

Spring 2018

Friends and colleagues,

I'm excited and honored to be writing to you as the Division's new Director. I've worked for the Division since its inception in 2009, and before that, for the Riverways Program. I've met many of you out in the field, at site visits, or at meetings over the last 10+ years. We share a passion for the rivers and wetlands of Massachusetts, an integral part of our landscape and sense of place.

This issue of Ebb & Flow highlights habitat restoration projects that DER staff carry out in collaboration with towns, non-profit organizations, and state and federal agencies. Because DER's projects bring multiple benefits, ranging from safer roads to improved water quality, they are supported by individuals and organizations with many different missions. Whether removing a dam, reducing outdoor water use during the summer, or restoring wetlands in retired cranberry bogs, none of this work would be possible without partners.

If we haven't met yet, please feel free to call me at 617-626-1542, email me at [beth.lambert@state.ma.us](mailto:beth.lambert@state.ma.us), or stop by our office at 251 Causeway Street in Boston any time to introduce yourself.

See you on the river!

-Beth Lambert, *Director*

### **In this issue:**

- **Priority Project Pre-RFR**
- **Learning from the Eel River Headwaters Project**
- **Record Response to DER's Culvert Replacement Grant Program**
- **Monitoring Streamflow to understand stream health**

### **DER Project Updates**

- **Community Based Social Marketing to Reduce Outdoor Water Use**
- **Manhan River Restoration Project Attracts Federal Support**
- **DER and Partners Celebrate Barstowe's Pond Dam Removal**
- **River Herring Return to the Mill River in Taunton**
- **George's Pond Tidal Restoration Project in Development**
- **Coonamessett River Restoration**
- **Hoosic River Restoration Project TEDx Event**

### **Restoration Resources**

*(Including DER's Blue Carbon Calculator is a User-Friendly Tool to Estimate Climate Change Benefits from Restoration)*

### Priority Projects Pre-RFR (Statewide)

DER selects wetland, river and flow restoration projects through a state-wide, competitive process. We choose high-priority projects that bring significant ecological and community benefits to the Commonwealth. Projects range from removing dams and tidal restrictions to restoring abandoned cranberry bogs and more natural streamflow regimes. Explore our [Project Map](#) to see current and completed projects.

In late May, we will issue a Request for Responses (RFR) seeking applications for aquatic habitat restoration and revitalization Priority Projects. Currently the Pre-RFR is available for review. If you have a project that you are considering proposing for Priority Project status, review the [pre-RFR](#). No submission is required now but interested applicants are strongly encouraged to discuss potential applications with DER staff during the pre-RFR period, which ends May 23, 2018 at 5PM. Once the RFR has been issued, DER staff are not allowed to discuss the program or any questions beyond technicalities (e.g. downloading the application form). Please contact Nick Wildman ([nick.wildman@state.ma.us](mailto:nick.wildman@state.ma.us) or 617-626-1527) to discuss potential applications.

### Learning from the Eel River Headwaters Project (Plymouth)



Eel River Headwaters before restoration in 2008



Same location post restoration in 2017



Eel River Headwaters (2017)



Sphagnum moss (2017)



Learning team (2017)



AWC seedlings (2017)

*Photos from Eel River Headwaters Project.*

DER strives to incorporate learning into all of our work. The practice of ecological restoration is still relatively new, as is the science of restoration ecology. Both practitioners and scientists have much to learn from each other and from project outcomes. What works, what could be improved, and what should be avoided? In the rush to complete the next project, we can sometimes overlook the importance of slowing down to *learn*. DER is taking steps to encourage learning and improve our practice of freshwater wetland restoration.

