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Massachusetts Association for Floodplain Management (massFM)

We educate, promote, & inform on practices related to floodplain management.

We welcome and encourage readers to send us notices of training and other events, articles or other contributions to share with others in our community.

Please visit our website at www.massFM.org for additional articles and resources, and to sign up to receive future editions via email.

Contact: massfloodplain@gmail.com

More on The Great Flood of July 2023

Written by Lori Watson, CFM

“The Great Vermont Flood of July 2023: How a Complex and Long Duration Flood Event Came to Be” is a **Story Map** (<https://storymaps.arcgis.com/stories/1734322dab92443386foa04a9ddbe857>) created by the National Weather Service. The Story Map includes information about pre-storm conditions, the storm event, and the post-storm assessment of damage. The photos are eye-opening! The Story Map also includes rainfall maps and an interesting comparison of this flash flood event to the damage caused by the 2011 Hurricane Irene. For further reading, check out the Weather Service’s **Meteorological Summary** about the July flood event in Vermont at <https://www.weather.gov/btv/The-Great-Vermont-Flood-of-10-11-July-2023-Preliminary-Meteorological-Summary>.

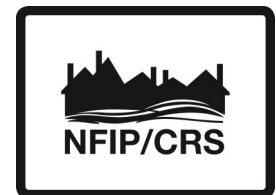
The Weather Service’s Burlington, Vermont Weather Forecast Office also wrote a meteorologic report about the record breaking flooding New England experienced last fall entitled **Heavy Rain From A Slow Moving Front October 7** (<https://www.weather.gov/btv/Heavy-Rain-From-A-Slow-Moving-Front-October7>). The report focuses on the factors and impacts in Vermont and northern New York and how this “event highlights the importance of context.”

Many thanks to John Goff (john.goff@noaa.gov), Senior Service Hydrologist, NOAA/National Weather Service for sharing this information with massFM!

Lori is a Senior Planner at Michael Baker International.

Community Rating System Corner A Handy Place to Stay Current on CRS Matters

Written by Shannon Hulst, CFM



Activity 540: Drainage System Maintenance

This activity provides credit for actions to maintain drainage channels and keep them clear of debris that can clog them, causing them to back up and flood. The activity is broken into five subsections. The bulk of the credit is available for annual checks and clearing of these channels. Many communities are hopeful that they will receive credit for the work they do to meet their MS4 requirements, but that typically involves maintenance every three years, and the CRS requirement here is for annual inspections and clearing. Further, credit is provided based on the length of drainage channels that are regularly maintained, which requires a robust mapping program within the community.

More limited credit is provided for keeping up with known problem sites with more frequent checks and clearing. If a town has a Capital Improvement Program that provides funding for permanent structural fixes for known problems within the drainage system, they can earn credit. However, credit is NOT provided here for funding for regular maintenance. Towns can also earn credit for regulations that prohibit refuse from being dumped in a stream specifically for the purpose of creating conditions which could exacerbate flooding (which are typically grouped with other reasons as well, such as environmental protection). Finally, credit is available for annual inspections and maintenance of storage basins.

Activity 540 can be a bit challenging to earn credit in, but if your town undertakes any of the activities noted above and has a robust mapping and tracking system, pursuing credit in this activity should be a no-brainer! For more information, see section 540 of the CRS Coordinators Manual at <https://crsresources.org>.

The Community Rating System (CRS) is a voluntary program within the National Flood Insurance Program that offers discounts on flood insurance in exchange for actions taken within a community that improve flood resilience. More information can be found at www.fema.gov/floodplain-management/community-rating-system and crsresources.org.

Shannon is the CRS & Floodplain Coordinator for Barnstable County through the Cape Cod Cooperative Extension & Woods Hole Sea Grant.

DCR Flood Hazard Management Program News

Written by Joy Duperault, CFM

Greetings! Here's some information about what's going on at the state level...

