

Maine Stream Connectivity Work Group
2012-2013 Report

Maine Coastal Program, Department of Agriculture,
Conservation and Forestry



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**Gulf of Maine
Council on the
Marine Environment**



On the cover: Alewives congregate near the outlet of a road crossing in Surry that hinders passage to upstream spawning grounds. To ensure the run persists, local citizens resorted to hand-dipping fish over the crossing and Maine DMR has stocked the stream with alewives. The engineering phase of a fish passage project is underway and supported by GOMC, NOAA, Wright-Pierce, Blue Hill Heritage Trust, US Fish and Wildlife Service (USFWS) and the Town of Surry.

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Appendix A. Maine Stream Connectivity Work Group Participants

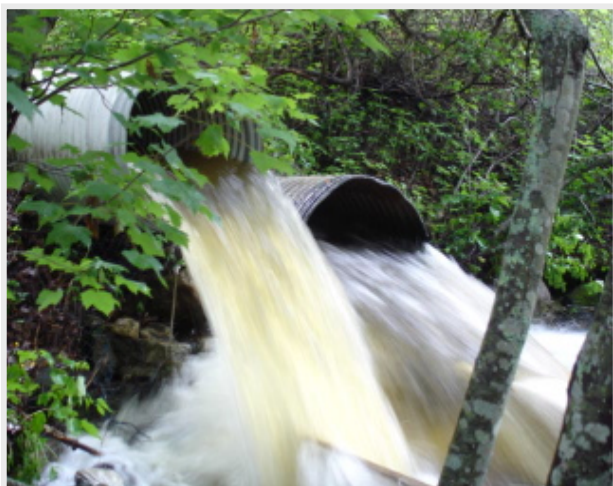


Above photo: With construction of a new 8' x 17' Stream-Smart road crossing and a series of downstream rock weirs, alewives, sea-run brook trout and other species are once again afforded unhindered passage into habitats upstream of the Thorne Road crossing over Flanders Stream. The project was completed with support from NOAA, GOMC, Maine Department of Marine Resources, USFWS, Maine Natural Resources Conservation Program, Corporate Wetlands Restoration Partnership and the Town of Sullivan.

I. Background on Stream Connectivity and this Report

Connectivity

When dams or undersized road crossings in rivers and streams restrict or block the flow of water, they act as barriers to the movements of fish and wildlife to and from key habitats. Barriers also impair processes like tidal flow and the transport of sediment and organic material, which are the essential building blocks that create and maintain quality habitat for a range of species. The resulting loss of connectivity increases with the number of barriers that block species movements and impair habitat-sustaining processes. As a result, populations of prized species, like Atlantic salmon, wild eastern brook trout, river herring, and rainbow smelt, are compromised or no longer present, leaving many of our watersheds without the



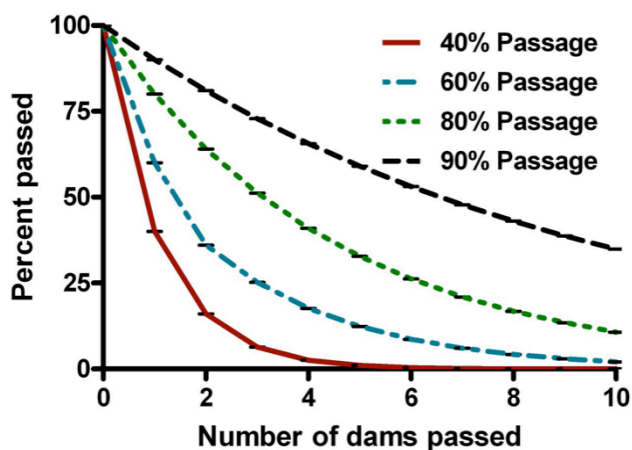
Dams and road crossings like undersized and perched culverts act as barriers that prevent fish and wildlife access to key habitats and interrupt stream processes that build and sustain habitat.

ecological underpinnings necessary to support the economic services and cultural traditions long-valued by Maine's citizens.

