Results

Four types of GI were found to be most suitable for parking lot retrofits in Michigan:

1. Permeable Pavers
Permeable pavers have quarter-inch gaps between them that filter water and let it infiltrate into the soil below. These gaps are small enough for wheelchair-users to move over comfortably (Fig. 1)

2. Rain Gardens
Rain gardens are bowl-shaped gardens designed to hold water that would otherwise go to a storm drain. They provide habitat for native species, improve water quality, and effectively infiltrate surface runoff (Fig. 2)

3. Tree Boxes
Tree Boxes are concrete boxes that filter pollutants and allow runoff to infiltrate through a drain at the bottom. They are planted with trees, which provide shade, sequester carbon, and act as a habitat for native species (Fig. 3)

4. Native Landscaping
In properties with limited space or clay soil, Native Landscaping provides curb appeal, habitat for native pollinators, and limited water quality improvement (Fig. 4)

Conclusions

While there are many types of GI, Permeable Pavers, Rain Gardens, Tree Boxes, and Native Landscaping are the most practical for small business owners in Grand Rapids. They can be scaled to fit smaller urban parking lots, survive well through Michigan winters, and are relatively affordable options.

Using the information gathered over the course of this project, engineering plans are underway for a parking lot retrofit in Grand Rapids that will incorporate three of the four options (Permeable Pavers, a Rain Garden, and Native Landscaping). The resources will also be shared with clients interested in installing GI, especially with new city programs that will potentially incentivize it.

Methods

This project was conducted in two phases:

1. Collection and Evaluation of Data
Assessment of current literature with a focus on infiltration and pollutant reduction rates, costs, maintenance requirements, and performance in cold climates
Conversations with local business owners, engineers and economists to gain practical knowledge about GI implementation

2. Creation of Accessible Tools
Design of a website and informational pamphlet to be shared on the PCS website and distributed to potential community partners, emphasizing ease of comprehension

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