By the time of this publication you probably already know that the MA Building Code 10th Edition has received public comment and is sifting through those before they make a final decision on the exact content of the final version. Word is that the new 10th Edition will have a concurrency period later this year, with full compliance to it alone beginning in early 2025.

DEP's proposed Land Subject to Coastal Storm Flowage standards have also received public comment—this comment period may have been extended by the time you read this. You can check the status on DEP's public hearings webpage: <https://www.mass.gov/info-details/massdep-public-hearings-comment-opportunities>

CZM has been working hard on the Massachusetts Resilient Coasts Plan—check out the initial press release here: [Statewide Coastal Resiliency Strategy](#).

Several state agencies have partnered together over this past year to examine how communities can implement higher floodplain management standards that don't conflict with the MA building code—things like zoning by-laws, local incentives and other forms of encouragement for smarter floodplain development. We anticipate the release of a **“Local Action Guide for Reducing Flood Risk”** around the beginning of summer—plenty of time for your community to review the guide and make recommendations to your local boards for possible inclusion of these actions on your spring 2025 town meeting warrants. We'll send out the Guide as soon as it's published and offer training sessions about what's in it this summer.

Finally, the Flood Hazard Management Program office (FHMP) has been working on a new project to help us all understand where flooding may impact Environmental Justice (EJ) communities. [Nadia Madden](#), CFM is leading the effort to produce maps of flooding in EJ neighborhoods, as well as to put boots on the ground to meet folks who are concerned about this across the state. A part of the project includes pilot flood mitigation action recommendations for a handful of selected communities. Look for the development of a web page that tells the story sometime in 2025.

For more information about the FHMP and floodplain management, visit our web pages at <https://www.mass.gov/guides/floodplain-management>
If you're looking for something that isn't there, let us know!

Joy is the Massachusetts NFIP coordinator. She can be reached by email at Joy.duperault@mass.gov

UPDATE: NOAA Coastal Change Analysis Program High Resolution Now Available

MOVE TO HIGH RESOLUTION REPORTED BY BECKY LOVE IN THE massFM FALL NEWSLETTER AND AT THE ANNUAL CONFERENCE IN OCTOBER 2023 IS LIVE!

NOAA recently announced the availability of new, high-resolution land cover data — used to document key geographic and landscape features covering Earth's surface — for coastal communities across the country. This new data can be used to improve planning for sea level rise, protect communities from flooding, inform wetland restoration projects and enable other activities to build climate resilience. Read about it in NOAA's [Press Release](#).

Local leaders have requested this data for decades, but the acquisition cost has been prohibitive. Funding provided through the Bipartisan Infrastructure Law, along with contracts with the private sector and partnerships with others, have now allowed NOAA to fulfill this request. The data are available from the **Digital Coast** website at <https://coast.noaa.gov/digitalcoast/data/ccaphighres.html>

Please reach out to Nate Herold (nate.herold@noaa.gov) if you have any questions.

