



Charles River Environmental Watch (CREW) Vegetation Monitoring Report

2024

PROGRAM BACKGROUND

Hell's Half Acre (HHA) is seven and a half acres of urban wilderness located in Cambridge, MA. This diverse plot of land provides important ecological and community values to the Charles River Basin. Since 2019, the Charles River Conservancy (CRC) has worked in partnership with the Department of Conservation and Recreation to reduce invasive plant populations found at HHA using a combination of manual cutting and removal by volunteers and herbicide application by professional contractors. In 2024, the CRC launched its Charles River Environmental Watch (CREW) Vegetation Monitoring program. Volunteers were trained to collect data to help determine the effectiveness of our restoration efforts and monitor native and invasive plant growth. In the 2024 growing season, 16 5x5 ft. test plots were monitored by volunteers (Fig. 1) in the four habitat types found at the HHA site: Wetland, Road's Edge, Successional Woodland, and Riparian Habitat (Fig. 2 and Fig. 3). **Read on to explore the year one findings of the Vegetation Monitoring program.**



HELL'S HALF ACRE

Fig. 2 depicts the habitat types at HHA.

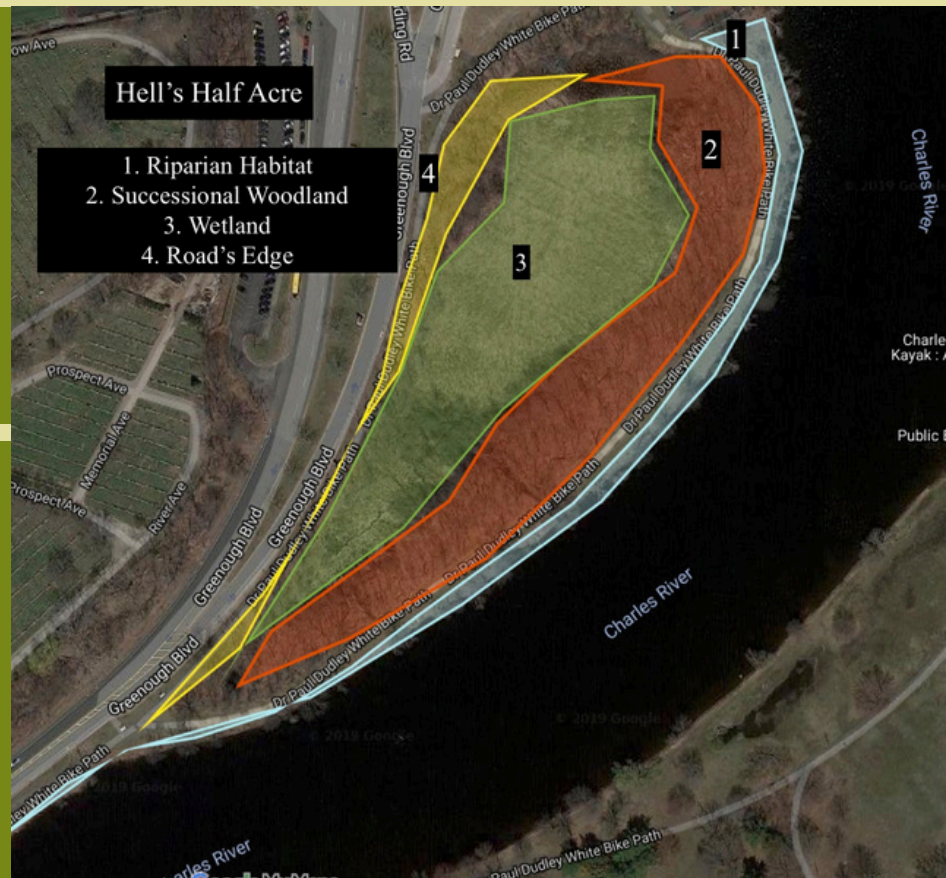


Fig. 3 depicts the locations of the 16 Vegetation Monitoring program test plots in each habitat type at HHA.



RIPARIAN HABITAT

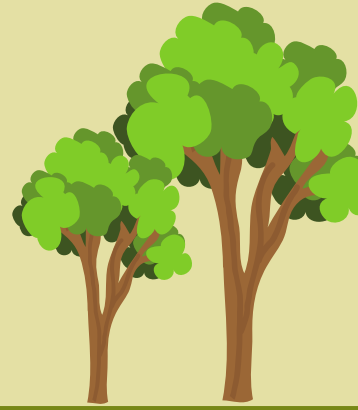


The Riparian Habitat represents the habitat type with the highest proportion of invasive species in the study area. There were a total of five test plots in this habitat. There were seven native plant species and eight invasive plant species observed in the riparian test plots. Test plot #5 in this habitat, which has been treated professionally by contractors for two seasons, exhibited a Japanese knotweed monoculture. Other invasive species recorded include: garlic mustard, honeysuckle species, black swallowwort, tree of heaven, glossy buckthorn, and oriental bittersweet. **Due to the diversity and aggressiveness of these invasive species, we identified the riparian habitat type as a strong candidate for continued invasive plant management and recommend ongoing treatments.**



Fig. 4 shows a river birch stretching over the Charles in the Riparian Habitat at HHA.

