Dam Removal as a collaborative, multi-objective solution for fish passage and fire protection

Coopers Mills, Sheepscot River

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MIDCOAST CONSERVANCY

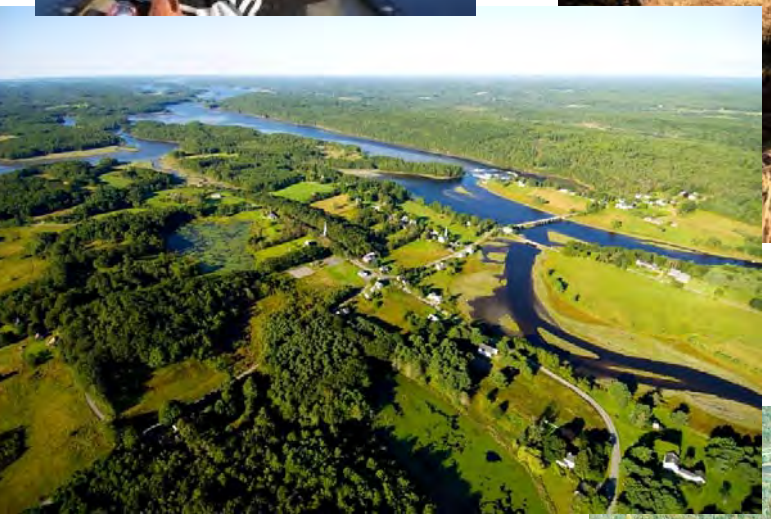
Atlantic Salmon Federation • Fédération du Saumon Atlantique

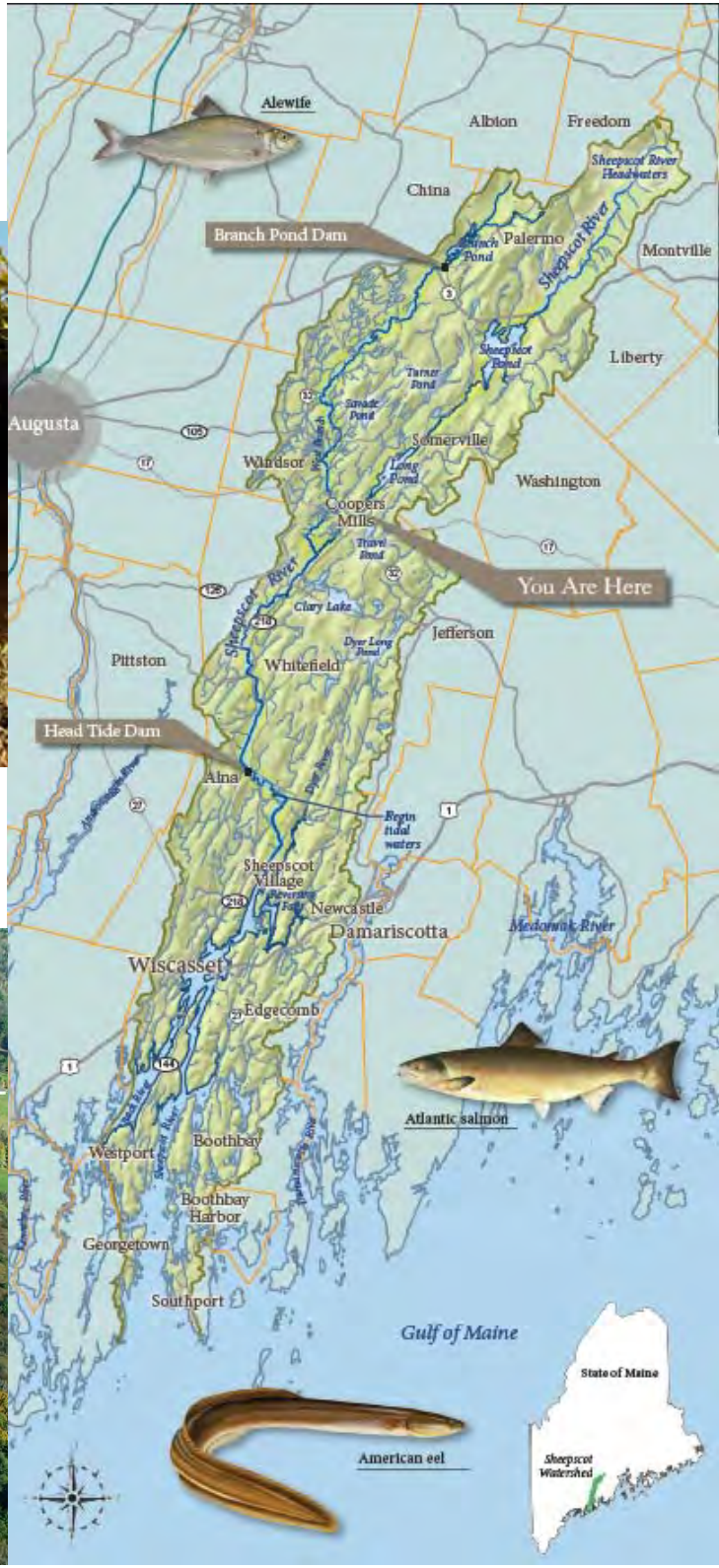
NOAA

Outline

- Project location and context
- Project Planning and outcome
- Construction
- Next Steps
- Acknowledgements

