Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: Monson
Project Title: Chicopee Brook Flood Resilience Improvements
Award Year (FY): 2023
Grant Award: $ 295,000.00
Match: $ 98,350.00
Match Source: In-kind hours and Town cash
One or Two Year Project: One
Municipal Department Leading Project: Conservation Commission
Project Website URL: N/A

Community Overview:

- **What is the population size of your community and where is it located?**
  - The Town of Monson has a population of approximately 8,865 and is located in Hampden County, approximately 17 miles east of Springfield.
- **Do you have any Environmental Justice or other Climate Vulnerable communities? (Think about both those who live and work in your town.)**
  - In the MA EJ Viewer (updated 2022), the north end of Monson along Chicopee Brook, between Route 32 and the New England Central Rail line (Block Group 3, Census Tract 8137.02), is identified as a low-income Environmental Justice community that extends into neighboring Palmer to the north. The median household income for this EJ community is $49,000, or 58.1% of the median income for Massachusetts. (For comparison, Monson as a whole has a median household income of $76,612.) The community is made up of 9% minority populations. Much of this area is also mapped by FEMA as being within the 100-year or 500-year floodplain, including a significant portion of a mobile home park (approximately 45 homes in the flood zone) and at least a dozen additional homes on Silva Road, Hospital Road, Maple Lawn Drive, and Palmer Road. This area experiences regular flooding, with Hospital Road flooding during major rain events, and access to homes on Bunyan Road (a dead-end street) also floods at the low point where it crosses Chicopee Brook, preventing kids in this area from being able to reach school.
- **Other unique traits of your municipality like who the top employers are, geography, history, etc.**
  - Nestled quietly between the vibrant foliage of the Pioneer Valley, Monson embodies the pastoral, unspoiled charm that is New England. Steeped in history as a historic factory and mill town, the town was incorporated in 1775 and stands as solid as the granite foundation from which it was born. Monson is a culturally rich small town, especially noted for theater, the arts, and for its festivals.

Project Description and Goals:

- **Where was the project located?**
  - The project was located at the Bunyan Road Crossing (42.1312N, 72.3099W) and at other locations along the Chicopee Brook corridor through downtown Monson, including Veterans Field, Cushman Field, Bliss Street Dam, and Maple Street.
- **What climate change impacts did the project address?**
  - The Town's 2016 Hazard Mitigation Plan update characterized flooding as a high hazard for Monson, noting that the area of potential flood occurrence is large,

the probability of future flooding events is high, and the impacts from such flooding would be critical.
    - Monson's MVP Planning process identified the development of a Flood Damage Reduction Plan emphasizing nature-based solutions as one of the highest priority needs to increase resilience.
    - The project addressed the issue of climate-related flood impacts by conducting flood resilience modeling of the Chicopee Brook corridor to identify optimal strategies for protecting against impacts of flooding. Strategies included the implementation of nature-based solutions ranging from rightsizing of culverts to increasing flood capacity through floodplain reconnection and green infrastructure. A hydrologic and hydraulic modeling study of the Chicopee Brook corridor was completed, and potential improvement scenarios were developed at several key locations adjacent to the downtown area and within the downstream EJ community.
    - Modeling of proposed conditions under future precipitation and flow conditions was performed to: (1) identify future floodplain impacts, (2) quantify the flood reduction benefits that could be achieved through different combinations of resilience projects, and (3) develop a strategy and sequencing for carrying out the implementation of improvements over time.
- **What were the specific goals and tasks of the project as stated in your application?**
    - The goal of this MVP Action Grant project was to complete a hydrologic and hydraulic (H&H) flood modeling study of the Chicopee Brook corridor and develop potential improvement scenarios at several key locations adjacent to the downtown area and within the downstream EJ community, including the Bunyan Road crossing, Veterans and Cushman Fields, Bliss Street Dam, and the Maple Street crossing. This goal was realized through the completion of the following tasks:
        - Task 1: Project Kick-off, Management, and Reporting
            - Sub-task 1.1 Kick-off meeting with Town, EEA, and Consultant
            - Sub-task 1.2 Monthly progress reports FY23
            - Sub-task 1.3 Project Case Study
        - Task 2: Public Involvement and Community Engagement in FY23
            - Sub-task 2.1 Downtown Flood Resilience Public Visioning and Outreach
            - Sub-task 2.2 Supporting Outreach Activities
            - Sub-task 2.3 Schools Partnership
        - Task 3: Modeling Nature-Based Solutions for Chicopee Brook
            - Sub-task 3.1 HEC-RAS Model Development
            - Sub-task 3.2 Modeling of Nature-Based Solutions
        - Task 4: Bunyan Road Crossing Design
            - Sub-task 4.1 Field Data Collection
            - Sub-task 4.2 Site Survey and Base Mapping
            - Sub-task 4.3 Replacement Structure Alternatives Analysis
            - Sub-task 4.4 Conceptual Design Plans & Additional Feasibility Assessment for New Road (*formerly* "Preliminary (30%) Design Plans")
- **The project has met the goals set forth in the Town's grant application in terms of:**
    - <u>Employing nature-based solutions</u>
        - In developing concepts for several key flood resilience projects along the Chicopee Brook corridor, nature-based solutions were incorporated into the visual design concepts – along with updated H&H modeling to quantify potential flooding impacts of restoring floodplains (at Bunyan

