

Massachusetts Department of Fish and Game

Division of Ecological Restoration

Invested in Nature and Community

Ebb&Flow

George N. Peterson Jr., Commissioner

Tim Purinton, Director

July 2016

<http://www.mass.gov/der>

Welcome

Greetings, restoration friends and colleagues:

These days, whenever I meet someone who is familiar with my job, a fly fisherman, a watershed association employee, a family member, the first thing they tell me is how low their river is. Drought-like conditions are upon us and the time to conserve water is now. Over 100 towns have water use restrictions in effect, check the Mass DEP website to see if your city or town is under a restriction.

In this edition you can read about what we are doing to proactively help streams that are stressed. Restoring streamflow is complicated and usually requires a cocktail of strategies. There is no magic faucet we can crank open to return water back into streams and ensure abundant supplies for our use, however if we limit summer outdoor water use the rivers and streams, and the organisms that depend upon them (including us!), have a chance to weather periods of drought.

On a related note, I am happy to announce that Michelle Craddock, who worked for Laila Parker for 5 years, will now be leading our flow restoration efforts. We also welcome Eric Ford to the DER team who recently replaced Franz Ingelfinger. Eric's expertise is in the restoration of freshwater wetlands.

See you on the water.

Tim Purinton, Director

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Feature Article:

Boosting Mill Towns by Busting Dams

By Tim Purinton, Director

(Originally published in the July edition of *Revitalization News*, <http://revitalizationnews.com/>)



Briggs Brothers Mill complex. Dam is above complex, adjacent to the worker's housing.

The term “dam removal” brings to mind the decommissioning of large hydropower facilities in the west and the waging of contentious legal battles to improve wild salmon passage on big, iconic rivers, images of roiling white water, dynamite charges and environmental luminaries like Edward Abbey and Yvon Chouinard come to mind.

While these river restoration projects capture the national headlines, in the Northeast, where a myriad of dams dot the landscape like white church spires, dams are being removed for more subtle environmental and social reasons, one of which is the economic revitalization of depressed mill towns.

In New England, water-powered wheels, shafts, and gears mostly ceased turning in the 1920s and 1930s, replaced by the wide distribution of reliable and cheap electrical power. Dams that were built so solidly in the late 1800s and early 1900s are now entering the twilight of their design life, the equivalent of a rusty Saab 900 in need of a new transmission.

While a small percentage of the better built, designed and sited dams can be repurposed for small scale hydropower, a vast majority of low-head dams exacerbate flooding, present attractive nuisances, do not meet modern safety requirements and are under the threat of failure. These realities make the repurposing and redevelopment of mill sites complicated, as most dams are physically and legally connected to their brick and stone mill building counterparts.

Planners in small New England cities and towns such as Lee, East Bridgewater, Taunton, and Pittsfield are eager to rethink their business districts, and iconic mill buildings are the centerpieces of potential economic development. Senior housing, artist's lofts, micro-breweries and

hydroponic gardens are all considered beneficial uses in these beautiful, light-filled buildings.

However, developers are loathe to assume excessive risk in redeveloping mill buildings. The profit margins for renovating historic buildings are slim. In addition, government incentives for preservation are scarce. A developer who learns that an industrial site comes with a dilapidated old dam usually will think twice about investing the hundreds of thousands of dollars needed to attract new tenants or retain old ones.

While a small percentage of the better built, designed and sited dams can be repurposed for small scale hydropower, a vast majority of low-head dams exacerbate flooding and are under the threat of failure.

Historic mill buildings require universal access improvements, broadband internet and energy efficient windows. What they do not need is an ever-present liability such as a dam.

In Massachusetts, 40 dams have been removed for ecological and social purposes. Most of them were industrial mill dams at one point in their long and illustrious lives. Here is a look at a specific river restoration project where the dam was removed and a business was saved, allowing the mill building to be easily redeveloped in the future.

