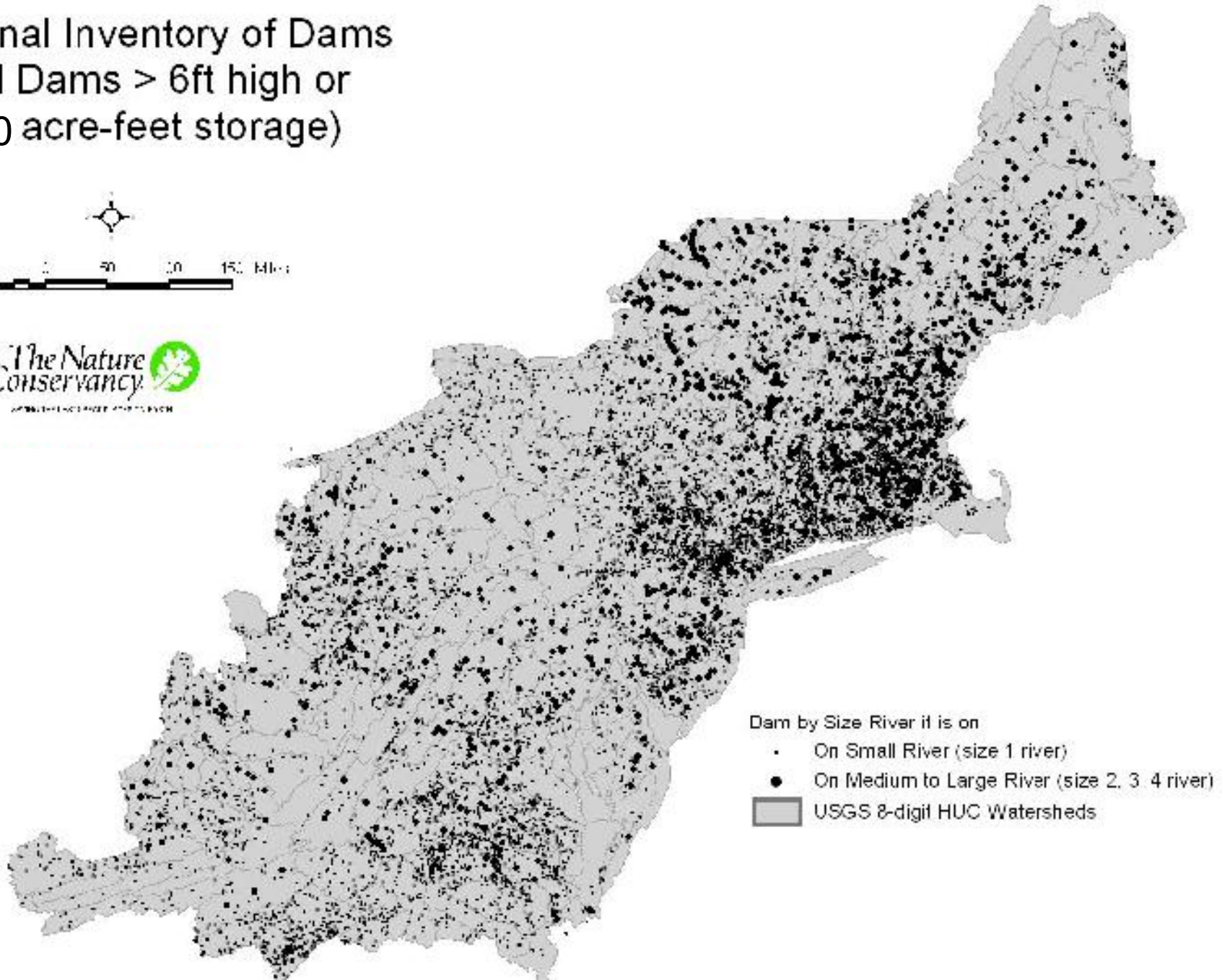
Research Sections

- Ecology
- Physiology
- Behavior
- Fish Passage

-Dr. Alexander Haro

National Inventory of Dams (All Dams > 6ft high or 2500 acre-feet storage)

The Nature Conservancy



Technical Fishways

Goal: create appropriate slope and water velocity to allow fish to pass with minimum amount of stress, injury, delay, and mortality

