II. Management Unit – Oak Savanna 1 (17.4 Acres)

A. Management Goals for Management Unit – Oak Savanna 1

Goals for the Oak Savanna 1 management plan include improving the use of this property for passive recreation and educational purposes and the restoration/reconstruction of a native Michigan oak savanna. Studies including the monitoring of flora and fauna as the restoration/reconstruction of an oak savanna progresses will be encouraged. This unit is used heavily for research and teaching purposes. One goal will be to create a balance between the educational use of this management unit with that of restoration/reconstruction efforts.

The goal of the restoration/reconstruction is to encourage a healthy native oak savanna habitat that contains diverse native flora and fauna. This management unit has been impacted extensively in the past by humans. An oak savanna can be made up of a combination of oak savanna types including bur oak plains, oak openings, and/or oak barrens. Due to the soil type and surrounding vegetation this management unit will be more consistent with a bur oak plains or oak opening habitat and because of the recent planting of bur oaks in this area, we will emphasize the former. The Michigan Natural Features Inventory (MNFI) describes bur oak plains as a formerly widespread savanna type having a 10 to 30% canopy. Bur oak plains occur on level to gently sloping plains and are often adjoining mesic prairie. The soils are made up of loam and sandy loam with a neutral pH and good water retaining capacity. The dominant plants include scattered, widely spaced bur oak with a few white and black oak. The ground-layer vegetation is similar to that of a mesic prairie. (Kost, 2007)

B. Overview of Management Unit – Oak Savanna 1

1. Landscape Context

The Oak Savanna 1 management unit encompasses 17.4 acres of the Asylum Lake Preserve including the land north of the prairie management unit and the two-track roadway that in the past was known as Cherry Lane. Drake Road is its western boundary and it extends north and east up to the boundary of the forest. (Refer to map of Asylum Lake Management Areas)
One of the entrances to the Preserve is located in the southwest corner of the management unit at the end of Cherry Lane. A small dirt parking lot exists at this entrance with a break in the fence for people to enter the property. This entrance is shared with the prairie management unit.

According to the KNC Report (2001) the soils are made up of Kalamazoo loam. Loam is described as soil composed of a mixture of sand, clay, silt, and organic matter. There are slopes of 0-2% in the southwest corner, but the landscape predominantly contains slopes of 6-12%.

2. Description and Uses

   a. Historic Description and Uses

      Pre-Settlement Period (circa 1800)
      This management unit was described by the Kalamazoo Nature Center as a mixed oak savanna circa 1800. This mixed oak savanna probably was a combination of three Michigan natural community types as classified by the Michigan Natural Features Inventory (MNFI): bur oak plains, oak openings, and oak barrens.

      Institutional Period (1887-1975)
      According to archeological evidence and written documents there is no evidence of activities such as farming or the raising of livestock taking place within this management unit (Becker & Nassaney, 2005). No buildings, other structures were constructed on this management unit during the time it was owned by the Kalamazoo State Hospital (Becker & Nassaney, 2005). However, the current boundary between this management unit and the Prairie unit, was once a road traveling east to west off of Drake Road, known as Cherry Lane.

      University Period (1975-2008)
      This management unit has been used extensively for research and education purposes. In 1991 part of this management unit was established by the Department of Geosciences, WMU as a geophysical test site. The test site covers an area of 50 meters by 200 meters wide. Steel drums, plastic drums, flush mounted well protectors and pipes are buried at varying depths and orientations. Within the test site, man-made archeological artifacts are buried at shallow depths, used by the Department of Anthropology, WMU. In 2004, an azimuthal resistivity array was installed by Geosciences just north of the test site. The azimuthal array is made up of two concentric circles of electrodes with wires buried 6-8 inches beneath the surface connecting the electrodes. At the center of the array is a flush-mounted well protector. The diameter of the azimuthal array is 24 meters. Also in 2004, Geosciences installed a longitudinal array near the test site. It consists of a bundle of wires buried shallow beneath the ground in a straight east and west orientation for 294 meters. The arrays and geophysical test site are used for classroom purposes periodically throughout the year. (Refer to Geoscience Dept. Structures at Asylum Lake Map)

