

Rooted in Risk: Mapping Invasives Against Flood Risk

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Project Motivation & Goals

Climate change and habitat disturbance have increased the spread of invasive species, which threaten native species and ecosystem stability. In Connecticut, over 97 invasive plant species have been reported in the past year,¹ including Japanese barberry (*Berberis thunbergii*) and Japanese knotweed (*Reynoutria japonica*). Both species can destabilize the soil through shallow root systems and altering nutrient dynamics, potentially worsening flood risk (Fig 1).



Fig 1. From left to right, Japanese Knotweed, Shallow Roots of Japanese Knotweed, Flooding in Areas with Japanese Knotweed

My project examines how invasive plants, specifically Japanese barberry and knotweed, presence overlaps with flood-prone areas in Fairfield, CT.

My project goals are to:

1. Design a Survey123 tool for environmental organizations to document Japanese barberry and Japanese knotweed presence in 4 locations.
2. Create an ArcGIS map overlaying invasive plant abundance with FEMA flood risk zones.
3. Communicate key findings via an ArcGIS StoryMap for community partners and public officials to support management decisions.

Methods

Invasive Plant Survey using Survey123

- Created Survey123 form to collect data on Japanese barberry and Japanese knotweed abundance, erosion, and land cover
- Data collected across 4 locations within the Mill River watershed (Fig 2)
 - Location 1: Mill Hollow Park
 - East side of the Mill River
 - 1% annual chance of flooding
 - Location 2: Perry's Mill Open Space
 - Surrounds a portion of the Mill River
 - Regulatory flood way and 1% chance of flooding
 - Location 3: Lake Mohegan
 - Part of the Mill River watershed
 - 0.2% annual chance of flooding
 - Location 4: Cricker Brook
 - Part of the Mill River watershed
 - 0.2% annual flood rate



Fig 2. The four site locations within Fairfield, CT. Site photos of Cricker Brook (top) and Perry's Mill Pond (bottom).

Using ArcGIS StoryMaps

- ArcGIS map was created from invasive species data from surveys and layered over FEMA flood map
- StoryMaps created for public officials to easily access and understand

Project Outcomes

ArcGIS Storymap

- Total of 9 responses to create data points for 4 locations
- Survey participants included environmental professionals from organizations including Pollinator Pathway, Mill River Wetland Committee, and Sustainable Fairfield
- Data autopopulated into a map within ArcGIS
- Invasive species data were overlaid with map from Federal Emergency Management Agency (FEMA)
- Any place with a 1% chance or higher is considered to be a high flood risk zone?

Key Findings

- Highest-risk sites identified:
- Perry's Mill Open Space: 25% knotweed, 25% barberry
 - Mill Hollow Park: 25% knotweed, 50% barberry

Both sites fall within 1% annual flood risk zones, suggesting a possible spatial relationship between invasive plant abundance and flood vulnerability.

