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Marcia A. Holmberg
Minneapolis Park and Recreation Board, mholmberg@minneapolisparks.org

Debra L. Pilger
Minneapolis Park and Recreation Board, dpilger@minneapolisparks.org

Jeremy R. Barrick
Minneapolis Park and Recreation Board, jbarrick@minneapolisparks.org

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Plant Community Assessment and Management Recommendations for Minneapolis Park Natural Areas

In 2017 the Minneapolis Park and Recreation Board (MPRB) began a two-phase study to collect quantitative and qualitative data for urban park natural areas in Minneapolis, MN parks to inform management activities. The first phase took existing GIS data and quality ranking systems and tailored them to the Minneapolis park system. The second phase, which is still in process, involves field checking the data, applying the quality ranking system, and writing a management plan.

Keywords

urban forest assessment, urban vegetation, urban ecology, urban park management

INTRODUCTION

In 2017 the Minneapolis Park and Recreation Board (MPRB) began a two-phase study to collect quantitative and qualitative data for urban park natural areas in Minneapolis, MN parks to inform management activities. The first phase took existing GIS data and quality ranking systems and tailored them to the Minneapolis park system. The second phase, which is still in process, involves field checking the data, applying the quality ranking system, and writing a management plan.

CONTEXT

The Minneapolis Park and Recreation Board is an independently elected, semi-autonomous governing body that maintains and develops the Minneapolis park system. Established in 1883, the system includes 6,790 acres of parkland, including 1,162 acres of natural areas. MPRB parklands are classified as either regional or neighborhood parks.

Park staff have varying roles in managing forested natural areas. A dedicated Environmental Natural Resources work unit was established in 2005 to manage prairies planted as part of park redesign efforts in addition to remnant native plant communities that staff identified and maintained due to their high ecological value. Natural Resources staff and volunteers primarily remove buckthorn, garlic mustard, and plant understory species. MPRB's Forestry division removes diseased and hazard trees and performs replacement plantings.

Through park master planning processes, the community frequently expresses the desire for natural areas and naturalization as features in parks. In 2016, the organization identified a need to develop vegetation management strategies for natural areas.

GOALS

Several goals were established as a part of the natural areas study. The first goal was to conduct natural areas assessments to develop an understanding of the ecological quality and quantity of park natural areas. The second goal was to use the natural areas assessment data to inform management techniques to improve the ecological condition of natural areas. The third goal was to connect the assessment data and management recommendations to resources and funding needed to develop and implement work plans. The final goal is to use the written Natural Areas Management Plan and GIS data to communicate to the public, park commissioners, and staff on the ecology and sustainable management of these areas.

APPROACH USED

The first step we took in our assessment approach was to apply remote sensing data to understand the type and acreages of natural areas across the Park system. Minnesota Department of Natural Resources' (MnDNR) Minnesota Landcover Classification System (MLCCS) was an

existing dataset that was used for this study. MLCCS is a remotely-sensed dataset that was developed through aerial and satellite imagery and field surveys. MLCCS combines elements of the National Vegetation Classification System (NVCS) and MnDNR Natural Heritage program plant community data. It is a hierarchical system that defines lands by plant community type. Each polygon in MLCCS has a unique numeric plant community code and corresponding data on the given polygon. MLCCS is used as a regional planning tool for land managers and a standardized land cover categorization and assessment methodology for the state of Minnesota (see additional resources at the end of this article for a link to the tool).

In order to rank the quality of the natural areas, MnDNR's Element Occurrence Ranking (EOR) for native plant communities was used. MnDNR's EOR takes into consideration the structure and species composition of the plant community, coverage of invasive species, and human impacts to determine plant community quality.

The study was broken into two phases:

- Phase I developed a geodatabase for park natural areas and determined acreage by plant community type. MnDNR quality ranking methodologies were adapted to consider the amount of restoration effort needed to improve the ecological condition of natural areas.
- Phase II is in process. In 2018, the field assessment work began to confirm plant community type and apply the quality ranking. Georeferenced photo documentation and monitoring points were also collected as part of the field assessment.
- As part of the Phase II work in 2019 and 2020, field assessments will be completed and GIS data updated based on field work (i.e., finalize quality rankings by adding plant observation notes). A written management plan will be completed in 2020 that will include management strategies and species lists by community type and stratum layer. The plant lists will include replacement species for tree losses and recommend climate adaptive species.

RESOURCES

A local consulting firm, Applied Ecological Services, Inc., was hired due to the detail of the GIS analysis and extent of field work. The project was funded through State of Minnesota lottery proceeds and MPRB General Fund dollars. Lottery dollars are allocated annually to the MPRB through a funding formula and can only be used for operations and maintenance needs in the MPRB's regional park system. Of the approximate $1,300,000 the MPRB receives annually in lottery dollars, $100,000 is allocated annually from these funds to maintain natural resources in the Minneapolis regional park system. These funds are used by the Natural Resources work group for materials, contracted services, and seasonal staff wages.

KEY RESULTS

1. **Phase I: Quantifying where, how much and the type of natural areas in Minneapolis Parks**
   Using the results of the landcover classification during Phase I (MLCCS), we were able

to determine that forested natural areas comprise most park natural areas (880 acres). We also were able to determine the amount of different forest types/communities. We classified 5 main types of forest. The most abundant types of forests include altered forest/woodland (boxelder, green ash) (296 acres) and dry-mesic oak forest (270 acres), followed by mesic maple – basswood-oak forest (170 acres). Floodplain forest (116 acres), wet forest/swamp (25 acres), and forested peatland (tamarack bog) (3 acres) were less common. The classification system also identified grassland natural areas including 92 acres of prairie vegetation and 50 acres of prairie/savanna vegetation.

2. **Phase II: Ranking the quality of all forested natural areas**
The natural areas originally identified and maintained by staff were found to be the highest-quality areas in the park system. These areas total 260 acres and include prairie/savanna along the Mississippi River, a tamarack bog, and small pockets of remnant mesic oak and maple forests. Field checking the MLCCS data found plant community classifications for park natural areas were mostly accurate with only a few revisions in plant community type needed.

   We were surprised to find that dense levels of buckthorn in the Mississippi River Gorge were only at the top and bottom of the slope. This is less quantity than expected, and management costs are being developed for these steep slope areas for inclusion in the Management Plan.

   a. **Written Natural Area Management Plan and GIS Geodatabase (in process)**
   Currently the GIS data collected during the field survey is being refined to develop a final geodatabase for all park natural areas. The Natural Areas Management Plan is being written and will include

- Discussion of findings of plant communities in the parks, both quality and quantity
- Costs and resources needed for management of natural areas, including invasive species/buckthorn control on steep slopes
- Management strategies for improving the ecological health of natural areas, based on plant community type
- Plant lists by community type

ADDITIONAL RESOURCES

https://www.dnr.state.mn.us/mlccs/index.html