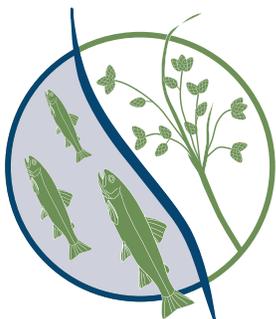


COMMONWEALTH OF MASSACHUSETTS  
Department of Fish & Game  
Division of Ecological Restoration

# 2013 Annual Report The Value of Restoration



The Commonwealth of Massachusetts  
Deval L. Patrick, Governor

Executive Office of Energy and  
Environmental Affairs  
Richard K. Sullivan, Jr. Secretary

Department of Fish and Game  
Mary B. Griffin, Commissioner

Division of Ecological Restoration  
Tim Purinton, Director



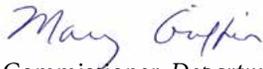
# KEY DIVISION ACCOMPLISHMENTS

Dear Colleagues and Partners,

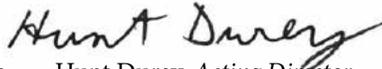
'Value' is a subjective term that means different things to different people. However, everyone supports the principle that public funds should be spent wisely to generate significant value and benefits for society. Guided by this core principle, DER staff work hard every day to ensure that investments in habitat restoration and protection create exceptional value for the Commonwealth. This 2013 annual report highlights the many ways that DER projects and partnerships produce results and deliver value for our economy, our communities, and our overall quality of life.

As we come to the close of another successful year, we must once again point to our partners who help make ecological restoration happen across Massachusetts. Hundreds of people from federal and state agencies, local communities, watershed groups, private sector companies, and many other non-profit organizations collaborate with DER to complete projects that benefit people and the environment. We are thankful for your partnership and also greatly appreciate the strong support of Governor Patrick and Secretary Sullivan. We look forward to working with you in 2014—it's shaping up to be a very busy and productive year!

Sincerely,



Mary B. Griffin, Commissioner, Department of Fish & Game



Hunt Durey, Acting Director



Eileen Goldberg, Assistant Director

## DER & Partners 2013 Key Accomplishments

- Provided technical assistance and guidance to people from more than 277 Massachusetts communities in all 27 major watersheds.
- Volunteers working in 178 communities devoted over \$238,849 worth of labor toward protecting and restoring the Commonwealth's rivers and wetlands by reading stream gages, conducting river continuity and stream surveys, collecting monitoring data, and participating in restoration planning.
- Leveraged \$8.4 million in external funds.
- Completed 4 wetland restoration projects spanning 240 acres and removed 3 dams, eliminating public safety hazards and opening up 10 river miles.

**For More Information:** [www.mass.gov/der](http://www.mass.gov/der)

Check out our interactive project map highlighting active and completed restoration projects.



@MassEcoRestore



[http://www.flickr.com/photos/der\\_riverways/](http://www.flickr.com/photos/der_riverways/)

# VALUING ECOSYSTEM SERVICES

Restoration projects, such as dam demolition, culvert replacement, fill removal, and streamflow enhancement, provide numerous benefits to local communities in the form of improved ecosystem services. The term ecosystem services refers to the goods and services that healthy natural habitats provide to humans, such as clean and plentiful water, flood protection, biodiversity, fisheries production, and recreational opportunities. Collectively, these services form a 'green infrastructure' foundation that supports economic prosperity, public health and safety, and a high quality of life for Massachusetts residents. But what is the economic effect of ecosystem service improvements in dollars and cents?

In 2012-2013, DER contracted with ICF International to begin answering that question by estimating the economic benefits of four ecosystem services enhanced by DER projects. The study found that restoration of natural habitats and the services they provide generates significant economic value. Brief highlights of the study findings are provided below; [see our website for a summary of the full study](#).

**Carbon Sequestration** – The Damde Meadows and Broad Meadows salt marsh restoration projects in Hingham and Quincy are estimated to prevent **\$86,000** and **\$138,000**, respectively, in damages caused by greenhouse gases through 2050. The projected increase in carbon storage resulting from restoration of these two wetlands is equivalent to avoiding the combustion of over **814,000 gallons of gasoline**.