Clarksburg Massachusetts is small; its population of 1702 is less than the date in which it was incorporated (1798.) The North Hoosic River starts in the Green Mountains of Vermont and races across the state line through tiny Clarksburg, where it once hesitated at the Briggsville Dam.



Briggsville Dam removal underway.

Today Clarksburg has one major business: Cascade School Supplies. Over 80 years ago, Cascade bought the old Briggs Brothers Mill, a sprawling brick complex, which, at the turn of the century, manufactured woolen warp, the long yarns used in weaving cloth.

When Cascade bought the Mill they became owners of a run-of-river dam, a structure 145 feet long and 16 feet high. Over the decades, the dam fell into disrepair, and at the turn of this century, Cascade faced a nearly \$750,000 bill to repair it. The cost was significant, so much so that the president of the company opined that the dam repairs could

put his company out of business.

The dam happened to be on a high-quality cold water stream, home to a rare fish and perfect habitat for a myriad of aquatic species which would benefit from free flowing water. A group of ecosystem restoration partners banded together and removed the dam for an estimated \$250,000 less than what it would have cost to repair it. Grants were secured, and Cascade was able to stay in business and continue to be the town's largest employer.

With the dam gone, the community has a much more valuable property that can, in the future, be repurposed and redeveloped. Adding to this value is the fact that flooding has been reduced post-dam removal. When Tropical Storm Irene ripped through the region, the Briggs Brothers Mill buildings experienced no significant losses.

As natural resource managers, we typically remove dams to improve river health and eliminate a major ecological stressor on the landscape, not to pump life into a local economy. We know from experience that dam removal improves habitat and passage for fluvial fish, enhances water quality, and creates new recreational opportunities, but when these river restoration projects also help a struggling town become more vibrant and economically viable, then there is an added reason to keep tearing down barriers to environmental, social, and economic progress.



Briggs Brothers mill building alongside newly restored North Hoosic River.

Low Streamflow and How DER is Helping

Michelle Craddock, Watershed Ecologist



Low flows at Third Herring Brook in Norwell, July 14, 2016.

As you may have noticed, Massachusetts has had an unusually dry spring and summer so far, leaving many of our rivers at critically low flows. In fact, streamflow in many rivers has been below normal for several months and at levels typically not seen until late August and September. These conditions have led the Commonwealth to declare a Drought Watch for Central and Northeast Massachusetts and a Drought Advisory for Southeast and the Connecticut River Valley.

While Massachusetts is a relatively wet state, a number of streams and rivers regularly experience below-normal flow conditions in the summer, due in large part to water withdrawals and impervious cover¹. DER continues to monitor streamflow in streams across the state to better understand conditions in headwater and stressed streams. Additionally we continue to be a partner with EPA's regional climate change monitoring network and are hopeful that data collected as part of that effort will further our understanding of the impacts of climate change on summertime low flow events, which are predicted to increase in duration with climate change

DER is currently working on a project in the Ipswich River watershed to better understand outdoor water use behaviors during the summer to find additional ways of reducing water use. Typically water usage spikes in the summer, just as streams are experiencing their normal lowest flows. We hope to implement and test new, non-regulatory ways to reduce outdoor water use based on the information learned in this project.

Tips on Water Conservation

One important way to alleviate some of the impacts to our streams is to reduce the amount of water used outdoors. There are several ways to use less water but still have a beautiful landscape:

- watering in the morning or evening alleviates losses due to evaporation;
- using conservation tools like rain barrels provides ready water for plants without tapping into local resources; or
- be worry-free and plant drought-tolerant species – even in dry conditions, these plants remain alive and well.

Finally be aware of outdoor water use restrictions. As of July 7, 117 communities had reported to the Department of Protection that they had a water use restriction in place ([find more info here](#)). Water use restrictions are an important tool for preserving water for essential uses such as drinking and for emergency needs such as firefighting. If you are interested in more ways to reduce water usage, inside and out, you can [find additional tips here](#).

