CHAPTER 5

LIFE

Life in the Parks

Life Goals, Strategies, and Recommendations

LIFE IN THE PARKS

Minneapolis parks are home to a rich variety of birds, mammals, fish, and insects. While this wildlife has to adapt to a living environment transformed by the effects of human activities, it is still wild and its habitat is a critical consideration in park maintenance and management. However, there are often competing interests in wildlife protection and human recreational activities; shared spaces mean compromises happen on both sides. Thus, MPRB has been working to create programs that work to bring these interests into balance for all life within the parks while fulfilling its mission to "permanently preserve, protect, maintain, improve, and enhance its natural resources, parkland, and recreational opportunities for current and future generations." Understanding that water, air, and land conditions have the biggest impacts on the plant, animal, and insect life within the parks, this chapter considers what can be addressed in park operations that will help to mitigate these impacts, resulting in improved habitat quality and increased biodiversity.

AIR QUALITY, CLIMATE CHANGE, AND LIFE

A 2015 Minneapolis Climate Change Vulnerability Assessment prepared by graduate students at the University of Minnesota in partnership with the Sustainability and Public Health Offices at the City of Minneapolis showed that continued climate change will result in an increase in precipitation and in the number of days where extreme heat (over 90 degrees) will be experienced in Minneapolis. The same study states Minneapolis "can be considered the **urban heat island** core of our region," which will only exacerbate the effects of increased stormwater and temperature, given the greater amount of impervious surface and relatively less vegetation in the city compared with the broader metropolitan area. These effects have the potential to be devastating to the plant and animal communities that currently occupy the parks. Their ability to adapt and thrive will be severely limited if climate conditions are in a constant state of change. Climate change can also result in overpopulation of problem insect species. Mosquito populations, for instance, tend to fluctuate depending on temperature and rainfall, where tick populations tend to thrive after mild winters. Because human development and travel patterns have a significant effect on climate change, it is important to examine the steps that can be taken to reverse effects, as these effects impact park users as well as wildlife populations. Thus, MPRB must be concerned with implementing solutions that present opportunities to curtail climate change and improve air quality in order to protect and preserve natural areas and all forms of life that occupy them.

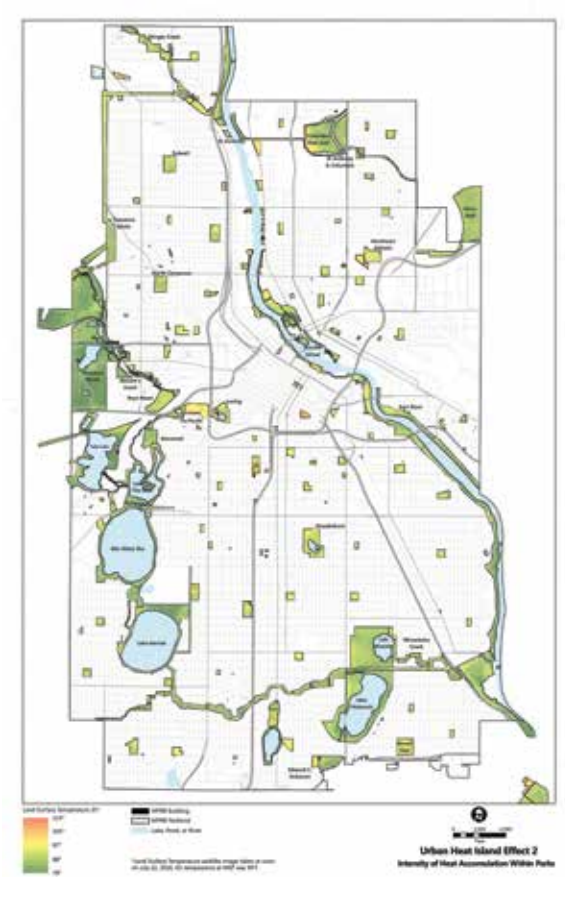


Figure 29. Urban Heat Island Effect: Intensity of Heat Accumulation. See appendix for full size map.

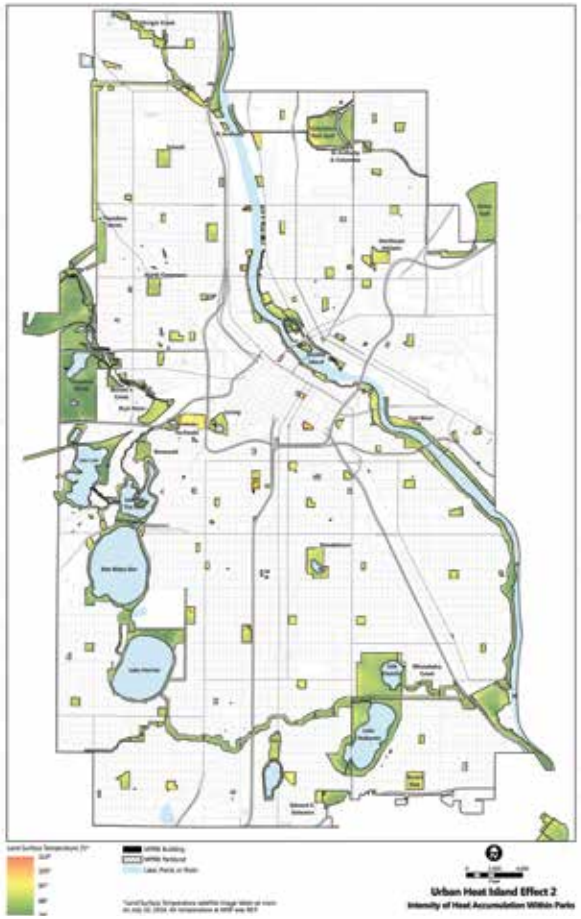


Figure 30. Urban Heat Island Effect: MPRB Intensity of Heat Accumulation. See appendix for full size map.