The Eel River Headwaters Restoration Project is well-known to *Ebb&Flow* readers. Completed in 2010, it was the first of its kind - a comprehensive ecological restoration of retired cranberry farmland. The project was led by the Town of Plymouth, and supported by DER, the U.S. Fish and Wildlife Service, USDA's Natural

Resources Conservation Service (NRCS), The Nature Conservancy (TNC), and others. The project was engineered by Inter-Fluve, Inc. and constructed by SumCo Eco-Contracting. The work involved channel reconstruction, dam removals, culvert replacements, grading, and extensive plantings across a 60-acre site. The techniques pioneered at Eel River have since been used at Tidmarsh Farms (Plymouth), and will soon be used elsewhere, including the Coonamessett River (Falmouth) and Cold Brook Preserve (Harwich).

To help generate insights that can be applied on other projects, and to complement more formal monitoring activities, DER organized a site walk with project partners at Eel River this past summer. Area by area, the group reviewed restoration treatments, examined before and after maps, and then set out across the site to collect observations. What we found was surprising and inspiring. We knew that the site was on a healing trajectory; monitoring activities over the past several years were already telling us that. But by getting in the muck together, we uncovered new wonders, and clear changes from just a few years back. For example:

- A new layer of sphagnum moss is now present on top of the former sand layer of the old farm. We measured 4 inches of sphagnum in many locations! This is an impressive recovery of a cornerstone bog species in just a few years.
- The spread of moss seems to be driving other changes. For example, we observed hundreds if not thousands of new Atlantic white cedar (AWC) seedlings. Perhaps the moss is just the right landing surface for AWC seeds? Perhaps it is now at the right density for AWC germination?
- Many of the AWC planted in 2010 are now over 12 feet tall. Much of the site has the appearance of a young AWC swamp.
- In some places, the reconstructed channel is full of plants. This may lead to elevated water temperatures and reduced dissolved oxygen levels. We will use this observation to re-consider the geometry of restored channels, especially where coldwater fish are present.

All of these findings confirm that ecological restoration takes time. If done properly, restoration interventions like dam removals and ditch plugging simply re-establish and jumpstart the appropriate natural conditions and processes that are needed for healing to take place. The real restoration “work” is done by nature over time. At Eel River, nature’s healing work appears to be well underway.

DER is developing a structured learning agenda around key issues associated with wetland restoration at retired cranberry farmland. Stay tuned in the years ahead as we collectively learn much more about the effects of wetland restoration on water quality (e.g., nitrogen removal), soil moisture and plant response, fish and wildlife, and greenhouse gas dynamics.

## **Record Response to DER’s Culvert Replacement Grant Program**



*Undersized culvert, Town of Washington, FY18 grant awardee.*

The application period for DER’s Culvert Replacement Municipal Assistance Grant Program closed on April 6. DER received applications from 67 communities—nearly 20% of all Massachusetts municipalities, with a total requested amount of \$5.7 million. The purpose of this grant program is to encourage municipalities to replace culverts with better designed crossings that meet improved environmental design standards and climate resiliency criteria.

Communities are eligible to apply for

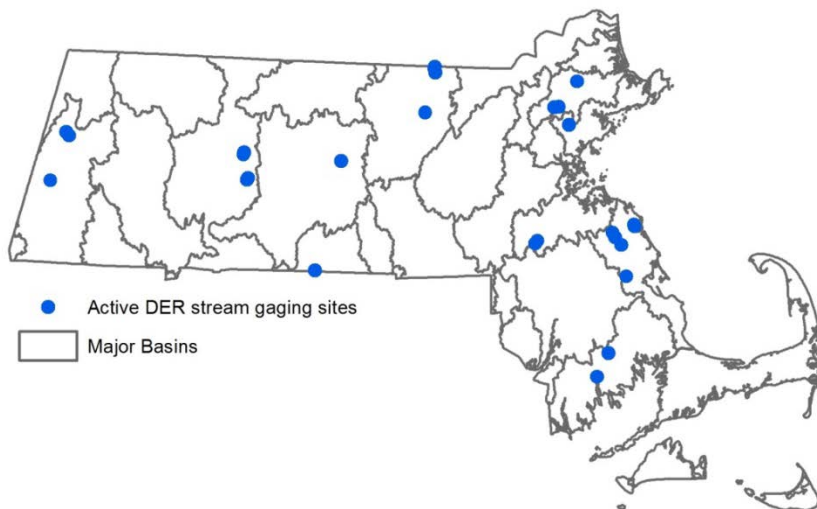


funding to support the advancement of one culvert replacement project that intends to meet the goals of the Massachusetts Stream Crossing Standards. Incorporating these Standards into culvert design will improve river function and access for fish and wildlife, and will reduce hazards to public safety, such as flooding, culvert failure, and road washout. Total anticipated funding available for the current grant round is \$750,000.