Understanding Stream Channel Bankfull Width Matters for Flood Reduction

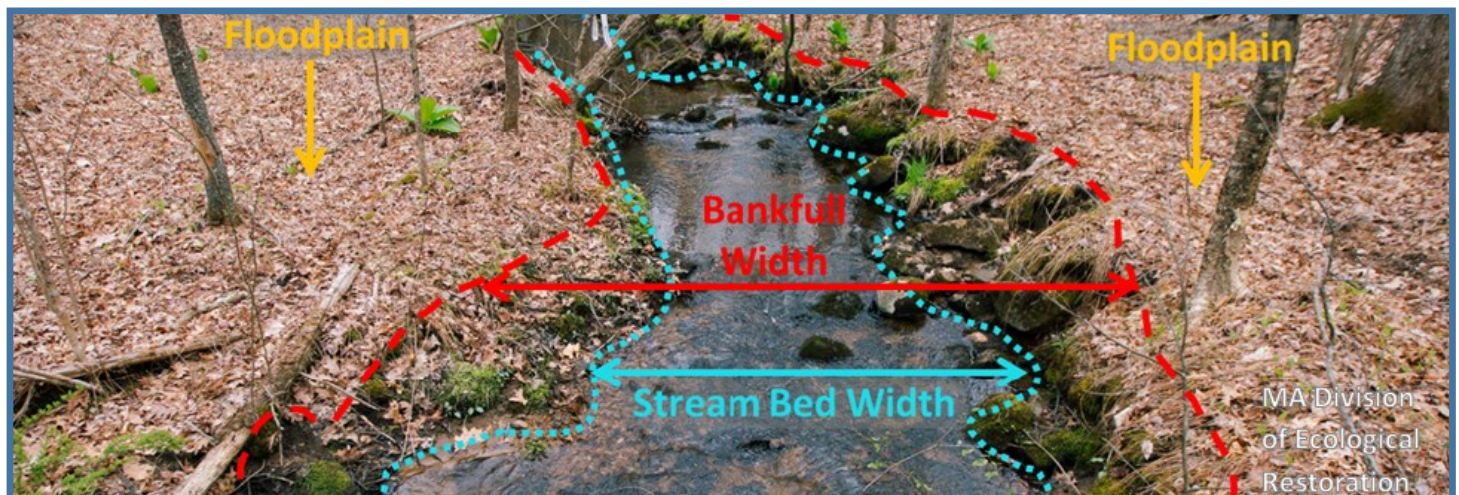
Written by David Azinheira, PE, CFM and Holden Sparacino

Culvert and small bridge replacement designs that consider natural stream characteristics improve ecological functions and flood resilience. One key characteristic used in design is the bankfull width of the stream. This article will explain this characteristic of streams, and how designs that consider bankfull width can improve stream functions, reduce flood risks, and improve infrastructure resilience.

What is bankfull width?

You may already know that culvert and small bridge replacements meeting the **Massachusetts Stream Crossing Standards** (<https://www.mass.gov/doc/massachusetts-stream-crossing-handbook/download>) are required to have minimum spans 1.2 times the field measured bankfull width. However, what is bankfull width and how is it measured?

The water level of a stream fluctuates constantly, influenced by factors such as rain, snow, and drought. Stream channels are sculpted by the downhill movement of water, with their shapes being determined by the historical patterns of stream flows at a particular site. The banks of a stream are usually dry and are typically overtopped every year or two. The width of the channel when it is full, just before it spills over into the floodplain, is referred to as the bankfull width. Good indicators of areas within the bankfull width include wet areas with stream bed material, unstable or eroding banks, and/or dry areas next to the streambed without perennial plants or trees (especially in summer or drought conditions). Good indicators of areas outside of the bankfull width include stable areas with perennial plants or trees. The figure below illustrates the bankfull width.



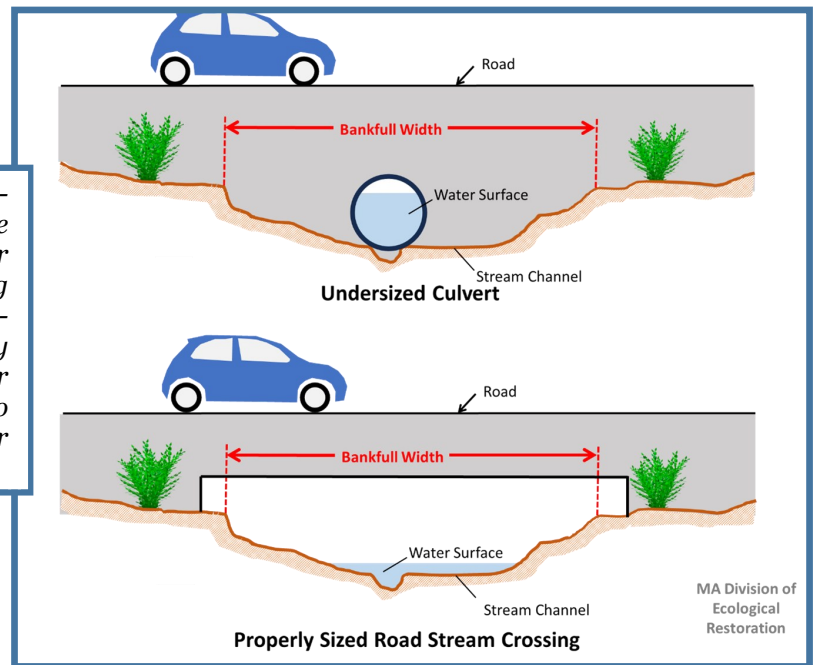
Stream scientists call the stream flow when the stream level is at the bankfull width the ‘channel forming flow,’ as this is when the most significant channel erosion and sediment transport occurs within the channel. Bankfull width flows typically occur at about the 1.5-year frequency storm, or during storm events with a two-thirds chance of occurring in any single year. During even larger floods, the higher velocities, debris loads, and heavy erosion are more likely to be concentrated within the deeper, well-defined channel.