Sheepscot River Watershed

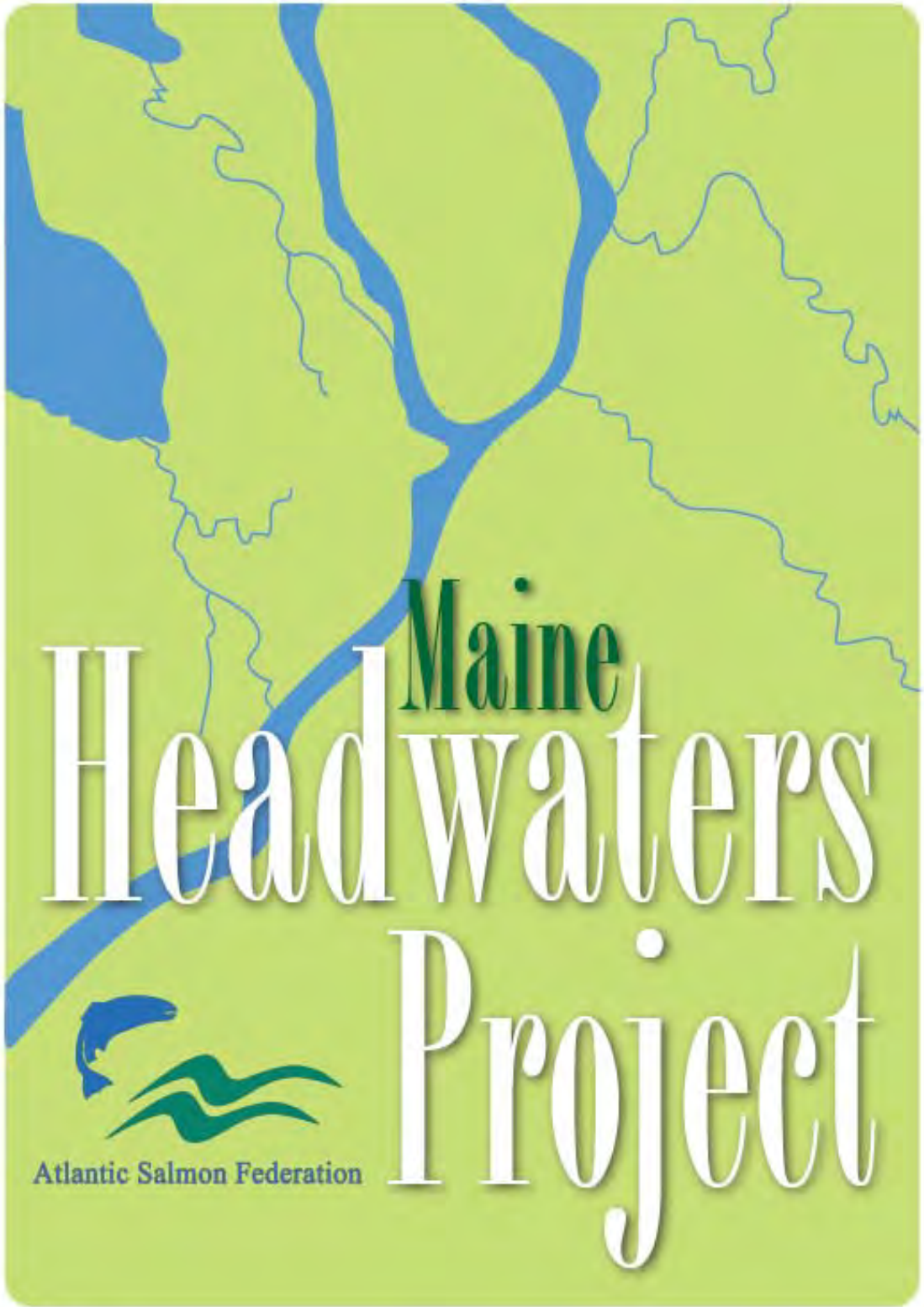




All 12 species of Diadromous Fish

"But is was the dams on the main river and its tributaries, constructed to supply water power and later electric power, which truly sealed the salmon's fate. Over the years the runs continued to diminish until the mid-1800s saw their virtual end."

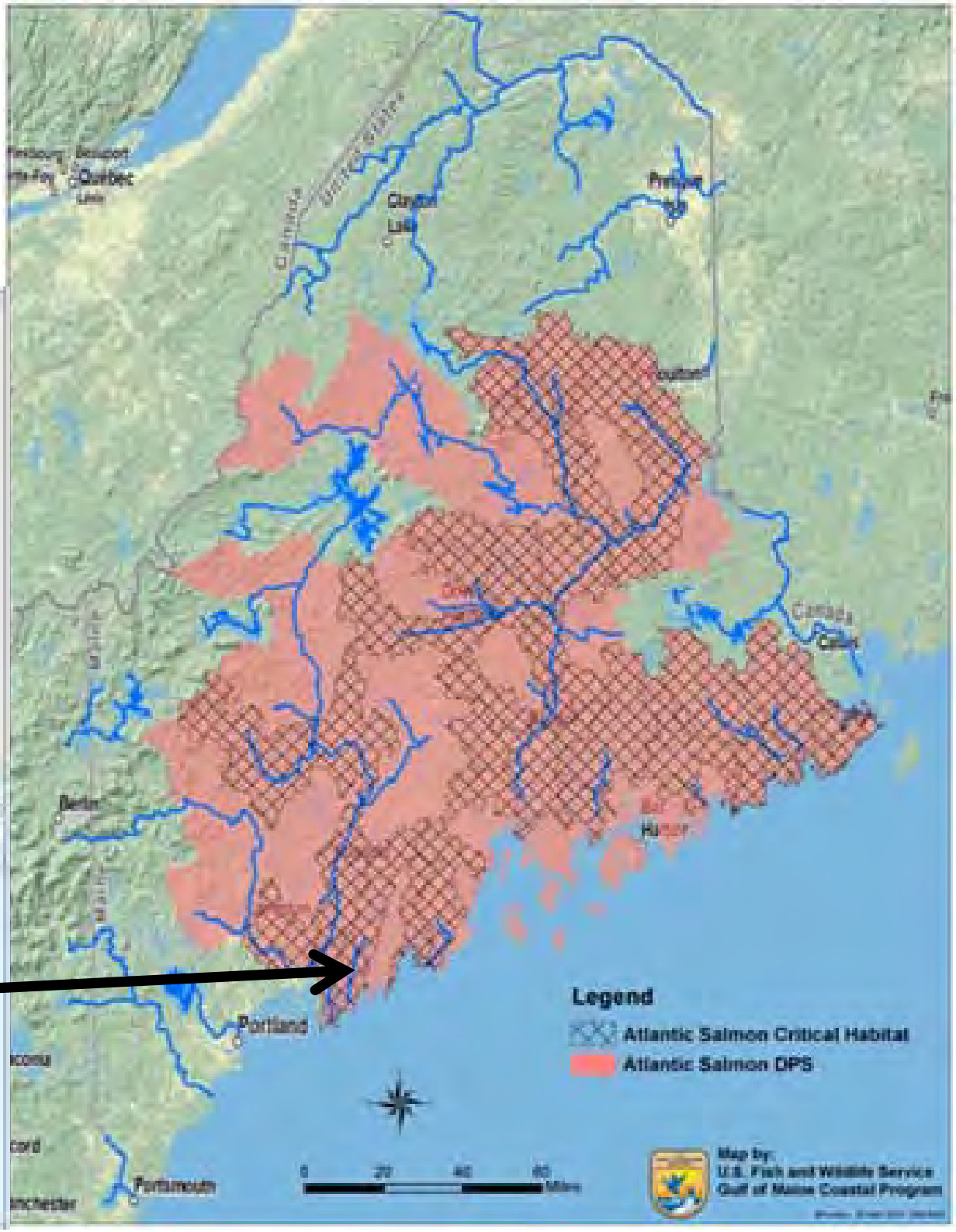
Edward C. Janes - Salmon Fishing in the Northeast - 1973



ASF Strategy:

- Work in partnership in a watershed-wide & bottom, up approach.
- Long-term investment
- Focus on mid-size, smaller rivers.
- Prioritize non-hydro dams and road crossings
- Goal is to improve, not change

Atlantic salmon recovery



Sheepscot Partnered Approach

Core Coalition

+

Fishery agencies

+

Local groups

Atlantic Salmon Federation
Fédération du Saumon Atlantique

MIDCOAST CONSERVANCY

The Nature Conservancy

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Maine Marine Resources
Dirigo
Maine