¹ Weiskel, P.K., Brandt, S.L., DeSimone, L.A., Ostiguy, L.J., and Archfield, S.A., 2010, *Indicators of streamflow alteration, habitat fragmentation, impervious cover, and water quality for Massachusetts stream basins*: U.S. Geological Survey Scientific Investigations Report 2009-5272.

Division of Ecological Restoration Project Updates

Tidmarsh Farms Greening Up! (Plymouth)

Restoration work continues at Tidmarsh Farms in Plymouth, with Mother Nature now taking the lead across much of the site. Plants, insects, fish, frogs, turtles, and birds have quickly come back to the site after earthwork this past winter and spring. The end of the construction phase is in sight – about 2 more months to go. Planting is in progress now. Stay tuned for a more detailed update in the next *Ebb&Flow*. In the meantime, please contact DER Project Manager Alex Hackman with inquiries (617-626-1548; alex.hackman@state.ma.us).



Tidmarsh prior to restoration, November 2015



*Same location as photo to left, during restoration
March 2016*



Tidmarsh Farms, same site as photos above, July 2016

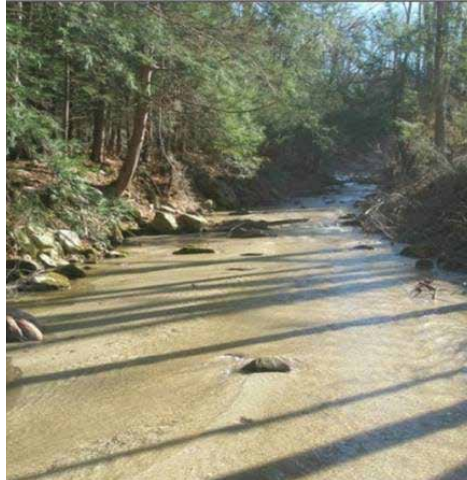
What does sediment release associated with a dam removal look like?

Within the past decade, DER has become an increasing advocate for ‘in-stream’ sediment management for dam removal projects. Few of us have the chance to witness a dam removal, let alone witness the dramatic transformation that happens downstream and upstream over the following years. The miracle of river restoration is best appreciated over time, and can be quite dramatic for dam removal projects involving sediment release. We thought it might be helpful to *Ebb&Flow* readers to see what this looks like. Thanks to our friend Robin MacEwan at Stantec Consulting Services (project engineer for the Amethyst Brook Restoration Project), we are able to share what it looks like over a period of 4 years. The following images were taken by Robin just before, during, and after the removal of the Bartlett Rod Shop Company Dam.



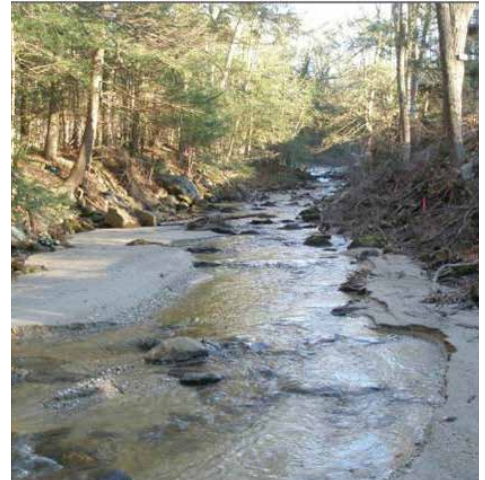
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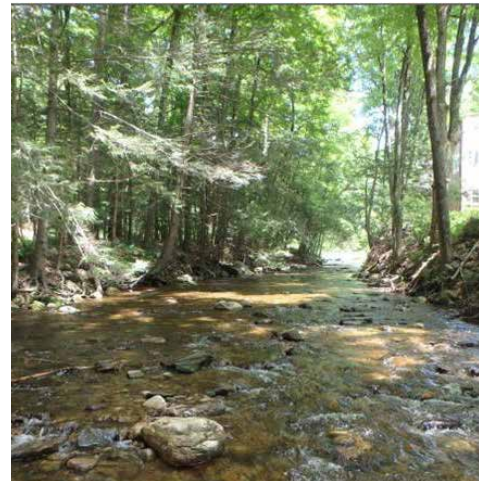
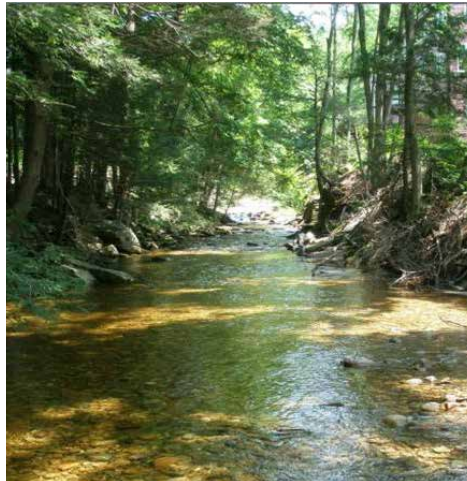
11-09-2012

