

Kleinstuck Preserve Management Plan

Kalamazoo, Michigan

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Kleinstuck Management Plan

I. Goal

The goal of management of the Kleinstuck Preserve is to restore as much biological diversity and ecosystem health as possible to the natural areas of the preserve and surrounding landscape.

II. Purpose

Diverse and healthy natural areas support a higher quality of life for the region by improving water quality, air quality, and preventing both nutrient loss and loading. A natural area with diversity in flora and fauna will be better able to adjust to seasonal, annual, and long-term changes in hydrology and climate, maintaining healthier habitats. Healthy habitats are more efficient at sequestering nutrients and water that are otherwise lost to the system. Unhealthy habitats cannot hold onto water and suffer from erosion, expelling nutrients and sediment with the surplus water into the surrounding area, damaging the adjacent habitats and surrounding ecosystem.

III. Habitat Objectives

Upland Forest: The upland forest should have a diverse suite of flora that increases through three levels, from the canopy through the second story down to the forest floor. The canopy should be made up of scattered trees with wide canopies, maintaining cover at 50%-80%, allowing dappled sunlight to shine through. Predominate species will be oaks and hickories in the higher ground and transition to other species such as maples and willows in the lower ground. Additional trees such as black cherry, basswood, and hackberry will supplement the diversity. The second story will be scattered and patchy, with clusters of native shrubs and small trees such as witch hazel, hazelnut, and maple leaf viburnum. Tree saplings will be infrequent, allowing sunlight to reach the forest floor. The forest floor will have a carpet of native sedges, grasses, and rushes with numerous wildflowers, showing little bare ground.

Swamp Forest: The lowland forest should have a canopy with occasional gaps, maintaining cover at 75%-100%. The main canopy trees will be made up of maples and willows with a mixture of many other species. It is expected that, due to the emerald ash borer, ash will decline and no longer be a major component of the forest, creating an increased number of gaps in the canopy in the near future. The second story will be made up of patches of shrubs such as dogwoods, elderberry and willow. The floor of the swamp forest under shrub canopies will be relatively sparse with few plants able to live under the dense shade. However, areas with a sparse second story will support a variety species and habitat structure. Some areas will be dominated by sedges and grasses with occasional wildflowers such as marsh marigold, cardinal flower and skunk cabbage while other areas will have thick stands of ferns interspersed with other flora.

Marsh: The wetland in the middle of the preserve will be managed as a marsh with a variety of vegetation zones: submergent, floating, and emergent. Large areas of marsh will be dominated by cattail, spatterdock, and other wetland vegetation while occasional

islands of shrubs such as buttonbush and dogwood will add diversity in species and structure.

Shrub Carr: The border between the swamp forest and the marsh will have occasional areas of wetland dominated by shrubs. Shrub carr also can occur in occasional openings within the swamp forest habitat. Native shrubs such as dogwood, willow, and elderberry can offer good food and cover for wildlife but should not be allowed to dominate the wetland, as they will reduce floral diversity on the ground level and potentially lower the water table through respiration.

IV. Management Strategies

Upland Forest: The key to improving the health of the upland forest is to allow enough sunlight to reach the ground to support a diversity of grasses, sedges and wildflowers that will retain soil, water, and nutrients. The forest canopy will need to be lightly thinned of heavy shade producing trees, particularly Norway maples. Canopy thinning can be achieved by girdling large trees by physical or chemical methods.

The second story will need to be heavily thinned of shade producing trees, such as maples, and cleared all invasive shrubs. Woody materials can be stacked into brush piles to be left as cover for wildlife habitat. If the numbers of brush piles are decided to be too numerous, they may be burned only in accordance with local ordinances. If burning is not feasible, wood chipping may be an option. The stumps of all woody material cut should be treated with an herbicide to prevent sprouting. Herbicides will be used in accordance to the law.

Invasive species growing in the forest floor, such as garlic mustard and dame's rocket, should be removed by physical and/or chemical means as appropriate to the infestation and adjacent native vegetation. In general, foliar applications of herbicide will not be used within six feet of trails. Herbaceous invasive species within six feet of trails will be treated by mechanical means such as cutting and pulling.

Swamp Forest: The canopy of the swamp forest may need some thinning in places, further evaluation is needed. If necessary, canopy thinning can be achieved by girdling large trees by physical or chemical methods.