Dams

An accurate count is unavailable, but most authorities agree that there are over 1,000 dams in Maine. Most dams in Maine no longer serve their intended purpose, but the lake-like environments

they impound can have considerable aesthetic and recreational value to local landowners. At least 90% of dams lack facilities for fish and wildlife passage. Those with fishways are usually designed to pass one or a few "target" species, which means that for other aquatic organisms the dam often remains a barrier. Most fishways in Maine were intended to meet the passage needs of anadromous species, like salmon or alewife, which historically had



Fishways may not pass enough fish to support viable populations of the target species, especially when fish must ascend multiple fishways to reach spawning habitat. In this simplified model, hypothetical passage efficiencies for species "X" range between 40% and 90% (Moore and Reblin 2010).

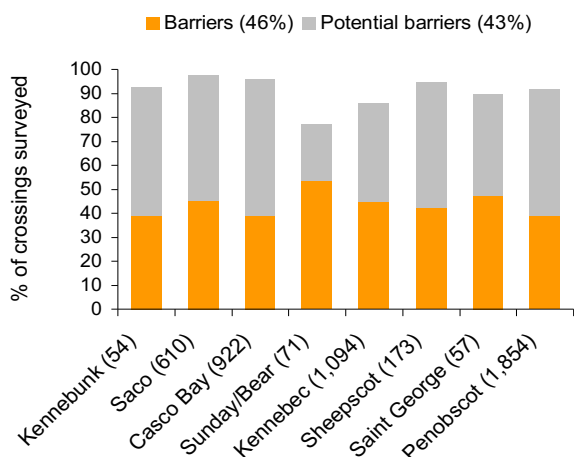
unhindered access between marine environments and freshwater spawning grounds sometimes far inland. In some cases, design limitations or changes in site conditions result in fishway passage efficiency that is too low to sustain a viable population size for the intended species.

When fish must ascend multiple fishways to reach important habitats, like those with the necessary conditions for spawning, fishways with even relatively high passage efficiency can cumulatively erode the target species' population size. For example, if a series of three dams on a river or

stream each had a fishway with 80% efficiency, about 51% of the target species spawning population would be expected to pass the most upstream dam.

Roads

Dams have been the traditional focus of barrier removal efforts, but recent surveys of road crossings in Maine characterize about half (46%) of all surveyed culverts as barriers because they are perched above the stream and/or blocked. Another 43% of culvert crossings show signs of scouring typically associated with undersized culverts that “pinch” or reduce channel width at a crossing. These culverts are called “potential barriers” because stream flows with velocities sufficient to scour may also exceed the swimming abilities of many species. Whether the interest is in highly migratory anadromous fish or resident



The percentage of culverts identified as barriers and potential barriers in Maine watersheds (2007-2012), indicates that most of these structures probably pose some hindrance to stream processes or the passage of aquatic organisms. The number of culverts surveyed per watershed is provided in parentheses. USFWS unpublished data.

stream organisms that require mobility within a single catchment, successful recovery and management of stream-dependent fish, wildlife and the processes they depend on requires a focus on reversing the impacts of both roads *and* dams,

among other factors. The good news is that to varying extent, dam removals, well-designed fishways, and Stream-Smart road crossings can provide relief for some stream-dependent species. The challenge is not so much a technical one, but instead how to develop funding sources that can provide steadily increasing on-the-ground restoration progress.

The Maine Stream Connectivity Work Group

In the absence of a formal State of Maine restoration program, the Maine Coastal Program and Department of Marine Resources convened an informal restoration coordination effort in 2009. The Stream Connectivity Work Group (SCWG) is coordinated by the Maine Coastal Program (Department of Agriculture, Conservation and Forestry) and composed of individuals representing state and federal agencies, tribal governments, non-governmental organizations, forest products companies, and engineering firms (Appendix A). The SCWG’s overall goal is to increase the rate and quality of restoration in Maine, to the extent that can be achieved with available funding. To that end, the SCWG’s role has largely focused on providing:

1. An open forum and educational resource for Maine’s restoration community
2. Opportunities for enhanced inter-organizational coordination
3. Data and tools that demonstrate restoration needs and inform how to make the most wise restoration investments
4. A practitioner network that leads to increased project collaboration, and
5. Clear articulation of Maine’s restoration needs as expressed by the statewide restoration community.

