A Socio-Ecological Management Plan for Lakeview Cemetery:

Maximizing Human and Ecological Value of Public Cemeteries as Urban Greenspace

NR 206: Environmental Impact and Problem Solving, Spring 2021

By Bay Burnham, Caitlyn Williams[1], Caleb Genereaux, Cheyanne Connelly, Corinne Hill-James[2], Gabby Ostrov, Linnea Tootsov, Molly Meehan, and Max Horte[3]

[1] Caitlyn.R.Williams@uvm.edu
[2] corinne.hill-james@uvm.edu
[3] mhorte@uvm.edu

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Acknowledgements

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Section I: Introduction

Purpose & Overview

The purpose of this management proposal is to maximize the ecological and social value of Lakeview Cemetery as a public greenspace in the wild heart of Burlington, Vermont. Lakeview is an active public cemetery located between North Avenue and the Burlington Greenway, a public recreation path on the shore of Lake Champlain. It neighbors the public North Beach Campground to the northeast and the Cambrian Rise housing development currently underway to the southwest.

As a large area of public land near Burlington's urban core, popular recreation areas, important wildlife habitat, and Lake Champlain, we believe that Lakeview Cemetery offers unique opportunities to serve as a valuable interface between humans and nature. This management plan proposes strategies to improve the ecological health of the cemetery while also encouraging public understanding and appreciation of the space as more than just a burial ground. Specifically, the goals of this project are to:

- Enhance the capacity of the cemetery to function as a core habitat and corridor for wildlife, particularly for valuable pollinator species
- Recommend management strategies that improve ecosystem services of the cemetery including biodiversity, wildlife habitat, pollination, soil retention, and stormwater regulation
- Draw from existing cemeteries around the globe that explore and encourage alternative ecological and social uses of cemeteries as urban green spaces to inspire Lakeview's future
- Encourage social acceptance and appreciation of the multifunctional potential of urban public cemeteries
- Build upon work completed by previous NR 206 students of establishing a baseline wildlife inventory and conservation recommendations for Lakeview Cemetery

Together, these outcomes are meant to align with the City of Burlington's Open Space Protection Plan (OSPP) and Climate Action Plan (CAP) so that Lakeview Cemetery can serve as a pilot site demonstrating the potential of Burlington's public greenspaces to sequester carbon, provide habitat for wildlife, increase biodiversity, and improve watershed health. Our hope is to utilize our diverse perspectives and experiences from the Rubenstein School of Environment and Natural Resources to outline clear and achievable management steps for a future of Lakeview Cemetery that maximizes social and ecological health. This proposed management plan is meant to serve as an adaptable guide to inform stakeholders and decisionmakers balancing multiple perspectives and priorities in working towards the above outlined goals.

Background & Rationale

Problems with Conventional Cemeteries:

Conventional landscaping and burial practices used in most cemeteries in the United States, including those used at Lakeview, are ecologically problematic. According to a 2012 report for the Berkeley Planning Journal on national cemetery trends, large quantities of formaldehyde (from the embalming process), toxic heavy metals (from casket construction), and petroleum-based fertilizers (from lawn maintenance) pollute the soils of most modern cemeteries, posing health risks for cemetery workers and the environment (Harker, 152). In addition to this pollution, most cemeteries consist of significant areas of land that provide little to no ecological value. Large tracts of lawn that make up most cemeteries tends to consist of homogenous non-native species that provide few resources for wildlife

and have shallow root systems prone to erosion (Talbot, 2016). Cemeteries are also rarely included in descriptions of public or green spaces despite their similar species, organization, and maintenance to other parks, especially in urban areas. With proper management and planning, cemeteries can become important ecological habitats yet they continue to be excluded from environmental or recreational management plans, unlike other public green spaces (Quinton and Duinker, 2018). One of the goals of this project is to convert some of this space of low ecological value into areas that are beneficial to local pollinators and other wildlife species. These ecological restoration steps can also help to remediate chemical contamination (Brennan, et al., 2018).

In addition, cemeteries carry taboos and stereotypes in the United States that leave them reserved largely just for the deceased and mourning. Many existing cemeteries created in the late 1800s and early 1900s, including Lakeview Cemetery, were designed with the goal of providing space for the public to enjoy outdoor recreation outside of urban areas before the rise of public parks (Pennsylvania Historical & Museum Commission, 2015), but this use is not common today. Even though these are often some of the only large green spaces in many urban areas, they are underutilized as sites for recreation (Peinhardt, 2019). While still showing respect for deceased and their visitors, it is possible to transform cemeteries into more welcoming places for people to visit for recreation, relaxation, and reflection amidst nature.

Emerging Trends of Alternative Use of Cemeteries:

Many cemeteries around the world have already begun to make changes to take advantage of alternative green space uses, inspiring many of our proposals for this project. Glasgow Necropolis, the first Victorian garden cemetery created in Scotland, created a wildflower meadow with the help of local school children in order to protect populations of flies, bees, and birds that provide valuable pollination services (Weddle, n.d.). They have also introduced sections of no-mow zones and encouraged the growth native plant species selected intentionally to provide habitat for wildlife. Woodlawn Cemetery is a large cemetery located in the Bronx, New York, that uses its open greenspace to restore bee populations, currently providing a home for nearly 400,000 bees in 7 hives (Herndon, 2016). This addition to the cemetery has increased visitation from local residents while also increasing the ecological productivity of the cemetery and offering a new source of revenue for the cemetery through the sale of honey. Some cemeteries have also begun to embrace educational programs to promote collective learning and public interaction. Mount Auburn Cemetery in Cambridge, Massachusetts has introduced a citizen science training program, a self-guided art and history tour, a free online database of plant species, and other community programs to encourage engagement with the cemetery (Mount Auburn Cemetery). These examples show the potential for cemeteries to shift their management strategies to support local ecological and community health, taking advantage of these large, often under-utilized public greenspaces.

Why Lakeview?

Connecting to the City of Burlington's Vision for a Sustainable Future:

Lakeview Cemetery has the potential to serve as a pilot site for the City of Burlington to advance its goals for conservation and climate change mitigation as outlined in the city's Open Space Protection Plan (OSPP) and Climate Action Plan (CAP). These plans have been instrumental in outlining how future changes throughout Burlington will contribute to global climate change mitigation. The 2014 OSPP has resulted in various projects to improve and conserve natural areas, many of which align with the goals of this project: tree planting, wetland and lakeshore restoration, increased wildlife monitoring, and a heavy focus on the importance of native plant species (Burlington Conservation Board, 2014). This project draws from the goals of the OSPP including protecting and enhancing wildlife and woodland corridors, protecting the shoreline of Lake Champlain, preserving scenic viewing areas, and increasing overall access to open spaces throughout the city. Lakeview Cemetery offers a significant area of land that can be used to implement a variety of conservation and mitigation actions that can serve as a model for other parts of Burlington. It also provides the city an opportunity to begin to introduce the public to the idea of alternative green spaces in conjunction with the OSPP.

The 2014 CAP is a broader initiative focused on reducing Burlington's overall greenhouse gas emissions. One of its primary goals is to increase carbon storage and sequestration through the implementation of additional forest areas and tree coverage (City of Burlington, 2014, p. 18). Our proposal for Lakeview Cemetery would integrate this goal and allow for it to be built on with future plans and projects. This proposal will offer an initial step in moving towards the goals listed by the OSPP and the CAP, with the hopes that Lakeview Cemetery will continue to be improved and conserved for both humans and the natural environment.

In line with the goals outlined in the OSPP, implementing our management proposals will help to end the myth that nature exists "out there", encouraging biodiversity back into human-dominated landscapes by integrating native plants, native ecosystems, and natural processes into developed landscapes such as the cemetery. Lakeview Cemetery can serve as an example of Burlington's more recent Grow Wild initiative to encourage people to plant more native plant species in their yards by demonstrating what it can look like to design landscapes for pollinator and wildlife habitat (Burlington Wildways, n.d.). Burlington is not immune from the threats of urbanization, habitat fragmentation, invasive species, erosion, pollution, and climate change that are causing harm to local ecosystems and wildlife populations. To combat these threats, our proposal emphasizes the reintroduction of native plants into the ecosystems that make up Lakeview Cemetery through intentional, site-specific plantings as well as adaptable large-scale management transitions.

Another principal factor for our proposal is the impact of the Cambrian Rise housing development underway in the property that neighbors Lakeview Cemetery to the south. The largescale development project is and will continue to have significant negative impacts on the landscape, including erosion and habitat destruction from the construction process. Our hope is that increasingly ecologically conscious management decisions at Lakeview can help to offset these impacts by providing additional habitat, stabilizing the shoreline, and protecting soil and water quality. Additionally, the housing development will increase the number of people living near the cemetery. We hope that our proposals will encourage more people to develop an appreciation for and an understanding of the important ecological role of the cemetery.

Taking Advantage of an Ecologically Valuable Landscape:

Lakeview Cemetery is uniquely situated to offer important ecological benefitd within the City of Burlington. It sits between important natural areas that provide critical ecological resources including habitat for rare and endangered species and watershed protection. We believe that adapting current cemetery management strategies can improve the ecological functioning of the cemetery by taking advantage of this large open area in the following ways:

1) ***Enhance the cemetery's function as a corridor and habitat for wildlife by providing ecological resources including food, shelter, and protection to vulnerable wildlife populations:*** Figure 1 shows a map of the area surrounding Lakeview Cemetery with ecological data gathered by the Vermont Agency of Natural (ANR) Resources, produced with the ANR's Natural Resource Atlas tool. This map shows Priority Habitat Blocks (green, yellow, and orange shaded areas) in and surrounding the cemetery as well as nearby populations of rare, threatened, and endangered species (red and bright green shaded circles). As a large area of open space laying between these important wildlife habitats, Lakeview can serve as a wildlife corridor—a transportation route linking wildlife populations with habitat resources and other populations that would otherwise be separated by cultivated land, roads, or other forms of human-caused development.