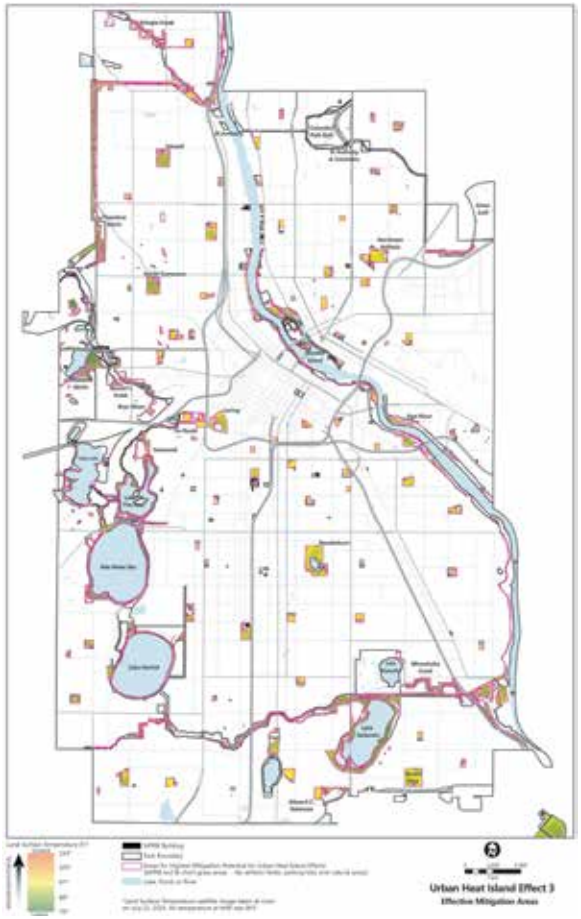


Figure 31. Urban Heat Island: Effective Mitigation Areas. See appendix for full size map.

While MPRB works diligently to explore opportunities for partnership that will result in improved conditions for plant and animal life in the parks, it is also important to note that quality of life in the parks also extends beyond plant and animal communities to the visitors who come to park properties for recreation, relaxation, and enjoyment. Because air quality in and around the parks may have an effect on the health of park users, it is critical to be mindful of what's happening near the park system when thinking about its future. "Current air pollution levels contribute to a large number of health impacts. In the seven-county Twin Cities metro area, air pollution contributed to about 2,000 deaths and hundreds of hospital admissions and emergency department visits annually for respiratory and cardiovascular conditions" (Life and Breath: How air pollution affects public health in the Twin Cities, MPCA and MDH 2015). Because of this, MPRB must continue to strategically partner with other local agencies and organizations to determine how to best individually and collectively mitigate air quality impacts that pose human health risks.

WATER AND LIFE

While there is certainly opportunity to create habitat at a certain scale in each of the neighborhood parks that MPRB manages, the highest quality habitats for wildlife in the parks are found in regional parks, as these are both larger and more naturalized than neighborhood parks. Deer, coyotes, squirrels, rabbits, turtles, fish, mussels, beaver, turkeys, geese, eagles, owls, bees, butterflies, and many other mammals, birds, insects, and water-dwelling species make themselves at home in these parks. Region-

al parks are also home to the majority of the water bodies found in the park system. As such, it is critical to consider how water quality affects habitat quality and poses potential health impacts for all forms of life throughout the park system.

"Some types of water pollution affect habitat quality or pose a threat to aquatic life. These types of pollution make it difficult for fish, macroinvertebrates like snails and insects, and native aquatic plants to thrive in and around a water body" (City Goal Results Minneapolis: Healthy lakes, Rivers, and Streams; City of Minneapolis and MPRB, 2016). However, this problem extends beyond aquatic life. Water pollution also poses a significant health risk to plant and animal species that depend on water bodies for hydration and food sources and to visitors who depend on safe beaches and water bodies for recreational activities.

While MPRB must partner to achieve improved water quality, given all of the externalities that are not under MPRB's immediate control, the organization can work toward preventing any further degradation of water quality and enhancing aquatic habitat, wherever possible. Green infrastructure, such as rain gardens, bioswales, permeable pavers, and other devices designed to catch and filter stormwater before it enters waterbodies, are essential tools in this effort. Because they also require regular maintenance, it is important to include those requirements and costs in the scope of the project when green infrastructure is proposed.

Because invasive species in water can also impact aquatic habitat, MPRB's aquatic invasive species inspections, harvesting of aquatic invasive plants, and special studies to monitor and eradicate invasive fish are all building blocks toward protecting water quality, and by extension, aquatic habitat. According to the Minnesota Department of Natural Resources website, "all surface waters in Minnesota, including lakes, rivers, streams, and wetlands, are protected for aquatic life and recreation where these uses are attainable.

Protection of **aquatic life** means:

- maintenance of healthy, diverse, and successfully reproducing populations of aquatic organisms,
- protection of the aquatic community from the direct harmful effects of toxic substances,
- protection of human and wildlife consumers of fish or other aquatic organisms.

Protection of **aquatic recreation** means:

- maintenance of conditions suitable for swimming and other forms of recreation.

CASE STUDY SNAPSHOT: Invasive carp study

As a bottom-feeding fish, carp are capable of disturbing lake beds where phosphorous has settled. This diminishes water quality by creating algal blooms. Carp also eat and uproot vegetation, which can destroy a lake's aquatic plant community. Lakes with an overgrowth of carp typically have high phosphorus concentrations, low water clarity, and little to no aquatic plant growth.

In 2000-2001, carp were removed from Lake Nokomis as part of a broader water-quality project implemented by the Blue Water Partnership. Formed in 1998 by the MPRB, the City of Minneapolis and the Minnehaha Creek Watershed District (MCWD), the Blue Water Partnership also expanded three wetlands near Lake Nokomis to create settling ponds, installed two grit chambers near the lake; and installed two generations of weirs on Minnehaha Creek to keep pollution, stormwater, and invasive species out of Lake Nokomis.

