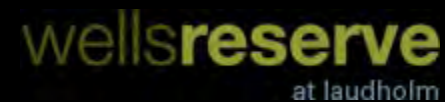


The Value of Stream-Smart Road Crossings



Stream-Smart Road Crossing Workshop Partners



Road Map of Day

- ❖ The Value of Stream-Smart Road Crossings
- ❖ How to Create Stream-Smart Road Crossings
- ❖ Legal Requirements
- ❖ Wells NERR Surveys and Local Restoration Priorities

Stream-Smart Crossings...

Maintain fish and
wildlife habitat



while protecting roads
and public safety.

This is what we're trying to avoid



Free-flowing streams are valuable

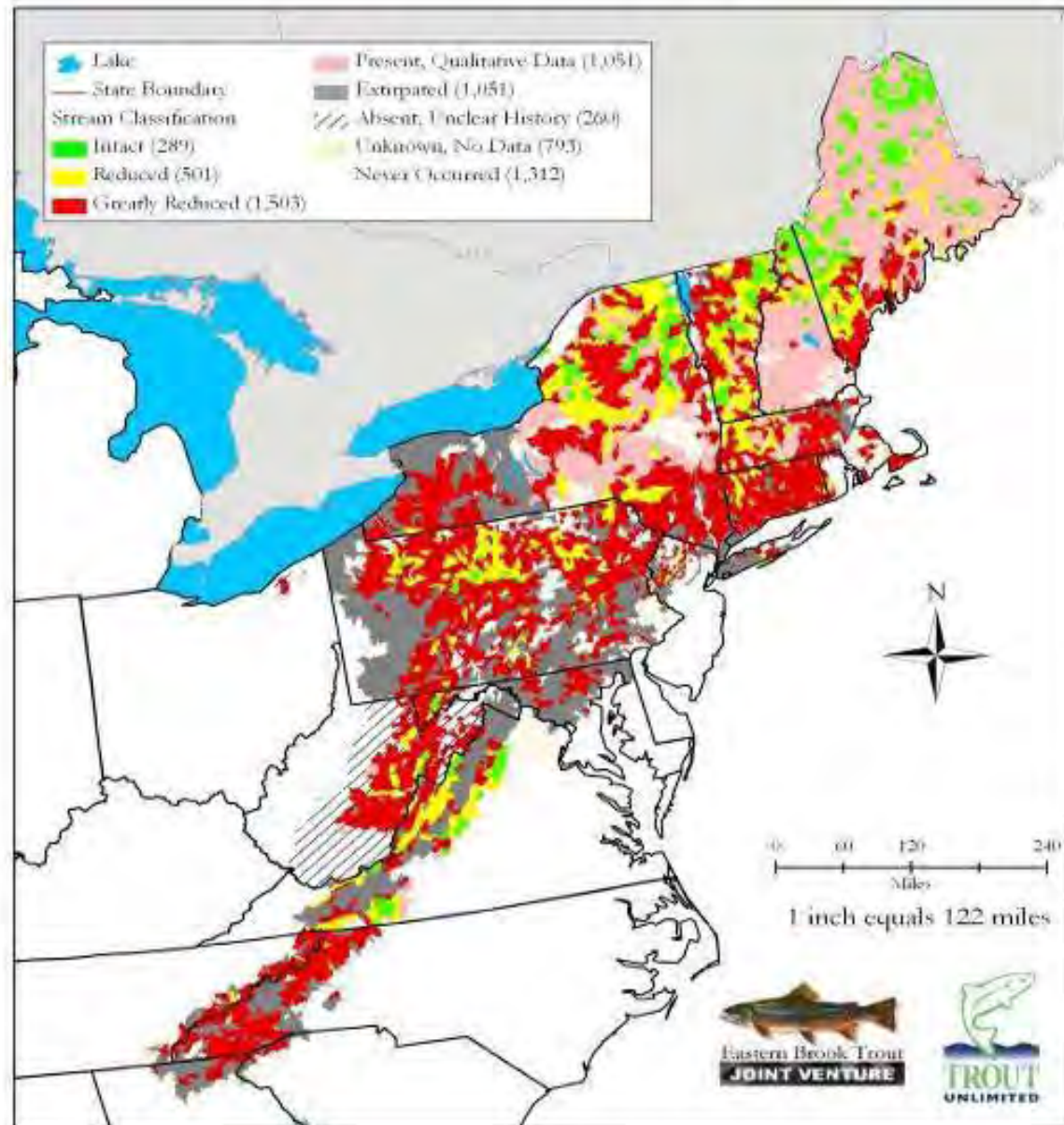


Maine's amazing fisheries: Recreational and economic benefits



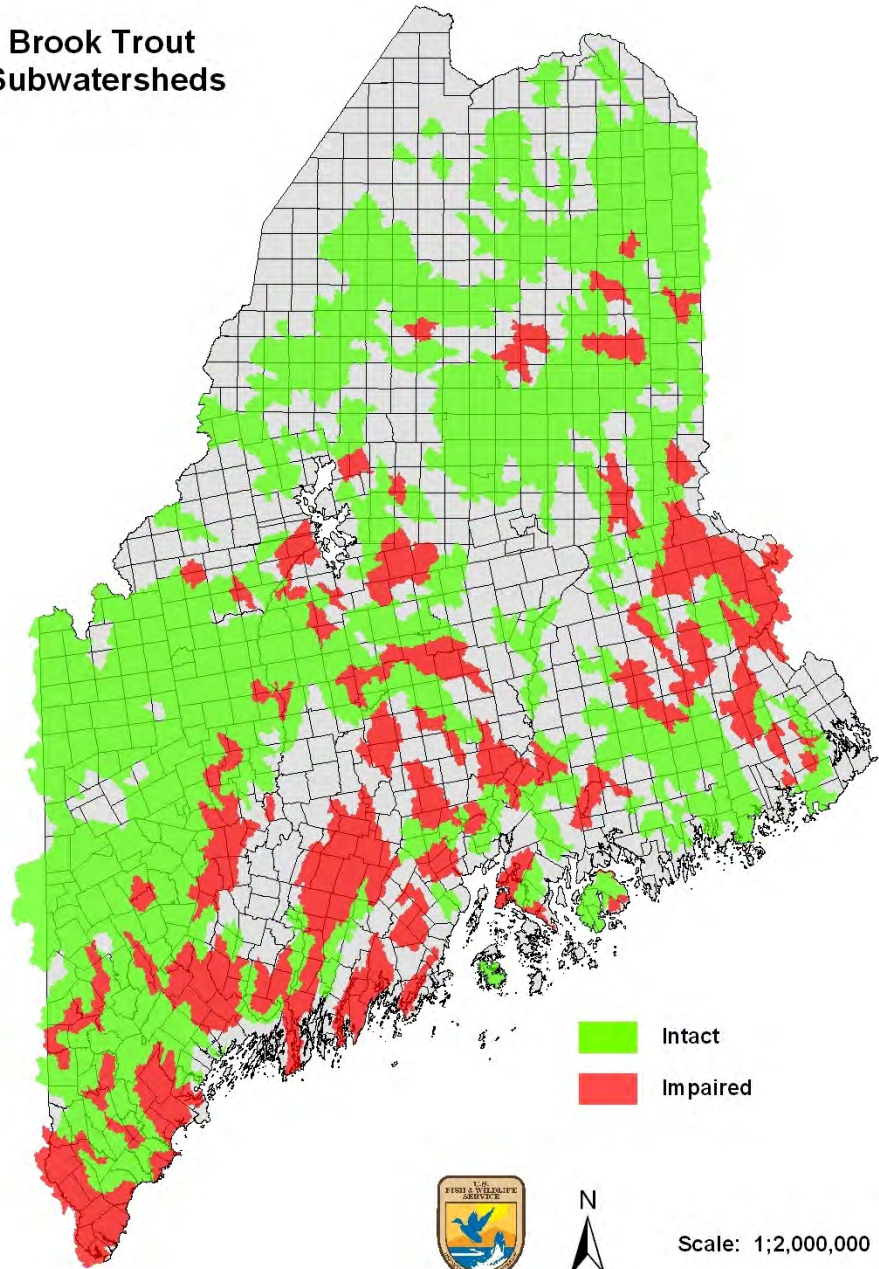
Brook Trout Population Status by Subwatershed for Eastern U.S. Range