U.S. Fish & Wildlife Service
Department of the Interior

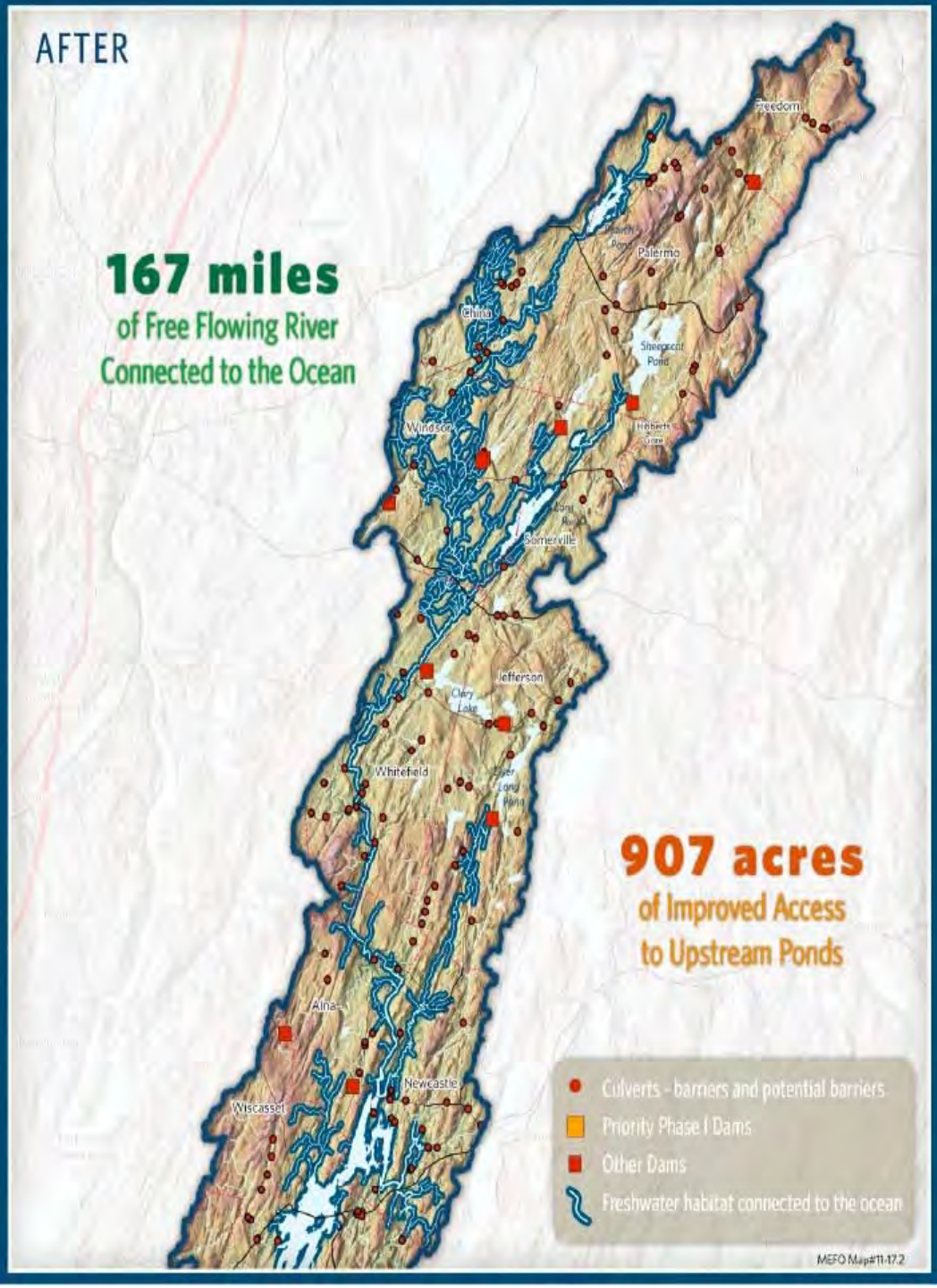
Town of Whitefield

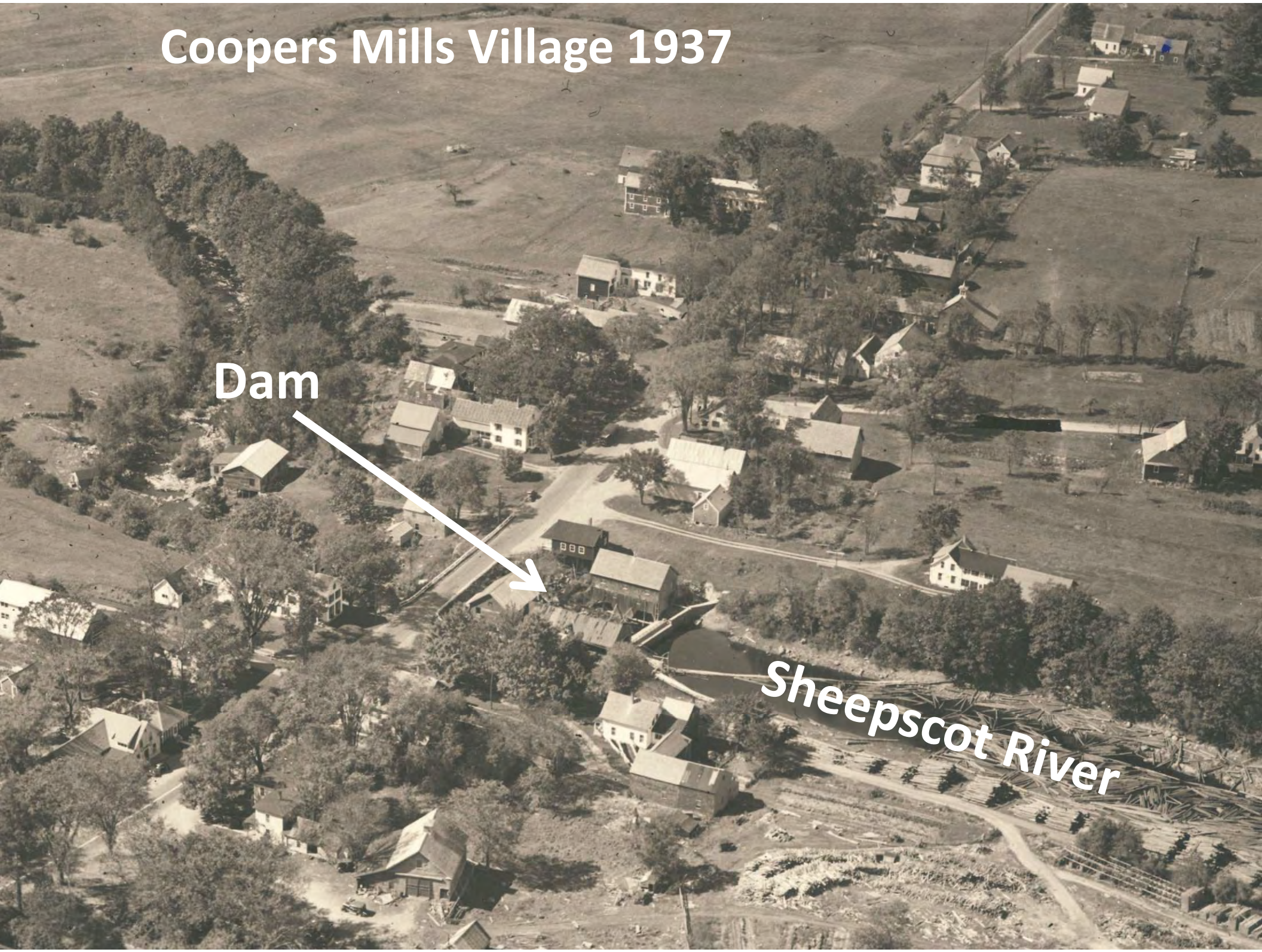
Town of Alna
Incorporated June 25 1794

Branch Pond Association, Inc.