From 2010 to 2016, the MCWD conducted a biomanipulation project to remove other "rough fish" species, such as bullhead; and also to stock predator fish that could eat fish linked to increased algae and turbidity.

Based on MPRB field staff's observations of carp in possibly excessive numbers, MCWD organized an electrofishing expedition on the lake as the initial step in estimating its carp population. Based on those estimates and research conducted by Minnesota Aquatic Invasive Species Research Center at the U of M, it was determined that Lake Nokomis' carp population had indeed reached a point where water quality could be affected.

In 2016, the MPRB was awarded LCCMR funding for a project to study Lake Nokomis' carp population by applying new research to a proven approach. The goal of the project is to develop long-term management practices that improve water quality.

MPRB and MCWD partnered with scientists at two local environmental consulting firms—WSB and Blue Water Science—to implement a project with three objectives:

1. *Determine carp population structure and monitor patterns of carp movement to determine optimal times for carp removal*
2. *Remove carp from the lake during periods when the fish have aggregated (or "schooled") during winter.*
3. *Implement an Integrated Pest Management plan to lessen future impacts of carp on the lake's water quality*

The project study area is the entire Lake Nokomis subwatershed, that includes Taft Lake, Mother Lake, Legion Lake, and several wetlands where carp are most likely migrating through storm sewers, open channels, and wetlands. Carp migrate so that they can spawn in lakes and wetlands that experience winter kill (when fish die in winter due to a lack of oxygen). This eliminates competition from other fish species that feed on carp eggs and larvae.

The project is estimated to run through December 2019.

LAND AND LIFE

Land management strategies in the parks are mindful of an ever-growing, ever-changing natural world. Environmental managers, naturalists, park keepers, planners, and recreation directors work collaboratively toward long term sustainability of the parks, their programs, and native plant and animal populations that reside within them. They do this through an extensive list of standards, best management practices, and protocols, but also through goal setting and policy direction. MPRB's greatest opportunity to protect life on the land it manages is to evaluate how the land is managed and to identify what, if anything, could be improved about managerial approach. Recently, this ongoing evaluation has resulted in changes to park board policies, ordinances, and invasive plant management techniques.

INTEGRATED PEST MANAGEMENT

MPRB's **Integrated Pest Management** (IPM) procedure, adopted in 2008, "uses a combination of approaches, incorporating the judicious application of ecological principles, management techniques, cultural and biological controls, and chemical methods to keep pests below levels where they cause economic damage."

Effective January 1, 2019, the MPRB Board of Commissioners placed a moratorium on all use of glyphosate, a common chemical herbicide, in all parks. While in the past few years glyphosate use was limited to regional parks, mostly as spot application to eradicate noxious weeds as required by the MDA and to reduce invasive species, this change in policy is hoped to eliminate potential health risks associated with the chemical from the entire park system.

Note: MPRB still needs to assess what the alternative removal methods will be and to assess relative effectiveness, increased cost for manual labor if needed, or change in aesthetics and function of landscapes.

TERRESTRIAL INVASIVE SPECIES

In select parks and natural areas, invasive plants are addressed aggressively and subsequently, several eradication projects are underway and planned. MPRB contracts for these services, works with volunteers, and partners with local non-profits, such as Friends of the Mississippi River, to tackle invasive plant removal and restoration work.

CASE STUDY SNAPSHOT: Biological controls—knapweed and purple loostrife by Marcia Holmberg

Biological control is a process used to manage invasive plants using bioagents, the natural enemies of a plant such as insects or pathogens. Before bioagents are approved for release there is a rigorous process of testing and assessment. This work involves scientific study and collaboration with many agencies across the country such as the US Department of Agriculture and State Departments of Agriculture and Natural Resources. Testing and assessment can also involve agencies in other countries in addition to those in the United States.

Intensive research minimizes the risk that a newly imported bioagent will have a negative impact on other species including commercial agriculture crops in the United States. Additionally, the bioagents cannot harm humans and should be easy to use for a biological control program.

MPRB collaborated with the MnDNR in the 1990s to rear and introduce leaf-feeding beetles as a biocontrol for purple loosestrife in Minneapolis parks. This program has been highly successful and currently the leaf feeding beetles are well-established in Minnesota and doing a good job of controlling purple loosestrife.

MPRB worked with the Minnesota Department of Agriculture in 2003 to release insects for control of Spotted Knapweed and Leafy spurge on the Cedar Lake Regional Bike trail prairie, former railroad land.

You will still see these plants present in the park system, as the goal of a biological control program is to reduce the plants and lessen their impact on the environment.

WILDLIFE POPULATION MANAGEMENT AND PROTECTION

To meet the demands of park users as well as maintain the natural systems within the parks, wildlife management techniques are sparingly employed, when needed, to address unsustainable wildlife populations. In these instances, MPRB management techniques are consistent with US Fish and Wildlife Service (USFWS) and Minnesota Department of Natural Resources (MnDNR) requirements as well as MPRB Park Police safety standards. Additionally, MPRB has been implementing goose management since the 1980s and has a MnDNR approved Goose Management Plan.

MPRB staff recognize that more can be done to protect turtles and frogs in the parks, and as they travel to and from nesting sites. A first step is for the MRPB to assess parkways and roads that traverse park property (or roads adjacent to parks) near permanent or ephemeral waterbodies. The assessment should include items such as traffic volume and road width, shoulder materials (gravel is very attractive to snapping turtles for nesting) and grade change, noting the quality of the adjacent habitat, and identify the types of turtles found in those areas. Mitigation strategies could be seasonal or permanent and could include low wildlife fencing to prevent crossing and redirect turtles, adding better nesting sites on the 'right' side of the road, or as high traffic roadways are rebuilt, work with the City, County and MNDOT to install ecopassages (see below) to provide safe, under road crossings that will benefit more turtles, frogs, and other animals.