      The Department of Geosciences, WMU has used this management unit for a Field Hydrogeological course, which in the past, students were taught how to drill and install wells for monitoring water quality. Although the class is still taught at the property, the practice of drilling no longer occurs. A cluster of these wells were installed in the
the southeast corner of this management unit along the two-track road currently referred to as Cherry Lane. This group of wells is referred to as well field 1 by the Geosciences Dept. According to Dr. Duane Hampton, professor in the Geosciences Dept., WMU (personal correspondence, May, 2006) all but three of these wells have been capped and flush mounted. Within the cluster of well field 1, the U.S. Geological Survey (USGS) took over two of the wells for the purposes of monitoring water quality. This practice continued for many years until 2006 when their funding was cut and monitoring at the property was discontinued. Both the well field and the geophysical test site are mowed periodically for teaching purposes.

![The well on the Savanna 1 management unit that was formerly monitored by the USGS.](image)

From 1976 to 1994, Western Michigan University leased the land included in this management unit to farmers for the growing of agricultural crops. According to correspondence (May, 2006) with Paul MacNellis (Landscape Services, WMU), during these years the land was leased to three different local farmers. All three farmers used the land to grow feed corn for dairy cows. This piece of land was let go fallow from 1994 until the summer of 1999 when WMU subcontracted Dan Kline to apply non-selective, non-permanent herbicides and plow the soil in preparation for the reconstruction/restoration of an oak savanna habitat.

Again in the spring of 2000, this management unit, along with the Prairie management unit were mowed and treated with herbicides. Using no-till drill methods, WMU planted the Savanna 1 management unit, along with the Prairie unit with a mesic prairie seed mix. This mix contained grasses including big bluestem, little bluestem, Indian grass, and prairie dropseed. The forbs and legumes in the seed mix included; New Jersey tea, white false indigo, columbine, butterfly milkweed, heart-leaved golden alexanders, rough blazing star, purple prairie clover, stiff goldenrod, dotted mint, black-eyed susan, New England aster, ox-eye sunflower, white prairie clover, lance-leaved coreopsis, Canada milk vetch, common milkweed, western sunflower, and lupine. Once the seed mix was planted, Seventeen native bur oaks were transplanted from local populations and planted in random formation. Other trees not found in an oak savanna were removed.

The Kalamazoo Nature Center was hired by WMU to inventory the flora and fauna of the Asylum Lake Preserve at the oak savanna management unit at intervals between the dates of September 1, 1999 and November 30, 2000 while this area was still recovering from herbicide treatments. It was described as containing mostly spotted knapweed, Queen Anne’s lace, Canada goldenrod, early goldenrod, flat-topped goldenrod, multiflora rose, blackberry, and wild black cherry. Other less common plants included burdock, thistle, red-osier dogwood, staghorn sumac, and box-elder. (For detailed lists, refer to the KNC Report, 2001)
The KNC also surveyed any fauna present in this management unit. Observations included several species of butterflies, dragonflies and damselflies along with mammals such as chipmunks, meadow voles, mice and white-tailed deer. Many bird species were recorded including: field sparrow, vesper sparrow, tree swallow, eastern bluebird, red-tailed hawk, and mourning dove. No amphibian or reptile species were recorded within this management unit. For detailed lists, refer to the KNC Report (2001).

In the summer of 2000, Drake Road, located to the west of the prairie was expanded to add more lanes and create a boulevard. This caused the loss of some savanna land and disturbances to the landscape.

In order to reduce invasive species and propagate the seeded mix, sections of the oak savanna were burned annually in the spring of 2003 through 2005 by WMU.

b. **Current Description and Uses**

This management unit is regularly used by Western students for research and educational purposes. During the summers, the Geosciences Department at WMU conducts their Hydrogeological Field Course utilizing the geophysical test site buried below ground within this management unit. It is also used occasionally throughout the year by the Archeology Department of WMU. (Refer to Geoscience Dept. Structures at Asylum Lake Map)

This management area was classified as an area of high-archeological sensitivity by Dr. Michael Nassaney (Archeology Dept., WMU). “Areas of high sensitivity have a high potential for subsurface archeological remains based on documentary sources and pedestrian survey”(Becker & Nassaney, 2005). According to Dr. Nassaney, further archeological work should be conducted prior to conducting any activity that will impact the landscape. (Refer to Archeological Sensitivity Map)

The most current flora description of this management unit is that of the seed mix planted in the summer of 2000. The fauna was documented in 2001 by the KNC. (Refer to descriptions under “Historic Description and Uses. University Period (1975-2008)” of this document). No recent surveys have been conducted. Baseline studies on the distribution of flora and fauna will be encouraged.

