

Fall 2018

Friends and colleagues,

I am excited to tell you that **DER is growing**. The Division plans to post five open positions by the end of 2018. If you would like to receive notice when the positions are posted, follow us on Twitter [@MassEcoRestore](#) or email megan.sampson@mass.gov with subject “DER Hiring”.

See you on the river!

Beth Lambert, *Director*

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Restoration Resources

DER Staff Receive Prestigious Awards

We are excited to congratulate two DER staff who recently received prestigious awards for their hard work and accomplishments restoring aquatic ecosystems in the Commonwealth and promoting scientific practice and education.

Alex Hackman—Award for Excellence in Restoration, New England Chapter of the Society for Ecological Restoration

Alex Hackman received the Award for Excellence in Restoration the New England Chapter of the Society for Ecological Restoration. This award recognizes an individual's work to promote or implement ecological restoration in the northeastern United States. For the past 11 years, Alex has managed aquatic habitat restoration projects for DER including 26 dam removals, culvert replacements, stream channel and floodplain re-construction, and wetland restoration. He currently manages a new program dedicated to restoring wetlands on retired cranberry farmland and is considered to be a pioneer in this field. Alex was selected for this award for his passionate advocacy for and practice of process-based restoration, his consistent and inspiring ecological vision, and his strong management skills for implementing successful restoration projects. As a Certified Ecological Restoration Practitioner from the Society for Ecological Restoration, and a founding member of the Living Observatory (<http://www.livingobservatory.org/>), Alex consistently demonstrates his commitment to linking science, practice, and learning.



Alex Hackman receiving the Award for Excellence in Restoration

Carrie Banks—Waite Award, Westfield River Watershed Association

In September, Carrie Banks received the Waite Award from the Westfield River Watershed Association, which honors those who have made substantial contributions to the Westfield River Watershed. For over 15 years, Carrie served as the state coordinator for the Wild & Scenic Westfield River Committee. She provided technical assistance and support to river-related projects to this Committee, as well as communities, agencies, and conservation organizations working in the Westfield River Watershed. Her efforts led to expanded partnerships in the region including partnership with the Westfield River Environmental Center at Westfield State



Carrie Banks (on right) with fellow DER staff Cindy Delpapa.

University, where she mentored over 22 student interns and guided faculty and students in conducting monitoring for dam removals and culvert replacements. Carrie also helped develop field

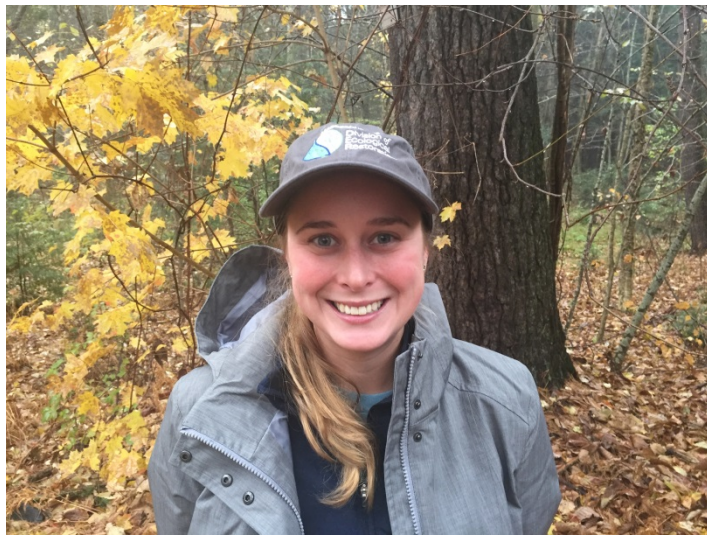
protocols for volunteer assessments of road-stream crossings, and has managed culvert replacement projects in several Wild & Scenic communities.

In addition to these outstanding achievements, DER's Eel River Headwaters Restoration project in Plymouth, received a Restoration Project Award from the New England Chapter of the Society for Ecological Restoration. This \$2 million project completed in 2010 transformed 60 acres of former commercial cranberry farm into self-sustaining freshwater wetlands with benefits to fish and wildlife, water quality, public education, and enhanced recreation.



Eel River Headwaters Restoration – monitoring in 2017

Westfield State University Cultivates the Next Generation of Restoration Professionals



Dr. Lauren DiCarlo

With trillions of dollars invested annually in ecological restoration worldwide, the need for trained and skilled restoration specialists increases every year. Yet, few academic institutions offer the necessary academic and practical training for students interested in careers in restoration. In 2016, DER commissioned a study in collaboration with Westfield State University to evaluate the need for and availability of restoration science related curriculum and degree programs in institutions of higher learning.

