Vascular Plant Inventory and Ecological Assessment of Ashworth Park in the Mountain Bike Trail Area

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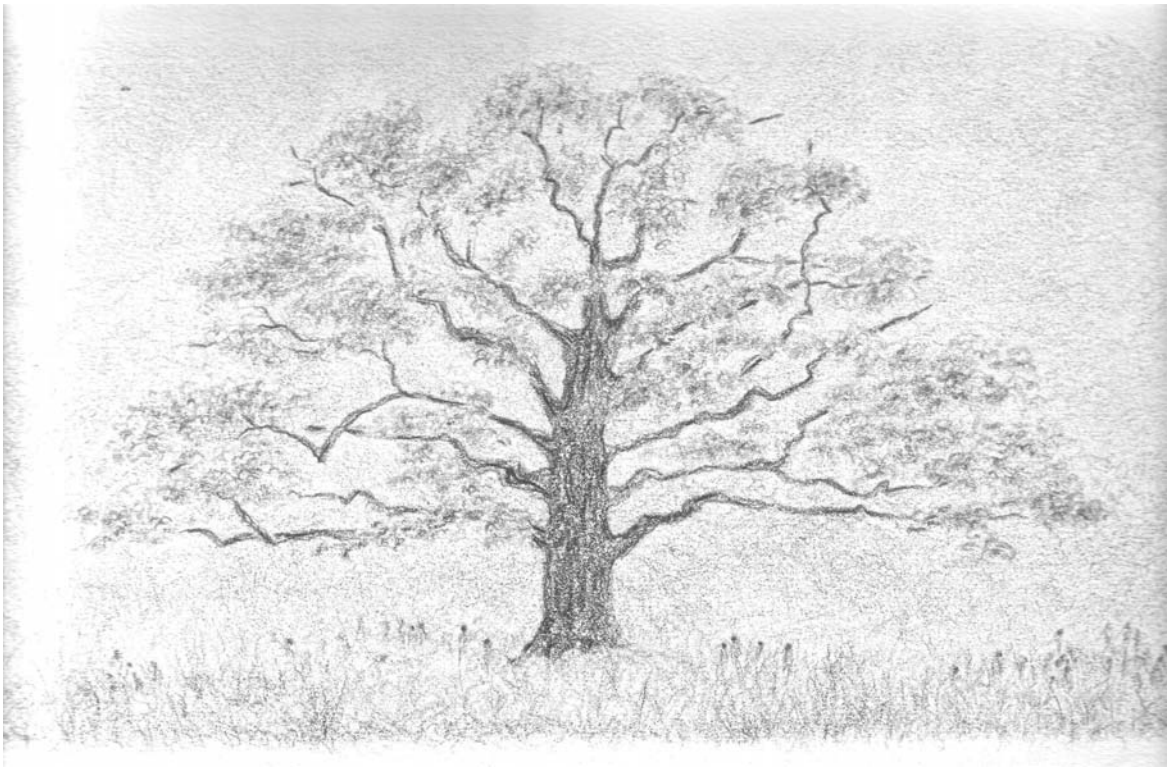

Scope and Purpose of the Study

This study was conducted to provide a list of the vascular plant flora of Greenwood/Ashworth Park in the area bordered by Ashworth Pool on the North, Foster Drive on the East, private property on the south, and the Bill Riley Bike Trail on the west. The list also includes an estimate of species abundance, and categorizes each species as native vs. non-native.

A map with the location of sensitive areas, defined as areas with concentrations of conservative plant species (defined below) or fragile topography, were prepared. The map also included locations of some species that are both conservative and uncommon. I have identified the most aggressive non-native species as priorities for control.

The Ecological Setting

Iowa has lost at least 60 percent of the forest cover that was present when the state was settled 150 years ago. As Iowa was settled forests were cut to convert land to agricultural use, and were used to supply fuel and lumber, and pasture cattle (Thomson and Hertel 1980). Much of the remaining forest has declined in quality largely due to the impact of humans (Back 1982, Thompson 1992). The Des Moines area, at the confluence of the Des Moines and Raccoon Rivers, was once heavily wooded. Greenwood and Ashworth Parks are the among the last intact remnants of these once extensive forests, and serves as an important refugia for native plant plants, birds and other animals. These wooded areas, adjacent to the Raccoon River, also act as buffers protecting the water supply from fertilizers, lawn chemicals and other urban runoff (Peterjohn and Correll 1984).

Methods

The inventory area was divided into three equally sized sections based on topography (Figure 1). Section 1 consists of a narrow east-west running upland bordered by highly dissected ravines. Section 2 borders the Bill Riley Bike Trail on the west, and section 3 on the east. Section 3 is mostly a flat upland bordered by private homes on the west and south, and the other sections on the north and west.