As part of the Asylum Lake Preserve, this management unit is open for public use such as walking, bird watching, skiing, running and other passive recreation. Prescribed burns for this management unit are planned in the future. WMU’s Landscape Services periodically mows the firebreaks, throughout the spring, summer and fall. The geophysical test site and well field 1 are mowed upon request.
C. Management Actions for Management Unit – Oak Savanna 1

1. Conservation and Management Objectives
   - Conduct baseline flora and fauna ecological studies before reconstruction/restoration efforts and implement a monitoring program in order to assess the progress of management practices.
   - Consult archeologists such as those affiliated with WMU before conducting activities that will significantly impact the landscape.
   - Encourage a diverse natural community and the ecological processes that sustain it, including flora and fauna species native to a Michigan, especially grassland birds and endangered, threatened, or species of special concern.
   - Improve trails, entryways and firebreaks conducive to the lowest impact to the natural features, while enhancing the educational and aesthetic experience of visitors.
   - Encourage the compatible use of this management unit for teaching, research and recreational purposes with that of wildlife restoration.
   - Improve the educational experience for visitors and emphasize the appropriate use of the land.
   - Implement necessary changes in keeping with ecologically sound practices in order to improve handicap access if studies demonstrate feasibility.

2. Problems
   - Poor native floral and faunal diversity.
     - According to the KNC Report (2001), the floristic quality index for this management unit had a poor rating of less than 19. This may have changed since the survey was conducted due to prairie seed mix planted around the same time.
   - Incompatible human use.

3. Possible Causes
   - Invasive flora and fauna.
   - Small overall habitat area.
   - Large edge areas.
   - The organization of trails, firebreaks and entryways.
   - Nutrient depleted and/or contaminated soils.
     - According to personal correspondence with Paul MacNellis (August, 2008), WMU Physical Plant, pesticides including Atrazine were used in the Prairie and Savanna 1 management units for crop management.
   - Lack of knowledge of Asylum Lake Preserve documentation and coordination for group visits and research projects.
   - Visitor’s lack of understanding of the ecology of the land and the goals of the oak savanna restoration/reconstruction.
   - Unleashed dogs.

4. Mitigation Strategies
   - Introduce native Michigan genotype vegetation, as appropriate, to improve native species diversity.
- Introduce native Michigan fauna, as appropriate, to improve native species diversity.
- Control invasive vegetation and replace non-native vegetation with native species that provide appropriate food and cover sources for fauna, especially threatened, endangered or species of special concern.
- Control sources of nutrient depletion and contamination of soils.
- Reduce edge areas.
- Design trails, entryways, and firebreaks to minimize impact on the native flora and fauna while improving the educational and aesthetic experience of visitors.
- Implement changes to improve handicap accessibility if determined to be feasible and ecologically sound.
- Coordinate group visits and research activities with appropriate notices and approvals.
- Improve public perception and/or the public’s relationship with the property.
- Add interpretive signage explaining management activities and emphasizing appropriate use of the area.
- Mitigate any sources of erosion and contamination in the soils.
- Encourage the integration of research and classroom activities with the restoration/reconstruction of a native Michigan oak savanna.
- Enforce the use of leashes for dog walking.

5. **Assessment (the following are possible actions that may be taken)**
   - Conduct a baseline ecological study of floral and faunal diversity including relationships within the ecosystem in a quantitative manner.
   - Monitor floral and faunal diversity at appropriate intervals.
   - Measure and monitor the soil, microflora and microfauna quality.
   - Identify, measure, and monitor sources of nutrient depletion and/or contamination.
   - Monitor human use and ecological impacts at appropriate intervals

6. **Measures of Success**
   - An increase of native floral diversity compared to baseline studies.
   - A decrease of non-native floral diversity compared to baseline studies.
   - An increase of native faunal diversity compared to baseline studies.
   - The reduction of incompatible human use compared to initial assessments.