

# **Botanical Inventory and Management Consideration for Potential Park at 32<sup>nd</sup> Street Property: City of Grand Rapids Parks and Recreation**

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## **Introduction**

During the spring and summer of 2022, a botanical inventory and floristic quality assessment was carried out by Calvin University students and faculty for the 32<sup>nd</sup> Street Property proposed as a 17-acre potential City Park, located at 2163 32<sup>nd</sup> Street SE in Grand Rapids, Michigan. The purpose of this inventory was to inform the staff of the Grand Rapids Parks and Recreation Department of the botanical significance of this newly sectioned property and also to provide information for the City to share with neighbors of the plants that could be found in this parcel. The research conducted as part of this project adds to the ongoing Calvin University's Emma Cole Grand Rapids Flora Project, the goal of which is to inventory the flora in numerous natural landscapes occurring in the greater Grand Rapids area. The project also seeks to evaluate changes to the flora within the past ~120 years since Emma Cole, high school teacher and vice-president of the Kent Scientific Society (forerunner of the Grand Rapids Public Museum), published her *Grand Rapids Flora* in 1901.

During the spring of 2022 (March 15, March 29, April 5, and April 12), the Plant Taxonomy class (Biology 346), taught by Dr. David Warners at Calvin University, documented the general layout of the land within the property and recorded the early spring flora found there in an effort to learn more about plant life and begin a plant inventory. Floristic inventorying was then continued throughout the summer, when researchers with the Emma Cole Project visited the site 6 times (May 12, June 7, June 17, June 29, July 12, and July 28); an additional visit was made on December 5. The property was generally divided into 6 different parcels based on habitat type: Eastern Hardwoods/Shrubland, Northern Successional Field, Northern Upland Hardwoods, Southern Successional Field, Western Scrub Shrub, and Wetland. The flora of each parcel was then compiled into a total species list of the property. Herbarium voucher specimen collections from the property were taken to document the flora and placed in the Calvin University Herbarium, with duplicates sent to the herbaria of Michigan State University or University of Michigan. Some additional species found but not collected were recorded as "sight records."

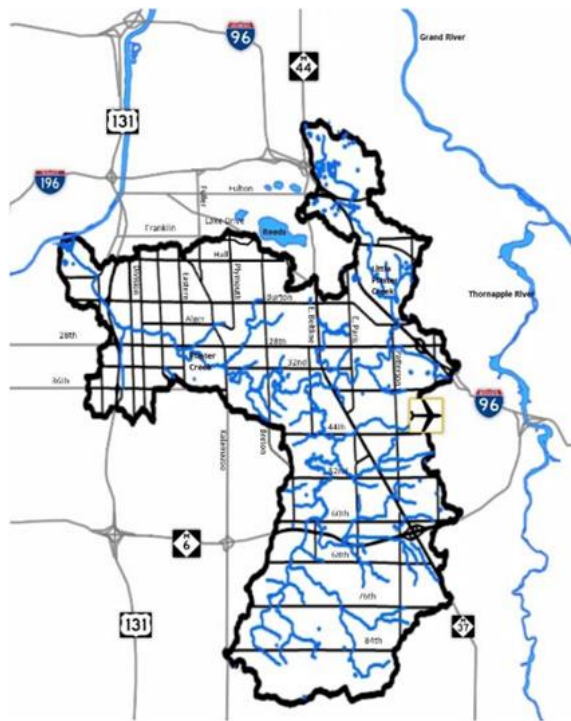
## **Background on the Emma Cole Project**

Emma Jane Cole was a botanist and teacher from the Grand Rapids area who lived during the turn of the 20<sup>th</sup> century. Her 1901 book, *Grand Rapids Flora: A Catalogue of the Flowering Plants and Ferns Growing Without Cultivation in the Vicinity of Grand Rapids, Michigan*, is an inventory of the flora of 16 townships centered around Grand Rapids in the 1890s. This book remains a significant work to this day which can be used to compare the flora of Grand Rapids now to the plants present 120+ years ago. This comparison helps when estimating how much environmental change has occurred over this time frame, while trying to assess the level of high-quality natural sites that remain. Many changes have occurred in West Michigan during this

time, but the project was able to bring Cole's information up-to-date (see "Emma Cole's 1901 Grand Rapids Flora: Nomenclaturally Updated And Revised," G. E. Crow, 2017, *The Great Lakes Botanist* Vol. 56: 98–176).