Town of China, Maine
Incorporated 1818

Reconnecting the Sheepscot River

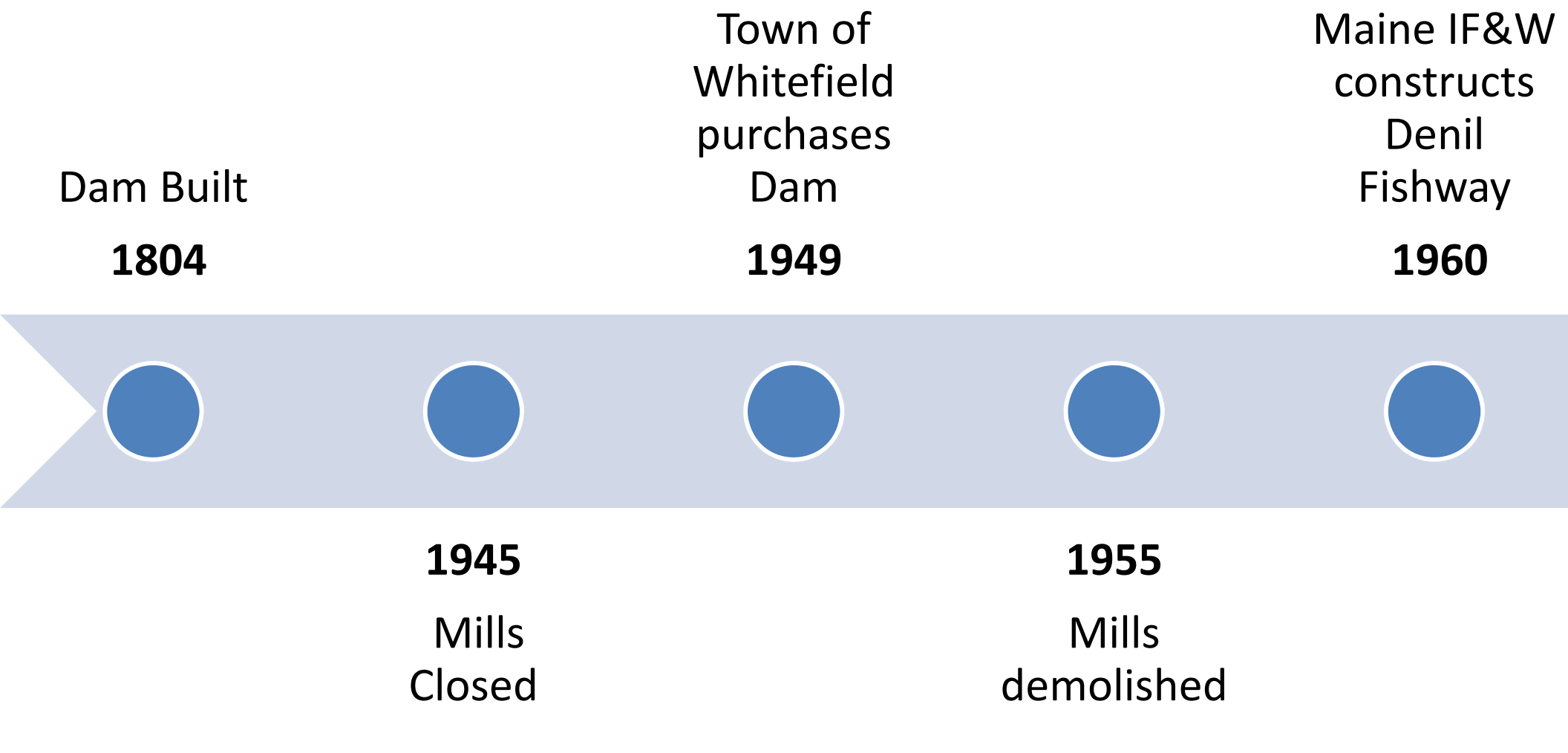



Coopers Mills Village 1937
Dam
Sheepscot River

← 1905

2017 →

Coopers Mills Dam Timeline



Coopers Mills Dam Timeline

SRWC, TU, USFWS efforts

Kleinschmidt feasibility study

2003-2006

2006

Proposal for dam removal

Town voted to keep dam

2007

2015

Town Committee established with ASF, MC & TNC

Town voted unanimously approval for Dam removal

2016

2018

Dam Removal

Fire Protection

Site Enhance

Site Issues & Considerations

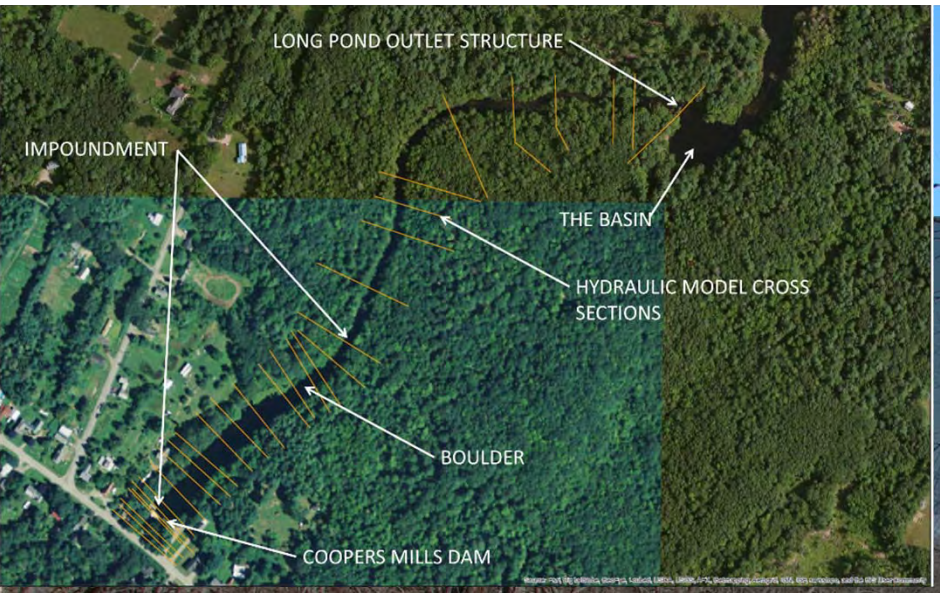
- Dam stability and repair
- Hydropower potential
- Long Pond impacts concern
- Fire Protection
- Fish Passage
- Historical Site Recognition
- Public Access

Site Issues & Considerations

- Dam stability and repair
  - *Kleinschmidt (2006): $238,000*
  - *MBP Consulting (2015): $360,000 to $490,000*

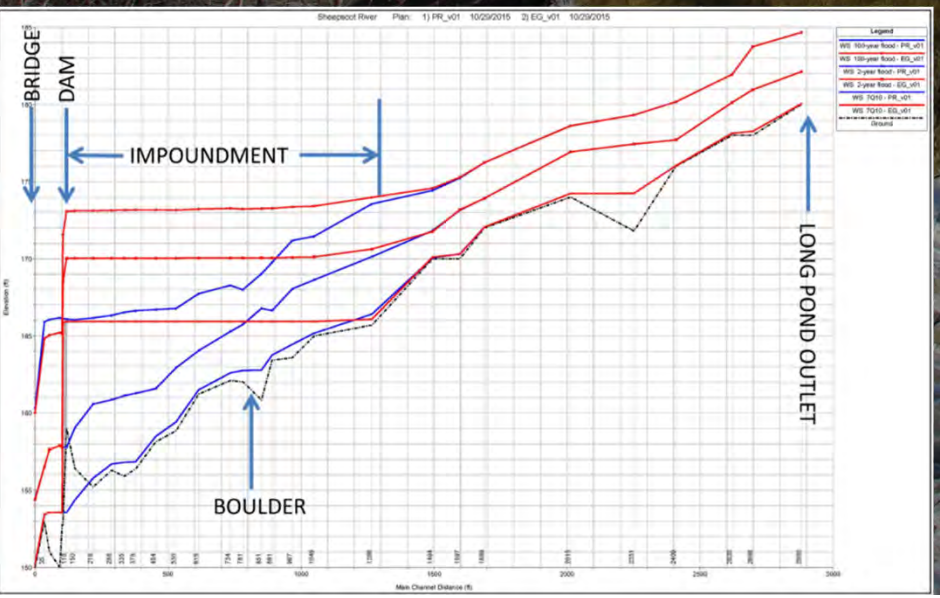
Site Issues & Considerations

- Hydropower potential
  - *Gomez & Sullivan (2007)*
    - Development Cost $3-$4 million
    - Pay back 26 to 100 years
  - *Kleinschmidt (2015)*
    - Maine Hydropower Study
    - Installation Cost $1.1 million
    - Pay back 36 years