2) ***Improve the health of Lake Champlain by incorporating certain landscape design features that slow runoff and erosion:*** The eastern boarder of the cemetery contains approximately 150 feet of shoreline that has been protected under the state's 2014 Shoreline Protection Act, indicated in Figure 1 with blue shading. Currently, the health of Lake Champlain faces many threats including blue-green algae blooms, pollution from stormwater runoff and erosion, and a collapsing food chain (Vermont Department of Environmental Conservation (a), n.d.). As described in the Vermont Department of Environmental Conservation's shoreland Best Management Practices (Vermont Department of Environmental Conservation (b), n.d.), intentionally designed landscape features such as multifunctional riparian buffers, rain gardens, no-mow zones, and revegetation can mitigate these threats and improve the health of the lake.

3) ***Increase biodiversity and net primary productivity by attracting pollinator and wildlife species through carefully designed native plant habitats:*** The planet is currently facing a dramatic loss decline of bird and insect populations due to human causes, namely habitat loss, agriculture practices, and climate change (Christmann, 2019, p. 720). 76% of world crops and 87% of all flowering wild plants depends on the services of pollinators (ibid, p. 721). Native plant species diversity, in turn, form the basis of ecosystem healthy and productivity (Tallamy, 2007, p. 19-21). Because many plants rely on specific pollinator species and vice verse, and because most pollinator species have limited ranges of less than 1.2 miles (ibid), sustaining diverse plant communities requires sustaining diverse local pollinator populations. As the City of Burlington strives to increase local food production, a goal expressed in the city's Climate Action Plan (City of Burlington, 2014, p. 14), it will be necessary to restore and protect local pollinator populations. As a large natural area within the City of Burlington, we believe that Lakeview Cemetery offers a valuable space to support pollinators through the introduction of healthy native plant communities.

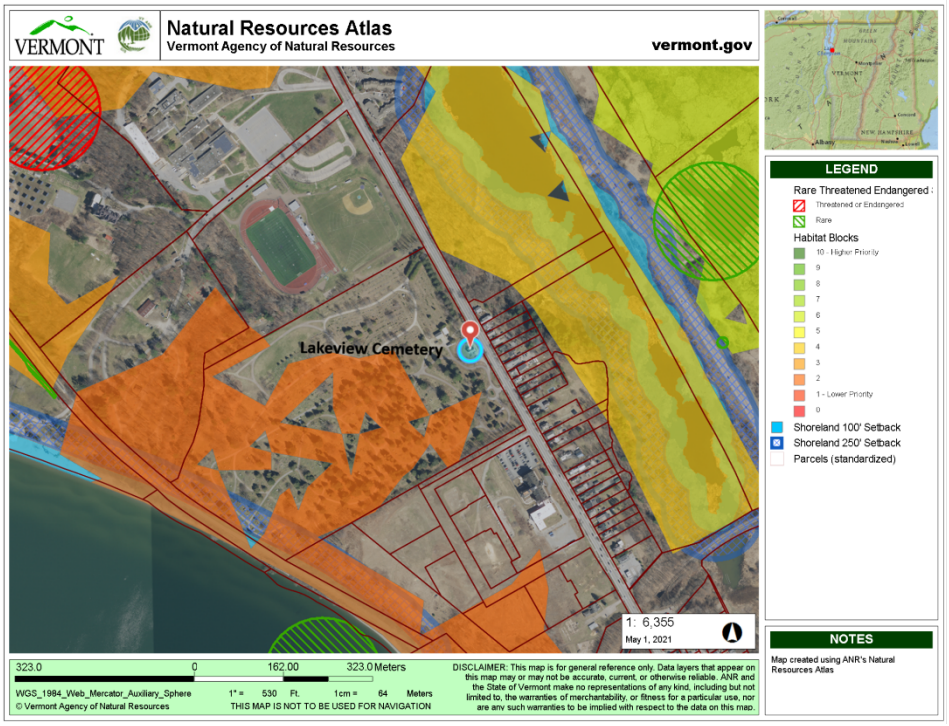


Figure 1: Lakeview Cemetery lays between two significant natural communities and contains a designated protected shoreline, meaning that management decisions could have important ecological effects.

Section II: Enhancing Lakeview's Purpose as a Wildlife Corridor

In Fall 2019, NR 206 students established a baseline understanding of the wildlife and tree species that inhabit Lakeview Cemetery by inventorying trees and tracking wildlife. During Spring 2020, another team of students continued this baseline inventory by gathering additional data on terrestrial and avian species present at Lakeview and how they used the landscape. These students contributed to data collection efforts in *iNaturalist* and wrote recommendations for future development with a focus on the conservation of keystone plant species that provide essential resources to wildlife. To continue this data collection and add to the understanding of how Lakeview Cemetery functions as a wildlife corridor, we installed 3 game cameras throughout the cemetery and gathered data for 3 weeks. One was placed on the fence line near the campground, one was placed in the southwest corner near the compost area, and one was placed near the entrance to the cemetery from the bike path (unfortunately this camera was stolen during the project and only resulted in one week's worth of data collection).

Results

After three weeks, the data we obtained from the campground camera yielded sightings of 4 woodchuck (*Marmota monax*), 8 raccoons (*Procyon lotor*), 6 eastern grey squirrels (*Sciurus carolinensis*), and 2 red foxes (*Vulpes vulpes*, Figure 2). There was one sighting of a white-tailed deer (Odocoileus virginianus) after the first week of data collection near the bike path entrance before this camera was stolen. No wildlife was captured with the third camera placed near the compost area. A complete set of data images can be found in Appendix 1 of this document.

Figure 2: Image of a red fox taken with a UVM game camera on 4/23/21 at 4:57 a.m.

Implications for Management

The data we collected from our game camera footage contributes to data collected by previous NR 206 projects that show that Lakeview Cemetery support a rich diversity of wildlife. They offer continued justification that management decisions at the cemetery have the potential to impact the health and abundancy of wildlife populations, as well as an opportunity to demonstrate to the public the richness of species that utilize this space. We suggest the following management considerations to maximize the potential of Lakeview to sustain and encourage wildlife use:

- Breaks in the fence line are important wildlife pathways that currently exist within Lakeview Cemetery. These areas allow wildlife to move freely between the cemetery and outside of it. We encourage the cemetery to avoid repairing these breaks and to consider alternatives to fencing in the future as infrastructure continues to age.
- No-mow zones are also critical spaces for wildlife to use as food and shelter resources. Existing no-mow zones could be made even more beneficial for wildlife if they, and other areas of high plant debris, were left uncleared every winter. Plant debris acts as valuable habitat for many species such as leafcutting bees (*Megachilidae*) and Comma butterflies (*Polygonia c-album*) (ADK Action, 2019). Supporting populations of insects and other low-trophic species such as small mammals is essential in sustaining populations of birds and larger mammals that rely on them as food sources. In addition to creating habitat, this management technique preserves soil moisture, prevents weeds, recycles essential nutrients back into the soil, and reduces landfill waste (ADK Action, 2019).
- There are many exiting tree species within Lakeview Cemetery that provide wildlife with abundant resources whose health should be carefully maintained. Oak trees (*Quercus sp.*) are invaluable because they have mast years, meaning they produces a high quantity of nuts or fruit in certain years in order to encourage greater reproduction success. Oak masting, occurring every two to five years, is an important food resource for wildlife before winter (The Botanical Journey, n.d.). Planting more masting tree species could sustain larger wildlife populations.
- Planting native and naturalized plants that act as food sources and shelter can allow for the continued support of important wildlife in Lakeview Cemetery. Our team has created landscape designs with the specific intention of continuing the protection and encouragement of wildlife in Lakeview Cemetery (see Section IV). These landscape designs act as wildlife pathways to ensure that the cemetery be used as a corridor. The designs create optimal habitat zones for a variety of species types: pollinator gardens act as an oasis for important insect and bird species, and restored forests act as prime habitat zones for native plants and mammals.
- Other strategies to support wildlife in Lakeview Cemetery include marking wildlife hotspots with signage and continuing the use of game cameras to track species.

Section III: Ecological Rehabilitation of Lakeview Cemetery

We believe that simple management techniques at Lakeview Cemetery can have far-reaching impacts to improve its ecological health and functioning to support a greater diversity and abundance of species. The interdependent strategies of improving soil health and encouraging native plant communities can help to restore Lakeview Cemetery into a thriving ecosystem. Not only will the following recommendations help support wildlife populations, but they will contribute to other goals of providing biodiversity, wildlife habitat, pollination, soil retention, and stormwater regulation.

Improving Soil Health

Healthy soil is critical for proper ecosystem functioning because it provides essential services including absorbing and storing water, filtering runoff, suppressing pests and weeds, reducing erosion, and providing essential nutrients to plants that support entire ecosystems (Honeyager, 2015). However, unhealthy, contaminated soils destroy and prevent these processes.