**Flood Protection** – Salisbury businesses and residents will benefit from increased flood protection provided by the Town Creek Restoration Project that will reduce economic impacts from flood damage and lost business by an estimated **\$2.5 million** over the next 30 years.

**Water Quality** – The planned Muddy Creek Estuary Restoration Project in Chatham and Harwich will help those two towns save an estimated **\$3.9 million** over 30 years to meet

mandatory water quality standards by reducing wastewater infrastructure construction and operating costs.

**Landscape Appeal** – In the towns of Wellfleet and Truro, the planned 1,000-acre Herring River Restoration Project is projected to improve the value of over **1,400 properties** as a result of being closer to healthy tidal wetlands after restoration, thus generating a total estimated property value increase of **\$10.4 million**.

While these example ecosystem service values are impressive in their own right, they represent only one of many services improved by each project. Thus, the total per-project value of all service enhancements combined is anticipated to be much higher. Nature's green infrastructure, when restored to health, provides these services free of charge, year after year. When these ecosystem service benefits are added to the economic output generated by restoration project design and construction, the return on investment becomes even more impressive. A 2011 study ([available on our website](#)) commissioned by DER found that the average economic output of DER projects generates a 75% return on investment and creates or maintains 12.5 full-time-equivalent jobs for every \$1 million spent.

The more progress we make toward a full accounting of restoration value, the more apparent it becomes that ecological restoration projects pay major dividends for the Massachusetts economy. Projects that create green jobs, stimulate the regional economy, and enhance critical ecosystem services are a wise investment for society and the environment.



*South Cape Beach Bridge*

# WETLANDS RESTORATION

2013 has been a busy year for DER's Wetlands Program. Many high profile projects continue on the path to construction. In 2013, four tidal restoration projects were completed totaling 240 restored acres. Restored wetlands provide many benefits such as improved fish and wildlife productivity, pollution reduction, storm damage buffering, and carbon sequestration. These services not only improve the health of our environment, but also provide a substantial economic benefit to our communities.



*Breach in the Town Creek railroad dike following a strong spring storm in 2007*

## Restoration Projects Saving Towns Money - Town Creek & Muddy Creek

One example of a project with multiple social and environmental benefits is the Town Creek Restoration in Salisbury which is currently under construction and will be completed in early 2014.

Three separate Town Creek flood events over the past decade caused extensive damage and lost revenue to businesses along the Route 1 corridor. This project will install new culverts and tide gates to reduce future flood risk along Route 1. At the same time it will improve habitat conditions across 56 acres of coastal wetlands for many species of fish and other

wildlife. According to an economic analysis commissioned by DER, the Town Creek Project will reduce the economic impacts from flood damage and lost business by an estimated \$2.5 million over the next 30 years.

Another notable wetland restoration project in progress is Muddy Creek in Chatham and Harwich. Currently in design, this project will feature an open channel and bridge which will restore tidal flow to the 55-acre estuary. Project partners have rallied around the project's anticipated habitat and water quality improvements in the

Muddy Creek Estuary, which has a high level of nitrogen contamination that is amplified by restricted tidal exchange with Pleasant Bay and the Atlantic Ocean. Nitrogen pollution is a challenging issue for many Cape Cod coastal waters. In appropriate situations, increasing tidal exchange can help reduce nitrogen concentrations by restoring more natural water circulation while greatly improving natural habitats.

Economic analysis of the Muddy Creek restoration demonstrates the project will help Chatham and Harwich save an estimated \$3.9 million over 30 years to meet mandatory water quality standards by reducing wastewater infrastructure construction and operating costs. We anticipate Muddy Creek construction to begin in late 2014.