Within Theodore Wirth Park, turtles face mortality trying to cross Highway 55 and Glenwood Ave near Wirth Lake, and along certain sections of Wirth Parkway. Other known turtle trouble spots include Portland Ave along Diamond Lake and the west side of Hiawatha Golf Course. There are also human, dog, and turtle interactions at Powderhorn Park, at almost all beaches, especially Lake Harriet, Bde Maka Ska, and Cedar, as well as Webber Natural Swimming Pool where the MPRB is trying to keep them out of the pool area.

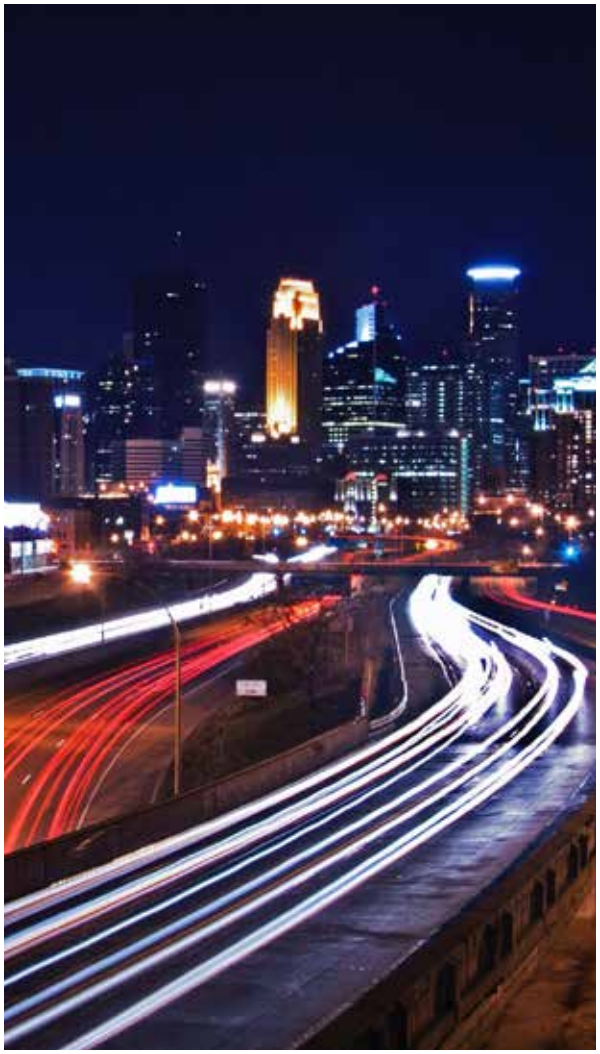
Note: As MPRB continues to evaluate how wildlife protection strategies might be incorporated into its daily operations, construction and development standards should be revised to require wildlife friendly materials. Erosion control netting, in particular, poses a challenge to songbirds, ducklings, small mammals, amphibians and reptiles. Erosion control netting standards should require woven or unwelded mesh. It is critical that MPRB staff monitor construction contractors to ensure they are mindful of wildlife protection as they do their work.

LIGHT POLLUTION

Light pollution negatively impacts humans, wildlife and entire ecosystems. Nocturnal wildlife, including moths, are the most affected. For example, artificial light interferes with insects' normal night-day cycle and impacts feeding and reproduction. In addition, street lights and other night lights readily attract moths which increases their exposure to predators, resulting in overall decline in moth populations. A Swiss study showed that the mortality rate of urban insects is 40 to 100-fold greater than in rural populations, due in part to the effects of light pollution.

NOISE

According to the OSHA website, "with noise, Occupational Safety and Health Administration's permissible exposure limit (PEL) is 90 dBA for all workers for an 8 hour day. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half." Thus, noise is something to be mindful of when thinking of the effects it can have not only on park users, but wildlife in the parks. Research shows that human activities, in general, increase background noise by 30 decibels. Special events and programming within the parks can also raise the noise levels. Additionally, maintenance of park spaces can be especially noisy, given the use blowers, mowers, and other noise producing machinery.



HABITAT AREAS

The Minneapolis park system provides homes for birds, insects, mammals, reptiles, plants, and other living beings. Whether comprised of preserved remnant prairie or mown turf under flowering trees, parks provide a wide range of habitat types and qualities. Habitat is not limited only to "nature areas," though those carefully preserved and stewarded sites provide significant advantages. In an urban area like Minneapolis, habitat may be scarce between parks, making those green spaces even more critical for habitat needs than in suburban or rural areas with their large swaths of undeveloped land. MPRB is committed to providing habitat for plants and animals in its system, and it must strategically balance the needs of habitat and the needs of recreation. The master planning of the park system in recent years has identified new and improved habitat areas in almost all parks—neighborhood and regional. MPRB also, through the urban forest, has management responsibility over perhaps the greatest opportunity for habitat: the tree canopy, where local and migratory birds like to rest and nest and where mammals and insects can find forage.

There are two main considerations with habitat: its essential presence in parks, at a variety of scales and landscape types; and how it connects across the city. This section focuses on habitat enhancement in individual parks.

NATIONAL AUDUBON SOCIETY'S IMPORTANT BIRD AREA DESIGNATION

Realizing the important role Minneapolis' parkland corridor provides for bird life, representatives from Minneapolis' Audubon Society and ACM, with approval and support of the MPRB, applied for and obtained National Audubon Society's Important Bird Area (IBA) designation for Minneapolis Chain of Lakes and Theodore Wirth Regional Parks in 2009.

The IBA program is a global initiative that seeks to "identify and conserve areas that are vital to birds and other biodiversity by working with Audubon chapters, land owners, public agencies, community groups, and other non-profits, Audubon endeavors to interest and activate a broad network of supporters to ensure that all Important Bird Areas are properly managed and conserved" (National Audubon Society, 2010).