The Emma Cole Project, run by Dr. Crow and Dr. Warners, is an 8 year-running study of the flora of the greater Grand Rapids area, with intentions to revisit remnant natural spaces of West Michigan, documenting as much of the flora as possible to understand the overall scope of botanical diversity that remains. Many of the sites studied are of high quality and have significant conservation value, and some exhibit a resemblance of what these areas might have looked like during Cole's day. Several different sites within the 16 townships covered in Cole's *Grand Rapids Flora* are chosen each year. This year included a ~40 acre beech-maple woodlot with an abandoned sugarbush operation north of Comstock Park in Plainfield Township (on the west side of Little Pine Island Lake); Little Pine Island Lake east of the aforementioned woodlot (a site visited by Emma Cole in the 1890s); fields and woodlands adjacent to Dutton Christian School in Dutton (Gaines Twp.); 4 wooded sites surrounding Reeds Lake owned by East Grand Rapids along with Reeds Lake itself (visited by Cole in the 1890s); a revisitation of Ken-O-Sha Park which was previously documented in the study 7 years ago; and of course, the recently acquired 32<sup>nd</sup> Street Property owned by the City of Grand Rapids. Each site was visited several times over the course of the summer months, and the same method discussed in the introduction for the 32<sup>nd</sup> Street Property was used to collect specimens and identify them for all sites. The 2 lake sites involved using a canoe to document aquatic species.

This project is one that is connected to the Plaster Creek Stewards, a volunteer organization directed by Dr. Warners in collaboration with Calvin and community partners, which seeks to



restore beauty and health to the Plaster Creek Watershed. This watershed, which covers 58 square miles of southeastern Kent County, is drained by Plaster Creek which empties into the Grand River just south of downtown Grand Rapids. Plaster Creek accumulates high volumes of stormwater runoff as it winds through residential, industrial, and commercial regions of Grand Rapids. This runoff carries undesirable chemicals from lawns, roads, and parking lots that compromise the ability of aquatic creatures to thrive.

The 32<sup>nd</sup> Street property is part of this watershed; a small stream that runs through the property flows southwest for several hundred meters until it joins the main channel of Plaster Creek. Therefore, this property can make an important contribution to watershed health by limiting the runoff volume that is washed downstream into Plaster Creek.

Figure 1: A non-satellite view of the Plaster Creek Watershed.

## 32<sup>nd</sup> Street Property Site Detailed Description

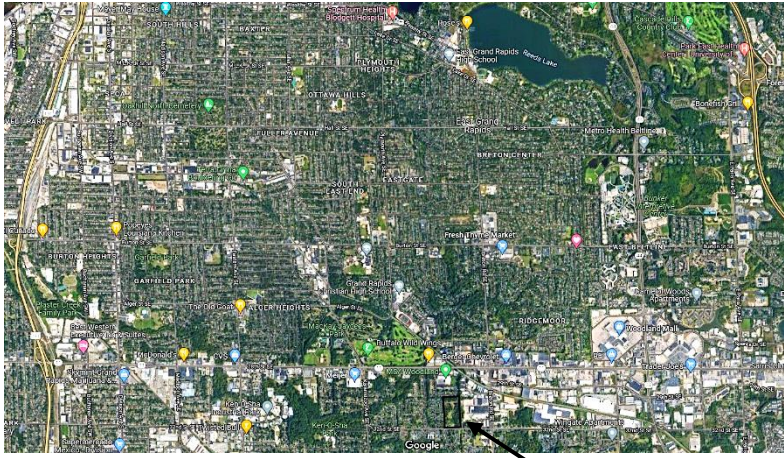


Figure 2: A Google Maps zoomed-out satellite view of the 32<sup>nd</sup> Street Property for the context of its location in Grand Rapids.; it is the small black box on the southern edge of the image (black arrow points to it for further reference).