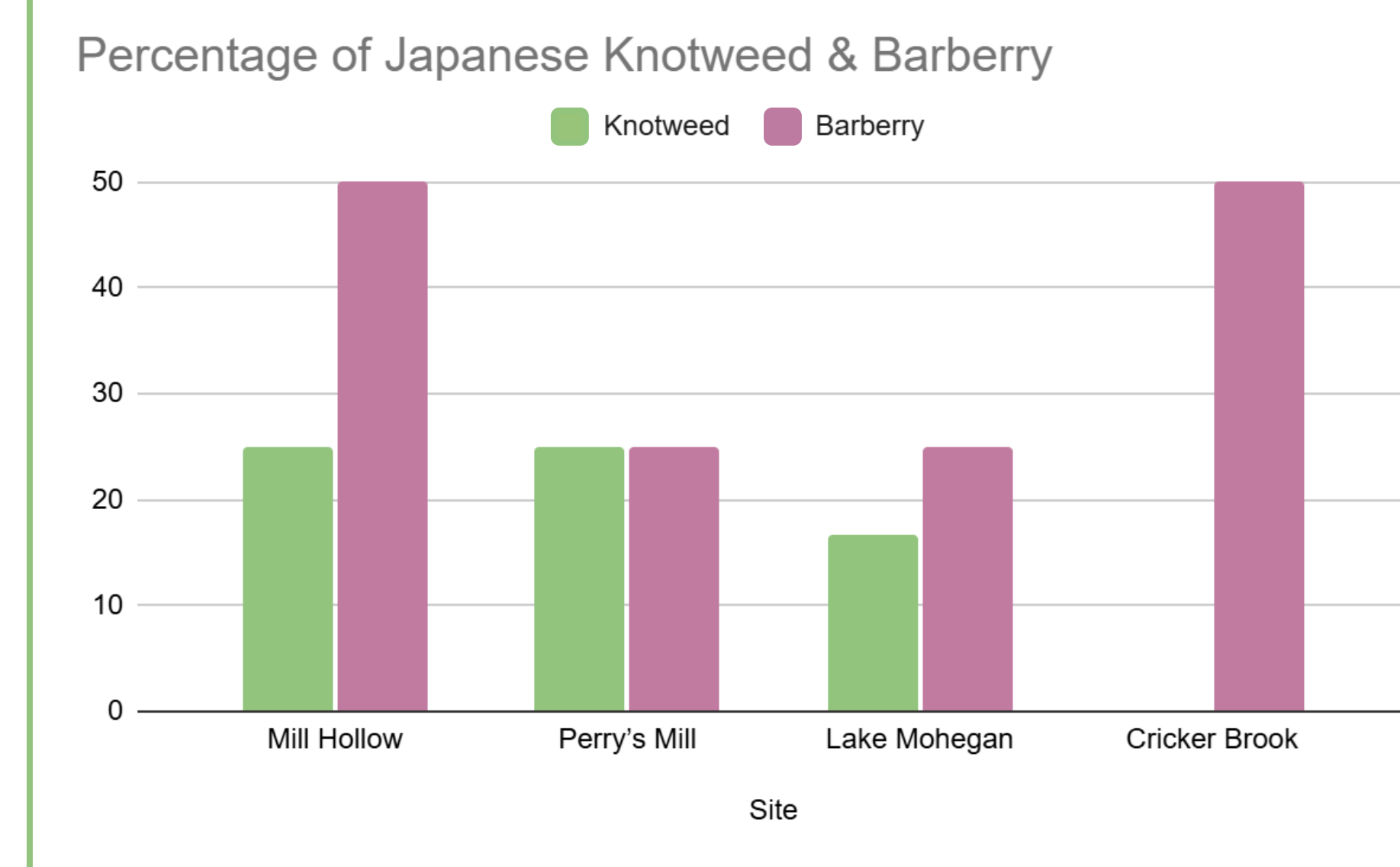


Fig 3. Percentage of