Improving the health of the swamp forest will rely largely on the removal of exotic shrubs in the understory. Many of these areas can be replanted with native shrubs, creating a mosaic of open understory and shrub land to provide food and cover for wildlife.

Open understory areas will need to be cleared of herbaceous invasive species such as garlic mustard and dame's rocket and replaced with native sedges, grasses, ferns and wildflowers. Herbicides will be used in accordance with the law, with special care taken to use wetland approved herbicides near open water. In general, foliar applications of herbicide will not be used within six feet of trails. Herbaceous invasive species within six feet of trails will be treated by mechanical means such as cutting and pulling.

Marsh: Invasive species need to be removed from the marsh. Woody species such as glossy buckthorn should be cut and stump treated with herbicide with special care taken regarding wetland regulations of pesticides. Cut brush in the marsh can be disposed of in a similar manner as the upland and swamp forests. Care should be taken to avoid leaving brush in submerged or seasonally submerged areas as they may sprout roots.

Reed canary grass and narrow-leaved cattails should be treated with wetland approved herbicide by people with appropriate licenses and certification. Thinning, or eradicating if possible, these herbaceous invasives will allow native vegetation to return to the marsh without the need to plant or seed additional species. However, it may be necessary to seed in additional native species to compete with invasives to assist in control. Until controls can be implemented, cutting of flowering/seed heads can reduce the spread of reed canary grass.

Purple loosestrife can be reduced by chemical methods using either foliar spray or cut stem treatments. Long-term control will likely require the introduction of a biocontrol such as the *Galerucella* beetles. Until controls can be implemented, cutting of flowering/seed heads can reduce the spread of loosestrife.

Shrub Carr: Invasive shrubs such as glossy buckthorn should be cut and stump treated with herbicide with special care taken regarding wetland regulations of pesticides. Cut brush in the marsh can be disposed of in a similar manner as the upland and swamp forests. Care should be taken to avoid leaving brush in submerged or seasonally submerged areas as they may sprout roots.

Areas cleared of invasive shrubs can be replanted in native shrubs such as buttonbush, pussy willow, red osier dogwood, nine bark, high bush blueberry and other species that provide food and cover for wildlife.

V. 5-year Strategy

Management zones will be identified throughout the preserve (see maps on pages 10 and 11). All the zones will have habitat objectives and assigned an overall priority within the management plan. Priority will be assigned to zones considering current habitat quality, potential impact on ecosystem health, and educational opportunity to build public support. Habitat quality refers to the current health of a zone, a high ranking meaning the area is of good health and a low ranking meaning the zone is highly degraded. Environmental impact refers to the potential a zone has to affect the health of adjacent zones and the overall preserve, with a high ranking meaning the zone has great affect and a low ranking meaning it has little impact. Educational opportunity refers to the potential a zone has for outreach to visitors, a high ranking meaning the area gets very frequent use and a low ranking meaning the area is seldom visited. Greatest weight will be given to habitat quality and environmental impact to determine the overall priority of the zone.

Zone	Habitat Quality	Environmental Imp.	Educational Opp.	Overall
1	Medium	Medium	Medium	Medium
2	Medium	High	High	High
3	Medium	Medium	Medium	Medium
4	Low	Medium	High	Medium
5	High	High	Medium	High
6	High	Medium	Medium	High
7	Low	Low	Medium	Low
8	Low	Low	Low	Low
9	Medium	High	High	High
10	Low	Low	Medium	Low
11	Low	Medium	Medium	Low
12	Low	Medium	High	Medium
13	Medium	Medium	Medium	Medium
14	Low	Medium	Medium	Low
15	Low	Medium	Medium	Low
16	Low	High	High	High
17	Low	Medium	Low	Low
18	Low	Medium	Low	Low

Each zone will then be divided into work areas to help focus management strategies and facilitate monitoring efforts. Progress in each zones will be monitored and reassessed for strategy and priority every 5-years.

Zone 1: Upland Forest - Medium Priority

Upland forest in the northwest corner of the preserve. It has rolling terrain with some steep slopes.

Work Area A: Hillside ranging from gentle to steep with some large oaks in the canopy. The understory is dense with invasive shrubs and young maples.

Work Area B: Mostly steep slopes down to the main trail. There are some large oaks and the understory is dense with invasive shrubs and young maples.

