Micro Wild Initiative: An Education Through the Rejuvenation and Reclamation of Malden's Forgotten Urban Spaces

Authors: Kyle A. Neumann, Rebecca R. Bagdigian-Boone [1], Madeline D. Brandel

[1] *University of Massachusetts, Amherst*

Abstract

A city's ability to sustain a flourishing population is linked to multilayered subjective understandings of its cultural identities (Fincher and Jacobs 1998). As we understand it, Malden, Massachusetts is a rapidly densifying urban area distinguished by a near-majority immigrant population and a landscape fractured by vacated spaces (U.S. Census Bureau 2021). It has a rich socioeconomic footing but lacks public resources for its growing family population. Because current green space is inaccessible or otherwise compromised, our project explores ways that the community can transform idle lots, backyards, and urban poché into wilding spaces, agricultural learning spaces, pollinator connectivity corridors, and spaces for other forms of prefigurative activism (Kato 2020). Using an existing residential yard as a case study, we will investigate the limits of a confined urban space's ability to host this variety of programs and test access for the growing population. We will collaborate with local schools and foundations to develop a curriculum that best complements the current Malden population through a flexible set of identifying factors specific to the community ecology, such as native food production practices, local artist initiatives, and cultural traditions (Rose 2016, 223–249). Our goal for the Micro Urban Discovery Lab, or MUD Lab, is to develop this methodology in the hopes that it could be replicated for the ongoing reactivation of other post-industrialized cities (Drake & Lawson 2014).

Introduction

1. Setting the Scene

The ecological climate of an urban area can be assessed relative to the health and resilience of its environmental systems and the projected impact which the community will have on these systems. In order for human and natural elements to thrive in an urban ecology, community members must understand the value and potential of green space in the cityscape. The city's residual lots link space, social intentions, flora and fauna, and room for generations to grow and adapt their surroundings accordingly. Malden, Massachusetts is one example of an urban environment rich in residual space and therefore potential for community driven wilding. It offers a plethora of scalar information both past and current, which, if made accessible to constituents, could support a future of ecology focused community builders. We have chosen to study Malden as an initial site for a network of education focused on preservation, habitat growth and communal and cultural resilience through food production and systems development.

Malden consists of a population of 66,263 and has 30 parks within its 5.1 square miles (U.S. Census Bureau 2021). The city has a sleepy yet steadily growing downtown, and a recent boom in development raises questions about the costs to the preservation of its already fragile natural and social ecology. Malden's sizable immigrant population affords the city rich access to different cultures, an opportunity that is vanishing in and around Boston; the lack of a singular

cultural homogeneity is a celebrated part of Malden's identity. To the extent that it can in the environmental context it was dealt, this vibrant community is already taking initiative to develop its city's parks and green spaces with a focus in native plant acclimation and local food production.

2. Intentions of the Project

There have been numerous studies outlining the positive human health impacts that nearby nature can have on residents, especially urban residents who may lack easy access to instances of nature (Wells, n.d.). A study by Weber and Schneider found that, with the rapid growth of urban populations, there is a need for "increased intentional greening of small-scale urban spaces" (Weber & Schneider, 2021). Their research suggested that residents with access to greened areas, no matter how small, had improved opportunities for fascination and feelings of wonder and curiosity. They displayed feelings of compatibility not only with nature but also with the neighborhood as a whole and beyond to the larger environment. Creating this interest in the natural world is the first step in creating a network of stewardship and can be beneficial for getting citizens interested in holistic climate change resiliency adaptations.

3. Project Scope

In order to engage with community members as closely as possible, the project will begin with a case study focusing on a single residential lot in Malden. Within the boundaries of this site, larger challenges related to urbanization which affect Malden and its surrounding region will be closely examined and solutions tested. The project team will study the local water table, soil composition, and present plant communities. Using this high resolution information to inform site specific strategy, the project team will respond to cultural issues at play in Malden and beyond through the establishment of a local ecology and urban farming education center. The MUD Lab, once underway, will act as a microcosm of the greater natural environment. It will reintegrate native plants which support pollinators, manage runoff, and provide opportunities for food production and cross cultural education. The success of the case study depends on the active involvement of community stakeholders of all ages and backgrounds, not just in order to carry out the initial management relating to wilding, but also to communicate the importance of these systems to members of the community and integrate these practices into their own lives. Community education and engagement concerning topics relating to ecology is a key objective of the project.