II. 2012-2013 SCWG Accomplishments

Since the last SCWG report (2012), our participants and partners have continued to address the focus areas mentioned above. Notable products delivered included spatial habitat datasets for key species that are the focus of restoration activities

and the Maine Stream Habitat Viewer, found at: <http://mapserver.maine.gov/streamviewer/streamdocHome.html>. Credits for those involved in the development of the Viewer are on the website. The full list of 2012-2013 SCWG accomplishments include:

- **Bi-annual connectivity meetings, providing:**
 - A clearinghouse of the latest restoration news about projects, techniques, research, and planning
 - Maine's only forum focused on restoration needs of all aquatic habitats and for statewide habitat restoration practitioners and others interested in restoration
- **Restoration Training and Outreach, including:**
 - In-kind support for Maine Audubon-led trainings on Stream-Smart Road Crossings
 - US Forest Service road crossing aquatic organism passage ("Stream-Simulation") training for road crossings
 - Presentations at various forums to raise awareness of SCWG tools and resources
- **Interagency coordination to:**
 - Initiate identification of restoration priorities
 - Initiate planning for maintenance of State-owned dams
 - Initiate development of outreach for dam owners
- **Development of new and updated data and tools including:**
 - The online Stream Habitat Viewer
 - An expanded Statewide Barrier Database
 - The Project Collaboration GIS Viewer
 - Spatial habitat data layers for alewife, sea-run rainbow smelt, Atlantic salmon, wild eastern brook trout, and tidal wetlands
- **Combining restoration resources** of our participants for site-specific projects using our

network of practitioners, Collaboration Sessions and the Project Viewer

III. 2014 SCWG Priorities and Objectives

The Stream Connectivity Work Group is well positioned to deliver services and products that make worthwhile contributions to restoration in Maine. The areas on which we choose to focus on in 2014 are provided below. Our goal is for each new initiative to develop a workplan and timeline to encourage reasonable expectations for deliverables and efficient use of participant's time.

Objective 1: Use data, including those developed for the Stream Habitat Viewer, for an assessment that identifies regions, watersheds, and sites warranting the most immediate restorative action and representing the best potential return on investment.

Statement of Need

Several factors are responsible for the magnitude of challenges faced by restoration practitioners in Maine. These include: 1) the ubiquitous nature of barriers to stream connectivity, 2) the lack of funding to address more than a relative handful of individual sites each year, and 3) the need to promptly stimulate recovery of imperiled or at-risk aquatic species. Under these conditions, it is essential that restorative actions maximize the return on each investment. We can address this need by using our knowledge of the statewide distribution and amount of functioning habitats and those that are impaired. This approach would provide an ecological and strategic basis for guiding the allocation of resources and comparing our progress with identified needs.

Objective 2: Raise awareness among dam and road owners of stream connectivity benefits and provide information on how to integrate ecological considerations into the operation and maintenance of their infrastructure.

Statement of Need

There are many more barriers to connectivity caused by dams and road crossings than can be corrected within a reasonable timeframe (given the level of urgency) even if restoration capacity improves. Providing infrastructure owners with meaningful rationales for re-establishing connectivity could mobilize a new source of restoration interest and implementation – one that far outpaces present capacity of the restoration community. Examples of ongoing work will include Stream-Smart Road Crossing class and field workshops and efforts to provide outreach, technical assistance and funding to dam owners who have difficulty managing the full ecological, public safety, and financial obligations of dam ownership.

Objective 3: Continue support for barrier surveys in watersheds throughout Maine.