*Freemans Pond Restoration project, completed in 2013, installed a new culvert to improve tidal flow, site drainage and water quality to 21 acres of coastal wetlands.*

# RIVER & STREAM RESTORATION

DER's River Restoration Program restores rivers for the benefit of people, fish, and wildlife. Dam removal is one of our most common project types. Dam removal improves water quality, restores river and floodplain habitat, and returns rivers to their natural, free-flowing condition. Removing unwanted, aging dams also improves public safety and saves money for public and private dam owners. Finally, many dam removal projects catalyze additional projects with community benefits – such as park improvements, community trail development and boating.



*Mill River site of the Whittenton Dam after removal.*

## Mill River Restoration Project, Taunton

The Mill River Restoration Project in Taunton exemplifies the mixture of ecosystem and community benefits found with most dam removal projects. The goal of the project is to remove three obsolete mill dams and construct a fish ladder at a fourth dam on the Mill River. When complete, the project will give river herring and American eel access to more than 30 miles of high quality mainstem and tributary habitat.

The Mill River's Whittenton Dam drew national attention in 2005 when it nearly failed during a record flood. Officials evacuated downtown Taunton and federal, state, and local

agencies worked 24 hours a day to bolster the aging, privately owned structure to prevent a catastrophic breach. After the immediate crisis was averted, DER and partners realized that dam removal on the Mill River would bring numerous public safety and environmental benefits.

In 2012, DER and partners removed Hopewell Mills Dam. The dam removal restored 6 acres of former impoundment to floodplain habitat. The Taunton State Hospital, which owned the dam, will develop a public trail network and interpretive signage in the restored floodplain.

In the same year, the Massachusetts Department of Transportation installed a fish ladder at Morey's Bridge Dam, the one dam not slated for removal.

In 2013, the restoration team removed Whittenton Dam and restored 22 acres of floodplain habitat that had previously been submerged. In 2014, DER and partners will work with the Reed & Barton Company to remove West Britannia Dam, the final barrier blocking the return of river herring to their historic spawning grounds.

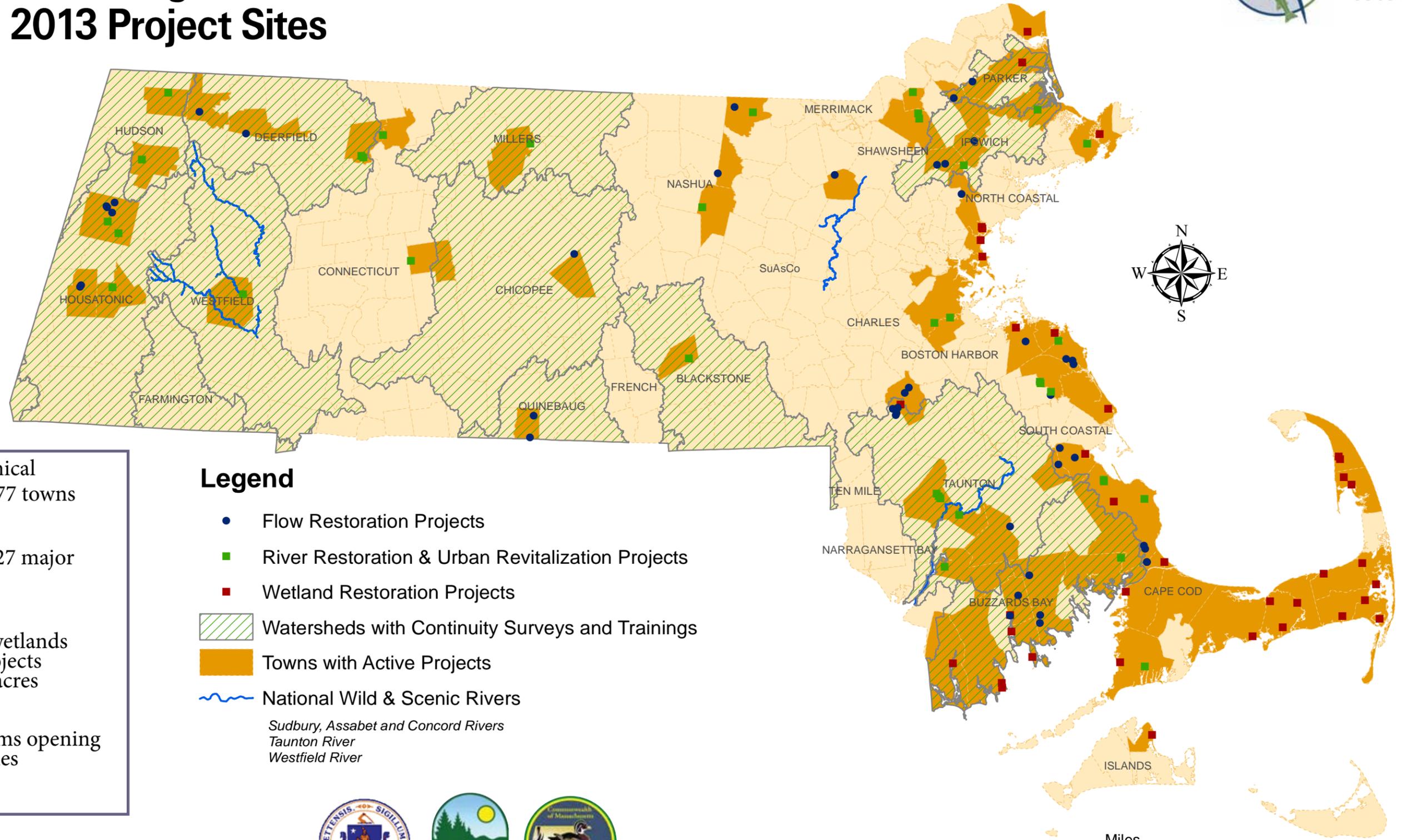
The Mill River Restoration restores over 25 acres of floodplain, once submerged by the dams, that will provide habitat, flood storage, pollutant filtering and open space. The project also eliminates the risks to public safety posed by the aging dams.