Site Issues & Considerations

- Long Pond impacts concern
  - *Profile Survey 2004 – ~14 feet of elevation drop*
  - *2015-16 extensive outreach & modeling study*

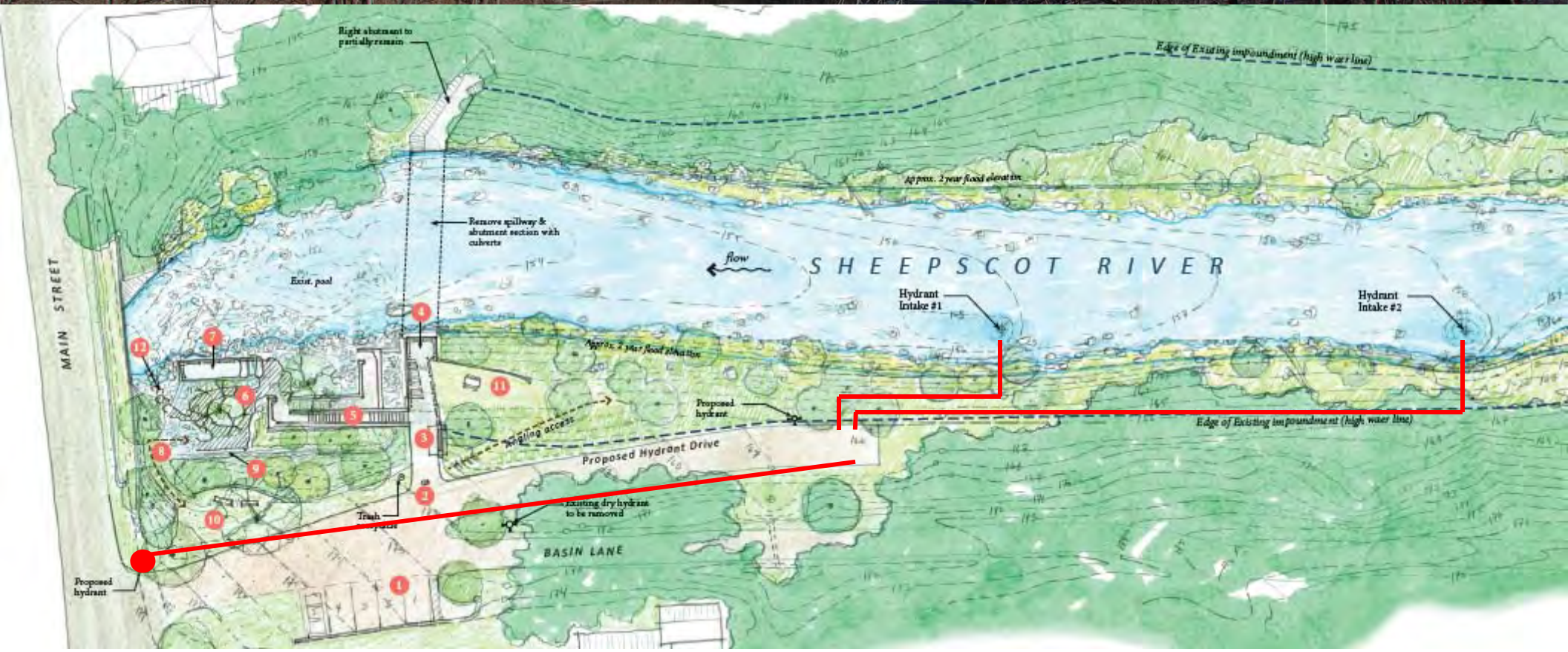


Site Issues & Considerations

- Fire Protection
  - *Existing hydrant inoperable ~4 mos./year*
  - *Key criteria*
    - Winter fire load
    - Summer low flow lift and capacity
  - *Array of alternatives not accepted*
    - reliance on water level control structures
    - winter operations
    - Storage
    - Not in village center