U.S. FISH AND WILDLIFE SERVICE'S URBAN MIGRATORY BIRD TREATY

The U. S. Fish and Wildlife Service (USFWS) declared in July 2011 that the City of Minneapolis, the MPRB, the City of Saint Paul, and Audubon Minnesota were successful in their application to be part of the Urban Migratory Bird Treaty (UMBT) program. There are three major goals for the program: protect, restore, and enhance urban habitats for birds; reduce urban hazards to birds; and to educate and engage urban citizens in caring about and conserving birds and their habitats. These goals encompass everything from simple actions like keeping cats indoors to changing building codes to require new construction to follow bird safe guidelines for glass and for landscaping.

The focus area for Minneapolis and Saint Paul's UMBT is the Mississippi River corridor. Projects have focused on restoration and creation of habitat, and education through native plant gardens and interpretive signs.

ROBERTS BIRD SANCTUARY

The Thomas Sadler Roberts Bird Sanctuary is within Minneapolis Chain of Lakes Regional Park and is within the Minneapolis Chain of Lakes/Theodore Wirth Important Bird Area, designated by the National Audubon Society. The Important Bird Areas Program is an effort to identify and conserve areas that are vital to birds and other biodiversity. By working with Audubon chapters, landowners, public agencies, community groups, and other non-profits, Audubon endeavors to interest and activate a broad network of supporters to ensure that all Important Bird Areas are properly managed and con¬served. Ecologically speaking, the park system's forested natural areas would be considered fragmented: broken into small patches by road ways, paths and park lands featuring primarily turf grass and man-made amenities.

Lake Harriet, Lyndale Park and Lakewood Cemetery together total well over 300 acres of land. This acreage and the contiguous link to other parkland provides an important corridor of forest and waterways for wildlife, resident and migrating birds. White- tailed deer, turkey, fox and

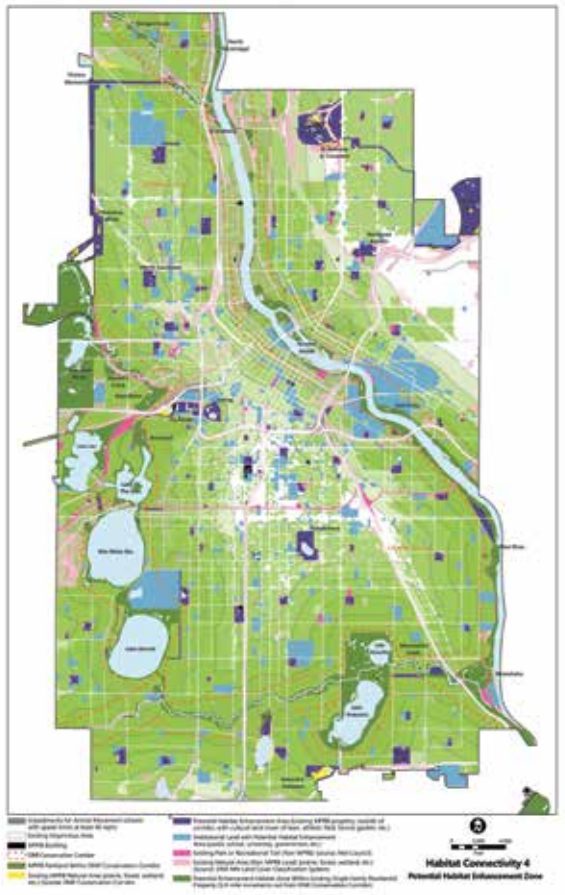


Figure 32. Habitat Enhancement Zones. See appendix for full size map.

coyote have all been seen in and around the Roberts Bird Sanctuary area, as well as common urban wildlife such as raccoons and gray squirrels.

Three goals were developed for improving the condition of the Roberts Bird Sanctuary:

1. Protect, preserve, and enhance the bird habitat and native plants contained within the Sanctuary for present and future generations of people and wildlife;
2. Educate and inspire people about birds and their habitats, Minnesota native plants, and the natural world;
3. Provide a minimal infrastructure for the Sanctuary that honors the integrity of this undeveloped natural area as a bird sanctuary and a place that connects people with nature.

LEAVES

Leaves are another important consideration in tree-related habitat and land management within the parks. Leaves are essential to the survival of butterflies, moths, spiders, and dozens of arthropods. Many butterflies and moths overwinter as an egg, caterpillar, chrysalis or adult and use leaf litter for winter cover, protection from cold, and predators. For example, as cocoons and chrysalis, Luna moths and swallowtails are disguised as dried leaves, blending right in with the 'real' leaves. Mowing or shredding leaves means these cocoons and chrysalis are shredded too. The many small insects that live in leaves are an important food source for small mammals, birds, turtles, and amphibians. To support pollinators and the entire food chain within the park system, MPRB best practices should seek to follow guidelines published by the Xerxes Society and Leave the Leaves.

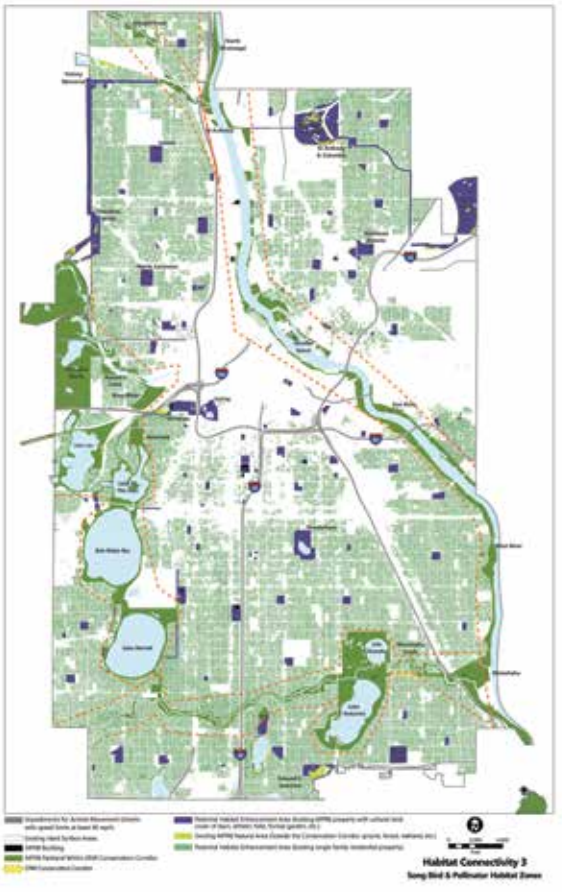


Figure 33. Song Bird & Pollinator Habitat Zones. See appendix for full size map.