For more information and to see videos of river herring returning to the Mill River after 200 years, visit <http://millriver.blogspot.com>.



*Mill River, Whittenton Dam prior to removal.*

# Department of Fish and Game Division of Ecological Restoration 2013 Project Sites



Provided technical assistance to 277 towns

Worked in all 27 major watersheds

Completed 4 wetlands restoration projects spanning 240 acres

Removed 3 dams opening up 10 river miles

## Legend

- Flow Restoration Projects
- River Restoration & Urban Revitalization Projects
- Wetland Restoration Projects
- Watersheds with Continuity Surveys and Trainings
- Towns with Active Projects
- National Wild & Scenic Rivers  
*Sudbury, Assabet and Concord Rivers  
Taunton River  
Westfield River*



DER has additional ecological restoration and protection initiatives. To find out what's happening in your town or watershed, please call us at 617-626-1540



# FLOW RESTORATION

DER works to restore more natural streamflows through our River Instream Flow Stewards (RIFLS) program. Volunteers across the state collect data from stream gages and the resulting flow information allows local watershed associations and others to track this critical aspect of aquatic health. Natural streamflow supports a host of ecosystem services, from adequate drinking water supply to healthy fish populations.

*(L-R) RIFLS intern Michelle O'Donnell, RIFLS volunteers Tom Brownrigg, Warren Lyman and Debbie Geltner, and Flow Restoration Specialist Michelle Craddock discuss reading the staff gage in River Meadow Brook, Carlisle. Photo by Sylvia Willard, Carlisle Conservation Commission*



## Streamflow Monitoring & Action

One such project is on River Meadow Brook, a tributary to the Concord River. Community members and the Conservation Commissions of Carlisle and Chelmsford are working to understand the dynamics of the brook's flow through adjoining conservation lands owned by the two towns and to evaluate the effects from past, current and future water management decisions. Natural flows through these wetlands and woodlands support wildlife habitat, recreation, residential drinking water supplies, and agricultural operations (including the northernmost cranberry bog in Massachusetts and dairy farming at Great Brook Farm State Park).