Two take-home messages emerged from the report. First, although the number of ecological restoration science programs increased nationally over the past decade, the demand for trained professionals increased at an even greater pace. In the Northeast, only two institutions have restoration programs. Second, the 2016 report made a good case for the need for additional

restoration science educational opportunities at universities in Massachusetts to fill both the interest of students in restoration and the employment opportunities.

The report cited Westfield State University as being in a favorable position to develop a degree program in ecological restoration for several reasons: a number of courses already offered at the school are relevant to a restoration degree program; many faculty have restoration experience; and the University has a strong collaboration with DER.

Over the summer, Westfield State University expanded its student's opportunities to learn about the restoration field by hiring a new Environmental Science faculty position with a special emphasis on restoration science. DER is pleased to welcome Lauren DiCarlo, Ph.D. as the new Assistant Professor at Westfield State University. Dr. DiCarlo is a New England native, completed her Ph.D. at Oregon State University and has a long list of interesting research and restoration undertakings in the U.S. and abroad. Her first semester at Westfield State University brings an initial targeted offering in ecological restoration techniques. The class proved popular and was quickly filled with eager students. Students will be able to continue to quench their interest in restoration next semester when ecological restoration theory is added to the 'menu'.

Dr. DiCarlo summed up her vision for expanding the field within the WSU Environmental Science Department with these words: "My hope is that these courses will prepare students to work in ecological restoration--by not only introducing the fundamentals of restoring disturbed lands and ecosystems but by providing the hands-on skills necessary to critically assess degradation, implement preferred plans, and measure restoration success. In addition, many of these skills will be useful in alternative fields including natural resources, conservation, etc."

Many students jumped at the chance to take her first restoration course. Vanessa Parmeggiani explained why she signed on, "When I heard about this class, it opened an opportunity for me to finally be able to learn how to make a difference by restoring what we have lost over the years. I want to have a green world full of nature and beauty."

Vanessa is not the only student considering a career in restoration ecology. Linnea Skoglund has great plans for her future, "Growing up with an active outdoors background has given me a feeling of responsibility to protect and restore the natural world, and this course has provided me the opportunity to learn how to do that as a future career."

Westfield State is fulfilling a real need in the ecological sciences and DER looks forward to working with Dr. DiCarlo, the Environmental Sciences staff and the students as the program grows.

Setting Water Rates in Massachusetts

At certain times of the year, many streams in Massachusetts do not have enough water to support healthy streamflow, which affects aquatic ecosystems, drinking water supplies, fishing, and recreation. DER is working on several projects to help partners implement innovative ways to increase water use efficiency to improve streamflow. As part of these efforts, we have been working with the Department of Conservation and Recreation (DCR) to support Public Water Suppliers (PWS) and Water Districts that are trying to restructure their water rates to meet multiple goals. Effective rates can encourage water use efficiency and conservation while ensuring the long-term

sustainability of water supplies through cost recovery and protecting the affordability of water for essential needs.

In August 2017, DER and DCR conducted a short survey of PWS and Water Districts in Massachusetts to determine whether suppliers have embarked on the process of restructuring their water rates, and what goals, successes, and obstacles they encountered during the process. As a follow up to the survey, interviews were conducted with seven water supply communities to better understand the processes they use to change their rate structures to balance multiple goals. Lessons learned from both successes and setbacks were documented, and points of guidance were developed to aid other suppliers in their rate-setting processes. The lessons learned focus on four areas – communication, financial planning, governance, and data management. Results from the survey, the full report, and a document summarizing key findings can be found on our [project webpage](#).

As a follow up to the case studies, DER and DCR are hosting a workshop with the Alliance for Water Efficiency on [Financing Sustainable Water](#). The workshop will be held November 14 in Sharon, MA and will address many of the challenges identified through the survey and case studies. To learn more and register, please visit the [workshop website](#).

Division of Ecological Restoration Project Updates

Manhan Meadows Floodplain Forest Restoration Project (Easthampton)



Manhan Meadows, Arcadia Wildlife Sanctuary

At first glance, floodplain forests may not look anything out of the ordinary. In fact, to the untrained eye, they can be hard to differentiate from the many forested communities that exist across New England's landscapes. However, as one looks a bit deeper, a truly unique ecosystem is revealed – one with many important functions.

Floodplain forests require flooding to sustain themselves. Within larger river systems (e.g., Connecticut River), they are generally found in areas that are flooded at a 2-year recurrence interval. Higher flooding frequencies will result in a more semi-aquatic or aquatic system, while lower frequencies will result in a more traditional upland forest. Flooding typically occurs in the spring, when the water table is high and rapid snow melt occurs.