POLLINATOR HABITAT

Another opportunity to improve habitat connectivity is in the creation of pollinator habitat. Given the ongoing decline of bee populations throughout the Midwest, it is critical that each city do what it can to give these essential species places to safely nest and do their work.

In 2011, the University of Minnesota Bee Lab reached out to MPRB Environmental Education staff about the possibility of placing bee "most wanted" posters at the gardens

in Lyndale Park. The Bee Lab was also working with the Xerces Society, a national non-profit dedicated to invertebrate conservation, to recruit volunteers to search for the rusty patched bumble bee (bombus affinis). This bee had rarely been seen in the previous 10 years. MPRB staff agreed to lead surveys in the park and volunteers have been helping conduct bee surveys in select parks every year since then. The rusty patched bumble bee has been found multiple times in the Minneapolis park system, including Lyndale Park. This is ecologically significant, as the rusty patched bumble bee was placed on the federal endangered species list in 2017.

From that initial connection, the Bee Lab and the MPRB Environmental Education department have worked together on many bee related projects and programs including an annual community party focused on bee and habitat education and moving people to action; a research project on flowering lawns, their impact to bee abundance and diversity as well as park visitor support for flowering lawns; incorporating bee lawn seed mixes into park projects; participating in the Minnesota Bee Atlas project for solitary nesting bees; and a new Pollinator Ambassador training program for teens.

A 2013 to 2014 survey of Eloise Butler Wildflower Garden & Bird Sanctuary's identified 104 species of bees including several uncommon or rare species, such as the rusty patched bumble bee. The study also identified plants that supported the greatest abundance of bees. These included New Jersey Tea, Queen of the Prairie, Bellflowers, Goldenrods, and native thistles.

As part of the Ecological System Plan development, MPRB partnered with Metro Blooms to map areas within Minneapolis that are most suited to the creation of pollinator habitat, including "sweet spots"-- the areas within the City of Minneapolis that would offer the greatest return on investment given the existing habitat quality and the potential to connect with other nearby habitat areas. This data has been shared with local and regional partners, including watershed districts and city and county departments to help begin a conversation about what might be tried both independently and together to expand pollinator habitat throughout the region.

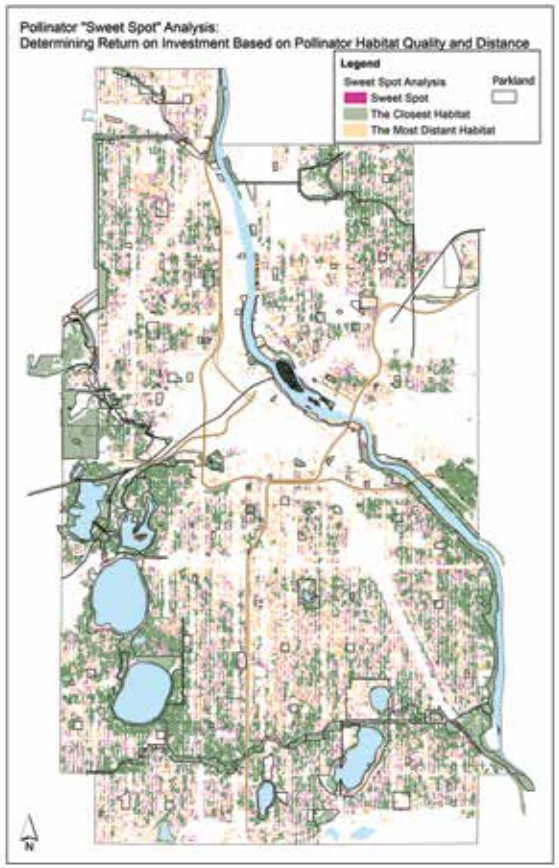


Figure 34. Pollinator "Sweet Spot" Analysis map. See appendix for full size map.