Technical vs. Nature-like Fishways

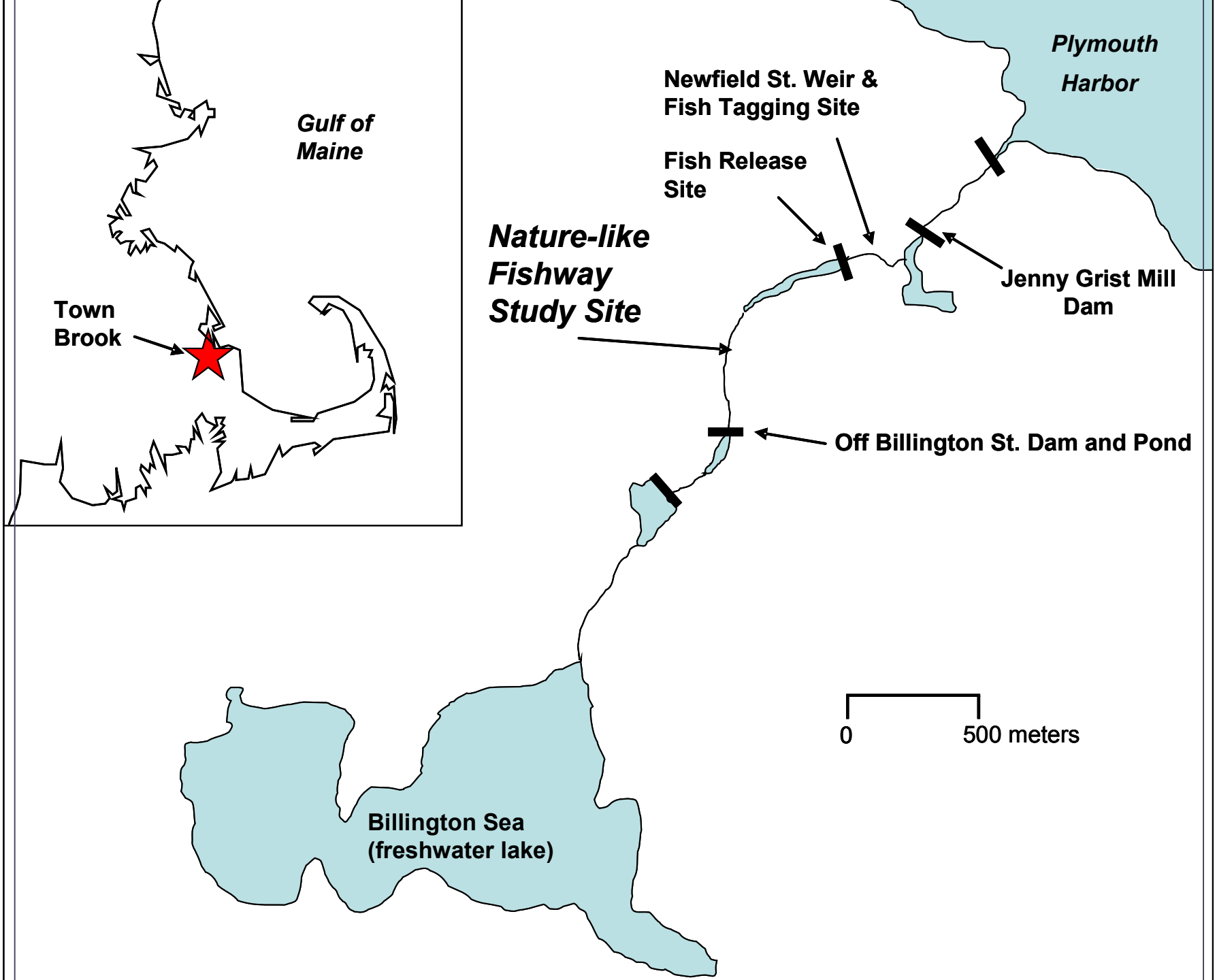
Technical Fishway

- **Constructed with metal, concrete, wood**
- **Same hydraulic conditions**
- **Goal: Pass target species**

Nature-like Fishway

- **Constructed with natural substrates**
- **Range of velocities, design site specific**
- **Goals: Stream continuity, pass all migratory fish, provide habitat**


Town Brook,
Plymouth


Gulf of Maine
Town Brook
Plymouth Harbor
Newfield St. Weir & Fish Tagging Site
Fish Release Site
Nature-like Fishway Study Site
Jenny Grist Mill Dam
Off Billington St. Dam and Pond
Billington Sea (freshwater lake)
0
500 meters