Most of the soil in Burlington contains elevated levels of arsenic and lead (Freese, 2016). Additionally, chemicals released into the air from the burning of coal and gas, called polycyclic aromatic hydrocarbons, have accumulated in much of Burlington's soils (Freese, 2016). Cemeteries themselves are also a significant source of soil pollution. Conventional burial practices use embalming fluids like formaldehyde and heavy metals that are used in casket construction. These pollutants usually leach into surrounding cemetery soils and threaten ecosystems and nearby watersheds (Harker, 2012; Brennan, et al., 2012). Although there is no current research proving these contaminants exist within Lakeview Cemetery, it is very likely that they reside within the site's soils. Soil contaminants such as these are transported through runoff to surrounding streams and lakes and are consumed by plants and animals, accumulating in food chains (National Oceanic and Atmospheric Administration, 2019). Lakeview Cemetery's soils lack stability created by plant root systems. This makes it hard for soils to retain their topsoil and perform their services because they have little protection from wind and rain erosion. Restoring soil health at Lakeview Cemetery is essential to protect local wildlife and surrounding ecosystems, such as Lake Champlain.

To improve Burlington's watershed and transform Lakeview Cemetery into an important buffer zone, the cemetery needs to build back healthy soils. We recommend that organic matter and fungi be introduced to landscape design sites so that soils can properly decompose and filter out contaminants that currently impact Burlington's watershed, as well as reduce erosion:

- **Organic matter** is one of the most important aspects of healthy soil because it feeds the decomposition process and provides habitat for microorganisms (Bot and Benites, 2005). It can be introduced by adding compost, manure, or plant debris. Organic matter can be introduced and protected from erosion through deep mulching, introducing mulch-maker plants (i.e. plants that create litter), and cover crops.
- Healthy soils also require **active mycorrhizal networks**—underground pathways created by fungi that transfer nutrients between plants and abiotic resources. Fungi can also break down and consume contaminants in soils, effectively remediating a site of its contaminants (Stamets, 2005). Lakeview Cemetery's fungal presence can be increased through various mushroom inoculation methods. Covering soil with woodchips or installing mushroom logs can add spores and mycelium culture to soils. White rot mushrooms, like oyster mushrooms and turkey tail, are

easy to grow and they are cost effective. There are many sites in Lakeview Cemetery where fungi could be easily inoculated, such as the preexisting areas of high plant litter outside of Lakeview Cemetery's fences. A brief guide on mushroom inoculation can be found in Appendix 2.

- **Nutrient accumulator plants and nitrogen-fixing** plants are also important aspects to building plant networks in healthy soils. Creating dynamic networks throughout soils increases microbial activity, reduces erosion, and creates a healthier soil environment. More information about the types of plants that could be used to fulfill these roles are included in the Appendix. Plants also contribute organic matter, help to stabilize soil, and infiltrate water in storm events. The next section provides more information on selecting plant species for the cemetery.

Selecting Plants

As the foundation of every ecosystem, healthy plant communities are essential for supporting wildlife populations—including invaluable pollinator species—and providing other ecosystem services such as sequestering carbon, stabilizing soils, and mitigating runoff. We suggest that the cemetery emphasize landscape decisions that support a wide variety of native plants.

Native plant species are uniquely adapted to the local environments in which they evolved, serving as the preferred host plants for native insects and pollinators that provide instrumental ecosystem services for both humans and nature (U.S. Forest Service, n.d.; Tallamy, 2007, p. 50-55). They tend to be more tolerant of local conditions such as climate, soils, water, pests, and diseases than introduced species and have deeper root systems that provide more erosion control, water absorption, and fire resiliency, while introduced species, in turn, do not perform the same ecological functions as native species they replace (Cusack et al., 2008; Tallamy, 2007, p. 44-46). Native flowering plant species are also essential in reducing stormwater runoff because of their strong, deep root systems (Christmann, 2019, p. 722). Having a diversity of native plant species is important to supporting pollinators all year round, providing floral resources with a long range of bloom times, nesting sites, and protection from disturbances including wind, human recreation, and lawn maintenance. With rich species diversity, even small habitat sites add up to create valuable connectivity (Tallamy, 2007, p. 280).

In addition to establishing intentionally designed gardens (as we describe in Section IV), we suggest that the cemetery continue to implement no-mow zones to encourage the revegetation of healthy plant habitat throughout the cemetery. No-mow zones are created by stopping mowing routines and allowing natural succession to occur. To add diversity and encourage native plant growth, no-mow zones can be interplanted with native perennials, shrubs, and trees. In place of traditional lawn areas, no-mow zones help to stabilize soil, absorb stormwater, and provide wildlife habitats without requiring extensive labor or planning (Vermont Department of Conservation (c), n.d.).

Section IV: Examples of Small Landscape Designs

Lakeview Cemetery has great potential as a pollinator pathway and a wildlife corridor. The Lakeview Cemetery team has created landscape designs to show how Lakeview Cemetery can become a valuable natural area for the City of Burlington. We have chosen five sites around Lakeview Cemetery that would be ideal spaces to transform into wildlife and pollinator habitat areas. Transforming these locations could be the first step toward transitioning Lakeview Cemetery into a space for both people and wildlife.

Figure 3: Proposed sites for landscape designs in Lakeview Cemetery

Site 1: Ash Circle

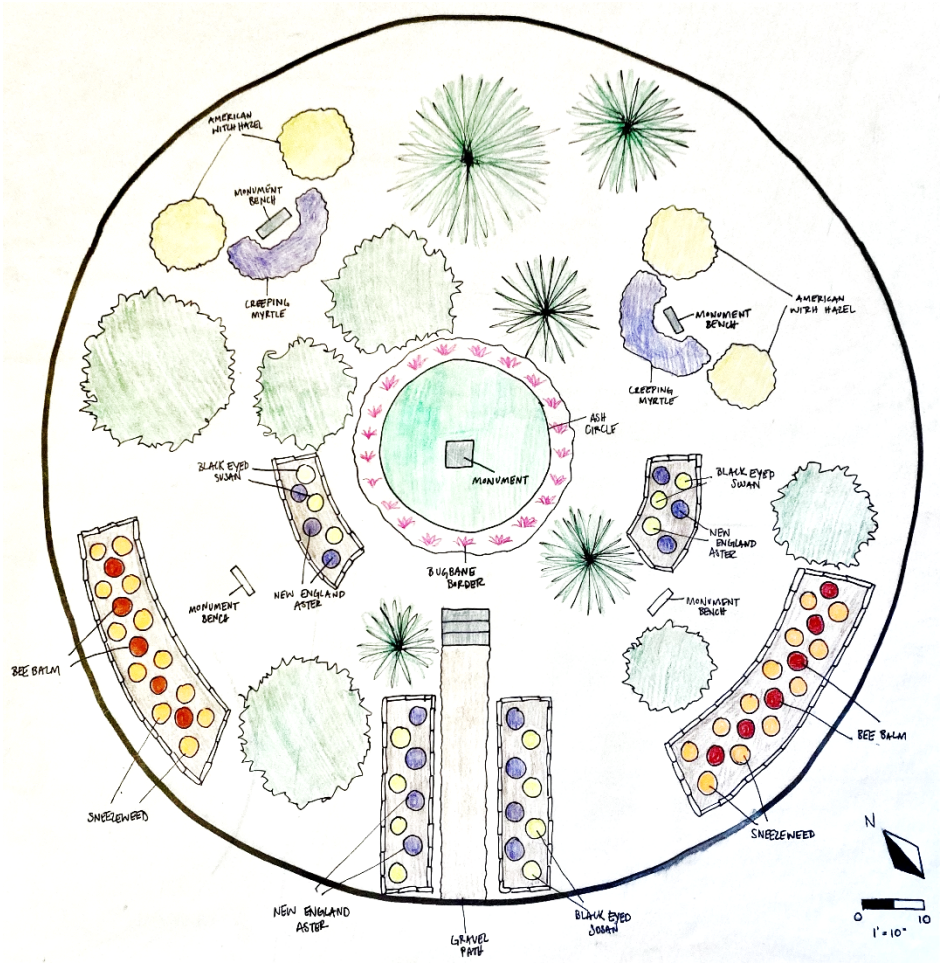


Figure 4: Landscape design created by Molly Meehan for Site 1.

The ash circle is the most central of all the prospective design sites in the cemetery. The western side receives full afternoon sun, while the eastern side is almost completely shaded by tree cover for most of the day. Shade tolerant plants were prioritized in these areas while plants that require a lot of sun were placed on the western side of the circle. All the plants chosen are native to Vermont and host many pollinator species. There is a pre-existing mulched bed with a stone perimeter to the southwest side of the circle. We decided to replicate this design feature throughout the site to provide consistency and to maximize burrowing shelter for pollinators with stone borders. We envision five new slightly larger beds that include stone borders like the existing one.

Since the ash circle is such a central location in the cemetery, vibrant, complementary colors were chosen to maximize aesthetic benefits. For example, yellow black-eyed Susan (*Rudbeckia hirta*) and purple New England aster (*Symphyotrichum novae-angliae*) were placed leading up to and surrounding the circle. The purpose of this bordered pathway of flowers it is to draw people into the space with more intention given that it is such a sacred space. While these plants bloom at different times, this combination was selected because it offers a longer span of flower resources for pollinators. Complimentary colors are used similarly on the northeastern side where purple creeping myrtle (*Vinca minor*) and yellow American witch-hazel (*Hamamelis virginiana*) are planted. These plants are subtly surrounding memorial benches so that people can approach them with more intention and be

welcomed by beautiful flowers and colors. Lastly, bugbane (*Cimicifuga sp.*), a tall pink and white plant, is placed surrounding the ash circle itself to discourage folks from walking all over it given the lack of signage to explain that the mowed area around the monument is for ash scattering.