Brook Trout



Brook Trout

Brook Trout Subwatersheds

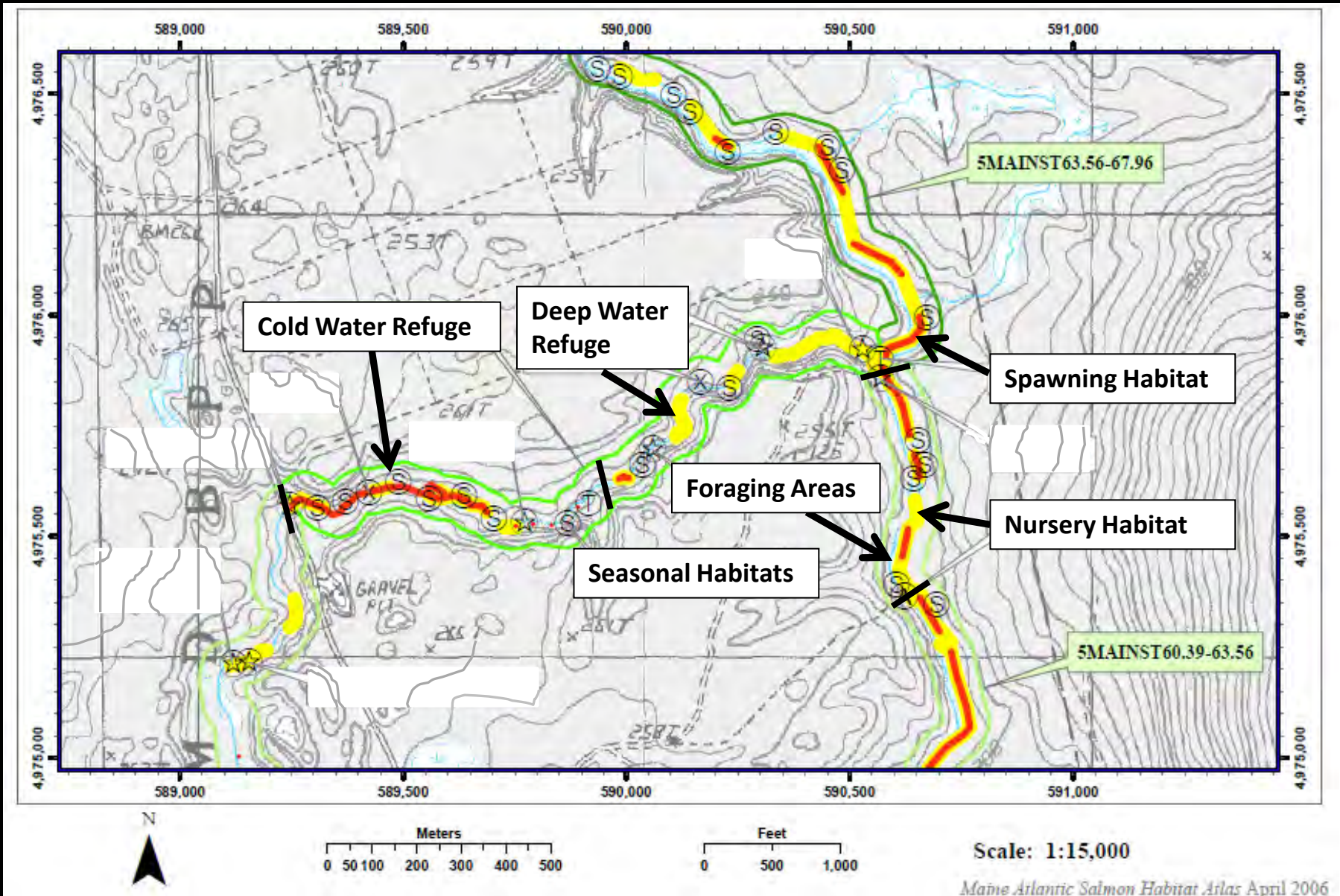


Scale: 1;2,000,000

Atlantic Salmon



Fish need to move



It's not just fish



Photo: NH Public TV



A photograph of a stream flowing over large, light-colored rocks in a forest. The water is turbulent, creating white rapids. The surrounding trees have vibrant autumn foliage in shades of red, orange, and yellow. The scene is captured from a slightly elevated perspective, looking down at the stream.

It's what the stream does

Stream flow variability



Moves organisms and material



Maintains water temperature

Even small streams are valuable.





**OK, so free-flowing streams are
valuable.**

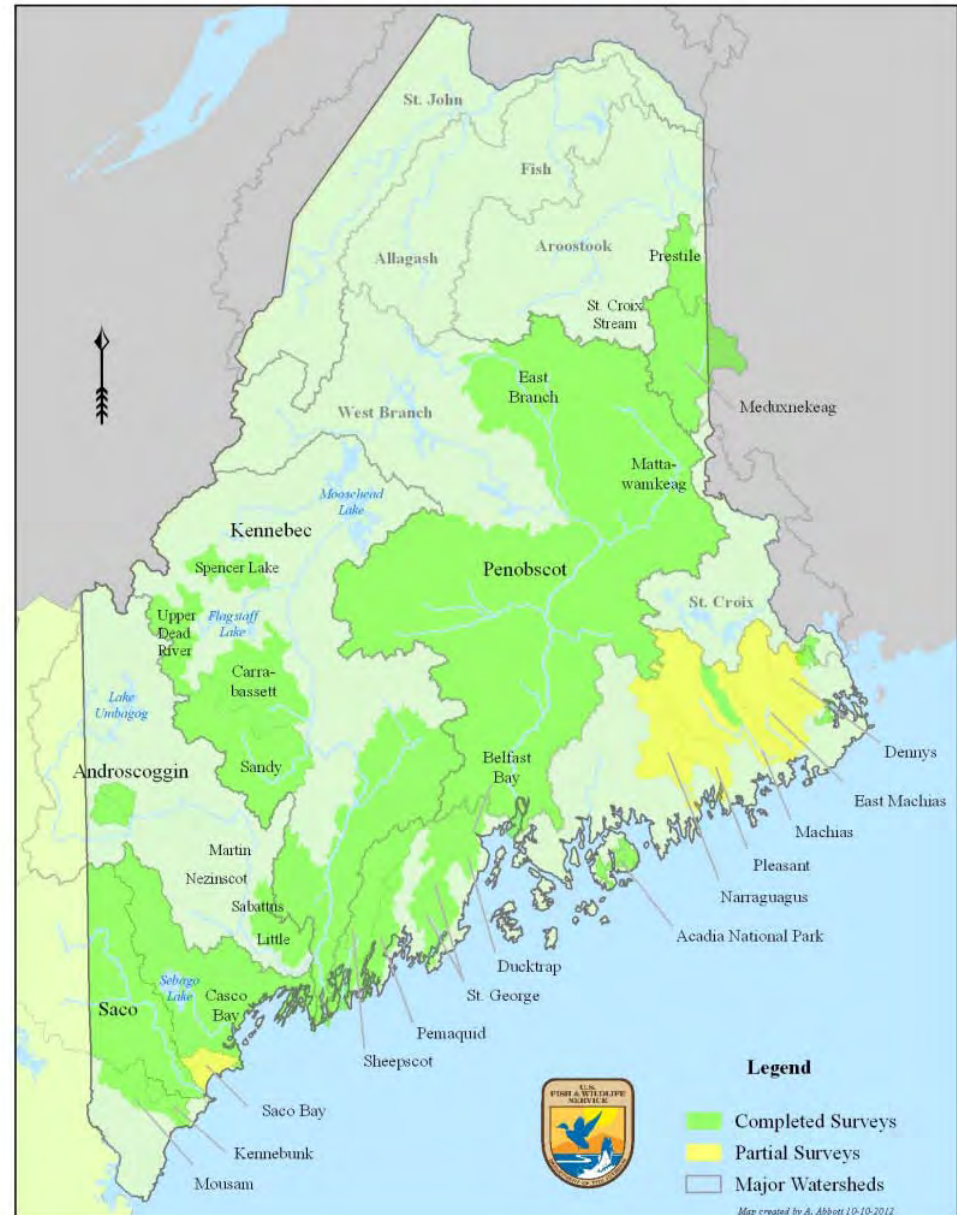
What's the problem?