Hydrant System Design

- *Two hydrants on site*
- *Third hydrant in West Branch ~1 mile away*

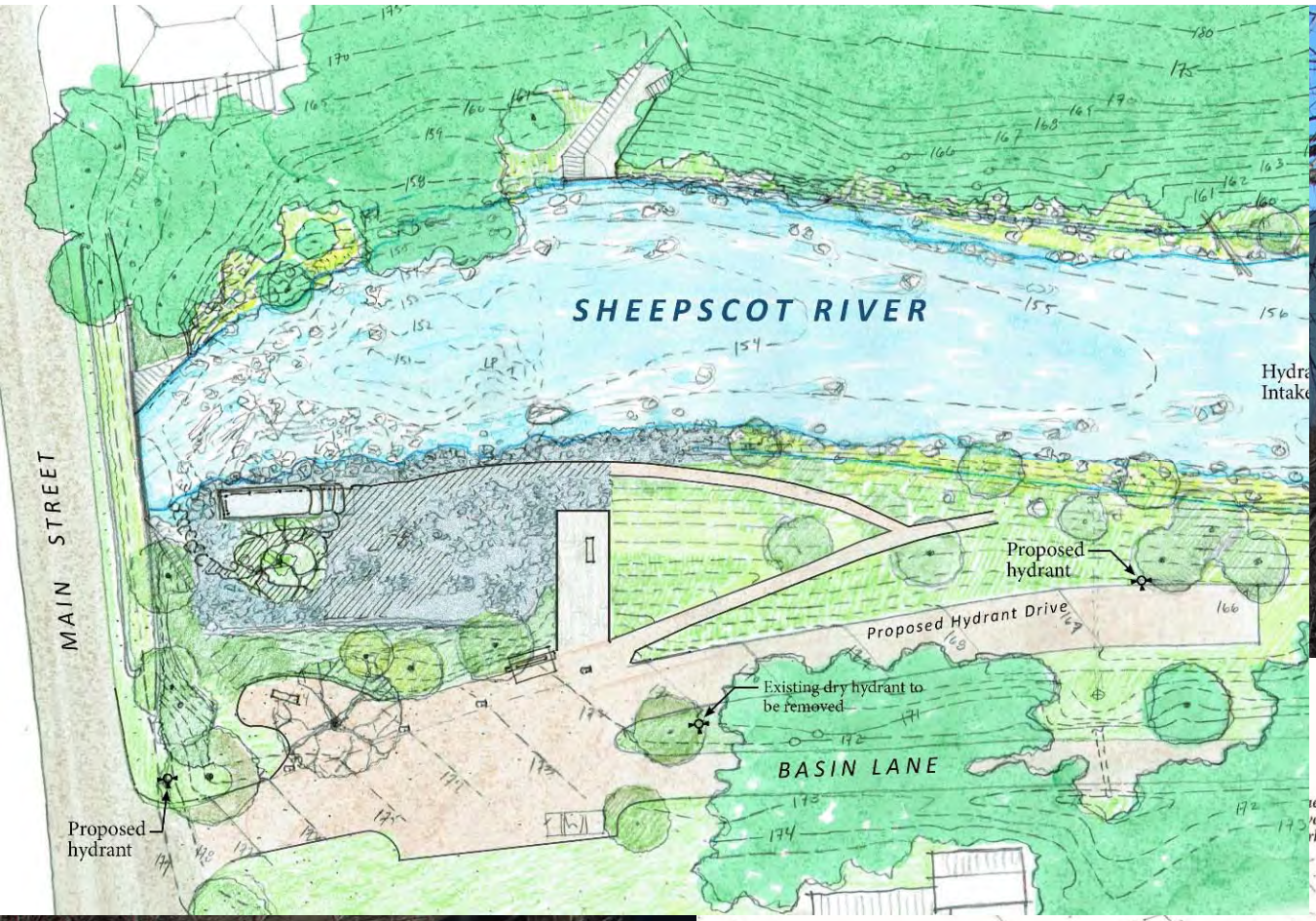


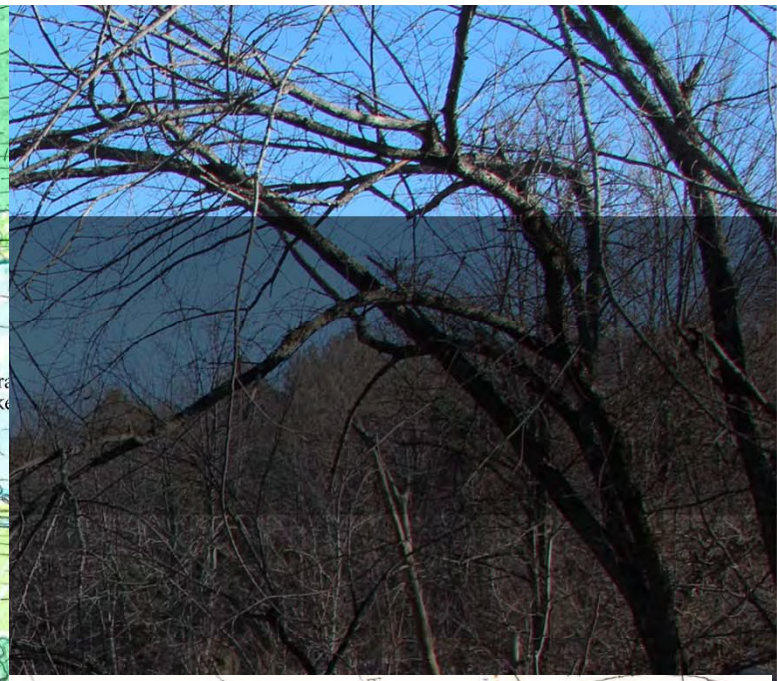
Site Issues & Considerations

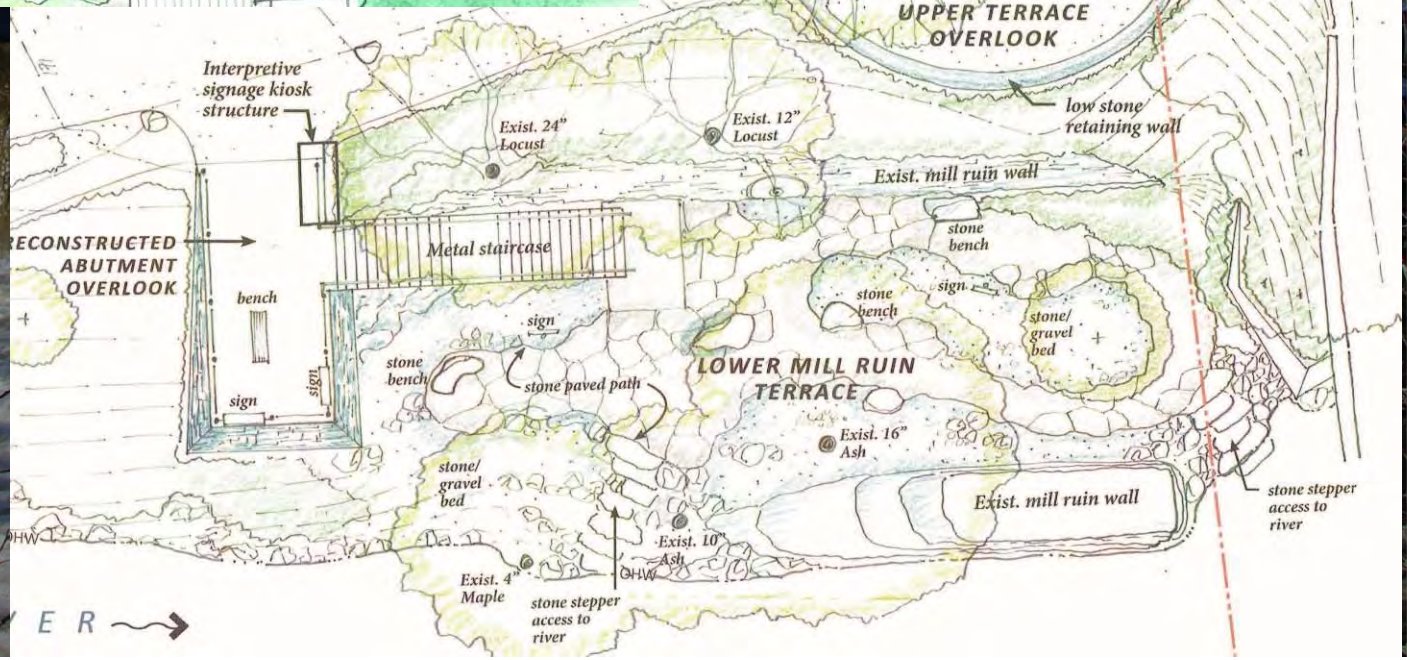
- Fish Passage
  - *Underfunctioning Denil*
  - *Downstream mortality*
- Dam Removal

Site Issues & Considerations

- Historical Site Recognition
  - *Retain selected features*
  - *Interpretive*
- Public Access & Site Amenity
  - *Derelict, ignored and overgrown site*
  - *Site lines, improve access, retain features*


SHEEPSCOT RIVER
MAIN STREET
Proposed hydrant
Proposed Hydrant Drive
Existing dry hydrant to be removed
BASIN LANE
Proposed hydrant




Interpretive signage kiosk structure
Exist. 24" Locust
Exist. 12" Locust
low stone retaining wall
Exist. mill ruin wall
RECONSTRUCTED ABUTMENT OVERLOOK
Metal staircase
bench
sign
stone bench
stone paved path
LOWER MILL RUIN TERRACE
stone/ gravel bed
Exist. 16" Ash
Exist. mill ruin wall
stone stepper access to river
Exist. 4" Maple
Exist. 10" Ash
OHW
Exist. 24" Maple
UPPER TERRACE OVERLOOK
bench
stone/ gravel bed

Era of Mills: River for Power

Maine's rivers and streams, such as the Sheepscot, provided vital corridors for access to raw materials and the transport of manufactured goods from inland to sea. Vertical drops and geologically constricted points in the river made ideal locations for milldam sites, which harnessed water power for the region's early villages. From manufacturing agricultural goods—such as milling grain, and making barrels for apples—to converting white pine timber into construction materials—such as shingles and window frames—the mills and people along the Sheepscot River were hard at work.