Each of the three sections were walked at least three times during the 2002 growing season, in early spring to identify the spring ephemerals (those species that complete their life cycle in April and May), in mid-summer, and in the fall. I identified all species (trees, shrubs, vines and herbs) occurring in the wooded area described above. To assess tree regeneration, tree species were assigned abundance values in three categories: canopy trees, saplings and seedlings. Canopy trees are defined as individuals greater than 2.5 cm in stem diameter; seedlings are < 1.5 m tall, and saplings are > 1.5 m tall but less than 2.5 cm in diameter. I classified the species according to whether they are native to Iowa, versus non-native species (horticultural and Eurasian species) that have become established in Iowa's native habitats.

I also classified the plants by an index of conservatism. The index ranged from zero to 10, with zero assigned to the least conservative and 10 to the most conservative species. Conservative species are native species that have a high affinity for a specific habitat, while less conservative species have more general habitat requirements and tolerate human disturbance (Wilhelm 1991). I defined sensitive areas are areas with steep moist slopes (generally associated with streams or drainages, and/or where there was a concentration of conservative species

Plants were assigned an abundance value in the following way:

A = abundant, many individuals and/or large colonies; immediately evident in the appropriate season with searching required.

C = common, easily found in appropriate season with some searching.

S = sparse, unlikely to find without prior knowledge of locality or with extended search.

U = uncommon, one to a few individuals or colonies.

Results

Overview

There were 171 plant species found, 150 forbs and 21 canopy tree species. Of these, 19 (12 percent) were non-native to Iowa (Table 1). I assessed the quality of the native flora in three ways. First, twenty-seven (16 percent) had an index of conservatism of 7 or greater (Table 2). Second, some understory herbaceous species are eliminated or have the sizes of their population greatly reduced in woods that have been grazed by cattle (heavy trampling and other human disturbances may have a similar affect, although to my knowledge this has not been tested in Iowa). Another indicator of higher quality woodlands may be the presence of these grazing-sensitive species. Twenty-six of the 30 species that were sensitive to grazing in one study (Mabry in press) are found in the woods (Table 3). Third, a good representation of the spring ephemerals and spring flowering species are also found (Table 4). These species are especially valued for their beauty in the spring woods, and may play an important role in the cycling and retention of nutrients in forests (Blank et al. 1980, Peterson and Rolf 1982). In sum, although a heavily used urban park, this area has a surprisingly high number of plant species that are indicative of a high quality woodland.

Section 1

Section 1 is probably the most ecologically sensitive of the three sections. It is primarily a relatively narrow ridge running east-west from the Bill Riley trail on the west to private property on Foster Drive. Steep banks fall away from each side of the ridge (Fig. 1). The eastern portion of this section is a more finely dissected series of steep banks and narrow ridges. Many conservative plant species tend to have their largest populations in the

section, possibly because steep slopes provide a specialized habitat that is moister and cooler than the surrounding area. These species include maidenhair and ostrich ferns, large flowered bellwort, wild ginger, yellow pimpernel, common blue and midwestern blue asters, wild lettuce, Canada snake root and bearded short husk grass (Table 2).

Although this section had the largest number of non-native/invasive species, the populations were all small, and with the exception of garlic mustard, not an immediate threat to the natural community. Garlic mustard will be discussed in more detail below, but its small numbers in this area warrant an especially intensive effort to prevent its further spread. Other exotics, however, should also be eliminated, especially the dames rocket and privet because, while not as aggressive as garlic mustard, they will spread and over time erode the aesthetics of the area and undermine its ecological value.

Section 2

This area is also immediately bordered by the bike trail on the west, and is composed of two main ridges dissected by seeps or very small streams. I arbitrarily designated the eastern border of this section as the beginning of the relatively flat upland of section 3 (Fig. 1). Like section 1, this section has areas prone to erosion due to the steep topography, especially near the Bill Riley trail, and populations of a number of other conservative species have their largest populations here. These include cut leaf toothwort, dutchman's breeches, Indian pipe, and panic grass.

Two aggressive invasives occur in this section. Of most immediate concern is the garlic mustard, with large but not dominant populations occurring in patches throughout the area. A small population of Japanese bamboo occurs adjacent to the Bill Riley trail and should be controlled immediately by repeated cutting of the shoots and possibly limited herbicide application. Once this aggressive invader becomes established it is, unlike garlic mustard, very difficult to pull or otherwise control. However, like garlic mustard, it is capable of forming a dense unattractive monoculture that eventually can virtually exclude native plants.

Section 3

This is a flat upland (with a small stream area on the southern border), which borders private property on the east and south, and sections 1 and 2 on the north and west respectively (Fig. 1). This is the least diverse of the three sections, and has relatively small populations of sensitive species. It also has the largest population of garlic mustard, particularly adjacent to the houses on the east. It also has large areas also on the east filled with lawn waste, and other debris. Recently, a number of large old oaks have been cut, apparently to clear a power line through the area.