Barriers!

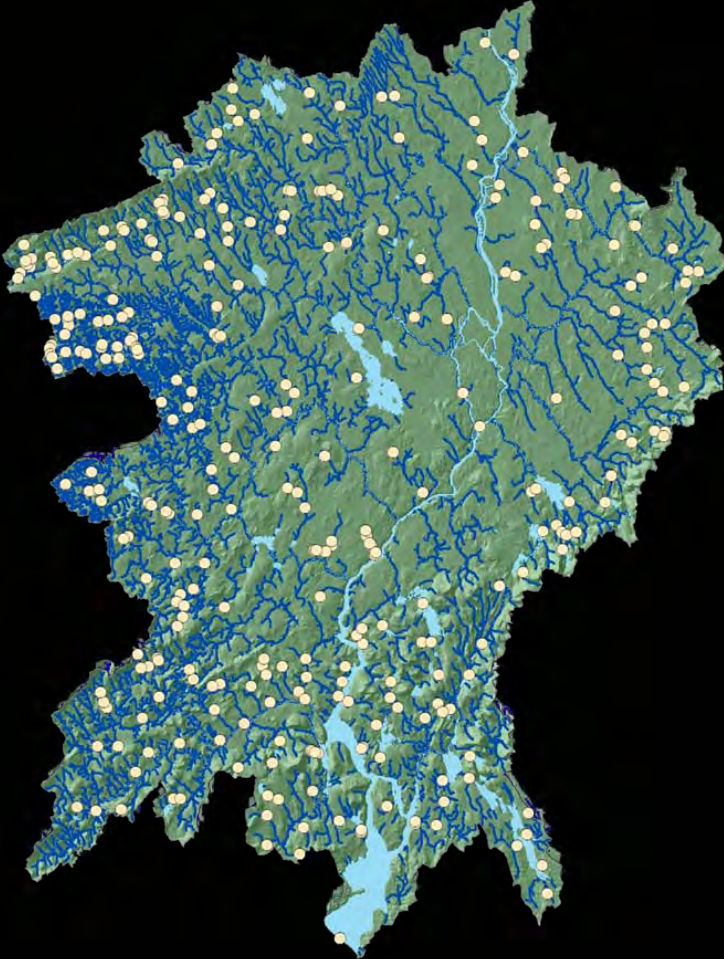


Approximately 35% of
Maine's road crossings
surveyed between 2007-
2012

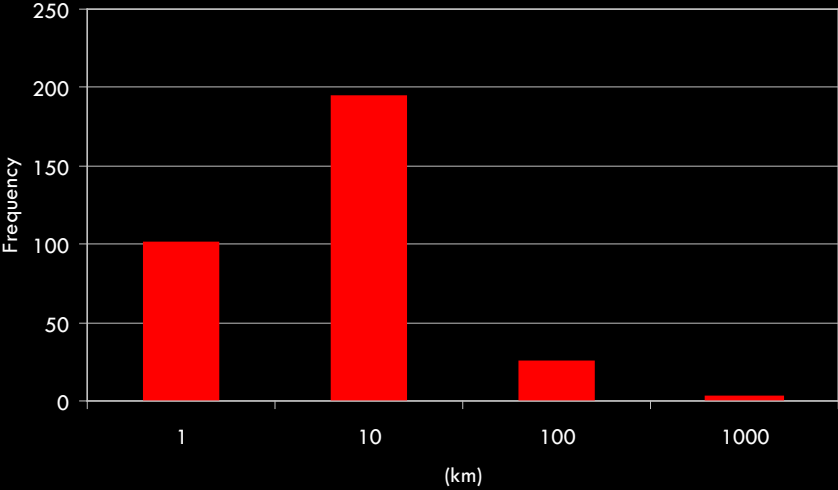
Maine Barrier Survey Status Map



Pre-disturbance network
totaled over 4,600 km. of streams

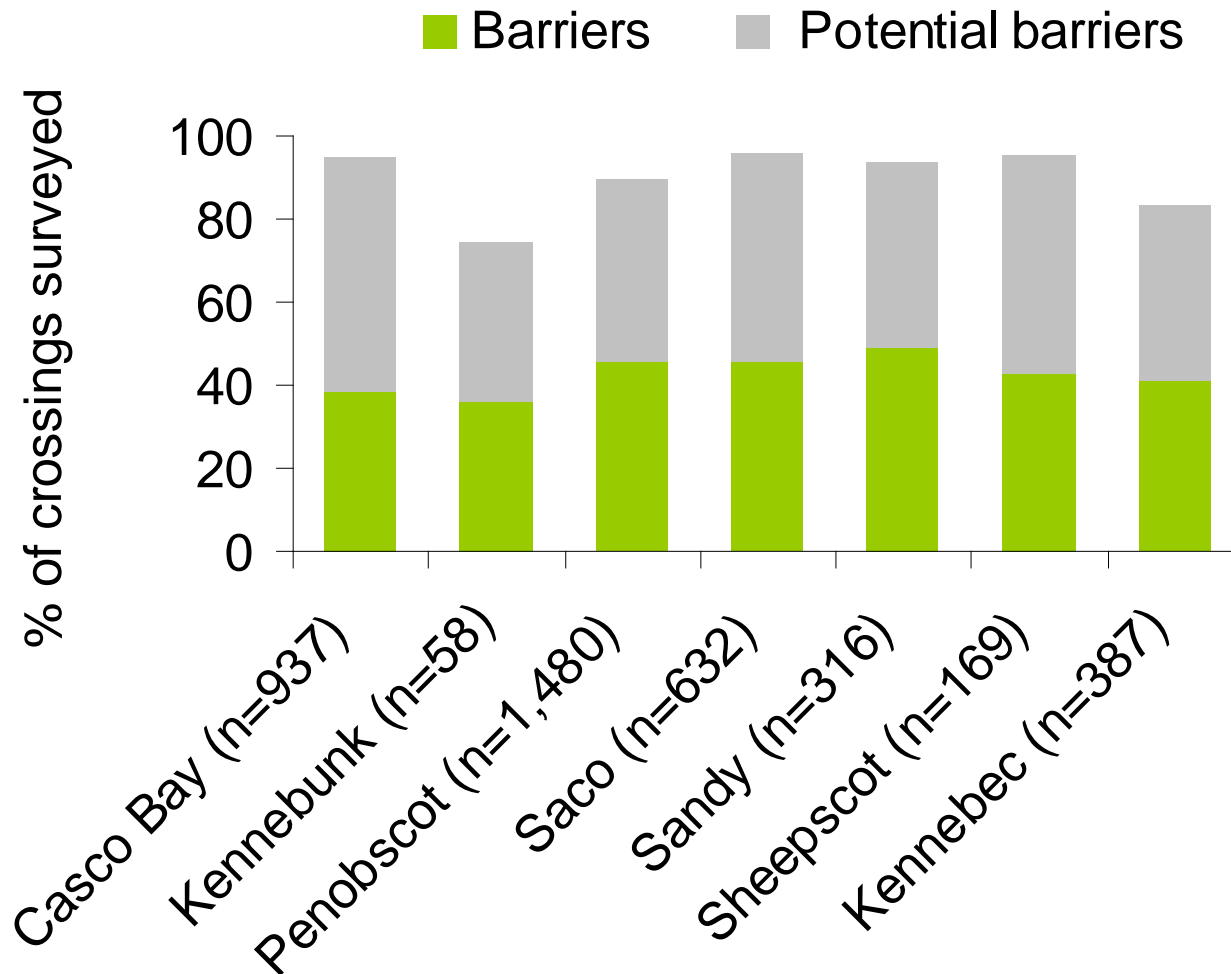


Current system is severely fragmented –
average network length is 6.4 km.