Upon stabilizing the first MUD Lab case study, the project will extend to include other spaces in Malden, and further, the greater Boston area. These spaces may be other residential lots offered by the community, underused public parks, or residual spaces such as alleys and grassy medians. The project will become a network of urban wild tracts, each placed in dialogue with existing community structures nearby. This expansion will serve as a model for other post-industrialized cities; each city will present a different set of environmental needs and opportunities, but will follow the same basic structure: reintroduce native plants, manage water, support urban farming, and integrate community education in all phases of the process.

4. Project Stakes

Constant dialogue with community stakeholders is critical in rendering this project successful. In the last decade, Malden has rapidly densified while land and housing prices have remained low relative to surrounding areas (U.S. Census Bureau 2021). This places Malden at

risk of gentrification. Often efforts intended to rejuvenate post-industrial cities provide a fresh face to urban areas but primarily benefit new businesses and outside investors, fracturing existing connections which support community structure. In many cities, as groups layer together, a system of cultural nodes develops; despite existing in fraught economic climates, these groups find ways to integrate and thrive in the urban setting. As cities homogenize, these cultural nodes persist. For many groups, open green space in cities provides vital social meeting grounds. These areas form islands throughout the urban ecology and are, over time, cut off from each other by the asphalt poche that surrounds them. It remains an essential point to preserve and bolster Maldens cultural landscape nodes through the study and education of the past and present ecological landscape. By using these greened tendrils to connect segments of Malden's vital social infrastructure, we can investigate the extent to which the micro wilding model can improve a city's performance in terms of sustainability, resilience, and public health while remaining congruous with its specific character. The micro wilding model is intended to be internationally replicable while also highly site and city specific. Though each city around the globe faces its own challenges and finds strength in its unique character, every city could benefit from broader access to natural spaces as well as food production.

Background and Literature Review

In their "Urban Green Space Policies: Performance and Success Conditions in European Cities," Tüzin Baycan-Levent and Peter Nijkamp use rough set data analysis to evaluate the degree to which 25 European cities have successfully managed and planned urban green spaces . According to their study, only five cities have been very successful. Budapest was one city labeled "marginally successful;" overall, an absence of public policy concerning public green space and a failure to consider the people at the heart of the city contributed to dismal results. Baycan-Levent and Nijkamp assert that, in order to improve quality of life, cities need to revise urban policy regarding green space. Specifically, they must gather ecological data in order to develop locally specific objectives for their green spaces. They must then address those objectives by involving community stakeholders in the development of highly accessible green spaces across diverse locations within the city; the green spaces should not be limited to stark lawns adjacent to public housing complexes. There is a clear demand for a new model which places people at the heart of landscape design and urban planning while taking seriously the distinguishing factors of the local ecology. MIT graduate students Tim Cousin, Olivier Faber, and Eytan Levi have studied the potential of vacant rooftops for urban farming opportunities (Roofscapes), as one example of micro greening urban space; their work was selected by the City of Paris' Urban Lab to be developed over a roof there, where urban agriculture has recently been prioritized by the city government (*Urban Agriculture in Paris | About | The Parisculteurs*, n.d.).

In contrast, the heavily urbanized greater Boston region has precious few open natural areas. Currently, the city of Malden has no critical natural landscapes, which are intact landscapes that "are better able to support ecological processes and disturbance regimes, and a wide array of species and habitats over long time frames" (Natural Heritage and Endangered Species Program 2012). Additionally, Malden is 78% impervious surface and has a canopy density of only 1% (Massachusetts Urban and Community Forestry Information n.d.). Of the open space currently present in Malden, much of it has limited or no legal protection (MassGIS (Bureau of Geographic Information) | Mass.Gov n.d.). The open spaces that are present have little or no connectivity, resulting in fragmented habitat corridors (Dramstad et al. 1996).

Because of the high amount of development in Malden, there's a high likelihood that the soils have been contaminated with various heavy metals and other harmful toxins. There is an opportunity here to incorporate phytoremediation techniques on a multi-scale level (Sleegers 2010), creating a network of green infrastructure that not only improves the soil conditions long term, but could also provide vital pollinator connectivity, improved habitat spaces and stormwater management, and educational opportunities for the community.