Japanese Knotweed and Barberry at each location

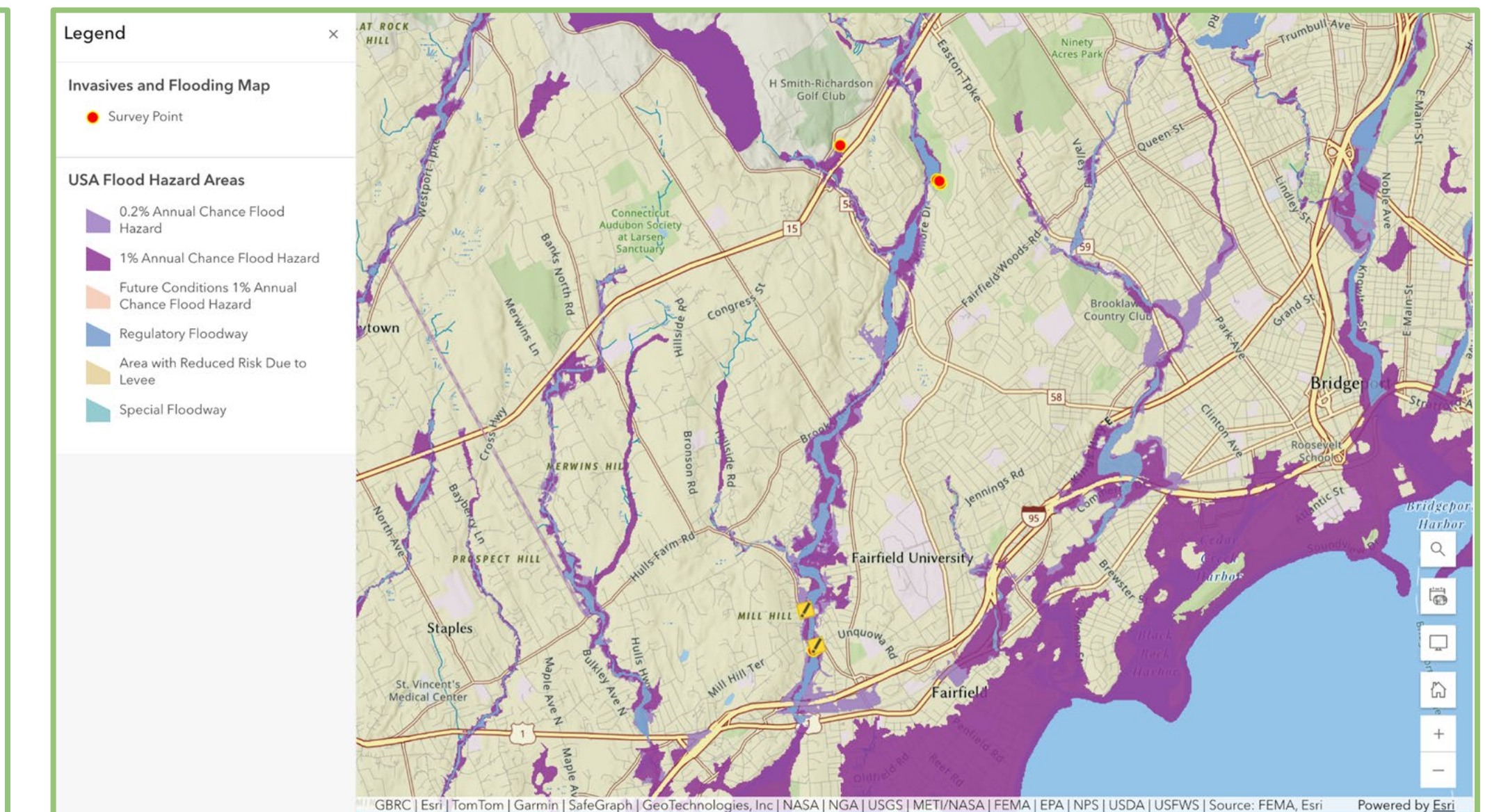
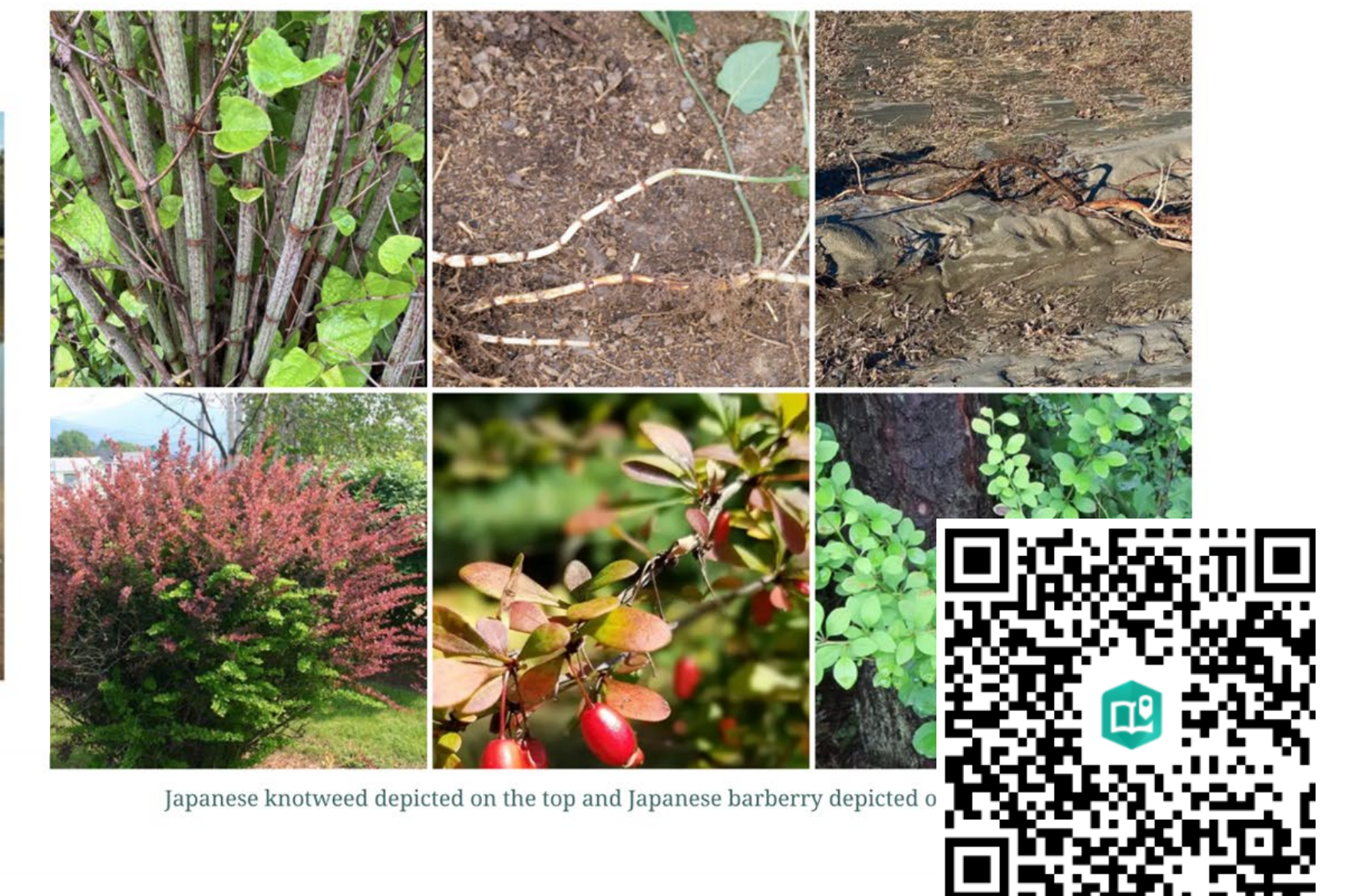