SUCCESSIONAL WOODLAND



There are five test plots located within the Successional Woodland habitat type (#6, #7, #8, #9, and #10). Over the monitoring period, a total of 13 native species and six invasive species were observed in the test plots. Invasive species were found in four out of the five test plots, indicating their widespread presence throughout the habitat. No invasive monocultures were present and native plants covered the majority of ground in all of the woodland test plots.

These results indicate that with ongoing invasive plant management, invasive species are not outcompeting native plant populations. Continued monitoring of this habitat type is recommended and will be important in determining how the relationship between invasive and native species will change with ongoing treatment.

Fig. 5 shows test plot #6 within the Successional Woodland habitat type with two mature black cherry trees on the perimeter.



WETLAND



There are three test plots in the Wetland habitat type (#11, #12, and #13). Test plot #11 (Fig. 6) is located in the two-acre patch of *Phragmites* that is actively managed by contractors to control its growth and provide space for native or non-invasive vegetation. *Phragmites* is an invasive reed which commonly spreads as a monoculture, outcompeting all native plants in its area of coverage. While *Phragmites* was present in the first test plot, it covered less than 25% of the area post treatment, and was outnumbered by native plants like maple, goldenrod, holly, and pokeweed. **The results of the data were encouraging, as this test plot represents an area of wetland that is recovering from an invasive *Phragmites* monoculture. The findings suggest that treatment has been successful in suppressing *Phragmites* growth.**

Fig. 6 shows CREW Vegetation Monitors standing in the actively managed *Phragmites* patch during training.



Test plots #12 and #13 were located in areas where no *Phragmites* was present, and we were interested in tracking the biodiversity and potential encroachment of invasive plants. Wetland test plot #13, located west of the *Phragmites* patch, boasts the highest diversity of native plants across all habitat types, with 15 species recorded. Although three invasive species were identified within the plot, native plants dominated the area. However, the diversity of species in this test plot could be at risk if the *Phragmites* patch expands further. **Given the data from year one, the CRC recommends continued management of *Phragmites* to ensure a monoculture does not return and the area of coverage does not expand. This work is vital in creating a space for native wetland species to return to.**

ROAD'S EDGE



There are three test plots in the Road's Edge habitat (#14, #15, and #16). Prior to restoration efforts, the area on which the Road's Edge test plots are located was dominated by Japanese Knotweed and other invasive plants. While some Japanese Knotweed was recorded in the test plots this year, data showed that native and invasive plants had comparable amounts of ground coverage in the Road's Edge test plots. These results indicate that a regeneration of native plants such as American pokeberry, black cherry, poison ivy, and sumac has taken place following invasive plant management. **While this habitat type represents the lowest diversity of native plant species in the study, with only four native plant species recorded, it is important to note which species are emerging post-treatment to better understand what viable native seeds are stored in the soil. We recommend continued treatment of invasive plants and ongoing monitoring in the Road's Edge habitat.**

Fig. 7 shows the Road's Edge habitat prior to invasive plant management. The foreground of the picture depicts a Japanese Knotweed monoculture.

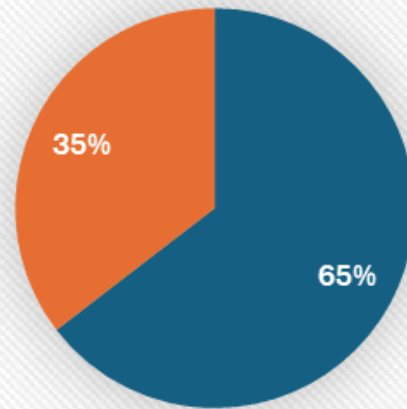


BY THE NUMBERS

These graphs present data from the 2024 growing season, reflecting the effects of up to five years of treatment, and will serve as baseline for the future of the program.