Zone 2: Upland Forest - High Priority

Upland forest in the north central part of the preserve south of Kazoo School. It is a steep sloped valley down to the main trail.

Work Area A: The slope west of the Kazoo School entry trail and north of the main trail has some large oaks and an understory with lots of young maples. Invasive shrubs are common.

Work Area B: The slope east of the Kazoo School entry trail has some large canopy oaks and an understory dense with invasive shrubs.

Zone 3: Upland Forest - Medium Priority

Upland forest in the north central part of the preserve, east of Kazoo School. It has rolling terrain with some steep slopes.

Work Area A: Highly disturbed forest with oak canopy and dense invasive shrub understory.

Work Area B: Steep slope down to the main trail with a few large oaks and very dense invasive shrubs.

Zone 4: Upland Forest - Medium Priority

Upland forest in northeast part of the preserve. It is largely pine plantation with gentle to steep slopes.

Work Area A: Steep slope northwest of the Stearns Ave. entry trail down to the main trail dense with invasive shrubs. Also present is the unusual Japanese spindle tree which may or may not be invasive. Winter creeper is common.

Work Area B: Pine plantation on rolling ground including a large bowl northwest of the Stearns Ave. entry trail. Understory is largely invasive shrubs and young maples. Bittersweet, garlic mustard and other invasives are common.

Work Area C: Mostly pine plantation that is southeast of the Stearns Ave. entry trail. The understory is dense with garlic mustard, bittersweet and other invasives.

Zone 5: Upland Forest - High Priority

Upland forest on the eastern edge of the preserve. It has rolling to steep forest habitat with a canopy of oak, hickory, maple and black cherry. The understory ranges from fair quality with some diverse native flora to highly disturbed with high densities of invasive species.

Work Area A: A narrow valley south of the YMCA entry trail with highly disturbed portions dense with invasive shrubs and bittersweet. Small portions support good populations of native wildflowers near the main trail.

Work Area B: A rolling oak hickory forest near the old scout camp and becoming steep close to the main trail. Portions are dense with winged Wahoo and privet. Garlic mustard is sparse.

Work Area C: An oak hickory forest in a large bowl may be the highest quality portion of the preserve. The understory below the oaks and hickories has sparse invasive shrubs and garlic mustard.

Zone 6: Upland Forest - High Priority

An upland forest between the Wilshire entry trail, private property to the south, and the main trail.

Work Area A: The steep slope down to the main trail has sparse invasive shrubs and garlic mustard.

Work Area B: An area that slopes up from the side trail towards private property appears to be in fair shape in need of some thinning and sparse invasive shrub removal.

Zone 7: Upland Forest - Low Priority

The hillside is mostly pine plantation with a small portion of deciduous forest in the far southwestern corner of the preserve, southeast of the Chevy Chase entry trail.

Work Area A: A mix of white and red pines form a dense canopy on the hillside with young maples and cherries underneath. There is little to no ground cover or second story.

Work Area B: A small area of oak and maple canopy in a corner of the preserve between the pine plantation and private property. Invasive shrubs, including privet, are sparse.

Zone 8: Upland Forest - Low Priority

An area in the southwest corner of the preserve north of the Chevy Chase entry trail that is largely pine plantation.

Work Area A: A mix of red and white pine with some young maples and sassafras create a dense canopy. There is little to no understory.

Work Area B: A dense stand of pines cover the hillside with a few small oaks in the understory. Invasive shrubs and garlic mustard are common.

Zone 9: Upland Forest, Swamp Forest, and Marsh - High Priority

A narrow valley where a ditch running along the Chevy Chase entry trail forms an intermittent stream that enters the wetland while going under the main trail.

Work Area A: The slope along the northwest side of the Chevy Chase entry trail is dense with invasive species such as bittersweet, winter creeper, honeysuckle and other shrubs. There is little in the way of canopy trees. A spring supplements water flow into the ditch creating an intermittent stream. Opening up the canopy in the wetland area will encourage marsh vegetation that improves water retention and reduces erosion.

Work Area B: The slope along the southeast side of the Chevy Chase entry trail is dense with invasive shrubs and garlic mustard. It is adjacent to a severely eroded slope on private property. A spring supplements water flow into the ditch creating an intermittent stream.