Figure 5: Plan view, for Site 1[3].

Figure 6: Section view, Site 1.

Figure 7: Perspective, Site 1.

[3] All 3D landscape design renderings were created for this project by Caleb Genereaux using the software Sketch-Up.

Site 2: Fountain 1

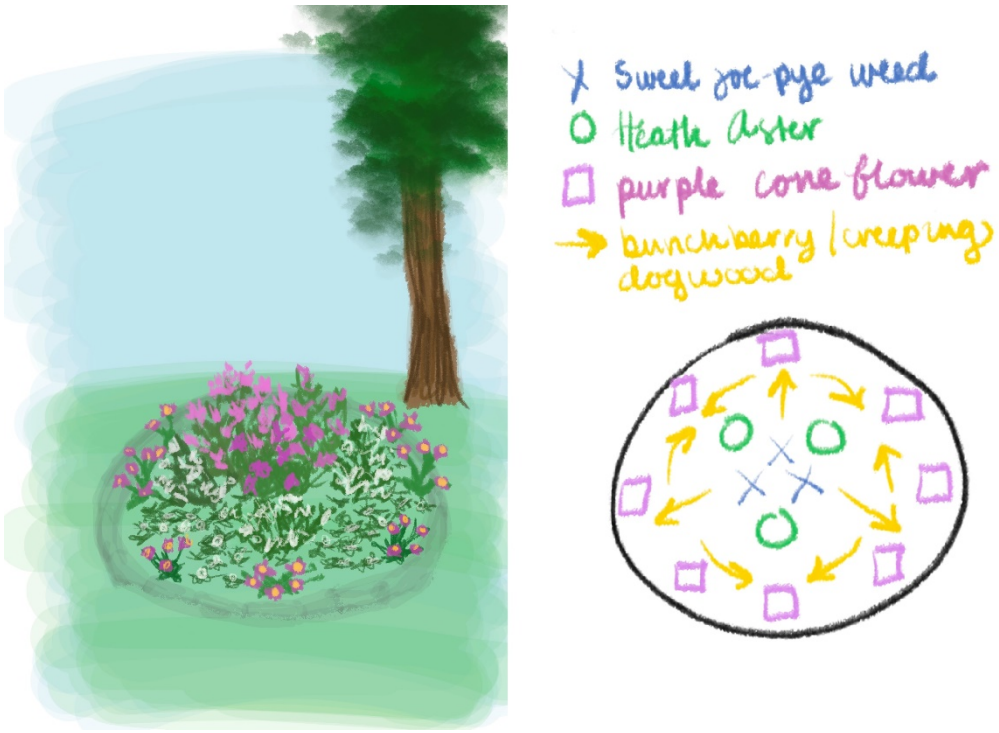


Figure 8: Landscape design created by Caitlyn Williams for Site 2.

For Fountain 1, traditional colors that are commonly found in funeral bouquets and wreaths were selected. Flowering plants are layered to maximize species diversity and space, as well as to create a fountain-like illusion to highlight its past existence and suggest positive changes coming to the cemetery. All plants selected are native perennials that need minimal upkeep and are self-sufficient, as well as a ground cover that is slow spreading and will not create additional maintenance demands. The species include sweet joe-pye weed (*Eutrochium purpureum*), heath aster (*Symphotrichum ericoides*), purple coneflower (*Echninacea purpurea*), and bunchberry/creeping dogwood (*Cornus canadensis*).

The red berries produced by the bunchberry are both edible to people and wildlife, offering a food source to sustain wildlife populations without any concerns of poisonous berry consumption by visitors. This diverse set of flowering species will attract a wide range of pollinators to support a diverse micro-ecosystem, including bees, butterflies, moths, birds, beeflies, and flies. Some notable species that this area cater to include pearl crescent butterflies (*Phyciodes tharos*), American goldfinches (*Spinus tristis*), and long-tongued bees (*Apidae*). This design could be implemented gradually by starting with the inner circle and moving to the outer circle, allowing planters to gradually add species in a contained space.

Site 3: Fountain 2

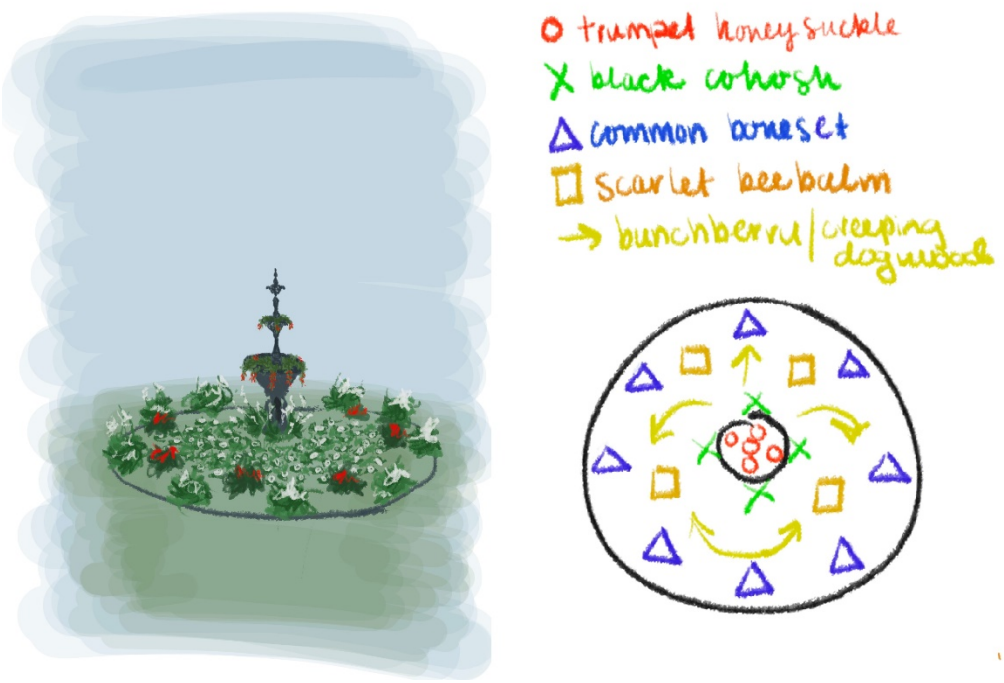


Figure 9: Landscape design by Caitlyn Williams for Site 3.

Fountain 2 keeps a modest color pallet to compliment modern funeral arrangements. This design could be started by adding flowers to the fountain, repurposing it into a container garden by building a drainage system of drilled holes, and adding soil, mesh, and rocks. The species selected are a mix of perennial and annuals, consisting of trumpet honeysuckle (*Lonicera sempervirens*) pictured in the fountain, black cohosh (*Actaea racemosa*), common boneset (*Eupatorium perfoliatum),* scarlet beebalm (*Monarda didyma*) and creeping dogwood (*Cornus canadensis*) as a cover. These species attract hummingbirds, beetles and flies, bees, butterflies, and birds, namely Ruby-throated hummingbirds (*Archilochus colubrus*), bumblebees (*Bombus* sp.), sweat bees (*Halictidea sp*.), and Leafcutting bees (*Megachilidae*).

Site 4: New Development Area

Figure 10: Landscape design plans of LA Group design modified by Cheyanne Connelly and Caitlyn Williams created for Site 4.

In order to maximize pollinator benefits, we suggest increasing the emphasis on native plant species in the existing landscape designs produced by the LA Group (a landscape company based out of Saratoga Springs, NY) for the New Development Area of the cemetery. As seen from our team's wildlife footage, this area is used frequently by wildlife. We suggest additional native tree plantings, such as red oak (*Quercus rubra)* and sugar maples (*Acer saccharum*), and fruit-bearing plants such as bunchberry (*Cornus canadensis)* and serviceberry *(Amelanchier canadensis)*. These plants would not only provide resources to wildlife such as the eastern cotton-tail rabbit (*Sylvilagus floridanus*) and avian species such as cedar waxwing (*Bombycilla cedrorum*), but they would also add understory coverage to the area. Understory cover provides shelter to animals, helps to stabilize soils and infiltrate water, and adds to the overall biodiversity of forested ecosystems.

Based on the data we collected with game cameras, we also suggest the implementation of wildlife pathways in the nearby fence to allow easy passage for wildlife. Figure 11 depicts a wildlife pathway designed by the 2019 NR 206 Lakeview Cemetery group.

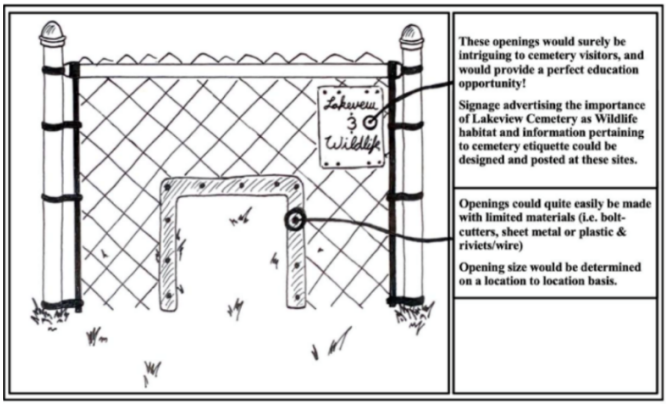


Figure 11: A design of a wildlife pathway created by students in NR 206 in 2019

Keeping snags and dead brush in this area can help to provide shelter for wildlife, but we also believe that this particular site would be well-suited for artificial habitat structures. For example, we suggest installing structures to encourage nesting of insects in this area, including “bug hotels” as pictured in Figure 12. These structures provide overwintering habitat for insects, including valuable pollinator species, and can be made using repurposed and natural materials. Incorporating bird houses and bat houses may be useful to ensure shelter for these valuable wildlife species. All these structures have the additional benefit of increasing public awareness of the wildlife that uses the cemetery by serving as educational art pieces.

