

Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: Pepperell

Project Title: Sucker Brook Continuity Restoration

Award Year (FY): FY22/FY23

Grant Award: \$ 840,142

Match: \$ 206,238

Match Source: In-kind services and materials provided by the Town; volunteer efforts by Trout Unlimited and other non-profit organizations, town funds and/or Trout Unlimited funds

One or Two Year Project: Two Year

Municipal Department Leading Project: Conservation Commission/DPW

Project Website URL:

<https://town.pepperell.ma.us/767/Sucker-Brook-Continuity-Restoration-Proj>

and for photos:

<https://www.dropbox.com/s/3lhju1uyd9ngrty/SuckerBrookContinuity.zip?dl=0>

Community Overview:

- What is the population size of your community and where is it located?

Pepperell is a community of 11,694 people located in northwestern Middlesex County.

- Do you have any [Environmental Justice](#) or other Climate Vulnerable communities? (Think about both those who live and work in your town.)

The Town of Pepperell has an Environmental Justice (EJ) population as well as residents who were identified during the MVP Planning Grant Program process as vulnerable to climate impacts, primarily Pepperell's seniors. As of November 2022, the EJ population makes up 6.6% of the town's total population with a block group identified with an "income" criteria. Within the town, 15.1% of the population is identified as minority and 5.4% of households experience language isolation. Pepperell is an aging community and our seniors were identified as vulnerable. Power outages can have impacts on all residents, like many rural communities within the Commonwealth. Flooding of roadways, sometimes major roadways, is always a major concern with two major river systems, because it can cut off access to critical services. The town has few options for those who require transportation if they do not have access to a vehicle, which can result in challenges for residents who rely totally on others to provide services. Private wells, lack of generators to provide water, lack of heat or air conditioning, and the ability to keep food cold were all identified as concerns and challenges during the MVP Planning Grant process. In times of flooding and other disasters, relocating impacted residents to safety is key to providing the services they need. Addressing roads that are prone to flooding or failure, is critical to providing these services to all residents.

- Other unique traits of your municipality like who the top employers are, geography, history, etc.

Of the largest 25 employers in Pepperell, two schools, the fire department, and the local skydive company are listed in the top four employers with 50-99 employees. The remainder of the list is a combination of smaller companies ranging from a day care business, landscaping company, real estate office, and a grocery store. The town of Pepperell, which is 23.2 square miles, is located at the confluence of the Nashua and Nissitissit Rivers and borders New Hampshire to the north, Dunstable to the east, Groton to the south, and Townsend to the west. The town was originally part of the Groton Plantation (1655), which included an area that covered Harvard, MA to portions of Nashua, NH. During the 1720s, a population of farmers settled along the west bank of the Nashua River and this population became known as the Groton West Parish in 1742. In 1753, the Groton West Parish became known as the District of Pepperell and in 1775, Pepperell was incorporated as a town. Volunteers are now preparing for Pepperell's 250th anniversary celebration. Since the mid 1800s, Pepperell has used the waterpower of the Nashua and Nissitissit Rivers to operate a papermill. Through a succession of owners, the operation continued until 2002. Pepperell is predominantly a residential commuter community with pockets of commercial and industrial development. Residents work, shop, and play in communities from Nashua, NH, Lowell, Fitchburg, the Route 128 area, to Boston. Pepperell prides itself on its rural character and recognition for its commitment to permanently protected open space, including properties in agriculture.

Project Description and Goals:

- Where was the project located?

The project was located in Pepperell on Sucker Brook, a coldwater fishery and a tributary to the Nissitissit River. The project included the removal of a dam and replacement of an undersized, perched culvert at the Keyes Parker Conservation area and replacement of an undersized, failing, perched culvert on Heald Street.

- What climate change impacts did the project address?

The project addressed climate change impacts related to flooding, drought, and extreme weather and their impacts on people, wildlife, and infrastructure.

- What were the specific goals and tasks of the project as stated in your application?