Statement of Need

Knowing the location and condition of barriers to connectivity in Maine has been essential to characterizing the issue of lost stream connectivity and planning well-informed and effective restoration actions. Collaborative efforts to fund, lead, and offer training for surveys remains an ongoing need.

Objective 4: Provide a useful and enduring forum, action network, and educational outlet for organizations focused on restoring Maine’s aquatic resources.

Statement of Need

The Maine Stream Connectivity Work Group fills a niche by providing an efficient and effective network for convening restoration practitioners of diverse public, private, and commercial interests and backgrounds. Participants collaborate on the development and execution of site-specific restoration projects, learn about innovations and standards of practice, engage practitioners from other states, and develop new tools. The group is

currently coordinated by a position under a contract from the Gulf of Maine Council on the Marine Environment and contributing partnering organizations. Funding for the present coordination approach will expire in June 2014. Preparing for that transition early will help the SCWG to continue providing a useful service without interruption.



Together, this Stream-Smart crossing design and well-maintained worksite incorporate lessons learned at many other sites and also promotes standards of practice encouraged by the SCWG.

IV. Remaining Unmet Policy and Funding Needs

Despite accomplishments by many partners working for decades to increase the pace of restoration in Maine, several factors continue to hinder progress. We call attention to these needs below and note that they require attention and action by entities having decision-making authority beyond that of the SCWG, which is not a policy organization.

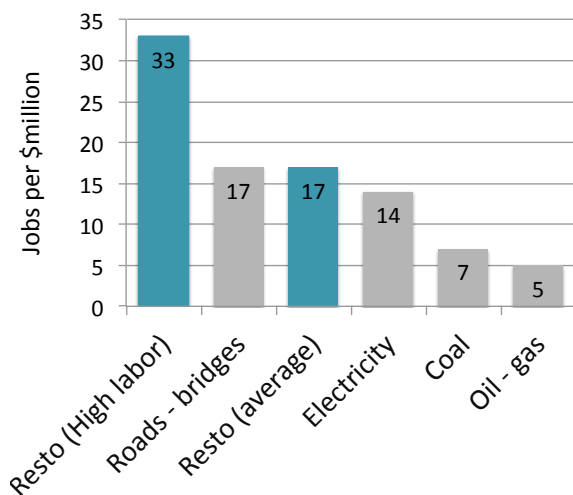
Need 1: Long-term funding sources to support a sustainable statewide, ecological restoration program.

Dedicated restoration programs in all other New England states have successfully increased the pace and quality of restoration. There is consensus among Maine restoration practitioners that development of a state-led restoration program is necessary to support interagency collaboration and

coordination needs, but also implementation of comprehensive, cost-effective restoration approaches that address the range of species and habitats warranting attention. Also important, a dedicated program is more likely to seek and attract the scale of funding necessary to achieve meaningful statewide increases in restoration

Need 2: Increased funding to support “on-the-ground” barrier removal projects at priority sites and regions across Maine.

Public funding to support stream restoration is extremely limited. Most projects rely on a patchwork of federal, state, local, private and landowner funding that can take several years to accumulate, even for modestly priced high priority projects. These contributions have been essential to Maine’s restoration successes, but *many* more projects are ready to implement each year than can be supported.



Jobs created per \$1 million invested: Habitat restoration ranks highly among traditional sectors (Edwards et al. 2012).

As demonstrated by successful restoration grant programs such as NOAA’s now defunct Community-Based Habitat Restoration Partnership, a regular source of funding not only reduces the backlog of projects, but it also increases awareness of restoration needs, builds community support, and

provides an incentive to position high quality projects for action.

A steady stream of restoration projects also has immediate economic benefits and the job creation impacts of habitat restoration often meet or exceed other industrial sectors. Furthermore, restoration dollars often stay close to home because most projects rely on engineering, construction labor, equipment, materials and support services sourced from the local community or state.

Need 3: Implementation of stream crossing practices that help achieve aquatic restoration and conservation goals by supporting recovery of species and stream processes that create and sustain habitat.