Figure 12: A "bug hotel." Image taken from the Royal Society for the Protection of Birds.

Site 5: Outside the Southeastern Fence Line

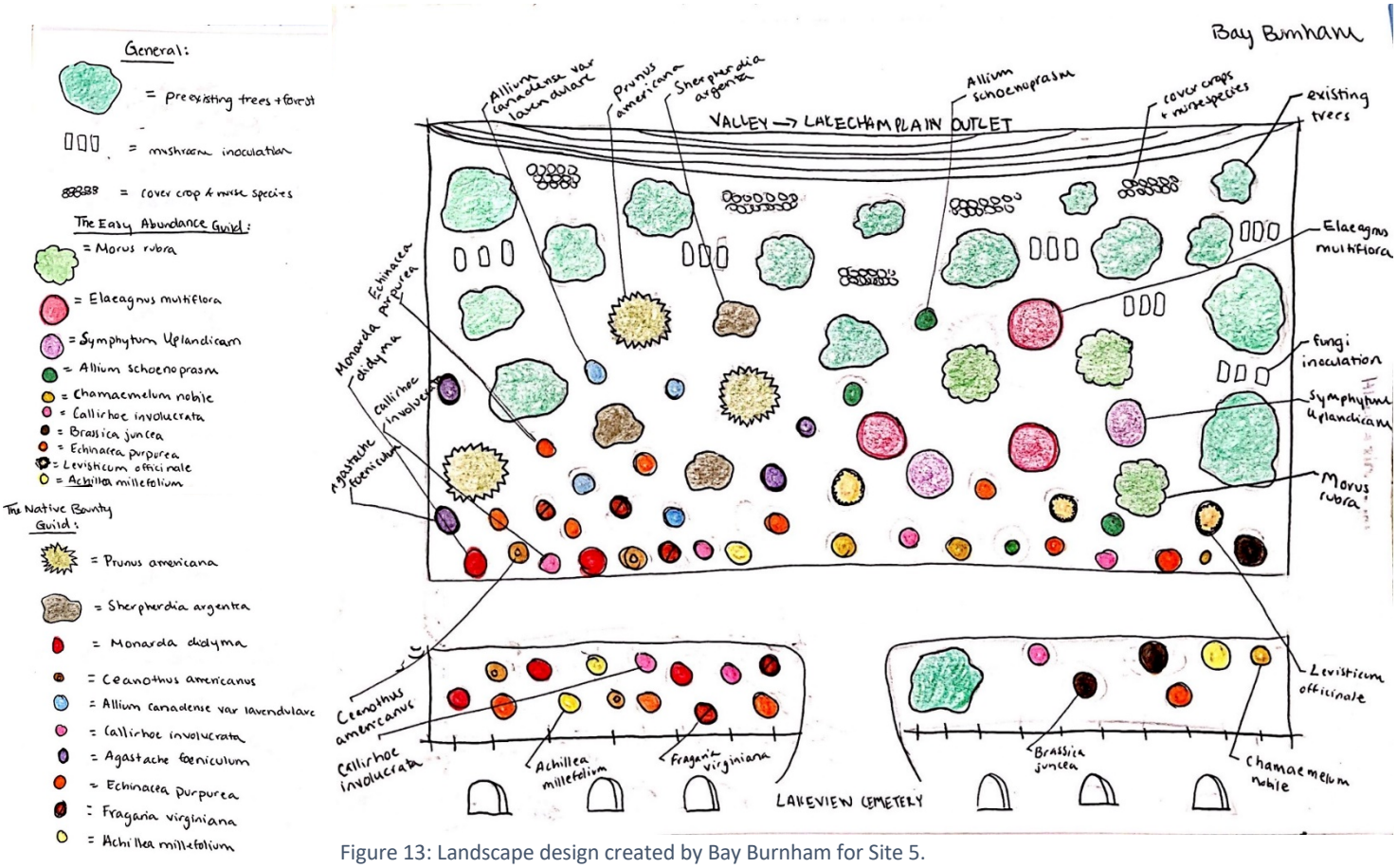


Figure 13: Landscape design created by Bay Burnham for Site 5.

There is a cleared area outside of Lakeview Cemetery's southeastern fence line that would be an excellent place to restore wildlife habitat by creating pollinator gardens, plant guilds, and implementing plants that build healthy soils. Ideally, this site could be transformed into a multifunctional buffer zone for Burlington's watershed. The landscape design for Site 5 is intended to build soil quality by introducing fungi and planting nutrient accumulator, nitrogen-fixing, and mulch-maker plants to recycle nutrients into soils. The landscape design also uses cover crops and dynamic plantings to reduce wind and water erosion, mushroom inoculation to remediate harmful pollutants—like arsenic (Alexander, 2019) and lead (Kapahi and Sachdeva, 2017), and diverse native plants that encourage wildlife and pollinators.

The path in this design would be made from a permeable surface, like gravel or stones. Stones and gravel act as crucial habitat zones for many pollinators and wildlife species (Young People's Trust for the Environment, 2014.) and help to infiltrate water. This path could also allow people to easily engage with this site. The Site 5 landscape design would attract many native species, particularly pollinators like swallowtail butterflies (*Papilio glaucus*) (Elzer-Peters, n.d.) , ruby-throated Hummingbirds (*Archilochus colubris [Linnaeus]*) (Whitten 1981), bumblebees (*Bombus spp.)* (Whitten 1981), and sweat bees (*Halictidae spp.*) (Philadelphia Orchard Project 2021). Wildlife that may be attracted to this landscape design include squirrels (*Sciuridae*), raccoons (*Procyon lotor*), foxes (*Vulpes vulpes*), catbirds (*Dumetella*

carolinensis), cardinals (*Cardinalis cardinalis*), woodpeckers (*Picidae*), and purple grackles (*Quiscalus quiscula*) (Gilani 2020).

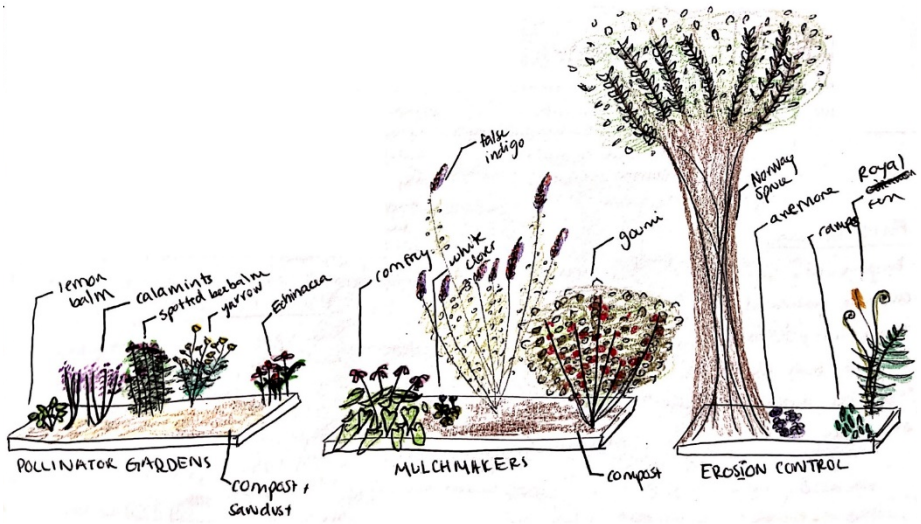


Figure 14: Depiction of plant species that could be planted at Site 5 created by Bay Burnham.

Figure 15: An alternate view of Site 5, showing pollinator gardens and rain gardens that boarder the garden path.

Section V: Conclusion and Future Recommendations

Our hope is that the management proposals we have described in this document serve as a catalyst to encourage public understanding and appreciation of the ecological benefits offered by the cemetery. Lakeview Cemetery is already frequented by joggers, walkers, birders, mourners and more. We are excited that this area already sees this level of engagement and we are interested in creating more engagement with this space. We offer the following suggestions to build upon this project in order to increase more public uses of the cemetery:

- ***Using the cemetery as an educational site:*** With its varied, tree species, bird populations and wildlife activities, this area provides a great variety of natural exposure that could be harnessed into a teaching tool. In Appendix 3, we outline two potential learning experiences that a teacher or community member might implement with a group of students.
- ***Developing signage:*** Adding signage could increase the public's appreciation and understanding of wildlife we share this space with. They could also detail the history of specific buildings or notable burial sites, explain the reasons behind the pollinator and wildlife developments we outline in this document, identify notable plants, all to help cemetery visitors build a stronger connection with the area.
- ***Increase public programming at the cemetery:*** Hosting public events such as birding outings, tree and plant walks, and wildlife tracking could provide opportunities for community members to engage in the natural communities of the cemetery in a respectful way. Mount Auburn Cemetery in Cambridge, Massachusetts, offers a wide variety of public programs such as these and could serve as inspiration for Lakeview Cemetery (Mount Auburn Cemetery, n.d.).