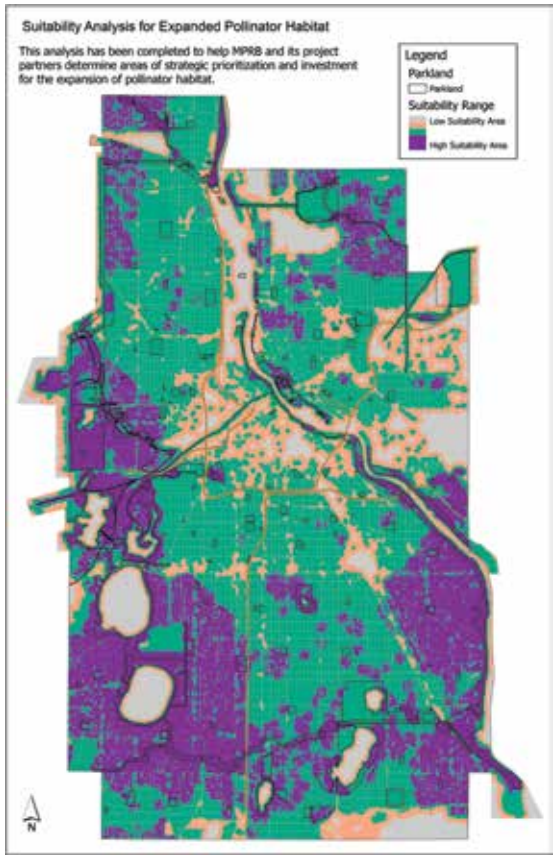
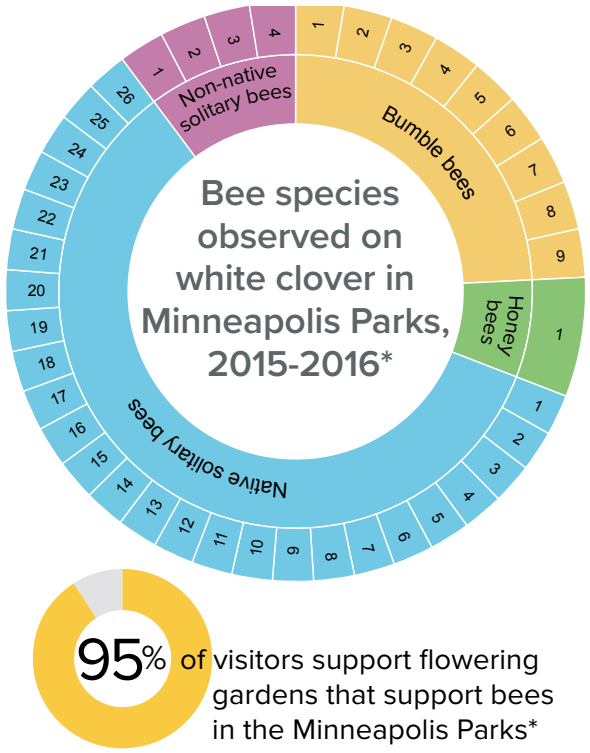


Figure 35. Suitability Analysis for Expanded Pollinator Habitat. See appendix for full size map.

Case Study Snapshot: Bee Lawn Benefits

In 2013 the University of Minnesota Bee Lab's project proposal, Enhancing Pollinator Landscapes, received funding from the Legislative-Citizen Commission on Minnesota Resources (LCCMR). The intent of the project was to develop an innovative way of helping pollinators by florally enhancing turf areas, otherwise known as Bee Lawns. This work had two parts. Part One was to run trials with native floral species to see which species could withstand mowing pressure and continue to flower when seeded into hardfescue. Part Two was to collect baseline data about bee diversity and abundance in existing typical turf areas. MPRB staff worked with student researchers to identify 11 Minneapolis park sites and one stormwater management area for monitoring to create the baseline data.

*Over the course of the 2015 growing season, this project monitored bee abundance and diversity at park sites with turf grass that had a consistent population of Dutch white clover (*Trifolium repens*). Working along a transect at each park site, approximately 1300 total specimens were captured. Findings showed that about 40% were honey bees, 29% bumblebees, and 31% other native bees.*



*MPRB and University of Minnesota Bee Lab collaboration project

Figure 36. Bees in the Minneapolis Parks

Figure 37. Habitat Corridors. See appendix for full size map.

*At the same time, the Bee Lab identified a few promising native plant species that could help enhance lawns including Calico aster (*Symphyotrichum lateriflorum*), creeping thyme (*Thymus serpyllum*), and Self-heal (*Prunella vulgaris ssp. Lanceolata*). Within the turf areas planted with Self-heal at the U of MN, researchers found zero honey bees, 38% bumblebees, and 62% other native bees.*

In Part Two of the project, four parks with clover were left as is and served as control sites, and four other clover sites were seeded or planted with plugs of creeping thyme and self-heal. Researchers then conducted bee surveys to discover if bee abundance and diversity changed as the result of a more florally diverse lawn. Findings showed that florally enhanced lawns support greater bee diversity than clover only lawns, and the bees that use Dutch white clover are different from the bees that use self-heal and creeping thyme.

Part Two of the project also included a survey of more than 500 Minneapolis park visitors to determine their attitudes towards bees, flowering lawns, and support for flowering lawns in parks. An amazing 91% of those surveyed strongly or moderately supported flowering lawns in Minneapolis parks. Researchers also held focus groups with MPRB asset management staff, and land managers from other parks, and city departments to share flowering lawn findings, as well as listen for common concerns or potential barriers to implementing flowering lawns.

It became clear through this process that incorporating enhanced flowering lawns throughout the park system is an easy, cost effective, and community supported way for MPRB to support pollinators.

HABITAT CONNECTIVITY

To be most effective, habitat areas should connect together, creating a city-wide network of protected corridors rich with forage. The Department of Natural Resources has identified several "Conservation Corridors" in the city, mainly following established watercourses like the Mississippi River, Minnehaha Creek, and the Chain of Lakes. As part of the Ecological System Plan, MPRB examined habitat areas within its own system and also partnered with Metro Blooms to generate a "pollinator sweet spot" map. This analysis looks at the most effective return on investment in habitat enhancement, based on proximity to existing habitat. This map, coupled with habitat potential on MPRB lands (focusing specifically on birds and pollinator insects), shows how habitat connectivity could expand beyond the DNR Conservation Corridors. The result of all this analysis is a new MPRB Habitat Corridors map. It builds on the DNR's map but adds new linkages across town, essentially island-hopping between major habitat corridors.

This new habitat map can be used to prioritize habitat projects, select street tree species, and strategically target partnerships for private land improvements and community projects. Furthermore, this map shows habitat corridors that touch all parts of the city, not just those blessed with "automatic" habitat areas like lakes and rivers. Improving habitat areas and linkages on the north side, the upper south, and northeast is potentially more important in terms of overall ecological health, because these areas tend to have poorer air quality and lower human health outcomes than elsewhere. Habitat is good for plants and animals, but it is also good for people.