This property is situated within 4 busy roads in southeastern Grand Rapids: 32<sup>nd</sup> St SE (south edge of the property), Kalamazoo Ave SE (west), 28<sup>th</sup> St SE (north), and Breton Rd SE (east). More specifically, this parcel is directly east of the Maple Villa residence complex, extending roughly 1000 feet north to south, and roughly 550 feet east to west (about 17 acres). Residential areas bound the northern, western, and southern edges of the property, and an industrial park is to the east. There are a few properties to

the south side of 32<sup>nd</sup> street with backyards that border the property directly (3 without fences), and several properties to the north along Shangrai-La Drive SE whose backyards also border the property.

Residences in the northwest corner of the property have yards (many with exotic garden plants) which rather seamlessly transition directly into the property. Along the eastern edge, a corridor of trees and a fence border the parking lot of an industrial park. A small stream running from east to west in the property emerges from under an eroding slab of concrete close to the parking lot; this stream then flows southwest until it converges with Plaster Creek roughly half a mile away.

Most of this property has clearly been impacted by humans over time. An electrical line spans north-south above the western edge of the property, and takes an eastward 90 degree turn to run just south of the upland hardwood grove in the northernmost sector. The powerline then turns 90 degrees to the north upon reaching the eastern boundary. Under the east-west oriented portion of the electrical line is a successional field; under the north-south oriented portion to the northeast, very shrubby vine growth envelops the entirety of the ground. Moreover, a landscaping path for dumping lawn clippings originates from roughly the center of the western edge and extends to the center of the property.



Figure 3: A Google Maps close-up satellite image of the 32<sup>nd</sup> Street Property within the black box.

## **Fauna Observed**

White-tailed deer (*Odocoileus virginianus*) were common within the property. Multiple individuals were observed over the course of the summer. Also of note was an eastern box turtle (*Terrapene carolina carolina*) found towards the southern edge of the property. This species is Michigan's only truly terrestrial turtle and is listed as a **Special Concern** species by the Michigan Natural Features Inventory, so its presence in this relatively small property in suburban Grand Rapids is significant. Notably, amidst the tall grasses, none of the research crew found ticks on themselves, which is interesting considering the prevalence of deer, a known tick host.

## **Inventory Results with Specific Habitat Descriptions of the Property**

There are 6 specific habitats within the property, each with their own set of species. (See Additional Resources, Map 1, for a map of the habitats in the property). While there is some blending of the habitats at their edges, for the most part these are distinct and intact zones. They are as follows:

- 1) **Northern Successional Field:** This plot is located between the northern upland hardwoods to the north, the wetland to the south, and the eastern hardwoods/shrubland to the east. This open meadow is a result of years of secondary succession and deer browse after abandoned agricultural use. The soil is notably sandy, and no trees are present which exposes the plants here to full sun. Among the grass-like plants here are an abundance of Broom sedge (*Andropogon virginicus*), various types of sedges (moist-loving graminoids in the genus *Carex* which are prevalent in the Midwest), Panic grass (*Dichanthelium oligosanthes*), and Quack grass (*Elymus repens*). A few small clumps of Giant foxtail (*Setaria faberi*)—an agricultural weed introduced in the USA from Asia—are present in this habitat. These specimens represent a new county record, since Giant foxtail has been documented in a few surrounding counties but not Kent County (Michigan Flora database<sup>[1]</sup>). There are also a few species of Violet (*Viola* spp.), Common spiderwort (*Tradescantia ohioensis*), Goat's beard (*Tragopogon dubius*), and various other relatively weedy forbs (herbaceous dicots).



Figure 4: The northern successional field habitat in the 32<sup>nd</sup> Street Property.