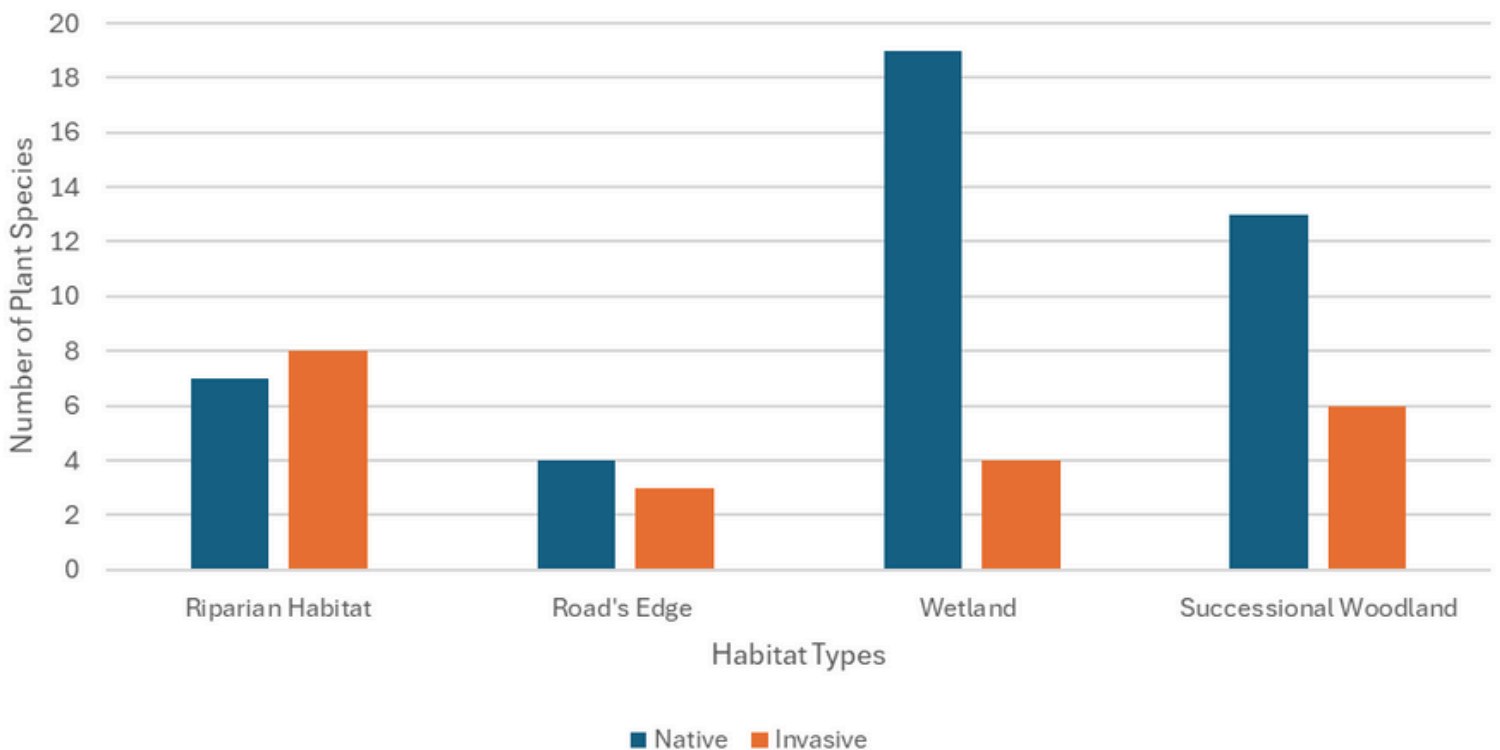
Fig. 8 shows the ratio between the number of native and invasive plant species recorded at HHA in all habitat types. Fig. 9 shows the ratio between the number of native and invasive plant species within each habitat type.

Native vs. Invasive Plant Species in All Habitat Types



■ Native Species ■ Invasive Species

Comparison of Native and Invasive Plant Species Across Four Habitat Types



TAKEAWAYS

While invasive species were present in all habitat types and 13 out of 16 of the test plots, invasive monocultures were only observed in 2 out of 16 test plots after 5 years of treatment. On average, an individual invasive plant species occupied less than 25% of the total area of a test plot. The diversity, abundance, and dominance of native species in the test plots serve as strong indicators of a healthy, productive ecosystem. However, the presence of a significant number of invasive species highlights the importance of monitoring their growth in the coming years to better understand their response to treatment. **Lastly, identifying the habitats where invasive plant species are most prevalent and pose the greatest threats to native vegetation will help inform the CRC in prioritizing specific habitat types and invasive species for the [Charles River Vegetation Management Plan](#).**

Thank you to all of the CREW Vegetation Monitors who contributed their time and energy to make year one of this community science project possible. We are thrilled with all of the great data collected and are eager to see what we can learn from next year's 2025 CREW season.

