Case Study Template

Municipality/Nonprofit Organization: Holyoke
Project Title: Impervious Surface Mapping for Resiliency Planning and implementation
Grant Award: $93,850
Match: $40,300

Community Overview:
Holyoke has a unique legacy as one of the first planned industrial cities in the country, still evident in the densely developed and populated downtown with a system of three canals that once powered a massive complex of paper mills. The dam that diverts water to these canals from the Connecticut River now provides most of the city's electricity. In contrast with Holyoke's industrial downtown neighborhoods, the western portion of the city is relatively rural, containing a small agricultural belt and conserved natural areas, including the Mount Tom Reservation and watershed forest owned and managed by the Holyoke Water Department.

Description of Climate Impact:
Holyoke faces multiple climate change vulnerabilities related to the built environment. The highly developed industrial neighborhoods along the Connecticut River have a large proportion of impervious surface. Pockets of localized flash flooding occur during the heavy rain events, and are projected to become more frequent in coming decades. Holyoke's aging sewer infrastructure is undergoing a 30-year Long-term Control Plan to separate storm water from sewers, but still maintains a large network of Combined Sewer Systems that discharge into the Connecticut River during these heavy rain events. Higher temperatures in this area due to Urban Heat Island effects are also projected to become more pronounced with associated health impacts as co-factors. All of these climate impacts disproportionately affect lower income residents in Environmental Justice communities.

The city applied to the MVP Grant program for this project in order to better understand the extent and distribution of different impervious surface types in the city and what strategies might exist to mitigate harm from climate change related impacts.

Project Goals:
This project had two main goals:

1) Create a planimetric data layer for Holyoke that shows the extent and type of different impervious surface classes.
2) Development of an impervious surface action plan that synthesizes the latest research with Holyoke-specific data, and uses this information to identifies targets and strategies for reduction based on different risk metrics.

Approach and Result:
Though both the goals of the project relate to impervious surface reduction, we chose to separate the work into two RFQs, recognizing that creation of both a planimetric data layer and mitigation plan would be best accomplished by selecting firms with skills and backgrounds best suited to each (Sanborn for the planimetric data, Milone & MacBroom for the planning document). Our original timeline would have had the impervious surface data layer be completed first so that it would be available to inform drafting of the mitigation plan. However, due to time constraints, we chose to hire both firms to do the projects concurrently. Milone & MacBroom still had use of the latest USGS 2019 aerial imagery, which proved adequate given the broad scale of their analysis.

Project goals were met through periodic email exchanges and remote meetings with contractors. Our Holyoke project team consisted of the city engineer, planner, and conservation and sustainability director, so these conversations reflected input across different areas of expertise. We began the planimetric data layer project by having Sanborn create mapping of a small pilot area with different impervious surface types. We reviewed this map to identify the correct scope and definitions for different cover classes, and made decisions for how to interpret certain ambiguous cover type situations, such as street curbs and driveways. By establishing clear guidelines at the outset, Sanborn was able to then complete the bulk of their mapping work with minimal oversight needs, and only a few minor revisions were requested by city staff at the end. The final product is a complete citywide impervious surface map with 12 distinct cover classes, now available to the public on the Holyoke website: Holyoke Impervious Surface Map

The Impervious Surface Mitigation Plan project required more frequent dialogue between city staff and Milone & MacBroom. During the kickoff meeting with our MVP coordinator, we discussed project goals identified Holyoke-specific studies that the plan could draw from that relate to impervious surfaces, including prior assessment of urban tree canopy, city master plan, and control plans for combined sewer overflow projects. We wanted a plan informed by different risks associated with impervious surfaces and strategies for mitigation, including a review of our city ordinances. The most difficult stage of this project was the community engagement piece, given the challenges introduced by covid-19. Ultimately, an online story map with associated survey was deemed to be the best way forward. Given that impervious surface is a complex topic, we decided to provide the story map and surveys in separate links, and worked closely on several drafts to craft the language describing impacts of flood risk and urban heat island. City staff then produced a Spanish language version of these materials and disseminated the links widely through connections with local organizations and on the city website. Links to both versions of the Story Map are here:

Impervious Surface Story Map (English)
Impervious Surface Story Map (Spanish)

The final draft of the plan was accepted by the project managers but awaits formal adoption from the city. The findings have already proved useful for the FY '21 stage of the project, which will involve a broader public engagement and campaign to be worked through a matching grant with TNC.

Lessons Learned:
The Impervious Surface Mitigation Plan taught us a great deal about the built environment of Holyoke on a city-wide scale. Though the general extent of high-density impervious surface was already known, this plan quantified specific impacts across different geographic areas, including increased flood risk, water quality impairment, combined sewer overflows, urban heat island effects, and reduction in air quality. We learned that although the areas with the greatest proportion of impervious surface are in the Flats and South Holyoke neighborhoods, these different impacts vary greatly in terms of high risk levels.

The process taught us that selection of quality contractors is vital to achieving desired outcomes. Our city staff team put a great deal of effort and deliberation when crafting the RFQs, interviewing applicants, and making the final selection. As a result, the collaborative process moved along smoothly at all stages and left us with high value deliverables.

As discussed in the previous section, we had to greatly modify our plans for community engagement due to the timing of the coronavirus outbreak. Though we did our best with a difficult situation, the experience illustrated that there is no replacement for good in-person community engagement. In the FY '21 portion of the project, we hope to incorporate some of the community forum and discussion group elements that we missed out on during the first phase of the project.

Partners and Other Support:
City Staff:
- Mike Bloomberg, Mayoral Chief of Staff (Overall Project Manager)
- Curtis Wiemann, Planner II (General Grant Management, GIS Analyst)
- Yoni Glogower, Conservation and Sustainability Director (General Grant Management)
- Robert Peirent, City Engineer (Technical Advisor)
- Cynthia Espinosa, Economic Development Project Manager (Translation Assistance)

Contractors:

- Sanborn (Impervious Surface Planimetric Data Layer Project)
- Milone & MacBroom (Holyoke Impervious Surface Mitigation Plan Project)

Matching Grant:

- Sara Burns, TNC Wetland Scientist (Impervious Surface Outreach Project, Phase 2)

Project Photos:

See attached photos representative of the impervious surface planimetric mapping by Sanborn (fig. 1) and mitigation plan by Milone & MacBroom (fig. 2).