- 2) **Northern Upland Hardwoods:** The northern edge of the property includes hardwoods such as Red maple (*Acer rubrum*), Sugar maple (*Acer saccharum*), Boxelder (*Acer negundo*) Shagbark hickory (*Carya ovata*), Red oak (*Quercus rubra*), and Basswood (*Tilia americana*). Quite a few fairly large Sassafras trees (*Sassafras albidum*) are on the southern edge of this narrow strip of trees. The northern edge of this woodland borders the backyards of several homes. There is very limited undergrowth in this habitat, likely due to deer herbivory, but the few

species present include some Violets (*Viola spp.*), Daffodils (*Narcissus pseudonarcissus*), and an Oregon grape shrub (*Berberis aquifolium*), the latter two of which are likely escapees from yards to the north of this woods. A stand of the highly invasive Autumn olive (*Elaeagnus umbellata*) is present in the southeastern portion of this habitat.

- 3) **Eastern Hardwoods/Shrubland (Includes Pine Plantation):** This is the largest of the habitats at this site and is located towards the southeastern and eastern sides of the property. It includes an area of Red pine (*Pinus resinosa*) which represents a remnant pine plantation—with the trees growing in neat rows. Other trees in this section of the property include Red maple (*Acer rubrum*), Sugar maple (*Acer saccharum*) Boxelder maple (*Acer negundo*), Paper birch (*Betula papyrifera*), American ash (*Fraxinus americana*), Black walnut (*Juglans nigra*), Quaking aspen (*Populus tremuloides*), and Wild black cherry (*Prunus serotina*). A robust stand of Common buckthorn (*Rhamnus cathartica*), a highly invasive shrub, was found just south of the stream in this habitat.



Figure 5: A group of Common milkweed plants (*Asclepias syriaca*) close to the stream in the eastern hardwoods/shrubland habitat.

The western edge of this woods includes several Hawthorn (*Crataegus sp.*) which provide a dense understory covering. Quite a few sedges (*Carex spp.*) are under the taller trees; all 18 of the sedges identified at this property are native to Michigan. One that is especially prevalent is the distinctive Gray's sedge (*Carex grayi*), clumped in large patches on the western edge of this habitat and even more abundant along the edge of the stream that cuts through the northern part of the habitat. Along with quite a few grasses and a few violets mostly south of the stream, there are several Common milkweed plants (*Asclepias syriaca*) in the northwest corner of this habitat in an area just north of the stream. These are mixed in with Bull thistle (*Cirsium vulgare*) and the previously mentioned Gray's sedge.

- 4) **Western Scrub Shrub:** Dominated a bit more by shrubby trees than its southern counterpart, this habitat is smaller and is between the northern successional field to the northeast and wetland to the south. Many Crabapple trees (*Malus prunifolia*) and shrubby eastern Red cedars (*Juniperus virginiana*) provide shade to similar grasses found in the southern successional field. An aforementioned landscaping trail runs through the southern edge of this habitat, to the sides of which landscaping workers dump lawn clippings from nearby residential yards. A technical Kent county record present in this habitat is Wild-oats (*Chasmanthium latifolium*)<sup>[1]</sup>, which is described in more detail below these habitat descriptions.
- 5) **Southern Successional Field:** This habitat is in the southwestern quadrant of the property and is confined to the east by the mixed forest habitat and to the north by the

stream. It is dominated by various grasses that grew up to waist height during July, with some Crabapple (*Malus prunifolia*) and Scotch pine (*Pinus sylvestris*) individuals scattered throughout (all likely planted at some time). Some of the grasses include Orchard grass (*Dactylis glomerata*) and Timothy-grass (*Phleum pratense*), both of which are European species, along with a few bluegrasses (*Poa* spp.). Also mixed in are Field garlic (*Allium vineale*) and Ox-eye daisy (*Leucanthemum vulgare*). An apparently expanding patch of Black bamboo (*Phyllostachys nigra*) is encroaching from the border of a property south of this habitat and is described in more detail below these habitat descriptions.