Road, Bliss Street Dam, and Veterans/Cushman Fields) and removing existing crossings and abandoned railroad abutments (at Bunyan Road).

- Improving equitable outcomes for and fostering strong partnerships with EJ and other Climate Vulnerable Populations
  - Outreach was conducted by Town staff to members of the mapped EJ community near the Bunyan Road crossing to inform them of the FY23 MVP Action Grant project and encourage them to engage in community events (e.g., visioning workshop) tied to the project.
    - Later members of this community offered letters of support for Monson's FY24 MVP Action Grant application.
  - Youth were also specifically invited to attend the visioning workshop from May 2-4, 2023 and were also offered an opportunity to present posters highlighting environmental conditions related to Chicopee Brook.
  - Food was provided during public visioning workshop activities to encourage participation.
- Providing regional benefits
  - Through this project, Monson serves as a pilot community along the Chicopee Brook that can demonstrate how to apply H&H modeling to develop long-term flood resilience projects that mitigate risks and restore local ecosystems. The outcomes of this project can serve as a model to other neighboring communities (e.g., Palmer, Hampden, Wales, and Wilbraham) about how to develop a conceptual vision for the future of the river corridor and develop actionable solutions that can be carried forward to implementation.
- Implementing the public involvement and community engagement plan set forth in your application
  - Members of the Monson community were invited and participated in the multi-day visioning workshop (held on May 2-4, 2023) to contribute input on the development of illustrative concept plans for key future project sites along Chicopee Brook
    - A local school group also participated in the vision workshop and made public presentations on May 2, 2023
  - The Town conducted additional supporting outreach to members of the community by:
    - Updating Town storyboards around Veterans Field with information about the project
    - Posting a display at the Town Library with visuals of the proposed climate-resilient design concepts for priority sites along Chicopee Brook
    - Website and social media postings of project events (e.g., multi-day vision workshop)
    - Interviews with two local newspapers about the project and workshop. One that is delivered for free weekly and distributed amongst the community and one that can be purchased weekly within the community.
- Finishing the project on time
  - All project deliverables were completed on time.

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 project application outlined several key milestones of success, which were achieved in the following ways:
        1. Identification of projects to be advanced to design which will have significant benefit for reducing flood elevations in residential areas.
            - During the visioning workshop, 5 priority project sites were identified for flood resilience improvements along the Chicopee Brook corridor. These included the Bunyan Road crossing, Cushman Field, Veterans Field, Bliss Street Dam impoundment area, and Maple Street crossing.
            - At each of these priority site locations, conceptual designs were developed through the visioning workshop, which were coupled with updated H&H modeling to quantify impacts to localized flooding under current and future projected flooding conditions.
        2. Protection of homes, Route 32, and infrastructure.
            - Bunyan Road (off Route 32) was studied more rigorously through an alternative crossing analysis – and eventually a full conceptual design study to develop plans for an alternative road connection that would provide access to at least 10 residential homes and the Town water supply land that would otherwise be cut off during current and future storm events.
        3. Reduction of flood risk and quantifiable increase in flood storage capacity along the Chicopee Brook corridor.
            - Reduction of flood risk and quantification of any potential increased flood storage capacity was incorporated into the conceptual designs developed for all 5 of the priority project areas as part of Sub-task 3.2
        4. Completion of preliminary design plans to advance the first resilience project at Bunyan Road.
            - Preliminary design plans were not developed for the Bunyan Road crossing as originally anticipated. After completing the crossing alternatives analysis as part of Sub-task 4.3 and H&H modeling as part of Sub-task 3.1, it was determined that in lieu of developing designs for a new crossing, it would be more cost-effective and resilient to develop a conceptual design for a new road that would connect the west end of Bunyan Road to Palmer Road – providing access to the residential homes and the Town water supply land that would otherwise be cut off during current and future storm events along Chicopee Brook.
        5. Increased native plant cover to sustain pollinators and other urban wildlife/reduction of invasive species at potential project sites along Chicopee Brook for improved habitat conditions.
            - Increased native plant cover was incorporated into the conceptual designs developed for the Bliss Street Dam impoundment area, Cushman Field, Veterans Field, and Bunyan Road restoration area.
        6. Successful community engagement, measured by number of residents participating in the community design workshop to focus ideas for resilience projects on public lands.