Work Area C: This is a small marshy area where the intermittent stream enters the wetlands. There is a collection of some native species including waterleaf and skunk cabbage.

Zone 10: Upland Forest and Swamp Forest - Low Priority

This is a transition area that slopes from mesic upland into wetland bounded on the south and west by the main trail as it leaves the preserve and on the north by private property.

Work Area A: This area has a sparse canopy made up of black cherry, elm, and a single oak. It has dense thickets of invasive shrubs and garlic mustard.

Work Area B: Dense thickets of invasive shrubs over wet soils make this a difficult area to explore and will require further evaluation.

Zone 11: Upland Forest and Swamp Forest - Low Priority

A narrow band of transitional forest between the main trail and wetland running from the property corner to the Kazoo School entry trail. It has a sparse canopy of black cherry and maple.

Work Area A: A dense concentrations of bittersweet and invasive shrubs dominate the area southwest of the marsh viewing bench. A few native trees such as black cherry rise above the overgrown understory.

Work Area B: Northeast of the marsh viewing bench is a thick patch of blackberries surrounded by dense populations of bittersweet, buckthorn and other invasive species including winter creeper.

Zone 12: Upland Forest and Swamp Forest - Medium Priority

A very narrow band of transitional forest that lends itself to clearing to provide views of the marsh. It runs from the Kazoo School entry trail to the YMCA entry trail. A few cherry trees make up the canopy.

Work Area A: Very dense area of invasive shrubs and bittersweet. Not many native species apparent.

Work Area B: Bittersweet and invasive shrubs are common to sparse. There is a small but dense population of the unusual Japanese spindle tree along the main trail near the YMCA entry trail.

Zone 13: Upland Forest and Swamp Forest - Medium Priority

A band of transitional forest between the main trail and the marsh that is dominated by a variety of invasive shrubs with a mixed canopy of various native trees such as elm and ash. It runs from the YMCA entry trail to the Wilshire entry trail.

Work Area A: Winged Wahoo is dense in this area, and invasive shrubs such as multiflora rose and common buckthorn are common.

Work Area B: Dense areas of invasive shrubs such as common buckthorn and winged Wahoo lead down to a wall of glossy buckthorn in the wetland. Open areas still maintain native wildflowers such as Jack-in-the-pulpit and trout lily.

Zone 14: Swamp Forest, Marsh, and Shrub Carr - Low Priority

A wetland habitat mix of trees, shrubs and marsh with areas of dense glossy buckthorn between the main trail and open marsh.

Work Area A: An area with a dense monoculture of buckthorn. Not much else can grow there.

Work Area B: A mosaic of open wetland and shrubs. *Further evaluation is needed.*

Zone 15: Swamp Forest - Low Priority

A large area of swamp forest dense with invasive shrubs.

Work Area A: An area of wetland with dense canopy. *Further evaluation is needed.*

Work Area B: An area of wetland with dense canopy. *Further evaluation is needed.*

Work Area C: An area of wetland with dense canopy. *Further evaluation is needed.*

Zone 16: Marsh and Shrub Carr - High Priority

Western portion of permanently saturated wetland that is predominately marsh with areas of dense shrubs.

Work Area A: There are some areas of intermittent open water and areas of dense glossy buckthorn south of the marsh viewing bench with some native shrubs such as dogwood and elderberry.

Work Area B: Open marsh north and east of the marsh viewing bench dense with cattails and expanding populations of purple loosestrife and reed canary grass.

Zone 17: Marsh and Shrub Carr - Low Priority

Northeastern portion of permanently saturated wetland that is predominately marsh with areas of dense shrubs, west of the opening to the main trail.

Work Area A: Open marsh dense with cattails with expanding populations of purple loosestrife and reed canary grass. *Further evaluation is needed.*

Work Area B: A mix of open marsh of dense shrub carr made up of both native and invasive shrubs. *Further evaluation is needed.*

Zone 18: Marsh and Shrub Carr - Low Priority

Southeastern portion of permanently saturated wetland that is predominately marsh with areas of dense shrub carr.

Work Area A: Open marsh dense with cattails with expanding populations of purple loosestrife and reed canary grass. *Further evaluation is needed.*

Work Area B: A mix of open marsh of dense shrub carr made up of both native and invasive shrubs. *Further evaluation is needed.*