Town Brook, Plymouth

Billington St. Dam 2002

Town Brook, Plymouth

Billington St. Dam 2002

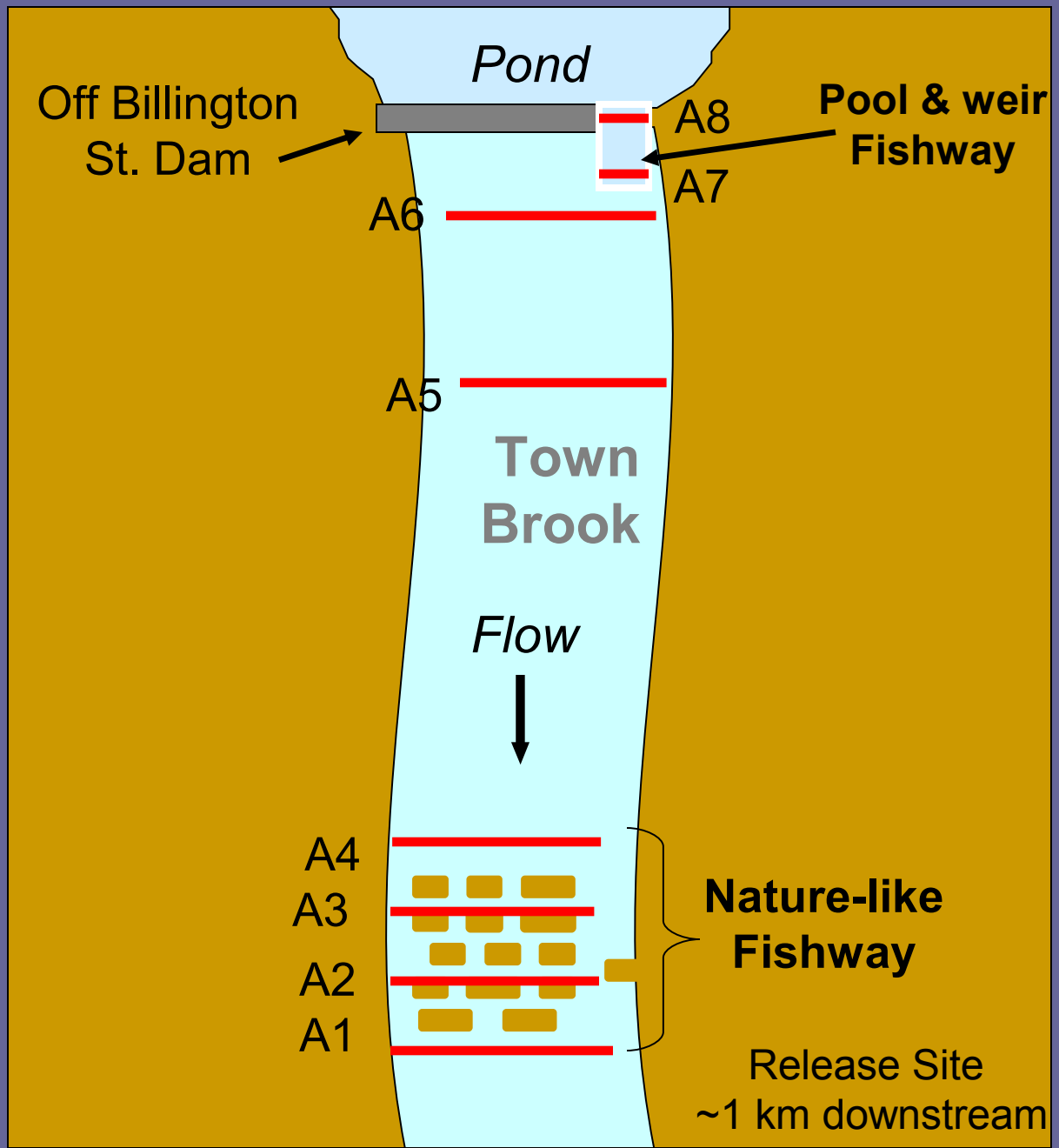
Town Brook, Plymouth

Nature-like Fishway

Town Brook, Plymouth

Length: 30m Slope: 1:20 Width: 7-8m