### **Monitoring Streamflow to understand stream health**

The Streamflow Restoration program maintains a network of stream gages across the state and works with a variety of partners to collect high quality streamflow data. We use the streamflow data to help us better understand the causes of unnatural streamflows, to inform and support policy and actions that restore and maintain healthy streamflows, to document restoration successes, and to understand the impact of climate change on streams (as part of the [EPA Regional Monitoring Network](#)).

At each stream gaging site, water level is continuously recorded and logged by a pressure transducer and/or is manually read from a staff gage by volunteers. Staff make a series of streamflow (discharge) measurements at low, medium, and high flows and we use the relationship between these measurements and the stage (gage depth) at which we've made the measurements to establish rating curves. We regularly visit all sites to check the accuracy of the rating curve and update it if the river has changed enough to affect the curve. Data collected as part of the Streamflow Restoration program may be found [here](#).



*Map of current DER streamgaging sites.*

New stream gaging sites are selected through an application process, with preference given to sites with observed flow stress, high ecological value, and water manager involvement. Please contact Michelle Craddock at [michelle.craddock@state.ma.us](mailto:michelle.craddock@state.ma.us) or 617-626-1544 for additional information or to apply.

## Division of Ecological Restoration Project Updates

### Community Based Social Marketing to Reduce Outdoor Water Use



Ipswich River's largest tributary - Martins Brook North Reading on Aug 31 2016.

Reducing non-essential water use, especially in the summer, is an important tool to keep water in our rivers and maintain drinking water supplies. During the summer of 2017, DER worked with the Towns of Wenham and Middleton, the Ipswich River Watershed Association, and the Middleton Stream Team to pilot two different water conservation strategies, targeted at reducing residential summer outdoor water use. The strategies utilized Community Based Social Marketing (CBSM), a method that uses marketing concepts to go beyond traditional education campaigns to influence behaviors.

DER and partners tested two strategies: a 'social norms' strategy and a 'commitment' strategy. The 'social norms' strategy compared individual household's summer water use to average use in town and provided targeted educational information and feedback on how to reduce use. The 'commitment' strategy used door-to-door delivery of educational materials and a request to commit to reduce water use.

We evaluated campaign effectiveness based on reductions in water use as compared to a control group within each community, as well as on a post-pilot mail survey. In both communities, the 'social norms' group saw the largest decrease in water use between 2016 and 2017, but the reductions were not statistically significant when compared to the control group. The 'commitment' strategy encountered several logistical challenges and saw few changes in water use between years. Survey results showed that those who use the most water rated the educational materials as significantly more helpful for saving water and keeping their lawn healthy. A detailed discussion of the results as well as lessons learned can be found in the [final report](#).

MassDEP is funding additional testing and refinements to the 'social norms' campaign in summer 2018. This project will build on the lessons learned in the DER project and test the campaign in three additional communities.

### Manhan River Restoration Project Attracts Federal Support (Southampton)

Last summer, the US Fish and Wildlife Service awarded \$24,000 to help support preliminary design for the Manahan River Restoration Project in Southampton. The centerpiece of this project is the proposed removal of the Lyman Mill Pond Dam. Removal of this dam will reconnect 27 miles of mainstem and tributary streams in the upper part of the Manhan. The project was awarded Priority Project status by DER in 2016. Besides the US Fish and Wildlife Service, DER's partners include the private dam owner, The Nature Conservancy, and American Rivers.