Within these floodplain forests, many important processes occur. One of the most important relates to the inputs of sediment and organic matter from recurring flood events. Over time, accumulation of the sediment and organic matter results in the creation of a soil parent material (i.e., the underlying geologic material from which the soil is derived) known as “alluvium”. Soils derived from alluvium are among the most productive on earth and provide the foundation for the unique assemblages of flora and fauna (including many rare species) that exist in these forests. These communities provide increased biodiversity and spatial heterogeneity at the landscape scale. In addition (and perhaps most importantly to us humans), these floodplain forest ecosystems mitigate flooding hazards by slowing the movement of floodwaters, thereby reducing erosion and downstream sedimentation, while allowing surface water to be absorbed and transferred into the water table. As the water moves through the root zone, excess nutrients and toxins are removed and/or transformed by the existing plant and microbial communities, improving water quality.

Prior to European settlement, the banks of the Connecticut River harbored expansive floodplain forest communities. Over time, however, Native Americans and later, European settlers, cleared these floodplains, whose rich and stone-free alluvial soils were well suited for agriculture. With increases in agriculture came increases in population, resulting in development pressures that led to additional loss of these forest systems. Currently, floodplain forests represent only 0.1% of the nearly 3,000,000 hectare Connecticut River watershed. Much of this area is developed, contains agricultural easements or consists of wetland communities, leaving little opportunity for restoration.

Despite these challenges, DER has partnered with MassAudubon to restore 15-acres of existing grassland (former agricultural field) to a high-terrace floodplain forest community. The Manhan Meadows Restoration Project, located within MassAudubon’s Arcadia Wildlife Sanctuary, will ultimately establish an increasingly rare natural community type in Massachusetts and in doing so, re-establish floodplain processes and succession, create habitat for several rare plant and animal species, and improve adjacent grassland habitat. This is the first project of its type for DER, and highlights the Division’s efforts to identify and pursue new restoration opportunities across the State. The project is currently in the preliminary design phase, and is anticipated to go to construction in late 2019/early 2020.

Holmes Dam Removal Begins (Plymouth)

The Town Brook Restoration Project is one of the earliest and most comprehensive river restoration projects in Massachusetts. This 12-phase effort began with the removal of the Billington Street Dam in 2001. Each phase has addressed a different impairment to the Brook including stormwater treatment, bank stabilization, and barrier removal. The removal of the Off-Billington and Plymco Dams in 2014 and 2015 were some of the most complex dam removals ever completed in the Commonwealth. With the removal of Holmes Dam, now underway, the restoration of Town Brook is nearly complete.



Holmes Dam Removal begins.

This summer, the Town entered into a contract with ET&L Corporation to implement the next phase of the Town Brook Restoration – removal of the Holmes Dam and replacement of the nearby Newfield Street bridge. Engineers from Milone & MacBroom, Inc. will oversee the work along with the Plymouth Natural Resources Department. The implementation of this \$6 million project improves public safety by removing a dam listed as “High Hazard” by the MA Office of Dam Safety. It also provides numerous ecological and public benefits, including:

- Additional floodplain storage along the Brook.
- Replacement of the Newfield Street bridge, which will be able to accommodate all forms of vehicle traffic.
- Access to 269 acres of high quality spawning habitat for river herring, as well improved access and passability along Town Brook.
- Removal and disposal of contaminated river sediments.
- A new basketball court and skate park.
- Other site amenities to improve the Pilgrim Walking Trail.

Additionally this project will create or maintain approximately 72 full-time-equivalent jobs and provide a 75% return on investment from associated economic activity. Completion of the Holmes Dam removal and Newfield Street bridge replacement is expected in summer of 2019.

All the work completed under the Town Brook Restoration project has made the neighborhood more resilient by removing deteriorated dams and contributed to Town Brook being one of the strongest runs of herring and other diadromous fish in this part of Massachusetts. The annual herring runs are usually around 200,000 fish. The entire Town Brook Restoration Project will be celebrated as part of a range of public activities commemorating Plymouth’s 400th Anniversary in 2020.

Cranberry Bog Program Updates

DER's Cranberry Bog Program now includes three completed projects and seven active projects totaling approximately 800 acres. Engineering design and permitting is in progress on three projects - the Foothills Preserve (Plymouth), the Coonamessett River (Falmouth), and Robert F. Smith Cold Brook Preserve (Harwich). These sites include 120-acres of wetland restoration, several miles of channel reconstruction, and over a dozen small dam removals. Fundraising is complete or underway to support project implementation, scheduled to begin in 2019 for all three.