Antenna Layout – Town Brook

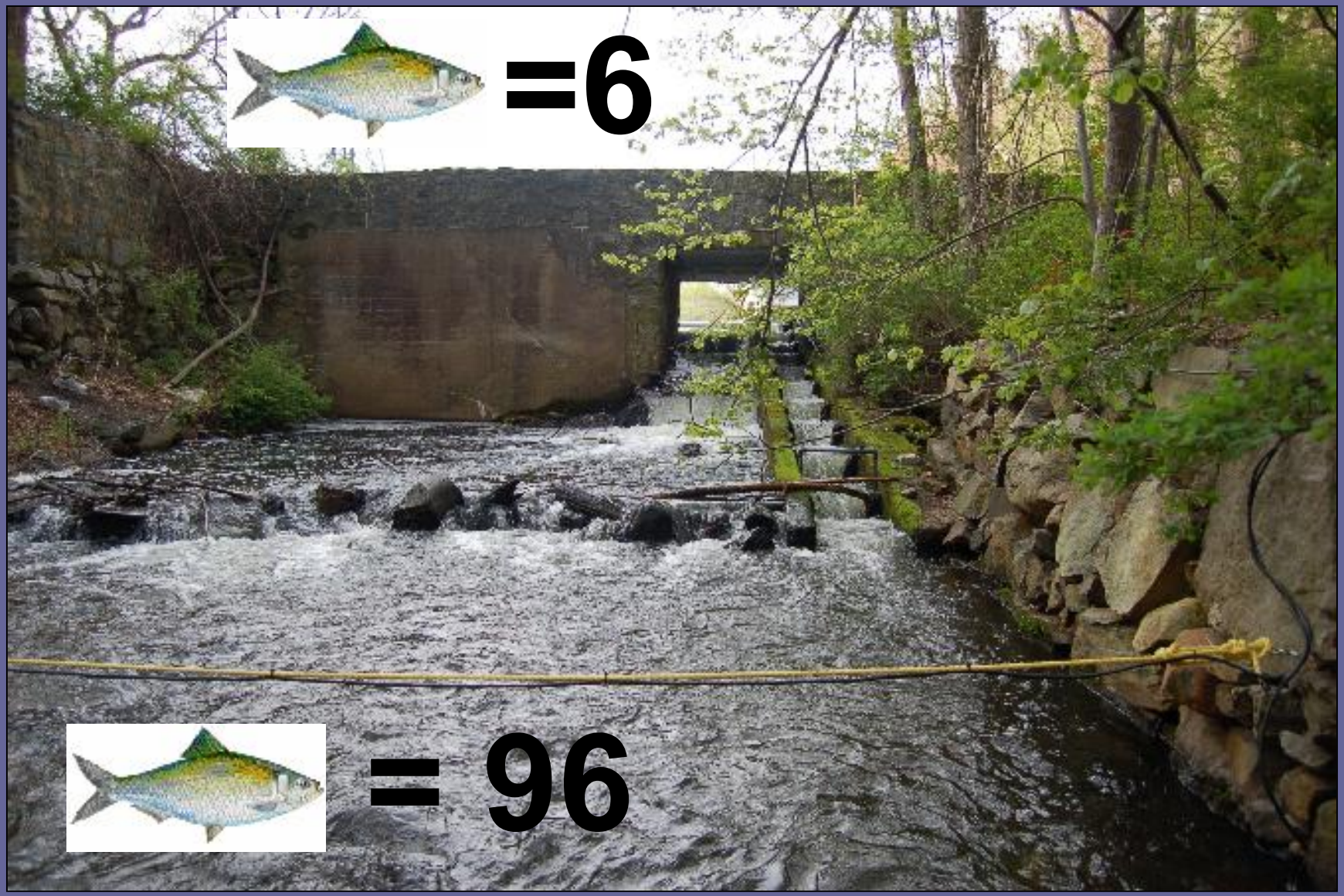


Town Brook, Plymouth

Results

- 103 fish detected at beginning of fishway
- 96 fish detected at top of fishway
- Passage: 94% completed NLF
- Only 5.8% pass beyond next dam