The Manhan is a major tributary to the Connecticut River just south of Northampton. It originates in Southampton and joins the Connecticut River in Easthampton. Previous work by the US Fish and Wildlife Service resulted in the installation of a state-of-the-art fish ladder on the dam in Easthampton which re-opened the Manhan for river herring, Atlantic salmon, American eel, and other fish species. The Manahan River and many of its tributaries are listed as Cold Water Resources by MassWildlife.



*The Lyman Pond Dam and its former impoundment as viewed from Route 10 upstream.*

The Lyman Mill Pond Dam is located just downstream from Route 10 in Southampton. This aging dam is part of a larger Historical District and is actually built on the foundation of the adjacent former mill building. As the dam has deteriorated, the owner has taken emergency action by draining the impoundment to reduce pressure on the dam and the mill building. Dam removal design is underway with Gomez and Sullivan Engineers, DPC.

### **DER and Partners Celebrate Barstowe's Pond Dam Removal (Taunton)**



*Cotley River after Barstowe's Pond Dam removed.*

The Cotley River is an 8-mile long tributary to the Wild and Scenic portion of the Taunton River. Since the 1800's the Barstowe's Pond Dam blocked the natural movement of water, sediment, and fish on the Cotley, but following an 8-year effort by DER and partners, the dam was successfully removed just before the 2018 herring migration. Project partners included the Taunton Development Corporation, the Mashpee Wampanoag Tribe, NOAA, US Fish and Wildlife Service, and Save the Bay.

The dam was listed as a Significant Hazard by the Office of Dam Safety and concerns over its condition led the previous owner, the Taunton Development Corporation to seek removal. Over the design and permitting

phases of the project, ownership transferred to the Mashpee Wampanoag Tribe which value restoring the river to its natural state. Over the course of the project, DER worked closely with the Tribe, the Taunton Conservation Commission, and MassDOT, which recently stabilized an upstream rail bridge so that it would not be affected by the dam removal.

Substantial funding for the implementation was provided through the Hurricane Sandy Disaster Relief-Coastal Resiliency Grants funds and NOAA. The removal work was completed in less than one month by the firm RC&D, overseen by the engineers at Inter-Fluve. Native plantings will be installed this spring and monitoring of the river's response to the removal will continue.



## River Herring Return to the Mill River in Taunton



*Left: Construction firm RC&D removes West Britannia Dam. Right: The first river herring to swim the entire Mill River is captured on an underwater camera by DMF.*

In February, The Nature Conservancy (TNC), DER, the US Fish and Wildlife Service (USFWS), and NOAA removed West Britannia Dam from the Mill River in downtown Taunton. In early April, the first river herring to swim the Mill River in over 200 years were captured on camera by the MA Division of Marine Fisheries (DMF) (see photo). The West Britannia Dam Removal is the final element in the Mill River Restoration Project – a project to remove three dams and construct a fish ladder at a fourth. The Mill River is a tributary to the undammed Taunton River, a federally-designated Wild and Scenic river.

Now complete, the project opens over 30 miles of mainstem and tributary habitat to river herring, American eel, sea lamprey, and many other species. Besides the environmental benefits, the project addresses public safety, climate adaptation, and resilience to extreme weather by removing three aging, obsolete dams. Project partners include the City of Taunton, Taunton River Watershed Alliance, Taunton River Wild and Scenic Stewardship Committee, Southeastern Planning and Economic Development District, TNC, American Rivers, DMF, Massachusetts Environmental Trust, MA DEP's Natural Resource Damages Trust, NOAA, USFWS, the Natural Resources Conservation Service, MA Department of Transportation, the MA Department of Mental Health / Taunton State Hospital (dam owner), Acuity Management, Inc. (dam owner), and Jefferson Development (dam owner). DMF is leading a five-year project to track the reestablishment of river herring and other diadromous fish in the Mill River watershed. For more details, check out this excellent blog post by the USFWS: <https://usfwsnortheast.wordpress.com/2018/03/28/of-herring-and-humans/>