Canopy Trees and Regeneration

The forest in all three sections is dominated by large old white and red oaks, with lindens, hackberries and ashes relatively common, particularly on the moister slopes, seeps and

stream areas. There are numerous seedlings of hickory, hackberry, ash, and basswood, and in section 3 of white oaks. Although there is an encouraging number of canopy oaks that are in younger age classes, trees in the sapling stage are present in low numbers throughout all three sections, particularly the upland section 3. This lack of oak regeneration is a widespread concern in oak forests throughout the eastern U.S. and there is not a clear consensus among foresters and ecologists about the causes and remedies.

Recommendations

Trail Placement

The locations of the most sensitive species and areas are shown in Figure 1 as shaded area. The most sensitive areas are the steep slopes found throughout area 1, and the steep slopes above the bike trail in area 2 plus several other patches in the area. Most of the conservative species found in this area of the park occur in diffuse populations rather than in particular areas; however, a few species occur in restricted areas and their locations are also shown in Figure 1.

The many trails that now occur across the streams and along the streams and steep slopes above them are resulting in areas of severe erosion (evident especially by the silt on the paved Bill Riley trail following rain), collapsed areas above streams, and deep gullies. Unfortunately, it is just this steep topography that gives the area its appeal to many mountain bikers. While a few carefully constructed and maintained trails may be possible on these steep slopes, bike trails should generally avoid these sensitive areas, and most of the existing trails should be closed. To prevent erosion and to protect plant life trails should generally follow the ridge tops, flat uplands, and areas with gentler slopes. Because the entire area is crisscrossed by numerous trails, many very close together, I believe that a new trail can be created using the old trail as a template, generally avoiding the need to cut an entirely new trail.

Control of Garlic Mustard

Garlic mustard is one of the greatest threats to Iowa forests in general and to the esthetics and ecological integrity of the entire area that includes Geenwood and Ashworth Parks, and Water Works Park. Because it is not native to the United States, garlic mustard is not subject to its native predators, pathogens or competitors, factors that would hold its population in check. It is capable of explosive population growth, and competes with the native forest understory, particularly the spring ephemerals, and other spring flowering plants. These spring plants give our forests much of their value, because of their beauty and also because of their important ecological function of holding soil and retaining nutrients in the forest system. Garlic mustard is capable of forming a virtual monoculture if left unchecked, leaving the forest degraded and unsightly (Row and Swearingen 1999).

Fortunately, garlic mustard control is possible, and feasible. However, coordinated effort is needed to achieve this. There is no known biological control, and while this possibility is being researched, there is none on the horizon (Rowe and Swearingen 1999, Nuzzo

undated). As a biennial, the plant can only persist by producing seeds, which persist in the soil for around five years. Thus, the best course of action is to prevent the plant from producing seeds. In areas where the infestations are large, spraying with Round-up is very effective. However, because the spraying must be done when the basal leaves of garlic mustard are green, but the native vegetation is dormant, there are relatively narrow windows of opportunity in the spring and fall where this can be done (Nuzzo undated). Thus, monitoring the plants, and the flexibility to act quickly are needed for spraying to be effective. There is also a window of opportunity in the spring when the 1000s of tiny garlic mustard seedlings that sprout can be prevented from growing into mature plants using a simple propane torch (Mutel, personal communication). Where the plant occurs more sparsely, the most effective option is simply to cut or pull the plant. The key to success of this strategy is sufficient numbers of people available during late May through mid-June to work on control. This has been a highly successful strategy in other parts of the state.

It is unlikely that the garlic mustard problem will be completely eliminated in the park, and its control should be included as a part of the routine park maintenance. Because the seeds persist in the soil for five years and are a source for replenishing the population, effective control should be achieved once these seeds are depleted and if new seed production is prevented.

Foster Drive Residences

The areas immediately adjacent to Foster Drive are highly disturbed and unsightly, filled with leaves, branches, lawn clippings and trash. The park boundary is not clearly marked and this may contribute to the problem. The area is also where the highest populations of garlic mustard and very likely one source for the infestation now occurring in this part of the park. One homeowner in the southeast corner of the park appears to have had a lawn service company that has mowed regularly well into the park, eliminating the understory. The areas near the residences should be cleaned, the garlic mustard controlled, and the park boundaries marked. This would be most successful if the homeowners themselves could be involved, and so that they are invested in valuing and preserving the beauty and integrity of the park.

Monitoring

Long-term monitoring of the area would allow the impact of bike trails and other human activities, and the effectiveness of garlic mustard control to be assessed. A simple monitoring system might include permanently marked plots arranged along transects that run perpendicular to the mountain bike trail, along with periodically walking the whole area to check for erosion and other damage and the spread of invasive species. After the monitoring plots are established, volunteers can be trained to maintain them and to conduct the inventories.

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