06-06-2013



12-06-2012

06-06-2016



An ‘in-stream’ approach to sediment management involves allowing the river to naturally erode, transport, and re-distribute downstream sediment that has accumulated behind a dam. For some polluted sites, this approach may not be appropriate. But for most dam removal projects, releasing clean impounded sediment to the downstream reach can have significant habitat restoration value. The reason is simple - most dams trap sediment that otherwise would have traveled downstream. Many stream reaches below dams appear very rocky, missing the normal mix of smaller sediment grain sizes found in other parts of the river. Letting sediment travel downstream allows the river to heal itself and habitat to dramatically improve in a short period of time. Of course, the approach does involve temporarily smothering of the stream bed. But as shown in these images – and consistent with scientific literature – such impacts generally last less than two years. After this transition period, the area below a dam can have greatly improved habitat value. At this site, and after the dam removal, sea lamprey began using this restored downstream reach for the first time in decades.

For more discussion of sediment management issues, feel free to contact Alex Hackman, DER Restoration Specialist, at alex.hackman@state.ma.us.



Hunter's Pond Dam

Hunter's Pond Dam Removal on Bound Brook (Scituate)

DER is supporting the Town of Scituate in its effort to remove the Hunter's Pond Dam (a.k.a. Mordecai Lincoln Road Pond Dam) (located here) on Bound Brook. The Town completed the MEPA process in 2015 and their consultants, Princeton Hydro, are now developing the remaining permit applications to be filed this summer and fall. The project has received funding from the National Fish and Wildlife Foundation Hurricane Sandy Coastal Resiliency Competitive Grant Program. The primary technical challenges include fish passage and hydraulics related to the multiple dam spillways. DER looks forward to providing additional support through the permitting process. Dam removal is tentatively scheduled for summer 2017.

Long Term Culvert Replacement Training Project First Trainings (Statewide)

In late June, DER's Stream Continuity Program held the first in a series of trainings as part of our Long Term Culvert Replacement Training Project (Training Project). Over 30 Public Works/Municipal Highway Directors from across Massachusetts gathered to learn how to assess rivers to ensure that culverts are successfully designed to allow for natural stream processes. The Training Project is broken up into 3 phases relevant to the implementation of culvert replacements: 1) Site/River Assessment; 2) Culvert Design and Permitting; and 3) Construction. Individual training sessions will be developed for each phase.

The June training, held in both Ashfield and Spencer, focused on the first phase of Site/River Assessment and demonstrated how specific culvert site and river information is important for successful culvert replacements. Site specific conditions such as utilities, height and type of road cover over the existing culvert, and existing road layout play critical roles in designing a culvert replacement. In addition to classroom instruction, attendees spent a portion of the day in the field learning about stream processes, stream features, and bankfull widths. Attendees saw

firsthand how undersized culverts cause downstream erosion and put roads at risk of washing out, as well as ecological impacts.