The project goals were to improve ecological conditions in Sucker Brook, a tributary to the Nissitissit River, by restoring stream continuity and restoration of the stream's natural processes with the removal of a dam and replacement of two undersized, perched culverts with culverts that meet MA Stream Crossing Standards, thereby

improving habitat while addressing current and future climate change impacts. Sucker Brook is home to State-listed wood turtles and three endangered mussel species. The project eliminated warmer, shallow, impounded waters, which impact coldwater species, and will improve water quality and quantity; remove a public safety hazard at Heald Street, including a potential road failure as a result of the collapsing culvert; eliminate flooding risks at both Heald Street and Oak Hill Road, including flooded agricultural fields; reduce the need for ongoing emergency maintenance of the culverts by highway department staff during flooding events; and build climate resiliency. The project also included outreach to the community as well as outreach to other communities and organizations. Information about the project was shared throughout the process on the town's website, including videos created by town staff and the MA Division of Ecological Restoration, and during outreach opportunities with seniors, the general public, at monthly Trout Unlimited meetings, and onsite events attended by State officials, representatives of other conservation and watershed organizations, representatives from other communities, and UMass Amherst Dam Practicum students. The outreach opportunities resulted in informal conversations and proved to be informative for those in attendance as well as for the Project Team. During outreach sessions, there was an opportunity to speak with representatives from the MVP Program, MA DER, Secretary Beth Card, DFW Commissioner Ron Amidon, representatives from MA Ecosystem Climate Adaptation Network (ECAN), students from the UMass Dam Practicum, Pepperell seniors, and the many volunteers who helped with the project. Outreach sessions provided opportunities to meet with experts who have been working in Sucker Brook for years collecting temperature data and studying aquatic macroinvertebrate populations, as well as studying and collecting rare mussel data and fish populations. An opportunity to continue the study of fish populations will be greatly enhanced with the introduction of the use of Passive Integrated Transponder (PIT) tags, which has been funded and will be implemented in the near future. The use of PIT tags in Sucker Brook will provide data on fish movement and species present and has been possible as a result of conversations that began between Trout Unlimited and Commissioner Amadon and MA DER and DFW.

- Did your project meet the goals set forth in your application in terms of:
 - Employing nature-based solutions

Yes. The work that was completed to remove the dam and replace both culverts, eliminated barriers to fish and wildlife and removed impoundments of warmer water in a coldwater fishery. By replacing the undersized, culverts at both the Keyes Parker Conservation Area and Heald Street with culverts that meet or exceed MA Stream Crossing Standards, the stream is no longer impounded and a free-flowing stream that mimics natural stream flow conditions prior to construction of the dam and undersized culverts, has restored stream connectivity allowing wildlife to pass unimpeded, improve water quality and quantity, remove flooding risks, and eliminate emergency maintenance. The work conducted at the Keyes Parker site included an extensive native planting restoration effort with volunteers from several

communities. Native plantings provide a multitude of benefits from increasing biodiversity, using less water, preventing erosion, and sequestering carbon but there are many more benefits from the use of native plants, which are adapted to this region. The native plant restoration work days provided opportunities to emphasize the value and importance of using native plants to the volunteers. This was a great educational and learning experience and another opportunity to encourage others within the community to select native plants. Pepperell's zoning regulations, which are currently being drafted, are proposing the use of native plants and the restoration work at Keyes Parker brought together like-minded people committed to ensuring this happens. The restoration work included an aggressive invasive species plant removal effort. Volunteers, young and old, from the community and beyond, took part in these efforts.

- Improving equitable outcomes for and fostering strong partnerships with EJ and other Climate Vulnerable Populations