Carlisle reports that streamflow in summer and fall is often barely adequate for these existing uses. They hope through RIFLS monitoring to obtain baseline data on low flows and year-round patterns to help regulators and stakeholders make more informed decisions on future water withdrawals and their potential impacts to these key ecosystem services provided by River Meadow Brook.

RIFLS monitoring often leads to DER's involvement in specific flow restoration actions. For example, we are

supporting the Parker River Clean Water Association in their effort to ask communities in the watershed to include updated precipitation intensity estimates in their land use regulations. This would help to improve the potential of the watershed to receive and process intense rain events, thus reducing flooding and property damage. It would also enhance the recharge of groundwater supplies that communities rely on for drinking water and contribute to the Parker River's baseflow to sustain healthy aquatic habitats.

### **RIFLS VOLUNTEERS in 2013 Accomplished:**

**3,471 gage readings**

**Made by 41 Volunteers  
At 40 Sites  
In 24 Towns  
In 12 Watersheds**

# TECHNICAL ASSISTANCE

Each year hundreds of volunteers, managed and supported by watershed organizations, donate countless hours collecting data about local rivers. DER ensures the reliability and quality of the monitoring information the volunteers record. DER also helps groups prepare Quality Assurance Project Plans, assists with data analysis, and offers assistance with the overall program. Helping these groups generate sound and high quality data reaps many rewards.

The results of volunteer-based water quality monitoring programs provide a range of benefits to communities and the Commonwealth, from helping to prevent or mitigate water quality problems to providing additional tools that allow decision makers to better focus limited state resources for managing our rivers and streams. Monitoring efforts support clean water for drinking, recreating, and enhancing

the value and attractiveness of our cities and towns. The data collected during this monitoring season has identified several river sections with elevated bacteria levels. The monitoring groups are working with local health officials to identify sources and find solutions to this public health threat. Several monitoring sites have high nutrient levels and a handful of locations have markedly depressed oxygen levels, a trend the groups are watching.

Another important role for the water quality data collected by volunteers is to support funding requests to address the problems found during monitoring. DER staff assisted sister agencies with their review of grant proposals and helped select the best projects to receive hundreds of thousands of dollars in state and federal funding this past year.

## Urban Rivers

A recent U.S. Geological Survey analysis found that urban river restoration projects resulted in more than improved river habitat. An analysis of the restoration work on the Watts Branch of the Anacostia River, which flows through heavily populated neighborhoods in and around Washington D.C., found that the work done on this urban river also brought jobs, higher salaries, and value added to the regional economy of approximately \$6 million. Here in Massachusetts, DER has long been an advocate for urban river restoration. In Lawrence, four in-stream habitat and riverbank restoration projects are moving from design to construction. The enhancements are adjacent to the new Spicket River Greenway and provide safe access to the river in addition to improving



*Hoosic River Revival conceptual designs*

in-stream habitat and riverbank stability. In North Adams, the Hoosic River Revival commissioned a restoration options study and hosted a community conversation to discuss the best river revitalization options for the city's economic and ecological health. The Revival has gained momentum by showing how the restoration of the Hoosic River will be a catalyst for economic development. This effort has built a diverse coalition of supporters and raised tens of thousands of dollars for their work.

# TECHNICAL ASSISTANCE

DER is working to improve road-stream crossing designs that result in ecological and public benefits. When people design transportation infrastructure with the river in mind, we reap both ecological and public benefits.

This was the underlying theme for a series of six workshops held in 2013 – “Improving Stream Crossings: Flood Resilient, Fish Friendly,” – co-sponsored by DER and attended by nearly 400 municipal officials, highway staff, regional planners and conservation partners across the state. Carrie Banks, DER’s River Continuity Coordinator, presented several case studies that illustrated the economic, ecological and public benefits of crossings designed according to the Massachusetts Stream Crossing Standards.

Photographs and documentation collected by river continuity survey volunteers demonstrated the value of road-smart stream crossings and illustrated the importance of engineering and design standards prepared by experts.