Additionally, we suggest that the cemetery continue to develop understandings of the ecological health and functions of the space. Continuing to research ecological specificities of the site can help better shape landscape management decisions to best fulfill local needs. Potential areas of future exploration at the cemetery that could be undertaken by future NR 206 groups or the City of Burlington include:

- ***Measuring and analyzing the impacts of changes in landscape management:*** As the cemetery begins to change the landscape, such as by implementing our suggested site designs or taking steps to improve soil health and introduce more native plants, data could be collected on animals using the cemetery. Wildlife data could be collected with game cameras and compared to past data. A thorough insect or bird survey could be conducted to assess pollinator activity at the cemetery.
- ***Testing and analyzing soils in the cemetery:*** As previously discussed in the "Improving Soil Health" section of this document, it is likely that contaminants such as polycyclic aromatic hydrocarbons, arsenic, lead, embalming fluids like formaldehyde, and heavy metals from casket construction reside within Lakeview Cemetery's soils. Future soil contaminant research could help pinpoint the types of pollutants that are harming Burlington's surrounding ecosystems, making it easier to find strategies to remediate soils resolve any pollutant issues within Lakeview Cemetery's soils.
- ***Developing an understanding of the potential to implement green burial practices in Lakeview:*** There are various strategies to make the conventional burial process (involving high amounts of toxic chemicals, heavy metals, and energy) more sustainable by avoiding the use of

embalming fluid and using biodegradable caskets, known collectively as ‘green burial’. ‘Natural’ or ‘green’ burials are legal in the state of Vermont but there are very few public cemeteries that offer them (Green Burial Vermont, n.d.). Research could be conducted on public cemeteries across the country that offer green burials, legal and practical considerations for their implementation, and local social acceptance and desire to have green burial options in Burlington. We believe that modifying burial practices at Lakeview could have significant positive ecological impacts, including reducing soil pollution, lowering carbon emissions at the cemetery, and reducing habitat disturbances.

We see this area as a land of opportunity where humans, wildlife, and nature can interact in a safe and healthy way, where city residents can escape the concrete jungle, and where lovers of plants and animals can come to appreciate the uniqueness of Burlington’s ecosystems. We hope that our proposals here inspire Burlington Parks and Recreation and the Burlington Cemetery Commission to create change in the cemetery to demonstrate how underutilized public greenspace can be revitalized. We are excited to see how this project, along with the collaborative efforts of past and future NR 206 groups, can utilize Lakeview Cemetery to materialize the city’s goals to mitigate climate change and maximize the value of open space.

Appendices

Appendix 1: Wildlife Data

Images taken on Week 1 (4/5/21-4/14-21), all from the game camera placed near the campground, with the exception of the white-tailed deer that was taken by the camera near the bike path entrance:

Figure 16: Common Raccoon (Procyon lotor)

Figure 17: Figure 16: Common Raccoon (Procyon lotor)

Figure 18: Groundhog (Marmota monax)

Figure 19: White-tailed Deer (Odocoileus virginianus) ~Bike path entrance~

Images taken on Week 2 (4/14/21-4/23/21), all from the campground game camera:

Figure 20: Groundhog (Marmota monax)

Figure 21: Common Raccoon (Procyon lotor)

Figure 22: Red Fox (Vulpes vulpes)

Images taken on Week 3 (4/21/21-5/1/21), all from the campground camera:

Figure 23: Eastern Grey Squirrel (Sciurus carolinensis) ~Captured 6 separate times during this period—images have been excluded from this document~

Figure 24: Common Raccoon (Procyon lotor)

Figure 25: Groundhog (Marmota monax)

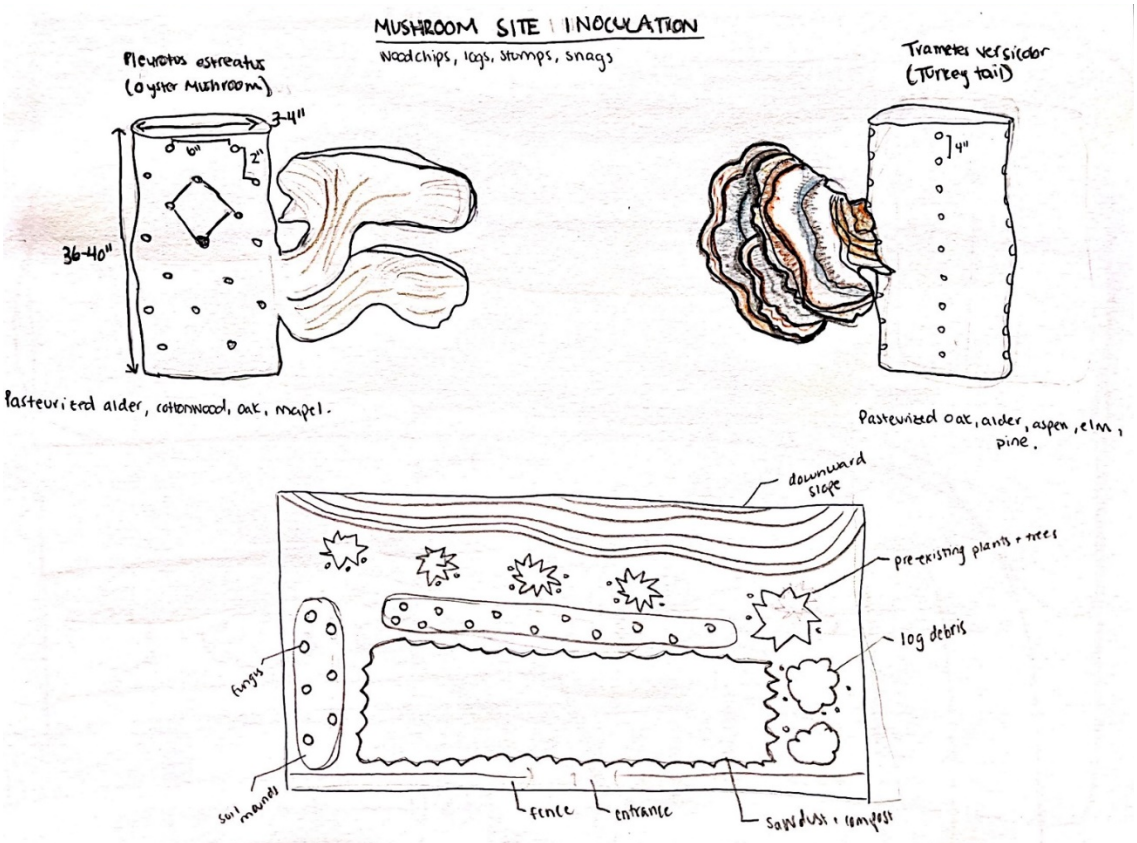
Figure 26: Groundhog (Marmota monax)

Figure 27: Common Raccoon (Procyon lotor)

Figure 28: Red Fox (Vulpes vulpes)

Appendix 2: Mushroom Inoculation Diagram

This image depicts fungal inoculation that could be implemented as a first step at Site 5. It represents inoculating the site with mushroom logs and adding sawdust/woodchips and compost to Site 5. The circles in the logs depict drill holes to be filled with spores/mycelium. This technique would help establish fungal networks and remediate the site of contaminants prior to any large-scale planting.



Appendix 3: Complete Plant Guide

Common Name	Scientific Name	Zone	Sunlight Requirement	Soil Requirement	Reason for Growing	Animal Use	Other Use	Specific Design Site Application
Sweet Joe-Pye Weed	*Eutrochium purpureum*	4-8	Full Sun, Partial Shade	Medium Moisture	Pollinators	Insectary		Fountain A
Heath Aster	*Symphyotrichum ericoides*	3-10	Full Sun, Partial Shade	Medium Moisture	Pollinators			Fountain A
Purple Coneflowers	*Echninacea purpurea*	5-8	Full Sun, Partial Shade	pH 6.5-7.0	Pollinators Wildlife food	Insectary		Fountain A Site 5
Bunchberry/ Creeping dogwood	*Cornus canadensis*	2-7	Shade	Moist	Groundcover	Berries for birds/wildlife	Pollinators	Fountain A/B New Development
Trumpet Honeysuckle	*Lonicera sempervirens*	3-9	Full Sun, Partial Shade	Draught tolerant, loves moist	Pollinators			Fountain B
Black cohosh	*Actaea racemosa*	4-8	Shade	Moist	Pollinators			Fountain B
Common boneset	*Eupatorium perfoliatum*	2-10	Full Sun, Partial Shade	Moist	Pollinators			Fountain B
Scarlet beebalm	*Monarda didyma*	4-9	Full Sun, Partial Shade	Moist	Pollinators		biomass	Fountain B Site 5
Serviceberry	*Amelanchier canadensis*	4-8	Full Sun, Partial Shade	Acidic, moist, well-drained	Understory	Berries for birds		New Development
White Clover	*Trifolium repens*	4-8	Full sun	Well-drained, fertile soils	Biomass, Nitrogen fixer			
Purple poppy-mallow	*Callirhoe involucrata*	3-9	Full Sun, Partial Shade	Well-drained to dry soil	Ground cover	insectary	Soil improver	Site 5
Anise hyssop	*Agastache foeniculum*	4-8	Full sun	Fertile, well-drained soils	biomass	insectary		Site 5
New Jersey Tea	*Ceanothus americanus*	4-10	Full Sun, Partial Shade	Well drained average to dry soil	nitrogen-fixer	insectary	Biomass, soil improver	Site 5
Common yarrow	*Achillea millefolium*	4-8	Full sun	Sandy, loamy, clay, well-draining	insectary	beneficial insect attractant		Site 5
Wild strawberry	*Fragaria virginiana*	4-9	Full Sun, Partial Shade	Fertile, moist to dry-mesic, well-drained soils	Ground cover	insectary	Soil improver	Site 5
Black Mustard Seed	*Brassica juncea*	2-11	Full Sun, Partial Shade	Light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil	Soil improver	insectary		Site 5
Roman chamomile	*Chamaemelum nobile*	4-9	Full sun	Light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil	Ground cover	insectary		Site 5
Lovage	*Levisticum officinale*	4-8	Full Sun, Partial Shade	Average, medium moisture, well-drained soil	insectary	beneficial insect attractant	soil improver	Site 5