DER designed the first phase of the Training Project in a way that illustrates the process towns will go through for their own culvert replacements – i.e., contracting with an engineering firm for the first step of site/river assessment. The final report for the Ashfield and Spencer culverts is available on-line at DER's Stream Continuity website. This report is intended to help municipalities understand the process of culvert site/river assessment, so the process can be repeated by municipal staff and so Public Works/Highway Directors can confidently coordinate with an engineer. Additionally, the Request for Proposals and the Scope of Work that DER used to contract with an engineering firm for Site/River Assessment for the Spencer and Ashfield culverts are available on-line as examples.



In the field at the Ashfield Culvert Replacement Training held in June.

They will soon be converted into templates for broader use and modification by municipalities for culvert replacements.

DER's Stream Continuity Program offers free technical assistance for design and construction of culverts that allow for natural river processes intending to meet Massachusetts Stream Crossing Standards. Municipalities and consultants are welcome to contact Tim Chorey with any culvert questions: 617-626-1541 and timothy.chorey@state.ma.us.

Rattlesnake Brook Dam Removal (Freetown)

DER is supporting the City of Fall River in its effort to remove the Rattlesnake Brook Dam (a.k.a. Crystal Springs Dam) (located here) in Freetown. The City received competitive bids from seven regional construction firms and is in the process of reviewing the bids. The City plans to begin construction as early as September 2016. Design and constructing funding has been received from the

National Fish and Wildlife Foundation Hurricane Sandy Coastal Resiliency Competitive Grant Program, The Nature Conservancy, DER, and Massachusetts Dam and Seawall Repair and Removal Fund (see here for more information). DER looks forward to providing additional support throughout the construction phase.



Rattlesnake Brook Dam

Kent's Island Salt Marsh Restoration Project (Newbury)

On June 8th, project partners and regulators gathered to learn more about the Kent's Island Salt Marsh Restoration Project – an effort 10-plus years in the making. First formally characterized in the 2006 Great Marsh Atlas (WRP), the Kent's Island Salt Marsh Restoration Project seeks to restore 47 acres of coastal tidal salt marsh within the Great Marsh in Newbury, MA. Working with our partner



Investigating Kent's Island tidal restriction.

and the project proponent, the Division of Fisheries and Wildlife (DFW), DER is engaged in advancing project design for a new crossing at Kent's Island Road, which will not only remove a tidal restriction, but also maintain and improve access to Kent's Island as part of the William Forward Wildlife Management Area. As currently designed, the new crossing at Kent's Island Road, will remove the remnants of an old timber crib and stone crossing that have deteriorated to the point of collapsing into the creek and restricting tidal flow. Similar to another local project,

the Old Town Hill Crossing off of Newman Road (a project completed in 2004 in partnership with The Trustees for Reservations), the new crossing at Kent's Island Road will also incorporate hardened surface swales to facilitate surface flow over the low-lying road on higher tides – a design feature that is not always practicable on more heavily traversed roads and highways. Currently making its way through the MEPA process, full regulatory permitting is anticipated through the remainder of 2016 with the desire to reach implementation in 2017.

Restoration Resources

A Glimpse into Social Marketing By Cindy Delpapa

I have been involved in volunteer water monitoring for decades. For the entire time I have been bowled over by the dedicated volunteers who diligently and enthusiastically undertake their sampling duties month-after-month and year-after-year and the watershed groups carefully interpreting the mounds of information collected. I have read the reports and studied the graphs packed with detail. I find the monitors inspiring and their efforts to improve their local waterways heartwarming. That is until I received an email from a talented and dedicated volunteer I had the privilege of working with.

The email explained she was quitting- walking away from her volunteer monitoring work. What finally toppled this dedicated volunteer? In a word - frustration. After years of volunteer labor and tens of thousands of data points logged there had been little impact in the greater community on improving water quality.