- 6) **Wetland:** This habitat is nestled between the western scrub shrub and northern successional field to the north and the stream to its south. There are raised tussocks of Bulrushes (*Scirpus atrovirens* and *Scirpus expansus*) along with other species which create varied topography during drier parts of the summer between rain events, with deepened muddy trenches sneaking their way between the bases of these raised tussocks. Along with the dominating bulrush tussocks are Soft-stemmed rush (*Juncus effusus*), Dudley's rush (*Juncus dudleyi*), and Redtop (*Agrostis gigantea*). A new record for Kent county<sup>[1]</sup> found within this habitat is Sweet-flag (*Acorus calamus*), a colony of which is close to the southwestern edge of the wetland. This species is introduced from Eurasia and only reproduces vegetatively (spreading by horizontal underground stems), which suggests that this species was planted in the wetland.



Figure 6: The wetland habitat, with many *Scirpus* spp. present.

Of special note are two aforementioned species, one native and widespread south of Michigan, and one introduced. Wild-oats (*Chasmanthium latifolium*) is frequently cultivated as “Northern sea-oats” or “Indian woodoats” and is found in several native landscaping designs around the Grand Rapids area. The specimens in this property appear to have originated similarly, coming from the garden flora of one of the condos adjacent to the northwestern edge of the land. In the western scrub-shrub habitat and along the western edge of



Figure 7: Close up of Wild-oats (*Chasmanthium latifolium*).

the northern successional field, specimens have really taken a hold, with tens of tussocks spreading towards the middle of the property where they are growing in both open sun and partial shade under some of the nearby shrubby trees. Multiple online sources describe its native range as extending into extreme southwestern Michigan; the only wild populations suggested by Michigan Flora<sup>[1]</sup> and the Michigan State University Natural Features Inventory<sup>[2]</sup> are from a mature floodplain in Berrien County in the very southwest corner of the state.



Figure 8: A large group of *Chasmanthium latifolium* individuals.

The other species mentioned is Black bamboo (*Phyllostachys nigra*), and its presence is more troublesome. This is an aggressive invasive plant from China which has previously been discovered at a single locality in Berrien County in southwestern Michigan as an accidental colony, only spreading vegetatively. This bamboo species is often grown as an ornamental garden plant. The patch appears to have been previously planted in a backyard bordering the southern successional field, but the colony now radiates into the field north of a clear mowing line in the yard. It has the potential to spread into the 32<sup>nd</sup> Street property through underground rhizomes and should be monitored. This represents the second wild growing population documented for the state.



Figure 9: The colony of *Phyllostachys nigra* in the southern successional field.

### **Analysis of Floristic Quality and Brief Recommendations**

To determine the quality of the flora in this property from a quantitative standpoint, we utilized the Floristic Quality Assessment, or an FQA, to produce a Floristic Quality Index, or FQI. The FQA is derived from a list of all of the flowering plants that are recorded as growing in the site. The assessment distinguishes between native and non-native plants along with their degree of fidelity to particular habitats or landscapes (quantified as their coefficient of conservatism, or *C*, which is detailed just below), allowing an interpretation of a site's floristic quality.

This assessment is determined by using the assigned Coefficient of Conservatism (*C*), a number from 0-10 that is assigned to each species, with 10 being the "highest" value and 0 being the "lowest." Species with higher values tend to grow in very specific habitats and many are rare because much of Michigan's landscape has been so heavily altered by humans. Such habitats include old-growth forests, pristine fens or bogs, and undisturbed prairie remnants, among others. Species with low *C* values are usually more common and are able to grow in a wide range

of different habitats, including those that have been disturbed (with little fidelity to any particular habit). Non-native (adventive) species are automatically given a 0 for their *C* value. The Michigan Floristic Quality Assessment database was used for determining the FQI using the Universal FQA calculator website.<sup>[3]</sup>

FQI Range	Site Quality
<20	Low quality, reflecting human disturbance
20-35	Average quality
35-50	Fairly high quality, natural
>50	Pristine, extraordinarily high quality

Table 1: Descriptions of what different FQI values suggest.