Fig 4. Map created from Invasive Plant Survey and FEMA Flood Map overlay



Soil degradation and erosion, byproducts of invasive species

Fig 5. Photos from the ArcGIS Storymap and QR Code to the Project Storymap



Japanese knotweed depicted on the top and Japanese barberry depicted on the bottom

Community Partnership

This project was developed in partnership with **Pollinator Pathway** and **Sustainable Fairfield**, with support from Ted Luchsinger and Mary Hogue.

Ted Luchsinger, director of Pollinator Pathway Fairfield, helped identify and refine the four survey locations, reviewed the survey design, and provided field expertise on Japanese barberry and knotweed abundance during site visits. His community connections also supported outreach efforts and increased survey participation.



Ted Luchsinger



Mary Hogue

Mary Hogue, chair of the Natural Environment Committee at Sustainable Fairfield and co-chair of CTLCV, helped shape the project focus by identifying key environmental concerns within Fairfield. She also supported outreach by connecting the survey with members of Pollinator Pathway, Sustainable Fairfield, and other community partners.

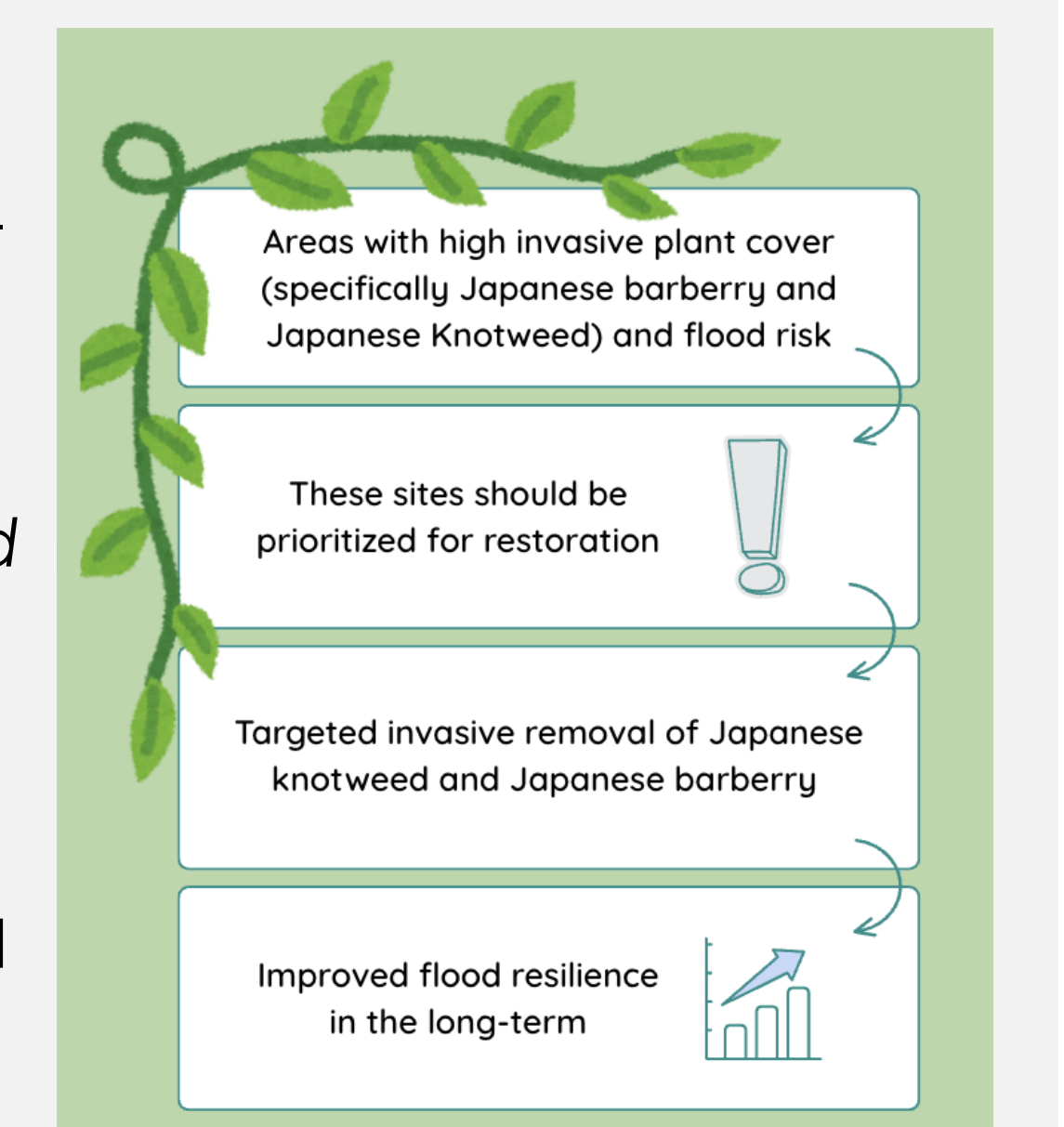
Working with community partners enriched the project by grounding the research in local knowledge and ensuring that the resulting map can serve as a practical tool for future environmental decision-making.

Conclusion and Next Steps

Findings suggest that areas with higher invasive plant cover, particularly Mill Hollow Park and Perry's Mill Open Space, overlap with high flood-risk zones:

→ Both areas have a 1% flood risk and 25% cover of Japanese knotweed and 50% and 25% cover of Japanese barberry, respectively

Next steps include expanding survey participation, increasing the number of mapped sites, and updating the StoryMap to support long-term conservation planning in Fairfield.



Acknowledgements and References

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1. Connecticut Invasive Plant Working Group. cipwg.uconn.edu/. Accessed 16 Apr. 2026.
2. "Flood Maps." Federal Emergency Management Agency, www.fema.gov/flood-maps. Accessed 16 Apr. 2026.