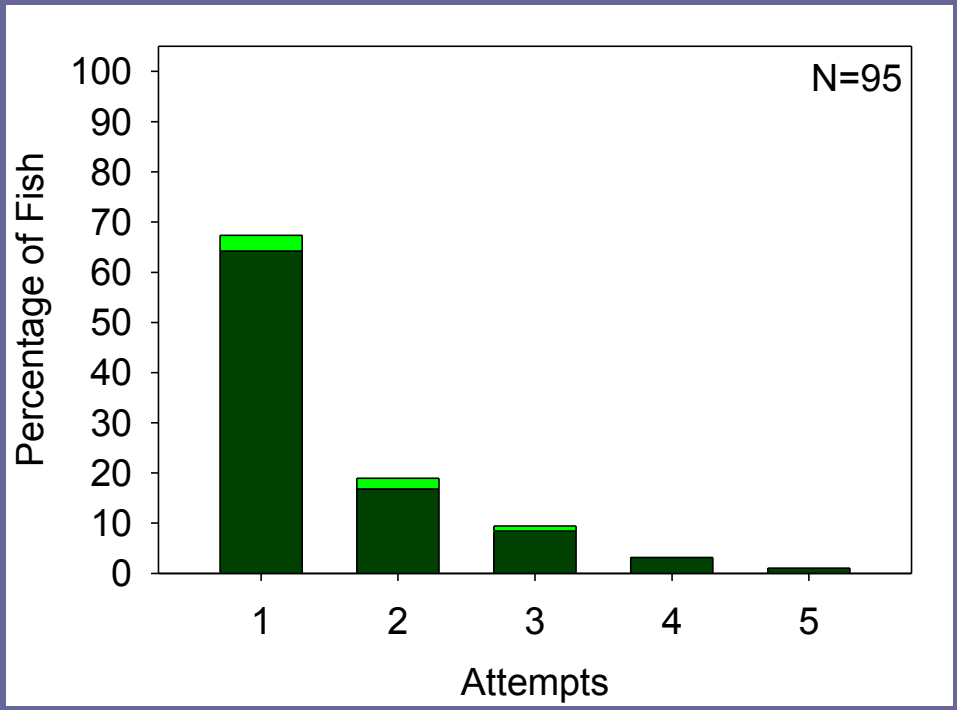
Town Brook, Plymouth



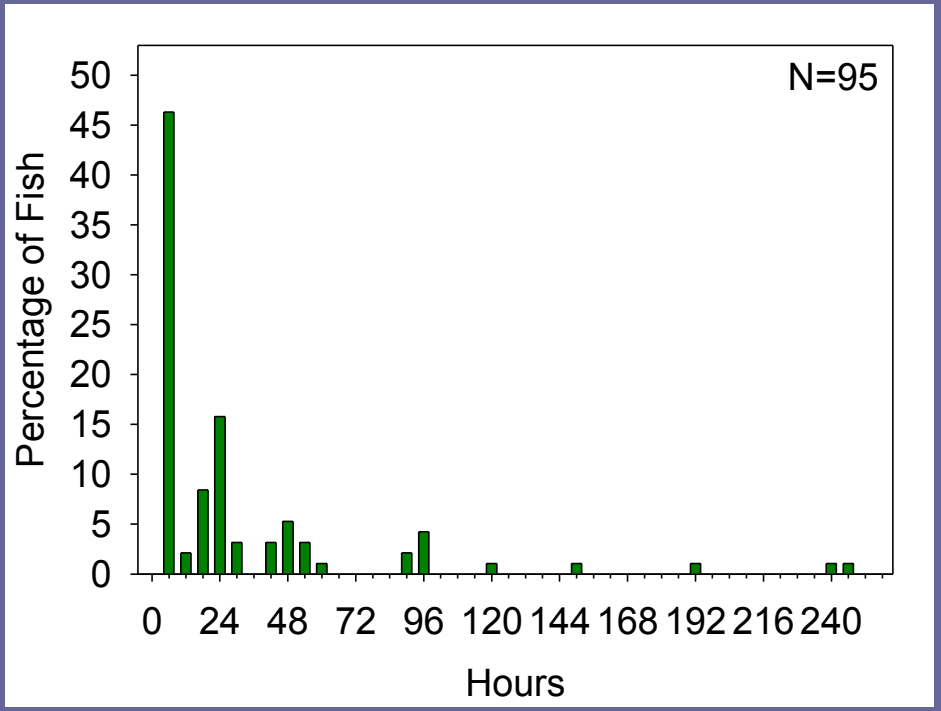
Off Billington St. Dam

Town Brook Off Billington Dam, Plymouth

How many attempts did they make to pass?



How long did they stay below the dam on the first attempt?



Ocean intercept fishery


CHOIR Coalition


CHOIR Coalition

Who manages river herring?