        - Over 46 members of the community participated in the multi-day visioning workshop. This included 28 students, 2 teachers, and 1 teacher's aide from two Biology classes.
    7. Development of a road map for next steps and a priority order of projects to advance to implementation.
        - Each conceptual design developed for the 5 priority projects as an outcome of the visioning workshop provided a roadmap of several actions. The Bliss Street Dam concept also included a separate attachment highlighting 12 steps for the removal of the dam and restoration of the impoundment area.
- **Provide a brief summary of project deliverables with web links, if available.**
    - Key project deliverables include:
        1. Illustrative conceptual plans for key flood resilience projects for priority sites along Chicopee Brook, including the Bunyan Road crossing, Cushman Field, Veterans Field, Bliss Street Dam, and Maple Street crossing
            - Accompanying order of magnitude cost estimates
        2. Complete H&H model of the Chicopee Brook through Monson, including current and future projected flood conditions (with and without the Church Manufacturing Dam)
            - Updated local H&H modeling results for proposed nature-based/climate-resilient project concepts
        3. Multi-day visioning workshop and related community engagement activities, including school partnership and other print/digital outreach materials

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.**
    - There was a need early in the project to pivot from the original idea of replacing the existing crossing at Bunyan Road. Once the preliminary H&H flood modeling results were developed, and order of magnitude cost estimates were established for various crossing alternatives, it became clear that it no longer made sense to develop 30% designs for a new crossing structure. Instead, the project team and Town staff were able to work with MVP to re-scope Sub-task 4.4 to develop a new concept design for establishing a more cost-effective solution to providing access to the vulnerable residents and Town water supply land on the west side of Bunyan Road.
    - While a primary focus of the project was on flood resilience, as concepts were developed for priority sites, there was a need to integrate other design needs expressed by members of the community. These needs included the need for a broader cross-section of recreational opportunities and the need for greater restoration and floodplain reconnection.
- **What is the best way for other communities to learn from your project/process?**
    - Contact Toni Uliana, Conservation Agent: tuliana@monson-ma.gov

Partners and Other Support:

- **Include a list of all project partners and describe their role in supporting/assisting in the project.**
    - Town of Monson Project Team
        - Toni Uliana, Conservation Agent

        - Jennifer Wolowicz, Town Administrator
        - Ben Murphy, Highway Department
        - Craig Jalbert, Water and Sewer Department
    - Project Team Roles
        - As the project lead for the Town, Toni Uliana provided project management, grant oversight and administration, and leadership of the project team. Ben Murphy and Craig Jalbert provided the consultant team with relevant reference materials and input on the Bunyan Road alternatives analysis. Jennifer Wolowicz provided leadership support for the successful completion of the project.
    - Fuss & O'Neill Consultant Team
        - Andrew Bohne, RLA, Associate – Senior Landscape Architect
        - Jeffrey Dawson, Landscape Designer
        - Julie Busa, PhD, CSE, PWS, Senior Resilience
        - Lara Sup, PE, Lead Civil Engineer
        - Claire Nauman, Climate Resilience Engineer
        - Michael Frederick, Landscape Designer
        - Alex Maxwell, PhD, Resilience Planner (Project Manager)
    - Collectively, the project team has extensive expertise in wetland restoration, climate resiliency visioning and planning, H&H modeling, public engagement, and engaging diverse stakeholder populations to address issues of justice and equity. The project's consultant team developed the H&H models and conceptual design and cost estimates.