A machine offers dirty water - showing Disruption in action.

Harsh as it was for me to admit, there was some truth to her observation. The data collected by volunteer monitors does not have the impact it should. But why? More importantly how can this unfortunate situation be turned around? The answer that floated to the top was to explore how social marketing might help. So in April, DER hosted a two-day training on Social Marketing (*The Science of Making Monitoring Cool*) with Dr. Bill Smith and the Massachusetts Rivers Alliance.

It is worth backing-up a bit to explain how *social* marketing

differs from mass marketing. For one, social marketing is dedicated to social good. It is not about selling a product for profit but making the world better. It borrows from old school marketing but folds in a fair amount of the social sciences. Generally social marketing is striving to foster beneficial change. The change may be related to energy conservation or using sunscreen to reduce skin cancer but it is change for the better. Here are some of the key points of social marketing that Dr. Smith shared.

Who is the audience

Identifying the desired change is important but identifying the audience is also key. Dr. Smith made it clear the audience could not be 'the general public' if significant success was the goal. The truth is no campaign is going to influence everyone. The work is in identifying the audience likely to be motivated to change, figuring out the barrier(s) preventing this segment of the public from adopting the change and figuring out how to use this information to convince your audience the benefit(s) they will reap outweigh the barriers to action.

It is not about facts but about emotions

As counter-intuitive as this may sound, knowledge and raising awareness will not break down barriers and drive change. If it did the mountains of water quality data Massachusetts' watershed groups have collected over the past three decades would have everyone installing rain gardens, tearing up pavements and dedicated volunteers would not be quitting in frustration. Social marketing identifies humans as an emotional species. This means emotion can drive change. As Bill bluntly informed us- it is not about facts but about emotions when trying to engage an audience.

Cater to your audience

Bill introduced us to the many tools used to overcome barriers to change- from storytelling to disruption. But perhaps the most fundamental piece of advice provided by Bill was to stop having 'everything about you'. The point he worked hard to instill was the need to focus on the target audience. It is not about an organization or their needs (e.g. more volunteers). The goal is not to educate the audience so they can recognize the difference between low or high phosphorus concentrations but to motivate people to reduce their lawn fertilizing or to support the adoption of a stormwater utility to reach the low phosphorus concentration. Social marketing is about catering to the target audience. What speaks to them? What motivates them? What prevents them from changing?

Sell the solution instead of the problem

People can also get overwhelmed if a message is too complex or fear inducing. Face it, there can be a fair

amount of gloom in many environmental messages. Turn this around by selling the solution instead of hammering away at the direness of the problem. Don't bring up the problem without offering a solution. It is all about the target audience buying into the solution and perceiving they will benefit from adopting the solution. And do not assume the benefit must be monetary. There are many examples of simple actions able to save most people a bit of money, (e.g. turn down the temperature on a water heater) but the majority of people do not adopt them. What may work better is the next door neighbor walking the homeowner through the steps needed to adjust water temperature. The homeowner now feels a connection to the neighbor and the neighborhood- a stronger benefit than the pennies a day in savings accrued in saved gas or electricity.

Identify the benefits

Identifying the benefits for a target audience may mean asking or observing the segment of people you would like to influence. An upcoming clean-up might call for some strong and energetic volunteers. Consider changing your plea for volunteers from "Friends of Sandy Beach need volunteers to help us make the beach clean and inviting" to "Like fresh air, sunshine, nice people and a reason to skip the dreary gym workout this weekend? Come to Sandy Beach for the annual clean-up." Note the first pitch is about Friends of Sandy Beach needs (volunteers) and benefit (Friends of Sandy Beach achieve their clean-up goal) while the second is offering a fun social event that will help participants meet a daily workout goal.

Capture their attention

Disruption, showing something unusual in a place it is not expected, can also be a great way to capture attention and open a door for more interaction. In Bill's experience, surprising people may be one of the most powerful things a group can do to motivate change. Identifying what disruption might work may require really getting creative but the reward may be a great deal of buzz and recognition.