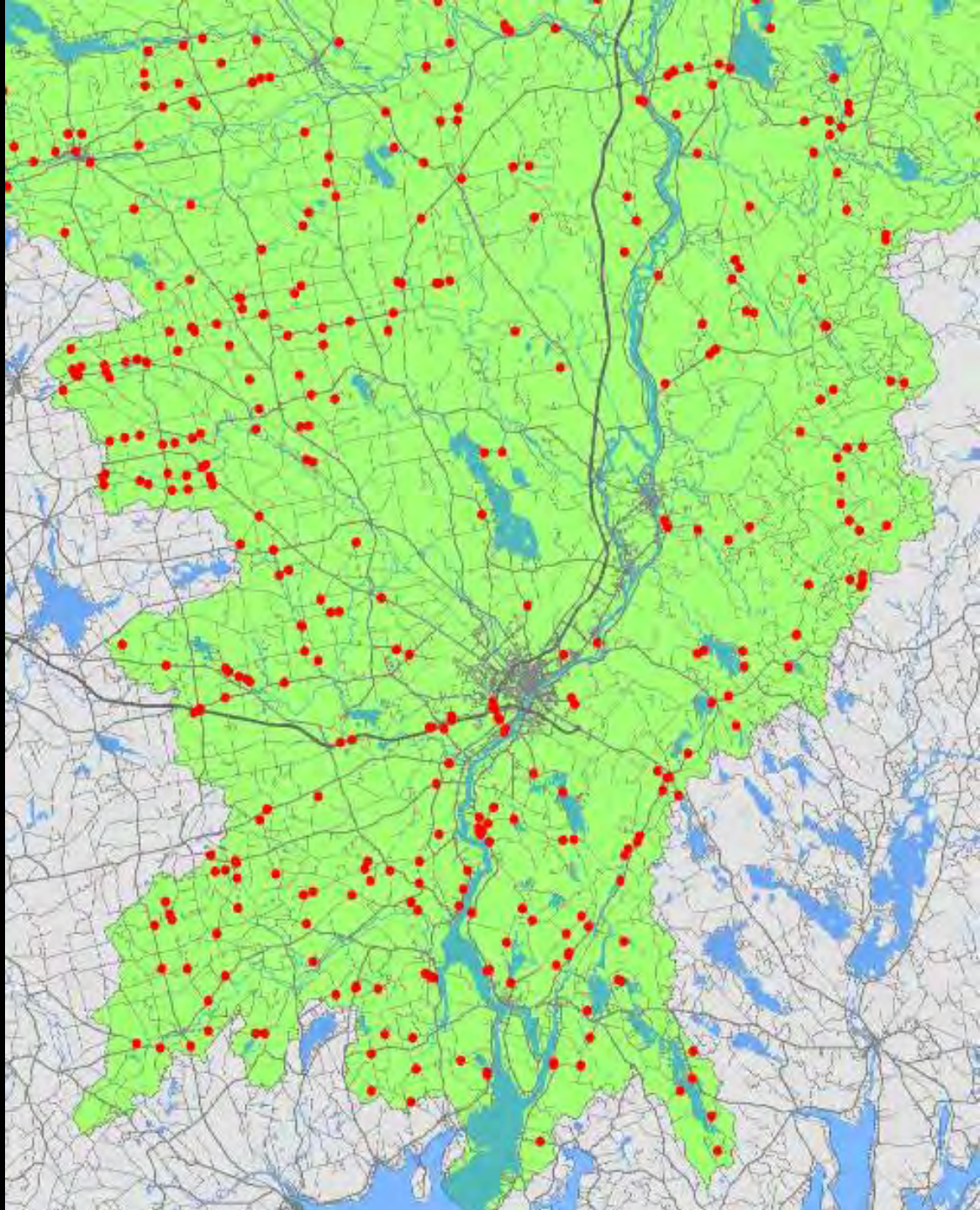
Histogram of current stream network lengths