Red Mulberry	*Morus rubra*	4-9	Full Sun, Partial Shade	Rich, moist, well-drained soils				Site 5
Comfrey	*Symphytum Uplandicum*	4-8	Full Sun, Partial Shade	Average, medium moisture, well-drained soils	biomass	insectary	Soil improver	Site 5
Goumi	*Elaeagnus multiflora*	4-9	Full sun	Dry or moist soil and can tolerate drought	nitrogen fixer			Site 5
Chives	*Allium schoenoprasum*	4-8	Full Sun, Partial Sun	Average, medium, well-drained soils	insectary			Site 5
Silver buffaloberry	*Shepherdia argentea*	3-9	Full Sun, Partial Shade	Average, moderately fertile, medium moisture, well-drained soil	nitrogen fixer			Site 5
Wild plum	*Prunus americana*	3-7	Full Sun, Partial Shade, Shade	Moist	Wildlife food			Site 5
Wild garlic	*Allium canadense var lavendulare*	5	Full sun	Drought tolerant and prefers well-drained soils	insectary		soil improver, nitrogen-fixer, biomass	Site 5
Blue False Indigo	*Baptisia australis*	4-8	Full Sun, Partial Shade	Average, dry to medium, well-drained soils	Nitrogen fixer			Anywhere
Russian olive	*Elaeagnus angustifolia*	2-7	Full sun	Light, sandy loams	Nitrogen fixer			Anywhere
New Jersey Tea	*Ceanothus americanus*	4-10	Full Sun, Partial Shade	Well drained average to dry soil	Nitrogen fixer			Anywhere
Comfrey	*Symphytum officinale*	3-9	Full Sun, Partial Shade	Loamy, well-drained	biomass			Anywhere
Anise Hyssop	*Agastache foeniculum*	4-8	Full Sun, Partial Shade	Fertile, well-drained soils	biomass	insectary		Anywhere
Chives	*Allium schoenoprasum*	4-8	Full Sun, Partial Shade	Average, medium, well-drained soils	Nutrient Accumulator	Insectary		Anywhere
Dandelion	*Taraxacum officinale*	3-10	Full sun	Well-drained	Nutrient Accumulator			Anywhere
Chicory	*Cichorium intybus*	3-7	Full sun	Fertile, well-draining soil	Nutrient Accumulator			Anywhere
Yarrow	*Achillea millefolium*	4-8	Full sun	Sandy, loamy, clay, well-draining	Nutrient Accumulator, Insectary			Anywhere
Highbush Cranberry	*Viburnum opulus*	3-8	Full Sun, Partial Shade	Moist but Well-Drained, Well-Drained	Erosion prevention			Anywhere
Orchard grass	*Dactylis glomerata*	4-8	Full Sun, Partial Shade	Moist soil, drought tolerant	Erosion prevention			Anywhere
Perennial ryegrass	*Lolium perenne*	5-7	Full Sun, Partial Shade	average, medium moisture soils	Erosion prevention			Anywhere

Lemon Balm	*Melissa officinalis*	4-9	Full Sun, Partial Shade	Average to even poor, well-drained soil	Insectary			Anywhere
Spotted Beebalm	*Monarda punctata*	4-9	Full sun	Dry, sandy soil	Insectary			Anywhere
Echinacea	*Echinacea angustifolia*	3-8	Full Sun, Partial Shade	Clay Loam, Medium Loam, Sandy Loam, Clay, Sandy	Insectary	Insectary		Anywhere
Greek oregano	*Origanum vulgare hirtum*	4-8	Full Sun, Partial Shade	Well-drained, light/medium/heavy clay soils	Insectary			Anywhere
Bronze Fennel	*Foeniculum vulgare 'purpureum'*	4-9	Full sun	Moist, rich, well-drained soils	beneficial insect attractant	insectary		Anywhere
Clove Currant	*Ribes odoratum 'Crandall'*	4-8	Full Sun, Partial Shade	rich, fertile, medium moisture, well-drained clay or silt loams	Wildlife food	Insectary, biomass	soil improver, very fragrant blooms	Anywhere
Black Eyed Susan	*Rudbeckia hirta*	3	Full Sun, Partial Shade	Drought resistant	Aesthetics, food, pollen, shelter	Pollination	Dye	Ash Circle
New England Aster	*Symphyotrichum novae-angliae*	4	Full sun	All but dry soil	Aesthetics, food, pollen, shelter	Pollination	Relieves upper/lower respiratory issues	Ash Circle
Bee Balm	*Monarda*	4	Full Sun, Partial Shade	Well-drained soil	Aesthetics, food, pollen, shelter	Pollination	Treats common cold	Ash Circle
Common Sneezeweed	*Helenium autumnale*	3	Full Sun, Partial Shade	Moist- wet soil	Aesthetics, food, pollen, shelter	Pollination	Treats common colds and headaches	Ash Circle
Bugbane	*Cimicifuga*	4	Partial shade	Moist, well-drained soil	Aesthetics, food, pollen, shelter	Pollination		Ash Circle
American Witchhazel	*Hamamelis virginiana*	5-8	Full Sun, Partial Shade	Moist soil, but tolerant to most conditions	Aesthetics, food, pollen, shelter	Pollination		Ash Circle
Creeping Myrtle	*Vinca minor*	4-9	Full Sun, Partial Shade	Moist, well-drained soil	Aesthetics, food, pollen, shelter	Pollination		Ash Circle

Appendix 4: Lesson Plans

These lesson plans are designed to be implemented by a community member or teacher. They are beginner level but have the potential to be scaled to be of interest to older participants.

Lesson Plan 1: Who are all these Bugs?

Activity Goal:

For students to familiarize themselves with Lakeview Cemetery, find (and name) as many insects as they can, and discover where those insects often hide. Students are asked to make a list of the insects they come across and to creatively name new insects they don't recognize. The goal in this is not to accurately ID each insect, but rather to make a connection between a funny name and a new bug!

Required Materials:

For each group

- Pencils
- Paper
- Clipboard

For instructor

- Timepiece

Time: 40 Mins-1 Hour

Activity Description:

Students will be split into two to three teams, depending on overall group size, and will be sent off in different directions in search for the mysterious critters of the graveyard: insects! The students will spend 20-30 minutes exploring the grasses, trees, and edge areas of the cemetery looking for bees, flies, caterpillars, butterflies, ants etc. Students should record what types of insects they are able to find (i.e. butterflies of different colors, moths, ants, flies, grasshoppers, beetles, etc), identify the ones they recognize, and come up with names for the ones they don't. For example, if a group found a stink bug and didn't know how to ID it, they might call it a "shiny diamond bug," "Hunched-back greenie," or "Ms. Smelly Beetle Shell", the point here is for kids to have fun assigning names to new insects and to *remember* this fun name associated with a new species. It is not to accurately identify all insects they find. Kids should be encouraged to base their names off of the behavior of the insect as well as its appearance; tell them to watch what it does and make note of where it lives! Does it have wings? How many legs does it have? Can you see its eyes? How long are its antennae?

Steps:

- Split the group into even teams of up to 6.
- Give each team their writing materials and have them designate a scribe/recorder.
- Students should understand the importance of insect abundance and diversity before beginning this exercise (their role in pollination and the food web, their importance in the health of birds, bats, rodents, plants, etc).

- Send each group off in a different direction from the central meeting location. Depending on available time, weather, and instructor preference, decide a time limit for the exploration part of this exercise (20-40 minutes). Students should be ready to return when they hear the instructor calling; discourage early returners asking for a time-check.
- Kids should record all the different insects they come across by name. Making up names for insects they don't know. Encourage a bit of competition! Who can find and name the most insects?
- Groups should also note where these insects were found. Were they on the bark of trees, in between grass blades, on headstones, or in tall grass? (The purpose of this is for them to understand what habitats in which these insects most often live.)

Discussion:

After all the groups have explored for 20-40 minutes, have them come back together and talk about what they saw. Did they see similar insects? Where did they find them? Have they seen these insects around their house, in parks, in the city, or in their garden before? Were they surprised by the amount, or lack thereof, of insects? What do you think these insects eat? Does this dictate where they live? How do insects move, do they all jump or fly?

Feel free to talk about grass as monocultured, biological deserts. Have the kids share their favorite insect names and the insect they thought looked coolest.

Learning Outcomes:

Kids should learn where insects are most prevalent and what habitats they like to live in. The distinction between tall, meadow grasses and short yard grass should be made. Students should come away from this exercise with a greater appreciation of insects. Students should become more familiar with the natural area of Lakeview Cemetery and have fun exploring and naming insects.

Lesson Plan 2: Diversity Exercise

Activity Goal:

This activity aims to build an awareness of the vast diversity of our natural landscape and the diversity of the people of Burlington VT. Through the plants and headstones available in Lake View Cemetery students can learn how varied the life in our world can be.