Project Photos:

- See below


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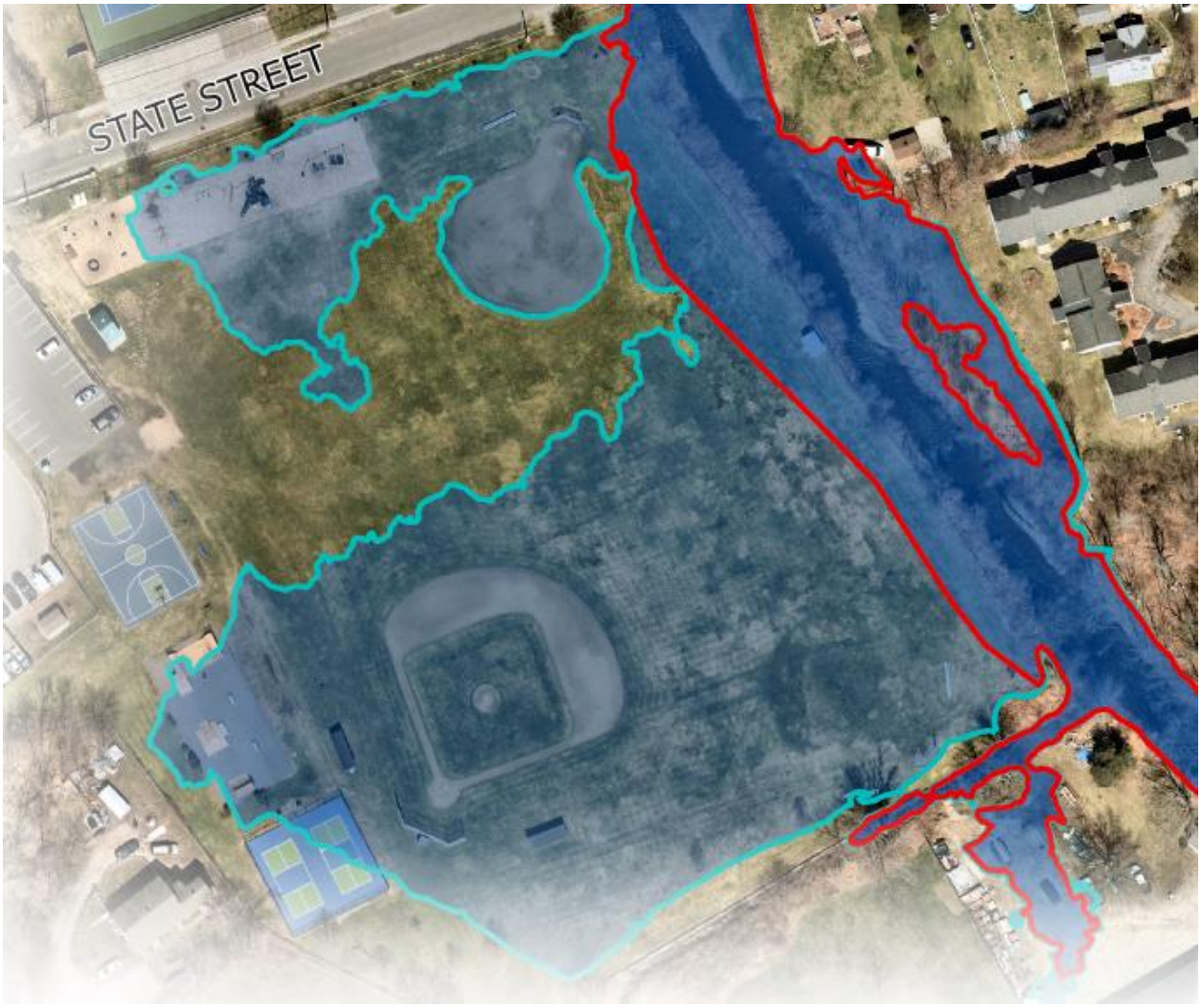
PROCEED WITH CAUTION


STATE STREET


WASHINGTON STREET

PLAN LEGEND

1. PARKING AREA (30 SPACES)
2. GREEN INFRASTRUCTURE & DRAINAGE IMPROVEMENTS
3. COMFORT STATION
4. PERIMETER LOOP TRAIL WITH BOARDWALK CROSSINGS
5. FLOODABLE ATHLETIC FIELDS FOR 10U SOCCER & 12U BASEBALL (FIELD ELEVATION AT 353.4' THROUGHOUT, JUST ABOVE 5-YEAR 2070 ELEVATION)
6. STORAGE SHED
7. LANDSCAPE ENHANCEMENTS
8. PICNIC TABLES & PARK BENCHES
9. CREATED EMERGENT WETLAND FOR FLOODPLAIN RECONNECTION WITH HUMMOCKS (ELEVATION 350.8') & HOLLOWS (ELEVATION 350.3') FOR COMPLEXITY & HABITAT DIVERSITY
10. CONNECTOR ACCESS TRAIL TO STATE STREET & VETERANS FIELD