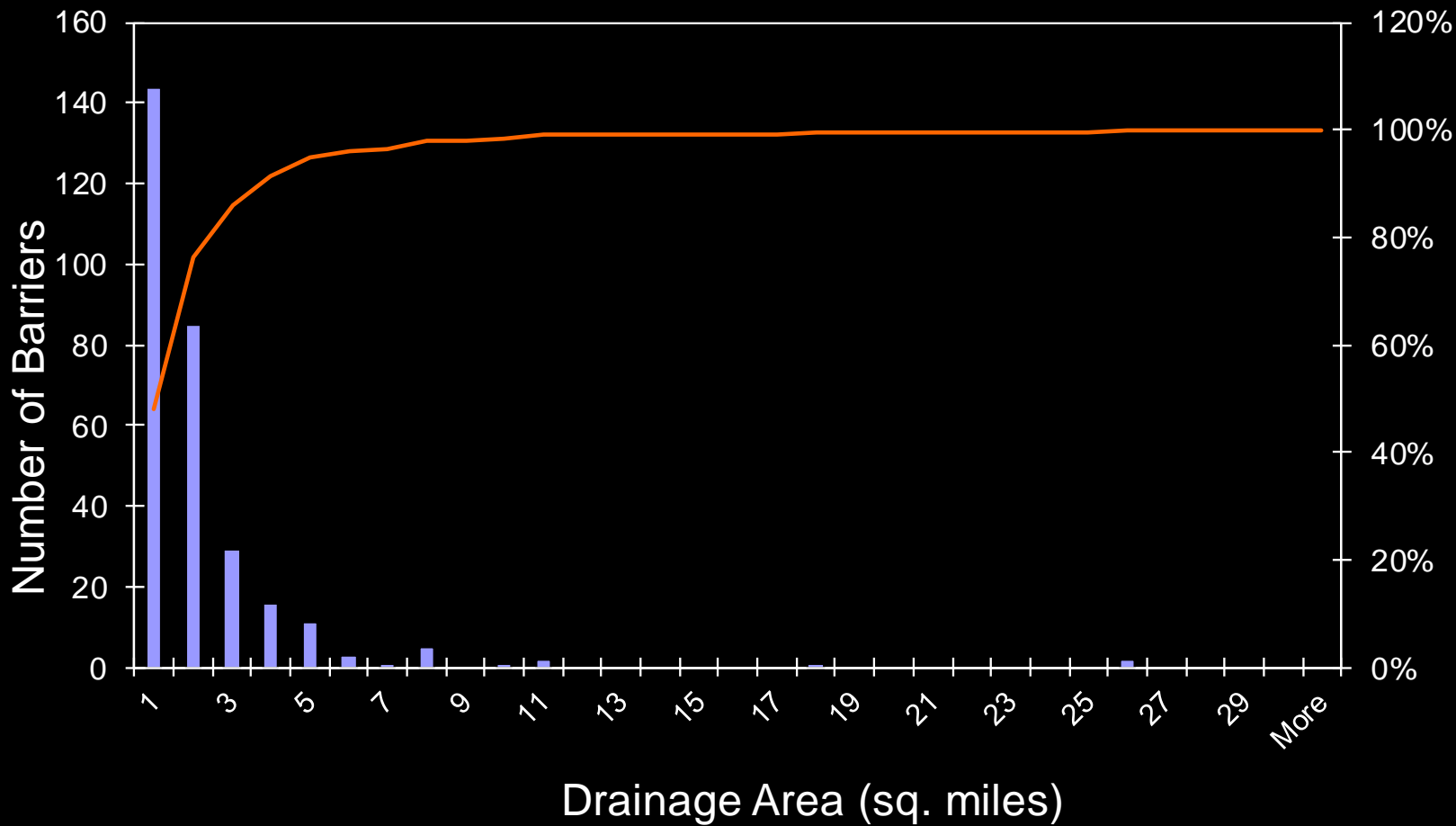
Culverts are often barriers



Data sources: KELT, CBEP, KCSWD, USFWS, MFS, SRWC, TU, and partners

**The problem is
widespread**





Barriers limit fish passage and disrupt what the stream does



Photo by Kandis Hovland VTF&W



HOW do culverts block fish passage?

A) Flow too fast

- Undersized or Too Steep

B) Flow too shallow

- Set too high

C) Physical barrier

- Outlet perched
- Inlet Blocked
- Thermal Barrier



Flow too fast



Flow too shallow



Physical barrier: Outlet perched



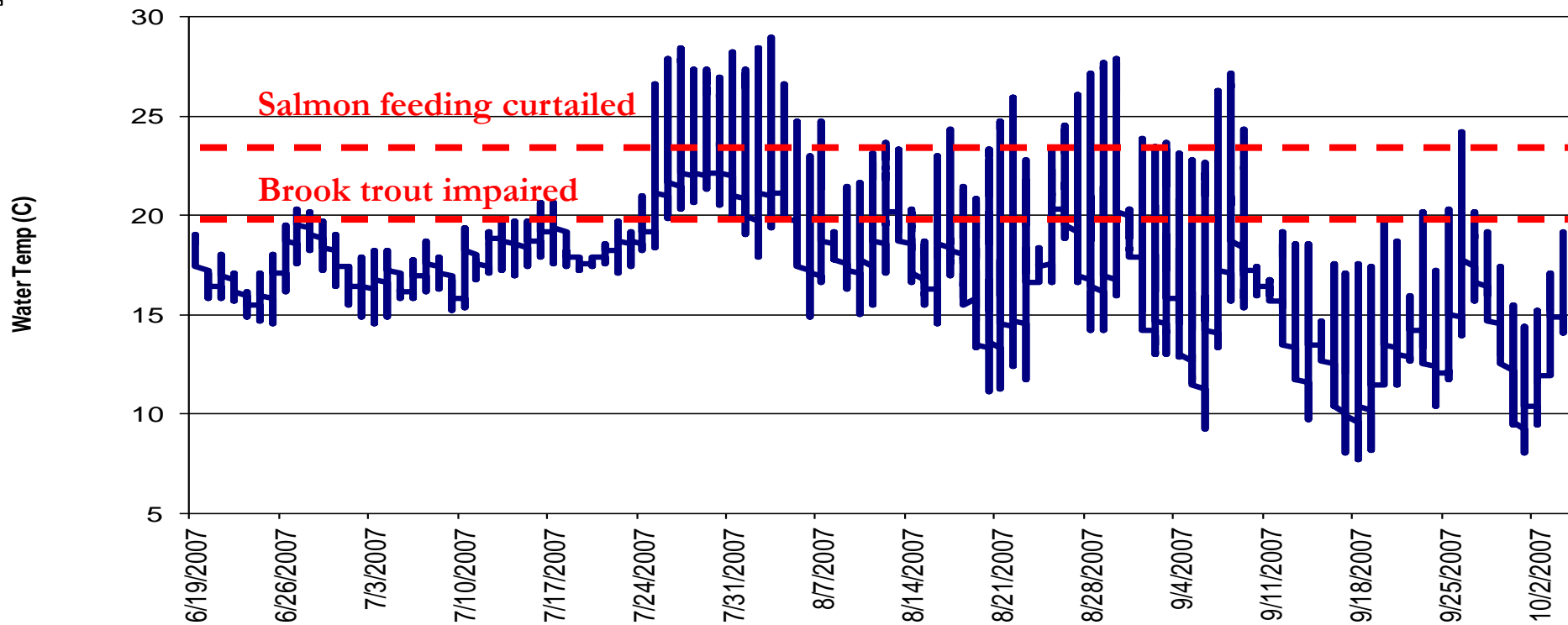
Physical barrier: Inlet blocked



Physical barrier: Thermal dams



High water temperatures stress trout and salmon



What about tidal streams?




Tidal restrictions: Shrinking wetlands



© 2011 Google

©2010 Google

Imagery Date: 5/16/2010  1996

lat 43.901531° lon -69.889689° elev 9 ft

Eye alt 1704 ft 

Tidal restrictions: Impoundments



What failure looks like



What failure looks like



Road washouts: Bad for budgets...

Tons of Material	Item	Cost
400	Imported gravel and base material (\$21 / ton)	\$8,400
50	2 employees/trucks (80/hrs @ \$45 / hr)	\$3,600
	1 employee/backhoe (60 hrs @ \$75 / hr)	\$4,500
	Road Work- Grading (40 hrs @ \$100 /hr)	\$4,000
450		\$20,500

The Undersized Culvert is Still There!