## George's Pond Tidal Restoration Project in Development (Dartmouth)



*The current crossing and culverts at George's Pond cause a 90% reduction in tidal range.*

Over the last few years, DER has been providing technical support to the Massachusetts Department of Conservation and Recreation (DCR) to restore tidal flow within Georges Pond, a tidal estuary located in Demarest Lloyd State Park in Dartmouth. The pond discharges to Giles Creek, which conveys water to the Slocum River and eventually, Buzzards Bay. Currently, tidal water must flow over a relic stone crossing and through dual, four-foot diameter culverts beneath

the park's primary access road to the adjacent barrier beach.

The combination of the relic crossing and culverts has caused a 90% reduction in the tidal range within Georges Pond, resulting in a loss of intertidal habitat and reduced water quality. In 2014, DER contracted with Woods Hole Group, Inc. to develop a hydrodynamic model and various design alternatives to alleviate the muted tidal range. The design will require balancing the ecological needs of the site with public safety concerns and potential impacts to rare species. DCR has committed funding for design and permitting and has contracted with GZA GeoEnvironmental, Inc. to complete this work.

### **Coonamessett River Restoration (Falmouth)**



The Town of Falmouth along with DER, NOAA, the Coonamessett River Trust, the 300 Committee and other partners continue to move forward with the Coonamessett River Restoration Project. Phase 1 of the project, which kicked off in October, is substantially complete, and includes removal of the first dam from the ocean on the Coonamessett River, as well as restoration of wetlands and riverine habitat in an 11-acre former cranberry bog just upstream of the dam. Phase 2 is currently in the design and permitting phase, and will include removal of the next dam upstream, replacement of a failing culvert carrying John Parker Road over the Coonamessett River, and restoration of wetlands and riverine habitat within the remaining 26 acres of former cranberry bog held by the Town. Construction is anticipated to kick off in the fall/early winter of 2018. The Coonamessett River Trust is conducting a citizen science monitoring effort in parallel with the restoration effort, to compare pre- and post-restoration conditions.

This project brings together many local, state and federal agencies and organizations, as well as teachers, students and community volunteers. Funding for the project comes from the NOAA Restoration Center, NFWF, DER, the Massachusetts Environmental Trust, the Falmouth Community Preservation Fund, and the Falmouth Rod and Gun Club, and others with matching funds and in-kind contributions from the Town of Falmouth.

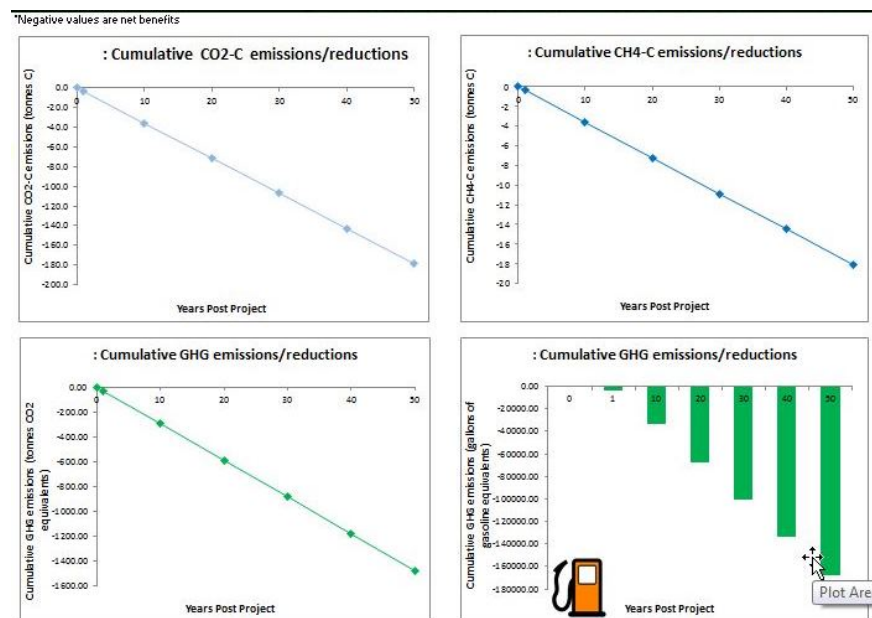
### **Hoosic River Restoration Project TEDx Event**