When the project was first proposed, an EJ population had not been identified within the town. Pepperell's more vulnerable populations, our seniors, had been contacted and notified when events were taking place. Local organizations used their newsletters or monthly meetings to provide updates on the project to a wider audience and updates on the project were discussed at Conservation Commission meetings. A PowerPoint presentation was given to the Agricultural Commission (10/26/21) to highlight the projects and explain how the town can build climate resiliency by the use of properly-sized culverts, which allow streams to flow freely through culverts and eliminate flooding on adjacent agricultural fields. Three breakfast or lunchtime presentations (9/17/21, 8/19/22, 6/23/23) at the Albert Harris Center (Senior Center) were completed by June 30, 2023. The Nashoba Conservation Trust shared updates via their website or newsletter on multiple occasions. The Squan-A-Tissit Chapter (TU) of Trout Unlimited provided updates about the projects at their monthly meetings and on April 1, 2023, TU invited those within the community and in surrounding communities to their annual meeting to learn about the work underway. Two videos showing the work that took place were shared at the meeting and the important message of working with partners to build climate resiliency was emphasized. Building climate resiliency to protect coldwater streams was the focus of the message to all who attended (approximately 70 people). Community outreach via the Squan-A-Tissit Chapter of Trout Unlimited, the Nashoba Conservation Trust, the Conservation Commission and community involvement from school staff, the Girl Scouts, residents and friends, has provided an opportunity to share the progress to date.

- Providing regional benefits

The regional benefits of the project have included ongoing communication with the local watershed association (Nashua River Watershed), the Squan-a-Tissit Chapter of

Trout Unlimited, and visitors and volunteers from abutting communities. The work on Sucker Brook will not only benefit Pepperell, but it will also benefit communities downstream of Sucker Brook and those communities downstream of the Nissitissit and Nashua Rivers. It is critical that every community along these major river systems recognize that what we do can have serious consequences downstream of these rivers.

- Implementing the public involvement and community engagement plan set forth in your application

One of the more challenging parts of the project was due to Covid and the limitations of sharing progress with the seniors at the Albert Harris Center (Pepperell's Senior Center) on a more regular basis. Covid restrictions delayed some in-person opportunities and limited food sharing. In addition, the senior center director and activities coordinator both resigned months ago and were not replaced until recently. The project team took every opportunity, even if it meant a casual conversation on a Friday morning or during the annual Christmas dinner at the senior Center, to talk about the project. It was fun and encouraging to see the enthusiasm and interest from so many groups.

- Finishing the project on time

The final portion of the project, the culvert replacement at Heald Street, is still underway with a planned completion date of June 30, 2023.

Results and Deliverables:

- Describe, and quantify (where possible) project results (e.g. square footage of habitat restored or created, increase in tree canopy coverage, etc.). Report out on the metrics outlined in your application.

The Projects at the Keyes Parker Conservation Area, which consisted of a dam removal and culvert replacement, removed two barriers and reconnected a 1.66 mile segmented section of Sucker Brook. The project at Heald Street, which consisted of a culvert replacement, removed one barrier and reconnected a .5 mile segmented portion of Sucker Brook. Each structure formed a barrier, which caused warmer, impounded waters while restricting the movement of sediment.

- Provide a brief summary of project deliverables with web links, if available.

Project deliverables were provided with monthly Progress Reports as sub-tasks were completed. Photos were taken throughout the project and a link to the photos is included in the Case Statement under the section for Project Website URL.

Lessons Learned:

- What lessons were learned as a result of the project? Focus on both the technical matter of the project and process-oriented lessons learned.

The project brought many groups and organizations together. Lasting partnerships are a critical component in moving projects of this size forward and these partnerships are the key to success, especially when considering future projects.

From a technical standpoint, many of those involved with the project were excited to learn how many people have previously been involved in conducting research on Sucker Brook. Research was conducted by UMass Amherst and the Dam Removal Practicum as well as research conducted on rare mussel species, macroinvertebrates, and temperature monitoring; Trout Unlimited and its temperature monitoring and fish surveys with the MA Division of Fisheries and Wildlife; and MA Division of Fisheries and Wildlife and its research on rare mussels.

Even though we recognize the need for regulations and oversight, we learned how time-consuming and costly the permitting process can be. During her visit to Pepperell, EEA Secretary Beth Card asked if there were challenges we faced when considering or moving forward with these projects. These are restoration projects with the intent of enhancing, restoring, and/or improving ecological conditions and there are safeguards in place to ensure the wellbeing of residents, wildlife, and the environment. They are not large construction projects in or near wetlands that will have permanent impacts. Delays in permitting can place funding at risk when deadlines are missed. We also learned the importance of ensuring all permits are in hand prior to applying for funding for the construction phase of each project.