...also bad for habitat



**Big storms will become
increasingly likely**

43% ↑

Extreme storms

Vermont – Hurricane Irene 2011



A Wise Investment



2010



After Tropical Storm Irene
September 2011

Machias River, Maine – December 2010





Sea level rise will magnify impact on tidal streams



Eastport, ME

~ 6.1" rise since 1929

Portland, ME

~ 6.8" rise since 1912

Predictions of rises
up to 6.5' by 2100



Luckily, there are solutions.

**Stream-smart crossings
maintain fish and wildlife habitat**

while protecting roads and public safety.

What makes a solution stream-smart?



Pre-restoration

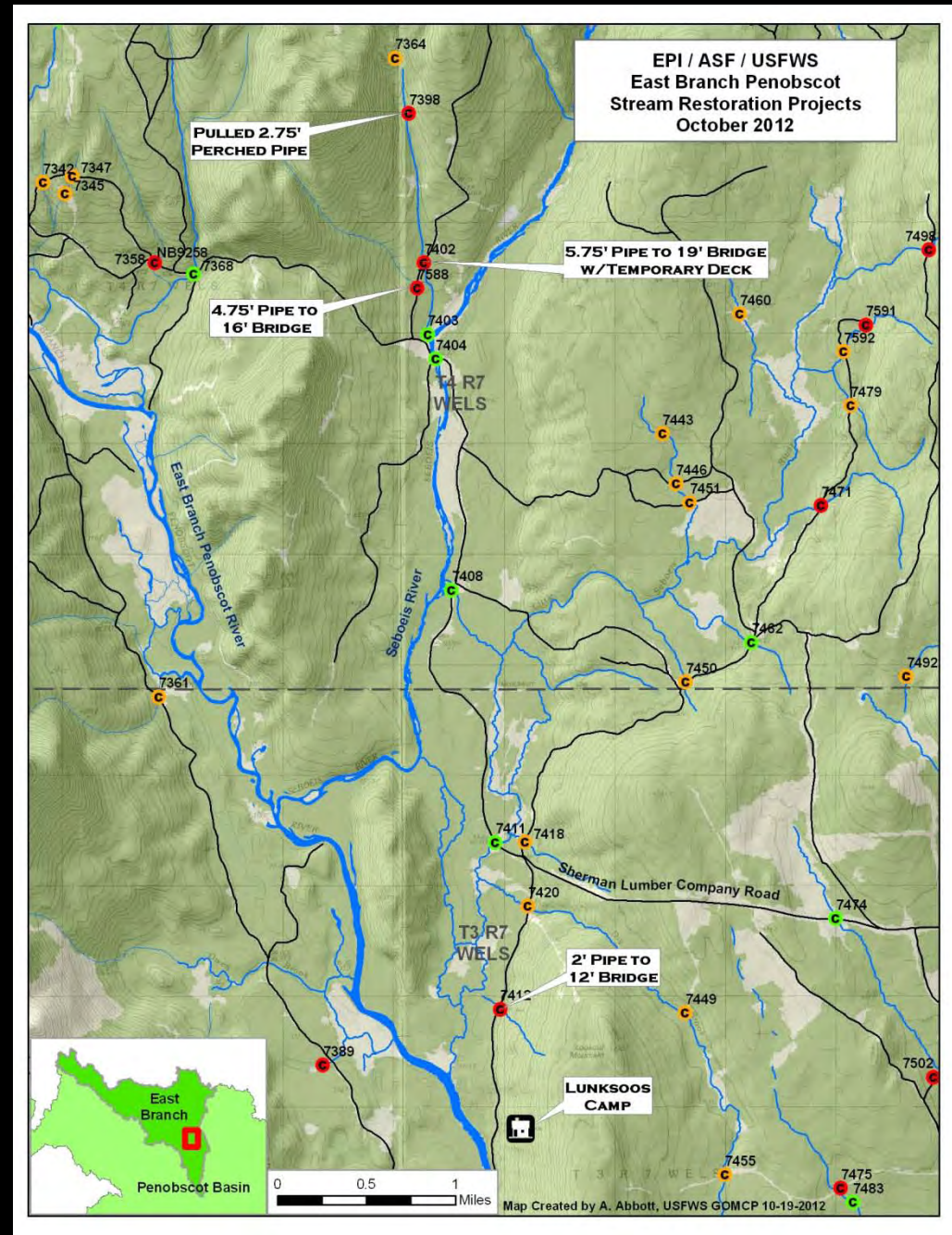






East Branch Penobscot Focus Area

- Funding, Outreach, Technical Assistance and Information Sharing
- Four sites improved totaling 2.3 miles of perennial stream habitat for Atlantic salmon and Eastern brook trout
- Simple, low-cost bridge designs using local businesses and local materials



Site 7588 – Before Restoration



4.75' Perched Round Pipe

Inlet

Site 7588 – After Restoration *



16' Bridge Span



Outlet



* Bridge composed of timber on steel beams. Revegetation to follow.

Site 7412 – Before Restoration



Inlet

Site 7412 – After Restoration *



Outlet



* Bridge deck composed of timbers only. Revegetation to follow.







Stream-Smart Crossings...

Maintain fish and wildlife habitat while protecting roads and public safety.



Allow the stream to act like a stream, passing fish and wildlife as well as the higher flows that come with larger, more frequent storms.