- **Federal**: NOAA National Marine Fisheries Service
- **Regional**: Atlantic States Marine Fisheries Commission
- **States**: Massachusetts Division of Marine Fisheries
- **Local**: Town of Wellfleet
  Watershed Associations

http://www.asmfc.org

Comments due by January 1, 2009

Public Hearing December 1,2008

Atlantic States Marine Fisheries Commission

DRAFT AMENDMENT 2 to the

Interstate Fishery Management Plan

For SHAD AND RIVER HERRING

For Public Comment

(River Herring Management)

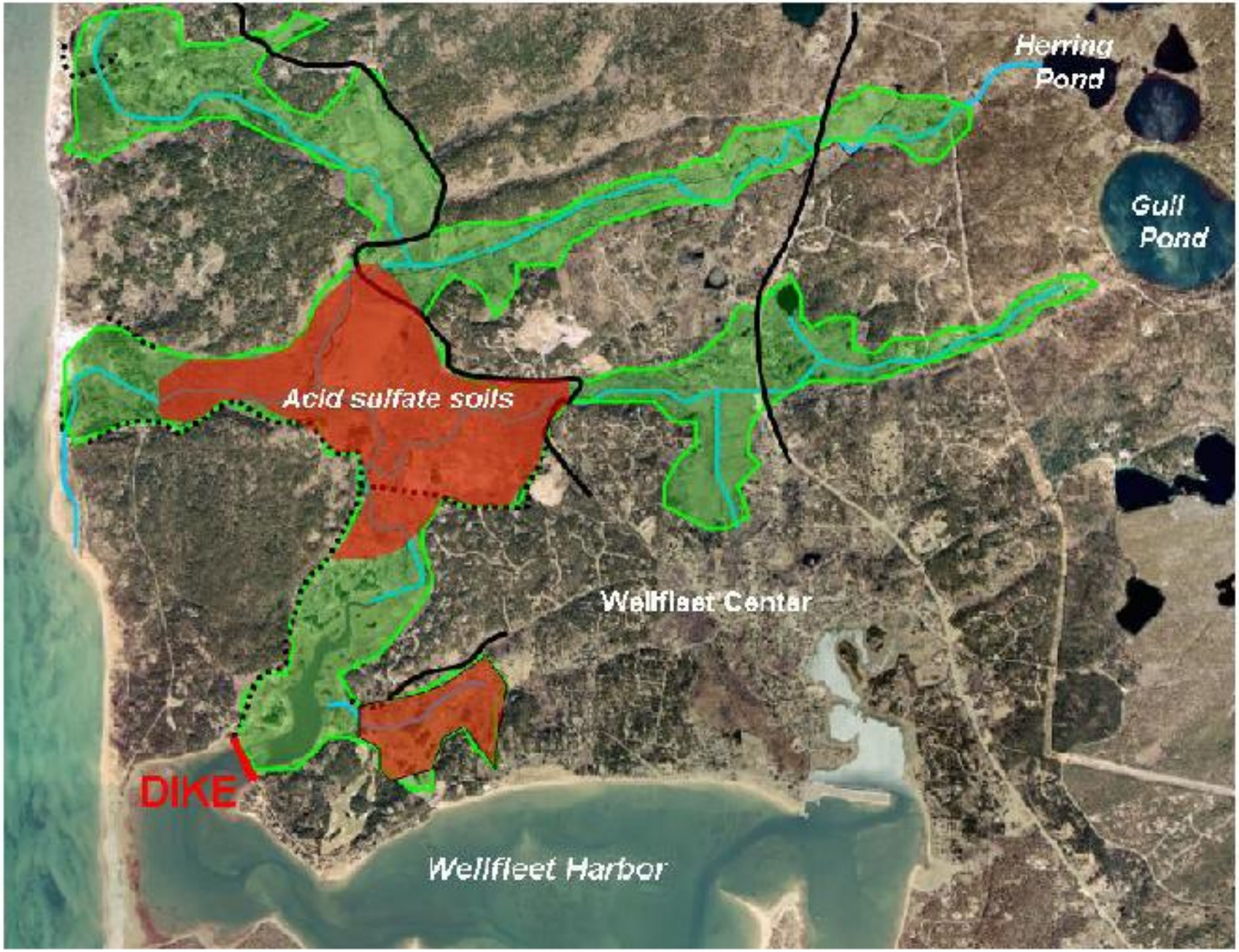
Massachusetts Division of Marine Fisheries