Judy Grinnell, of the Hoosic River Revival, gave a talk at a TEDx event, which uses the TED conference format but is independently organized by a local community. She talks about how the dream of recapturing our historic waterways may only take the right people, the right inspiration, and the right amount of hard work. [You can listen to the full talk on YouTube.](#)



## Restoration Resources

### DER's Blue Carbon Calculator is a User-Friendly Tool to Estimate Climate Change Benefits from Restoration



A screenshot showing the Calculator's results from analyzing a recent Massachusetts saltmarsh restoration project.

In 2015, DER made the [Blue Carbon Calculator](#) available, a simple tool designed to help decision-makers estimate the reductions in greenhouse gas emissions from restored wetlands. Restoring degraded wetlands can result in improved carbon dioxide capture, or sequestration. In coastal environments, projects that restore tidal flushing to coastal embayments can also drastically reduce emissions of methane, a powerful greenhouse gas. The Calculator was designed to be easily edited and customized by scientists and decision-makers and it was cited in the Commonwealth's [2016 Clean Energy and Climate Action Plan](#).

The calculator allows users to input the amount of different wetland cover types before and after a project and see how the emissions of CO<sub>2</sub> and methane change. In order to make the results more tangible, it also shows how this amount of carbon relates to the equivalent emissions from gallons of gasoline burned. The calculator is built on emissions factors from different wetland types that were published by the Intergovernmental Panel on Climate Change (IPCC) in its [2013 Wetland Supplement](#) report. These factors, or amounts of carbon emissions, are based on published data from wetland types around the world and represent a consensus of the best science available.

While these data are scientifically reliable, they aren't specific to the Massachusetts environment. This year, DER contracted with scientists at the Woods Hole Marine Biological Laboratory (MBL) to collect carbon emissions data from coastal wetland types on Cape Cod and update the emissions factors in the Blue Carbon Calculator. MBL scientists installed state-of-the-art instruments in various wetland types in the Herring River estuary in Wellfleet and the Plum Island estuary on the North Shore to collect the most up-to-date data. The MBL scientists also provided Massachusetts-specific data on the amount of plant material, or biomass, in these wetlands which helps us better understand how carbon is taken up by plants in healthy wetlands.

The Massachusetts emissions data was greater than the IPCC data for each of the coastal wetland types that were updated in this iteration of the calculator. As a result, the new model output shows much greater

reductions in methane emissions from coastal wetland restoration projects than output from the original version.

DER is continuing to evaluate the new version of the Blue Carbon Calculator to better understand how the results can be applied to decisions about wetland restoration. In the meantime, we encourage scientists and policymakers to [download the Version 1.0 tool](#) and consider adding their own updates that use other current data or make the trends the model displays more representative of actual carbon dynamics. For more information on this project, please contact Nick Wildman at [nick.wildman@state.ma.us](mailto:nick.wildman@state.ma.us).

## Grants

### **Small Bridge Program, MassDot**

The Small Bridge Program was signed into law on August 10, 2016 by Governor Charlie Baker. This 5 year, \$50,000,000 program will provide reimbursable assistance to cities and towns of up to \$500,000 per year to aid in the replacement and preservation of municipally owned bridges with spans between 10' and 20'. This is a need and merit based program that will seek to fund those applications that demonstrate a critical need (i.e. emergency closure, detrimental detour routes for first responders) or will substantially extend the life of an existing bridge. Applications will accepted three (3) times per year - Oct. 31st, Feb. 28th, and **June 30th**. [For more information.](#)