The Division of Ecological Restoration (DER) Stream Continuity program recommends determining a representative bankfull width by averaging three (3) bankfull width measurements taken upstream of the culvert (or small bridge) and three (3) downstream of the culvert (or small bridge). Typically, measurements approximately 10 to 20 bankfull widths away from anthropogenic features (for example dams, bridges, and culverts) are recommended for determining a representative bankfull width.

How does the bankfull width impact flooding and ecological functions?

Historically, most culverts and small bridges were installed with spans that are significantly smaller than the streams' bankfull widths. Undersized culverts act as partial barriers to stream functions and limit hydraulic capacity, increasing the risk of flooding, and can result in significantly altered water velocity and sediment movement, as well as increased debris accumulation during heavy storm events. Undersized structures also can significantly disrupt stream connectivity and fish and wildlife passage – often reducing the number of species and population sizes thereby disrupting the natural function of a stream. The figure below illustrates a simplified stream cross-section before and after replacing an undersized culvert.

Simplification of a stream crossing with an undersized round culvert with an opening less than the bankfull width and a three-sided box culvert (or embedded four-sided box culvert) with an opening width that exceeds the bankfull width. The average water surface elevation is shown. Properly sized crossings provide additional capacity for high flows during storm events compared to undersized crossings, and typically have lower water levels through the crossings.



A road stream crossing structure with a span of at least 1.2 times the stream's measured bankfull width ensures the structure is built outside of the stream channel. This facilitates natural channel dynamics, provides sufficient hydraulic capacity during storm events, ensures greater fish passage, and provides dry passage for wildlife (including turtles) to travel along the stream corridor without crossing over the road. Structures that meet the MA Stream Crossing Standards (including having a span of 1.2 times the stream's bankfull width) are also protected from structural stress caused by repetitive wet/dry cycles, heavy erosion, and debris blockages that are common for undersized culverts. This can reduce maintenance costs, increase structure lifespan, and generally reduce the probability of flooding due to either structure failure or overtopping.

Culverts and bridge crossings designed to meet the Massachusetts Stream Crossing Standards increase flood resiliency while also providing passage for water based and land based wildlife. The DER Stream Continuity Program promotes the replacement of undersized culverts and bridges with crossings meeting the Massachusetts Stream Crossing Standards through our **Municipal Assistance Grant Program** (<https://www.mass.gov/how-to/culvert-replacement-municipal-assistance-grant-program>). Our stream continuity grants typically open in February or March – if you would like to receive announcement on upcoming grant opportunities you can sign-up for **News from DER** (<https://lp.constantcontactpages.com/su/cebEgxf>) for the Culvert Connection newsletters.

David is a Stream Crossing Specialist within the DER Stream Continuity Program and is the Clerk of the massFM Board of Directors, and Holden Sparacino is the DER Stream Continuity Program Manager.