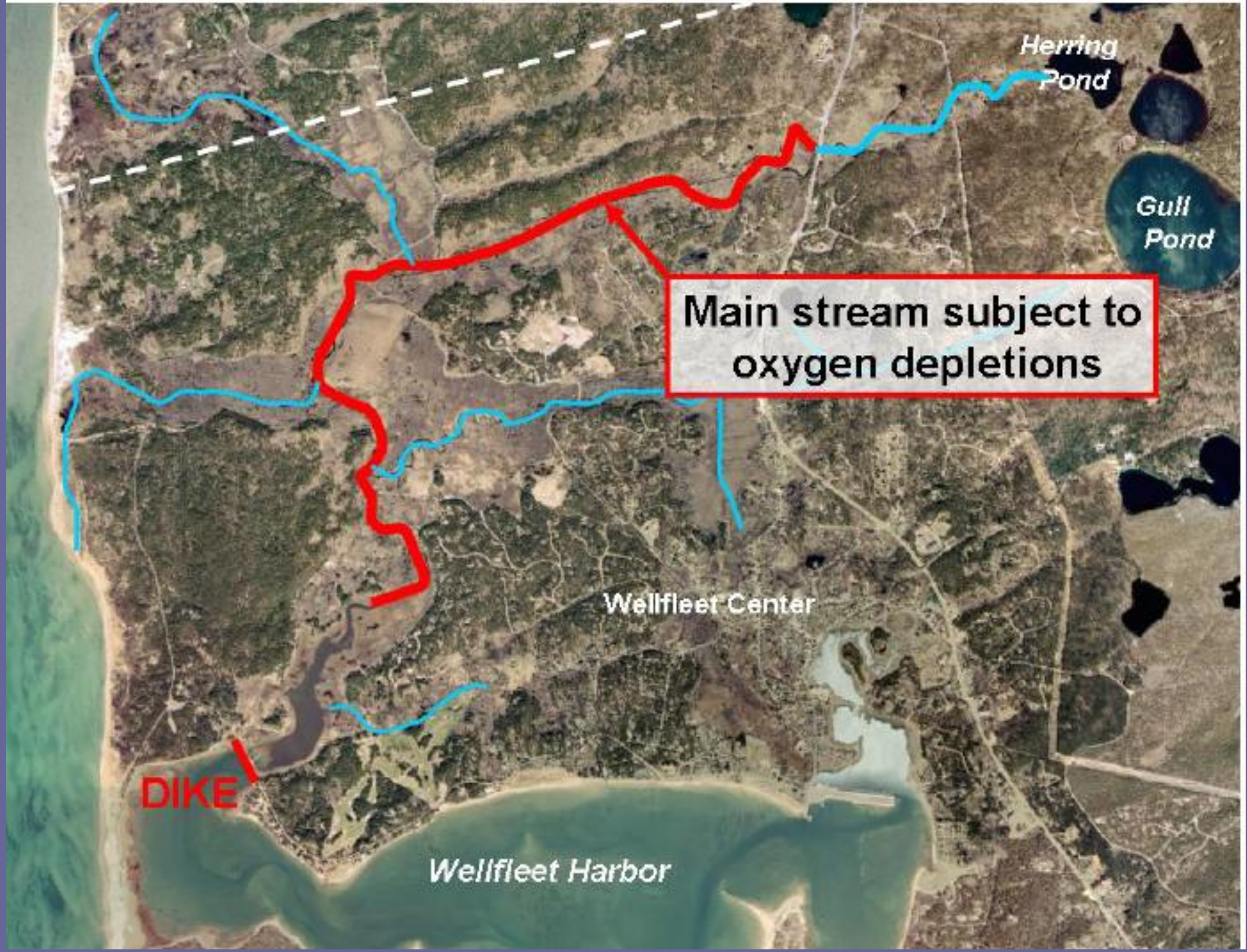
- Technical Report: A Survey of Anadromous Fish Passage in Coastal Massachusets
- River Herring Moratorium 2005, 2008
- Dockside Sampling

What impacts river herring populations in the Herring River?

Delay **Water Quality**

Figure 7. Acid Sulfate Soils in Herring River Marshes




Herring Pond
Gull Pond
Main stream subject to oxygen depletions
Wellfleet Center
DIKE
Wellfleet Harbor


http://www.glooskapandthefrog.org