The ecological landscapes of Malden, while limited to non-polarizing features, develop a strong relationship between granite outcrops, coastal scrub forests, industrial/waste sites and offset urban grid. In contrast to the manipulated agreges land sprawl described in Reyner Banham's *Los Angeles: The Architecture of the Four Ecologies* (1971), Malden's connective tissues, while scaled down, still rely on the threshold between its ecologies. Specifically, the industrial and municipal sites' proximity to housing and green spaces illustrates a commonality between similar post-industrial cities and their relationship to public natural areas (Rose 2016). By posing a series of interventions to address this relationship, a new network of threshold between the existing infrastructure and the preexisting ecological landscape emerges.

Method and Data

1. **Actors Involved**

The Malden community has demonstrated a desire to redefine its post-industrial spaces; new developments in the downtown area and urban farms around the rail and waterway are evidence of this shift. On an administrative level, the project team will work with a diverse group of residents through interviews, site visits, and local board meetings. The relationship between the project team and the community at large will be facilitated by Ose and Marcel Schwab, the owners of the case study site. Ose will act as a liaison between the project team, community members, and local environmental consultants. These individuals will help to re-develop the MUD Lab sites' biodiversity and coherence from initial intervention to long term engagement and annual maintenance (Rose 2016).

In addition to key community members, several local practitioners have consulted on the project and will continue to offer their expertise throughout the process. Casey-Lee Bastien of Massachusetts based firm BSC Group met with the project team to discuss holistic strategy and phasing for developing a healthy and balanced ecosystem within a public park. As a veteran landscape architect, Bastien advised the team regarding the reintroduction of native species, long term support of plant growth, and mobilization of community members. Matt Burne, Senior Ecologist of BSC Group, also counseled the team regarding water management and irrigation. Burne surveyed the site with the team and identified areas of interest for runoff management, water collection, and potential integration of wetlands. The team spoke with Julie Mangan about challenges and opportunities she has encountered as Garden Coordinator for the City of Malden Community Garden for the past eight years. Mangan confirmed that access to urban farming resources is highly desirable in Malden; the 106 plots available for Malden residents to rent are constantly in use, leaving some interested community members on the waiting list. Mangan also identified a concern shared by others working on urban sites: the hazards associated with contaminated soils.

2. **Siting**

Starting with our site and then expanding outward, we will be creating a multilayered landscape plan to outcompete invasive plant species while also supporting pollinators and incorporating stormwater retention and infiltration. Using native plant communities as a model for successful plant layering, we will develop our planting palette to leverage on-site stress as an asset (Rainer & West 2015). Using the CSR model of vegetation classification (Grime 1974), we can build a landscape plan that will be optimized for ensuring the success of native species establishment and minimize the occurrence of invasives. Learning to identify and responsibly remove invasives will be a part of the educational aspect of MUD Lab (MIPAG - Massachusetts Invasive Plant Advisory Group n.d.). By layering stress-tolerant species (ideally with phytoremediation benefits, like those found in the *Salix* spp. (Wani et al. 2020)) with aggressive spreading ruderal species, we can help these native plants vie with the invasive species that are present in urban areas. We also will be exploring the possibility of incorporating fungi into our phytoremediation plan. Studies have shown that playing upon the symbiotic relationship between fungi and terrestrial plants can be a promising strategy for hyperaccumulating, detoxifying, or remediating contaminants (Khalid et al. 2021). Additionally, the MUD Lab's function as an educational tool will also inform planting selection, ensuring that our final garden is structured in a way that provides the needed ecosystem services legibly to the visitor (Nassauer 1995).

3. Phasing

By introducing the MUD Lab at the residential scale, we will be able to prove the overall feasibility of the interventions before scaling upward. During this time, we will also be establishing social connections with the Malden community and introducing the educational

aspects of MUD Lab on an informal level. By demonstrating the benefits of the interventions, we hope to encourage others with underutilized spaces to follow our lead, causing the creation of a larger network of converted conventional lawns. We will be exploring ways to create public/private partnerships to turn these fragmented lots into a corridor with passionate stewardship. Longer term phasing will include acquiring access to potential wetland lots closer to the areas that will be impacted by sea level rise in the hopes of creating salt marsh migration corridors. Additionally, we aim to establish soil remediation practices with the end goal of the availability of in-ground urban agriculture as a more accessible method for the population of Malden. By showcasing the potential of these underutilized spaces, we aim to shift the perception of urban gardening from temporary practice in vacant spaces to a vital resource for cities (Drake & Lawson 2014), eventually shifting the paradigm enough to be incorporated into larger zoning laws.