### **Section 319 Nonpoint Source Competitive Grants Program**

This grant program is authorized under Section 319 of the federal Clean Water Act for implementation projects that address the prevention, control, and abatement of nonpoint source (NPS) pollution. In general, eligible projects must: implement measures that address the prevention, control, and abatement of NPS pollution; target the major source(s) of nonpoint source pollution within a watershed/subwatershed; contain an appropriate method for evaluating the project results; and must address activities that are identified in the Massachusetts NPS Management Plan. Proposals may be submitted by any interested Massachusetts public or private organization. To be eligible to receive funding, a 40% non-federal match is required from the grantee. Proposals are due June 1, 2018. [Read the RFR for more information.](#)

### **Energy & Environmental Affairs Park & Conservation Grants**

The Executive Office of Energy & Environmental Affairs' Division of Conservation Services (DCS) is seeking applications for the FY 2019 [Parkland Acquisitions and Renovations for Communities \(PARC\)](#), [Local Acquisitions for Natural Diversity \(LAND\)](#), and [Conservation Partnership](#) grants. PARC grants help communities acquire parkland, develop new parks, and renovate existing parks. LAND grants provide funds to municipal conservation commissions to purchase conservation land and conservation restrictions. Conservation Partnership grants provide funds to nonprofit organizations for land acquisitions.

### **Municipal Vulnerability Preparedness (MVP) Program**

The Executive Office of Energy & Environmental Affairs (EEA) through the MVP program has two grants available to help communities with funding, technical support, climate change data and planning tools to identify hazards, develop strategies to improve resilience, and implement priority actions to adapt to climate change. Two grant opportunities are available.

- MVP Action Grants (due 05/18/18 05PM)  
Financial and technical assistance for municipalities who have received designation from EEA as a Climate Change MVP Community to implement priority adaptation actions identified through the MVP planning process, or similar climate change vulnerability assessment and action planning that has led to MVP designation. More information:  
<https://www.commbuys.com/bsa/external/bidDetail.sdo?bidId=BD-18-1042-ENV-ENV01-25921&parentUrl=activeBids>



- MVP Planning Grants (due 05/11/18 5PM)  
Municipalities who wish to prepare for climate change impacts, build community resilience, and receive designation from the EEA as a Climate Change MVP program municipality. More information:  
<https://www.commbuys.com/bsi/external/bidDetail.sdo?bidId=BD-18-1042-ENV-ENV01-25924&parentUrl=activeBids>

### **Environmental License Plates**

The Massachusetts Environmental Trust (MET) provides funding to many river, wetland and other water resources protection and restoration projects throughout the Commonwealth. A major source of MET's funding comes from the sale of environmental license plates. Getting an environmental plate is easy and can be done on-line, or in person at your local Registry of Motor Vehicles office.

---

#### **DER Boston Office**

251 Causeway St. Suite 400  
Boston, MA 02114  
(617) 626-1540

#### **DER Westfield Office**

544 Western Avenue  
Westfield MA 01086

### **Commonwealth of Massachusetts**

Charles D. Baker, Governor  
Karyn E. Polito, Lieutenant Governor  
Matthew A. Beaton, Secretary  
Executive Office of Energy & Environmental Affairs

Ronald S. Amidon, Commissioner  
Department of Fish & Game  
Mary-Lee King, Deputy Commissioner  
Department of Fish & Game

### **Division of Ecological Restoration**

Beth Lambert, Director  
Hunt Durey, Deputy Director  
Eileen Goldberg, Assistant Director  
Carrie Banks, Stream Team &  
Wild & Scenic Westfield River Coordinator  
Kate Bentsen, Streamflow Restoration Specialist  
Michelle Craddock, Watershed Ecologist  
Cindy Delpapa, Riverways Program Manager

Kristen Ferry, Habitat Restoration Specialist  
Eric Ford, Restoration Specialist  
Alex Hackman, Project Manager  
Kris Houle, Ecological Restoration Specialist  
Georgeann Keer, Project Manager  
Megan Sampson, Program Coordinator  
Nick Wildman, Restoration Specialist