Aerial view of Coopers Mills as published in the Kennebec Journal on January 12, 1937. Photographer: Gannet Publishing Company. Courtesy of Whitefield Historical Society.

Log Drives

Loggers were at work along the Sheepscot. Loggers on Drive, ca. 1900. Courtesy of Patten Lumberman's Museum.

U.S.S. Constitution

It was here that spars were cut and used as masts for the U.S.S. Constitution, a three-masted warship named by George Washington that is still afloat in Boston Harbor.

Mills Flanking Spillway

View looking up the Sheepscot River towards the dam spillway in 1906. On the left was a shingle mill. On the right was a sawmill where the undershot wheel would have been housed. Photographer: Frank W. Cunningham. Courtesy of Whitefield Historical Society.

Product of the Mills

Eli Putnam built the original Coopers Mills dam around 1804 and constructed a mill on each side of the river. Jesse Cooper and his heirs, for whom the village is named, purchased the dam in 1808. The mills changed hands many times. The last private owner of the dam was Chester Colby.

Logs spilling over Coopers Mills Dam. Courtesy of Whitefield Historical Society.

Coopers Mills dam spillway and view of sawmill along Basin Lane. The mills were removed in the 1950's, but remnants of this stone foundation wall remain intact today. Courtesy of Whitefield Historical Society.

Decline of the Mills

Due to a flood in 1937 that damaged the dam, and to the declining supply of timber, the mills stopped operations in the 1940s. The Town of Whitefield purchased the dam and mill sites in 1949 from Chester Colby. The Town demolished the mill buildings in the 1950s. Most of the original stone foundations of the mills were removed at this time; however, two stone foundation walls still remain below this sign. The dam removal was completed in 2018, and the relic concrete abutment remains can be seen across the river from the viewing platform.

Undershot Wheel

The undershot wheel mechanism captured the river's energy and was located in the mill on the right. The mill was first a gristmill but later converted to a saw mill. It made barrel heads, barrel staves, doors, window frames, and clapboards.

Life vein from land to sea

Coastal rivers like the Sheepscot are critical links for fish that originate in ponds and streams, develop to adulthood in the ocean, and return to freshwater to deposit their eggs (spawn). Sea-run fish have existed in these rivers for thousands of years; Native Americans and European settlers depended on their abundance for food and fertilizer. The fish are also an important part of the saltwater and freshwater food chains and support a wide variety of birds and mammals along the river corridor.

Osprey

Watershed Wildlife

Life thrives throughout the watershed. Osprey, eagle, waterfowl, and mammals such as beaver and otters are attracted to the river to feast on its bounty. Its forested banks provide habitat for deer, songbirds, and other animals. The river supports seven species of freshwater mussels, at least five species of turtles, and hundreds of plant and tree species.

Coopers Mills Fish

Atlantic salmon, river herring (alewives and bluebacks), American eels, sea lampreys and American shad have all been documented here at Coopers Mills. River herring are the base of the food chain, serving as prey for a wide variety of fish and wildlife along the river. Historically they were the most numerous and ecologically important fish in Maine's coastal rivers. Today a small commercial river herring fishery still exists, largely due to their spawning in Long Pond above this site.

River biologist tagging shad.

Watershed Health

The upper sections of the Sheepscot are relatively pristine, and much of the river has the state's highest water quality rating. Nevertheless, the watershed faces issues such as nutrient runoff from the land, sedimentation from eroding banks, elevated water temperatures, reduced levels of oxygen, and various sources of pollution. Tree plantings, bank stabilization, pollution prevention, and improved land management are vital efforts to support the health of the Sheepscot River.

Upstream Migration

Every year, adult sea-run fish—guided by smell or their 'homing' instincts—migrate from the ocean to freshwater rivers, streams, ponds and lakes to spawn, often at the very site where they hatched. Many of these fish will return to the ocean as adults only to come back the following year to spawn again. The Sheepscot is one of only eight Maine rivers that provide essential spawning grounds for the federally endangered Atlantic salmon.

Photo by Leah Sprague

White-tailed deer

Sea lamprey

Spawning Grounds

Many sea-run fish spawn in the quiet backwaters of rivers and streams. Atlantic salmon prefer the cooler, gravelly headwaters while alewives require pond habitat to reproduce. There are thirteen historic alewife ponds in the Sheepscot watershed, though many remain blocked by impassable dams. With the removal of the dam at this site, schools of juvenile alewives can now freely migrate to the Atlantic Ocean, where they will grow into adulthood.

river otter

American eel

Alewife

Atlantic salmon

Sea-run brook trout

Upstream Migration Timeline

January | February | March | April | May | June | July | August | September | October | November | December


Coopers Mills Construction Project
Construction Dates
July 2018 to November 15, 2018
There will be limited river access and Monday – Thursday road closures of Basin Lane during construction
Project Summary
This project will benefit the fisheries of the Sheepscot River while preserving the mill history of the site and maintaining a reliable water supply for local fire protection
What to Expect
The Coopers Mills Dam will be removed, two new fire hydrants will be installed, historic mill foundations will be stabilized and protected, and a river viewing platform, educational signage, and other public use enhancements to the site will be constructed
Point of Contact
For project updates, please visit the Town of Whitefield website or contact the Atlantic Salmon Federation at 207-725-2833 ext. 1
SHEEPSCOT RIVER
LVBrown Studio LLC
Project Partners
MIDCOAST CONSERVANCY
The Nature Conservancy
NOAA
Project Sponsor
Project Design
SEWALL
inter-fluve
Kleinschmidt
Project Contractor
SUMCO ECO-CONTRACTING