*This article incorporates materials developed in coordination with Carrie Banks (DER Capacity Building Branch Manager), the **Massachusetts Stream Crossing Standards**, and the **USDA Stream Simulation manual** (https://www.fs.usda.gov/biology/nsaec/fishxing/aop_pdfs.html).*

Properly sized crossings provide additional capacity for high flows during storm events compared to undersized crossings, and typically have lower water levels through the crossings

Simplification of a stream crossing with an undersized round culvert with an opening less than the bankfull width and a three-sided box culvert (or embedded four-sided box culvert) with an opening width that exceeds the bankfull width. The average water surface elevation is shown. Properly sized crossings provide additional capacity for high flows during storm events compared to undersized crossings, and typically have lower water levels through the crossings.

NEW! Flood Management Culture Corner

Your place to nerd out and expand your Flood Manager mind!

MOVIES

See this documentary movie, **Inundation District!** It is all about the recent development of Boston's Seaport District (the Innovation District) over the past 2 decades, and the flooding and storm surge risk that had been essentially ignored. There are lessons for the entire coastline and some very powerful images and commentary from many people you may recognize. For more information and to find screenings (many screenings are accompanied by a Q&A with the director), go to <https://www.inundationdistrict.com>.

Check out the **Wild and Scenic On Tour** Touring Film Festival brought to NH by NH Rivers Council. \$15 for 5 days of video-on-demand streaming access, or purchase an in-person ticket for Concord, NH, March 29, 2024. For more information, go to <https://nhrivers.org/film-festival-2024/>.

POETRY

Going for Water

by Robert Frost

The well was dry beside the door,
And so we went with pail and can
Across the fields behind the house
To seek the brook if still it ran;

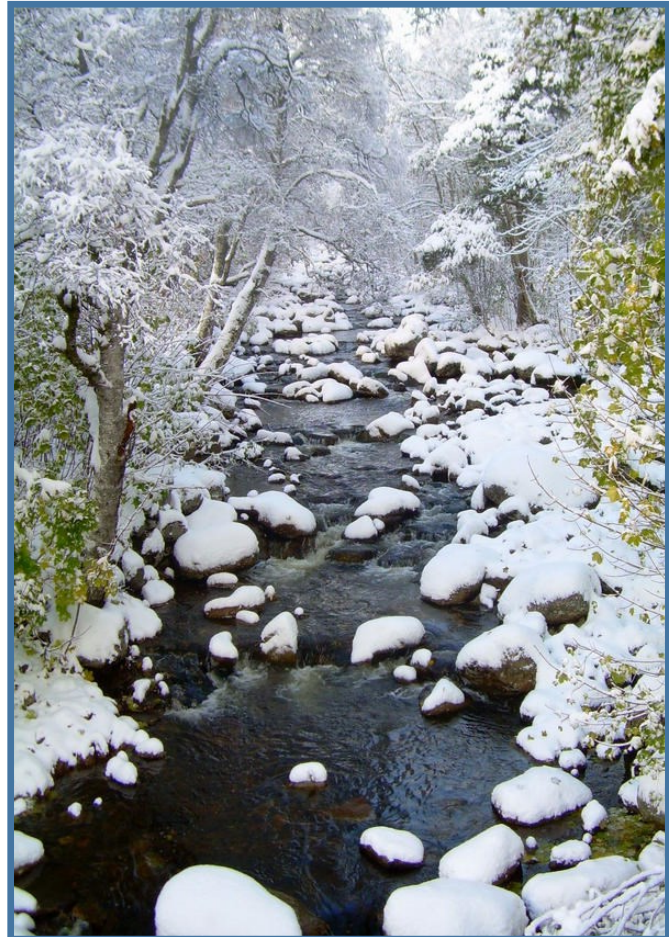
Not loth to have excuse to go,
Because the autumn eve was fair
(Though chill), because the fields were ours,
And by the brook our woods were there.

We ran as if to meet the moon
That slowly dawned behind the trees,
The barren boughs without the leaves,
Without the birds, without the breeze.