The Floristic Quality Assessment takes an average *C* value of all the species found at a site and adjusts it with the overall species richness of the site, since the mean *C* by itself can be similar regardless of if an area has very high or low species richness. This assessment creates a calculated FQI value. Figure 1 displays the ranges of FQI values in terms of their quality of flora with respect to Michigan's natural landscapes. Most undeveloped and smaller tracts of land in Michigan have FQIs of less than 20, as

human disturbance is quite prevalent even on seemingly secluded and intact sites. Sites between 20-35 are often larger and slightly less disturbed than those below 20, usually being able to support a greater variety of species which results in a higher FQI value; however, they still indicate a high level of human disturbance which limits the quality of the flora. Those between 35-50 indicate sites that cannot be recreated by humans and therefore deserve protection, while those above 50 reflect sites that still retain pre-settlement conditions of the land; these are quite significant and should be considered the highest priority for protection.

With the 149 species that were documented in the 32<sup>nd</sup> Street Property, 88 (59%) of which were native and 61 (41%) of which were non-native, this parcel has a **native FQI of 33.1**, and a **total FQI of 25.4**. The first number represents only the native species within the property, while the second number represents all the species, thus reflecting the impact of disturbance by invasive species. These two values, both being within the average quality FQI range, indicate a high amount of disturbance has occurred within the property, resulting in a medium level of flora quality.

However, even with the site not having significant native floral quality, there are some signs of notable native plant life in this property and there are many positives that a managed park would provide in this natural space. The whole of the property is not overly dominated by a few species, or worse, a single invasive species, as some natural areas located within human dominated landscapes are filled with near monocultures of readily spreading species like Common buckthorn (*Rhamnus cathartica*) or Autumn olive (*Elaeagnus umbellata*). This is likely due to the multiple distinct habitats that exist in the property that still retain remarkable native plant life. We suggest that with some restoration activity, the northern successional field and the wetland can both be enhanced to demonstrate Michigan sand prairie and open wetland habitats respectively.

We suggest that concerted management would benefit the natural quality of this site as it is developed into a nature park. Limiting the amount of landscaping dumping that occurs in the western scrub shrub would help reduce the number of invasives that show up within the property



and would improve aesthetics of the site. Restricting the potential spread of invasives such as the populations of Black bamboo (*Phyllostachys nigra*), Common buckthorn (*Rhamnus cathartica*) and Autumn olive (*Elaeagnus umbellata*) plants would be beneficial for avoiding larger removal efforts in the future. Large numbers of deer will also need to be managed to avoid over-browsing the plant communities in the property.

### **Concluding Summary**

32<sup>nd</sup> Street Property has multiple diverse habitats that serve as hosts to a variety of plant life as well as insects, birds and mammals. Its connection to Plaster Creek is significant, as this natural area has the ability to reduce runoff into the creek caused by nearby impervious surfaces. This site could absorb and filter even more runoff if a floodplain restoration plan is undertaken with the coordination of Plaster Creek Stewards (<https://calvin.edu/plaster-creek-stewards/>). Although there have been historical disturbances at this site, the land still supports many native plants and has the capacity to be a wellspring of native biodiversity. With ongoing management, this property will provide a valuable refuge for recreational enjoyment by nearby residents and other visitors.

### **Footnotes and Important Links**

[<sup>1</sup>]Michigan Flora Website: <https://lsa-miflora-p.lsa.umich.edu/>

[<sup>2</sup>]Michigan Natural Features Inventory *Chasmanthium latifolium* entry: <https://mnfi.anr.msu.edu/species/description/15606/Chasmanthium-latifolium>