Tell a story

This article began with a story. The reason for this unusual beginning is to illustrate one more tool. Bill stressed the importance of telling your story. Storytelling is a key tool in Social Marketing because a good story will entertain, elicit emotion, be remembered and, if done well, motivate change.

Key Pieces of A good

Story
Hero
Villain
Journey
Surprise
Message
Awe-Inspiring
Emotion

What story does your group want to tell?

Restoration Resources

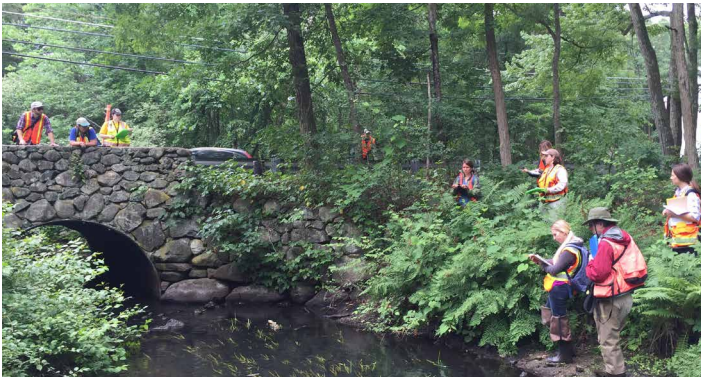
Training - Massachusetts Road-Stream Crossing Field Training

Saturday, August 20th, 11am-5pm
Groton, MA

Offered by the Massachusetts Division of Ecological Restoration, Department of Fish & Game in collaboration with the North Atlantic Aquatic Connectivity Collaborative.

The North Atlantic Aquatic Connectivity Collaborative (NAACC) is a network of individuals from universities, conservation organizations, and state and federal natural resource and transportation departments focused on improving aquatic connectivity across a thirteen-state region. DER provides training to local, watershed and regional groups in the NAACC protocols to assess and determine the location and extent of barriers to the movement of fish and wildlife.

To be certified as a NAACC observer or coordinator, a person must satisfy three training components:
1) Protocol training either in-person (3 hours) or on-line. Everyone must go online to pass the training questions.



Carrie Banks leads a Road-Stream Crossing Training in Sudbury, MA in July.

- 2) In-person field training (4-6 hours)
- 3) Shadowing an experienced observer at 20 sites (2-3 field days)

Carrie Banks', DER's and NAACC's Massachusetts State Continuity Survey Coordinator's, next scheduled training is Saturday, August 20th – Groton, MA (11am-5pm).

To register for this field training, please contact Carrie at 413-579-3015 or carrie.banks@state.ma.us.

Grants

Grant - NOAA Coastal Ecosystem Resiliency Grants Program

- Through this solicitation, NOAA seeks to implement projects that use a proactive approach to improve or restore coastal habitat to: 1) strengthen the resilience of U.S. marine and coastal ecosystems and decrease the vulnerability of communities to extreme weather and 2) support sustainable fisheries and contribute to the recovery of protected resources. Applicants may submit one or more projects to be completed in one, two, or three years. The deadline is August 16, 2016. Click for more information.

Grant - FY2017 Brook Trout Conservation Funding Opportunity

- The Eastern Brook Trout Joint Venture (EBTJV) is requesting project proposals that restore and conserve habitat necessary to support healthy and productive populations of wild brook trout. Federal funding available under the National Fish Habitat Action Plan through the U.S. Fish and Wildlife Service will be used to fund top ranked proposals. The maximum award amount for an individual project is \$50,000. All proposed projects must be developed in coordination with the nearest Service Sponsoring Office. Applications are due by 5:00 p.m Eastern time on September 16, 2016. Click 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 by clicking here, or in person at your local Registry of Motor Vehicles office.

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