Services and Benefits of Properly Designed Transportation and Stream Networks:
<b>Public Benefits</b>
<ul style="list-style-type: none"> <li>• Movement of goods and people</li> <li>• Access to critical locations (food, hospitals, municipal and emergency operations, etc.)</li> <li>• Provides for continuous free flow of traffic</li> <li>• Accommodates various vehicle types, sizes, speeds and traffic volumes</li> </ul>
<b>Ecological Benefits</b>
<ul style="list-style-type: none"> <li>• Movement of fish and wildlife</li> <li>• Access to critical habitat (feeding, spawning, and shelter)</li> <li>• Conveys flow of water, sediments and natural materials</li> <li>• Accommodates full range of wildlife types, life stages and movement abilities</li> </ul>

*Transportation and stream networks are important to the movement of materials, people, fish and wildlife. Improving Road-Stream Crossing designs provides numerous public and ecological benefits.*

In less than 6 years this road-stream crossing (see photos below) in the Town of Becket washed out twice at a cost of over \$130,000 in repairs to the Town. River Continuity survey volunteers documented the impacts of this crossing on the stream, as well as the impacts on the transportation network. The survey information collected by the volunteers indicates this crossing is undersized based on the bankfull width of the stream and does not adequately pass flood water, sediments or debris during flood events, resulting in structural failure. This documentation is being used by the Town of Becket to apply for a MEMA Hazard Mitigation Grant to replace this crossing with an open bottom span designed to withstand large flood events.



MINOR STREAM BARRIER  
BEFORE FIRST WASHOUT  
10/06/05



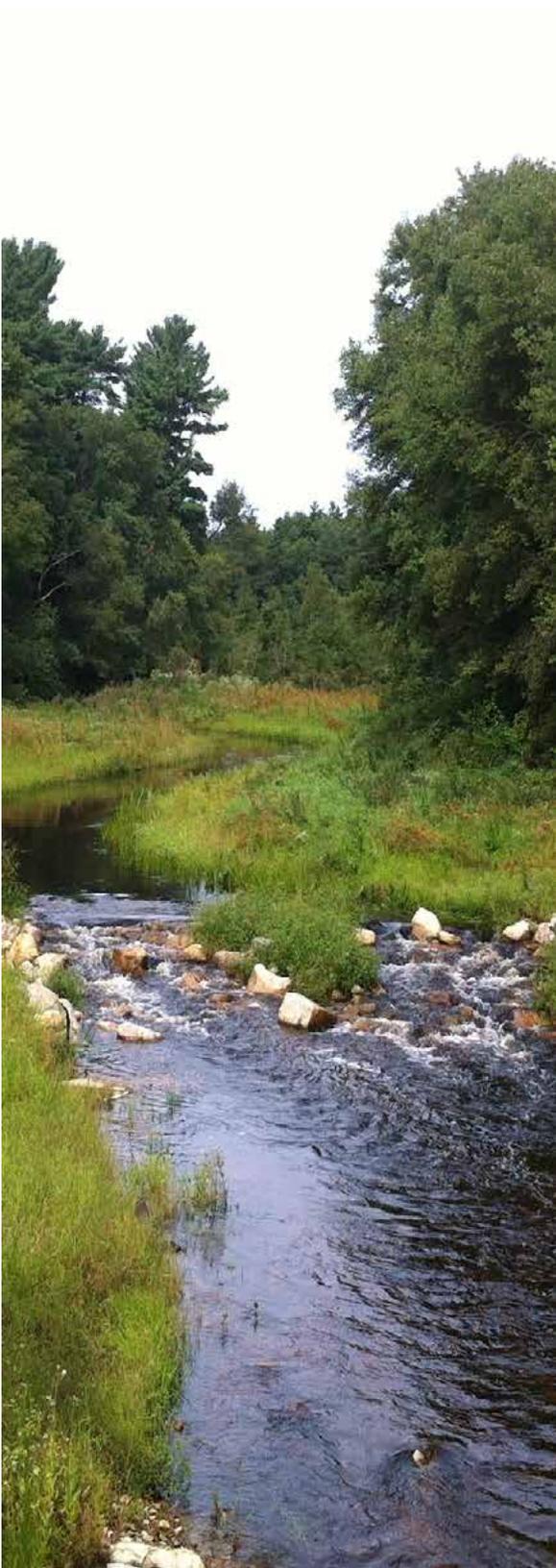
MODERATE STREAM BARRIER  
AFTER FIRST WASHOUT  
6/30/11