- What is the best way for other communities to learn from your project/process?

The best way a community can learn from our project is to view the website, the videos, and to reach out to us. The town was able to rely on the highway department for removal of the dam and replacement of the culvert at the Keyes Parker Conservation Area but we recognized the need for a construction contractor to complete the Heald Street culvert project, mainly because of multiple utilities present and the need to relocate them. We have presented information about the Project almost monthly and we encourage communities who have questions to contact us.

Partners and Other Support:

- Include a list of all project partners and describe their role in supporting/assisting in the project.

Town of Pepperell – The town of Pepperell provided project oversight and coordination, secured funding, tracked and submitted expenses and reimbursements. The Pepperell highway department was responsible for construction activities at the Keyes Parker Conservation Area for the dam removal and culvert replacement.

Municipal Vulnerability Preparedness (MVP) Program – The MVP Program assisted the town of Pepperell with assessing and identifying vulnerabilities, identifying how the town should prepare for future climate change impacts, and how to build community resiliency. Replacing undersized, failed culverts with culverts that meet the MA Stream Crossing Standards, was identified during this process as an opportunity to build community resiliency and the MVP Program awarded a substantial Action Grant for the construction phase of these projects. Support from the MVP Regional Coordinator was available throughout the process at every level. The MVP team brought the projects to the attention of other State and local organizations and visitors from across the Commonwealth attended several site visits, including a grant award ceremony attended by EEA Secretary Bethany Card and DFW Commissioner Ron Amidon.

Squan-a-Tissit Chapter of Trout Unlimited (TU) – The local TU Chapter committed up to \$30,000 for the project and provided countless hours of volunteer time to support these efforts. The TU Chapter discussed the projects at every monthly meeting over the past two years and provided opportunities for the public to join the local Chapter to learn more about the work that was being undertaken.

MA Division of Ecological Restoration (DER) – DER's Culvert Replacement Municipal Assistance Grant provided funding as early as 2019 for field data collection, design and engineering, and permitting for the Heald Street culvert. In FY2022, DER's CRMA grant provided funding for fabrication and construction of the Heald Street culvert. In 2018, DER's Priority Projects program selected the dam removal and culvert replacement at the Keyes Parker Conservation Area as a Priority Project. Project oversight, significant funding, technical assistance to conduct field data collection, design and engineering, permitting, and construction, for the dam removal and culvert replacement have been provided by DER since 2018. Follow up monitoring of sediment, photo stations, and stream flow, as well as monitoring of the stream channel continue with the assistance of DER.

Nashoba Conservation Trust (NCT) – NCT is a private non-profit land trust with a mission to protect biodiversity by promoting natural resources and providing recreational opportunities. Board members were involved during various stages of project including mussel translocation, community meetings, project promotion, and restoration work with native plantings.

Horsley Witten Group – Horsley Witten Group was hired to complete field data collection, hydraulic and hydrologic modeling, provide design and permitting support, draft final engineering design plans, prepare construction specifications, determine an opinion of

probable cost, and to support construction activities for the dam removal and culvert replacement at the Keyes Parker Conservation Area.

Gomez and Sullivan Engineers (GES) – GES was hired to complete field data collection, hydraulic and hydrologic modeling, provide design and permitting support, draft final engineering design plans, prepare construction specifications, determine an opinion of probable cost, and to support construction activities for the culvert replacement at Heald Street.

Project Photos:

- In your electronic submission of this report, please attach (as .jpg or .png) a few high-resolution (at least 300 pixels per inch) representative photos of the project. Photos should not show persons who can be easily identified, and avoid inclusion of any copyrighted, trademarked, or branded logos in the images. MVP may use these images on its website or other promotional purposes, so please also let us know if there is someone who should receive credit for taking the photo.

Photos that will be attached or those photos that were included in the Dropbox link, which is included under the Case Statement section for *Project Website URL*, were taken by Paula Terrasi, except for the photos taken for the mussel translocation.