Required Materials:

- Timepiece
- Note paper for students
- Chalk/charcoal and paper for doing rubbings
- Clipboard for each group

Time: 30 Mins-1.5 Hours

Activity Description:

Before arrival at the cemetery, prep students with the concept of diversity. They should understand the basic differences between biodiversity and cultural diversity, specifically highlighting the importance of

biodiversity in a functional ecosystem and illustrating the abundance of names humans have. Students should also be made aware of the need for reverence and respect when moving through the graveyard. This is a sacred place and our use of it is contingent on our behavior.

Steps:

- The goal of the activity is to find as many **different** trees and family names as possible.
- The group is divided into two or three teams of five depending on group size.
- Give each team their materials and instructions.
- Team 1 (Leaves) gets paper and pencil and has the goal of finding as many different types of leaves as possible inside the time limit: 15-30 mins or more. They are encouraged to document the differences however they want. Drawing a basic image of each different variety is encouraged. Samples my be collected from the ground, don't encourage the picking of live leaves (still attached to branches/green)
- Team 2 (Names) Gets paper and pencil and has the goal of finding as many last names as possible inside the time limit. For each name they should record a birth date on the stone.
- Optional team 3 (textures) This group should be given the rubbing supplies (paper and chalk/charcoal), their task is to find as many distinct textures throughout the cemetery on tree trunks and headstones.

Send all the groups off at once to complete their goals, expect some light to moderate competitiveness, though make it clear that sabotage will not be acceptable. Give the students a time limit but feel free to monitor engagement and shrink or expand this time limit as needed.

Discussion:

This part of the activity will be largely based on the teacher's interest and the direction the students take this discussion.

Once all the students have returned from their searches ask them to briefly describe what they have found. Anticipate that they may express surprise at the level of diversity they found. Delve into questions and thoughts students have brought up. If little arises from the students, consider adding in your own questions or any of the ideas listed below.

- How have your expectations differed from the experience if at all?
- Can you guess what the regionality/culture behind the names collected off headstones?
- Using the dates collected off headstones, how long do you think people have been buried here?
- How many tree species did they recognized while exploring the cemetery?
- Why are there are so many different textures of rock and bark?
- Is it important that people, plants and rocks are different?
- What does diversity mean to you?
- Does diversity make us resilient or vulnerable?
- Where do you see diversity in your life?

Don't over do it on the questions, read your group and ask the right things to deepen the conversation and promote introspection. Wherever possible allow the students to lead the conversation. Moderate, don't dictate.

Learning Outcomes:

Students should walk away from this activity with a better understanding of

- Vermont's diverse plant population
- Cultural diversity of Burlington residents
- Exposure to the idea that diversity makes us resilient

References

ADK Action. (2020, September 23). *Leaf it Alone: Creating Overwintering Habitat for Pollinators*. https://www.adkaction.org/blog/leaf-it-alone/

Alexandra, R. (2019). *Oyster mushrooms helped clean up after California's wildfires. Why is it so hard to make a business case for "mycroremediation?"*. The Counter. https://thecounter.org/mycoremediation-radical-mycology-mushroom-natural-disaster-pollution-clean-up/

Bot, A., & Bernites, J. (2005). *The importance of soil organic matter*. Retrieved May 4, 2021 from http://www.fao.org/3/a0100e/a0100e02.htm

The Botanical Journey. (n.d.). *Oaks & acorns: the mystery of the mast. https://thebotanicaljourney.com/blogs/the-botanical-journey/oaks-acorns-and-the-mystery-of-the-mast*

Brennan, A. K., Givens, C. E., Prokopec, J. G., Hoard, C. J. (2018). Preliminary investigations of groundwater quality near a Michigan cemetery, 2016-17. *U.S. Geological Survey*. https://pubs.usgs.gov/sir/2018/5120/sir20185120.pdf

Burlington Conservation Board. (2014). *City of Burlington Open Space Protection Plan*. https://www.burlingtonvt.gov/sites/default/files/PZ/OpenSpaceProtectionPlan/BOSPP_As%20Adopted_3.31.14%20with%20inventory.docx.pdf

Burlington Wildways. (n.d.). *Grow Wild*. https://burlingtonwildways.org/get-involved/grow-wild

Christmann, S. (2019), Do we realize the full impact of pollinator loss on other ecosystem services and the challenges for any restoration in terrestrial areas?. Restor Ecol, 27: 720-725. https://doi.org/10.1111/rec.12950

City of Burlington. (2014). *Climate Action Plan*. https://www2.burlingtonvt.gov/Archives/assets/0/122/318/360/815/794/1960/00bb0426-bd69-4a57-ae89-0cce64c66f4e.pdf

Cusack, C., Harte, M., & Chan, S. (n.d.). *The Economics of invasive species*. Oregon State University. Retrieved May 4, 2021 from https://seagrant.oregonstate.edu/sites/seagrant.oregonstate.edu/files/sgpubs/onlinepubs/g09001.pdf

Elzer-Peters, K. (n.d.) *All about echinacea.* American Meadows. https://www.americanmeadows.com/perennials/echinacea/all-about-echinacea

Freese, A. (2016). *What lies beneath: Burlington's dirt problem isn't cheap*. Seven Days Vermont. Retrieved May 4, 2021, from https://www.sevendaysvt.com/vermont/what-lies-beneath-burlingtons-dirt-problem-isnt-cheap/Content?oid=3153124

Gilani, N. (n.d.). *Nonpoisonous trees.* SF Gate. https://homeguides.sfgate.com/nonpoisonous-trees-34931.html

Green Burial Vermont. (n.d.) https://grassrootsfund.org/groups/green-burial-vermont

Herndon, L. (2016). *Bees buzzing at Woodlawn Cemetery*. The Riverdale Press. Retrieved May 4, 2021, from https://riverdalepress.com/stories/Bees-buzzing-at-Woodlawn-Cemetery,60631

Honeyager, M. (2015, June 29). *Why is Soil Health So Important?* RecycleNation. https://recyclenation.com/2015/06/why-is-soil-health-so-important/

Kapahi, M., & Sachdeva, S. (2017). Mycoremediation potential of Pleurotus species for heavy metals: a review. Bioresources and bioprocessing, 4(1), 32. https://doi.org/10.1186/s40643-017-0162-8

Larum, D. (2020). *Deep mulch gardening info: how to garden with deep mulch methods.* Gardening Know How. Retrieved May 4, 2021, from https://www.gardeningknowhow.com/garden-how-to/mulch/deep-mulch-gardening-info.htm

Mount Auburn Cemetery (n.d.). https://mountauburn.org/?cache

National Oceanic and Atmospheric Administration. (n.d.). *Watersheds, flooding, and pollution.* https://www.noaa.gov/education/resource-collections/freshwater/watersheds-flooding-and-pollution

Peinhardt, K. (2019). *Multi-use cemeteries: A place for the living in the land of the dead*. Project for Public Spaces. https://www.pps.org/article/multi-use-cemeteries-a-place-for-the-living-in-the-land-of-the-dead

Pennsylvania Historical & Museum Commission. *1900-present: Lawn-park cemeteries and memorial parks.* http://www.phmc.state.pa.us/portal/communities/cemetery-preservation/development/1900-present.html

Quinton, J. & Duinker, P. (2018). Beyond burial: Researching and managing cemeteries as urban green spaces, with examples from Canada. Environmental Reviews. 27. 10.1139/er-2018-0060.

Stamets, P. (2005). Mycelium Running: How Mushrooms Can Help Save the World (Illustrated ed.). Ten Speed Press.

Talbot, M. (2016). More sustainable (and beautiful) alternatives to a grass lawn. *Natural Resources Defense Council.* Retrieved May 7, 2021 from https://www.nrdc.org/stories/more-sustainable-and-beautiful-alternatives-grass-lawn

Tallamy, D. 2007. *Bringing nature home: How you can sustain wildlife with native plants* (2nd ed.). Timber Press.

US Forest Service. (n.d.). *Native gardening*. Retrieved May 4, 2021, from https://www.fs.fed.us/wildflowers/Native_Plant_Materials/Native_Gardening/index.shtml

Vermont Department of Environmental Conservation. (a) (n.d.). *Lake Champlain*. https://dec.vermont.gov/watershed/restoring/champlain

Vermont Department of Environmental Conservation. (b) (n.d.). *Shoreland permitting best management practices. https://dec.vermont.gov/watershed/lakes-ponds/permit/shoreland/appresources/shoreland-bmps*

Vermont Department of Environmental Conservation. (c) (n.d.). *Establishing no-mow zones.* https://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/LP_BMPSHOREestablishing%20NoMowZones.pdf

Vermont Shoreland Protection Act of 2014, Chapter 49A of Title 10 V.S.A. § 1441 et seq. (2014). https://dec.vermont.gov/sites/dec/files/wsm/lakes/docs/Shoreland/lp_ShorelandHandbook.pdf

Weddle, R. (n.d.) *Wildlife.* Friends of Glasgow Necropolis. Retrieved May 4, 2021, from https://www.glasgownecropolis.org/wildlife/

Whitten, W. (1981). Pollination Ecology of Monarda didyma, M. clinopodia, and Hybrids (Lamiaceae) in the Southern Appalachian Mountains. *American Journal of Botany, 68*(3), 435-442. doi:10.2307/2442781

Young People's Trust for the Environment. (2014, September 12). *Wildlife in Winter*. https://ypte.org.uk/factsheets/wildlife-in-winter-df955f07-e96e-417b-9def-5a25608c56d6/making-winter-habitats