But once within the wood, we paused
Like gnomes that hid us from the moon,
Ready to run to hiding new
With laughter when she found us soon.

Each laid on other a staying hand
To listen ere we dared to look,
And in the hush we joined to make
We heard, we knew we heard the brook.

A note as from a single place,
A slender tinkling fall that made
Now drops that floated on the pool
Like pearls, and now a silver blade.



massFM Lunch & Learn

March Members Only Lunch & Learn - Register Now!

Members only “Lunch & Learn” meetings are held every other month on Thursdays at noon. Members can expect to receive an email invitation to register prior to each upcoming Lunch & Learn meeting. Earn 1 CEC for attending the full meeting.

Grab a sandwich and join us virtually for the March Lunch & Learn “Flood Risk and Historic Structures” on March 14, 2024 noon ET.

Not a member, yet? Join today by going to our *Become a Member* page [here](#) and complete the Application/Renewal Form.

The March Lunch & Learn topic is *Flood Risk and Historic Structures*

Shannon Hulst and Sarah Korjeff will provide an overview of the practical application of the exemption of historic structures from Substantial Improvement regulations and share lessons learned from qualifying historic projects in the floodplain on Cape Cod.

Sarah Korjeff works as Historic Preservation Specialist and Planner for the Cape Cod Commission, a regional planning and regulatory agency in Barnstable County, Massachusetts. She is a primary author of the Commission's cultural heritage and community design guidance documents, and she has led planning efforts to make zoning consistent with community design goals in several towns and historic districts in the region. She provides training and technical assistance to Historical Commissions and Historic District Committees across Cape Cod. Sarah holds a master's degree in Historic Preservation from the University of Pennsylvania.

Shannon Hulst is Floodplain Specialist for Barnstable County, MA with Cape Cod Cooperative Extension and Woods Hole Oceanographic Institution Sea Grant. She is a Certified Floodplain Manager with a master's degree in Marine Affairs from the University of Rhode Island. She provides technical assistance on all things related to flooding to communities, residents, and businesses on Cape Cod. Shannon has received national awards for her work in regional floodplain management from the Federal Emergency Management Agency and the Association of State Floodplain Managers.

Job Postings, Notices, and Announcements

RIFMA ANNUAL CONFERENCE

The Rhode Island Flood Mitigation Association's ([RIFMA](#)) annual conference will be on **May 23, 2024** at the University of Rhode Island! You have a chance to attend free of charge as a speaker. Click this link to read the [Call for Presenters](#). The deadline for abstracts is **Monday, April 1, 2024**. To submit an abstract, visit [Call for Presenters Submissions](#) (or scan QR code at right) or email rhodeislandfma@gmail.com.



ASFPM'S FLOOD MITIGATION RESOURCE LIBRARY

ASFPM's flood mitigation resource library continues to work to bring flood mitigation to the masses with the addition of 22 things property owners can do to reduce flood risk, just in time for many state severe weather awareness campaigns. To get started, people can go to ReduceFloodRisk.org, answer a series of five simple questions, and receive a detailed list of mitigation options recommended to reduce flood risk for their specific property type. The curated results can then be filtered and sorted by key attributes, such as cost, complexity, and level of required maintenance.

Have a job opening or volunteer opportunity in your organization? Are you a new CFM? Do you have some other Flood Management related notice or announcement to make? Let us know and we'll publish it in the next massFM Newsletter. Send entries to massfloodplain@gmail.com.

We would like to extend a Thank You to our Sponsors!



BECOMING A SPONSOR

If you are interested in becoming a sponsor please download the sponsorship form by clicking [here](#) or contact us at massfloodplain@gmail.com

Our mission at massFM is to create a forum for the exchange of local knowledge about floodplain management, to share that knowledge with the public, to inform municipal and statewide policies and procedures, and to improve the Commonwealth's ability to mitigate flood hazards now and in the future. massFM strives to be inclusive across multiple disciplines, regardless of means. We welcome you to join us.