Life Goals, Strategies, and Recommendations

Most of the goals, strategies, and recommendations in the previous Water, Air, and Land chapters all touch on life. Overall, the goals in this plan recognize the interconnected web of ecology that exists in Minneapolis, the region, state, nation, and world. This chapter focuses on birds, mammals, insects, fish, and plants and how MPRB can improve life for them in the parks. Often, when paired together, goals can result in stacked benefits that contribute more toward the protection of life in parks than when pursued individually. It is critical that MPRB look for opportunities to achieve these stacked benefits whenever possible because, in addition to the ecological advantages they offer, they often achieve greater operational and budgetary efficiencies than independent projects. Nevertheless, the following pages include goals, strategies, and recommendations that specifically address life in all its myriad forms.

LIFE

Goal

Strategy

Recommendation

I. LIFE: PROTECT AND ENHANCE HABITAT QUALITY IN PARKS

34. Identify potential habitat areas in most parks as part of master planning efforts

35. Develop and update baseline data on wildlife in the parks, including birds, mammals, amphibians, reptiles, insects, fish, and invertebrates, using citizen science, Bio Blitzes, and other techniques

36. Transition from turf-focused parks management to a mixture of turf and naturalized areas, ultimately reducing total acreage of turf

36.1. Develop maintenance guidelines for natural areas

36.2. Develop staffing plans that will allow for an expansion of naturalized areas in the parks, including possibility of additional ecologist positions, park-keeper/gardener-type positions devoted to naturalized areas, and analysis of cost and staffing impact on organization

36.3. Continue to work with local partners to restore and manage natural areas, guided by park master plans and approved agreements

36.4. Expand use of fescue and drought tolerant grasses, including native plants

36.5. Complete analysis of sites most suited to pollinator-friendly lawns, map their acreage over time, and monitor success

36.6. Reassess equipment suitability and mowing heights to protect bird, bee, and butterfly habitat.

36.7. Prepare prescriptive mowing plans that address height, frequency, timing, and landscape slope in order to protect habitat

37. Enhance management of natural and naturalized areas in parks

37.1. Complete Natural Areas Management Plan

37.2. Increase technology capability in the field to include definitions, maps, methods, and standards of maintenance

37.3. Map both formal and ad-hoc natural surface trails in the park system and identify those in need of improvement or closure to protect natural resources

37.4. Increase interdepartmental coordination on plantings, mowing, sight lines, and general landscape management planning

37.5. Identify areas where standing or fallen dead wood can be left to enhance habitat

38. Develop an invasive species management strategy, in keeping with IPM principles, working with state, local, and academic partners advisory groups

39. Limit use of pesticides and fertilizers

39.1. Continue to reduce pesticide and fertilizer applications, based on recommendations from partners and advisory groups

39.2. Develop and maintain Pest Management Plan for facilities, consistent with IPM program

J. LIFE: INCREASE HABITAT CONNECTIVITY THROUGHOUT THE CITY

40. Implement identified habitat corridors (see map)

40.1. Prioritize planting of bird and pollinator-friendly vegetation, including street trees, within identified corridors

40.2. Work with public, private, and nonprofit partners within identified corridors to implement habitat restoration and enhancement projects, including blooming boulevards, green alleys, habitat enhancement on public lands, etc.

40.3. Research, track, and report on plant life that will offer best pollinator habitat throughout the growing season, working with state, local, and academic partners

41. Implement wildlife protection strategies for major construction projects and at significant roadway crossings of corridors

41.1. Identify sites with largest number of animal-roadway conflicts, working with partner agencies, as necessary

41.2. Develop wildlife-friendly construction and maintenance standards, policies, and procedures (including ramps, turtle tunnels, curb cuts, signed crossings, temporary fences, seasonal signage, wildlife-friendly erosion control netting, etc.)

42. Increase public education about wildlife interaction

42.1. Add interpretive and educational signage in parks

42.2. Continue to develop and disseminate educational resources in the form of print, map, video, or other media

K. LIFE: PROTECT, MAINTAIN, AND EXPAND URBAN FOREST

43. Maintain and expand extents of the forest canopy

43.1. Set specific and realistic goals for urban forest canopy coverage, with input from the Minneapolis Tree Advisory Commission, and share publicly

43.2. Improve integration of forestry with capital projects in parks, to ensure tree removal is minimized and to capitalize on opportunities to increase urban canopy through post-project planting

43.3. Identify areas where soil compaction around trees is an issue due to general use or events, and develop remedies

43.4. Expand pruning of young trees to ensure proper shaping and health as they mature

43.5. Continue pest monitoring and management programs in partnership with federal, state, and local agencies

44. Increase urban forest diversity to make it more resilient to climate change and invasive pests

44.1. Continue to partner with University of Minnesota to research and pilot new tree species in Minneapolis

44.2. Increase number of tree species and reduce overall percentage of single species as replanting takes place

44.3. Educate the public on what trees to plant based on future climate forecasts

L. LIFE: PROTECT AND ENHANCE AQUATIC HABITAT

45. Protect lakes, wetlands, and waterways from aquatic invasive species

45.1. Prepare an Aquatic Invasive Species Management Plan based on the Zebra Mussel Action Plan and Nokomis Carp Management Study

45.2. Continue AIS prevention and early detection programs

45.3. Update IPM to address aquatic plants

46. Develop an Aquatic Plant Management Plan that addresses fish habitat

46.1. Perform more frequent lake surveys as budget allows

46.2. Evaluate efficacy and need of aeration systems at the end of each system's useful life

47. Work with local, regional, and state partners to monitor and address issues with waterfowl and mosquitoes

47.1. Plan and design structural BMPs so they are not breeding areas for mosquitoes, per MMCD recommendations.

47.2. Create public information campaign about biological mosquito control

M. REMAIN ACCOUNTABLE AND ADAPT WITH THE EVOLVING WORLD

48. Create interactive map layers in GIS based on the maps included in this document and make them publicly available on the MPRB website

49. Update this plan's implementation checklist and report at least annually to the MPRB Commissioners and general public

50. Communicate and coordinate plan implementation responsibilities of all departments and divisions

51. Update and modify this plan to account for evolving and emerging technologies every 5 years