Congruent to the completion of the site analysis and data collection, procurement of the area will progress with a focus on the removal of invasive ground cover and non pursuant hardscapes. The future scope of the intervention weaves and connects landscape nodes across Malden and its surrounding area, growing through the flux of the built urban topography. This suggests that the project will arrive at a layered state over time as new individuals add or subtract to its network. The time frame in which the growth and development of the project exists is entirely dependent on the degree to which community members choose to participate and activate vacant, underutilized, and forgotten spaces across the city and beyond.

Data

Upon breaking ground in the spring, we will conduct soil testing on site, collecting samples to determine whether there are heavy metal contaminants present and whether those levels are appropriate for food production. Because the site has contained a residential building since at least the late 19th century, the soil is likely to contain some degree of lead, and may contain other heavy metals, PAHs, or creosote (U.S. EPA 2011, 8). Because contaminant levels can vary widely across small areas such as a residential yard (U.S. EPA 2020), we will arrange a point cloud of sample locations for soil testing. Per recommendations disseminated by the U.S. Environmental Protection Agency (2020), we will refrain from planting root crops where the soil's lead content is higher than 200 parts per million (ppm), low-growing leafy vegetables where the lead content is higher than 500 ppm, and avoid growing crops for food production altogether where the lead content is higher than 1,000 ppm. Following our introduction of phytoremediators, we will test soil samples taken from the same locations again and adjust planting schedules accordingly. As we reintroduce more native species to the site, we will observe the rates of visitation by birds and insects and compare that to visitation rates before our interventions.

Results, Discussion, and Conclusion

The degree to which the project is successful will be affected by the stewards and their commitment to procuring green spaces as part of the communal ecology the MUD Lab aims to augment. There will inevitably be a fluctuation in participation among community members; it will be our role to maintain a flow of resources to eventually propagate a self-generating native ecology. Soil amendment and stormwater management being priorities, it is our main objective for this first phase of the project to collect as much data as available to understand the

ramifications of such an intervention. As we develop MUD Labs throughout the city, we will examine a more diverse point cloud of soil samples to better understand the urban fill conditions Malden faces as a whole. This information will facilitate the re-establishment of native species on site, while allowing proper water drainage and soil decay to occur in our urban spaces. Urban farming and wilding education will support the continuation of this endeavor, providing access to local soil, water and plant propagation information for current and future generations to reference in their own wild spaces. The resultant overlaid superstruct system of learning and research labs will be designed in coordination with the shifting asphalt mass of the built environment. In its final form, the whole of this ever changing and growing network becomes increasingly important in developing each individual site, expanding upon the notion of site specific greenway planning. By identifying forgotten spaces in Malden, we can visualize a map of interventions acting within a closed loop ecological system. This system ultimately will be able to support itself and a diverse biosphere within the urban landscape.

References

Banham, Reyner. 1971. *Los Angeles: The Architecture of Four Ecologies*. London: Allen Lane.

Baycan-Levent, Tüzin and Peter Nijkamp. "Urban Green Space Policies: Performance and Success Conditions in European Cities." 44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism." (August 2004): 2-13. https://www.econstor.eu/bitstream/10419/117268/1/ERSA2004_660.pdf

Drake, Luke, and Laura J. Lawson. 2014. "Validating verdancy or vacancy? The relationship of community gardens and vacant lands in the U.S." *Cities* 40, (October): 133–142. https://doi.org/10.1016/j.cities.2013.07.008.

Dramstad, W. E., Olson, J. D., & Forman, R. T. T. (1996). Landscape ecology principles in landscape architecture and land-use planning. Harvard University Graduate School of Design ; Island Press ; American Society of Landscape Architects.

Fincher, Ruth, and Jane M. Jacobs. 1998. *Cities of Difference*, 1-22. New York: Guilford Press.