MAJOR TRANSPORTATION BARRIER  
AFTER SECOND WASHOUT  
09/08/11

# 2014 PREVIEW

The Division of Ecological Restoration is currently supporting more than 70 active projects. We look forward to advancing these projects in collaboration with partners over the coming year. Here are a few highlights for 2014:



*Jones River, after Wapping Dam Removal*

DER was recently awarded \$9.5 million in “Superstorm Sandy” funds through the U.S. Fish and Wildlife Service under the Disaster Relief Appropriations Act for projects that restore coastal habitats and improve coastal resiliency to future storm events. These funds will support the design and construction of four ecological restoration projects in southeastern Massachusetts.



For nearly 100 years, a large portion of the Round Hill Salt Marsh in Dartmouth has been lost due to historic filling. In 2014, DER will work with partners to complete project designs to remove fill material from over 11 acres of former marsh and replace a culvert to restore this important coastal wetland.



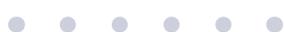
In Plymouth, the Tidmarsh Farms Restoration project team ramps up for on-the-ground work by collecting 3,000 pieces of large wood (trees, stumps) and growing 7,000 Atlantic white cedar trees to prepare for a 250-acre river and wetland restoration anticipated to begin construction in 2014.



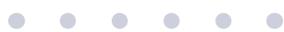
DER, the Town of Plymouth, and partners will remove the Plymco Dam on Town Brook, construct a new bridge, and install signage along the Pilgrim Trail and brook corridor.



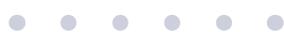
DER and partners will complete restoration designs for the 219-acre Parkers River Estuary Restoration Project in Yarmouth that will greatly expand the opening under the Route 28 Parkers River Bridge which currently restricts natural tidal flow.



Restoration of the Third Herring Brook in Norwell kicks off with the first dam removal - Mill Pond Dam in Norwell.



In collaboration with DER, partners in Pittsfield will pilot a new dam management system that will improve downstream habitat while supporting lake recreation on Lake Onota and Pecks Brook.



DER, the Division of Marine Fisheries, and partners will install an underwater video camera on the Mill River in Taunton to track the return of river herring and American eel to the now free-flowing river.



The Town Creek Flood Mitigation and Salt Marsh Restoration Project in Salisbury will be completed, greatly improving flood protection for local businesses while enhancing tidal flushing to 56 acres of coastal wetlands.

Tim Purinton  
Director *(on leave to attend graduate school)*

Hunt Durey  
Acting Director

Eileen Goldberg  
Assistant Director

Carrie Banks  
Stream Team & Wild & Scenic Westfield  
River Coordinator

Jeremy Bell  
Wetland Restoration Program Manager

Russell Cohen  
Rivers Advocate

Michelle Craddock  
Flow Restoration Specialist

Cindy Delpapa  
River Ecologist

Alex Hackman  
Project Manager

Franz Ingelfinger  
Restoration Ecologist

Georgeann Keer  
Project Manager

Beth Lambert  
River Restoration Program Manager

Laila Parker  
Flow Restoration Program Manager

Megan Sampson  
Program Administrator

Nick Wildman  
Priority Projects Coordinator



Castle Neck Marsh, Essex & Ipswich, during construction (above)  
Stewarts Creek, Barnstable, during construction. (below)



Amethyst Brook Restoration, Bartlett Rod Shop Dam, Pelham.  
Before (above) and after (below) dam removal.



**The mission of the Division of Ecological Restoration is to restore and protect the Commonwealth's rivers, wetlands, and watersheds for the benefit of people and the environment.**