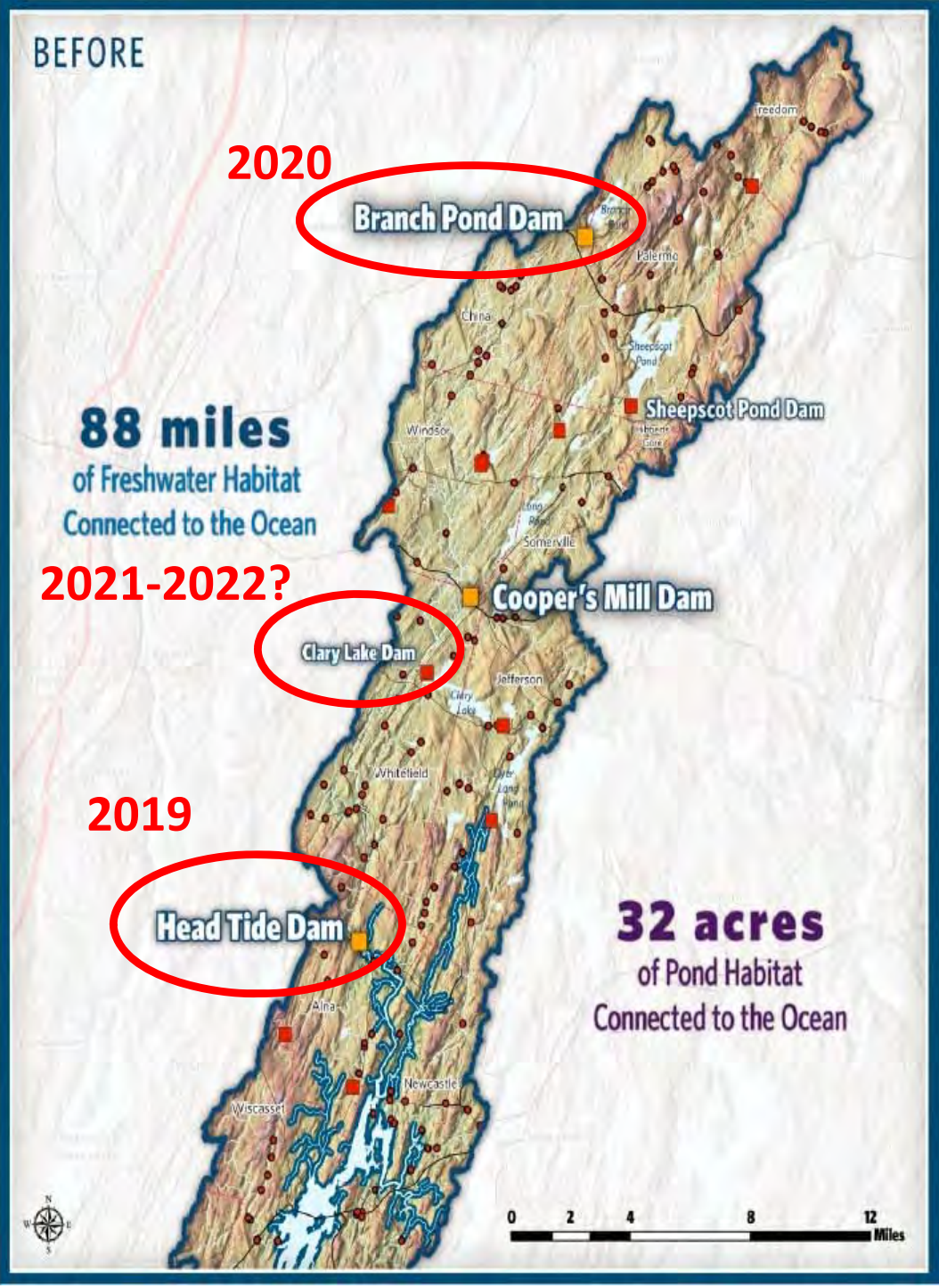

CAT

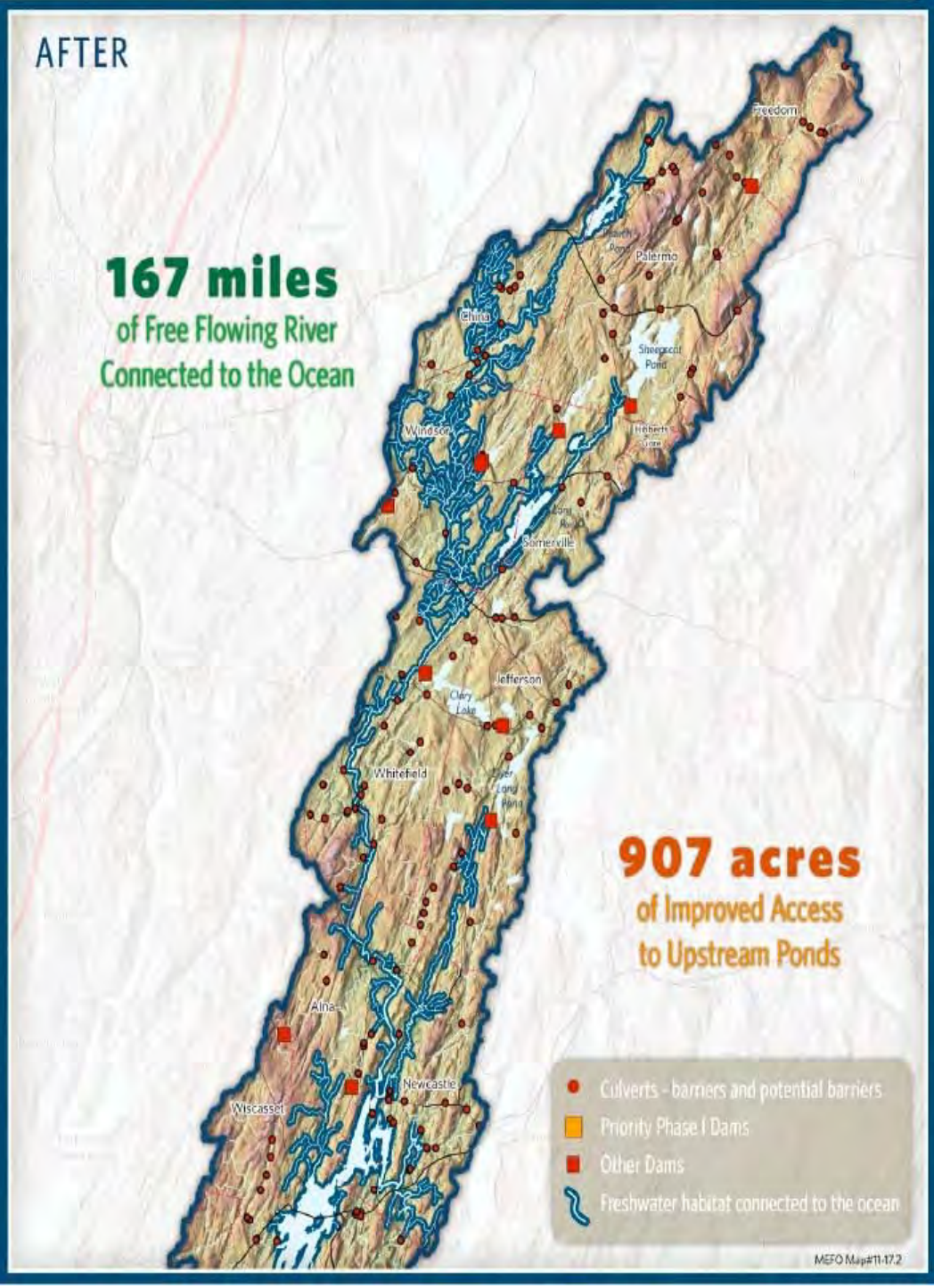

Bobcat

Summary

- Collaborative approach yielded a win-win
- Patience over many years, with many partners, to systematically work through issues paid off
- Construction budget $567,000

Next Steps


BEFORE
2020
Branch Pond Dam
Sheepscot Pond Dam
88 miles
of Freshwater Habitat
Connected to the Ocean
2021-2022?
Cooper's Mill Dam
Clary Lake Dam
2019
Head Tide Dam
32 acres
of Pond Habitat
Connected to the Ocean
Freedom
Palermo
China
Windsor
Somerville
Jefferson
Whitefield
Alna
Newcastle
Wiscasset
0 2 4 8 12 Miles


AFTER
167 miles
of Free Flowing River
Connected to the Ocean
907 acres
of Improved Access
to Upstream Ponds
Culverts - barriers and potential barriers
Priority Phase I Dams
Other Dams
Freshwater habitat connected to the ocean
Freedom
Palermo
China
Windsor
Somerville
Jefferson
Whitefield
Alna
Newcastle
Wiscasset

Questions?

Acknowledgements:

Town of Whitefield, ASF, Midcoast Conservancy, NOAA, MDMR, USFWS, TNC

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Sumco Eco-Contracting, Linkel Construction

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