Grime, J. P. "Vegetation Classification by Reference to Strategies." *Nature* 250, no. 5461 (July 1, 1974): 26–31. https://doi.org/10.1038/250026a0.

Kato, Yuki. 2020. "Gardening in Times of Urban Transitions: Emergence of Entrepreneurial Cultivation in Post–Katrina New Orleans." *City & Community* 19, no. 4 (March): 987–1010. https://doi.org/10.1111/cico.12476.

Khalid, Muhammad, Saeed Ur-Rahman, Danial Hassani, Kashif Hayat, Pei Zhou, and Nan Hui. "Advances in Fungal-Assisted Phytoremediation of Heavy Metals: A Review." *Pedosphere* 31, no. 3 (June 1, 2021): 475–95. https://doi.org/10.1016/S1002-0160(20)60091-1.

"Massachusetts Urban and Community Forestry Information." Accessed March 26, 2022. http://maps.massgis.state.ma.us/dcr/forestry/forestry23.html.

"MassGIS (Bureau of Geographic Information) | Mass.Gov." Accessed March 26, 2022. https://www.mass.gov/orgs/massgis-bureau-of-geographic-information.

"MIPAG - Massachusetts Invasive Plant Advisory Group." Accessed March 26, 2022. https://www.massnrc.org/mipag/index.htm.

Nassauer, Joan Iverson. “Messy Ecosystems, Orderly Frames.” *Landscape Journal* 14, no. 2 (1995): 161–70.

Natural Heritage and Endangered Species Program. “Malden.” Massachusetts Division of Fisheries and Wildlife, 2012. http://maps.massgis.state.ma.us/dfg/biomap/pdf/town_core/Malden.pdf.

Rainer, Thomas, and Claudia West. *Planting in a Post-Wild World: Designing Plant Communities for Resilient Landscapes*. First edition. Portland, Oregon: Timber Press, 2015.

Roofscapes. “About.” Roofscapes. Accessed May 4, 2022. https://www.roofscapes.studio/about.

Rose, Jonathan F. P. 2016. *The Well-Tempered City : What Modern Science, Ancient Civilizations, and Human Nature Teach Us about the Future of Urban Life*. New York: HarperCollins.

Sleegers, Frank. “Phytoremediation as Green Infrastructure and a Landscape of Experiences.” *Proceedings of the Annual International Conference on Soils, Sediments, Water and Energy* 15, no. 1 (June 10, 2010). https://scholarworks.umass.edu/soilsproceedings/vol15/iss1/13.

U.S. Census Bureau, Department of Commerce. 2021. QuickFacts: Malden City, Massachusetts. Population estimates as of July 1, 2021. https://www.census.gov/quickfacts/maldencitymassachusetts.

U.S. Environmental Protection Agency. *Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices*. EPA 560/S-11/001. Chicago: U.S. EPA, 2011.

U.S. Environmental Protection Agency. “Lead in Soil.” United States Environmental Protection Agency. August 2020. https://www.epa.gov/sites/default/files/2020-10/documents/lead-in-soil-aug2020.pdf

Ville de Paris. “Urban Agriculture in Paris.” Les Parisculteurs. Accessed May 4, 2022. https://www.parisculteurs.paris/en/about/urban-agriculture-in-paris/.

Wani, Khursheed Ahmad, Zuber M. Sofi, Junaid Ahmad Malik, and Jahanger Ahmad Wani. “Phytoremediation of Heavy Metals Using Salix (Willows).” In *Bioremediation and Biotechnology, Vol 2*, edited by Rouf Ahmad Bhat, Khalid Rehman Hakeem, and Moonisa Aslam Dervash, 161–74. Cham: Springer International Publishing, 2020. https://doi.org/10.1007/978-3-030-40333-1_9.

Weber, Ella, and Ingrid Schneider. “Blooming Alleys for Better Health: Exploring Impacts of Small-Scale Greenspaces on Neighborhood Wellbeing.” *Urban Forestry & Urban Greening* 57 (January 2021). https://doi.org/10.1016/j.ufug.2020.126950.

Wells, Nancy. “How Natural and Built Environments Impact Human Health.” Cornell University Press, n.d. https://fundacioncosmos.cl/sitio2016/wp-content/uploads/2017/04/How-Natural-and-Built-Environments-Impact-Human-Health_Wells.pdf.