Town of Plymouth public open space

To bolster our partnership with those protecting land and setting the stage for restoration, DER is pleased to announce a signed Letter of Cooperation with the USDA Natural Resources Conservation Service (NRCS). Through their Wetlands Reserve Easement Program NRCS can purchase conservation easements from landowners, permanently protect historic wetlands, and fund wetland restoration actions. DER's role in this evolving partnership is to help generate new projects, fund and manage restoration design and permitting, and oversee project implementation. Thanks to NRCS Massachusetts for sustaining and growing this shared work.

DER's completed cranberry bog restoration projects - Eel River Headwaters (Plymouth), Tidmarsh Wildlife Sanctuary (Manomet), and Lower Coonamessett River (Falmouth) - are all open to the public and include maintained walking trails. Totalling 277-acres of wetland restoration, these sites provide examples of what is possible. Visit to see wetland restoration at various stages of recovery. Research is also active at each of these sites to help us continue to improve our work. Thanks to the Town of Plymouth, Mass Audubon, Town of Falmouth, Living Observatory, Woods Hole Research Center, and others for continued partnership.



Completed Projects to Date from left to right Eel River Headwaters (Plymouth); Tidmarsh Wildlife Sanctuary (Manomet) and Lower Coonamessett River (Falmouth)

DER Begins Year Four of the UMass Dam Removal Practicum



DER and Dam Removal Practicum students visit the site of recent dam removal in Northampton.

This fall DER and the University of Massachusetts - Amherst began their fourth consecutive year of the Dam Removal Student Practicum. The course offers graduate and undergraduate students an opportunity to learn about on-going dam removal and river restoration efforts in Massachusetts. The course exposes and integrates students into the project management teams that are working to advance dam removal projects that DER is involved in. Ten students from the Civil Engineering and Environmental Conservation Departments at UMass have been selected to participate in the course. This year, the students visited the Upper Roberts Meadow Brook dam removal and witnessed the final stages of construction. The visit was led by DER, the City of Northampton, and the project engineers from GZA GeoEnvironmental, Inc. DER's primary goal for the course is to educate and cultivate future ecological restoration practitioners and to help students learn more about career opportunities in restoration. The Dam Removal Practicum is funded in part by the National Fish and Wildlife Foundation – Hurricane Sandy Coastal Resiliency Competitive Grant Program.

Kent's Island Creek Restoration Nearing Construction (Newbury)

MassWildlife is nearing construction on a long-planned tidal restoration project located in the William Forward Wildlife Management Area associated with Kent's Island Creek in Newbury. First formally identified as a tidal restriction in the North Shore Atlas of Tidal Restrictions (1996), the project site encompasses approximately 47 acres of salt marsh located adjacent to an existing bridge that conveys a tidal creek beneath a single lane wildlife management road. The road and bridge-like structure, like many historic road and cart-path crossings across New England, restricts tidal flow across the marsh. Built just slightly above the



*The bridge at Kent's Island Creek has deteriorated and restricts tidal flow.
Photo by Foth-CLE Engineering*

elevation of spring tides, the surface of the access road interferes with the natural flow of higher tides across the surface of the marsh, somewhat like a long miniature dam. The crossing, which is narrower and losing some of its stones and fill material directly into the creek, also impedes primary tidal flow. Perched water conditions impounded upstream of the road and unnatural tidal flow can lead to excess scour, erosion and loss of wetland habitat.

By restoring natural tidal flow both at the creek crossing and creating lowered swales across the access road, tidal waters may flow more naturally upstream, reducing velocities, scour, and erosion. In addition to addressing an ecological impairment, reconstruction of the access road and bridge will serve to provide continued access to Kent's Island providing passive recreation access along with access for equipment to manage up to 70 acres of upland grassland and shrubland habitat to provide nesting habitat for American Black Ducks. DER is pleased to have partnered with MassWildlife on this project, having provided technical services and support and assisted with the acquisition of matching grant funds. This project is also supported by a grant from the US Fish and Wildlife Service's North American Wetlands Conservation Act Grant Program.

Restoration Resources

MOST Center Resource Library

The MOST (municipal online stormwater training) Center Team newly redesigned Resource Library features over 250 key stormwater resources from across the watershed (and beyond) organized into six categories - Climate and Resilience, Community Engagement, Finance, Green Infrastructure, Policy and Planning, BMP Design and Performance, and MS4 Minimum Control Measures.

State Hazard Mitigation and Climate Adaptation Plan

Adopted this fall, the State Hazard Mitigation and Climate Adaptation Plan, the purpose of this plan is to identify risks and vulnerabilities associated with natural disasters and climate change, and to developing-term strategies for protecting people and property from future hazard events and climate change impacts.

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 Oct. 1st and April 1st, each year. For more information.

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.

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