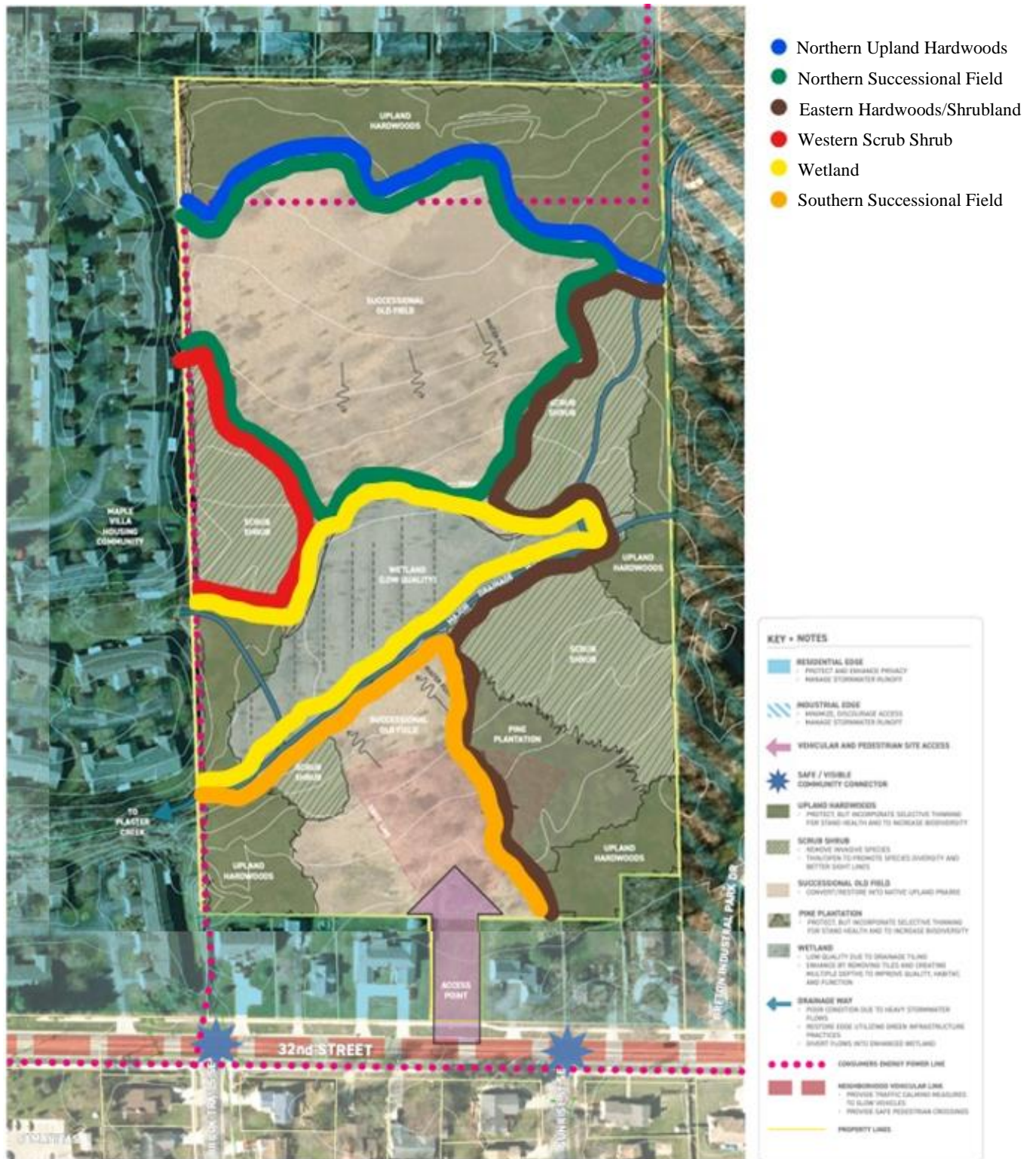
[<sup>3</sup>] Universal FQA Calculator Website: <https://universalfqa.org/>

Google maps link for Sources 2 and 3: <https://www.google.com/maps/@42.9354756,-85.6173166,7786m/data=!3m1!1e3>

Figure 4 Source: <https://mgmv.org/2019/12/20/grass-chasmanthium-latifolium-northern-sea-oats-winter-interest/>

Figure 5 Source: <https://myriad.gardenexplorer.org/taxon-453.aspx>

## Additional Resources



Map 1: Map of the habitats in the 32<sup>nd</sup> Street Park Property. We have created new, more condensed habitats overlaying the City's Case Study map based on what we found out in the field in relation to the City's habitats and names.