Surveys of road crossings indicate that most of Maine’s culverts over streams hinder or block the movements of fish, other aquatic organisms, or the sediment and organic materials they require for survival. Improved road crossing design and/or performance standards can be fashioned to directly support the access needs of key species but also the *stream processes* that are the building blocks of habitat for those species and others. Because standards that benefit ecological recovery can accommodate higher stream flows, they also predispose our road infrastructure to increased safety and durability.

V. Literature Cited

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Appendix A. 2012-2013 Maine Stream Connectivity Work Group participants

Name	Organization	Name	Organization
Alex Abbott	US Fish and Wildlife Service	Tara King	Natural Resources Conservation Service
Jacob Aman	Wells National Estuarine Reserve	Carrie Kinne	Kennebec Estuary Land Trust
Ray Ary	Plumb Creek Timber Company, Inc.	Dan Kircheis	National Oceanographic and Atmospheric Administration
Charlie Baeder	Sheepscot River Watershed Council	Steve Koenig	Project SHARE
Dan Baumert	Natural Resources Conservation Service	Brandon Kulik	Kleinschmidt Associates
Antonio Bentivoglio	US Fish and Wildlife Service	David Ladd	Maine Department of Environmental Protection
Matt Bernier	National Oceanographic and Atmospheric Administration	Sandra Lary	US Fish and Wildlife Service
Curtis Bohlen	Casco Bay Estuary Partnership	Kathleen Leyden	Maine Department of Agriculture, Conservation and Forestry
John Boland	Maine Department of Inland Fisheries and Wildlife	Don Mansius	Maine Forest Service
Francis Brautigam	Maine Department of Inland Fisheries and Wildlife	Eric Martin	The Nature Conservancy
John Burrows	Atlantic Salmon Federation	Dan McCaw	Penobscot Indian Nation
John Catena	National Oceanographic and Atmospheric Administration	Linda Mercer	Maine Department of Marine Resources
Barbara Charry	Maine Audubon	Slade Moore	Maine Department of Agriculture, Conservation and Forestry
Mike Chelminski	Stantec	Mike Mullen	Maine Department of Environmental Protection
Matt Craig	Casco Bay Estuary Partnership	Ben Nauman	Natural Resources Conservation Service
Dan Daly	Trout Unlimited	Jeff Norment	Natural Resources Conservation Service
Claire Enterline	Maine Department of Marine Resources	John Pratte	Maine Department of Inland Fisheries and Wildlife
Merry Gallagher	Maine Department of Inland Fisheries and Wildlife	Kristen Puryear	Maine Department of Agriculture, Conservation and Forestry
Judy Gates	Maine Department of Transportation	Anji Redmond	Maine Department of Environmental Protection
John Gilbert	J.D. Irving, Ltd.	Josh Royte	Maine Chapter of The Nature Conservancy
Andy Goode	Atlantic Salmon Federation	Vicki Schmidt	Maine Department of Environmental Protection
Brian Graber	American Rivers	Dwayne Sieders	Maine Department of Inland Fisheries and Wildlife
Charlie Hebson	Maine Department of Transportation	Henning Stabins	Plum Creek Timber Company, Inc.
Liz Hertz	Maine Department of Agriculture, Conservation and Forestry	Tara Trinko-Lake	National Oceanographic and Atmospheric Administration
Landis Hudson	Maine Rivers	Robert VanRiper	Maine Department of Inland Fisheries and Wildlife
Eric Hutchins	National Oceanographic and Atmospheric Administration	Steve Walker	Maine Department of Inland Fisheries and Wildlife/Maine Coast Heritage Trust
Mark Hyland	Maine Emergency Management Agency	Gail Wippelhauser	Maine Department of Marine Resources
Chris Jones	Natural Resources Conservation Service	Jed Wright	US Fish and Wildlife Service
Keith Kanoti	Maine Department of Agriculture, Conservation and Forestry		